Before the Federal Regulatory Energy Commission

DRAFT
Application for License
Major Project – Existing Dam

Reusens Hydroelectric Project
FERC Project No. 2376

Volume 1 – Public

August 2021

Eagle Creek Reusens Hydro, LLC
a subsidary of

EAGLE CREEK
— RENEWABLE ENERGY —

[this page intentionally left blank]

INITIAL STATEMENT PER 18 CFR § 4.51(a)

Application for License for Major Project – Existing Dam

(1) The Eagle Creek Reusens Hydro, LLC (the Applicant), applies to the Federal Energy Regulatory Commission (Commission or FERC) for a new license for the existing Reusens Hydroelectric Project (Project), FERC Project Number 2376, as described in the attached Exhibits hereafter. The current license for the Reusens Hydroelectric Project was issued on May 20, 1983, and expires on April 30, 2023.

(2) *The location of the Project is:*

State or Territory: Virginia
Counties: Bedford and Amherst
Township or nearby town: Lynchburg
Stream or other body of water: James River

(3) *The exact name, address, and telephone number of the Applicant are:*

Eagle Creek Reusens Hydro, LLC
116 N. State Street
P.O. Box 167
Neshkoro, WI 54960-167
Telephone: (973) 998-8400

The exact name, address, and telephone number of each person authorized to act as agent for the Applicant in this application are:

Jody Smet
Vice President, Regulatory Affairs
Eagle Creek Renewable Energy, LLC
2 Bethesda Metro Center, Suite 1330
Bethesda, MD 20814
Jody.Smet@eaglecreekre.com
(804) 739-0654

Joyce Foster
Director, Licensing and Compliance
Eagle Creek Renewable Energy, LLC
2 Bethesda Metro Center, Suite 1330
Bethesda, MD 20814
Joyce.Foster@eaglecreekre.com
(804) 338-5110

(4) The Applicant is a domestic corporation and is not claiming preference under section 7(a) of the Federal Power Act, 16 USC 800.

(5) *Regulatory requirements:*

(i) *The statutory or regulatory requirements of the Commonwealth of Virginia which affect the Project as it exists with respect to bed and banks and the appropriate, diversion, and use of water for power purposes, and with respect to the right to*

engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purpose of the license under the Federal Power Act are:

- Applicant is subject to Water Quality Certification from the Virginia Department of Environmental Quality 401 (a)(1) of the Clean Water Act.

(ii) *The steps which the applicant has taken or plans to take to comply with the regulations cited above are:*

- The Applicant will submit a request for Water Quality Certification from the Virginia Department of Environmental Quality at the time when the Commission issues their Ready for Environmental Analysis notice as permitted and pursuant to 18 CFR §4.34(b)(5)(i).

(6) Eagle Creek Reusens Hydro, LLC owns all the existing Project facilities. No federally owned or operating facilities are associate with the Project.

ADDITIONAL INFORMATION REQUIRED BY 18 CFR § 4.32

(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, operation or maintain the project:*

Eagle Creek Reusens Hydro, LLC currently owns and will continue to maintain all proprietary rights necessary to construct, 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;*

Amherst County
153 Washington Street
Amherst, VA 24521

Bedford County
122 East Main Street, Suite 202
Bedford, VA 24523

(ii) *Every city, town, or similar political subdivision:*

i. *In which any part of the Project, and any Federal facility that would be used by the project, would be located;*

The Reusens Hydroelectric Project is located adjacent to the City of Lynchburg, Virginia and is not adjacent to the boundary of any other city, town, or similar political subdivision, and does not use any federal facilities and occupies no federal lands.

ii. *That has a population of 5,000 or more people and is located within 15 miles of the project dam.*

City of Lynchburg
900 Church Street
Lynchburg, VA 24504
(Population: 75,568)

iii. *Every irrigation district, drainage district or similar special purpose political subdivision (A) in which any part of the project is located, and any Federal facility that is or is proposed to be used by the project is located, or (B) that owns, operates, maintains, or uses any project facility or any Federal facility that is or is proposed to be used by the project:*

The Amherst County Service Authority could use the Project's reservoir to withdraw up to 3 million gallons of water per day to provide public water and wastewater services to Amherst County; however, the pumping station is not yet constructed. The City of Lynchburg also utilizes the Project reservoir as a municipal water supply. The City of Lynchburg has a water pumping station, the Abert Pump Station, which is located approximately 3.6 miles upstream of the Project dam. There are no other irrigation district, drainage district, or similar special purpose political subdivision in which any part of the Project is located or that owns, operates, maintains, or uses any Project facility. The Project uses no federal facilities and occupies no federal lands.

(iii) *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.*

Eagle Creek Reusens Hydro, LLC is not aware of other political subdivisions in the general area of the Project.

(iv) *All Indian tribes that may be affected by the Project:*

Eastern Band of Cherokee Indians
P.O. Box 455
Cherokee, NC 28719

Monacan Indian Nation
PO Box 960
Amherst, VA 24521

Absentee-Shawnee
2025 S. Gordon Cooper Drive
Shawnee, OK 74801

Eastern Shawnee Tribe of Oklahoma
70500 East 128 Road
Wyandotte, OK 74370

Shawnee Tribe
P.O. Box 189
29 S Hwy 69A
Miami, OK 74355

Delaware Nation
P.O. Box 825
31064 State Highway 281, Bldg 100
Anadarko, OK 73005

Cherokee Nation
PO Box 984
Tahlequah, OK 74465-0948

United Keetoowah Band of Cherokee Indians
PO Box 746
Tahlequah, OK 74465

Tuscarora Nation
2006 Mt. Hope Road
Lewiston, NY 14092

Pamunkey Indian Tribe
1054 Pocahontas Trail
King William, VA 23086

Nansemond Indian Nation
1001 Pembroke Lane
Suffolk, VA 23434

(3) *Notification:*

(i) For a license (other than a license under section 15 of the Federal Power Act) state that the applicant has made, either at the time of or before filing the application, a good faith effort to give notification by certified mail of the filing of the application to:

(A) *Every property owner of record of any interest in the property within the bounds of the Project, or in the case of the Project without a specific boundary, each such owner of property which would underlie or be adjacent to any Project works, including any impoundments; and*

(B) *The entities identified in paragraph (2) above, as well as any other federal, state, municipal or other local government agencies that there is reason to believe would likely be interested in or affected by the application.*

Because this is an application for a new license under Section 15 of the Federal Power Act (FPA), this regulatory provision does not apply.

(4) *PURPA Benefits:*

The Applicant intends to exercise its rights under Section 210(e) of the Public Utility Regulatory Policies Act of 1978 (PURPA). The project is not located at a new dam or diversion. The applicant reserves the right to exercise any additional rights available to it under PURPA in the future.

VERIFICATION

[*to be completed for the Final License Application*]

This Application for License Major Project – Existing Dam for the Reusens Hydroelectric Project FERC No. 2376 is executed in the

STATE OF: _____

COUNTY OF: _____

by: Jody Smet
Vice President, Regulatory Affairs
Eagle Creek Renewable Energy, LLC
2 Bethesda Metro Center, Suite 1330
Bethesda, MD 20814

being duly sworn, deposes and says that the contents of this application are true to the best of his knowledge or belief. The undersigned has signed this Application this _____ day of _____ 2022.

EAGLE CREEK REUSENS HYDRO, LLC

by: _____
Jody Smet
Vice President, Regulatory Affairs
Eagle Creek Renewable Energy, LLC

Subscribed and sworn to before me, a Notary Public of the State of _____, this _____ day of _____ 2021.

_____/seal
(Notary Public or other authorized official)

(My Commission Expires _____)

Reusens Hydroelectric Project
(FERC No. 2376)

DRAFT

Application for License
Major Project – Existing Dam

Exhibit A – Project Description

[This page intentionally left blank]

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 PROJECT DESCRIPTION

The 12,500 kilowatt (kW) Reusens Hydroelectric Project (Project) is located on the James River at approximately river mile 265 near the City of Lynchburg, Virginia (Figure 1-1). The James River is approximately 340 miles long and flows into Chesapeake Bay near Hampton, Virginia. The Project is located at the fifth dam on the mainstem of the James River from its mouth and is situated 3.7 river miles upstream of the Lynchburg Dam, and 8.0 river miles downstream of the Holcomb Rock Hydroelectric Project (FERC No. 2901). The Project is the second hydroelectric project on the James River. Figure 1-1 also shows the location of the Reusens Hydroelectric Project in relation to other hydroelectric projects on the James River

1.1 Project Facilities

Principle Project facilities are shown in Figure 1.1-1, and include the dam, auxiliary spillway, Powerhouses A and B, reservoir, and tailrace.

1.1.1 Dam and Spillway

The existing dam is a concrete structure and spillway. The overall length is 416 feet, and total height is 24 feet. The dam abuts the left riverbank of the James River (looking downstream) and extends partway across the river. The right abutment of the dam attaches to Powerhouse B. The spillway crest is 533.29 feet NAVD88.[1] The spillway has eight, 16.75 feet-high floodgates that are approximately 44 feet in width. The top of each gate is at an elevation of 550.04 ft. Each bay is separated by concrete piers supporting the gates. A steel bridge traverses the length of the spillway from which the gates are opened and closed by hoists powered by electric motors. A separate, permanent auxiliary power source drawn from a distribution circuit and two propane emergency generators provide two separate back-up means of operating the gates in the event of station power loss at the spillway. The spillway is constructed of concrete block, the flood gates are steel, and the piers are reinforce concrete.

1.1.2 Auxiliary Spillway

Separating Powerhouse A from Powerhouse B is a concrete curved auxiliary spillway (Figure 1.1-1). This spillway has a radius of 51.17 feet along an arc of 125.67 feet. It is 25 feet high and topped with 7.25 feet of wooden flashboards. The crest of the auxiliary spillway is 543.29 feet NAVD88, making the top of the wooden flashboards measure at 550.54 feet.

1.1.3 Powerhouses

Powerhouse A

Powerhouse A is situated between the river right abutment and the auxiliary spillway. It is a steel frame, concrete and brick structure that is approximately 105-feet long, 83-feet wide, and 86-feet high. Within Powerhouse A are three identical 2.5 MW generator units and three

[1] All elevations presented herein are in reference to NAVD88 unless otherwise noted. The conversion from NAVD88 to NGVD29 at the Project is +0.715 feet.

identical vertical Francis turbines (Units 1, 2, and 3), for an installed capacity of 7.5 MW. The three generators, with their respective governors and exciters, pump and other miscellaneous equipment necessary for operation are housed in the main-level floor of the powerhouse. Elevated above the powerhouse main floor in its southeast corner is a control room with equipment to monitor and control operations of both Powerhouses A and B.

A trash rack cleaner is present at Powerhouse A, and is powered by a 240 V AC Electric motor. The trash rack cleaner removes debris from the trashrack and lifts the debris into a trash sluice. The trash sluice is located just behind the trashrack at Powerhouse A, and is 56-inch wide, 40-inch deep, and 93-feet long. The sill elevation of the sluice is 549.94 feet. The sluice passes debris downstream of on the river-left side of Powerhouse A.

The intake section of Powerhouse A, located directly below the main level, consists of three inlet bays. Each bay has three steel, concrete and wood gates approximately 6.83 feet wide and 17.92 feet high separated by two concrete piers. When necessary for maintenance or repair work, these gates are closed and opened by hoists powered by a reversible electric motor. The gates admit water to rectangular concrete wheel pits with arch-shaped roofs that each house a vertical-shaft Francis hydraulic turbine, direct-connected to a generator on the main level. The wheel pits are approximately 53-feet by 16.5-feet high by 20-foot wide and are separated by 5-foot-wide reinforced concrete walls. Flow through each turbine in Powerhouse A passes to a concrete-supported steel draft tube, then through a reinforced concrete discharge chamber and into the tailrace. The three conical draft tubes are each approximately 14 feet tall and have outlet diameters of 14.25 feet. The three discharge chambers have arched roofs and are approximately 19-feet wide by 15-feet high by 77-feet long.

Each Francis turbine has nominal runner diameter of 9 feet, and 12 buckets per runner. Flow through the turbines is regulated by opening and closing 20 wicket gates placed in a circular pattern around the turbine. Outside of the wicket gates are ten stay vanes, also in a circular pattern around the turbine. The stay vanes are stationary, and are used to control the direction of flow and to support the upper portion of the turbine.

The three inlet bays at Powerhouse A are faced with an intake screen approximately 86 feet wide and consisting of 3/8 inch by 4-inch steel bars. The bars are 29.42-feet long and are inclined toward the powerhouse at approximately 26.5 degrees to the vertical. The bars are spaced 3.5 inches on-center and have a clear spacing of 3.125 inches.

The maximum hydraulic capacity of Powerhouse A is 3,834 cubic-feet per second (cfs), as each of the identical turbine generator units have a hydraulic capacity of 1,278 cfs. Table 1.1.3-1 provides the turbine and generator specifications for those within Powerhouse A.

Powerhouse B

Powerhouse B lies between the auxiliary spillway and dam (Figure 1.1-1). Powerhouse B is an approximately 55-feet long, 27-feet wide, and 84-feet high concrete and brick structure. The main level of Powerhouse B contains two identical 2.5 MW generator units with two identical vertical Francis turbines, for an installed capacity of 5.0 MW. The generators and turbines are identical to those in Powerhouse A. Powerhouse B also contains governors, exciters, pumps, and other miscellaneous equipment necessary for operation.

Like Powerhouse A, Powerhouse B also has a trash rake and trash sluice. However, the trash rake, custom made for cleaning Powerhouse B racks, is locked and tagged out of service because it is outdated for current safety standards. The sluice is located just upstream Powerhouse B and is 6-feet wide, 4-feet deep, and 50-feet long. The sill elevation of the sluice is 550.65 feet.

The intake section of Powerhouse B, located directly below the main level, consists of two inlet bays. Each bay has three timber gates approximately 6.67-feet wide and 17.5-feet high separated by a concrete pier. These gates are closed and opened by hoists driven by a reversible electric motor when maintenance or repair work is necessary. The gates admit water to rectangular concrete wheel pits, each of which house a vertical-shaft Francis hydraulic turbine, direct connected to a generator on the main level. The wheel pits are approximately 27.5-feet long by 16.5-feet high by 23-feet wide. They are separated by a 3-foot wide reinforced concrete wall. Flow through each turbine passes to a steel draft tube, then through a reinforced concrete discharge chamber and into the tailrace. The two conical draft tubes are approximately 13-feet tall and have an outlet diameter of approximately 14 feet. The two discharge chambers have arched roofs and are approximately 23-feet wide by 16.5-feet high by 27.5-feet long.

The two inlet bays at Powerhouse A are faced with an intake screen approximately 45-feet wide and consisting of 3/8 inch by 4-inch steel bars. The bars are 29-feet long and are inclined toward the powerhouse at approximately 12.7 degrees to the vertical. The bars are spaced 3-1/2 inches on-center and provide a cleared spacing of 3-1/8 inches.

Table 1.1.3-1 provides the turbine and generator specifications for Powerhouse B. The turbine generator units in Powerhouse B are identical to those in Powerhouse A. Therefore, the maximum hydraulic capacity of Powerhouse B is 2,556 cfs. Overall, the total hydraulic and generation capacity of the Project is 6,390 cfs and 12,500 kW, respectively.

1.1.4 Reservoir

The reservoir for the Project has a surface area of about 500 acres, and a gross storage capacity of approximately 6,869 acre-ft at the Project's normal maximum water surface elevation of 549.99 feet. The reservoir shoreline with the project boundary is approximately 16 miles in length. Between the Project's normal maximum (549.99 feet NGVD) and minimum (546.29 feet) operating water surface elevations the usable storage is approximately 1,687 acre-ft.

1.1.5 Tailrace

Turbine flows are discharged into two tailraces immediately downstream of Powerhouses A and B. The tailrace below Powerhouse A is about 100-feet wide and 250-feet in length, while the Powerhouse B tailrace is approximately 60-feet wide and 50-ft long.

1.1.6 Transmission Line

There are no primary transmission lines as a part of the Project because the point of interconnection is just outside of Powerhouse A.

1.1.7 Electrical Facilities

Project electrical facilities include the turbine generating units, three 5,210 kVA (single phase) 4/34.5 kV step-up transformers, bus structures, switching equipment and switchboard, and generator terminals.

1.1.8 Appurtenances

Appurtenances at the Project include a 15-ton capacity crane at Powerhouse A, a 20-ton capacity crane at Powerhouse B, and other mechanical and electrical equipment necessary for efficient and safe operation of the Project.

Table 1.1.3-1. Turbine and generator specifications within Powerhouse A and B.

Specification	**Powerhouse A (Units 1-3)**	**Powerhouse B (Units 4-5)**
Turbines		
Type	Vertical Francis	Vertical Francis
Design head (feet)	32	32
Horsepower at design head	3,620	3,620
Maximum hydraulic capacity (cfs)	1,278	1,278
Minimum hydraulic capacity (cfs)	800	800
Revolutions per minute (rpm)	164	164
Intake trashrack clear spacing	3.125	3.125
Generators		
Nameplate capacity (kilovolt-ampere; kVA)	3,125	3,125
Power factor (percent)	80	80
Nameplate kW	2,500	2,500
Phase/frequency	3/60	3/60
Voltage	4,150	4,150

2 LANDS OF THE UNITED STATES

No lands of the United States are located within or are adjacent to the Project boundary.

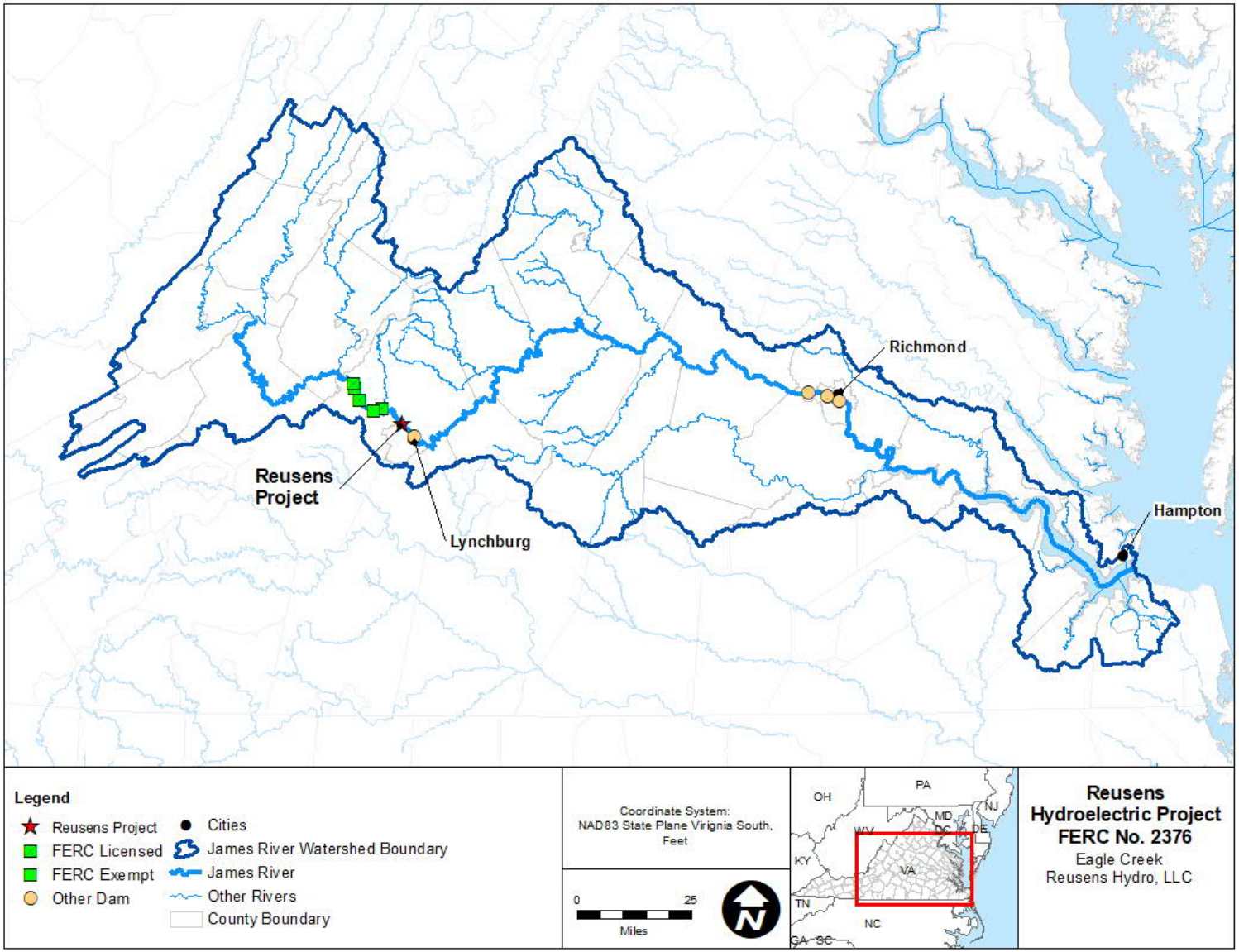


Figure 1-1. Reusens Hydroelectric Project general location.

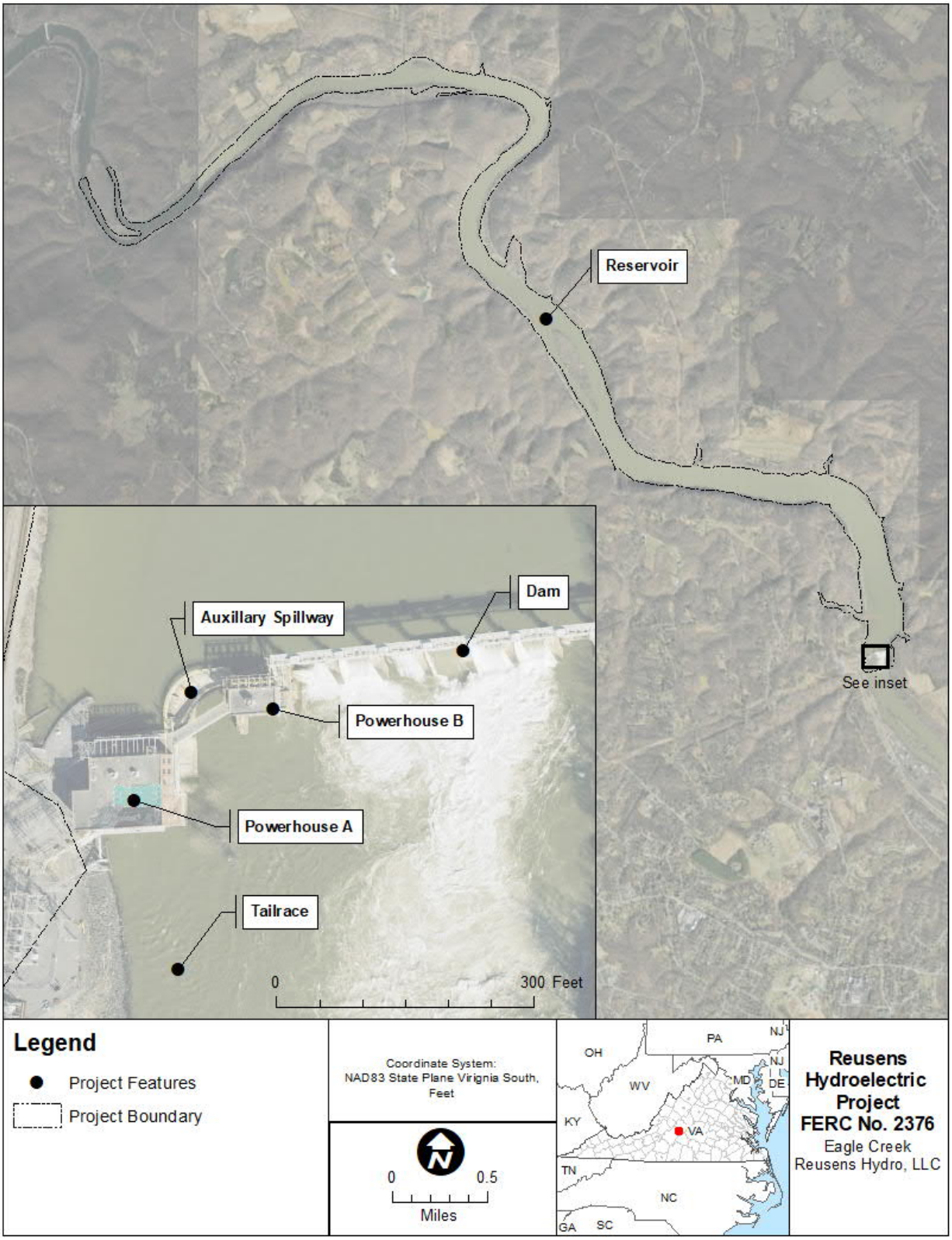


Figure 1.1-1. Reusens Hydroelectric Project facilities

Reusens Hydroelectric Project
(FERC No. 2376)

DRAFT

Application for License
Major Project – Existing Dam

Exhibit B – Project Operations and Resource Utilization

[This page intentionally left blank]

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 EXISTING AND PROPOSED PROJECT OPERATION

1.1 Existing Project Operations

Project operations are automated and controlled from a control room in the upper level of Powerhouse A. The Project is operated as a conventional hydropower project in accordance with the Operations Plan filed with Commission on August 9, 2018 per Article 403 of the current license[1]. The Operations Plan discusses normal operations and project outages, supplemental discharges, maintenance situations and emergency situations. These operations are summarized below.

1.1.1 Normal Operations and Project Outages

Operation of the Project during non-maintenance and non-emergency periods is in accordance with the current FERC license, taking into consideration variations in electricity demand as well as natural flow in order to maximize the efficient use of available water. When inflows are within the Project's generating capacity, Reusens Hydro uses the limited impoundment storage at the Project to dispatch generation as required to meet the generation schedule managed by the PJM Regional Transmission Organization (RTO). During daily operation, generation can vary between the required minimum flow and full generating capacity, depending on inflow and impoundment storage.

Anticipated inflow and recent rainfall over the basin forms the basis for bidding into the PJM RTO market. Bids are usually day-ahead (i.e., one-day forward), and reflect must-run generation, minimum flow, sustained higher flows, opportunistic generation periods when inflow and available storage allow, and anticipated electricity demand. Inflow into the Project is estimated based on the upriver USGS stream flow gage, USGS No. 0205500 James River at Holcomb Rock, VA. Other stream flow gages (USGS Gage No. 02024752 James River at Blue Ridge Parkway near Big Island, VA, USGS Gage No. 02019500 James River at Buchan, VA and USGS Gage 0204000 Maury River near Buena Vista, VA) are used to anticipate inflow for operations planning as the Holcomb Rock gage is immediately upstream of the Project reservoir.

The current FERC license allows Reusens Hydro to operate the Project in peaking mode. When peaking, the Reusens reservoir usually starts at or near its normal maximum water surface elevation of approximately 550.9 NAVD88.[2] Generally, Reusens Hydro operations staff loads the turbine-generating units up to their most efficient operating point and units are brought online one at a time. Normally, the number of units used during peaking operations is four subject to precipitation conditions. The Project operates at the set loading for as long as necessary, or until the forebay elevation reaches the lower operating elevation of roughly 547 feet. The reservoir is then refilled during which the Project usually operates one unit when

[1] Reusens Hydro sent a draft Operations Plan to the City of Lynchburg, Virginia Department of Game and Inland Fisheries, and the U.S. Fish and Wildlife Service on June 27, 2018 to consult with the agencies and requested they provide written comments on or before July 28, 2018. No comments were received. Reusens Hydro then prepared the final Operations Plan and filed it with the Commission. The final Operations Plan is available at FERC's e-library at https://elibrary.ferc.gov/idmws/search/fercgensearch.asp.

[2] All elevations presented herein are in reference to NAVD88, unless otherwise noted. The conversion from NAVD88 to NGVD29 is +0.715 feet.

inflow allows, which fulfils the current minimum flow requirement. If inflow is not sufficient to utilize one unit, then the minimum flow is provided by one of the spillway gates or debris sluice between Powerhouse B and main spillway. Under peaking operations, over the course of a day, the Project generally passes the inflow. Under certain high or low flow conditions, or in periods of low demand for electricity, the Project units are operated in run-of-river mode, such that the forebay elevation is kept nearly constant by adjusting the unit loadings to pass river inflow.

The maximum hydraulic capacity of the Project is 6,390 cfs, which is equaled or exceeded 16 percent of the time (see Section 2.4). 95,390 cfs represents the maximum Project discharge (generation plus spill) when Powerhouses A and B are at their maximum hydraulic capacities and all floodgates are opened and the reservoir is its normal maximum water surface elevation. Figure 1.1.1-2 presents a photograph of the floodgates along the main spillway. 95,390 cfs represents approximately 46 percent of the flood of record, 207,000 cfs, which occurred on November 5, 1985. During the current license term, the flood of record at the Project occurred on January 20, 1996 and was approximately, 116,000 cfs, or 121.6 percent of station capacity.

Article 401 of the current license describes the minimum flow requirements Reusens Hydro shall release into the James River below the Project, which requires Reusens Hydro maintain an average hourly minimum flow of at least 333 cfs or reservoir inflow if less. However, Reusens Hydro maintains a continuous minimum flow of 333 cfs or reservoir inflow, if less. The minimum flow is met by passing water through either a turbine, an existing debris sluice between Powerhouse B and the main spillway, a floodgate at the Project dam, or a combination of the above. Compliance with the minimum flow requirement is determined based on records of generation and pond level combined with performance tables and curves for each source, as provided in the Operations Plan. In cases when there is a Project outage, an automated alarm is sent to the operations staff. Operations staff are on call 24 hours per day. In the event of a trip that interrupts minimum flow, operations staff arrive at the Project and restore minimum flow (either through a turbine, the auxiliary spillway outlet, or a floodgate) within one hour.

Article 402 requires Reusens Hydro to maintain the forebay at a minimum surface water elevation of 546.29 feet NAVD88 to protect municipal water supply intakes in the Project reservoir and downstream below the Lynchburg Dam. Compliance is assured using the monitoring equipment discussed above. Over the duration of the current license period, water surface elevation of the reservoir had not fallen below 546.29 feet. In addition, and when requested by the City of Lynchburg's Director of Public Works, supplemental discharges from the Project are provided downstream when reservoir inflow is less than 223 cfs, emergency conditions exist at one or both of the City's raw water intakes, and existing storage and inflow conditions are conducive to providing supplemental discharges. Supplemental discharges are subject to all project equipment that would be used to provide the supplemental discharges being fully operational and the City providing timely notice of scheduled maintenance or emergency conditions at the raw water intakes and pumps.

Reservoir water level monitoring is accomplished via monitoring equipment installed at Powerhouse A forebay, which consists of an annually calibrated transducer/well system link to a digital display in Project's control room within Powerhouse A and a staff gauge. The staff gauge is used by Project personnel to verify forebay elevations daily. Dependent on powerhouse discharges and inflow, the reservoir drawdown rates are typically less than 0.5 to 1.0 foot (ft) per hour and do not exceed 1.0 ft per hour. Because the length of the reservoir in relation to the channel width, channel morphology, and operations of the upstream Holcomb Rock

Hydroelectric Project (FERC No. 2901) changes in water surface elevations and flow at the dam are not mirrored at upper reservoir locations.

Routine repairs or maintenance work on the main spillway structures are performed using a bulkhead system so that the reservoir water levels do not fall below the minimum operating water level of 547.0 feet NVGD in order to protect the City of Lynchburg's water intakes. If maintenance work cannot be done within the bulkhead system, the Licensee consults with the City of Lynchburg to schedule an agreed upon time to perform the work to minimize impacts to the City's water supply intakes. Should a water supply emergency develop during a period when the Reusens reservoir is drawn down to perform non-emergency maintenance or repair work, the Licensee coordinates with the City to resolve the emergency situation while minimizing impacts to the City's water intakes and Project structures.

Reusens Hydro employs a four-part emergency response to protect the City of Lynchburg water supply pump station intakes. First, Reusens Hydro personnel monitor plant forebay elevations and USGS gage levels for emergency situations. In addition, an automated alarm is in place to detect emergency situations, which when triggered, alerts the operator outside of normal work hours. Second, when alerted of a potential emergency situation, the Project operator makes an assessment of the potential adverse impact and the corrective action needed. Third, Project operations staff notify appropriate contractors from the Emergency Action Plan (EAP) for the Project, prepared by the Licensee in accordance with Part 12 of the Commission's regulations. Lastly, the Project operator would notify the City of Lynchburg Director of Public Works immediately if it is determined the emergency situation could impact the operation of the City of Lynchburg pump station intakes.

1.1.2 Operations During Adverse, Mean, High Water Years, and Emergency Conditions

High flows at the Project can occur throughout the year, but mainly occur during the spring and fall rainy seasons. Annually, flows at the Project would be expected to exceed the Project hydraulic capacity 16 percent of the time (see Section 2.3). During periods of sustained high flows, Reusens Hydro utilizes as much inflow as possible for generation up to the maximum hydraulic capacity. When inflows to the Project reservoir are anticipated to exceed the maximum hydraulic capacity of the Project, flood gates along the main spillway are open to an elevation based on rating tables to maintain the reservoir water surface elevation at or near 550.7 ft NGVD. At approximately 26,000 cfs , the turbine units are usually shut down due to the loss of operating head. If inflows exceed the capacity of the flood gates, the flashboards along the auxillary spillway overtop and trip.

During low flow periods, Reusens Hydro passes the minimum flow requirement as discussed above. In addition, Reusens Hydro employs a four-part emergency response to protect the City of Lynchburg water supply pump station intakes. First, Reusens Hydro personnel monitor plant forebay elevations and USGS gage levels for emergency situations. In addition, an automated alarm is in place to detect emergency situations, which when triggered, alerts the operator outside of normal work hours. Second, when alerted of a potential emergency situation, the Project operator makes an assessment of the potential adverse impact and the corrective action needed. Third, Project operations staff notify appropriate contractors from the Emergency Action Plan (EAP) for the Project, prepared by the Reusens Hydro in accordance with Part 12 of the Commission's regulations. Lastly, the Project operator would notify the City of Lynchburg

Director of Public Works immediately if it is determined the emergency situation could impact the operation of the City of Lynchburg pump station intakes.

Typically, routine and periodic maintenance does not require impoundment drawdown, outside the license-specified full operating impoundment range. If the need arises for unanticipated reasons or emergencies, Reusens Hydro would notify state and federal regulatory agencies, seek FERC authorization if needed, and secure any necessary permits to conduct such work. This would include the replacement of the flashboards along the auxiliary spillway if tripped during high flow events or are in need of replacement.

1.2 Proposed Project Operation

Reusens Hydro does not propose any change in Project operations. Reusens Hydro proposes to continue to operate the Project in accordance with the existing license with no proposed changes in operations as described in Section 1.1.

Figure 1.1.1-2. Photograph of the flood gates along the Project's main spillway.

2 DEPENDABLE CAPACITY AND ANNUAL GENERATION

2.2 Estimate of Dependable Capacity and Average Annual Generation

At full load, with inflow equaling the maximum hydraulic capacity, the Project has the capability of producing 12.5 MW. In April of 2017, Reusens Hydro acquired the Project. From 2018 through 2020, the average annual generation was 21,052 MWh. At present, Reusens Hydro is rehabilitating the last turbine generator unit, and intends to bring back online, sometime in late-summer 2021. When all turbine generator units are available the average annual generation to be approximately 36,000 MWh. Because Reusens Hydro is proposing to operate the Project as currently licensed, annual generation is expected to be close this estimate.

2.3 Annual Plant Factor

The annual plant factor for the Reusens Hydroelectric Project is the ratio of estimated average annual generation from the plant to the energy that the plant might produce if it operated at full capacity for one year (nameplate capacity [12.5 MW] × 8,760 hours per year). Therefore, the annual plant factor for the Project is 32.9 percent.

2.4 Flow Records and Flow Duration Curves

Table 2.3-1 provides minimum, mean, and maximum recorded flows at the Project dam based on 15-minute flow records from the James River at Holcomb Rock, VA USGS Gage No. 02025500 (Holcomb Rock Gage). Over the period analyzed, mean monthly flows ranged from 1,418 cfs to 6,166 cfs at the Project dam. The highest mean monthly flows occur in March, and the lowest mean monthly flows occur in August. The maximum instantaneous flow at the dam was 117,160 cfs, which occurred in January of 1996, and the lowest instantaneous flow was 13 cfs, which occurred in November of 2008. Figures 2.3-1 through 2.3-4 provide monthly flow, and Figure 2.4-5 present an annual exceedance curves at the Project dam based on instantaneous flow records from March 1, 1994 through May 20, 2021 observed at the Holcomb Rock Gage prorated by 1.01 to account for the intervening drainage.

2.5 Area-Capacity Curve

The reservoir for the Project has a surface area of approximately 500 acres, a gross storage capacity of approximately 6,869 acre-ft at the Project's normal maximum water surface elevation of 549.99 feet. Within the 3.7 foot operation range, 549.99 feet to 546.25 feet, the Project has 1,687 acre-ft of usable storage. Figure 2.4-1 presents the area-capacity curve for the Project reservoir.

2.6 Estimated Hydraulic Capacity

The minimum and maximum hydraulic capacity of the plant is 800 cfs and 6,390, respectively.

2.7 Tailwater Rating Curve

The Project discharges directly into the James River. A tai1water rating curve for flows through the Reusens generating units ranging from 0 cfs to 5,000 cfs is shown in Figure 2.6-1.

2.8 Power Capability

The Project's power capability is its power output at a given head. Figure 2.7-1 present the Project's power capability curve, the power output over a range of heads. The normal, minimum, and maximum operating head at the Project are 31.0, 27.0 and 34.5 feet, respectively.

Table 2.3-1. Estimated minimum, maximum and mean flows at the Project from March 1994 to May 2021.[1]

Month/ Time Period	Instantaneous		Average		Mean
	Minimum	Maximum	Minimum	Maximum	
January	97	117,160	1,251	23,035	4,890
February	125	50,399	1,934	17,117	5,267
March	352	41,006	2,192	20,362	6,166
April	403	53,126	1,858	23,233	6,021
May	148	54,338	1,603	19,018	5,422
June	92	88,678	653	16,583	3,570
July	125	32,118	600	6,046	1,754
August	94	28,684	469	4,712	1,418
September	26	72,619	424	13,837	2,186
October	37	34,340	572	8,625	1,823
November	13	52,116	674	14,146	2,826
December	77	56,055	1,242	16,995	4,314
Annual	– [2]	–	1,096	15,350	3,799[3]

Source: USGS (2021), as modified by Reusens Hydro.

1. The statistics presented are based on instantaneous, 15-minute observations from USGS Gage No. 0205500 James River at Holcomb Rock, VA from March 1, 1994 through May 20, 2021, prorated by 1.01 to account for the intervening drainage between the gage and Project dam.
2. "–" indicates a corresponding value for the table cell is not applicable.
3. Based on calendar years 1995 through 2020.

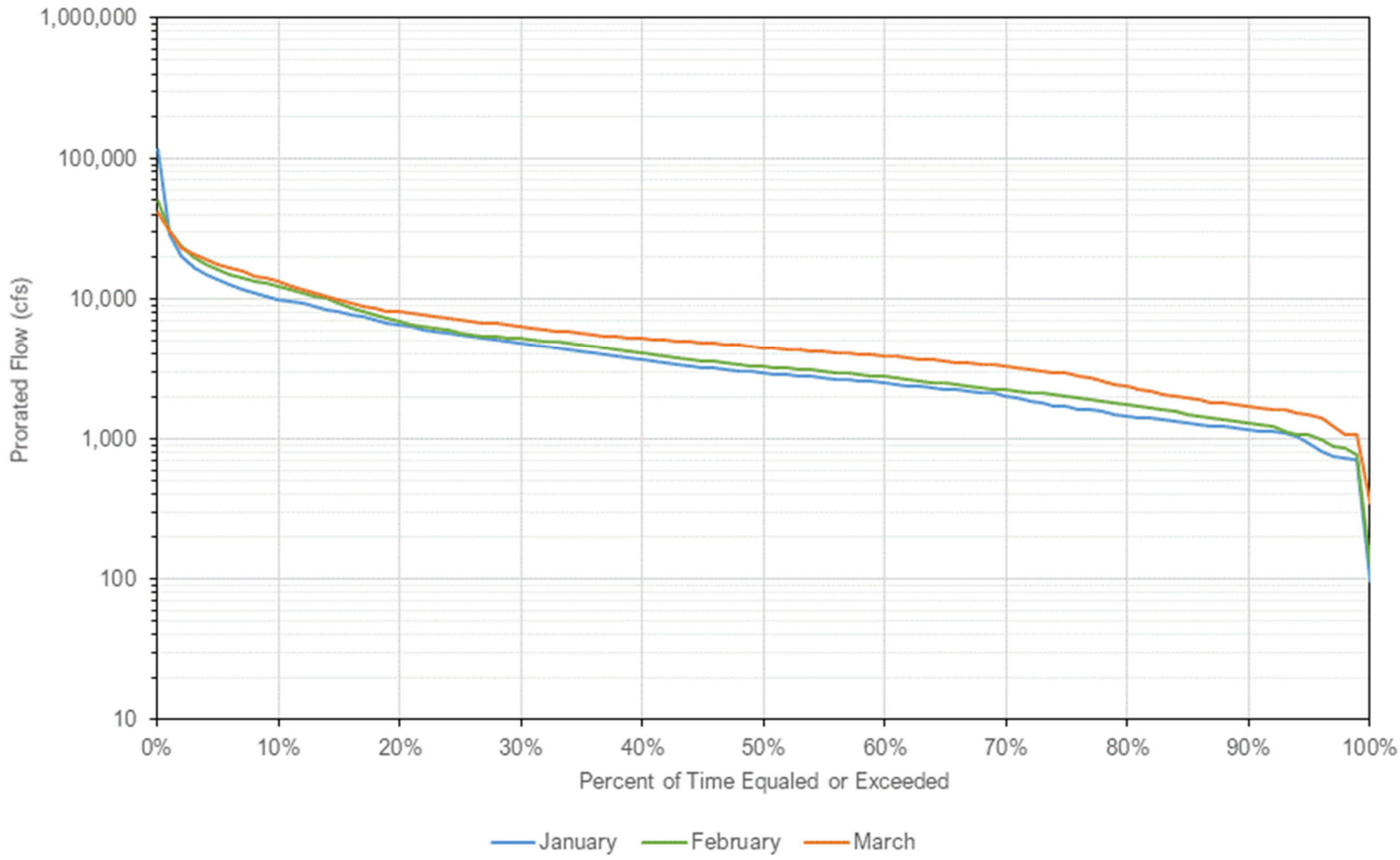


Figure 2.3-1. Flow exceedance curves for January, February, and March.

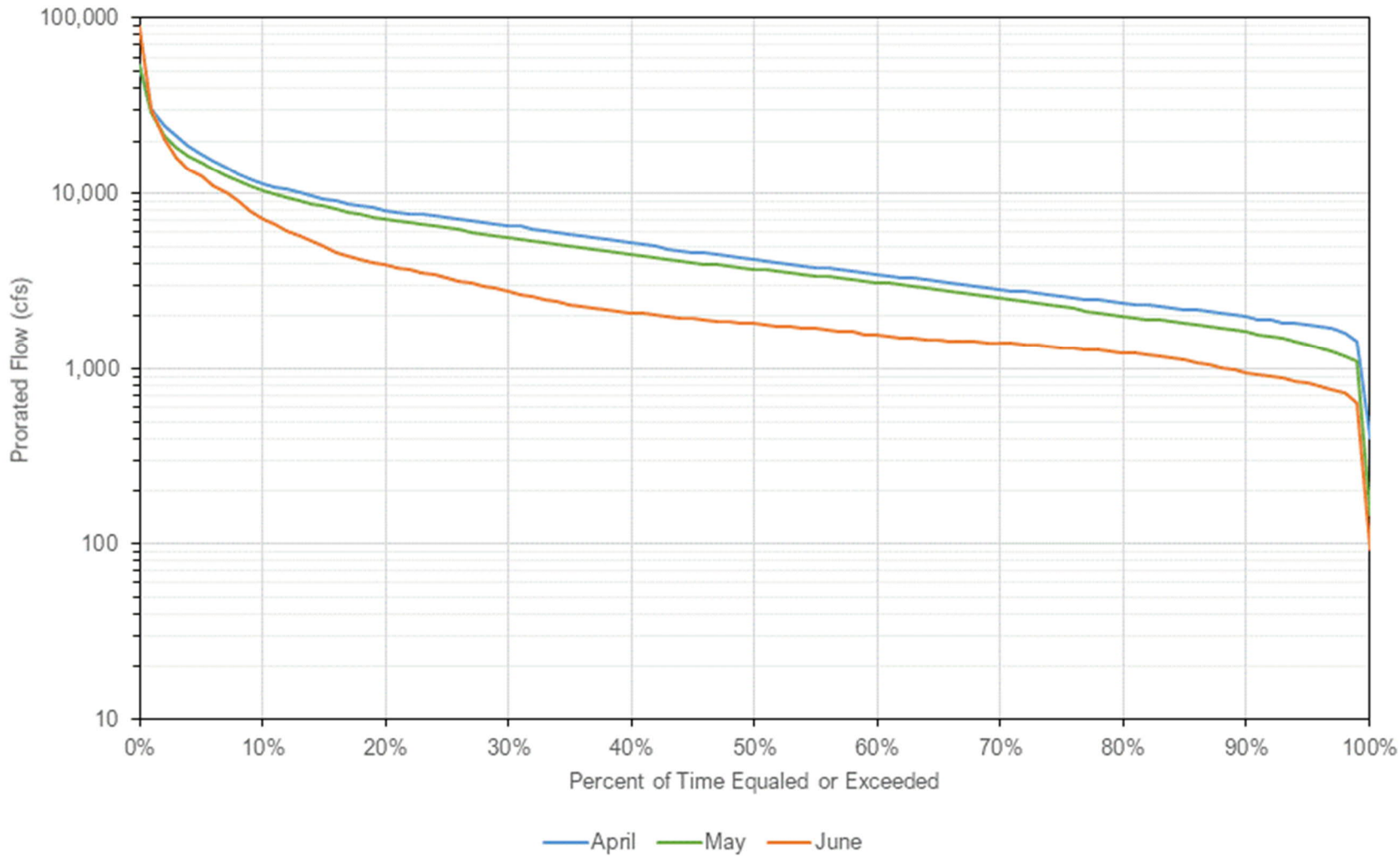


Figure 2.3-2. Flow exceedance curves for April, May, and June.

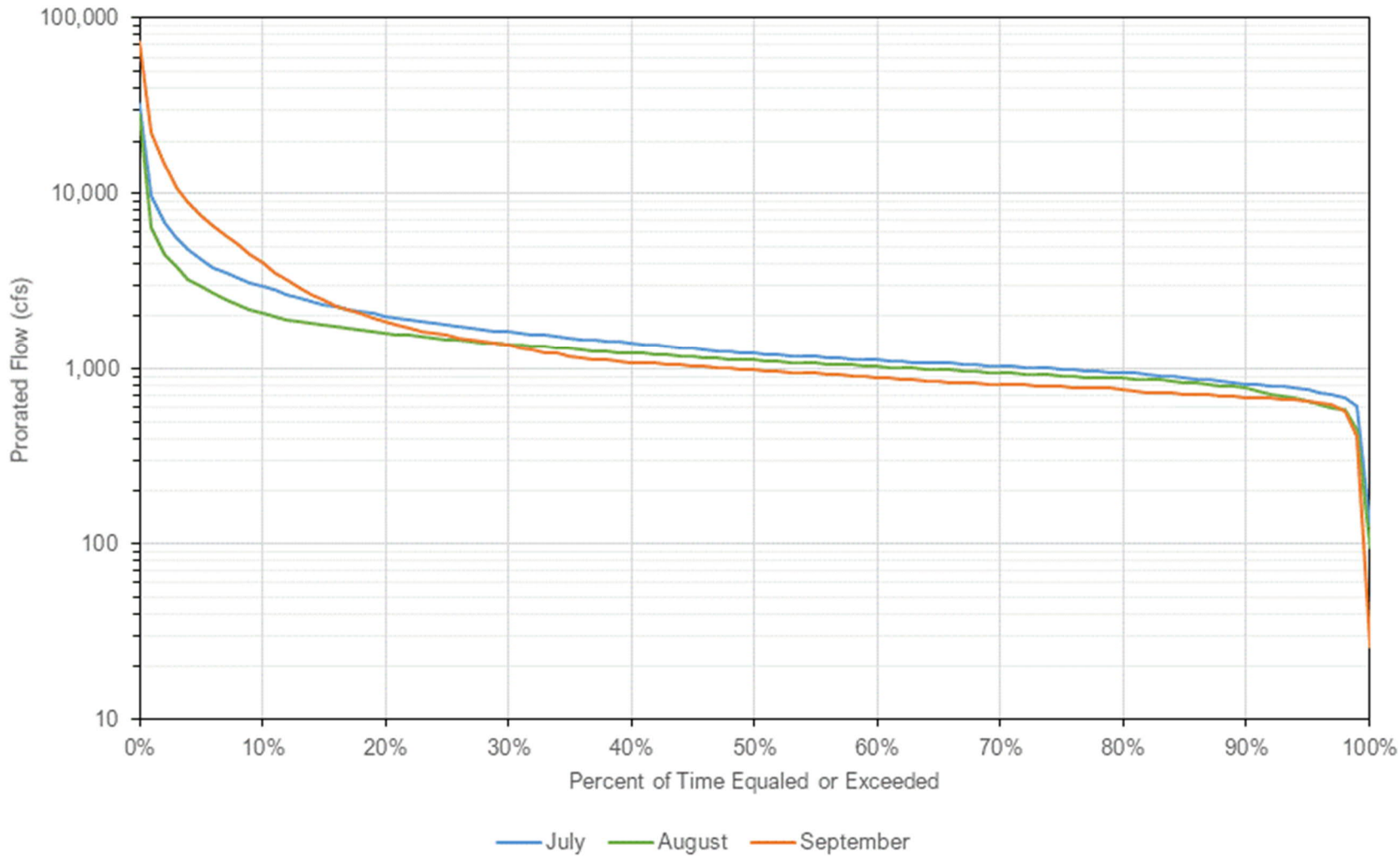


Figure 2.3-3. Flow exceedance curves for July, August, and September.

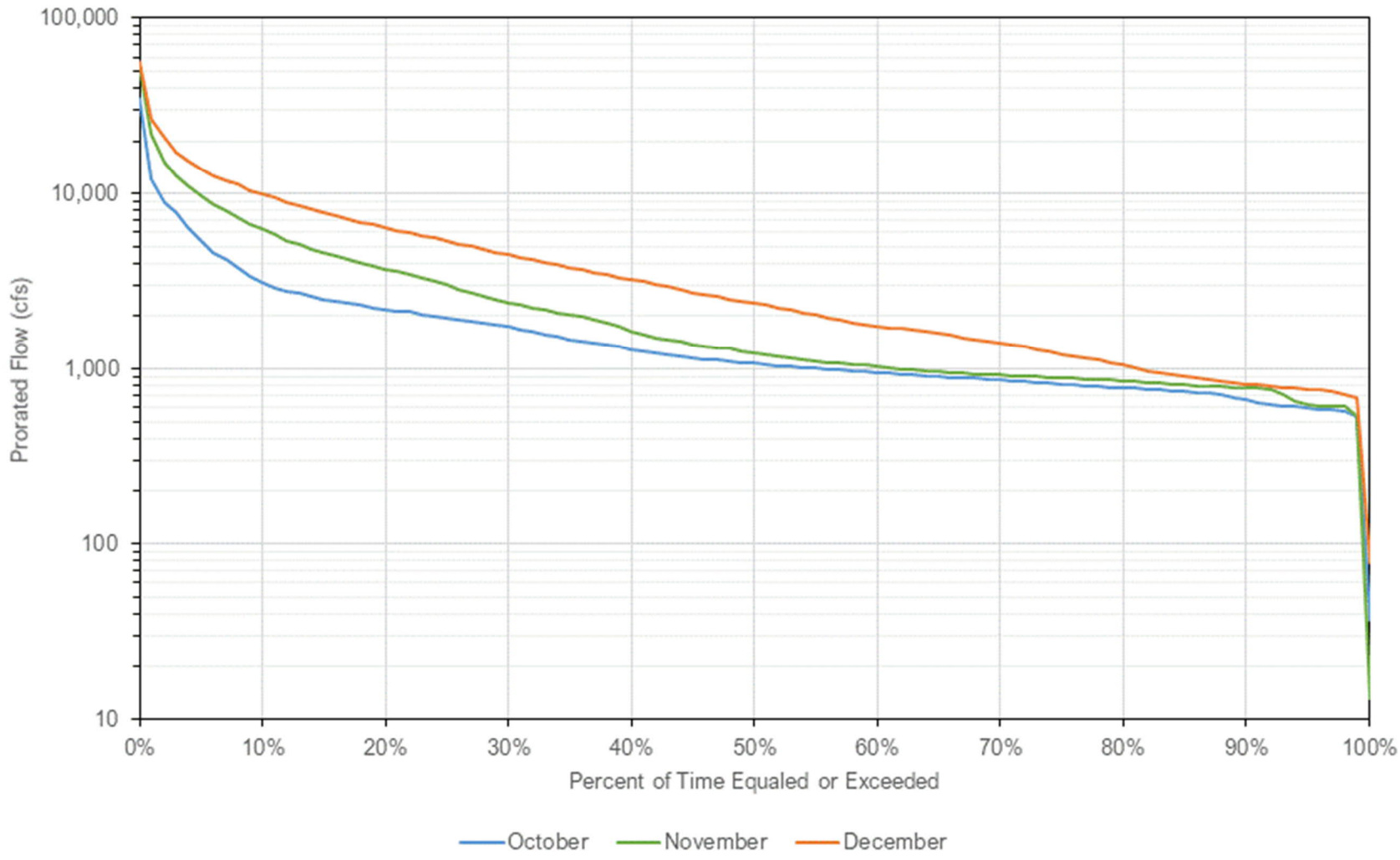


Figure 2.3-4. Flow exceedance curves for October, November, and December.

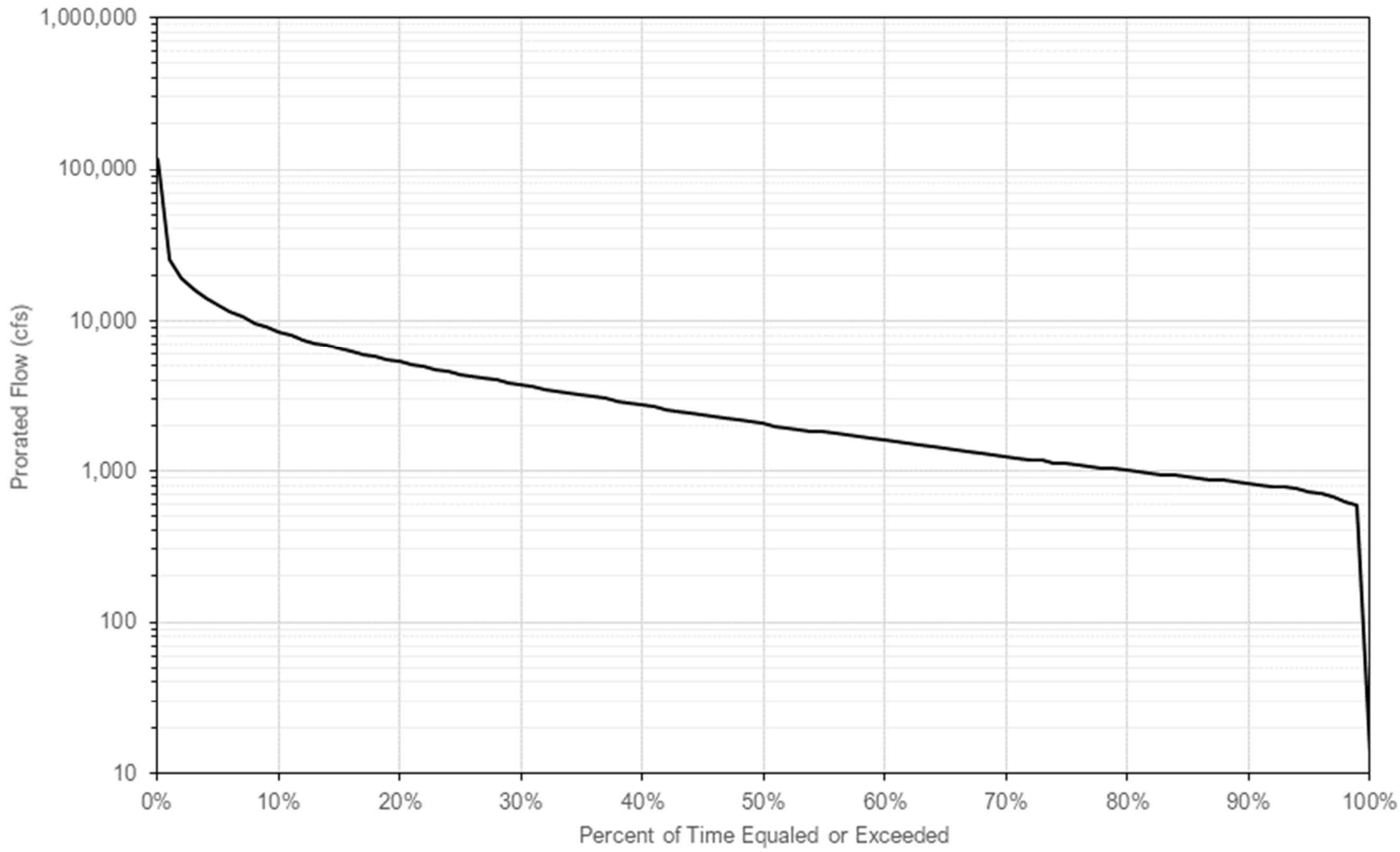
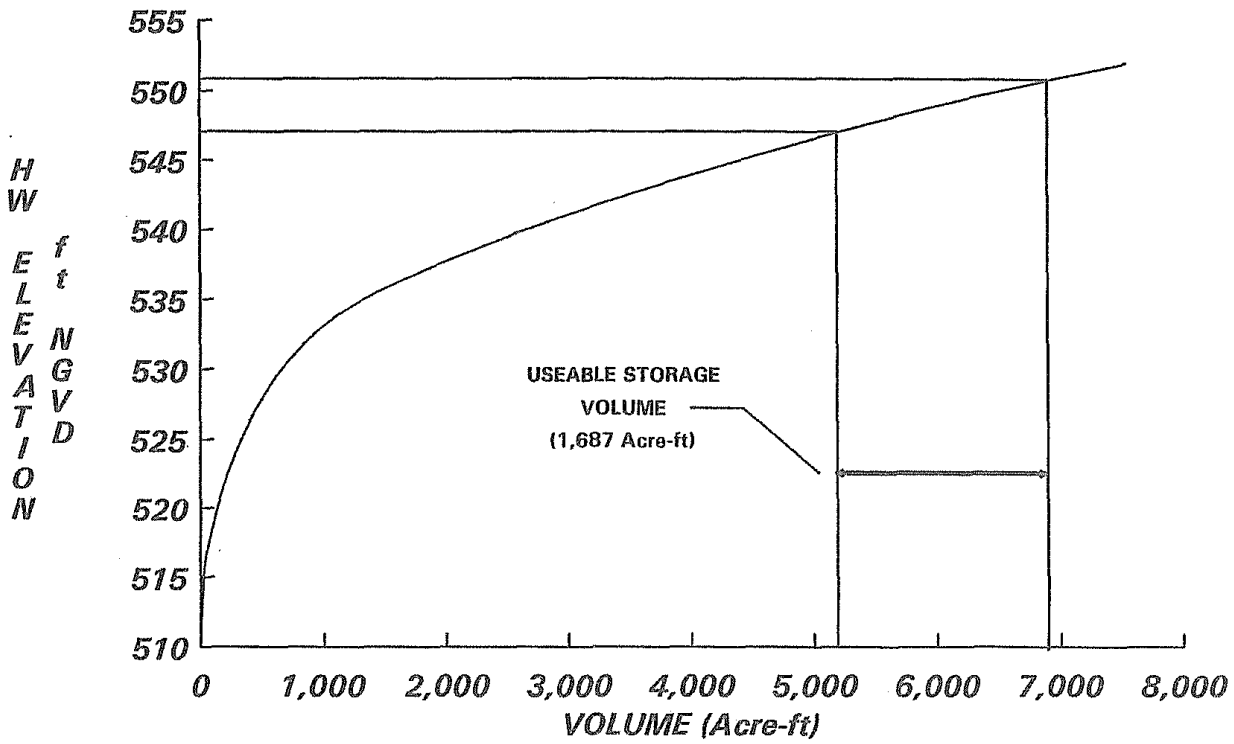
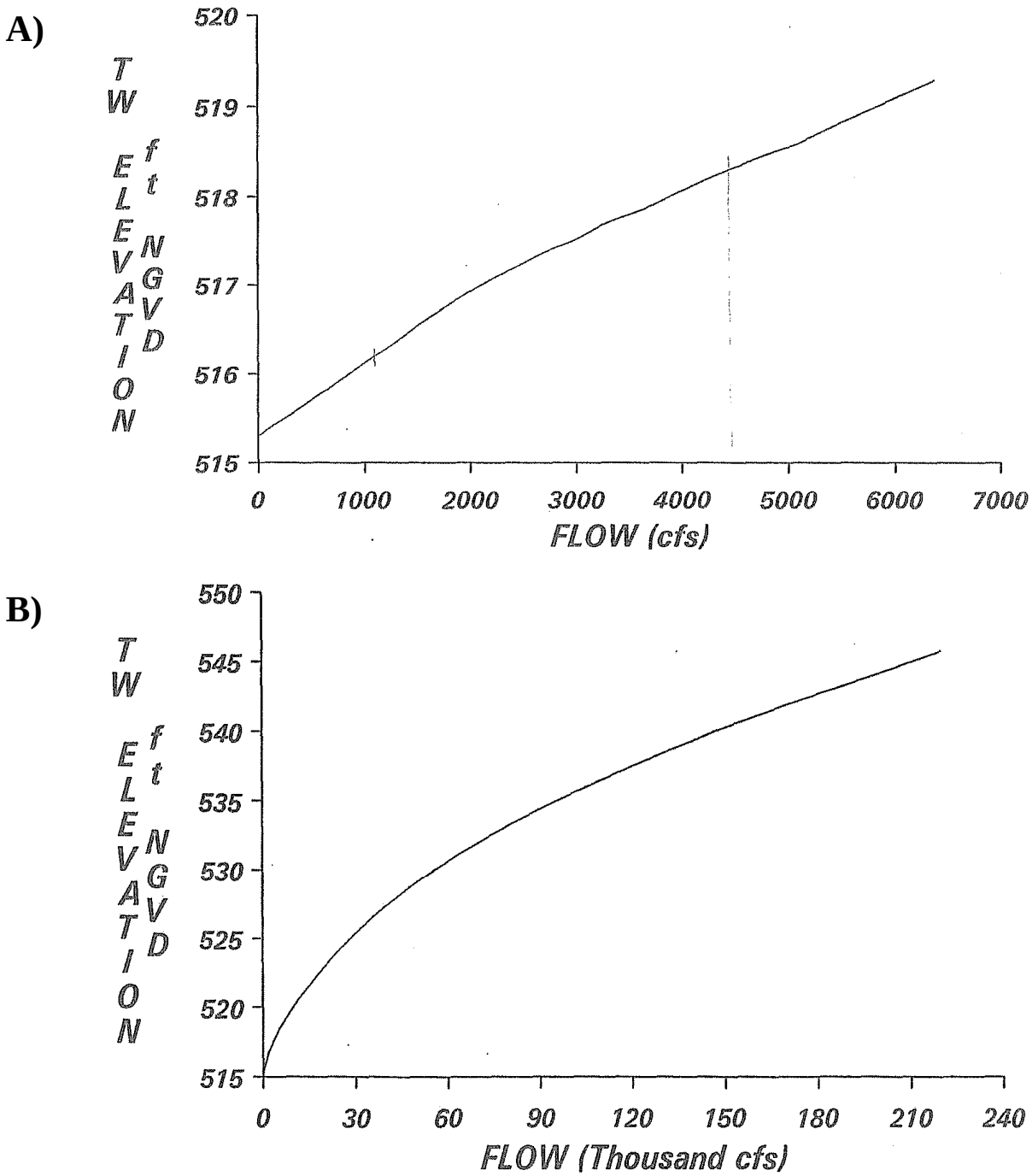


Figure 2.3-4. Annual flow exceedance curve at the Project.



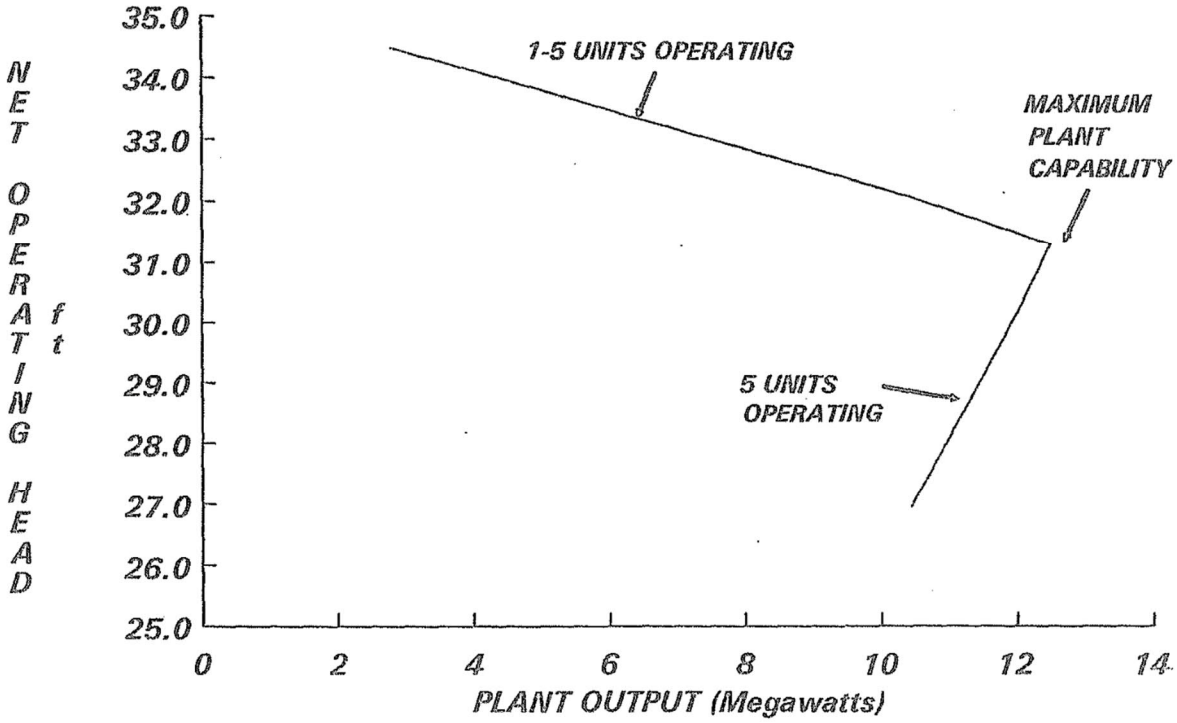
Source: APC (1991), as modified by Reusens Hydro

Figure 2.4-1. Reservoir storage capacity curve for the Project.



Source: APC (1991), as modified by Reusens Hydro

Figure 2.6-1. Project tailwater rating curves from 0 to 6,500 cfs (A), and 0 to 210,000 cfs (B).



Source: APC (1991), as modified by Reusens Hydro

Figure 2.7-1. Power plant capability curve.

3 UTILIZATION OF PROJECT POWER

The Project produces power that is sold into the regional PJM RTO (PJM) energy market. PJM ensures the reliability of the high-voltage electric power system serving parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. Over the term of the new license, Reusens Hydro expects to directly provide 36,000 MWh of renewable power into the region served by PJM annually. The Project uses approximately [to be provided in the Final License Application MWh annually for station service.

4 PLANS FOR FUTURE DEVELOPMENT

Reusens Hydro is not proposing or has any plans for future development of the Project or any other existing or proposed water power project on the James River. Reusens Hydro is aware of the proposed 4.5 MW Scott's Mill Hydroelectric Project (FERC No. 14687) on the James River approximately 3.7 river miles downstream of the Project.

5 LITERATURE CITED

Appalachian Power Company. 1991. Reusens Hydroelectric Project No. 2376, Application for License for Major Project Existing Dam. Appalachian Power Company, Roanoke, Virginia. 332 pp.

U.S. Geologic Survey (USGS). 2020. National Water information System: Web Interface, USGS 02025500 JAMES RIVER AT HOLCOMB ROCK, VA. <https://waterdata.usgs.gov/nwis/uv?02025500>. Accessed: March 20, 2021.

Reuses Hydroelectric Project
(FERC No. 2376)

DRAFT

Application for License
Major Project – Existing Dam

Exhibit C – Construction History and Proposed Construction

[This page intentionally left blank]

TABLE OF CONTENTS

1 CONSTRUCTION HISTORY

The required content of Exhibit C is specified in 18 C.F.R §4.51(d)(1) and 18 C.F.R §4.51(d)(2). 18 C.F.R §4.51(d)(1) is only applicable to applications for an initial license, and 18 C.F.R §4.51(d)(2) is applicable to any new proposed development. This license application is for a new license; therefore, content of Exhibit C required by 18 C.F.R §4.51(d)(1) is not applicable. However, below is a cursory overview of the Project's construction and operation history.

1.1 Project Development and Construction History

Operation of the first hydroelectric generating station at the Project began in 1903. The Lynchburg Traction & Light Company constructed a generating station at the free-overflow granite block impoundment structure known as Judith Dam. The original powerhouse was located where the current Powerhouse A exists and housed two 750 kW generators; each connected by rope drives to two pairs of horizontal camelback turbines. In 1913, a 1.000 kW generating unit was added to the powerhouse, then under the ownership of the American Railways Company of Philadelphia, which acquired Lynchburg Traction & Light Company in 1910. Between 1924 and 1925, a joint-venture between American Gas & Electric Company and the Appalachian Power Company acquired the American Railway Company. During the same time period Powerhouse B was constructed, and two 1,000 kW vertical shaft generating units were installed within the new powerhouse. The Appalachian Electric Power Company (predecessor to the current Appalachian Power Company) was formed in 1926, and subsequently took over operation of the Project. From 1930 through 1931, the Project was rebuilt. The crest of the old Judith Dam was reduced by five feet, capped with concrete, and topped with the current eight floodgates. In addition, the existing generating units were installed, and the superstructure of Powerhouse A was enlarged. Except for various control, auxiliary equipment upgrades, rehabilitation of the generator units, there has been no major changes to the facilities since 1931.

1.2 Commencement of Commercial Operation

Commercial operation of the Project as it roughly exists today began sometime in 1931.

1.3 Additions or Modifications

At this time, Reusens Hydro is not proposing any additions. or modification, other than routine maintenance, at the Project.

2 PLANS FOR FUTURE DEVELOPMENT

Reusens Hydro is not proposing or has any plans for future development of the Project or any other existing or proposed water power project on the James River. Reusens Hydro is aware of the proposed 4.5 MW Scott's Mill Hydroelectric Project (FERC No. 14687) on the James River approximately 3.7 river miles downstream of the Project

Reusens Hydroelectric Project
(FERC No. 2376)

DRAFT
Application for License
Major Project – Existing Dam

Exhibit D – Statement of Project Costs and Financing

[This page intentionally left blank]

TABLE OF CONTENTS

LIST OF TABLES

1 ACTUAL OR APPROXIMATE ORGINAL COST

The Reusens Hydroelectric Project (FERC No. 2376; Project) was previously licensed in 1994, and this Application is for a new license. Federal Energy Regulatory Commission (FERC) regulations at 18 C.F.R. § 4.51(e)(1) do not require a statement of costs of lands, water rights, structures, or facilities in applications for new licenses, only for initial licenses.

2 AMOUNT PAYABLE IN THE EVENT OF PROJECT TAKEOVER PURSUANT TO SECTION 14 OF THE FEDERAL POWER ACT

Section 14 of the Federal Power Act (FPA) reserves the right of the United States to take over a non-publicly owned project upon expiration of its license. If a Federal takeover were to occur, Reusens Hydro, would be entitled to be reimbursed for its net investment, not to exceed the fair value of the property taken, plus severance damages suffered (16 United States Code [U.S.C.] § 807). However, the information required by FERC's regulations (18 C.F.R. 4.51(e)(2)) that would be needed to quantify the compensation to be paid to Reusens Hydro pursuant to Section 14 of the FPA is provided below.

2.1 Fair Value

A definition of the term "fair value" is not within the FPA. For the purpose of providing an estimate of the fair value of the Project, Reusens Hydro believes the best approximation of fair value is the cost to construct and operate a comparable power generating facility. If a takeover were proposed, Reusens Hydro would calculate the fair value based on then-current conditions because of the high capital costs involved with constructing new facilities, the increase in fuel costs, and variability in the building material markets.

2.2 Net Investment

The FPA broadly defines net investment as the original cost of the Project, plus similar cost of additions and betterments, minus the sum of depreciation and other amounts. The net investment of the Project is $[*to be provided in the FLA*] as of [*to be provided in the FLA*].

2.3 Severance Damages

Severance damages are not unequivocally defined in the FPA but are generally those reasonable damages, if any, to property of the licensee valuable, serviceable, and which is then dependent for its usefulness upon the continuance of the license but not taken in the event of a federal takeover. All Project structures, facilities, equipment, and contractual obligations or requirements are required for the successful operation of the Project. Reusens Hydro believes that potential severances inflicted by a federal takeover of the Project would be significant. Therefore, given the challenges of estimating damages associated with severance, Reusens Hydro is reserving the right to provide the Commission with such an estimate should the Commission consider a federal takeover of the Project.

3 ESTIMATED COSTS OF NEW DEVELOPMENT

Reusens Hydro is not proposing any new development at the Project at this time. Therefore, regulations at 18 C.F.R § 4.51(e)(3) are not applicable.

4 ESTIMATED AVERAGE ANNUAL COST OF THE PROJECT

Reusens Hydro is proposing to operate the Project over the new license term as it is currently licensed. The cost estimates provided below are presented for 2020 unless otherwise noted; therefore, approximate the cost of Reusens Hydro licensing proposal.

4.1 Average Annual Cost

The estimated annual cost of the total Project (in 2020 dollars) was approximately $[*to be provide in the FLA*] based on a full fiscal 2020 year of record. This estimate includes local, state, and federal taxes, depreciation and amortization, and operation and maintenance expenses.

4.2 Capital Costs

Capital costs are based on a combination of funding mechanisms that may include contributions from Reusens Hydro parent company, debt issuances, revolving credit lines, cash from operations, or other sources of funding. In 2020, the capital cost approximated [*to be provided in the FLA*] percent of the annual cost.

4.3 Local State, and Federal Taxes

In 2020, Reusens Hydro paid approximately $[*to be provided in the FLA*] in local, State, and Federal taxes.

4.4 Depreciation and Amortization

In 2020, depreciation for the Project was $[*to be provided in the FLA*].

4.5 Operation and Maintenance Expenses

Estimated annual operation and maintenance expenses for 2020 were approximately $[*to be provided in the FLA*]. Operation and maintenance expenses including interim replacements, insurance, administrative and general expenses, but exclude property and income taxes and depreciation.

4.6 Estimated Cost of Proposed Environmental Measures

The estimated capitol cost and annual operation maintenance cost of the proposed environment measures at the Project are provided in Table 4.6-1.

Table 4.6-1. Estimated capitol cost and annual operations and maintenance cost for each proposed environmental measure.

Proposed Environmental Measure	**Capitol Cost (2021 $)**	**Annual Operations and Maintenance Cost (2021 $)**
Average hourly minimum flow of 333 cfs and compliance reporting	[*to be provided in the FLA*]	
Review and update, if necessary, existing Cultural Resource Management Plan		
Monacan Park boat ramp assessment and modification		
Total		

5 ESTIMATED ANNUAL VALUE OF PROJECT POWER

Electricity generated by the Project is sold into the PJM-RTO regional market on a day-ahead and real-time basis. Capacity commitments are priced through a regional Forward Capacity Auction process. The Project also receives revenue for providing ancillary services to the regional system and the sale of renewable energy credits. Table 5-1 summarizes estimated revenues from energy production, capacity, renewable energy credits, and ancillary services based on 2020 prices and generation (18,665 megawatt-hours [MWh]). The total estimated annual valuation of Project power is $[*to be provided in the FLA*] or $[*to be filed with the FLA*]/MWh.

Table 5-1. Valuation of Annual Project Output.

Revenue Source	**Value (2020 $)**
On-peak energy	[*to be provided in the FLA*]
Off-peak electricity	
Forward capacity	
Real-time reserves	
Volt-ampere-reactive support	
Renewable energy credits	
Total Value	
Total Value/MWh	

6 SOURCES AND EXTENT OF FINANCING AND ANNUAL REVENUES

Capital projects are financed using cash flow from operations and as necessary, additional debt obligations or equity injections. Based on the value of Project power described in section 5 *Estimated Annual Value of Project Power* above, the Project will have adequate financial resources to meet the costs of operations for the term of the new license.

7 ESTIMATED COST TO DEVELOP LICENSE APPLICATION

The estimated cost to develop the license application for the Project is approximately $[*to be provided in the FLA*].

8 ON-PEAK AND OFF-PEAK VALUES OF PROJECT POWER

The value of power produced by the Project is based on current rates of the generation market established by the PJM-RTO. Based or Reusens Hydro's 2020 fiscal year, on- and off-peak value of power produced by the Project were $[*to be provided in the FLA*]/MWh and $[*to be provided in the FLA*]/MWh, respectively.

9 ESTIMATED AVERAGE ANNUAL CHANGE IN PROJECT GENERATION AND VALUE OF PROJECT POWER DUE TO CHANGES IN PROJECT OPERATION

Reusens Hydro is proposing to operate the Project as currently licensed during the next license term. Therefore, estimates of the average annual increase or decrease in generation or the value of Project power is not applicable at this time.