

**DEBRIS  
REVISED STUDY PLAN**

**Claytor Hydroelectric Project  
Application for New License  
FERC Project No. 739-018**

**October 2006**

# REVISED DEBRIS STUDY PLAN

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## 1.0 Introduction

Appalachian Power Company (Appalachian) is making an application to the Federal Regulatory Commission (FERC or Commission) for a new license for the Claytor Hydroelectric Project (No. 739), located on the New River in southwestern Virginia. The existing Project license was issued to Appalachian by the FERC on July 1, 1981, and expires June 30, 2011. The process being utilized to apply for a new license is the Integrated Licensing Process (ILP), as defined under rules and regulations of the Commission (18 CFR Part 5). As part of this licensing process, Appalachian has solicited input from stakeholder meetings, including governmental agencies and non-governmental organizations, to identify potential project-related issues needing to be addressed during the licensing process.

As part of this licensing process, Appalachian filed the Pre-Application Document (PAD) with the FERC on January 6, 2006. In that document, Appalachian presented available information addressing each identified relicensing issue, and also presented its position regarding issues needing further study. Study plans have been prepared to address each issue needing further study. Initial study plan meetings were held with the stakeholders on July 19 and 20, 2006. The following study plan addresses the issue of debris at the Claytor Hydroelectric Project (Project). This version of the study plan incorporates decisions and recommendations made by the study workgroup during the meeting held on August 10, 2006 and comments filed with the Commission.

## 2.0 Background

The Claytor Project is an existing conventional hydroelectric project located on the New River in Pulaski County. The Claytor Project has four generating units, with a combined hydraulic capacity of 10,000 cfs and generating capacity of 75 MW. A location map is provided in Figure 2.1.

The Claytor Dam has an overall length of 1,142 feet and a maximum height of 137 feet above the streambed. The dam consists of concrete gravity dam with gated spillway; integral intake; and powerhouse, switching equipment, and appurtenant facilities. The reservoir behind the dam has an approximate length of 21.5 miles, a surface area of 4,472 acres, and shoreline distance of 100 miles at the normal full pond elevation of 1,846.0 feet. The reservoir storage capacity is estimated to be 225,000 acre-feet. The maximum and mean depths of the reservoir are approximately 115 and 49 feet, respectively.

The upstream Project boundary generally follows the reservoir at the 1,850 foot NGVD contour. The downstream Project boundary extends along the riverbanks approximately 2,000 feet below the dam. Effects of flows from project operations can be seen at the USGS river gage located at Glen Lyn, Virginia.

The Claytor Project powerhouse and intake are located on the right bank of the river and have 4–16 foot diameter penstocks conveying water to the four turbine-generator units.

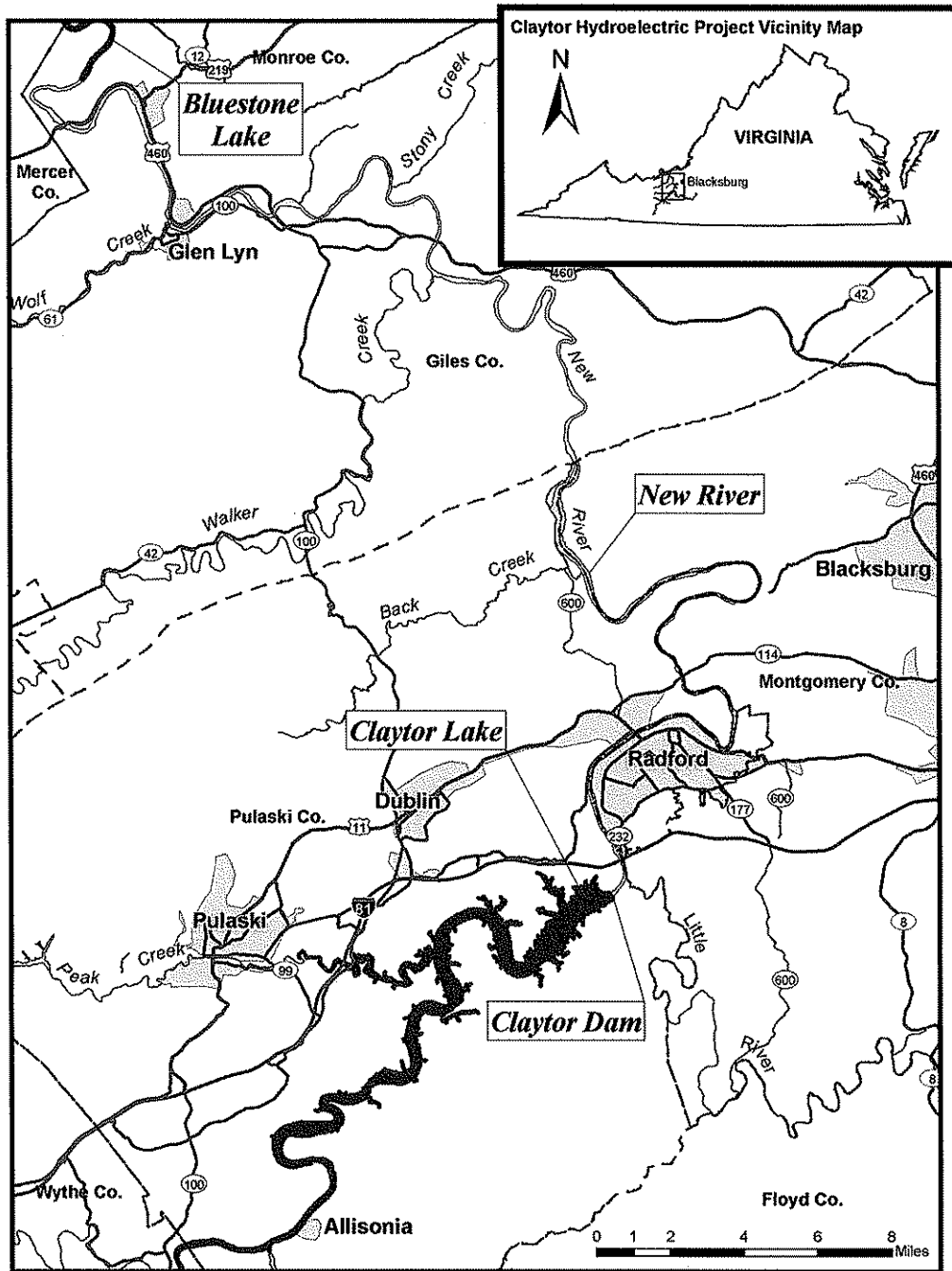


Figure 2.1 Claytor Hydroelectric Project Location, VIRGINIA

The intake section is 176 feet wide with the invert located approximately 61 feet below the reservoir surface. Each hydro unit has two intake bays per penstock, with each bay measuring approximately 38 feet tall and 14 feet wide. The intake screens are vertically aligned.

The Claytor Project is operated on a weekly cycle as a peaking facility from October 16 – April 14. Historical hydro unit outflow releases are normally in the range of 750–8,000 cfs. Daily reservoir fluctuations are typically less than 1 foot, with overall weekly fluctuations of 1-2 feet. During April 15 to June 15, the Project is operated to maintain reservoir elevations at or above 1844 feet to protect spawning habitat for shallow-water spawning fish. Also during recreation season (April 15 – October 15), Appalachian voluntarily operates the project to maintain more constant downstream flows to enhance downstream recreation opportunities by limiting peaking operation. The reservoir is drawn down 5 feet in the late fall or early winter to facilitate lake residence maintenance and/or repairs to docks, bulkheads, and boat ramps. The Claytor Project is operated to provide a minimum average daily flow of 750 cfs.

Debris enters Claytor Lake through a number of sources and can include both natural and fabricated materials. Natural debris consists of organic matter that is biodegradable. This “woody” debris (e.g., treetops) can serve as an important source of aquatic habitat and cover for fish and macroinvertebrates. Typically, woody debris can be produced by natural processes such as storm-throw and by adjacent land clearing (e.g., logs and branches). Sources of woody debris can include feeder tributaries to the reservoir and the riparian zone within the Project boundary. Fabricated or non-biodegradable materials entering the Project do not readily decompose and can include Styrofoam, bottles and cans, trash, rubber tires, and sports balls.

The amount and type of debris that accumulates within Claytor Lake can vary according to the magnitude of the flow event. In general, the higher the magnitude and duration of the flow event, the higher the amount of accumulated debris. This accumulated debris includes material floating on the lake surface and/or found rafted in adjacent wetlands and riparian areas. The affects of accumulated debris can include the degradation of visual and aesthetic quality of the shoreline and lake surface; effects to Project operations; impairment of navigability, recreation, and safety; and breeding grounds for pests such as mosquitoes.

Currently, Appalachian has no active debris removal program on Claytor Lake. However, the non-profit organization Friends of Claytor Lake currently has a volunteer debris removal program in which Appalachian donates certain removal equipment (e.g., conveyor), funds and the use of property in support of the effort.

### **3.0 Study Objectives**

To assess the effects of the Claytor Project operations on debris accumulation, the primary objectives that will be undertaken are as follows:

1. Determine amount and type of debris that accumulates on the surface of Claytor reservoir.
2. Debris will be characterized to the most practical level (i.e. woody versus man-made/trash, cut trees versus root-wads intact, relatively new versus historic, etc.) and an attempt to determine where the debris entered the lake (i.e. from the New River upstream of Claytor Lake or direct tributary to the lake) will be determined.
3. Determine the relationship between debris types and amounts to flow event duration and magnitude.
4. Assess various methods and/or programs for reducing debris accumulations on the reservoir and for removing accumulated debris.
5. Define what types of woody debris are considered beneficial fish habitat that should not be removed.
6. Develop a debris management plan for the reservoir, as appropriate.

#### **4.0 Relicensing Relevance**

Debris, both natural and fabricated, accumulates within the Project boundary of Claytor Lake. The affects of accumulated debris can include the degradation of visual and aesthetic quality of the shoreline and lake surface; effects to Project operations; impairment of navigability, recreation, and safety; and breeding grounds for pests. However, woody debris is an important source of aquatic habitat and cover, and is an important component to the Claytor Lake ecosystem. For these reasons, an assessment to determine the debris amounts, types, sources, and removal methods/programs will be accomplished.

#### **5.0 Methods and Geographic Scope**

A debris study will be accomplished through desktop analysis, using information obtained from the Friends of Claytor Lake and their associated volunteer removal program. Additional information may be obtained from the Virginia Department of Game and Inland Fisheries (VDGIF) biologists and wardens, Virginia Department of Environmental Quality (VDEQ) scientists, and any local commercial contractors and homeowners. Information gathered from these data sources include areas of debris sources, types, and known areas of concentration. The geographic scope of this study includes the area within Claytor Lake (full pond elevation 1846 feet.)

In addition to the desktop analysis and existing information review, a field assessment will be conducted during each quarter of 2007 to document the debris type, quantity, and areas of concentration within the lake and zone of operational influence. The possible sources of the debris will also be determined, as well as determining the relationship to flow event duration and magnitude. Right-of-way clearing practices will be reviewed. A photographic record and Geographic Information System (GIS) mapping of the debris sources, types, and areas of concentration will also be provided.

Appalachian will periodically consult with the agencies and pertinent stakeholders (e.g., Friends of Claytor Lake) during the data gathering period to discuss the information obtained.

Appalachian will consult with other regional hydropower operators, the state agencies such as VDGIF and VDEQ, and federal agencies such as the U.S Army Corps of Engineers concerning pertinent programs and methods for managing safe, cost-effective, and environmentally responsible options for non-biodegradable debris. Appalachian will also investigate the options for managing and promoting beneficial debris, which should not be removed from the Project boundary.

## **6.0 Analysis and Reporting of Results**

Upon completion of analysis, Appalachian will prepare a draft report of the results. Preparation of the draft report will be accomplished in consultation with the stakeholders and agencies. Based upon the comments received regarding the draft report, Appalachian will prepare a final report to be incorporated into the final Application for New License.

## **7.0 Schedule**

A pre-study meeting will be held in January 2007. The debris field data collection will be scheduled for 2007 (field assessment to be conducted each quarter). At a minimum, study plan progress updates will be provided to the Commission, as well as the stakeholders involved in the relicensing of the Claytor Project, in May 2007 and November 2007. Additional progress reports will be provided to the stakeholders as information becomes available and meetings will be scheduled with stakeholders at key decision points to seek input and recommendations. All information will be made available in printed format as well as electronic format in accordance with the Information Distribution Protocol for the relicensing of the Claytor Project. Meetings will be scheduled and stakeholders notified in accordance with the Communications protocol for the relicensing of the Claytor Project. Individuals, agencies, governments, etc. will be given at least thirty (30) days time prior to a meeting to review the information to be discussed. Information will also be posted on the web site established for the relicensing of the Claytor Project ([www.claytorhydro.com](http://www.claytorhydro.com)) as appropriate.

## **8.0 Costs**

The estimated cost for performing the Debris Study components identified in this plan is \$81,000. These costs include field studies and labor for both consultants and Appalachian.

## **9.0 References**

Appalachian Power Company. 2006. Pre-Application Document (PAD). Integrated Licensing Process, Claytor Hydroelectric Project. (FERC Project No. 739-018). Vol. I. 172 pp.