CHAPTER 1

INTRODUCTION TO THE ENVIRONMENTAL REPORT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION TO THE ENVIRONMENTAL REPORT

1.0 INTRODUCTION TO THE ENVIRONMENTAL REPORT

The National Environmental Policy Act (NEPA) requires any federal agency taking a “major federal action” to prepare an environmental impact statement (EIS) for the action. The proposed action is the U.S Nuclear Regulatory Commission (NRC) issuance of a combined license (COL) to the Tennessee Valley Authority (Applicant), for the Bellefonte Nuclear Plant, Units 3 and 4 (BLN), in Jackson County, Alabama. NRC must consider the potential environmental impacts associated with the construction and operation of the BLN and its associated support facilities, which does not include the construction of new transmission lines, or activities related to removal of existing buildings and buried material from the site, including any repair and remediation activity. Two partially-completed pressurized water reactors are currently situated on the site. The Applicant is the owner and operator of the facility and associated transmission corridors.

In accordance with the provisions of Title 10 of the Code of Federal Regulations (CFR) Part 52, the Applicant is submitting to the NRC an application for a combined license for the BLN. The regulations in 10 CFR 52.79(a)(2) requires a complete environmental report (ER), as required by 10 CFR 51.45 and 51.50. This ER is submitted to aid the NRC in fulfilling their obligations under NEPA. The general format and contents of this ER are based on Regulatory Guide 4.2 and the environmental standard review plans set forth in NUREG-1555.

This ER is organized into the following chapters:

- Chapter 1, Introduction to the Environmental Report
- Chapter 2, Environmental Description
- Chapter 3, Plant Description
- Chapter 4, Environmental Impacts of Construction
- Chapter 5, Environmental Impacts of Station Operation
- Chapter 6, Environmental Measurements and Monitoring Programs
- Chapter 7, Environmental Impacts of Postulated Accidents Involving Radioactive Materials
- Chapter 8, Need for Power
- Chapter 9, Alternatives to the Proposed Action
- Chapter 10, Environmental Consequences of the Proposed Action

The proposed project is expected to be constructed on the BLN site owned by the Tennessee Valley Authority (TVA). The Applicant is the owner and operator of the facility and the associated transmission corridors. The TVA was established by an Act of Congress in 1933 as a federal corporation to develop the natural resources of the Tennessee Valley region and to improve the lives of the region's population. Today, TVA is one of the largest producers of electricity in the United States and operates the largest public power system in the country. TVA supplies about 4 to 5 percent of the electricity in the nation, serving more than eight million people in a seven-state region encompassing some 80,000 sq. mi.

This ER describes the existing environment of the BLN site and vicinity, describes the proposed AP1000 nuclear power reactors, summarizes potential environmental impacts of construction and operation of the proposed facility, and considers appropriate mitigation measures. It includes discussions of alternative sites and alternative technologies for the production of electrical power. The ER also includes an evaluation of the benefits and costs associated with construction and operation of the specified reactor.

1.1 THE PROPOSED PROJECT

This application incorporates the Design Control Document (DCD) (Reference 1) for a simplified passive advanced light water reactor plant provided by Westinghouse Electric Corporation, the entity originally sponsoring and obtaining the AP1000 design certification documented in 10 CFR Part 52, Appendix D. Throughout this application, the "referenced DCD" is the AP1000 DCD submitted by Westinghouse as Revision 16, including any supplemental material as identified in Reference 2.

The Applicant identified a need for additional generation capacity in the 2010 – 2020 time frame. The Applicant is submitting this combined license application to preserve the option of nuclear generation to meet this need. The need for power is further discussed in Chapter 8 of this ER.

The ER provides a description of the existing environment on the BLN site and in the surrounding area, as well as a detailed description of the proposed action to construct and operate the power plant, its on-site support facilities, and the existing transmission system. This is followed by an assessment of the environmental impacts that may occur as a result of construction and operation. It also contains an evaluation of impacts from postulated accidents involving radioactive materials. In addition, the ER addresses environmental measurement and monitoring programs, issues such as the need for power from the proposed plant, alternatives to the proposed action, irreversible and irretrievable commitments of resources, the relationship between short-term uses and long-term productivity of the human environment, and a benefit-cost evaluation.

Site identification for the plant is complete. Criteria such as seismic characteristics, demographics, emergency planning, exclusion area, transmission access, and water availability were used in the site-identification analysis. The BLN site meets the desired characteristics necessary to support the construction and operation of a new nuclear power plant. This ER provides an analysis of alternative sites to the BLN site.

The BLN site is located near the cities of Hollywood and Scottsboro in Jackson County in northeast Alabama (Figures 1.1-1, 1.1-2, and 1.1-4). The site is situated on 1600 ac. on a peninsula at Tennessee River mile 392, on the western shore of Guntersville Reservoir, located 7 mi. northeast of Scottsboro, Alabama.

The three largest population centers (defined as having more than 25,000 residents) in the region are Huntsville, Alabama; Chattanooga, Tennessee; and Gadsden, Alabama. The BLN site is located 38 mi. east of downtown Huntsville, Alabama; 44 mi. southwest of downtown Chattanooga, Tennessee; and 48 mi. north of downtown Gadsden, Alabama. Scottsboro is the largest city within a 10-mi. radius of the site.

Guntersville Reservoir is the nearest major body of surface water to the BLN site. This reservoir is an impoundment of the Tennessee River. The site is located adjacent to the reservoir, which surrounds the site to the north, east, and west. Guntersville Reservoir is operated by the TVA as part of its mandate to manage the Tennessee River as an integrated water control system primarily for the purposes of navigation, flood control, and power production, and consistent with those purposes, to improve water quality and water supply, provide recreational opportunities, and a wide range of other public benefits.

Site elevations range from a low of 594 ft. msl along the shores of Guntersville Reservoir southwest of the barge loading dock to a high of 830 ft. msl directly west of the existing cooling towers. Universal Transverse Mercator grid coordinates (NAD 83) for the proposed reactor location at Unit 3 of the new nuclear power plant are 598,376.4 m east and 3,841,786.7 m north. The reactor coordinates at Unit 4 are 598,567.6 m east and 3,841,635.5 m north. At the center of the BLN site (the midline between the two proposed reactors), the coordinates are 598,472 m east and 3,841,711.1 m north.

The Applicant was issued a construction permit for Bellefonte Units 1 and 2 by the Atomic Energy Commission (now the NRC) in December 1974. By 1988, Unit 1 was 90 percent complete, and Unit 2 was 57 percent complete. On July 29, 1988, the TVA notified the NRC that completion of construction of Bellefonte Units 1 and 2 was being deferred. A lower-than-expected load forecast was the reason for deferral. At the TVA's request, the construction permit was terminated by the NRC in September 2006. TVA is now taking preliminary steps to consider whether Bellefonte Units 1 and 2 should again be regarded as a potential baseload generating option, due in large part to the change in power generation economics since 2005. In August 2008, TVA submitted a letter to NRC requesting reinstatement of the construction permit for Bellefonte Units 1 and 2. Having the permit in place once again would allow TVA to establish, with a relative degree of certainty, the regulatory framework and licensing basis that would be used in considering the viability of completing the units. Detailed descriptions of the existing site, buildings, structures, systems, and operations are provided in the licensing documents for the plant.

The two AP1000 units would be constructed on-site in an area previously disturbed, with a portion extending into an undeveloped wooded area (Figure 1.1-3). The primary land uses in the surrounding area are forestry and agriculture, with some urban-industrial development. The site is already zoned as industrial. Guntersville Reservoir on the Tennessee River is used as the source of makeup water for the BLN. About 400 ac. of the BLN site have been developed with buildings and facilities, roads, parking lots or other uses related to the nuclear option. The remaining approximately 1200 ac. are in various stages of grassland or forest combination, with perhaps 200 – 300 ac. that are considered forest.

The BLN project utilizes the Westinghouse AP1000 design, and two reactors are planned for the BLN. Each reactor has an estimated reactor thermal power level of 3400 MWt and a net electrical output of at least 1000 MWe. Waste heat is dissipated by natural draft cooling towers. Makeup water for the cooling towers is planned to be withdrawn from Guntersville Reservoir through the intake structure. Cooling tower blowdown is expected to be discharged to the Guntersville Reservoir, downstream of the intake structure. These facilities and the other facilities are described in more detail in Chapter 3.

No new transmission lines are needed for this project. Figure 1.1-5 illustrates the existing 500-kV and 161-kV transmission lines in and out of the BLN site. For the sake of completion, the map also shows the 46-kV tapline to the BLN construction substation off the Scottsboro – Stevenson 46-kV transmission line. This 46-kV substation is scheduled to be taken out of service by 2008. Construction power for BLN Units 3 and 4 would be provided from the existing on-site 161-kV switchyard. The 46-kV tapline to the BLN construction substation is on a corridor approximately 50 ft. wide. The transmission lines and associated corridors are described in more detail in Chapter 3.

The de-energized loop into the BLN off the Widows Creek – East Point 500-kV transmission line is situated on a corridor approximately 300 ft. wide. The de-energized loop into BLN off the Widows Creek – Madison 500-kV transmission line is also situated on a corridor 300 ft. wide, but only up to the point where this line crosses over the Widows Creek – Scottsboro 161-kV transmission line, which is also looped into BLN as an under-built on the 500-kV loop. From this intersection, the 500-kV and the 161-kV loop are situated on a corridor approximately 350 ft. wide.

The anticipated schedule for construction and operation of the BLN are summarized in Table 1.1-1. Estimates of the acreage affected by construction and operation are presented in Table 1.1-2.

1.1.1 REFERENCES

1. Westinghouse Electric Company, LLC, 2007, AP1000 Design Control Document, APP-GW-GL-700, Revision 16.

2. Westinghouse Electric Company, LLC, October 2007, AP1000 Design Control Document Impacts to Support Combined Operating License Application Standardization, APP-GW-GLR-134.

TABLE 1.1-1
ANTICIPATED SCHEDULE FOR CONSTRUCTION AND OPERATION OF TWO AP1000 UNITS AT THE BLN SITE

Activity	Start[a][b]	Finish[a][b]	Duration
UNIT 3			
Early Procurement Activities	3rd Q 2009	--	--
Site Preparation	3rd Q 2011	3rd Q 2013	24 Months
Commence Construction (Safety-related activities)	3rd Q 2013	--	--
Fuel Load, Commence Start-Up	3rd Q 2017	--	6 Months
UNIT 4			
Early Procurement Activities	3rd Q 2010	--	--
Site Preparation	3rd Q 2012	3rd Q 2014	24 Months
Commence Construction (Safety-related activities)	3rd Q 2014	--	--
Fuel Load, Commence Start-Up	3rd Q 2018	--	6 Months

a) Quarters shown are for government fiscal year.

b) Activities that do not indicate a start or finish date are milestones, and represent the anticipated commencement (start) or completion (finish) of the activity.

TABLE 1.1-2
ACREAGE AFFECTED BY VARIOUS FACILITIES ASSOCIATED WITH THE PROPOSED PLANT

Construction Areas	Area Affected (to the nearest acre) (ac.)
Power Production	5
PSO Training Center	4
Parking	22
Switchyard	15
Administrative Building	3
Other Operational Support	14
Additional Construction Support	130
Total for Construction and Operation	193 (approximately 200)
Total for Site	1,600

1.2 STATUS OF REVIEWS, APPROVALS, AND CONSULTATIONS

Construction and operation of BLN requires compliance with a number of environmental regulations, obtaining a number of associated permits, and performing consultations with governmental agencies. A search for applicable regulations, permits, and consultations required by federal, state, regional, local, and potentially affected Native American tribal agencies was conducted, and the results are presented in Table 1.2-1.

The status of specific environmental permits currently active at the BLN is provided below. The existing permit conditions have been reviewed and assessed for validity under anticipated operations for the BLN, and require modification or application for a new permit upon receipt of the COL and a final decision to construct the BLN.

The U.S. Department of Energy's (DOE) Standard Contract for disposal of spent nuclear fuel contained in 10 CFR Part 961 is being modified by the DOE. The Nuclear Energy Institute (NEI) is actively engaged with the DOE in revising the language in the Standard Contract. It is expected that this revision will be completed and the Standard Contract will be entered into by the end of 2008.

Air - Minor Source Status granted June 24, 1996, by the Alabama Department of Environmental Management (ADEM). There is no expiration date for a minor source permit.

Toxics - There are no polychlorinated biphenyl (PCB) transformers on-site; however, there are other PCB-containing items/equipment/articles on-site but not in service. PCB information is reported annually in the PCB Annual Document Log.

Wastes (Environmental Protection Agency Identification Number AL5640090002):

Hazardous - Small Quantity Generator

Solid - Wastes are disposed of off-site at permitted landfills.

Wastewater (National Pollutant Discharge Elimination System [NPDES] Permit Number AL0024635) - Construction and permanent sewage are routed to the Scottsboro Wastewater Treatment Facility. The current NPDES permit expires on November 30, 2009.

Water - Drinking water is purchased from the Scottsboro Municipal Water System, a community public water system regulated by the state.

Solid wastes are disposed of off-site at permitted landfills.

TABLE 1.2-1 (Sheet 1 of 5)
FEDERAL, STATE, AND LOCAL ENVIRONMENTAL AUTHORIZATIONS

Statute/Agency	Authority	Phase/Requirement/ Status	Activity Covered
U.S. Nuclear Regulatory Commission (NRC)	10 CFR 52.79	COL Submittal. Environmental report.	Preparation of a combined license application for construction and operation of a commercial nuclear power plant.
Endangered Species Act (ESA) U.S. Fish and Wildlife Service	16 U.S.C. §§1531 *et seq*.	COL Submittal. Consultation. Negative declaration from USFWS.	Consultation of potential impacts to federal threatened and endangered species.
U.S. Department of the Interior	42 U.S.C. §1996 25 U.S.C. §3001	COL Submittal. Consultation with Native American tribes.	Identification and evaluation of historic properties, and any cultural sites of significance to Native American tribes.
National Historic Preservation Act of 1966 Alabama Historical Commission; State Historic Preservation Officer	16 U.S.C. §§470 *et seq*	COL Submittal. Consultation. Negative declaration from SHPO.	Review and analysis of cultural and historic resources. TVA plans to initiate formal NHPA Section 106 consultation as part of its EIS process.
Federal Aviation Administration (FAA)	Federal Aviation Act, 14 CFR Part 77	Pre-Construction. Form filed and approval received prior to construction of existing cooling towers.	Preconstruction letter of notification to FAA results in a written response certifying that no hazards exist or recommending project modification.

TABLE 1.2-1 (Sheet 2 of 5)
FEDERAL, STATE, AND LOCAL ENVIRONMENTAL AUTHORIZATIONS

Statute/Agency	Authority	Phase/Requirement/ Status	Activity Covered
U.S. Coast Guard	14 U.S.C. 81, 83, 85, 633/ 49 U.S.C. 1655(b).	Pre-Construction. Authorization not required as no activities affect navigation.	Navigation markers authorization to protect river navigation from hazards connected with temporary construction activities in a river.
U.S. Army Corps of Engineers (USACE)	33 U.S.C. §1344; 33 U.S.C. §§401 *et seq.*	Pre-Construction. Permit not required - no placement of structures affecting navigation.	Placing structures or working in or affecting waters. Aquatic resource alteration (wetland filling, stream alteration). TVA has its own Section 26a review requirements that are generally combined with USACE Section 10 and Section 404 permit process to consider construction (in, across, and along the Tennessee River and its tributaries) that can potentially affect navigation, flood control, or public lands.
USACE	33 U.S.C. §1251 *et seq*. 33 U.S.C. §1344; 33 U.S.C. §§401 *et seq.*	Pre-Construction. Permit Section 404 for impacts to wetlands.	Jurisdictional wetlands significantly altered require a CWA Section 404 permit from USACE. A State Section 401 certification that the action does not violate state water quality standards must be obtained prior to application for a USACE Section 404 permit.
Clean Air Act (CAA) Alabama Department of Environmental Management (ADEM)	(40 CFR Part 50-99) Title 22 Alabama Code Chapter 28	Permits required for diesel generators.	Construction Permit application addresses the air toxics program. Operating Permit includes the Title V permit for emissions and air quality monitoring, Title III, hazardous air pollutants, and Title IV, acid rain.

TABLE 1.2-1 (Sheet 3 of 5)
FEDERAL, STATE, AND LOCAL ENVIRONMENTAL AUTHORIZATIONS

Statute/Agency	Authority	Phase/Requirement/ Status	Activity Covered
Clean Water Act (CWA) Alabama Water Pollution Control Act ADEM	33 U.S.C. §1251 *et seq*. Title 22 Alabama Code Chapter 22	Pre-Construction. Construction. Operation. Permits held by TVA. NPDES Permit AL0024635 EXP: 30NOV09 Stormwater Permit AL0024635 EXP: 30NOV09	Discharge of wastewater to surface waters and in-stream monitoring. Existing permit issued for operation of existing facilities at BLN for discharge points, and limits and conditions of operations for those points, and those associated with the operation of a nuclear plant. Stormwater to surface water discharges associated with land disturbance and industrial activity.
ADEM	Administrative Code Chapter 335-6-12	Pre-Construction. Notice of Registration (NOR).	Stormwater runoff control for construction sites disturbing more than 1 ac.
Resource Conservation and Recovery Act Alabama Hazardous Waste Management and Minimization Act ADEM	42 U.S.C. §§6901 *et seq*. 22 Alabama Code Chapter 30	Pre-Construction. Permit not required - no on-site disposal facility	Permit for construction of a disposal facility.

TABLE 1.2-1 (Sheet 4 of 5)
FEDERAL, STATE, AND LOCAL ENVIRONMENTAL AUTHORIZATIONS

Statute/Agency	Authority	Phase/Requirement/ Status	Activity Covered
Resource Conservation and Recovery Act Alabama Hazardous Waste Management and Minimization Act ADEM	42 U.S.C. §§6901 *et seq*. 22 Alabama Code Chapter 30	Operation. Permit not required - municipal services used.	Permit for disposal of non-hazardous waste.
Resource Conservation and Recovery Act Alabama Hazardous Waste Management and Minimization Act ADEM	42 U.S.C. §§6901 *et seq*. 22 Alabama Code Chapter 30	Operation. Permit held by TVA. AL5640090002	Transport, treatment, storage, and disposal of hazardous waste.
ADEM	ADEM Admin. Code R. 335-6	Operation. Permit not required. No USTs as defined by ADEM.	Installation/operation of underground storage tanks that store regulated substances.
Alabama Game and Fish Commission	Title 9 Alabama Code Chapter 11	COL Submittal. Consultation. Complete.	Reviews of State Heritage information for T&E species.

TABLE 1.2-1 (Sheet 5 of 5)
FEDERAL, STATE, AND LOCAL ENVIRONMENTAL AUTHORIZATIONS

Statute/Agency	Authority	Phase/Requirement/ Status	Activity Covered
Alabama Public Service Commission		Operation. Certificate of public convenience and necessity	Certification is not required.
Executive Order 11514 (Protection of Enhancement of Environmental Quality)	40 CFR Part 1500-1508	COL Submittal. Completed as part of ER preparation.	Protect and enhance the quality of the environment; develop procedures to ensure the fullest practicable provision of timely public information and understanding of Federal Plans and programs that may have potential environmental impacts that the views of interested parties can be obtained.
Executive Order 11988 (Floodplain Management)	10 CFR Part 1022 18 CFR Part 725	COL Submittal. Completed as part of ER preparation.	Floodplain impacts to be avoided to the extent practicable.
Executive Order 11990 (Protection of Wetlands)	10 CFR Part 1022 18 CFR Part 725	COL Submittal. Completed as part of ER preparation.	Requires federal agencies to avoid any short- and long-term adverse impacts on wetlands wherever there is a practicable alternative.