APPENDIX C – RESPONSES TO AGENCY AND PUBLIC COMMENTS

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RESPONSE TO PUBLIC COMMENTS

The draft supplemental environmental impact statement (DSEIS) was available for public review and comment from November 13, 2009 through December 28, 2009. The document was transmitted to state, federal, and local agencies and federally recognized tribes. It was also available on TVA's website for review. Thirty-nine agencies, businesses, organizations, and individuals commented on the DSEIS via mail, email, and verbal statements. In addition, a public meeting was held in Scottsboro, Alabama on December 8, 2010 where the public had the opportunity to ask questions about the DSEIS and submit comments. Forty-nine people registered for the public meeting. This appendix summarizes the public's comments on the DSEIS and TVA's responses to those comments.

Analysis of Comments

Commenters submitted a variety of comments on the DSEIS. The comments were reviewed and arranged into groups with similar concerns. Then, a primary comment statement was prepared for each group of comments. Finally, a response was generated for each comment statement. While many of the commenters supported nuclear power, others voiced general concerns about the use of nuclear power. Many comments focused on the age of existing structures, water quality, reactor design, the safety of nuclear power, air quality, spent fuel, radwaste, alternative sources of energy and conservation, and socioeconomic impacts. Some comments raised concerns about the need and cost of power and cumulative effects.

The individuals, businesses, organizations, and agencies that commented on the DSEIS are listed in Table 1. The table lists each commenter alphabetically and identifies the comment statement or statements attributed to the commenter.

The identifiers for the comment statements are associated with each comment statement in the section immediately preceding the table. The actual letters, e-mails, facsimiles, and transcripts of verbal statements have been included in the administrative record.

Agency Letters

TVA received four letters from state and federal agencies during the 45-day public comment period. The responses to agency comments on the DSEIS follow each letter.

U.S. Environmental Protection Agency — Region IV Atlanta

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

December 11, 2009

Ms. Linda B. Shipp
Senior Manager
NEPA Compliance
Environmental Permitting and Compliance
Office of Environmental Research
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Attn: Ms. Ruth Horton
Senior NEPA Specialist

Subject: EPA's NEPA Review Comments on TVA's DSEIS for the "Single Nuclear Unit at the Bellefonte Plant Site" (November 2009); Jackson County, Alabama

Dear Ms. Shipp:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject Tennessee Valley Authority (TVA) Draft Supplemental Environmental Impact Statement (DSEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. TVA has identified an additional need for baseload capacity in the Tennessee Valley for the 2018-2020 timeframe. In response, TVA proposes to either complete or construct and operate one nuclear generating unit at the Bellefonte Nuclear Plant (BLN) brownfield site with a capacity of at least 1,100 MW and up to 1,200 MW, and an expected life cycle of 40 years. BLN is a 1,600-acre peninsular site located on TVA's Guntersville Reservoir in Jackson County Alabama near the town of Hollywood and city of Scottsboro. Three larger cities located within a 50-mile radius of the BLN site are Huntsville and Gadsden, Alabama, and Chattanooga, Tennessee.

EPA environmentally supports TVA's consideration of additional nuclear power in its power mix for the Tennessee Valley if impacts can be minimized and mitigated. Compared to conventional forms of fossil fuels such as pulverized coal, the use of nuclear power reduces overall air emissions – both criteria pollutants and emissions such as carbon dioxide associated with climate change effects. Although nuclear plants may have spent fuel disposal and safety concerns, we give deference to and assume facility safety compliance with the U.S. Nuclear Regulatory Commission (NRC) and TVA requirements and standards. We note that TVA currently operates three nuclear sites in the Valley with two or more reactor units each: Browns Ferry Nuclear Plant (BFN) on the nearby Wheeler Reservoir in Alabama, and the Watts Bar Nuclear Plant (WBN) and

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Sequoyah Nuclear Plant (SQN) on the Chicamauga Reservoir in Tennessee. We believe that renewables, clean fossil fuel options and nuclear power will become more and more prominent and eventually replace conventional fossil fuels for power generation.

Background

The TVA Bellefonte site has an extended history. The original TVA license application of 1973 to construct two nuclear reactors at BLN was made to the Atomic Energy Commission, pre-dating the NRC. Filing an application for an operational license followed in 1978. However, with construction for BLN Unit 1 (BLN 1) about 90% complete and for BLN Unit 2 (BLN 2) about 58% complete in the mid-1980s, TVA requested a deferred license status from NRC due to reduced growth forecasts. This deferred status was continued and NRC extended the construction permits to 2011 and 2014 for the two units. In the late 1990s, TVA also issued a "BLN Conversion EIS" to repower Bellefonte from a nuclear facility to a natural gas facility (i.e., combustion turbine plant). EPA provided comments on the DEIS and FEIS in 1997, although conversion construction did not go forward.[1] Subsequently in 2006, TVA submitted a site redress plan and NRC withdrew the construction permits. As part of the TVA redress plan and asset recovery program, unneeded portions of the Bellefonte site "were sold for reuse or abandoned in place" (pg. 4)[2] while others, such as a substation and training center, continued to operate. In response to more favorable power economics since 2005, TVA formally requested re-instatement of the construction permits for BLN 1&2 in 2009. Also, the earlier 2008 COLA ER proposed the Westinghouse AP1000 units BLN 3 and 4 at Bellefonte. On October 19, 2009, NRC conducted a site inspection for the requested deferred status and a response letter to TVA is pending.[3] Of note is that there was a lapse in quality assurance oversight during the period of permit withdrawal through March 2009, a fact that was entered into the Corrective Action Program. EPA01

TVA has not determined whether to complete an existing structure or construct a new structure for the proposed single nuclear generating unit. That is, one of the existing partially completed units could be completed using a Babcock & Wilcox (B&W) pressurized light water reactor technology as BLN 1 or 2, or a new unit could be constructed using a Westinghouse AP1000 (AP1000) advanced pressurized light water reactor technology proposed as BLN 3 or 4 in 2008.

Existing plant structures at BLN include several buildings (two reactor containment, two diesel generator, control, turbine, auxiliary, service and office buildings), a condenser circulating water pumping station, a river intake pumping station, two natural draft cooling towers, a transformer yard, a 500-kV and a 161-kV switchyard,

[1] TVA's interim consideration to convert to a natural gas plant was not documented in the present DSEIS in Section 1.2, but should be noted in the Final SEIS (FSEIS). However, we note that the BLN Conversion EIS was referenced in Section 1.7. BLN 3 and 4 should also be referenced relative to the 2008 Combined License Application Environmental Report (COLA ER). EPA02

[2] The FSEIS should summarize the equipment and structures that were sold and discuss how this might change the Exclusion Area Boundary (EAB) from previous analyses referenced in the DSEIS and whether the previous X/Q and dose calculations are still appropriate or must be re-calculated. EPA03

[3] NRC's findings regarding this site inspection should be disclosed in the FSEIS. EPA01 *cont*

a spent nuclear fuel storage pool, sewage treatment facilities, a helicopter pad and railroad spurs. These facilities remain intact but some, such as one of the cooling towers, will need repair or upgrading. Potential work on existing BLN 1 or 2 is facilitated since neither were completed or irradiated when construction ceased.

Reactor Technologies

The DSEIS considers the older B&W and the modern AP1000 reactor technologies as its two nuclear reactor alternatives for the proposed unit at BLN. These alternatives were the *Completion and Operation of a Single B&W Pressurized Light Water Reactor* (Alt. B) or *Construction and Operation of a Westinghouse AP1000 Advanced Pressurized Light Water Reactor* (Alt. C). Alternative B would maximize re-use of the existing, partially-constructed structures at BLN to complete the B&W reactor, i.e., primarily the re-use of one of the two started reactors (BLN 1 or 2). Alternative C would start construction of a new nuclear generation facility using an AP1000 reactor technology (BLN 3 or 4), although some reactor support facilities such as one of the two existing cooling towers could still be re-used.

EPA typically supports the re-use of materials and sites (brownfields/grayfields over greenfields). For the present proposal, re-use would be maximized by Alternative B where BLN 1 or 2 would be completed with the intended B&W reactor design. In this case, however, EPA is concerned that over 20 years have elapsed since construction ceased on BLN 1&2 in the mid-1980s, and that construction designs and materials as well as new inspection standards have significantly changed – especially for development of a nuclear generation unit. EPA04

Beyond the uncertainty of the structural integrity of the partially-completed BLN 1&2, it should be noted that the B&W technology is not as efficient and safe as the AP1000 technology (or equivalent). Compared to the B&W design, the DSEIS documents that an AP1000 reactor uses less radioactive fuel (1,821 fuel assemblies vs. 2,285) over a 40-year life cycle (Table 2-2) and therefore produces less spent fuel for disposal; needs fewer components (Fig. 2-8); has inherent public health safety features in its new "passive" safety design (Sec.2.3) with less potential radiological effects (Sec. 3.17) and design-based accidents (Sec. 3.19); and requires less water intake for cooling with less thermal discharge volumes. EPA05

Purpose & Need

The purpose of the present SEIS is to notify agencies and the public that TVA proposes a major federal action to complete or construct and operate a single nuclear generating unit at BLN, and to document the resultant potential environmental impacts for this unit (pg. S-1). Although TVA may wish to add additional future units at the BLN site, only TVA's NEPA responsibilities for the proposed single BLN nuclear generating unit are covered in the present SEIS. Accordingly, additional TVA NEPA documentation would be needed for additional units at the BNL site (however, if reasonably foreseeable, the cumulative impacts of such additional units should be included in this FSEIS). EPA06

Moreover, we understand from TVA that NRC will subsequently develop its own NEPA document on the licensing process for BLN once TVA determines its selected reactor technology in its Record of Decision (ROD) for the present BLN SEIS.

Alternatives

In addition to the above two nuclear generation alternatives (and the no action), power alternatives requiring or not requiring new generation, site selection alternatives, and transmission alternatives (with the no action) were presented in the DSEIS. Although these alternatives are further described in the enclosed *Detailed Comments*, we offer the following summary comments.

* ***Suitability of Existing BLN Structures***: If Alternative B is selected for the FSEIS, the suitability for re-using existing structures associated with the B&W reactor should be discussed. While EPA typically supports the re-use of materials and sites (brownfields and grayfields over greenfields), we are concerned that over 20 years have elapsed since construction was suspended on BLN 1&2.[4] While we defer nuclear plant safety to TVA and NRC, EPA has documented our re-use construction concerns in the enclosed *Detailed Comments*. EPA07

* ***Reactor Technologies***: The relative environmental and engineering merits of the B&W and AP1000 technologies are compared in the DSEIS. EPA finds that the modern AP1000 technology (or equivalent) is the preferred design for TVA's proposed nuclear generation unit at BLN. EPA prefers this type of AP1000 reactor (Alt. C) over the B&W design (Alt. B) despite the fact that more existing structures at BLN could be used (if found competent) by completing either BLN1 or BLN 2 with the B&W design. EPA08

* ***"Green" Alternatives***: With or without the present nuclear generation project, EPA strongly believes that green alternatives should continue to be promoted by TVA and that the FSEIS should summarize ways in which TVA is promoting such green alternatives, particularly efficiency/conservation and the addition of renewable capacity to support clean conventional baseload options. The FSEIS should also discuss how the amount of energy that could be saved or generated by these green alternatives would compare to the identified need and projected 1,100-1,200 MW capacity of the proposed BLN unit. EPA09 EPA10

* ***Alternate Sites***: TVA screened several existing, brownfield and greenfield sites in its site selection process. We understand that co-location of the proposed nuclear unit at an existing TVA nuclear power station such as BFN may not be advisable due to cumulative thermal discharge issues at the same site and reservoir. Other potential co-locations at WBN and SQN apparently have onsite space conflicts. Former TVA plant sites (e.g., Hartsville Nuclear Plant site) are also not ideal since all or most of the EPA11

[4] Presumably because of new construction standards and other upgrades, the 90% and 58% completion levels for BLN 1&2, respectively, may translate into only a 55% and 35% completion level according to the internet (Wikipedia). The FSEIS should discuss this. EPA12

lands have now been sold to private developers. Finally, development of the Murphy Hill (MH) greenfield site would likely have more environmental impacts than development of the BLN brownfield site, even though MH was already partially graded before a proposed TVA gasification plant at MH was cancelled. Although these site options might be revisited for verification in the FSEIS, we agree that the availability of the BLN brownfield site for development with either Alternative B or C has environmental merit. EPA11 *cont.*

* ***Transmission Upgrades***: If Alternative B (B&W) or C (AP1000) is pursued by TVA, transmission lines and facilities would need to be upgraded through refurbishment (Option 1) or new construction (Option 2) to accommodate the 1,100-1,200 MW of additional electricity. We agree with the selection of Option 1 from an environmental perspective.

* ***FSEIS Conclusions***: In the FSEIS, TVA should confirm or modify its DSEIS preferred alternatives and select a preferred reactor technology. EPA13

Environmental Impacts

Although additional EPA comments are provided in the *Detailed Comments* enclosure, we offer the following summary comments on the environmental impacts of the proposed nuclear generation unit at BLN.

* ***Air Quality*** – One of the advantages of a nuclear power plant is that the criteria pollutants and climate change air emissions associated fossil fuel plants are circumvented or significantly reduced. As discussed in the *Detailed Comments*, our BLN air quality comments are therefore more procedural, relating to meteorological data; dispersion modeling assumptions, procedures, and inputs; use of the new PM 2.5 standard; and further substantiation of some conclusions.

* ***Radiological Effects*** – As indicated previously, EPA prefers the AP1000 reactor design over the B&W technology. One of the reasons for this preference is that the AP1000 is inherently safer than the B&W design due to its advanced passive safety design. We have also provided additional comments on radiological effects in the enclosed *Detailed Comments*. These primarily focused on our requests for additional substantiation of provided dose calculations, tritium detection and the storage of spent nuclear fuel. EPA14

* ***Waters of the US*** – It appears from the DSEIS that avoidance and minimization of adverse impacts to aquatic resources under the federal Clean Water Act (CWA) Section 404 are being taken into consideration appropriately. That the project would utilize existing structures and transmission corridors, to varying degrees based on alternatives, is a good approach to mitigation as a baseline. Whereas Alternative B (B&W) would not result in the filling of wetlands and Alternative C (AP1000) would impact 12.2 acres, operational safety and modernization considerations associated with the AP1000 design provide adequate justification for pursuing Alternative C if it is otherwise appropriate. Once an alternative is selected and TVA is ready to proceed, a CWA Section 404 permit application should be submitted that characterizes any wetlands and/or stream impacts, EPA15

EPA15 *cont.*

along with a mitigation plan to address them. Also, since upgrading existing transmission line and facilities (Option 1) is preferred by TVA over new construction, we assume that there would not be any additional wetland impacts associated with project transmission upgrades. EPA16

* ***Surface Water*** – Surface water withdrawals ("make-up water") are needed to account for the proposed nuclear power unit's evaporative losses, cooling tower drift and discharges ("blowdown") to remove solids that accumulate in the cooling water. The Tennessee River (Guntersville Reservoir) would be both the source water for intake withdrawals and receiving waters for downstream discharges via a submerged diffuser (Figs. 3-2 to 3-5).

Although both the B&W and AP1000 technologies would operate in a closed-circuit mode and utilize one of the existing natural draft cooling towers to cool reactor cooling waters, thermal effluent would nevertheless be generated and discharged back into the Guntersville Reservoir receiving waters. Discharge of this heated blowdown is regulated by the State of Alabama National Pollutant Discharge Elimination System (NPDES) permit. This permit also prescribes thermal discharge limits, which are not to exceed a 92°F monthly average, 95°F daily maximum, and 5°F increase over ambient conditions. Hydrothermal modeling (pg. 94) appears to predict that the proposed nuclear unit would not exceed these limits for both Alternatives B and C outside the mixing zone, with the exception of infrequent and unusual hydrologic or meteorological conditions. The FSEIS should clarify and summarize if compliance with all three thermal limits is indeed predicted for both designs and what measures will be taken for compliance during unusual river flows and weather conditions (e.g., generation at less than nameplate capacity or temporary unit shutdown). EPA17

As suggested above, it is noteworthy that the AP1000 technology would require significantly less surface water than the B&W technology – 72% of the B&W withdrawal volume and 36% of the B&W discharge volume (pg. 95). The expected withdrawal rate for the B&W reactor is 34,000 gpm (75 cfs) and discharge rate is 22,650 gpm (50 cfs), while the withdrawal rate for the AP1000 reactor is 23,953 gpm (53 cfs) and discharge rate is 7,914 gpm (18 cfs).[5] Overall, this would result in a lower level of thermal pollution for Guntersville Reservoir, even if both technologies are predicted to comply with NPDES thermal limitations. Such relative differences in efficiency should be considered in TVA's final selection of a preferred reactor technology, particularly if additional units would be added at BLN in the future causing cumulative effects. EPA18

In regard to chemical additives such as biocides and inhibitors added to the cooling waters to control fouling, EPA recommends that the minimum amount of chemical additives be used and that concentrations be monitored. We will defer to the State of Alabama's NPDES permit regarding compliance with water quality standards for discharge effluents, and retain our federal permit oversight. EPA19

[5] Although a minor discrepancy, these "gpm" data suggest a difference of 71% and 35% as opposed to the 72% and 36% stated in the DSEIS. EPA20

* ***Environmental Justice (EJ)*** – U.S. Census data for 2000 for the block group incorporating BLN showed a minority level (percentage) higher than the county average but lower than the state and national averages. Estimates for 2008 showed increases in minorities but with probably similar trends. U.S. Census poverty levels for 2000 and 2007 estimates showed a poverty level percent for the BLN area that is below county, state and national levels. EJ evaluations were made in the BLN Conversion EIS (1997) and were referenced (pg. 146). The more recent COLA ER concluded "…that any impacts would be minor and not disproportionate." Moreover, "more recent data" with the same conclusion were also referenced, but not cited. The FSEIS should briefly substantiate these conclusions, rather than only incorporating by reference, and provide citations/timeframes. Also, any potential concentrations ("pockets") of minority and/or low-income populations near the BLN site should be identified in the FSEIS. It should be noted that a potential EJ impact at BLN would make this site less environmentally preferable to EPA despite being an available brownfield site. EPA21 EPA22 EPA23 EPA24

Regardless of the final EJ conclusion, TVA should provide public outreach on the project to all demographics living near the site during the SEIS process as well as periodic updates thereafter. EPA25

* ***Induced/Secondary/Cumulative Impacts*** – Although TVA has identified a need for additional power by 2018-2020, supplying such power (1,100-1,200 MW) will likely accommodate or induce additional growth in the Tennessee Valley and result in developmental impacts. The FSEIS should acknowledge these expected secondary impacts as a project consequence. EPA26

Regarding cumulative effects, NEPA documents should discuss the past, present and reasonably foreseeable future projects (federal and non-federal) within the project area. This listing should focus on projects that impact the same resources as the proposal, with impacts being qualified and quantified to the extent feasible. In the case of the present BLN proposal, nearby projects with similar impacts (wetland, water quality and radiological impacts) should be emphasized. EPA27

We note that Section 3.13.10 discusses cumulative impacts, albeit only for socioeconomics, while other environmental consequences do not have a cumulative impacts section. This document format is somewhat cumbersome and could be streamlined in the FSEIS by designating only one cumulative impacts section that covers all relevant parameters. EPA28

EPA DSEIS Rating

EPA rates this DSEIS an "EC-2" (Environmental Concerns, additional information requested). We primarily base this rating on the inherent uncertainties associated with a nuclear power unit.

Summary

EPA supports TVA's consideration of additional nuclear power for the Tennessee Valley due to its reduced air emissions compared to conventional fossil fuel technologies. However, we will defer nuclear plant safety issues to NRC and TVA. For the proposed nuclear generation unit at the Bellefonte site, EPA prefers the AP1000 technology (or equivalent). EPA therefore prefers Alternative C (AP1000) over Alternative B (B&W). However, we also support the use of green alternatives (renewables, efficiency and conservation) if it can be shown that they can provide the identified power need in lieu of the planned nuclear unit, or if not, as a growing supplement to TVA's baseload capacity. Moreover, EPA favors the use of brownfields, grayfields and co-located facilities when feasible and new impacts are not thereby generated. We therefore agree that the availability of the BLN brownfield site for development has environmental merit. Finally, we concur that refurbishing transmission lines and facilities (Option 1) if all current regulatory codes can be met rather than constructing new ones is environmentally appropriate if the BLN project is pursued by TVA. In the FSEIS, TVA should confirm or modify its DSEIS preferred alternatives and select a preferred reactor technology.

Regarding project impacts for the proposed single nuclear unit, the FSEIS should provide additional background information for air quality impacts and radiological effects; EPA29
EPA30 discuss mitigation for BLN impacts to waters of the US (Alt. C); insure compliance with State NPDES thermal limits for heated effluent discharges by either reactor technology EPA31
(Alts B or C); verify minor or no EJ impacts, and revise the cumulative impacts section. EPA32

EPA appreciates the opportunity to review this DSEIS. Should you have questions on our comments, please contact Chris Hoberg of my staff at 404/562-9619 or hoberg.chris@epa.gov for NEPA issues, and Stanley Krivo of the Air, Pesticides and Toxics Management Division at 404/562-9123 or krivo.stanley@epa.gov for air quality technical issues.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Enclosure: *Detailed Comments*

DETAILED COMMENTS

Environmental Impacts

o ***Air Quality*** – EPA's air quality comments for the DSEIS are as follows:

+ Section 3.16.1.2 Local Meteorology (pg. 160)

* *Meteorological Data (2006-2008)*: The discussion of the updated 2006-2008 meteorological data period does not provide a complete summary of the meteorological conditions. This discussion should be supplemented with tables and figures that provide applicable wind roses, frequency distributions, comparisons, etc. that would provide the reader with a better understanding of the current meteorological conditions. The tables and figures will also allow comparisons with previous observations and long-term records, and a basis for the evaluation of subsequent dispersion and transport analyses. EPA33

* Comparison of *Meteorological Data Records*: The stability class frequency distribution is used to show agreement between different meteorological data records. EPA believes that this is not sufficient to show agreement. The data record comparisons should include joint frequency distributions of stability, wind direction, and wind speed. EPA34

+ Section 3.16.2.1 Dispersion (pg. 162)

* *Section Contents/Title*: This section is concerned with both the dispersion and transport of effluent releases. Therefore, we suggest changing the name to "Transport and Dispersion". EPA35

* *Transport and Dispersion Modeling Procedures*: The atmospheric transport and dispersion modeling procedures, computer model, and input parameters used to develop the provided dispersion estimates should be provided. Explanations may be needed for some of the input parameters (e.g., modeled receptors). An appendix could be used for this information. EPA36

* *Figure of Reactor Plant Layouts*: A figure providing the plant layout, release vents, building heights, and receptor locations, for both the B&W and AP1000 reactor units would be of value in understanding the information provided. We recommend inclusion of such a figure in the FSEIS. EPA37

* *Define Symbols*: The definition and importance of calculated X/Q, X/Q no decay undepleted, X/Q 2.26 day decay undepleted, X/Q 8.0 day decay depleted, and D/Q values provided in Tables 3-14, 15, and 16 should be explained. EPA38

* *Receptor Type and Locations*: The receptors of interest in Tables 3-14 and 3-15 (e.g., nearest cow, garden, goat, etc.) for the B&W reactor appear to be different EPA39

depending on the location of the release. Some of these locations appear to be inside the EAB. An explanation should be provided. EPA39 *cont.*

Table 3-16 has four receptor types at the same location which appears to be within the EAB. This table also has a new column "Maximum Receptor Type Value". The FSEIS should explain these items. EPA40

The reason routine releases (i.e., Tables 3-14, 15 & 16) used the maximum modeled dispersion values while the accidental releases provided in Tables 3-17 and 18 use the 50% probability values should be explained. Because the accident releases are concerned with mostly short-term periods (i.e., less than 24 hours), the maximum values would appear to be appropriate. EPA41

* *Release Boundary*: The "release boundary" used to determine the distance of interest for the accidental release X/Q values should be explained. It appears that the release location used for the previous routine releases could be used. EPA42

+ Section 3.16.3 Affected Environment – Air Quality (pg. 164)

* *Auxiliary Equipment Emissions*: This section does not address the anticipated emissions from the auxiliary equipment except by referencing the 1974 TVA Final Environmental Statement (FES). The FSEIS should include/provide the appropriate emission values and impact assessments for these project emissions. EPA43

* *New PM 2.5 Standard*: This section indicates that the new PM 2.5 24-hour National Ambient Air Quality Standards (NAAQS) was not addressed in previous documents. This new standard should be addressed in evaluating the project PM 2.5 impact in the FSEIS. EPA44

* *PSD Class I Areas*: Class I Areas beyond 100 km should not be eliminated from impact consideration. The need to perform Class I area impact assessment depends on the magnitude of the emissions and the distance to the receptors of concern. EPA45

o ***Radiological Effects*** – We offer the following comments.

+ Section 3.17 Radiological Effects of Normal Operations (pg. 167) – This section indicates recent dose calculations confirm the earlier 1974 assessment for the B&W reactors so the 1974 impacts are applicable for the proposed project. The DSEIS contains no demonstration for this conclusion. The recent dose calculations should be provided along with comparison to the referenced 1974 assessment to demonstrate this conclusion. An appendix could be used to provide this needed documentation. EPA46

+ Section 3.17.3.2 Radiation Doses Due to Gaseous Effluents (pg. 173) – The stated purpose of this section is to revise the inputs and methodologies used in the 1974 FES to use current values representing recent meteorological, population and agricultural data. It also provides gaseous effluent doses for the AP1000 unit. This section should provide EPA47

the modeling procedures, computer model, and input parameters etc. used to develop the provided doses. An appendix could be used for this information. EPA47 cont.

+ Section 3.19.1 Design-Basis Accidents (pg. 197) – The purpose of this section is to update the accident dose consequences given in the previous BLN Units 1 and 2 Final Safety Analysis Report (FSAR) (TVA 1991) using atmospheric dispersion values based on current meteorological data and to present corresponding results for the AP1000 unit. The second paragraph on page 199 indicates this was not done directly through re-modeling but by using previously reported doses scaled by 50 percentile X/Q values using the more current meteorological data period. Confirmation is needed that all other parameters used in the dose assessments remain unchanged for the two reactors (e.g., EAD and LPZ distance for each reactor, the Q values, etc.). EPA48

+ Tritium – Undetected levels of tritium in the liquid pathway in the vicinity of some of the currently operating reactors has been an ongoing concern. The levels of tritium released via the liquid pathway annually for either the B&W or AP1000 reactors listed in Tables 3-23 and 3-24, respectively, should be monitored closely and actions levels put in place as these numbers are approached. As an example, for the AP1000, if 50% of the estimated annual release of 1010 C/yr is reached, more frequent environmental monitoring and/or sampling should be conducted. Additionally, if necessary, TVA may need to re-evaluate the operational parameters of the reactor and its associated liquid waste treatment systems. EPA49 Guidelines for the need to increase the frequency of monitoring for tritium based on predetermined action levels should be addressed in the TVA Radiological Environmental Monitoring Program (REMP), if they are not already included. EPA50

+ Spent Fuel Storage – An ongoing, long-term issue is the projected storage of spent nuclear fuel onsite until late in the 21st century, addressed in Section 3.18.2. Although the NRC has determined that this can be done safely for an extended period of time with little risk to the public, it is desirable but not certain that a high-level waste repository will be licensed prior to the need for an onsite spent fuel storage facility in 2036. EPA51

+ Other – The basis and documentation for the dose calculations should be provided. An appendix could be used to provide this information. EPA52

o ***Noise*** – We offer the following noise comments:

+ Cooling Towers: Page 142 indicates that operational noise generated by the cooling tower is expected to be 48 dBA at the nearest residence (similar to ambient levels) and 54.6 dBA if the tower was operated 24 hours a day. The FSEIS should define the frequency of operation associated with the 48 dBA level and the basis of such an operational timeframe. EPA53

+ Noise Metric: The noise metric used in the DSEIS is unclear. That is, are the provided data in dBA instantaneous or averaged, such as the day-night level (DNL) descriptor? We assume the readings are in DNL but should be clarified in the FSEIS EPA54

(e.g., "48 dBA" could be designated as "48 DNL", "48 dBA DNL", Ldn = 48 dBA, or an introductory sentence indicating that all noise data are expressed in DNL). EPA54 *cont.*

+ Blasting: Blasting may be associated with construction of the AP1000 reactor. The FSEIS should provide additional information on the expected noise levels during blasting at the nearest residence and the frequency of such events. EPA55

+ Residences: Approximately how many residences are located in the proximity of the "nearest residence"? Are homes isolated or clustered? EPA56

Alternatives

In addition to the no action, two nuclear generation alternatives (completion of a B&W reactor or a new AP1000 reactor) were considered for BNL. Both technologies are predicted (pg. 15) to save the public user money in terms of cents per kilowatt (cents//kWh) by 2020 (B&W) or 2023 (AP1000). In addition, alternatives requiring or not requiring new generation, site selection alternatives, and transmission alternatives were considered in the DSEIS. We offer the following.

o ***Nuclear Generation Alternatives:*** Three nuclear generation alternatives were presented.

+ Alternative A (*No Action*) – Under the No Action Alternative, TVA would continue to maintain construction permits for BLN 1&2 in deferred status and not initiate any further site construction at this time.

+ Alternative B (*Completion and Operation of a Single B&W Pressurized Light Water Reactor*) – Alternative B would maximize re-use of the existing, partially-constructed structures at BLN to complete the B&W reactor technology. These primarily include the re-use of one of the two started reactors (BLN 1 or 2), with BLN 1 construction intentionally being about two years further along than BLN 2. Some 400 acres of the 1,600-acre site were disturbed during the initial construction of BLN 1&2.

+ Alternative C (*Construction and Operation of a Westinghouse AP1000 Advanced Pressurized Light Water Reactor*) – Alternative C would start construction of a new nuclear generation facility using an AP1000 reactor technology. An additional 185 acres of the BLN site would need to be cleared. However, several existing structures at the site could still be re-used. These primarily include the re-use of one of the two existing cooling towers; however, they also include reactor supporting structures such as the intake channel and pumping station, blowdown discharge structure, transmission lines and switchyards, barge dock, railroad spur, and meteorological tower.

o ***Alternatives Requiring or Not Requiring New Generation:*** Other alternatives requiring or not requiring new generation capacity were also considered (pp. 46-47). Those alternatives requiring new generating capacity included power generation through coal-fired and natural gas plants as well as renewables. We agree that nuclear power

would generate less emissions than coal and natural gas and that that renewables are still intermittent, and that such "green" power may need to be purchased by TVA. Moreover, those alternatives not requiring new generation included repowering of existing plants, increasing efficiency and demand side management (energy conservation), and reducing peak demand. TVA concluded that these options were already ongoing and that the addition of nuclear facility at BLN would continue to diversify TVA's energy resources and reduce energy source uncertainties, consistent with TVA's Energy Vision 2020 EIS.

o ***Site Selection Alternatives:*** Regarding the site selection process, several brownfield and greenfield sites were screened. These included co-location with existing TVA nuclear plant sites (BFN, WBN and SQN) which TVA generally found unacceptable because of reservoir thermal issues, the unavailability of some sites due to space or planned changes, and the availability of assets at BLN. In addition to BLN, several brownfield sites in Tennessee were also considered. These were the former Hartsville Nuclear Plant (HVN) site on Old Hickory Reservoir, the former Phipps Bend Nuclear Plant (PBN) site on the Holston River, and the former Yellow Creek Nuclear Plant (YCN) on the Pickwick Reservoir. Although these sites have highway access and prior site characterizations, they have been sold or partially sold and therefore would need to be re-acquired by TVA for power plant development. The considered Murphy Hill (MH) greenfield site on Guntersville Reservoir was a former selected site for a coal gasification plant (1981 TVA FEIS). Although some grading had been done before the project was cancelled, the DSEIS suggested that more impacts can be expected at a greenfield site such as MH than at a brownfield site such as BLN. Although we generally agree, given that the MH site was partially graded, the differences between MH and BLN may not be as significant. However, if BLN 1 or 2 were re-used, there could be a significant benefit to selecting BLN.

o ***Transmission Alternatives:*** With the addition of 1,100-1,200 MW of power, the existing transmission line and stations would need to be upgraded if Alternative B (B&W) or C (AP1000) were implemented. Two action options were screened: Option 1 would upgrade existing facilities while Option 2 would construct new facilities. Since the latter would cost twice the price of the former, only Option 1 was carried forward. Option 1 would re-energize the 500 kV transmission lines and switchyard and would be implemented over the no action if TVA decided to implement Alternative B or C.

EPA Re-Use Recommendations

While EPA typically supports the re-use of materials and sites (brownfields over greenfields), the fact that over 20 years have elapsed since construction ceased on BLN 1&2 in the mid-1980s may be of concern in terms of construction design and material upgrades as well as new inspection standards, especially for a nuclear plant facility. That is, if portions of the partially completed structures for BLN 1 or 2 are to be used for the present project, we offer the following areas of review to help insure construction competence for a nuclear generation unit at BLN.

o ***Building Codes & Inspections*** – The condition of the existing facilities at BLN 1&2 should be inspected. Existing utilities at the two unfinished facilities could include mechanical, plumbing, electrical, and telecommunications equipment and their respective distribution systems. The condition and capacity of existing boilers, chillers, air handlers, duct work, plumbing fixtures, piping, transformers, generators, power panels, and wiring are a few of the items that should be carefully examined to determine if they have any remaining usable life or if they should be replaced, and what costs might be involved. In this regard, it should be noted that NRC's standards for safety requirements may have changed since construction on BLN 1&2 was suspended. EPA57

Similarly, what is the status of Building Code compliance and what code(s) (e.g., International Building Code: IBC) is/are in effect? The existing facilities/structures may require upgrades to render them in full compliance with current building codes. Since building codes are constantly being revised to include more stringent requirements, this could result in significant additional construction costs. The assessment of any Bellefonte structure/facility being considered for re-use should include a complete building code analysis. EPA58

o ***Asbestos*** – EPA has identified numerous construction materials that may contain asbestos (http://www.epa.gov/region4/air/asbestos). Although the use of asbestos containing materials is currently illegal, such materials were used until about 1980. If asbestos is determined to be present in existing BLN 1&2 facilities, abatement may be required for re-use, which may be costly. EPA59

o ***Structural Condition*** – Given that a nuclear generating unit is being proposed, the structural condition of the existing facilities is probably the most important issue. Has a complete structural engineering and safety assessment of the major structures been done, especially for the two partially-built, pressurized water reactors? As suggested above, building codes are frequently upgraded to include more stringent requirements for the structural resistance to natural forces (tornados, earthquakes). NRC has apparently upgraded their seismic design for nuclear power plants (2000) since the Bellefonte plant was first started (http://www.riskeng.com/PDF/New_Seismic.pdf). In addition, are there complete construction materials and inspection records of the initial construction available for compliance reviews (compressive strengths, slump tests, reinforcing steel inspections, welding records, etc.)? Were "as-built drawings" prepared after construction? Has there been any measured subsidence or settlement of the structures/facilities? EPA60 EPA61 EPA62

Other structural-related considerations include infestations, roofing integrity and pavement structures. Regarding infestations, do the structures have a history of water infiltration, either through roof leaks or at window and door openings? Are any structures affected by mold and/or termites? Similarly, the structural integrity of roofs is also important. Although roofing integrity may be sound, it is critical to assess the weather-tight integrity of the finished roofing system and materials, including its age, repair history, and its replacement cost. Any needed roofing replacement or repair costs should be addressed as part of the project's development costs. Finally, regarding EPA63

pavements and hard stand areas, an analysis of all flexible, rigid and special pavement types should be performed, with remaining life determinations made. EPA63 *cont.*

o ***Weather/Climate Events*** – As suggested above, tornados, earthquakes and other weather/climate events since the mid-1980s could be important in determining the re-use suitability of BNL 1&2. The BNL site is located in an F-3/F-4/F-5 tornado alley, according to http://upload.wikimedia.org/wikipedia/commons/3/35/Tornado_Alley.gif . EPA64

Moreover, in April of 2003, this area[6] experienced an earthquake of a 4.9 Rickter Scale magnitude. Did this event result in any structural damage at the BLN facilities? EPA65

Similarly, did the recent flooding events in the summer of 2009 cause Guntersville Reservoir to flood at Bellefonte and cause structural damages for the existing facilities? EPA66

Also, does the current site design and layout meet requirements for capture and treatment of onsite storwmwater? We note (pg. 37) that structures on the "nuclear island" portion of the BLN site are designed to withstand "…hurricanes floods, tornados and earthquakes without loss of capability to perform safety functions." EPA67

o ***Impact Analysis*** – Were the existing facilities designed and constructed to survive the impacts of large commercial aircraft? Advances in power station designs have occurred since the 9-11 terrorism event. Will the partially-built facilities to contain the pressurized water reactor meet (or can they be modified to meet) the current standards for this? Also see: http://www.nrc.gov/reading-rm/doc-collections/news/2007/07-127.html. EPA68

Other Comments

o ***NEPA Process*** – Because of the new BLN site development plan, the large number of supporting documents containing important basic information/analyses, and the more than 3.5 decades over which these reference document have been developed, a stand-alone complete SEIS containing all pertinent information and backup analyses appears to be appropriate for this project. The present DSEIS for the current single nuclear reactor configuration does not provide the information and supporting documentation needed for a complete understanding and evaluation by licensing agencies and the general public. In lieu of a complete stand-alone SEIS, the FSEIS should provide the specific document, section, and page where referenced documentation/analyses can be obtained to support the information provided. If appropriate, the specific NRC docket website location should also be provided. EPA69

o ***Benzene*** – On page 97, the molluscicide entry includes this description: "a nitrogen atom with four attachments, some or all of which can be benzene-based, rather than hydrocarbon-based." Since benzene is a hydrocarbon, this statement should be revisited for the FSEIS. EPA70

o ***Terminology*** – The name of Alternative C is somewhat inconsistent in the DSEIS. Typically, it is listed (e.g., pg. 36) as *Construction and Operation of a Westinghouse AP1000 Advanced Pressurized Light Water Reactor*. However, the technology is also referred to (pg. 188) as the *Westinghouse Advanced Passive pressurized water reactor* EPA71

[6] The earthquake epicenter was located some 37 miles southwest of Chattanooga, TN (internet).

(AP1000). Although the FSEIS should clarify, we assume that the AP1000 design is an "advanced passive safety" system. EPA71 *cont.*

o ***Table 1-3*** – The information provide in this table (*Environmental Reviews and Documents Pertinent to Bellefonte Nuclear Plant Unit 1*: pg. 19) is not limited to Unit 1. Therefore, "Unit 1"should be removed from the title. EPA72

o ***Figures*** – Assumed Figure 2-1 is not numbered in the DSEIS. Also, we suggest that Figures 3-2, 3-3, and 3-4 label the identified "submerged diffuser" area as the plant discharge site for clarity, as was done in Figure 3-5. EPA73

EPA01. On October 19, 2009, NRC conducted a site inspection for the requested deferred status and a response letter to TVA is pending. NRC's findings regarding this site inspection should be disclosed in the FSEIS.

> *Response:* The December 2, 2009 NRC Inspection Report has been included as the Final Supplemental Environmental Impact Statement (FSEIS) Appendix B. The inspection concluded that TVA has established the necessary programs to support transition to deferred status, consistent with the Commission Policy Statement for Deferred Plants. By letter dated January 14, 2010, the U.S. Nuclear Regulatory Commission (NRC) authorized placement of BLN Units 1 and 2, into 'deferred plant' status (see Appendix A). FSEIS 1.2.2 has been revised to include additional information about the inspection and its findings as well as the NRC's authorization to place Bellefonte Units 1 and 2 into 'deferred plant' status.

EPA02. TVA's interim consideration to convert to a natural gas plant was not documented in the present DSEIS in Section 1.2, but should be noted in the Final SEIS (FSEIS). However, we note that the BLN Conversion EIS was referenced in Section 1.7. BLN 3 and 4 should also be referenced relative to the 2008 Combined License Application Environmental Report (COLA ER).

> *Response:* TVA's 1997 FEIS for the Bellefonte conversion process was briefly described and incorporated by reference in DSEIS 1.7 and documented in Table 1-3. The FSEIS 1.2.2 has been revised to further document the consideration to convert Bellefonte to a natural gas plant in 1997. The 2008 COLA ER is discussed in FSEIS 1.2.3 and is listed in Table 1-3.

EPA03. The FSEIS should summarize the equipment and structures that were sold as part of the TVA redress plan and asset recovery program, and discuss how this might change the Exclusion Area Boundary (EAB) from previous analyses referenced in the DSEIS and whether the previous X/Q and dose calculations are still appropriate or must be re-calculated.

> *Response:* FSEIS 2.2.3 summarizes the equipment sold by TVA as part of the investment recovery program. The Unit 1 and 2 atmospheric dispersion (χ/Q) values have been revised based on current meteorological data (see FSEIS 3.16) and the current Exclusion Area Boundary. The dose calculations were revised based on these revised χ/Q values and releases from the Units 1 & 2 Final Safety Analysis Report (FSAR). Equipment and structures that were sold as part of the TVA redress plan and asset recovery program is to be replaced to maintain conformance with the original Unit 1 and 2 design. Replacement of any Unit 1 or 2 plant equipment, which was previously sold as part of the redress plan and asset recovery program, will not impact the EAB, χ/Q calculations, or dose calculations.

EPA04. EPA is concerned that over 20 years have elapsed since construction ceased on BLN 1&2 in the mid-1980s, and that construction designs and materials as well as new inspection standards have significantly changed - especially for development of a nuclear generation unit.

> *Response:* FSEIS 2.2.2, 2.2.3, and 2.7.1 have been updated to include detailed information regarding the condition of existing structures, and facilities, including remaining usable life and compliance with NRC standards and consideration of building codes.

EPA05. Beyond the uncertainty of the structural integrity of the partially-completed BLN 1 &2, it should be noted that the B&W technology is not as efficient and safe as the AP1000 technology (or equivalent). Compared to the B&W design, the DSEIS documents that an AP 1000 reactor uses less radioactive fuel (1,821 fuel assemblies vs. 2,285) over a 40-year life cycle (Table 2-2) and therefore produces less spent fuel for disposal; needs fewer components (Fig. 2-8); has inherent public health safety features in its new "passive" safety design (Sec.2.3) with less potential radiological effects (Sec. 3.17) and design based accidents (Sec. 3.19); and requires less water intake for cooling with less thermal discharge volumes.

> *Response:* FSEIS 2.2, 2.3, 2.7, Tables 2-2, and 3-3 have been revised to clarify the differences between the two technologies.

EPA06. Although TVA may wish to add additional future units at the BLN site, only TVA's NEPA responsibilities for the proposed single BLN nuclear generation unit are covered in the present SEIS. Accordingly, additional TVA NEPA documentation would be needed for additional units at the BLN site (however, if reasonably foreseeable, the cumulative impacts of such additional units should be included in this FSEIS).

> *Response:* TVA is not proposing to add nuclear units beyond Watts Bar Unit 2 and the proposed single unit at Bellefonte. The Integrated Resource Planning process currently underway will provide a roadmap for meeting future power needs beyond those addressed by the current proposal. While nuclear power is expected to be a component of TVAs future plans, it would be speculative at this time to say that TVA might build additional nuclear units at the Bellefonte site.
>
> Two-unit construction and operation at the Bellefonte site is addressed in the original TVA/NRC environmental reports, the environmental assessment and the construction permit for the B&W plant, and also in the combined license application for the AP1000 plant. Based on these earlier reports, TVA can project that should one or more units be added in the future, additional site disturbance would be minimal outside of the 606 acre project area. Operational impacts would increase, but not double, as there are some shared systems, particularly with the B&W units. Because both units would use closed cycle cooling systems, additional surface water impacts would be small. In general surface water, air quality, radiological, and many other effects would be regulated under permits issued by state and federal agencies and the plants would be operated in compliance with permits to minimize environmental effects.

EPA07. If Alternative B is selected for the FSEIS, the suitability for re-using existing structures associated with the B&W reactor should be discussed. While EPA typically supports the re-use of materials and sites (brownfields and grayfields over greenfields), we are concerned that over 20 years have elapsed since construction was suspended on BLN 1&2. While we defer nuclear plant safety to TVA and NRC, EPA has documented our re-use construction concerns in the enclosed *Detailed Comments*.

Response: See response to EPA04.

EPA08. EPA finds that the modern AP1000 technology (or equivalent) is the preferred design for TVA's proposed nuclear generation unit at BLN. EPA prefers this type of AP1000 reactor (Alt. C) over the B&W design (Alt. B) despite the fact that more existing structures at BLN could be used (if found competent) by completing either BLN 1 or BLN 2 with the B&W design.

Response: Comment noted.

EPA09. With or without the present nuclear generation project, EPA strongly believes that green alternatives should continue to be promoted by TVA and that the FSEIS should summarize ways in which TVA is promoting such green alternatives, particularly efficiency/conservation and the addition of renewable capacity to support clean conventional baseload options.

Response: The contribution of energy efficiency and demand response (EEDR) programs and the generation of electricity from renewable resources are more fully addressed in FSEIS 1.4 and 2.4.

Currently TVA is actively pursuing renewable generation capacity through our Green Power Switch and Generation Partners programs and has recently added approximately 1,300 MWs of wind resources to its energy portfolio through several power purchase agreements. TVA currently provides incentives to customers through the Energy Right and Generation Partners programs.

TVA recognizes that EEDR programs play an important part in meeting our energy needs. The demand reduction and energy savings associated with EEDR programs have been included in our updated need for power analysis in FSEIS 1.4.

TVA anticipates using a mix of resources, including EEDR programs, renewable resources, natural gas-fired generation, and nuclear generation to provide the additional future needs. Given the magnitude of the capacity and energy need, and to avoid the risk of relying on only one fuel or technology, no single resource should be used to meet all of the future energy and capacity requirements. TVA has determined that adding a nuclear unit at the BLN site is the most cost effective alternative to meet a portion of these future needs.

EPA10. The FSEIS should discuss how the amount of energy that could be saved or generated by these green alternatives would compare to the identified need and projected 1,100-1,200 MW capacity of the proposed BLN unit.

Response: See response to EPA09.

EPA11. TVA screened several existing, brownfield and greenfield sites in its site selection process. We understand that co-location of the proposed nuclear unit at an existing TVA nuclear power station such as BFN may not be advisable due to cumulative thermal discharge issues at the same site and reservoir. Other potential co-locations at WBN and SQN apparently have onsite space conflicts. Former TVA plant sites (e.g., Hartsville Nuclear Plant site) are also not ideal since all or most of the lands have now been sold to private developers. Finally, development of the Murphy Hill (MH) greenfield site would likely have more environmental impacts than development of the BLN brownfield site, even though MH was already partially graded before a proposed TVA gasification plant at MH was cancelled. Although these site options might be revisited for verification in the FSEIS, we agree that the availability of the BLN brownfield site for development with either Alternative B or C has environmental merit.

Response: Comment noted.

EPA12. Presumably because of new construction standards and other upgrades, the 90% and 58% completion levels for BLN 1&2, respectively, may translate into only a 55% and 35% completion level according to the internet (Wikipedia). The FSEIS should discuss this.

Response: FSEIS 2.2.2 and 2.2.3 have been revised to address the completion status of Unit 1 and Unit 2 and the activities required to complete a unit.

EPA13. In the FSEIS, TVA should confirm or modify its DSEIS preferred alternatives and select a preferred reactor technology.

Response: FSEIS 2.9 identifies TVA's preferred alternative as the completion and operation of Bellefonte Unit 1, a B&W unit.

EPA14. As indicated previously, EPA prefers the AP1000 reactor design over the B&W technology. One of the reasons for this preference is that the AP1000 is inherently safer then the B&W design due to its advanced passive safety design.

Response: FSEIS 2.7.2 has been revised to clarify that both designs would meet all NRC safety requirements. The AP1000 design is different, but not safer.

EPA15. It appears from the DSEIS that avoidance and minimization of adverse impacts to aquatic resources under the federal Clean Water Act (CWA) Section 404 are being taken into consideration appropriately. That the project would utilize existing structures and transmission corridors, to varying degrees based on alternatives, is a good approach to mitigation as a baseline. Whereas Alternative B (B&W) would not result in the filling of wetlands and Alternative C (AP1000) would impact 12.2 acres, operational safety and modernization considerations associated with the AP1000 design provide adequate justification for pursuing Alternative C if it is otherwise appropriate. Once an alternative is selected and TVA is ready to proceed, a CWA Section 404 permit application should be submitted that characterizes any wetlands and/or stream impacts, along with a mitigation plan to address them.

Response: If the selected alternative involves any activity that results in the discharge of dredge or fill material into the waters of the U.S, TVA would apply for a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers. The

permit would address wetland and stream impacts by requiring mitigation measures to compensate for those impacts.

EPA16. Also, since upgrading existing transmission line and facilities (Option 1) is preferred by TVA over new construction, we assume that there would not be any additional wetland impacts associated with project transmission upgrades.

Response: Because the transmission line corridors proposed for upgrade are already existing and no new or wider rights-of-way are proposed, no additional impacts to wetlands are anticipated under any generation action alternative. The only impacts to wetlands would be those associated with reenergizing, refurbishing and upgrading the lines, and with regular right-of-way maintenance activities. Any wetland areas located within existing corridors may experience vegetation clearing and/or vehicular traffic. All best management practices (e.g. dry season work, pressure reducing tires, mats, aquatic approved herbicides) would be implemented to minimize wetland impacts in existing rights-of-way.

EPA17. Although both the B&W and AP1000 technologies would operate in a closed-circuit mode and utilize one of the existing natural draft cooling towers to cool reactor cooling waters, thermal effluent would nevertheless be generated and discharged back into the Guntersville Reservoir receiving waters. Discharge of this heated blowdown is regulated by the State of Alabama National Pollutant Discharge Elimination System (NPDES) permit. Thls permit also prescribes thermal discharge limits, which are not to exceed a 92°F monthly average, 95°F daily maximum, and 5°F increase over ambient conditions. Hydrothermal modeling (pg. 94) appears to predict that the proposed nuclear unit would not exceed these limits for both Alternatives B and C outside the mixing zone, with the exception of infrequent and unusual hydrologic or meteorological conditions. The FSEIS should clarify and summarize if compliance with all three thermal limits is indeed predicted for both designs and what measures will be taken for compliance during unusual river flows and weather conditions (e.g., generation at less than nameplate capacity or temporary unit shutdown).

Response: If TVA selects and completes Alternative B (B&W reactor) or Alternative C (AP 1000 reactor), procedures for the operation and maintenance of the plant will include processes to monitor all National Pollutant Discharge Elimination System (NPDES) thermal limits and implement changes in the operation of the plant to maintain compliance with these limits. If required, curtailing power generation at the plant (i.e., derating) would be used to prevent a violation of the NPDES permit limits, as emphasized on page 92 and page 94 of DSEIS 3.1.3.1. Derating has been successfully implemented to maintain compliance at several TVA thermal plants in Alabama, including Widows Creek Fossil Plant, Colbert Fossil Plant, and Browns Ferry Nuclear Plant. TVA will implement processes to maintain compliance with the NPDES limits at Bellefonte for all possible operating conditions of the plant, including unusual river flows and weather conditions (FSEIS 3.1.3).

EPA18. As suggested above, it is noteworthy that the AP1000 technology would require significantly less surface water than the B&W technology – 72% of the B&W withdrawal volume and 36% of the B&W discharge volume (pg. 95). The expected withdrawal rate for the B&W reactor is 34,000 gpm (75 cfs) and discharge rate is 22,650 gpm (50 cfs), while the withdrawal rate for the AP1000 reactor is 23,953 gpm (53 cfs) and discharge rate is 7,914 gpm (18 cfs). Overall, this would result in a lower level of thermal pollution for Guntersville Reservoir, even if both technologies are predicted to comply with NPDES thermal limitations. Such relative differences in efficiency should be considered in TVA's final selection of a preferred reactor technology, particularly if additional units would be added at BLN in the future causing cumulative impacts.

> *Response:* The use of closed-loop cooling system under both technologies would result in a water withdrawal rate that is a small percent (0.2 percent or less) of the annual average river flow of Guntersville Reservoir. For example, the minimum daily average flow out of Chickamauga Dam (located upstream) is 1,350,000 gallons per minute (gpm). The daily average flow through Guntersville Reservoir will be about the same. TVA has revised FSEIS 2.7.2 and 3.1.2, replaced DSEIS Tables 3-3 and 3-4 with FSEIS Table 3-3, and added Table 2-5 to clarify the comparison of both technologies. A comparison of thermal efficiencies for both technologies has been added to FSEIS 2.7.2 and Table 2-2.

EPA19. In regard to chemical additives such as biocides and inhibitors added to the cooling waters to control fouling, EPA recommends that the minimum amount of chemical additives be used and that concentrations be monitored. We will defer to the State of Alabama's NPDES permit regarding compliance with water quality standards for discharge effluents, and retain our federal permit oversight.

> *Response:* As provided in the BLN site NPDES permit (AL0024635), should TVA select Alternative B or C, TVA would implement best industry practices to minimize the amount of chemical additives used. Concentrations of additives would be routinely monitored.

EPA20. Although a minor discrepancy, these "gpm" data suggest a difference of 71% and 35 % as proposed to the 72% and 36% stated in the DSEIS.

> *Response:* See response to EPA18.

EPA21. U.S. Census data for 2000 for the block group incorporating BLN showed a minority level (percentage) higher than the county average but lower than the state and national averages. Estimates for 2008 showed increases in minorities but with probably similar trends.

> *Response:* FSEIS 3.13.3.1 has been revised to include further discussion about impacts to minority and low-income populations based on additional information provided to NRC in 2008. The 'more recent data' mentioned in FSEIS 3.13.3.2 is discussed in FSEIS 3.13.3.1. This has been clarified in the FSEIS. These data may be cited as <http://www.census.gov/hhes/www/poverty/poverty.html>.

EPA22. U.S. Census poverty levels for 2000 and 2007 estimates showed a poverty level percent for the BLN area that is below county, state and national levels. EJ evaluations were made in the BLN Conversion EIS (1997) and were referenced (pg. 146). The more recent COLA ER concluded "...that any impacts would be minor and not disproportionate." Moreover, ",more recent data" with the same conclusions were also referenced, but not cited. The FSEIS should briefly substantiate these conclusions, rather than only incorporating by reference, and provide citations/timeframes.

Response: See response to EPA21.

EPA23. Also, any potential concentrations ("pockets") of minority and/or low-income populations near the BLN site should be identified in the FSEIS.

Response: FSEIS 3.13.3.1 has been updated to include concentrations of minority and/or low-income populations near the BLN site.

EPA24. It should be noted that a potential EJ impact at BLN would make this site less environmentally preferable to EPA despite being an available brownfield site.

Response: Comment noted.

EPA25. Regardless of the final EJ conclusion, TVA should provide public outreach on the project to all demographics living near the site during the SEIS process as well as periodic updates thereafter.

Response: FSEIS 1.6.2 describes the public outreach for the DSEIS including notice of availability, newspaper ads, TVA's webpage, and a public meeting. Should TVA select one of the action alternatives, ongoing communications would be established with those living in areas affected by plant construction to ensure the public is informed about the construction process and that TVA is aware of public questions and concerns. Outreach will be designed to reach all demographics.

EPA26. Although TVA has identified a need for additional power by 2018-2020, supplying such power (1,100-1,200 MW) will likely accommodate or induce additional growth in the Tennessee Valley and result in developmental impacts. The FSEIS should acknowledge these expected secondary impacts as a project consequence.

Response: While not addressed in the Socioeconomics section, an overview of the growth in power needs that TVA anticipates and is planning for is discussed in FSEIS 1.4, in particular in 1.4.1. TVA is responding to the forecasted need for power and does not agree that it is "inducing" growth by doing do. TVA does agree that the reliability of the energy TVA's system provides and is known for can be a consideration when companies assess where to locate new facilities. Trying to assess the impacts from that would involve substantial speculation. Any cumulative effects from future proposals to use the BLN site can and would be assessed when such proposals occur.

EPA27. Regarding cumulative effects, NEPA documents should discuss the past, present, and reasonably forseeable future projects (federal and non-federal) within the project area. This listing should focus on projects that impact the same resources as the proposal, with impacts being qualified and quantified to the extent feasible. In the case of the present BLN proposal, nearby projects with similar impacts (wetland, water quality and radiological impacts) should be emphasized.

Response: The SEIS considers cumulative effects on a resource by resource basis. The analysis for each resource takes into account current background conditions, which reflect the effects of past and present projects. Where applicable, the resource-specific analysis considers the impact of reasonably foreseeable future projects. FSEIS 3.13.11 references information from Section 4.7 of the COLA ER (TVA 2008), which indentifies the Redstone Arsenal realignment project as the only major federal project in the 50-mile area that could contribute to cumulative socioeconomic effects. Redstone Arsenal is nearly 50 miles from Bellefonte and the construction period for that project is not expected to overlap with the proposed Bellefonte project. Both the Bellefonte and the Redstone projects would provide longterm economic benefit to the area. Updated information about nonfederal projects planned for the area has been added to FSEIS 3.13.11. Most of the projects identified would be completed before projected construction workforce buildup at the Bellefonte site and none were thought to contribute to cumulative effects during operation. Cumulative effects of TVA's Widows Creek fossil plant on water and air quality are discussed in FSEIS 3.1.3 and 3.16.2.

EPA28. We note that Section 3.13.10 discusses cumulative impacts, albeit only for socioeconomics, while other environmental consequences do not have a cumulative impacts section. This document format is somewhat cumbersome and could be streamlined in the FSEIS by designating only one cumulative impacts section that covers all relevant parameters.

Response: Comment noted. TVA has chosen to address cumulative effects on a resource by resource basis. A statement regarding how cumulative effects are addressed in the FSEIS has added to the introduction to FSEIS 3.0.

EPA29. ...the FSEIS should provide additional background information for air quality impacts and radiological effects;

Response: FSEIS 3.16.2 and 3.17 have been revised to include additional information about air quality impacts and radiological effects.

EPA30. ...discuss mitigation for BLN impacts to waters of the US (Alt C);

Response: FSEIS 3.4.2 discusses the potential purchase of credits from a wetland mitigation bank within the same watershed to compensate for wetland impacts resulting from selecting Alternative C. If Alternative C is selected, implementation of that alternative will generate more specific details regarding proposed mitigation methods and compensation ratios required by the U.S. Army Corps of Engineers under the Clean Water Act Section 404 permit for all wetland impacts associated with this alternative.

EPA31. ...insure compliance with State NPDES thermal limits for heated effluent discharges by either reactor technology (Alts B or C).

Response: TVA will comply with the thermal limit requirements of the applicable NPDES permit. As indicated in FSEIS 3.1.3.2, modeling results indicate that NPDES thermal limits (i.e., discharge temperatures not to exceed limits of 92°F monthly average, 95°F daily maximum, or 5°F increase over ambient conditions) will be met under most river flow and meteorological conditions. On rare and infrequent occasions, measures up to, and including, plant derates would be taken to prevent a violation of the NPDES permit. Monitoring would be conducted to confirm compliance with the NPDES thermal limits.

EPA32. ...verify minor or no EJ impacts, and revise the cumulative impacts section.

Response: See response to EPA21.

EPA33. The discussion of the updated 2006-2008 meteorological data period does not provide a complete summary of the meteorological conditions. This discussion should be supplemented with tables and figures that provide applicable wind roses, frequency distributions, comparisons, etc. that would provide the reader with a better understanding of the current meteorological conditions. The tables and figures will also allow comparisons with previous observations and long-term records, and a basis for the evaluation of subsequent dispersion and transport analyses.

Response: The 2006-2008 meteorological data has been added to the FSEIS. The following is included in Appendix I:

- Composite wind rose (all stability classes).
- Occurrence of stability classes (percent of total hours).
- Wind direction distribution (percent of total hours).
- Wind speed distribution (percent of total hours).
- Joint frequency distribution tables for each stability class (A-G) and all stability classes combined.

EPA34. The stability class frequency distribution is used to show agreement between different meteorological data records. EPA believes that this is not sufficient to show agreement. The data record comparisons should include joint frequency distributions of stability, wind direction, and wind speed.

Response: Appendix J, which compares the different data periods (1979-1982, 2006-2007 COLA, and 2006-2008 Full), has been added to the FSEIS. Tables list the percent of occurrence for wind direction, wind speed and, stability class during each data period. Graphs are provided to display the data for direct comparison. The differences between the three data periods are within the normal year-to-year variation for Bellefonte.

EPA35. Section 3.16.2.1 Dispersion (pg. 162). This section is concerned with both the dispersion and transport of effluent releases. Therefore, we suggest changing the name to "Transport and Dispersion".

Response: Section 3.16 has been reorganized in the FSEIS to better match the structure of other sections in Chapter 3. The discussion of atmospheric dispersion can now be found in subsection 3.16.1 Climatology and Meteorology, Environmental Consequences. This subsection includes both routine and accidental releases.

EPA36. The atmospheric transport and dispersion modeling procedures, computer model, and input parameters used to develop the provided dispersion estimates should be provided. Explanations may be needed for some of the input parameters (e.g., modeled receptors). An appendix could be used for this information.

Response: The requested information has been added to FSEIS 3.16.1.2, Routine Releases.

EPA37. A figure providing the plant layout, release vents, building heights, and receptor locations, for both the B&W and AP1000 reactor units would be of value in understanding the information provided. We recommend inclusion of such a figure in the FSEIS.

Response: The site layout for the B&W and AP1000 reactor units are shown in FSEIS Figures 2-1 and 2-12 respectively. Figures providing the release vents, building heights, and receptor locations, for both the B&W and AP1000 reactor units, have been added to FSEIS 3.16.1.2.

EPA38. The definition and importance of calculated X/Q, X/Q no decay undepleted, X/Q 2.26 day decay undepleted, X/Q 8.0 day decay depleted, and D/Q values provided in Tables 3-14, 15, and 16 should be explained.

Response: This information has been added to FSEIS 3.16.1.2, Environmental Consequences, Routine Releases.

EPA39. The receptors of interest in Tables 3-14 and 3-15 (e.g., nearest cow, garden, goat, etc.) for the B&W reactor appear to be different depending on the location of the release. Some of these locations appear to be inside the EAB. An explanation should be provided.

Response: The distances and directions from the release point to the receptor location will be different for different release points. A discussion of the selection of receptor locations and Figure 3-21 showing the receptor locations for the B&W reactor has been added to FSEIS 3.16.1.2.

EPA40. Table 3-16 has receptor types at the same location which appears to be within the EAB. This table also has a new column "Maximum Receptor Type Value." The FSEIS should explain these items.

Response: Additional information has been provided in FSEIS 3.16.1.2, to clarify the receptor locations within the EAB.

EPA41. The reason routine releases (i.e., Tables 3-14, 15 & 16) used the maximum modeled dispersion values while the accidental releases provided in Tables 3-17 and 18 use the 50% probability values should be explained. Because the accident releases are concerned with mostly short-term periods (i.e., less than 24 hours), the maximum values would appear to be appropriate.

Response: As stated in FSEIS 3.16.1.2, 50 percent probability short-term accident χ/Q values were determined to provide more realistic doses in accordance with NRC Regulatory Guide 1.145. This means that the resulting χ/Q values could be exceeded half of the time. In contrast, the design basis analyses in the FSAR are required to use more conservative 95th percentile χ/Q values meaning that the values would be exceeded only 5 percent of the time. The normal effluent release χ/Qs given in FSEIS Tables 3-14, 3-15, and 3-16 are based on annual averages. Therefore, they do not represent any probability percentile. However, for normal effluent releases, the highest χ/Qs were determined from all of the offsite locations to provide conservative maximum individual doses.

EPA42. The “release boundary” used to determine the distance of interest for the accidental release χ/Q values should be explained. It appears that the release location used for the previous routine releases should be used.

Response: Additional information has been added to FSEIS 3.16.1.2 to explain the basis for the release boundary surrounding the potential release locations.

EPA43. Section 3.16.3 Affected Environment – Air Quality (pg. 164). This section does not address the anticipated emissions from the auxiliary equipment except by referencing the 1974 TVA Final Environmental Statement (FES). The FSEIS should include/provide the appropriate emission values and impact assessments for these project emissions.

Response: According to TVA's 1974 Final Environmental Statement (FES), the oil-fired auxiliary steam generators would, at peak load, release sulfur oxides to the atmosphere from a 125-ft stack at a rate of almost 143 pounds per hour (lb/hr) or 18 grams per second (gm/sec). The maximum SO_2 concentration was calculated to be 0.12ppm. This peak would occur quite close to the plant stack and decrease quite rapidly with distance. At the time of the 1974 FES, the State of Alabama SO_2 standard was 0.15ppm for a 24-hour average. The current EPA National Ambient Air Quality Standards (NAAQS) for SO_2 is 0.14ppm for a 24-hour average. The 1974 FES concluded that the SO_2 releases from the oil-fired auxiliary steam generators were acceptable. Even with the slightly lower NAAQS, these releases are acceptable. The auxiliary boilers have since been sold and various options for their replacement are being considered, including an electric boiler which would have no emissions. The AP1000 utilizes an electric boiler in place of an oil fired boiler; therefore no emissions will occur from the auxiliary boiler with Alternative C. Operational activities, emissions and impacts related to Alternative C would be roughly equivalent to or less than those under Alternative B. FSEIS 3.16.3 has been revised to include this information.

EPA44. Section 3.16.3 Affected Environment – Air Quality (pg. 164). This section indicates that the new PM 2.5 24-hour National Ambient Air Quality Standards (NAAQS) was not addressed in previous documents. This new standard should be addressed in evaluating the project PM 2.5 impact in the FSEIS.

> *Response:* TVA addressed the $PM_{2.5}$ NAAQS in the DSEIS on page 164. $PM_{2.5}$ non-attainment designations were also addressed in the COLA ER. Both the standard and the non-attainment designations were referenced and updated for this SEIS. This information can be found in FSEIS 3.16.2.1.

EPA45. Class I Areas beyond 100 km should not be eliminated from impact consideration. The need to perform Class I area impact assessments depends on the magnitude of the emissions and the distance to the receptors of concern.

> *Response:* Typically, Class 1 areas are identified within a 100-km radius of the site; however, TVA identified and considered the two nearest Class 1 areas even though they fell outside this radius. TVA's analysis determined that emissions related to the action alternatives B or C would be controlled to meet current applicable regulatory requirements such that resulting impacts would be minor and would not adversely affect these Class 1 areas. Therefore, areas located further away than these Class 1 areas would also experience no adverse impact.

EPA46. Section 3.17 Radiological Effects of Normal Operations (pg. 167) – This section indicates recent dose calculations confirm the earlier 1974 assessment for the B&W reactors so the 1974 impacts are applicable for the proposed project. The DSEIS contains no demonstration for this conclusion. The recent dose calculations should be provided along with comparison to the referenced 1974 assessment to demonstrate this conclusion. An appendix could be used to provide this needed documentation.

> *Response:* The conclusions of the 1974 assessment demonstrated that the doses are within the more recently established 10 CFR Part 50 Appendix I limits (1977a), and the new analyses calculated independently also confirms that the doses are within these limits. The 1974 assessment is discussed for informational and historical purposes only. All conclusions presented in this section are based on their respective analyses presented in FSEIS 3.17.

EPA47. Section 3.17.3.2 Radiation Doses Due to Gaseous Effluents (pg. 173) – the stated purpose of this section is to revise the inputs and methodologies used in the 1974 FES to use current values representing recent meteorological, population and agricultural data. It also provides gaseous effluent doses for the AP1000 unit. This section should provide the modeling procedures, computer model, input parameters etc. used to develop the provided doses. An appendix could be used for this information.

> *Response:* The requested information has been added to FSEIS 3.17.2.

EPA48. Section 3.19.1 Design-Basis Accidents (pg. 197) - The purpose of this section is to update the accident dose consequences given in the previous BLN Units 1 and 2 Final Safety Analysis Report (FSAR) (TVA 1991) using atmospheric dispersion values based on current meteorological data and to present corresponding results for the AP 1000 unit. The second paragraph on page 199 indicates this was not done directly through re-modeling but by using previously reported doses scaled by 50 percentile *X/Q* values using the more current meteorological data period. Confirmation is needed that all other parameters used in the dose assessments remain unchanged for the two reactors (e.g., EAD and LPZ distance for each reactor, the Q values, etc.).

> *Response:* The following statement has been added to FSEIS 3.19.1.1, evaluation methodology: 'All other input parameters and assumptions used for the accident analyses remain unchanged from the BLN Units 1&2 FSAR and BLN COLA FSAR.'

EPA49. Undetected levels of tritium in the liquid pathway in the vicinity of some of the currently operating reactors has been an ongoing concern. The levels of tritium released via the liquid pathway annually for either the B&W or AP1000 reactors listed in Tables 3-23 and 3-24, respectively, should be monitored closely and actions levels put in place as these numbers are approached. As an example, for the AP1000, if 50% of the estimated annual release of 1010 C/yr is reached, more frequent environmental monitoring and/or sampling should be conducted. Additionally, if necessary, TVA may need to re-evalutate the operational parameters of the reactor and its associated liquid waste treatment systems.

> *Response:* The radiological environmental monitoring program (REMP) conducted for the BLN site will be designed based on the regulatory guidance from NRC Regulatory Guide 4.1 and NUREG 1301/1302. The sampling will include the collection of water samples from the Tennessee River downstream from the site at a minimum of two locations using automatic composite samplers. These samplers will be designed to collect a sample at least once every two hours. The resulting composite sample will be analyzed monthly. The process that is currently applied in the REMP monitoring conducted for TVA's existing nuclear sites is to collect and analyze samples for the composite samplers more frequently if elevated activity levels are identified or suspected in samples from any of the REMP monitoring locations. This process would be applied to the BLN REMP.

EPA50. Guidelines for the need to increase the frequency of monitoring for tritium based on predetermined action levels should be addressed in the TVA Radiological Environmental Monitoring Program (REMP), if they are not already included.

> *Response:* See response to EPA49.

EPA51. An ongoing, long-term issue is the projected storage of spent fuel onsite until late in the 21st century, addressed in Section 3.18.2. Although the NRC has determined that this can be done safely for an extended period of time with little risk to the public, it is desirable but not certain that a high-level waste repository will be licensed prior to the need for an on-site spent fuel storage facility in 2036.

> *Response:* The U.S. Department of Energy (DOE) is responsible for the disposal of all high-level radioactive waste generated from TVA's nuclear reactors, as well as the transportation of radioactive materials to the disposal facility. TVA plans to provide dry cask storage of radioactive materials in an on-site independent spent

fuel storage installation (ISFSI) at BLN, in addition to the storage capacity of the spent fuel pool for either a B&W reactor or an AP1000 reactor, until a licensed repository or interim offsite storage option becomes available (10 CFR 51.23). A discussion of spent fuel storage is contained in FSEIS 3.18.2.

EPA52. The basis and documentation for the dose calculations should be provided. An appendix could be used to provide this information.

Response: See response to EPA47.

EPA53. Page 142 indicates that operational noise generated by the cooling tower is ecpected to be 48 dBA at the nearest residence (similar to ambient levels) and 54.6 dBA if the tower was operated 24 hours a day. The FSEIS should define the frequency of operation associated with the 48 dBA level and the basis for such an operational timeframe.

Response: The cooling towers will operate 24 hours a day, 7 days a week. The only time that they will not operate is during refueling outages.

EPA54. The noise metric used in the DSEIS is unclear. That is, are the provided data in dBA instantaneous or averaged, such as the day-night level (BNL) descriptor? We assume the readings are in DNL but should be clarified in the FSEIS (e.g., “48 dBA” could be designated as “48 DNL”, “48 dBA DNL”, Ldn = 48 dBA, or an introductory sentence indicating that all noise data are expressed in DNL).

Response: The metric used is the day-night average noise level, which is abbreviated as either Ldn or DNL.

EPA55. Blasting may be associated with construction of the AP1000 reactor. The FSEIS should provide additional information on the expected noise levels during blasting at the nearest residence and the frequency of such events.

Response: Peak instantaneous A-weighted noise levels from blasting are predicted to be 75 dBA at the source and approximately 40 dBA at the nearest residence. Blasting is expected to occur intermittently over the course of one year, though there would likely be several weeks when blasting would occur daily. When blasting does occur, there would likely be two or three detonations per day, each lasting less than one second. FSEIS 3.12.2 has been updated to include this information.

EPA56. Approximately how many residences are located in the proximity of the “nearest residence”? Are homes isolated or clustered?

Response: There are approximately 50 cabins, second homes and primary residences located along the north shore of Town Creek embayment in the Creeks Edge Development. The homes most likely to be impacted by noise are clustered in the southwestern portion of the development (see Figure 3-15). This information has been added to FSEIS 3.12.2.

EPA57. The condition of the existing facilities at BLN 1&2 should be inspected. Existing utilities at the two unfinished facilities could include mechanical, plumbing, electrical, and telecommunications equipment and their respective distribution systems. The condition and capacity of existing boilers, chillers, air handlers, duct work, plumbing fixtures, piping, transformers, generators, power panels, and wiring are a few of the items that should be carefilly examined to determine if they have any remaining usable life or if they should be replaced, and what costs might be involved. In this regard, it should be noted that NRC's standards for safety requirements may have changed since construction on BLN 1 &2 was suspended.

Response: See response to EPA04.

EPA58. Similarly, what is the status of Building Code compliance and what code(s) (e.g., International Building Code: IBC) is/are in effect? The existing facilities/structures may require upgrades to render them in full compliance with current building codes. Since building codes are constantly being revised to include more stringent requirements, this could result in significant additional construction costs. The assessment of any Bellefonte structure/facility being considered for re-use should include a complete building code analysis.

Response: See response to EPA04. As a federal agency, TVA is not subject to building codes but it does consider them.

EPA59. EPA has identified numerous construction materials that may contain asbestos (http://www.epa.gov/region4/air/asbestos). Although the use of asbestos containing materials is currently illegal, such materials were used until about 1980. If asbestos is determined to be present in existing BLN 1&2 facilities, abatement may be required for re-use, which may be costly.

Response: DSEIS 3.14.1 stated that asbestos materials have been used in the construction of BLN Units 1&2 facilities. Several roll-offs of asbestos waste generated from the repair and upkeep of the plant buildings have been disposed of in the past three years. These materials were removed by appropriately certified personnel, and disposed of in an ADEM-approved landfill. Should TVA select one of the action alternatives, it is expected that this process will continue, as needed, during plant construction.

EPA60. Given that a nuclear generating unit is being proposed, the structural condition of the existing facilities is probably the most important issue. Has a complete structural engineering and safety assessment of the major structures been done, especially for the two partially-built, pressurized water reactors? As suggested above, building codes are frequently upgraded to include more stringent requirements for the structural resistance to natural forces (tornados, earthquakes). NRC has apparently upgraded their seismic design for nuclear power plants (2000) since the Bellefonte plant was first started (<http://www.riskeng.com/PDF/New_Seismic.pdf>).

Response: See response to EPA04.

EPA61. In addition, are there complete construction materials and inspection records of the initial construction available for compliance reviews (compressive strengths, slump tests, reinforcing steel inspections, welding records, etc.)? Were “as-built drawings” prepared after construction?

Response: FSEIS 2.2.3 has been revised to include information on the status of quality assurance records and as-constructed drawings.

EPA62. Has there been any measured subsidence or settlement of the structures/facilities?

Response: There has been no observed subsidence or settlement of the structures/facilities. FSEIS 2.2.3 has been updated to address the issue of subsidence or settlement of structures/facilities.

EPA63. Other structural-related considerations include infestations, roofing integrity and pavement structures. Regarding infestations, do the structures have a history of water infiltration, either through roof leaks or at window and door openings? Are any structures affected by mold and/or termites? Similarly, the structural integrity of roofs is also important. Although roofing integrity may be sound, it is critical to assess the weather-tight integrity of the finished roofing system and materials, includingeits age, repair history, and its replacement cost. Any needed roofing replacement or repair costs should be addressed as part of the project's development costs. Finally, regarding pavements and hard stand areas, an analysis of all flexible, rigid and special pavement types should be performed, with remaining life determinations made.

Response: See response to EPA04.

EPA64. As suggested above, tornados, earthquakes and other weather/climate events since the mid-1980s could be important in determining the re-use suitability of BLN 1&2. The BLN site is located in an F-3/F-4/F-5 tornado alley, according to http://upload.wikimedia.org/wikipedia/commons/3/35/Tornado_Alley.gif.

Response: FSEIS 3.16.1.1 has been updated to include weather events since 1980. The tornadoes listed on the Huntsville National Weather Service web site for 1980-2008 were identified and are listed in Appendix K. During 1980-2008, 17 tornadoes occurred in Jackson County, including 2 storms with a strength of F4(Fujita scale)/EF-4 (Enhanced Fujita scale). Of these tornadoes, 7 (including 1 EF-4 tornado) had tracks (all or part) within 10 miles of the BLN site. The F/EF Class for each tornado is listed and tornadoes with tracks within 10 miles of Bellefonte are identified. Numerous other significant weather events were identified for Jackson County during 1980-2008 on the National Climatic Data Center (NCDC) Storm Events web site. The quantity of each of these events is listed. No impacts to existing plant structures resulted from these events.

EPA65. Moreover, in April of 2003, this area experienced an earthquake of a 4.9 Rickter Scale magnitude. Did this event result in any structural damage at the BLN facilities?

Response: No, the April 29, 2003 earthquake that occurred near Fort Payne, Alabama did not cause any damage, structural or otherwise, to BLN facilities. According to the U.S. Geological Survey's community internet intensity map, the shaking intensity at BLN was in the IV (light) to V (moderate) range. At these

intensity levels the vibration, similar to the passing of heavy trucks, effects include the rattling of windows, dishes, and doors; small unstable objects displaced or upset; doors swing, close, open are typically noticed ; and could be felt both indoors and outside enough to waken sleepers. No structural damage would be expected at these intensity levels.

EPA66. Similarly, did the recent flooding events in the summer of 2009 cause Guntersville Reservoir to flood at Bellefonte and cause structural damages for the existing facilities?

Response: Based on observed data at Guntersville Dam and the South Pittsburg gage at Tennessee River mile 418.1, the highest reservoir elevation between May and September 2009 occurred in early May and was less than a two-year flood at both locations. Therefore, there was no flood damage at the BLN site.

EPA67. Also, does the current site design and layout requirements for capture and treatment of onsite storm water? We note (pg. 37) that structures on the "nuclear island" portion of the BLN site are designed to withstand ". . .hurricanes floods, tornados and earthquakes without loss of capability to perform safety functions."

Response: The capture and treatment of stormwater for the current site design and layout is managed through NPDES permit, AL0024635. Any future construction will meet applicable NPDES requirements. The current permit is active from December 1, 2009 through November 30, 2014.

EPA68. Were the existing facilities designed and constructed to survive the impacts of large commercial aircraft? Advances in power station designs have occurred since the 9-11 terrorism event. Will the partially-built facilities to contain the pressurized water reactor meet (or can they be modified to meet) the current standards for this? Also see: http://www.nrc.gov/reading-rm/doc-collections/news/2007/07-127.html.

Response: The Category 1 structures that contain the pressurized water reactor are complete, with minor modifications necessary to meet new regulatory requirements. Security requirements for nuclear power plants have been significantly upgraded since September 11, 2001, including the development of contingency plans to address beyond design basis events. The B&W plant design will meet applicable licensing requirements and regulations including those regarding aircraft impact.

EPA69. Because of the new BLN site development plan, the large number of supporting documents containing important basic information/analyses, and the more than 3.5 decades over which these reference document have been developed, a stand-alone complete SEIS containing all pertinent information and backup analyses appears to by appropriate for this project. The present DSEIS for the current single nuclear reactor configuration does not provide the information and supporting documentation needed for a complete understanding and evaluation by licensing agencies and the general public. In lieu of a complete stand-alone SEIS, the FSEIS should provide the specifc document, section, and page where referenced documentation/analyses can be obtained to support the information provided. If appropriate, the specific NRC docket website location should also be provided.

Response: The FSEIS strives to include specific citations for all reference documents. Many of the key documents are posted on TVA's web-site for easy

access by readers. In response to EPA's comment, we've reviewed the DSEIS for complete and accurate citations. Where they were missing, complete citations have been added to the FSEIS.

EPA70. On page 97, the molluscicide entry includes this description: “a nitrogen atom with four attachments, some or all of which can be benzene-based, rather than hydrocarbon-based.” Since benzene is a hydrocarbon, this statement should be revisited for the FSEIS.

Response: The molluscicide entry has been corrected in FSEIS 3.1.4.1.

EPA71. The name of Alternative C is somewhat inconsistent in the DSEIS. Typically, it is listed (e.g., pg. 36) as “Construction and Operation of a Westinghouse AP1000 Advanced Pressurized Light Water Reactor.” However, the technology is also referred to (pg. 188) as the “Westinghouse Advanced Passive Pressurized Water Reactor (AP1000).” Although the FEIS should clarify, we assume that the AP1000 design is an “advanced passive safety” system.

Response: This inconsistency has been corrected in the FSEIS.

EPA72. Table 1-3 - The information provided in this table (“Environmental Reviews and Documents Pertinent to Bellefonte Nuclear Plant Unit 1:” pg 19) is not limited to Unit 1. Therefore, “Unit 1” should be removed from the title.

Response: The title of Table 1-3 has been corrected in the FSEIS.

EPA73. Assumed Figure 2-1 is not numbered in the DSEIS. Also, we suggest that Figures 3-2, 3-3, and 3-4 label the identified “submerged diffuser” area as the plant discharge site for clarity, as was done in Figure 3-5.

Response: Figure 2-1 is labeled in the FSEIS and is listed in the Table of Contents. The suggested revision has been made to FSEIS Figures 3-3, 3-4 and 3-5.

U.S. Department of Interior

12/21/2009 11:44:32 AM TVA PAC site ID #64

The Department of the Interior has reviewed the draft EIS and have no comments to provide for your consideration. I can be reached at 404-331-4524 or by email at gregory_hogue@ios.doi.gov. DOI01

Gregory Hogue
Regional Environmental Officer
Office of Environmental Policy and Compliance
Office of the Secretary
Department of the Interior
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Contact: email

DOI01. The Department of the Interior has reviewed the draft EIS and have no comments to provide for your consideration.

Response: Comment noted.

State of Alabama — Alabama Historical Commission

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

FRANK W. WHITE
EXECUTIVE DIRECTOR

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

November 24, 2009

Ruth M. Horton
TVA
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Re: AHC 09-1092
Supplemental Environmental Impact Statement
Bellefonte Facility
Jackson, Limestone, & Morgan Counties, Alabama

Dear Ms. Horton:

Upon review of the SEIS submitted by your office, we have determined that we agree with the findings in the report. Fort the facility, we agree that archaeological site 1Ja311 should be avoided. We also agree that the Bellefonte Cemetery and the African American Bellefonte Cemetery should be avoided and some vegetative screening should be utilized here. SHPOAL01 Furthermore, for the transmission lines, we agree with your consulting with our office on the scope of work when it becomes available to ensure cultural resources are identified and dealt with according to eligibility. SHPOAL02

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

Truly yours,

Elizabeth Ann Brown
Deputy State Historic Preservation Officer

EAB/GCR/gcr

RECEIVED DEC 14 2009

THE STATE HISTORIC PRESERVATION OFFICE
www.preservala.org

SHPOAL01. Fort [sic] the facility, we agree that archaeological site Ija311 should be avoided. We also agree that the Bellefonte Cemetery and the African American Bellefonte Cemetary should be avoided and some vegetative screening should be utilized here.

Response: Comment noted.

SHPOAL02. Futhermore, for the transmission lines, we agree with your consulting with our office on the scope of work when it becomes available to ensure cultural resources are identified and dealt with according to eligibility.

Response: Comment noted. TVA will continue to consult with the Alabama Historical Commission regarding the scope of work for the transmission lines associated with the Bellefonte Plant.

Georgia Department of Natural Resources — Historic Preservation Division

GEORGIA
DEPARTMENT OF NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION

CHRIS CLARK
COMMISSIONER

DR. DAVID CRASS
ACTING DIVISION DIRECTOR

December 9, 2009

Ruth M. Horton
Senior NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, Tennessee 37902
rmhorton@tva.gov

RE: Upgrade Bellefonte Nuclear Transmission Lines
Dade County, Georgia
HP-090914-001

Dear Ms. Horton:

The Historic Preservation Division (HPD) has reviewed the *Draft Supplemental Environmental Impact Statement, Single Nuclear Unit at the Bellefonte Plant Site, Jackson County, Alabama*, dated November 2009 and prepared by the Tennessee Valley Authority (TVA). Our comments are offered to assist TVA in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information provided, HPD understands that if the Transmission Action Alternative is selected, then TVA will consult with our office and conduct a cultural resource survey to identify historic properties in the project's area of potential effects. SHPOGA01

For future submittals, please note our new address below. We look forward to reviewing the additional information as it becomes available. Please refer to project number **HP-090914-001** in any future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6624.

Sincerely,

Elizabeth Shirk

Elizabeth Shirk
Environmental Review Coordinator

ES: jht

cc: Dan Latham, Jr., Northwest RC

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SHPOGA01. Based on the information provided, HPD understands that if the Transmission Action Alternative is selected, then TVA will consult with our office and conduct a cultural resource survey to identify historic properties in the project's area of potential effects.

> *Response:* Comment noted. TVA will continue to consult with the Georgia Department of Natural Resources - Historic Preservation Division regarding the scope of work for the transmission lines associated with the Bellefonte Plant.

Public Comments

General

1. We incorporate by reference Blue Ridge Environmental Defense League's (BREDL) previous recommendations on TVA's Integrated Resource Management Plan.

> *Response:* Comments relevant to this SEIS contained in BREDL's August 14, 2009 letter to TVA regarding the scoping of the IRP have been responded to in Appendix C.

2. TVA's main goal is to be guardians over the TVA Watershed area, which includes providing energy plus protecting our environment while protecting the welfare of its stakeholders.

> *Response:* Comment noted.

3. TVA has neglected one of their primary missions, environmental stewardship.

> *Response:* Comment noted. For more information about TVA's environmental stewardship programs, activities and goals, go to the TVA environmental stewardship webpage <http://www.tva.gov/environment>.

4. Since TVA got into the power generation business, its mission has been to increase use of electricity to spur economic development. Neither TVA nor its distributors have the ability to transform themselves into a modern electricity system that sees energy efficiency as an energy resource that will save money, create jobs, and benefit everyone.

> *Response:* Comment noted. The FSEIS has been modified to include more information about energy efficiency (EE), including the addition of an Energy Efficiency/Demand Response (EEDR) program to the base case and all alternatives, and the analysis of an enhanced, more aggressive EE effort on the Bellefonte B&W alternative.

5. The dedication of water supply to nuclear power plants is wasteful and contrary to the principal purposes for which the Tennessee Valley Authority was created -- river navigability, flood control and agricultural and industrial development.

> *Response:* The expected BLN withdrawal is about 35,000 gallons per minute (gpm; with 23,000 gpm being returned to the river) and 24,000 gpm (with 8,000 gpm being returned to the river), for the B&W and the AP1000 alternatives, respectively. These expected BLN withdrawals are approximately 0.2 percent and 0.1 percent, respectively, of the average flow through Guntersville Reservoir (see FSEIS Table 3-3). River navigability, flood control and agricultural and industrial development would not be impacted by these small water withdrawals.

6. TVA and its distributors make money strictly on how much power they sell and how much they can recover in increased rates from the capital investments of building new generation sources. The single largest barrier to unrolling energy efficiency in our region is how to ensure that the TVA and its distributors can cover their costs as power sales decline.

Response: Comment noted. FSEIS 1.4 shows the reduction in power sales due to energy efficiency programs, and the annual cost of power taking into account the cost of the programs as well as the power sales decline.

7. TVA deferred investment in base load generation, which increased the cost of electricity to many municipal and cooperative utilities by up to 75 percent, to prepare for competition that never came. With the restart of Browns Ferry Unit 1 and the completion of Watts Bar Unit 2, TVA is working to close the gap in base load generation that was caused by their tepid reaction to pending competition forecast by the industry during the mid-1990s.

Response: Comment noted.

8. The TVA has carried forth a community propaganda campaign which has not presented accurate risks of nuclear power or employment statistics.

Response: TVA provides information that is based on verifiable data when available or based on best available estimates when making forecasts. FSEIS 3.0 provides information on nuclear plant safety in FSEIS 3.19, 'Nuclear Plant Safety and Security' and on employment statistics in FSEIS 3.13, 'Socioeconomics.'

9. What has TVA spent totally on all costs (including insurance and interest) related to the failed attempt to build two nuclear reactors at the Bellefonte site? How much does TVA still owe on this debt?

Response: TVA has spent approximately $4.6 billion on the partial construction of Bellefonte Units 1 and 2. TVA has been addressing these costs over the years. In July 2005, TVA's Board of Directors approved amortizing the remaining costs, $3.9 billion, and collecting them in rates over ten years beginning with fiscal year 2006. While TVA seeks to maximize the use of existing assets and thereby avoid some of the capital costs associated with constructing an entirely new facility, TVA had already addressed the amortization and recovery of the Bellefonte sunk costs before the current consideration of completing one of the unfinished Bellefonte units. Costs such as insurance and interest on debt are part of the cost of doing business and generally are not allocated to individual projects. Investments in power production facilities are a liability only if left unfinished. Once a power plant is brought online, the resulting revenue stream will provide a return on the investment.

10. The mismanagement of the nuclear program has resulted in the TVA Debt.

Response: Some of TVA's current debt can be attributed to the past nuclear programs. TVA spent approximately $4.6 billion on the partial construction of Bellefonte Units 1 and 2. Investments in power production facilities are a liability only if left unfinished. Once a power plant is brought online, the resulting revenue stream will provide a return on the investment.

11. TVA's lack of honesty to the public after the Kingston and Widows Creek Disasters does not give citizens a sense of security and trust.

Response: TVA works to ensure public trust by providing information to the public about any incident as quickly and accurately as possible, and information is updated as new information becomes available.

The NEPA Process

12. TVA's analysis of energy efficiency and renewable energy as potential alternatives to the proposed new nuclear reactor is inadequate to fulfill NEPA's requirements to vigorously explore and objectively evaluate all reasonable alternatives. TVA has not released any analysis that would support its contention that these resources do not merit full consideration. Energy efficiency and renewable energy alternatives should be given full consideration as reasonable alternatives under NEPA.

Response: FSEIS 2.4 has been revised to include a more robust discussion of the potential for EEDR and renewable resources either alone or in combination with energy storage technologies.

TVA has reviewed the most recently published studies on energy efficiency identified by comment providers (Brown, M and J A Laitner, et al, "Energy Efficiency in Appalachia: How Much More is Available and at What Cost, and by When?" Appalachian Regional Commission, March 2009; Chandler, S and M A Brown, "Meta-Review of Efficiency Potential Studies and Their Implications for the South," Georgia Tech Ivan Allen College School of Public Policy, Working Paper #51, August 2009) as well as reports published since the close of the comment period (Brown, M A et al, "Energy Efficiency in the South," Southeast Energy Efficiency Alliance, April 12, 2010). These studies estimate the potential of EE to effectively add capacity to power systems–through energy savings–to replace or delay the construction of new generating plants through 2020 and/or 2030. For comparative purposes, TVA also reviewed a study by the Electric Power Research Institute that forecasted energy efficiency potential in southern U.S. states ("Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010-2030)," Electric Power Research Institute, Technical Report 1016987, January 2009).

The FSEIS has been updated to include an EEDR program that reduces energy needs by about 5,200 GWhs in the 2018-2020 time period. The average annual reduction for this program is about 0.3 percent through 2020. This is about 55 percent of the moderate achievable estimate of 0.5 percent annual reduction through 2020 by the Meta-Review study and about the 70 percent of the realistic achievable estimate of 0.4 percent for southern states by EPRI. An Enhanced EEDR program which about doubles the reduction in energy use of the base case EEDR program in the 2018-2020 time period has also been developed and analyzed. The TVA Enhanced EEDR program averages 0.6 percent reduction per year through 2020. This is approximately 55-75 percent of the maximum achievable estimates of 1 percent by the Meta-Review study, 0.9 percent for southern states by EPRI, 0.7 percent for Appalachia by the ARC, and 0.9 percent by the Energy Efficiency in the South study (see FSEIS 2.4).

The Need for Power analysis in FSEIS 1.4 shows that in the base case EEDR program, the proposed nuclear unit plus additional gas and nuclear expansion units are needed to meet the forecasted demand for power. Analysis of the Enhanced EEDR program shows that even with substantial energy replacement through conservation measures, TVA must still add new generation in the 2018-2020 time frame to balance resources with the projected load requirements. TVA needs both EEDR and new base load generation to meet projected demand. If EEDR efforts are more successful than predicted, TVA will be able to consider this in future energy resource analyses, including consideration of new resources and the retirement of existing resources, such as older coal-fired generating units.

FSEIS 2.4 discusses in more detail the merits of renewable energy sources such as wind and solar. Both of these resources have significantly greater land footprints and associated environmental impacts compared to the proposed nuclear unit. Additionally, to provide generation profiles similar to a nuclear unit, they must be coupled with energy storage capacity which would increase the land requirement to compensate for additional efficiency losses or with fossil-fueled generation which would increase air quality impacts. Biomass as a renewable fuel can be used to provide high capacity factor power provided adequate fuel supply exists; however, the air quality impacts are higher than a nuclear unit. Hydroelectric power has been concluded to be less environmentally preferable given its low capacity factors, environmental impacts, and the limited availability of feasible new sites in the TVA territory.

13. TVA’s analysis does not offer any substantive consideration of the significant risks associated with building a nuclear reactor, such as the uncertainty in the timeline to license and construct a new reactor and costs associated with construction.

Response: The cost and schedule risks associated with building a nuclear power plant are considered in FSEIS 1.2 and 2.7. These risks are considered in the cost and schedule estimates. TVA's experience with completing Watts Bar Unit 1, refurbishing and restarting Browns Ferry Unit 1, and the current efforts to complete Watts Bar Unit 2 provide confidence in the processes and practices TVA has established to complete a nuclear unit at BLN within cost and schedule estimates. For the B&W design, similar to the process at Watts Bar Unit 2, construction will not begin until engineering is substantially complete. This practice provides assurance that the full scope of activities required to support construction is clearly defined.

For the AP1000, the Part 52 'one step' licensing process is designed to minimize licensing schedule risks, and the standardized design is intended to provide a high degree of confidence in construction schedules and costs, especially for the units that follow the reference plant construction.

14. The Southeast U.S. could generate more than 15 percent of forecasted electricity demand by 2015 with renewable energy resources such as wind, solar, and biomass resources. The DEIS fails to consider biomass resources altogether in spite of clear potential within the TVA service territory.

Response: In FSEIS 2.4 TVA addresses the potential for wind, solar, biomass, and hydroelectric generation in the TVA region either alone or in combination with energy storage technologies. The results have been compared to those presented

in the 2009 Southern Alliance for Clean Energy's (SACE) "Yes We Can: Southern Solutions for a national Renewable Energy Standard."

Wind: The SACE report did not provide its underlying technical assumptions for determining potential wind energy capacity, which is higher than that calculated by TVA. In Tennessee, for example, the SACE report concludes that 2,089 MW of potential wind energy capacity exists. However, using the DOE Wind Powering America basis of 163.3 km^2 (40,352 acres) of available windy land area and a reasonable assumption of 1 MW of capacity per 60 acres of land, TVA calculates that the potential wind energy capacity is 672.5 MW. The SACE report estimates 1416.5 MW more wind capacity in Tennessee alone.

Solar: The SACE report extrapolates available capacity within each state in the Southeast from a calculation for the state of Florida for ground-mounted photovoltaic solar energy – the only technically feasible solar energy technology on a large scale in the TVA region. This results in capacity factors between 20 percent and 25 percent depending on the state, which is higher than the 17 percent calculated by TVA using the average direct solar radiation in the region. The result is a more optimistic calculation of the solar energy potential than what TVA believes is reasonable for the TVA power service area.

Biomass: The SACE report provides an estimate of potential power capacity to be generated from biomass fuels which is higher than that of the analysis conducted by TVA. The report appears to have either over-estimated the heat content of biomass fuels or assumed efficiencies for each conversion technology that are uncharacteristically high.

Hydro: The basis for the methodology used in the SACE report is similar to that used by TVA. Thus, the conclusions are reasonably similar on the basis of annual average power (MWa). The SACE report, however, cites a state-wide capacity factor for each state in the region to calculate the total feasible capacity (MW). TVA prefers to measure hydroelectric resources in terms of annual average power as it is closer to a base load equivalent.

15. TVA should look seriously at recycling waste energy (including steam, furnace gases, heat, and pressure).

Response: Recycling waste energy, combined heat and power, is an important resource alternative. TVA pursues opportunities for recycling waste energy projects with our large industrial users as they arise. These are evaluated on a case by case basis as potential purchased power agreements in our planning efforts. Concerning our existing steam generation facilities, continuous efforts are made to monitor and reduce any heat losses in our systems to make them as efficient as possible. This is typically the least cost additional power available.

For and Against the Alternatives

16. This is the best way to produce the amount of energy needed by the Tennessee Valley area with less harm to the environment.

Response: Comment noted.

17. I (we) am against implementation of Alternative C.

Response: Comment noted.

18. I (We) prefer or support the selection of Alternative A for implementation.

Response: Comment noted.

19. I (We) prefer or support the selection of Alternative B for implementation.

Response: Comment noted.

20. I (We) prefer or support the selection of Alternative C for implementation.

Response: Comment noted.

21. I (We) prefer or support the selection of Alternative B or C for implementation.

Response: Comment noted.

Air Quality

22. We need to move away from fossil fuels, and in particular, the Widows Creek steam plant should be taken out of service in order to remove the pollution that comes from it.

Response: Comment noted. The Need for Power analysis conducted for this FSEIS includes the reduction of TVA's dependence on fossil fuel (see FSEIS 1.4.3). The base case and all alternatives for this analysis includes a reduction in fossil fuel capacity of 1,000 to 2,000 MW by 2015.

23. Carbon dioxide emission from construction and operation of the plant (total carbon cost) are unacknowledged, but considerable. The greenhouse gas emissions associated with nuclear generation (including uranium mining, milling, processing, enrichment, fuel fabrication and radioactive waste storage) come close to those of natural gas generation and are far higher than renewable energy sources.

Response: Nuclear power plants do not emit carbon dioxide in large quantities during the normal course of operations. However, fossil fuels are often used as part of a nuclear power facility life-cycle, primarily for the manufacture of the fuel that is used in the facility. Nuclear energy life-cycle emissions include emissions associated with construction of the plant, mining and processing the fuel, routine operation of the plant, waste disposal and decommissioning. Numerous studies demonstrate that on a life-cycle based comparison, nuclear generated electricity emits about the same amount of carbon dioxide per kWh as renewable energy sources and far less than fossil fuel sources. One such study is from the University of Wisconsin, "Life-Cycle Assessment of Electricity Generation Systems and Applications for Climate Change Policy Analysis" (Meier 2002). A discussion of life-cycle carbon dioxide emissions from nuclear power plants has been added in FSEIS 3.16. 3.

24. Reducing demand for electricity with efficiency and renewables will reduce emissions from combustion of fossil fuels at utility power plants.

Response: See response to Comment 22. Energy efficiency and renewable contribute to lower emissions from TVA's existing coal plants.

25. Nuclear power is not the answer to the carbon-fueled climate change crisis. We should not exchange one environmentally damaging technology for another.

Response: Nuclear energy has a proven ability to safely generate large quantities of reliable, affordable base load power generation with very little greenhouse gas emissions and other environmentally damaging impacts. Because low-carbon nuclear energy (life cycle) can produce more electricity than other clean sources, it can help to reduce our dependence on fossil fuels for base load generation and lead the way for other clean energy sources. Radiation releases are governed by federal regulations that ensure the protection of public health and safety.

Aquatic Ecology

26. Methods to control aquatic plants in the Tennessee River are of concern.

Response: Comment noted

27. Has the environmental and energy impact statement considered the amount of coolant water needed for nuclear cooling and its impacts on aquatic ecosystems?

Response: Yes, see FSEIS 2.7.2, 3.1, 3.5 and 3.7.1. The BLN site would employ a closed-cycle cooling system. Closed-cycle systems have been demonstrated to have very low effects on aquatic biota and ecosystems in the source water body. Under Alternative B or C, plant water withdrawals are 0.2 percent or less than the annual average river flow. TVA would monitor these effects during the first NPDES permitting cycle to verify that impacts to the source waterbody (impingement/entrainment of aquatic organisms) are acceptable.

28. Many fish and mussel populations throughout the entire Tennessee River, including the Bellefonte site, are greatly reduced from their historical numbers.

Response: Guntersville Reservoir was impounded in 1939. Prior to impoundment, the reach of the Tennessee River that is now inundated by Guntersville Reservoir supported a more diverse fish and mussel community. Impoundment changed this reach from a free-flowing river, characterized by a diversity of habitats (shoals, etc.), into a reservoir. Many fish and mussel species could not adapt to these changes.

TVA fish data collected from 1949 until present was reviewed to assess changes in fish species composition shortly after impoundment until present. During 1949 to 1989, 70 species were collected in TVA fish surveys in Guntersville Reservoir. A total of 71 species have been collected in Guntersville Reservoir in TVA fish samples over the past 20 years. Two of the 71 species collected in recent surveys (Atlantic needlefish and inland silverside) invaded the Tennessee River system during the past 15 years; for comparison of recent data to historic data these species are excluded. Overall, there have been no major changes in fish community composition of Guntersville Reservoir from historic data (1949 to 1989,

70 species) to recent data (1990 to 2009, 69 species). A more detailed discussion of this analysis has been added to FSEIS 3.5.1.

Rare fish species in the Tennessee River system mostly occur in reservoir tributaries that are free-flowing. Inflow areas below dams of mainstem Tennessee River reservoirs are reaches that may contain some rare species occurrences, many of which are on a seasonal basis (such as use of these areas to spawn). Bellefonte Nuclear Plant is situated approximately 35 miles downstream from Nickajack Dam in a transitional area between the reservoir inflow and forebay of Guntersville Reservoir. Fish communities of transitional areas in Tennessee River reservoirs are characterized by reservoir tolerant species and operation of this plant should have no effect on rare fish species or their habitats.

In the comments on the DSEIS, nuclear power facilities were identified as a cause of decline of fish and mussel populations in the Tennessee River system. This is incorrect. TVA currently operates three nuclear power facilities which discharge a heated effluent into the Tennessee River. Thermal discharges from each of these facilities are regulated by Section 316(a) of the federal Clean Water Act. Annual fish and benthic macroinvertebrate monitoring is conducted upstream (reference site unaffected by the plant's thermal discharge) and immediately downstream of the thermal discharge to demonstrate that these facilities are not adversely affecting fish and benthic macroinvertebrate populations as a result of thermal discharges. These data are reported annually to state and federal regulators. Operation of these facilities in a manner that ensures that the maximum thermal discharge limits are not exceeded assures protection of aquatic resources from the thermal affects of the facilities' discharges. Facilities must reduce power production, if necessary, to ensure compliance with the thermal limits in the NPDES permits.

Mussels have declined significantly in the Tennessee River system and throughout North America. Impoundment of free-flowing rivers is the primary cause of this decline. Some species have been able to adapt to reservoir environments and can be locally abundant. Many species are still extant in tailwaters below dams but are present in low numbers due to a variety of factors. Cold water dam releases inhibit reproductive physiology, reproductive timing, and may eliminate specific host fish required for reproduction. Unnatural flow regimes also interrupt reproductive timing and may scour substrates necessary for juvenile development. Many of the species that are listed as threatened or endangered under the Endangered Species Act are extant as old individuals that have remained in tailwaters since the dam was constructed. In many cases, conditions are not suitable for successful reproduction and populations slowly disappear as these individuals die. Mussel surveys conducted around the BLN site yielded mostly common, reservoir tolerant species. One individual of the pink mucket, *Lampsilis abrupta*, was found in surveys conducted for this SEIS. This species is an example of a long lived mussel that is widespread in the Tennessee River system (but rare and occurs in low abundance) and that has had limited reproductive success in areas affected by impoundments. As stated above, the BLN site is situated in a mid-reservoir (transitional) area between the reservoir inflow and forebay of Guntersville Reservoir. Mussel habitats in transition zones of Tennessee River reservoirs are typically marginal and only support viable populations of species that are able to adapt to reservoir conditions.

29. Warm water that is discharged from nuclear power plants results in 'thermal plumes' that cause stress on aquatic life, lower dissolved oxygen levels, and affect the feeding and breeding patterns of various species. Dissolved oxygen levels downstream from the Sequoyah nuclear plant were even lower as it is downstream from the Watts Bar nuclear plant. What about the impacts at the Bellefonte location, which is even further down stream?

Response: Hydrothermal modeling of potential heat effects under either action alternative are discussed in FSEIS 3.1.3.1. Thermal effects of plant operations on aquatic species are addressed in FSEIS 3.5.2. TVA has modeled the potential effects of cooling water blowdown discharges on fish and shellfish communities at the BLN site and does not anticipate any significant effects to important fish or shellfish communities to occur. TVA will monitor these communities when the plant is operational to confirm the conclusion of the model.

TVA monitors dissolved oxygen levels in Guntersville Reservoir as part of its Reservoir Vital Signs monitoring program. Monitoring results demonstrate that, due to the physical makeup of the reservoir (relatively shallow and more riverine when compared to other reservoirs), relatively short retention times, and inflows from unimpounded rivers and streams, Guntersville Reservoir does not exhibit the low dissolved oxygen conditions that occur in some deeper reservoirs with longer retention times. Therefore, effluent from the BLN site is not expected to combine with effects from upstream or downstream industries to result in extraordinarily low dissolved oxygen levels.

Climatology & Meteorology

30. As climate change worsens, water shortages and heat waves will make nuclear power less reliable due to rising river water temperatures forcing reactors to be powered down.

Response: Additional analysis was performed on the possible effects of climate change, both for temperature and water resources, and this information is included in FSEIS 3.16.3.

31. The Draft EIS did not adequately address global climate change impacts.

Response: TVA has performed additional analysis of possible climate change impacts on a nuclear reactor at the Bellefonte site, as well as impacts from a Bellefonte reactor on global climate change. See FSEIS 3.16.3, Global Climate Change.

Cost of New Generation

32. Nuclear energy is the cheapest, cleanest means for producing reliable electrical energy for an ever growing power need in America.

Response: Cost and emissions are two important benefits for using nuclear energy for producing reliable electrical energy. FSEIS Table 1-2 shows that completion and operation of a B&W unit (Alternative B) is the least costly alternative by 2020 and overall the most cost effective alternative for providing base load energy. FSEIS Table 1-1 shows that emissions of SO_2, NO_x, and mercury are cut by over half from

2010 levels for alternatives that include a new nuclear unit. CO_2 emissions are reduced by 1.3 percent.

33. A study of the social costs of renewable energy technologies indicate that they provide a net social benefit from employment gains and resultants wage and tax benefits from the installation of wind and solar technologies.

Response: Comment noted. Renewable energy resources are addressed in FSEIS 2.4.

34. The estimated cost to construct a nuclear power plant has risen significantly in recent years; this contrasts with some renewable energy options like solar and wind, whose costs have declined.

Response: While it is true that the cost estimates for new nuclear power plants has risen and cost estimates for solar and wind options have declined in part due to increased maturity level in the technology, nuclear is still TVA's most economical option for new generation capacity. FSEIS 2.4 discusses the renewable energy alternatives considered. While economics were not addressed specifically, each of the primary renewable technologies (wind, solar, hydro, and biomass) was found to be less environmentally preferable when compared to a generating capacity equal to that of the proposed nuclear facility (See response to Comment 14). Additionally, in order to provide a generation profile similar to a nuclear facility, renewable technologies require coupling with energy storage systems or fossil-fuel powered generation, which increases the environmental impact and costs.

35. Nuclear power plants are a poor long range investment given their long and risky construction schedules. TVA's first attempt at constructing a nuclear power plant at the site was a financial disaster. This project presents a large financial risk to TVA.

Response: See FSEIS 2.2.3 and 2.2.4. As it did with WBN 2, TVA has conducted a detailed analysis of the BLN B&W units to determine constructability, costs and risks. This has substantially increased TVA’s confidence that BLN 1 can be successfully completed. TVA also carefully considered similar risks for an AP1000 unit. See FSEIS 2.3.

36. Nuclear power is expensive and would not survive without federal subsidies.

Response: Nuclear, like many generation alternatives, has a high upfront capital cost which is offset by low operating cost. Nuclear is less sensitive to fuel costs than other technologies. However, all forms of electricity generation are subsidized through the various government programs and these subsidies are factored into the economic evaluation to determine the cost of energy. TVA evaluates the total cost when making decisions about the most cost effective forms of new generation. FSEIS 1.4.5 discusses the economic benefit of adding nuclear power to TVA’s generation portfolio. TVA receives no direct funding or subsidies from the federal government for the operation of its power generation system.

37. Providing the lowest cost electricity as mandated by the TVA Act will not be accomplished if either Alternative B or C is selected.

Response: FSEIS 1.4.4 discusses the economic benefit of adding nuclear power to TVA's generation portfolio. While both Alternatives B and C have lower annual power costs than the base case, Alternative B (B&W) increases its cost advantage over time relative to the base case because of the lower operating cost and lower capital cost of this technology.

Delivered Cost of Power

38. Selection of Alternative B or C will reduce power costs for TVA customers and mitigate price fluctuations caused by off-system power purchases and the increased use of natural gas-fired generation to meet peak demands and meet reserve capacity requirements.

Response: FSEIS 1.4.4 discusses the savings provided by completing either action alternative. See response to Comment 37.

39. Because of TVA's reliance on natural gas-based generation to meet peak demands and reservation capacity requirements for most of the past decade, consumer electric bills have dramatically increased.

Response: Consumer bills for electricity have increased over the past decade for a number of reasons, including fuel cost volatility, higher cost of purchased power, and lower than expected hydro generation. With a diverse generation portfolio that includes nuclear generation, TVA is better able to control energy costs and the risk to customers of increased costs of any specific generation resource is lessened.

40. Nuclear generated electricity is the least expensive generating option, or is at least cost-effective.

Response: Nuclear generated electricity is one of the least expensive base load generating options to meet the growing demand for electricity in the Tennessee Valley.

41.Has an analysis been conducted comparing the cost of nuclear power compared to alternative, renewable energy sources?

*Response: C*ost estimates for new nuclear power plants have risen and cost estimates for solar and wind options have declined due in part to increased maturity level in the technology, but nuclear is still TVA's most economical option for new generation capacity. FSEIS 1.4.4 compares the cost of various generation options, including an enhanced EEDR program and concludes that completion of the nuclear unit at Bellefonte is the most economical way to meet the projected demand.

FSEIS 2.4 discusses renewable energy alternatives, while economics were not addressed specifically, each of the primary renewable technologies (wind, solar, hydro, and biomass) was found to be less environmentally preferable when compared to a generating capacity equal to that of the proposed nuclear facility. (See response to Comment 14) Additionally, in order to provide a generation profile similar to a nuclear facility, renewable technologies require coupling with energy

storage systems or fossil-fuel powered generation, which increases the environmental impact and costs.

Demand-Side Management (DSM)

42. TVA should invest money in an aggressive advertising campaign for conservation energy efficiency programs they are offering.

Response: Comment noted. TVA will continue to develop cost effective EEDR programs to help meet future load growth as well as prepare for the possible placement of aging fossil generation units in long term layup. Advertising campaigns are an important consideration that is incorporated into program design.

43. TVA recognizes the benefits of a well-diversified resource mix to address uncertainties associated with any one kind of energy resource, but dismisses demand response and energy efficiency programs because TVA considers these programs will take time to implement and could have uncertain results. Building a new nuclear reactor does not diversify TVA's energy mix since the utility is already heavily reliant on nuclear power.

Response: TVA recognizes that EEDR programs play an important part in meeting our energy needs. As discussed in the response to Comment 12, the demand reduction and energy savings associated with EEDR programs have been included in our updated need for power analysis in FSEIS 1.4. TVA will continue to develop cost effective EEDR programs to help meet future load growth as well as prepare for placement of aging fossil-generation units in long-term layup. Currently about one third of TVA's power mix is nuclear generation. Adding a single nuclear unit in 2019 will increase the contribution by a small amount (see FSEIS Figure 1-7).

44. TVA has not, to date, effectively addressed energy efficiency as a resource. Energy efficiency is the most cost-effective, near-term strategy to ensure future system reliability. TVA should focus on the implementation of energy efficiency programs or refute the studies that show energy efficiency to be a potentially significant resource in the TVA service territory.

Response: The FSEIS has been updated to include an EEDR program that reduces required energy needs by about 5,200 GWhs in the 2018-2020 time period. FSEIS 2.4 has been revised to include a comparison of TVA's EEDR program with recent studies that describe potential energy reductions in the TVA service territory due to energy efficiency. For additional information see FSEIS 1.4, 2.4 and the response to Comment 12.

Energy Alternatives

45. Nuclear power, clean coal, U.S. produced petroleum, geothermal, wind, and natural gas are all components to energy independence and will all be needed to meet increasing energy demand.

Response: TVA uses a diverse portfolio of EEDR and supply side resources to meet the electricity needs of our customers. This approach helps mitigate risks such as those associated with fuel dependence. As we develop our portfolio of base, intermediate and peaking generation resources to meet projected load requirements we consider all viable options in our planning efforts.

46. Since TVA has initiated a renewed integrated resource planning process that is not yet complete, making a final determination of the need for an additional nuclear reactor at the Bellefonte site means that up-to-date analysis of various alternatives will not be factored into the decision-making process, which does not live up to the purpose of NEPA to require a full and fair consideration of all reasonable options. TVA must delay deciding on whether to build the proposed nuclear reactor at the Bellefonte site until this resource planning process has resulted in a comprehensive plan that fairly considers all viable resource options.

Response: One of TVA's most important responsibilities is ensuring that it is able to meet the demand for electricity placed on its power system. Thousands of businesses, industries and public facilities, and millions of people depend on TVA each day to reliably supply their power needs. To meet this responsibility TVA forecasts the future demand and the need for additional generating resources in the region it serves. Because planning, permitting, and construction of new generating capacity and transmission requires a long lead time, TVA must make decisions to build new generating capacity well in advance of the actual need. Waiting until the Integrated Resource planning process is complete in 2011 would put TVA at risk of not being able to meet the capacity needs in the 2018-2020 time frame and could remove completion of one of the BLN units as a viable resource option for meeting this identified need. Similarly, TVA has proceeded to acquire additional wind resources while the integrated resource planning process is underway to make sure it secured these resources at an optimal time.

Commenters identified renewable energy resources and EEDR resources, specifically, as the resources that needed more consideration in the context of the proposed construction of a nuclear unit at the BLN site. In response, TVA has expanded the discussion of these resources in the FSEIS and comment responses, including analyzing an enhanced, more aggressive EE program. Based on this analysis, TVA has determined that one nuclear unit still was the low-cost option for meeting TVA's purpose and need. See FSEIS 2.4 for a discussion of alternative energy resources.

47. The FSEIS should discuss the contribution of energy efficiency/conservation programs and the generation of electricity from renewable resources in terms of the purpose and need of the proposed BLN unit. TVA should focus on an energy policy that invests in clean, renewable energy sources such as wind and solar, and that includes a comprehensive energy conservation and efficiency program. TVA should offer incentives to residential and commercial entities to offset the cost of installing renewable energy technologies.

Response: The contribution of EEDR programs and the generation of electricity from renewable resources are more fully addressed in FSEIS 1.4 and 2.4. Currently TVA is actively pursuing renewable generation capacity through our Green Power Switch and Generation Partners programs and has recently added 1,300 MWs of wind resources to its energy portfolio through several power purchase agreements. TVA currently provides incentives to customers through the Energy Right and Generation Partners programs.

TVA anticipates using a mix of resources, including EEDR programs, renewable resources, natural gas-fired generation, and nuclear generation to provide the additional future needs. Given the magnitude of the capacity and energy need, and

to avoid the risk of relying on only one fuel or technology, no single resource should be used to meet all of the future energy and capacity requirements. TVA has determined that adding a nuclear unit at the BLN site is the most cost effective alternative to meet a portion of these future needs.

48. TVA's current portfolio of nuclear and fossil fuel-fired electricity generation facilities presents real economic impacts in terms of public health in the region, particularly medical care costs and early death. TVA should adopt a carbon negative energy policy that invests in clean, renewable energy sources such as wind and solar, and that includes a comprehensive energy conservation and efficiency program. Such an energy policy will generate benefits to public health and the economy.

Response: TVA's current energy policy includes energy conservation and efficiency programs. Nuclear energy has a proven ability to safely generate large quantities of reliable, affordable base load power generation without greenhouse gas and other emissions. NRC regulations ensure that public health and safety are adequately protected from radiation exposure. Because low-carbon nuclear energy (life cycle) can produce more electricity than other clean sources, it can help to reduce our dependence on fossil fuels for base load generation and lead the way for other clean energy sources. FSEIS 1.4 shows that the base case and all alternatives reduce carbon emissions from present levels.

49. Energy storage technologies are becoming economically and practically viable as evidenced by information available from the US Department of Energy.

Response: Comment noted. TVA continues to evaluate energy storage technologies and how they can fit into its portfolio. Energy storage is primarily used to help manage peak demands by storing power generated off peak for use during times of peak demand or to mitigate the variability of renewable fuel supply such as wind and solar providing a more stable energy generation profile. FSEIS 2.4.2 discusses various energy storage alternatives.

50. TVA should make public any and all analysis that indicate the environmental impacts of solar and wind energy 'are equal to or greater than those of a nuclear plant.'

Response: FSEIS 2.4 has been revised to include a more robust discussion of the potential for renewable resources. Renewable energy sources such as wind and solar have significant land requirements to generate electricity comparable to that of a nuclear facility. Additionally, to provide generation profiles similar to a nuclear unit, they must be coupled with energy storage capacity which increases the land requirement to compensate for additional efficiency losses or with fossil-fueled generation which increases the impact on air quality. Biomass as a renewable fuel can be used to provide high capacity factor power provided adequate fuel supply exists; however, the air quality impacts are higher than a nuclear unit. Hydroelectric power has been concluded to be less environmentally preferable given its low capacity factors, environmental impacts, and the limited availability of feasible new sites in the TVA territory.

51. While the US might not need to build any coal or nuclear plants to meet the base load, as generation units age, the challenge will be to replace their capacity with the most forgiving electricity sources, which will be renewable energy sources.

Response: Renewable energy sources are one supply side option to meet TVA's energy needs. The need for power analysis in FSEIS 1.4 has been updated to include renewable resources and discusses their appropriate utilization for meeting power needs. Likewise, a discussion of renewable resources considered as an alternative to the nuclear plant is also included in FSEIS 2.4.

52. The region needs to move away from coal and adopt nuclear and non-polluting renewable resources. The region has too many coal burning units, which pose hazards. How many millions of tons of coal ash does TVA own?

Response: TVA continues to develop cost effective EEDR and renewable energy programs to help meet future load growth and provide the flexibility to retire older fossil generation. Nuclear energy has a proven ability to safely generate large quantities of reliable, affordable base load power generation without greenhouse or other gas emissions. TVA currently has 217 million tons of coal combustion products (CCP), including fly ash, bottom ash, slag, gypsum, char, and spent bed which is stored in ponds and landfills. TVA beneficially reuses 38 percent of its CCP.

53. The high temperatures used in incineration and gasification waste biomass, as well as the cooling process following burning, can produce toxic and acidic gases, metals, dioxins, and furans that are dangerous at extremely low levels. Some are persistent and bioaccumulative.

Response: Comment noted. Any fuel that TVA considers for combustion is thoroughly evaluated for environmental impacts including emissions. Any waste sources that are high in heavy metals, toxins, etc. are not accepted as fuel sources.

54. Biomass should not be considered a renewable energy, as waste is not a renewable resource.

Response: Comment noted. Broadly speaking there are two biomass energy feed stocks—biomass waste and biomass crops. The latter clearly is renewable because crops, such as switch grass, can be repeatedly grown and harvested to feed a biomass combustor. Biomass waste—such as wood wastes from industries using forest products—also is considered renewable because it is derived from a renewable resource initially. The sustainable availability of biomass waste is a factor that must be carefully considered when deciding to rely on biomass waste as an energy resource.

55. If increased generating capacity is necessary, TVA should build a natural gas generation plant at the site. Such a plant could be built more quickly with a lower installed cost and less technological risk, and would eliminate some of the waste generation and public and environmental health concerns of a nuclear generating facility.

Response: Natural gas generation was considered as an option to meet the purpose and need of TVA's current proposal in the FSEIS 2.4.2. Our need for

power analysis predicts a need for 7500 MW additional generation capacity from 2010 to 2019 (medium-load forecast). Due to the relatively high cost of natural gas as a fuel, natural gas plants were found to be most suitable for meeting intermediate and peaking needs. Additionally, the negative impact to air quality from gas-fired generation exceeds that of nuclear power. Nuclear energy has a proven ability to safely generate large quantities of reliable, affordable base load power generation. Nuclear waste is discussed in FSEIS 3.18. Constructing and operating natural gas generation at the BLN site was evaluated in detail in TVA's Final Environmental Statement, "Bellefonte Conversion Project" (TVA 1997).

56. A 800mgw natural gas combined cycle plant is a solution along with energy efficiency measures and updating hydroelectric generation and power distribution systems.

Response: FSEIS 2.4 discusses alternatives that do not require new generation, such as energy efficiency, and those that do, such as natural gas-fired technology and hydro power, as well as combinations. The discussion concludes these alternatives are less environmentally preferable to the nuclear facility.

57. It is unreasonable to expect all renewable technologies to produce full base load capacity. Solar peaking units should also be seriously considered.

Response: The load shape of our energy requirements dictates the type of resources that are considered as alternatives in the FSEIS, as well as how they are utilized to meet customer demand. Here the need is for base load generation, not peaking generation. Matching resources to the hourly demands requires a diverse portfolio of resource options.

FSEIS 2.4 shows that renewable energy sources such as wind and solar have significant land requirements to generate electricity comparable to that of a nuclear facility. Additionally, to provide generation profiles similar to a nuclear unit, they can be coupled with energy storage capacity which increases the land requirement to compensate for additional efficiency losses or with fossil-fueled generation which increases the impact on air quality.

58. The FSEIS should include an analysis of the significant direct solar conversion capability in the vicinity of the Bellefonte site.

Response: FSEIS 2.4.2 has been updated to further explain the feasibility of solar-powered generation in the TVA service area using direct normal insolation and diffuse horizontal radiation data provided by the National Renewable Energy Laboratory. Solar plants have significant land requirements to generate electricity comparable to that of a nuclear facility. Additionally, to provide generation profiles similar to a nuclear unit, they must be coupled with energy storage capacity which increases the land requirement to compensate for additional efficiency losses or with fossil-fueled generation which increases the impact on air quality.

59. New solar capacity can be closely tailored to rising demand due to short construction times.

Response: See the response to Comments 57 and 58. Despite shorter construction times, solar generation is not considered a suitable option for the base

load need identified in this FSEIS. FSEIS 2.4.2 has been updated to further explain the potential of renewable resources, including solar, in the TVA service area.

60. The Department of Energy projects that if solar energy capacity increase goals are achieved, it would put the U.S. industry on track to reduce the cost of electricity produced by PV from current levels to a price that is competitive in nationwide markets.

Response: TVA monitors the progress made in the development of various demand and supply side options to meet our future energy needs. As developmental goals are realized the new characteristics of the options are entered into our planning models for future decisions.

FSEIS 2.4.2 has been updated to further explain the feasibility of solar-powered generation in the TVA service area using direct normal insolation and diffuse horizontal radiation data provided by the National Renewable Energy Laboratory. PV solar generation is not considered a suitable option for the need identified in this FSEIS. In addition, as this comment suggests, solar energy currently is substantially more costly than other energy resource options

61. Wind energy produces three times the total U.S. electric power need annually. Wind power is becoming one of the lowest cost energy technologies with zero waste and should be among TVA's highest priorities.

Response: TVA is actively pursuing renewable generation capacity through our Green Power Switch and Generation Partners programs. In addition, TVA has recently acquired 1,300 MWs of wind energy through several power purchase agreements.

While an important part of our clean energy portfolio, the use of wind power to provide base load generation requires coupling with either fossil-fueled generation or energy storage. FSEIS 2.4.2 discusses this potential for wind power in the TVA region and concludes that it is less environmentally preferable to the proposed nuclear option, primarily due to the large land area requirement to provide a comparable source of base load generation.

62. Most thermoelectric power plants have an efficiency factor of about 33 percent (two thirds of the power released by the heat source is wasted and is released to the environment as hot water). To meet base load demand, thermoelectric plants build thermal capacity three times the desired electric power need. Similarly, base load power from wind turbines requires the construction of about three times to needed electric capacity to deliver reliable base load power.

Response: Some inefficiency is inherent in the process of thermoelectric generation. However, these thermoelectric plants provide electricity in a reliable manner.

Floodplain and Flood Risk

63. Of concern in terms of the site and the proposed facility is the possibility of flooding in the Guntersville Watershed.

> *Response:* Completion or construction and operation of a nuclear plant at this location would not increase the flood risk in the Guntersville Reservoir watershed because the plant would not impact upstream flood elevations. Nor would there be unacceptable flooding risks at the site itself. See FESIS 3.3.

64. The DSEIS indicates that all safety related structures are located above the PMF levels or have been flood-proofed. When additional site hydrological studies completed, analysis could result in a PMF higher than assumed in the design, which could require additional construction not already assumed in the DSEIS. Without a completed hydrology analysis, the Draft SEIS cannot address the potential impact of any additional construction.

> *Response:* FSEIS 3.3.1 has been updated based on the 2009 re-verification of the Probable Maximum Flood (PMF), the controlling PMF elevation at the BLN site. The PMF would be 625.7 feet msl with dam safety modifications that were made to Watts Bar and Nickajack dams. The maximum wind wave activity is estimated to be 1.3 feet high. Therefore, the PMF and coincident wind wave activity results in a flood elevation of 627.0 feet msl which is below the B&W plant flood design grade elevation of 629.1 and the AP1000 plant grade elevation of 628.6.

65. Possible issues with the location of safety systems in terms of the Probable Maximum Flood levels were not adequately addressed in the NEPA analysis.

> *Response:* FSEIS 3.3.2 has been updated to clarify that, under both Alternatives B and C all safety-related structures are either located above or flood-proofed to the Tennessee River PMF and coincident wind wave elevation of 627.0 feet msl, and above the probable maximum precipitation (PMP) site drainage elevation of 627.53 feet msl.

Need for Power

66. TVA has not demonstrated realistic future projections of electrical needs nor financial reductions of debt.

> *Response:* FSEIS 1.4 describes the methodology used to estimate our future energy needs. The methodology is comparable to that used by other large utilities. TVA's 2007 Strategic Plan calls for TVA to pay its financing obligations before the power generating assets supporting those obligations are fully depreciated. Also, any new debt will be supported by new assets. In following these principles, TVA ensures that it maintains a debt level that is supportable based on the size and scope of operations.

67. With the growth in the Tennessee Valley region and with electric vehicles on the horizon, TVA must invest in new base load supply. Otherwise, its base load fleet would be further strained and its peaking fleet would be operated more often, effectively increasing the cost of TVA power.

Response: Comment noted. If widespread use of electric vehicles becomes a reality, we anticipate that TVA's load shape will flatten somewhat, lessening the need for peaking resources and increasing the need for more base load resources.

68. The recession has reduced the consumption of electricity and many utility executives believe that this recession's recovery will not follow traditional patterns due to advances in energy efficiency.

Response: As stated in FSEIS 1.4.1, future growth is expected to be lower than historical averages, including the impact of the 2008-2009 recession.

69. TVA's projections for 2030 system energy and summer peak are inaccurate and cannot be used to determine the need for more generating capacity since they do not include the 1200MW peak reduction that TVA plans to deliver in 2012, the effects of the Time of Use pricing rate structure anticipated to occur in 2012, or the anticipated legislation that will put a price on carbon.

Response: The need for power analysis for Bellefonte is not based on 2030 projections for system energy and summer peak loads. FSEIS 1.4 discusses the methodology used to determine the need for power, which includes the load forecast, current system resources, and forecasted additions for all years of the forecast. FSEIS 1.4 has been updated to include a number of changes in planning assumptions that have been made as part of the normal business planning cycle, including adjustments to reserve requirements, forecasted hydro production, fuel and emissions allowance prices, an updated load forecast, power purchase agreements for wind energy, increased emissions control from coal plants, long term layups of coal capacity, and the addition of an EEDR program. The potential impacts of carbon legislation are included in the production cost model.

70. TVA needs to revise downward its projected need for additional capacity based on the EIA's updated projection (December 2009) of the growth in electricity.

Response: The need for power projection in the DSEIS matches that of the EIA'S updated projections of growth in electricity. In order to address the uncertainty of economic growth, TVA's forecast includes analysis of both higher and lower than expected economic growth. As stated in FSEIS 1.4.1, future growth is expected to be lower than historical averages including the impact of the 2008-2009 recession. An updated analysis of the need for power is provided in FSEIS 1.4.

Even though historically, net system requirements (NSR) grew at an average rate of 2.3 percent (1990-2008), in TVA's current forecast, NSR shows a reduction in demand through 2010, reflecting the weak economic conditions compounding over the last year. In TVA's forecast, the average annual growth rate recovers to 1.3 percent, which is higher than EIA's longer term projection (2012-2028) in the December 2009 forecast, but remains lower than the growth rate over the 18-year historical period. For comparison, the long-term net system requirements in the low

economic conditions case grow at an average annual rate of 0.3 percent (much lower than the 1.0 percent in EIA update); whereas, in the high economic conditions case, NSR forecast shows average annual growth of 2.0 percent, double that of the EIA update, but still lower than the 18-year historical period of the Tennessee Valley.

71. The hydro and steam plants are experiencing a lot of stress and it's straining the systems.

Response: TVA maintains and operates its coal fleet and hydro plant in a manner that optimizes generation. The success of meeting the January 2010 cold spell, which was a new peak for TVA, suggests the strengths of the TVA system. However, TVA is paying more attention to maintenance activities. The additional base load generation that a nuclear unit provides will ensure that TVA will be able to meet the increasing base load demand while maintaining system reliability.

72. It makes sense to use a site that has already experienced a great deal of development as a nuclear power plant, like Bellefonte, instead of developing another site to increase the electrical base load.

Response: Making use of the infrastructure at the Bellefonte site maximizes the use of existing assets, avoids larger capital outlays, and avoids the environmental impacts and extended project schedule of siting new power generating facilities elsewhere.

Nuclear Plant Safety and Security

73. There is no such thing as accident-free nuclear power; all reactors are susceptible to operator error or programming errors.

Response: Nuclear plant accidents are discussed in detail in FSEIS Section 3.19. Additionally, information pertaining to nuclear plant safety can be found at the following links:

<http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0164/r4/>

<http://www.nei.org/keyissues/safetyandsecurity/operationalsafety/>

<http://www.world-nuclear.org/info/inf06.html>

74. Nuclear power reactors release radioactive gases and liquids into the environment as a result of accidents, as well as normal operations.

Response: The FSEIS addresses both normal operations and accidents. See Sections 3.17, 3.19.1, and 3.19.2 regarding the radiological effects of normal operation, design-basis accidents, and severe accidents, respectively. All calculated doses are within the applicable NRC limits.

75. The incident at Browns Ferry nearly resulted in the loss of everything by everyone living downwind of the site.

Response: Safe operation of our nuclear plants is of utmost importance. The safety of nuclear plants is highly regulated by the NRC and TVA continues to comply with all applicable safety standards. Worker training and compliance with written procedures are used to prevent incidents such as the Browns Ferry event which happened in 1975, 35 years ago. See FSEIS 3.19 for analysis and further discussion of plant safety and security.

76. The uncertainties associated with new nuclear reactors continue to escalate, putting people and the environment at increasing risk.

Response: The new reactor licensing process is designed to reduce risk and uncertainty. The NRC safety and environmental reviews are extremely thorough and complete. The process ensures that the designs are substantially complete before the Design Certification and Combined Operating Licenses are issued, further reducing risk and uncertainty. The technology, design methods and analyses used in new reactor designs have reduced the uncertainty to levels that meet or exceed the published NRC safety goals.

A probabilistic risk assessment (PRA) has been submitted as a part of the AP1000 design certification application in accordance with 10 CFR Part 52. The PRA evaluation, provided in Chapter 19 of the AP1000 DCD, evaluates the AP1000 design, including plant, containment, and typical site analysis that consider both internal and external events. The AP1000 design process included a risk assessment of the design prior to being finalized to optimize the plant with respect to safety. The risk informed design process resulted in the selection of design alternatives which increased the overall level of safety and verified that the US NRC PRA safety goals have been satisfied.

The risks associated with operation of a new AP1000 plant at the Bellefonte site are addressed in Section 7.2 of the COLA ER (TVA 2008a). The reported early fatality risk resulting from a severe accident is zero and the latent (cancer) fatality risk is 1.83E-05 per reactor year. As discussed in Section 7.2, these risks meet the nuclear regulatory commission's safety goal policy statement. Therefore, the early and latent fatality risks from a severe accident at the BLN site are considered acceptable. The risks associated with operation of B&W and AP1000 reactors are addressed in FSEIS 3.19.

77. No fire-endurance tests have been conducted to qualify Hemyc as an NRC-approved one-hour or three-hour fire barrier for installation at nuclear power plants.

Response: TVA is aware of the issues with Hemyc. TVA construction will utilize an approved and qualified fire barrier design.

78. What will the impact be, if any, on the general aviation airport in Scottsboro given the proximity of the Bellefonte plant and towers to the approach and glide pattern?

Response: The Bellefonte Nuclear Plant should have no impact on the general aviation airport in Scottsboro. See response to Comment 79. In addition, the BLN Units 3 and 4 COLA, Section 3.5.1.6, analyzed the probability of an aircraft crash from the Scottsboro airport, including projected growth through 2060, and found "the aircraft hazards pose no undue risk to the health and safety of the public." Similarly, the BLN Units 1 and 2 FSAR evaluated the potential aircraft crash from the Scottsboro airport and found the results acceptable.

79. Will there be any security areas, off-limits areas, or any other restrictions that may impact local aviation?

Response: There will be no restrictions that would affect local aviation.

80. The nuclear option makes us more susceptible to danger from a variety of sources, including hazardous wastes and terrorism. Terrorism targeting the nuclear plant presents serious risks to our safety.

Response: TVA believes that the possibility of a terrorist attack affecting operation of one or more units at the BLN site is very remote and that postulating potential health and environmental impacts from a terrorist attack involves substantial speculation. Notwithstanding the very remote risk of a terrorist attack affecting operations, TVA increased the level of security readiness, improved physical security measures, and increased its security arrangements with local and federal law enforcement agencies at all of its nuclear generating facilities after the events of September 11, 2001. These additional security measures were taken in response to advisories issued by NRC.

Nuclear Reactor Design

81. Both of the proposed nuclear plant designs are problematic, untested in the U.S., and potentially costly and unsafe. An AP1000 reactor has never been constructed. In addition, the design of the AP1000 reactor is problematic and presents a financial (and potentially a safety) risk.

Response: The B&W design at Bellefonte is an enhancement of proven B&W plants that are successfully operating in this country. The B&W 205 reactor has improved operating margins and the Bellefonte plant design has incorporated many other safety and operational improvements. This design was built and operated well in Germany (the Muelheim-Kaerlich reactor) before it was shut down for reasons unrelated to its performance.

AP1000 units are currently under construction in China and are scheduled to be operational several years before any planned need at Bellefonte. Additionally, three US utilities are planning to begin construction on AP1000 units before TVA. These efforts will serve to confirm construction techniques and schedules, reduce cost and schedule risks, and provide valuable lessons learned before construction would begin at Bellefonte. The design of third (or later) generation reactors is specifically intended to provide safety enhancements and improved operability over the existing nuclear fleet which have demonstrated an impressive reliability and safety record.

Westinghouse, along with the AP1000 owners group, is working diligently to resolve the remaining NRC licensing issues and has proposed design changes to respond to the cited NRC concern. Recertification of the design is anticipated in 2011.

82. The Draft SEIS states that in 1988 when TVA abandoned plans to complete the reactors, Unit 1 was 90 percent complete and Unit 2 was 58 percent complete. However, due to new construction standards and other upgrades, the completion levels may translate into only 55 percent and 35 percent complete. This should be addressed in the FSEIS.

Response: FSEIS 2.2.2 and 2.2.3 have been revised to address the completion status of Unit 1 and Unit 2 and the activities required to complete a unit.

83. Existing assets should be utilized to maximize the use of existing disturbed lands and minimize new land disturbances.

Response: Use of existing assets to obtain new generation sources makes good business and environmental sense. As discussed in FSEIS 2.2 and 2.3, for either alternative TVA would utilize existing assets to maximize the use of existing disturbed lands and facilities, and to minimize new land disturbances.

84. So-called 'cookie cutter' reactors are not standard and require substantial site-specific design changes, adding to uncertainties about performance and reliability. Substantial site-specific design changes necessary during the construction of previous nuclear power plants have delayed construction and created uncertainty regarding performance and reliability.

Response: Substantial site-specific design changes have not been necessary for the AP1000 units. The AP1000 utilities and Westinghouse have worked closely together to achieve an extremely high degree of standardization in both plant design and operational programs. Further, design and engineering work will be substantially complete prior to construction minimizing the potential for design changes and schedule delays. This commitment to standardization will ensure that construction schedules and reliable performance have a high degree of certainty.

85. The building of new-design AP1000 reactors should not even be considered until the design problems, critiqued by the Nuclear Regulatory Commission, have been fully resolved.

Response: An AP1000 reactor can only be constructed after Westinghouse has received the approved design certification from the NRC.

Radiological Effects

86. Independent studies have shown increases in childhood leukemia near nuclear facilities in La Hague, France. TVA should study these findings.

Response: The Compagnie Générale des Matières Nucléaires (COGEMA) La Hague spent fuel reprocessing facility near Cherbourg, France is unlike any domestic nuclear facility because spent fuel is not currently reprocessed in the United States. The proposed BLN commercial nuclear power plant will not reprocess nuclear fuel, and there would not necessarily be any correlation between

the anticipated radiological impacts associated with the operation of the COGEMA facility and operation of an AP1000 or B&W reactor at BLN.

The NRC periodically investigates the cancer risks for populations that live near nuclear power facilities as part of its mission to protect the health and safety of the public. The NRC uses the results of these studies to provide assurance that current regulations provide adequate protection for the health and safety of the public. In fact, the NRC has recently asked the National Academy of Sciences to perform an updated study regarding these risks. If the NRC were to find that current regulations do not adequately protect the public, the regulations would be modified so as to do so. TVA is obligated to comply with all regulations applicable to each of its nuclear facilities. In addition to complying with applicable regulations, TVA keeps abreast of studies performed regarding the potential effects of nuclear facilities on the health and safety of the public through the Nuclear Energy Institute. There have been numerous studies performed in the United States, Canada, and Great Britain that found no correlation between nuclear power plants and cancers (see <http://www.nei.org/keyissues/safetyandsecurity/factsheets/safetystudiespublicworkerspage2/>).

87. Can TVA ensure that nuclear power is safe given the potential effects on the environment and the quality of life of current and future generations of residents as a result of the generation of waste products?

Response: The handling, transportation and storage of spent fuel and irradiated waste are highly regulated and are safely managed. The NRC has independently determined that these waste forms can be safely stored until they are eventually disposed of permanently. TVA's plans for storing spent fuel and radwaste that would be generated during the operation of the B&W and AP1000 reactor units are described in FSEIS 3.18.2.

88. Radioactive pollution from nuclear power plants is invisible and a threat to public health.

Response: The FSEIS addresses the radiological effects of normal operation, design-basis accidents, and severe accidents in FSEIS 3.17, 3.19.1, and 3.19.2 respectively. All calculated doses are within the applicable NRC limits. The average annual dose within 50 miles of a nuclear power plant due to normal radioactive effluents is much less than the average annual background radiation dose.

Radiological Waste (RadWaste)

89. Groundwater and surface waters in France are reported to have been impacted by leaks from on- and off-site storage facilities. These events should be studied by TVA.

Response: The radioactive waste leaks from French nuclear facilities came from waste processing plants and not from power plants. As indicated in FSEIS 3.2.1, groundwater quality at BLN has been monitored over the years to obtain background concentration data. During operation, TVA will continue to monitor groundwater and surface waters to ensure that water quality standards are maintained. The radiological environmental monitoring program (REMP) conducted for the BLN site will be designed based on the regulatory guidance from NRC Regulatory Guide 4.1 and NUREG 1301/1302.

90. TVA nuclear power plants do not have a facility licensed to accept Class B, C, or greater-than-C radioactive waste.

Response: Congress enacted the Low-Level Radioactive Waste Policy Amendments Act (LLRWPAA) of 1985 to ensure that disposal capacity would be available for all types of LLRW generated by Atomic Energy Act (AEA) licensees. Although no facility licensed for the off-site disposal of all classes of LLRW is currently available to TVA, off-site long term storage options are in the process of being developed.

A Bellefonte unit is not scheduled to load fuel and begin operation for several years and will not be generating Class B and C waste until after initial operation. By that time, it is expected that a Class B and C disposal facility or a means of processing such waste in a manner that allows disposal in an existing facility will be available. Shipping waste at the earliest practicable time minimizes the need for waste reprocessing caused by potential changes in a disposal facility's requirements, reduces occupational and nonoccupational exposures from handling and maximizes the amount of onsite storage space available for use.

Seismology

91. The Bellefonte site is located about one mile from the Sequatchie Fault Line, implying an increased probability that it may experience earth tremors or possibly earthquakes. The site is also over Karst terrain which is a geological term for unstable Limestone formations characterized by fractured and shifting rock, sink-holes, ravines, and underground streams. Putting a nuclear reactor at such an unstable site might ultimately result in core meltdown.

Response: FSEIS 3.15 addresses Seismology. In additon, geology, seismology, and geotechnical information is provided in the COLA FSAR Section 2.5.

There is no new information to suggest that the thrust faults (including the Sequatchie Valley Fault) within the Appalachian foreland thrust belt are capable tectonic structures as defined by NRC Regulatory Guide 1.208 (Appendix A). Seismicity in the region occurs primarily within basement rocks below the regional detachment and first motion analyses indicate predominantly strike-slip focal mechanisms (see discussion in Subsection 2.5.1.1.4.2.4 of the NRC regulatory guide). Evidence for post-Cenozoic faulting or geomorphic evidence for Quaternary deformation in the region is not reported in the published literature.

Investigations at the BLN site by TVA have not identified large-scale karst features (Reference 201). No natural sinkholes have been identified and no enterable caves have been located. Thick, pure limestones like the Tuscumbia, Monteagle, and Bangor Limestones that host large caverns elsewhere in Jackson County, do not occur at the site. Nevertheless, the underlying impure limestones of the Stones River Group are found to weather primarily by dissolution, and small-scale karst features are present. Karst features at the BLN site are of a somewhat different character and smaller scale than highly karstified areas of northern Alabama. Factors such as relief, hydraulic gradient, and purity of the limestone beds have combined to produce a more subtle karst terrain.

The relief and hydraulic gradient at the BLN site are not favorable for the development of large cavern systems. In lowland areas like the BLN site, where

limestone units have little relief, are relatively close to groundwater levels, and groundwater has relatively low hydraulic gradients, cave systems that can be entered and explored are not known. A map of the distribution of caves in Jackson County shows hundreds of caves in the adjacent highlands, but none within the Sequatchie Valley (Figure 2.5-303; Reference 413). Cave locations shown immediately east of the site are associated with the northeast-trending escarpment of Sand Mountain, approximately 1.5 miles east of the BLN site where the Mississippian Bangor and Monteagle Limestones crop out beneath the Permian sandstone cap. Thick beds of pure limestones are not present at the BLN site. The limestone underlying the Units 3 and 4 power block construction zone belongs to the Ordovician Stones River Group and consists of beds of relatively pure limestone 80 to 100 percent carbonate) alternating with beds of argillaceous and silty limestones (30 to 80 percent carbonate). See Subsection 2.5.4.1.2 for detailed lithology and mineralogy. The presence of the impure limestone beds may inhibit development of larger conduits and favor smaller ones

Most of the cavities encountered are small, 0.1 to 0.5 ft. in height, and clustered near the top-of-rock, 62 percent within 10 ft. and 84 percent within 20 ft. of top-of-rock. At the Units 1 and 2 power block location, explored in the 1970s, 32 percent of borings encountered cavities (Table 2.5-225). Most cavities occurred in the upper ten feet of rock, and were removed during excavation. Photographs of the excavation (Figures 2.5-307 and 2.5-308) show competent rock without significant cavities at excavation grade.

Socioeconomics

92. Alternatives B or C would generate positive direct, indirect, and induced economic impacts in the immediate area and in other states in which products or services are procured.

Response: Comment noted. FSEIS 3.13.2.2 includes discussion of the beneficial effects of the construction and operation workforce for both action alternatives.

93. The current energy policy in the Tennessee Valley--in particular a lack of focus on renewable energy generation and energy efficiency programs, and the resultant waste of energy--places the region at a disadvantage in the global competition for economic development.

Response: Comment noted. TVA is committed to increasing its renewable energy and energy efficiency programs.

94. Jackson County is in need of the jobs that would be created by completion or construction and operation of a single nuclear unit at the BLN site. Training programs are being planned to help supply a qualified workforce.

Response: In addition to direct employment at the site, there would be some positive secondary impact on employment due to increased demand for goods and services by workers and their families.

95. TVA could generate a greater number of jobs in the service area by instituting aggressive energy efficiency and renewable energy programs. These labor-intensive programs could result in the creation of a greater number of jobs than would be created by pursuing the development of capital-intensive nuclear power plants.

> *Response:* To meet future power needs, TVA will need a diverse power mix. TVA is committed to decreasing dependence on high carbon-emitting fossil fuel plants by increasing generation from renewable energy sources as well as focusing on energy efficiency and demand response. TVA welcomes the opportunity to help create "green jobs" by encouraging growth of these industries in the Valley. However, the need currently being addressed is for base load power, which is best met by generators which have relatively low operating costs and which are expected to be available and able to operate continuously throughout the day.

96. An analysis should be conducted to identify the potential positive and negative impacts on the city of Hollywood of each of the three Alternatives. The analysis should identify and evaluate the possible domestic and social impacts (including effects on economics and traffic) resulting from plant construction and operation. Such impacts may include economics, traffic, strains on the police and fire departments, and impacts to City infrastructure and its maintenance.

> *Response:* FSEIS 3.13 has been expanded to provide additional information about the potential for socioeconomic impacts to the surrounding community. Although no study specific to Hollywood has been conducted, TVA plans to work with the local governments and/or community representatives during the preconstruction and throughout the construction period to identify specific problems and concerns and to assist the community in alleviating problems. This could also involve identification of positive impacts.

97. The county is prepared for the influx of construction workers and has the infrastructure in place to facilitate construction activities.

> *Response:* Comment noted. As discussed elsewhere, TVA will work with the local communities to help manage issues that arise, such as traffic concerns.

Spent Fuel

98. There is no long-term storage available for the spent fuel that would be produced by the nuclear reactors. It is desirable that a high level waste repository be licensed before the need for an on-site spent fuel storage facility in 2036.

> *Response:* The U.S. Department of Energy (DOE) is responsible for the disposal of all high-level radioactive waste generated from TVA's nuclear reactors, as well as the transportation of radioactive materials to the disposal facility. TVA plans to provide dry cask storage of radioactive materials in an on-site independent spent fuel storage installation (ISFSI) at BLN, in addition to the storage capacity of the spent fuel pool for either a B&W reactor or an AP1000 reactor, until a licensed repository or interim offsite storage option becomes available (10 CFR 51.23). A discussion of spent fuel storage is contained in FSEIS 3.18.2.

Water Quality

99. There will likely be significant negative impacts to the Tennessee River basin.

Response: State and federal pollution control regulations require that all effluent discharges from the plant have an NPDES permit from the Alabama Department of Environmental Management. These permits specify effluent discharge limits and monitoring requirements to ensure the plant has no significant harm on the receiving water body. TVA will operate the plant to comply with these requirements. A modeling assessment of potential impacts to reservoir water quality indicates that the plant will have essentially no effect on overall reservoir temperatures, dissolved oxygen concentrations, or algae biomass (see FSEIS 3.1.2 and 3.1.3).

100. Nuclear power operations degrade the water bodies from which they draw enormous amounts of fresh water.

Response: The impact of nuclear power plant operation on the water body from which they draw water is regulated under the Clean Water Act, including hydrothermal, entrainment and impingement impacts. Potential water quality impacts to Guntersville Reservoir were examined using two models, one to evaluate 'near-field' impacts in the discharge mixing zone of the plant (CORMIX), and one to evaluate 'far-field' impacts throughout the entire Guntersville reservoir (CE-QUAL-W2). These evaluations are summarized in FSEIS 3.1.3. The CORMIX analyses showed that in the most extreme events, the plant will need to curtail operation to maintain the mixing zone temperature within current regulatory limits. TVA operating procedures will include a process to continuously monitor the plant discharge temperature and provide adequate notification to curtail the plant operation in such events. The CE-QUAL-W2 analyses included a two-dimensional representation of the entire Guntersville Reservoir. Two years were simulated with CE-QUAL-W2 to assess the range of potential range of reservoir-wide impacts: 1) 1999 a year representative of typical or near average (annual) river flow, and 2) 2007 the driest year in over 100 years of record in the Tennessee Valley. The results indicated only small to no changes in reservoir water quality. As to the entrainment and impingement impacts, the closed-cycle cooling system is considered the “best technology available” to minimize these adverse environmental impacts.

101. Special attention is needed to minimize the effects of higher water temperatures to the (Tennessee) river.

Response: Both Alternative B (B&W reactor) and Alternative C (AP1000 reactor) utilize a closed loop cooling system, which minimizes impacts of the plant thermal discharge on the receiving waters. TVA is required under the provisions of the Clean Water Act to ensure that the impact of the plant discharge to the Tennessee River does not exceed state standards for water temperature that are specified in the plant NPDES Permit. These standards are summarized in FSEIS 3.1.3.1. To document compliance with these standards, the plant will include real-time instrumentation to measure the temperature of the water exiting the plant into the river, and procedures to implement changes in plant operation should the water temperature begin to approach the level of the temperature standards.

102. Nuclear power plants release radioactive contaminants and hazardous chemicals into surrounding waters resources, contribute to thermal pollution, and impact aquatic life.

Response: See FSEIS 3.17.3 for radiation doses due to liquid effluents including doses to aquatic plants, invertebrates, and fish. All doses are within the applicable NRC limits.

See FSEIS 3.1.4 for identification and discussion of environmental effects of chemical additives required for plant operation. The BLN site NPDES permit establishes criteria to protect Guntersville reservoir water quality for its designated uses as a drinking water source, recreation, and industrial use such as cooling. For each discharge point, the NPDES permit establishes limits for the types and quantities of effluents, monitoring and reporting requirements, and required sampling locations. Therefore, the effects of chemical discharges would be minor. See FSEIS 3.1.3 for information and an analysis of the hydrothermal effects of plant operation. Construction and operation of either a B&W or AP1000 reactor unit would meet all effluent requirements.

103. Based on observations from other nuclear power plants in Tennessee and Alabama, TVA will do an outstanding job of monitoring discharge from a new power plant at the Bellefonte site.

Response: State and federal pollution control regulations require that all effluent discharges from the plant have an NPDES permit. These permits will specify effluent discharge limits and monitoring requirements. TVA will operate the plant to comply with these requirements. TVA may also conduct additional monitoring to assist in regulatory compliance, environmental protection, and efficient plant operation, especially during the initial startup of the plant.

Water Supply

104. Monitoring is necessary at downstream water intakes. Monitoring stations should be established upstream of each of the downstream water intakes; stations should be established on both sides of the river. These monitoring stations should be established in addition to those generally required of a nuclear power plant.

Response: Effluent limits and monitoring requirements for discharges from the plant are established by state and federal regulations. The quality of intake water that is withdrawn by water utilities is routinely monitored by the utility as a necessary step in treating the water. Should any of these monitoring activities indicate a potential water supply concern related to the operation of Bellefonte, additional targeted monitoring may be initiated to address the concern and protect the water supply.

105. Has an analysis been conducted to evaluate the feasibility and potential impacts of water withdrawals during a global warming-induced drought?

Response: The expected BLN withdrawal (makeup) is 35,000 gpm and 24,000 gpm respectively, for the B&W and the AP1000 alternatives. FSEIS 2.7.2 has been revised to clarify these data including the addition of FSEIS Table 2-5, which provides a comparison of plant water use. Also, DSEIS Tables 3-3 and 3-4 have been replaced with a new FSEIS Table 3-3. These withdrawals are approximately 0.2 percent and 0.1 percent, respectively, of the average flow at the BLN site and

approximately 2.5 percent and 1.8 percent, respectively, of the minimum expected drought flow (i.e., the minimum daily average flow of 3000 cfs from Chickamauga Dam). Potential water quality impacts to Guntersville Reservoir were examined using a two-dimensional reservoir model (i.e., CE-QUAL-W2). Two years were simulated to assess the range of potential impacts: 1) 1999 a year representative of typical or near average (annual) river flow, and 2) 2007 the driest year in over 100 years of record in the Tennessee Valley. The results indicated only small to no changes in reservoir water quality. Because plant withdrawals are small relative to average and minimum river flows (and the volume of reservoir water), and because the established minimum flows and reservoir volume are expected to be maintained even during a drought more severe than 2007, results of the modeling analysis are believed to cover reasonably foreseeable drought conditions. The discussion of global warming/climate change has been expanded. See FSEIS 3.16.

106. Has an analysis been conducted to evaluate the feasibility and potential impacts of plant water usage in light of increasing population in the region and increasing residential, commercial, and industrial water consumption?

Response: Projected 2030 water use in the area is shown in FSEIS Table 3-2, including a single BLN unit. TVA examined the potential impacts of these and other projected 2030 water supply withdrawals throughout the Tennessee Valley as part of its 2004 river operations assessment (TVA 2004). The analysis indicated that projected 2030 water supply withdrawals would be protected with the possible need for short-term mitigation measures at several locations during an extreme and prolonged drought.

107. Selection of either Alternative B or C would result in a Bellefonte plant that uses more water than conventional or renewable energy sources and more than is consumed by energy efficiency measures. The plant would be the largest water consumer in the area, and would compete with other important water users in the region. Despite this, water supply issues are not considered significant in the DSEIS.

Response: Typically, nuclear generation requires more water than solar or wind generation, but less water than bio-fuels. Solar and wind generation have other economic and environmental disadvantages. FSEIS 3.1.2 addresses surface water use and trends. FESIS Table 3-2 lists all of the surface water withdrawals in the Guntersville watershed for the years 2005 and 2030. The table shows that a single nuclear reactor at Bellefonte would be the second largest water user in 2030, with the largest being TVA's Widows Creek Fossil Plant which withdraws 1,476 MGD. However, because Bellefonte water withdrawals are small relative to the average and minimum river flows (and the volume of reservoir water), and because the established minimum flows and reservoir volume are expected to be maintained even during severe drought conditions, potential adverse impacts to Guntersville Reservoir and regional water supplies are expected to be insignificant. For example, the expected BLN withdrawal is about 35,000 gpm (with 23,000 gpm being returned to the river) and 24,000 gpm (with 8,000 gpm being returned to the river), respectively, for the B&W and the AP1000 alternatives. These expected BLN withdrawals are approximately 0.2 percent and 0.1 percent, respectively, of the average flow through Guntersville Reservoir and approximately 2.5 percent and 1.8 percent, respectively, of the minimum expected drought flow (i.e., the minimum daily average flow of 3000 cfs from Chickamauga Dam). FSEIS 2.7.2 has been revised to

clarify these data including the addition of Table 2-6, which provides a comparison of plant water use. Also, DSEIS Tables 3-3 and 3-4 have been replaced with a new FSEIS Table 3-3.

108. The DSEIS does not address the cumulative impacts presented by the possibility of having eight nuclear reactors operating in the Tennessee River basin along with other facilities.

Response: Currently there are six nuclear units operating in the Tennessee River Basin. Proposed additional units include one unit at Bellefonte and one additional unit at Watts Bar. Both of these units would have closed cycle cooling systems that involve small hydrothermal discharges relative to the adjacent river flow and reservoir volumes. As explained in the FSEIS 3.1.3.1, the hydrothermal analysis encompasses worst-case conditions based on potential ranges for river flow, river temperature, meteorology, and plant operations, using more than 30 years of historical data. The range of river flow was based on historical hydrology and the expected future operating policy of the TVA river system. As indicated in the FSEIS 3.1.3.2, Environmental Consequences, the CE-QUAL-W2 model assessed potential cumulative effects on Guntersville Reservoir and concluded that far-field effects would not be significant. Given these findings and with design and operation in compliance with regulatory requirements, single nuclear unit operations at Bellefonte are not expected to have adverse cumulative impacts on surface waters.

109. The FSEIS should present data on the volume of water consumed and evaporated at each of TVA's currently operating nuclear reactors and coal fired power plants.

Response: Total water withdrawal from TVA nuclear and coal-fired power plants in 2005 was approximately 15,539 MGD. Return flow totaled approximately 15,463 MGD resulting in a consumptive use of 76 MGD. In contrast, the average annual flow in the Tennessee River out of Chickamauga Dam is about 20,680 MGD. Information on individual plants in the Tennessee Valley can be found in the following FSEIS reference.

Bohac, C. E. and M.J. McCall. 2008. *Water Use in the Tennessee Valley for 2005 and Projected Use in 2030*. Retrieved from <http://www.tva.gov/river/watersupply/watersupply_report_to_2030.pdf>

Wetlands

110. TVA should avoid impacts to the wetlands located at the AP1000 site.

Response: This wetland complex would be impacted (filled) if the AP 1000 alternative is selected. FSEIS 3.4.2 documents this impact. TVA took this environmental impact into consideration in selecting the B&W reactor as its preferred alternative. Should TVA decide to build the AP1000 reactor, the loss of wetland functions would be compensated for via wetland mitigation (purchase of wetland credits from a wetland mitigation bank within the watershed).

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