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June 28, 2011

VIA ELECTRONIC FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

RE: Appalachian Power Company
London/Marmet Project No. 1175
Winfield Project No. 1290
Application for New License
Updated Study Report

Dear Ms. Bose:

On behalf of Appalachian Power Company (Appalachian), enclosed for filing please find a copy of the Updated Study Report describing the overall progress in implementing the study plan and schedule for the Application for New Licenses for the London/Marmet and Winfield Projects located on the Kanawha River in West Virginia. The enclosed Updated Study Report has been prepared and is being filed in accordance with the requirements of the Integrated Licensing Process (18 CFR 5, § 5.15(c)).

In accordance with the requirements of the Integrated Licensing Process (18 CFR 5, § 5.15(c)), Appalachian has scheduled a meeting with the participants and Commission staff involved in the relicensing process for the London/Marmet and Winfield Projects to discuss the progress made relative to each study. The meeting is scheduled for July 13, 2011 at 9:00 a.m. at Appalachian's Headquarters in Charleston, West Virginia.

Any questions regarding the enclosed Updated Study Report and/or the scheduled meeting referenced above should be directed to the undersigned.

Sincerely,

Teresa P. Rogers

Teresa P. Rogers
Process Supervisor I
(540) 985-2441

Enclosure: Updated Study Report

cc: w/encls: Attached Distribution List
Brandi Sangunett, FERC
Mike Hreben, Kleinschmidt

APPALACHIAN POWER COMPANY

LONDON/MARMET HYDROELECTRIC PROJECT No. 1175
WINFIELD HYDROELECTRIC PROJECT No. 1290

UPDATED STUDY REPORT

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State Agencies	
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Susan Pierce	WV Department of Culture and History, Historic Preservation Unit
Michael Hohn	State of West Virginia Geological & Economic Survey
Richard Mulfinger	Pennsylvania Fish & Boat Commission
Frank Jezioro	WV Department of Commerce, Department of Natural Resources
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Non-Governmental Organizations	
Shanda Minney	West Virginia Rivers Coalition
Marybeth Beetham	Endangered Species Coalition
Bruce Glabe	Appalachian Mountain Club
Rebecca Sherman	Hydropower Reform Coalition
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APPALACHIAN POWER COMPANY

LONDON/MARMET

PROJECT No. 1175

WINFIELD

PROJECT No. 1290

UPDATED STUDY REPORT

June 28, 2011

Prepared by:

Kleinschmidt

Energy & Water Resource Consultants

APPALACHIAN POWER COMPANY

LONDON/MARMET HYDROELECTRIC PROJECT No. 1175
WINFIELD HYDROELECTRIC PROJECT No. 1290

UPDATED STUDY REPORT

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APPALACHIAN POWER COMPANY

LONDON/MARMET HYDROELECTRIC PROJECT No. 1175
WINFIELD HYDROELECTRIC PROJECT No. 1290

UPDATED STUDY REPORT

1.0 INTRODUCTION

The existing license for the London/Marmet project (No. 1175) was issued by the Federal Energy Regulatory Commission (FERC) on September 23, 1983 and expires January 31, 2014. The existing license for the Winfield Project (No. 1290) was issued on September 26, 1983 and has the same January 31, 2014 expiration date as that for the London/Marmet Project. Appalachian Power Company (Appalachian/Licensee) has elected to prepare and file the Application for New License for the London/Marmet and Winfield projects (Projects) in accordance with the Integrated Licensing Process (ILP) as described under the Code of Federal Regulations (18 CFR Part 5). On August 14, 2008, the Licensee filed with the FERC the Notice of Intent to File for New License (NOI) for both Projects along with a combined Pre-Application Document (PAD). Since that filing, the Process Plan for filing the Applications for New License has been followed.

Since the filing of the NOI and PAD, the Owner filed with the FERC on January 26, 2009 the Proposed Study Plans as required under 18 CFR § 5.11. The proposed study plans filed included five studies on various resources and operations having a nexus to the projects, including: 1) cultural resources; 2) recreation management; 3) water quality; 4) effects of fish entrainment and impingement; and 5) transmission line corridor maintenance. After consultations with various stakeholders including State and Federal Agencies, local governments, and non-governmental organizations (NGOs), Appalachian filed revised study plans that incorporated comments and an additional study plan for assessing a tailwater fishing access feasibility study. By letter dated June 25, 2009, the Director of the FERC Office of Energy Projects issued the Study Plan Determination for the London/Marmet and Winfield hydroelectric projects.

A Schedule for remaining components of the ILP is included in Appendix A. An update on the status of each of the ongoing relicensing studies is provided below.

2.0 CULTURAL RESOURCES

A Phase I cultural resources survey of the London/Marmet (FERC Project No. 1175) and Winfield (FERC Project No. 1290) hydroelectric projects in Kanawha and Putnam counties, West Virginia has been completed. The project was conducted in general accordance with the FERC approved Cultural Resources Study Plan dated June 2009.

The purposes of the study were: 1) to identify the historically significant architectural, engineering, and landscape components that define the historic character of the three hydroelectric facilities; 2) to identify and evaluate archaeological resources within the Area of Potential Effect (APE); and 3) to assess project-related effects, if any, on significant resources within the APE.

The draft study report was distributed for review. The West Virginia State Historic Preservation Office, by way of a letter dated August 5, 2010, concurred with the report and did not request changes or further analysis.

Appalachian is currently working to develop Historic Property Management Plans (HPMPs) for each of the three developments. It is anticipated that draft HPMPs will be available for review during the late summer of 2011.

3.0 TRANSMISSION LINE CORRIDOR MAINTENANCE

The Transmission Line study has been completed. A draft study report will be distributed to stakeholders prior to the Update Meeting. During issues scoping for the relicensing of the London/Marmet and Winfield Projects, the West Virginia Division of Natural Resources (WVDNR), and the FERC raised issues regarding the transmission line corridors associated with each development. Appalachian prepared a Transmission Line Investigation Report to address the following identified issues:

1) Effects of continued operation and maintenance of the transmission lines, on wetland, riparian, and littoral habitats and associated wildlife within the projects boundary.
2) Effects of continued operation and maintenance of the transmission lines, on potentially occurring federally listed endangered species, including the running buffalo clover (*Trifolium stoloniferum*), Indiana bat (*Myotis sodalis*), and Virginia

big-eared bat (*Corynorhinus townsendii virginianus*), as well as other terrestrial species of concern.

3) Clarification regarding the regulation of each transmission line corridor.

To complete the work, Kleinschmidt field verified the primary transmission line. The FERC definition of the primary transmission line is a line that is used solely to transmit power from a hydroelectric powerhouse to a load center or to an interconnection point in a regional power grid (18 CFR Part 4.70). Kleinschmidt found that the primary transmission lines for the London Development was 0.38 miles. The two primary transmission lines for the Marmet Development stretched for 0.82 miles and then one line terminated at a substation and the other extended an additional 0.22 miles to a second substation. The Winfield Project primary transmission line ends at the Winfield Station immediately adjacent to the Project.

Then Kleinschmidt reviewed the habitat and assessed the suitability of the habitat for rare, threatened, or endangered (RTE) species. State and federal agencies as well as local experts were also contacted regarding the presence of protected species. At each Project, the habitat was characteristic of an urbanized landscape, suitable only to generalist species and no RTE species were documented. The habitat in the Project boundaries of the London/Marmet and Winfield Projects would likely not be suitable for RTE or special status species. The current maintenance of the primary transmission lines is minimal because the habitat is maintained by local residents or industry. The developed areas surrounding the Projects are the major contributors to the lack of species diversity and the growth of invasive species.

4.0 FISH ENTRAINMENT AND IMPINGEMENT

The overall objective of this study was to evaluate the relative likelihood of entrainment and turbine mortality for fish occurring in the vicinity of the London/Marmet and Winfield Hydroelectric Projects (including channel catfish, white bass, crappie, smallmouth bass, sauger, gizzard shad, bluegill, largemouth bass, and walleye). The study was conducted during 2010-2011 and a Draft Study Report will be provided for review prior to the Update Meeting.

A general summary of the each of the four tasks listed above is summarized below.

1. **Literature Review of Swimming Speeds and Intake Avoidance Behavior**

Information regarding species likely occurring in the vicinity of the projects (and thus potentially exposed to entrainment and/or turbine mortality) has been compiled from studies conducted by resource agency staff and also data collected at a nearby steam electric station. In addition, life history characteristics of the species present were researched to identify traits which could influence a species potential for entrainment. Such traits include habitat preferences and seasonal movement patterns.

A review of swimming speeds was conducted and applied to the empirical intake velocity data discussed below in Item 4.

2. **Review of Evidence of Existing Entrainment Problems**

Discussions with Project staff indicated that while dead fish are occasionally observed, they are not observed in quantity and the cause of mortality is unknown. Dead fish in the vicinity of the intake are usually larger and of poor condition indicating that they had been dead for a period of time. The only anecdotal evidence of dead fish in the tailwater was from a tailrace fisherman who participated in the recreation survey. The fisherman indicated observing several dead gizzard shad in the tailrace.

3. **Literature Review and Comparative Analysis of Impingement and Entrainment at Projects of Similar Design**

Over sixty (60) site-specific entrainment studies that provide estimates of annual resident fish entrainment at hydroelectric sites in the United States have been reported by FERC (1995). These studies were derived from the 1992 EPRI (Electric Power Research Institute) report entitled Fish Entrainment and Turbine Mortality Review and Guidelines. Projects of similar design to the Projects have been identified using the EPRI Database (EPRI, 1997). These studies were reviewed to identify trends in entrainment that may be applicable to these projects (*i.e.* timing and magnitude).

While these studies were conducted at Projects exhibiting different intake configurations, as a whole they provide a robust dataset of information. This information was used to assess the likelihood of entrainment by species and size group.

Entrainment rates established by species and size group were then applied to turbine passage mortality rates to provide an order of magnitude assessment of fish lost to entrainment mortality. Turbine mortality rates were assessed based on empirical study results from studies conducted at facilities with similar turbines and also by using the leading edge blade-strike equation. This equation was developed as part of the Department of Energy's Fish Friendly Turbine Program.

4. Velocity Profile Measurements

Empirical field data characterizing intake velocities at the Projects were collected utilizing Acoustic Doppler Current Profiler (ADCP) technology. Specifically, data were collected at a transect located immediately upstream of the Project intakes (between the concrete piers immediately of the trashracks). For each Project turbine, velocity data were collected with the turbine operating at full hydraulic capacity as well the most efficient gate setting. A minimum of three passes was collected for each turbine for each operating scenario to ensure accurate characterization of the velocity patterns.

Results of the ADCP assessment were used to develop velocity profiles near the face of and through the Project trashracks. Velocity profiles in the turbine intake zones were then compared to swim speed information for target species. In general, impingement is unlikely to be an issue at any of the developments. The trash racks have a 3.5-inch clear spacing. As such, fish would have to be larger than 3.5 inches in all dimensions (*i.e.*, length, width, and depth) to be susceptible to impingement. Fish smaller than the clear spacing in any dimension would be entrained. Fish larger than the clear spacing in all dimensions are expected to have the swimming ability to avoid impingement.

5.0 RECREATION ASSESSMENT AND ANGLER USE STUDY

The Project boundaries for the London/Marmet and Winfield Hydroelectric Projects (Projects) are very limited and essentially include little more than the footprints of the associated powerhouses. Each development however, provides public access to recreation facilities in the form of tailwater fishing piers. The Recreation Assessment and Angler Use Creel Survey Study was conducted from March through November 2010. A draft study report will be distributed to stakeholders prior to the Update Meeting.

The recreation survey focused on collecting the following information: 1) recreational use patterns, 2) user preferences, 3) need for amenities, 4) demographics, and 5) expenditures. The Angler Use Creel Survey is geared to determine: 1) target species, 2) catch, harvest, and release data, 3) angler effort, 4) angler preferences, 5) need for amenities, and 6) demographics and expenditures.

The study used a combination of data collection efforts to obtain the information necessary to address the study objectives. Primary data included counts of vehicles, shoreline and pier anglers as well as survey data obtained via exit interviews of recreationists at project tailwater angling access sites. Spot counts of vehicles and anglers were conducted periodically throughout the sampling day with traffic count data also being obtained from the Winfield site. Secondary data included West Virginia Division of Natural Resources fishery data, U.S. Bureau of Census data, the West Virginia Statewide Comprehensive Outdoor Recreation Plan, and other relevant literature.

A stratified random sample of 90 study days for spot counts and surveys was conducted at both the Marmet and Winfield tailwater access sites. The sample included a stratified random sample of 5 weekdays and 5 weekend days per month. Generally, most recreation activity at public access sites occurs on weekends and holidays. Because of this, the study effort was relatively higher on weekends and holidays than weekdays, in order to maximize the efficiency of the data collection effort and focus data collection efforts on time periods when people were more likely to use the tailwater angling access sites for recreation purposes.

Since the recreation day is sunrise to sunset, the recreation day varied in length each month. A randomly selected sample shift of 6 hours per sample day was selected with shift start times varying from sunrise to 6 hours before sunset.

During the course of the study, clerks completed a total of 307 useable surveys with 75 surveys not completed due to refusals and two surveys not completed because the individuals were under the age of 18 years. No surveys were incomplete as a result of language barriers. It is noteworthy that the London tailwater access site was closed during the 2010 study, due to the

absence of a designated public access through property owned by CSX railroad. As such, an evaluation of providing access to the London Tailrace is being conducted as a separate effort.

The study found that recreation use at the Marmet and Winfield tailwater access sites has declined since 2003. Overall, there were very low use levels at the Marmet angling access site during the 2010 season, which is supported by the "light crowding" ratings observed by respondents. As such, it is expected that the Marmet angling access site and to a lesser extent, the Winfield angling access site are capable of accommodating additional use stemming from displaced London access site anglers.

6.0 LONDON DEVELOPMENT TAILRACE FISHING ACCESS FEASIBILITY STUDY

Appalachian has been working representatives from the CSX Corporation to establish public access through CSX property. Such access is needed to allow the public to utilize the existing tailrace fishing area. Despite a good faith effort on the part of Appalachian, this process has been slow and difficult. While significant progress was achieved and a Preliminary Engineering Agreement was established, further progress has not been achieved. As such, the schedule to resolve this issue with CSX is unknown. Appalachian therefore has proceeded with the London Development Tailrace Fishing Access Feasibility Study.

The objective of the London Development Tailrace Fishing Access Feasibility Study, as approved by the FERC on June 25, 2009 is to identify, analyze and compare alternatives for providing public access to the London tailrace fishing access and to identify the preferred means to re-establish access to the London tailrace fishing access. According to the Study Plan, the preferred option should provide public access to the tailrace fishing area, have minimal adverse impacts and intrusion on the environment, and have acceptable capital and maintenance cost implications. Options include: 1) replacing the pedestrian bridge and 2) providing an at-grade crossing for the public. Additionally, in light of the complications associated with establishing a Right-of-Way with CSX, two other options are being evaluated. They are: 1) establishing a new fishing access area at Appalachian owned property near Cabin Creek and 2) enhancing the existing facilities at the Marmet Development which is part of the same FERC license. A draft report will be available for review in July 2011.

7.0 WATER QUALITY

A draft report of the Water Quality Study was distributed by mid-summer 2010. No comments requiring change to the draft report were received. Therefore, the report was converted to a Final Report. A copy of the Final Report will be provided prior to the Update Meeting.

The goal of the Water Quality Study was to gather sufficient water quality data to prepare a demonstration that details the impact, if any, of the Projects on water quality in project waters, defined as those waters both upstream and downstream of the project dams that are potentially influenced by the Projects and primarily as it relates to dissolved oxygen (DO) and temperature. This effort involved gathering, verifying, compiling, analyzing and displaying comprehensively in report format all relatively recent and reasonably available existing and newly collected water quality data. The water quality focus was on DO and temperature, because those parameters are the ones most typically affected by hydroelectric operations and also the ones that play overriding roles in supporting other aquatic resources.

Accordingly, Normandeau Associates, as a contractor of Appalachian, completed all tasks identified in the Approved Water Quality Study Plan. In particular, Normandeau:

1. Assembled and reviewed available water quality data collected by the U. S. Army Corps of Engineers (ACOE), West Virginia Department of Environmental Protection (WVDEP) and other entities, as appropriate.
2. Supplemented the existing database by collecting additional DO, temperature, pH and conductivity data at selected locations upstream and downstream of the London/Marmet/Winfield powerhouses during high temperature/low flow conditions.
3. Characterized existing DO and temperature conditions within and downstream of the projects.
4. Identified the impacts of the Projects' operations on impoundment and downstream water quality.
5. Identified measures that could enhance DO concentrations downstream of the powerhouses, and in extreme conditions, mitigate natural drought-related DO depressions, if necessary.

The study resulted in the following conclusions:

- Dissolved oxygen levels throughout the study area have been in compliance with WV Water Quality Standards throughout the recent (since 1997) historic period of record.
- Extensive and continuously-recorded data during the summer and early fall of 2009 documented that dissolved oxygen levels were never less than 6.2 mg/l above and below both the London and Marmet hydroelectric developments or below 5.6 mg/l above and below the Winfield Hydroelectric Project.
- There was little vertical or horizontal stratification or variability in the temperature, DO, conductivity or pH anywhere in the study area.
- Although measured water quality parameters generally increased or decreased upriver to downriver, depending on the parameter, these changes appeared to be unrelated to project operations and primarily related to tributary or wastewater discharge influences.
- Although Kanawha River flow would be characterized as abnormally high during portions of the study period, there were also extended, lower flow periods during July and September when river flow was substantially below median flows. The conclusion was therefore made that this study provides a reasonable demonstration of existing water quality and probable project impacts under relatively low flow conditions.
- While high flow associated with runoff events generally improved water quality, there was no indication that smaller changes in flow during low flow periods, consistent with the flow changes that might result from changes in minimum flow regulation by the ACOE, had any appreciable effect on water quality.
- There was no indication that project operations had any impact on measured water quality parameters nor did the existing or newly collected data indicate a need for DO enhancement at any of the Projects.

APPENDIX A

FERC Relicensing Schedule

APPALACHIAN POWER COMPANY

LONDON/MARMET HYDROELECTRIC PROJECT No. 1175
WINFIELD HYDROELECTRIC PROJECT No. 1290

FERC Relicensing Schedule

Date	Pre-Filing Milestones	Responsible Party
6/28/2011	Update study report (as needed) and	
	Notice of Intent to file a Draft License Application (if so selected)	Appalachian
7/13/2011	Hold updated study report meeting (as needed)	Appalachian
7/28/2011	Updated study report meeting summary	Appalachian
8/12/2011	File Preliminary Licensing Proposal or Draft License Application	Appalachian
8/12/2011	File application for 401 WQ Certification from West Virginia DEQ	Appalachian
8/22/2011	Comments on meeting summary	Participants
9/21/2011	Response to meeting summary comments	Appalachian
10/21/2011	Director's study plan determination	FERC
11/10/2011	Comments on Preliminary Licensing Proposal	FERC/Participants
1/31/2012	File Application for New License	Appalachian