

Hydropower Project Summary

NEW RIVER, VIRGINIA

CLAYTOR HYDROELECTRIC PROJECT (P-739)



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This summary was produced by the

Hydropower Reform Coalition

and

River Management Society

April, 2013

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Description: This project is located on the New River in Pulaski County in Virginia. The stretch of river from Claytor Dam to Eggleston offers recreationists ample opportunities to fish and float the wide and relatively slow flow with beautiful scenery of high cliffs. Downstream of the Peppers Ferry Bridge is a series of Class I-II ledges for whitewater paddling. McCoy Falls, also known as Big Falls, is located further downstream where the river breaks through Walker Mountain. This ledge provides a popular whitewater play spot, and location of the New River rodeo with adequate water levels.

The new license does not include any new development or modifications to project operation other than the measures contained within the resource management plans that were developed in consultation with project stakeholders, including: (1) the June 2009 Erosion Monitoring Plan, (2) the June 2009 Sedimentation Monitoring Plan, (3) the June 2009 Water Management Plan,¹¹ (4) the June 2009 Water Quality Monitoring Plan, (5) the June 2009 Freshwater Mussel Adaptive Management Plan, (6) the June 2009 Aquatic Vegetation Management Plan, (7) the June 2009 Habitat Management Plan, (8) the June 2009 Fringed Mountain Snail Management Plan, (9) the June 2009 Recreation Management Plan, (10) the June 2009 Debris Management Plan, (11) the June 2009 Aids to Navigation Management Plan, and (12) the June 2009 Shoreline Management Plan. In addition to the plans filed with the application, Appalachian Power's July 2010 Historic Properties Management Plan (HPMP) addressed cultural resources at the project.

A. SUMMARY

1. License application filed: June 29, 2009
2. License Issued: December 27, 2011
3. License expiration: Nov. 30, 2041 The original license, issued May 22, 1943 expired June 30, 2011. The project operated under an annual license until the current license was issued.
4. Waterway: New River downstream from Claytor Dam
5. Capacity: 75.00 MW
6. Licensee: Appalachian Power Company (Appalachian Power), a unit of American Electric Power (AEP)
7. County: Pulaski
8. Project area: The current project boundary encloses the dam, reservoir, intakes, penstocks, powerhouse, tailrace, transmission line, the project recreation facilities, and lands reserved for recreation. The project boundary generally follows the reservoir at about the 1,850-foot contour, with the exception of a few steep shoreline areas, and where it encloses facilities needed for project operation and project recreation. The project boundary extends along the river bank about 2,000

feet downstream of the project dam. The project does not occupy any federal lands.

9. Project Facilities: the Claytor Project consists of:
 - a. A 1,142-foot-long, 137-foot-high concrete gravity dam.
 - b. A 4,363-acre reservoir with a storage capacity of 225,000 acre-feet at a normal pool elevation of 1,846.0 feet National Geodetic Vertical Datum (NGVD)
 - c. Four 16-foot-diameter penstocks
 - d. A powerhouse integral with the dam containing four generating units with a combined capacity of 75 MW
 - e. An 827-foot-long transmission line

The Claytor Project receives water from the New River and Claytor Lake, the reservoir created by Claytor Dam. Flow from Claytor Lake is directed either through the spillway gates or through the project intake, located at the base of Claytor Dam, and into the powerhouse via the project penstocks. From the powerhouse, located on the southeast side of the dam, water is discharged back into the New River via the tailrace. The Claytor Project is operated to provide a minimum average daily flow of 750 cubic feet per second (cfs) to the tailrace when inflow to the reservoir is greater than 750 cfs.

B. IMPORTANT PROVISIONS AND REQUIREMENTS IN LICENSE

Several of Appalachian Power's management plans required by this license (*e.g.*, Water Quality, Habitat Management, Aquatic Vegetation, Recreation, Debris, and Aids to Navigation) provide for the formation of technical review committees. These plans stipulate that the committees "will include," "will be established with," or "will be made up of" representatives of entities other than the licensee. As explained in the plans, the committees will play an important consultation role in the plans' implementation and review during the license term. Many of the plans require detailed monitoring, data collection, planning implementation, and annual reporting requirements in addition to other provisions not provided in the following project summary:

1. Water Management [Reference: License Article 404]

Operation of the Claytor Project affects water uses within and downstream of the project. This is most evident during low-flow conditions when maintaining sufficient flow for aquatic resources and recreational uses downstream of the project can lead to a drawdown of Claytor Lake, or, conversely, when ensuring that lake levels are adequate for lake recreation can reduce flows for downstream resources.

Among other provisions, the Water Management Plan includes:

- a. releasing recreation flows for a specific whitewater competition in May, and during weekends in August, September, and October when inflow is between 800-1,000 cfs;
- b. publishing flow release information on Appalachian Power’s website;
- c. providing for flood control operations, including notification requirements for upstream and downstream land owners, relevant agencies, and municipalities; and
- d. measuring water levels and flows in Claytor Lake and downstream of the dam.

The Claytor Project provides numerous recreational opportunities. Increasing the the minimum flow from 750 cfs to 1,000 cfs during the December 1 through March 31 peaking period, as proposed in the water management plan, will benefit boating, float-based fishing, and powerboat-based fishing and hunting downstream from the project. The additional 1,000-cfs minimum flow releases for recreation during weekends in August, September, and October will also benefit these recreation types, as well as tubing, during this typically dry period.

Acknowledging that the proposed minimum flows are generally insufficient for whitewater boating, this license requires provisions for a minimum of two annual whitewater flow releases in addition to the May squirt boat competition, to be scheduled during each annual review. The license also requires that the flow notifications provided on Appalachian Power’s website include publication of dates and timing of planned whitewater flow releases, and a clear description of the flow regime.

Minimum Instream Flow (MIF) Requirements and Options

Month	Required Average Hourly MIF	Optional Authorized Modification to MIF
April, June, July, November	750 cfs*	
May	750 cfs*	Squirt boat competition: recreational flows may be released upon sufficient inflow, provided that reservoir elevations are maintained between 1845 and 1846 feet NVGD.
August, September,	750 cfs*	When inflows average between 800 and 1,000 cfs during Monday through Friday, additional weekend releases may occur,

October		provided the reservoir elevations are maintained between 1845 and 1846 feet NVGD.
December and January	1,000 cfs	
February and March	1,200 cfs	

* or inflow to Claytor Lake, whichever is less

Flow Release Reporting

The license requires that the flow notifications provided on Appalachian Power’s website include publication of these release dates including dates and timing of planned whitewater flow releases and a clear description of the flow regime.

Appalachian Power intends to provide flow information related to releases from the dam to the public via its website,

<http://www.aep.com/environment/conservation/hydro/>. Appalachian Power aims to provide 24-hour notice of flow release schedules. This license requires that Appalachian Power include 1) tools for calculating downstream flow arrival times from Claytor Lake to Glen Lyn and 2) available stage versus flow information, by boat launch, to aid the public in determining the suitability of scheduled releases to a particular activity. Though it would be impractical for Appalachian Power to provide flow information more than 24 hours in advance, this license requires that the utility provide a description of the project’s seasonal operational parameters so that recreation users understand the potential range of flows and how best to take advantage of any increased minimum or specific flows.

2. Recreation Management [Reference: License Article 411]

Recreational access at the project is available at seven public sites, two commercial marinas, and two tracts of land that Appalachian Power has reserved for future recreational development. Three of the public recreation sites (the New River Access boat launch, the Appalachian Power Group Picnic Area at Claytor Dam, and the Allisonia boat launch) and the two reserved tracts of land are project facilities. The remaining four sites that offer public access are: (1) Lowman’s Ferry, which is privately owned; (2) Harry DeHaven County Park, which is owned jointly by Pulaski County and Appalachian Power; (3) Dublin boat launch, which is owned by Virginia Department of Conservation and Recreation (DCR); and (4) Claytor Lake State Park, which is owned by Virginia DCR. These four sites are not project facilities, but each site offers direct water access.

Among other provisions, the Recreation Management Plan and license provides for:

- a. enhancing existing facilities and providing a picnic area at the Allisonia boat launch;
- b. enhancing existing facilities, providing a picnic area, and improving bank fishing access at the New River Access site below Claytor Dam;
- c. enhancing Appalachian Power's existing picnic area with the addition of a boat launch, courtesy pier, and trailer parking;
- d. managing recreational use of the project area in the future through establishment of a technical review committee that would review the results of recreational use monitoring (every 6 years), establish criteria to evaluate and prioritize the need for additional facilities and amenities at existing public access sites and/or new facilities at the project, and recommend any necessary plan revisions; and
- e. a plan regarding the establishment of a new portage put-in downstream from the dam, a portage trail leading from Appalachian Power's picnic area to this put-in, and the adequacy of the access road to access these sites.

3. Erosion Monitoring [Reference: License Article 402]

The goal of the Erosion Monitoring Plan is to inform future decisions regarding on-going erosion concerns and erosion control efforts on the part of Appalachian Power, government agencies, and affected landowners. Among other provisions, the plan and license provides for:

- a. monitoring areas identified as having erodible sands or saprolite soils, as shown on the revised shoreline material classification mapping;
- b. installing and using bank pins at monitoring ten sites along a segment of the New River extending 11.6 miles downstream of Claytor Dam in order to quantify the amount of bank erosion that occurs downstream of the project
- c. developing a demonstration project utilizing natural methods for stabilizing eroding shoreline on Claytor Lake; and
- d. identifying areas to be recommended for no-wake zones to address boating wake-related erosion, if determined from monitoring.

4. Sedimentation Monitoring [Reference: License Article 403]

Since the project was constructed, sediment has accumulated in Claytor Lake primarily in inlets and coves where tributary rivers and streams enter the lake with little sedimentation in the main body of the reservoir. Sedimentation can affect recreational access, both private and public. In order to address sedimentation concerns, the Sedimentation Monitoring Plan and license includes:

- a. monitoring areas of concern, including the headwaters of Claytor Lake from Allisonia boat ramp to above Lowman's Ferry Bridge (an 8.8-mile reach) and Peak Creek, a major tributary to Claytor Lake (a 5.8-mile reach), every 5 years over the term of a new license; and developing a report of the initial and subsequent monitoring efforts;

- b. monitoring areas of sediment deposition in the New River downstream from Claytor Dam; and
- c. defining criteria for determining the need to dredge and provide a description of the types of actions that would be implemented to manage sediment (*e.g.*, if it is restricting recreational access) and what conditions would trigger such actions.

5. Reservoir Drawdown [Reference: License Article 405]

At least 3 months prior to implementing a non-emergency reservoir drawdown, Appalachian Power is required to file a reservoir drawdown plan with FERC. The purpose of the drawdown plan is to minimize the impact of any project maintenance activity requiring a reservoir drawdown on aquatic resources in the project reservoir and downstream of the project and to allow shoreline property owners sufficient time to plan shoreline maintenance activities. The plan will be prepared after consulting with the U.S. Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries, Virginia Department of Conservation and Recreation, Virginia Department of Environmental Quality, Pulaski County, New River Valley Planning District Committee, and the Friends of Claytor Lake.

In addition to the detailed plan, public notification of the reservoir drawdown is required including notification of property owners along the shoreline by mail, 45 days prior to implementing the drawdown to allow property owners sufficient time to plan shoreline maintenance activities. The notification will include the rate (feet per day), limit in feet, and term of the drawdown.

6. Water Quality Monitoring [Reference: License Article 406]

When Claytor Lake stratifies in the late spring through summer, water discharged from the dam can have low temperatures and dissolved oxygen (DO) concentrations affecting water quality for downstream uses. The Virginia Department of Environmental Quality (Virginia DEQ) requires Water Quality Certification prior to license approval. Virginia DEQ issued its certification on Feb 8, 2011 with special conditions including:

- a. establishing instream flow and lake level conditions and requires Appalachian Power to:
 - maintain a minimum instream flow for the New River downstream from Claytor Dam;
 - operate the project in a levelized flow mode of operation from April 1 through November 30; and
 - operate the project in a peaking mode from December 1 through March 31.
- b. monitoring flows and dissolved oxygen (DO) at certain sites including:

- monitor elevations in Claytor Lake as measured in the forebay (reservoir) and tailrace (downstream of the dam), using water level transducers, staff gauges located upstream and downstream that are calibrated with the transducers, and cameras located at the dam;
- monitor releases of instream flows (discharges) from Claytor Dam based on the discharge curves developed for the existing generating units; and
- monitor flows into the project boundary (inflow) as determined through monitoring of the U.S. Geological Survey (USGS) gauges on the New River at Allisonia (Gauge No. 03168000) and New River near Galax (Gauge No. 03164000).

Virginia DEQ also requires among other conditions, notifications relative to impacts to surface waters (including wetlands), submission of the results of all plan studies, demonstration projects, research, analysis, modeling, and stakeholder coordination efforts conducted for the authorized project activities, and an annual monitoring report to demonstrate compliance with the certification's special conditions.

Additionally, the license requires:

- a demonstration study of the effects of any proposed mitigation measure for low dissolved oxygen (DO) concentrations in the tailrace on reservoir fisheries and water quality (*Mitigation Measures for Low Dissolved Oxygen on the Tailrace*);
- a period of 1 year to evaluate a new mitigation measure for low DO in the tailrace (effectiveness of demonstration study) should any implemented measure fail to raise DO levels to state water quality standards;
- development of alternative mitigation measures to address low DO in the discharge should an applied mitigation measure fail to resolve low tailrace DO, within 120 days of the conclusion of an effectiveness demonstration study;
- continuous monitoring of DO and temperature at five locations downstream of the project to the Route 11 bridge for 5 years; and
- continuous monitoring of DO of inflow to the project at the Allisonia USGS gauge station (No. 03168000) from April 1 to November 1. Monitoring records for DO shall be maintained by Appalachian Power and summarized in an annual report filed with the Commission.

7. Mussel Monitoring [Reference: License Article 407]

To address operational effects on mussels located in the New River, both upstream and downstream of the dam, Appalachian Power will implement a Freshwater Mussel Adaptive Management Plan that includes among the provisions compiling baseline data, monitoring (hourly DO and temperature readings) at mussel monitoring locations for 1 year, and filing annual reports with recommendations for changes to the plan as necessary.

8. Aquatic Vegetation Monitoring [Reference: License Article 408]

Non-native, invasive aquatic vegetation, such as *Hydrilla* which has a documented presence in certain areas of Claytor Lake, can have undesirable economic and environmental effects. The goal of the Aquatic Vegetation Management Plan is to ensure that aquatic vegetation, particularly invasive species which can affect important fish habitat, does not increase to nuisance levels. The plan includes a monitoring component, a consultation process, and limited control measures and is meant to be an integrated management strategy for aquatic weed control at the project.

Among other provisions in the plan, Appalachian Power will:

- a. establish a permitting process;
- b. educate the public; and
- c. control nuisance aquatic vegetation in beneficial use areas.

Beneficial use areas include public access boat ramps, Claytor Lake State Park, sites of public water withdraws by Pulaski County Public Service Authority (within Claytor Lake), American Electric Company's Glen Lyn power plant (downstream of Claytor Lake), the Town of Pulaski (Peak Creek), and the City of Radford (downstream of Claytor Lake), Harry Dehaven Park, sensitive habitat areas for fish and wildlife, fishing piers and designated bank fishing areas, and sites designated for future recreation.

Entities planning to apply treatments to control these species are required to obtain a permit from Appalachian Power and notify adjacent landowners of planned spot treatments of herbicides (with the notification period to be worked out by the Aquatic Vegetation Technical Review Committee). Spot treating are those instances where landowners need to treat the areas around their dock or swimming areas for invasive aquatic vegetation. When applying for a treatment permit, each permittee must notify adjacent landowners when treatment will occur.

9. Habitat Management [Reference: License Article 409]

To protect and enhance valuable shoreline habitat, the Habitat Management Plan includes among other provisions:

- a. prohibiting or limiting construction of boat docks or other structures in areas where wetlands, woody cover, bald eagle habitat, and tributary streams are found, and in areas identified by the Virginia Natural Heritage Program under the Shoreline Management Plan;
- b. where construction of these structures is authorized, requiring measures for ameliorating the loss of habitat due to shoreline disturbance associated with development;

- c. developing a demonstration project that has a dual benefit of erosion control and habitat improvement;
- d. undertaking habitat enhancement projects for Claytor Lake (annual cost of approximately \$5,000); and
- e. educating the public on the importance of habitat, measures that individuals can undertake to improve habitat along the shoreline, and opportunities to partner on habitat enhancement projects.

10. Fringed Mountain Snail Management [Reference: License Article 410]

The Fringed Mountain Snail Management Plan is designed to protect the federally endangered Virginia fringed mountain snails at the project. The plan includes:

- a. annually inspecting the six sites at the project identified as potential habitat;
- b. conducting an inventory for fringed mountain snail if there is a proposal to modify the current use of any of the six sites; and
- c. provisions for consultation and approvals by Fish and Wildlife Service (FWS), Virginia Department of Game and Inland Fisheries (Virginia DGIF), Virginia Department of Conservation and Recreation (Virginia DCR), and the Commission.

11. Aids to Navigation [Reference: License Article 413]

In order to provide for delineation of the navigable channel, Appalachian Power developed an Aids to Navigation Management Plan that includes installation of additional navigational markers, developing an educational program to warn mariners of unusually heavy debris and high or low water, and publishing information and description with regards to height restrictions for sailboats as well as provisions for marking any height-related hazards on Claytor Lake.

12. Shoreline Management [Reference: License Article 414]

Appalachian Power has authority over all shoreline improvements. In order to protect shoreline uses and resources at the project, Appalachian Power consolidated its existing permitting and various resource management programs into a single comprehensive plan for resource protection through shoreline classifications and development planning through permitting and regulations of shoreline uses. The resultant Shoreline Management Plan, developed by Appalachian Power and a working group includes:

- a. a description of shoreline conditions based on the results of relicensing studies;
- b. a shoreline classification system;
- c. requirements and guidelines for shoreline management such as permitted structures and activities within shoreline classifications, shoreline stabilization requirements, vegetative cover requirements, and provisions regarding woody debris and cultural resources; and

- d. implementation procedures including permitting responsibilities, fees ,variance procedures, enforcement, and provisions for a 5-year review and update process.

The Shoreline Management Plan and license includes clarifications and revisions pertaining to:

- a. dock size regulations including docks on steep slopes;
- b. low density use regulation waivers (Plan Section 2.5.4, *Low Density- Single Family Residential* and Section 2.5.6, *Steep Slope Protection*);
- c. shoreline stabilization regulations;
- d. the variance process (Plan Section 3.3, *Variance Process*); and
- e. fifty percent rule (Plan Section 2.5.4, *Low Density- Single Family Residential* and Section 2.5.6, *Steep Slope Protection*).

At a minimum, the following entities must be consulted during any review and update for the plan: U.S. Army Corps of Engineers, Virginia Department of Health, Virginia Department of Game and Inland Fisheries, Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, Virginia Department of Historic Resources, Pulaski County, and the Friends of Claytor Lake. Within 60 days of license issuance, and after consultation with the stakeholders identified above Appalachian Power shall file an amendment to paragraph 22 of section 2.5.4, *Low Density Use – Single Family Residential* that provides clarification on the manner in which section 2.5.4 (22) and any similar sections of the plan are to be implemented. Within 60 days of license issuance, Appalachian Power shall file an amendment to section 3.3, *Variance Process*, that provides, at a minimum, a description of, and explanation for, the criteria and justification that Appalachian Power will use in reviewing a request for a variance. This additional detail should provide guidance to potential applicants on when it is appropriate to apply for a variance and what exceptions might be considered.

13. Programmatic Agreement and Historic Properties Management [Reference: License Article 415]

The Historic Properties Management Plan (HPMP) contains information on cultural resources at the project including maps of the area of potential effect and archaeological sites, preservation goals and priorities, project effects and mitigation/management measures, implementation procedures, and a list of activities that do not adversely affect historic properties. In addition to the HPMP, Appalachian Power proposed to protect significant cultural resources at the project through the Shoreline Management Plan's *Impact Minimization Zones*.

Development in these zones would be limited, but possible, based on a review of the Shoreline Management Plan and any necessary mitigation. Further, Appalachian Power proposed, as a component of the Erosion Monitoring Plan, to entertain requests for no-wake zones in areas experiencing high erosion due to

boat wakes. This would include shoreline areas containing sensitive cultural resources that are experiencing erosion.

C. MAP

There are two convenient ways to become familiar with this project on the Hydropower Reform Coalition website, www.hydroreform.org.

1. Go directly to the project page <http://www.hydroreform.org/projects/claytor-p-739>
2. To understand the geographical context of the project, visit the *On Your River* section of the site. [This link](#) will take you to section for rivers in the South. Zoom in until you can see the regions south western of Roanoke, Virginia. Mouse over the two blue markers near Radford. P-739 is the western blue marker.