UNITED STATES OF AMERICA

BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

FINAL APPLICATION FOR NEW LICENSE FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT A - PROJECT DESCRIPTION

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July 2020

GREGORY B. JARVIS PROJECT RELICENSING

FERC NO. 3211

NEW YORK STATE OF OPPORTUNITY. | NY Power Authority

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1 Introduction

The Gregory B. Jarvis Power Project (Project) is located on West Canada Creek, a tributary to the Mohawk River, approximately ½ mile upstream of the Hamlet of Hinckley in the Towns of Remsen, Russia, Ohio, and Trenton, in the counties of Oneida and Herkimer, New York. The Project is owned and operated by the Power Authority of the State of New York (d/b/a "New York Power Authority" and referred to as "the Power Authority").

This exhibit is required under the Federal Energy Regulatory Commission (FERC) regulations which can be found in Title 18 of the Code of Federal Regulations (CFR) Section 4.51(b). The information provided herein covers the specifics prescribed for Exhibit A and serves the purpose of providing a description of the Project.

2 Project Description

The principal features of the Project generally include north and south embankment dams, a non-overflow concrete gravity section with integrated intake structure, a 15-foot diameter penstock which bifurcates into two 10.5-foot diameter penstocks, a powerhouse containing two 4.5 megawatt (MW) Kaplan type turbine/generator units, tailrace channel, step-up transformer, and appurtenant facilities (Figure 2-1). Table 2-1 provides a summary of Project components. A more detailed description of Project components is provided in the sections below.

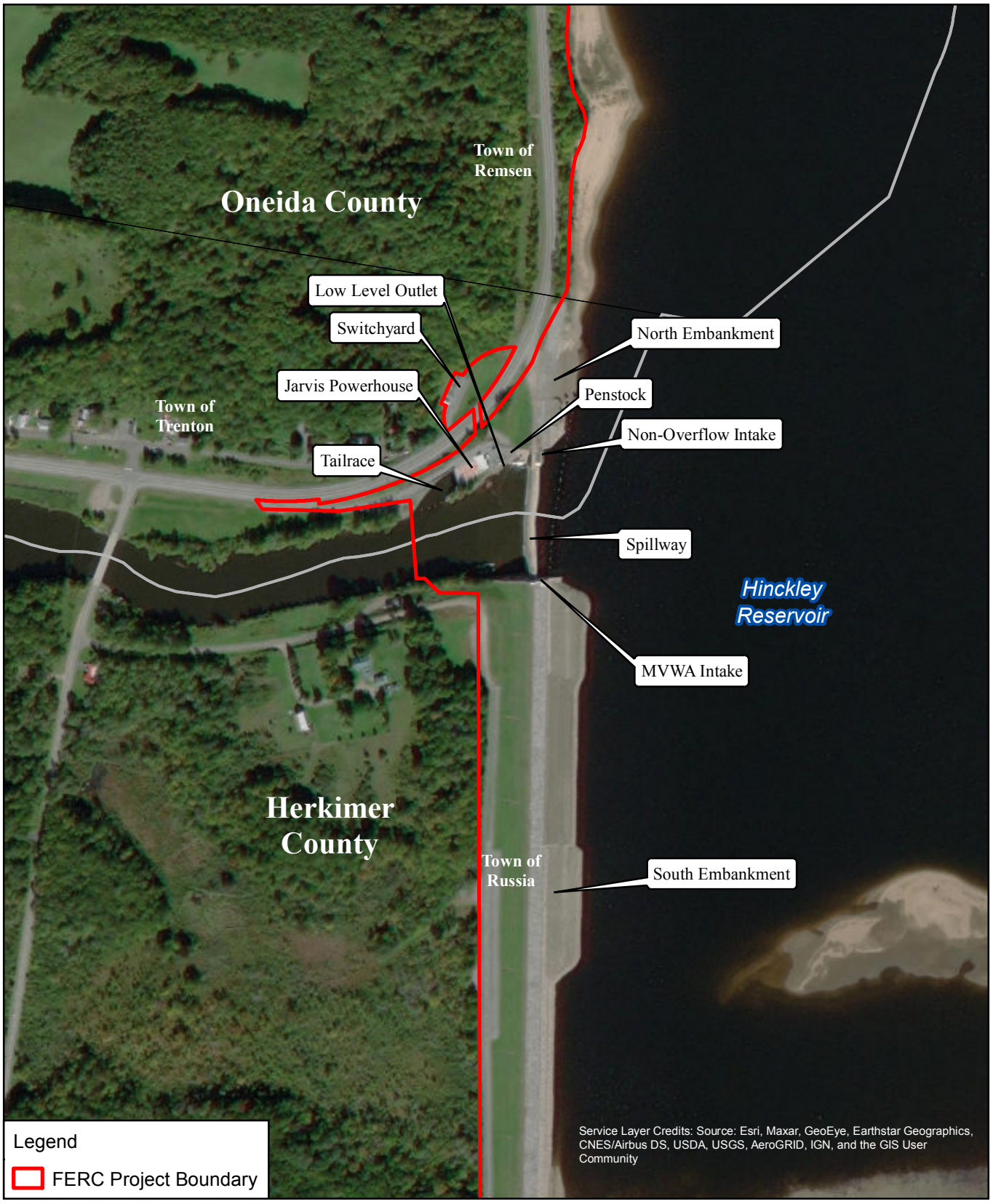
Table 2-1. Description of Project Facilities

Description	Number or Fact
General Information	
FERC Project Number	3211
License Issued	August 12, 1982
License Expiration Date	July 31, 2022
Licensed Capacity	9 megawatts
Project Location	Located on West Canada Creek in the counties of Herkimer and Oneida and in the towns of Remsen, Russia, Ohio and Trenton, NY.
Owner/Operator of Project	New York Power Authority
Total Area Encompassed by Existing Project Boundary	2,799 acres
Federal lands within project boundary	None
Reservoir	
Water Surface Area	2,709 acres at elevation (El.) 1225[1]
Water Surface Elevation	El. 1225
Average Depth	27 feet
Drainage Area	372 square miles
Usable Storage	24.6 billion gallons
Total Storage Capacity	25.1 billion gallons
Shoreline	28.5 miles (including the upper West Canada Reach)
Maximum Depth (at full pool)	73.5 feet
Dam	
Construction Type	Cyclopean concrete gravity dam. Diaphragm earthen embankments with a concrete core wall.
Length	• 570 feet – North embankment dam • 2600 feet – South embankment dam • 65 feet – Concrete non-overflow intake section • 400 feet – Spillway
Height at Top	El. 1242 with a height of 84 ft.

Description	Number or Fact
Crest Width	11 feet
Crest Elevation	• El. 1242 – Earthen embankments • El. 1240 – Non-overflow intake section • El. 1225 – Spillway
Water Conveyance Structures	
Intake, Shaft, Power Tunnel	• Hydro Intake – 15-foot diameter penstock. Intake opening is 35 ft. high by 21 ft. wide • Sluice gate – 60-inch diameter cast iron conduit
Penstocks	• One 15-foot diameter penstock, 141 ft. long that bifurcates into two 10.5-foot diameter penstocks approximately 188 ft. long
Powerhouse	
Construction Type	Reinforced concrete
Location	200 feet downstream of the non-overflow intake, 43 feet below grade
Dimensions	120 feet long, 55 feet wide
Trashracks	• Intake structure – 6-inch spacing on center, 5/8-inch thick bars for an actual spacing of 5 3/8 inches • Sluice gate – 4-inch spacing on center; ½-inch thick bars for an actual spacing of 3 ½ inches
Turbines	
Manufacturer	Bell – Turbine manufacturer; Dominion Bridge-Sulzer, Inc. – penstock, wicket gates, and governor manufacturer; Siemens-Allis – generator manufacturer; Louis-Allis – Exciter manufacturer
Type	Horizontal Kaplan – double regulated
Number	Two
Rating	4.5 MW each
Size	2,200 mm (86.6 in)
Rotation Speed	257.1 RPM
Maximum Discharge	900 cfs per turbine for a total of 1,800 cfs at spillway elevation

Description	Number or Fact
Switchyard/Transmission Lines	
	The generator leads run underground from the powerhouse about 50 feet to the transformer. A 200-foot-long power line runs from the transformer to the switchyard located north of Route 365 where it connects to National Grid's transmission lines. • Generator leads – 4.16-kV • Underground leads between Step-up transformer and switchyard – 46 kV • National Grid Transmission Line – 46 kV

[1] All elevations referenced herein refer to the Barge Canal Datum (BCD). Elevations referenced to the BCD are 1.04 feet higher than elevations referenced to the National Geodetic Vertical Datum of 1929, U.S. feet (NGVD29 or Mean Sea Level (MSL)); thus, El. 1225.0 BCD = 1223.96 NGVD29.



NEW YORK STATE OF OPPORTUNITY. NY Power Authority

Gregory B. Jarvis Project
(FERC No. P-3211)
Final License Application

N

0 250 500 1,000 Feet

Figure 2-1:
Project Facilities

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2.1 Structures (18 CFR Section 4.51(b)(1))

The following existing components are included as part of the Project. The Power Authority is not proposing to install any new structures as part of the relicensing.

2.1.1 North and South Embankments

The embankment sections at Hinckley Dam[1] have a maximum height of 53 feet and a crest width of about 11 feet at elevation[2] (El.) 1242. The north embankment dam is approximately 570 feet long, and the south embankment dam is approximately 2,600 feet long. The upstream slopes, which are covered with riprap, are 1V:2.5H from the dam crest to El. 1227.0, 1V:3H from El. 1227.0 to El. 1210.0, and 1V:3.5H below El. 1210.0. In 1987-1988, a berm was added to portions of the upstream and downstream slopes. The downstream slopes are 1V:2H with two 8-foot wide berms, one at El. 1226 and the other at El. 1213.

The embankment dams contain a concrete core wall, which extends to rock except as noted below. The core walls vary from a width of 2.75 feet at the top (El. 1238.0) to 8.0 feet at the base. Drawings and construction photographs show that the vertical and horizontal joints of the core walls have keys that overlap joints by about 1 foot. The 300 feet of the core wall from Sta. 34+00 to Sta. 37+00 at the south abutment extends 30 feet into overburden and does not reach bedrock. The 350 feet of core wall on the north abutment also does not reach bedrock.

2.1.2 Non-Overflow Intake

The non-overflow section is constructed of cyclopean concrete (concrete with boulders embedded during placement). This structure is approximately 65 feet long and 82 feet high, with the top at El. 1240. The intake to the powerhouse is housed in the cyclopean non-overflow section. This structure originally contained four 60-inch diameter cast-iron outlet conduits at centerline El. 1169.5. A 5-foot by 5-foot sluice gate for each conduit was located at the upstream face of the non-overflow section. From 1984 to 1985 the Power Authority substantially modified the non-overflow structure to construct the Project. Three of the 60-inch diameter outlet conduits were eliminated, and a 15-foot diameter penstock and penstock bypass were added. After the addition of the powerhouse, one of the original 60-inch diameter water pipes (sluice gate no. 4) remained. The one remaining water pipe now acts as an outlet for low flows, and is located on the powerhouse side through the non-overflow section.

The maximum calculated water velocity at approximately 1-foot in front of the intake trashracks is

[1] Hinckley Dam, reservoir, and associated lands are owned by the People of the State of New York, under the jurisdiction of the New York State Canal Corporation (NYSCC), which became a subsidiary of the Power Authority on January 1, 2017.

[2] All elevations referenced throughout this exhibit refer to the Barge Canal Datum (BCD). Elevations referenced to the BCD are 1.04 feet higher than elevations referenced to the National Geodetic Vertical Datum of 1929 (NGVD29 or Mean Sea Level (msl)); thus, El. 1225.0 BCD = 1223.96 NGVD29.

2.57 ft./sec. The intake structure trashracks have a rack spacing of 6-inches from centerline to centerline of each bar. Given that each bar is $^{5}/_{8}$-inches thick, the actual space between bars at the intake structure is 5 $^{3}/_{8}$-inches. Trashrack spacing on the remaining sluice gate #4 is 4-inches from centerline to centerline of each bar. Given that each bar is ½-inch thick, the resulting sluice gate trashrack spacing is 3 ½-inches between bars.

2.1.3 Spillway

The cyclopean concrete spillway is an ungated ogee-type section with its crest at El. 1225.0. The spillway is approximately 400 feet long and has a maximum structural height, measured from crest to foundation, of 83 feet. The base of the section is founded at least 2 feet into bedrock with a 5-foot-deep, 8-foot-wide key at the heel. A 40-foot concrete apron 4 feet thick extends beyond the structural toe of the section, and the downstream edge of the apron is keyed into rock.

2.1.4 Conveyance Systems

Water is conveyed to the powerhouse through a 15-foot-diameter penstock, which bifurcates into two 90-foot long, 10.5-foot diameter penstocks. The 10.5-foot diameter penstocks lead to two horizontal Kaplan turbine units. The powerhouse discharges into a short tailrace that meets West Canada Creek approximately 150 feet downstream of the powerhouse. This tailrace is cut into bedrock and has nearly vertical side slopes. There is also a penstock bypass which can act as a low level outlet (in addition to the 60-inch diameter water pipe).

The upstream section of the spillway's south wing-wall contains a gatehouse from which the Mohawk Valley Water Authority (MVWA) withdraws water for water supply. Flow into each of the two 42-inch-diameter water supply conduits is controlled by two 3-foot by 4-foot gate valves located on an outer gate shaft. These valves lead to a 42-inch diameter sluice gate at invert El. 1161.5, located in an inner gate shaft. The water supply conduits pass under the south embankment dam in a trench excavated into rock and backfilled with concrete.

2.1.5 Low Level Outlet

During the 1985 modifications for the Project, three of the four 60-inch diameter outlet conduits through the non-overflow structure were eliminated. The one remaining water pipe is located on the powerhouse side of the non-overflow section, and now acts as a low level outlet for the Project. There is also a penstock bypass which can act as a low level outlet.

2.2 Reservoir (18 CFR Section 4.51(b)(2))

Hinckley Reservoir was constructed by New York State in the early 1900s to serve as a primary water source for the Erie Canal portion of the New York State Barge Canal. The reservoir was constructed on the West Canada Creek, which flows south out of the Adirondack Mountains and through the reservoir on its route to the Mohawk River at Herkimer, NY. The reservoir was commissioned in 1915. The reservoir was constructed to have an average water depth of about 28 feet and a maximum depth of approximately 75 feet from the spillway crest at El. 1225.

The NYSCC maintains Hinckley Reservoir levels within a normal operating range of El. 1195 feet or above, except during adverse conditions. Based on the results of the 2018 Hinckley Reservoir Bathymetric Survey, the reservoir has a surface area of approximately 2,709 acres and an estimated gross volume of 25.1 billion gallons when full to the spillway crest (El. 1225). The lower limit of storage is at reservoir elevation 1173.5 feet, which is the minimum elevation required to pass the 230 cfs flow necessary for canal navigation. Below El. 1173.5 feet the dead storage is approximately 0.52 billion gallons. Therefore, the estimated usable storage capacity of Hinckley Reservoir when full to the spillway crest is 24.6 billion gallons.

2.3 Powerhouse (18 CFR Sections 4.51(b)(1) and 4.51(b)(3))

The Project powerhouse is a semi-underground structure located 200 feet downstream of the non-overflow intake. The powerhouse is 120 feet long, 55 feet wide, and 43 feet deep below grade. The powerhouse contains two 4.5-megawatt (MW) horizontal Kaplan turbine/generator units operating under a maximum head of 67.5 feet, plus surcharge, at the spillway crest elevation (El. 1225) with a tailwater level at El. 1157.5.

2.4 Switchyard (18 CFR Sections 4.51(b)(4) and 4.51(b)(5))

Project transmission infrastructure includes:

- 4.16-kV electrical leads from each generator routed through an underground chase approximately 50 feet long to the aboveground Power Authority-owned 46-kV / 4.16-kV step-up transformer located within the powerhouse parking area, and
- A 46-kV underground transmission line, approximately 300 feet long, which runs from the 46-kV / 4.16-kV step-up transformer to a Power Authority-owned switchyard located north of NYS Route 365 at which point Project power interconnects with transmission lines owned by National Grid.

As noted above, voltage values are as follows:

- Generator leads: 4.16-kV
- Underground leads located between the step-up transformer and the switchyard: 46.0-kV
- National Grid transmission line: 46.0-kV

There are no overhead lines between the step-up transformer and the switchyard. The only overhead line serving the Project is a 480-volt overhead line that terminates at the metering pole located just north of the main entrance to the powerhouse. Conduit from the metering pole is routed to the powerhouse running west to east along the soldier pile wall.

3 Lands of the United States (18 CFR Section 4.51(b)(6))

There are no Federal lands or facilities within the Project boundary.

4 References

New York Power Authority. 2019. Hinckley Reservoir Bathymetric Survey. Prepared by: Gomez and Sullivan Engineers, D.P.C. May 2019.