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June 1, 2020

VIA E-FILING

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

Subject: Response to Commission's Additional Information Request
Shawmut Hydroelectric Project (FERC No. 2322)

Dear Secretary Bose:

On January 31, 2020, the Licensee for the Shawmut Hydroelectric Project (Project), Brookfield White Pine Hydro LLC (White Pine Hydro) filed an *Application for New License for Major Project – Existing Dam – Shawmut Hydroelectric Project*. By letter dated March 2, 2020, the Commission issued an Additional Information Request (AIR) for the Project. White Pine Hydro's responses to the application deficiencies noted in the letter are provided in Attachment 1. Responses to the additional information requests are contained in Attachment 2.

If there are any questions or comments regarding this filing, please contact me by phone at (207) 755-5605 or by email at Randy.Dorman@BrookfieldRenewable.com.

Sincerely,

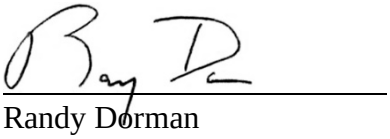
Randy Dorman
Licensing Specialist
Brookfield Renewable

Attachments:
Attachment 1 – Response to Deficiencies in Schedule 1
Attachment 2 – Response to Additional Information Requests (AIRs)
Attachment 3 – Revised Exhibit A
Attachment 4 – Conceptual Drawings of Downstream Fish Guidance Boom
Attachment 5 – Revised Exhibit F (CEII)
Attachment 6 – FERC Confirmation of Refiled Exhibit G
Attachment 7 – Shawmut Fish Passage Operations and Maintenance Plan (December 2020)
Attachment 8 – MHPC Letter of Concurrence for Post-Contact Archaeology Study (Privileged)

cc: Distribution List
Mr. Matt Cutlip, FERC

DISTRIBUTION LIST
Shawmut Hydroelectric Project (FERC No. 2322)
Final License Application

I, Randy Dorman, Licensing Specialist, Brookfield Renewable Energy Group, hereby certify that a link to the foregoing document on the Commission website has been transmitted to the following parties on June 1, 2020.



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June 2020 Response to Commission's Additional Information Request

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ATTACHMENT 1

RESPONSE TO DEFICIENCIES IN SCHEDULE 1

Shawmut Project Relicensing (FERC No. 2322)
Attachment 1 – Response to Deficiencies in Schedule 1

Exhibit A

1. *Section 4.51 (b)(1) of the Commission's regulations requires the physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouse, tailrace, or other structures whether existing or proposed, to be included as part of the project. Exhibit A of your final license application (FLA) did not provide the dimensions of: (i) non-overflow section between the hinged flashboards and the forebay headworks structure, (ii) headworks structure, and (iii) the concrete wall beyond the west abutment of the headworks structure. Please update your Exhibit A to include this information.*

Exhibit A has been updated to include the additional detail requested, to the extent the information is available. The revised Exhibit A is attached as Attachment 3.

2. *Page A-2 of the Exhibit A section 2.1.2, Headworks and Intake Structure, states that "the forebay intake section contains 11 headgates and two filler gates. Five of the headgates are installed in openings 10-feet by 15.5-feet and six are installed in openings 10-feet by 12.5-feet. The two filler gates are 4-feet by 6-feet." This discussion also indicates that there are trash racks on the headgates by stating "headgates are fitted with trash racks". However, you provide no additional information on the size or construction materials of the headgates, filler gates, or trash racks. Please revise your application to include the construction materials, type, and dimensions of the headgates, filler gates, and trash racks on the headworks.*

Exhibit A has been updated to include the additional detail requested, to the extent the information is available. The revised Exhibit A is attached as Attachment 3.

Exhibit E

3. *Section 5.18(b)(4)(iv) of the Commission's regulations requires that the Exhibit E include the number, type, and minimum and maximum hydraulic capacity and installed (rated) capacity of existing and proposed turbines or generators to be included as part of the project. In our comments on the preliminary licensing proposal (PLP), we noted that you omitted the minimum hydraulic capacities for Units 7 and 8. In your response to comments on the PLP included in Appendix E-1 of the FLA, you indicate that "Exhibit A has been revised and updated to include additional detailed information on the Project facilities, as applicable." However, you did not provide the minimum hydraulic capacities of these units and instead noted that only the maximum hydraulic capacities of Units 7 and 8 are available from index tests. We will need to understand the hydraulic capacity of the turbines in order to conduct our analysis of project operation effects on downstream migrating fish and other environmental resources of the project area. Therefore, if you are uncertain on the exact minimum hydraulic capacities of Units 7 and 8, please provide a reasonable estimate of the minimum hydraulic capacities of these units and explain how you derived the estimates.*

The Licensee has been unable to locate any unit specifications or testing results that provide a minimum flow capacity for Units 7 and 8. The Licensee operates Units 7 and 8 as either full on or full off, and so minimum capacity should not be a consideration in evaluating how Project operation may affect downstream fish passage.

4. *Section 5.18(b)(5)(iii)(A) of the Commission's regulations requires that Exhibit E include functional design drawings of any fish passage and collection facilities or any other facilities necessary for implementation of environmental measures. Section 5.18(b)(iii)(C) requires that Exhibit E include an implementation or construction schedule for any proposed measures or facilities, showing the intervals following issuance of a license when implementation of the measures or construction of the facilities would be commenced and completed. You did not provide design drawings for the proposed forebay guidance boom to bypass Units 7 and 8, nor a construction schedule for this new proposed facility. Please revise your application to include this information. The drawings must conform to the specifications of section 4.39 of the Commission's regulations regarding dimensions of full-sized prints, scale, and legibility.*

The forebay guidance boom has been proposed as a downstream fish passage enhancement measure as part of the Kennebec SPP and as a PME measures for the Shawmut Project relicensing. As such, installation of the proposed guidance boom is still in the conceptual state, and there are as yet, no detailed design drawings for the proposed boom installation. However, conceptual design plans, developed by the guidance boom manufacturer, Worthington Boom, are provided in Attachment 4.

Exhibit F

5. *Section 4.41(g) requires that all applications for licenses include drawings that show all major project structures in sufficient detail to provide a full understanding of the project, including plan, elevation, profile, and section views. While some of this information was included in your Exhibit F, you did not include any elevation views of the non-overflow section and headworks structure. Therefore, please revise your application to include, at a minimum, the front elevation view (looking downstream) of the non-overflow section and the headworks section (showing all gates and trash racks).*

As requested, the Licensee has revised Exhibit F to include front elevation views (looking downstream) of the non-overflow section and the headworks section (showing all gates and trash racks) of the Shawmut Project. The revised Exhibit F is provided in Attachment 5 (which is being filed separately as CEII). An elevation view of the non-overflow section and headworks structure has been added to Sheet F-2. An elevation view of the old 1912 (Unit 1-6) Powerhouse has been added to Sheet F-3.

Exhibit G

6. *The Geographic Information System (GIS) files you filed as part of the FLA Exhibit G appear to be corrupted because we could not open them. Please refile your GIS files in accordance with sections 4.51 (h) and 4.41 (h) of the Commissions regulations.*

The Shawmut Project Exhibit G GIS data files were refiled with the Commission on April 8, 2020. The Licensee received confirmation that the GIS data files could be opened by FERC staff on April 15, 2020. Documentation of the filing and the staff confirmation are provided in Attachment 6.

ATTACHMENT 2

RESPONSE TO ADDITIONAL INFORMATION REQUESTS (AIRS)

Shawmut Project Relicensing (FERC No. 2322)
Attachment 2 – Response to Additional Information Requests (AIRs)

1. *In section 2.1.2 of Exhibit A, you state that the forebay intake headworks contain 11 headgates and two filler gates. However, none of your application exhibits explain the purpose of these gates or how they are operated. We will need to understand the operation of these gates across the full range of Kennebec River stream flows and project operating conditions in order to conduct our analysis of the project's effects on migratory fish species. Therefore, please describe the purpose of the gates and the typical sequence of operations for all of the headworks gates. For example, are all gates typically used to regulate flow into the forebay or are only some of them? For those that are used, how much are they typically opened? Are gates adjusted in response to changes in streamflow conditions and project operation, and if so how frequently are they adjusted? Are the gates manually adjusted or fitted with automated controls?*

In December 2020, the Licensee filed with the Commission a Fish Passage Operations and Maintenance Plan for the Shawmut Project. The Plan includes details regarding the current and proposed future operation of the Shawmut Project, specifically as it relates to fish passage. A copy of the Plan is provided in Attachment 7. The Licensee is in the process of constructing an upstream fishway at the Shawmut Project. The fishway is currently scheduled to be completed by May 2021. Once the new fishway is completed, the Licensee will update the Plan, as needed, to reflect any new or adjusted operating plans for the Project for the enhancement of upstream and downstream fish passage.

2. *Coastal Zone Management Act - In section 2.3 you state that the project will not affect the state's coastal zone because it is in the Kennebec River more than 50 miles above the head-of-tide and is outside of Maine's designated coastal zone. You state that you will submit a request to the Maine Department of Marine Resources (Maine DMR) seeking a determination that a consistency review of the license application is not required, but did not indicate when you would submit the request. Please provide documentation of your consultation with Maine DMR and their response.*

In Maine, the Coastal Zone Management Act (CZMA) consistency review is done after the State's review and issuance of a Maine Waterway Development Permit and Water Quality Certification (WQC). Applications for WQC are filed once FERC has issued its Ready for Environmental Analysis (REA) Notice for an application. Thus, in accordance with State of Maine procedures and processes, the Licensee plans to file its WQC application with MDEP, and its request for CZMA consistency review with MDMR, once the Commission has issued its REA Notice for the Shawmut Project. Once MDEP issues the WQC, MDMR will conduct its CZMA consistency review and certification. The Licensee will file the CZMA consistency certification with the Commission when it is received.

3. *On page E-1-1 you state that the Shawmut Project is located at river mile (RM) 66 on the Kennebec River. In the final species protection plan you also indicate that the downstream Hydro-Kennebec and Lockwood Projects are located at RM 64 and 63, respectively. However, Maine DMR's August 17, 2017 filing indicates that the Shawmut, Hydro-Kennebec, and Lockwood Projects are located at RM 88.4, 82.9, and 81.7, respectively. Additionally, based on our review of aerial maps of the project area, it is unlikely that the Shawmut, Hydro-Kennebec, and Lockwood Projects are only 3 river miles apart as would be the case if the RM designations in your license application and final species protection plan are accurate. So that we can accurately describe the affected environment of the Kennebec River in the project area, please explain the source of your river mile designations for these projects.*

Based on a careful review of GIS based maps and coordinates, and previous documents filed with the Commission, the Licensee has concluded that the Shawmut Project (dam) is located on Kennebec River at river mile 69.5; which is 6.5 upstream of the Lockwood Project (FERC No 2574) and 5.5 miles upstream of the Hydro Kennebec Project (FERC No. 2611).

4. *On page E-3-9 and E-4-54, you indicate that you provide downstream American eel passage at the project by opening a Tainter gate and turning off Units 7 and 8 for an 8-hour period at night for a 6-week period between September 15 and November 15 annually. However, on page E-4-50, E-4-54, E-4-75, and E-4-92, you indicate that American eel passage is provided by opening the "deep gate" and turning off units 7 and 8 for an 8-hour period per night for a 6-week period between September 15 and November 15 annually. Please clarify which gate (i.e., Tainter gate or the deep gate) is used for downstream passage of American eel. Further, please provide a clear description of how the gate(s) are operated (e.g., size of gate openings, specific start and end time within 8-hour period, and procedures for determining which 6 weeks you will provide eel passage across the two-month period) to provide downstream eel passage during turbine shutdown.*

In December 2020, the Licensee filed with the Commission a Fish Passage Operations and Maintenance Plan for the Shawmut Project. The Plan includes details regarding the current and proposed future operation of the Shawmut Project, specifically as it relates to fish passage. A copy of the Plan is provided in Attachment 7. As outlined in that plan, for eel passage, for a six week period between September 15th through November 15th the Licensee opens the deep gate (also referred to as the "deep drain gate") next to Unit 7 at least two and one half feet (approximately 425 cfs) and shut down Units 7 and 8 for at least 8 hours per night starting one hour after sunset. This deep gate is positioned under the Tainter gate as shown in Exhibit F, Sheet F-2, Section P.

5. *Throughout the Exhibit E you reference an existing "downstream bypass" that is used to provide downstream fish passage at the project. However, the FLA does not specifically describe which of the project facilities comprise the "downstream bypass". Please clarify if the "downstream bypass" refers to either or some combination of the surface sluice, Tainter*

gate, deep gate; or another project facility altogether. In addition, please specifically explain: (i) how and when these facilities are operated (e.g., operating schedule, specific gate openings, and any existing minimum conveyance flows through the facilities); (ii) the specific locations where the downstream bypass facilities discharge to under existing conditions and where they would discharge to after completion of the proposed forebay guidance boom and the fish passage facilities shown in your January 7, 2020 final fish passage design drawings; and (iii) the minimum and maximum hydraulic capacities for each facility, and any proposed minimum conveyance flows under the proposed action and after completion of the new fish passage facilities that were previously authorized.

The details of the Licensee's downstream passage operations are provided in Exhibit E of the FLA, and also in the Kennebec Species Protection Plan that was filed with FERC December 31, 2029, as well as in the Fish Passage Operations and Monitoring Plan provided in Attachment 7. Downstream passage at Shawmut, for migratory fish other than eel, is currently provided through a combination of a surface weir (sluice gate), Tainter gate, and opened hinged flashboards. The sluice is located at the right side of the intake structure next to Unit 6. It is 4 ft wide by 22-inches deep and flow can be adjusted by adding or removing stoplogs. With all stoplogs removed, the sluice passes between 30 and 35 cfs which is discharged over the face of the dam into a 3 ft deep plunge pool. The Tainter gate located next to the sluice measures 7 ft high by 10 ft wide and can pass up to 600 cfs.

Currently, the sluice gate and Tainter gate are operated for Atlantic salmon smolt and kelt passage from April 1 through June 15 and from November 1 through December 31, as river flow and ice conditions allow. Gate settings for the sluice gate and Tainter gate are variable and are adjusted to provide a combined flow that equals or exceeds 6% of station flow (402 cfs at full station flow of 6,700 cfs). Downstream passage is also provided along the Shawmut spillway during periods of excess river flow that results in spill. To provide additional passage during the Atlantic salmon smolt migration season, the Licensee also drops four sections of hinged flashboards, located immediately adjacent to the power canal headworks which provides up to approximately 560 cfs of spill flow. The hinged flashboard sections pass a flow of approximately 140 cfs per section. With three sections down the flow is approximately 420 cfs; with four sections down the flow is approximately 560 cfs.

As described above in response to AIR 4, the deep gate is opened for downstream passage of adult eel in the fall.

6. *On page E-4-70, you indicate that downstream passage for Atlantic salmon, shad, and river herring at the project is provided through a combination of a sluice, Tainter gate, and opening of hinged flashboards. Based on the results of downstream smolt studies conducted from 2012 through 2015, you propose in the final species protection plan to implement certain modifications to the downstream passage facilities and their operation. This includes operating the "forebay bypass gate" to pass adult and juvenile Atlantic salmon from April 1 through December 31, as river conditions allow, and ensuring that the forebay bypass gate is*

operated to maintain a flow of "6 percent of station unit flow" through the gate. However, it is not clear what existing gate(s) are considered the "forebay bypass gate", or if this a separate gate not previously described. It's also not clear if the "forebay bypass gate" is related to or is the same as the "downstream bypass" described in item 4 above. Please clarify if the "forebay bypass gate" refers to either or some combination of the surface sluice, Tainter gate, or deep gate located between the powerhouses; and explain how it relates to the "downstream bypass" described in item 4 above. fluAdditionally, if you are referring to more than one forebay bypass gate, please explain how you would divide the proposed "6 percent of station unit flow" between these facilities. Lastly, please clearly define the term "station unit flow", as it is unclear if this is meant to include 6 percent of inflow to the entire project or some other flow metric such as 6 percent of flow into the forebay or one or multiple turbine generating units.

There are three gates in the forebay area that can be used to pass fish downstream. The sluice gate is located at the right side of the intake structure next to Unit 6. It is 4 ft wide by 22-inches deep and flow can be adjusted by adding or removing stoplogs. With all stoplogs removed, the sluice passes between 30 and 35 cfs which is discharged over the face of the dam into a 3 ft deep plunge pool. The Tainter gate located next to the sluice measures 7 ft high by 10 ft wide and can pass up to 600 cfs. There is also a deep gate that is located under the Tainter gate (see Exhibit F, Sheet F-2, Section P). This gate is used for downstream passage of American eel in the fall. Together, the sluice gate and the Tainter gate comprise the "forebay bypass gates" or "downstream bypass", and can be used alone or in combination with each other, to provide up to 402 cfs, which is 6% of 6,700 cfs, the total hydraulic capacity of the Project's eight turbine/generator units.

7. *On page E-4-70, you indicate that the conceptual design for new upstream fish passage facilities includes a new fish lift adjacent to Unit 1 and an upstream fish flume to connect the Unit 7&8 Tailrace to the Unit 1-6 Tailrace. Although you do not propose an operating period for these new upstream facilities in the FLA, your Fish Passage Operations and Maintenance Plan filed January 7, 2020, indicates that you would operate the fish lift from May 1 to October 31. However, you do not indicate whether the upstream fish flume would also be operated according to the same schedule. Please clarify your proposed operating schedule for the upstream fish flume.*

The fish flume would operate on the same schedule as the fish lift, May 1 to October 31.

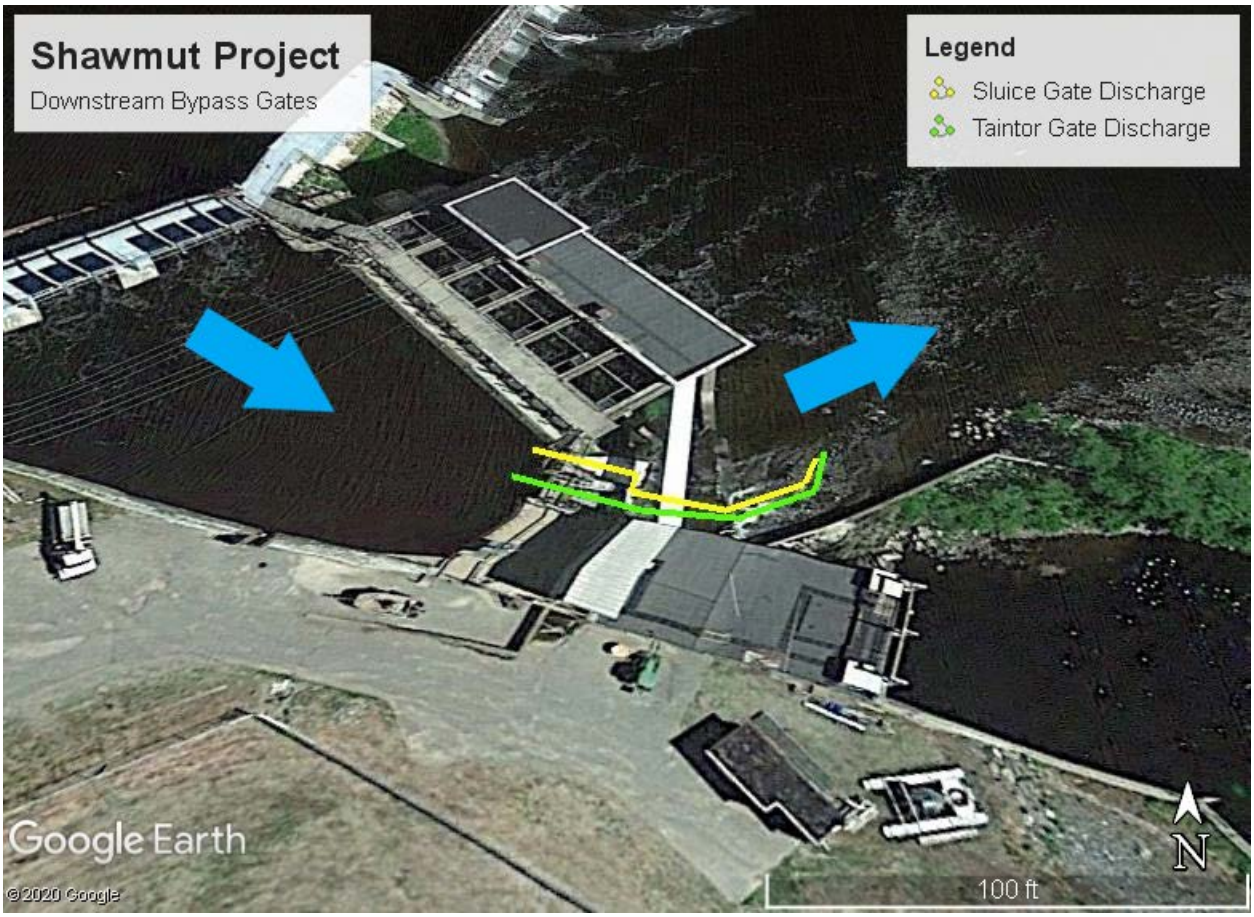
8. *On page E-4-70, you indicate that the forebay surface sluice passes water over the face of the dam into a 3-foot-deep plunge pool connected to the river. You also indicate that the Tainter gate is located next to the sluice. However, you provide no additional information about the plunge pool. We will need to assess the effects of the plunge pool on downstream migrating fish. Therefore, please describe the dimensions and physical characteristics of the plunge pool (e.g., any physical structures or modifications to the stream channel that were constructed to create the plunge pool). Please also provide the drop height between the invert elevation of the sluice and the water surface elevation of the plunge pool. Further, please indicate whether, under existing conditions, the Tainter gate or any other forebay gates also discharge to the plunge pool (and if not then specify where they currently discharge to), and whether any of the three forebay facilities (e.g., surface sluice, Tainter gate, deep gate) would discharge to the existing plunge pool or to another location after construction of the new fish passage facilities shown on your January 7, 2020 final fish passage facility design drawings. Lastly, please provide the following information with respect to the new downstream fish passage flume shown on your final design drawings: (i) identify which of the three forebay facilities (i.e., surface sluice, Tainter gate, deep gate) would discharge through the new downstream flume into the Units 7&8 Tailrace, (ii) provide the drop height from the invert elevation of any such facilities to the water surface elevation of the tailrace, and (iii) explain whether you would construct an additional plunge pool in the Unit 7&8 Tailrace to facilitate safe passage of downstream migrants passing through the new downstream passage flume.*

The Tainter gate is located between the old and new powerhouses. The Tainter gate measures 7 ft high by 10 ft wide and can pass up to 600 cfs. Under existing conditions, the Tainter gate discharges into the river channel on the Unit 1-6 powerhouse side of the island. The plunge pool area of the discharge zone is about 4 feet deep, 10 ft wide and 8 ft long. The deep gate that is used for American eel passage and which is positioned below the Tainter gate, discharges into this same plunge pool. The stop log sluice located to left of the Tainter gate (looking downstream) discharges into a boxed plunge pool which is 3 feet deep and approximately 10 ft by 10 ft in dimension. Photo 1 provides a view of the sluice gate and Tainter gate plunge pools. Figure 1 illustrate the current location and direction of flow from both the sluice gate and Tainter gate. The invert elevation of the Tainter gate is 105'. The normal tailwater elevation is approximately 88.0'. The invert elevation of the sluice gate, with all stop logs removed is 111 ft.

The proposed upstream fishway construction will result in changes into the discharge location and route from the Tainter gate and deep gate. The sluice gate will continue to discharge to the Unit 1-6 tailwater area essentially as it does now. Discharge from the Tainter gate and deep gate will be routed through a new concrete flume which will discharge to the Unit 7&8 tailwater area. Figure 1, shows the discharge route directions once the new fishway and flumes are constructed. Since under this new configuration water from the Taintor gate will flow down a concrete apron into the flume, and since the flume will discharge into the deep (approximately 20 ft deep) Unit 7&8 tailwater area, there will be no need for a plunge pool under the planned configuration.

Photo 1. Shawmut Project Sluice Gate (near, boxed) and Tainter Gate (far) Plunge Pools.

Figure 1. Current Location and Direction of Shawmut Downstream Bypass Gate Flow



9. *The FLA provides minimum and maximum hydraulic capacities for all but two of the eight turbine-generator units, but does not adequately describe how varying flow through the project is managed through each of the turbine units. For example, if inflow falls to a level that is less than the total maximum hydraulic capacity of the turbines and you are also spilling flows or providing minimum conveyance flows for downstream fish passage facilities, the FLA does not explain how this would affect turbine output (i.e., whether turbine output would be reduced or shut off across all units or only some of them, and how you would prioritize which units would reduce output or be shut down). In order to conduct our assessment of the effects of flow routing through the turbines and other flow regulating equipment on downstream migrating fish, we will need a complete understanding of the sequence of operation of the turbines. Therefore, please describe the order of operation or shutdown of each turbine unit with increasing and decreasing inflow to the project. This description should include operations during the downstream fish passage season when minimum conveyance flows are spilled through the downstream fish passage facilities and spillways, as well as outside of the downstream fish passage season during periods of both spill and no spill. Additionally, when turbine flow is reduced or shut off due to insufficient inflow for operation, please explain how flow is diverted away from the turbines (e.g.,*

closing wicket gates, inserting stop logs, lowering intake gates) and whether flow is completely shut off or still passes through the intakes and bypasses the units.

Under existing conditions, the preferred order of operation of the Project units is Units 7 and 8 (since these are the two largest units), followed by Units 1-6. Generally, Unit 1 is the last unit on since it is the unit that collects the most debris. Since there is currently no upstream fishway at Shawmut, operation of the units is not currently prioritized specifically to enhance fish passage, with the exception of nighttime shut down of Units 7 and 8 in the fall for downstream migrating eels.

A determination regarding unit operation and priority under proposed future conditions, following construction of the upstream fish lift and connecting flume, and the changes to the downstream bypass with the installation of the guidance boom and reconfiguration of the Tainter gate and deep gate discharge (through the new discharge flume), will be made after the fishway construction is completed. Several factors may come into play in determining how, and in what priority order, units should be operated that will have to be considered once the fishways are completed. For example, Unit 1 operation is not currently prioritized because that unit is most susceptible to debris intake. However, once the fish lift is installed, Unit 1 will be closest to the fish lift, and it may be determined that it should have operational priority to enhance fish lift entrance attraction. Also, Unit 7 may have operational priority over Unit 8 in order to provide better attraction conditions to the entrance to the connector flume. Further, operation of the units is likely to vary upstream, downstream and non-fish migration seasons. However, a determination of these types of operational details cannot be made until the fishways are completed and operational, and some testing of the fishways has occurred. Once such a determination has been made, and unit prioritization discussed with the fishery agencies, the Project Operations Monitoring Plan can be updated to include unit prioritization and operation during fish passage seasons.

10. *Your Exhibit E notes that downstream survival studies from 2012-2015 provided estimates for route-specific passage survival through the project's two large spillway sections (i.e., the hinged flashboard and the inflatable bladder sections). Because there are differences in fish passage survival through these two spillway sections, we need more information on how you route spill flows through each in order to conduct our analysis of project effects on downstream fish passage survival. Therefore, please describe the specific operating procedures for how you choose to route flows over the hinged flashboard or the inflatable bladder sections of the spillway during periods of spill. Your response should include specific flow thresholds for when you begin spilling flows through each of the three overflow sections of the dam (i.e., log sluice, hinged flashboard, inflatable bladder).*

Downstream passage at the Shawmut Project for migratory fish is provided through several different passage routes. The "downstream bypass" for anadromous fish consists of the two gates located in the forebay area between the Unit 1-6 and Unit 7 and 8 powerhouses; the small sluice gate located adjacent to the Unit 1-6 powerhouse, and the Tainter gate which is located to the

right of the sluice gate, looking downstream. For the downstream passage seasons April 1 through June 15 and from November 1 through December 31 both gates are opened. The top 1-2 stop logs are removed from the sluice gate for the period April 1 through December 31 and at the normal full pool elevation of the impoundment, this gate provides a flow of approximately 30-35 cfs. In addition, the Tainter gate is opened to provide a total flow (when combined with the sluice gate flow) which equals or exceeds 6% of unit flow (up to 402 cfs when the station is operating at full hydraulic capacity of 6,700 cfs). In addition to these two gates, during the spring smolt migration season (April 1 through June 15), the Licensee also drops the 4 flashboard sections closest to the canal intakes which provides up to 560 cfs of additional bypass flow. The flashboards remain down through the entire spring migration period, and discharge through the flashboard opening varies depending on impoundment elevation.

11. *On page E-4-47, you indicate that you currently seasonally install two upstream eel fishways to provide upstream passage for American eel. You also indicate that, based on the results of eel fishway monitoring, you will select a permanent location for the eel fishway in consultation with the fishery agencies. In section 6.2, you indicate that the capital costs for a permanent upstream eel fishway "if needed" would be $150,000. Based on your description in the Exhibit E, it is unclear whether you intend to continue to seasonally install temporary eel fishways or construct a new permanent upstream eel fishway at the project. Therefore, please clarify whether you intend to continue to install and operate the temporary eel fishways or construct a new permanent eel fishway at the project. If you are proposing to construct a permanent eel fishway, when would it be constructed?*

At this time, the Licensee is planning to work with the agencies to identify a new location for seasonally installed upstream eelway at the Shawmut Project once the new upstream fish lift and connector flume have been constructed and are operational. Initially the Licensee envisions seasonal installation of a temporary eelway, until the new location can be evaluated. At some point, the Licensee and agencies may decide that the new location is working well and will consider the installation of permanent eelway at that time. Under the current schedule for upstream fishway installation, the Licensee expects to have the new upstream fishways, including a temporary upstream eelway operational by May 2021. Evaluation of the new upstream fishways and any temporary eelways that are installed at Shawmut are expected to occur in the 2-3 years following fishway construction. Results of the evaluations will be reported in the annual Kennebec River fish passage reports that are prepared by the Licensee every year in accordance with the Species Protection Plan, Biological Opinion, and FERC license.

12. *On page E-3-10, you propose to install a fish guidance boom in the forebay upstream of the Unit 7 and 8 powerhouse intake to provide screening, guidance, and sweeping flows to the existing downstream forebay fish bypass. You also state that the proposed boom will have a depth of 10 feet and consist of rigid panels with 0.5-inch perforations (48 percent opening). So that we can analyze the effects of your proposed measure, please provide the following information about your proposed forebay guidance boom: (1) hydraulic conditions, including at a minimum, the design flows and design velocities; (2) a description of any*

construction necessary for installation; and (3) a description of any specific maintenance procedures.

The proposed guidance boom will be installed after the upstream fishway construction has been completed. The floating boom will be approximately 210-ft-long, with a series of suspended, 10-ft-deep rigid screen panels with 0.5-inch perforations attached to an anchored buoy system. Detailed designs and installation specifications are not yet available. A conceptual plan for the boom location is provided in Attachment 4. The Licensee will file final boom designs and specifications one the boom is installed and operational. The Fishway Operations Plan will be updated to include any boom-specific maintenance procedures.

13. *The project has the potential to affect downstream migrating juvenile American shad and river herring (alosines). In your cumulative effects analysis on pages E-4-91 and E-4-92 of the FLA, you state that the continued operation of the Shawmut Project as proposed would result in significant positive cumulative effects on river herring and American shad, respectively. However, as we noted in our comments on the PLP, other than general statements about how the measures intended to improve salmon smolt survival through the project would also benefit alosines, you provide little site-specific information or analyses to support this conclusion. For example, because of differences in their size and swimming ability, your existing (e.g., trash racks) and proposed fish protection measures (e.g., forebay guidance boom) to facilitate safe downstream passage for juvenile salmon may not have the same effect on juvenile alosines. In your response to comments on the PLP, you state that the trash racks on the 1912 Powerhouse have a clear bar spacing of 1.5 inches, which is small enough to prevent entrainment of salmon smolts. However, you do not assess whether the bar spacing on the trash racks would also protect juvenile alsoines which are typically smaller than salmon smolts. Similarly, you provide no analysis of how the proposed physical and hydraulic characteristics of the boom would specifically protect juvenile alosines from entrainment into Units 7 and 8.*

    To support your conclusions about the project's effects on downstream migrating alosines, include an analysis of the potential for impingement and entrainment of these species into trash racks, powerhouse intakes, and turbines during downstream migration. At a minimum, this should include a comparison of the physical (e.g., bar spacing, perforation size) and hydraulic characteristics (e.g., approach and through-screen velocities) of the trash racks and forebay guidance boom to the body sizes and swimming abilities of juvenile alosines.

Juvenile alosines (i.e., American shad, blueback herring, and sea-run alewives) outmigrate from the Kennebec River in the fall, typically in September or October. Alosines are pelagic species, inhabiting surface waters during most of their lifecycle. Young-of-year juveniles migrate downstream near the water's surface in schools when they are approximately 3 to 5 inches long (Pardue 1983, Talbot and Sykes 1958). Burst swim speeds for juvenile alosines, which can be maintained for up to 20 seconds, range from approximately 1.0 to 2.15 feet per second (fps) (Alden 2004, FishXing 2006, EPRI 2000).

There are two powerhouses at the Shawmut Project. The 1912 powerhouse has six Francis turbines (Units 1-6) that each have a hydraulic capacity 674 cfs for a total maximum capacity of 4,044 cfs. The new powerhouse has two tube-type hydraulic turbines (Units 7 and 8) with a maximum hydraulic capacity of approximately 1,200 cfs each. Each powerhouse is equipped with full-depth trash rack bars spaced at 1.5-inches (1912 powerhouse) and 3.5 inches (1982 powerhouse). The Licensee provides downstream passage for diadromous fish species through a surface weir (sluice gate) and Tainter gate, both of which are located between the two powerhouses. The 4-foot-wide sluice gate/surface weir is located adjacent to the intake structure, next to Unit 6. The surface weir passes between 30 and 35 cfs to convey fish into a plunge pool at the base of the dam. The Tainter gate next to the surface weir is 7-feet-high by 10-feet-wide and can pass up to 600 cfs. Together these two gates comprise the downstream bypass for the Shawmut Project.

The Licensee has designed a new upstream fishway comprised of a fish lift and a connecting flume. As part of the new upstream fishway design changes will be made to the discharge from the Tainter gate, whereby water (and fish) will be released into a new concrete flume, that will discharge into the Unit 7 and 8 powerhouse. There will be no changes to the smaller sluice gate, and that gate will continue to discharge to the Unit 1-6 powerhouse tailwater. White Pine Hydro has proposed and is in the process of designing a fish boom guidance system to be installed in the Project forebay upstream of the Unit 7 and 8 powerhouse intake to provide screening, guidance, and sweeping flows to the Tainter gate and sluice gate bypass system. The guidance boom will be installed after completion of the new upstream fishways. As described in response to AIR #12, the floating boom will be approximately 210-ft-long, with a series of suspended, 10-ft-deep rigid screen panels with 0.5-inch perforations attached to an anchored buoy system.

To evaluate the risk for entrainment and impingement of juvenile alosines, the Licensee reviewed alosine biological information and the engineering characteristics of the existing and proposed Project structures. In addition, the Licensee estimated turbine passage survival for juvenile alosines based on common turbine blade strike equations (i.e., Franke et al. 1997).

According to the USFWS' 2019 Fish Passage Engineering Design Criteria:

*a water velocity criterion of 2.0 fps for downstream fishways minimizes or eliminates fatigue in weaker species and allows fish to escape entrainment/impingement without resorting to burst swimming speed (*USFWS 2019*).*

At full generation, the calculated approach velocity (i.e., the water velocity approximately 6 to 12 inches upstream of the trash rack face) at the Unit 1-6 powerhouse intake is 1.58 feet per second (fps). This value was derived by dividing the maximum hydraulic capacity of units 1-6 by the gross area of the intake (4,044 cfs / 2,556 square feet = 1.58 fps), which is the recommended techniques of the USFWS (USFWS 2019). When there is less river flow available for generation, approach velocity decreases. For example, during the median September river flow of 3,455 cfs,[1]

[1] September median flow; Kennebec River at North Sidney, prorated to the Shawmut Project.

the calculated approach velocity in front on the unit 1-6 trash racks is 1.35 fps (3,455 cfs / 2,556 ft = 1.35 fps).

The proposed fish guidance boom system is designed to preclude juvenile alosines from encountering the intake area of the Unit 7-8 powerhouse because it is considered a "Fish-Tight" design resulting in 100 percent closure with no gaps where fish can pass through. Sweeping or approach velocities along the face of the proposed boom are unknown; however, the intent of the design is to guide pelagic fish, which typically approach guidance systems near the upper levels of the water column (USFWS 2019), along the face of the boom to the surface weir. The proposed downstream passage system meets USFWS' criteria and the final design will be completed in consultation with state and federal resources agencies. The design of the fish guidance system is conceptual at this point and final design will occur once the upstream fish passage facility construction has been completed.

Overall, the risk of impingement and entrainment of juvenile alosines at the Shawmut Project is low because of the slow approach velocities (~1.6 fps), the ability of juvenile alosines to swim away from the trash racks, and the ability of juvenile alosines to fit through the trash racks. The installation of the fish guidance system is expected to successfully guide juvenile alosines to the bypass. However, there is some risk that juvenile alosines that may become entrained into the Unit 1-6 powerhouse because the entrance is downstream of the intake area. For incidental juvenile alosines that may be entrained, expected turbine passage survival was derived from the 2012 desktop entrainment study completed by Brookfield to assess survival of 5-inch-long Atlantic salmon smolts (Normandeau 2012). Although the 2012 study did not focus on juvenile alosines, the blade strike equations used for the desktop entrainment model (Franke et al. 1997) are dependent on fish length, not fish species; therefore, the 2012 estimate of turbine passage survival is an acceptable means to predict passage of 5-inch-long juvenile alosines. Expected turbine passage survival of 5-inch-long fish through the unit 1-6 powerhouse is 94.6 percent (Normandeau 2012). Survival typically increases as fish size decreases (Franke et al. 1997), therefore, survival would be greater than 95 percent for any smaller juvenile alosines (e.g., 3 and 4-inch-long fish) that may be entrained.

References

Alden. 2004. Winnicut Dam Removal Feasibility Study – Hydraulic Fish Passage and Alternatives Analysis. February 2004.

Electric Power Research Institute (EPRI). 2000. Technical Evaluation of the Utility of Intake Approach Velocity as an Indicator of Potential Adverse Environmental Impact under Clean Water Act Section 316(b).

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Franke, G. F., D. R. Webb, R. K. Fisher, Jr., D. Mathur, P. N. Hopping, P. A. March, M. R. Headrick, I. T. Laczo, Y. Ventikos, and F. Sotiropoulos. 1997. Development of environmentally advanced hydropower turbine system design concepts. Prepared for U.S. Department of Energy, Idaho Operations Office Contract DE-AC07-94ID13223.

Normandeau. 2012. A Review of Effects of Shawmut Project on the Kennebec River Atlantic Salmon (Salmo salar) Smolt and Kelt Downstream Passage and Upstream Passage.
Pardue, G. B. 1983. Habitat Suitability Index Models: Alewife and Blueback Herring. 22 pp.

Talbot, G. B., and J. E. Sykes. 1958. Atlantic coast migrations of American shad. U.S. Fish and Wildlife Service Fishery Bulletin 58: 473-490.

14. In section 6.2 of Exhibit E you provide a cost for your proposed environmental measures that includes a general $50,000 annual cost for operation and maintenance of all the project's upstream and downstream fishways. We cannot determine the basis of the $50,000 cost from the information provided. For example, we cannot determine what costs are included in the operation and maintenance of each facility and whether your $50,000 estimate includes the costs of lost generation due to their operation. We will need to assess the benefits and costs of each of your proposed fishway operations and fish passage measures as part of our environmental analysis. Therefore, please provide specific annual operation and maintenance costs for each of the fishway operations or measures described below. At a minimum, the annual cost for each should include the cost of lost generation to implement the measure or operate the facility over your proposed operating schedule for each on an annual basis. The costs should add up to $50,000, or if they do not, then you should revise the total annual fish passage facility operation and maintenance costs to include the sum of each of these items below as well as any other costs that were factored into your original estimate.

- *(i) 340-cfs minimum conveyance and/or attraction flows for the new upstream fish lift and its associated auxiliary water supply during May 1st to October 31st operating period;3*
- *(ii) Any proposed minimum conveyance flows or operating costs for the upstream fishway connecting the Units 7&8 Tailrace to the Units 1-6 Tailrace;*
- *(iii) Any proposed minimum conveyance flows for downstream fish passage through each of the three forebay flow-regulating facilities (i.e., surface sluice, Tainter gate, deep gate);*
- *(iv) night-time Unit 7&8 shutdown for 8 hours over 6-week period for eel passage; and*
- (v) *interim spill through four hinged-flashboard sections of 560 cfs during May.*

The Licensee did not include the cost associated with lost generation in its estimate of $50,000 for annual fishway operation and maintenance costs. The Licensee estimates the generation loss due to providing fishway operation flows and unit shut downs seasonally, as follows:

Fishway Operation	Flow	Season	Estimated Annual Generation Loss (kWh)	Annual Cost ($)
Downstream Bypass (sluice gate plus Tainter gate)	400 cfs	April 1-June 15, September 15 – December 1	2,130,432	51,120
Upstream Fish Lift and Attraction Water	340 cfs	April 15 – November 15	2,550,000	101,188[2]
Nightime Unit 7&8 Shutdown for American Eel downstream passage	N/A	6-weeks, ~Sept 15-October 31	382,000	9,183

15. *On page 12 of your Draft Recreation Facilities Plan, you propose to "ensure the management" of all Commission-approved recreation sites, including the Shawmut canoe portage trail. Please clarify whether you propose to maintain the entire 0.25-mile-long trail, including the approximate 350-foot-long portion on state land, or only the portion of trail included within the project boundary.*

The Licensee proposes to maintain the entire canoe portage trail, including the portions that are located outside the Project boundary on State of Maine owned land. The Licensee has and will maintain a cooperative working relationship with the State to ensure the trail is maintained and remains available for public use.

16. *You indicate in your Draft Recreation Facilities Plan that once recreation site capacity is reached, you will evaluate the need for additional access or improvements; however, you do not describe how project-induced recreation would be monitored to determine whether site capacity has been reached and recreational improvements are needed in the future. Such information is needed to determine how future recreation needs would be met at the project over the term of any new license issued. Therefore, please provide the following: (1) a description of how you propose to monitor the recreational use at the project and the condition of project recreation sites over the term of any new license, and (2) a proposed schedule and estimated capital and annual costs for such monitoring.*

The Licensee will monitor FERC-approved Project recreation site use periodically over the term of the new Project license. Monitoring will be done every ten years and will involve conducting use counts at the Project recreation sites using an appropriate methodology, such as trail cameras, spot counts, drone/aerial counts, or other readily available and cost-effective technology. The Licensee will update the Project Recreation Management Plan (RMP) to include the results of the recreation use monitoring, and to make any proposed changes to the Project recreation sites that use monitoring suggests are necessary to meet demand. The RMP will be updated, revised, and filed with FERC every 10 years.

[2] Annual cost includes energy reduction due to water dedicated to fishway operation ($61,188) as well as the loss of head at Units 7 and 8 due to the connecting flume ($40,000).

17. On page 2.21 and 2.22 of your Draft Historic Properties Management Plan, you identify two post-contact archaeological areas within the project's Area of Potential Effect that you investigated as part of a Phase I survey. One is a previously identified site (ME-151-003) possibly associated with the Good-Will School and the Maine Central Railroad's Skowhegan Branch. The other area consists of a scattering of artifacts from possible locations of camps associated with the 1775 Arnold Expedition to Quebec. At either site, you were unable to make a conclusive determination of the site's origin. Nor do you make any assessment of potential project effects on these sites. However, you do not propose any further investigation of these sites to make such a determination or determine National Register eligibility. Please explain why you chose not to further investigate these sites.

As described in the Phase I post-contact archaeology study report, metal detection survey investigated two of the four areas identified as possible locations of camps associated with troop movement in the 1775 Arnold Expedition to Quebec. Two areas were not investigated due to landowner denial and not all the other two investigation areas could be accessed for the same reason. Three locations of wrought-iron artifact concentrations were found that have the potential to relate to either the Arnold Expedition or early settlement of the region, but no conclusive determination could be made as to their actual cultural origins. Because the artifacts discovered could not be conclusively tied to the Arnold Expedition, these sites were not recommended for Phase II study. In a letter dated February 21, 2020 (Attachment 8), the Maine Historic Preservation Commission concurred with this finding, and with the report recommendation to conduct Phase II testing at the Noble's Ferry West site, as proposed by the Licensee.

ATTACHMENT 3

REVISED EXHIBIT A

EXHIBIT A
PROJECT DESCRIPTION

Revised June 2020

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SHAWMUT HYDROELECTRIC PROJECT
(FERC NO. 2322)

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT A
PROJECT DESCRIPTION

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SHAWMUT HYDROELECTRIC PROJECT
(FERC NO. 2322)

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT A
PROJECT DESCRIPTION

1.0 INTRODUCTION

White Pine Hydro LLC (White Pine Hydro) owns and operates the Shawmut Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 2322. The 8.650 megawatt (MW) Project is located on the Kennebec River in south-central Maine in Kennebec and Somerset counties at river mile (RM) 66 and in the towns of Skowhegan, Fairfield, Clinton, and Benton. The Kennebec River basin above the Shawmut Dam has a drainage area of approximately 4,200-square-miles. The Project is one of 10 FERC licensed hydropower and storage projects on the mainstem of the Kennebec River. The Project boundary extends approximately 12.3 miles upstream from the Shawmut Dam.

2.0 PROJECT STRUCTURES

2.1 Existing Structures

Existing structures at the Project consist of a concrete gravity dam, an enclosed forebay, an intake and headworks section, two powerhouses, a tailrace, an interconnection with the local utility's transmission system, and appurtenant facilities (Figure 2-1).

2.1.1 Dam

The dam is a concrete gravity type overflow section with the fixed crest at elevation 108.0' U.S. Geological Survey (USGS) datum[1]. The spillway section is comprised of several sections totaling 1,135-feet-long with an average height of approximately 24 feet; the total dam is approximately 1,480 feet in length. The spillway section is approximately 19-feet high, has 380 feet of hinged flashboards 4-feet high serviced by a steel bridge with a gantry crane, a 730-foot-long section topped with an inflatable bladder composed of three sections, each 4.46-feet-high when inflated, and a 25-foot-wide sluice having a crest elevation of 104.0' and equipped with a timber and steel gate. The dam includes a non-overflow section between the hinged flashboards and the forebay headworks structure. The non-overflow section of the dam between the hinged flashboards and the forebay headworks structure is 104 feet long and 30 feet high, with a top of elevation of approximately 118'. An earthen dike with a concrete core wall is situated beyond the west abutment of the headworks structure.

2.1.2 Headworks and Intake Structure

The headworks and intake structure are integral to the dam. The forebay intake section contains 11 headgates and two filler gates. Five of the headgates are installed in openings 10-feet by 15.5-feet and six are installed in openings 10-feet by 12.5-feet. The two wood filler gates are 4-feet by 6-feet. In the 1912 powerhouse (Units 1-6), the intake section has six open flumes each fitted with two 10.5-feet by 14-feet double leaf slide gates and a continuous trash rack which extends from elevation 114.0' down to elevation 93.75'. The clear spacing of the racks in front of Units 1-6 is 1.5 inches. In the 1982 powerhouse (Units 7 and 8), the intake section contains two openings fitted with vertical headgates approximately 12-feet-high by 12-feet-wide and operated by hydraulic cylinders. The trash racks are serviced by a track mounted, hydraulically operated trash rake with trash removal capabilities. The trash racks screening the Units 7 and 8 intakes extend from elevation 115.25' to 88.0' and have clear spacing of 3.5 inches. Elevation and dimension details for the headworks structures, as determined from Exhibit F drawings, are provided in Table 2-2. Trash rack details are provided in Table 2-3.

[1] Note: All references to elevation in this report are based on USGS datum.

The westerly non-overflow section contains a 2-foot-high by 2-foot-wide steel gate which was formerly used as an intake for process water serving the former Keyes Fibre Company mill adjacent to the Project (the mill was demolished in 2018).

A retaining wall connects the west end of the non-overflow section to a concrete cut-off wall which serves as a core wall for an earthen dike.

2.1.3 Forebay

The forebay is located immediately downstream of the headgate structure and is enclosed by two powerhouse structures. The 1912 powerhouse (Units 1-6) is located to the east and the 1982 powerhouse (Units 7-8) is located to the south. There is an approximately 240-foot-long concrete retaining wall located on the west side (river right) of the forebay. A second process water intake for the former Keyes Fibre Company is located in this forebay, similar to that installed in the headworks structure. Located at the south end of the forebay between the powerhouses are three gates; a 10-foot-high by 7-foot-wide Tainter gate, a 6-foot-high by 6-foot-wide deep gate (positioned under the Tainter gate), and a 4-foot-wide by 22-inch high sluice gate fitted with 3 stop logs. Collectively these 3 gates are used as the primary downstream bypass route(s) for diadromous fish (the Tainter gate and sluice gate for anadromous fish, the deep gate for American eel). Details regarding the forebay gate dimensions and materials are provided below:

Sluice Gate

Type	Open Sluice
Size	4 feet by 22 inches
Closure	Stoplogs (3)
Invert Elevation	111’
Flow Capacity	35 cfs (with all stoplogs removed)

Tainter Gate

Type	Tainter
Material	Steel
Size	7 feet high by 10 feet wide
Invert elevation	105’
Flow Capacity	600 cfs (at full open)

Deep Gate

Type	Lift Gate
Size	6 feet by 6 feet
Invert Elevation	89.0 feet
Flow Capacity	600 cfs

Forebay Filler Gates

Material	Wood
Dimensions	3 feet wide

2.1.4 1912 Powerhouse (Units 1-6)

The 1912 powerhouse structure, water wheel flumes, and intake section are 86-feet-wide by 148-feet-long and constructed of reinforced concrete. The walls of the 1912 powerhouse superstructure are of brick construction. The building itself is 39-feet-wide by 148-feet-long. Approximately one-third of the building is two stories high. Steel columns are embedded in the downstream wall of the powerhouse for support of the bridge crane beam and the steel framing used for the second story floor construction. The roof is reinforced concrete supported by concrete encased steel beams. There is an overhead crane for handling equipment.

The water wheel flume and intake section has six open flumes, each fitted with two 10.5-foot-high by 14-foot-wide double leaf slide gates and a continuous trash rack with 1.5-inch spacing between the bars. There are six turbines and six generators (Units 1-6) within the powerhouse which are described in more detail in Section 4.1.

2.1.5 1982 Powerhouse (Units 7-8)

The 1982 powerhouse substructure and superstructure are approximately 59-feet-long by 43-feet-wide and are constructed of reinforced concrete. The building is approximately 28-feet-high from roof to generator floor and the substructure extends down to a maximum depth of approximately 20-feet below the generator floor in the tailrace draft area. The roof is reinforced concrete supported by steel beams. An equipment service hatch, 23-feet by 16-feet, is located on the roof. An overhead bridge crane is used for servicing powerhouse equipment.

The intake section is constructed of reinforced concrete containing two openings fitted with vertical headgates approximately 12-feet-high by 12-feet-wide and operated by hydraulic cylinders, and trash racks with spacing of 3.5 inches between the bars. The trash racks are serviced by a track mounted, hydraulically operated trash rack rake with trash removal capabilities.

The powerhouse contains two turbines and two generators (Units 7-8), which are described in more detail in Section 4.1.

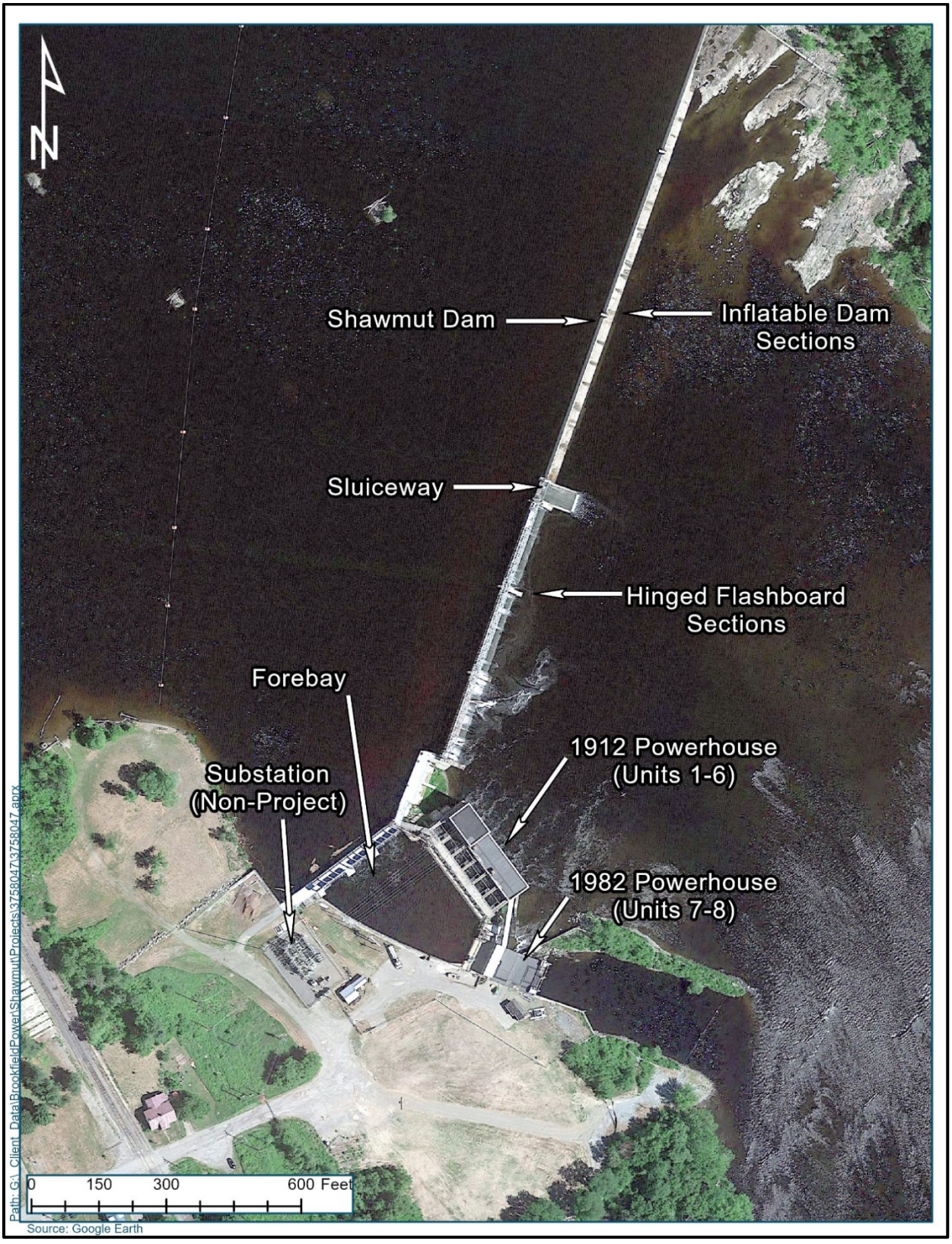


Figure 2-1 Overview of Shawmut Project Facilities

Table 2-1 General Shawmut Project Information

GENERAL INFORMATION	
Owner	Brookfield White Pine Hydro LLC
FERC Project Number	2322
Current License Term	February 1, 1981 to January 31, 2022
County	Kennebec and Somerset Counties, Maine
Nearest Town(s)	Fairfield, Skowhegan, Clinton, and Benton, Maine
River	Kennebec River
Drainage Area	4,200 square miles
Normal Full Pond Elevation	112.0 feet USGS Datum
Normal Tailwater Elevation	88 feet
Impoundment Length	Approximately 12.0 miles
Gross Storage	Not Determined
Surface Area at Normal Full Pond	1,310 acres
Average Annual Inflow at Shawmut Project	8,582 cfs[1] for the period 2004-2019
Structures	
Dam	
Construction	Concrete gravity
Total Length	1,480 feet
Spillway Length	1,135 feet
Powerhouses	1912 Powerhouse: 148 feet x 35 feet 1982 Powerhouse: 59 feet x 43 feet
Turbine/Generator Units	8 Units
Turbine Manufacturer/Type	Units 1, 2, 3, & 5: J.M. Voith Francis (4 Runners) Units 4 & 6: S.M. Smith Francis (4 Runners) Units 7 & 8: Allis-Chalmers Tube (3 blade)
Turbine Capacitates	Units 1, 2, 3, & 5: 1,200 hp approximately 674 cfs Units 4 & 6: 1,200 hp approximately 674 cfs Units 7 & 8: 2,880 hp approximately 1,200 cfs
Generator Manufacturer	Units 1, 2, & 3: Fort Wayne Units 4 & 6: G.E. Unit 5: G.E. Units 7 & 8: Siemens-Allis
Generator Capacities	Units 1, 2, & 3: 750 KVA at 1.0 power factor (750 kW) Units 4 & 6: 750 KVA at 1.0 power factor (750 kW) Unit 5: 1,125 KVA at 0.8 power factor (900 kW) Units 7 & 8: 2,222 KVA at 0.9 power factor (1750 kW)
Nameplate Installed Capacity	8.650 MW

[1] cfs cubic feet per second

Table 2-2 Shawmut Headworks Structure Details

Structure	Height (ft)	Width (ft)	Length
Headworks Structure – Supports for 5 headgates closest to river left (varies by location)	TOC El. 122.0' – 91.0' (assumed bedrock) = 31.0'	-15'6" @ top of section -±30' @ bottom of section	196'-4" (total length) 2'-4" Thick (original piers)
Headworks Structure – Supports for 6 headgates closest to river right (varies by location)	TOC El. 122.0' – 94.0' (assumed bedrock) = 28.0'	-15'6" @ top of section -±27'6" @ bottom of section	196'-4" (total length) 2'-4" Thick (original piers)
Headworks Structure – Pier closest to river left	TOC El. 122.0' – 91.0' (assumed bedrock) = 31.0'	-18'6" @ top of section -±48' @ bottom of section	196'-4" (total length) 14'-8" Thick
Headworks Structure – Pier closest to river right	TOC El. 122.0' – 94.0' (assumed bedrock) = 28.0'	-18'6" @ top of section -±46' bottom of section	196'-4" (total length) 14'-8" Thick
Headworks Structure - @ Former Mill Intake Gate	TOC El. 122.0' – 94.0' (assumed bedrock) = 28.0'	-15'6" @ top of section -±27'6" @ bottom of section	196'-4" (total length)

Table 2-3 Shawmut Trash Rack Details

1912 Powerhouse (Units 1-6)	Trash Rack Details
Material	Steel
Overall Width	142 feet
Overall Height	19 feet 6 inches
Trash Rack Bars	Rectangular; 4 inches deep and 3/8 inch thick, spaced at 1-7/8 inch on center
Spacers	Racks have 3/8 inch by 3 inch welded spacers spaced at 3 feet 0 inches.
Support	Racks are set directly on concrete at elevation 93.75' (bottom of racks). Racks are supported by continuous WT 3x8 located 7 feet 4 inches form the bottom of the racks. The WT3x8 is bolted to a continuous W12x40 I-beam. The W12x40 I-

	beam support structure consists of two (2) 4x4x3/8 inch support legs, two (2) 4x6x3/8 inch support legs, and one (1) ½ inch gusset plate.
1982 Powerhouse (Units 7-8)	
Material	Steel
Overall Width	37 feet 6 inches
Overall Height	27 feet 6 inches
Trash Rack Bars	Rectangular; 1/2 inch thick, spaced at 4 inch on center.
Spacers	Spacers are welded to the rack bars at 2 feet 6 inches on center.
Support	Racks are set in a concrete slot. The bottom and top of the slot elevations are 87.43 feet and 88.0 feet. The racks are supported by three continuous W24x94 beams. The beams are at elevation 91.5, 95.5, and 101.5 feet. The beams are 40 feet long and bolted to the concrete support piers.

2.1.6 Tailrace

The Project tailraces are excavated riverbed located downstream of the powerhouses. The normal tailwater elevation of the stations is approximately 88.0'. From the 1982 powerhouse, water is released into a 300-foot-long tailrace approximately 45-feet-wide by 12-feet-deep. The tailrace for the 1912 powerhouse is approximately 140-feet-wide by 12-feet-deep and extends approximately 175-feet downstream. The two powerhouse tailraces are separated by an island and training wall.

2.1.7 Transmission Lines

The project related transmission facilities include three step-up transformers located in the non-project Central Maine Power Company (CMP) substation adjacent to, but outside of the Project boundary. An electrical single-line diagram showing the project's connection to the CMP transmission system is provided in Exhibit H. Based upon a review of aerial photographs, the length of the generator leads between the powerhouses and the point of interconnection within the local utility's substation is approximately 250 feet from the 1912 powerhouse.

2.1.8 Project Boundary

The Project boundary extends approximately 12.3-miles upstream of the dam, and approximately 4,000-feet downstream of the dam. Above the dam, the Project boundary generally follows the 113.0' or the 114.0' contour, but also includes two parcels of land on the east and west bank in the upper portion of the Project. Project boundary drawings are provided in Exhibit G.

The Licensee proposes to remove the two parcels from the upper end of the Project boundary, which are not required for project purposes. Section 3.3 of Exhibit E discusses the details of the proposed change in the Project boundary and provides maps showing both the existing and proposed Project boundary. The Exhibit G maps show the proposed Project boundary. The total acreage of land and water within the proposed Project boundary combined is estimated to be 1,729 acres. Approximately 1,432 acres within the Project boundary is open water, consisting of an estimated 1,310 acres of impoundment waters and 90 acres of tailwater.

2.2 Proposed Structures

There are no new structures being proposed in this application. New upstream fish passage measures are being implemented at the Project as authorized under the current license. Future fish passage measures for the Project will be governed by the terms of a Species Protection Plan (SPP) that was filed with FERC on December 31, 2019. Revised Exhibits A and F will be filed when construction of the fish passage facilities has been completed.

3.0 IMPOUNDMENT DATA

3.1 Surface Area and Elevation

The project impoundment encompasses approximately 1,310 acres at normal full pond elevation of 112.0’.

3.2 Storage Capacity

The impoundment has an estimated volume of 4,960 acre-feet. However, because the Project is operated as run-of-river mode, the impoundment has no significant usable storage capacity at the normal full pond elevation of 112.0’.

4.0 TURBINES AND GENERATORS

4.1 Existing Turbines and Generators

In the 1912 powerhouse, there are six horizontal, four-runner, Francis-type turbines rated at 1,200 horsepower (hp) each, and six generators, five rated at 750 kilowatts (kW) each and one rated at 900 kW. The units have a net head of 23.5 feet.

In the 1982 powerhouse, there are two horizontal tube-type hydraulic turbines, rated at approximately 2,880 hp each, and two generators rated at 2,000 kW each. The units have a net head of 22.6 feet.

The total installed capacity of the Project, as limited by the generator nameplates for each unit, is 8,650 kW[2].

4.2 Proposed Turbines and Generators

There are no proposed changes to the existing turbines and generators.

5.0 TRANSMISSION LINES

The Project related transmission facilities include three General Electric (GE) transformers rated 750 kilovolt-ampere (KVA) 3 phase, 60 hertz; three GE transformers rated 1,250 KVA 3 phase, 60 hertz; and one Westinghouse step-up transformer rated 5,000 KVA, 3 phase, 60 hertz. The transformers are located approximately 250 feet from the 1912 powerhouse, in the CMP substation adjacent to, but outside of the Project boundary. An electrical single-line diagram showing the Project's connection to the CMP transmission system is provided in Exhibit H.

6.0 ADDITIONAL EQUIPMENT

The following listing describes the specification of the appurtenant equipment in use at the Project.

6.1 Battery Set

Manufacturer	SBS
Type	STT2V250
Number of Cells	60

6.2 Battery charger

Manufacturer	G.E.
Type	No. C.R – 75010110G8
Volts	120-240
Amps	12.5

[2] By Order Approving As-Built Exhibits (25 FERC ¶ 62,4170) the Commission amended the authorized installed capacity of the Project to be 11,700 horsepower (approximately 8,775 kW). This was based upon licensee's November 21, 1983 filing of a revised Ex. A which, based upon bids for the then new turbine units 7 and 8, anticipated that these units would be rated with a total capacity of 4,090 kW; the units however are actually nameplated at 2,222 kVa each at a.0.9 PF for a total of 4,000 kW. The total installed capacity of 8,650 kW listed in this current exhibit is based upon the as-built nameplates mounted on the generator units.

6.3 Powerhouse Cranes

Manufacturer	Hugh R. Blethen
Capacity	12 tons
Lift	19 feet, 10 inches
Operated	Hand

Manufacturer	Harrington/Peerles
Capacity	15 tons
Lift	20 feet
Operated	Electric Hand Control

6.4 Powerhouse Intake Gate Hoists

Manufacturer	Not known
Number	12
Type	Rack and Pinion
Operated	Portable Motor Operator

Manufacturer	Wright
Number	2
Type	10 ton hoist
Operated	Portable Motor Operator/Hand-held

6.5 Forebay Intake Gate Hoist

Manufacturer	Not Known
Number	1
Type	Jib-Rail Mounted
Capacity	5 tons
Operated	Motor

6.6 Log Sluice Gate Hoist

Manufacturer	Waterville Iron Works
Number	1
Type	Rack and Pinion
Operated	Motor

6.7 Flashboards Gantry Crane

Manufacturer	Thern
Number	1
Capacity	3.75 tons
Hoist Speed	14 feet per minute
Length of Lift	35 feet

6.8 Spillway Gate Hoist

Manufacturer	Portland Company
Number	1
Capacity	3 tons
Lift	12 feet
Motor	1.5 hp
Travel	5 feet per minute
Hoist Drum	12 inches (2)

6.9 Deep Gate Hoist

Manufacturer	Portland Company
Number	1
Type	Double Screw
Operated	Hand/Toledo

6.10 Intake Rack Gates

Manufacturer	Portland Company
Number	1
Capacity	2 tons
Lift	43 feet
Operated	Motor and Hydraulic

Manufacturer	Berry/Cross Machine
Number	1
Capacity	1 ton
Lift	33 feet
Operated	Motor and Hydraulic

6.11 Forebay Filler Gate Hoists

Manufacturer	Not known
Number	1
Type	Rack and Pinion
Operated	Hand

Manufacturer	Not known
Number	1
Type	Rotork
Operated	Motor Operated

6.12 Forebay Filler Gates

Material	Wood
Dimensions	3 feet wide

6.13 Trashracks (Units 1-6)

Material	Steel
Overall Width	142 feet
Overall Height	19 feet 6 inches
Trash Rack Bars	Rectangular; 4 inches deep and 3/8 inch thick, spaced at 1-7/8 inch on center
Spacers	Racks have 3/8 inch by 3 inch welded spacers spaced at 3 feet 0 inches.
Support	Racks are set directly on concrete at elevation 93.75' (bottom of racks). Racks are supported by continuous WT 3x8 located 7 feet 4 inches form the bottom of the racks. The WT3x8 is bolted to a continuous W12x40 I-beam. The W12x40 I-beam support structure consists of two (2) 4x4x3/8 inch support legs, two (2) 4x6x3/8 inch support legs, and one (1) ½ inch gusset plate.

6.14 Trashracks (Units 7-8)

Material	Steel
Overall Width	37 feet 6 inches
Overall Height	27 feet 6 inches
Trash Rack Bars	Rectangular; 1/2 inch thick, spaced at 4 inch on center.
Spacers	Spacers are welded to the rack bars at 2 feet 6 inches on center.
Support	Racks are set in a concrete slot. The bottom and top of the slot elevations are 87.43 feet and 88.0 feet. The racks are supported by three continuous W24x94 beams. The beams are at elevation 91.5, 95.5, and 101.5 feet. The beams are 40 feet long and bolted to the concrete support piers.

7.0 LANDS OF THE UNITED STATES

There are no lands of the United States within the Project.

ATTACHMENT 4

CONCEPTUAL DRAWINGS OF DOWNSTREAM FISH GUIDANCE BOOM

Brookfield Renewable Power - Shawmut Dam - Fish Guidance System

Conceptual Drawings of Downstream Fish Guidance Boom

Worthington Products Inc.
1520 Wood Ave SE / Canton, Ohio 44705
Phone: (330) 452-7400
Email: support@tuffboom.com
Website www.tuffboom.com

WORTHINGTON
Waterway Barriers

CONCEPTUAL

UNITS IN IMPERIAL UNLESS NOTED

REV	DESCRIPTION	DATE	APP

DRAWN BY: JSS	CHECKED BY:	APPROVED BY:	JOB REFERENCE:
DRAWN DATE: 11-01-18	CHECKED DATE:	APPROVED DATE:	

CUSTOMER/PROJECT NAME: Brookfield Renewable Power Shawmut Dam

DRAWING DESCRIPTION: Fish Guidance System

SHEET NUMBER:

Brookfield Renewable Power - Shawmut Dam - Fish Guidance System

Conceptual Drawings of Downstream Fish Guidance Boom

WORTHINGTON
Waterway Barriers

Worthington Products Inc.
1520 Wood Ave SE / Canton, Ohio 44705
Phone (330) 452-7400
Email: support@tuffboom.com
Website www.tuffboom.com

CONCEPTUAL

UNITS IN IMPERIAL UNLESS NOTED

REV	DESCRIPTION	DATE	APP

DRAWN BY:	DRAWN DATE:
JSS	11-01-18
CHECKED BY:	CHECKED DATE:
APPROVED BY:	APPROVED DATE:
JOB REFERENCE:	

CUSTOMER/PROJECT NAME
Brookfield Renewable Power
Shawmut Dam

DRAWING DESCRIPTION
Fish Guidance System

SHEET NUMBER:

Brookfield Renewable Power - Shawmut Dam - Fish Guidance System

Conceptual Drawings of Downstream Fish Guidance Boom

Worthington Products Inc.
1520 Wood Ave SE / Canton, Ohio 44705
Phone (330) 452-7400
Email: support@tuffboom.com
Website www.tuffboom.com

WORTHINGTON
Waterway Barriers

CONCEPTUAL

UNITS IN IMPERIAL UNLESS NOTED

REV	DESCRIPTION	DATE	APP

DRAWN BY: JSS	CHECKED BY:	APPROVED BY:	JOB REFERENCE:
DRAWN DATE: 11-01-18	CHECKED DATE:	APPROVED DATE:	

CUSTOMER/PROJECT NAME:
Brookfield Renewable Power Shawmut Dam

DRAWING DESCRIPTION
Fish Guidance System

SHEET NUMBER:

Contains Critical Energy Infrastructure Information
- CUI//CEII -

ATTACHMENT 5

REVISED EXHIBIT F
(CEII)

This Material is Critical Energy Infrastructure Information (CEII).
Members of the Public may Obtain Nonpublic or Privileged Information by Submitting a Freedom of Information Act (FOIA) Request.

ATTACHMENT 6

FERC CONFIRMATION OF REFILED EXHIBIT G

From: eFiling@ferc.gov
To: Blair, Michelle A. eFilingAccessHarvest@ferc.gov
Subject: [EXTERNAL] FERC Receipt of Filing in P-2322-069
Date: Wednesday, April 8, 2020 3:21:57 PM

This is an EXTERNAL email. Do not click links or open attachments unless you validate the sender and know the content is safe.

Confirmation of Receipt

This is to confirm receipt by the FERC Office of the Secretary of the following electronic submission:

-Submission ID: 1082894
-Docket(s) No.: P-2322-069
-Filed By: Brookfield White Pine Hydro LLC
-Signed By: Randy Dorman
-Filing Desc: Brookfield White Pine Hydro LLC re-submits the Exhibit G files for the Shawmut Hydroelectric Project under P-2322-069.
-Submission Date/Time: 4/8/2020 3:19:14 PM
-Projected Filed Date/Time: 4/8/2020 3:19:14 PM (Subject to Change based on OPM/FERC Closure)

Additional detail about your filing is available via the following link:

https://nam01.safelinks.protection.outlook.com/?url=https%3A%2F%2Ferconline.ferc.gov%2FSubmissionStatus.aspx%3Fhashcode%3DU9jioOoEhHdbFszTiVhZQ&data=02%7C01%7Cmblair%40rccompanies.com%7C54cef4d1f1894a9c6e9a08d7dbf21943%7C543eaf7b7e0d4076a34d1fc8cc20e5bb%7C0%7C0%7C637219705168287578&sdata=kPKu%2BtQ1e8wRtRX%2B6IKDo01WyWTVO9UaGbf4cbHEnMf%3D&reserved=0

Thank you for participating in the FERC Electronic Filing System. If you have any questions, or if you detect errors in your submission or the FERC-generated PDF, please contact FERC at:

E-Mail: ferconlinesupport@ferc.gov mailto:ferconlinesupport@ferc.gov (do not send filings to this address)
Voice Mail: 866-208-3676.

From: eFiling@ferc.gov
To: Blair, Michelle A.; efilingacceptance@ferc.gov
Subject: [EXTERNAL] FERC Acceptance for Filing in P-2322-069
Date: Wednesday, April 8, 2020 4:38:35 PM

Acceptance for Filing

The FERC Office of the Secretary has accepted the following electronic submission for filing (Acceptance for filing does not constitute approval of any application or self-certifying notice):

-Accession No.: 20200408153
-Docket(s) No.: P-2322-069
-Filed By: Brookfield White Pine Hydro LLC
-Signed By: Randy Dorman
-Filing Type: Project Operations Compliance Report
-Filing Desc: Brookfield White Pine Hydro LLC re-submits the Exhibit G files for the Shawmut Hydroelectric Project under P-2322.
-Submission Date/Time: 4/8/2020 3:19:14 PM
-Filed Date: 4/8/2020 3:19:14 PM

Your submission is now part of the record for the above Docket(s) and available in FERC's eLibrary system at:

https://nam01.safelinks.protection.outlook.com/?url=http%3A%2F%2Felibrary.ferc.gov%2Fidmws%2Ffile_list.asp%3Faccession_num%3D20200408-5153&data=02%7C01%7Cmblair%40trccompanies.com%7C18b647d18df24d93dcc308d7dbfcce82%7C543eaf7b7e0d4076a34d1fc8cc20e5bb%7C0%7C0%7C637219751155976939&sdata=SnXfwU%2BSftWFXvt0CIRIr2vG5XIWikLAfeMT%2FXG6uOU%3D&reserved=0

If you would like to receive e-mail notification when additional documents are added to the above docket(s), you can eSubscribe by docket at:

https://nam01.safelinks.protection.outlook.com/?url=https%3A%2F%2Ferconline.ferc.gov%2FeSubscription.aspx&data=02%7C01%7Cmblair%40trccompanies.com%7C18b647d18df24d93dcc308d7dbfcce82%7C543eaf7b7e0d4076a34d1fc8cc20e5bb%7C0%7C0%7C637219751155976939&sdata=y%2BkYe%2FHVUhwXV45o5dweTNbKURnGWpITg%2FAaSEqgJCA%3D&reserved=0

Thank you again for using the FERC Electronic Filing System. If you need to contact us for any reason:

E-Mail: ferconlinesupport@ferc.gov mailto:ferconlinesupport@ferc.gov (do not send filings to this address)
Voice Mail: 866-208-3676.

From: Leclerc, Lauren G.
To: Wendy Bley; Dorman, Randy
Cc: Blair, Michelle A.; Fredenburg, Jeff
Subject: FW: [EXTERNAL] FW: INC000000211426 - [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files
Date: Wednesday, April 15, 2020 2:02:59 PM
Attachments: image006.png
image013.png
image014.png
image005.png

Wendy and Randy –

We received the below email from FERC Online Support that the second set of Exhibit G shapefiles that we submitted for Shawmut open fine.

Hurray!

Thanks Michelle and Jeff for working this through!

Lauren Leclerc
Project Manager, PWS

14 Gabriel Drive, Augusta, ME 04330
T 207.620.3857 | **F** 207.621.8226 | **C** 207.756.9322
LinkedIn | Twitter | Blog | TRCcompanies.com

Please note that our domain name and email addresses have changed

---

From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Wednesday, April 15, 2020 8:48 AM
To: Fredenburg, Jeff <jfredenburg@trccompanies.com>
Cc: Blair, Michelle A. <mblair@trccompanies.com>; Leclerc, Lauren G. <lleclerc@trccompanies.com>; Stevenson, Meg E. <MEStevenson@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Subject: FW: [EXTERNAL] FW: INC000000211426 - [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Hello,

Response from our Team:

Am not sure what data you are looking for. The document you have submitted is in final status and opening fine. Here is the link from eLibrary to check your submission.

G files

https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15506126

https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15506127

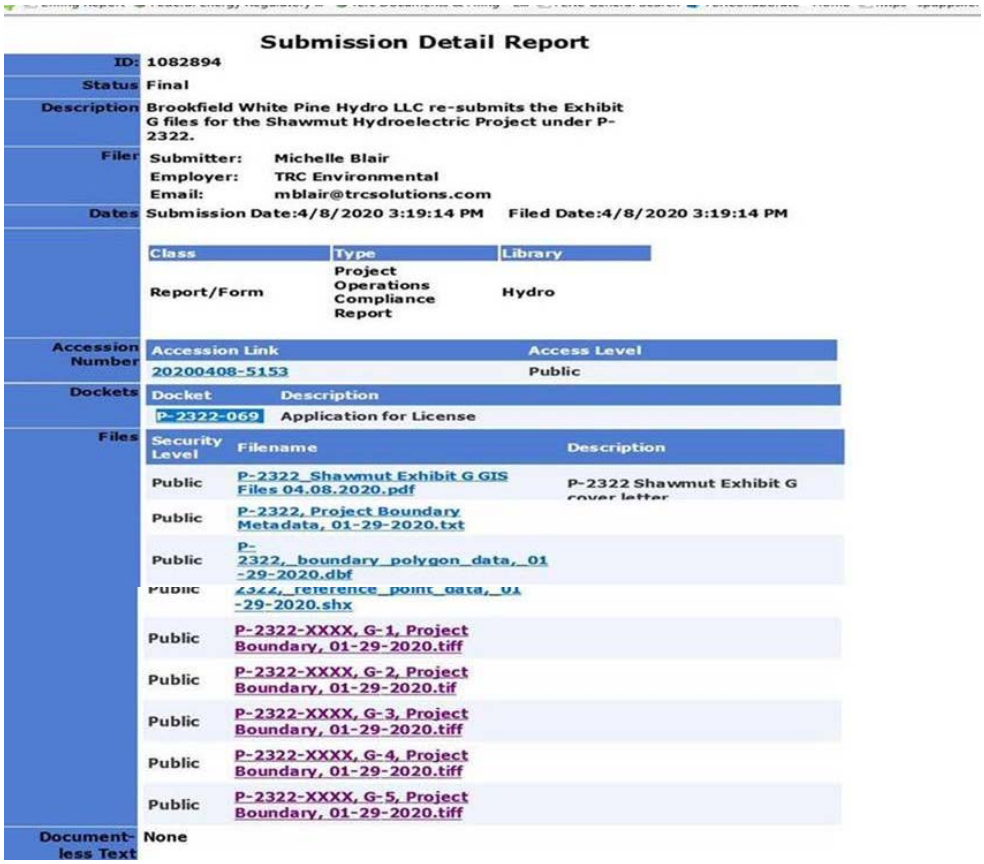
https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15506128

https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15506129

https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15506130

File List

https://elibrary.ferc.gov/idmws/search/intermediate.asp?link_file=yes&doclist=14850006



Submission Detail Report

ID:	1082894
Status	Final
Description	Brookfield White Pine Hydro LLC re-submits the Exhibit G files for the Shawmut Hydroelectric Project under P-2322.
Filer	Submitter: Michelle Blair Employer: TRC Environmental Email: mblair@trcsolutions.com
Dates	Submission Date:4/8/2020 3:19:14 PM Filed Date:4/8/2020 3:19:14 PM

Class	Type	Library
Report/Form	Project Operations Compliance Report	Hydro

Accession Number	Accession Link	Access Level
	20200408-5153	Public

Dockets	Docket	Description
	P-2322-069	Application for License

Files	Security Level	Filename	Description
	Public	P-2322_Shawmut Exhibit G GIS Files 04.08.2020.pdf	P-2322 Shawmut Exhibit G cover letter
	Public	P-2322, Project Boundary Metadata, 01-29-2020.txt	
	Public	P-2322,_boundary_polygon_data,_01-29-2020.dbf	
	Public	P-2322,_reference_point_data,_01-29-2020.shx	
	Public	P-2322-XXXX, G-1, Project Boundary, 01-29-2020.tiff	
	Public	P-2322-XXXX, G-2, Project Boundary, 01-29-2020.tif	
	Public	P-2322-XXXX, G-3, Project Boundary, 01-29-2020.tiff	
	Public	P-2322-XXXX, G-4, Project Boundary, 01-29-2020.tiff	
	Public	P-2322-XXXX, G-5, Project Boundary, 01-29-2020.tiff	

Document-less Text	None

From: Fredenburg, Jeff <jfredenburg@trccompanies.com>
Sent: Tuesday, April 14, 2020 11:23 AM
To: Blair, Michelle A. <mblair@trccompanies.com>; Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>; Stevenson, Meg E. <MEStevenson@trccompanies.com>
Subject: RE: [EXTERNAL] FW: INC000000211426 - [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Hi Shirley – I'm reaching out a second time because I'm not convinced the first email was received as I replied to the FERC support email address. We tested the files we uploaded based on your suggestion below and those do not appear to work either. I have always filed G information the same way and haven't run into problems until now. Are others submitting EX G files successfully? I'm not sure what else to try. If you have an example of one that came through correctly I can emulate that file structure and see if that works. Any suggestions/advice is appreciated.

Thanks

Jeff Fredenburg
TRC
O: 207-620-3840
C: 207-458-5570

From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Tuesday, April 14, 2020 10:57 AM
To: Fredenburg, Jeff <jfredenburg@trccompanies.com>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>; Stevenson, Meg E. <MEStevenson@trccompanies.com>
Subject: RE: [EXTERNAL] FW: INC000000211426 - [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Hi Jeff,

Just checking in to see if you have gotten any response from FERC yet? Any updates?

From: Fredenburg, Jeff <jfredenburg@trccompanies.com>
Sent: Thursday, April 9, 2020 10:38 AM
To: FERC Online Support <FERCOnlineSupport@ferc.gov>; Blair, Michelle A. <mblair@trccompanies.com>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>; Stevenson, Meg E. <MEStevenson@trccompanies.com>
Subject: RE: [EXTERNAL] FW: INC000000211426 - [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Shirley,

We tested what we uploaded to the e-library yesterday and it appears the shapefiles still will not open. We have been submitting exhibit G files the same way for 10 years. I'm at a loss as to how to get the files uploaded correctly. Everything works here before we post it. Are other folks successfully filling G's? What does their format look like? I'll take any

other suggestions you may have.

Thanks

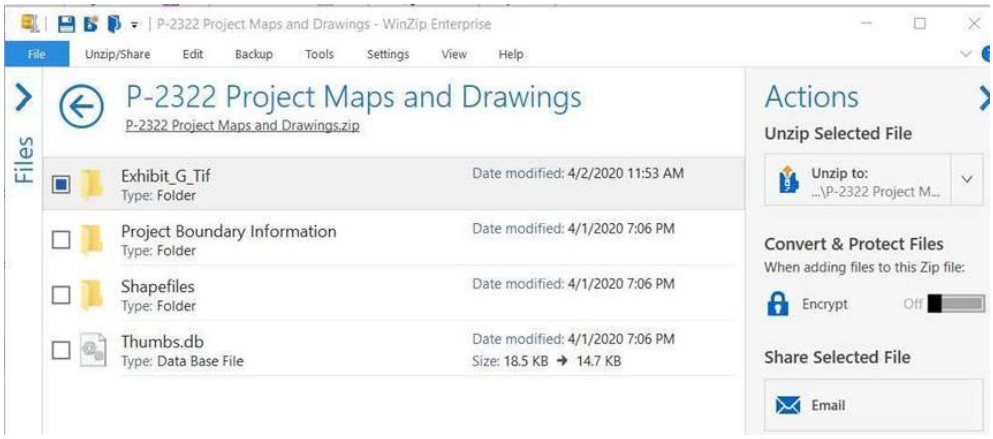
Jeff Fredenburg
GIS Analyst II

14 Gabriel Drive, Augusta, ME 04330
T 207.620.3840 | **C** 207.458.5570
LinkedIn | Twitter | Blog | TRCcompanies.com

From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Wednesday, April 8, 2020 3:06 PM
To: Blair, Michelle A. <mblair@trccompanies.com>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Subject: [EXTERNAL] FW: INC000000211426 - [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Good afternoon,

There are folders inside the zip. It looks like that is the issue. Take out the folders and zip the files only. Let me know if you are able to file it.



From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Wednesday, April 08, 2020 11:24 AM
To: FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files
Importance: High

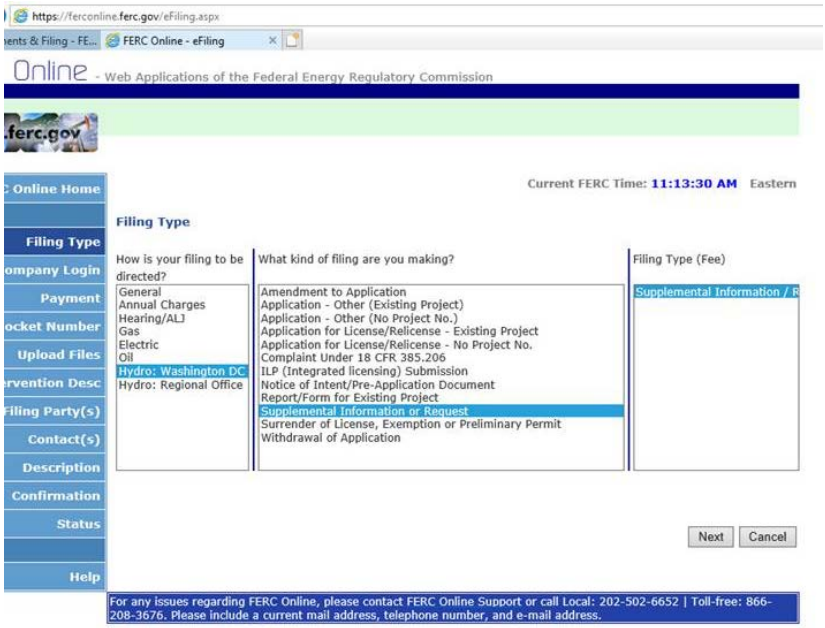
Good morning-

Below are the screenshots of the steps I am taking for this Exhibit G filing. When I get to the step to upload the zip files I receive the **FERC Online – Error** message as you can see in the last screen shot.

Yesterday we had our client try to upload the filing and they ran into the same problem. We have checked the zip file and it contains the acceptable file types listed on the website https://www.ferc.gov/docs-filing/elibrary/accept-file-formats.asp

If you would like to contact me for additional information I can be reached at **1-207-680-6958**.

Thank you for your assistance.
Michelle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Annual Charges
Hearing/ALJ
Gas
Electric
Oil
Hydro: Washington DC
Hydro: Regional Office
What kind of filing are you making?
Amendment to Application
Application - Other (Existing Project)
Application - Other (No Project No.)
Application for License/Relicense - Existing Project
Application for License/Relicense - No Project No.
Complaint Under 18 CFR 385.206
ILP (Integrated licensing) Submission
Notice of Intent/Pre-Application Document
Report/Form for Existing Project
Supplemental Information or Request
Surrender of License, Exemption or Preliminary Permit
Withdrawal of Application
Filing Type (Fee)
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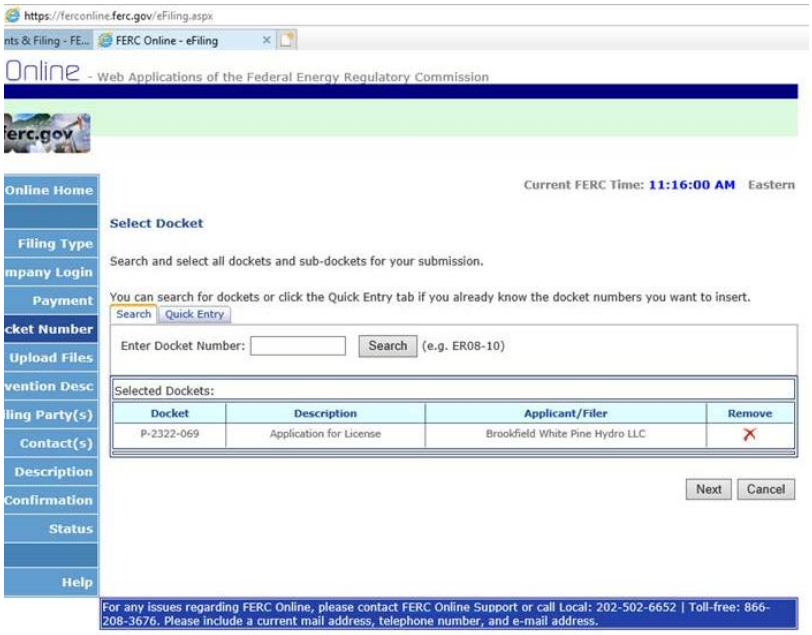
For any issues regarding FERC Online, please contact FERC Online Support or call Local: 202-502-6652 | Toll-free: 866-208-3676. Please include a current mail address, telephone number, and e-mail address.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Select Docket
Search and select all dockets and sub-dockets for your submission.
You can search for dockets or click the Quick Entry tab if you already know the docket numbers you want to insert.
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(e.g. ER08-10)
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Docket
Description
Applicant/Filer
Remove
P-2322-069
Application for License
Brookfield White Pine Hydro LLC
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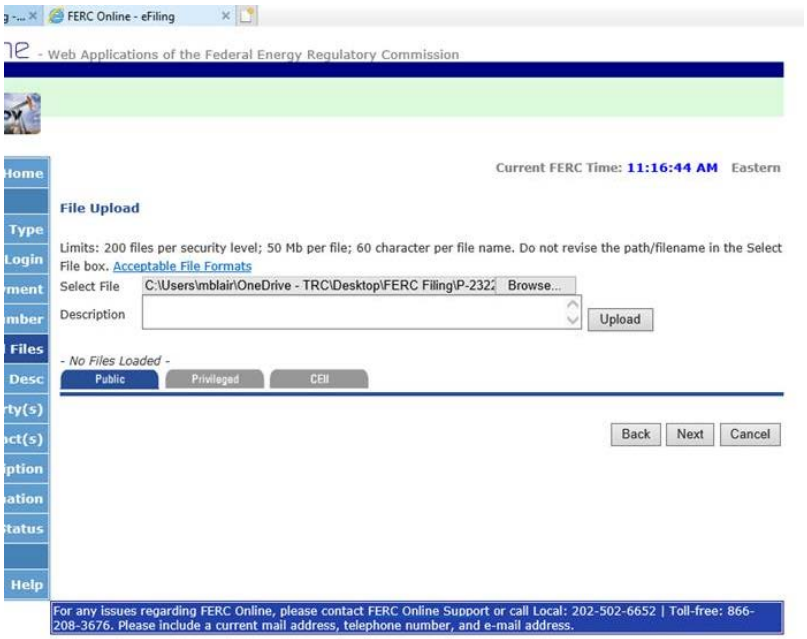
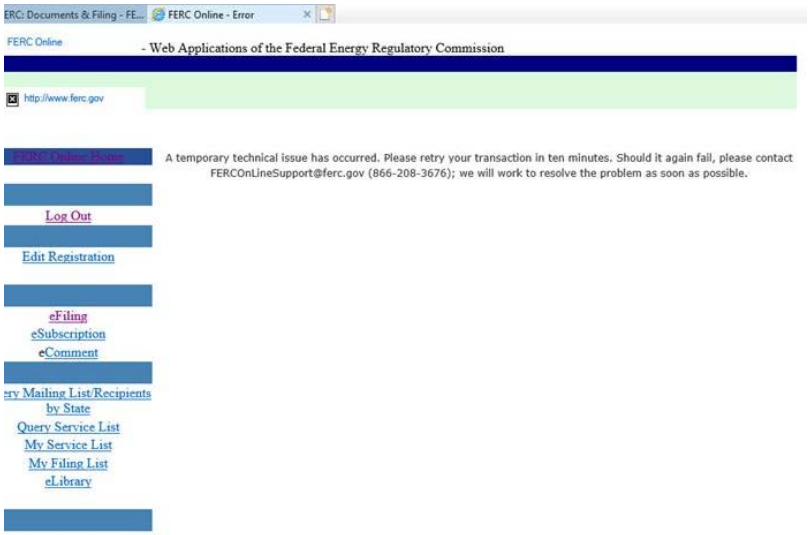
For any issues regarding FERC Online, please contact FERC Online Support or call Local: 202-502-6652 | Toll-free: 866-208-3676. Please include a current mail address, telephone number, and e-mail address.





From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Tuesday, April 7, 2020 3:22 PM
To: Blair, Michelle A. <mblair@trccompanies.com>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Subject: FW: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Can you give the steps, error/screenshot and what you are trying to file so that we can troubleshoot the issue.

From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Tuesday, April 07, 2020 1:33 PM
To: FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files
Importance: High

I have tried again to upload from my office laptop and I also had one of my co-workers try to upload the zip files. We are both still having the same issue.

The zip file is attached. Could you please review the files to see if there may be something preventing the upload?

Michelle Blair
Project Coordinator

TRC

14 Gabriel Drive, Augusta, ME 04330
T 207.620.3845 | **F** 207.621.8226 | mblair@trccompanies.com
LinkedIn | Twitter | Blog | TRCcompanies.com

From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Tuesday, April 7, 2020 11:22 AM
To: Blair, Michelle A. <mblair@trccompanies.com>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Subject: FW: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

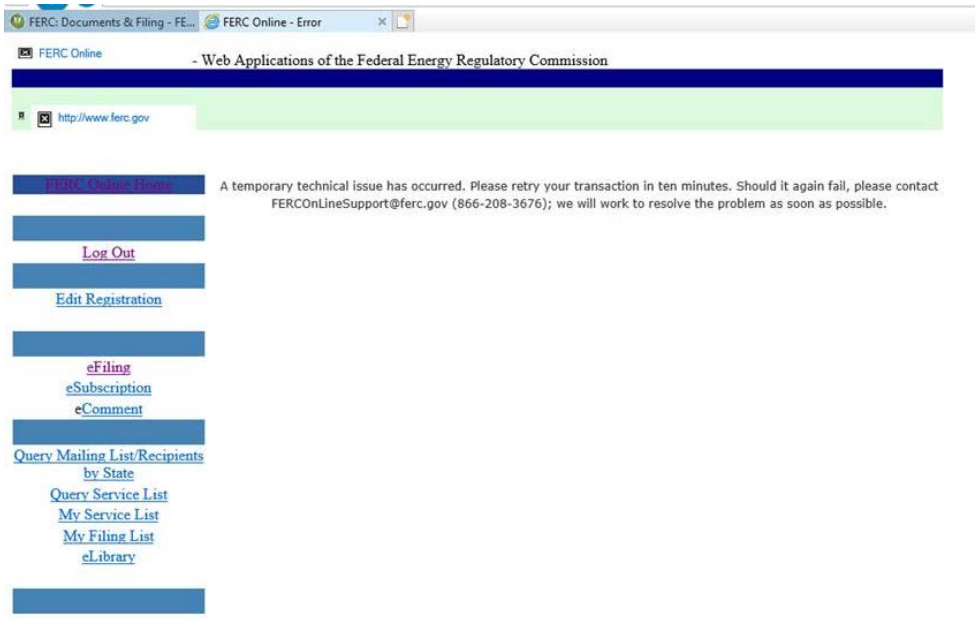
Good morning,

We have restarted the server, please try again and let me know if it works.

From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Tuesday, April 07, 2020 9:41 AM
To: FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Good morning-

I have tried all the suggested options and still having the same results. I also tried logging in through 3 different laptops/desktops with these same results. Could there be something in my profile preventing me from filing the zip files?



From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Tuesday, April 7, 2020 9:26 AM
To: Blair, Michelle A. <mblair@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Come all the way out, try clearing cache/cookies if you are using Internet Explorer try Google Chrome or vice versa.

From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Monday, April 06, 2020 5:05 PM
To: FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Yes, I am.

From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Monday, April 6, 2020 5:00 PM
To: Blair, Michelle A. <mblair@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Are you using Internet Explorer?

From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Monday, April 06, 2020 4:59 PM
To: FERC Online Support <FERCOnlineSupport@ferc.gov>; Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: RE: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Shirley, I attempted to file again using the link and Internet Explorer. Still getting the same message. Is there someone who could assist me tomorrow morning and possibly look at my account and see what may be preventing me from uploading the files?

Thank you!

From: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov> **On Behalf Of** FERC Online Support
Sent: Monday, April 6, 2020 4:51 PM
To: Blair, Michelle A. <mblair@trccompanies.com>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: [EXTERNAL] RE: FERC Filing of Exhibit G files - unable to upload files

Good afternoon Blair,

Try using the link below along with using Internet Explorer

https://www.ferc.gov/docs-filing/ferconline.asp

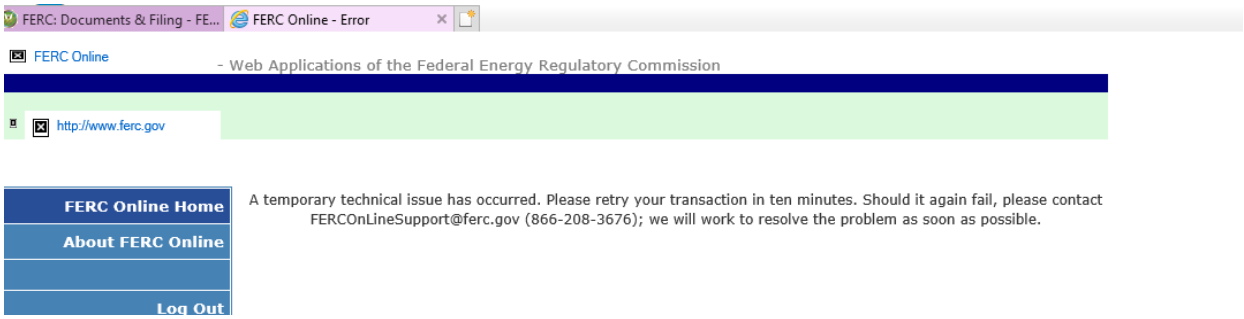
From: Blair, Michelle A. <mblair@trccompanies.com>
Sent: Monday, April 06, 2020 4:23 PM
To: Shirley Armstrong (CTR) <Shirley.Armstrong@ferc.gov>; FERC Online Support <FERCOnlineSupport@ferc.gov>
Cc: Leclerc, Lauren G. <lleclerc@trccompanies.com>
Subject: FERC Filing of Exhibit G files - unable to upload files
Importance: High

Good afternoon Shirley-

You assisted me last month with problems I was having submitting an Exhibit G filing. I am attempting to submit a filing again today for Exhibit G drawings.

When I pull in the .zip file an error message appears as shown below. I have attempted both IE, Microsoft Edge and Google Chrome browsers multiple times. Is there someone available that could help me work through this problem since it is the 2nd time within two months? I can be reached at 207-680-6958.

Thank you.
Michelle



Michelle Blair
Project Coordinator

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ATTACHMENT 7

SHAWMUT FISH PASSAGE OPERATIONS AND MAINTENANCE PLAN (DECEMBER 2020)

SHAWMUT PROJECT

FERC NO. 2322-ME

FISH PASSAGE OPERATIONS & MAINTENANCE PLAN

Version 1.0

Revision: December 19, 2019

Operated by:

Brookfield White Pine Hydro, LLC

An indirect subsidiary of

Brookfield Renewable Energy Group

Skowhegan, ME

SHAWMUT FISH PASSAGE OPERATIONS & MAINTENANCE PLAN

Table of Contents

SHAWMUT FISH PASSAGE OPERATIONS & MAINTENANCE PLAN

1.0 - INTRODUCTION

This Fish Passage Operations and Maintenance Plan (the "Plan" or "O&M Plan") is intended to define how Brookfield White Pine Hydro will operate and maintain the fish passage facilities at the Shawmut Project FERC No. 2322 (the "Project"). This Plan is part of Brookfield's commitment to our environmental principles that are based on the fundamental values of accountability, partnership and open communication. As such, we have accepted the responsibility entrusted to us to manage natural resources in ways to ensure sustainable development.

The Plan will define what fish passage facilities (the "Facilities") are to be constructed at the Shawmut Project, the period in which the existing and new facilities are to be operated, guidance on the annual start-up and shut-down procedures, routine operating guidelines, debris management, and safety rules and procedures that are in place. Along with these defined procedures and guidelines, the Plan includes the necessary supporting information such as contact information, daily inspection forms, drawings, and spare parts on-site. This Plan should be considered a living document, and as such it will be updated annually, as needed.

2.0 - BACKGROUND

The Shawmut Project is located at river mile 66 on the Kennebec River in the towns of Fairfield and Benton, in Somerset and Kennebec Counties, Maine. Shawmut is the third dam upstream on the Kennebec River. The Shawmut Project has a total installed capacity of 8.8 megawatts at a normal head of 24.0 feet. The principal Project facilities include a concrete gravity dam with hinged flashboards and rubber bladder, forebay, reservoir, transmission line, appurtenant facilities, and two powerhouses. The Units 1-6 powerhouse, built in 1912, consists of horizontal Francis quad runner turbines. The Units 7-8 powerhouse, built in 1982, consists of two horizontal single regulated propeller turbines.

The Shawmut Project includes a 1,310-acre reservoir, a 1,135-foot-long dam with an average height of 24 feet, headworks and intake structures, enclosed forebay, and two powerhouses. The crest of the dam has a 380-foot section of four-foot-high hinged flashboards serviced by a steel bridge with a gantry crane; a 730 foot long section of dam topped with an inflatable bladder composed of three sections, each 4.46 feet high when inflated; and a 25 foot wide by downward opening 8 foot deep sluice equipped with a timber and steel gate.

The headworks and intake structures are integral to the dam and the powerhouse. On the west end of the dam there is a head gate structure which along with the two power houses creates a forebay. Also, on the south end of the forebay between the two powerhouses, is a ten-foot-wide by seven foot deep Tainter gate set above a six foot wide by six foot tall deep sluice gate, and directly adjacent to the Tainter gate is an approximately 6 ft wide surface sluice gate. A non-overflow concrete gravity section of dam connects the west end of the forebay gate openings with a concrete cut-off wall, which serves as a core wall of an earth dike.

The Project typically operates as run-of-river, with a target reservoir elevation near the full pond elevation of 112.0 ft during normal conditions. The total maximum hydraulic capacity of the turbines is approximately 6,700 cubic feet per second (cfs). After maximum flow to the turbines has been achieved, excess water is spilled through the existing log sluice. When flows exceed the capacity of the log sluice, sections of the rubber dam are deflated to pass additional water.

3.0 - DESCRIPTION OF FISH PASSAGE FACILITIES

3.1 - UPSTREAM FISH PASSAGE

The upstream fish passage design, to be constructed and operational by 2022, consists of a fish lift with an integrated attraction water intake and spillway placed downstream of the non-overflow portion of the dam and adjacent to the Units 1-6 powerhouse, a short fish bypass channel connecting the Units 7-8 tailrace to the Units 1 through 6 tailrace at the upstream end of the training wall/island, and modifications to the discharge of the Tainter gate adjacent to the Units 7-8 powerhouse.

Fish Lift

The lower portion of the fish lift structure will consist of a concrete and steel entrance flume with an 8 foot wide entrance that widens to a 12 ft entrance channel leading to a fish blocking screen and the lifting hopper. The entrance flume will include a hinged flap entrance gate to maintain velocity and head drop, a set of adjustable V-trap gates, an approximately 11 ft by 11 ft traveling hopper, a baffle wall, and a V-shaped wooden baffled weir for dissipating energy and entrained air from the attraction water system. Set upon the entrance flume will be an approximately 31 ft long by 15 ft wide by 56.5 ft tall structural steel tower within which the hopper will travel to the upper level; the open steel tower will also contain an access stairway. At the upper level (the top of the non-overflow portion of the dam) will be an exit flume (20-inch diameter pipe), a 600-gallon supplemental water storage tank, and steel grating access platform.

An approximately 93 ft long by 10 to 16 ft varying width spillway will be cut into the non-overflow portion of the dam which extends and turns approximately 53 degrees to discharge adjacent to the fish lift entrance to the flume. At the upstream edge of the spillway a beveled broad crested weir will extend about five feet into the headpond. Internally, the spillway channel will include a 16 ft long by 16 ft wide wedge wire screen floor which will convey water from the spillway channel to the energy dissipation pool located just upstream of the fish lift hopper and will provide the attraction flow to the entrance flume of the fish lift.

The attraction water intake and spillway are designed to convey 340 cfs of flow from the head pond; of this 115 to 225 cfs will be diverted through the wedge wire screen intake to the energy dissipation pool and then to the fish lift entrance flume. The remaining 115 to 225 cfs will be bypassed and spilled adjacent to the fish lift entrance.

Unit 7-8 Fish Bypass Channel

An approximately 77 ft long by 10.5 ft wide bypass channel will be constructed at the upstream end of the island to provide fish egress from the Unit 7-8 tailrace across to the Unit 1-6 tailrace. The discharge from the Tainter gate located between the two powerhouses will be rerouted to the Unit 7-8 tailrace. The bypass channel structure will be comprised of a concrete channel with two baffles, a hinged entrance gate, and isolation gates. The southern side of the channel will share a wall with the modified Tainter gate spillway channel and the northern wall will extend 80 ft downstream along the island as a training wall. An approximately 75 ft long by 8 ft wide channel will be excavated into the bedrock turning about 84 degrees from the Units 1-6 tailrace to the bypass channel exit. The excavated rock channel will be at existing grade near the Unit 1-6 powerhouse tailrace and about 5 ft deep. Access stairs from the roof of the Unit 7- 8 powerhouse will lead down to a steel grating walkway near the exit of the Tainter gate spillway channel. This walkway will cross over both channels to allow access to the fish bypass.

A new 79 ft long by 10 ft wide concrete spillway channel will extend from the discharge of the existing Tainter gate to the Unit 7-8 tailrace. See Attachment D for facility drawings.

Upstream fishway operations

The proposed fish lift will be operational from May 1st to October 31st, annually. The fish lift has a designed operating range of 2,540 cfs and 20,270 cfs and will maintain a flow of 0.5 feet per second (fps) at the fish lift attraction water intake Flow in the entrance flume will be maintained at 1.0-1.5 fps through the hopper and 4-6 fps at the fishway entrance. The facility has been designed in consultation with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Maine Department of Marine Resources, the Maine Department of Inland Fisheries and Wildlife and is designed to pass Atlantic salmon (population size 12,000), American shad (population size 177,000), alewives (population size 134,000), and blueback herring (population size 1,535,000).

3.2 - DOWNSTREAM FISH PASSAGE

Downstream passage at Shawmut is currently provided through a combination of a surface weir (sluice), Tainter gate, Deep gate (for downstream passage of adult eel in the late summer/fall) and opened hinged flashboards. The sluice is located at the right side of the intake structure next to Unit 6. It is 4 ft wide by 22-inches deep and flow can be adjusted by adding or removing stoplogs. With all stoplogs removed, the sluice passes between 30 and 35 cfs which is discharged over the face of the dam into a 3 ft deep plunge pool. The Tainter gate located next to the sluice measures 7 ft high by 10 ft wide and can pass up to 600 cfs.

Currently, the sluice and Tainter gate are operated for Atlantic salmon smolt and kelt passage from April 1 through June 15 and from November 1 through December 31, as river flow and ice conditions allow. Downstream passage is also provided along the Shawmut spillway during periods of excess river flow that results in spill. To provide additional passage during the

Atlantic salmon smolt migration season, the Licensee also drops four sections of hinged flashboards, located immediately adjacent to the power canal headworks which provides up to approximately 560 cfs of spill flow.[1] Based on the results of downstream eel passage studies conducted in 2007 and 2008, and with concurrence resource agencies, the deep drain gate is opened for 6 weeks during the period September 15th to November 15th annually for downstream eel passage, in combination with Unit 7-8 shutdowns for at least 8 hours per night.

To minimize the potential for stranding fish on the ledges below Rubber Dam No. 3, Brookfield deflates rubber dams in numerical order (Section l first, Section 3 last) and inflate in reverse order.

With the new license, Brookfield will continue to operate the existing downstream passage facilities and is also proposing to install a guidance boom in the forebay to improve downstream passage at the Shawmut Project. The combined new and existing downstream measures are listed below.

- Install a guidance boom (e.g., Worthington boom) in the forebay in front of Units 7-8. The proposed boom will have a depth of 10 ft., be made of rigid panels with ½ inch perforations (48% opening) and will be installed year-round.
    - Undertake measures necessary to keep the guidance boom in place and in good operating condition. If the guidance boom becomes dislodged or damaged, the resource agencies will be notified and the repair or replacements to the guidance boom will be made as soon as can be safely and reasonably done.
- Continue to operate the forebay bypass gate/surface sluice for utilization by downstream migrating diadromous fish from April 1 through December 31, as river conditions allow.
- Continue to ensure that the forebay Tainter gate is operated to maintain a flow of 6% of station unit flow through the gate (600 cfs through the smolt passage season).
- For a 6 week period between September 15th through November 15th, continue to open the deep drain gate next to Unit 7 at least two and one half feet (approx. 425cfs) and shut down Units 7 and 8 for at least 8 hours per night starting one hour after sunset for eel passage.

The new upstream fish passage facility will also provide additional downstream passage opportunity via the spillway channel auxiliary attraction water system (AWS). AWS flow of 115-225 cfs in excess of the flow required for the fish lift operation will be discharged (along with any downstream migrating fish passing through the system) to the Unit 1-6 tailrace adjacent to the fish lift entrance.

[1] The hinged flashboard sections pass a flow of approximately 140 cfs per section. With three sections down the flow is approximately 420 cfs; with four sections down the flow is approximately 560 cfs.

4.0 - OPERATION AND MAINTENANCE OF FISH PASSAGE FACILITIES

4.1 - UPSTREAM FISH PASSAGE – OPERATIONS & MAINTENANCE

The upstream fish lift and Unit 7-8 bypass channel facilities will be operated and maintained by Brookfield. To maximize attraction to the upstream passage facility, the unit closest to the fish lift entrance (Unit 1) is operated first-on and last-off, followed consecutively by Units 2 through 6. In the future, unit prioritization for upstream fish passage may be adjusted based on the results of fish passage studies, and in consultation with the resource agencies.

Brookfield personnel shall visit the fishway several times each day to ensure:

1. there is no debris clogging throughout the fish lift facility,
2. there is adequate velocity (1 to 1.5 ft/s) through the hopper,
3. adequate velocity (4-6 ft/s) at the fishway entrance,
4. and, a 6-9" head drop from inside the entrance to the tailwater. The head drop at entrance gate is automatically adjusted via a programmable logic controller (PLC) which tracks the tailrace elevation and associated operator interface terminal (OIT) touch screen.

Proper operation of all the fishway water systems and maintenance of appropriate water velocities will be calculated via staff gauges and/or transducers, flow curves and AWS flow control gate setting. Cleaning of the AWS will be determined based on visual inspection. Brookfield personnel will confirm that the velocities through the fish lift, the attraction flow distribution upstream and downstream of the hopper, and that the entrance flow conditions are set in accordance with agency instructions applicable at the time. All fish passage operational information will be recorded in daily fishway logs and then entered into an electronic data sheet that can be provided to the resource agencies on timely intervals as agreed upon.

Brookfield personnel shall also visit the Unit 7-8 fish bypass channel several times each day to ensure:

1. there is no debris clogging throughout the fish bypass channel,
2. adequate velocity (4-6 ft/s) at fishway entrance,
3. and, a 6-9" head drop from inside the entrance to the tailwater. The head drop at flap gate is automatically adjusted via a programmable logic controller (PLC) which tracks the tailrace elevation and associated operator interface terminal (OIT) touch screen.

Proper operation of all the fishway water systems and maintenance of appropriate water velocities will be calculated via staff gauges and/or transducers, flow curves and flap gate setting and recorded in the daily fishway logs and the electronic data sheet. Brookfield personnel will confirm that the velocity through the fishway and that the entrance flow conditions are set in accordance with agency instructions applicable at the time.

The fish lift and bypass channel shall be dewatered annually inspection and maintenance. Typically, August is a good time for this effort as river temperatures often exceed the threshold for handling salmon. Flow will be reduced and fish within the fishway will be safely removed

before stopping flow completely in order to prevent stranding. Routine annual maintenance shall include dewatering the fishway, removing accumulated debris from within the fishway as necessary (vacuum truck may be needed) and inspection of the integrity of the fishway. Any fishway components that are found to be damaged shall be replaced, in kind. All mechanical and electrical systems shall be inspected, serviced and maintained per manufacturer specifications.

OPERATIONAL PERIOD

- May 1 to October 31, seven days a week as river conditions allow. Daily hours of operation will be established in consultation with resource agencies based on run timing for the target fish species and numbers of fish present.

OPENING METHODS

At least two to three weeks prior to fish lift and fish bypass start-up if river conditions allow:

Fish Lift

1) Remove ice eaters from the lower flume of the fish lift
2) De-water fish lift lower flume, inspect and clear all debris from within the entrance channel as well as the AWS diffusion chamber
3) Inspect for any damaged components and repair as necessary
4) Remove safety chain from the hopper
5) Inspect and repair hopper mechanical components as necessary (cotter pins, turn buckles, cable, limit switches, etc.)
6) Grease entrance gate operators
7) Following the fish lift start up procedure (to be developed and included in this O&M Plan in the future), water up fish lift by opening attraction water valves and adjust entrance gate via the operator interface terminal (OIT) for approximately 6-9 inch differential from inside the fish lift entrance flume to the tailrace

Unit 7-8 Fish Bypass Channel

1) Remove ice eaters from the fish bypass channel
2) De-water fish bypass channel, inspect and clear all debris from within the channel
3) Inspect for any damaged components and repair as necessary (cotter pins, turn buckles, cable, limit switches, etc.)
4) Grease entrance gate operators
5) Water up bypass channel by opening the upstream and downstream isolation gates and adjust the flap gate via the operator interface terminal (OIT) for approximately 6-9 inch differential from inside the bypass channel entrance flume to the tailrace

SPARE PARTS

- 4 hopper wheels
- 4 hopper pulleys
- 2 drive bushings for entrance gate operator
- 2 drive bushing for attraction water valve operators
- 2 drive bushings for V-gate operator
- 1 (Operator interface terminal PLC touch screen OIT)
- 2 Hoist fuses
- 2 Limit switches
- Encoder for hoist if required
- Stop logs
    - Location and dimensions to be listed here
- Hopper hoist cable
    - Specifications and supplier (if a spare is not kept on site) to be listed here

WORKFORCE PLANNING

- <u>Staffing Requirements:</u>
    - Start Up - Crew of 2
    - Routine Operations – Crew of 2
    - Routine Maintenance – Crew of 2 for standard maintenance, crew of 3 for fishway entry for cleaning and fish removal
    - Shut Down – Crew of 2

- <u>Daily basis:</u>
    - The fish lift and fish bypass channel will be inspected for debris accumulation. Staff will remove debris from fish lift. If debris is not manageable by hand, operations crew will de-water fish lift lower flume as described below and remove debris. The resource agencies will be notified if debris management requires shutting down of the facility for more than 4 hours.
    - The attraction water gates will be adjusted to maintain a velocity of 1.0-1.5 fps through the hopper and 4-6 fps velocity at the entrance based on head pond and tailwater elevations and flow curves.
    - The fish lift entrance hinged flap gate will be adjusted for via the PLC/OIT resulting in a 6-9" head drop from inside the entrance to the tailwater as determined by water level gauges.
    - The fishway log sheets are completed consistent with Appendices A and C.

- The daily fishway log information will be entered into an electronic data sheet that can be provided to the resource agencies on timely intervals as agreed upon.

- Weekly basis:
  - Facility's lead fishway technician to distribute a weekly Fishway Operations Report consistent with Appendix C to the fishery resource agencies

- Cleaning process lower flume:
  - Set up fall arrest/fall retrieval device, inspect fall harness (per procedure)
  - Install access ladder
  - Dewater fish lift lower flume to 6 inch depth and inspect for stranded fish and safely remove fish as necessary
  - Complete dewatering of lower flume can take place only after all fish are safely removed
  - Remove debris as necessary

- Preventative Maintenance process:
  - Monthly :
    - Grease the entrance gate, attraction water gate and V-gate operator mechanisms
    - Inspect and repair hopper mechanical (cotter pins, turn buckles, cable, limit switches, etc.) as necessary
  - Yearly:
    - Inspect the fish lift hopper hoist
    - Inspect attraction water dewatering gate operators
    - Inspect fish lift hopper isolation screen hoist
    - Inspect the entrance gate, attraction water gate and V-gate operators
    - The fish lift and fish bypass channel shall be dewatered annually (dates and duration to be determined in consultation with the resource agencies, but generally in August) for inspection, cleaning, to make essential repairs, and to adjust the various mechanical and structural systems as needed.

WINTERIZING METHODS

- Close the attraction water gates and seal to minimize leakage
- Close isolation gates on fish bypass channel
- Remove all debris from fish lift and fish bypass channel
- Lift hopper and install safety chains

- Install 2 ice eaters in lower flume of fish lift and 2 in the fish bypass channel
- Close V-gates
- Open entrance gate
- De-energize all electrical equipment
- Drain water storage tank and leave all valves in the open position
- Drain water storage tank fill piping and pump
- Close upstream isolation gate and seal to minimize leakage

4.2 - DOWNSTREAM FISH PASSAGE – OPERATIONS & MAINTENANCE

OPERATIONAL PERIOD

The combined new and existing downstream measures are listed below.

- Forebay Guidance Boom: permanently installed and angled to forebay guidance sluice.
- Open forebay bypass gate/surface sluice: April 1 through December 31, as river conditions allow
- Open forebay Tainter gate to 6% station flow: 600 cfs during smolt migration period (two week period, starting when the river temperature reaches 10°C, typically in month of May).
- For a 6 week period between September 15th through November 15, continue to open the deep drain gate next to Unit 7 at least two and one half feet (approx. 425cfs) and shut down Units 7 and 8 for at least 8 hours per night starting one hour after sunset for eel passage.
- New downstream passage opportunity via spillway channel AWS system – May 1 – October 31

OPENING METHODS: for the new downstream passage associated with the fish lift spillway AWS system

1) Grease AWS isolation gate and attraction water flow control gate operator mechanisms
2) Open the upstream fishway (AWS) head gate 100% to pass 340 cfs of flow.
3) Adjust fish lift attraction flow gate to divert 115 to 225 cfs of the AWS flow.
4) Close attraction water flow control gate when fish lift is not in operation

SPARE PARTS

- 1 drive bushing for each gate operator

WORKFORCE PLANNING

- Staffing Requirements:
    - Start Up – Crew of 1
    - Routine Operations – Crew of 1
    - Routine Maintenance – Crew of 2 for standard maintenance, crew of 3 for fishway entry for cleaning
    - Shut Down – Crew of 1

- Daily basis:
    - Inspect the downstream fish passage entrances for debris and remove it. If debris can't be easily removed, operations crew will assist. Notify the resource agencies (see Section 8.0) if downstream fish passages can't be cleaned the same day.
    - Verify proper outflow of the downstream fish passages.
    - The fishway log sheets are completed consistent with Appendices A and C. Information within the daily inspection form will be entered into a database for ease of data sharing throughout and at the end of the season

- Weekly basis:
    - Facility's lead fishway technician to distribute a weekly Fishway Operations Report consistent with Appendix C to the fishery resource agencies
- Cleaning process:
    - De-water the downstream fish passage (AWS) and inspect fishway for stranded fish
    - Set up fall arrest/fall retrieval device, inspect fall harness (Brookfield procedure)
    - Prepare chainsaw for operation, inspect all chainsaw PPE
    - Inspect all rigging for hoisting debris

- Preventative Maintenance process:
    - Yearly:
        - Inspect the isolation gate and attraction water flow control gate operators
        - Inspect the wedge wire intake screen and spillway

DOWNSTREAM FISH PASSAGE DE-WATERING METHOD

- Close the AWS gate and de-energize
- Open attraction water flow control gate and de-energize

WINTERIZING METHODS

- Close AWS gate to drain water and de-energize
- Open attraction water flow control gate to drain water and de-energize

5.0 – FISH STRANDING PLAN

- If a stranding event occurs, contact the Senior Fisheries Lead or Seasonal Fish Technicians along with the local Compliance Specialist and Stakeholder Relations.
- To minimize the chance of fish stranding on the ledges below the spillway, coordinate with the National System Control Center (NSCC) to potentially lower inflatable rubber bladder No. 3 as applicable.
- If there is a stranding event on the ledges, access the ledges on the east shore via the access road to the spillway. There is a hand carry launch directly below the station and a public boat launch approximately four miles downstream of the dam, in Fairfield, below the three bridges.

5.1 - OBSERVATION POINTS

- The east shoreline access road located off the River Road, to the spillway overlook.

5.2 – AVAILABLE RESOURCES

- Nets and handle extensions located at the Lockwood Dam fishlift
- Salmon "vinyl" socks, five-gallon buckets and a trash can located at the Lockwood fishlift
- Canoe and paddles located inside Lockwood Dam powerhouse
- 14-foot motor boat located at Hydro Kennebec

6.0 - FISH MORTALITY DISPOSAL PLAN

- With prior approval of resources agencies, fish mortalities can be picked up by a local bait dealer (Wild Things Bait Shop) located in Oakland. Contact is Scott Horne at 207-313-9741. All mortalities shall be noted on the fish lift daily log sheets.

7.0 - SAFETY

7.1 - SAFETY RULES & PROCEDURES

- Pursuant to Brookfield's Safety Procedure SP9, Job Safety and Environmental Plans are completed prior to, and ideally, well in advance of any work at the various fish ways are started. Job Safety and Environmental Plans are to be completed using the

standard form which may be updated from time to time. Review of prior Job Safety and Environmental Plans for similar work is encouraged to help capture all safety risks that may be present at the site.

8.0 – NOTIFICATION AND CONTACT INFORMATION

NOTICE:

- Contact NMFS and MDMR within 24 hours of any interactions with Atlantic salmon, Atlantic sturgeon or shortnose sturgeon, including non-lethal and lethal take
- In the event of any lethal takes, any dead specimens or body parts must be photographed, measured, and preserved (refrigerate or freeze) until disposal procedures are discussed with NMFS[2]
- Notify resource agencies of any changes in Project and fishway operations (including maintenance activities)[3]
- The first Brookfield point of contact for all Fishway related issues is the local Operations Manager

BROOKFIELD CONTACTS

- Dave Watson, Operations Manager, Brookfield
  - (o) 207-474-3921 x 12
  - (c) 207-520-8870
  - David.watson@brookfieldrenewable.com
  -
- Joel Rancourt, Senior Operations Manager, Brookfield
  - (o) 207-474-3921 x 11
  - (c) 207-458-6775
  - joel.rancourt@brookfieldrenewable.com

- Kelly Maloney, Manager of Compliance, Brookfield
  - (o) 207-755-5606
  - (c) 207-233-1995
  - Kelly.maloney@brookfieldrenewable.com

[2] This would typically include date collected, species, measurements, photographs, etc.

[3] *This does not include typical operational changes such as generator load swings, putting generators online and offline, normal impoundment and flow fluctuations, and opening/closing gates to control spillage. The resource agencies should be notified for any fishway dewatering's or maintenance issues, problems meeting fishway operational dates, impoundment drawdowns for flashboard or other maintenance, or any other atypical project operations such as dewatering of tunnels, conduits, or penstocks*

- Jason Seyfried, Compliance Specialist, Brookfield
  - (o) 207-755-5615
  - (c) 207-312-8323
  - Jason.seyfried@brookfieldrenewable.com

- Adam Brown, Senior Fisheries Lead, Brookfield
  - (c) 207-343-1941
  - Adam.brown@brookfieldrenewable.com

AGENCY CONTACTS

- Matt Buyoff, Atlantic Salmon Recovery Coordinator, NMFS
  - (c) 207-866-4238
  - Matt.buhyoff@noaa.gov

- Don Dow, Hydro Engineer, NMFS
  - (o) 207-866-3758
  - (c) 207-416-7510
  - Donald.dow@noaa.gov

- Antonio Bentivoglio, Fishery Biologist, USFWS
  - (o) 207-781-8364 x18
  - (c) 207-974-6965
  - Antonio_bentivoglio@fws.gov

- Bryan Sojkowski, Fish Passage Engineer, USFWS
  - (o) 413-253-8645
  - Bryan_sojkowski@fws.gov

- Sean Ledwin, Director Sea Run Fisheries Division, MDMR
  - (o) 207-624-6348
  - Sean.m.ledwin@maine.gov

- Gail Wippelhauser, Marine Resources Scientist, MDMR
  - (o) 207-624-6349
  - Gail.wippelhauser@maine.gov

- Paul Christman, Marine Resources Scientist, MDMR
  - (c) 207-577-5780
  - (o) 624-6352

- paul.christman@maine.gov

- John Perry, Environmental Coordinator, MDIFW
  - (o) 207-287-5254
  - (c) 207-446-5145
  - John.perry@maine.gov

- Dwayne (Jason) Seiders, Fishery Biologist, MDIFW
  - (o) 207-287-5254
  - Dwayne.j.seiders@maine.gov

- Kathy Howatt, Hydropower Coordinator, MDEP
  - (o) 207-446-2642
  - Kathy.howatt@maine.gov

- Chris Sferra, Hydropower Specialist III, MDEP
  - (o) 207-446-1619
  - Christopher.sferra@maine.gov

9.0 - APPENDICES

Appendix A: DAILY INSPECTION FORM

Shawmut Daily Fishway Inspection Form

Date: _____ Time: _____ Inspector: _____

River Flow (cfs):		Unit 5 flow (cfs)	
Unit 1 flow (cfs)		Unit 6 flow (cfs)	
Unit 2 flow (cfs)		Unit 7 flow (cfs)	
Unit 3 flow (cfs)		Unit 8 flow (cfs)	
Unit 4 flow (cfs)			
Unit 5 flow (cfs)			

Tainter gate operation and flow (cfs) _____

Rubber Dam condition _____

Fish Lift

1	Lift operating mode	Automatic	___	Manual	_____
		Frequency	___	Min.	_____
2	Fish lift debris	_____			
3	Attraction water Screen	_____			
4	Hopper blocking screen	_____			
5	V-Trap screen	_____			
6	Entrance gate	_____			
	a	Setting	_____		
	b	Flume water elev.	_____		
	c	Tailwater elev.	_____		
	d	Head differential	_____		

Auxiliary water system

Headpond elev. (ft) _____

AWS flow control gate Setting (in) ___ Flow (cfs) ___

7 & 8 Fish Ladder

7	Unit 7 & 8 Fish ladder mode	Automatic	___	Manual	_____
8	Unit 7 & 8 Fish debris				
9	Flap gate				
	a	Setting	_____		
	b	Flume water elev.	_____		
	c	Tailwater elev.	_____		
	d	Head differential	_____		

Auxiliary water system

10 Forebay elev. (ft) _____

		Setting		Flow	
11	Tainter gate	(in)	_____	(cfs)	_____

Comments:

_____

_____

Downstream Fishway

12 Flow Adequate _____

13 Debris _____

Comments:

_____

_____

Please provide completed inspection forms to the Compliance Group every Monday morning

Appendix B: FISHWAY DRAWINGS

Appendix C: FISHWAY OPERATIONS WEEKLY REPORT

Shawmut Fishway Operation Weekly Report Form

Project Name _____

Fishway Facility _____

Date _____

Species	#'s Detected (Weekly)	Total For Season
Atlantic Salmon (MSW):		
Atlantic Salmon (1SW):		
River Herring:		
American Shad:		
Striped Bass:		
Sea Lamprey:		

Weekly Operational Status: _____

_____

_____

_____

_____

_____

Note:

Weekly Fishway Operations report to be provided to the resource agencies.

Appendix D: Fishway PLC Operations (placeholder)

Appendix E: Fishway Attraction Water Valve Curve (placeholder)

Appendix F: Handling Plan for Shortnose and Atlantic Sturgeon (placeholder)

Contains Privileged Information
- CUI//PRIV -

ATTACHMENT 8

MHPC LETTER OF CONCURRENCE FOR POST-CONTACT ARCHAEOLOGY STUDY (PRIVILEGED)

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