

PMBelCOL PEmails

From: Creek, Carolyn P [cpcreek@tva.gov]
Sent: Wednesday, May 07, 2008 1:25 PM
To: Mallecia Hood
Cc: Neil Haggerty
Subject: Response to Environmental Report Sufficiency Review Comments
Attachments: Response to Environ Report wo-TVA.pdf; TVA Letter_Enclosure_Response to NRC Sufficiency Review Comments pdf_2008-04-## (3).pdf

The entire file was too large to send in one email.

So I have divided it into two parts

Email One of Two

1. Letter to NRC Dated May 2, 2008

Letter
<<Response to Environ Report wo-TVA.pdf>>

2. Response to Environmental Report

Response to Environmental Report Sufficiency Review
<<TVA Letter_Enclosure_Response to NRC Sufficiency Review Comments
pdf_2008-04-## (3).pdf>>

Please feel free to give me a call with any questions or concerns.

Carolyn Creek

Carolyn Creek

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From: Creek, Carolyn P

Created By: cpcreek@tva.gov

Recipients:

"Neil Haggerty" <neilhaggerty@comcast.net>
Tracking Status: None
"Mallecia Hood" <Mallecia.Hood@nrc.gov>
Tracking Status: None

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Files	Size	Date & Time
MESSAGE	1017	5/7/2008 1:25:07 PM
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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)
Tennessee Valley Authority)

Docket Numbers 52-014 and 52-015

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.

May 2, 2008

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)

- 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 through E1 & E2

May 2, 2008

**RESPONSE TO ENVIRONMENTAL
REPORT SUFFICIENCY REVIEW**

MAY 2, 2008

Pg. 1-98

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 Guntersville 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 Guntersville 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.

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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

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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.

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](#)).

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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 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, 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.

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.

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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 (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

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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 GASPAN 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 GASPAN 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 GASPARG code for inputting data. Specifically, page 2.12 of the GASPARG 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.](#)

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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:

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.

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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_h) 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.

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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](#)).

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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/bean/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~~

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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](#)

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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.

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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.

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.

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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).

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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
Redhead	45	0
Canvasback	1,000	142
Scaup	360	83

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Species	2006	2007
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>Lepisosteus 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>

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<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](#)

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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 atherniodes</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
Spotted sucker	<i>Minytrema melanops</i>	X	X			X

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Common Name	Scientific Name	Tennessee River Mile				
		350.0	375.2	405.0	410.0	424.0
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

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

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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 Guntersville 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 Guntersville 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 Guntersville 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 Guntersville Reservoir was approximately 15 million.

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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.

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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.

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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), Guntersville – 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.

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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

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.

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. Broemmel, 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.

ATTACHMENTS:

None.