



Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

May 2, 2008

10 CFR 52.75

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of) Docket Numbers 52-014 and 52-015
Tennessee Valley Authority)

NUCLEAR REGULATORY COMMISSION (NRC) – BELLEFONTE NUCLEAR
PLANT (BLN) – RESPONSE TO ENVIRONMENTAL REPORT (ER) SUFFICIENCY
REVIEW COMMENTS

References:

1. Letter from Ashok Bhatnagar (TVA) to Mr. R. William Borchardt (NRC),
“Application for Combined License for BLN Units 3 and 4,” dated October 30,
2007
2. Letter from Mr. David B. Matthews (NRC) to Mr. Ashok S Bhatnagar (TVA),
“Acceptance Review for Combined License for Bellefonte Units 3 and 4
Application,” dated January 18, 2008

The purpose of this letter is to provide responses to comments that were identified by the NRC staff during their acceptance review of the Applicant’s Environmental Report – Combined License Stage (ER) related to the Tennessee Valley Authority (TVA) Combined License Application (COLA) for Bellefonte Nuclear Plant, Units 3 and 4 (BLN).

By letter dated October 30, 2007 (Reference 1), TVA submitted an application for a combined license for two AP1000 advanced passive pressurized-water reactors at the BLN site. In subsequent discussions with the NRC staff (staff) during the BLN COLA acceptance review, TVA compiled a list of staff comments regarding information in the ER. The BLN COLA acceptance review concluded on January 18, 2008, with the issuance of an acceptance letter from the NRC (Reference 2). Because the ER comments addressed issues that were beyond the level of detail needed for the staff to make its acceptance determination, it was agreed that TVA would respond to these comments at a later date.

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Because several of these comments could be resolved by reviewing ER reference documents and touring the BLN site and its environs, TVA opted to defer the submittal of the responses to these comments until after the conclusion of the March 31 through April 4, 2008, Bellefonte site audit.

The enclosure to this letter provides the TVA response to the 65 comments that were compiled during the BLN COLA acceptance review. Where practical and appropriate, similar comments are addressed with a combined, concise response. In addition to addressing the staff comments, each response also indicates whether the response necessitates a corresponding ER change. If so, the response provides the resultant changes to the ER. These changes will be incorporated into the next revision to the ER, which is currently being scheduled. The ER changes use red, strike-out font for text to be deleted and blue, underlined font for new text. Tables and figures being added to the ER are assigned temporary identifiers (e.g., Table 2.3-x5); the final numbers will be assigned when they are incorporated into Revision 1 of the ER. Attachments A through E2 to this letter provide the documents that are identified in the BLN responses to comments ER10, ER14 – 19, ER34, ER35, and ER58.

If there are any questions regarding this application, please contact Phillip Ray at 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7030, or via email at pmray@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 5th day of May, 2008.



Andrea L. Sterdis
Manager, New Nuclear Licensing and Industry Affairs
Nuclear Generation Development & Construction

Enclosure and Attachments A-E2:

- A. SHPO Correspondence Omitted from BLN COLA Part 3, ER Appendix A
- B. Bellefonte – Environmental Justice Impact Assessment Methodology and Findings
- C. Bathymetry of Surface Waters in Proximity to Three Proposed Nuclear Power Facilities: William States Lee III Nuclear Station (South Carolina), Bellefonte Nuclear Station (Alabama); Grand Gulf Nuclear Station (Mississippi), January 2007 (includes excerpts for BLN only)

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- D. ER Figure 2.3-X1, Recreational Sites within a Six-Mile Radius
- E1. Mussel Survey between Tennessee River Miles 390.8 – 392.4 for TVA's Bellefonte Power Plant in Jackson County, Alabama, April 2007
- E2. Survey of Native Mussel Stocks Adjacent to the Bellefonte Nuclear Plant Site, Tennessee River Miles 390-392, 1995

cc (Enclosure and Attachments A-E2):

J. M. Sebrosky, NRC/HQ

M. A. Hood, NRC/HQ

cc (w/o Enclosure and Attachments A-E2):

T. A. Bergman, NRC/HQ

R. W. Borchardt, NRC/HQ

W. B. Burton, NRC/HQ

M. P. Cazaubon, NuStart

S. M. Coffin, NRC/HQ

M. Concepcion, NRC/NRO/DCIP/CQVPS.

C. B Cook, NRC/NRO/DSER/RHEB

P. Frantz, Morgan Lewis

R. C. Grumbir, NuStart

P. S. Hastings, NuStart

P. L. Hiland, NRC/NRR/ADES/DE

G. M. Holahan, NRC/HQ

K. A. Kavanagh, NRC/NRO/DCIP/CQVP

R. H. Kitchen, PGN

M. C. Kray, NuStart

Y. Malave, NRC/NRO/DSER/RHEB

D. B. Matthews, NRC/HQ

V. M. McCree, NRC/RII

E. M. McKenna, NRC/HQ

A. M. Monroe, SCE&G

J. D. Peralta, NRC/NRO/DCIP/CQVP

C. R. Pierce, SNC

L. R. Plisco, NRC

K. R. See, NRC/NRO/DSER/RHEB

M. E. Shields, DOE/HQ

R. F. Smith-Kevern, DOE/HQ

G. A. Zinke, NuStart

RESPONSE TO ENVIRONMENTAL REPORT SUFFICIENCY REVIEW

Enclosure with Attachments A thru E1 & 2

May 2, 2008

**RESPONSE TO ENVIRONMENTAL
REPORT SUFFICIENCY REVIEW**

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NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: TRANSMISSION LINES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

ER01: It may be necessary to obtain further descriptions of the transmission corridors with regard to terrestrial and cultural issues. Section 3.7 refers to surveys completed on topic during original application, but no details are provided.

ER02: Details of cultural resource surveys and identified cultural resources for the transmission line corridors are not clear.

ER03: No details for cultural resources located within the transmission line corridors were provided or indication of monitoring, or avoidance measures that may be implemented to avoid such resources, if any.

ER05: No indication of SHPO comments on these resources.

BLN COMMENT ID: ER01 - ER03, ER05

BLN RESPONSE:

As explained in the Combined License application (COLA) Part 3, Environmental Report (ER) Subsection 2.2.2, the transmission rights of way (ROW) for Bellefonte Nuclear Plant Units 3 and 4 (BLN) were previously cleared for Units 1 and 2, when the transmission lines were constructed. The ROW maintenance that is expected to be performed prior to energizing the transmission lines is not anticipated to include ground-disturbing activities (ER Subsection 3.7.2.3). TVA follows its Sensitive Area Review (SAR) process for pre-maintenance activities, as well as activities performed in the course of the ROW maintenance. The SAR process guidance prescribes actions to be followed to avoid unwarranted disturbance of sensitive ecological and cultural areas. Prior to performing maintenance on the transmission ROW, the transmission line area (including the right-of-way) is reviewed by technical specialists in the TVA Regional Natural Heritage Project, and TVA Cultural Resources group, to identify any resource issues that may occur along that transmission line. Because the ROW maintenance does not involve ground-disturbing activities, and the resource identification and avoidance practices prescribed in the TVA SAR guidance will be followed, no cultural issues are expected as a result of this maintenance, and cultural surveys of the ROWs were not performed for the construction of BLN.

It is noted that the transmission corridors were not addressed in TVA's letters to the SHPO because the ROW maintenance will involve no ground-disturbing activities and construction is not planned along these corridors.

TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

Based on this set of circumstances and conditions, correspondence to the SHPO did not discuss maintenance on the transmission corridors and consequently, the SHPO did not comment on transmission corridors.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: TRANSMISSION LINES, CULTURAL RESOURCES, SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

ER04: It is also unclear if cumulative and/or secondary impacts resulting from modifications to the docking facilities and discharge structure and potential off-site activities associated with the need for borrow material described in Section 4.1, 4.2, and 4.3 have been adequately addressed in the ER.

ER11: A cultural and historical overview is not included. A general/brief description of the cultural and historical context for the region would be helpful for understanding significance of resources being affected. It is also unclear if cumulative and/or secondary impacts resulting from modifications to the docking facilities and discharge structure and potential off-site activities associated with the need for borrow material described in Sections 4.1, 4.2 and 4.3 have been adequately addressed in the ER.

ER43: 4.3.2.1 Preliminary surveys indicate existing intake channel may function appropriately without dredging. 4.2.1.2 and 4.2.1.4 state that dredging is either "anticipated" or "expected." Maps of the area to be dredged were not located. In particular, Section 4.2.1.2 discusses maintenance dredging, installation of riprap to stabilize banks of 4.3.2.1 Preliminary surveys indicate existing intake channel may function appropriately without dredging. 4.2.1.2 and 4.2.1.4 state that dredging is either "anticipated" or "expected." Maps of the area to be dredged were not located. In particular, Section 4.2.1.2 discusses maintenance dredging installation of riprap to stabilize banks of the embayment and river shoreline. But details and maps are not provided. 4.3.2.5 Construction of reservoir may involve pile driving, dredging, barge traffic, and other noise producing activities. No details provided as to what or where.

ER44: 4.2.1.1 – states that there will be "Construction or modification of existing cooling water intake structure and discharge structure for water withdrawn from and discharged into the Gunter'sville Reservoir/Tennessee River.... construction of new and/or potential modification of docking facilities for barges/vessels." However, no maps of impacted areas or details on the construction or modification of these structures was found.

ER45: Section 4.3.2.1 provides information related to dredging. No information provided relative to impacts from modifications to barge slip or discharge.

BLN COMMENT ID: ER04, 11, 43, 44, 45

BLN RESPONSE:

[Note: This response addresses comments pertaining to modifications to existing structures and features at the Bellefonte site. Comments regarding the location borrow and dredge material are addressed in response to comments ER40 and ER46 and the comment regarding the description of cultural and historical overview of the region is addressed in response to comment ER11.]

Activities associated with existing systems and equipment are considered to be maintenance activities, rather than modification. These include intake and discharge canal and structures, barge dock, and transmission line corridors. For example, plans are to restore the barge dock to its "original" size (i.e., maintenance/refurbishment), rather than to modify it. Also, the intake canal area maintenance dredging (rather than a dredging activity resulting in modification of intake area) is anticipated during construction. The ER text for subsections 4.2.1.2 and 4.2.1.4 will be revised to clearly identify dredging as a maintenance activity, and provide detail related to riprap installation. The location of the intake canal and barge unloading dock, are depicted on Figure 2.1-1. The extent of desilting of the intake canal is expected to include the 200-ft. wide base of the intake canal, particularly concentrating on the 25-ft. wide channel cut in the center of the intake canal. Figure 3.4-2 illustrates the intake canal, and provides details of the existing riprap placement. In that the discharge structure piping, as shown in Figure 3.4-3, is located at a 60 degree angle 300 feet out in the Gunter'sville Reservoir, maintenance dredging is not considered warranted. No construction activities are anticipated for the discharge structure and associated piping other than an inspection to evaluate the discharge structure and piping physical condition. Impacts of these maintenance activities during the construction period, as stated in the ER, are expected to be minimal. The anticipated environmental impacts are discussed in the associated Chapter 4 subsections relating to the noted maintenance activities.

To provide clarification related to maintenance and refurbishment activities, ER Subsections 4.2.1.1, 4.2.1.2, 4.2.1.4, 4.2.1.8, 4.2.2.7, 4.3.2.1, 4.3.2.5, and 5.3.1.1.2 and Table 4.6-1 are revised, as described below.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 4, Subsection 4.2.1.1, first paragraph, 4th and 5th bullets, as follows:
 - ~~Construction or modification~~ Maintenance of existing cooling water intake canal and intake structure and discharge ~~structure~~ pipe for water withdrawn from and discharged into the Guntersville Reservoir/Tennessee River. Figures 3.4-2 and 3.4-3 provide details of the intake canal and discharge pipe.
 - ~~Construction of new and/or potential modification~~ Refurbishment of existing docking facilities for barges/vessels.

2. Revise ER Chapter 4, Subsection 4.2.1.2, and ER Chapter 5, Subsection 5.2.1.6, first paragraphs, as follows:

For Subsection 4.2.1.2, insert the sentence below between the first and second sentences of the section.

For Subsection 5.2.1.6, insert the sentence below between the first and second sentences of the section.

Maintenance dredging of the intake canal, as the term suggests, is a maintenance de-silting activity for sediment removal only. The intake canal design is not altered (modified) during this activity.

3. Revise ER Chapter 4, Subsection 4.2.1.2, existing fourth sentence, as follows:

~~Installation of riprap for the intake canal, as illustrated in Figure 3.4-2, stemwalls, or other appropriate means is in place to stabilize the banks of the intake canal embayment, and the river shoreline around the embayment, during and following construction is also anticipated.~~

4. Revise ER Chapter 4, Subsection 4.2.1.4, third paragraph, second sentence, as follows:

Maintenance dredging is expected to be necessary in the vicinity of this intake structure, and the appropriate USACE permit acquired prior to commencing dredging activities.

5. Revise ER Chapter 4, Subsection 4.2.1.8, last sentence, as follows:

In addition, ~~constructing~~ maintenance dredging of the intake structures for withdrawing water from ~~available supplies~~ Guntersville Reservoir requires USACE and TVA permits.

6. Revise ER Chapter 4, Subsection 4.2.2.7, first sentence, as follows:

Maintenance dredging of the intake structure area on the north shore of Guntersville Reservoir could create a temporary loss of Guntersville Reservoir shoreline-edge habitat in the affected areas.

7. Revise ER Chapter 4, Subsection 4.3.2.1, as follows:

[Insert the information below between the first and second paragraphs.]

Upon assessing the material condition of the docking facilities refurbishment (maintenance) as needed will be performed to return the facilities to original condition. Any disturbance of the aquatic environment is considered to be similar but of smaller effect than that experienced during the Bellefonte Unit 1 and 2 construction of the docking facility. Therefore, its potential impact is considered SMALL. Figure 2.1-1 provides location detail for the docking facility.

8. Revise ER Chapter 4, Subsection 4.3.2.1, second paragraph, first sentence, as follows:

Although preliminary surveys indicate that the existing intake channel may function appropriately without maintenance dredging, but should it is anticipated that sediment deposition prior to construction will make dredging of the intake channel necessary, TVA is expected to obtain appropriate permits from ADEM and USACE and use appropriate mitigation.

9. Revise ER Chapter 4, Subsection 4.3.2.5, second paragraph, first sentence as follows:

Construction activities associated with or near the Guntersville Reservoir may involve pile driving related to potential refurbishment (maintenance) of docking facility supports, maintenance dredging of intake canal, dredging, barge traffic transporting construction materials, and other noise-producing activities. Subsection 4.4.1.5 provides a detailed discussion related to construction noise and attenuation measures.

10. Revise ER Chapter 4, Table 4.6-1, Subsection 4.2.1, Item 1 under the "Impact Description or Activity" column, as follows:

1. ~~Construction or modification~~ Maintenance activities on ~~of~~ water intake structures could result in minor hydrologic changes.

11. Revise ER Chapter 4, Table 4.6-1, Subsection 4.2.3, Item 1 under the “Impact Description or Activity” column as follows:

1. Potential ~~construction or modification~~ maintenance or refurbishment of the barge facility, ~~or dredging of the intake canal and discharge structures,~~ or ~~dredging of and construction water discharges to~~ Tennessee River at the BLN vicinity. ~~wastes or materials~~

12. Revise ER Chapter Table 4.6-1, Subsection 4.2.3, Item 1 under the “Specific Measures and Controls” column, as follows:

- (1) Use of best management practices in addition to TVA, USACE and ADEM ~~Install coffer dams or use other standard engineering~~ controls to protect affected water bodies.

13. Revise ER Chapter 5, Subsection 5.3.1.1.2, last sentence, as follows:

However, the intake channel is periodically monitored and dredged, as a maintenance activity, as required to prevent the buildup of sediment deposits and littoral debris to maintain free access to the river.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: TRANSMISSION LINES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Seasonal access to transmission corridors that cross land in agricultural or other productive use is not explicitly addressed. To assess cumulative impacts, some additional descriptive information may be required. In addition, impacts of the activities required to re-energize the transmission lines (listed in Section 3.7) need to be addressed.

BLN COMMENT ID: ER06

BLN RESPONSE:

TVA has processes in place regarding accessing rights-of-way (ROWs) during crop production, etc. Typically, TVA easements allow access along the ROW at any time. Access is usually at road crossings. Verbal agreements are reached with landowners prior to accessing land. Knowledgeable TVA staff discussed the TVA ROW access processes with the NRC staff and contractors during the Bellefonte site audit held on March 31 through April 4, 2008. Based on this review, it was determined that TVA's process for accessing ROWs minimizes and controls unnecessary ROW access, especially when crop production would be impacted, and provides an adequate means for notifying landowners prior to accessing ROWs.

Although re-clearing activities for re-energization of the transmission lines may be more extensive than periodic maintenance, the types of activities to be performed are the same. Access to ROW for trimming and re-clearing and any "ground-truthing" activities (i.e., verification and resolution of discrepancies noted during aerial reviews) would be gained through existing access points and roads. TVA does not anticipate a need to conduct any ground-disturbing work (i.e., digging, grubbing or bulldozing) in support of re-energizing of the transmission lines. In addition, the majority of the transmission ROW directly supporting the BLN site traverses agricultural areas and will not require any maintenance prior to re-energizing the transmission lines. Therefore, as stated in Section 5.1.2, the impacts of the activities required to re-energize the transmission lines are considered to be SMALL.

Based on the above, it is TVA's understanding that access to ROW and impact of transmission line re-energization has been resolved to the staff's satisfaction.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: TRANSMISSION LINES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Need reference to procedures used by TVA for ROW maintenance near aquatic ecosystems.

BLN COMMENT ID: ER07

BLN RESPONSE:

During the NRC site audit held March 31 through April 4, 2008 at the Bellefonte site, TVA provided to the NRC reviewers the procedures used for power line maintenance and Sensitive Area Review (SAR). These procedures provide guidance for ROW maintenance near aquatic ecosystems. Knowledgeable TVA staff discussed the TVA procedures with the NRC staff and contractors during the Bellefonte site audit. Because the existing TVA ROW maintenance procedures utilize best management practices (BMPs) that are protective of aquatic ecosystems and incorporate industry experience and State-issued BMP guidance, TVA understands that this issue has been resolved to the staff's satisfaction.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: CULTURAL RESOURCES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Only the Alabama SHPO and affected Tribes in the region were contacted. More effort to contact historical organizations or family members who may continue to visit the two historic cemeteries located in closed proximity to the BLN site may be warranted.

BLN COMMENT ID: ER08

BLN RESPONSE:

In late 2006, TVA's archaeological consultants met with the Alabama State Historic Preservation Office (SHPO) and the Alabama Office of Archaeological Research (OAR). The subjects discussed in the meetings at both offices included the cultural resources on the BLN site and surrounding 10 miles surrounding the site. Informal communications regarding knowledge and/or concerns in the area also took place with the Jackson County Historical Society at the same approximate time; however, no consequential correspondence was returned and there are no records of these communications remaining. TVA's staff and consultants also discussed cultural resource issues, including Traditional Cultural Properties (TCPs) and historic properties for the BLN site, with these Offices, several university professors, and the author of the Phase I Archaeological Survey Report for the BLN site. Through these consultations TVA's consultants obtained several valuable resources, such as a study of the old town of Bellefonte (now ER Reference 87), and were directed to Eugene Futato, the Deputy Director of the University of Alabama Museums, Office of Archaeological Research. Eugene Futato has performed extensive research of the Tennessee Valley and was involved with excavations at site 1JA300 on the BLN site.

Documentation retained from this period includes only copies of the correspondence with the two professors who responded to TVA's consultant's information requests. Copies of those two emails were made available at the site audit. Subsequent correspondence with Eugene Futato was by phone and there is no record of that correspondence. However, TVA's consultant has recently received a letter, dated April 1, 2008, from the Alabama OAR stating that, as per earlier communication with Eugene Futato, there are no National Register of Historic Places (NRHP)-listed archaeological sites within 10 miles of the BLN site. A copy of the letter from the Alabama OAR was provided to the NRC reviewers at the BLN site audit.

TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

Family members of persons interred at the historic cemeteries were not contacted, as none of the cemeteries lie within the project APE. Visual/noise impacts beyond the APE would only be relevant if the cemetery was considered eligible for the NRHP listing and if the “setting” or “feel” of that resource were elements cited in regard to the cemeteries eligibility that might then be adversely impacted. One cemetery, the Bellefonte town cemetery, has recently been listed. Visiting that site during the BLN site audit, it was observed that the cooling towers cannot be seen from the cemetery due to vegetation. In addition, the cemetery lies beyond the distance at which adverse noise impacts are expected, as interpreted from the noise assessments provided in ER Subsections 2.5.5 and 4.5.1.5, and Table 4.4-1. TCPs can pertain to cemeteries; however, TCPs are not applicable to individuals or to individual families, as they are specifically derived from a distinct cultural group (a living community) having shared affinity and relationships to a property in a multi-generational (“traditional”) sense. Consultation letters sent to both federally and state-recognized Tribes, and consultation with the SHPO, the OAR, the Jackson County Historical Society, and several university professors established no TCPs for the area. (See National Register Bulletin #41 on cemeteries and #38 on TCPs). Given these considerations, TVA’s consultants determined that the necessary contacts had been made.

During the BLN site audit held March 31 – April 4, NRC staff and TVA agreed that a survey of the aboveground structures within a 1-mile radius of the BLN cooling towers would be conducted. This aboveground structures survey includes a survey of cemeteries that are known to lie within the 1-mile radius to evaluate them in terms of NRHP eligibility and to assess potential adverse impacts from visual or noise issues related to the BLN. Upon completion of the survey, TVA plans to submit the survey report to the Alabama SHPO and other consulting parties in order to determine if there are any concerns regarding the identified resources.

ASSOCIATED BLN COL APPLICATION REVISIONS:

No COLA revisions at this time. Any potential revisions are dependent on the findings of the aboveground structure survey, which is expected to be completed by mid-May.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: CULTURAL RESOURCES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

One of the five archaeological sites (1JA111) located on the BLN site has not been formally evaluated but is described as "potentially eligible". A formal evaluation has not been completed and would be necessary if the site cannot be avoided.

BLN RAI ID: ER09

BLN RESPONSE:

Evaluation of Site 1JA111 is provided in Subsection 4.1.3.1.1. As explained in that subsection, TVA will provide site protection and avoidance for site 1JA111. By a letter dated July 26, 2007, the Alabama SHPO concurred with TVA's determination that site 1JA111 is potentially eligible for listing in the NRHP. This letter was provided to the NRC reviewers at the site audit on March 31 through April 4, 2007 at the Bellefonte site.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.5.3.3, to add the following sentence at the end of the next-to-last paragraph:

TVA has determined, in consultation with the Alabama SHPO, that site 1JA111 is potentially eligible for listing in the NRHP. TVA has agreed to avoid site 1JA111. Protection measures include the establishment of a 50-ft. buffer around this site. Fencing placed around this site ensures protection during construction and operation of the plant. The Alabama SHPO has concurred with this finding (Reference 129), as discussed in Subsection 4.1.3.1.1.

2. Revise ER Chapter 2, Subsection 2.5.6, to add Reference 129:

129. Letter from Colonel (Ret.) John A. Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, to Diane A. Cargill, Cargill Archaeological Services, "AHC 06-1211, Jackson Camp, Bellefonte Nuclear Site, Jackson County, Alabama," dated July 26, 2007.

ATTACHMENTS:

None.

TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

NRC Review of Environmental Report**Acceptance Review Comment****NRC Comment: CULTURAL RESOURCES**

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Additional correspondence beyond initial correspondence between SHPO and the archaeological contractor and NuStart and SHPO and TVA was referenced but not included.

BLN COMMENT ID: ER10**BLN RESPONSE:**

A comparison of the BLN correspondence files to the correspondence provided in ER Appendix A identified four letters related to the Section 106 consultation that were not included in Appendix A. The following letters are provided as an attachment to this letter:

Letter from Richard J. Grumbir, NuStart Energy Consortium, to Robert Thrower, Tribal Historic Preservation Officer, Poarch Band of Creek Indians, "NVA/NuStart Bellefonte Project, Request for Information on Cultural, Historic, and Archaeological Resources," dated August 28, 2006.

Letter from Thomas O. Maher, PhD., Tennessee Valley Authority, to Ms. Elizabeth A. Brown, Deputy State Historic Preservation Officer, State of Alabama, Alabama Historic Commission, Explains TVA/NuStart/Enercon project roles, dated September 7, 2006.

Letter from Thomas O. Maher, PhD., Tennessee Valley Authority, to Deborah Luchsinger, Ph.D., Enercon Services, Inc., "Bellefonte NuStart Energy Development Project Area of Potential Effects," dated September 14, 2006 (copy to Ms. Elizabeth A. Brown, Alabama SHPO).

Letter from Thomas O. Maher, PhD., Tennessee Valley Authority, to Colonel John Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, "AHC 2006-1211; Bellefonte NuStart Energy Development; Jackson County," dated April 17, 2007.

Letter from Colonel (Ret.) John A. Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, to Diane A. Cargill, Cargill Archaeological Services, "AHC 06-1211, Jackson Camp, Bellefonte Nuclear Site, Jackson County, Alabama," dated July 26, 2007.

The August 28, 2006 letter to Mr. Robert Thrower, Tribal Historic Preservation Officer (THPO) for the Poarch Band of Creek Indians does not involve a change to the ER, because consultation with this Native American tribe is addressed in Subsection 2.5.3.2, Consultations with the State Historic Preservation Office and Native American Tribes.

TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

The September 7, 2006 and September 14, 2006 correspondence are addressed in Subsection 2.5.3.2 (see change #1, below), and the April 17, 2007 and July 26, 2007 correspondence with the Alabama State Historic Preservation Office (SHPO) are referenced in Subsection 4.1.3.1.1 (see change #2, below).

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.5.3.2, to modify the fourth paragraph, as follows:

On June 30, 2006, NuStart Energy began Section 106 consultation by sending correspondence to the Alabama State Historic Preservation Office (SHPO). However, in response to the Section 106 consultation letter, the SHPO declined to review the document because TVA, rather than NuStart, would be the applicant for the BLN site development. On September 7, 2006, TVA sent correspondence to the SHPO explaining the TVA/NuStart/Enercon BLN project roles. Subsequently, on September 14, 2006, TVA, as the Applicant, inquired about the Section 106 consultation process with the Alabama SHPO and provided the spatial recommendation of the archaeological APE. Because past surveys of the area specific to the BLN site were conducted prior to the Secretary of the Interior's Historic Preservation Professional Qualification Standards, issued on September 29, 1983, it was also determined that a new survey of the area was required to meet those standards. The APE was redefined slightly in a TVA-issued PDF map document (last modified on November 2, 2006) that recommended the on-site APE area as 606 ac. Following the final APE recommendation, in November 2006, archaeologists with the Nashville office of TRC, Inc. conducted the required Phase I archaeological survey on the 606 ac. of the BLN site (Subsection 2.5.3.1) (Reference 85).

2. Revise COLA Part 3, ER Chapter 4, Subsection 4.1.3.1.1, to modify the second paragraph, as follows:

Further, the SHPO agreed with the recommendation of potential eligibility for site 1JA111 and agreed that the site must be protected by avoidance during BLN construction (Reference 8). The TVA previously submitted ~~subsequently drafted~~ official correspondence (described initially in Subsection 2.5.3.2) assuring site protection and avoidance for site 1JA111 (Reference 9).

TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

3. Revise COLA Part 3, ER Chapter 4, Subsection 4.1.4, to include References 8 and 9, as follows:

8. Letter from Colonel (Ret.) John A. Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, to Diane A. Cargill, Cargill Archaeological Services, "AHC 06-1211, Jackson Camp, Bellefonte Nuclear Site, Jackson County, Alabama," dated July 26, 2007.

9. Letter from Thomas O. Maher, PhD., Tennessee Valley Authority, to Colonel John Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, "AHC 2006-1211; Bellefonte NuStart Energy Development; Jackson County," dated April 17, 2007.

ATTACHMENTS:

The following correspondence are provided in Attachment A:

- Letter from Richard J. Grumbir, NuStart Energy Consortium, to Robert Thrower, Tribal Historic Preservation Officer, Poarch Band of Creek Indians, "NVA/NuStart Bellefonte Project, Request for Information on Cultural, Historic, and Archaeological Resources," dated August 28, 2006.
- Letter from Thomas O. Maher, PhD., Tennessee Valley Authority, to Ms. Elizabeth A. Brown, Deputy State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, Explains TVA/NuStart/Enercon project roles, dated September 7, 2006.
- Letter from Thomas O. Maher, Ph.D., Tennessee Valley Authority, to Deborah Luchsinger, Ph.D., Enercon Services, Inc., "Bellefonte NuStart Energy Development Project Area of Potential Effects," dated September 14, 2006 (copy to Ms. Elizabeth A. Brown, Alabama SHPO).
- Letter from Thomas O. Maher, PhD., Tennessee Valley Authority, to Colonel John Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, "AHC 2006-1211; Bellefonte NuStart Energy Development; Jackson County," dated April 17, 2007.
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- Letter from Colonel (Ret.) John A. Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, to Diane A. Cargill, Cargill Archaeological Services, "AHC 06-1211, Jackson Camp, Bellefonte Nuclear Site, Jackson County, Alabama," dated July 26, 2007.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: CULTURAL RESOURCES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

A cultural and historical overview is not included. A general/brief description of the cultural and historical context for the region would be helpful for understanding significance of resources being affected. It is also unclear if cumulative and/or secondary impacts resulting from modifications to the docking facilities and discharge structure and potential off-site activities associated with the need for borrow material described in Sections 4.1, 4.2 and 4.3 have been adequately addressed in the ER.

BLN COMMENT ID: ER11

BLN RESPONSE:

[Note: This response addresses portion of comment pertaining to a cultural and historical overview. The portion of the comment pertaining to modifications to existing structures and features at the Bellefonte site is addressed in response to comments ER04, ER11, and ER43 – ER45.]

During the week of March 31 through April 4, 2008, the NRC staff conducted an audit of the BLN site, including a review of the documentation supporting the BLN ER. The documentation reviewed by the staff included the "Phase I Archaeological Survey of 606 Acres at the Bellefonte Nuclear Site, Jackson County, Alabama," Final Report, dated March 2007. Because this report includes a detailed cultural and historical overview of the BLN site, TVA understands that the NRC staff considers this comment resolved.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: CULTURAL RESOURCES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

ER indicates that TVA intends to develop a plan of action to address NAGPRA [Native American Graves Protection and Repatriation Act] and an MOA to address conditions of construction monitoring. Proposed contents of the subject plan of action and MOA were not included.

BLN COMMENT ID: ER12

BLN RESPONSE:

The archaeological monitoring discussion in ER Subsection 4.1.3.3 did not reflect the Alabama State Historical Preservation Officer (SHPO) correspondence of July 26, 2007, which provided concurrence with TVA's proposed cultural historical avoidance methods. Accordingly, this subsection is revised to reference the current SHPO position and summarize the TVA methods to achieve compliance with the NAGPRA provisions; thereby eliminating the necessity for developing a plan of action and MOA to address construction monitoring.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 4, Subsection 4.1.3.3, to replace the existing paragraph with the following paragraph:

It has been determined through the Section 106 process (Section 2.5.3) that archaeological monitoring is not required during BLN construction. TVA determined, in consultation with the Alabama SHPO, that the protection procedures discussed in Subsection 4.1.3.1.1 for site 1JA111 are sufficient for protecting the site and the remaining areas within the BLN APE have been cleared for construction (Reference 8). To provide assurance that cultural materials inadvertently encountered during BLN construction are properly evaluated in compliance with provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (43 CFR Part 10) (Reference 4), TVA cultural resource staff inform construction managers and workers during site orientation that in the event of the discovery of cultural materials described under 43 CFR 10.2(d), construction work must cease in the area of the discovery, with reasonable efforts applied to protect the area and discovered objects. In such an event, TVA cultural resource staff are informed immediately by telephone followed by a written confirmation [43 CFR 10.4(b)]. Following such notification, TVA implements procedures as described in 43 CFR Part 10, beginning with a written confirmation by certified mail of the receipt of notification.

2. Revise COLA Part 3, ER Chapter 4, Subsection 4.1.4, to include the following references: [**NOTE:** This change is addressed in response to BLN Comment ER10, and is repeated here for clarity.]

8. Letter from Colonel (Ret.) John A. Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, to Diane A. Cargill, Cargill Archaeological Services, "AHC 06-1211, Jackson Camp, Bellefonte Nuclear Site, Jackson County, Alabama," dated July 26, 2007.

ATTACHMENTS:

None. In response to ER10, the July 26, 2007 letter from the Alabama SHPO, as cited above, is attached to this letter for inclusion in Attachment A to the BLN ER.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ENVIRONMENTAL JUSTICE

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Provide information on any organizations contacted to locate and assess uniquely vulnerable minority and low-income communities located on or near the proposed station site.

BLN COMMENT ID: ER13

BLN RESPONSE:

In accordance with existing guidance, minority and low-income populations (i.e., environmental justice (EJ) populations) were determined using U.S. Census Bureau data. Furthermore, during the development of the BLN ER, various organizations were also contacted to locate and assess uniquely vulnerable minority and low-income populations that do not rely on the mainstream economy for all of their income and can be more difficult to find. Local and county services and resources provide another means of identifying EJ populations. Managers of these services and resources are closest to the communities and may have knowledge about cultural practices that help identify these populations in ways that federal databases and current literature do not. When contacted, the agencies and organizations either provided no valuable information that would help identify EJ populations or did not respond to the information request. The following local and county agencies and organizations were contacted:

- Cherokee Tribe of Northeast Alabama (256) 593-8102
(Cherokees of Jackson County)
- City of Hollywood, Alabama (256) 259-4845
- City of Scottsboro, City Hall (256) 574-3100
- Jackson County Agriculture Extension Office (256) 574-2143
- Jackson County Chamber of Commerce (256) 259-5500
- Jackson County Economic Development Authority (256) 574-1331
- Jackson County Emergency Management (256) 574-9344
- Jackson County Health Department (256) 259-4161
- Scottsboro Public Library (256) 574-4335
- Scottsboro-Jackson Heritage Center (256) 259-2122
- U.S. Department of Agriculture, Jackson County Local Office (256) 638-7423

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Research on EJ populations was further extended to contacting local sporting goods and bait and tackle shops in an effort to help identify low-income or subsistence populations that historically obtain or supplement their food supply through hunting and fishing. No useful information was obtained from the following businesses:

- Big Daddy's Outdoor, Inc. (256) 495-9225
- Goose Pond Colony, Bait and Tackle Store (256) 574-1083
- Kirks Pro-Am, Inc. (256) 259-1402
- Scottsboro Gun & Pawn Shop (256) 259-0693
- Southern All-Sports (256) 574-6755

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ENVIRONMENTAL JUSTICE

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

ER14: Need more information regarding identification and analysis of any unique minority or low-income communities within each environmental-impact area that are likely to be disproportionately affected by the proposed project construction or operation.

ER15: Provide indication that analysis is based on community-specific information. Assumptions that there are no particular pathways or vulnerabilities relevant to the minority populations in the area is not supported and therefore limiting consideration to whether the overall impacts would be enough to affect the minority population (as they would affect anyone else) is inadequate.

ER16: Need detailed explanation of method of assessment (qualitative or quantitative, as appropriate) of the degree to which each minority or low-income population would disproportionately experience adverse human health or environmental (including socioeconomic) impacts during construction as compared with the entire geographic area. A referenceable source for this information is needed.

ER17: Need detailed explanation of method of assessment (qualitative or quantitative, as appropriate) of the significance or potential significance of such environmental impacts on each minority and low-income population. A referenceable source for this information is needed.

ER18: Need detailed explanation of assessment of the degree to which each minority and low-income population would disproportionately receive any benefits compared with the entire geographic area. A referenceable source for this information is needed.

ER19: Provide analysis of special pathways or vulnerabilities pertinent to minority populations. A referenceable source for this information is needed.

BLN COMMENT ID: ER14, ER15, ER16, ER17, ER18 and ER19

BLN RESPONSE:

A report titled, "Bellefonte Environmental Justice – Impact Assessment Methodology and Findings," is attached to this response. This report describes the method of assessment used to analyze possible pathways or vulnerabilities pertaining to the identified minority and low-income census blocks and block groups. Included in the report are two tables, one for construction and one for operation, which summarize impacts from the Environmental Report that could potentially be associated with

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Environmental Justice. Each impact includes an assessment of potential pathways between the impact and the identified low-income or minority census block and block groups. The analysis results, which include degree and significance, are recorded in the 'EJ Impact' column of the tables. One pathway was identified during this assessment that showed a potential relationship between housing costs during construction and the identified low-income block groups.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENT:

The following document is provided in Attachment B:

- Bellefonte Environmental Justice – Impact Assessment Methodology and Findings

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: TRANSPORTATION

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

- ER20:** The analysis in Sec 3.8 incorrectly assumes NRC has approved higher enrichments and burnup levels for advanced reactors and cites NUREG-1437 and NUREG-1555 as basis. A full and detailed analysis of transportation impacts is not provided as required by 10 CFR 51.52(b).
- ER21:** Shipping distances from the proposed reactor site to the spent fuel disposal facility were not provided.

BLN COMMENT ID: ER20, ER21

BLN RESPONSE:

A detailed analysis of the radiological and nonradiological impacts of transporting unirradiated and spent nuclear fuel to and from the BLN site, as well as the four alternate site locations, has been performed to demonstrate compliance with 10 CFR 51.52(b). For shipments from fuel fabrication facility sites to the plant sites and from the sites to the high-level waste repository at Yucca Mountain, Nevada, highway routes were analyzed using the routing computer code TRAGIS and 2000 Census data. The calculated distance for transportation of spent fuel from the BLN site to the proposed spent fuel repository at Yucca Mountain, Nevada, is 1953 mi. The analysis demonstrates that the impact of accident-free transportation of unirradiated and spent fuel will be SMALL and will not warrant additional mitigation. Additionally, the analysis shows that the transportation accident risks associated with the spent fuel from the proposed new reactors at the BLN and alternative sites would also be SMALL. The results of this analysis are reflected in revisions to ER Sections 3.8 and 7.4, which are provided under separate cover.

ASSOCIATED BLN COL APPLICATION REVISIONS:

The results of this analysis are reflected in revisions to ER Sections 3.8 and 7.4, which are provided under separate cover.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: RADIOLOGICAL EXPOSURE PATHWAYS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

- ER22:** Table 2.7-119 appears to be incomplete (e.g., no residences in 13 sectors and yet gardens in most sectors) and hard to reconcile with FSAR Figure 2.1-206.
- ER23:** Table 5.4-6 has some, but not all, of the information regarding grazing seasons and fraction of daily intake of cows, meat animals, and milk goats derived from pasture or fresh forage during the grazing season, and conflicts with Table 2.7-119 on distance to nearest residence/house. Table 5.4-6 claims to define "Nearest" as "the location at which the highest radiation dose to an individual from the applicable pathways has been estimated. Locations by all compass directions and distances are not provided because the highest dose location is identified." The source of much of the data in Table 5.4-6 is not given.

BLN COMMENT ID: ER22, ER23

BLN RESPONSE:

ER Table 2.7-119 was originally intended to depict only that information that was necessary to determine the potential maximum dose concentration at the limiting locations beyond the plant boundary. During the Bellefonte site audit held on March 31 through April 4, 2008, it was identified that the potential doses associated with off-site receptors in locations other than those previously evaluated could potentially result in calculated doses higher than those previously considered to be limiting. To resolve this discrepant condition, TVA performed additional land use surveys to identify the limiting receptors in each sector. These receptor locations were evaluated to determine if any changes to the annual average atmospheric dispersion factors are required. Based on this evaluation, it was determined that the normal atmospheric dispersion (X/Q) calculations will be revised and the results incorporated into Table 2.7-119. The revised Table 2.7-119 is expected to be more easily reconciled with FSAR Figure 2.1-206. The revised X/Qs would also be used in a reanalysis of the maximum individual exposure. The revision to these calculations are expected to be completed in late May 2008. Upon completion, TVA plans to make the revised calculations available to NRC staff and contractors who are responsible for reviewing this information. Table 5.4-6 will be revised to list all necessary GASPARG input data. A revision in the maximum individual dose would be reflected in revision of Tables 5.4-10, 5.4-11, 5.4-12, and 5.4-17. Additionally, TVA will provide a copy of the input and output data decks for the PAVAN and GASPARG codes to replace those made available to the NRC staff at the Bellefonte site audit.

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ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: RADIOLOGICAL EXPOSURE PATHWAYS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Table 5.4-1 has some suspect entries. If these were used in other calculations, their results are also suspect. The questionable entries include:

- Average Distance to Where Fish are Caught (mi.);
- Downstream Distance ... commercial fishing;
- Downstream distance... shoreline activities (mi.);
- Dilution Factor for Sport Fishing (mi.).

The latter should not be in miles. These 4 entries have identical values, which is suspect, especially since one of them should not be in miles.

BLN COMMENT ID: ER24

BLN RESPONSE:

Values in Table 5.4-1 were verified to be correct. The words "Downstream Distance used to Determine" were inadvertently omitted from the bullet that currently states, "Dilution Factor for Sport Fishing." The ER will be revised to state, "Downstream Distance used to Determine Dilution Factor for Sport Fishing."

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise ER Chapter 5, Table 5.4-1, to add the words, "Downstream Distance used to Determine," to the beginning of the last line item, as follows:

Downstream Distance used to Determine Dilution Factor for Sport Fishing (mi.) 21.25

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: RADIOLOGICAL EXPOSURE PATHWAYS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Projected population is provided for 2057, not 5 years from the time of the projected licensing action. Meat, milk, vegetables are averages, not by compass point.

BLN RAI ID: ER25

BLN RESPONSE:

The projected population for the year 2057 is expected to be greater than the population at the time of the licensing action (i.e., 2017). Consequently use of the 2057 projected population is conservatively used for dose calculation, because it results in a higher calculated dose to the population surrounding the BLN site than would be obtained using the 2017 projected population. Additionally, while preparing the response to this comment, it was identified that the text mistakenly included the number 2007 where 2057 should have been stated. To resolve this discrepancy, the text in the fourth paragraph in Subsection 5.4.1, is revised to reflect population table data is 2057 rather than 2007.

The TVA calculation that demonstrates compliance with 10 CFR Part 50, Appendix I, assumes commodity production values to be uniformly distributed. Consequently, commodity production values by compass point are not used in the analysis. This assumption is clearly stated in the note to Table 5.4-5. The use of a uniform distribution for commodity production is one of the options allowed in the GASPAR code for inputting data. Specifically, page 2.12 of the GASPAR manual states that the input options defined for population data input are also available for production data input.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 5, Subsection 5.4.1, 4th paragraph, 3rd sentence as follows:

The ~~2007~~ 2057 population distribution within 50 mi. of the BLN site is given in Table 5.4-4.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: RADIOLOGICAL EXPOSURE PATHWAYS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Major commercial fish and invertebrate catch locations, distances, transit times (unless 0 is used) not specified. Dilution factors in table 5.4-1 have some problems. If these were used in other calculations, their results are suspect. Dilution factor for Sport Fishing should not be in miles.

BLN COMMENT ID: ER26

BLN RESPONSE:

As identified in the response to BLN Comment ID ER 24, the Table 5.4-1 line item identified as "Dilution Factor for Sport Fishing" was in error. This line item description is corrected to identify it as the downstream distance used to determine the dilution factor. The sport fishing dilution factor (479) is generated internally by the LADTAP Code, and will not be added to Table 5.4-1. Knowledgeable TVA staff discussed the LADTAP Code and Table 5.4-1 content with the NRC staff and contractors during the Bellefonte site audit held on March 31 through April 4, 2008. Because the appropriate information is included in Table 5.4-1 and the sport fishing dilution factor is generated internally by the LADTAP Code, rather than being provided as input to the analysis, TVA understands that this issue has been resolved to the staff's satisfaction.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: RADIOLOGICAL EXPOSURE PATHWAYS

There is little information on irrigation rate, crop yield, annual production, and growing period for irrigated land, and no statement that crop production has <10% dose contribution. Section 5.4.2.1 states: "There is no record of crop or pasture downstream of the BLN site, therefore this pathway is not evaluated." "There is no record of consumption of aquatic vegetation in the area surrounding the BLN site, therefore this pathway is not evaluated."

BLN RAI ID: ER27

BLN RESPONSE:

The pathway that would be associated with irrigation of crops was not evaluated because there is no irrigation of crops downstream of the BLN site. The word "irrigation" was inadvertently omitted from the statement regarding crops or pasture downstream of the site. The ER is revised to state, "There is no record of crop or pasture irrigation downstream of the BLN site; therefore, this pathway is not evaluated."

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 5, Subsection 5.4.2.1, to add the word "irrigation" to the following sentence in the second paragraph, as follows:

There is no record of crop or pasture irrigation downstream of the BLN site; therefore, this pathway is not evaluated.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: RADIOLOGICAL IMPACTS TO MEMBERS OF THE PUBLIC

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Collective doses to the population within 80 km (50 mi) of the facility and occupational collective doses are not provided.

BLN COMMENT ID: ER28

BLN RESPONSE:

Liquid pathway population dose is provided in Table 5.4-8, "Estimated Population Dose from Liquid Effluents via the Aquatic Food Pathway." ER Subsection 5.4.3.1 cites Table 5.4-8 for the annual radiation exposure to the population within a 50-mi. radius of the BLN site via the liquid pathway. Gaseous pathway dose is provided in Table 5.4-13, "Annual Population Doses – Gaseous Pathway." ER Subsection 5.4.3.2 cites Table 5.4-13 for the annual radiation exposure to the population within a 50-mi. radius of the BLN site via the gaseous pathway.

The anticipated occupational radiation exposure due to normal operation and anticipated inspection and maintenance of the AP1000 units is provided in the AP1000 Design Control Document (DCD), Section 12.4, Dose Assessment. Section 12.4.3 of the DCD provides the determination that no additional information is required to be provided in support of a Combined License application. Based on the information provided in DCD Sections 12.3 and 12.4, the staff concluded in NUREG-1783, Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design, that "the applicant has shown that the AP1000 is designed to operate within the occupational dose limits specified in 10 CFR 20.1201." It is anticipated that TVA will revise the introduction to ER Section 5.4 to refer to DCD Section 12.4 for the occupational radiological dose information.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 5, Section 5.4, to add the following paragraph after the existing paragraph, as follows:

The AP1000 is designed to operate within the occupational dose limits specified in 10 CFR 20.1201. The anticipated occupational radiation exposure due to normal operation and anticipated inspection and maintenance of the AP1000 units is provided in the AP1000 Design Control Document (DCD), Section 12.4, Dose Assessment.

ATTACHMENTS:

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Responses to Environmental Report Acceptance Review Comments

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SEVERE ACCIDENTS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Information is needed on why current census data are used with no projection to start up time.

BLN COMMENT ID: ER29

BLN RESPONSE:

As noted in ER Subsection 7.2.3.1, Methodology, "The results presented in this section are based on 2007 population data. These data are used because they provide the accurate model of the actual population near the BLN site. In the MACCS2 evaluation, however, the model is projected through the year 2017, and the results remain acceptable." Knowledgeable TVA staff discussed the use of the current census data with the NRC reviewers during the audit held at the Bellefonte site from March 31 through April 4, 2008. The NRC reviewers also discussed the TVA calculation that performed the population projections that were subsequently used in the other BLN evaluations, such as the MACCS2 evaluation. Because the current census data is projected to the time of start-up (2017) in the MACCS2 evaluation, it is TVA's understanding that this issue has been resolved to the staff's satisfaction.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SEVERE ACCIDENTS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

There is no discussion as to potential changes in land use.

BLN COMMENT ID: ER30

BLN RESPONSE:

NUREG-1555, ESRP 7.2 provides guidance for the review of severe accidents. This guidance does not call for land use changes to be considered as input for the severe accident analysis. Similarly, TVA's severe accident analysis did not address potential land use changes, as this information is unknown at this time, and any such considerations would be based on speculation.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SEVERE ACCIDENTS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Need to provide modeling details for surface water pathway results given in ER.
Also, need to provide some information on groundwater pathway.

BLN COMMENT ID: ER31

BLN RESPONSE:

Surface Water Pathway

In the BLN MACCS2 assessment of severe accident consequences, all rivers are conservatively ignored because inclusion of rivers in the MACCS2 model would remove some fallout from the area within the 50-mile radius of the site. It is conservative, in terms of maximizing dose to the public, to ignore rivers and treat all segments as land watersheds. Therefore, the default watershed definitions in terms of ingestion factors for Sr-89, Sr-90, Cs-134, and Cs-137 are not changed from those provided in the MACCS2 manual, but all watershed indexes are set to land values. Bodies of water were included in the land fraction portion of the MACCS2 site file input.

Groundwater Pathway

Traditional methods of groundwater investigations of karst-type systems were not considered effective at the BLN due to the poorly developed karst system and lack of springs in surface exposures. This lack of springs and poor karst development led to the decision to apply a conservative, worst-case approach to the groundwater transport at the BLN.

Voids were encountered during the geotechnical drilling program; however, most voids were small (with some larger ones noted), with no indications of widespread interconnection of the voids observed. Twenty-four voids with loss of circulation were encountered during the drilling program (BLN FSAR, page 2.5-115); however, these voids normally regained circulation after drilling deeper. The location of the aquifer characterization test well was decided on the basis of reported loss of circulation in a geotechnical boring. This was considered the worst loss at the time, and a well cluster (MW-1217) was installed at that location for the purpose of performing the aquifer testing. Following the pump test analysis, this location produced the highest hydraulic conductivity value measured on-site to date and in the same magnitude of the highest readings from previous investigations; therefore, it was considered a conservative value and used in our calculations.

Assumptions and data used in the groundwater model are detailed in the groundwater velocity calculation, available for review. This calculation details the use of a “porous media” approach to the groundwater calculations. In summary, the underlying bedrock (epikarst) is consistent with a “diffuse-type” karst system (those with poor development), and the application of Darcy’s Law is appropriate.

The groundwater model uses a very conservative model of groundwater pathways. Due to the unknown flow pathways inherent in karst systems of any type, it was decided to assume all flow was concentrated in a single, straight-line fracture with the highest hydraulic conductivity measured to date. This is considered the more conservative approach, as the actual transport pathways would be subject to three-dimensional, tortuous pathways with highly variable hydraulic conductivities.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 2, Subsection 2.3.1.5.6, to insert a new paragraph between the last two paragraphs, as follows:

MW-1217b was chosen as the pump test location due to a significant loss of recirculation water at approximately 24 ft. below ground surface during coring operations for geotechnical boring B-1006. Due to limited groundwater availability, the pump test was performed using a constant drawdown method to place the maximum stress on the aquifer. Pumping flow rates, to maintain groundwater level at the pump screen, dropped from 4.8 gpm at the beginning of the test to 1.98 gpm at the end of the 24-hr. testing period.

For the purpose of characterizing groundwater movement and transport, groundwater flow is assumed to be concentrated in a single, straight-line fracture with the highest hydraulic conductivity measured to date. A straight line flow path is considered the most conservative as the actual groundwater pathways would be much more tortuous, transport times would be much longer, and hydraulic conductivities (K_f) of the fractures/joints are expected to be lower.

Groundwater elevations used in the groundwater velocity calculations were chosen based on proximity (nearest) to the unit installation centerlines. The low groundwater level was assumed to be the elevation of the surface water in Town Creek embayment (for Unit 3) and the intake channel (for Unit 4). Monthly groundwater gradients, velocities, and travel times were collected during well gauging activities from July 2006 to May 2007 and are presented in Table 2.3-22. Additional information on groundwater flow characteristics are provided in FSAR Subsection 2.4.12. Based on the monthly calculations, the average groundwater travel time from Unit 3 to the Town Creek embayment is 1547 days (approximately 4.2 years). The average groundwater travel time from Unit 4 to the intake channel is 1603 days (4.4 years). However, the hydraulic potential for groundwater flow from the area of Unit 4 to the intake channel only occurs for a short duration (wet months only) and groundwater normally flows toward the Town Creek embayment during the remainder of the year.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ALTERNATIVES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Decommissioning costs were not directly addressed for alternatives.

BLN COMMENT ID: ER32

BLN RESPONSE:

Cost data were not provided for alternatives that were determined not to be environmentally preferable to the proposed project. NUREG-1555, ESRP 9.2.3, Data and Information Needs, states that information should be obtained related to decommissioning cost for proposed project and each alternative when alternatives or combination of alternatives have been determined to be environmentally preferable. In that none of the alternative sites, or combinations of alternative sites, were determined to be environmentally preferable, cost information for the alternative sites was not provided.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ALTERNATIVES

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

The description of how the site selection process was used to identify and select the ROI and potential, candidate, and alternative sites lacks detail and current references. More information is needed regarding the exact condition of the sites (for brownfields) – both how TVA left them when it ceased construction and sold the sites and the current land-use activities on the sites. All references are dated. The key studies cited are all the original EISs completed in 1974, 1975, 1977 and 1978. There are no updated references.

BLN COMMENT ID: ER33

BLN RESPONSE:

During the NRC site audit held at the Bellefonte site from March 30 to April 4, the staff's review resulted in a more comprehensive set of comments and information needs. TVA staff are currently preparing reports that will address both the staff's information needs discussed at the site audit and the information requested by this acceptance review comment. TVA expects to submit these reports to the NRC by mid-May, in support of the draft EIS development schedule. Consequently, the response to this comment is deferred to the submittal of these alternative site reports.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Lakes and impoundments detailed bathymetry data base may not be present in the references. The color shaded and contoured map (Section 2.3.1.2.5, Figure 2.3-9) may not be sufficient, and a data base of the bathymetry data may be required to support analyses and the creation of maps and figures in the EIS.

BLN COMMENT ID: ER34

BLN RESPONSE:

The echo data are acquired using a proprietary software package, SounderSuite, provided with the echo sounding system from Knudsen Engineering, LTD.

SounderSuite has a function to extract the data as delimited ASCII files, which are then imported into MS Excel and processed using a set of algorithms developed specifically for this purpose. Once processing is complete, the final processed files are imported into MapInfo and the GIS program. MapInfo has a module called Vertical Mapper that does the gridding of the data and produces contour maps.

The echo sounder raw data can be viewed graphically using a no-cost viewer program (PostSurvey) available from Knudsen Engineering at:
(<http://www.knudsenengineering.com/html/software/postsurvey.htm>).

At the Bellefonte site audit held on March 31 through April 4, 2008, the NRC staff reviewed a copy of the raw echo sounder data files and the intermediate ASCII files for use in performing support analyses and the creation of maps and figures in the EIS. During the site audit, NRC staff also requested the accompanying bathymetry survey report. The BLN-specific pages of that report are provided as Attachment C to this letter. The data files are being submitted under separate cover.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENT:

Excerpts applicable to BLN, from the following document are provided as Attachment C:

- Boss, S. K., "Bathymetry of Surface Waters in Proximity to Three Proposed Nuclear Power Facilities: William States Lee III Nuclear Station (South Carolina), Bellefonte Nuclear Station (Alabama); Grand Gulf Nuclear Station (Mississippi)," Final Survey Report, January 2007.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

The applicant states in Section 2.3.2.2 that "Quantitative estimates for instream water use within the Tennessee River Basin watershed have not been completed to date."

BLN COMMENT ID: ER35

BLN RESPONSE:

In accordance with NUREG-1555, ESRP 2.3.2, the information to be obtained should include instream water use in the vicinity of the plant, rather than basinwide. Based on this information need, the statement in Subsection 2.3.2.2 regarding quantitative estimates of instream water use within the Tennessee River watershed is replaced with the more relevant information pertaining to instream water use in the vicinity of the plant. Additional discussion of instream (nonconsumptive) water use, including recreational and navigational water uses within the vicinity of the BLN site was developed, and included in Subsection 2.3.2.2.2.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.3.2.2, by revising the second paragraph, as follows:

The USGS and TVA categorize water use as either instream use or total offstream use. Instream use occurs without diverting or withdrawing from surface water or groundwater sources. Examples of instream use are hydroelectric power generation, navigation, maintenance of minimum streamflows to support fish and wildlife habitat, and wastewater assimilation. ~~Quantitative estimates for instream water use within the Tennessee River Basin watershed have not been completed to date.~~ Subsection 2.3.2.2.2 provides a description of instream (nonconsumptive) water use in the vicinity of the BLN site. ~~However,~~ The USGS and TVA are developing water resources management methods and procedures, because instream uses compete with offstream uses and affect the quality of water resources for all uses (Reference 2).

2. Revise COLA Part 3, ER Chapter 2, Subsection 2.3.2.2.2, by replacing the existing subsection with the following:

2.3.2.2.2 Instream Water Use in the BLN Vicinity

There is no hydroelectric power generation in the vicinity of the BLN site; however, both the Nickajack and the Guntersville dams, located approximately 34 mi. upstream and 43 mi. downstream of the site, respectively, include hydroelectric generating plants. Both dams are multipurpose dams whose operations also include maintaining navigation channels, flood control, recreational opportunities, fisheries and aquatic habitat, and water quality, as discussed in Subsection 2.3.1 (Reference 6).

Guntersville Reservoir is host to various recreational activities, including canoeing, kayaking, boating, fishing, and waterfowl hunting. Both commercial and recreational boating are available at the Guntersville Reservoir in the vicinity of the BLN site. Recreational boat access and fishing opportunities are provided at area boat ramps and public parks.

Six recreation areas and boat ramps are located within the vicinity of the BLN site: Wanville Ramp (6 mi. upstream), Raccoon Gulf Small Wild Area and Ramp (5.5 mi. upstream), Mud Creek Fish Camp and Ramp (4 mi. upstream), Town Creek Ramp (2 mi. upstream); Camp Jackson Boy Scout Camp and Ramp (4 mi. downstream), and Comer Bridge Ramp (6 mi. downstream). Boat ramps and fishing access are also available within 10 river mi. at Jackson County Park, Jackson County Sportsman's Club, and Scottsboro Municipal Park (Figure 2.3-X1).

The Guntersville Reservoir is also used as a navigational waterway. From 2000 to 2005, waterway traffic moving past BLN declined approximately 50 percent from about 6.8 million tons to about 3.6 million tons. The loss of traffic can be attributed generally to economic conditions in the Tennessee Valley, and to higher costs of transporting goods to the upper end of the Tennessee River as compared to transporting them to the lower end of the river. Waterway transportation rates for commodities moving to the upper East Tennessee Region have risen considerably over the years, making shipping to the upper end of the river less economical, especially when compared with land transportation alternatives. With a decline in total waterway commodities moving past the BLN site since the year 2000, the number of towboats, loaded and empty barges, and total barges has also declined as well.

Maintaining minimum streamflow for support of fish and wildlife habitat, water quality, and waste assimilation is a key instream water use. Following completion of its Lake Improvement Plan in 1990, TVA has provided minimum streamflows to improve water quality and aquatic habitat, and also implemented other forms of water quality improvement, most notably oxygen enhancement of dam release waters at key locations on the system. TVA now also uses auto-venting turbines, surface water pumps, oxygen-injection systems, aerating weirs, and air

compressors and blowers to increase dissolved oxygen concentrations to target levels. Turbine pulsing, reregulation weirs, and small hydropower units are used to maintain minimum flows when hydro turbines are not operating. (Reference 6). Subsections 2.3.3.2.1 and 2.3.3.2.2 discuss Alabama water quality standards and designated uses, and the role of ADEM in monitoring water quality in Guntersville Reservoir.

3. Revise COLA Part 3, ER Chapter 2, Section 2.3, by inserting **Figure 2.3-X1**, Recreational Sites within a Six-Mile Radius, near the end of the chapter.

ATTACHMENT:

The following figure is provided in Attachment D:

- Figure 2.3-X1, Recreational Sites within a Six-Mile Radius.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL, SOCIOECONOMIC DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

- ER36:** Related to the area's economic base, need detailed workforce information and regional expenditure information. A referenceable source for this information is needed.
- ER63:** Section 5.8.2.2 bases the estimate on a regional model, but text does not discuss expenditures for materials and services or provide any specific information, as it also did not in Section 4.4.2.
- ER65:** Provide estimates of taxes, and relate expected revenues to expected needed expenditures.

BLN RAI ID: ER36, ER63 and ER65

BLN RESPONSE:

Construction

Most materials for plant construction are procured through bulk contracts in order to obtain the best prices. This somewhat limits regional procurement (within 50 miles of the BLN site). Specific items that likely would not be purchased regionally include rebar and major plant equipment, such as pumps, valves, and vessels. Safety-related concrete is expected to be purchased locally, as are many consumable items such as cleaning supplies and office supplies, along with miscellaneous services, such as janitorial services, paving, and maintenance on temporary buildings. Other regional expenditures would include items such as office furniture and equipment, construction trailers and vehicles, trucks, and scaffolding. Estimated regional purchases total about \$41 million throughout the construction period (see Table 1).

Operations

During operation, estimated local purchases include miscellaneous services, such as janitorial services and building maintenance; and various consumables, such as cleaning supplies and office supplies, estimated to total about \$550 thousand per year (see Table 1).

Table 1

Estimated Local Area Expenditures, Bellefonte Nuclear Plant Units 3 and 4

<i>Category</i>	<i>Construction (Total \$)</i>	<i>Operations (Annual \$)</i>
Consumables	2,000,000	400,000
Misc. Services	5,000,000	150,000
Safety-Related Concrete	14,000,000	--
Other	20,000,000	--
Total	41,000,000	550,000

State Tax Revenue related to Plant Labor Force/ Employee Expenditures

As of January 1, 2008 the state sales tax rates for the three states included in the BLN region (Alabama, Georgia, and Tennessee) were 4 percent, 4 percent, and 7 percent, respectively (FTA, 2008a). In addition to state sales tax rates, individual cities and towns can levy additional sales tax, based on local ordinances. The additional sales tax is used to fund new city projects and bolster funding for existing city services. The maximum local sales tax rate that can be assessed, in addition to the state sales tax rate for municipalities within Alabama, Tennessee, and Georgia is 7 percent, 2.75 percent, and 3 percent, respectively (FTA, 2008b).

During construction, the peak construction workforce is estimated to be 3000 (Subsection 4.4.2.1), and the total population increase within the region due to construction workers and their families is estimated to be 6000 people (Subsection 4.4.2.1). Their retail expenditures (restaurants, hotels, merchant sales, and other items) would increase statewide revenue in both sales tax and use tax. Within the region, the multiplier effect of these new jobs and influx of people would also result in higher personal income, more disposable income, and greater expenditures by individuals and families for items subject to sales or use tax. Based on RIMS II information, every additional dollar spent on the BLN construction labor force within the region (salary, e.g.) would have the direct impact of adding 1.44 dollars to the income of households employed by all industries within the region (RIMS, 2007).

Overall, the increase in sales and use tax revenues is expected to have a SMALL beneficial impact to the state. In addition, based on the settlement pattern of construction workers and their families, localities could see more benefits.

Construction

Estimated local purchases total about \$41 million during the construction period. Based on the percent of the BLN region that each state occupies, estimated state sales tax revenue from procurement of goods and services for the duration of construction is as follows:

Alabama: \$940,222
Georgia: \$276,150
Tennessee: \$741,349

At the state level, the tax revenue generated by \$41 million in expenditures over the construction period of BLN would have a SMALL beneficial impact, though larger beneficial impacts could be seen at a local level, based on the spatial distribution of companies from which goods and services are procured.

Operations

Based on the percent of the BLN region that each state occupies, estimated state sales tax revenue from procurement of goods and services for each year of operation is as follows:

Alabama: \$12,612
Georgia: \$ 3,704
Tennessee: \$ 9,945

At the state level, the tax revenue generated by \$550,000 in annual operational expenditures would have a SMALL beneficial impact, though larger beneficial impacts could be seen at a local level, based on the spatial distribution of companies from which goods and services are procured.

REFERENCES

FTA, 2008a. Federation of Tax Administrators, State Sales Tax as of January 1, 2008, Website, <http://www.taxadmin.org/FTA/rate/sales.html>, accessed March 28, 2008.

FTA, 2008b. Federation of Tax Administrators, Comparison of State and Local Retail Sales Taxes – 2004, Website, http://www.taxadmin.org/fta/rate/sl_sales.html, accessed March 28, 2008.

RIMS, 2007. U.S. Bureau of Economic Analysis, Economics and Statistics Administration, "RIMS II Multipliers for the Bellefonte, AL Region", Website, <http://www.bea.gov/bea/regional/rims/>, accessed May 8, 2007.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 4, Subsection 4.4.2.2, 4th and 5th paragraphs, as follows:

For every dollar input into the BLN site, an additional 0.443 dollars is added to the regional economy (Reference 7). ~~At this time annual expenditures within the region for materials and services during construction of the BLN site are not known. This information is not expected to be available until the construction plan is finalized. A~~ limited quantity of material and services are purchased from within the BLN region in

support of plant construction. Most materials for construction are procured through bulk contracts in order to obtain bulk pricing incentives. This somewhat limits regional procurement (within 50 mi of the BLN site). Specific items that are not likely to be purchased regionally include rebar and major plant equipment, such as pumps, valves, tanks and other vessels. Safety-related concrete is expected to be purchased locally, as are many consumable items such as cleaning supplies and office supplies, along with miscellaneous services, such as janitorial services, paving, landscaping, and maintenance on temporary buildings. Other regional expenditures would include items such as office furniture and equipment, construction trailers and vehicles, trucks, and scaffolding. Estimated regional purchases total about \$41 million throughout the construction period, as detailed below:

<u>Category</u>	<u>Construction (Total \$)</u>
<u>Consumables</u>	<u>2,000,000</u>
<u>Miscellaneous Services</u>	<u>5,000,000</u>
<u>Safety-Related Concrete</u>	<u>14,000,000</u>
<u>Other</u>	<u>20,000,000</u>
<u>Total</u>	<u>41,000,000</u>

In addition to direct expenditures on construction-related materials and services, expenditures and benefits associated with the construction workforce include the creation of jobs, employee purchasing, and increased tax revenues. When comparing the influx of the construction workforce with the relatively small population of the vicinity, the increase in expenditures and benefits is substantial. When comparing the influx of the construction workforce with the larger population of the region, the increase in expenditures and benefits is proportionally smaller. Expenditures and benefits include the creation of jobs, employee purchasing, and increased tax revenues. Thus the impact from plant construction expenditures and employees is considered a MODERATE to LARGE beneficial impact in the vicinity and a SMALL beneficial impact in the region.

2. Revise COLA Part 3, ER Chapter 4, Subsection 4.4.2.2.1, by adding the following paragraph after the first paragraph:

The BLN region encompasses three states: Alabama, Georgia, and Tennessee. As of January 1, 2008, the state sales tax rates for these three states were 4 percent, 4 percent, and 7 percent, respectively (Reference 14). TVA estimates regional expenditures for materials and services throughout the construction of BLN to be \$41 million. Based on the percent of the BLN region that each state occupies, estimated state sales tax revenue from procurement of materials and services for the duration of construction is as follows:

Alabama: \$940,222

Georgia: \$276,150

Tennessee: \$741,349

At the state level, the tax revenue generated by \$41 million in expenditures over the construction period of BLN would have a SMALL beneficial impact, though larger beneficial impacts could be seen at a regional level, based on the spatial distribution of companies from which goods and services are procured.

3. Revise COLA Part 3, ER Chapter 4, Subsection 4.4.4, by adding Reference 14, as follows:

14. Federation of Tax Administrators, State Sales Tax as of January 1, 2008, Website, <http://www.taxadmin.org/FTA/rate/sales.html>, accessed March 28, 2008.

4. Revise COLA Part 3, ER Chapter 5, Subsection 5.8.2, as follows:

This section evaluates the demographic, economic, infrastructure, and community impact to the region as a result of plant operations at the BLN site. The evaluation assesses impacts of operation and of demands placed by workforce on the region. ~~At this time, annual expenditures within the region for materials and services during operation of the BLN site is not known.~~ It is estimated that regional procurement of various consumables and out-sourced services in support of BLN operation will be at least \$550,000 per year.

5. Revise COLA Part 3, ER Chapter 5, Subsection 5.8.2.2.1, by adding the following sentences at the end of the last paragraph:

The estimated annual state sales tax revenue from regional expenditures on goods and services is expected to be less than \$27,000 for Alabama, Georgia, and Tennessee, combined. Therefore, the annual sales tax resulting from these regional expenditures is beneficial, but is not expected to affect the impact significance associated with the plant's tax-equivalent payments.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAILS

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Dewpoint temperature summary information not included.

BLN COMMENT ID: ER37

BLN RESPONSE:

As discussed in ER Subsection 2.7.2.1.3, dew point temperature data is provided in Table 2.7-126. The dew point temperature data in Table 2.7-126 has been summarized for inclusion in Subsection 2.7.2.1.3. The dew point summary indicates that the data in Table 2.7-126 support the data supplied in other discussions of atmospheric moisture, and these data are consistent and representative of the local meteorology.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 2, Subsection 2.7.2.1.3, to replace the second paragraph with the following:

Table 2.7-6 and Table 2.7-106 show the mean relative humidity for four time periods per day at the BLN site for the periods 1979 – 1982 and 2006 – 2007, respectively. These data agree reasonably well with the Huntsville data.

Table 2.7-126 provides the average monthly wet bulb temperature, as well as the monthly average, minimum, and maximum dew point temperatures, and the diurnal range of dew point temperatures at the BLN site. The table presents data from the 4-year period from January 1, 1979 through December 31, 1982 and the 1-year period from April 1, 2006 through March 31, 2007. During these combined time periods, the annual average dew point temperature was determined to be 49.2°F, with an annual minimum average value of 24.1°F and an annual maximum average value of 67.4°F. The lowest monthly average dew point temperature, 23.9°F, occurred in the month of February, and the highest monthly average dew point temperature, 69.4°F, occurred in the month of August. May through September produced the highest monthly average dew point temperature values, ranging from 58.3°F to 69.4°F. The lowest monthly average dew point temperatures occur in the late fall and winter months of November through March. The lowest dew point temperature recorded during these time periods occurred in the month of February with a value of -3.20°F, while the highest dew point temperature recorded during the same time periods occurred in August with a value of 75.74°F.

Table 2.7-126 also provides the dew point diurnal range on a monthly and annual basis. The values show an annual average minimum dew point diurnal range delta-T of 3.4°F

with an annual average maximum delta-T value of 27.3°F. The minimum monthly dew point diurnal ranges occur in approximately the same order of magnitude throughout the year, ranging from 1.5°F to 6.1°F. The maximum monthly dew point diurnal ranges occurred in approximately the same months as the lowest monthly average dew point temperatures: November through March. Annual and monthly averaged values of wet bulb temperatures are provided in the table as well. The highest and lowest monthly averages for wet bulb temperatures correspond to the same months of highest and lowest monthly dew point averages, August and February, respectively. The wet bulb temperature values range from the highest monthly value of 69.9°F in August to 27.3°F in February. The annual average wet bulb temperature was determined to be 50.5°F. These values support the data supplied in other discussions of atmospheric moisture, and the data are consistent and representative of the local meteorology.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Nearby industrial facilities and other nuclear facilities in the region are not listed.

BLN COMMENT ID: ER38

BLN RESPONSE:

As recommended in NUREG-1555, ESRP 2.8, ER Section 2.8 addresses only federal facilities; however, additional information on nearby industrial facilities may be found in FSAR Section 2.2. Although NUREG 1555 does not call for identification of nearby nuclear facilities. TVA has depicted the locations of other TVA nuclear facilities in ER Figure 2.3-16, "Tennessee River Dams and Power Plants Map."

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

A topographic map is provided, along with some other figures, but these lack some of the required details, i.e., liquid and gaseous release points (elevations of gaseous points are given in the text), meteorological towers.

BLN COMMENT ID: ER39

BLN RESPONSE:

Liquid Release Points

Liquid release points are monitored, and releases regulated, as described in the state's NPDES Permit. Site ponds and NPDES-permitted monitored outfalls used for liquid releases are shown on Figures 2.3-26 and 3.1-6. A description of the site ponds is provided in Subsections 4.3.2.4 and 5.3.3.2.4. Details related to NPDES-permitted outfalls for liquid releases during plant operation, including relation to site ponds, are provided in Subsections 5.5.1.1 and 6.1.3.

Gaseous Release Points

Airborne effluents are normally released through the plant vent or the turbine building vent. The plant vent provides the release path for containment venting releases, auxiliary building ventilation releases, annex building releases, radwaste building releases, and WGS discharge. The plant vent is located next to the containment building on the northwest side and discharges at an approximate elevation of 811 ft., approximately 130 ft. above the auxiliary building roof. The turbine building vents provide the release path for the condenser air removal system, gland seal condenser exhaust and the turbine building ventilation releases. Additional details related to gaseous release points are provided in ER Chapter 3 and DCD Chapter 15. The plant ventilation and exhaust systems are discussed in ER Section 3.5.4, under the heading Ventilation and Exhaust Systems (pages 3.5-18 through 3.5-21). DCD Table 15A-7 and Figure 15A-1 provide details related to release points and release point elevations associated with the analysis of radiological consequences of accidents. Westinghouse Electric Company technical report APP-GW-GLR-134 (TR-134), Revision 4, (Reference 1) revises the location of the condenser air removal stack as identified in DCD Table 15A-7 and depicted in DCD Figure 15A-1. The technical evaluation presented in AP1000 Document Number APP-GW-GLE-001, Rev. 0 (Reference 2), provides the basis for this change. As discussed in Reference 2, these changes are made to correct an inconsistency between DCD Figure 15A-1 and Table 15A-7 and the engineering design drawings.

Gaseous release points and elevations for diesel generators and diesel-driven pumps are provided in ER Subsection 3.6.3.1.

Meteorological Tower

The location of the meteorological tower is shown on Figure 2.1-1.

References

1. Westinghouse Electric Company, LLC, AP1000 Document Number APP-GW-GLR-134, Revision 4, AP1000 DCD Impacts to Support COLA Standardization.
2. Westinghouse Electric Company, LLC, AP1000 Document Number APP-GW-GLE-001, Revision 0, Impact of Annex Building Expansion and Condenser Air Remover Stack Location on the Control Room Atmospheric Dispersion Factors.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

- ER40:** Are there buildings scheduled for demolition? Where specifically will borrow areas and dredge spoils be located? Black-and-white figure format does not provide adequate detail.
- ER46:** Section 4.2.1.4 states they plan to place dredged material above the 500 yr flood elevation. Details on location not provided.

BLN COMMENT ID: ER40 and ER46

BLN RESPONSE:

TVA's Environmental Assessment for Units 1 and 2 Redress identifies buildings that are planned to remain intact following redress. The other buildings will likely be 1) sold, taken apart, and removed from the site; 2) abandoned in place; or 3) demolished. These activities are outside the scope of the BLN (Units 3 and 4) ER. Furthermore, because the Units 1 and 2 facility demolition and associated redress activities are expected to be completed long before construction begins on Units 3 and 4, and the portion of the site impacted by Units 3 and 4 construction includes the area occupied by the Units 1 and 2 facility, no cumulative impacts are expected.

At the Bellefonte site audit held on March 31 through April 4, 2008, knowledgeable TVA staff identified proposed on-site locations for the borrow areas with the NRC staff. Because TVA has processes in place to protect and avoid critical habitat and potential archaeological sites, and these processes will be in force during the excavation of borrow material, it is TVA's understanding that the borrow area location issue has been resolved to the staff's satisfaction.

As stated in Section 4.2.1.4, TVA intends to dispose of the dredged material at an on-site location above the 500-year flood plain. Any dredged material would be disposed of in accordance with regulatory requirements and permit conditions. TVA also expects that the on-site location of the dredged material will be within the BLN APE, and TVA will follow the archaeological site avoidance practices that received the SHPO concurrence. At the BLN site audit, knowledgeable TVA staff showed the NRC staff site maps depicting the APE and 500-year floodplain. It is TVA's understanding that, based on plans to dispose of dredge materials within the APE above the 500-year floodplain and obligations to follow regulatory requirements and permit conditions, this issue has been resolved to the staff's satisfaction.

Enclosure

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TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Potential grade and fill impacts to surface water flow outside the construction zone not addressed. Will special species habitat be impacted outside construction area?

BLN COMMENT ID: ER41

BLN RESPONSE:

TVA will obtain a stormwater permit prior to commencing construction at the BLN site. The stormwater permits include grading plans, which identify surface water flowing off the construction site. Best management practices (BMPs) to control sediment flow and other mitigating features are identified when the stormwater permit is developed. This information reflects guidance provided by the Alabama Soil & Water Conservation Committee in their handbook for erosion control. At the Bellefonte site audit held during the week of March 31, 2008, knowledgeable TVA staff and NRC reviewers discussed the timing for submitting updates to the state's NPDES permit, including requirements associated with stormwater runoff during construction and operation. Based on information provided at the site audit, it is TVA's understanding that because the stormwater permit will apply the appropriate BMPs to minimize grade and fill impacts to surface water flow outside the construction zone, this issue has been resolved to the staff's satisfaction.

No unique and/or rare terrestrial habitats have been determined to be located within, or immediately adjacent to, the BLN site boundary. Additionally, as of 2006, no aquatic wildlife species on the federal list of endangered and threatened species were discovered within the Tennessee River near the BLN.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 4, Subsection 4.3.1.1 third paragraph as follows:

Once the ground is free of vegetative cover, erosion and fugitive dust are expected. Erosion can be minimized by the effective use of best management practices (BMPs), which are specified by a stormwater pollution prevention plan (SWPPP). In consideration for potential grade and fill impacts of surface water flow outside the construction zone, a stormwater permit is obtained prior to commencing construction at the BLN site. Stormwater permits typically include grading plans that identify surface water flowing off the construction site. BMPs to control sediment flow and other mitigating features are identified when the stormwater permit is developed.

Examples of BMPs used by the TVA for erosion control include but are not limited to strategically placing straw rolls, silt fence, temporary sediment traps and check dams in watershed areas. Appropriate measures to control fugitive dust include sprinkling the construction site, as needed.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SITE/DESIGN DETAIL

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Laydown areas not identified.

BLN COMMENT ID: ER42

BLN RESPONSE:

ER Figure 3.1-6 depicts the location of the laydown/storage areas that are to be used during the construction of Units 3 and 4. These areas are located south of the cooling towers.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Although it was determined Alabama is between flyways, waterfowl species are listed as occurring on the site and habitats are present but not sufficiently described.

BLN COMMENT ID: ER47

BLN RESPONSE:

Alabama Department of Conservation and Natural Resources conducted midwinter waterfowl surveys in 2006 and 2007 for the Guntersville Reservoir. These surveys indicate that dabbling ducks and coots use the reservoir extensively. Additional waterfowl species information has been developed based on the above surveys, as well as a discussion of foraging habitat, as provided below.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.4.2.1, as follows:

[**Note:** Move the last sentence of the existing 3rd paragraph to the end of the existing 2nd paragraph to clarify that BLN construction proposes no new transmission lines. Add a new paragraph between existing 3rd and 4th paragraphs, as noted below.]

Extensive historical manipulation has greatly influenced aquatic habitats surrounding the BLN site. Impounding the Tennessee River in 1939 created Guntersville Reservoir within the river valley. Although Guntersville Reservoir has a short retention time and winter drawdown of only a few feet, the habitat was transformed from riverine to an artificial reservoir environment.

Furthermore, a canal of approximately 8 surface ac. was dredged from Guntersville Reservoir to provide a source of cooling water for the original power plant. Because the canal did not previously exist, immobile terrestrial organisms within the construction area were replaced by aquatic communities. Bellefonte Units 1 and 2 were never operational, so any thermal stresses on aquatic environments surrounding BLN are associated with power plants and conditions upstream of Guntersville Reservoir, and the fact that slower moving water absorbs more solar energy due to increased exposure. Also constructed, but never used, were TVA transmission lines that run adjacent to and cross Town Creek embayment in two locations, and also cross Guntersville Reservoir in a single location (Figure 1.1-5).

Existing lines don't cross areas designated as critical waterfowl habitat or habitat for threatened or endangered species and are not

located within mapped migration flyways. No new transmission lines have been proposed.

The TVA monitors shorebird migrations annually. Depth of water within Guntersville Reservoir does not fluctuate much from winter to summer months. Due to the low drawdown occurring in winter months, mudflats are not extensively exposed, which limits shorebird use of the reservoir. No new transmission lines have been proposed.

Winter surveys performed by the Alabama Department of Conservation and Natural Resources in 2006 and 2007 indicate Guntersville Reservoir is extensively used by dabbling ducks, predominantly mallard (*Anas platyrhynchos*) and gadwall (*Anas strepera*) species, and coots (*Fulica sp.*) (Table 2.4-x1). Of the 82,081 waterfowl identified during the 2007 survey, 61,754 were coots and 19,488 were dabbling ducks. In 2006, 33,900 coots and 22,556 dabbling ducks dominated the total waterfowl count of 60,774. Thick vegetative mats accumulate in slow-moving backwater areas and provide foraging habitat for both coots and dabbling ducks.

Data indicate in the years after the initial river impoundment and construction activities, aquatic habitats associated with BLN became relatively consistent (References 2 and 3). Town Creek embayment and the Tennessee River (Guntersville Reservoir) are the predominant lentic and lotic habitats associated with BLN (Figure 2.4-4) (Reference 2).

2. Revise ER Chapter 2, by adding Table 2.4-x1, as follows:

Table 2.4-x1
Waterfowl Identified within
Guntersville Reservoir, Midwinter 2006 and 2007

Species	2006	2007
Mallard	3,100	1,764
Black duck	270	74
Gadwall	16,500	16,951
American widgeon	806	80
G. W. Teal	960	79
N. Shoveler	640	530
N. Pintail	80	10
Wood duck	200	0
Total Dabblers	22,556	19,488

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Species	2006	2007
Redhead	45	0
Canvasback	1,000	142
Scaup	360	83
Ringneck	1,310	351
Goldeneye	20	5
Bufflehead	411	13
Ruddy duck	60	20
Total Divers	3,206	614
Merganser	390	54
Unidentified duck	50	0
Total Ducks	26,202	20,156
Canada goose	670	171
Total Geese	670	171
Mute Swan	2	0
Total Swans	2	0
Coot	33,900	61,754
Grand Total	60,774	82,081

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

USFWS recommended surveys during flowering/ fruiting, yet winter surveys were conducted. No evidence of USFWS approval of winter survey as stated in Section 2.4.1.4.1 unless this is when plants are flowering or fruiting.

BLN COMMENT ID: ER48

BLN RESPONSE:

As noted in ER Subsection 2.4.1.4.1, a 2007 winter habitat survey of the BLN site found potential habitat for Price's potato bean and Morefield's leather flower within the BLN site; however, habitat was located on the western portion of the site not within the proposed construction areas. No habitat for the green pitcher plant, the white fringeless orchid, or the American hearts tongue fern was discovered on BLN property. The U.S. Fish and Wildlife Service (USFWS) personnel who reviewed the report on this survey rendered an oral opinion that the winter survey for habitat for the threatened and endangered (T&E) plant species would be acceptable, as no habitat conducive to the support of these species is present within the construction area. No written documentation of this opinion was provided.

Since that time, a change in management and technical personnel at the USFWS Daphne Field Office renders this original opinion moot. The new USFWS personnel assigned to this review would not accept the original position of their predecessor and have requested that a survey be conducted during the fruiting/flowering phase for the T&E species. Accordingly, another survey will be performed during mid- to late-June 2008 to confirm the absence of the applicable T&E plant species. TVA expects to update the BLN ER to reflect the results of the fruiting/flowering phase survey.

ASSOCIATED BLN COL APPLICATION REVISIONS:

No COL application changes are applicable at this time.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Species composition. Not much information on intake canal or on Town Creek Embayment beyond "Aquatic communities have been extensively studied" and "productive ecosystem and is characterized by diverse aquatic fauna and flora."

BLN COMMENT ID: ER49

BLN RESPONSE:

From 1984 to 1986, TVA conducted an extensive study related to the addition of white amur (also known as grass carp) as a vegetative control in Town Creek embayment. Part of the study included characterizing the fish assemblage, waterfowl and wading birds, and flora within Town Creek embayment. That species information is provided in three new tables cited in the ER revisions provided below.

ASSOCIATED BLN COL APPLICATION REVISIONS

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.4.2.1.1, to insert the following statements to the first paragraph, and to add a second paragraph. [NOTE: Table 2.4-x5 is referenced in this revision to ER Subsection 2.4.2.1.1. This is a new table that is added by the response to Comment ER50 and ER52.]

The Town Creek embayment is an extensive shallow overbank which flows into the Tennessee River (Guntersville Reservoir) at TRM 393.4, just upstream of BLN. Town Creek is a productive ecosystem, and is characterized by diverse aquatic fauna and flora. The addition of white amur (*Ctenopharyngodon idella*), also known as grass carp, as a vegetative control was studied from 1983 to 1986. Part of the study included characterizing the aquatic fauna within Town Creek embayment, in which no unique species were shown to exist. Fish assemblage in Town Creek embayment (Table 2.4-x2) is similar to that identified in Guntersville Reservoir at Tennessee River mile 350.0, 375.2, 405.0, 410.0, and 424.0, as indicated in studies conducted from 2002 to 2006, which are discussed in Subsection 2.4.2.4 and Table 2.4-x5.

Waterfowl species identified in Town Creek embayment in the fall and winter seasons of 1983 to 1984 and 1985 to 1986 (Table 2.4-x3) are similar to species identified in Guntersville Reservoir in winter 2006 and 2007 (Table 2.4-x1). American coots and dabbling ducks, such as the gadwall, outnumber other species and take advantage of thick vegetative mats that grow in slow backwater areas. Although Town Creek embayment provides habitat for many species of aquatic vegetation (Table 2.4-x4) in the littoral areas, Eurasian watermilfoil is thick in deeper, more open areas of Town Creek embayment.

2. Revise COLA Part 3, ER Chapter 2, by adding **Table 2.4-x2**, **Table 2.4-x3**, and **Table 2.4-x4**, as provided on the following pages.

Table 2.4-x2
Fish Species Identified within
Town Creek Embayment 1983 – 1986

<u>Gizzard shad</u>	<u><i>Dorosoma cepedianum</i></u>
<u>Threadfin shad</u>	<u><i>Dorosoma petenense</i></u>
<u>Golden shiner</u>	<u><i>Notemigonus crysoleucas</i></u>
<u>Emerald shiner</u>	<u><i>Notropis atherniodes</i></u>
<u>Logperch</u>	<u><i>Percina caprodes</i></u>
<u>Brook silverside</u>	<u><i>Labidesthes sicculus</i></u>
<u>White crappie</u>	<u><i>Pomoxis annularis</i></u>
<u>Spotted gar</u>	<u><i>Lepistosteus oculatus</i></u>
<u>Yellow perch</u>	<u><i>Perca flavescens</i></u>
<u>Skipjack herring</u>	<u><i>Alosa chrysochloris</i></u>
<u>Common carp</u>	<u><i>Cyprinus carpio</i></u>
<u>Smallmouth buffalo</u>	<u><i>Ictiobus bubalus</i></u>
<u>Spotted sucker</u>	<u><i>Minytrema melanops</i></u>
<u>Channel catfish</u>	<u><i>Ictalurus punctatus</i></u>
<u>Flathead catfish</u>	<u><i>Pylodictis olivaris</i></u>
<u>Freshwater drum</u>	<u><i>Aplodinotus grunniens</i></u>
<u>White bass</u>	<u><i>Morone chrysops</i></u>
<u>Yellow Bass</u>	<u><i>Morone mississippiensis</i></u>
<u>Warmouth</u>	<u><i>Lepomis gulosus</i></u>
<u>Bluegill</u>	<u><i>Lepomis macrochirus</i></u>
<u>Redear sunfish</u>	<u><i>Lepomis microlophus</i></u>
<u>Longear sunfish</u>	<u><i>Lepomis megalotis</i></u>
<u>Largemouth bass</u>	<u><i>Micropterus solmoides</i></u>
<u>Black crappie</u>	<u><i>Pomoxis nigromaculatus</i></u>
<u>Bullhead minnow</u>	<u><i>Pimephales vigilax</i></u>
<u>Golden redhorse</u>	<u><i>Moxostoma erythrurum</i></u>
<u>Longnose gar</u>	<u><i>Lepisosteus osseus</i></u>
<u>Mosquito fish</u>	<u><i>Gambusia affinis</i></u>

Table 2.4-x3
Waterfowl Identified within
Town Creek Embayment 1983 – 1986

<u>Town Creek</u>	<u>Spring/Summer</u>		<u>Fall/Winter</u>	
<u>Species</u>	<u>1984</u>	<u>1986</u>	<u>1983 – 1984</u>	<u>1985 – 1986</u>
<u>Gadwall</u>	<u>150</u>	=	<u>2,965</u>	<u>5,166</u>
<u>Mallard</u>	<u>34</u>	<u>15</u>	<u>57</u>	<u>149</u>
<u>American wigeon</u>	=	=	<u>195</u>	<u>305</u>
<u>Wood duck</u>	<u>264</u>	<u>638</u>	<u>16</u>	=
<u>Ring-necked duck</u>	=	=	<u>25</u>	=
<u>Lesser Scaup</u>	=	=	<u>50</u>	=
<u>American coot</u>	=	<u>5</u>	<u>6,050</u>	<u>4,717</u>
<u>Northern shoveler</u>	=	<u>1</u>	=	<u>3</u>
<u>Blue-winged teal</u>	<u>355</u>	<u>82</u>	=	<u>2</u>
<u>Green-winged teal</u>	=	=	=	<u>25</u>
<u>Common goldeneye</u>	=	=	=	<u>1</u>
<u>American black duck</u>	<u>1</u>	=	=	=
<u>Great blue heron</u>	<u>168</u>	<u>587</u>	<u>18</u>	<u>45</u>
<u>Canada Goose</u>	<u>2</u>	<u>2</u>	=	<u>2</u>
<u>Pied billed grebe</u>	<u>10</u>	=	=	<u>3</u>
<u>Green backed heron</u>	<u>5</u>	<u>92</u>	=	=
<u>Great egret</u>	<u>11</u>	=	=	=
<u>Horned grebe</u>	=	<u>1</u>	=	=

Dashes indicate none were identified during a survey.

Table 2.4-x4
Aquatic Macrophytes Identified within
Town Creek Embayment 1983 – 1986

<u>Spiny-leaf naiad</u>	<u><i>Najas minor</i></u>
<u>Southern naiad</u>	<u><i>Najas guadalupensis</i></u>
<u>Narrow-leaved pondweed</u>	<u><i>Potamogeton pusillus</i></u>
<u>Variable-leaf pondweed</u>	<u><i>Potamogeton diversifolius</i></u>

<u>Muskgrass</u>	<u><i>Chara zeylandica</i></u>
<u>Eurasian watermilfoil</u>	<u><i>Ceratophyllum demersum</i></u>
<u>Curly-leaf pondweed</u>	<u><i>Potamogeton crispus</i></u>
<u>Horned pondweed</u>	<u><i>Zanichellia palustris</i></u>
<u>American pondweed</u>	<u><i>Potamogeton nodosus</i></u>
<u>Hydrilla</u>	<u><i>Hydrilla verticillata</i></u>

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

- **ER50:** For river, the assumption is made that the fish community is substantially similar from TRM 375.2 to TRM 424.0. But that data is not in the ER. Habitat and life histories described in general by Family – not specifics by species.
- **ER52:** Site-specific data is not provided or referenced. Studies are mentioned. Is data is available.

BLN COMMENT ID: ER50 and ER52

BLN RESPONSE:

TVA conducted Vital Signs monitoring in the Guntersville Reservoir at Tennessee River mile (TRM) 350.0, 375.2, and 424.0 during 2002, 2004, and 2006. Additionally, TVA performed Reservoir Fish Assemblage Index (RFAI) surveys at TRM 405.0 and 410.0 during 2000, 2001, 2002, and 2005. Results of these studies indicate similarity in species composition from TRM 350.0 to 424.0. Species composition data for this stretch of the Tennessee River (Guntersville Reservoir) is discussed in the ER text revisions noted below and identified in the attached new table.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, Chapter 2, Subsection 2.4.2.4 to insert the following paragraph after the existing 5th paragraph:

Additional RFAI surveys were performed at TRM 405 and 410 from 2000 to 2002 and again in 2005 in support of a continued 316(a) thermal variance in the vicinity of Widows Creek Fossil Plant. In reviewing RFAI scores throughout the reservoir, it was determined the fish assemblage throughout the upper 50 mi. of Guntersville Reservoir, which includes the section adjacent to BLN at TRM 391, is substantially similar.

2. Revise COLA Part 3, Chapter 2, Subsection 2.4.2.4, by revising the existing 6th paragraph, as follows:

Most of the species identified at TRM 350.0 and 375.2 were also identified at TRM 405.0, 410.0, and 424.0 (Table 2.4-x5). Table 2.4-x6 indicates the most abundant fish species across five electro-fishing survey locations in Guntersville Reservoir from

2000 to 2006. Because the fish community is substantially similar at these locations and no unique reservoir habitat exists adjacent to the BLN, it is reasonable to assume the fish community adjacent to the BLN (TRM 391.0) is similar to the fish community determined for river miles 350.0, 375.2, 405.0, 410.0, and 424.0. Therefore, sampling fish species in Guntersville Reservoir directly adjacent to the BLN is not warranted, and the ongoing TVA Vital Signs sampling scheme for Guntersville Reservoir has, and continues to be, an adequate measure and monitor of any substantive changes which might occur to the aquatic community of the reservoir.

3. Revise COLA Part 3, Chapter 2, to include the following table (currently identified as **Table 2.4-x5**) in the appropriate location near the end of Chapter 2:

Table 2.4-x5
Fish Species Collected at Five Survey
Locations in Guntersville Reservoir 2000 – 2006

Common Name	Scientific Name	Tennessee River Mile				
		350.0	375.2	405.0	410.0	424.0
Gizzard shad	<i>Dorosoma cepedianum</i>	X	X	X	X	X
Threadfin shad	<i>Dorosoma petenense</i>	X	X	X	X	X
Golden shiner	<i>Notemigonus crysoleucas</i>	X	X		X	X
Emerald shiner	<i>Notropis atherinodes</i>	X	X	X	X	X
Blackstripe topminnow	<i>Fundulus notatus</i>	X	X	X	X	
Logperch	<i>Percina caprodes</i>	X	X		X	X
Brook silverside	<i>Labidesthes sicculus</i>	X		X	X	X
White crappie	<i>Pomoxis annularis</i>	X				
Spotted gar	<i>Lepistosteus oculatus</i>	X	X	X	X	X
Yellow perch	<i>Perca flavescens</i>	X	X	X		
Bowfin	<i>Amia calva</i>		X	X		
Skipjack herring	<i>Alosa chrysochloris</i>	X	X	X		
Common carp	<i>Cyprinus carpio</i>	X	X	X	X	X
Northern hog sucker	<i>Hypentelium nigricans</i>	X				
Smallmouth buffalo	<i>Ictiobus bubalus</i>	X	X	X	X	X
Green sunfish	<i>Lepomis cyanellus</i>	X		X		
Black buffalo	<i>Ictiobus niger</i>	X		X	X	X

Common Name	Scientific Name	Tennessee River Mile				
		350.0	375.2	405.0	410.0	424.0
Spotted sucker	<i>Minytrema melanops</i>	X	X			X
Yellow bullhead	<i>Amerurus natalis</i>	X				
Blue catfish	<i>Ictalurus furcatus</i>	X	X	X	X	X
Common catfish	<i>Ictalurus punctatus</i>	X	X	X	X	X
Flathead catfish	<i>Pylodictis olivaris</i>	X	X		X	X
Freshwater drum	<i>Aplodinotus grunniens</i>	X	X	X	X	X
White bass	<i>Morone chrysops</i>	X	X			X
Yellow bass	<i>Morone mississippiensis</i>	X	X	X	X	X
Striped bass	<i>Morone saxatilis</i>	X	X			
Rock bass	<i>Ambloplites rupestris</i>			X		X
Warmouth	<i>Lepomis gulosus</i>	X	X			X
Redbreast sunfish	<i>Lepomis auritus</i>	X	X	X	X	X
Bluegill	<i>Lepomis macrochirus</i>	X	X	X	X	X
Redear sunfish	<i>Lepomis microlophus</i>	X	X	X	X	X
Longear sunfish	<i>Lepomis megalotis</i>	X		X	X	X
Smallmouth bass	<i>Micropterus dolomieu</i>	X				X
Spotted bass	<i>Micropterus punctulatus</i>	X	X	X	X	X
Largemouth bass	<i>Micropterus solmoides</i>	X	X	X	X	X
Black crappie	<i>Pomoxis nigromaculatus</i>	X	X	X	X	X
Sauger	<i>Stizostedion canadense</i>	X	X		X	X
Inland silverside	<i>Menidia beryllina</i>	X	X	X	X	X
Spotfin shiner	<i>Cyprinella spiloptera</i>			X	X	X
Mimic shiner	<i>Notropis volucellus</i>			X		X
Steelcolor shiner	<i>Cyprinella whipplei</i>					X
Bullhead minnow	<i>Pimephales vigilax</i>			X	X	X
Channel shiner	<i>Notropis wickliffi</i>			X		
Chestnut lamprey	<i>Ichthyomyzon castaneus</i>			X		X
Black redhorse	<i>Moxostoma duquesnei</i>				X	X
Golden redhorse	<i>Moxostoma erythrurum</i>					X
Longnose gar	<i>Lepisosteus osseus</i>			X	X	X
Blackspotted topminnow	<i>Fundulus olivaceus</i>			X		
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>				X	X

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4. Revise COLA Part 3, Chapter 2, to include the following table (currently identified as **Table 2.4-x6**) in the appropriate location near the end of Chapter 2:

Table 2.4-x6
Most Abundant Fish Species Collected at Five
Survey Locations in Guntersville Reservoir 2000 – 2006

	Tennessee River Mile					
	2000	350.0	375.2	405.0	410.0	424.0
Bluegill	NS	NS	NS	8%	40%	NS
Emerald shiner	NS	NS	NS	22%	2%	NS
Brook silverside	NS	NS	NS	22%	<1%	NS
Gizzard shad	NS	NS	NS	18%	9%	NS
Spotted bass	NS	NS	NS	9%	6%	NS
Largemouth bass	NS	NS	NS	9%	6%	NS
Channel shiner	NS	NS	NS	-	18%	NS
	2001	350.0	375.2	405.0	410.0	424.0
Bluegill	NS	NS	NS	22%	47%	NS
Emerald shiner	NS	NS	NS	15%	9%	NS
Channel shiner	NS	NS	NS	12%	1%	NS
Largemouth bass	NS	NS	NS	8%	8%	NS
Spotted bass	NS	NS	NS	8%	3%	NS
Gizzard shad	NS	NS	NS	7%	15%	NS
Spotfin shiner	NS	NS	NS	4%	4%	NS
	2002	350.0	375.2	405.0	410.0	424.0
Bluegill	60%	31%	31%	40%	35%	19%
Largemouth bass	12%	9%	9%	3%	18%	5%
Gizzard shad	2%	22%	22%	10%	16%	6%
Redear sunfish	8%	6%	6%	3%	2%	10%
Threadfin shad	-	13%	13%	1%	-	<1%
Redbreast sunfish	5%	2%	2%	-	1%	6%
Spotted bass	2%	-	-	1%	3%	11%
Channel catfish	<1%	1%	1%	2%	1%	18%
Longnose gar	-	-	-	5%	2%	<1%
Spotfin shiner	-	-	-	27%	8%	3%
Smallmouth buffalo	<1%	-	-	1%	4%	<1%

Tennessee River Mile

2004	350.0	375.2	405.0	410.0	424.0
Bluegill	48%	13%	NS	NS	34%
Inland silverside	6%	11%	NS	NS	<1%
Largemouth bass	8%	8%	NS	NS	6%
Redbreast sunfish	9%	3%	NS	NS	4%
Gizzard shad	8%	25%	NS	NS	11%
Emerald shiner	2%	5%	NS	NS	13%
Logperch	<1%	2%	NS	NS	6%
Golden shiner	<1%	15%	NS	NS	<1%
2005	350.0	375.2	405.0	410.0	424.0
Bluegill	NS	NS	64%	48%	NS
Redear sunfish	NS	NS	7%	8%	NS
Largemouth bass	NS	NS	3%	8%	NS
Gizzard Shad	NS	NS	4%	7%	NS
Channel catfish	NS	NS	2%	6%	NS
Spotfin shiner	NS	NS	4%	2%	NS
Emerald shiner	NS	NS	5%	5%	NS
2006	350.0	375.2	405.0	410.0	424.0
Bluegill	71%	34%	NS	NS	62%
Gizzard Shad	12%	22%	NS	NS	<1%
Largemouth bass	3%	10%	NS	NS	2%
Redear sunfish	3%	6%	NS	NS	8%
Channel catfish	<1%	<1%	NS	NS	4%
Emerald shiner	-	-	NS	NS	7%
Green sunfish	2%	-	NS	NS	-
Threadfin shad	<1%	13%	NS	NS	-
Longear sunfish	<1%	-	NS	NS	4%

“NS” indicates location was not sampled

“-” indicates zero specimen of a particular species were identified at the given location.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Onsite ponds – “Other populations migrated from surrounding areas and are therefore, not considered rare or unique to the onsite pond habitats”. There is no data, such as species lists to back this statement.

BLN COMMENT ID: ER51

BLN RESPONSE:

This discussion of on-site pond habitats is expanded to include insect populations and to clarify that organisms migrating from one aquatic habitat to another in proximity would not be considered rare or unique. In addition, during the BLN site audit held from March 31 to April 4, 2008 NRC staff toured the on-site ponds, and concluded the ponds could be defined as industrial ponds and further identification of the biota was unnecessary.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.4.2.1.3, second paragraph, as follows:

On-site ponds to be utilized under BLN plant design include those labeled A, WWRB, C, D, and E on Figure 2.4-4. Ponds were constructed with Bellefonte Units 1 and 2, and an ecosystem within has been established. Sterile grass carp, also known as white amur, were stocked in the ponds to keep vegetation from taking over the small water bodies. Over time, on-site ponds have developed communities of vegetation kept in check by grass carp, fish, amphibians, invertebrates, and beavers. Blue heron can also be seen hunting along the pond edges. Although the ponds appear to support diverse and functional habitat, grass carp are the only introduced species. Other populations likely migrated from surrounding areas. Insects such as dipterans, ephemeropterans, and odonates reproductively colonize by laying eggs in surrounding water bodies. Adult coleopterans and hemipterans colonize by non-reproductive immigration (Reference 56). Organisms that migrate from one aquatic habitat to another in proximity would not be ~~and are therefore not~~ considered rare or unique to the region on site pond habitats. No new ponds are proposed for the BLN site.

2. Revise COLA Part 3, ER Chapter 2, Subsection 2.4.6, by adding the following reference:
 56. Tronstad et al., Aerial colonization and growth: rapid invertebrate responses to temporary aquatic habitats in a river floodplain, Website, <http://www.bioone.org/perlserv?request=get-document&doi=10.1899%2F06-057.1%ct=1>, Accessed March 12, 2008.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Important species were identified in part. Additional information and data needed related to abundance of pink mucket mussel and Anthony's river snail. Information on recreationally important species and potential for entrapment, impingement and entrainment needed.

BLN COMMENT ID: ER53

BLN RESPONSE:

Additional discussion on fish impingement and entrainment regarding mussel densities, fish species of interest to anglers, and egg characteristics that reduce vulnerability to entrainment is included in ER Subsection 5.3.1.2.1. As discussed in Subsection 2.4.2.5.1, surveys in Gunter'sville Reservoir immediately adjacent to BLN in 1995 and 2007 divulged no pink mucket mussels or empty pink mucket mussel valves. A 2006 review indicated that Anthony's river snail has not been located within 10 mi. of the BLN site.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 5, Subsection 5.3.1.2.1, paragraphs 4, 5, and 6 as follows:

Only two federal- and state-listed protected species (Tables 2.4-5 and 2.4-6) identified through agency contacts (Section 2.4.2) possibly occur on or near the BLN site. The pink mucket mussel (*Lampsilis abrupta*) and Anthony's river snail (*Athearnia anthonyi*) have been found in the northern reaches of the Gunter'sville Reservoir. However, a 1995 survey adjacent to BLN revealed neither species (Section 2.4). A mussel survey performed in April, 2007 identified only common mussels in low densities (0.08 – 0.48 mussels/square meter) adjacent to the BLN site. Densities are too low to support commercial or recreational uses. Because few mussels exist adjacent to BLN, impacts from the intake system to resident mussel populations are expected to be SMALL.

Although protected species have not been located within the Gunter'sville Reservoir adjacent to the BLN site, the reservoir does support an active sport fishery. In the mid-1990s, estimations concerning sport fishing dollars funneled into the local economy from the Gunter'sville Reservoir was approximately 15 million.

Two thirds of anglers visiting the Guntersville Reservoir fish predominantly for largemouth bass, although sunfish, sauger, crappie and catfish also receive attention from anglers. To prevent over-harvesting of young, quickly growing bass, the minimum length limit was increased to 15 in. on October 1, 1993 (Reference 5). Although fish growth is largely dependent upon water temperature and food availability, on average largemouth bass in Alabama reach harvestable size at four years of age (Reference 6). Given the percentage of reservoir water necessary to cool the BLN, negative impacts to the fishery on Guntersville Reservoir are considered SMALL.

Entrainment of ichthyoplankton carries a 100% mortality rate. A study of ichthyoplankton and larval fish in the Guntersville Reservoir from 1977 – 1983 did not result in the collection of any species of special interest. The overwhelming majority (95 percent) of entrained ichthyoplankton were from freshwater drum (*Aplodinotus grunniens*), which are one of the only pelagic spawning fish species (Reference 7). However, egg characteristics of many fish species are such that they would not be entrained. Some Catostomidae species lay heavy eggs in open water, which sink to the bottom leaving them less vulnerable to current patterns (Reference 18). Species from families Catostomidae, Clupeidae, Cyprinidae, and Percidae (sauger) lay eggs with adhesive properties that stick to substrate such as logs or emergent vegetation and are not susceptible to directional flow (References 18 and 19). Some species of families Centrarchidae (sunfish, crappie, bass), Ictaluridae (catfish), and Cyprinidae display parental care by laying eggs in nests and guarding them until they hatch. (References 19, 20 and 21)

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

ER54: Species composition data is needed to verify statement that sampling near intake and discharge is not warranted. Details on Widows Creek Fossil Plant cooling system (design, water flow rate, etc.) are needed.

ER55: Need more information for tie-in to Widows Creek Fossil Plant as a surrogate and more information on species.

BLN COMMENT ID: ER54 and ER55

BLN RESPONSE:

Data on the Widows Creek Fossil Plant (WCF) intake system, including intake structure equipment, intake canals parameters, and measured and estimated water velocities, has been reviewed to ascertain that the WCF intake system is a suitable surrogate for the BLN intake system. In addition to other details, this information confirms that the design and operational factors that are critical to fish impingement (i.e., length and flow velocity) for the WCF and BLN intake canals are essentially similar, such that WCF fish impingement studies can provide surrogate data for BLN. The basis for accepting WCF data as surrogate data for BLN will be included in the ER, as noted below.

TVA conducted fish impingement studies at WCF in 2005 – 2006 and again in 2006 – 2007 (See Table 5.3-x). The impingement studies, along with species sample data at Tennessee River miles (TRM) 350.0, 375.2, 450.0, 410.0, and 424.0, provide surrogate data on species composition near the BLN intake structure and discharge area. The proposed ER change provided below includes a new table that shows species composition as a percentage of total number of fish impinged during the above study periods. Only major species impinged (i.e., number of impinged specimen equaled or exceeded 1 percent of the total number of fish impinged during the study period) are listed in the table.

Several studies conducted between 2000 and 2006 provide surrogate data on species composition near the BLN discharge as they demonstrate the similarity in species composition from TRM 350.0 to 424.0. These species data are presented in a new **Table 2.4-x5** that details the presence of species at TRMs 350.0, 375.2, 405.0, 410.0 and 424.0.

Given the abundance of surrogate species composition data available, it was determined that sampling near the BLN intake and discharge was not warranted.

ER subsections will be revised as described below to address WCF cooling and intake canal detail and impingement data and species composition.

During the review of information presented in Section 5.3, a discrepancy was identified with the inappropriate references to entrainment in the discussions of impingement studies. Specifically, in the seventh paragraph of ER Section 5.3.1.2.1, beginning with the fourth sentence, and continuing into the eighth paragraph, the terms “entrained” and “entrainment” were mistakenly used whereas the terms “impinged” and “impingement”, were, in fact, the more appropriate terminology and should have been used. The changes necessary to correct this discrepancy are included in the ER revisions provided with this response.

ASSOCIATED BLN COL APPLICATION REVISIONS:

1. Revise COLA Part 3, ER Chapter 5, Subsection 5.3.1.2.1, Paragraphs 7 and 8, as follows:

TVA owns and operates Widows Creek Fossil Plant (WCF), which is also located on Guntersville Reservoir, and owned and operated by the TVA. WCF is located between Tennessee River mile 406 and 408, approximately 15 mi. upstream from of the BLN site. The eight coal-fired units at WCF are divided into two groups; WCF Plant A is comprised of Units 1 through 6, and WCF Plant B is comprised of Units 7 and 8. The intake canal and intake structure for WCF Plant A are similar in length and design to those for BLN. The BLN intake canal is 1200 ft. long, and the intake canal at WCF is 1100 ft. in length. Both intake structures are equipped with trash racks and traveling screens and have a trash boom located at the intake canal entrance to protect the channel from floating debris. Plant operating maximum intake water velocity at the intake structure for WCF is 1.55 fps, whereas the BLN intake water velocity is estimated to be less than .5 fps.

Annual impingement information was collected from 2005 to 2007 for two both intake structures associated with WCF Plants A and B. Data from the 2005-2006 study and 2006-2007 study indicate threadfin shad is most susceptible to entrainment. Threadfin shad comprised 89 to 98 percent of total fish entrained for both intake units over two years. The closest seconds were the redear sunfish (2 percent entrained) and freshwater drum (2.9 percent entrained) in the 2005-2006 and 2006-2007 studies, respectively. Other fish entrained were below 2 percent of the total fish entrained. Because the intake structure for WCF Plant A is similar to that for BLN, the years of impingement monitoring at Plant A, along with species sample data taken at TRMs 350.0, 375.2, 450.0, 410.0, and 424.0 (Table 2.4-x5), provide surrogate species composition information for BLN. Study data indicate threadfin shad is the species most susceptible to impingement. Threadfin shad comprised 72 percent of fish impinged during the 2005 - 2006 study and 93 percent during the 2006 - 2007 study.

Bluegill and freshwater drum comprised a distant second-highest percentage (6 percent each) of fish impinged during 2005 - 2006, and yellow bass comprised a distant second-highest percentage (4 percent) of fish impinged during 2006 - 2007 (Table 5.3-x).

~~The two most vulnerable species to impingement and entrainment are threadfin shad and freshwater drum respectively.~~ Although threadfin shad is the species most vulnerable to impingement, other species present within Gunter'sville Reservoir appear able to largely avoid impingement and entrainment. However, threadfin shad and the freshwater drum have consistently been collected in population surveys indicating the operation of the WCF cooling system through the existing intake structure has not dramatically reduced populations of these fishes. Due to the difference in water velocity at the BLN intake compared to WCF, impingement at the BLN intake structure is expected to be of a similar composition but reduced magnitude from that shown for WCF. Population impacts stemming from impingement and entrainment of fish are, therefore, considered to be SMALL.

2. Revise COLA Part 3, ER Chapter 5, by adding **Table 5.3.x**, Species Percentage of Total Number of Fish Impinged, Widows Creek Impingement Study 2005 – 2007, as indicated on the following page:

Table 5.3-x

Species Percentage of Total Number of Fish Impinged

Widows Creek Impingement Study 2005 – 2007

<u>Species</u>	<u>June 2005 - 2006</u>	<u>June 2006 - 2007</u>
<u>Threadfin shad</u>	<u>72</u>	<u>93</u>
<u>Bluegill</u>	<u>6</u>	<u>1</u>
<u>Unidentified sunfish</u>	<u>5</u>	<u>1</u>
<u>Gizzard shad</u>	<u>2</u>	<u>=</u>
<u>Channel catfish</u>	<u>4</u>	<u>=</u>
<u>Freshwater drum</u>	<u>6</u>	<u>1</u>
<u>Largemouth bass</u>	<u>2</u>	<u>=</u>
<u>Yellow bass</u>	<u>3</u>	<u>4</u>

Dash denotes this was not a major species (i.e., <1%) that year.

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[NOTE: Table **2.4-x5** is referenced in this revision to ER Subsection 5.3.1.2.1. This is a new table that is added by the response to Comment ER50 and ER52.]

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

Are there "important" aquatic species present? Are the types, life stages, and relative abundance of impacted "important" biota etc. 5.3.2.2 more information needed to determine.

BLN COMMENT ID: ER56

BLN RESPONSE:

Subsection 5.3.2.2 is revised to reference important aquatic species discussion provided in Subsection 2.4.2. The U.S. Fish and Wildlife Service (USFWS) lists eight aquatic animal species for Jackson County, Alabama: pink mucket mussel, Anthony's riversnail, shiny pigtoe mussel, Alabama lampmussel, pale lilliput mussel, fine-rayed pigtoe mussel, slabside pearly mussel, and palezone shiner. However, USFWS identified only pink mucket mussel and Anthony's riversnail as potentially occurring within the project area. Surveys conducted in 1995 and 2007 in Guntersville Reservoir immediately adjacent to the BLN identified no pink mucket mussels or empty pink mucket mussel valves. The other seven species have not been identified or are not known to exist within 10 mi. of the BLN site.

State-protected, non-game species potentially occurring in Jackson County are eastern hellbender, green salamander, Tennessee cave salamander, and southern cavefish. Potential habitat for eastern hellbender does not occur on or adjacent to the BLN site. Green salamanders were identified within 3 mi. of the site, but none were identified on or immediately adjacent to the BLN site. Tennessee cave salamanders have not been identified within a 3-mi. radius of the BLN site. Southern cavefish have been located within 10 mi. of the BLN, but the cave habitat is not adjacent to the Tennessee River or any of the associated tributaries.

Table 2.4-4 lists state-recognized species of high conservation concern that potentially occur in Jackson County. Subsection 2.4.1.4.5 discusses terrestrial species of high conservation concern, and provides information on the availability of habitat for these species on or adjacent to the BLN site.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 5, Subsection 5.3.2.2, 4th paragraph, as follows:

The CORMIX model (Subsection 5.3.1.1) assumes worst case conditions when ambient water temperature in the Guntersville Reservoir is 39.2°F and the discharge temperature is 95°F. The plume is then 35 ft. in length and 232 ft. wide (Table 5.3-2). In summer months, when ambient reservoir temperatures can reach 88.5°F, thermal discharge mixes immediately, reducing the plume to 0.72 ft. in length and 124 ft. wide, at which point effects to biota, including important species outlined in Subsection 2.4.2, are expected to be negligible. Under all temperatures and water volume scenarios modeled, the plume is maintained well within 25 percent of the width of the reservoir.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Need references from Chapter 2 related to fish abundance in vicinity of discharge.

BLN COMMENT ID: ER57

BLN RESPONSE:

In meetings with the NRC reviewers at the site audit held at Bellefonte during the week of March 31, 2008, TVA's environmental staff and consultants presented copies of reports that were developed by TVA to assess fish abundance in its reservoirs. The following Vital Signs monitoring reports (2002, 2004, and 2006 [partial]) and Reservoir Fish Assemblage Index (RFAI) report were provided to the NRC reviewers at the Bellefonte site audit:

- Baker, T. "Aquatic Ecological Health Determinations for TVA Reservoirs – 2002: An Informal Summary of 2002 Vital Signs Monitoring Results and Ecological Health Determination Methods," with contributions by A. Brown, W. Hamberger, R. Hayden, K. Lakin, D. Lowery, E. Thornton, A. Wales, Tennessee Valley Authority, Resource Stewardship, September 2003.
- Baker, T. "Aquatic Ecological Health Determinations for TVA Reservoirs – 2004: An Informal Summary of 2004 Vital Signs Monitoring Results and Ecological Health Determination Methods," with contributions by A. Brown, R. Hallman, W. Hamberger, K. Lakin, D. Lowery, M. Moore, and A. Wales, Tennessee Valley Authority Resource Stewardship, June 2005.
- Lakin, K., D. Lowery, S. Malone, M. Moore, and A. Wales, "Aquatic Ecological Health Determinations for TVA Reservoirs – 2006: An Informal Summary of 2006 Vital Signs Monitoring Results and Ecological Health Determination Methods, Table 7. Scoring Result for the Twelve Metrics and Overall Reservoir Fish Assemblage Index (RFAI), Gunterville – 2006," coordinator T. Baker, Tennessee Valley Authority, Environmental Stewardship and Policy, June 2007.
- Tennessee Valley Authority, "Results of Biological Monitoring in the Vicinity of Widows Creek Fossil Plant during Autumn 2000 – 2002 and 2005 in Support of a Continued 316(a) Thermal Variance." Informal Summary Report.

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Based on discussions with the NRC reviewers at the site audit held at Bellefonte during the week of March 31, 2008, it is TVA's understanding that the these documents will satisfy the reviewers' needs regarding fish abundance references.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: ECOLOGICAL DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

Need reference related to 2007 survey for mussels and information specific to recreationally important species.

BLN COMMENT ID: ER58

BLN RESPONSE:

The 2007 mussel survey is documented in a report prepared by Mainstream Commercial Divers, Inc. for the environmental contactor that prepared the BLN ER. The April 2007 report is titled "Mussel Survey between Tennessee River Miles 390.8 – 392.4 for TVA's Bellefonte Power Plant in Jackson County, Alabama." A copy of this survey is provided as Attachment E1.

In addition to the 2007 mussel survey, during the site audit conducted at the Bellefonte site from March 31 to April 4, 2008, the NRC reviewers also requested a copy of a mussel survey that was performed in 1995. This 1995 survey was designed to provide information about the uses for the Bellefonte site that might include in-water construction. It was noted that Figure 1 was missing from the copy of the 1995 survey that was reviewed by the NRC staff. TVA was unable to locate a copy of Figure 1, which presumably depicts the locations of the transects that were searched in this survey. As the text in the body of this survey adequately describes the transect location and orientation, TVA believes that the information in this survey adequately summarizes the survey and the survey may be used, even without the missing figure. A copy of this survey is provided as Attachment E2.

Recreationally important species are addressed in the response to BLN Comment ER53.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

The following documents are included as Attachments E1 and E2, respectively:

- E1. Mainstream Commercial Divers, Inc. "Mussel Survey between Tennessee River Miles 390.8 – 392.4 for TVA's Bellefonte Power Plant in Jackson County, Alabama." 2007.
- E2. Tennessee Valley Authority. "Survey of Native Mussel Stocks Adjacent to the Bellefonte Nuclear Plant Site, Tennessee River Miles 390-392." 1995.

NRC Review of Environmental Report**Acceptance Review Comment****NRC Comment: WATER QUALITY**

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

There is a potential for dewatering during excavation and construction in areas where excavations will reach ~10 ft below the water table. However, potential dewatering efforts are not described or quantified in any detail.

BLN COMMENT ID: ER 59**BLN RESPONSE:**

TVA will develop a dewatering plan during NPDES permit review, prior to construction. The BLN Units 3 and 4 dewatering plan is expected to use dewatering methods that are similar to those employed during the construction of Units 1 and 2. Construction experience with Units 1 and 2 showed that seepage did not impact the condition of the foundation rock, and did not impact the excavation slopes. Consideration for groundwater orientation, characteristics of rock formations relating to groundwater in the excavation areas, and proposed dewatering methods for collection and pumping of groundwater seepage will be factored into the dewatering plan. Typical excavation dewatering practices (e.g., sumps and pumps at excavation low points) are expected to effectively control seepage during construction. Dewatering effluents are directed to the wastewater retention basin or Pond A prior to discharge at an NPDES-monitored location.

The effect on the environment is considered to be minimal. Seepage from the soil portions of the excavation slopes is expected to be slight due to the low hydraulic conductivity of the clay soils. Lowering of the perched groundwater in the soils is not expected to cause settlement of adjacent ground because the soil overlying the bedrock is mostly composed of stiff overconsolidated clays and the amount of water level reduction is slight. Additionally, by discharging dewatering effluent through BLN's cascading ponds, silt and other solids in the dewatering stream settle out in the pond rather than being released into Town Creek. Effluents released from the BLN site are monitored in accordance with conditions of the state NPDES permit. Based on the above, the impact of dewatering activities is considered SMALL.

ER Subsection 4.2.1 is revised to clarify dewatering methods considered during construction and to address the impact of dewatering activities.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 4, Subsection 4.2.1, to insert paragraph below between 3rd and 4th paragraph under heading "Power Station Area," as follows:

Groundwater characteristics of the excavation area, including groundwater level data, groundwater flow into nuclear island excavations, and rock formation content in relation to groundwater seepage, are used to evaluate the approach used for dewatering activities. Seepage from the soil portions of the excavation slopes is expected to be slight due to the low hydraulic conductivity of the clay soils. Lowering of the perched groundwater in the soils is not expected to cause settlement of adjacent ground because the soil overlying the bedrock is mostly composed of stiff overconsolidated clays and the amount of water level reduction is slight. Therefore, current construction plans do not call for extensive dewatering activities that could affect groundwater flow and quality. Dewatering methods similar to those used in the construction of Bellefonte Units 1 and 2 for collection and pumping of groundwater seepage will be considered. Typical excavation dewatering practices (e.g., sumps and pumps at excavation low points) are expected to effectively control seepage in excavated areas during construction. In addition, dewatering effluents are directed to the wastewater retention basin or Pond A prior to discharge at an NPDES-monitored location; thereby allowing silt and other solids in the dewatering stream to settle out in the ponds rather than being released to Town Creek. Effluents released from the BLN site are monitored prior to release to maintain compliance with the state NPDES permit. Based on the above, impact due to dewatering activities is considered SMALL.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: WATER QUALITY

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

Chemical concentrations are not provided on seasonal basis in Table 5.3-3.
Suspended solids information is not provided.

BLN COMMENT ID: ER60

BLN RESPONSE:

ER Table 5.3-3 provides cooling tower design data; information on chemical concentrations in the plant intake/discharge is discussed in other ER sections, as addressed below.

Concentration of chemicals and solids in the effluent stream is largely dependent upon three factors: concentrations of the constituents in the intake and receiving waters, quantities of chemicals added to the process stream, and concentration factors of the cooling systems. Information provided in the ER sections described below addresses the NUREG-1555 information and data needs pertaining to intake/discharge chemical concentrations.

Data from a full year of local surface water sampling is provided in Table ER 2.3-39. Subsection 2.3.3.1.2 provides a short discussion of local surface water quality, including a reference to Table 2.3-39. Data on solids is provided in Tables 2.3-39 and 2.3-16.

ER Subsection 3.4.1.1 provides descriptions of the Circulating Water System (CWS) and Service Water System (SWS). As noted in these system descriptions, the chemical concentration factor for the CWS cooling towers is three cycles of concentration and that for the SWS cooling towers is four cycles of concentration. When the reservoir water contains high levels of dissolved and suspended solids, the SWS may operate at three cycles of concentration in order to maintain circulating-water concentrations within design parameters. The concentration of river water contaminants in the discharge may be determined as the product of the levels in the raw water and the number of cycles of concentration.

ER Table 3.6-1 shows the chemicals used in each system, the amount used per year, the frequency of use, and the concentration in the waste stream discharged from two units. It is expected that the rate of chemical addition will vary throughout the year, and the amount of chemicals added will be dependent upon several factors such as intake or receiving water and climatic conditions. While the amount of chemicals to be added varies throughout the year, it is not reasonable to speculate on the quantities to be added at this time.

The effectiveness of chemical additions is based on several factors, including the characteristics of the surface water body, the resistance of the organisms being treated, etc. Because these factors are highly variable, chemical addition may involve several cycles of injection, sampling, and adjusting chemical quantities until the desired results are obtained. It is reasonable to assume that the annual quantities of chemicals listed in Table 3.6-1 are distributed consistently throughout the year. Furthermore, operation within the plant's NPDES permit provides reasonable assurance that any chemical contribution to the waste stream will not result in a significant adverse impact to aquatic biota.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: WATER QUALITY

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

No discussion of impacts of water level flux in Guntersville Res. or Town Creek Embayment.

BLN COMMENT ID: ER61

BLN RESPONSE:

Daily water withdrawals for BLN operations represent approximately 0.03 percent of the total volume of the Guntersville Reservoir at the minimum operating pool level of 593 ft. msl. This would result in a negligible (less than 1/100th foot per day) decrease in reservoir level due to BLN operations.

The water level fluctuation was determined based on an extremely conservative analysis (worst case) representing conditions that are unlikely to occur. These unlikely conditions assume no discharges from either Nickajack or Guntersville Dams (does not reflect dam operation schedule), no stream or return flows into the reservoir, and BLN water withdrawal at the maximum (start-up) rate. It is noted that water withdrawals for the BLN are extremely small when compared to the hydroelectric releases from Guntersville Dam. Water level fluctuation in Guntersville Reservoir would be reflected in Town Creek embayment, as the water bodies are connected.

ASSOCIATED BLN COL APPLICATION REVISIONS:

Revise COLA Part 3, ER Chapter 5, Subsection 5.2.2.1.1, fourth paragraph, to insert additional details and edits as follows:

Consumptive losses of this magnitude are barely discernible under normal circumstances (typical flows). Combined with other consumptive losses discussed earlier in this chapter, the BLN withdrawals constitute only a small cumulative effect on water supply. Water availability downstream of the BLN site during low-flow periods of operation of the BLN units at the BLN is considered to be of SMALL impact, because only about 1 percent of the river's flow is diverted and lost (Table 5.2-1). Daily water withdrawals for BLN operations represent approximately 0.03 percent of the total volume of the Guntersville Reservoir at the minimum operating pool level of 593 ft. msl. This corresponds to a negligible fluctuation (less than 1/100th foot per day) in reservoir level due to BLN operations. River level associated with consumptive water losses resulting from two-unit operations does not affect recreational boating in summer, when river use is at its highest, even during

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extreme low-flow conditions. At this level of consumptive water use, impacts to river level is considered to be SMALL and mitigation is not warranted.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SOCIOECONOMIC DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comments:

Section 4.4.1.3 expects roads adequate to handle construction activities, but 4.1.1.1 indicates that the construction of new roads, both temporary and permanent, are planned, but provides no additional detail.

BLN COMMENT ID: ER62

BLN RESPONSE:

These two ER subsections address different sets of roads. ER Subsection 4.1.1.1 describes construction activities within the BLN site. The new on-site roads to be constructed for BLN are discussed in this subsection and shown in Figure 3.1-6.

ER Subsection 4.4.1.3 describes the socioeconomic (transportation) impacts of construction. The roads discussed in this subsection are public, off-site roads. These roads were determined to be adequate.

ASSOCIATED BLN COL APPLICATION REVISIONS:

None.

ATTACHMENTS:

None.

NRC Review of Environmental Report

Acceptance Review Comment

NRC Comment: SOCIOECONOMIC DATA

During the NRC's acceptance review of the BLN COL application, the staff provided the following comment:

Section 5.8.2.3.1 does not consistently reflect that in most cases transition to the operations stage will require downsizing, rather than a further increase in capacity in local infrastructure.

BLN COMMENT ID: ER64

BLN RESPONSE:

Subsection 5.8.2.3.1 is revised to incorporate the changes associated with the transition from construction to operation.

ASSOCIATED BLN COL APPLICATION REVISIONS

Replace COLA Part 3, ER Subsection 5.8.2.3.1, with the following text:

5.8.2.3.1 Social and Public Services

Water Supply Facilities

Subsection 2.5.2 describes the public water supply systems in the area, their capacities, and current demands. Subsection 4.4.2.3 describes the public water supply system usage during construction. The BLN site is not anticipating the use of groundwater as a safety-related water source, and it does not plan to use groundwater as its primary water supply resource for any purpose. Potable water is supplied by the Scottsboro Municipal Water System, operated by the city of Scottsboro, Alabama.

The demand on potable water utilities is anticipated to decrease during operation at the BLN site. Taking into consideration the estimated number of operational workers (850) with families moving into Jackson County, the population is expected to decrease by 4300 people (estimated construction population increase [6000], minus the result of multiplying one-half of the anticipated operational workers by the estimated family size of four [1700]). During operation, the Scottsboro Municipal Water System would use approximately 77 percent (6.2 Mgd) of its normal capacity of 8 Mgd. It is anticipated that the average per capita amount of water consumed per day is 90 gal. (Reference 3). Based on these values, an overall decrease in consumption is anticipated at approximately 387,000 gal., from the construction phase to the operational phase. This represents a reduction of 5 percent usage of system capacity.

The current maximum capacities for the potable water supplies would not be reached during the peak construction phase, the period of highest use of service. Because the Scottsboro Municipal Water System is expected to be capable of handling the additional water use for construction, capacity is not expected to be reached during operation, when water demand decreases and approaches preconstruction levels.

Impacts to municipal water supplies from the operations-related population increase are considered SMALL and mitigation is not warranted.

Wastewater

Wastewater treatment is provided by the city of Scottsboro, Alabama. Currently, there are five wastewater treatment systems in the county, the largest of which is operated by the city of Scottsboro, Alabama. This plant has a maximum capacity of 5 Mgd. Estimated wastewater amounts for operations are based on expected water supply usage. With the understanding that some water is lost before it reaches the wastewater treatment facility due to watering lawns, evaporation, etc., the values for wastewater are conservative.

During the construction phase, the wastewater treatment facility operated by the city of Scottsboro is expected to operate at 91 percent of its capacity or 4.5 Mgd. Following construction, during reactor operation, facility use is anticipated to drop to 83 percent or 4.2 Mgd, which is 3 percent more than the wastewater system's current, preconstruction use of 4 Mgd.

The current maximum capacity for the wastewater treatment facility is not expected to be surpassed during the peak construction phase, the period of greatest use of services. Because this facility is expected to process the increased wastewater produced during construction without a change in capacity, no anticipated capacity increases are expected during operation. Indeed, wastewater production during operation is anticipated to approach preconstruction levels.

Based on system capacity and expected utilization, impacts to wastewater treatment facilities from an operations-related population increase are considered SMALL and mitigation is not warranted.

Police and Fire Protection Services

Because the number of police officers is not expected to increase during construction or operation, the resident-to-police officer ratio is anticipated to be 583 persons per officer during operation, a decrease of 45 persons per officer from the construction period. According to the U.S. military, resident-to-police ratios should be between 1 and 4 officers per 1000 citizens, or 250 to 1000 persons per police officer (Reference 14). Construction and operation values fall within these ratios.

TVA Letter Dated: May 2, 2008

Responses to Environmental Report Acceptance Review Comments

Because the number of firefighters is not expected to increase during construction or operation, the resident-to-firefighter ratio is anticipated to be 127 persons per firefighter during operation, a decrease of 10 persons per firefighter from the construction period. The derived resident-to-firefighter ratio for the United States in 2006 was 262 residents per firefighter (References 15 and 16).

Even with the anticipated increase and decrease of population in Jackson County due to construction and operation, the predicted ratios for persons per police officers and persons per firefighters fall within cited national values. Potential impacts of the BLN operations are considered SMALL, and mitigation is not warranted.

Medical Services

In Jackson County, the ratio of primary-care-physicians-to-persons ratio is 6.2 doctors per 10,000 people; however, the state ratio for rural areas is 5.74 doctors per 10,000 people. Jackson County is considered to be an area with a physician shortage. Alabama's shortage of physicians is a state-wide problem (Reference 17).

The construction and operation of the BLN station is expected to stimulate the local economy and make the area more attractive to physicians and medical investors. Because the county is currently experiencing a shortage, an excess of physicians is not anticipated during the transition from the construction phase to the operational phase of the BLN. Minor injuries to operations workers are assessed and treated by on-site medical personnel. Other injuries are treated at Highland Medical Center (Subsection 2.5.2.).

Based on these factors, the impact of plant operations on medical services is considered SMALL and mitigation is not warranted.

Revise COLA Part 3, ER Subsection 5.8.4, by adding the following references:

14. Broemmell, Major J., Major T. L. Clark, and Major S. Nielsen, U.S. Army, "The Surge Can Succeed," *Military Review*, July-August 2007, p. 110.
15. National Fire Protection Association, Fire Service Statistics, Website, <http://www.nfpa.org/itemDetail.asp?categoryID=417&itemID=18246&URL=Research%20%20Reports/Fire%20reports/Fire%20service%20statistics>, accessed March 4, 2008.
16. U.S. Census Bureau, State & County QuickFacts USA, Website, <http://quickfacts.census.gov/qfd/states/00000.html>, accessed March 11, 2008.
17. Alabama Rural Health Association, Alabama Rural Health Report "Selected Indicators of Rural Health Status in Alabama," March 2003, Website, <http://www.arhaonline.org/PDF%20Files/RHRv3no1.PDF>, accessed April 27, 2008.

Enclosure
TVA Letter Dated: May 2, 2008
Responses to Environmental Report Acceptance Review Comments

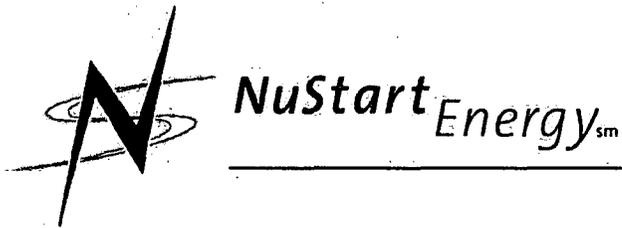
Page 99 of 99

ATTACHMENTS:

None.

SHPO Correspondence Omitted from BLN COLA Part 3, ER Appendix A

- Letter from Richard J. Grumbir, NuStart Energy Consortium, to Robert Thrower, Tribal Historic Preservation Officer, Poarch Band of Creek Indians, "NVA/NuStart Bellefonte Project, Request for Information on Cultural, Historic, and Archaeological Resources," dated August 28, 2006.
- Letter from Thomas O. Maher, Ph.D., Tennessee Valley Authority, to Ms. Elizabeth A. Brown, Deputy State Historic Preservation Officer, State of Alabama, Alabama Historic Commission, Explains TVA/NuStart/Enercon project roles, dated September 7, 2006.
- Letter from Thomas O. Maher, Ph.D., Tennessee Valley Authority, to Deborah Luchsinger, Ph.D., Enercon Services, Inc., "Bellefonte NuStart Energy Development Project Area of Potential Effects," dated September 14, 2006 (copy to Ms. Elizabeth A. Brown, Alabama SHPO).
- Letter from Thomas O. Maher, Ph.D., Tennessee Valley Authority, to Colonel John Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, "AHC 2006-1211; Bellefonte NuStart Energy Development; Jackson County," dated April 17, 2007.
- Letter from Colonel (Ret.) John A. Neubauer, State Historic Preservation Officer, State of Alabama, Alabama Historical Commission, to Diane A. Cargill, Cargill Archaeological Services, "AHC 06-1211, Jackson Camp, Bellefonte Nuclear Site, Jackson County, Alabama," dated July 26, 2007.



August 28, 2006

Mr. Robert Thrower
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road
Atmore, Alabama 36502

Subject: TVA/NuStart Bellefonte Project
Request for Information on Cultural, Historical, and Archeological
Resources

Dear Mr. Thrower:

As you may know, NuStart Energy Development LLC has selected TVA's Bellefonte site in Jackson County, Alabama, as one of two sites that will be the subject for applications for an advanced technology nuclear power plant. NuStart is a consortium of two nuclear reactor vendors and ten electric utility companies, including TVA, working together to demonstrate the combined Construction and Operating License (COL) process for advanced reactor designs in support of potential future construction and operation decisions.

While TVA has not committed to building a nuclear plant at the site, NuStart's work will provide TVA and its other members with detailed information regarding the licensing process as well as additional studies that will support the decision making process for future nuclear plant construction. NuStart is doing the preliminary work needed to apply for a combined construction and operating license from the Nuclear Regulatory Commission (NRC) at Bellefonte, and we have contracted with Enercon Services, Inc to complete much of the environmental and emergency planning work needed in the license application.

With this letter, NuStart is requesting information regarding your requirements for additional Section 106 consultation in support of the analysis of potential environmental impacts from the proposed activity. It is our strong desire to accurately depict the local cultural, historical, and archeological resources and work together to preserve any of these aspects, including traditional cultural properties (TCP).

With that perspective, Enercon has reviewed existing information and determined that the 1,600-acre Bellefonte site currently contains two partially-completed pressurized water reactors that were never put into use. The Bellefonte site is situated on a peninsula of the Tennessee River, on the western shore of Guntersville Reservoir, northeast of Scottsboro, Alabama. The primary land uses in the surrounding area are forestry and agriculture; however, urban-industrial development has grown over the past

several years around the plant along the Guntersville Reservoir. Guntersville Lake on the Tennessee River would be used as the source of makeup water for a Bellefonte nuclear plant. The site is already zoned as industrial. About 900 acres of the Bellefonte site have been developed with buildings and facilities, roads, parking lots or other uses related to the previous nuclear option. Approximately 20 acres are currently used by a local farmer for hay production. The remaining approximately 600 acres are in various stages of grassland or forest combination, with perhaps 200 acres that would be considered forest.

In accordance with the U.S. Nuclear Regulatory Commission regulations for submitting a COL application, NuStart is currently preparing an Environmental Report. Among other key aspects, the Environmental Report will assess the impact of the construction and operation of the nuclear power generation facility on properties within the proposed site that are listed in or eligible for inclusion in the *National Register* or are included in Alabama or local registers or inventories of historic and archaeological resources. This assessment includes traditional cultural properties.

The initial archeological reconnaissance of the 1,600 acres was conducted in 1972. As a result of this initial survey and subsequent assessments, two sites discovered during the pre-inundation archaeological survey of Guntersville Lake in 1936 (1JA978 and 1JA112) were verified and three additional sites were discovered (1JA300-302). Site 1JA978 was noted in the riverbank and contains both Archaic and Woodland components; 1JA112 is on a natural levee adjacent to the original riverbank and is primarily inundated and cultural affiliation could not be determined. Site 1JA300 covers an area of approximately 200- by 250-feet on a knoll adjacent to a small unnamed inlet that serves as the plant intake for make-up cooling water. The site contains Archaic, Woodland, and Mississippian components. Site 1JA301 consists of surficial remains from the Archaic on a knoll adjacent to two limestone hills. Site 1JA302 consists of a Woodland component in the northeast edge of the peninsula near the confluence of Town Creek and the Tennessee River and is potentially eligible for inclusion in the National Register of Historic Places. Since site 1JA300 was going to be adversely impacted by the construction of the original plant intake structure and an access road, data recovery excavations were conducted in 1973 by the University of Alabama.

Previous archival record search, field verification, and prior discussions with the Alabama Historical Commission deduced that the only historical site of potential significance was the original town site of Bellefonte. All structures associated with the original Bellefonte town site, including the 1845 Tavern and Inn, have been removed since 1974 when it was initially determined that the town site was eligible for placement on the National Register of Historic Places. The former town site is on the north side of and adjacent to Jackson County Highway 33, between U.S. 72 and the project Bellefonte project site. The town site is not on TVA property, and the buildings were removed by the owners.

Construction activities for the plant and ancillary facilities would not adversely affect the identified cultural, historic, or archeological properties. Additionally, no artifacts were discovered during extensive construction activities already completed for this site.

Please let us know if we should consider any other nearby historic, archaeological or cultural resources, including TCPs, under your legal jurisdiction in our analysis. Attached to this letter are several figures for reference, including a photograph of the site

showing current conditions, a topographic map, and an aerial photograph with the new plant outline. Personnel from Enercon Services, Inc will likely follow up on this letter to ensure any potential questions or requests for additional information are adequately addressed.

Thank you very much for your support and assistance. If you have questions regarding the environmental impact assessment effort, please contact Dr. Deborah Anne Luchsinger of Enercon, 303-927-6501 or dluchsinger@enercon.com. Should you have any questions regarding the entire NuStart COL demonstration project, please contact the NuStart communications team leader Carl Crawford, 601-368-5658. Written comments can be submitted to:

Dr. Deborah Luchsinger
Enercon Services, Inc.
6500 Crestbrook Drive
Morrison, Colorado 80465

We look forward to hearing from you at your earliest convenience.

Very truly yours,

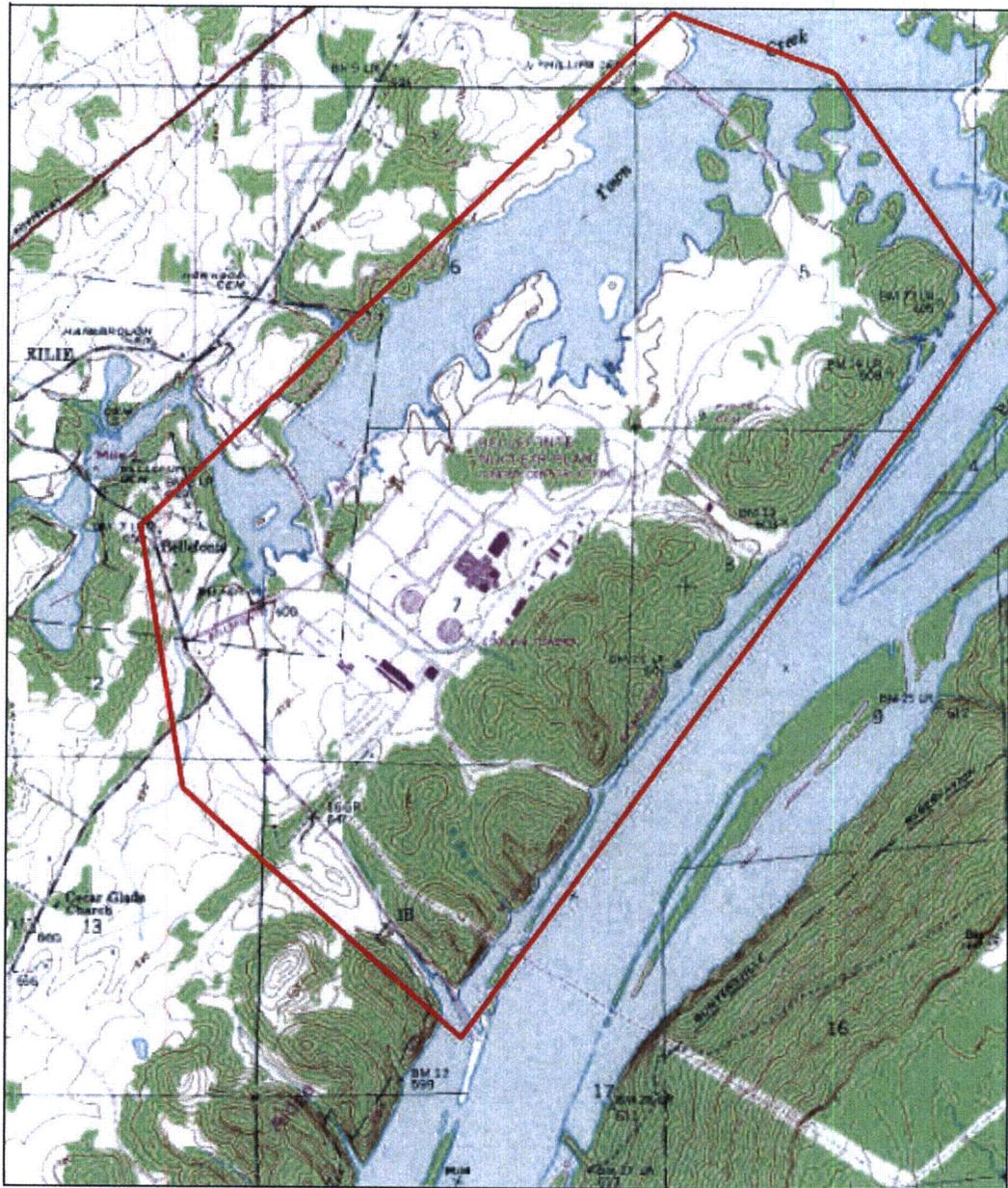


Richard J. Grumbir, AP1000 Project Manager
NuStart Energy Consortium

Enclosures: 1) Topographic Map
2) Aerial Photograph
3) Photograph

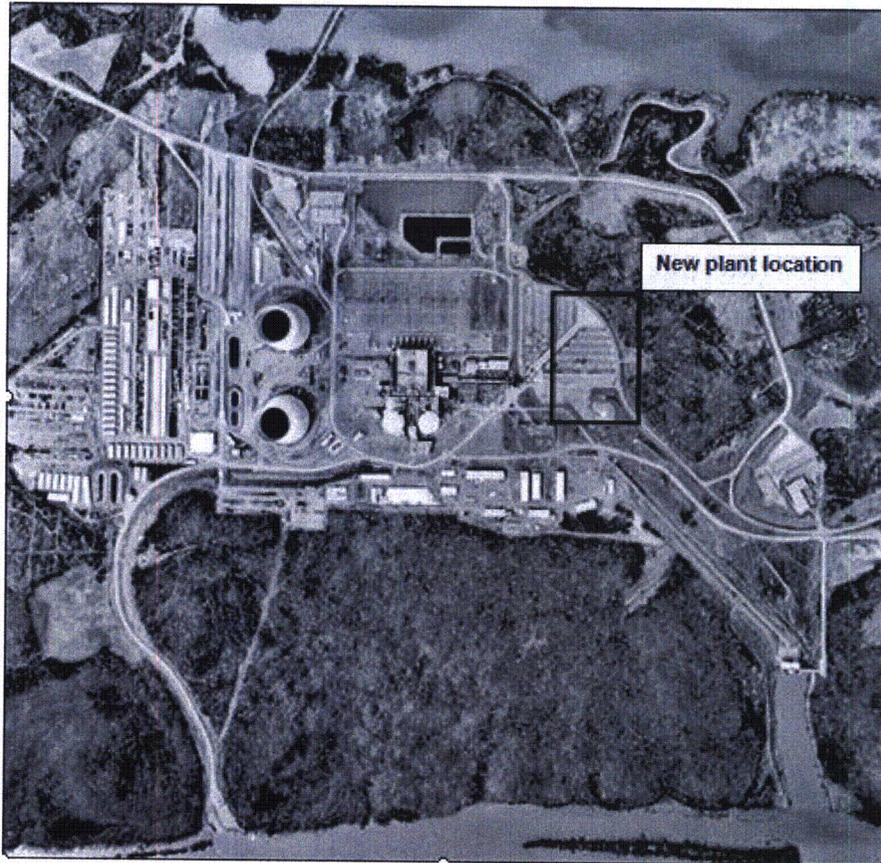
cc: Jack A. Bailey
James S. Chardos
B. J. Gatten

ENCLOSURE 1: Topographic map of the Bellefonte area.



Reference: USGS Hollywood Quadrangle, Jackson County, Alabama

ENCLOSURE 2: Aerial photograph of the Bellefonte site.



ENCLOSURE 3: Photograph showing current conditions at the site.





Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1401

September 7, 2006

Ms. Elizabeth Ann Brown
Deputy State Historic Preservation Officer
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900

Elizabeth
Dear ~~Ms.~~ Brown:

I would like to notify you about activities involving TVA's Bellefonte plant site near Scottsboro, Alabama. You may be, or have been, contacted by NuStart Energy Development (NuStart) or its environmental contractor, ENERCON. They are preparing an application for approval of an advanced nuclear plant at the Bellefonte site. This is an unusual situation and requires some explanation.

NuStart is a consortium of two nuclear reactor vendors and nine member electric companies, including TVA. The objective of NuStart's activities is to demonstrate the feasibility and efficiency of a new combined construction and operating license (COL) process established by the Nuclear Regulatory Commission (NRC) by submitting a COL application to NRC for approval. Various groups and companies are competing for funding being offered by the U.S. Department of Energy to do this. The Bellefonte site is one of the sites NuStart is using for this demonstration. Actual construction of a plant is not part of NuStart's activities, but the objective of this demonstration is to obtain NRC approval to construct and operate a plant.

Under NRC licensing guidelines, applicants are required to submit an Environmental Report (Report) to NRC. This report is similar to an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA), and it addresses many of the same things as an EIS, including potential impacts on cultural resources. NRC uses information in the Report to conduct its NEPA review process. NRC also uses the information to conduct other required processes, including the Section 106 process under the National Historic Preservation Act.

TVA fully supports the NuStart efforts and our participation in this process, so far, has included providing ENERCON information regarding the Bellefonte site to facilitate the consultant's preparation of the license application and the Report. The license application may list TVA as the applicant because TVA controls the Bellefonte site, but TVA has not decided to construct a new plant on the site or allow others to use the site. If TVA proposes to do this in the future, we would initiate consultation with your office in accordance with Section 106. In the meantime, we plan to work with ENERCON to ensure that it appropriately identifies potential impacts on cultural resources.

Ms. Elizabeth Ann Brown
Page 2
September 7, 2006

If you wish to discuss this further, do not hesitate to contact me (865-632-7452) or our tribal liaison, Pat Bernard Ezzell (865-632-6461).

Yours truly,

A handwritten signature in black ink, reading "Thomas O. Maher". The signature is written in a cursive style with a long, sweeping underline.

Thomas O. Maher, Ph.D.
Manager, Cultural Resources
Environmental Stewardship and Policy
WT 11D-K



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1401

September 14, 2006

Dr. Deborah Luchsinger
ENERCON Services, Inc.
6500 Crestbrook Drive
Morrison, Colorado 80465

BELLEFONTE NUSTART ENERGY DEVELOPMENT PROJECT AREA OF POTENTIAL EFFECTS

Dear Dr. Luchsinger:

Please find enclosed copies of TVA's recommendation for the area of potential effects (APE) and the area that we feel should be included in an archaeological survey. This decision was based on the following factors:

- The true extent of ground disturbing activities within the identified APE that may occur as a result of construction (such as laydown yards, equipment staging areas, borrow and spoil locations, required security features, etc.) is not known at this time. By creating a larger APE, it can be ensured that all historic properties will be identified in areas that may be included in such activity.
- There is some belief among local residents that a Civil War site is located in the upland area adjacent to the plant site. Identifying any potentially significant resources such as this will help address potential public concern that may be submitted during the Nuclear Regulatory Commission public meetings.
- One known National Register eligible archaeological resource is located adjacent to the intake structure. The current conditions of this site need to be assessed to determine whether any future plant activities may have an effect on the site.
- A larger APE will allow for potential changes in the scope of the project.

At this time, TVA does not think that an archaeological survey will be necessary for the existing de-energized transmission lines. TVA has conducted a preliminary review of these lines and does not believe that major maintenance will be required to activate these lines. Should this change in the future, a Sensitive Area Review of areas proposed for major maintenance can be conducted to identify historic properties that may be affected. I can provide you a copy of the process TVA uses to do this so that it can be included in the environmental review if you think this would be helpful.

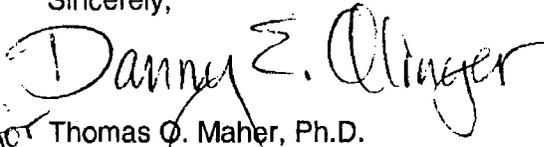
We are copying the Alabama State Historic Preservation Officer (SHPO) on this letter. Please let us know if additional correspondence from TVA regarding the APE is necessary and keep us apprised of any future discussions and copy us on any correspondence with the SHPO about this.

Dr. Deborah Luchsinger
Page 2
September 14, 2006

Because ENERCON is commissioning the Phase I archaeological survey at the Bellefont site, it will be necessary for the archaeological contractor to obtain a permit from TVA under the Archaeological Resources Protection Act prior to conducting the survey. This is not a difficult process, the consultant will need to submit their proposal to our office for review, and we will administer the permit within a few days.

If you have any questions, please contact Erin Pritchard at (865) 632-2463 or by e-mail at eepritchard@tva.gov, or contact Danny Olinger at (865) 632-3468 or by e-mail at deolinger@tva.gov.

Sincerely,


for Thomas O. Maher, Ph.D.
Manager, Cultural Resources

Enclosures

cc: Ms. Elizabeth Ann Brown
Deputy State Historic Preservation Officer
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1499

April 17, 2007

Colonel John Neubauer
106 Coordinator
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900

Dear Colonel Neubauer:

AHC 2006-1211; Bellefonte NuStart Energy Development; Jackson County

As per our previous discussion with your office (enclosed letter dated September 7, 2006), the Tennessee Valley Authority (TVA) is a participant in the NuStart Energy Development proposal to submit an application to the Nuclear Regulatory Commission (NRC) for a combined construction and operating license at the TVA-owned Bellefonte Nuclear Site (BLN) in Jackson County, Alabama.

In a previous letter dated January 8, 2007, Cargill Archaeological Services, LLC, under contract with ENERCON Services, Inc., reported the findings and recommendations of a Phase I archaeological survey performed by TRC, Inc. (TRC). TRC identified one new archaeological site (1Ja1103) and attempted to relocate four previously recorded archaeological sites (1Ja111, 113, 300, and 301). TRC recommended site 1Ja111 as potentially eligible for listing in the National Register of Historic Places (NRHP). Sites Ja113, 300, 301, and 1103 were recommended as ineligible for listing in the NRHP due to total site destruction and/or lack of integrity.

In a letter response dated January 31, 2007, the Alabama State Historic Preservation Officer (SHPO) agreed with the recommendation that site 1Ja111 is potentially eligible, but disagreed with the ineligible recommendation for site 1Ja1103 due to lack of sufficient research. No official eligibility determinations have been made for these sites by NRC or TVA at this time.

TVA is submitting this letter of assurance to the SHPO that all sites recommended as potentially eligible or eligible for listing in the NRHP, will be avoided and protected by the following measures in the event that the BLN site is selected:

Colonel John Neubauer
Page 2
April 17, 2007

- A 50-foot protective buffer will be established around each site which will be further protected by an obstructive barrier;
- The obstructive barrier will consist of construction fencing or temporary chain link fencing; and
- A sign will be posted informing personnel that an archaeological resource protected under the Archaeological Resource Protection Act is present.

With these measures in place, TVA believes that these sites will not be adversely affected by future construction activity. If avoidance is not possible, TVA will require Phase II testing to determine the sites' NRHP eligibility status. In the event that future construction and/or maintenance activities at the BLN are determined to potentially effect these sites (once final approval of the project has been made by TVA), TVA will coordinate these activities with your office pursuant to Section 106 of the National Historic Preservation Act.

If you have any questions regarding this project, please contact Ted Wells at ewwells@tva.gov or 865-632-2259.

Sincerely,



Thomas O. Maher, Ph.D.
Manager
Cultural Resources

Enclosure



STATE OF ALABAMA
ALABAMA HISTORICAL COMMISSION
468 SOUTH PERRY STREET
MONTGOMERY, ALABAMA 36130-0900

COLONEL (RET.) JOHN A. NEUBAUER
EXECUTIVE DIRECTOR

July 26, 2007

TEL: 334-242-3184
FAX: 334-240-3477

Diane A. Cargill
Cargill Archaeological Services
619 Tantra Drive
Boulder, Colorado 80305

Re: AHC 06-1211
Jackson Camp
Bellefonte Nuclear Site
Jackson County, Alabama

Dear Ms. Cargill:

Upon consultation with your office, we have determined the following. We continue to agree that site 1Jal103 is not eligible for the National Register and that site 1Jal111 is eligible for the National Register and should be avoided. Furthermore, we agree that the proposed avoidance methods outlined on page 2 in Dr. Tom Maher's letter of April 17, 2007 will adequately protect this site. Therefore, we agree with the project proceeding. However, should any cultural resources be discovered during project activities, work shall cease in that area and our office shall be notified immediately.

We appreciate your continued efforts on this project. Should you have any questions, my point-of-contact for this matter is Greg Rhinehart at (334) 230-2662. Please have the AHC tracking number referenced above available and include it with any correspondence.

Sincerely,

Colonel (Ret.) John A. Neubauer
State Historic Preservation Officer

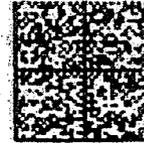
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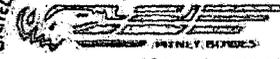
CC: Dr. Thomas O. Maher
TVA
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

STATE OF ALABAMA of Alabama
ALABAMA HISTORICAL COMMISSION Ops
468 SOUTH PERRY STREET
P.O. BOX 300900
MONTGOMERY, ALABAMA 36130-0900

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BOULDER CO 80305

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RESPONSE TO ENVIRONMENTAL REPORT SUFFICIENCY REVIEW
Attachment B, Methodology
May 2, 2008

**Bellefonte Nuclear Plant
Environmental Justice Impact Assessment
Methodology and Findings**

Tennessee Valley Authority

April 2008

Bellefonte - Environmental Justice Impact Assessment Methodology and Findings

Environmental Justice Policy Overview

In the Bellefonte Nuclear Plant, Units 3 and 4 (BLN) COLA Environmental Report (ER), TVA based its environmental justice analysis on federal guidance, including NUREG-1555, *Environmental Standard Review Plan*, and guidance provided by the Council on Environmental Quality.

TVA recognized in its analysis that environmental justice refers to a federal policy under which each federal agency identifies and addresses, as appropriate, disproportionately high and adverse human health or environmental effects of its program, policies, and activities on minority or low-income populations.

Identification of Minority and Low-Income Populations

The methodology suggested by the guidance calls for the identification of minority and low-income populations located on or near the proposed site. TVA conservatively selected the 50-mile region surrounding the BLN site as the environmental impact areas for the EJ analyses. This methodology and results are detailed in Subsection 2.5.4 of the BLN ER.

Concentrations of Minority or Low-income Populations

Using the results of the methodology for identifying minority and low-income populations, ESRI ArcGIS 9 mapping software, and public data, including U.S. Census Bureau 2000 data, the BLN region was searched to identify locations of minority or low-income populations. The resulting maps are presented in the BLN ER as Figures 2.5-9 through 2.5-28.

Identification Process for Uniquely Vulnerable Populations

NRC guidance (NUREG-1555) recommends the identification of any unique economic, social, or human health circumstances and lifestyle practices of minority and low-income populations that could result in disproportionately high and adverse impacts to these populations from plant construction and operation. Such circumstances and practices may include, for example, concentrations of minority or low-income populations within a compact area (e.g., Native American settlement), exceptional dependence on subsistence resources, or pre-existing health conditions within a community that might make it more susceptible to potential plant-related impacts.

Subsistence Resource Evaluation

The U.S. Department of Agriculture (USDA) Forest Service has conducted research regarding the practice of contemporary subsistence on public lands. USDA research is based on available peer-reviewed literature and interviews with resource managers, sociologists, etc. The USDA stresses the difficulty in finding quantifiable statistical data on the practice, outside of the state of Alaska. In a report cited by the USDA, research was conducted by Auburn University in 1992 and 1993, in which Alabama freshwater anglers were surveyed regarding personal consumption of their catch. The study

Bellefonte - Environmental Justice Impact Assessment Methodology and Findings

concluded that reliance on subsistence from fishing exists in the state. But no USDA or state population numbers were found that directly associates the practice with any TVA identified minority or low-income populations within the BLN vicinity or region. (Emery, et. al., U.S. Department of Agriculture, 2004)

Because of a lack of national or state data on subsistence populations, various organizations were contacted to locate and assess uniquely vulnerable minority and low-income populations that practice subsistence. Local county services and organizations provide another means of identifying subsistence populations. Managers of these services and organizations are closest to the communities and may have knowledge of cultural practices that could help identify these populations in ways that federal or state databases and current literature do not. However, when contacted, the agency and organizations either provided no response to the information requests or the responses produced no information that would help identify subsistence populations. In the event that the contact was not initially available, multiple contact attempts (via telephone or e-mail, if available) were made. The following local and county agencies and organizations were contacted:

Cherokee Tribe of Northeast Alabama (Cherokees of Jackson County)	(256) 593-8102
City of Hollywood, Alabama	(256) 259-4845
City of Scottsboro, City Hall	(256) 574-3100
Jackson County Agriculture Extension Office	(256) 574-2143
Jackson County Chamber of Commerce	(256) 259-5500
Jackson County Economic Development Authority	(256) 574-1331
Jackson County Emergency Management	(256) 574-9344
Jackson County Health Department	(256) 259-4161
Scottsboro Public Library	(256) 574-4335
Scottsboro-Jackson Heritage Center	(256) 259-2122
U.S. Department of Agriculture - Jackson County Local Office	(256) 638-7423

Research was extended further to contacting local sporting goods and bait and tackle shops in an effort to help identify subsistence populations that historically supplement their food supply through hunting and fishing. When such businesses were contacted, their responses produced no pertinent information that would help identify subsistence populations, or there was no response to the information request. The following businesses were contacted:

- Big Daddy's Outdoor Inc. (256) 495-9225
- Goose Pond Colony, Bait and Tackle Store (256) 574-1083
- Kirks Pro-Am Inc. (256) 259-1402
- Scottsboro Gun & Pawn Shop (256) 259-0693
- Southern All-Sports (256) 574-6755

Bellefonte - Environmental Justice Impact Assessment Methodology and Findings

Pre-existing Health Conditions

The Center for Disease Control (CDC) has national data that identify examples of health disparities in vulnerable populations by minority or race. The most frequently cited specific illnesses noted in the health profiles for the various minority groups include cancer, diabetes, heart disease, and stroke (CDC, Office of Minority Health & Health Disparities, 2000).

BLN ER Section 4.4.1.6 states, "While emissions from construction activities and equipment are unavoidable, a mitigation plan minimizes impacts to local ambient air quality and the nuisance impacts to the public in proximity to the project, particularly the residents living at Creeks Edge." Because these impacts could potentially reach adjacent properties, the possibility of disproportionately impacting minority and low-income populations was evaluated. Of the potential health-related pathways, asthma was the only disease identified with a pathway related to the construction impact described above. No other pathways related to the impacts listed in the ER were identified as being potentially aggravated by site construction or operation. Nationally, the CDC reports Puerto Ricans have the highest overall asthma prevalence rate. "When only race is considered, American Indians, Alaska Natives, and black people had a 25% higher prevalence than white people." (Center for Disease Control, 2003-05) No CDC data profiling pre-existing health conditions were found specific to Jackson County, Alabama, or the counties in the BLN region.

The Alabama Department of Public Health provides county-level reports, including the Jackson County 2006 Health Profile. (Alabama Department of Public Health, 2006) An additional report contains Jackson County data on death rates for the year 2005, differentiated by cause of death, race, and gender. Asthma is not mentioned in the Jackson County 2006 Health Profile. The deaths and death-rates list asthma as the cause of death for one white woman in 2005 (Alabama Department of Public Health, 2005). No other Alabama Health Department data profiling pre-existing health conditions was found specific to Jackson County, Alabama, or the counties in the BLN region.

Vulnerable Populations Summary

Based on the demographic and environmental justice analyses set forth above, TVA is not aware of any subsistence resource dependencies, practices, or other circumstances, that could result in disproportionate impacts to minority or low-income populations.

Indeed, the foregoing analysis suggests that such disproportionate impacts are unlikely given the observed distribution of low-income and minority populations within the BLN vicinity and region. Specifically, TVA identified no low-income populations within two miles of the BLN center point where potential plant-related impacts would be expected to be most significant. Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN ER describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks.

Bellefonte - Environmental Justice Impact Assessment Methodology and Findings

As reflected in ER Figures 2.5-27 and 2.5-28, low-income populations identified within the BLN region are located primarily within urban areas, where subsistence dependence on natural resources (e.g., fish, game, agricultural products, and natural water sources) is difficult to identify or quantify. To the extent that fishing, hunting, or gardening occur in the BLN vicinity or region, it is difficult to differentiate between those activities which are recreational in nature as opposed to those which are subsistence practices. No quantifiable data have been identified that associates subsistence practices with any TVA-identified minority or low-income groups.

ER Impact Assessments and Potential Environmental Justice Pathways

NUREG-1555 recommends that environmental justice analyses include input from several sections in the ER to be used as the basis for establishing potential environmental justice pathways. The purpose of using these inputs is to compare all potential impacts related to construction (ER Chapter 4) or operation (ER Chapter 5) to the inventory of low-income and minority populations, and their locations as described in ER Subsection 2.5.4.

For ER Chapters 4 and 5, NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, was used for quantification purposes only in impact assessments and not as the basis of analysis in categorizing impacts. NUREG-1437 operational plant case studies were not utilized in the BLN ER sections. BLN impact evaluations reflect site-specific analysis of socioeconomic interactions relating to construction and operations activities. Throughout ER Chapters 4 and 5, impacts are categorized as SMALL, MODERATE, or LARGE based on the following NUREG-1437 definitions:

- SMALL - Environmental effects are not detectable or are so minor that they neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's regulations are considered small.
- MODERATE - Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- LARGE - Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Unless the significance level is identified as beneficial, the impact is adverse, or in the case of "SMALL", may be negligible.

Potential adverse and beneficial impacts were identified and discussed in Chapters 4 and 5 of the ER. Impacts included in the Environmental Justice analysis are included in the attached tables (Tables 1 and 2). These impacts were compared to the low-income and minority population data described in ER Subsection 2.5.4 to identify any possible interaction during construction or operation. If it was determined that the potential for interaction is present, the pathway was analyzed to determine if a disproportionate

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impact involving identified low-income or minority populations exists. If the analysis illustrated that a potential pathway exists, the level of impact was determined (which included degree and significance) and assigned an impact of SMALL, MODERATE, or LARGE, as defined above.

Impact Analysis and Conclusion Rational

The attached tables (Tables 1 and 2) provide an overview of the analysis of ER impact statements and potential pathways for both beneficial and adverse impacts. Reviewing the potential impact and pathways for construction, summarized in Table 1, resulted in identifying housing as a possible environmental justice pathway for this site during the construction phase. Subsection 4.4.3.2 describes the housing impact on low-income populations, and potential mitigation measures are described in Subsection 4.4.2.4. There were no environmental justice pathways identified for the operation phase.

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Table 1: Environmental Justice Impact Assessment Table for Construction

#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
1	Land-Use Impacts (4.1)	The Site and Vicinity (4.1.1)	Because most of the construction does not disturb any previously undisturbed land, and/or construction is planned for areas with existing structures, the impact on land use of the site from construction is considered SMALL and does not require mitigation.	Because there is no population on the site, this impact will not disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
2		The Site and Vicinity (4.1.1)	The impacts on land use in the vicinity of the BLN from construction of the facility are considered SMALL, because no additional land outside of the existing site boundary is needed for construction of the BLN. No mitigation is required.	Because the land use in the vicinity is not expected to change as a result of the proposed activity, this impact will not disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
3		Transmission Corridors and Off-site Areas (4.1.2)	Because transmission corridors already exist, and no new transmission corridors are required, impacts on land use in the transmission corridors from construction are considered SMALL and do not require mitigation.	Because the land use in the transmission corridors is not expected change as a result of the proposed activity, this impact will not disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
4		Historic Properties (4.1.3)	The Alabama SHPO has concurred with the recommendation that BLN site construction be allowed to proceed, including within the areas occupied by archaeological sites determined not eligible for inclusion in the NRHP. Therefore, the potential impacts of BLN site construction on ineligible archaeological sites range from inadvertent avoidance resulting in no impacts to total site destruction, but by definition there will be no impacts on cultural heritage.	Because it was determined by TVA and concurred by the state SHPO that there will be no impacts on cultural heritage, this impact will not disproportionately affect identified low-income and minority populations.	No Disproportionate Impact
5	Water-Related Impacts (4.2)	Hydrologic Alterations (4.2.1)	Construction activities follow BMPs for soil and erosion control as required by applicable federal and state laws and regulations. Therefore, impacts to the local hydrology and wetlands from construction activities are considered to be SMALL and not warrant mitigation.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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Table 1: Environmental Justice Impact Assessment Table for Construction

#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
6	Water-Related Impacts (4.2)	Hydrologic Alterations (4.2.1)	Impacts to surface water bodies are considered to be SMALL due to the implementation of a construction stormwater pollution protection plan (SWPPP) and continued compliance with existing regulatory permits and applicable regulations. Impacts to wetland areas and groundwater resources are expected to be minimal while construction activities are taking place.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
7		Hydrologic Alterations (4.2.1)	Construction activities follow BMPs for soil and erosion control as required by applicable federal and state laws and regulations. Therefore, impacts to the currently undisturbed areas from construction activities are considered to be SMALL and not warrant mitigation.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
8		Hydrologic Alterations (4.2.1)	The existing road system is expected to adequately handle the construction traffic required for the new facility, and no new off-site road construction is expected to be needed. Therefore, no off-site hydrologic alterations are expected.	Because there are no expected offsite hydrological alterations due to road construction outside of the property boundary, no disproportionate impact on no identified minority and low-income populations is expected.	No Disproportionate Impact
9		Hydrologic Alterations (4.2.1)	Current construction plans do not call for extensive dewatering activities that could affect groundwater flow and quality. In addition, groundwater is not expected to be utilized during construction; therefore, the impact to groundwater availability is considered to be SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
10		Hydrologic Alterations (4.2.1)	Because the existing discharge structures are planned to be utilized, impacts from construction activities are considered to be SMALL.	Because the discharge structures will not change, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
11	Water-Related Impacts (4.2)	Hydrologic Alterations (4.2.1)	The greatest potential impacts during construction are expected to be from runoff that may contain higher-than-normal concentrations of silt and clay. Construction area runoff is directed to settling ponds prior to discharge to minimize this threat. NPDES limitations on physical and chemical parameters are met during construction activities and the impacts to the terrestrial and aquatic ecosystems are considered SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
12		Water-Use Impacts (4.2.2)	It is anticipated that potable water continues to be obtained from the Scottsboro Municipal Water System. The quantities of water obtained from Gunterville Reservoir are expected to have little effect on the availability of water for other users and is considered a SMALL impact.	Because the water obtained from the Gunterville reservoir is expected to have little affect on the availability water for other users, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
13		Water-Use Impacts (4.2.2)	Impacts from effluents from construction activities are considered to be SMALL. Water is withdrawn from Gunterville Reservoir in sufficient quantities to produce concrete, provide dust suppression water for roads, and provide for other construction activities as needed. The water withdrawn is essentially consumed with no free-flowing streams or runoff generated from these activities.	Because there is no free-flowing streams or runoff generated there will be no impact due to effluents from construction activities.	No Disproportionate Impact
14		Water-Use Impacts (4.2.2)	Because pipe cleaning discharges are monitored and restricted by the requirements of the BLN NPDES permit, the impacts to the environment from the pre-operational piping flushes are considered to be SMALL and do not warrant mitigation.	Because these events are monitored and are not expected to have any impacts on the environment, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
15		Water-Use Impacts (4.2.2)	Because most of the water needed for construction is expected to be withdrawn from Gunterville Reservoir, there should be no effects to the water quality or detrimental impacts that would affect any other user's consumption.	Because water quality and user consumption is not anticipated to be affected, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
16	Water-Related Impacts (4.2)	Water-Use Impacts (4.2.2)	Only very localized and transient impacts due to substrate exposure are anticipated and are considered SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
17		Water-Use Impacts (4.2.2)	The TVA has programs in place to minimize and address spills and accidents and there are no local groundwater users within the area affected by the construction activities; therefore, the environmental effects of these impacts to groundwater are considered SMALL and would be handled by state programs for environmental releases.	Because there are no local ground water users within the affected area, no pathways to identified low-income or minority populations were found.	No Disproportionate Impact
18		Water-Use Impacts (4.2.2)	Localized shoreline and bottom materials potentially can be affected during the dredging of the intake structure area; however, the implementation of erosion controls is planned resulting in a SMALL impact.	Because this impact is localized and very short in duration, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
19	Ecological Impacts (4.3)	Terrestrial Ecosystems (4.3.1)	Acreages that are affected by construction are common to the area and BMPs such as limiting deforestation, delineating a construction footprint and scheduling construction outside of sensitive breeding or nesting periods, are used to minimize adverse construction impacts in areas that cannot be avoided. For these reasons, effects of construction on terrestrial vegetation are considered to be SMALL.	Because the impacts on terrestrial vegetation is confined to the site, no pathways to identified low-income or minority populations were found.	No Disproportionate Impact
20		Terrestrial Ecosystems (4.3.1)	Because vegetative communities within the BLN boundary are common within the entire Sequatchie Valley, the affected area located on BLN property would be a very small percentage relative to the total areas present in the region.	Because the impacts are limited to the site, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
21		Terrestrial Ecosystems (4.3.1)	Because a small percentage of habitat on the BLN site is expected to be disturbed, ample habitat is available adjacent to the construction site, which provides refuge for displaced animals. Avoidance behavior surrounding construction sites partially offsets the risk of wildlife colliding with equipment or vehicles. Therefore, impacts are considered to be SMALL.	Because there is ample habitat for wildlife, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
22	Ecological Impacts (4.3)	Terrestrial Ecosystems (4.3.1)	Aside from the possibility of an accidental toxic release, the only permanent disturbance regarding construction is the loss of habitat due to the destruction of forested land or addition of permanent facilities. Consequently, effects of construction in affected areas lower the overall carrying capacity for wildlife within the BLN site. However, given the limited area of construction and that no additional transmission corridors are planned, impact to terrestrial habitats and wildlife in BLN construction areas are considered to be SMALL.	Because impacts are limited to the construction areas within the site, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
23		Terrestrial Ecosystems (4.3.1)	Alterations occurring from proposed construction at the BLN site are limited to habitat types common to the surrounding area. Therefore, construction activities are not expected to permanently adversely affect the constellation of residential wildlife populations. Impacts are considered to be SMALL.	Because there are no expected permanent adverse effects, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
24		Aquatic Ecosystems (4.3.2)	Potential impacts to the Gunterville Reservoir during the construction of the BLN are considered to be SMALL, similar to those measured during the construction of Bellefonte Units 1 and 2. Because intake and discharge structures are already in place, new construction is not expected to occur near the banks of the reservoir, and accidental discharge and stormwater runoff is limited under the SWPPP and SPCCP, which are implemented prior to construction initiation.	Because activities, and the subsequent outcomes, associated with this impact are temporary, no disproportionate impact on identified minority and low-income populations is anticipated.	No Disproportionate Impact
25	Ecological Impacts (4.3)	Aquatic Ecosystems (4.3.2)	Town Creek embayment is an extensive shallow overbank, which flows into the Tennessee River at Tennessee River mile (TRM) 393.4. Town Creek embayment is located west of the BLN construction area. An SPCCP specific to the construction period, as well as an SWPPP, provides measures to prevent runoff and chemical discharge to Town Creek embayment, and is prepared before construction begins. Therefore, impacts to Town Creek embayment are considered to be SMALL.	Because preconstruction measures prevent runoff and chemical discharge to Town Creek Embayment, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
26		Aquatic Ecosystems (4.3.2)	One mapped intermittent stream is located on the western edge of the BLN property (Figure 2.4-4). Given its distance from the BLN construction area, the intermittent stream would not be affected by construction activity.	Because this intermittent stream will not be affected by construction activities, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
27		Aquatic Ecosystems (4.3.2)	Several pond areas exist on the BLN site. Over time, on-site ponds have developed communities of vegetation kept in check by grass carp, fish, amphibians, invertebrates, and beavers. The WWRB functions as a settling pond and cascades into Pond A which is a functioning stormwater retention pond. Pond A discharges to Town Creek. Toxic wastes would not be disposed of in the WWRB, and solids are expected to settle in either the WWRB or Pond A. Based on the functioning of the existing site ponds, the impacts to on-site ponds were determined to be SMALL.	Because these ponds are entirely onsite and no adverse affects are expected, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
28		Aquatic Ecosystems (4.3.2)	Fishes adjacent to the BLN site during construction are expected to experience some degree of stress to their hearing mechanism, which may at least temporarily cause them to relocate or cause a temporary threshold shift, which may affect their foraging and predator avoidance capabilities. However, because Gunter'sville Reservoir is more than 70 mi. long, impacts to fish populations stemming from BLN construction noise is considered to be SMALL.	Because construction noise impacts to fish are expected to be temporary and localized, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
29	Ecological Impacts (4.3)	Aquatic Ecosystems (4.3.2)	In regard to the Anthony's River Snail and the Pink Mucket Mussel, alterations occurring from proposed construction projects are temporary and limited to aquatic habitat types common to the surrounding area. The BLN construction activities do not permanently adversely affect residential aquatic wildlife populations and impacts are therefore, considered to be SMALL.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact

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#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
30	Socioeconomic Impacts (4.4)	Physical Impacts (4.4.1)	People who could be vulnerable to noise, fugitive dust, and gaseous emissions resulting from construction activities at the plant are people working or living immediately adjacent to the site.	Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN Environmental Report describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
31		Physical Impacts (4.4.1)	Impacts to transportation from construction workers and deliveries are considered a temporary MODERATE TO LARGE impact during the peak construction period. Potential mitigation measures include establishing a centralized parking area away from the site and shuttling construction workers to the site, encouraging carpooling, installing traffic control lighting and directional signage, county road modifications and staggering shifts to avoid traditional traffic congestion time periods.	This impact is expected to be confined to routes used between the site and US 72. Census data reveal one minority census block is located near one of the Bellefonte access roads. This block is surrounded by nonminority blocks. Therefore, no disproportionate impact is anticipated.	No Disproportionate Impact
32		Physical Impacts (4.4.1)	Based on existing structures and the topographic layout of the vicinity, the impact of construction at the BLN site on aesthetics and recreational opportunities is considered to be SMALL and requires no mitigation efforts.	Because there will be very little change in aesthetics no disproportionate impacts are anticipated.	No Disproportionate Impact

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Table 1: Environmental Justice Impact Assessment Table for Construction

#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
33	Socioeconomic Impacts (4.4)	Physical Impacts (4.4.1)	Based upon the projected noise levels at various site and vicinity receptors and the duration of construction activities, noise impacts from BLN site construction are expected to be SMALL, for the surrounding communities and SMALL to MODERATE for the nearest residents of Creek's Edge addition.	Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN Environmental Report describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
34		Physical Impacts (4.4.1)	Transmission line corridor maintenance, after the initial maintenance activity is performed, is scheduled on a periodic basis and is of short duration; Therefore, these activities are expected to have SMALL noise impacts to surrounding communities and habitat.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, this is not anticipated to be a disproportionate impact.	No Disproportionate Impact
35		Physical Impacts (4.4.1)	Peak traffic noise during construction is expected to have a SMALL to MODERATE impact at approximately 10 homes along the access road, and off-peak traffic would have a SMALL impact to surrounding communities.	The identified minority blocks are located nearer to US 72 than they are the access routes. Each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
36		Physical Impacts (4.4.1)	Impacts to air quality from construction are considered to be SMALL and do not warrant mitigation beyond the measures described in the ER.	Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN Environmental Report describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact

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Table 1: Environmental Justice Impact Assessment Table for Construction

#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
37	Socioeconomic Impacts (4.4)	Social and Economic Impacts (4.4.2)	It is assumed that all workers and their families settle in Jackson County. Therefore, the influx of construction workers and families would likely represent a 10 percent increase in population in Jackson County. Therefore, construction workers and their families represent a small percentage of the existing county population and the impact is anticipated to be SMALL. Within Jackson County, the impacts to the communities within the vicinity are expected to be MODERATE.	The increase in population due to the construction workforce and their families are not anticipated to disproportionately impact the identified minority and low-income populations. However, the manner in which this population increase interacts with various socioeconomic variables have been analyzed in the following impact assessments.	No Disproportionate Impact
38		Social and Economic Impacts (4.4.2)	Expenditures and benefits include the creation of jobs, employee purchasing, and increased tax revenues. Thus the impact from plant construction employees is considered a MODERATE to LARGE beneficial impact in the vicinity and a SMALL beneficial impact in the region.	This impact is anticipated to beneficially impact the residents in the vicinity proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations. This impact is anticipated to beneficially impact the residents in the region proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations.	No Disproportionate Impact
39		Social and Economic Impacts (4.4.2)	Given the structure by which the TVA makes payments in lieu of taxes, the general distribution structure of funding by the state of Alabama, as well as the increase in personal sales and property tax, the potential impact of taxes within the region is expected to be SMALL and beneficial. The potential impact within Jackson County, Alabama, is expected to be a MODERATE to LARGE beneficial impact.	This impact is anticipated to beneficially impact Jackson County proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations. This impact is anticipated to beneficially impact the region proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations.	No Disproportionate Impact
40		Social and Economic Impacts (4.4.2)	The impacts of on-site construction activity on local police and firefighters are expected to be SMALL and offset by increased tax revenue.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact

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Table 1: Environmental Justice Impact Assessment Table for Construction

#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
41	Socioeconomic Impacts (4.4)	Social and Economic Impacts (4.4.2)	Highlands Medical Center is the only hospital in Jackson County, Alabama. Because the hospital has adequate beds and staff, the impacts of plant construction on medical services are expected to be SMALL and not warrant mitigation. Social services, such as Medicaid and welfare, are funded through the Federal and State governments. The BLN construction boom is not expected to have an impact on these social services.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact
42		Social and Economic Impacts (4.4.2)	The impacts of plant construction on the housing market in Jackson County are expected to be MODERATE to LARGE based on an estimated deficit in the number of available houses. With mitigation, this impact could be reduced to SMALL to MODERATE. The availability of housing would be reviewed again during the construction phase to assess whether mitigation efforts are needed. These efforts could include housing assistance for employees, transportation assistance for commuting employees, or remote parking areas with shuttles.	The increase in housing costs are anticipated to be evenly distributed within Jackson County; therefore, it is not expected to disproportionately impact identified minority populations. However, the low-income populations in the county are anticipated to be disproportionately impacted because they are more vulnerable to an increase in housing costs. Mitigative efforts, as described in Subsection 4.4.2.4, can reduce the impact to SMALL to MODERATE.	Small to Moderate
43		Social and Economic Impacts (4.4.2)	The impacts of construction on the educational system of Jackson County, Alabama is expected to be MODERATE to LARGE but temporary, depending on the speed with which current school district expansion plans are implemented.	The impacts on education due to construction are anticipated to occur mainly in Jackson County. The impacts are also expected to be distributed throughout the county. Because the impacts are expected to be evenly distributed throughout the county, there is no expected disproportionate impact on minorities or low-income populations.	No Disproportionate Impact
44		Social and Economic Impacts (4.4.2)	The nearest parks to the BLN site (Camp Jackson, a Boy Scout camping facility located 4.2 mi. from the site, and Jackson County Park, located 7.5 mi. from the site) are more than 4 mi. away. Therefore, impacts of construction on recreation would be SMALL and require no mitigation.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact

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Table 1: Environmental Justice Impact Assessment Table for Construction

#	Section	Subsection	Impact Summary	Minority and Low-Income Perspective	EJ Impact
45	Radiation Exposure to Construction Workers (4.5)		Due to the exposures from BLN Unit 3 normal operations, there would be a radiation protection and ALARA program for BLN Unit 4 construction workers. This program meets the guidance of Regulatory Guide 8.8 to maintain individual and collective radiation exposures ALARA. This program also meets the requirements of 10 CFR 20.1302. Measures and controls to protect Unit 4 construction workers are given in Section 4.6. The construction worker impact due to radiation exposures from Unit 3 normal operations is SMALL.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact

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Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
1	Land-Use Impacts (5.1)	The Site and Vicinity 5.1.1	Adverse impacts to the BLN site and vicinity occur primarily during construction of the BLN, as documented in Section 4.1. It is anticipated that BLN operation has SMALL impacts on land use within the site boundary and in the vicinity of the BLN site.	Because there is no population living on the site, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
2		The Site and Vicinity 5.1.1	No new areas are expected to be disturbed after the construction phase ends, and no agricultural crop production is expected to occur on the BLN site. Therefore, operations at the BLN site are expected to have SMALL impacts on the pasture and developed land located within the site boundary.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
3		The Site and Vicinity 5.1.1	No land used for agricultural purposes exists within the BLN site. Therefore, impacts on land use located within the site boundary at the BLN site due to operation are considered SMALL.	Because there is no population living on the site, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
4		The Site and Vicinity 5.1.1	Because the land use in the vicinity is expected to remain the same, this impact will not affect identified minority and low-income populations.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
5	Land-Use Impacts (5.1)	The Site and Vicinity 5.1.1	Because there is waste-minimization plan in place, there is a minimal amount of waste generated; therefore, the impacts to off-site land use due to disposal of wastes generated at BLN are considered SMALL and do not warrant mitigation.	Because state and local waste disposal rules will be followed, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact

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Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
6		Transmission Corridors and Off-Site Areas 5.1.2	Although the transmission lines and corridors already exist, maintenance activities are not expected to result in land-use restrictions or changes. Therefore, impacts on land use associated with operation and maintenance of the transmission corridors and off-site areas are considered SMALL.	Because the land use in the transmission corridors is expected to remain the same, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
7		Historic Properties 5.1.3	Operations have no effects on any potentially eligible or eligible prehistoric archaeological sites within the BLN site APE. With regard to prehistoric sites located beyond the BLN site APE (but within 1 mi.) and the numerous prehistoric and multi-component archaeological sites within the 10-mi. radius, there are no effects from BLN site operations because operations are expected to be confined to the site, and because indirect (noise-related and visual) effects are extraneous considerations for archaeological sites. Therefore, the impacts of BLN site operations on prehistoric archaeological sites are considered SMALL. Mitigation is not warranted.	Plant operations will not cause a historical properties land use change. Because there is no change in land use, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
8	Land-Use Impacts (5.1)	Historic Properties 5.1.3	Because 1JA1103 is the only Historic Period site within the BLN site APE and because indirect (noise-related or visual) effects are extraneous considerations for archaeological sites, no BLN site operation effects on Historic Period archaeological sites are anticipated. Therefore, operation impacts on Historic Period archaeological sites on the BLN site, in its vicinity, and within a 10-mi. radius of it are considered SMALL. No mitigation is warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
9		Historic Properties 5.1.3	BLN site operations have no effects on historic sites. The impacts of BLN site operations on aboveground historic sites are considered SMALL, and mitigation is not warranted.	Plant operations will not cause a historical properties land use change. Because there is no change in land use, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
10		Historic Properties 5.1.3	BLN site operations should have no effects on historic cemeteries. The impact of BLN site operations on historic cemeteries is considered SMALL. Mitigation is not warranted.	Because operations are not expected to have an affect on historic cemeteries, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
11		Historic Properties 5.1.3	No traditional cultural properties (TCP) are located on the BLN site, in its vicinity, or within a 10-mi. radius from the site (see Subsection 2.5.3.7). Therefore, BLN operations have no effect on TCPs in these areas. Therefore, the impacts of BLN site operations on TCP are considered SMALL. Mitigation is not warranted.	Because operations will have no effect on cultural properties within a ten-mile radius from the site, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
12		Historic Properties 5.1.3	The impacts of BLN site operations on historic properties associated with transmission line corridors are considered SMALL, and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
13	Land-Use Impacts (5.1)	Historic Properties 5.1.3	As TVA has already determined that no further historic property considerations or assessments along the extant transmission line corridor are deemed necessary, it is expected that the impacts of transmission line maintenance on historic properties are considered SMALL. Mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
14	Water-Related Impacts (5.2)	Hydrologic Alterations and Plant Water Supply 5.2.1	Based upon an evaluation of present and future water use, water withdrawal and discharge from the BLN are considered to be of SMALL direct, indirect, and cumulative impact, and mitigation is not warranted.	Based upon evaluation of present and future water use, withdrawal, and discharge, no pathways to identified minority and low-income populations were found.	No Disproportionate Impact
15		Hydrologic Alterations and Plant Water Supply 5.2.1	The water use at the BLN is considered to be of SMALL impact on downstream users including recreational, navigational, and water consumers and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
16		Hydrologic Alterations and Plant Water Supply 5.2.1	Operational activities at the BLN are considered to be of SMALL impact and mitigation is not warranted, based upon minimal impact from dredging discharge design, and no need for dewatering during operation.	Based on minimal impact from dredging discharge design, and no need for dewatering during operation, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
17	Water-Related Impacts (5.2)	Hydrologic Alterations and Plant Water Supply 5.2.1	Water availability downstream of the BLN site during low-flow periods operation of the units at the BLN is considered to be of SMALL impact, because only about 1 percent of the river's flow is diverted and lost. River-level associated with consumptive water losses resulting from two unit operations does not affect recreational boating in summer, when river use is at its highest, even during extreme low-flow conditions. At this level of consumptive water use, impacts to river-level is considered to be SMALL and mitigation is not warranted.	Because the water obtained from the river is expected to have little effect on the availability of water for other users, identified minority and low-income populations are not anticipated to be disproportionately affected.	No Disproportionate Impact
18		Hydrologic Alterations and Plant Water Supply 5.2.1	Surface-water-use impacts to groundwater are considered to be SMALL during normal operations and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
19		Hydrologic Alterations and Plant Water Supply 5.2.1	The operation of the BLN is not expected to cause hydraulic alterations to surface water bodies or groundwater resources, thus the operation of the BLN is considered to be of SMALL impact, and mitigation is not warranted based upon the information provided in ER Subsection 5.2.1.6.	Because hydrological alterations are not expected, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
20		Water-Use Impacts 5.2.2	By maintaining cooling tower discharges within water quality criteria (e.g., NPDES permits), impacts are considered to be SMALL and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
21	Water-Related Impacts (5.2)	Water-Use Impacts 5.2.2	Although the volume of the cooling tower blowdown is anticipated to be small when compared to the river flow, and the treatment chemicals added are largely consumed leaving very small concentrations by the time they are discharged, the discharge is regulated by the existing NPDES permit and complies with applicable state water quality standards as discussed in ER Subsection 2.3.3. Therefore, impacts of residual chemicals (discharged in the permitted blowdown) on river water quality are considered to be SMALL and mitigation is not warranted.	Because these impacts are regulated, monitored and no mitigation is required, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
22		Water-Use Impacts 5.2.2	Results of simulations show a small thermal plume that dissipates quickly. Therefore, temperature of the discharge from the BLN is considered to be of SMALL impact and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
23		Water-Use Impacts 5.2.2	Additional BLN water withdrawal volumes based on different BLN operational scenarios is presented on Table 3.4-2. Impacts from water consumption at the BLN site are considered to be of SMALL impact and mitigation is not warranted.	Disproportionate impacts from water consumption are not expected for identified minority and low-income populations.	No Disproportionate Impact
24		Water-Use Impacts 5.2.2	Impacts to terrestrial and aquatic ecosystems from the intake of water from and discharge to the Guntersville Reservoir is considered to be of SMALL impact and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
25	Water-Related Impacts (5.2)	Water-Use Impacts 5.2.2	The temperature of the discharge from the BLN is considered to be of SMALL impact and mitigation is not warranted. See ER Subsection 5.3.2 for further details regarding the thermal plume's mixing zone.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
26	Cooling System Impacts (5.3)	Intake System 5.3.1	A mussel survey performed in April, 2007 identified only common mussels in low densities adjacent to the BLN site (ER Section 2.4). Therefore, impacts from the intake system to shellfish are expected to be SMALL.	Impacts of the intake system on shellfish are not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
27		Intake System 5.3.1	Given the percentage of reservoir water necessary to cool the BLN, negative impacts to the fishery on Guntersville Reservoir are considered SMALL.	Because the water obtained from the Guntersville reservoir is expected to have little effect on the availability of water for the fishery, identified minority and low-income populations are not anticipated to be disproportionately affected.	No Disproportionate Impact
28		Intake System 5.3.1	Threadfin shad and the freshwater drum have consistently been collected in population surveys indicating the operation of WCF intake structure has not dramatically reduced populations of these fishes. Population impacts stemming from impingement and entrainment of fish are, therefore, considered to be SMALL.	Because fish populations are not dramatically reduced due to the intake structures, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
29		Discharge System 5.3.2	Calculated plume in the winter is 35 ft. Given the plume's small size within the reservoir, any impacts to drifting organisms is SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
30	Cooling System Impacts (5.3)	Discharge System 5.3.2	Accelerated spawning, possibly leading to increased larval mortality from asynchrony with food source development or cold shock of migrant larvae. Because the heated water plume is small in comparison to the reservoir size, these impacts are expected to be SMALL , having a negligible effect on total reservoir populations.	Because fish population impacts are localized and expected to be small relative to the size of the reservoir, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
31		Heat Discharge System 5.3.3	Sodium salt from the natural draft cooling towers (NDCT) is predicted to deposit at a maximum rate of 0.089 pounds per 100-acre-month at a distance of 7542 ft. southwest of the NDCT. NUREG-1555 Subsection 5.3.3.2 indicates maintaining a deposition rate below 89.2 to 178.4 pounds per 100-acre-month is generally not damaging to vegetation. The nearest garden is 0.71 mi. WNW of the cooling tower locations; therefore, operations at the BLN site are anticipated to have SMALL impacts on land use in the vicinity of the site.	Because cooling tower salt deposition is not expected to damage vegetation in the vicinity, there is no anticipated impact on minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
32		Heat Discharge System 5.3.3	The maximum NDCT sodium salt deposition rate of 0.089 lb per 100-ac-mo is predicted to occur at 7542 ft. southwest of the NDCTs. NUREG-1555, Subsection 5.3.3.2 indicates maintaining a deposition rate below two kilogram per ha per month (178.4 lb per 100-ac-mo), preventing damage to vegetation. Therefore, impacts associated with salt deposition stemming from cooling tower operation both on-site and outside the BLN site are SMALL.	Because cooling tower salt drift is not expected to damage vegetation on site and in the vicinity, there is no anticipated impact on minority and low-income populations.	No Disproportionate Impact
33	Cooling System Impacts (5.3)	Heat Discharge System 5.3.3	The precipitation amount due to the towers is inconsequential compared to the total annual rainfall (56.8 in.) experienced in this region and is expected to have a SMALL impact on resident species.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
34		Heat Discharge System 5.3.3	An investigation into the climatic conditions conducive to induced snowfall indicated that a very cold air temperature (less than -11°F), plume height (4900 ft.), and stable atmosphere with moderate winds (15 fps) optimized this situation (Subsection 5.3.3.1). This type of meteorological condition occurs infrequently at BLN; therefore, it is expected that impacts to area weather are SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
35	Cooling System Impacts (5.3)	Heat Discharge System 5.3.3	The height of the cooling towers and their evaluated plume make it unlikely that fogging could occur. Icing, which is associated with fogging, can result during periods of sub-freezing temperatures. However, because fogging is not expected, icing events would also be rare, thus having SMALL impacts on terrestrial ecology and not warrant mitigation.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
36		Impacts to Members of the Public 5.3.4	Noise stemming from the operation of existing cooling towers is expected to be similar to background at the site boundary, as noted in Subsection 5.8.1.4. Resident species quickly adapt to constant background noise or relocate to adjacent habitats. Therefore, noise is expected to have a SMALL impact on terrestrial ecology.	Because of the localized nature of the impact to terrestrial ecology, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
37	Radiological Impacts of Normal Operation (5.4)	Exposure Pathways 5.4.1	Because the liquid pathway doses due to operation of BLN are within the applicable regulatory limits of 40 CFR 190 and the goals of 10 CFR Part 50, Appendix I there are no observable health impacts and the impact to members of the public is considered to be SMALL and does not require mitigation.	Because these impacts are regulated, monitored, with no observable health impacts to members of the public, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
38	Radiological Impacts of Normal Operation (5.4)	Exposure Pathways 5.4.1	Because the gaseous pathway doses due to operation of BLN are within the applicable regulatory limits of 40 CFR 190 and the goals of 10 CFR Part 50, Appendix I there are no observable health impacts and the impact to members of the public is considered to be SMALL and does not require mitigation.	Because these impacts are regulated, monitored, with no observable health impacts to members of the public, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
39		Radiation Doses to Members of the Public 5.4.2	Because the doses due to operation of BLN are within the applicable design objective of 10 CFR Part 50, Appendix I and the criteria of 40 CFR 190 there are no observable health impacts and the impact to members of the public is considered to be SMALL.	Because these impacts are regulated, monitored, with no observable health impacts to members of the public, no disproportionate impact on identified minority and low-income populations is expected.	No Disproportionate Impact
40		Impacts to Members of the Public 5.4.3	Because the doses due to operation of BLN are within the applicable regulatory limits of 40 CFR 190 the impact to members of the public is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
41		Impacts to Biota Other than Members of the Public 5.4.4	Because the biota doses in Table 5.4-16 are below the 40 CFR Part 190 limits, no impacts are expected. The doses are well below those specified by IAEA and well below any dose expected to have any noticeable acute effects. Based on the postulated biota doses presented in Table 5.4-16, the impact due to operation of BLN is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
42	Environmental Impacts of Waste (5.5)	Nonradioactive Waste System Impacts 5.5.1	Based upon discussions in the ER, the impact from nonradiological waste management is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
43	Environmental Impacts of Waste (5.5)	Nonradioactive Waste System Impacts 5.5.1	The current NPDES permit takes biocide and chlorine concentrations into account and the associated discharge limits are established to protect receiving waters. Because biocides and chemicals used for water treatment are added in parts per million concentrations and are largely consumed serving their purposes, and the NPDES permit takes the potential for these substances being in the discharge into consideration by establishing requirements for appropriate chemical parameter monitoring and acceptable limits the impact from these discharges is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
44		Nonradioactive Waste System Impacts 5.5.1	Waste streams are monitored during discharges from the construction holding pond at DSN002. The spent RO system filters are disposed of in accordance with applicable industrial solid-waste regulations. See ER Subsection 5.5.1.2 for additional details on solid-waste management. The impact from this stream is like that for biocides and metals and is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
45		Nonradioactive Waste System Impacts 5.5.1	Because the NPDES permit requires monitoring of floor drain systems contributing to discharges made through the WWRB and desilting pond, the impact from floor drains is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
46	Environmental Impacts of Waste (5.5)	Nonradioactive Waste System Impacts 5.5.1	Because surface drainage and roof drain system discharges (including discharges made through DSN009 – 015) are made in accordance with the facility's SWPPP and the NPDES permit requires monitoring the discharges made through DSN002 and DSN004 surface and roof drain discharge impact is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
47		Nonradioactive Waste System Impacts 5.5.1	Because nonradioactive solid wastes water-treatment and purification-waste filters from the RO unit, construction/demolition and industrial wastes, solid hazardous waste, and petroleum wastes (including fuels, such as gasoline and diesel oil, and used oil and greases) are handled per the methods described above in Subsections 5.5.1.2.1 through 5.5.1.2.3, the impact from discharges to land is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
48		Nonradioactive Waste System Impacts 5.5.1	Because limited air emissions are created from the operation of the BLN, as described above, the impact from discharges to air is considered to be SMALL.	Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN Environmental Report describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
49	Environmental Impacts of Waste (5.5)	Nonradioactive Waste System Impacts 5.5.1	Because sanitary waste is discharged to and treated at the Scottsboro, Alabama's municipal sewage treatment plant, as described above, the impact from sanitary waste discharges is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
50		Mixed Waste Impacts 5.5.2	Due to this projected small volume of mixed waste, and because no significant emissions or releases of hazardous materials are expected as a result of control and containment requirements, the NRC generically concluded that the findings for both LLW and mixed-LLW impacts are considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
51	Environmental Impacts of Waste (5.5)	Mixed Waste Impacts 5.5.2	Because NRC regulations, ALARA chemical awareness training, and the waste minimization plan are used and followed at the BLN for managing (handling, storage, transportation and treatment) of mixed-wastes, as described above in Subsections 5.5.2 and 5.5.2.1, the impact from mixed-wastes is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
52	Transmission System Impacts (5.6)	Terrestrial Ecosystem 5.6.1	Best management practices are observed in wetland and potential wetland areas to avoid and minimize potential impacts. Potential terrestrial impacts associated with ROW maintenance are expected to be SMALL because the TVA has approved methods in place to protect terrestrial habitat from maintenance activities.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, the impact on terrestrial habitat due to maintenance activities is not anticipated to be a disproportionate impact to identified minority and low-income populations.	No Disproportionate Impact
53		Aquatic Ecosystem 5.6.2	Given the measures taken by the TVA to avoid affecting aquatic habitat and the fact no new transmission lines are proposed, any impacts associated with routine maintenance or re-clearing of existing transmission corridors are expected to be SMALL.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, the impact on aquatic habitat due to maintenance activities is not anticipated to be a disproportionate impact to identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
54	Transmission System Impacts (5.6)	Impacts to Members of the Public 5.6.3	The impacts of BLN site operations on historic properties associated with transmission line corridors are considered SMALL, and mitigation is not warranted.	Because operations are not expected to have an affect on historic properties associated with transmission line maintenance, this impact will not disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
55		Impacts to Members of the Public 5.6.3	Impacts due to electric shock as a result of induced current are potentially adverse but can be easily mitigated; therefore, impacts are considered to be SMALL.	Because of operational mitigation efforts, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact
56		Impacts to Members of the Public 5.6.3	Because EMF diminishes with distance, routing transmission lines using constraint buffers reduces potential public exposure to EMF. Because TVA uses conservative location practices to minimize public exposure to EMF, impacts resulting from public exposure to EMF are considered SMALL.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, the impact of EMF is not anticipated to be a disproportionate impact to identified minority and low-income populations.	No Disproportionate Impact
57		Impacts to Members of the Public 5.6.3	Because corona generally is not a problem at voltages below 765 kV, and TVA's transmission lines to BLN are at 500 kV and temporary noise from transmission line maintenance is infrequent, impacts to the public from transmission line noise are considered SMALL.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, the impact of transmission line noise is not anticipated to be a disproportionate impact to identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
58	Transmission System Impacts (5.6)	Impacts to Members of the Public 5.6.3	Electromagnetic interference with television and radio is usually the result of defective insulators or hardware. As discussed in Subsection 5.6.3.3, interference stemming from a 500-kV transmission line is minimal. Therefore, impacts associated with radio and television interference from transmission lines are SMALL.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, the impact of electromagnetic interference is not anticipated to be a disproportionate impact to identified minority and low-income populations.	No Disproportionate Impact
59		Impacts to Members of the Public 5.6.3	The TVA attempts to maintain important viewsheds. Natural vegetation is retained at road crossings to help minimize visual impacts where possible. Because no new transmission lines are proposed, viewscapes are not further impacted by the BLN transmission system.	Because there will be very little change in aesthetics, no disproportionate impacts to identified minority and low-income populations are anticipated.	No Disproportionate Impact
60	Uranium Fuel Cycle Impacts (5.7)	Land Use 5.7.1	The BLN fuel cycle requires only 15 percent of the temporarily committed land and 13 percent of the permanently committed land that would be required by replacement with coal-fired capacity. If the quality and opportunity cost of the land is equivalent, then it is reasonable to say that land requirements are SMALL. Therefore, it is concluded that the impact on land use to support BLN is considered SMALL.	This impact is anticipated to affect the residents in the vicinity proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations. This impact is anticipated to affect the residents in the region proportionally; therefore, no disproportionate impact is expected for the identified low-income and minority populations.	No Disproportionate Impact

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61		Water Use 5.7.2	Given that the water discharged to water bodies and to the ground from other fuel cycle facilities for an RRY is only a small fraction of the discharge from a LWR, it is concluded that the impact to support BLN is considered to be SMALL.	Based on the comparative analysis - between BLN and other fuel cycle facilities, no disproportionate impact is expected for the identified minority and low-income populations.	No Disproportionate Impact
62	Uranium Fuel Cycle Impacts (5.7)	Fossil Fuel Effects 5.7.3	Electrical energy needs for BLN associated with the UFC are presented in ER Table 5.7-2. It is concluded that the fossil fuel impacts from the consumption of electrical energy for UFC operations is considered to be SMALL relative to the net power production of BLN.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
63		Chemical Effluents 5.7.4	Tailings solutions and solids are generated during the milling process. These materials are not released in quantities sufficient to have a significant effect on the environment. It is concluded that the impact of these chemical effluents is considered to be SMALL.	Because this impact takes place outside the BLN region, no pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
64		Radioactive Effluents 5.7.5	Based on the analyses presented above, it is concluded that the environmental impact of radioactive effluents from the UFC is considered to be SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
65		Radioactive Waste 5.7.6	It is concluded that the radioactive waste disposal impact is acceptable, because the impact is not sufficiently great to require the conclusion of the NEPA analysis to be that the construction and operation of BLN should be denied. For the reasons stated above, it is concluded that the environmental impact of radioactive waste disposal from the UFC is considered to be SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
66	Uranium Fuel Cycle Impacts (5.7)	Occupational Dose 5.7.7	In the review and evaluation of the environmental effects of the UFC, the annual occupational dose attributable to all phases of the UFC for BLN is about 16.1 person-Sv (1605 person-rem). Occupational doses are maintained to meet the dose limits in 10 CFR Part 20, which is (0.05 Sv/yr) (5 rem/yr). On this basis, it is concluded that environmental effects from this occupational dose is considered to be SMALL.	Because these impacts are regulated and monitored, this impact is not expected to affect identified minority and low-income populations.	No Disproportionate Impact
67		Transportation 5.7.8	The transportation dose to workers and the public totals about 0.067 person-Sv (6.7 person-rem) annually per Table 5.7-2 for the BLN. For comparative purposes, the estimated collective dose from natural background radiation to the population within 50 mi. of BLN is 1440 person-Sv/yr (144,000 person-rem/yr). On this basis, it is concluded that the environmental impact of transportation is considered to be SMALL.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
68		Conclusions 5.7.9	Using an evaluation process as provided by NUREG-1437, this evaluation has examined the environmental impact of the UFC, considered the impact of Rn-222 and Tc-99, and appropriately scaled the data for the BLN. Based on this comparison, it is concluded that the environmental impact of the UFC is considered to be SMALL, and mitigation is not warranted.	No pathways were identified between this impact and identified minority and low-income populations.	No Disproportionate Impact
69	Socioeconomic Impacts (5.8)	Physical Impacts of Station Operation 5.8.1	Based on the distance from the nearest residences to on-site buildings and the safety standards to which the buildings are constructed, operational activities are considered to have a SMALL impact on on-site and nearby residential areas, and mitigation is not warranted.	Because of safety standards incorporated into the construction of onsite buildings, there are no anticipated impacts on identified minority and low-income populations.	No Disproportionate Impact
70		Physical Impacts of Station Operation 5.8.1	Given the current volume of traffic, as indicated by Annual Average Daily Traffic (AADT) counts in ER Subsection 2.5.2, on the road network, the addition of 612 vehicles is considered SMALL and mitigation is not warranted. During refueling and other outage periods traffic increases. Possible mitigation measures include staggering outage shifts opposite traditional high-traffic periods, mandatory carpooling, and busing in of employees, if necessary.	This impact is expected to be confined to routes used between the site and US 72. The identified minority blocks are located nearer to US 72 than they are the access routes. Each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact

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	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
71		Physical Impacts of Station Operation 5.8.1	Because the transmission service lines are already present, the impact on visual aesthetics is considered SMALL and mitigation is not warranted.	Because there will be no change in transmission lines, visual impacts are minimal with very little change in aesthetics. No disproportionate impacts are expected to affect identified minority and low-income populations.	No Disproportionate Impact
72	Socioeconomic Impacts (5.8)	Physical Impacts of Station Operation 5.8.1	Because significant noise sources are located a substantial distance from the BLN site boundary, plant operational noise is attenuated to near ambient levels beyond the site boundary; Therefore, noise impact is considered to be SMALL and mitigation is not warranted.	Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN Environmental Report describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
73		Physical Impacts of Station Operation 5.8.1	Because the electric transmission lines are expected to be energized at 500 kV or less and receptors are located a substantial distance from the transmission lines, noise impact created by corona discharge from the transmission lines is considered to be SMALL and mitigation is not warranted.	The transmission corridor crosses one identified minority block, which according to the US Census contains four individuals. The transmission corridor does not cross any identified low-income census block groups. Therefore, the impact of transmission line noise is not anticipated to be a disproportionate impact to identified minority and low-income populations.	No Disproportionate Impact

**Bellefonte - Environmental Justice
Impact Assessment Methodology and Findings**

Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
74		Physical Impacts of Station Operation 5.8.1	Because off-peak traffic should not increase significantly, off-peak traffic noise impact is considered to be SMALL and no mitigation is warranted.	This impact is expected to be confined to routes used between the site and US 72. The identified minority blocks are located nearer to US 72 than they are the access routes. Each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
75	Socioeconomic Impacts (5.8)	Physical Impacts of Station Operation 5.8.1	Because air emissions from nuclear power plants are minimal, physical impacts to the surrounding population as a result of operation of the new units are considered SMALL and mitigation is not warranted.	Four minority census blocks located within two miles of the BLN center point were identified (ER Figures 2.5-9 through 2.5-26). Section 2.5.4.3 of the BLN Environmental Report describes these census blocks and their demography. In brief, the sizes of populations in the census blocks are equivalent to single families and each of these identified blocks are dispersed within a collection of non-minority census blocks. Therefore, these identified minority blocks are not anticipated to be disproportionately impacted.	No Disproportionate Impact
76		Social and Economic Impacts of Station Operation 5.8.2	The impact of plant operations on local and regional demography is considered to be SMALL as the percent increase in population is below four percent for Jackson County and mitigation is not warranted.	The increase in population due to the operational workforce and their families are not anticipated to disproportionately impact the identified minority and low-income populations. However, the manner this population increase interacts with various socioeconomic variables have been analyzed in the following impact assessments.	No Disproportionate Impact

**Bellefonte - Environmental Justice
Impact Assessment Methodology and Findings**

Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
77	Socioeconomic Impacts (5.8)	Social and Economic Impacts of Station Operation 5.8.2	The impacts of operation employees on the economy of the region are considered SMALL beneficial impacts due to the creation of jobs, employee purchasing, and increased tax revenues. The impact from plant operation employees in Jackson County is considered MODERATE beneficial impacts due to the higher concentration of operation employees within Jackson County and the coinciding benefits.	This impact is anticipated to beneficially impact the residents in the vicinity proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations. This impact is anticipated to beneficially impact the residents in the region proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations.	No Disproportionate Impact
78		Social and Economic Impacts of Station Operation 5.8.2	The impacts of plant operation on tax revenue in the region are considered SMALL and beneficial because of the distribution system of the revenues. The tax revenue is given to all areas that are powered by TVA, not just the county in which the plant is located. Also, 20 percent of the revenue is allocated to the Alabama general fund and is used for services and improvements anywhere in the state while in Tennessee almost 50 percent is given to the state.	This impact is anticipated to beneficially impact the region proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations.	No Disproportionate Impact
79		Social and Economic Impacts of Station Operation 5.8.2	The impacts of the plant operation on tax revenue in Jackson County are expected to be MODERATE and beneficial due to the increased revenues from the TVA property in the county.	This impact is anticipated to beneficially impact Jackson County proportionally; Therefore, no disproportionate impact is expected for the identified low-income and minority populations.	No Disproportionate Impact

**Bellefonte - Environmental Justice
Impact Assessment Methodology and Findings**

Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
80	Socioeconomic Impacts (5.8)	Social and Economic Impacts of Station Operation 5.8.2	Impacts to municipal water suppliers from the operations-related population increase are considered SMALL and mitigation is not warranted.	Because the capacity of the Scottsboro Municipal Water System will not reach its maximum capacity during the heaviest phase of construction, there is no anticipated affect on water availability during the operation of the plant. Therefore, no disproportionate impact is expected for the identified minority and low-income populations.	No Disproportionate Impact
81		Social and Economic Impacts of Station Operation 5.8.2	Based on system capacity and additional utilization, impacts to wastewater treatment facilities from the operations-related population increase are considered SMALL and mitigation is not warranted.	Because the capacity of the wastewater treatment facilities will not reach its maximum capacity during the heaviest phase of construction, there is no anticipated affect on wastewater treatment during the operation of the plant. Therefore, no disproportionate impact is expected for the identified minority and low-income populations.	No Disproportionate Impact
82		Social and Economic Impacts of Station Operation 5.8.2	Based on percentage increase in persons per police officer and firefighter ratios from the operations-related population increase, potential impacts of new facility unit operations are considered SMALL, and mitigation is not warranted. Possible mitigation would include hiring of additional police officers, purchasing additional support equipment, building new facilities, or expanding existing facilities.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact

**Bellefonte - Environmental Justice
Impact Assessment Methodology and Findings**

Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
83		Social and Economic Impacts of Station Operation 5.8.2	Based on factors such as the number of hospital beds, as described in Subsection 2.5.2, the impact of plant operations on medical services is considered SMALL and mitigation is not warranted.	No pathways were identified between this impact and minority and low-income populations.	No Disproportionate Impact
84	Socioeconomic Impacts (5.8)	Social and Economic Impacts of Station Operation 5.8.2	Based on the availability of housing units and rental units in Jackson County in relation to the number of operations workers, the impacts of plant operation on housing are considered SMALL and mitigation is not warranted.	The impact on the housing market during operations is anticipated to be distributed evenly throughout Jackson County. The number of operational workers expected to move into the area is significantly less than the number of workers expected to move into the area during the construction phase. Therefore, no disproportionate impacts are expected for identified minority or low-income populations.	No Disproportionate Impact
85		Social and Economic Impacts of Station Operation 5.8.2	The impacts of plant operation on the educational system of Jackson County, Alabama are considered SMALL to MODERATE and do not require mitigation as the increase in students are offset by the increase in local government revenues paid to the school district. Any MODERATE impact is temporary and offset by the tax factors that allow the district to expand and/or update the current infrastructure and hire additional teachers.	The impacts on education due to operations are anticipated to occur mainly in Jackson County. Because the impacts are expected to be evenly distributed throughout the county, there will be no disproportionate affect to identified minorities or low-income populations.	No Disproportionate Impact

**Bellefonte - Environmental Justice
Impact Assessment Methodology and Findings**

Table 2: Environmental Justice Impact Assessment Table for Operation

	Section	Subsection	Impact Summary	Minority and Low-Income perspective	EJ Impact
86		Social and Economic Impacts of Station Operation 5.8.2	Many of the recreational opportunities within the BLN region are outdoors and it is not possible to ascertain capacities. Based on aesthetic impacts discussed in ER Subsection 5.8.1.4, noise impacts discussed in ER Subsection 5.8.1.5, and the potential use of mitigation measures to control air quality; the impacts on recreational opportunities due to plant operation are discussed in ER Subsection 5.8.1.4 and are considered SMALL; mitigation efforts are not warranted.	Because the impacts are expected to be evenly distributed throughout Jackson County, there will be no disproportionate affect to identified minorities or low-income populations.	No Disproportionate Impact
87	Design Basis Accidents (7.1)		The results from ER Section 7.1 indicate that all accident doses meet the site acceptance criteria.	Because these impacts are regulated and monitored, this impact is not expected to disproportionately affect identified minority and low-income populations.	No Disproportionate Impact

Excerpts from:
Bathymetry of Surface Waters in Proximity
to Three Proposed Nuclear Power Facilities:
William States Lee III (South Carolina)
Bellefonte Nuclear Station (Alabama)
Grand Gulf Nuclear Station (Mississippi)

(Pages 23 – 29 and Figures 1-1, 1-2 and 1-3)

Stephen K. Boss, Ph.D., P.G.
University of Arkansas
January 2, 2007

BELLEFONTE NUCLEAR STATION (ALABAMA)

The Bellefonte Nuclear Station (BI) is operated by the Tennessee Valley Authority (TVA) along the shore of Guntersville Reservoir, an impoundment of the Tennessee River near Scottsboro, Alabama (northeast Alabama). The station is named for Bellefonte Island, a prominent landmark within the Guntersville Reservoir adjacent to the nuclear facility (Fig. 20.).

Guntersville Reservoir (also known as Lake Guntersville) was completed in 1936 under direction of the TVA. The impoundment extends 76 miles up the Tennessee River and has a surface area of 67,900 acres at normal pool elevation of 595.44 ft above mean sea-level. The mapped portion of Guntersville Reservoir for this project was approximately 553 acres adjacent to the Bellefonte Nuclear Station and included the area surrounding Bellefonte Island (Figs. 20, 21, 22). Mapping was conducted from 25 – 27 Sep 2006.

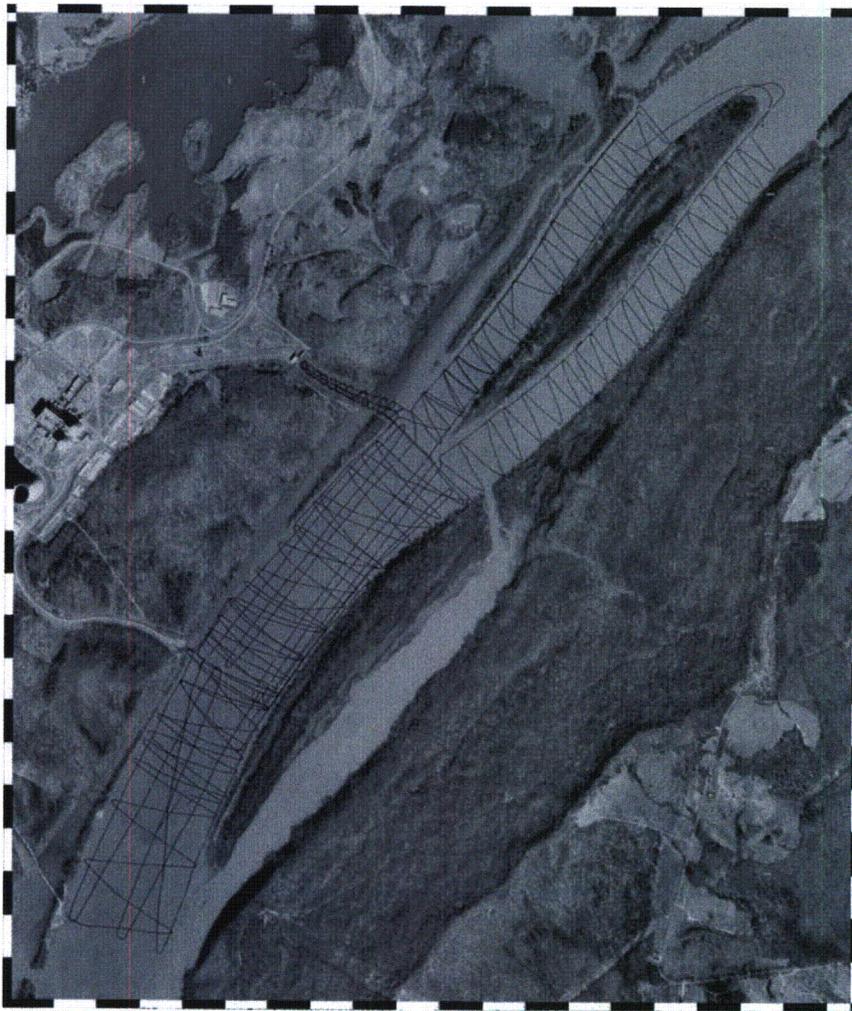


Fig. 20. Mapped area and echo sounder tracklines of the Bellefonte Nuclear Station site along Guntersville Reservoir near Scottsboro, Alabama.. These data were acquired on 25 - 27 Sep 2006. Note that tracklines are restricted to those areas of the reservoir that were navigable on these dates. Navigable waters are those with depths greater than approximately 3 feet. Hash marks on map border are 200 m.

The reservoir level on 25 - 27 Sep 2006 varied from 594.0 ft (25 Sep 2006) to 594.2 ft (26 Sep 2006) to 593.7 ft (27 Sep 2006), averaging 593.9 during the mapping interval (<http://www.lakegunterville.info/levelcal.asp?intMonth=12&intYear=2006>).

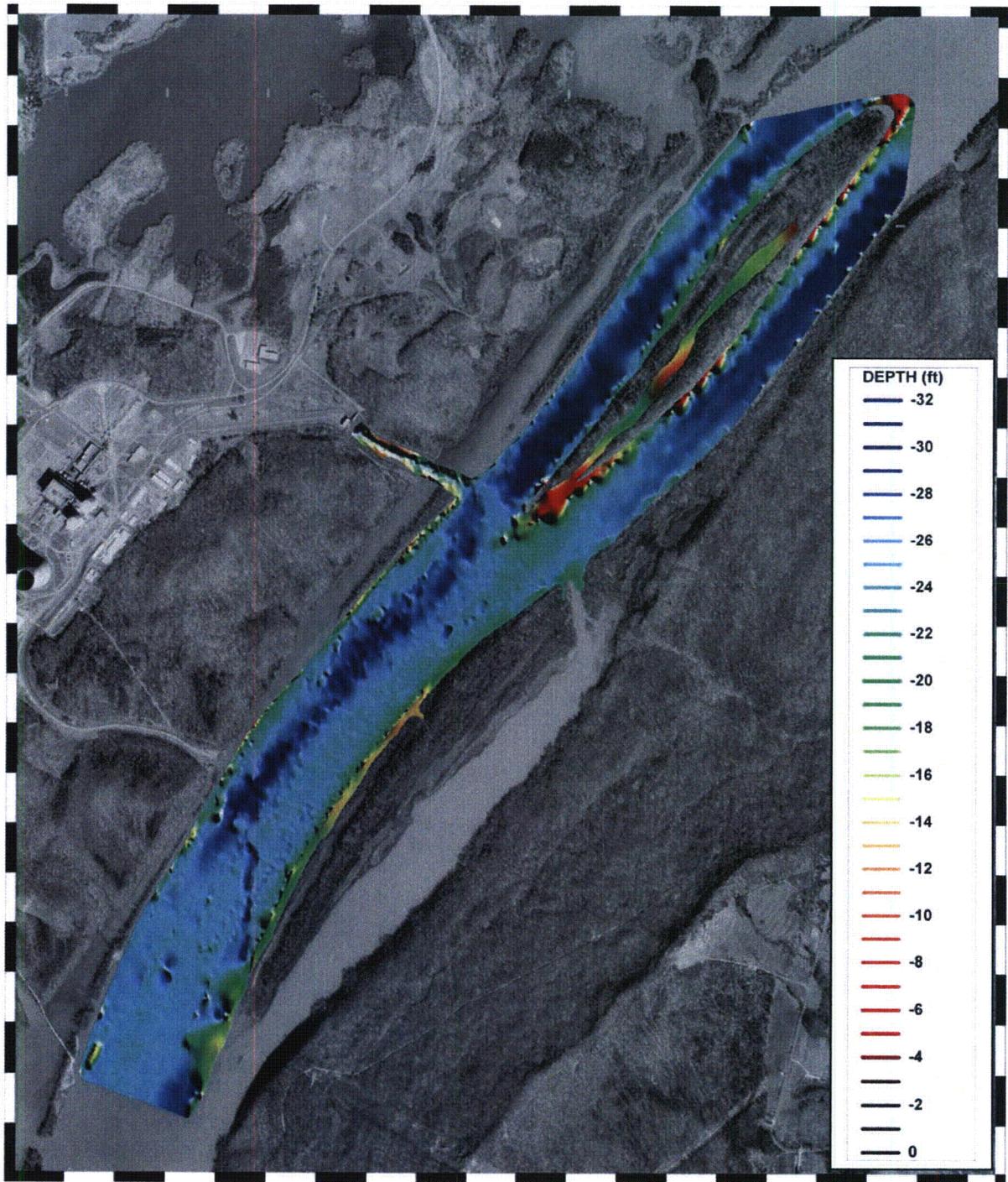


Fig. 21. Color shaded relief map of Bellefonte Island site mapped on 25 - 27 Sep 2006. Maximum depth of 36.3 ft. Mean depth throughout the impoundment was 23.7 ft (\pm 5.2 ft). Hash marks on map border are 200 m.

Processed and filtered echo sounder data for this portion of the BI yielded 408,798 soundings from which bathymetry was derived. Bathymetric data are represented by both a color shaded relief map (Fig. 21) and a contour map color coded to indicate depths (Fig. 22). Depths ranged from 0 ft to 36.3 ft with a mean depth 23.7 ft (± 5.2 ft). The deepest part of the mapped area was located within the northwest portion of the impoundment along the main dredged channel of the Tennessee River Figs. 21, 22).

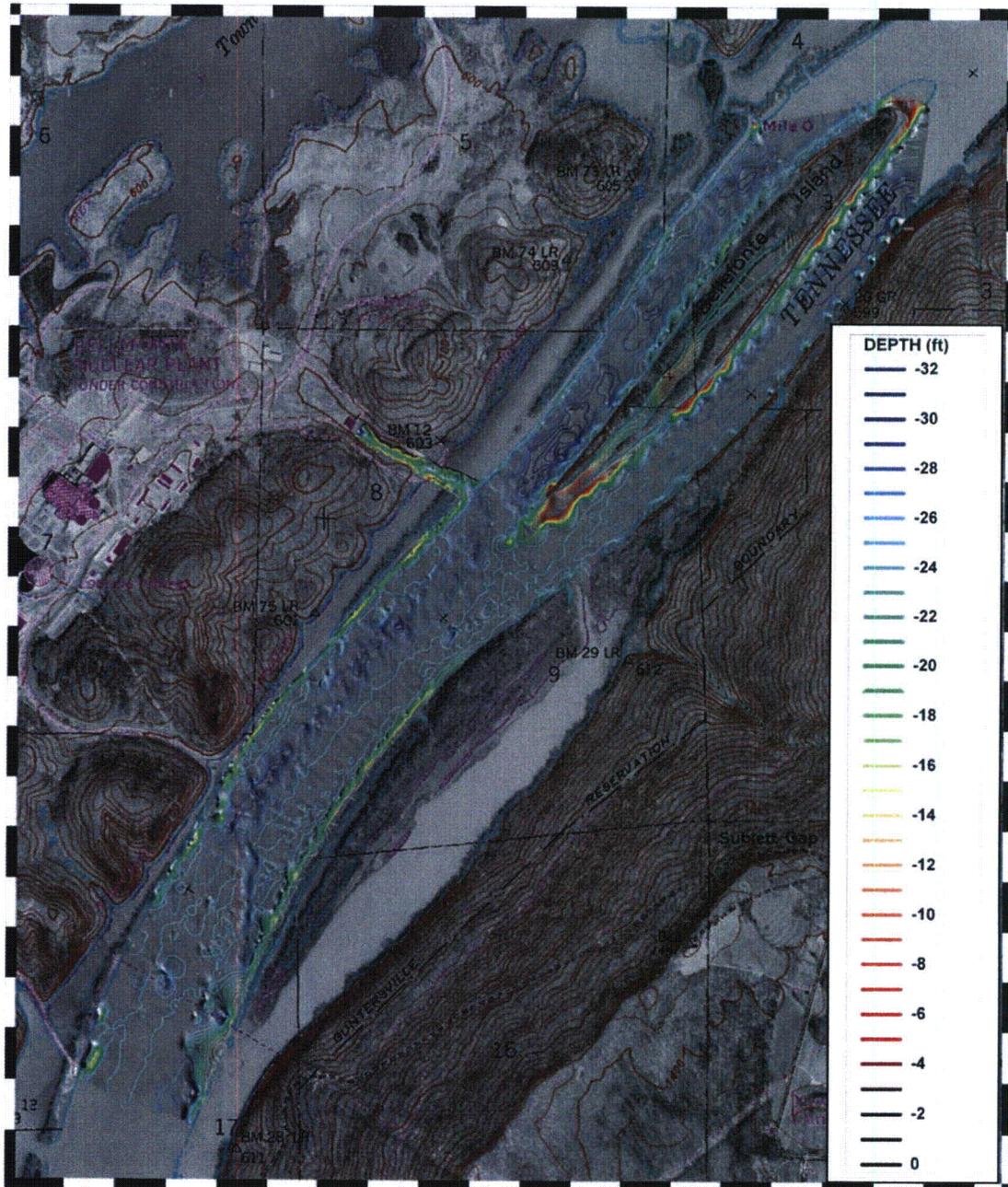


Fig. 22. Color coded contour map of BI area mapped on 25 - 27 Sep 2006 superimposed on USGS digital raster graphic taken from the Hollywood, AL 7.5' quadrangle map. Hash marks on map border are 200 m.

Contoured areas were summed to yield a total estimated volume storage within the mapped portion of BI of approximately 13,443 acre-feet. Graphics derived from bathymetric contours include area versus elevation (Fig. 23), area versus volume (Fig. 24), and elevation versus volume (Fig. 25). Though these curves are somewhat contrived given that they represent an arbitrary mapped area that is not physically bounded, the curves provide some reference and indication of volumetric changes that might be anticipated due to fluctuating reservoir levels. Note that active shipping along Gunter'sville Reservoir requires relatively stringent management of reservoir levels to ensure safe passage for barge traffic along the Tennessee River. As such, dramatic fluctuations of reservoir level are not common.

BELLEFONTE ISLAND AREA vs. ELEVATION

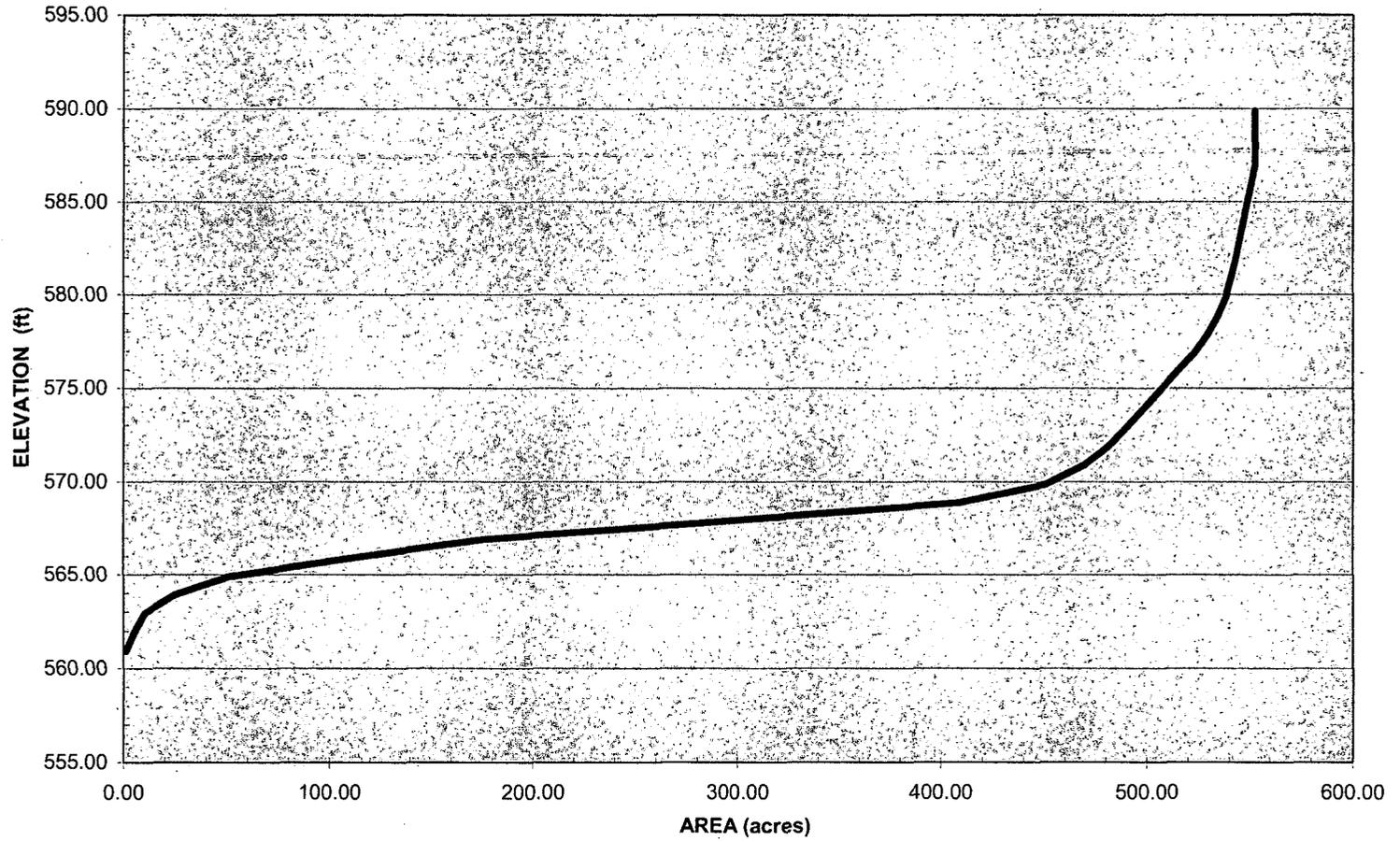


Fig. 23. Area versus elevation plot for BI mapped portion of Bellefonte Nuclear Station, Scottsboro, Alabama.

BELLEFONTE ISLAND AREA vs. VOLUME

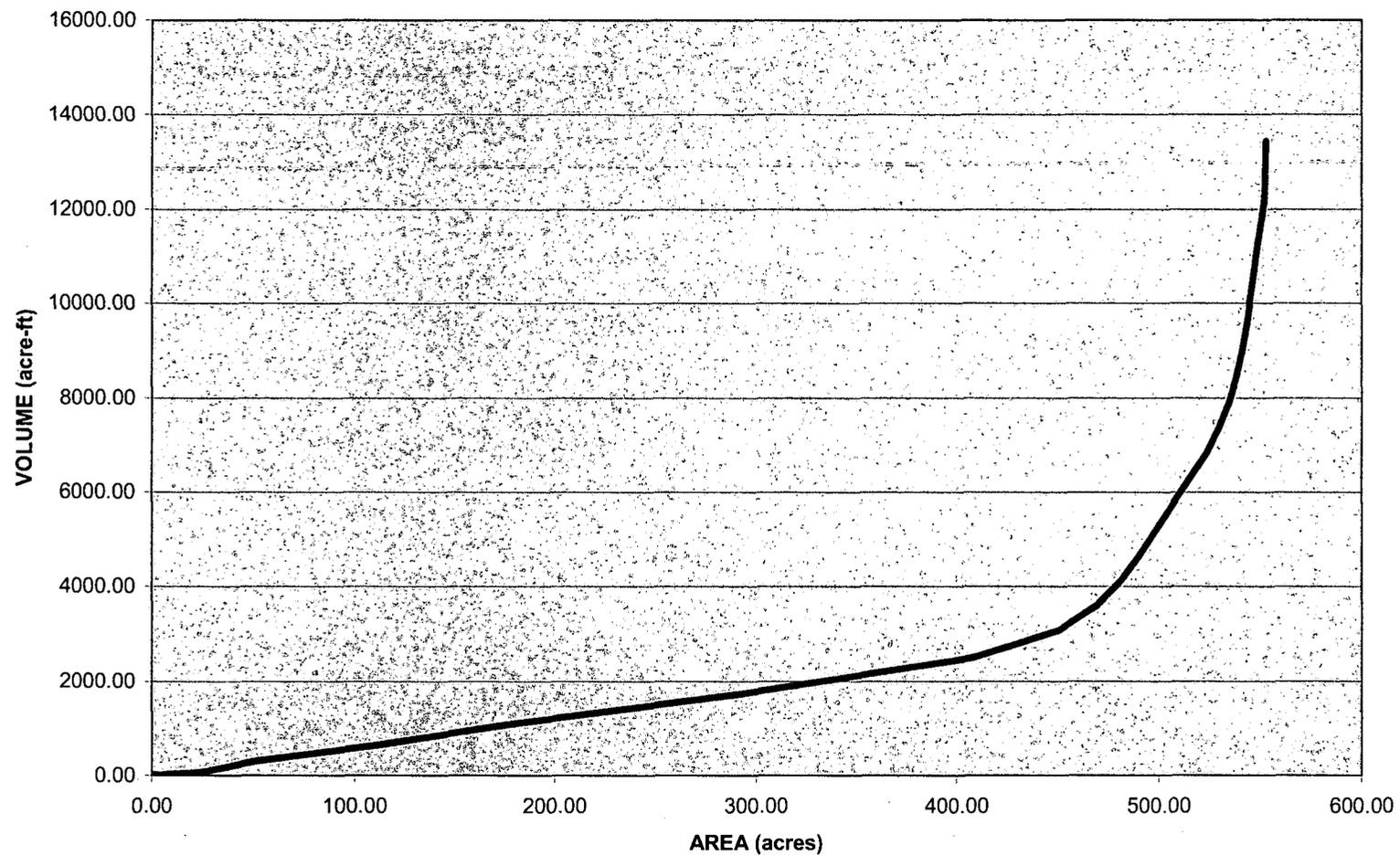


Fig. 24. Area versus volume plot for BI mapped portion of Bellefonte Nuclear Station, Scottsboro, Alabama.

BELLEFONTE ISLAND ELEVATION vs. VOLUME

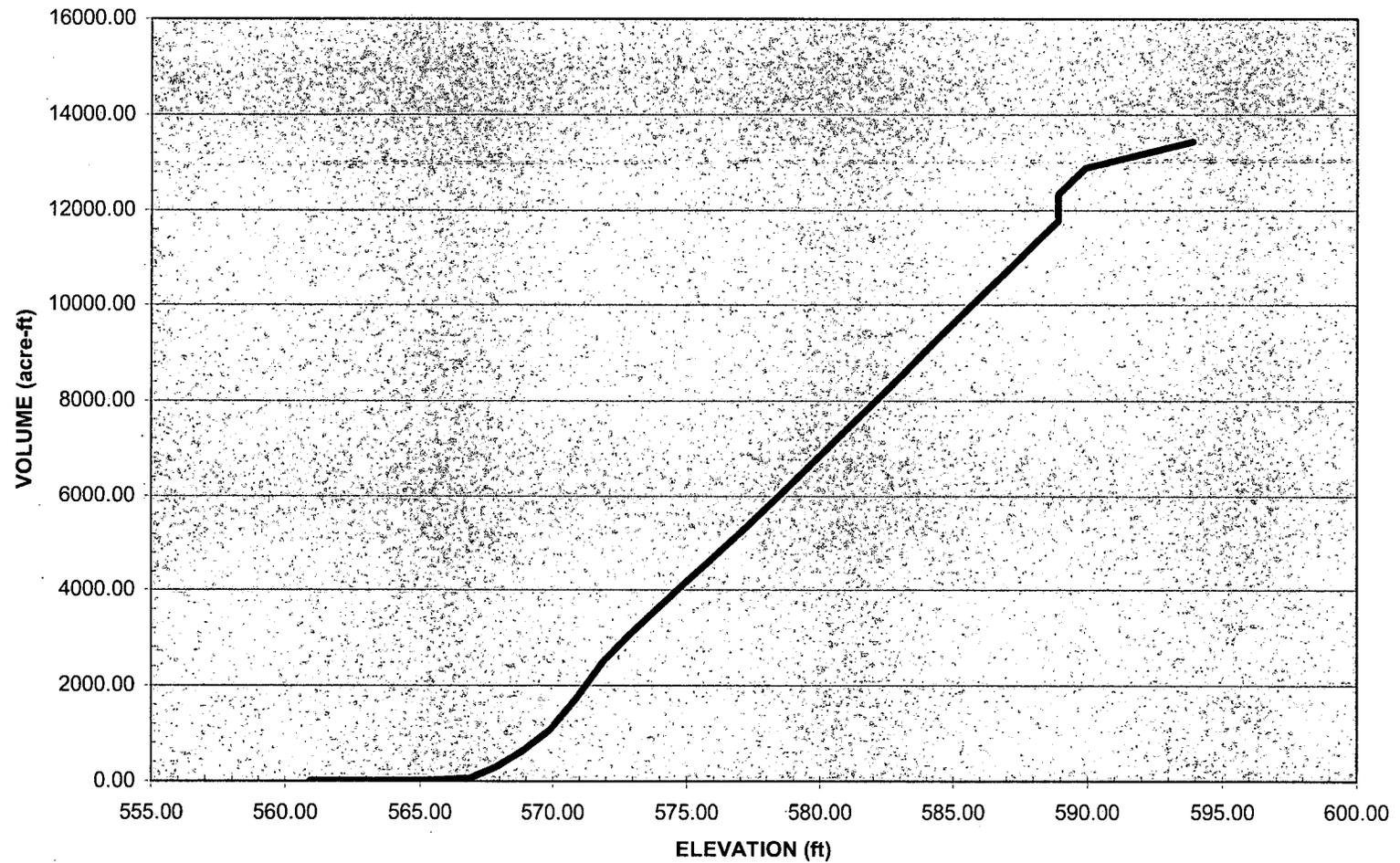
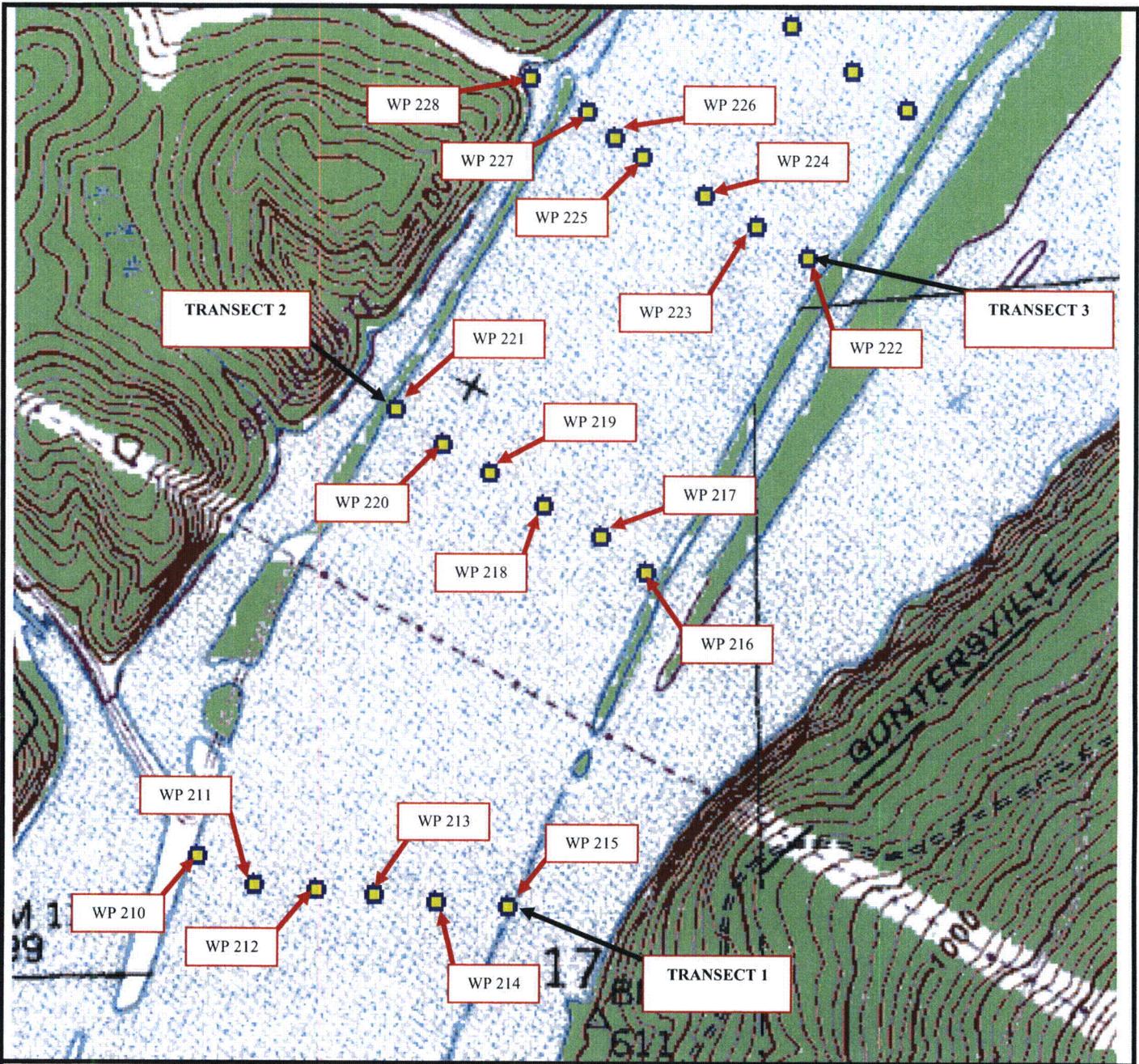


Fig. 25. Elevation versus volume plot for BI mapped portion of Bellefonte Nuclear Station, Scottsboro, Alabama.

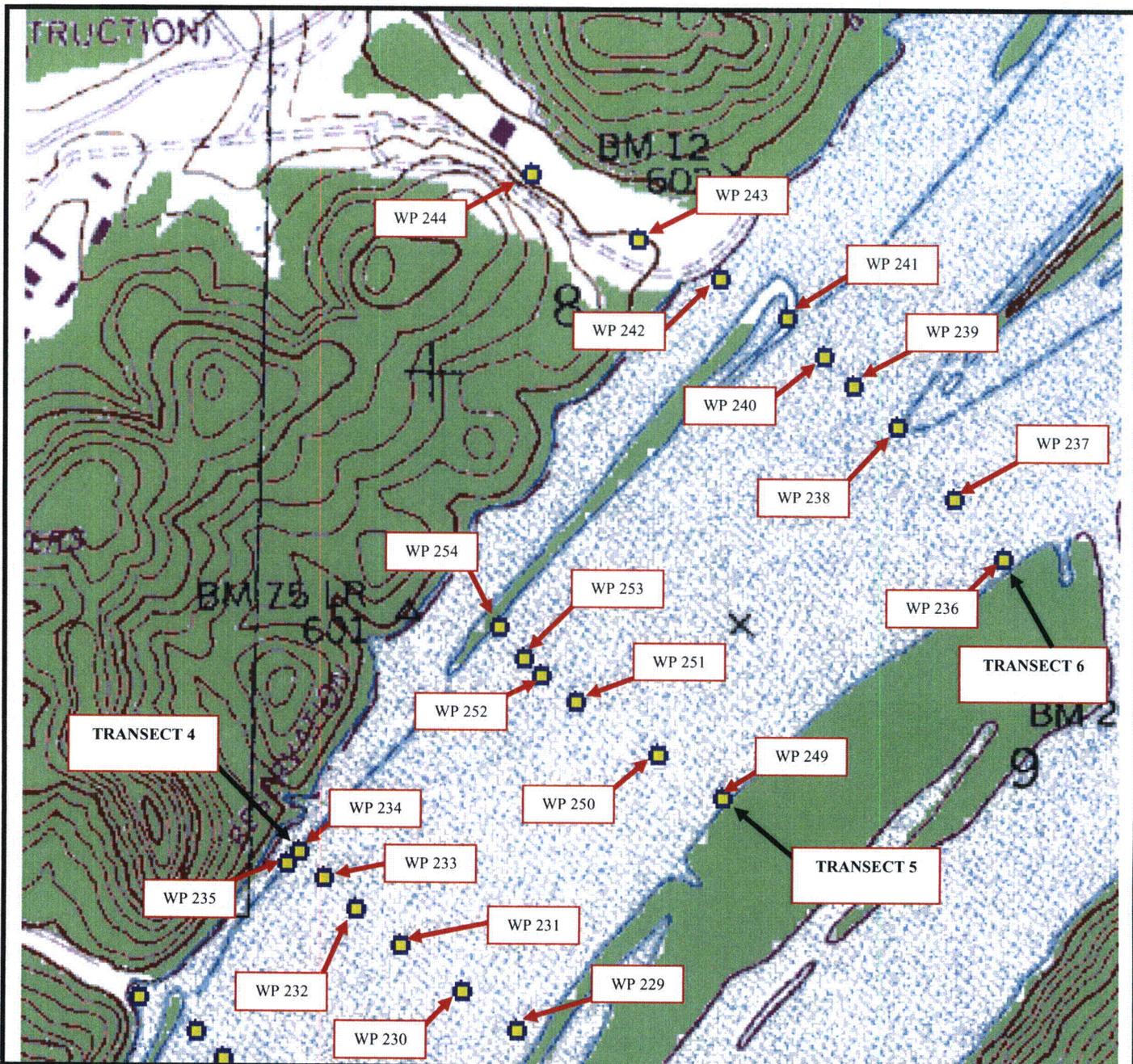


Enercon Services, Inc.
 6525 N. Meridian, Suite 503
 Oklahoma City, OK 73116

Figure 1-1: Topographic Map
 Scale: Not To Scale
 Source: USGS 7.5 Minute Topographic Map
 Hollywood, Alabama Qad

Subject Property
 Sections 17 & 18, T4S, R7E
 Jackson County, Alabama

Prepared for:
 COLA

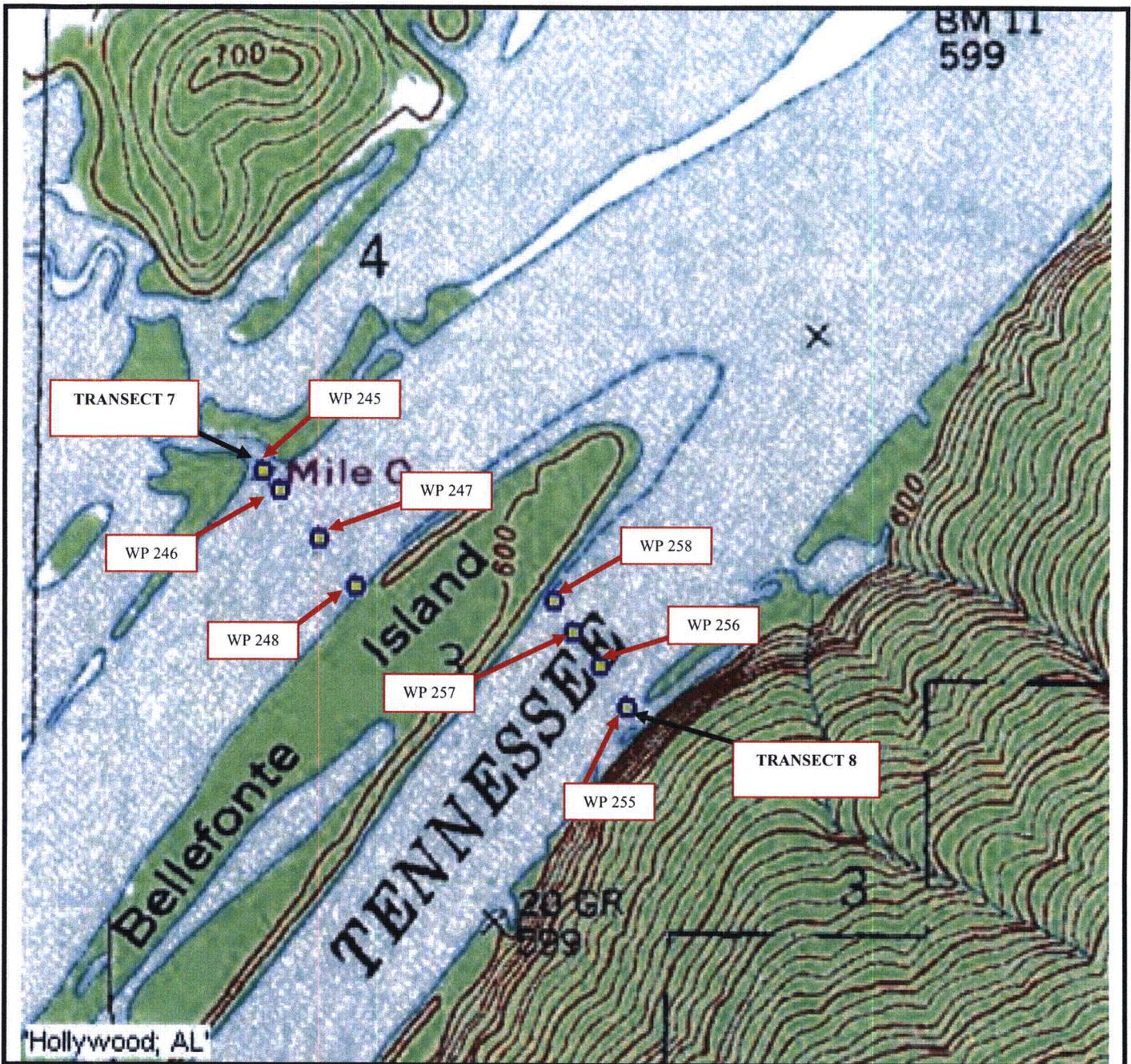


Enercon Services, Inc.
 6525 N. Meridian, Suite 503
 Oklahoma City, OK 73116

Figure 1-2: Topographic Map
 Scale: Not To Scale
 Source: USGS 7.5 Minute Topographic Map
 Hollywood, Alabama Quad

Subject Property
 Sections 8 & 9, T4S, R7E
 Jackson County, Alabama

Prepared for:
 COLA



Enercon Services, Inc.
 6525 N. Meridian, Suite 503
 Oklahoma City, OK 73116

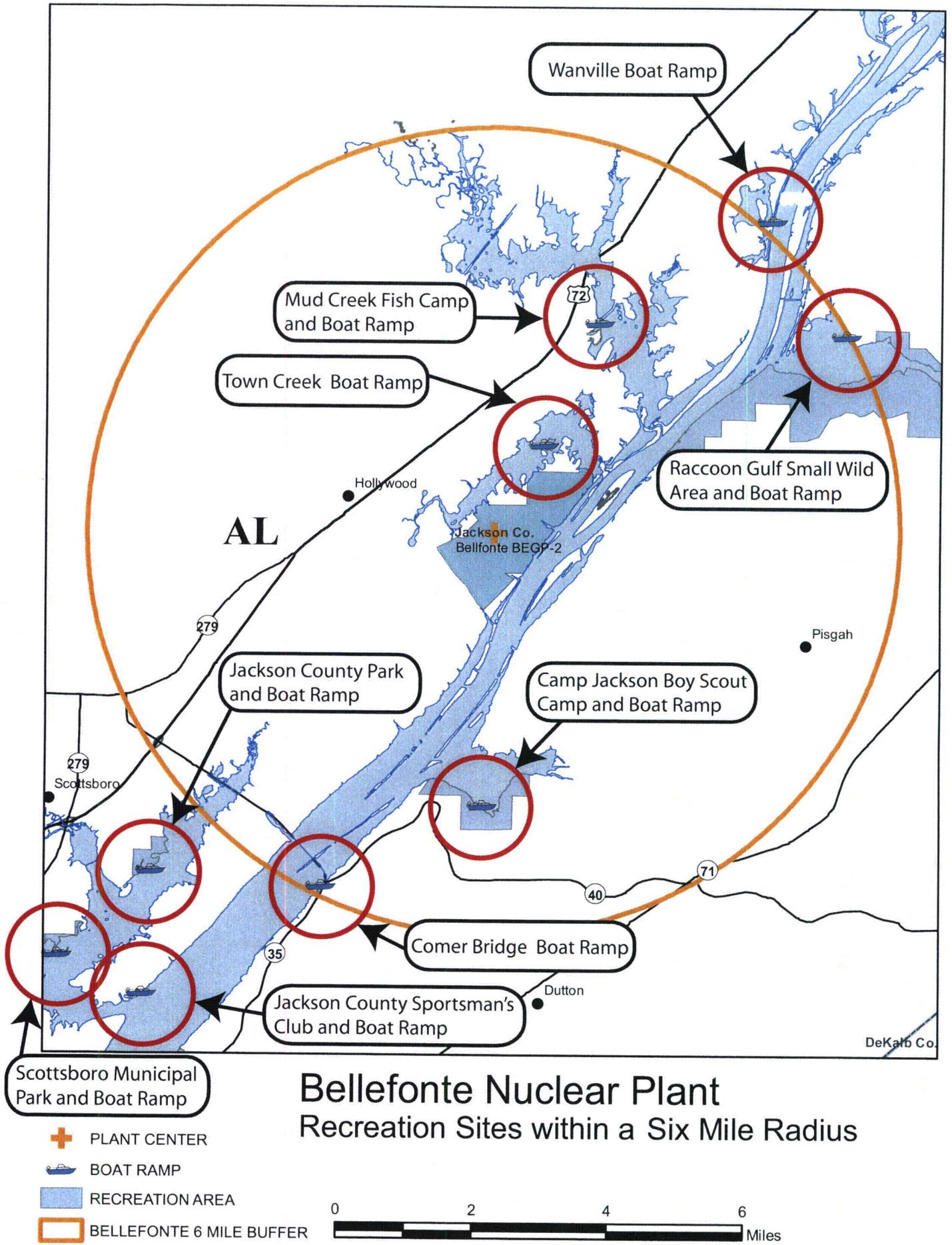
Figure 1-3: Topographic Map
 Scale: Not To Scale
 Source: USGS 7.5 Minute Topographic Map
 Hollywood, Alabama Quad

Subject Property
 Sections 3 & 4, T4S, R7E
 Jackson County, Alabama

Prepared for:
 COLA

**Bellefonte Nuclear Plant
COLA Part 3, Environmental Report
Figure 2.3-X1
Recreational Sites within a Six-Mile Radius**

**Tennessee Valley Authority
April 2008**



Wanville Boat Ramp

Mud Creek Fish Camp and Boat Ramp

Town Creek Boat Ramp

Raccoon Gulf Small Wild Area and Boat Ramp

Jackson County Park and Boat Ramp

Camp Jackson Boy Scout Camp and Boat Ramp

Comer Bridge Boat Ramp

Jackson County Sportsman's Club and Boat Ramp

Scottsboro Municipal Park and Boat Ramp

AL

Jackson Co.
Bellfonte BEGP-2

Hollywood

Pisgah

Scottsboro

Dutton

DeKalb Co.

279

40

71

35

72

279

RESPONSE TO ENVIRONMENTAL REPORT SUFFICIENCY REVIEW
Attachment E1, Mussel Survey
May 2, 2008

**Mussel Survey between
Tennessee River Miles 390.8 – 392.4
for
TVA's Bellefonte Power Plant
in
Jackson County, Alabama**

**Mainstream Commercial Divers
April 2007**

**Mussel Survey between Tennessee River Miles 390.8 – 392.4
for TVA's Bellefonte Power Plant in Jackson County, Alabama**

Prepared for:

**Enercon Services, Inc.
Oklahoma City, OK**



**322 C.C. Lowry Drive, Murray, KY 42071
Office: (270) 753-9654 Fax: (270) 753-0165**

Prepared by:

Chad E. Lewis

April 2007

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Mussel Survey between Tennessee River Miles 390.8 – 392.4 for TVA's Bellefonte Power Plant in Jackson County, Alabama

ABSTRACT

The Tennessee Valley Authority (TVA) has proposed to conduct maintenance activities at the Bellefonte Power Plant located at Tennessee River Mile 392. The Bellefonte Power plant is a potential site for a new nuclear plant in conjunction with Nustart Energy Development. Because the maintenance activities would potentially have an impact to the Tennessee River system, it was requested that a mussel survey be performed in the vicinity of the Bellefonte Power Plant. To complete the mussel survey, Enercon Services, Inc. retained the services of Mainstream Commercial Divers, Inc. of Murray, Kentucky. The mussel survey was conducted between TRM 390.8 – 392.4 in order to assess the current mussel fauna in the area and to determine if the potential exists for federally or state listed endangered or threatened mussel species to be present in the impact area. The particular species of concern for the mussel survey was the federally endangered Pink Mucket (*Lampsilis abrupta*). A total of 22 transects extended through the potential impact areas, including sixteen transects along the right descending bank, three transects in the center of the river within the navigation channel, and three transects along the left descending bank. During the survey, a total of 448 live mussels from 12 unionid species were encountered. Overall, *Megaloniais nervosa* was the dominant species, representing 38.84% of the mussels in the area. *Potamilus alatus* also comprised a significant portion of the mussel community, representing 29.91% of the mussels collected. Several other species occurred in significant numbers including *Pleurobema cordatum* (9.60%), *Elliptio crassidens* (8.48%), *Quadrula pustulosa* (5.80%), *Obliquaria reflexa* (2.46%), *Ellipsaria lineolata* (1.79%), and *Quadrula metanevra* (1.34%). The other four species (*Amblema plicata*, *Cycloniais tuberculata*, *Pyganodon grandis*, *Utterbackia imbecillis*) each comprised less than 1% of the sampled population and two species were only found as single individuals. The species diversity for the mussel concentration was 1.641957 and the evenness was 0.6607719. No zebra mussels were located during the survey. The areas along the right and left descending shorelines and within the navigation channel of the Tennessee River between TRM 390.8 and 392.4 contained a low density, patchy mussel community comprised of at least 12 species. The mussel community was dominated by two species, *Megaloniais nervosa* and *Potamilus alatus*, which comprised 68.75% of the sampled population. Few juvenile mussels (< 5 years old) were located during the survey, although some juveniles were located for several species indicating that recruitment has been at least somewhat successful for those species in recent years. No federally or state listed threatened or endangered species were located during the survey.

INTRODUCTION

The Tennessee Valley Authority (TVA) has proposed to conduct maintenance activities at the Bellefonte Power Plant located at Tennessee River Mile 392 (Figure 1). The Bellefonte Power plant is a potential site for a new nuclear plant in conjunction with Nustart Energy Development. Because the maintenance activities would potentially have an impact to the Tennessee River system, it was requested that a mussel survey be performed in the vicinity of the Bellefonte Power Plant. To complete the mussel survey, Enercon Services, Inc. retained the services of Mainstream Commercial Divers, Inc. of Murray, Kentucky. The mussel survey was conducted between TRM 390.8 – 392.4 in order to assess the current mussel fauna in the area and to determine if the potential exists for federally or state listed endangered or threatened mussel species to be present in the impact area. The particular species of concern for the mussel survey was the federally endangered Pink Mucket (*Lampsilis abrupta*).

METHODS

The purpose of the mussel survey was to determine if concentrations of mussels exist and if the potential exists for federally or state listed endangered or threatened mussel species to be present in the proposed maintenance construction area at the Bellefonte Power Plant. A total of 22 transects extended through the potential impact areas between TRM 390.8 – 392.4 (Figure 2). Based on a mussel survey plan developed by TVA and Enercon Services, Inc., sixteen transects were surveyed along the right descending bank, three transects were surveyed in the center of the river within the navigation channel, and three transects were surveyed along the left descending bank. The transects were spaced either 100 meters or 200 meters apart through the impact area and extended 100 meters into the river. Transects were set perpendicular to shore. Table 1 indicates the coordinates of the near shore end of each transect line along the right and left descending banks, and at each end of the transects within the river channel. These coordinates are approximate and may be accurate to only 30' since they were determined from a 7.5 minute topographic map using ArcView© software. Transect positions were located in the field using ArcPad GIS software connected to a Trimble AG132 DGPS giving sub meter position accuracy. Each transect was divided into 10 meter segments and the mussels from each section were recorded separately. Mussels were collected by a professional dive crew with considerable

experience in mussel survey techniques that was certified to meet ADCI and OSHA requirements. The diver searched an area one meter wide along one side of each transect and all mussels located within the 10 meter segments were sent to the surface for identification. Substrate information and depth were recorded at each 10 meter increment. Substrate information was based on a visual description of the surface material provided by the diver. Depth readings were obtained from the diver's pneumofathometer (accuracy $\pm 6''$).

Each mussel was identified to species and recorded on data sheets by M.C.D.I.'s malacologist. A general age range of mussels was noted to give an indication of whether recruitment was successful in recent years. Mussels were returned to near the area from which they were collected.

Species diversity (Shannon-Weiner Index) and evenness were determined for the area. Species diversity was based on the following formula: $[H' = -\sum p_i \log_e p_i]$ where p_i is the proportion of the i^{th} species in the sample. Results were based on the natural logarithm. Evenness was based on the following formula: $[\text{Evenness} = H'/H_{\text{max}} = H'/\ln(\# \text{ species})]$.

RESULTS AND DISCUSSION

The Tennessee River was surveyed for freshwater mussels between river miles 390.8 and 392.4 from April 10 –12, 2007. The water temperature was 60°F at the time of the survey and the flow was minimal. Water elevation during the survey was approximately 595 feet above mean sea level. Visibility was greater than one meter during the mussel survey.

During the survey, a total of 448 live mussels from 12 unionid species were encountered (Table 2, Photo 1, 2). Table 2 lists the scientific and common names of the species found, the number of each species, and their percent composition. The species diversity for the mussel community was 1.641957 and the evenness was 0.6607719. No zebra mussels were located during the survey. No federal or state threatened or endangered species of freshwater mussels were located during the survey.

Overall, *Megaloniaias nervosa* was the dominant species, representing 38.84% of the mussels in the area (Table 2). *Potamilus alatus* also comprised a significant portion of the mussel community, representing 29.91% of the mussels collected (Table 2). Several other species occurred in significant numbers including *Pleurobema cordatum* (9.60%), *Elliptio*

crassidens (8.48%), *Quadrula pustulosa* (5.80%), *Obliquaria reflexa* (2.46%), *Ellipsaria lineolata* (1.79%), and *Quadrula metanevra* (1.34%) (Table 2). The other four species (*Amblema plicata*, *Cyclonaias tuberculata*, *Pyganodon grandis*, *Utterbackia imbecillis*) each comprised less than 1% of the sampled population and two species were only found as single individuals (Table 2).

Right Descending Bank

Transects E-01 – E-16 were sampled along the right descending bank of the Tennessee River (Figure 2). During the survey along the right descending bank, a total of 430 mussels were encountered throughout the entire length of the survey area in patchy, low density concentrations (Table 3). The mussels were found in low abundance between 0m – 10m (2%), 10m – 20m (6%), and 90m – 100m (5%) (Table 4). Mussels were not consistently distributed along the survey lines and 28.75% of the 10-meter sections contained no mussels (Table 3). Along the right descending bank, 87% of the mussels were located between 20m – 90m along the transects (Table 4).

Total estimated density along the right descending bank transect lines ranged from 0.08 – 0.48 mussels per square meter (Table 3). Maximum density per 10 meter section ranged from 0.20 – 2.40 mussels per square meter (Table 3). The number of mussels per 100 meter transect line ranged from 8 – 48 individuals (Table 5). The number of species collected per transect line ranged from 2 – 9 (Table 5).

In the area from normal pool shoreline out to approximately 20 – 30 meters along the transect lines, the substrate was primarily composed of a layer of soft silt over hard clay (Table 6). In some areas the silt was over top of a layer of hard packed fine sand (Table 6). Once the diver proceeded past the 20 – 30 meter mark the substrate typically began to transition to a light layer of silt over gravel (Table 6). As the diver moved out further, there was cobble mixed with the gravel (Table 6). Overall, the substrate was variable along the transect lines, with the diver encountering varying compositions of silt, sand, gravel, and cobble, as well as encountering areas of boulders and bedrock (Table 6). Water depths were typically shallow at the beginning of the transects until the diver went over the first main drop off from the shoreline into the river channel (Table 6). Water depths past the drop off along the transect lines ranged from 19 – 28 feet (approximate bottom elevation 576 – 567 feet) (Table 6).

Navigation Channel

Transects E-17 – E-19 were sampled within the navigation channel of the Tennessee River (Figure 2). The navigation channel transects were sampled beginning at the end of the line nearest to the right descending bank. During the survey along the navigation channel, a total of eight mussels were encountered sporadically along transects E-17 and E-18 in very low numbers and no mussels were located along transect E-19 (Table 3). The mussels were found in very low abundance with no more than two mussels found per 10-meter section (Table 3, 4). Mussels were not consistently distributed along the survey lines and 76.67% of the 10-meter sections contained no mussels (Table 3).

Total estimated density along the channel transect lines ranged from 0.00 – 0.26 mussels per square meter (Table 3). Maximum density per 10 meter section ranged from 0.00 – 0.20 mussels per square meter (Table 3). The number of mussels per 100 meter transect line ranged from 0 – 6 individuals (Table 5). The number of species collected per transect line ranged from 0 – 4 (Table 5).

Substrate within the navigation channel was variable along the transect lines (Table 6). The substrate was typically a light layer of silt with a few inches of gravel over a layer of bedrock. In several areas there was cobble mixed with the gravel (Table 6). Water depth along the channel transect lines ranged from 23 – 29 feet and approximate bottom elevation ranged from 572 – 566 feet (Table 6).

Left Descending Bank

Transects E-20 – E-22 were sampled along the left descending bank of the Tennessee River (Figure 2). During the survey along the left descending bank, a total of 10 mussels were encountered sporadically along the transects (Table 3, 4). No mussels were found along the transect sections from 0m – 10m or from 40m – 50m and were in very low abundance between all of the other transect sections (Table 4). Mussels were not consistently distributed along the survey lines and 70.00% of the 10-meter sections contained no mussels (Table 3).

Total estimated density along the left descending bank transect lines ranged from 0.02 – 0.05 mussels per square meter (Table 3). Maximum density per 10 meter section ranged from 0.10 – 0.20 mussels per square meter (Table 3). The number of mussels per 100 meter transect

line ranged from 2 – 5 individuals (Table 5). The number of species collected per transect line ranged from 2 – 3 (Table 5).

In the area from normal pool shoreline out to approximately 20 meters along the transect lines, the substrate was primarily composed of either hard packed fine sand or a layer of soft silt over hard clay (Table 6). Once the diver proceeded past the 20 meter mark the substrate typically began to transition to a light layer of silt over gravel (Table 6). Overall, the substrate was variable along the transect lines, with the diver encountering varying compositions of silt and gravel, as well as encountering areas with sand, cobble, and bedrock (Table 6). Water depths were typically shallow at the beginning of the transects until the diver went over the first main drop off from the shoreline into the river channel (Table 6). Water depths past the drop off along the transect lines ranged from 19 – 25 feet (approximate bottom elevation 576 – 570 feet) (Table 6).

CONCLUSIONS

The areas along the right and left descending shorelines and within the navigation channel of the Tennessee River between TRM 390.8 and 392.4 contained a low density, patchy mussel community comprised of at least 12 species. The mussel community was dominated by two species, *Megaloniais nervosa* and *Potamilus alatus*, which comprised 68.75% of the sampled population. Few juvenile mussels (< 5 years old) were located during the survey, although some juveniles were located for several species indicating that recruitment has been at least somewhat successful for those species in recent years. No federally or state listed threatened or endangered species were located during the survey.

ACKNOWLEDGMENTS

I would like to thank the divers from Mainstream Commercial Divers, Inc. for conducting a professional survey.

Disclaimer:

Depth measurements are approximate and sediment types are subjective and are neither intended nor provided for engineering purposes. They are intended only to provide a description of mussel habitat.

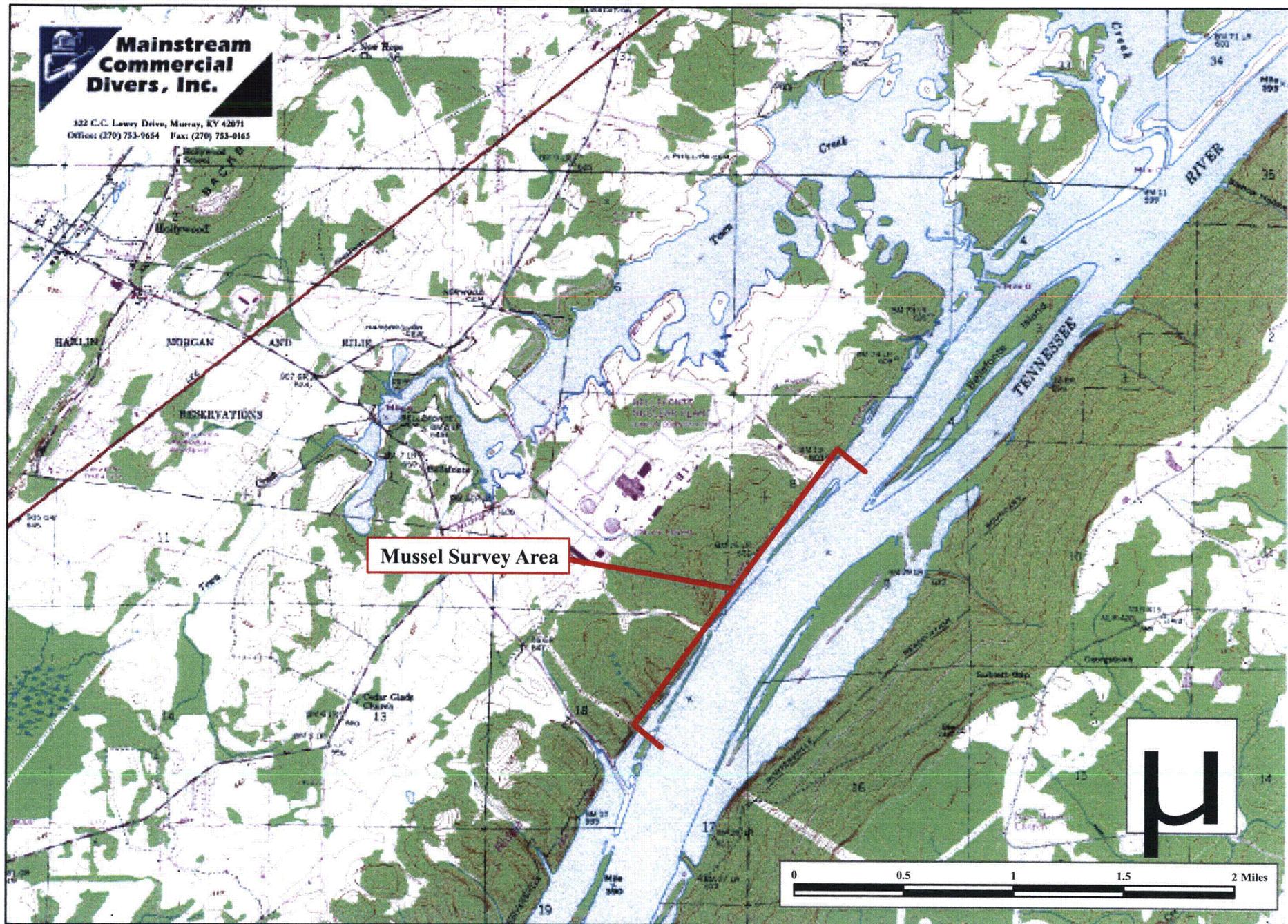


Figure 1. Survey area location for Enercon Services at Tennessee River Miles 390.8 - 392.4 in Jackson County, Alabama.



Figure 2. Mussel survey layout at Tennessee River Miles 390.8 - 392.4 along the left and right descending banks and within the navigation channel.

Table 1. Site coordinates for the shoreline end of the transect lines along the right and left descending banks, and the end coordinates of the transects in the channel between Tennessee River Miles 390.8 - 392.4. Coordinates are provided in Alabama State Plane East (Feet) NAD83 and Geographic (Degrees Decimal Minutes) NAD83 or WGS84.

Tennessee River - Right Descending Bank

Transect	River Mile	AL State Plane East (Feet)		Geographic	
		Easting	Northing	Latitude	Longitude
E-01	392.40	633349	1531873	34 42.6285066	85 54.5553279
E-02	392.27	632939	1531366	34 42.5448713	85 54.6371026
E-03	392.21	632685	1531140	34 42.5075807	85 54.6877754
E-04	392.05	632214	1530666	34 42.4293763	85 54.7817287
E-05	391.87	631762	1530186	34 42.3501840	85 54.8718851
E-06	391.74	631309	1529709	34 42.2714851	85 54.9622388
E-07	391.62	630850	1529226	34 42.1917951	85 55.0537864
E-08	391.51	630419	1528726	34 42.1093052	85 55.1397389
E-09	391.39	630054	1528185	34 42.0200644	85 55.2125067
E-10	391.33	629903	1527890	34 41.9714092	85 55.2425976
E-11	391.26	629755	1527600	34 41.9235786	85 55.2720899
E-12	391.20	629589	1527313	34 41.8762398	85 55.3051752
E-13	391.14	629420	1527033	34 41.8300545	85 55.3388598
E-14	391.02	629094	1526469	34 41.7370256	85 55.4038314
E-15	390.89	628771	1525895	34 41.6423481	85 55.4681999
E-16	390.77	628509	1525289	34 41.5424036	85 55.5203847

Tennessee River - Navigation Channel

Transect	River Mile	AL State Plane East (Feet)		Geographic	
		Easting	Northing	Latitude	Longitude
E-17a	391.55	631092	1528523	34 42.0759318	85 55.0053614
E-17b	391.55	631372	1528336	34 42.0451411	85 54.9494378
E-18a	391.36	630506	1527733	34 41.9456115	85 55.1222038
E-18b	391.36	630793	1527582	34 41.9207576	85 55.0648897
E-19a	391.17	630029	1526879	34 41.8047538	85 55.2172719
E-19b	391.17	630316	1526722	34 41.7789114	85 55.1599578

Tennessee River - Left Descending Bank

Transect	River Mile	AL State Plane East (Feet)		Geographic	
		Easting	Northing	Latitude	Longitude
ECS-20	391.44	631562	1527651	34 41.9322376	85 54.9113993
ECS-21	391.26	631062	1526849	34 41.7999522	85 55.0110727
ECS-22	391.06	630588	1525983	34 41.6571180	85 55.1055403

Table 2. Number of mussels collected and species percent abundance along the transect lines at Tennessee River Miles 390.8 - 392.4 along the right and left descending banks and within the navigation channel.

Scientific Name	Common Name	Total	Percent Abundance
<i>Megalonaias nervosa</i> (Rafinesque, 1820)	Washboard	174	38.84%
<i>Potamilus alatus</i> (Say, 1817)	Pink Heelsplitter	134	29.91%
<i>Pleurobema cordatum</i> (Rafinesque, 1820)	Ohio Pigtoe	43	9.60%
<i>Elliptio crassidens</i> (Lamarck, 1819)	Elephant-ear	38	8.48%
<i>Quadrula pustulosa</i> (Lea, 1831)	Pimpleback	26	5.80%
<i>Obliquaria reflexa</i> Rafinesque, 1820	Threehorn Wartyback	11	2.46%
<i>Ellipsaria lineolata</i> (Rafinesque, 1829)	Butterfly	8	1.79%
<i>Quadrula metanevra</i> (Rafinesque, 1820)	Monkeyface	6	1.34%
<i>Amblema plicata</i> (Say, 1817)	Threeridge	4	0.89%
<i>Cyclonaias tuberculata</i> (Rafinesque, 1820)	Purple Wartyback	2	0.45%
<i>Pyganodon grandis</i> (Say, 1829)	Giant Floater	1	0.22%
<i>Utterbackia imbecillis</i> (Say, 1829)	Paper Pondshell	1	0.22%
Total Number of Live Mussels		448	100.00%

Table 3. Distribution of mussels along each 10 meter segment of the transect lines.

	Right Bank										
	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09	E-10	E-11
0m - 10m		1	1		1		1			2	
10m - 20m		1		1	3		1	3			5
20m - 30m	1			2	4	2	2	8			9
30m - 40m	5			4		5	8	5	6	2	5
40m - 50m	4		1			7	11	5	12		8
50m - 60m	4	2	1			4	5	4	4		14
60m - 70m	3	2	2	1		5	3	10	6	2	1
70m - 80m	5		1			4	4	3	2	3	4
80m - 90m	5	1	2		1			5	4	3	2
90m - 100m	5	1	1		1			2	3		
Est. Density Per Transect Line (#/m ²)	0.32	0.08	0.09	0.08	0.10	0.27	0.35	0.45	0.37	0.12	0.48
Max. Density per 10 meter (#/m ²)	0.50	0.20	0.20	0.40	0.40	0.70	1.10	1.00	1.20	0.30	1.40

	Right Bank					Channel			Left Bank		
	E-12	E-13	E-14	E-15	E-16	E-17	E-18	E-19	E-20	E-21	E-22
0m - 10m	2	1				1					
10m - 20m	4	2	1		3	1				1	
20m - 30m	24	4	7		4			1	1		
30m - 40m	2	1	8	1	3				1		
40m - 50m	2	13	9	1	4						
50m - 60m	5		2	2	4	1		1			2
60m - 70m		1	2	4	3						1
70m - 80m	2	5	5	2	1	2					1
80m - 90m	1	3	6	3	4					1	1
90m - 100m	2		2	4		1			1		
Est. Density Per Transect Line (#/m ²)	0.44	0.30	0.42	0.17	0.26	0.06	0.00	0.02	0.03	0.02	0.05
Max. Density per 10 meter (#/m ²)	2.40	1.30	0.90	0.40	0.40	0.20	0.00	0.10	0.10	0.10	0.20

Table 4. Percentage of mussels located within each transect interval along the right descending bank, within the navigation channel, and along the left descending bank between TRM 390.8 - 392.4.

Right Descending Bank

Transect Interval	# Mussels	Percent Abundance
0m - 10m	9	2%
10m - 20m	24	6%
20m - 30m	67	16%
30m - 40m	55	13%
40m - 50m	77	18%
50m - 60m	51	12%
60m - 70m	45	10%
70m - 80m	41	10%
80m - 90m	40	9%
90m - 100m	21	5%
TOTAL	430	100%

Channel

Transect Interval	# Mussels	Percent Abundance
0m - 10m	1	13%
10m - 20m	1	13%
20m - 30m	1	13%
30m - 40m	0	0%
40m - 50m	0	0%
50m - 60m	2	25%
60m - 70m	0	0%
70m - 80m	2	25%
80m - 90m	0	0%
90m - 100m	1	13%
TOTAL	8	100%

Left Descending Bank

Transect Interval	# Mussels	Percent Abundance
0m - 10m	0	0%
10m - 20m	1	10%
20m - 30m	1	10%
30m - 40m	1	10%
40m - 50m	0	0%
50m - 60m	2	20%
60m - 70m	1	10%
70m - 80m	1	10%
80m - 90m	2	20%
90m - 100m	1	10%
TOTAL	10	100%

Table 5. Number of mussels of each species collected alive along the transects at Tennessee River Miles 390.8 - 392.4.

Scientific Name	Right Descending Bank								
	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09
<i>Amblema plicata</i>							1		
<i>Cyclonaias tuberculata</i>									
<i>Ellipsaria lineolata</i>						1	3		2
<i>Elliptio crassidens</i>	2		2			2	3	5	3
<i>Megalonaias nervosa</i>	13	1	4		4	17	18	23	16
<i>Obliquaria reflexa</i>	1		1	1				1	1
<i>Pleurobema cordatum</i>	7		1			2	1		4
<i>Potamilus alatus</i>	8	7	1	7	6	3	5	13	8
<i>Pyganodon grandis</i>							1		
<i>quadrula metanevra</i>							1		1
<i>Quadrula pustulosa</i>	1					2	2	3	2
<i>Utterbackia imbecillis</i>									
Number of mussels collected	32	8	9	8	10	27	35	45	37
Number of species collected	6	2	4	3	2	6	9	5	8

Scientific Name	Right Descending Bank							Channel	
	E-10	E-11	E-12	E-13	E-14	E-15	E-16	E-17	E-18
<i>Amblema plicata</i>		1			1	1			
<i>Cyclonaias tuberculata</i>			1				1		
<i>Ellipsaria lineolata</i>		1		1					
<i>Elliptio crassidens</i>	2	5	4	3	3	1	2		
<i>Megalonaias nervosa</i>	4	18	14	10	19	4	4		
<i>Obliquaria reflexa</i>			3				1	1	
<i>Pleurobema cordatum</i>		7	4	2	6	5	2	1	
<i>Potamilus alatus</i>	6	13	9	10	12	5	15	3	
<i>Pyganodon grandis</i>									
<i>quadrula metanevra</i>		1	1	2					
<i>Quadrula pustulosa</i>		2	8	2		1	1	1	
<i>Utterbackia imbecillis</i>					1				
Number of mussels collected	12	48	44	30	42	17	26	6	0
Number of species collected	3	8	8	7	6	6	7	4	0

Scientific Name	Channel	Left Descending Bank				Total
	E-19	E-20	E-21	E-22		
<i>Amblema plicata</i>					4	
<i>Cyclonaias tuberculata</i>					2	
<i>Ellipsaria lineolata</i>					8	
<i>Elliptio crassidens</i>				1	38	
<i>Megalonaias nervosa</i>		1		4	174	
<i>Obliquaria reflexa</i>		1			11	
<i>Pleurobema cordatum</i>			1		43	
<i>Potamilus alatus</i>	1	1	1		134	
<i>Pyganodon grandis</i>					1	
<i>quadrula metanevra</i>					6	
<i>Quadrula pustulosa</i>	1				26	
<i>Utterbackia imbecillis</i>					1	
Number of mussels collected	2	3	2	5	448	
Number of species collected	2	3	2	2	12	

Table 6. Tennessee River Miles 390.8 - 392.4 Transects - Approximate bottom elevation, water depth at normal pool elevation (595'), and type of sediment recorded at each 10-meter interval along the transects. (Elevations and Depths are only approximate and should not be used for engineering or navigational purposes. Depth and substrate are only intended to describe mussel habitat.)

Transect Mark	E-01 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	2" silt over hard clay
10 m	592	3	1" silt over hard clay
20 m	585	10	1" silt over hard clay
30 m	576	19	1" silt over hard clay
40 m	570	25	1" silt over gravel and hard clay
50 m	570	25	1" silt over gravel and hard clay
60 m	570	25	10% silt, 70% gravel, 20% cobble over hard clay
70 m	569	26	10% silt, 70% gravel, 20% cobble over hard clay
80 m	569	26	10% silt, 70% gravel, 20% cobble over hard clay
90 m	569	26	10% silt, 70% gravel, 20% cobble
100 m	567	28	10% silt, 70% gravel, 20% cobble

Transect Mark	E-02 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	12" silt over hard packed sand
10 m	590	5	5" silt over hard packed sand
20 m	581	14	1" silt over hard clay
30 m	574	21	1" silt over hard clay
40 m	570	25	10% silt, 70% gravel, 20% cobble
50 m	569	26	10% silt, 70% gravel, 20% cobble
60 m	569	26	10% silt, 70% gravel, 20% cobble
70 m	568	27	10% silt, 70% gravel, 20% cobble
80 m	568	27	10% silt, 70% gravel, 20% cobble
90 m	568	27	10% silt, 70% gravel, 20% cobble
100 m	568	27	10% silt, 70% gravel, 20% cobble

Transect Mark	E-03 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	6" silt over hard packed sand
10 m	581	14	1" silt over hard clay
20 m	573	22	1" silt over hard clay
30 m	571	24	20% silt, 80% gravel over hard clay
40 m	568	27	20% silt, 80% gravel over hard clay
50 m	570	25	10% silt, 90% gravel over hard clay
60 m	570	25	10% silt, 90% gravel over hard clay
70 m	570	25	10% silt, 70% gravel, 20% cobble
80 m	569	26	10% silt, 70% gravel, 20% cobble
90 m	569	26	10% silt, 70% gravel, 20% cobble
100 m	569	26	10% silt, 70% gravel, 20% cobble

Transect Mark	E-04 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	4" silt over hard clay
10 m	585	10	4" silt over hard clay
20 m	582	13	boulders
30 m	579	16	10% sand, 50% gravel, 20% cobble, 20% boulders
40 m	571	24	10% sand, 50% gravel, 20% cobble, 20% boulders
50 m	571	24	10% silt, 50% gravel, 40% cobble
60 m	572	23	10% silt, 50% gravel, 40% cobble
70 m	571	24	10% silt, 50% gravel, 40% cobble
80 m	571	24	10% silt, 50% gravel, 40% cobble
90 m	571	24	10% silt, 50% gravel, 40% cobble
100 m	571	24	10% silt, 50% gravel, 40% cobble

Table 6. Cont'd.

Transect Mark	E-05 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	4" silt over hard clay
10 m	586	9	2" silt over hard clay
20 m	579	16	1" silt over hard clay
30 m	571	24	10% silt, 70% gravel, 20% cobble
40 m	571	24	10% silt, 70% gravel, 20% cobble
50 m	571	24	10% silt, 70% gravel, 20% cobble
60 m	571	24	10% silt, 70% gravel, 20% cobble
70 m	571	24	10% silt, 70% gravel, 20% cobble
80 m	571	24	10% silt, 70% gravel, 20% cobble
90 m	571	24	10% silt, 70% gravel, 20% cobble
100 m	571	24	10% silt, 70% gravel, 20% cobble

Transect Mark	E-06 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	50% silt, 50% gravel over hard clay
10 m	592	3	50% silt, 50% gravel over hard clay
20 m	581	14	3" silt over hard clay
30 m	574	21	3" silt over hard clay
40 m	572	23	10% silt, 70% gravel, 20% cobble
50 m	571	24	10% silt, 70% gravel, 20% cobble
60 m	571	24	10% silt, 70% gravel, 20% cobble
70 m	570	25	10% silt, 70% gravel, 20% cobble
80 m	569	26	2" silt over bedrock
90 m	569	26	2" silt over bedrock
100 m	569	26	10% silt, 40% sand, 50% gravel over bedrock

Transect Mark	E-07 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	591	4	1" silt over hard clay
10 m	586	9	1" silt over hard clay
20 m	574	21	1" silt over hard clay
30 m	572	23	50% silt, 50% gravel over hard clay
40 m	572	23	10% silt, 70% gravel, 20% cobble
50 m	572	23	10% silt, 70% gravel, 20% cobble
60 m	571	24	10% silt, 70% gravel, 20% cobble
70 m	571	24	10% silt, 70% gravel, 20% cobble
80 m	571	24	10% silt, 70% gravel, 20% cobble
90 m	570	25	10% silt, 70% gravel, 20% cobble
100 m	569	26	10% silt, 70% gravel, 20% cobble

Transect Mark	E-08 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	50% silt, 50% gravel over hard clay
10 m	588	7	50% silt, 50% gravel over hard clay
20 m	582	13	2" silt over hard clay
30 m	573	22	10% silt, 70% gravel, 20% cobble
40 m	573	22	10% silt, 70% gravel, 20% cobble
50 m	573	22	10% silt, 70% gravel, 20% cobble
60 m	573	22	10% silt, 70% gravel, 20% cobble
70 m	572	23	10% silt, 70% gravel, 20% cobble
80 m	572	23	10% silt, 70% gravel, 20% cobble
90 m	572	23	10% silt, 70% gravel, 20% cobble
100 m	571	24	10% silt, 70% gravel, 20% cobble

Table 6. Cont'd.

Transect Mark	E-09 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	100% silt
10 m	592	3	100% silt
20 m	591	4	6" silt over hard clay
30 m	580	15	1" silt over hard clay
40 m	573	22	10% silt, 70% gravel, 20% cobble over hard clay
50 m	573	22	10% silt, 70% gravel, 20% cobble over hard clay
60 m	572	23	10% silt, 70% gravel, 20% cobble over hard clay
70 m	572	23	5% silt, 90% gravel, 5% cobble
80 m	572	23	10% silt, 40% gravel, 40% cobble
90 m	572	23	10% silt, 40% gravel, 40% cobble
100 m	572	23	10% silt, 40% gravel, 40% cobble

Transect Mark	E-10 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	582	13	1" silt over gravel
10 m	581	14	1" silt over gravel with some boulders
20 m	582	13	100% boulders
30 m	581	14	90% boulders, 10% gravel
40 m	579	16	1" silt over hard clay
50 m	574	21	1" silt over hard clay
60 m	573	22	1" silt over gravel
70 m	572	23	1" silt over gravel
80 m	570	25	1" silt over gravel
90 m	570	25	10% silt, 40% gravel, 40% cobble
100 m	568	27	10% silt, 40% gravel, 40% cobble

Transect Mark	E-11 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	2" silt over hard packed sand
10 m	574	21	50% silt, 50% cobble over hard clay
20 m	572	23	20% silt, 40% sand, 40% gravel
30 m	573	22	10% silt, 10% sand, 40% gravel, 40% cobble
40 m	577	18	10% silt, 50% gravel, 40% cobble
50 m	571	24	10% silt, 50% gravel, 40% cobble
60 m	570	25	10% silt, 50% gravel, 40% cobble
70 m	569	26	10% silt, 50% gravel, 40% cobble over bedrock
80 m	568	27	10% silt, 50% gravel, 40% cobble
90 m	568	27	10% silt, 50% gravel, 40% cobble
100 m	568	27	10% silt, 50% gravel, 40% cobble

Transect Mark	E-12 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	575	20	1" silt over hard clay
10 m	571	24	1" silt over hard clay
20 m	572	23	10% silt, 50% gravel, 40% cobble
30 m	570	25	10% silt, 40% gravel, 40% cobble, 10% boulders
40 m	575	20	10% silt, 40% gravel, 40% cobble, 10% boulders
50 m	581	14	10% silt, 40% gravel, 40% cobble, 10% boulders
60 m	580	15	10% silt, 30% gravel, 50% cobble, 10% boulders
70 m	570	25	10% silt, 30% gravel, 50% cobble, 10% boulders
80 m	568	27	10% silt, 20% gravel, 60% cobble, 10% boulders
90 m	567	28	10% silt, 20% gravel, 60% cobble, 10% boulders
100 m	567	28	10% silt, 40% gravel, 40% cobble, 10% boulders

Table 6. Cont'd.

Transect Mark	E-13 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	1" silt over hard clay
10 m	582	13	1" silt over hard clay
20 m	580	15	10% gravel, 90% boulders
30 m	581	14	10% gravel, 90% boulders
40 m	582	13	10% silt, 40% gravel, 40% cobble, 10% boulders
50 m	572	23	10% silt, 30% gravel, 30% cobble, 30% boulders
60 m	577	18	100% boulders
70 m	570	25	10% silt, 40% gravel, 40% cobble, 10% boulders
80 m	569	26	10% silt, 40% gravel, 40% cobble, 10% boulders
90 m	569	26	10% silt, 40% gravel, 40% cobble, 10% boulders
100 m	568	27	10% silt, 40% gravel, 40% cobble, 10% boulders

Transect Mark	E-14 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	1" silt over hard clay
10 m	582	13	1" silt over hard clay
20 m	571	24	1" silt over hard clay
30 m	570	25	2" silt over gravel
40 m	570	25	10% silt, 50% gravel, 40% cobble
50 m	570	25	10% silt, 50% gravel, 40% cobble
60 m	570	25	10% silt, 50% gravel, 40% cobble
70 m	570	25	10% silt, 50% gravel, 40% cobble
80 m	570	25	10% silt, 40% gravel, 40% cobble, 10% boulders
90 m	570	25	10% silt, 40% gravel, 40% cobble, 10% boulders
100 m	570	25	10% silt, 40% gravel, 40% cobble, 10% boulders

Transect Mark	E-15 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	1" silt over hard packed sand
10 m	579	16	1" silt over hard clay
20 m	571	24	1" silt over hard clay
30 m	570	25	5" silt over hard clay
40 m	569	26	10% silt, 50% gravel, 40% cobble
50 m	568	27	10% silt, 50% gravel, 40% cobble
60 m	568	27	10% silt, 50% gravel, 40% cobble
70 m	569	26	10% silt, 50% gravel, 40% cobble
80 m	570	25	10% silt, 50% gravel, 40% cobble
90 m	569	26	10% silt, 50% gravel, 40% cobble
100 m	569	26	10% silt, 50% gravel, 40% cobble

Transect Mark	E-16 (RDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	rip rap boulders, limestone gravel
10 m	571	24	2" silt over hard clay
20 m	570	25	10% silt, 50% gravel, 40% cobble
30 m	570	25	10% silt, 50% gravel, 40% cobble
40 m	570	25	10% silt, 50% gravel, 40% cobble
50 m	570	25	10% silt, 50% gravel, 40% cobble
60 m	570	25	10% silt, 50% gravel, 40% cobble
70 m	570	25	10% silt, 50% gravel, 40% cobble
80 m	570	25	10% silt, 50% gravel, 40% cobble
90 m	572	23	10% silt, 50% gravel, 40% cobble
100 m	571	24	10% silt, 50% gravel, 40% cobble

Table 6. Cont'd.

Transect Mark	E-17 (Channel)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	568	27	5% silt, 20% sand, 50% gravel, 25% cobble
10 m	567	28	5% silt, 20% sand, 50% gravel, 25% cobble
20 m	567	28	1" gravel over bedrock
30 m	568	27	1" gravel over bedrock
40 m	569	26	1" gravel over bedrock
50 m	569	26	1" gravel over bedrock
60 m	569	26	2" gravel over bedrock
70 m	570	25	1" gravel over bedrock
80 m	571	24	10% silt, 50% gravel, 40% cobble over bedrock
90 m	571	24	1" gravel over bedrock
100 m	570	25	1" gravel over bedrock

Transect Mark	E-18(Channel)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	569	26	5% silt, 20% sand, 50% gravel, 25% cobble
10 m	569	26	1" silt and gravel over bedrock
20 m	569	26	1" silt and gravel over bedrock
30 m	569	26	1" silt and gravel over bedrock
40 m	569	26	1" silt and gravel over bedrock
50 m	570	25	10% silt, 50% gravel, 40% cobble over bedrock
60 m	571	24	10% silt, 50% gravel, 40% cobble over bedrock
70 m	571	24	10% silt, 50% gravel, 40% cobble over bedrock
80 m	572	23	10% silt, 50% gravel, 40% cobble over bedrock
90 m	571	24	10% silt, 10% sand, 40% gravel, 40% cobble over bedrock
100 m	572	23	10% silt, 10% sand, 40% gravel, 40% cobble over bedrock

Transect Mark	E-19(Channel)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	570	25	1" silt and gravel over bedrock
10 m	570	25	1" silt and gravel over bedrock
20 m	569	26	1" silt and gravel over bedrock
30 m	568	27	1" silt and gravel over bedrock
40 m	566	29	50% silt, 50% gravel over hard clay
50 m	566	29	30% silt, 50% gravel, 20% cobble
60 m	566	29	30% silt, 10% sand, 60% gravel
70 m	568	27	30% silt, 70% gravel
80 m	571	24	20% silt, 60% gravel, 20% cobble over bedrock
90 m	570	25	20% silt, 60% gravel, 20% cobble over bedrock
100 m	570	25	20% silt, 60% gravel, 20% cobble over bedrock

Transect Mark	E-20 (LDB)		
	Bottom Elev. (Ft)	Depth (Ft)	Sediment
0 m	593	2	hard packed sand
10 m	592	3	1" silt over hard clay
20 m	576	19	1" silt over hard clay
30 m	573	22	3" silt over gravel
40 m	573	22	1" silt over gravel
50 m	573	22	10% silt, 50% gravel, 40% sand
60 m	572	23	10% silt, 50% gravel, 40% sand
70 m	571	24	10% silt, 50% gravel, 40% sand
80 m	571	24	10% silt, 50% gravel, 40% sand
90 m	571	24	10% silt, 50% gravel, 40% cobble over bedrock
100 m	570	25	10% silt, 50% gravel, 40% cobble over bedrock

RESPONSE TO ENVIRONMENTAL REPORT SUFFICIENCY REVIEW

Attachment E 2, Survey Of Mussel Stocks

May 2, 2008

**Survey of Native Mussel Stocks
Adjacent to the Bellefonte Nuclear Plant Site
Tennessee River Miles 390 - 392**

**Tennessee Valley Authority
1995**

**Survey of Native Mussel Stocks Adjacent to the Bellefonte Nuclear Plant
Site, Tennessee River Miles 390-392**

On August 29 and 30, 1995, Tennessee Valley Authority (TVA) biologists conducted a survey of native mussels in the Tennessee River adjacent to the Bellefonte Nuclear Plant site, Tennessee River Miles (TRM) 390 - 392, Jackson County, Alabama. This survey was designed to provide information about the mussels in this part of the river and will be used in an evaluation of alternative uses for the Bellefonte site which might include in-water construction.

The reach of the Tennessee River included in this survey included the right (descending) shoreline and right side of the river from downstream of the powerline crossing, TRM 390.8 upstream to approximately one-third the length of Bellefonte Island, to TRM 392.4. Along the upstream and downstream parts of this river reach, the shoreline consists of a series of long, narrow islands separated from the shore by shallow bays, pools, or swamps. In the center of this reach, the islands are absent along a short length of shoreline, from approximately TRM 391.3 to 391.7. Under water, the river bottom drops off quickly from the channel side of the islands or the shore approximately 7.5 meters (20 feet) to the wide, flat bottom of the river channel.

The mussel resources in this river reach were sampled by searching bottom habitats along a series of transects, typically oriented straight out from the shore of the barrier islands toward the channel. Each transect was established by anchoring one end of a 50-meter line near shore and the other end as far out into the channel as it would reach. Transects were established at approximately 0.2 mile intervals all along this reach of the river. Two divers

swam along the sides of these lines, collecting any live mussels they could see or feel within approximately one-half meter on each side of the line. All mussels collected by the divers were brought to the surface where they were sorted by species and counted. Notes taken while each transect was being searched included representative water depths and diver comments on substrate composition.

Results from this survey are presented in Table 1 and on Figure 1. During this survey, a total of 14 transects were searched. One of these transects was located along the left (descending) shore of this channel, close to Bellefonte Island. All of the 13 other transects were located along the right shore, adjacent to the Bellefonte Nuclear Plant site. Assuming that the divers were able to search a composite width of one meter along each transect, these 14 transects included 700 square meters of river substrate.

As indicated in Table 1, a total of 238 live mussels were found, representing 11 species. The two dominant species were the washboard (*Megaloniaia nervosa*) and pink heelsplitter (*Potamilus alatus*).

Table 1. Live freshwater mussels encountered during searches of 50-meter transects adjacent to the Bellefonte Nuclear Plant site Tennessee River Miles 390 - 392, August 29 - 30, 1995.

Transect	2	1	3	4	5	6	7	8	9	11	10	12	13	14		
Location (River Mile)	390.5	390.7	390.9	391.1	391.1	391.2	391.3	391.4	391.5	391.8	392.0	392.2	392.5	392.3		
Depth Range (feet)	4-26	9-25	6-25	4-26	9-26	21-24	7-26	4-24	4-26	5-24	7-26	4-27	5-25	22-30		
Substrate	S/GC															
Mussel Species																
<i>Megaloniais nervosa</i>			12	24	4	10	11	13	6	2	3	1	3		89	11
<i>Potamilus alatus</i>	3	7	4	11	16	4	6	4	10	7	4	2	4		82	13
<i>Pleurobema cordatum</i>		3	3	13		3	1	1	1	1	1		2		29	10
<i>Elliptio crassidens</i>			1	7	1	1						1	2		13	6
<i>Quadrula pustulosa</i>			2	2		2					1				7	4
<i>Quadrula metanevra</i>				4	1							1			6	3
<i>Amblema plicata</i>	1						1	1		1					4	4
<i>Ellipsaria lineolata</i>				3											3	1
<i>Obliquaria reflexa</i>				1				1						1	3	3
<i>Cyclonaias tuberculata</i>		1													1	1
<i>Tritogonia verrucosa</i>					1										1	1
Totals																
Specimens	4	11	22	65	23	20	19	20	17	11	9	5	11	1	238	14
Species	2	3	5	8	5	5	4	5	3	4	4	4	4	1	11	

Substrate abbreviations: C - cobble, G - gravel, S - silt or clay