HAWKS NEST HYDROELECTRIC PROJECT

(FERC NO. 2512)

DRAFT LICENSE APPLICATION
VOLUME I OF V

Prepared for:
Hawks Nest Hydro, LLC

Prepared by:

AUGUST 2015

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HAWKS NEST HYDROELECTRIC PROJECT (FERC No. 2512)
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List of Acronyms

Brookfield	Brookfield Renewable Energy Group
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
EA	Environmental Assessment
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FPA	Federal Power Act
gpm	gallons per minute
Hawks Nest	Hawks Nest Hydroelectric Project or Project
Hawks Nest Hydro	Hawks Nest Hydro, LLC, Applicant, or Licensee
hp	horsepower
HPMP	Historic Properties Management Plan
Hz	hertz
ILP	Integrated Licensing Process
ISR	Initial Study Report
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
msl	mean sea level
MW	megawatt
MWh	megawatt-hours
NGOs	non-governmental organizations
NOI	Notice of Intent
NRC	New River Conservancy
PAD	Pre-Application Document
PMF	Probably Maximum Flood
PM&Es	protection, mitigation, or enhancement measures
psi	pounds per square inch
psig	pounds per square inch gauge

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List of Acronyms (Continued)

PSP	Proposed Study Plan
rpm	rotations per minute
RSP	Revised Study Plan
RTU	remote terminal unit
SD1	Scoping Document 1
SD2	Scoping Document 2
SPD	Study Plan Determination
USACE	United States Army Corps of Engineers
USC	United States Code
USGS	United Stated Geological Survey
USR	Updated Study Report
V	Voltage
WQC	Water Quality Certification
WVAM	WVA Manufacturing, LLC
WVDEP	West Virginia Department of Environmental Protection
WVDNR	West Virginia Division of Natural Resources
WVPRO	West Virginia Professional River Outfitters Association

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Executive Summary

1.0 INTRODUCTION

The Federal Energy Regulatory Commission (FERC or Commission), under the authority of the Federal Power Act (or "FPA"), 16 United States Code (USC) § 791(a), et seq., may issue licenses for up to 50 years for the construction, operation, and maintenance of non-federal hydroelectric developments. Hawks Nest Hydro, LLC ("Hawks Nest Hydro" or "Licensee"), a wholly owned subsidiary of Brookfield Renewable Energy Group (Brookfield), is hereby applying for a new license for the Hawks Nest Hydroelectric Project (FERC Project No. 2512) ("Hawks Nest Project" or "Project"). The current operating license for the Project was issued on December 11, 1987 and expires on December 31, 2017. In accordance with applicable regulations, 18 Code of Federal Regulations (CFR) § 16.9(b), Hawks Nest Hydro must file its application with the FERC for a new license no later than December 31, 2015.

Presently the Hawks Nest development and the downstream Glen Ferris development are licensed by the FERC as a single project ("Hawks Nest-Glen Ferris Hydroelectric Project," FERC Project No. 2512). Hawks Nest Hydro is applying for separate licenses, and filing separate license applications, for each of the Hawks Nest and Glen Ferris developments.

Hawks Nest Hydro is applying for a 40-year license for each the Hawks Nest Project and the Glen Ferris Project. Hawks Nest Hydro believes that level of investment in terms of environmental measures proposed in this license application support this requested license term. Additionally, aligning the license expiration dates for the Hawks Nest and Glen Ferris Projects will, consistent with the Commission's policy, maximize future consideration of combined effects and licensing process efficiency for all parties.

2.0 SUMMARY OF THE HAWKS NEST PROJECT

Hawks Nest Hydro, LLC is the Licensee, owner, and operator of the Hawks Nest Project in Fayette County, West Virginia. The Project consists of the 102-megawatt (MW) Hawks Nest development on the New River.

Hawks Nest Hydro acquired the Project in 2006. The Hawks Nest Project was built in the 1930s to provide 25-hertz (Hz) power for the smelter furnaces at the Union Carbide ferroalloy plant

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near Alloy, West Virginia. Power from the Hawks Nest Project remains dedicated to the current ferroalloy manufacturing plant ("alloy facility"), which is owned by WVA Manufacturing, LLC (WVAM) and operated continuously to produce silicon, slag, and microsilica.

The Hawks Nest Project generates approximately 544,253 megawatt-hours (MWh) of clean, renewable electricity annually.

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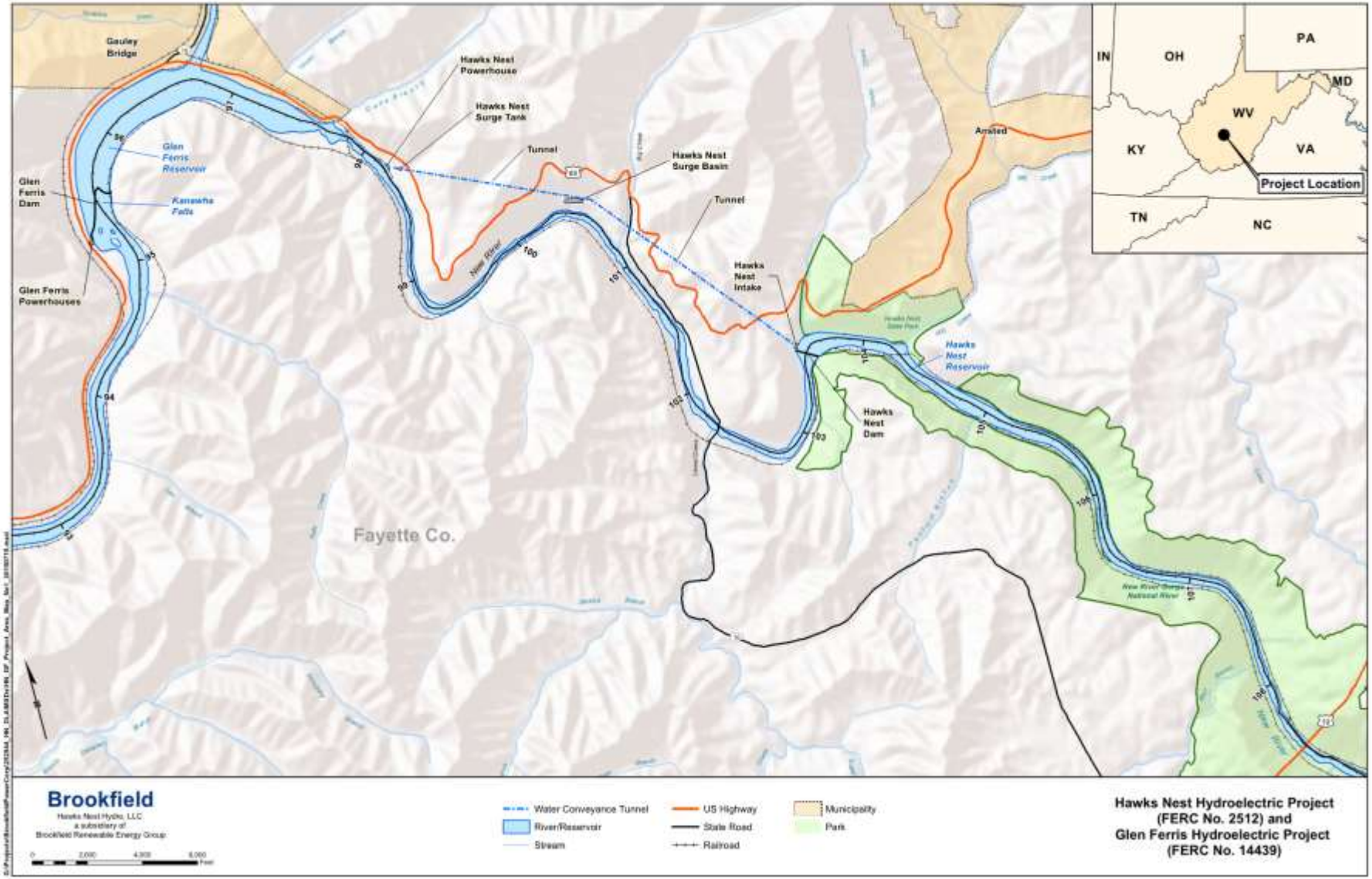
FIGURE ES-1 PROJECT LOCATION MAP



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3.0 AGENCY CONSULTATION AND THE RELICENSING PROCESS

Due to the proximity of the Hawks Nest and Glen Ferris Projects to each other, the expected overlap in resources to be evaluated during relicensing, and in the interest of efficiency of document preparation and overall relicensing activities, Hawks Nest Hydro prepared a single Pre-Application Document (PAD), Initial Study Report (ISR) and Updated Study Report (USR), and individual study reports that covered both the Hawks Nest and Glen Ferris Projects. For the same reasons as those described above, Hawks Nest Hydro has prepared a single Exhibit E that addresses both the Hawks Nest and Glen Ferris Projects.

Hawks Nest Hydro followed FERC's Integrated Licensing Process (ILP) in support of preparing this application for new license. On July 24, 2012, Hawks Nest Hydro filed a PAD for the Projects. Hawks Nest Hydro filed separate Notices of Intent (NOI) for the Projects; FERC subsequently assigned Glen Ferris the project number P-14439, while Hawks Nest retained project number P-2512.

The PAD provided a description of the Projects and summarized existing, relevant, and reasonably available information to assist resource agencies, federally recognized Indian tribes, non-governmental organizations (NGOs), and other interested parties (collectively, "stakeholders") in identifying issues, determining information needs, preparing study requests, and analyzing the license application. A preliminary list of potential studies and information needs was included in Section 6.3 of the PAD, including studies or surveys that may provide additional information regarding the Projects' effects on specific resources.

FERC issued Scoping Document 1 (SD1) for the Projects on September 20, 2012. SD1 was intended to advise stakeholders as to the proposed scope of the Environmental Assessment (EA) and to seek additional information pertinent to the Commission's analysis of the license application(s). As provided in 18 CFR §§ 5.8(a) and 5.18(b), the Commission issued a notice of commencement of proceeding concomitant with SD1. On October 17 and 18, 2012, the Commission held public scoping meetings in Ansted, West Virginia, to solicit comments regarding the scope of issues and analysis for the EA. Pursuant to 18 CFR § 5.8(d), the Commission also held a site visit in conjunction with the scoping meetings.

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By FERC notice dated September 20, 2012, stakeholders were afforded a 60-day period to request studies and provide comments on the PAD and SD1. FERC issued Scoping Document 2 (SD2) on January 2, 2013 to reflect issues or alternatives to be considered in the EA, based on stakeholder comments and study requests filed in response to SD1.

Pursuant to the schedule and requirements of the ILP, Hawks Nest Hydro developed a Proposed Study Plan (PSP) to address the comments and study requests submitted by stakeholders. The PSP also provided FERC and stakeholders with a plan and descriptions of the studies proposed by Hawks Nest Hydro. The PSP was filed with FERC and made available to stakeholders on January 4, 2013. In accordance with 18 CFR § 5.11(e), Hawks Nest Hydro held a PSP Meeting on January 29, 2013, in Charleston, West Virginia. The purpose of the PSP Meeting was to clarify the intent and contents of Hawks Nest Hydro's PSP, explain any initial information gathering needs, and address outstanding issues associated with the proposed studies.

In response to the comments on the PSP, Hawks Nest Hydro developed a Revised Study Plan (RSP) that was filed with FERC and made available to stakeholders on May 6, 2013. On May 31, 2013, FERC issued a Study Plan Determination (SPD) for the Projects approving the studies outlined in the RSP. The SPD directed Hawks Nest Hydro to conduct 10 studies:

1) Water Quality Study
2) Fish Entrainment Study
3) Aquatic Species Composition and Abundance Survey
4) Rare, Threatened, and Endangered Aquatic Species Study
5) Bypass Reach Aquatic Habitat Use and Instream Flow Study
6) Wetland and Riparian Habitat Survey
7) Rare, Threatened, and Endangered Terrestrial Species Study
8) Recreation Flow Assessment
9) Recreation Use and Needs Assessment
10) Cultural Resources Study

In accordance with 18 CFR § 5.15, Hawks Nest Hydro has completed the approved studies in accordance with the schedule and methods described in the RSP and FERC's SPD.

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Hawks Nest Hydro filed the ISR, including draft study reports for five completed studies, on May 30, 2014, conducted the ISR Meeting on June 12, 2014, and filed the ISR Meeting Summary with the Commission on June 27, 2014.

By letters to the Commission dated July 21, 2014 and July 24, 2014, respectively, the New River Conservancy (NRC) and West Virginia Professional River Outfitters Association (WVPRO) filed timely comments on the ISR and the ISR Meeting Summary. No comments or disagreements were filed by Commission staff or any other relicensing participants. On August 25, 2014 Hawks Nest Hydro filed with the FERC responses to the comments received from NRC and WVPRO. On September 25, 2014 FERC determined that no modifications would be required to the previously approved study plans.

Hawks Nest Hydro filed the USR, including draft study reports for four completed studies,[1] on May 29, 2015, conducted the USR Meeting on June 11, 2015, and filed the USR Meeting Summary with the Commission on June 26, 2015.

By letters to the Commission dated July 24, 2015 and July 26, 2015, respectively, WVAM and American Whitewater filed timely comments on the USR and the USR Meeting Summary, as well as the study reports filed with the USR. Hawks Nest Hydro's response to these comments is due to FERC on August 25, 2015, after the filing of the draft license applications, and therefore the final license applications may include further review.

4.0 SUMMARY OF PROPOSED ACTION AND ENHANCEMENT MEASURES

The Licensee proposes to continue to operate the Hawks Nest Project in the manner currently licensed, as described in Exhibits A and B of this license application. The Licensee also proposes additional protection, mitigation, or enhancement measures (PM&Es) for the Project. Proposals presented in this Draft License Application represent provisional proposals which are subject to further refinement and finalization within the Final License Application.

[1] The Cultural Resources Study report was filed with FERC as Privileged under 18 CFR § 388.112 on June 9, 2015.

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As further described in Exhibit E, additional PM&Es proposed by the Licensee are as follows:

- Continue to provide the annual fish compensation payment to the WVDNR at the existing level of compensation to continue to provide funding for WVDNR activities to enhance aquatic resources and develop and maintain public river access sites in the vicinity of the Hawks Nest Project, and to mitigate for potential turbine-induced impacts to fish.

- Every 5 years, prepare in consultation with WVDNR and USFWS and file with the Commission a Resource Enhancement Plan reporting on activities completed by WVDNR utilizing the annual fish compensation payment funding during the previous period and anticipated for the next 5 years.
- Provide the following seasonal minimum flows into the Hawks Nest bypass reach, subject to the parameters discussed in Section E.6.2.2 of Volume II of this license application:
    - July – February: 150 cfs (additional 50 cfs)
    - March – April: 300 cfs (additional 200 cfs)
    - May – June: 250 cfs (additional 150 cfs)
- Develop an updated Streamflow Monitoring Plan for any revised minimum flow targets or requirements, including detail of the mechanisms and structures that would be used and including any periodic maintenance and calibrations necessary for any installed devices and any recording or reporting of data to resource agencies or to FERC.
- Develop and implement an updated Running Buffalo Clover Protection Plan in consultation with USFWS and WVDNR for the term of the new license, to include continued agency consultation and site visit, preparation of an annual report to the Commission, and additional species protection activities, if appropriate
- Continue to annually provide $25,000 (equivalent to current funding level, as separate funding proposed for the Glen Ferris Project) to WVDNR for maintenance of and enhancements to recreation facilities on lands that have been deeded to WVDNR.
- Develop and maintain a central public website for information relevant to flows in the bypass reach, including links to available gages, applicable conversions or calculations to derive real-time flow information, and relevant forward-looking operational information (including that which may be available from upstream dams). Collectively, this flow notification package will facilitate awareness of, and access to the numerous whitewater

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flow conditions and opportunities that already exist today within the bypass reach, but which are not readily known due to limited access to this type of information.

- Identify, design, and construct improvements to the Cotton Hill Bridge Day Use Area parking area (on lands owned by Hawks Nest Hydro). However, because this area is managed by WVDNR, improvements would need to be identified in consultation with WVDNR and are generally expected to include a seasonal toilet/changing facility, new picnic facilities, and parking and signage improvements.
- Maintain the existing Hawks Nest Tailrace Fishing Access Area in accordance with its as-built conditions.
- Provide one-time funding of $50,000 to WVDNR for improvements or enhancements to the Cotton Hill Bridge Day Use Area (on lands owned by WVDNR) with specific improvements to be identified in consultation with WVDNR.
- Develop and implement an updated Recreation Management Plan, describing recreational facilities and access within and immediately adjacent to the project boundary.
- Develop and implement a Historic Properties Management Plan for the Project (to be filed with the final license application) to provide for the protection and management of historic properties within the area of potential effect.

5.0 APPLICATION ROAD MAP

This Draft License Application is composed of five volumes.

VOLUME I OF V

Volume I contains Public information and exhibits as follows:

- **Table of Contents**
- **Executive Summary**
- **Initial Statement**
- **Additional Information Required by 18 CFR §4.32**
- **Exhibit A – Project Description:** Describes the existing and proposed Project facilities.

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- **Exhibit B – Project Operation and Resource Utilization:** Describes the existing and proposed operation of the Project and how the resource is utilized.
- **Exhibit C – Construction History and Proposed Construction Schedule:** Provides a construction history and schedule for proposed construction activities.
- **Exhibit D – Cost and Financing:** Provides information on the cost and financing of the Project including fair market value estimates and net book costs of the existing facilities as prescribed for a new License Application.

VOLUME II OF V

Volume II contains Public information and includes Exhibit E, the Environmental Exhibit. As described above, Hawks Nest Hydro has prepared a joint Exhibit E that is identical in each application. However, there are sections of Exhibit E and the related Exhibit E appendices that only address either the Hawks Nest Project or the Glen Ferris Project. For example, Exhibit E treats the Projects separately in discussing proposed PM&Es and each Project's economics. Nevertheless, in many instances Exhibit E provides information (such as a description of the affected river basins, applicable laws, and affected environment) that is generally applicable to both Projects.

Exhibit E is further split into three parts as follows:

- Part 1 – Exhibit E
    - Table of Contents
    - General Description of the River Basins
    - Cumulative Effects – Geographic and Temporal Scope
    - Applicable Laws
    - Project Facilities and Operations
    - Environmental Analysis - Affected Environment and Environmental Effects (by Resource Area)
    - Economic Analysis
    - Consistency with Comprehensive Plans
    - Literature Cited

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- Part 2 – Exhibit E Appendices, including Consultation Summary

- Part 3 – Final Study Reports[2] (Public) *(to be included with FLAs; however, draft study reports were included as part of the ISR and USR filings and are publicly available on the relicensing website[3])*
    - Water Quality Study
    - Fish Entrainment Study
    - Aquatic Species Composition and Abundance Survey
    - Rare, Threatened, and Endangered Aquatic Species Study
    - Bypass Reach Aquatic Habitat Use and Instream Flow Study
    - Wetland and Riparian Habitat Survey
    - Rare, Threatened, and Endangered Terrestrial Species Study
    - Recreation Flow Assessment
    - Recreation Use and Needs Assessment

VOLUME III OF V

Volume III contains Public information and includes:

- **Exhibit F – List of General Design Drawings:** Includes the list of design drawings filed as Critical Energy Infrastructure Information (CEII) in accordance with 18 CFR § 388.112.

- **Exhibit G – Project Maps:** Includes maps showing the project boundary for the Hawks Nest Project. (*Electronic project boundary files to be included with FLA.*)

- **Exhibit H – Ability to Operate:** Describes the commitment and responsibility of Hawks Nest Hydro as a Licensee to continue to operate and maintain the Project and the needs and costs for power from the Project or alternate sources. (*This section is still under development and will be included with FLA.)*

[2] The Cultural Resources Study reports are being filed with FERC in Volume IV of the license application, as Privileged under 18 CFR § 388.112.

[3] http://www.hawksnestandglenferris.com/content/documents-35722.html

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VOLUME IV OF V (PRIVILEGED)

Volume IV contains Privileged information and includes:

- **Summary Archaeological and Historic Resources Tables and Figures:** Contains summary information about the location and nature of identified historic and archaeological resources within the Project's Area of Potential Effect.
- **Cultural Resources Study Reports**
- **Historic Properties Management Plan (HPMP):** Identifies the nature and significance of historic properties that may be affected by Project maintenance and operation and describes measures for considering and managing the effects on historic properties over the term of the new license. Because much of the information in the HPMP is confidential, it is filed with FERC but not made available to the public. *(This plan is still under development and will be included with the FLA.)*

VOLUME V OF V (CEII)

Volume V contains CEII materials, and includes:

- Exhibit F – General Design Drawings
- Exhibit H – Single-Line Diagrams of the Transmission System

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Initial Statement (18 CFR §4.51(a))

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

APPLICATION FOR A NEW LICENSE FOR A MAJOR WATER POWER PROJECT - EXISTING DAM

HAWKS NEST HYDROELECTRIC PROJECT
(PROJECT NO. 2512)

1. Hawks Nest Hydro, LLC applies to the Federal Energy Regulatory Commission for a new license for the Hawks Nest Hydroelectric Project (FERC No. 2512), as described in the attached Exhibits.

2. The location of the Project is:

State or Territory:	West Virginia
County:	Fayette
Township or Nearby Town:	Ansted
Stream or Other Body of Water:	New River

3. The exact name and business address of applicant is:

Hawks Nest Hydro, LLC
399 Big Bay Road
Queensbury, NY 12804

4. The exact name and business address of each person authorized to act as agent for the applicant in this application is:

Steven P. Murphy
Manager, Licensing
Brookfield Renewable Energy Group
33 West 1st Street South
Fulton, New York 13069
(315) 598-6130
steven.murphy@brookfieldrenewable.com

5. The applicant is a domestic corporation and is not claiming preference under section 7(a) of the FPA.

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6. (i) The statutory or regulatory requirements of West Virginia that affect the Project as proposed, with respect to bed and banks and to the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing and transmitting power and in any other business necessary to accomplish the purpose of the license under the FPA are:

    a. Hawk's Nest Hydro is a Delaware LLC registered to do business in West Virginia, and, as such, can engage in the activities set forth in its organizational documents, which includes the generation, transmission, and distribution of electricity from the Project.

    b. Section 401 of the Federal Clean Water Act, 33 USC §1341 requires that any applicant for a federal license or permit to conduct an activity that will or may discharge into waters of the United States (as defined in the Clean Water Act) must present the federal authority with a certification from the appropriate state agency. Pursuant to W. Va. Code §§22-1-6(d)(7), the West Virginia Department of Environmental Protection (WVDEP) is the state agency designated to carry out the certification requirements prescribed in Section 401 of the Clean Water Act for waters of West Virginia.

    c. The Dam Control and Safety Act, W. Va. Code §§20-14-1 to 22-14-22 is intended to provide for the regulation and supervision of dams to the extent necessary to protect the public health, safety and welfare. This Act makes it unlawful for any person to place, construct, alter, repair, remove or abandon any dam under the jurisdiction of the West Virginia Division of Natural Resources (WVDNR) without having obtained a certificate of approval. Since no modifications to the Project are proposed, this Act has no present applicability to the Project. Additionally, the Dam Control and Safety Act exempts federally licensed Projects and so does not apply to Hawks Nest.

    d. W. Va. Code §24-2-11 which prohibits any public utility, person or corporation from applying for or obtaining any franchise, license or permit from any municipality or other governmental agency, except ordinary extensions of existing systems in the ordinary course of business, until it obtains a certificate of public convenience and

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necessity from the Public Service Commission. This section, when read in its entirety, only applies to utility services furnished to the public. No such public service is contemplated by Hawks Nest Hydro, this section has no present applicability to the Project.

e. Water rights involved are merely the riparian rights appurtenant, under West Virginia law, to the various lands needed for dam site, flowage and tailrace purposes.

(ii) The steps the applicant has taken or plans to take to comply with each of the laws cited above are:

a. Applicant has complied with the requirements of the laws of the State of West Virginia with respect to the right to engage in the business of developing and transmitting power.

b. Applicant will apply to the WVDEP for a Water Quality Certification (WQC) pursuant to Section 401 of the Federal Clean Water Act, 33 USC §1341 and W. Va. Code §§22-1-6(d)(7) and 22-11-7(a) and West Virginia Legislative Rule §47CSR5A. Hawks Nest Hydro will apply for the WQC no later than 60 days after FERC issues the notice of ready for environmental analysis. A copy of the letter requesting certification will be filed with FERC following filing this application.

c. Applicant has performed a number of studies associated with water quality, aquatic resources, terrestrial resources, wetlands, bypass reach flows, recreation, and cultural resources in support of the associated environmental analyses.

7. The Hawks Nest Project has an installed generating capacity of 102 MW. The Project consists of the 102 MW Hawks Nest development on the New River.

8. The Hawks Nest Project does not occupy any lands of the United States.

9. The Hawks Nest Project is an existing constructed project.

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Additional Information Required by 18 CFR § 4.32(a)(2)

(1) Identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate, or maintain the project:

Hawks Nest Hydro presently holds and will continue to hold the proprietary rights necessary to operate and maintain the Project.

(2) Identify (providing names and mailing addresses):

(i) Every county in which any part of the project, and any Federal facilities that would be used by the project would be located:

Fayette County
County Clerk
P.O. Box 569
100 Court Street
Fayetteville, WV 25840

(ii) Every city, town, or similar local subdivision:

(A) In which any part of the project, and any Federal facilities that would be used by the project, would be located:

Town of Ansted
PO Box 798
Ansted, WV 25812

Town of Gauley Bridge
PO Box 490
Gauley Bridge, WV 25085

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(B) That has a population of 5,000 or more people and is located within 15 miles of the project dam:

City of Oak Hill
Fred Dickinson, Mayor
100 Kelly Avenue
Oak Hill, WV 25901

(iii) Every irrigation district, drainage district, or similar special purpose political subdivision:

(A) In which any part of the project, and any Federal facilities that would be used by the project, would be located:

The Project is not located in any irrigation district, drainage districts, or similar special purpose political subdivisions and does not utilize any federal facilities.

(B) That owns, operates, maintains, or uses any project facilities or any Federal facilities that would be used by the project:

There are no irrigation districts, drainage districts, or similar special purpose political subdivisions that own, operate, maintain, or use any project facilities. The Project does not use any federal facilities.

(iv) Every other political subdivision in the general area of the project that there is reason to believe would likely be interested in, or affected by, the application:

There are no other political subdivisions in the general area of the Project that there is reason to believe would likely be interested in, or affected by, the application.

(v) All Indian tribes that may be affected by the project:

There are no Indian reservation lands within the project boundary or immediate project vicinity.

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VERIFICATION

(To be included in FLA)

This application is executed in the

State of : New York

County of : Oswego

By : Steven P. Murphy
Manager, Licensing
Brookfield Renewable Energy Group
33 West 1st Street South
Fulton, NY 13069

The undersigned being duly sworn, deposes and says that the contents of this application are true to the best of his knowledge or belief. The undersigned applicant has signed this application this ____ day of December, 2015.

_____

Steven P. Murphy

Subscribed and sworn to before me, a Notary Public of the State of New York, this ___ day of December, 2015.

_____

Notary Public

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Exhibit A

Project Description (18 CFR §4.51(b))

A.1 PHYSICAL COMPOSITION, DIMENSIONS, AND GENERAL CONFIGURATION (18 CFR §4.51(B)(1))

The Hawks Nest Project is located upstream of the Glen Ferris, on the New River just upstream of the confluence of the New and Gauley Rivers. The Project is located in the towns of Ansted and Gauley Bridge, in Fayette County, West Virginia. As described in detail below, the Hawks Nest Project generally consists of a concrete gravity dam with 14 spillway bays, each with a steel crest gate, a power tunnel intake structure with intake gate, trashracks and a trash rake, a water-conducting tunnel, a surge basin, a surge tank, four water conveying penstocks and one bulkheaded penstock, a manifold, and a powerhouse containing four turbine-generator units. A 5.5-mile long segment ("bypass reach") of the New River extends between Hawks Nest Dam and the powerhouse. The bypass reach occupies a narrow gorge, with heavily wooded mountainsides forming the channel walls. The Cotton Hill Bridge crosses the bypass reach at a point 4.2 miles upstream of the powerhouse. With an exception of an access area in the vicinity of the Cotton Hill Bridge and a couple of informal trails, access to the bypass reach is mostly precluded by steep slopes and vegetation.

A.1.1 Dam

The dam is a concrete gravity structure (mostly a spillway). The dam is approximately 948-feet-long (from left abutment to right abutment[4]) oriented along a generally northwest-southeast axis, with a permanent crest elevation of 795.0 feet. The operating deck above the spillway is at elevation 832.0 feet mean sea level (msl)[5] with upstream and downstream concrete walls extending to elevation 835.5 feet. The maximum height of the dam from the deepest part of the foundation to the operating deck is about 90 feet. There is a drainage and inspection gallery that runs the entire length of the dam with a floor elevation at 773.25 feet. There are 16 relief wells and 9 piezometers located in the drainage gallery.

[4] Throughout this volume, all references to "left" and "right" are defined from the perspective looking downstream.

[5] All elevations in this license application are based on the msl National Geodetic Vertical Datum of 1929 (NGVD29), unless otherwise noted.

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The normal pool elevation of the reservoir is elevation 819.0 feet.

The 14 ogee-type spillway bays are each 50-feet-wide and have a 25-foot-high by 50-foot-wide Stoney-type vertical lift gate. Each gate, including roller trains, weighs 73.3 tons. The concrete crest elevation of each bay is at elevation 795.0 feet and the top elevation of the gates is at elevation 820.0 feet in the closed position. Separating each spillway gate bay is a 9-foot-wide concrete pier.

The crest gates are operated by two gantry cranes on rails running the entire length of the dam. Each crane has a lifting capacity of 100 tons. Each crane has a lifting beam with an automatic device for engaging and disengaging the gate to be moved. The gates can be latched open at various heights of lift. The two cranes are equipped with electric controls so that all 14 gates may be raised or lowered by remote control from the powerhouse control room (gates 1 through 7 are on one trolley power system, and gates 8 through 14 are on a second trolley power system).

In 2013-2014, 49 post-tension anchors were installed in the 31 monoliths comprising the 14 spillway bays of the ogee spillway structure, with each monolith getting one or two 28- to 50-strand anchors with design loads ranging from 987 kips to 1762 kips, respectively. The encapsulated anchors with grout encased epoxy strands extend the full length of each strand. Documentation of completion of the post-tension anchor installation is contained in the final project completion report filed by Hawks Nest Hydro on March 9, 2015 with the Commission and subsequently approved by the Commission on April 16, 2015.

Located between the main spillway section and the right abutment is a 10-foot-wide trash spillway which is equipped with steel stoplogs and has a sill elevation of 810.0 feet. The trash spillway stoplogs (“trash gate”) are operated by an electric motor, as required, to pass debris and to maintain the required minimum flow.

The dam has non-overflow sections which adjoin each abutment. On the right abutment, the non-overflow section extends to the bedrock abutment, and is about 30 feet long with a 15-foot cutoff wall to the bedrock abutment. The left non-overflow section is about 30 feet long with a core wall that is 105 feet long and ends with a vertical wall about 7 feet high.

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An earthen embankment dike is located upstream of the left abutment. A buried concrete core wall with a crest elevation of approximately 832.0 feet extends into the abutment.

There are six steel-lined low level sluices located beneath gates 5, 6, and 7 in the spillway. Each sluice is 7 feet 8 inches in diameter and controlled by a 9-foot butterfly valve, with operating gear contained in the drainage and inspection tunnel that runs longitudinally through the dam. The sluice inlets are equipped with steel trashracks and stoplog slots. The low level sluices have not been regularly operated historically and are not presently operable.

A.1.2 Intake

The intake to the water-conducting tunnel is located along the right shoreline of the reservoir just upstream from the dam. The opening is rectangular in shape with dimensions of 111.5-feet-wide and 52.5-feet-high, tapering in a distance of 58 feet, 8 inches to a section 34 feet square. The intake is equipped with trashracks and a Stoney-type bulkhead intake gate, which is located approximately 50 feet from the opening where the trashracks are located. The gate and lift structure are situated in front of a near vertical rock face. The gate is operated from an overhead steel frame by electric motors that can be controlled either by the local operator or by remote control from the powerhouse control room. The gate has dimensions of 42-feet-high by 34.5-feet-wide, with two internal 4.5-foot-square "filler" gates that can be independently operated. The tunnel headgate is located within the 34-foot square section. A transition from the 34-foot-square section to the 31-foot circular tunnel section ends at a distance of 101 feet, 6 inches from the entrance.

The intake trashracks are 110 feet wide and 51 feet high and have bar spacing of 3.5-inches on center.

A.1.3 Tunnel

The underground tunnel extends from the end of the intake transition to the penstock system, a distance of 16,240 feet. Of this total length, 10,230 feet is lined, and the remaining portion is unlined through bedrock. The lined sections are circular, while the unlined sections are more oval in shape. The unlined sections are located upstream of the surge basin in the vicinity of Big

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Creek (about 1,300 feet), and between the surge basin and the surge tank (about 4,700 feet). The tunnel lining is generally concrete, but in the vicinity of the surge tank, an approximately 2,600-foot-long section is steel-lined (30-foot diameter).

A.1.4 Surge Basin

The surge basin is a large concrete-lined pool at the ground surface with a tunnel adit (a gently sloping tunnel shaft) connection from one end of the basin to the water-conducting tunnel. At a point approximately 60 percent of the distance from the intake to the powerhouse, the tunnel connects to the surge basin through the adit. The adit is also concrete-lined. The basin is approximately 600 feet long and 170 feet wide. The bottom of the basin is at elevation 800.0 feet, and the top of the parapet wall around the basin is at elevation 830.0 feet. Along one side of the basin is an approximately 150-foot-wide overflow spillway. The crest of the spillway is at elevation 820.0 feet and discharges to the New River bypass reach. Steel trashracks are installed at the portal of the adit to prevent objects from entering the tunnel from the surge basin. Steel stoplogs for sealing off the tunnel from the surge basin are stored at the adit.

A.1.5 Surge Tank

The tunnel connects through a vertical shaft to the surge tank just upstream of where the tunnel reaches the manifold. The steel differential surge tank is located at the downstream end of the water-conducting tunnel just upstream of the manifold and the penstocks. The riveter steel surge tank is 116 feet in diameter and 56 feet high and is located on the hillside east of the powerhouse. The base of the surge tank is at elevation 787.0 feet, and the rim is at elevation 843.0 feet. The surge tank is connected to the tunnel by a 28-foot-diameter, steel-lined vertical riser. The tunnel at this point is also steel-lined and has a diameter of 30 feet. The centerline of the tunnel directly beneath the surge tank is at elevation 716.0 feet.

A.1.6 Penstocks and Manifold

As the water-conducting tunnel nears the powerhouse, the penstock to each turbine generator successively exits the tunnel and the tunnel diameter reduces to 30 feet. The penstock system includes a main penstock 30 feet in diameter and 107 feet long, a manifold, and five (5)

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penstocks, each 14 feet in diameter, with varying lengths of 42 feet to 132 feet, leading from the manifold to four (4) turbines in the powerhouse. The penstocks and manifold are of welded steel reinforced with concrete and heavy steel circumferential rods. The fifth penstock, which was built for an additional generating unit, is bulkheaded off with a steel and concrete bulkhead and the downstream end is filled in with approximately 10 feet of concrete. There are four butterfly penstock valves, one for each turbine unit, located at the end of the penstocks where they enter the powerhouse. The entire penstock system is located in an underground chamber, situated beneath the outdoor switchyard.

A.1.7 Powerhouse

The 210-foot-long by 50-foot-high by 74.5-foot-wide powerhouse substructure is constructed of mass and reinforced concrete and is founded on solid bedrock. The powerhouse is a multistory brick and concrete structure with five generation bays but only four turbine generators. Each turbine generator is rated at 25.5 MW. The centerline of the scroll cases for each generating unit is at elevation 663.0 feet, which is 157 feet below the normal pool at Hawks Nest Dam. Discharge from the turbine generators is through submerged draft tubes into the New River.

A.1.8 Tailrace

During original Project construction, a ledge was excavated for a short distance downstream of the powerhouse to improve flows out of the powerhouse. This excavation runs beneath the Chesapeake and Ohio Railway Bridge.

A.2 IMPOUNDMENT SPECIFICATIONS (18 CFR §4.51(B)(2))

The 6.9-mile-long reservoir for Hawks Nest Dam is situated in a narrow valley with an average width of approximately 500 feet. The reservoir extends from approximately the Marr Branch confluence, located downstream of the New River Gorge Bridge, to Hawks Nest Dam. The total length of the impoundment shoreline is approximately 15.7 miles. The drainage area at the reservoir is 6,913 square miles. At normal pool, the reservoir has a surface area of 243 acres and a gross storage capacity of 7,323 acre-feet. Because the Project is operated as run-of-river as further explained below, the reservoir has no significant usable storage capacity.

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As presently constructed, the maximum reservoir elevation is 820.0 feet. The Hawks Nest Project operates in a run-of-river mode, with inflow to the Project approximating outflow, with an approved seasonal ramping rate. The surface of the reservoir is typically operated at 819.0 feet. Operation of the Project below 818.50 feet would require notification to WVDNR. The reservoir does not typically rise above 819.5 feet during normal operations. Operation of the Project in this range provides a minimum of 0.5 feet of freeboard to provide limited storage (approximately 122 acre-feet) to decrease the risk of overtopping the dam in the event of a typical powerhouse load rejection event and to facilitate implementation of the seasonal ramping rate requirement for the protection of downstream public safety and aquatic resources, as described more fully in Exhibit B.

A.3 TURBINE AND GENERATOR SPECIFICATIONS (18 CFR §4.51(B)(3))

The Hawks Nest powerhouse contains four identical vertical Francis turbines manufactured by I. P. Morris. The turbines are rated at 35,000 horsepower (hp) at 157 feet of net head and a speed of 150 rotations per minute (rpm). The runners are fabricated of cast steel with a throat diameter of 125 inches. The distributor centerline is located at an elevation of 663.0 feet, which is approximately 7.3 feet above tailwater at 10,000 cubic feet per second (cfs) discharge. The minimum and maximum hydraulic capacities of each turbine are 800 cfs and 2,540 cfs, respectively. The turbines generally operate over this full range of flows. Turbine details are summarized in Table A-1.

The four identical generators are Westinghouse Umbrella generators with a 30,000 kVA rating, 0.85 power factor, 3-phase, frequency of 25 Hz, voltage 6,900, and speed of 150 rpm. 6.9 kilovolt (kV) generator leads are included as part of the Project. Unit 4 suffered a generator failure in 2013 and was subsequently reassembled, refurbished, and rewound to match its original specifications. Generator details are summarized in Table A-2.

The Hawks Nest turbine units have a total installed capacity of 105.0 MW, and the generators have a total installed capacity of 102.0 MW. Because the authorized installed capacity means the lesser of the ratings of the generators or turbine units, the Hawks Nest Project is considered by

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FERC to have a total authorized capacity of 102.0 MW, and at this output, the nominal hydraulic capacity of the Project is considered to be 10,000 cfs.

TABLE A-1 HAWKS NEST PROJECT TURBINE SPECIFICATIONS

	Unit 1	Unit 2	Unit 3	Unit 4
Type	Vertical, Francis	Vertical, Francis	Vertical, Francis	Vertical, Francis
Manufacturer	I.P. Morris	I.P. Morris	I.P. Morris	I.P. Morris
Year installed	1931-1933[1]	1931-1933[1]	1931-1933[1]	1931-1933[1]
Last overhaul date	None	1999	None	None
Rated capacity (hp)	35,000	35,000	35,000	35,000
Rated head (ft.)	157	157	157	157
Speed (rpm)	150	150	150	150
Runner replacement date	N/A - Original	N/A - Original	N/A - Original	N/A - Original
Runner material	Cast Steel	Cast Steel	Cast Steel	Cast Steel
Runner Manufacturer	Original	Original	Original	Original
Minimum hydraulic capacity	800 cfs	800 cfs	800 cfs	800 cfs
Maximum hydraulic capacity	2,540 cfs	2,540 cfs	2,540 cfs	2,540 cfs
Governor Type	Woodward GS Electro- mechanical	Woodward GS Electro- mechanical	Woodward GS Electro- mechanical	Woodward GS Electro- mechanical
Governor Installation Date	Upgrade 1972-1973	Upgrade 1972-1973	Upgrade 1972-1973	Upgrade 1972-1973

[1] Hawks Nest began partial commercial operation in 1936 and full operation in 1937. The units were installed between 1931 and 1933. Plant operation was delayed until 1936 due to an earlier penstock collapse requiring redesign, major repairs, and addition of the surge tank.

TABLE A-2 HAWKS NEST PROJECT GENERATOR SPECIFICATIONS

	Unit 1	Unit 2	Unit 3	Unit 4
Type	Vertical	Vertical	Vertical	Vertical
Manufacturer	Westinghouse	Westinghouse	Westinghouse	Westinghouse (refurbished by NEC)
Year installed	1931-1933	1931-1933	1931-1933	1931-1933 (refurbished 2014)
Rating (kVA)	30,000	30,000	30,000	30,000
Power Factor	0.85	0.85	0.85	0.85
Phases	3	3	3	3
Frequency (Hz)	25	25	25	25
Speed (rpm)	150	150	150	150
Voltage (V)	6,900	6,900	6,900	6,900
Last rewind	None	1999	None	2014

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A.4 TRANSMISSION LINE AND EQUIPMENT SPECIFICATIONS (18 CFR §4.51(B)(4-5))

A.4.1 Transmission Lines

Each generating unit has a dedicated step-up transformer (unit type topology) with a generator breaker at 69 kilovolts (kV) (25 Hz). The length of each generator lead is approximately 200 feet. The Hawks Nest switchyard has double 69-kV busses (bus A and B). Each generating unit can be switched to bus A or bus B. Both 69-kV lines can also be switched on both busses through a pair of line breakers. The normal operating topology is two generating units and one outgoing line per 69-kV bus. The switchyard is designed to accommodate one additional transmission line at 69-kV and one additional generating unit.

A 6.9-kV (25 Hz) transmission line provides station power from the Hawks Nest powerhouse to the Hawks Nest Dam. This approximately 3.1-mile-long overhead transmission line follows the course of the power tunnel. The Hawks Nest Project also includes two parallel, approximately 5.5-mile-long, 69-kV transmission lines that connect the substation at the Hawks Nest powerhouse to the Alloy Substation. (The transmission lines run in parallel with the one 13.8-kV Glen Ferris Project transmission lines that connect the Glen Ferris substation with the Alloy Substation.) No other transmission lines are included in the Project.

A.4.2 Appurtenant Equipment

The turbine-generators are controlled by digital governors rated at 30,000 foot-pounds. Each governor is equipped with a solenoid-operated shutdown system, oil pressure relays, and limit switches.

Each turbine is provided with a 15-foot-diameter hydraulically operated, butterfly style, shutoff valve. Each valve has its own hydraulic system with pressure tank, pressure pumps and motors.

The governor hydraulic oil system contains most of the original hydraulic components although the governors for all four units were upgraded to Woodward Type GS actuator in 1972 to 1973. The governor oil system is a low pressure system with a normal operating pressure of 175 pounds per square inch gauge (psig). Each unit has a 25 hp electric motor driven rotary oil pump,

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unloader valve and sump tank. There is a common pressure (accumulator) tank for each pair of units. The pressure tanks, oil pumps and motors are located on the operating floor. The sump tank is located on the floor below the operating floor.

The air system consists of two 10 hp electric motor driven air compressors, two receiver tanks, and two refrigerated air driers. The normal air system operating pressure is 175 psig. Air is supplied to the governor and accumulator tanks to provide the pressure cushion and to the generator air brake mechanisms. Air is also supplied for the general plant air system for maintenance uses.

The basement elevation includes a small sump pit for accumulating and discharging accumulated station leakage to the tailrace. The sump pit contains two vertical shaft sump pumps each rated at 200 gallons per minute. There is an emergency sump pump rated at 400 gallons per minute. The sump includes an oil detector which alarms to the plant control room plus a closed circuit TV camera for the operator to monitor the sump.

Service water is normally supplied off head pressure with takeoffs at each penstock. The normal water pressure is approximately 60 to 65 psig. There are also two emergency service water pumps tied into the service water system rated at 125 gallons per minute (gpm). Each generator is equipped with a water based fire suppression system. All four units are equipped with a water based fire suppression system. The transformer yard includes an automatic deluge system for the four transformers. This system works off static penstock pressure, but also includes a motor-driven pump for emergency water supply.

The Hawks Nest facility is equipped with an oil storage and purification system which is used during unit outages. The system consists of two large oil tanks of approximately 1,800 gallon capacity each, one for storing dirty oil and the other clean oil. The system also includes a centrifuge style oil purifier with two rotary pumps.

Each generator has a shaft mounted exciter rated at 100 kilowatt (kW).

The generator room is spanned by an overhead traveling crane with a main hoist of 175 tons capacity and two auxiliary hoists of 35 tons each. The crane is operated by 25 Hz, 440 volt motors.

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The Hawks Nest facility is monitored and operated from the control desk located in the control room in the powerhouse. The control room contains the main and auxiliary switchboards, water level recording instruments, and an annunciator panalarm system panel. The main switchboard has a panel for each of the four turbine-generators, one for each of the two connected transmission lines and one for redac supervisory remote control of the Hawks Nest Hydro Station.

The outdoor switchyard contains transformers, oil circuit breakers, disconnecting switches, lightning arrestors, and duplicate bus bars on the high tension side of the transformers.

There are four main power transformers, each rated at 30,000 kVA, 3 phase, 25 Hz, and steps voltage up from 6,900 volts to 69,000 volts. These transformers are protected by an automatic fire protection sprinkler system connected to an adjacent pump house which contains appropriate pumps, deluge valves, alarms, and automatic control devices. Duplicate auxiliary power transformers in the switchyard step down the 6,900 volt generator voltage to auxiliary bus voltage of 460 volts. Additionally, an auxiliary dam feeder transformer increases the voltage from the bus to the 6,900 volt and a 3-phase 25-hertz service line carries energy from the Hawks Nest Station auxiliary power bus to electrical equipment at the Hawks Nest Dam. The voltage at the dam is then stepped down by a service transformer to 440 volts.

A 28 conductor remote control and communication cable is installed from the powerhouse to the dam. Also installed is a multiplex tone operated system with transmitters and receivers at the dam and at the powerhouse control room.

A.5 UNITED STATES LANDS WITHIN PROJECT BOUNDARY (18 CFR §4.51(B)(6))

There are no lands of the United States included within the project boundary of the Hawks Nest Project.

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Exhibit B

Project Operation and Resource Utilization (18 CFR§4.51(c))

B.1 DESCRIPTION OF PLANT OPERATIONS (18 CFR §4.51(C)(1))

B.1.1 General Project Description and Overview

B.1.1.1 Drainage Basin Description

The watershed above Hawks Nest Dam extends into North Carolina and Virginia and drains a total area of 6,913 square miles. The New River flows in a general north-northwest direction, with its origins in the Blue Ridge Mountains. There are five dams located on the mainstem New River upstream of Hawks Nest, with the two closest to Hawks Nest being Bluestone Dam (owned and operated by the U.S. Army Corps of Engineers – Huntington District) (USACE), located in Summers County, West Virginia, approximately 65 miles above the mouth of the New River, and then Claytor Dam (owned and operated by Appalachian Power Company, a subsidiary of American Electric Power). Stream flow records are available from 25 locations on the river, so the river flow is well documented. The New River stream flow characteristics are typical of the West Virginia area: the summer and fall are usually dry, and the winter and spring are usually wet. The land elevation varies from 5,400 feet on Rich Mountain near the southern extreme of the drainage basin to 800 feet at Hawks Nest Dam. The relief is characterized by plateau lands, dissected plateau lands, and limestone valleys and mountain ridges in approximately equal amounts. The majority of the streams in the watershed are relatively steep, and most of the valleys are narrow and flanked by steep hillsides.

B.1.1.2 Hawks Nest Reservoir and Upstream Area

Normal pool in the Hawks Nest impoundment is typically maintained by the spillway gates and generation at about elevation 819.0 feet mean sea level (msl). At this elevation, the impounded reservoir has a surface area of approximately 243 acres. The average annual peak inflow at the Hawks Nest Project is about 65,500 cfs (for the period of record between 1954 and 2014).

Inflow to the Hawks Nest Project is primarily regulated by USACE's Bluestone Dam, which was constructed for flood control, recreation, and fish and wildlife enhancement by authority of an

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Executive Order of the President on 12 September 1935, and the Flood Control Acts of June 22, 1936 and June 28, 1938. Bluestone Dam was constructed in 1949, after construction of Hawks Nest Dam in the 1930s, and more recently than the flood of record for the New River (1940, 244,000 cfs at the historical U.S. Geological Survey (USGS) Caperton Gage). The Bluestone Reservoir/Dam controls 4,565 square miles of the Project watershed and stores 631,000 acre-feet when full. With regard to the probable maximum flood (PMF) at Bluestone, the peak inflow is 1,086,000 cfs and the peak outflow is 1,010,780 cfs. Bluestone Dam provides a limited extent of flood control for the basin year-round and is typically operated with a drawn down seasonal reservoir level during the winter and early spring months, for additional flood control storage during the time of year when general flooding most frequently occurs. Under typical flood operation, USACE limits the maximum control discharge from Bluestone Dam to 90,600 cfs at the Hinton gage.

B.1.2 Project Operation

The Hawks Nest Project is operated on-site from the powerhouse control room, which is staffed 24 hours per day, 7 days per week, including weekends and holidays. In general, there are typically ten people on site, during business hours Monday through Friday and one person on weekends. The Project is observed daily by operating personnel.

Plant control (powerhouse and two spillway gates) is conducted via a remote terminal unit (RTU) and/or electrical equipment from the control room. In the event of the loss of RTU communication, a local operator is dispatched to operate the plant manually.

The reservoir level is maintained through power generation and release of the required minimum flow from the trash gate at the right end of the spillway, and additional spill through the spillway gates when inflow exceeds powerhouse capacity. The Hawks Nest Project operates in a run-of-river mode, with inflow to the Project approximating outflow, with an approved seasonal ramping rate. The surface of the reservoir is typically operated at 819.0 feet. Operation of the Project below 818.50 feet would require notification to WVDNR. The reservoir is not typically operated more than 0.5 feet above the normal pool level. Operation of the Project in this range provides flexibility to maintain the required minimum flow release and make minor adjustments in anticipation of significant inflow based on releases from Bluestone Dam or local precipitation

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events. Moreover, this operating mode provides pond level flexibility to achieve compliance with the seasonal ramping rate, described in section B.1.3, under most conditions, and to prevent overtopping of the dam due to limited load rejection events at the Hawks Nest powerhouse. For Hawks Nest Dam, overtopping would consist of flow going downstream over the dam rather than through the spillway gates. A variety of potential events could necessitate a sudden diversion of Hawks Nest powerhouse flow to the Hawks Nest reservoir and downstream reach (e.g., lightning strike, grounded circuit trip, generator over speed trip, overload protection relay trip, or temperature trip) and even temporary shutdown of the powerhouse. Of significance for daily Hawks Nest Project operations is the potential for modified power generation to adjust for load changes at WVAM's alloy facility. All of the power generated from the Hawks Nest Project is utilized by the alloy facility. Furnaces at the alloy facility are taken off-line for routine maintenance and for emergency shutdowns, or through tripping of regulated equipment. When a furnace is taken off-line, a corresponding amount of power must be reduced, and commonly this reduction must be from the Hawks Nest powerhouse.

Upstream river stage below Bluestone Dam is monitored (via USGS gage 03184500 New River at Hinton, West Virginia and periodic communications with USACE) such that the Hawks Nest Hydro operator in the control room of the powerhouse can anticipate spillway gate and power generation operations. The control room operators are responsible for controlling the gates (14 spillway gates and the trash gate) at the dam to balance the river flow released into the New River bypass reach and the river flow diverted into the power tunnel for generation purposes. Supervisory data and control signals are telemetered between Hawks Nest Dam and the control room at the powerhouse. Two gates at the Hawks Nest Dam are connected at all times to the gantry cranes and can be remotely operated from the control room. Operators set these remotely controlled spillway gates at the appropriate opening to manage the excess river flow while sustaining the reservoir elevation. The upstream USGS gage below Bluestone Dam is utilized to determine the need for additional spillway gates and discharge. Operation of additional gates requires that the gantry cranes at the dam be moved by personnel at the dam.

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In accordance with the Flow Change Warning Plan approved by FERC in 1991[6], a siren at the dam is sounded 5 minutes prior to any spillway gate operation that increases the river level downstream of the dam, with delayed soundings of additional sirens in the bypass reach in the (e.g., vicinity of the Cotton Hill Bridge and in the vicinity of the surge basin). Additionally, the area immediately downstream of the dam is visually inspected by operations personnel via an installed surveillance camera that displays to the control room.

In accordance with the Project's Dam Safety Surveillance and Monitoring Plan, the dam and powerhouse are observed daily by operating personnel. Additionally, the Project structures are inspected annually by Brookfield engineers, as well as after significant earthquakes (felt earthquakes or earthquakes that have occurred locally which have received coverage by local news reporting outlets) and significant floods. Inspections of the Hawks Nest Project are also conducted annually by the FERC Division of Dam Safety and Inspections - New York Regional Office and every 5 years by an independent consultant under 18 CFR Part 12.

B.1.3 Project Operations during Low- and Mean-Flow Periods

Due to the lack of significant usable storage capacity, the Hawks Nest Project is operated as a run-of-river facility under all conditions of stream flow, except as needed to implement the FERC-approved ramping rate described below or if temporarily modified if required by emergencies beyond the Licensee's control. The control room operators monitor the Hawks Nest reservoir to minimize reservoir elevation changes and maintain the normal pool level of approximately 819.0 feet.

A minimum flow of 100 cfs is released at the dam into the bypass reach. With the minimum flow requirement of 100 cfs provided at the dam, the balance of the flow is dispatched through the power tunnel for powerhouse operations. The individual turbine-generator units each have a discharge rating of approximately 2,500 cfs, for a four-unit discharge capacity of approximately 10,000 cfs. During low flow periods, the available powerhouse flow is apportioned to two turbine-generator units. Although this results in a less efficient output generation from two 25-

[6] 54 FERC ¶62,080

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Hz units, this is necessary for the operation of the alloy facility. The continuous generation of two Hawks Nest units is essential for providing stability to the isolated 25-Hz electrical system used by WVAM for their production systems, as further described Section B.3.

River flow in excess of the powerhouse capacity (approximately 10,000 cfs) and required minimum flow (100 cfs) is released through the spillway gates. Based on the annual flow duration curve (see section B.2.1), the normal river flow is less than or equal to 10,100 cfs approximately 70 percent of the time.

The continuous minimum flow of 100 cfs is typically released through the trash gate. The 14 Stoney-type spillway gates are operated as needed to pass excess streamflow according to a preset schedule to maintain the normal reservoir elevation of 819.0 feet based upon upstream flow conditions and follow an approved ramping rate schedule between March 1 and October 31 when river flows are less than 12,600 cfs, for the protection of downstream public safety and aquatic resources. The ramping rate consists of 0.5-foot gate opening increments with a 45-minute time delay between gate movements. The incremental gate openings and time steps remain in place until the minimum opening of 2 feet is reached, corresponding to a spillway discharge of approximately 2,600 cfs. The intent is to maintain an upward or downward ramping rate not greater than 1-foot per hour, as measured at the downstream upper Cotton Hill site and USGS gage (USGS 380649081083301 New River below Hawks Nest Dam, West Virginia) and to maintain the reservoir elevation below the maximum 820.0 feet. In accordance with the Commission's 1991 Order Approving and Modifying Ramping Rate and Amending Mode of Operation[7], the approved ramping rate may be modified, if necessary, to prevent overtopping of the Project dam or spillway gates.

B.1.4 Project Operations during High-Flow Periods

In the event of a significant hydrological event, the 14 spillway gates are operated to pass inflow in excess of the powerhouse capacity (approximately 10,000 cfs). The spillway gates have a

[7] 52 FERC ¶62,244

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maximum opening of 22 feet and can be individually removed in preparation for an extreme flood. At the normal reservoir level, each spillway gate has a discharge capacity of about 23,900 cfs. The gates are lifted by one of two gantry cranes that operate on the operating deck of the dam. If multiple gates must be opened to maintain the pool elevation, each gate is successively dogged into position subsequent to lifting. The cranes are electrically operated and an emergency generator is located at the right abutment of the dam. Movement of the gantry cranes from bay to bay at the dam must be performed by an operator at the dam. Once the crane hoists are engaged with the spillway gates, the gates can be lifted by remote control from the powerhouse. The discharge capacity of the spillway with all the spillway gates fully opened at normal maximum operating elevation is approximately 334,600 cfs. The trash gate at the right end of the spillway can discharge up to 333 cfs.

B.1.5 Plant Factor

Based on actual gross energy produced during calendar years of 1954 through 2011 and the rated plant capacity of 102,000 kW, the plant capacity factor is estimated to be 0.585.

B.2 ESTIMATED ENERGY PRODUCTION AND DEPENDABLE CAPACITY (18 CFR §4.51(C)(2))

Based on the average for the years 1989 through 2014, the estimated annual gross energy production is 544,253 MWh. The Project experiences significant seasonal and annual variations in generation due to its run-of-river operating mode and seasonal precipitation events. Table B-1 provides a summary of monthly facility generation for the period 2005 through 2014.

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TABLE B-1
HAWKS NEST PROJECT MONTHLY GENERATION (MWH), 2005 TO 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Jan	64,198	64,168	68,293	61,192	54,793	64,692	38,861	69,631	59,213	54,810
Feb	65,224	51,586	44,156	61,897	45,598	67,244	48,848	66,784	60,353	51,032
Mar	72,437	41,012	68,495	21,163	64,474	72,820	72,432	74,580	74,308	56,555
Apr	68,100	63,099	66,032	20,347	68,309	65,277	70,796	64,609	72,547	55,809
May	59,774	39,616	50,903	13,819	67,019	64,397	75,556	70,372	67,030	53,926
Jun	39,201	28,566	28,078	11,912	61,940	39,030	34,796	32,289	53,386	30,939
Jul	44,289	42,206	22,198	14,308	32,999	20,105	22,729	21,560	55,036	18,789
Aug	34,973	20,294	11,460	18,608	36,811	24,503	12,870	19,122	55,011	31,179
Sep	14,222	28,145	10,635	45,376	24,952	10,697	28,288	23,537	37,716	24,395
Oct	19,456	41,383	49,211	9,864	34,052	15,405	23,111	23,748	28,770	37,251
Nov	23,409	62,638	54,487	14,477	56,357	16,701	40,589	27,132	27,436	36,554
Dec	33,535	43,044	65,130	43,773	71,263	37,590	65,460	35,176	54,937	53,757
Total	**538,818**	**525,757**	**539,078**	**336,736**	**618,567**	**498,461**	**534,336**	**528,540**	**645,741**	**504,995**

The estimated dependable capacity at Hawks Nest is 16,400 kW based on a stream flow of 1,359 cfs (Hawks Nest Hydro, LLC 2012). This is the lowest average thirty consecutive day stream flow recorded during the period of record, which has been defined by the Licensee as 1954 to present. The Licensee notes that this period of record generally reflects the construction of two major projects which have altered New River flows above Hawks Nest, Claytor Lake in 1939 and Bluestone Lake in 1949, and is representative of current and future stream flows.

B.2.1 Flows

No USGS gauging station of sufficient record is located near the Hawks Nest intake on the New River. The closest upstream gage is USGS gage 03185400 "New River at Thurmond, West Virginia," which is located approximately 15 river miles upstream of the Hawks Nest reservoir and does not capture intervening drainages that affect inflows to the Hawks Nest Project. However, the hydrology of the area in the vicinity of the Project is such that approximately 7

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miles downstream from the Hawks Nest intake the New River joins the Gauley River at the town of Gauley Bridge to form the Kanawha River. Therefore, the USGS gauging stations located on the Gauley and Kanawha Rivers and near the Town of Gauley Bridge have been utilized to determine flow data for the New River at the Hawks Nest intake. The gauging stations used are USGS gage 93192000, "Gauley River above Belva, WV", which is located 6.7 river miles upstream from the point of confluence of the New and Gauley Rivers, and USGS gage 03193000, "Kanawha River at Kanawha Falls, WV", which is located 2.0 river miles downstream from the point of confluence of the New and Gauley Rivers. Flows of the New River at the Hawks Nest intake were determined by multiplying the difference between the flows of the Kanawha and Gauley Rivers by a factor of 0.98 to compensate for the drainage area between the Hawks Nest intake and these gauges.

Table B-2 provides flow data for the New River in the vicinity of the Hawks Nest Project based on the Kanawha and Gauley River gages described above.

TABLE B-2 NEW RIVER FLOW DATA IN THE VICINITY OF THE HAWKS NEST HYDROELECTRIC PROJECT, 1954 THROUGH 2014

Month	Flow, cfs			
	Average	Minimum	Median	Maximum
January	12,350	1,316	8,700	93,900
February	14,974	1,740	10,995	91,300
March	18,695	2,506	13,800	93,200
April	15,250	2,880	11,525	90,800
May	12,005	2,224	8,885	69,790
June	7,422	1,350	5,145	66,700
July	4,763	110	3,756	64,500
August	4,121	822	3,014	46,200
September	3,670	800	2,429	55,000
October	4,629	750	2,779	68,100
November	6,688	1,170	4,140	74,800
December	10,024	1,321	7,000	73,900
Annual	9,528	110[a]	5,966	93,900[b]

[a] July 15, 1954
[b] January 20, 1996

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An annual as well as monthly flow duration curves for flows through the Hawk Nest Project are included at the end of this Exhibit (Figure B-3). The flow duration curves are based on flow data from 1954 through 2014 for the Gauley River above Belva, WV and Kanawha River at Kanawha Falls, WV USGS gages, adjusted for the Hawks Nest drainage area, as described above.

Under the existing license, a continuous minimum flow of 100 cfs is maintained for the conservation and maintenance of aquatic resources in the river bed between Hawks Nest Dam and the tailrace of the Hawks Nest powerhouse.

Due to the small surface area of the impoundment, evaporation is not considered to be a significant factor. Leakage at the dam is also not a significant contributor to flows in the bypass reach.

B.2.2 Capacity Curve

Due to the steep banks that form the shoreline of the Hawks Nest impoundment, the minimal fluctuations in the reservoir level between normal maximum and normal minimum cause very little change in the surface area of the impoundment. Consequently, a site specific area-capacity curve and impoundment rule curve have not been developed for, nor is necessary to the current and future operation of the Project.

The Hawks Nest reservoir has a gross storage capacity of 7,323 acre-feet.

B.2.3 Hydraulic Capacity

At the generator-limited installed capacity of 102 MW, the rated maximum hydraulic capacity of the powerhouse is approximately 10,000 cfs. The minimum hydraulic capacity of the powerhouse is approximately 800 cfs.

B.2.4 Tailwater Rating Curve

Figure B-1 depicts the tailwater curve associated with the Hawks Nest Project. The Hawks Nest powerhouse releases water into an excavated ledge known as Narrows Falls, which is located a short distance downstream from the powerhouse, and joins the bypass reach approximately 5.5 miles downstream of the dam.

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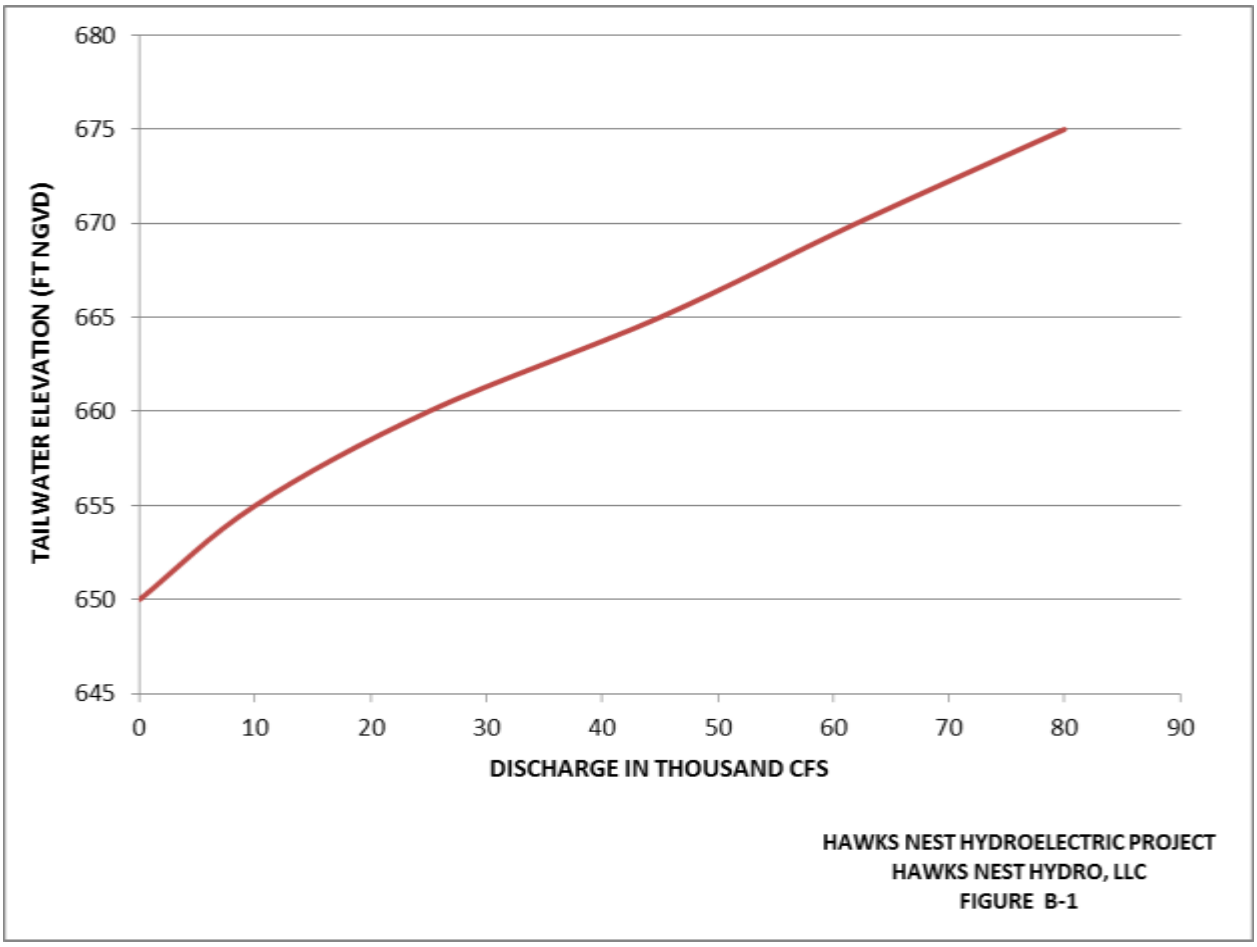
FIGURE B-1. HAWKS NEST PROJECT TAILWATER RATING CURVE



B.2.5 Powerplant Capability versus Head

Figure B-2 shows a curve displaying powerhouse capability as a function of head. The maximum, normal, and minimum heads are noted on the curve.

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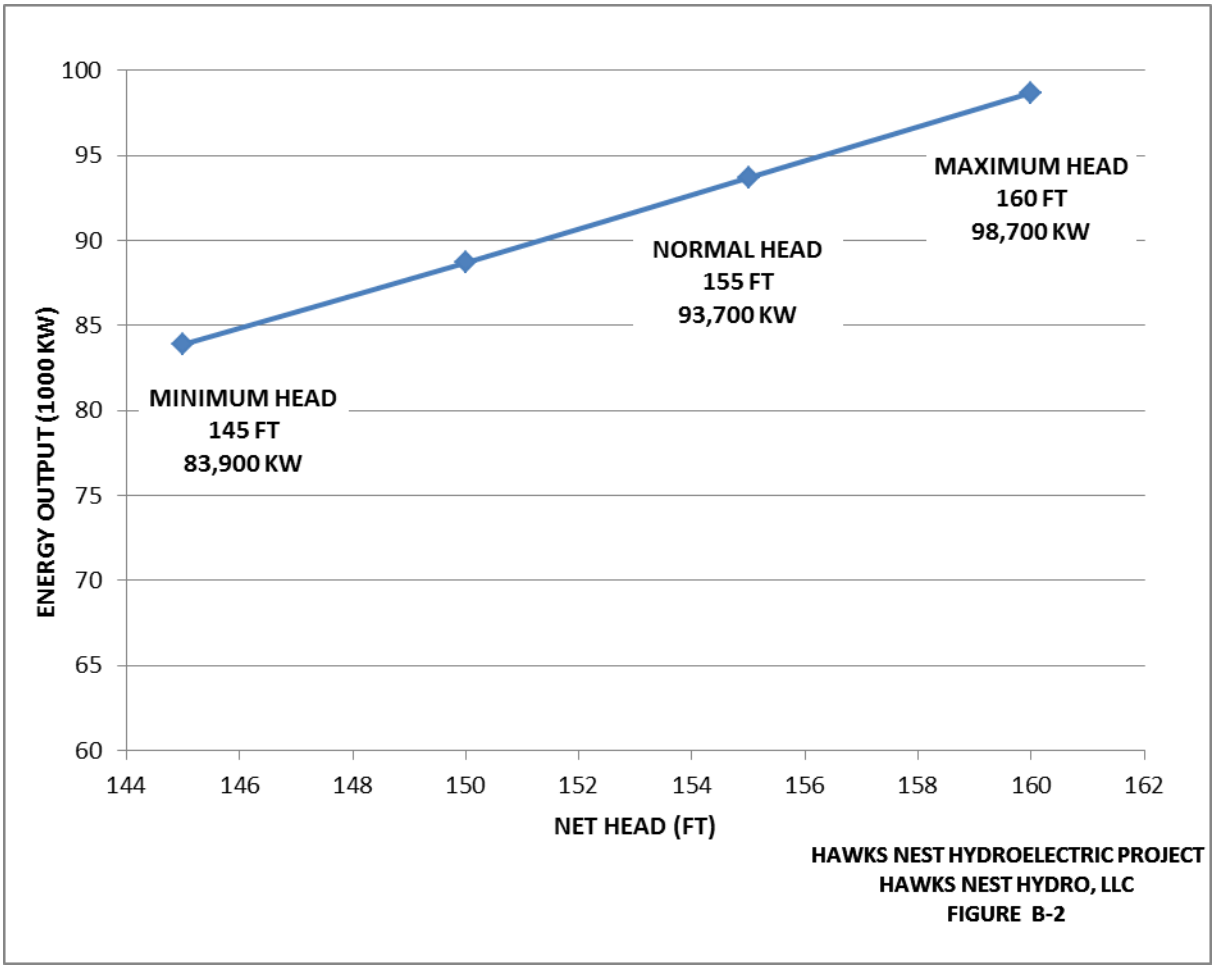
FIGURE B-2. HAWKS NEST POWERHOUSE CAPABILITY AS A FUNCTION OF HEAD



B.3 STATEMENT OF POWER UTILIZATION (18 CFR §4.51(C)(3))

Under an existing agreement, Hawks Nest Hydro sells all of the electricity generated at the Hawks Nest Project to WVAM. All the net energy generated at the Hawks Nest Project is transmitted to the Alloy Substation and used in the operation of the alloy facility (Hawks Nest station service power consumption is less than 0.5% of gross energy generation). The maximum power (furnace) load of the alloy facility is 135 MW, and additional power is required for the alloy facility's 25-Hz and 60-Hz auxiliaries. All power currently used by WVAM comes from the Hawks Nest Project or is purchased from the grid, though WVAM's operations cannot be supported completely or solely with grid power. A minimum short circuit level must always be provided by the Hawks Nest Project on WVAM's 25-Hz power systems in order to sustain operation of WVAM's frequency converters (60-Hz to 25-Hz conversion) such that WVAM can

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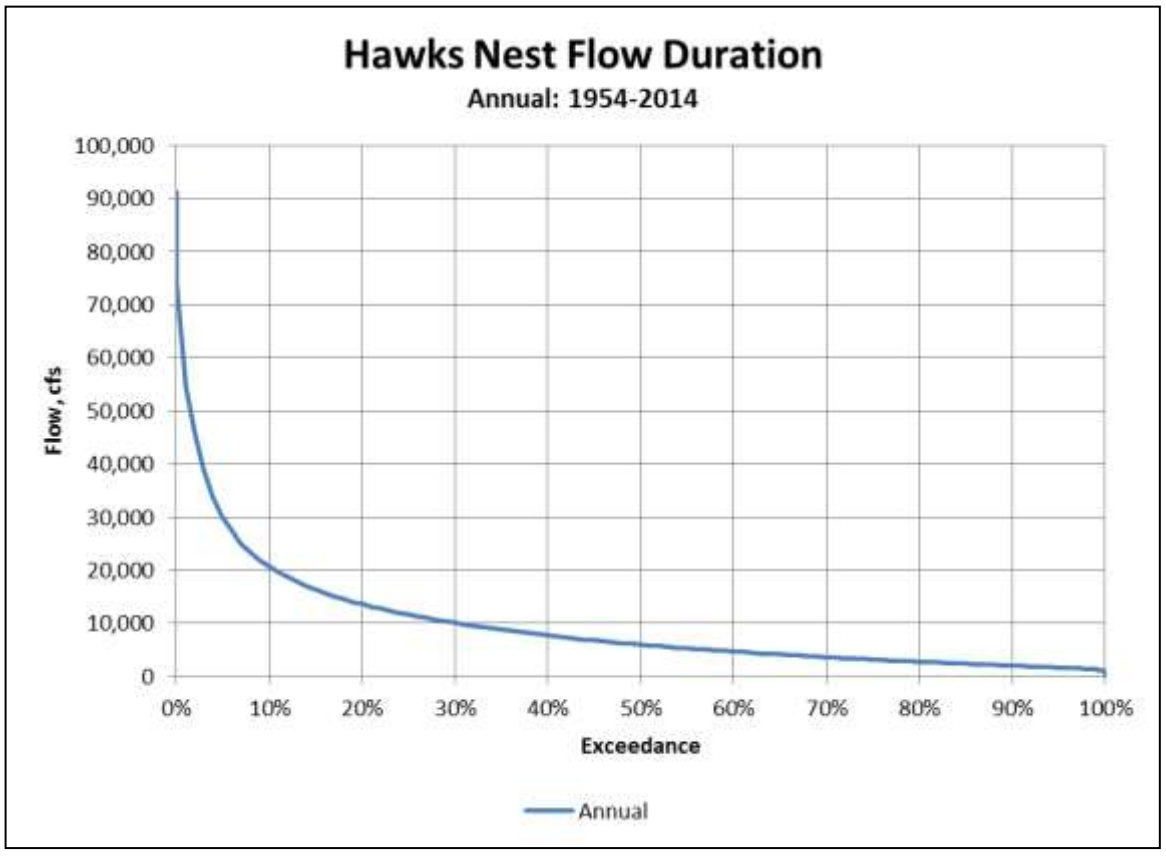
even have the opportunity to purchase supplemental power from the grid and convert it to 25-Hz. Generation from two of the Hawks Nest turbine-generator units is necessary to provide this voltage support and to meet 25-Hz reactive power demand of the Hawks Nest-Alloy system.

B.4 FUTURE DEVELOPMENT (18 CFR §4.51(C)(4))

The Licensee does not have any plans for future development of the Hawks Nest Project proposed as part of this proceeding. However, higher minimum flows are proposed (described in detail in Section E.6.2.2 of Exhibit E of this license application), which although will not require new construction constitute a change in Project operation.

FIGURE B-3. HAWKS NEST PROJECT ANNUAL AND MONTHLY FLOW DURATION CURVES

(Based on data from the Gauley River above Belva, WV and Kanawha River at Kanawha Falls, WV USGS gages, adjusted for the Hawks Nest drainage area)



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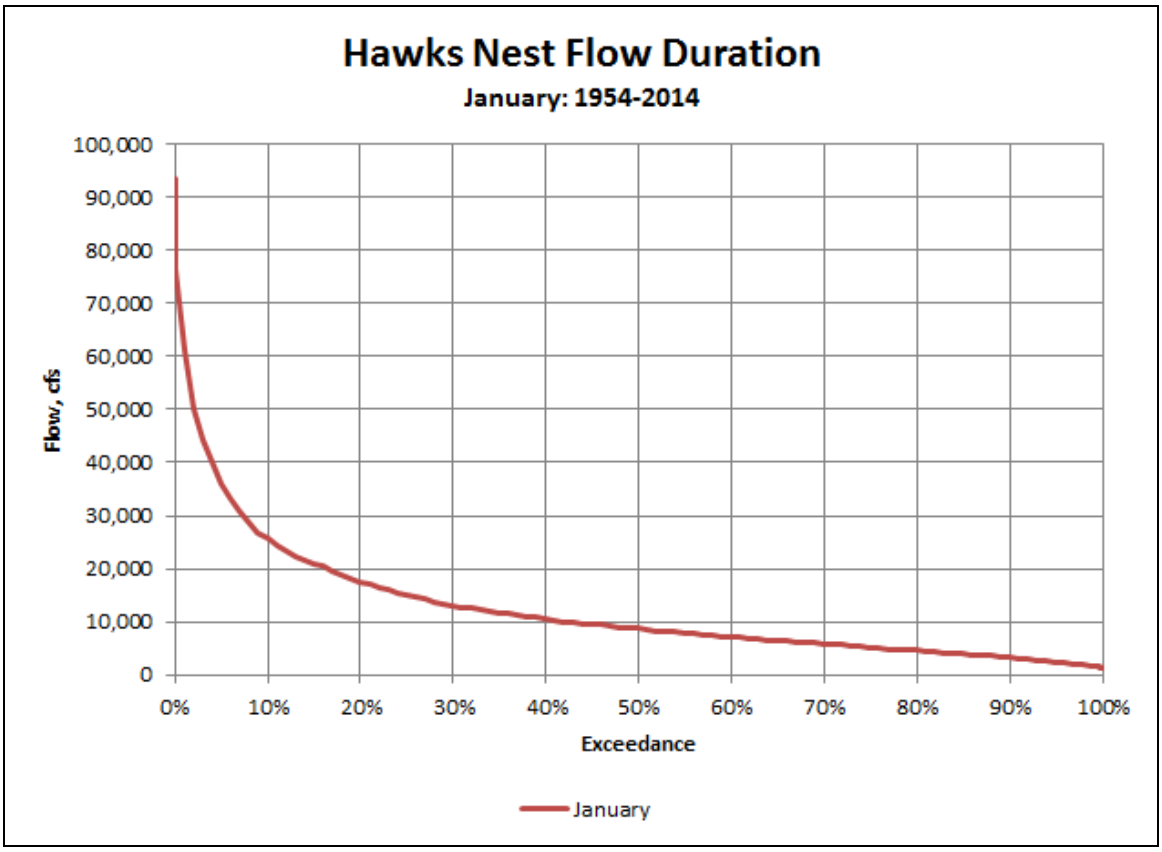

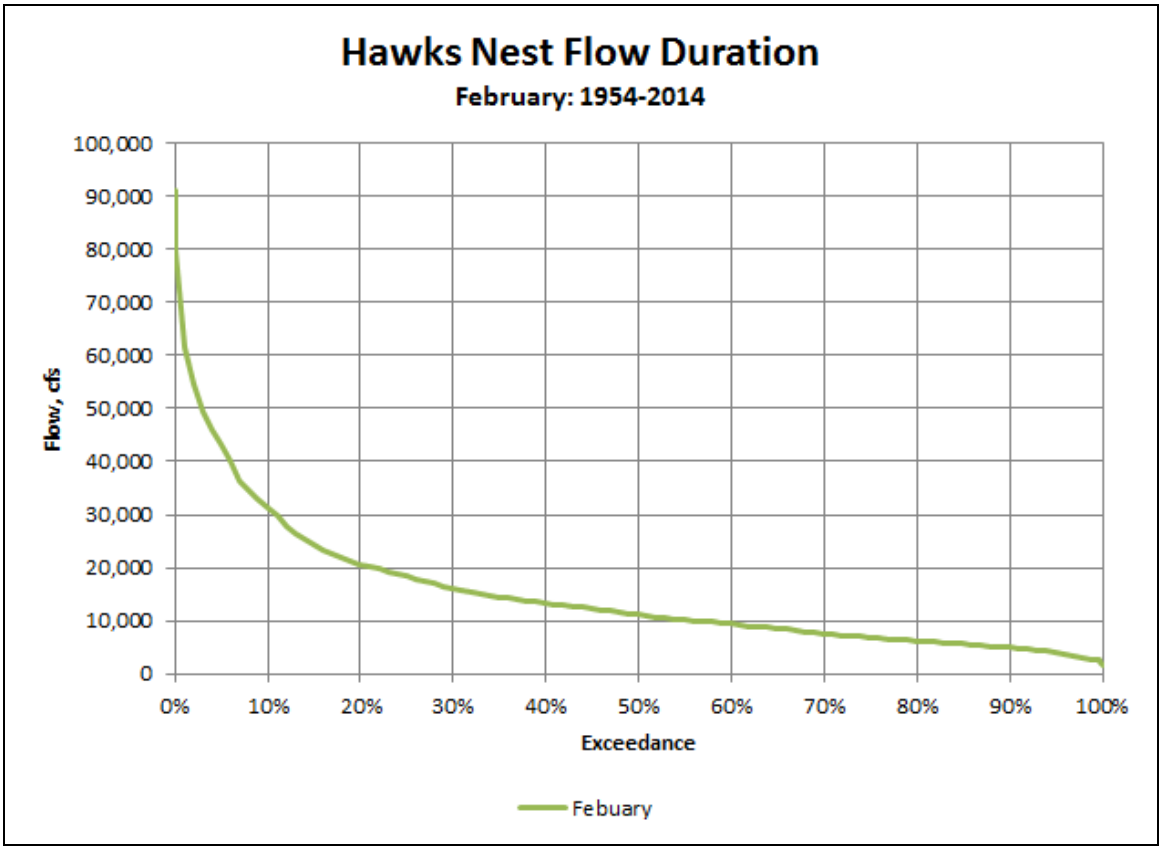

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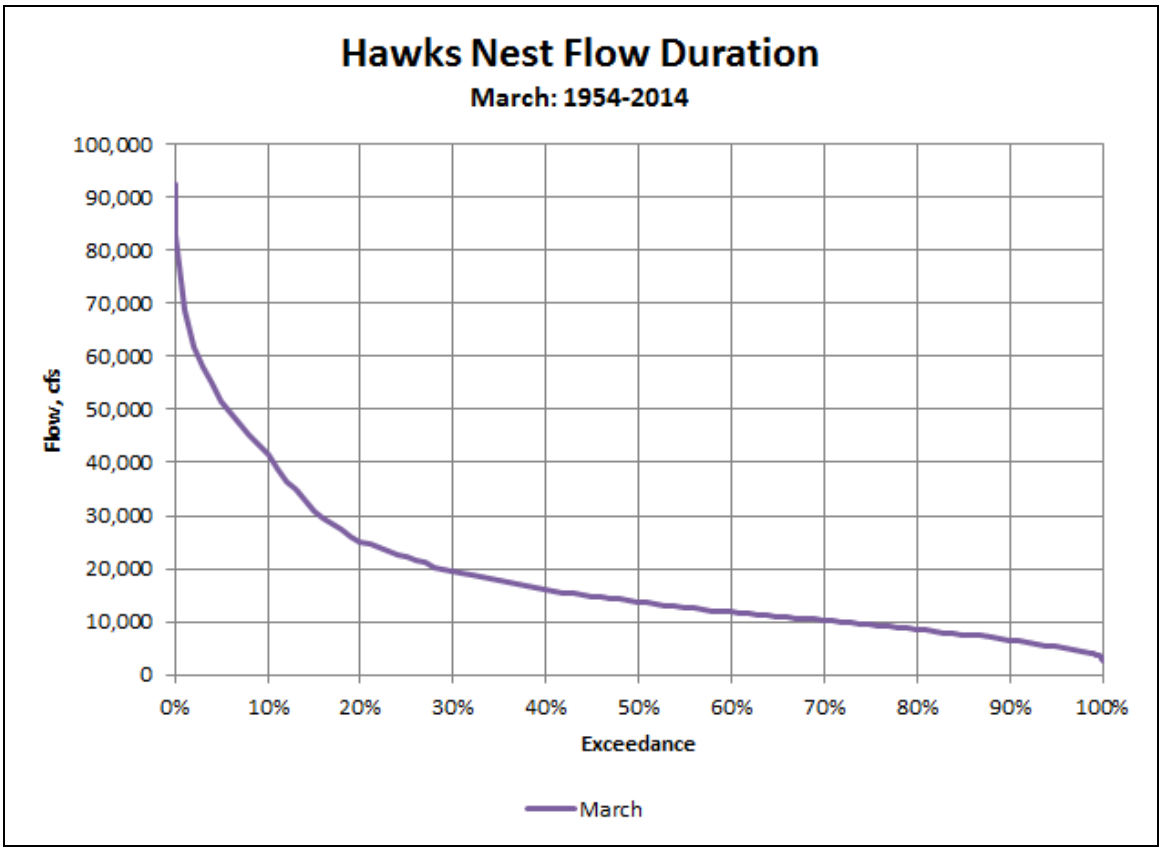

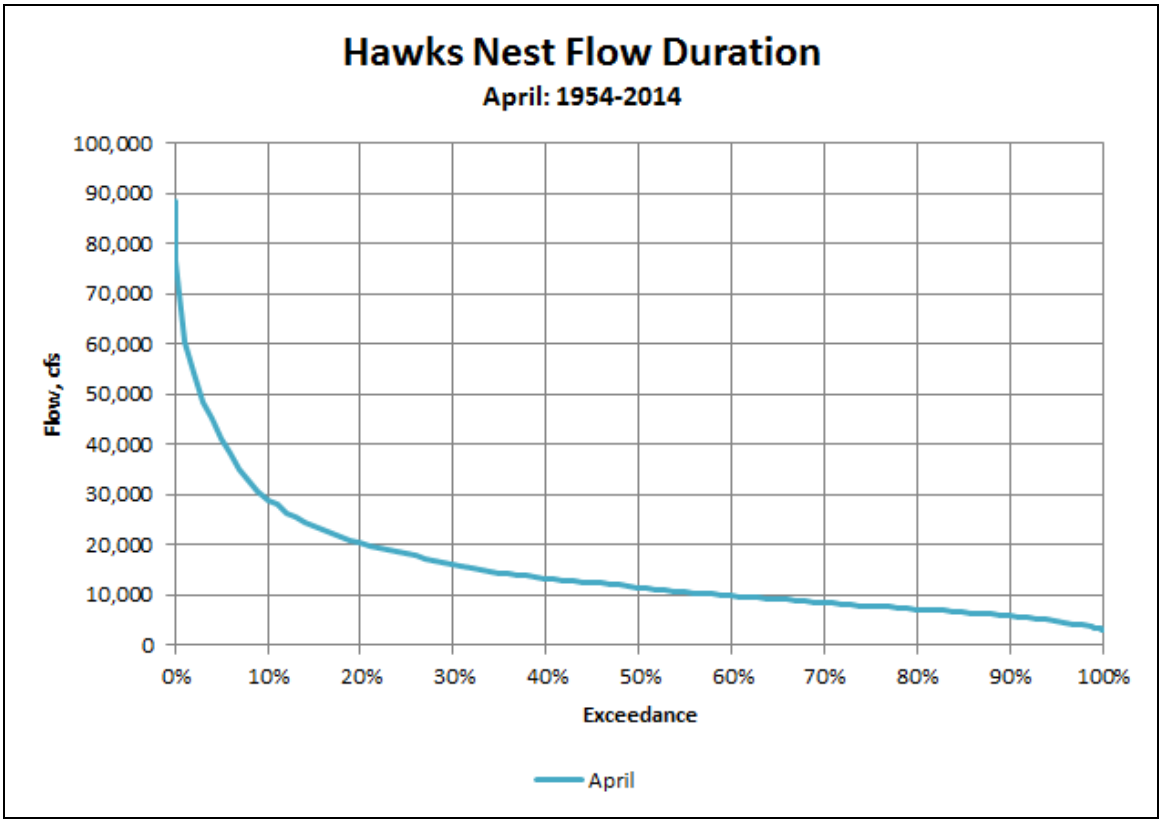

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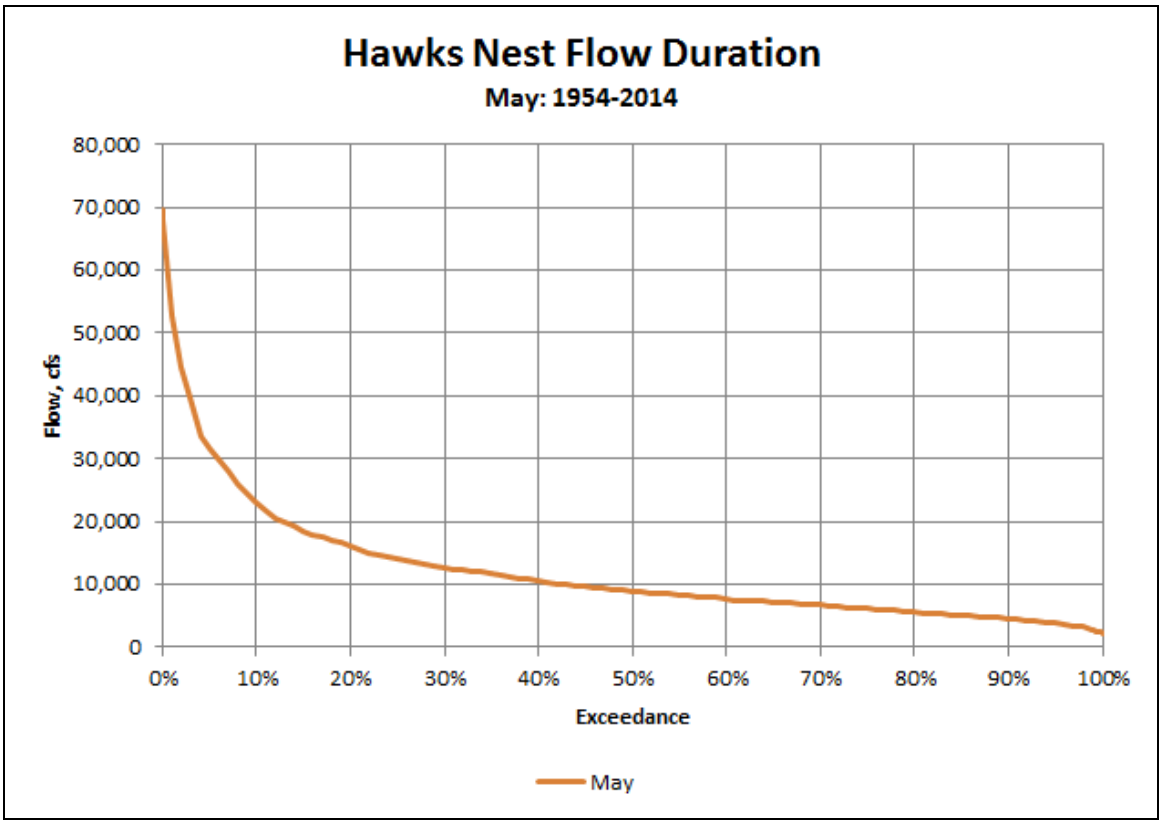

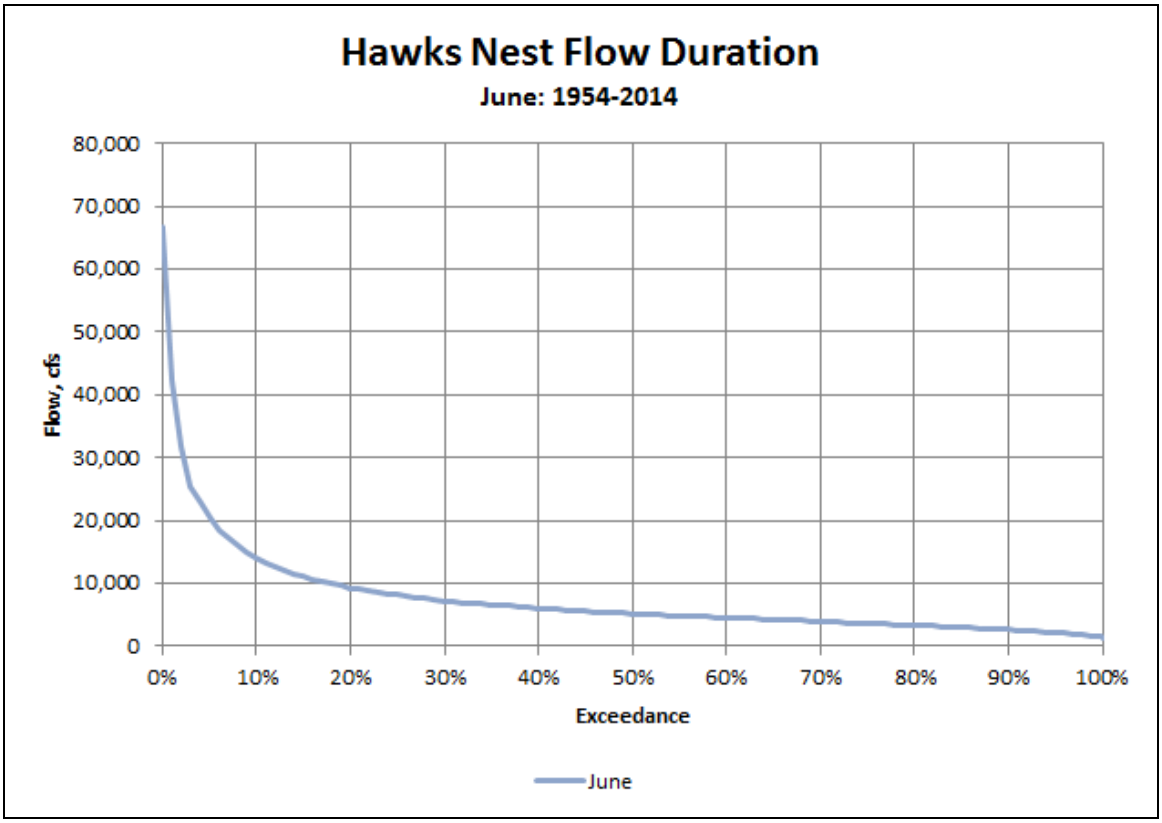

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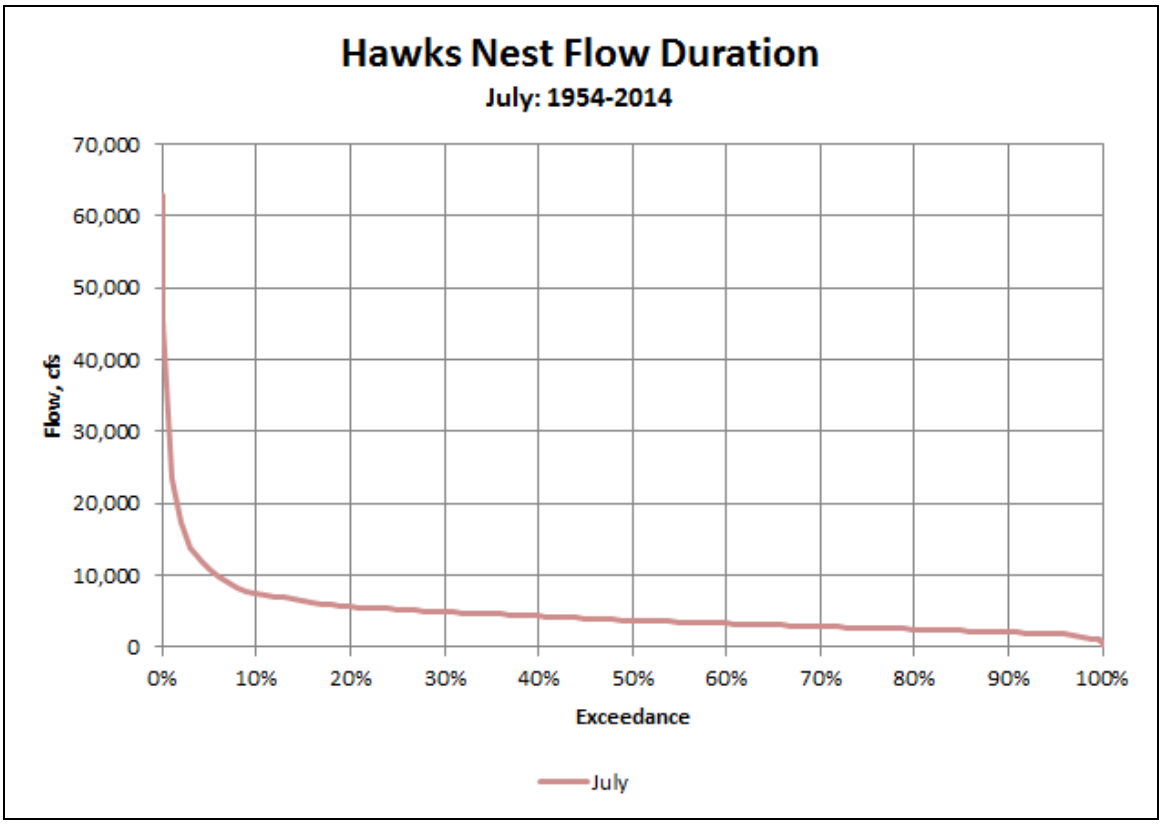

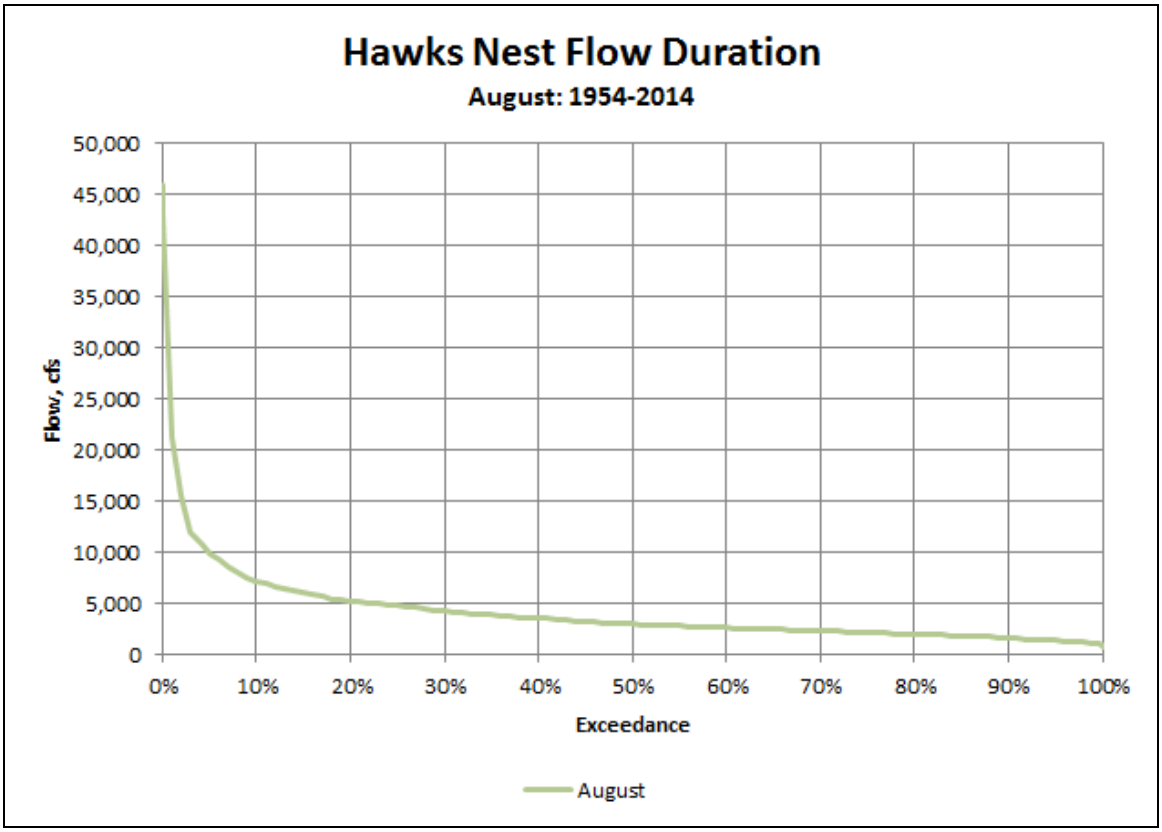

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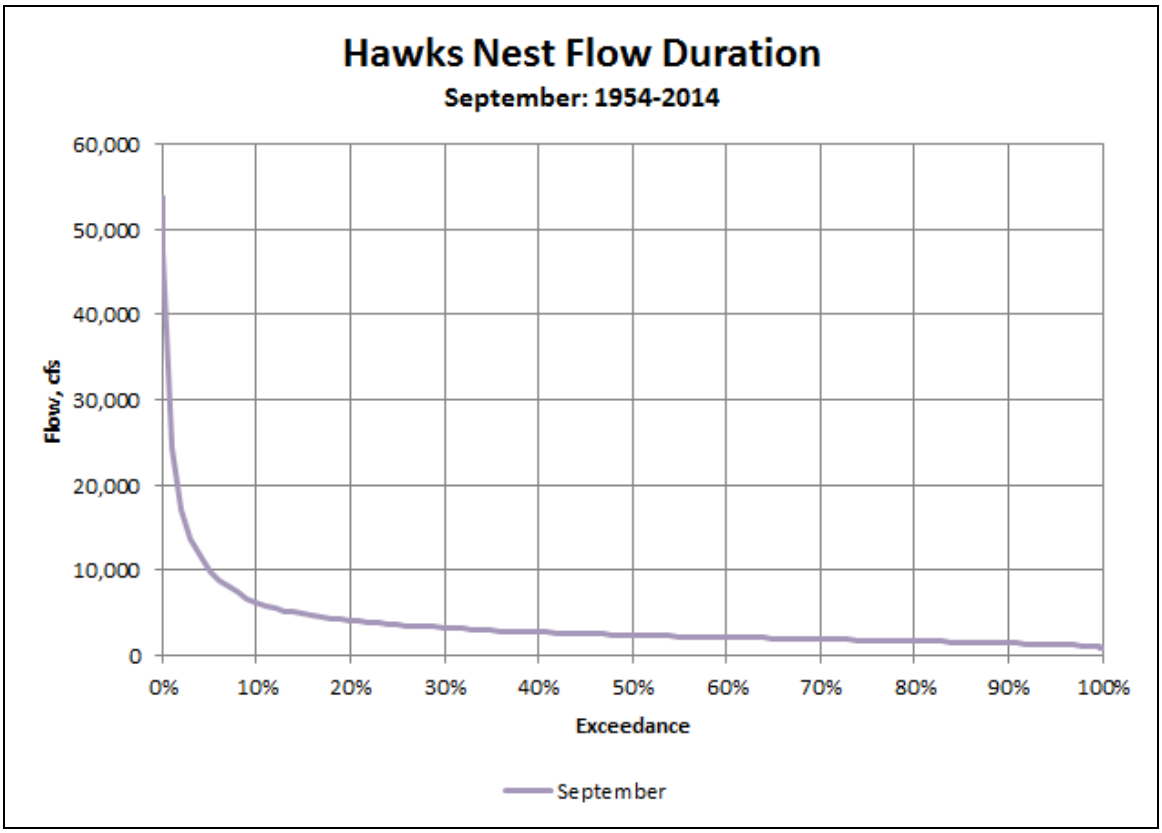

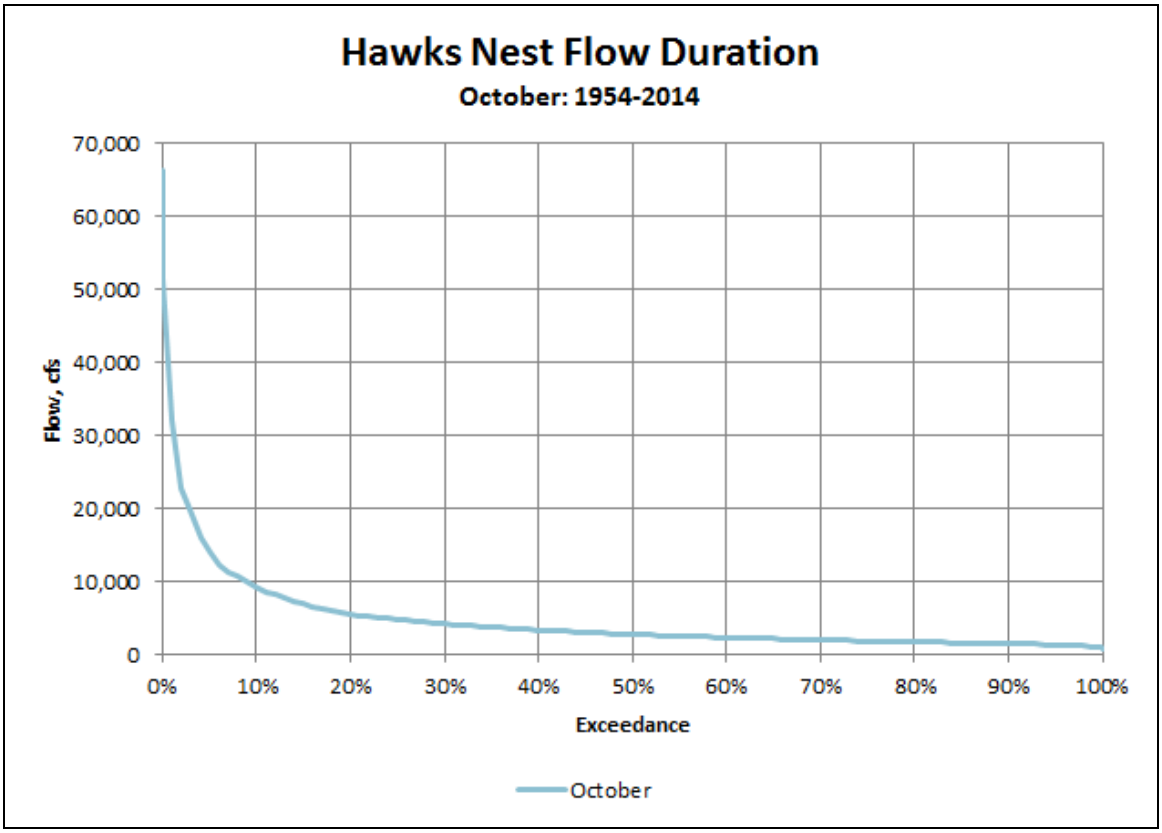

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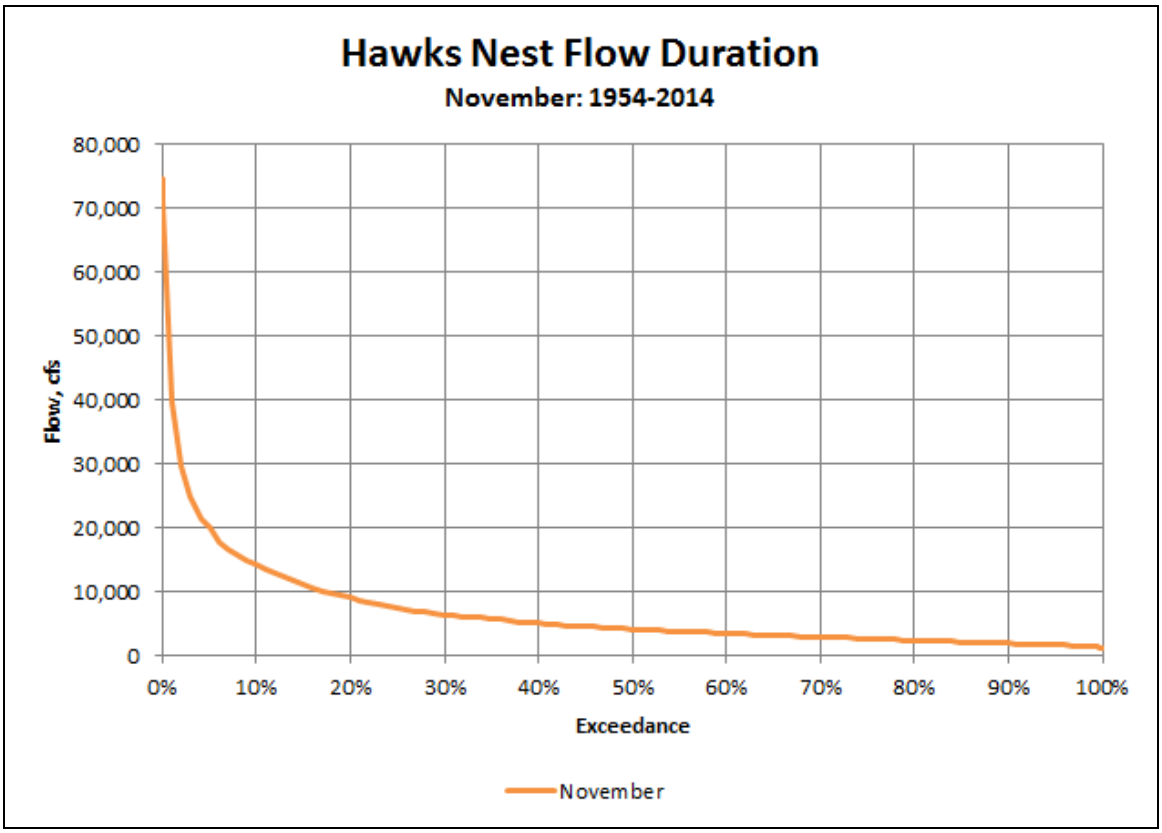

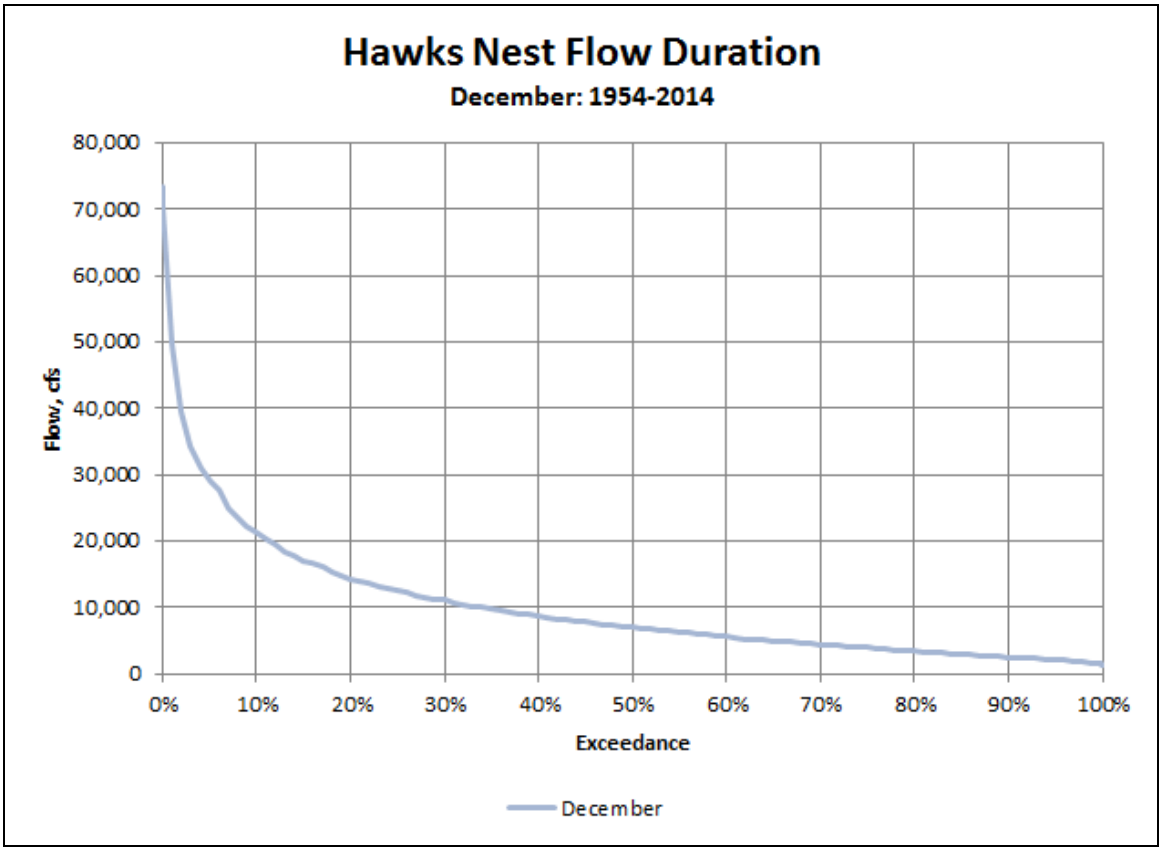

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Exhibit C

Construction History and Proposed Construction Schedule (18 CFR §4.51(d))

C.1 CONSTRUCTION OF EXISTING FACILITIES (18 CFR §4.51(D)(1))

Because 18 CFR §4.51(d)(1) requires a construction history only for applications for an initial license, a construction history is not required for this relicensing application for the Hawks Nest Project. However, to provide general and background information a brief summary of the construction history of the Hawks Nest Project is provided below.

Although surveys and tentative plans for the Hawks Nest Project were made as early as 1912, construction on the development did not begin until March 31, 1930. On January 8, 1927 the New-Kanawha Power Company (NKPC) was incorporated. This company, which was created for the purpose of constructing the power generating facility, was owned by Union Carbide. On May 10, 1927 NKPC filed a declaration of intention to build the Hawks Nest Dam and Hydro Station. The development was originally built by the Electro Metallurgical Company, a subsidiary of Union Carbide Corporation, for the purpose of providing economical power for a ferroalloys plant that was located in Boncar (changed to Alloy in 1931), West Virginia. The dam, except for the crest gates and associated machinery for their operation, was completed on September 1, 1933. Partial operation of the power station began on July 9, 1936, and full operation commenced on January 21, 1937, with completion of the surge basin and installation of the crest gates and one of the gantry canes for their operation. Construction of the project, except minor details, was completed on April 15, 1937, with installation of the second gantry crane.

The construction and major events/alterations/repairs to the Hawks Nest Project are listed below.

- 1929-1930 Project design and contractor selection.
- 1930 On March 30, tunnel construction began with 800 men working night and day on two ten-hour shifts.
- 1932 The Hawks Nest Tunnel was completed and the powerhouse was essentially complete in November.

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- 1933 The tunnel intake was completed in July. The dam, except for the spillway gates, was completed in September. Power transmission lines to Alloy were completed during this period.
- 1936 Power generation initiated on July 9.
- 1937 In January, the crest gates at the dam and one of the gantry cranes used to lift the gates were completed. The surge basin was also completed at about this time. Following a failure in one of the penstocks (Penstock 3) in the manifold vault during the early years of operation of the facility (date not known), the manifold and penstocks were embedded in concrete reinforced with circumferential steel rings.
- 1940s The owner filled cavities beneath flip buckets.
- 1941 The owner increased the top of the spillway gates by 5 feet (this included a 5 foot reservoir surface elevation increase).
- 1942 The owner grouted the surge basin to treat differential movement between concrete liner blocks.
- 1943 The riverbed downstream from the powerhouse was excavated to lower the tailrace.
- 1949 Bluestone Dam was constructed for flood control by the USACE.
- 1949 In August, work was completed on an automatic fire protection sprinkler system, with an adjacent pump house, for the protection of the four main power transformers in the switchyard.
- 1960 In April, a major mechanization and rearrangement of control equipment was completed. The control devices, alarms, sensors, selsyns, relays, and related equipment installed at that time permitted the remote operation of the turbine-generator units and their auxiliary equipment from the control room. Also, the gantry cranes at the dam were equipped with automatic electric controls enabling gates to be raised or lowered from the control room at the powerhouse.
- 1964 A Westinghouse Redac Control System was placed in service in the Hawks Nest control room to permit the remote operation and control of the Glen Ferris powerhouses.

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- 1969 Piezometers were installed to measure uplift pressures at three sections of the dam.
- 1972 Sixteen relief wells were installed into bedrock from the inspection gallery in the dam to reduce uplift pressures in response to new dam stability criteria.
- 1972-1973 Governors for all four units were upgraded to Woodward Type GS actuators.
- 1990 Repairs to the spalled parapet wall at the surge basin commenced.
- 1992-1993 Undercutting of the flip buckets at spillway bays 5, 6, 7 and 10 was repaired (grout bags placed in erosion cavities).
- 1999 The trash rack for the power tunnel intake was replaced. Also, a pilot test program to evaluate concrete materials for restoration of the spillways was initiated. Hydro-blasting for surface preparation and application of shotcrete with a silica fume additive was performed in 2006.
- 2000 No. 2 generator at the powerhouse was completely rebuilt.
- 2002 The embedment concrete and the circumferential rods of the manifold were subjected to non-destructive testing at 57 locations. The testing was performed by the firm of H.C. Nutting of Charleston, West Virginia.
- 2006 Hydro-blasting for surface preparation and application of shotcrete with a silica fume additive was performed.
- 2008 Repairs to gallery sump pumps completed.
- 2013-2014 49 post-tension anchors were installed in the 31 monoliths comprising the 14 spillway bays of the ogee spillway structure, with each monolith getting one or two 28- to 50-strand anchors, with design loads ranging from 987 kips to 1762 kips, respectively. The encapsulated anchors with grout encased epoxy strands extended the full length of each strand.
- 2014 Unit #4 generator was refurbished and rewound.

C.2 PROPOSED CONSTRUCTION SCHEDULE (18 CFR §4.51(D)(2))

Hawks Nest Hydro has examined the potential for Project life extension, unit upgrade, and capacity addition, and has determined that life extension of the existing facilities is the only economical consideration for the Project at this time. There is no fixed schedule for Hawks Nest Hydro's life-extension program. This program consists of an ongoing program to maintain,

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repair, modify, or replace the civil, mechanical, or electrical components of the Project on an as-needed basis. Hawks Nest Hydro reserves the right to reevaluate the potential for unit upgrades or capacity additions in the future.

The new environmental enhancements proposed by Hawks Nest Hydro will be implemented consistent with the schedule presented in Table C-1.

TABLE C-1
SCHEDULE FOR IMPLEMENTATION OF ENVIRONMENTAL ENHANCEMENTS

Environmental Enhancement	Proposed Implementation (Months After New License Issuance)
Provide first annual fish compensation payment to WVDNR	12 months
Prepare first 5-Year Resource Enhancement Plan in consultation with WVDNR and USFWS and file with FERC	60 months
Develop Streamflow Monitoring Plan in consultation with WVDNR and USFWS and file with FERC	12 months
Begin release of higher minimum flow releases to Hawks Nest bypass reach	18 months
Prepare first annual report on updated Running Buffalo Clover Protection Plan in consultation with WVDNR and USFWS and file with FERC	12 months
Prepare final Recreation Management Plan in consultation with agencies and file with FERC for approval	9 months
Provide first annual recreation facility maintenance payment to WVDNR	12 months
Provide one-time recreation facility enhancement payment to WVDNR	12 months
Develop and launch public website for information related to flows in the bypass reach	12 months of FERC-approval of final Recreation Management Plan
Maintain the existing Hawks Nest Tailrace Fishing Access Area in accordance with its as-built conditions	0 months
Complete construction of Cotton Hill Bridge Day Use Area (Licensee-owned lands) enhancements	18 months of FERC-approval of final Recreation Management Plan
Implement Historic Properties Management Plan	1 month of FERC-approval of final HPMP

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Exhibit D

Costs and Financing (18 CFR §4.51(e))[8]

D.1 ORIGINAL COST OF PROJECT

Since Hawks Nest Hydro is applying for a new license for an existing project, as compared to an initial license, a tabulated statement providing the actual or approximate cost of Project construction is not applicable.

D.2 PROJECT TAKEOVER COST PURSUANT TO SECTION 14 OF THE FPA (18 CFR §4.51(E)(2))

D.2.1 Fair Market Value

Fair market value is not defined in the FPA or its implementing regulations. Consequently, many principles applicable in determining this component of takeover compensation are uncertain. Accordingly, the fair market value provided is only an estimate and is subject to final determination in the event that a takeover occurs. Hawks Nest Hydro reserves the right to file appropriate revisions to its statement should administrative, legislative, or judicial decisions clarify the principles and definitions of takeover compensation.

Hawks Nest Hydro has estimated the fair market value of the Project through an evaluation of recent acquisitions throughout the United States, which have ranged from $2,500 to $5,000 per installed kW. Based on this evaluation, the estimated fair market value of the 102-MW Hawks Nest Project could be considered to range from $255,000,000 to $510,000,000.

D.2.2 Net Investment

The FPA defines "net investment" as the original cost, plus additions, minus the sum of the following items (to the extent that such items have been accumulated during the period of the license from earnings in excess of a fair return on such investment): (a) unappropriated surplus;

[8] Financial information presented in this Draft License Application represent provisional information which is subject to further refinement and finalization within the Final License Application.

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(b) aggregate credit balances of current depreciated accounts; and (c) aggregate appropriations of surplus or income held in amortization, sinking fund, or similar reserves.

The current net investment in the Hawks Nest Project is $123,800,000. This should not be interpreted as the fair market value of the Project.

D.2.3 Severance Damages

Severance damages are not clearly defined in the FPA or its implementing regulations and many principles applicable in determining this component of takeover compensation are uncertain and can only be estimated. However, Hawks Nest Hydro believes that potential severances inflicted by a takeover of the Project would be significant. Therefore, given the challenges of estimating damages associated with severance, Hawks Nest Hydro is reserving the right to provide the Commission with such an estimate should the Commission consider a federal takeover of the Project.

D.3 ESTIMATED COSTS OF NEW FACILITIES AND MEASURES (18 CFR §4.51(E)(3))

New facilities to be constructed and measures to be performed as a result of a new license are limited to the proposed environmental enhancements associated with an additional license term. The environmental enhancements will not require any new Project lands or water rights for which Hawks Nest Hydro does not already have ownership or rights. Table D-1 presents preliminary costs associated with the enhancement measures.

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TABLE D-1
PRELIMINARY COST ESTIMATE OF PROPOSED ENVIRONMENTAL MEASURES

Item	Capital Cost (2015 dollars)	Incremental O&M[a] or Annual Cost (2015 dollars)
Provide first annual fish compensation payment to WVDNR	-	$30,000
Prepare first 5-Year Resource Enhancement Plan in consultation with WVDNR and USFWS and file with FERC	-	$1,000
Develop Streamflow Monitoring Plan (including provision for continued funding of the USGS Hawks Nest Dam gage) in consultation with WVDNR and USFWS and file with FERC	$10,000	$8,000
Begin release of higher minimum flow releases to Hawks Nest bypass reach	$5,000	$140,000
Prepare first annual report on updated Running Buffalo Clover Protection Plan in consultation with WVDNR and USFWS and file with FERC	$5,000[b]	$5,000
Prepare final Recreation Management Plan in consultation with agencies and file with FERC for approval	$10,000	$1,000
Provide first annual recreation facility maintenance payment to WVDNR	-	$25,000
Provide one-time recreation facility enhancement payment to WVDNR	$50,000	-
Develop and launch public website for information related to flows in the bypass reach	$10,000	$5,000
Maintain the existing Hawks Nest Tailrace Fishing Access Area in accordance with its as-built conditions	-	$5,000
Complete construction of Cotton Hill Bridge Day Use Area (Licensee-owned lands) enhancements	$50,000	$5,000
Historic Properties Management Plan and implementation	$10,000[b]	$1,000
Total	**$150,000**	**$226,000**

[a] O&M = operations and maintenance
[b] Pre-license issuance cost if plan filed with FLA

D.4 AVERAGE ANNUAL COST OF PROJECT (18 CFR §4.51(E)(4))

There is no fixed schedule for Hawk Nest Hydro's life-extension program, rather a sequence of activities designed to be implemented when needed. Accordingly, there is not a fixed annual budget allocated for life-extension activities. These activities would be performed on an as-

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needed basis using existing planning procedures that provide short- and long-term windows to evaluate, schedule, and budget replacements and rehabilitation work in an orderly fashion.

D.4.1 Current Annual Costs

Based on operations and maintenance cost for 2014, the estimated annual costs for the Hawks Nest Project are presented in Table D-2.

TABLE D-2
OPERATING COST FOR 2014

Description	Cost
Annual operation, maintenance, expenses, fees, insurance, overhead, depreciation	$11,515,700
Local, state, and federal taxes	$253,600
Total	**$11,769,300**

D.4.2 Estimated Future Annual Costs

Given the proposed environmental measures presented in this application, future estimated annual O&M costs of the Hawks Nest Project are presented in Table D-3. Note that the estimated future annual costs do not include additional capital expenditures.

TABLE D-3
ESTIMATED FUTURE ANNUAL COSTS

Description	Cost
Current total annual costs	$11,769,300
Annual cost of proposed environmental measures[a]	$226,000
Total estimated future annual costs	**$11,995,300**

[a] Additional annual O&M cost associated with proposed PM&E measures.

D.5 VALUE OF PROJECT POWER (18 CFR §4.51(E)(5))

Table D-4 presents the value of power for the run-of-river Hawks Nest Hydroelectric Project based upon the average annual generation for 1989 through 2014. Similar to Glen Ferris, the value of Project power can be based upon a 30-day rolling average PJM market price of approximately $40/MWh (FERC 2015). However, given the unique nature of the 25Hz power afforded by the Hawks Nest Project [to WVAM], power provided to WVAM tends to be at a value less than the 30-day PJM average above. While the exact value can vary, it can be best approximated at $30/MWh for this Exhibit.

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TABLE D-4
VALUE OF POWER GENERATED

Description	Energy[a] (MWh)	Nominal Average Market Price ($/MWh)	Average Gross Annual Revenue
Total generation	544,253	$30	$16,327,590
Ancillary Services and Other Revenue[b]	-	-	-
Total Gross Revenue	-	-	**$16,327,590**

[a] Based on average generation from 1989 through 2014.
[b] To be included in FLA, as may be applicable.

D.6 SOURCES AND EXTENT OF FINANCIAL AND ANNUAL REVENUES (18 CFR §4.51(E)(6))

If determined to be needed, Hawks Nest Hydro's general plan for financing the environmental enhancements and life-extension cost of the Project initially will be to issue short-term debt (either bank line of credit or commercial paper) and to generate internal funding consisting of depreciation, retained earnings, and deferred federal income taxes. If short-term financing options become unattractive, Hawks Nest Hydro will issue permanent securities (i.e., long-term debt, preferred stock, and common stock) to replace short-term debt. This financing plan will adhere to Hawk Nest Hydro's overall corporate construction financing requirements.

D.7 COST TO DEVELOP THE LICENSE APPLICATION (18 CFR §4.51(E)(7))

Hawks Nest Hydro estimates that the cost to develop the license applications for the Hawks Nest and Glen Ferris Projects, including studies, consultants, and internal management and administrative costs, is approximately $2.75 million.

D.8 ESTIMATED AVERAGE DECREASE IN GENERATION (18 CFR §4.51(E)(9))

Based on the proposed environmental measures to be implemented following the issuance of a new license, the Hawks Nest Project will experience an estimated annual reduction of generation of approximately 4,592 MWh compared to continued operation as currently licensed. This reduction is the result of the provision of additional minimum flow released seasonally at the Hawks Nest Project, so long as the stability of WVAM's electrical systems are maintained, as described in this license application and summarized below:

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- July – February: 150 cfs (additional 50 cfs)
- March – April: 300 cfs (additional 200 cfs)
- May – June: 250 cfs (additional 150 cfs)

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