City of Norway
P.O. Box 99 - 915 Main St., Norway, MI 49870 - Ph. 906-563-9961 - Fax 906-563-7502 - norwaymi.gov

December 18, 2019 FERC Project No. 2720-045

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

Subject: Sturgeon Falls Hydroelectric Project (No. 2720) – Exhibit A Revision and Nameplate Update

Dear Secretary Bose:

Per the Commission's September 19, 2019 Order Approving Revised Exhibit A, Revising Project Description, and Revision Annual Charges (Order), the City of Norway, Michigan (City) is required to file a report confirming it installed new nameplates on the units to reflect the re-rated or rehabilitated capacities.

The City is also required to file for Commission approval, revised Exhibits A, F, and G drawings as necessary to reflect the completed work.

The City reviewed the approved Exhibit F and G drawings and did not identify any changes required as a result of the construction[1].

In 2019, after the turbine runner replacement for Unit #1, the unit was placed in service with an updated capacity of 2,960 kW on November 1, 2019. The enclosed Revised Exhibit A reflects the changes resulting from the 2019 turbine replacement project.

Prior to the June 7, 2019 filing preceding the Order, the City consulted with the installation contractor on the turbine runner replacement project about the turbine runner capacities. The installation contractor provided incorrect information by indicating the "All (turbine) capacity ratings were matched to be the same."

In completing nameplate corrections on generator nameplates on Unit #1, Unit #3, and Unit #4, and completing the replacement of turbine runners for Turbine Unit #1 in 2019, the City discovered it had actual nameplates with ratings from the manufacturer for both the 2018 turbine runner replacement project (Unit #2) placed into service on December 10, 2018 and the 2019 turbine runner replacement

[1] The revised Exhibit F drawings filed with the Commission on January 17, 2007 are current (Accession # 20070124-0193).

project (Unit #1) placed into service on November 1, 2019. The nameplates did not exactly match the information provided by the installation contractor.

Pictures of the corrected generator nameplates and the turbine nameplates for Turbine Units #1 and #2 are also enclosed in the Revised Exhibit A. Unfortunately, without knowing a new nameplate was in its possession for Turbine Unit #2, the June 7, 2019 filing inadvertently underreported the capacity of Unit #1 as 1,468 kW by reporting the information provided by the installation contractor. With the new turbine runners installed for Unit #2 in 2018, the rating is 1,480 kW according to the nameplate for the new turbine runners. The enclosed Revised Exhibit A has also been updated to reflect the correct capacity of Unit #2 that was placed in service on December 16, 2018.

As of November 1, 2019, the capacity of Unit #1 is 2,960 kW and the total capacity of the hydroelectric project is 6,440 kW as outlined in the enclosed revised Exhibit A.

We apologize for any inconvenience the Turbine Unit #2 nameplate oversight may have caused.

Should you have any questions relative to this information, please do not hesitate to contact me at (906) 563-9961.

Sincerely,

Ray D. Anderson
City Manager

Enclosure: Revised Exhibit A Copies

Revised Exhibit A. Clean Copy

Exhibit A

Description of Project
Sturgeon Falls Hydroelectric Project

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1. The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces, or other structures, whether existing or proposed, to be included as part of the project;

The project structures consist of a powerhouse with a guard lock structure; a left slide gate overflow spillway, a middle slide gate overflow spillway separated from the powerhouse and left spillway by an island; a gated spillway with two steel tainter-type gates; a right slide gate overflow spillway; and a non-overflow gravity abutment section.[2] A walkway extends over the overflow spillways to allow for access across the entire dam. All of the project structures are founded on massive competent bedrock. Exhibit F, Drawing No. 1, presents a general layout of the existing project structures. Exhibit F, Drawing Nos. 2 and 3, present cross-section and elevation views of the project structures.

(a) *Powerhouse*

The powerhouse consists of a reinforced concrete substructure and two masonry superstructure sections that house the generators. There are two turbine pits - one on either side of the original superstructure, which is located in the center of the powerhouse. The left turbine pit contains four sets of runners connected by a single horizontal shaft powering Generator No. 1. The right turbine pit is divided into three portions. The left portion contains one runner connected by a single horizontal shaft to Generator No. 2. Generator Nos. 1 and 2 are located in the left generator room at the center of the powerhouse. The two right portions of the right turbine pit each contain one vertical-shaft runner connected to Generator Nos. 3 and 4 in the generator room at the far-right end of the powerhouse.

[2] Project structures are described as left to right looking downstream.

(b) *Intake and Outlet Works*

Water is conveyed from the river to the powerhouse through the headworks and power canal. The concrete headworks structure is located 200 feet upstream of the dam on the left bank. This structure is 126.5 feet long and consists of seven openings that are 10 feet wide by 11 feet deep. Water is conveyed from the headworks structure to the powerhouse through a power canal that is 300 feet long, 60 feet wide, and approximately 12 feet deep.

The powerhouse has an integral intake. Water passes from the power canal through the trashracks and into the turbine pits. A power rake is available for removing brush and debris from the front of the trashracks. The horizontal turbines are located in the open turbine pits. There are steel grating covers on the top of the open turbine pits that can be removed to provide access for maintenance and repairs of the horizontal turbines. Flow into all of the turbine pits can be shut off by lowering the vertical slide gates located just downstream of the trashracks.
Water passing through the powerhouse discharges directly into the Menominee River downstream of the dam. Available head is approximately 25 feet.

(c) *Spillway*

The spillway capacity at the project is provided by a combination of two gated spillways - the slide gate overflow spillway and the gated spillway.

Slide Gate Overflow Spillway - The slide gate overflow spillway is divided into three sections. The left section extends from the right powerhouse abutment to the island bisecting the dam. The middle section extends 40 feet from the island bisecting the dam to the gated spillway. The right section extends 200 feet from the gated spillway to the right abutment of the dam. The overflow sections all have recently constructed galvanized steel slide gates on the crest that extend to elevation 102.8 feet - 831.0 feet National Geodetic Vertical Datum (NGVD).[3] The crest elevation of the overflow spillway concrete is 98.1 feet Plant Datum - 826.3 feet NGVD.

Gated Spillway - The gated spillway contains two steel tainter-type gates. One gate is 16 feet 8 inches high by 24 feet wide, and the other is 16 feet 8 inches high by 16 feet wide. The crest of the gated spillway rollway is at elevation 89.1 feet - 817.3 feet NGVD.

[3] NGVD = Plant Datum + 728.2 feet.

(d) *Dam*

Right Abutment Nonoverflow Section - The right abutment non-overflow section is a concrete gravity dam that extends from the right end of the overflow spillway to the right abutment. The top of this section is at elevation 107 feet - 835.2 feet NGVD, and it has sloping upstream and downstream faces. This section rests on the abutment bedrock.

2. The normal maximum surface area and normal maximum surface elevation (mean sea level), gross storage capacity, and usable storage capacity of any impoundments to be included as part of the project;

The impoundment has an estimated normal maximum surface area of approximately 400 acres at the median normal pool elevation of 101.6 feet - 829.8 feet NGVD. Storage capacity between the median normal pool and maximum normal pool elevation of 102.6 feet - 830.8 feet NGVD - is approximately 650 acre-feet. Storage capacity will be used to reregulate discharges from upstream peaking projects.

3. The number, type, and rated capacity of any turbines or generators, whether existing or proposed, to be included as part of the project;

The project has two horizontal and two vertical generating units. Generating Unit No. 1 consists of four Francis Type single runner horizontal units connected to a Westinghouse generator by a horizontal shaft. Generating Unit No. 2 consists of two Francis Type single runner horizontal units connected to a General Electric generator by a horizontal shaft. Generating Unit Nos. 3 and 4 each consist of a single vertical Barber Francis turbine connected to a vertical generator through a gearbox.

Table A-1 details existing turbine and generator capacity.

Table A-1
Turbine and Generator Capacity

Generating Unit No.	Turbine Capacity (kW)[a]	Generator Capacity (kW)	Actual Capacity (kW)
1	2,960[b]	3,000[c]	2,960
2	1,480[d]	1,500	1,480
3	900[e]	900[f]	900
4	1,100[g]	1,100[h]	1,100
Total	**6,440**	**6,500**	**6,440**

a. *Kilowatt*
b. *Based on four new Francis-Type single-runner horizontal units rated at a total generating capacity of 740 kW each placed in service on November 1, 2019.*
c. *The nameplate was corrected in 2019.*
d. *Based on two new Francis-Type single-runner horizontal units rated at a total generating capacity of 740 kW each placed in service on December 10, 2018.*
e. *Based on present operational characteristics as described and authorized in December 8, 2006 Order Amending License.*
f. *The nameplate was corrected in 2019.*
g. *Based on present operational characteristics as described and authorized in December 8, 2006 Order Amending License.*
f. *The nameplate was corrected in 2019.*

Generating Unit No. 1 originally underwent replacement of its four turbine units in 2008. Due to performance issues with the turbine runners replaced in 2008, the runners underwent replacement a second time and were placed in service on November 1, 2019. Generating Unit No. 2 originally underwent replacement of two turbine units in 2008. Due to performance issues with the turbine runners replaced in 2008, the runners were again replaced in 2018 and placed in service on December 10, 2018. Unit Nos. 3 and 4 were installed in 1982. Nameplate photographs for turbines No. 1 and No. 2 along with generator nameplates are enclosed as Exhibit 1.

4. <u>The number, length, voltage, and interconnections of any primary transmission lines, whether existing or proposed, to be included as part of the project</u>;

The project includes a 300-foot-long, 7.2-kilovolt (kV) generator bus leading to a substation.

5. The specifications of any additional mechanical, electrical, and transmission equipment appurtenant to the project;

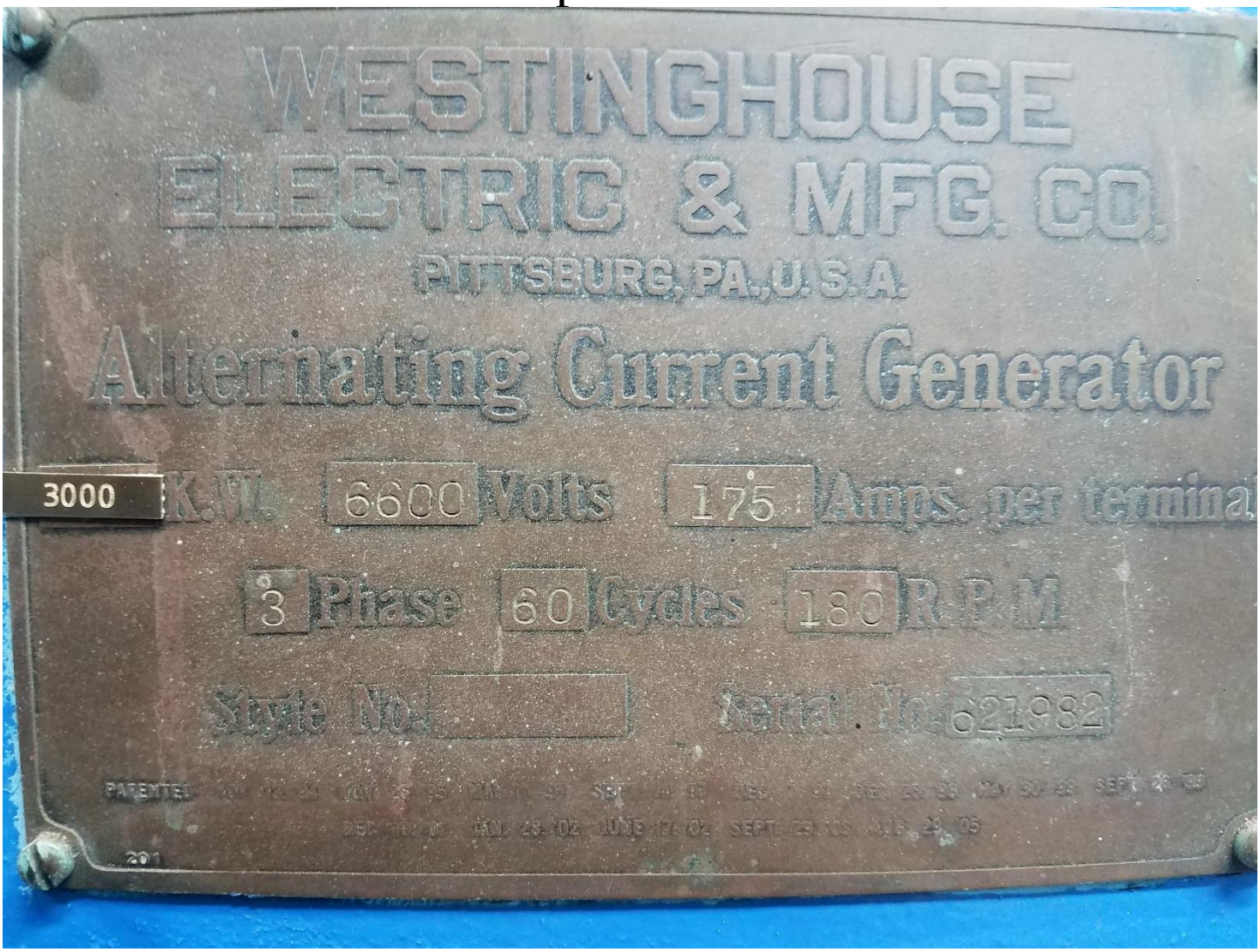
   The project includes a substation consisting of a step-up transformer.

6. All lands of the United States that are enclosed within the project boundary described under paragraph h of this section (Exhibit G), identified and tabulated by legal subdivisions of a public land survey of the affected area or, in the absence of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary.

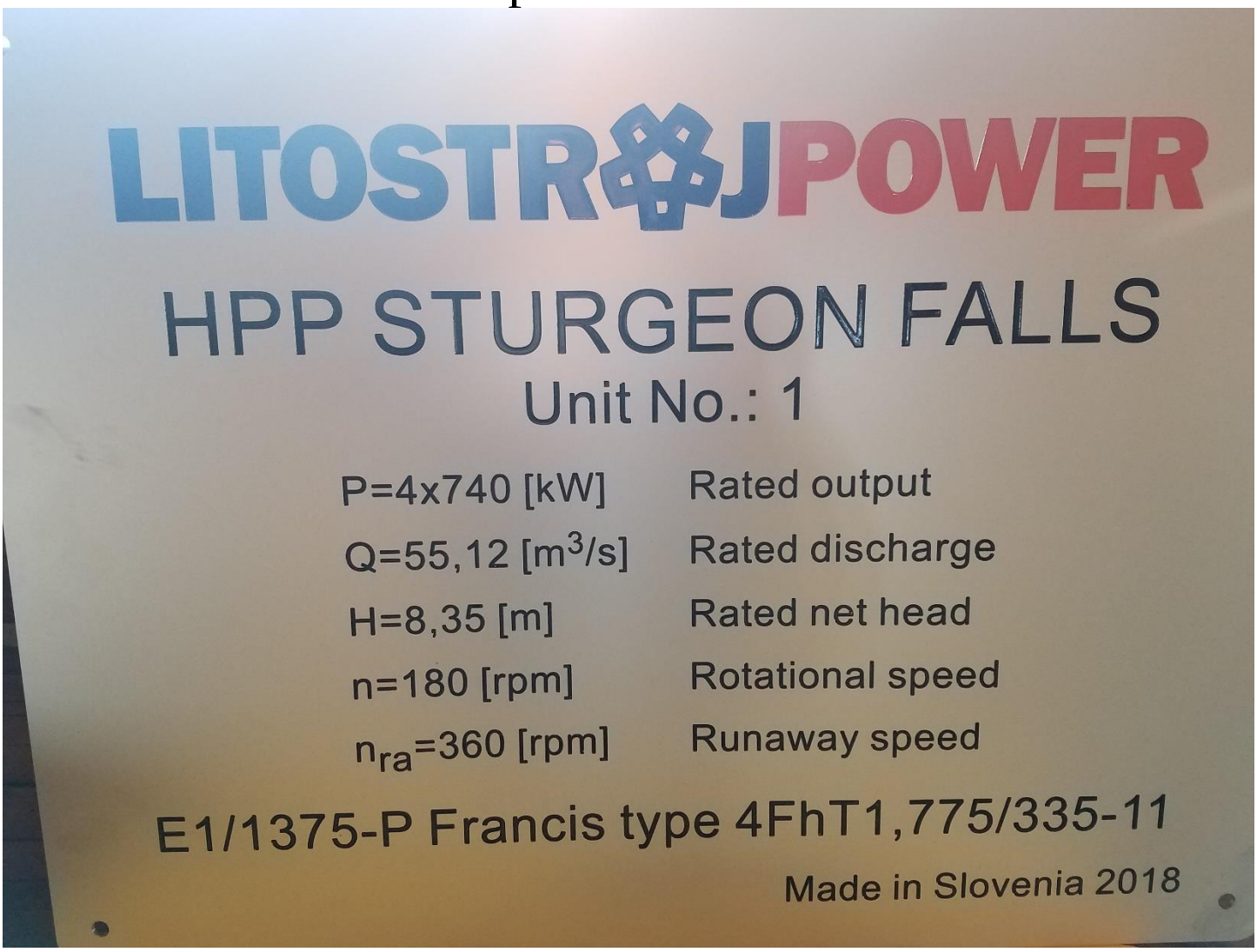
   No federally owned lands are located within the project boundary.

EXHIBIT 1-NAMEPLATE PHOTOGRAPHS

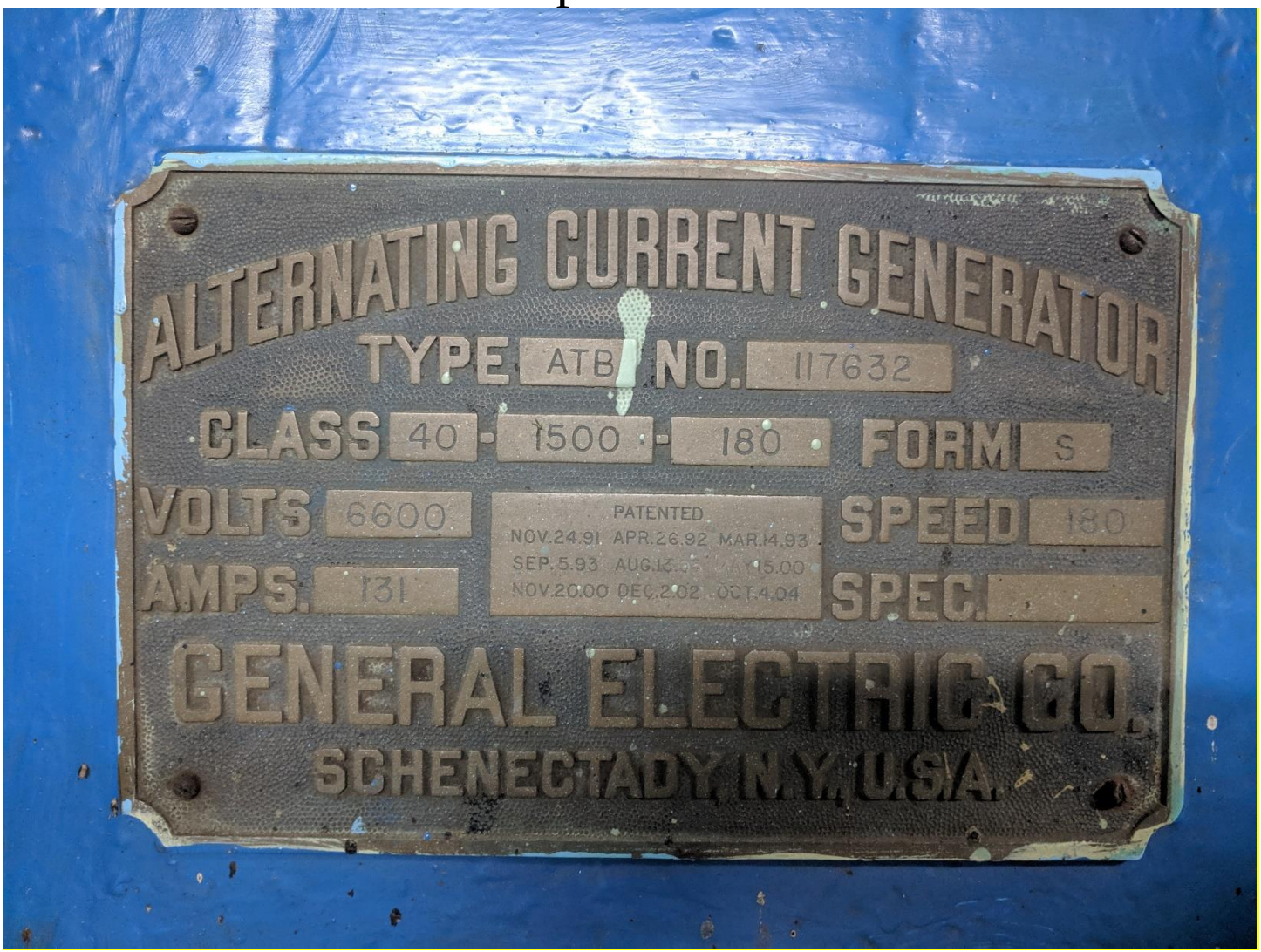
Unit #1 Generator Nameplate



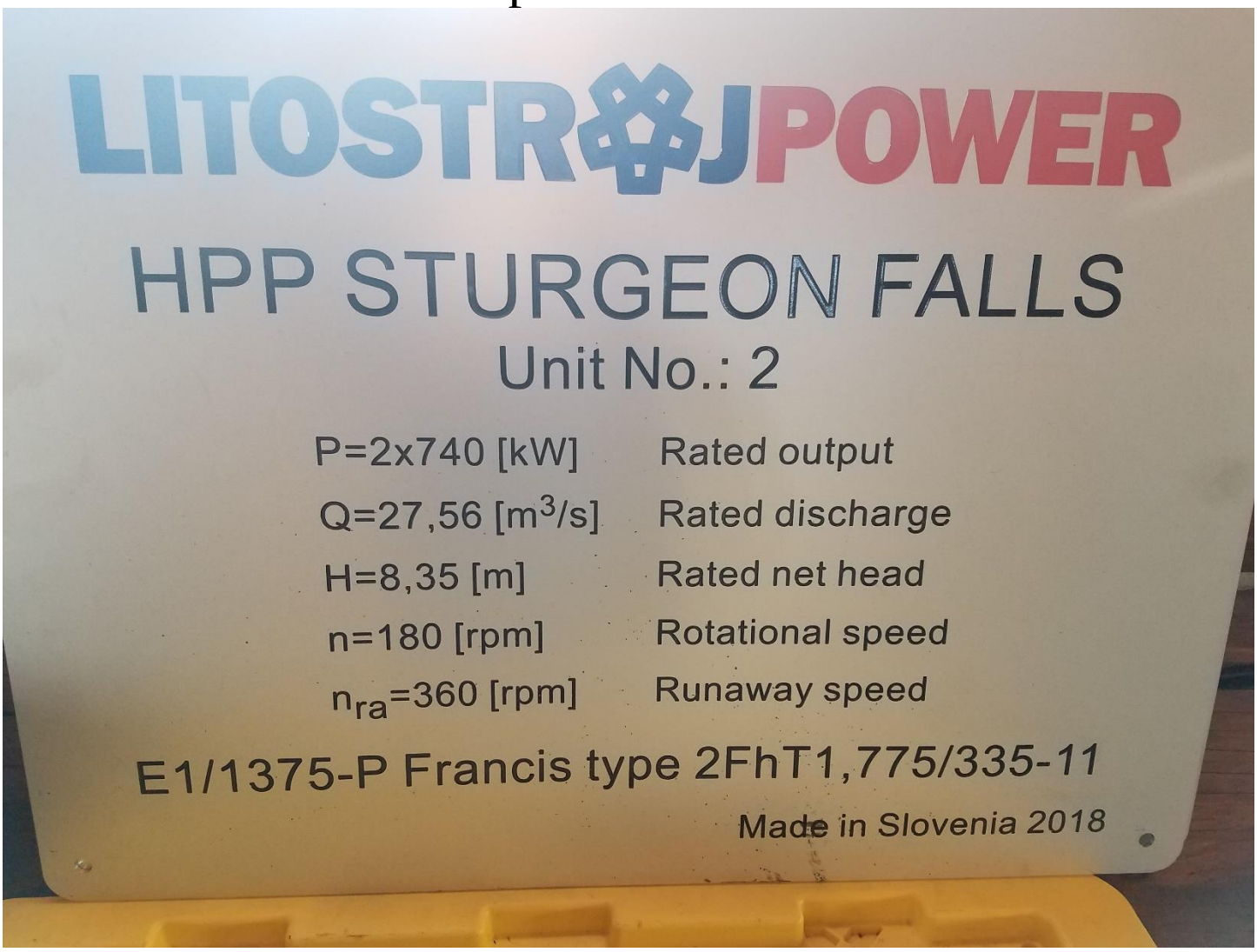
Unit #1 Turbine Nameplate



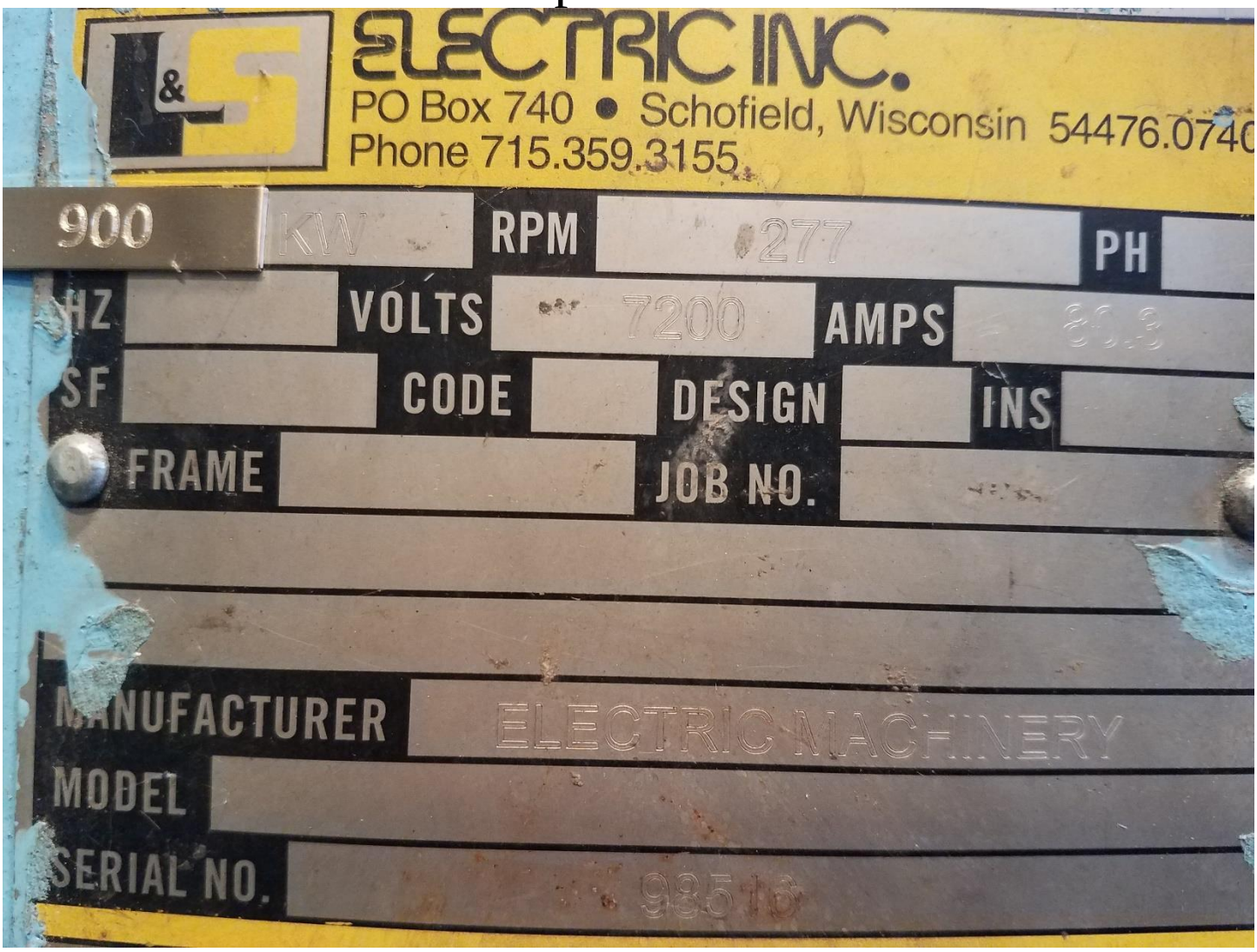
Unit #2 Generator Nameplate



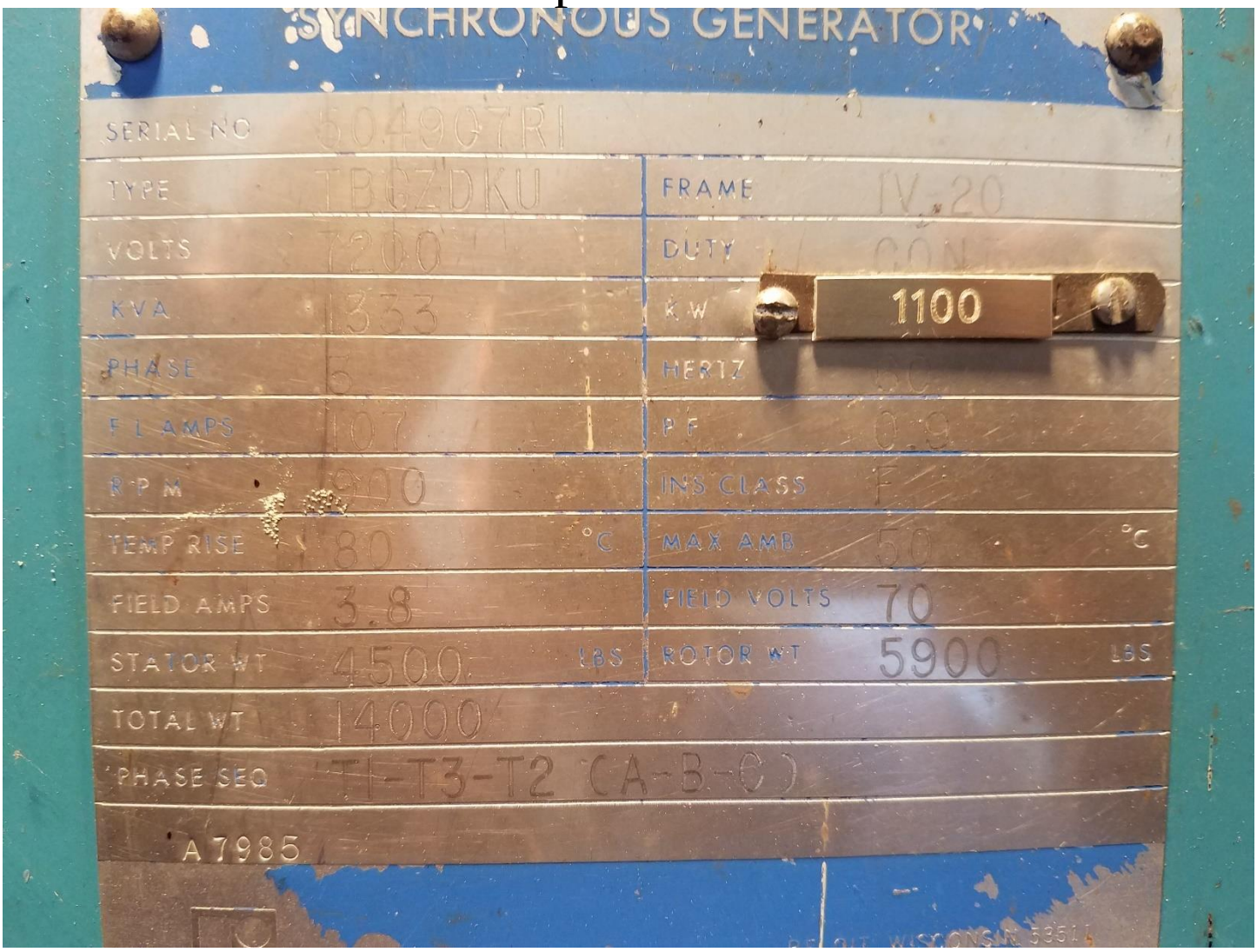
Unit #2 Turbine Nameplate



Unit #3 Generator Nameplate



Unit #4 Generator Nameplate



Revised Exhibit A. Strike Through Format

Exhibit A

Description of Project
Sturgeon Falls Hydroelectric Project

---

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Table A-1 details existing turbine and generator capacity.

Table A-1
Turbine and Generator Capacity

Generating Unit No.	Turbine Capacity (kW)[a]	Generator Capacity (kW)	Actual Capacity (kW)
1	~~2,936~~ 2,960[b]	3,000[c]	~~2,936~~ 2,960
2	~~1,468~~ 1,480[d]	1,500	~~1,468~~ 1,480
3	900[e]	900[f]	900
4	1,100[g]	1,100[h]	1,100
Total	**~~6,404~~ 6,440**	**6,500**	**~~6,404~~ 6,440**

a. *Kilowatt*
b. *Based on four new Francis-Type single-runner horizontal units rated at a total generating capacity of ~~734~~ 740 kW each placed in service on November 1,2019.*
c. *~~The nameplate rating is 2000 kW, but the generator is capable of producing up to 3,000 kW.~~ The nameplate was corrected in 2019.*
d. *Based on two new Francis-Type single-runner horizontal units rated at a total generating capacity of 740~~734~~ kW each placed in service on December 10, 2018.*
e. *Based on present operational characteristics as described and authorized in December 8, 2006 Order Amending License.*
f. *~~The nameplate rating is 800 kW, but the generator is capable of producing up to 900 kW.~~ The nameplate was corrected in 2019.*
g. *Based on present operational characteristics as described and authorized in December 8, 2006 Order Amending License.*
f. *~~The modified nameplate rating is 900 kW, but the generator is capable of producing up to 1,100 kW.~~ The nameplate was corrected in 2019.*

Generating Unit No. 1 originally underwent replacement of its four turbine units in 2008. Due to performance issues with the turbine runners replaced in 2008, the runners ~~are currently undergoing~~ underwent replacement a second time and ~~are scheduled to be~~ were placed in service on ~~by~~ ~~September 1, 2019~~ November 1, 2019. Generating Unit No. 2 originally underwent replacement of two turbine units in 2008. Due to performance issues with the turbine runners replaced in 2008, the runners were again replaced in 2018 and placed in service on December 10, 2018. Unit Nos. 3 and 4 were installed in 1982. Nameplate photographs for turbines No. 1 and No. 2 along with generator nameplates are enclosed as Exhibit 1.

4. The number, length, voltage, and interconnections of any primary transmission lines, whether existing or proposed, to be included as part of the project;

   The project includes a 300-foot-long, 7.2-kilovolt (kV) generator bus leading to a substation.

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EXHIBIT 1-NAMEPLATE PHOTOGRAPHS

Unit #1 Generator Nameplate

Unit #1 Turbine Nameplate

Unit #2 Generator Nameplate

Unit #2 Turbine Nameplate

Unit #3 Generator Nameplate

Unit #4 Generator Nameplate

Summary: Response Response to Staff Questions electronically filed by Mr. Stuart M. Siegfried on behalf of Applicant