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

Subject: **Deficiency of License Application and Additional Information Request**
Saxon Falls (FERC Project No. 2610-012) and Superior Falls (FERC Project No. 2587-066) Hydroelectric Projects

Dear Secretary Bose:

On May 30, 2023, the Federal Energy Regulatory Commission (Commission) issued a Deficiency of License Application and Additional Information Request letter to Northern States Power Company - Wisconsin (NSPW) regarding its final license application for the Saxon Falls and Superior Falls hydroelectric projects (FERC No. 2610 and FERC No. 2587, respectively). Accordingly, NSPW hereby submits the following information and responses as requested in the Commission's aforementioned letter.

DEFICIENCIES

Exhibit A

Section 4.61(c)(1)(ii) of the Commission's regulations requires, in part, that an application include the type of hydraulic turbines. The application for the Saxon Falls Project states the powerhouse contains two horizontal-type units manufactured by the James A. Leffel Company but does not specify the type of turbines. Therefore, provide the type of turbines installed at the Saxon Falls Project powerhouse.

NSPW Response

Exhibit A, Section 5.1 has been revised to indicate the turbines are horizontal shaft, Francis-type turbines. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 4.61(c)(1)(v) of the Commission's regulations requires, in part, that an application include the average head on the plant. The application for the Saxon Falls Project does not include the average head. Therefore, provide the average head on the plant.

NSPW Response

Exhibit A, Section 5 has been revised to indicate the average head is 135 feet. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 4.61(c)(5) of the Commission's regulations requires, in part, that an application include the estimated average annual increase or decrease in project generation, and the estimated average annual increase or decrease of the value of project power due to a change in project operations. The application for the Saxon Falls Project states that Northern States Power Company, a Wisconsin Corporation (Northern States Power) is proposing to increase the 5 cubic feet per second (cfs) minimum flow currently released into the bypass reach to 10 cfs. Northern States Power estimates the change would require an additional 248 acre-feet of storage to be released from the upstream proposed Gile Flowage Storage Reservoir Project (Gile Flowage Project), which is currently undergoing licensing. Northern States Power is also recommending releasing flow from the Saxon Falls Project to enhance whitewater recreation in the Montreal River Canyon, which is downstream of the Saxon Falls Project. Northern States Power recommends the average annual decrease in project generation and value of lost power due to the proposed change in minimum flow and whitewater recreational flows be evaluated as part of the Gile Flowage Project licensing. However, we need to evaluate the benefits and costs of the protection, mitigation and enhancement (PME) measures proposed for the Saxon Falls Project. Therefore, provide the estimated average annual increase or decrease in project generation, and the estimated average annual increase or decrease of the value of project power due to changes in project operations for the Saxon Falls Project. Furthermore, if it is determined that the increase in flows released at the Saxon Falls Project affects the Superior Falls Project generation, the estimated average annual increase or decrease of the value of project power due to changes in project operations for the Saxon Falls Project would need to be provided for the Superior Falls Project.

NSPW Response

Exhibit A, Section 15 has been revised to include the average annual increase or decrease in project generation, and the value of that generation, due to the increased flow in the bypass reach from the proposed whitewater releases. The revised Exhibit A is enclosed in Appendix AIR-1.

ADDITIONAL INFORMATION

General

In a letter filed on February 23, 2023, the Michigan Department of Natural Resources (Michigan DNR) provided comments on the license applications for the Saxon Falls and Superior Falls

Projects, which included item 4, emergency operations and preparedness. With respect to Michigan DNR's letter, please describe: (1) the improvements to cell communications made in response to the 2016 rainfall event that are currently in place and those improvements that are proposed and (2) which rating curves were updated and whether the updates were submitted to the Commission.

NSPW Response

Exhibit A, Section 10 has been revised for each Project to include a summary of the improvements made to cell phone communications in response to the 2016 rainfall event as well as a list of the updated rating curves. The Revised Exhibit A is enclosed in Appendix AIR-1.

Exhibit A

Saxon Falls Project

Section 2.1.1, Right Spillway Abutment, page A-SXN-1, states that the purpose of the right spillway abutment is to direct flow on the right side of the spillway toward the river channel downstream. Although this section provides the characteristics of the abutment, the top elevation is not included. Therefore, please provide the top elevation of the right spillway abutment.

NSPW Response

Exhibit A, Section 2.1.1 has been revised to include the top elevation of the right spillway abutment (1004.05 feet NGVD). The Revised Exhibit A is enclosed in Appendix AIR-1.

Section 2.2, Non-Overflow Concrete Gravity Dam, page A-SXN-2, states that a low-flow orifice outlet located on the downstream face, between the dam and powerhouse, is used to provide minimum flows to the river channel. However, the characteristics of the low-flow orifice are not provided. Please describe the dimensions and sill elevation of the low-flow orifice, and the mechanism that is used to control flow to the low-flow orifice outlet.

NSPW Response

Exhibit A, Section 2.2 has been revised to include information regarding the low-flow orifice outlet. The Revised Exhibit A is enclosed in Appendix AIR-1.

Section 2.3, Intake Structure, page A-SXN-2, provides the overall dimensions of the trash racks and clear bar spacing. For each trash rack, please provide the angle of inclination, bar thickness, spacer characteristics, frame thickness and effective opening area.

NSPW Response
Exhibit A, Section 2.3 has been revised to include additional trash rack details necessary to calculate their effective opening. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 5.2, Generators, page A-SXN-3, states the output of the generators is 2,300 volts. However, section 7, Transmission Equipment, includes a 2.4-kilovolt (kV) transmission line and a 2.4 / 34.5-kV step-up transformer. The Operations One Line Diagram shows the generators connected to a 2.4-kV bus. Please clarify the generator output and project transmission line voltage.

NSPW Response
Exhibit A, Section 5.1 has been revised to indicate the generators are operating at a nominal voltage of 2,400. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 7, Transmission Equipment, page A-SXN-4, states the project transmission line connects to a non-project distribution substation. Please identify the entity receiving project generation.

NSPW Response
Exhibit A, Section 7 has been revised to indicate NSPW is the entity receiving the project generation. The revised Exhibit A is enclosed in Appendix AIR-1.

The concluding sentence of section 7, Transmission Equipment, page A-SXN-4, includes footnote 9, but there is no footnote 9 in the Exhibit A for the Saxon Falls Project. Please revise Exhibit A to include footnote 9.

NSPW Response
Exhibit A, Section 7 has been revised to reflect the removal of footnote 9. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 9, Project Operation, page A-SXN-4, refers to the maintenance of minimum reservoir elevation during icing conditions. Please describe any additional modifications made to project operation during icing conditions and to prevent gates and trash rack from icing over to retain their functionality.

NSPW Response
Exhibit A, Section 9 has been revised to describe additional modifications to project operation during icing conditions and to prevent gates from icing over to retain their functionality. There

are no problems with icing of the trash racks. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 9, Project Operation, page A-SXN-4, does not describe trash rack operation. Please describe how the trash rack is cleaned; the frequency the trash rack is cleaned; and how the material cleaned from the trash rack is disposed, including large woody debris.

NSPW Response

Exhibit A, Section 9 has been revised to describe how the trash rack is cleaned; the frequency the trash rack is cleaned; and how the material cleaned from the trash rack is disposed, including large woody debris. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 9, Project Operation, page A-SXN-4, refers to project operation with respect to high and low water conditions. Please describe what constitutes high and low water conditions, how these conditions are monitored and the frequency of monitoring.

NSPW Response

Exhibit A, Section 9 has been revised to describe what constitutes high and low water conditions, how those conditions are monitored and the frequency of monitoring. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 12, River Flow Characteristics, page A-SXN-5, states streamflow information from the United States Geological Survey (USGS) Gaging Station No. 04029990 were used to develop flow duration curves for the Montreal River for the period of January 1986 to December 2021. However, the USGS Internet site states that the monitoring began October 1986 and was discontinued October 2017. Please provide the source of the data used to develop the flow duration curves for the Montreal River for the period of January 1986 to October 1986 and for the period of October 2017 to December 2021.

NSPW Response

There is no available flow data prior to October 1, 1986. The flow duration curves used the period from October 1, 1986 to December 31, 2021. USGS data was used from October 1, 1986 to September 30, 2015. Data from October 1, 2015 to December 31, 2021 was provided by NSPW and based upon the project's operating records.

Section 12, River Flow Characteristics, page A-SXN-5, states the average annual calendar year flow at the project was 3 cubic feet per second (cfs). However, average daily data currently available from the USGS Internet site for the period of October 1, 1986 to September 29, 2017,

yields an average daily flow of 311 cfs, which is substantially greater than the 3 cfs presented in the application. The smallest average daily flow recorded from the USGS Internet site for the period of October 1, 1986 to September 29, 2017 was 17 cfs, which was recorded on September 11, 1998. Please explain how the average annual calendar year flow at the project was estimated to be 3 cfs.

NSPW Response

Exhibit A, Section 12 has been corrected to reflect the average annual calendar year flow of 313 cfs. The revised Exhibit A is enclosed in Appendix AIR-1.

Exhibit A

Superior Falls Project

Section 2.1, Intake Structure, page A-SPR-1, provides the overall dimensions of the trash racks and clear bar spacing of the vertical bars. For each trash rack, please provide the clear bar opening, angle of inclination, bar thickness, spacer characteristics, frame thickness and effective opening area.

NSPW Response

Exhibit A, Section 2.1 has been revised to include additional trash rack details necessary to calculate their effective opening. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 2.2.1, Right Gate Section, A-SPR-1, states the elevation of the gate crest elevation is 722.2 feet. However, Exhibit F, drawing 3, Right Tainter Gate Section, shows the sill at an elevation of 722.2 feet. Please revise Exhibit A to indicate that the gate sill is at an elevation of 722.2 feet National Geodetic Vertical Datum of 1929 (NGVD29) and gate crest is at elevation 740.2 feet NGVD29.

NSPW Response

Exhibit A, Section 2.2.1 has been revised to indicate the gate sill and crest elevations are 722.2 and 740.2 feet NGVD, respectively. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 2.2.2, Middle Overflow Section, page A-SPR-2, states that this section contains two trash gates. However, the characteristics of these trash gates are not provided. Please describe the dimensions and sill elevation for both trash gates.

NSPW Response

Exhibit A, Section 2.2.2 has been revised to include the sill elevations and dimensions of both trash gates. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 2.2.3, Left Gate Section, A-SPR-2, states the elevation of the gate crest elevation is 726.2 feet. However, Exhibit F, drawing 3, Left Tainter Gate Section, shows the sill at an elevation of 726.2 feet. Please revise Exhibit A to indicate that the gate sill is at elevation of 726.2 feet NGVD29 and gate crest is at elevation 741.2 feet NGVD29.

NSPW Response

Exhibit A, Section 2.2.3 has been revised to indicate the gate sill and gate crest elevations are 726.2 and 741.2 feet NGVD, respectively. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 2.3, Right Earthen Embankment, page A-SPR-2, provides the length and height of the embankment but does not include the top elevation. Therefore, please provide the top elevation of the right earthen embankment.

NSPW Response

Exhibit A, Section 2.3 has been revised to include the top elevation of the right earthen embankment. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 5, Description of Powerhouse, page A-SXN-3, states that the powerhouse for the Saxon Falls Project is located in Michigan. However, section 5, Description of Powerhouse, page A-SPR-3, does not identify which state the powerhouse for the Superior Falls Project is located. Therefore, please identify the state in which the Superior Falls powerhouse is located.

NSPW Response

Exhibit A, Section 5 has been revised to indicate the Superior Falls powerhouse is located in the State of Michigan. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 7, Transmission Equipment, page A-SPR-4, states the project transmission line connects to a non-project distribution substation, which serves as the point of interconnection. Please identify the entity receiving project generation.

NSPW Response

Exhibit A, Section 7 has been revised to indicate NSPW is the entity receiving the project generation. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 9, Project Operation, page A-SPR-4, does not describe cold-weather operation. Please describe any modifications made to project operation during icing conditions and to prevent gates and trash rack from icing over to retain their functionality.

NSPW Response

Exhibit A, Section 9 has been revised to describe additional modifications to project operation during icing conditions and to prevent gates from icing over to retain their functionality. There are no problems with icing of the trash racks. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 9, Project Operation, page A-SPR-4, does not describe trash rack operation. Please describe how the trash rack is cleaned; the frequency the trash rack is cleaned; and how the material cleaned from the trash rack is disposed, including large woody debris.

NSPW Response

Exhibit A, Section 9 has been revised to describe how the trash rack is cleaned; the frequency the trash rack is cleaned; and how the material cleaned from the trash rack is disposed, including large woody debris. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 9, Project Operation, page A-SPR-4, refers to project operation with respect to high and low water conditions. Please describe what constitutes high and low water conditions, how these conditions are monitored and the frequency of monitoring.

NSPW Response

Exhibit A, Section 9 has been revised to describe what constitutes high and low water conditions, how those conditions are monitored and the frequency of monitoring. The revised Exhibit A is enclosed in Appendix AIR-1.

Section 12, River Flow Characteristics, page A-SPR-5, states streamflow information from the USGS Gaging Station No. 04029990 were used to develop flow duration curves for the Montreal River for the period of January 1986 to December 2021. However, the USGS Internet site states that the monitoring began October 1986 and was discontinued October 2017. Please provide the source of the data used to develop the flow duration curves for the Montreal River for the period of January 1986 to October 1986 and for the period of October 2017 to December 2021.

NSPW Response

There is no available flow data prior to October 1, 1986. The flow duration curves used the period from October 1, 1986 to December 31, 2021. USGS data was used from October 1, 1986 to September 30, 2015. Data from October 1, 2015 to December 31, 2021 was provided by NSPW and based upon the project's operating records.

Section 12, River Flow Characteristics, page A-SPR-5, states the monthly flow duration curves are included as Appendix A-8. However, the Superior Falls Project flow duration curves are provided in Appendix A-7. Please revise Exhibit A to include the correct reference to the Superior Falls Project flow duration curves.

NSPW Response

Exhibit A, Section 12 has been corrected to reference Appendix A-7. The revised Exhibit A is enclosed in Appendix AIR-1.

Exhibit E

Aquatic Resources

Section 2, Project Description, pages E-2 and E-3, discusses the minimum flows required to be released into the bypassed stream reaches of both projects, but does not identify how long the bypassed reach is for each project. Please provide the length of each project bypassed reach.

NSPW Response

The bypassed reach for the Saxon Falls Project is approximately 0.3 miles long and the bypassed reach for the Superior Falls Project is approximately 0.1 miles long.

Section 5.9, Operational Deviations, page E-46, states that Northern States Power will apply for a water quality certificate for the "project" from the Wisconsin Department of Natural Resources. The Exhibit E discusses both projects and thus it is unclear from this statement if the "project" referred to is the Saxon Falls Project or the Superior Falls Project. Furthermore, in the Initial Statement filed for both projects in the December 30, 2022 filing of the license application, on pages IS-SXN-1 (for the Saxon Falls Project) and IS-SPR-1 (for the Superior Falls Project) it states that Northern States Power will apply for a water quality certificate for each project from the Michigan Department of Environment, Great Lakes, and Energy. Please confirm which state resource agency will be requested to issue a water quality certificate for each project.

NSPW Response

NSPW will request a water quality certificate from the Michigan Department of Environment, Great Lakes, and Energy for both projects.

Section 6.1.5, Benthic Community, pages E-57 and E-58, describes the results of data collected for the benthic communities located at each project. In 1988 qualitative sampling was conducted at the Saxon Falls Project and in 2010 standardized macroinvertebrate surveys were conducted for the Superior Falls Project. Based on the review of the data, Northern States Power concluded that the benthic communities at both projects had relatively abundant populations

and were in excellent condition. If readily available, please provide any new data, current factors, or existing conditions that support Northern States Power's conclusions that the benthic communities at the two projects are in good condition today and whether the proposed operation of both projects would affect the existing benthic communities at each project.

NSPW Response

There is no additional data regarding benthic communities at either Project.

SAXON FALLS – At Saxon Falls, as noted in the Exhibit E from the previous licensing proceeding, the assemblage of macroinvertebrates collected were indicative of a clean water, well-oxygenated environment. In addition to the taxa collected during the macroinvertebrate sampling, surveyors commonly observed Bryozoa within the Saxon Falls Reservoir. Bryozoa are characteristically found in unpolluted, unsilted waters. While the bypass reach held few macroinvertebrates, this area is severely limited by poor habitat, specifically the high gradient, bedrock substrate, and general lack of habitat diversity.

The presence of macroinvertebrates is used to assist with determinations on water quality. The presence of diverse macroinvertebrate communities both within the reservoir and downstream of the Saxon Falls Project indicated healthy water quality conditions No changes to the operations of the project have occurred since the last relicensing that would adversely impact macroinvertebrate communities.

Under the proposed operation, the minimum flow released in the bypass reach would increase from 5 cfs to 10 cfs, which is likely to benefit the limited macroinvertebrate community downstream of the dam. The proposed operation is not expected to result in any adverse changes to the macroinvertebrate communities within the reservoir or downstream of the Project.

SUPERIOR FALLS – Macroinvertebrate sampling at the Superior Falls Project was conducted in 2010 by the WDNR as part of their assessment of the water quality within the Montreal River. According to the Wisconsin Consolidated Assessment and Listing Methodology (WisCALM), WDNR uses biological indices, including the macroinvertebrate index of biological integrity (MIBI), to determine whether current water quality conditions support the "Aquatic Life" designated use. WisCALM guidelines indicate that all waters scoring in the excellent, good, or fair categories are considered to be supportive of the "Aquatic Life" use. The condition category MIBI thresholds for wadable streams are as follows: >7.5 Excellent; 5.0-7.4 Good; 2.5-4.9 Fair; and <2.5 Poor. Using this standard, the waters below the Superior Falls powerhouse fall within the excellent range and thus meet the "Aquatic Life" use. No operational changes have occurred

since the last macroinvertebrate sampling took place that would adversely affect macroinvertebrate populations or the Aquatic Life use. Likewise, the proposed operation is not expected to adversely affect the macroinvertebrate populations or the "Aquatic Life" use within the Project.

Terrestrial Resources (for Saxon Falls and Superior Falls)

Section 9.5, Buffer Zone, references timber management activities that may occur in the project area. Please provide a description of these activities including: (1) harvesting schedule, (2) stand age and species composition, (3) location of harvests relative to the project and the proposed project boundary, and (4) spatial extent of any harvest.

NSPW Response

To protect the aesthetics at both projects, no timber harvests are planned within the buffer zones. However, NSPW may need to remove hazardous trees near Project facilities or recreation sites for public safety during the term of each license. Any tree removal activities will follow the guidelines set forth in the WDNR's Forest Management Guidelines, Chapter 4 Visual Quality and Chapter 5 Riparian Areas and Wetlands. All tree removal activities will also follow the current USFWS Northern-long Eared Bat guidelines and the WDNR Broad Incidental Take Permit/Authorization for Wisconsin Cave Bats.

Section 8.7.2.3, Tailwater Access, states routine maintenance is conducted at the project, including mowing and trail maintenance. However, no additional information regarding these activities is provided. Please provide a description of maintenance actions that may affect vegetation at the project, including the location, seasonal timing, frequency, and spatial extent of these actions.

NSPW Response

Routine recreation site maintenance includes, but is not limited to, the following:

- lawn maintenance,
- vegetation management along trails,
- vegetation management to maintain scenic overlooks,
- fence maintenance,
- sign maintenance,
- maintenance of portable toilets (where present), and
- maintenance grading of existing gravel parking areas.

Maintenance grading is not considered a ground disturbing activity unless a parking area is expanded or a new parking area is developed.

In order to provide information regarding FERC's comment on Section 8.7.2.3, NSPW is providing a summary of routine maintenance activities at each project than may affect vegetation.

SUPERIOR FALLS TAILWATER ACCESS – At the Superior Falls Tailwater Access site, NSPW mows or trims vegetation along the bank fishing areas adjacent to the powerhouse 2-3 times per year. The maintained area is approximately 0.1 acre in size and extends both upstream and downstream of the powerhouse. Other routine maintenance activities include repairing existing fencing, disposal of trash and litter, and sign repair or replacement. Tree removal is limited to that which is necessary to maintain trail or facility access and hazardous trees that present a threat to public safety or project facilities. The parking area, which is shared with the Superior Falls Scenic Overlook site, is graded annually or more often as deemed necessary by the operator.

SUPERIOR FALLS SCENIC OVERLOOK – At the Superior Falls Scenic Overlook site, NSPW conducts routine maintenance of the portable toilet facilities, safety fencing and signage, and the trail extending from the parking area to the scenic overlook. Tree removal is limited to that which is necessary to maintain trail or facility access and hazardous trees that present a threat to public safety or project facilities.

PROPOSED SUPERIOR FALLS CANOE TAKEOUT – At the proposed Superior Falls Canoe Take-Out, NSPW will maintain an area approximately 0.25 acres in size to include a gravel parking area with capacity for 6 vehicles, signage, and a mowed path to the water. The site contains a naturally sloped ramp to the water and will not require any excavation along the bank or placement of any in-water structures. Gravel areas will be graded annually or more often as needed. Lawn areas will be mowed 2-3 times per year. The area where the site is to be established is currently mowed.

EXISTING SUPERIOR FALLS CANOE TAKEOUT – The user developed trail at the existing Superior Falls Canoe Take-Out is trimmed 1-2 times per year. Parking is within the right-of way of Highway 122 and is not maintained by NSPW. When the new take-out site is established, the existing take-out sign will be removed and the area will no longer be maintained.

SUPERIOR FALLS DAM SITE – While not a public recreation site, there is an area approximately 0.5 acre in size near the dam that is regularly maintained as either lawn or gravel parking. These areas are adjacent to the dam and are used by NSPW operations and maintenance staff and are not open to the public. Lawn areas are mowed several times per year and gravel areas are graded as needed. Tree removal is limited to hazardous trees that present

a threat to NSPW personnel or project facilities and that which is necessary to maintain facility access.

SUPERIOR FALLS PENSTOCK & TRANSMISSION LINE – Vegetation maintenance is conducted once every few years at the approximately 0.3-acre area between the surge tank and substation extending down the bank to the powerhouse to prevent encroaching on the penstock, stairway leading to the powerhouse, and the transmission line leading from the substation to the powerhouse.

SAXON FALLS DAM SITE & BOAT LANDING – This area includes the Saxon Falls boat launch, earthen embankment, maintained lawn areas near the dam and the trail leading to the conduit where it crosses the bypass reach. This area is approximately one acre in size including both the gravel and lawn areas. The lawn areas are mowed several times per year and the parking areas are maintained annually, or more often, as deemed necessary by the operator. Tree removal is limited to that which is necessary to maintain trail or facility access and hazardous trees that present a threat to public safety or project facilities.

SAXON FALLS TAILWATER SCENIC OVERLOOK – This 0.25-acre area is a combination of grass and gravel parking areas including the trail leading to the scenic overlook. The grass parking area and trail are mowed or trimmed 2-3 times per year. The gravel parking area is graded annually or more often as deemed necessary by the operator. Other vegetation management activities include maintenance of the scenic overlook and removal of encroaching vegetation along the stairway leading to the tailwater area. Tree removal is limited to that which is necessary to maintain trail or facility access and hazardous trees that present a threat to public safety or project facilities.

SAXON FALLS CONDUIT AND PENSTOCKS – The conduit runs above ground from the dam to the surge tank where it bifurcates into two penstocks running down the slope to the powerhouse. This approximate 0.9-acre corridor is maintained periodically (once every few years) to remove encroaching woody vegetation along the conduit and penstocks.

SAXON FALLS TRANSMISSION LINE – At Saxon Falls, a transmission line runs from the powerhouse to the substation. This approximate 0.8 -acre corridor is periodically maintained (once every few years) by removing woody vegetation encroaching on the corridor.

Section 6.3.2, Proposed Terrestrial Mitigation, states it is possible future maintenance or construction activities could result in temporary ground disturbance. Please provide a description of any foreseeable construction at the project.

NSPW Response

Other than the establishment of a new Superior Falls Canoe Take-Out site, only routine recreation site maintenance is being proposed in this application. Routine recreation site maintenance includes, but is not limited to, the following:

- lawn maintenance,
- vegetation management along trails,
- vegetation management to maintain scenic overlooks,
- fence maintenance,
- sign maintenance,
- maintenance of portable toilets (where present), and
- maintenance grading of existing gravel parking areas.

The above-mentioned activities are not considered "ground disturbing activities" since they involve maintenance of existing facilities within their original footprint. Appropriate erosion and sediment control BMPs will be implemented during the establishment of the new Superior Falls Canoe Take-Out site. An aerial photograph of the proposed site's location and a photograph of the existing conditions are shown in Figures 2.2.3.1-2 and 2.2.3.1-3 of Volume 4 of the FLA, respectively.

Threatened and Endangered Species

Section 6.1.11, Threatened and Endangered Resources, states the federally threatened Canada lynx may occur in the project areas. If the information is readily available, please provide: (1) any records or recent observations of the Canada lynx near the projects, and (2) recent observations and the general abundance of the snowshoe hare near the projects.

NSPW Response

According to the WDNR's ER NHI reviews included in Appendix E-39 of the FLA and the Michigan Rare Species Reviews found in Appendix E-40 of the FLA, neither state identified the presence of Canada Lynx within the vicinity of either Project. While the Michigan rare species review did not identify the species within a 1.5-mile buffer of the Projects, it did indicate that there is suitable habitat for the species in the Project vicinity.

According to the UW Stevens Point Vertebrate Collection website (https://www3.uwsp.edu/biology/VertebrateCollection/Pages/Vertebrates/Mammals%20of%20Wisconsin/Lynx%20canadensis/Lynx%20canadensis.aspx), a breeding population of Canada Lynx has not been discovered in Wisconsin and it is believed that most occurrences are drifters coming from Michigan or Minnesota. Wisconsin removed the species from the state's

endangered species list due to the lack of a breeding population.

While there are snowshoe hares in the vicinity of the Projects, the population of the species is unknown. They prefer high density stands with lots of vegetation cover, particularly conifers, for predator protection. A 2014 study by Michigan State University (https://www.canr.msu.edu/news/msu_researchers_find_michigans_snowshoe_hare_population_dropping_off) concluded that Michigan's snowshoe hare population was declining. Snowshoe hares have disappeared from 50% of sites studied in the lower peninsula, and 27% of the sites in the Upper Peninsula. The study linked the population decline to warmer summers, winters without snow, and changes in forest management.

Section 6.1.11, Threatened and Endangered Resources, states the monarch butterfly, a candidate species for listing under the Endangered Species Act, may occur in the project area. If the information is readily available, please provide: (1) any records or observations of this species near the projects; (2) confirmation of milkweed or nectar-producing flowers at the projects; and (3) a description of maintenance actions that may affect monarch butterfly forage or habitat at the project.

NSPW Response

There is no specific survey information regarding the presence of Monarch butterflies in the vicinity of either Project. However, the species is known to occur within Iron County. It is assumed that the species is likely present within the vicinity of both Projects.

SAXON FALLS – Suitable habitat for the Monarch, that has the potential to be affected by vegetation management activities, includes the approximate 0.9-acre corridor for the conduit and penstock and the approximate 0.8-acre transmission line corridor leading from the powerhouse to the substation. These areas are periodically maintained (once every few years) to prevent encroaching woody vegetation. The remaining vegetation management activities conducted at the project are located at regularly maintained sites that do not provide suitable habitat for the species. While it is possible for Monarch habitat to be present in other areas within the Project, no vegetation management occurs at these sites.

Until a determination is made regarding the listing of the Monarch, and USFWS issues guidance regarding the species, NSPW is proposing to conduct vegetation management within the conduit/penstock corridor and transmission line corridor between October 1 and April 30, when the monarch butterfly is typically not present within the Project vicinity. By implementing this interim measure until guidance is issued, the proposed operation of the Project is not expected to result in the take of adults, larva, or caterpillars. The periodic maintenance of these sites will

also help to maintain open areas that may be suitable for milkweed and nectar species used by the species.

SUPERIOR FALLS –Suitable habitat for the species, that has the potential to be impacted by project operations, includes the approximate 0.3-acre area between the surge tank and substation and extending down the bank to the powerhouse. This area includes the penstock leading from the surge tank to the powerhouse and the transmission line leading from the substation to the powerhouse. These areas are periodically maintained (once every few years) to remove encroaching woody vegetation. The remaining vegetation management activities conducted at the project are at regularly maintained sites that do not provide suitable habitat for the species. While it is possible for Monarch habitat to be present in other areas within the Project, no vegetation management occurs at these sites.

Until a determination is made regarding the listing of the Monarch, and USFWS issues guidance regarding the species, NSPW is proposing to conduct vegetation management within the conduit/penstock corridor and transmission line corridor between October 1 and April 30, when the monarch butterfly is typically not present within the Project vicinity. By implementing this interim measure until guidance is issued, the proposed operation of the Project is not expected to result in the take of adults, larva, or caterpillars. The periodic maintenance of these sites will also help to maintain open areas that may be suitable for milkweed and nectar species used by the species.

Recreation Resources

Section 8.0, Recreation Resources and table 8.1.2-1, Recreation Sites within the Superior Falls Project Boundary of the application, state that the Superior Falls project canoe take-out is a FERC-approved recreation site that is within the project boundary; however, this recreation site is shown outside of the project boundary on the Exhibit G for the project. Please clarify if the recreation site is within, outside, or straddling the project boundary and, if needed, file a corrected Exhibit G drawing.

NSPW Response

As outlined in Exhibit E, Section 8.7.2.1, NSPW is proposing to remove the signage from the existing take-out along State Hwy 122 and create an alternate take-out upstream of the dam on the east shoreline (See Figure 8.3.2.2-1 for the locations of the existing and proposed take-out sites). Since the existing take-out is within the road right-of-way, and the only amenities associated with the recreation site the sign itself, the user-developed path, and the edge of the road where parking occurs, the site does not require any maintenance activities other than retaining the sign.

The removal of the take-out sign will result in the abandonment of the existing State Hwy 122recreation site. Therefore, the existing take-out location along State Hwy 122 will no longer be a FERC-approved recreation site and will no longer need to remain within the proposed project boundary as shown in Figure 8.3.2.2-1. The Exhibit G drawing shows both the existing take-out and the proposed take-out. Since the existing take-out will be abandoned, it is not shown within the project boundary; however, the proposed take-out is shown within the project boundary. NSPW does not believe the existing Exhibit G is incorrect as submitted. However, it can provide an updated version if required by the Commission.

Cultural Resources

Section 7.0, Cultural Resources, of the application states that there was one previously identified archaeological site within the Saxon Falls project boundary and four archaeological sites within the Superior Falls project boundary; however, it does not state if these sites are eligible for the National Register of Historic Places (National Register). Please indicate if any of these sites are eligible for the National Register.

NSPW Response

The records for sites 47IR46, 47IR47, and 47IR48 (Superior Falls) indicate no additional work has been recommended to determine their eligibility for the NRHP. Therefore, they are not eligible for the NRHP. The record for site 20GB51 (Saxon Falls) indicates the area has been surveyed in the past; however, no evidence of an archaeological site was found. Therefore, it is not eligible for the NRHP. Site 20GB3 (Superior Falls) is a rather large area with its southern portion (as mapped) located within the Superior Falls project boundary. Two previous surveys encompassed the area of the mapped site coincident within the Project boundary. Neither of the two surveys were able to re-locate any archaeological site. Therefore, the site is not eligible for the NRHP. This information was provided in Appendix E-16 of the Final License Application.

Project Boundary

Section 9.0, Project Boundary, of the application states that the proposed project boundary for the Saxon Falls project encompasses approximately 145.8 acres; however, the total acreage provided for project lands (73.5 acres) and inundated land (70.5 acres) is only 144 acres. Similarly, for the Superior Falls Project, the application states that the proposed project boundary includes 29.8 acres of inundated lands; however, the total acreage provided for the reservoir upstream of the dam (16.3 acres), bypassed reach (2.7 acres) and tailwater area (0.3 acres) is 19.3 acres. Please address the discrepancy of 1.8 acres for the Saxon Falls Project boundary and of 10.5 acres of inundated lands for the Superior Falls Project.

NSPW Response

Regarding Saxon Falls, the acreages were transposed for the Project lands. The acreage was incorrectly stated as 73.5 acres. It should have been stated as 75.3 acres (Project lands) + 70.5 acres (inundated lands) = 145.8 acres (Project boundary). The revised Appendix E-51 is attached as Appendix AIR-2.

Regarding Superior Falls, NSPW believes the Commission is referring to the current Project boundary acreage, not the proposed Project boundary acreage as indicated in the AIR. Upon review of the GIS data and map provided in Appendix E-52, the calculated acreages for the current Project boundary are correctly displayed on the map. However, the text in Section 9.3.2 excludes that portion of the Montreal River within the current Project boundary that is upstream of the Superior Falls Dam, which accounts for 10.5 acres. When the 10.5 acres is included as shown in Appendix E-52, there is no acreage discrepancy.

Inundated area = 29.8 acres
Montreal River upstream of Dam = 10.5 acres
Reservoir upstream of Dam = 16.3 acres
Bypass Reach = 2.7 acres
Tailwater = 0.3 acres

CZMA

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the Coastal Zone Management agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification. Section 3.4.5 of the application shows that Northern States Power requested a determination of consistency from the Wisconsin Coastal Resources Management Program (Wisconsin CMP) on April 15, 2022 and December 20, 2022, and did not receive a response. Additionally, the application states that Northern States Power received a consistency letter from the Michigan Coastal Resources Management Program (Michigan CMP) dated June 15, 2022 indicating that the Superior Falls Project is located within Michigan's coastal zone, but that no adverse impacts to coastal resources would be anticipated provided that Northern States Power acquires and complies with all required permits. To determine the effects of the project on the designated coastal zone, please provide the following, as applicable:

a. Any additional correspondence with or from Wisconsin CMP received by June 18,

2023, 180 days of its receipt of Northern States Power's request for a consistency certification.

b. Any correspondence with Michigan CMP discussing permits required for consistency certification, as indicated in their June 15, 2022 letter. Additionally, provide proof of compliance with and the receipt of any permits required for consistency certification or correspondence from Michigan CMP stating no additional permits are required.

NSPW Response

NSPW has had no additional correspondence with or from the Wisconsin CMP since December 20, 2022 for either project. NSPW has not had any additional correspondence with Michigan CMP discussing permits since their June 15, 2022 letter, nor has NSPW received or applied for any permits required for consistency certification or correspondence from Michigan CMP stating no additional permits are required.

Exhibit F

Saxon Falls Project

The linework on Drawing 2, Principal Project Works Plan, Elevation and Sections, is pixelated and lacks the detail needed to provide a clear depiction of the principal project works. The contour intervals in Plan are illegible. Please revise the pixelated linework and text on Drawing 2 to be legible and to provide a clear depiction of the principal project works.

NSPW Response

The pixelated line work on the Saxon Falls Exhibit F, Drawing 2, Principal Project Works Plan has been rectified. The revised Exhibit F drawings are included in Appendix AIR-3.

Superior Falls Project

Drawing 1, Site Plan, labels the penstocks with a length of 107 feet. However, Exhibit A, section 4.3, Penstocks, page A-SPR-3, state each penstock is 207 feet long from the surge tank to the concrete thrust block located adjacent to the upstream wall of the powerhouse. Please revise the application to provide a consistent length of penstock.

NSPW Response

The Exhibit F drawings have been revised to reflect the correct penstock length of 207 feet and are included in Appendix AIR-3.

Drawing 1, Site Plan, show the labeled dimensions for the 84-inch-conduit, surge tank diameter, and penstock that are not consistent when measured using the scale bar provided on the

drawing. Please revise the site plan so the labeled dimensions are consistent with the scale bar provided on the drawing.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 2, Plan View of Dam, does not include dimensions to facilitate understanding of the dam components because no detail or section of the intake structure is provided. Therefore, please include the conduit on the drawing, and provide length and width dimensions for the: (1) intake opening; and (2) trash rack. To facilitate understanding of the intake structure, please also provide a section that shows the relationship between the trash racks, concrete structure, conduit, and any gates.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 2, Plan View of Dam, does not provide labels for all relevant features. Please label the: (1) trash rack; (2) intake structure; (3) conduit (after it is added to the drawing); (4) right earthen embankment; (5) storm drain piping; (6) electrical line (specifying whether is above ground or underground; and (7) operator's bridge.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 2, Plan View of Dam, shows the earthen embankment on the right bank to have a length of about 80 feet. However, Exhibit A, section 2.3, Right Earthen Embankment, page A-SPR-2, states that the right earthen embankment is 213 feet long. Please revise the application to provide a consistent length of the right earthen embankment. This revision may require presenting the entire extent of the embankment on Drawing 2, Plan View of Dam.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 2, Plan View of Dam, shows the width of the operator's bridge of about 10 feet. However, Drawing 3, section A, Middle Overflow Section, shows the width of the operator's bridge of about 5 feet. Please revise Exhibit F to provide a consistent width for the operator's bridge.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 2, Elevation (Looking Downstream), does not include dimensions to facilitate understanding of the dam components. Please provide height and width dimensions for: (1) the bay openings, (2) the 5 gates, and (3) trash rack.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 2, Elevation (Looking Downstream), shows the right non-overflow section. The portion to the right of the intake section shows the section to have crest elevation of 740.2 feet Nation Geodetic Vertical Datum of 1929 (NGVD29), which is the normal reservoir elevation. Based on the information provided in Drawing 2, this portion of the right non-overflow section would allow flow to be conveyed over the crest. To facilitate understanding of the right non-overflow section to the right of the intake section, please provide a section that shows the relationship between its relevant components.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 3, Section F, Right Embankment Section, does not provide the top elevation of the embankment. Please revise Section F to include the top elevation of the right embankment.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

Drawing 4, Right Penstock Elevation, shows the surge tank. However, the dimensions scaled from this drawing do not agree with the dimensions presented in Exhibit A, section 4.2, Surge Tank, page A-SPR-3. Exhibit A provides a height of 28 feet for the steel section, a height of 13 feet for the concrete section, and a diameter of 28 feet. Drawing 3 provides a scaled height of 22 feet for the steel section, a scaled height of 7.5 feet for the concrete section, and a scaled diameter of 13 feet. Please revise the application to provide consistent dimensions for the surge tank.

NSPW Response
The revised Exhibit F drawings are included in Appendix AIR-3.

The Commission's records indicate that stability analyses were conducted in 1987 and it was determined that several sections of the dam could experience instability during certain loading conditions. As a result, a large dam retrofit was conducted in 1999, in part, to install reinforcing steel dowels between portions of the dam and the foundation. The stability analysis relied on these steel dowels to justify that the dam meets the Commission's stability criteria; however, no steel dowel reinforcement is shown on the Exhibit F drawings. Therefore, please update the Exhibit F drawings to include all locations and details of steel dowels installed during the 1999 renovation.

NSPW Response

The revised Exhibit F drawings are included in Appendix AIR-3.

Supporting Design Report for Saxon Falls Project

Section 2.B (5), Assumptions, page 3, provides a summary of the stability analysis assumptions. The Supporting Design Report (SDR) should be revised to address the following:

> *a. Third Bullet. The analyses assumed a friction angle of 45 degrees at the foundation interface based on guidance provided in the Bureau of Reclamation's Design Criteria of Concrete Arch and Gravity Dams. Please revise the SDR to provide supporting documentation such as photos from original construction, site observations of local geology, or exploration results from nearby structures to justify the foundation type and a citation from the referenced guidance document to justify the assumed friction angle.*
>
> *b. Fourth Bullet. The analyses assumed cohesion at the foundation interface based on guidance provided in the Bureau of Reclamation's Design Criteria of Concrete Arch and Gravity Dams. However, this assumption is not an acceptable justification to rely on cohesion for stability of concrete gravity structures. Therefore, without site-specific testing to justify the cohesion, please revise the SDR to include a no-cohesion stability analyses conducted in accordance with Chapter 3 of the Commission's Engineering Guidelines.*

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Section 3.A, Left Earth Embankment, presents the results for the stability analyses for the left earthen embankment. However, the SDR lacks documentation that justifies the assumed material properties and analysis methodology. Therefore, please revise the SDR to provide a

complete stability analyses, in accordance with Chapter 4 of the Commission's Engineering Guidelines.

NSPW Response
The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Section 4.A, Design Flood, page 12, states the 100-year flow rate at the project, according to the USGS, is 8,960 cfs. However, the SDR does not provide documentation or citation is provided to support the stated 100-year flow rate. Therefore, please revise the SDR to include relevant information that supports the use of the 100-year flow rate of 8,960 cfs.

NSPW Response
The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Section 4.B(1), Description, page 12, states that the height of the radial gate is 12 feet. However, Exhibit A, section 2.1.3, page A-SXN-1 and Exhibit F, drawing 2, Section: Gated Spillway @ B-B, provides the height of the radial gate as 13 feet. Please revise the application to provide consistent dimensions for the radial gate.

NSPW Response
The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Appendix B, Stability Analysis – Concrete Structures, table 4-1 (page 35 / 96) and table 4-2 (page 50 / 96), include material properties, loading conditions and stability analyses results for the overflow spillway, left non-overflow mass concrete dam, gated spillway, right non-overflow concrete gravity dam and intake structure. However, the SDR does not document the methodology used in the stability analyses. Therefore, please revise the SDR to provide a complete stability analyses, in accordance with Chapter 3 of the Commission's Engineering Guidelines.

NSPW Response
The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Appendix D, Headwater-Discharge Rating Curve, uses a left earthen embankment length of 260

feet in the spillway rating curve calculations. However, Exhibit A, section 2.5, Left Earthen Dam, and Exhibit F, drawing 2, Plan, both have the left earthen embankment length as 250 feet. The length of the left earthen embankment should be verified, and the application revised to provide a consistent length. If necessary, the rating curve calculation should be updated.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Appendix D, Headwater-Discharge Rating Curve, uses a Tainter gate sill elevation of 984.0 feet NGVD29 in the spillway rating curve calculations. However, Exhibit A, section 2.1.3, Gated Spillway Section; Exhibit F, drawing 2, Section: Gated Spillway @ B-B; and Supporting Design Report, section 2.B (1), Description, page 4, all have the Tainter gate sill elevation as 984.1 feet NGVD29. The Tainter gate sill elevation should be verified, and the application revised to provide a consistent elevation. If necessary, the rating curve calculation should be updated.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Supporting Design Report for Superior Falls Project

Section 2, Stability Analysis – Concrete Structures, identifies dam features using different terminology than used in Exhibit A, Exhibit F (including the SDR) and Exhibit G. The lack of consistency in the identification of dam features in the application impedes an understanding of the project components. Therefore, please revise the application to use a consistent terminology to identify dam features.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Section 2, Stability Analysis – Concrete Structures, does not include a stability analysis for the Middle Overflow Section shown on Exhibit F, Drawing 3. Therefore, please revise the SDR to provide a stability analysis for the Middle Overflow Section in accordance with the Commission's Engineering Guidelines.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide

updated SDRs.

Section 4, Table 19, Headwater Discharge Rating Summary, Page 17, states that the crest of the 18-foot-high radial gates are 722.2 feet NGVD29 and the crest of the 15-foot high radial gates are 726.2 feet NGVD29. Please revise table 19 to indicate that the sill of the 18-foot-high radial gates is at an elevation of 722.2 feet NGVD29 and the sill of the 15-foot-high radial gates is at an elevation of 726.2 feet NGVD29.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Appendix B1, 1987 Stability Analyses and Appendix B2, 1999 Stability Analyses, present stability analyses for the concrete structures. The hand-drawn sketches and hand-written calculations are not well organized and difficult to follow. Therefore, please revise the SDR to update and reorganize the stability analyses for all concrete structures to facilitate understanding.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Appendix B1, 1987 Stability Analyses and Appendix B2, 1999 Stability Analyses, restate the results of a prior analyses. However, it is insufficient to simply restate the results of a prior analyses. Therefore, please ensure and verify that the methodology, loading, and material assumptions used for the 1987 and 1999 analyses are consistent with the current Commission's Engineering Guidelines.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Appendix B1, 1987 Stability Analyses and Appendix B2, 1999 Stability Analyses, assumed cohesion at the foundation interface. The Commission does not allow relying on cohesion for stability of the concrete gravity structures without laboratory data to support the assumed cohesion. Therefore, without site-specific testing to justify the cohesion, please use a no-cohesion stability analyses in accordance with Chapter 3 of the Commission's Engineering Guidelines.

NSPW Response

The Commission has granted NSPW an extension of time until November 15, 2023 to provide updated SDRs.

Should you wish to access the information provided in this submittal, it will posted at the following website: https://hydrorelicensing.com/saxon/. Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

Don Hartinger

Digitally signed by Don Hartinger
Date: 2023.08.28 12:18:05 -05'00'

Donald Hartinger
Plant Director, Renewable Operations-Hydro

Enclosure

CC: Stakeholder List

Appendix AIR-1 – Revised Exhibit A Documents

This information has been submitted as a separate file.

Saxon Falls Hydroelectric Project
FERC No. 2610

Revised Exhibit A
Description of Project

Final License Application

Prepared for

Northern States Power Company
a Wisconsin Corporation

Prepared by

Mead & Hunt

meadhunt.com

August 2023

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TABLE OF CONTENTS

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TABLES

APPENDICES[1]

[1] All Appendices are located in *Volume 3 of 4, Appendices.*

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LIST OF ABBREVIATIONS

AC .....Alternating Current

cfs.....cubic feet per second

DSM .....demand side management

FERC.....Federal Energy Regulatory Commission

FLA.....Final License Application

hp .....Horsepower

kV .....Kilovolt

kW .....Kilowatt

NGVD .....National Geodetic Vertical Datum 1929

NSPW.....Northern States Power Company, a Wisconsin corporation

O&M .....Operation and management

Project .....Saxon Falls Hydroelectric Project

rpm .....Revolutions per minute

USGS .....United States Geological Survey

WDNR .....Wisconsin Department of Natural Resources

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1. Project Description

The Saxon Falls Hydroelectric Project (Project) is located 4.3 miles upstream of the Montreal River's confluence with Lake Superior. It is located within the Town of Saxon in Iron County, Wisconsin and Ironwood Township in Gogebic County, Michigan. **Appendix A-1** of this application includes a map showing the general location of the Project. **Appendix A-2** includes an aerial photograph showing the Project's primary facilities. The Project includes a reservoir, dam, powerhouse, conduit, surge tank, penstocks, tailrace, transmission equipment, and appurtenant equipment. These features are described in the following paragraphs.[2]

2. Description of Dam Structures

The dam is 440 feet long[3] and 40 feet high. From right to left looking downstream[4], the main structures of the dam consist of a spillway, a non-overflow concrete gravity dam, an intake structure, a non-overflow mass concrete dam, and an earth embankment dam.

2.1 Spillway

The spillway is divided into three components: the right spillway abutment, the overflow spillway section, and the gated spillway section.

2.1.1 Right Spillway Abutment

The right spillway abutment has a top elevation of 1004.05 feet NGVD and consists of a concrete training wall founded on bedrock that is 50.6 feet long and 3.5 feet wide. A concrete core wall extends 20 feet into the earth fill to the right of the spillway. The purpose of the right spillway abutment is to direct flow on the right side of the spillway toward the river channel downstream.

2.1.2 Overflow Spillway Section

The overflow spillway is a reinforced concrete Ambursen-type structure that is 127 feet long, 62 feet wide at its base, and 32.9 feet high at the crest. The elevation of the crest is 997.0 feet National Geodetic Vertical Datum (NGVD) and 964.1 feet (NGVD) at the downstream apron.[5] It is founded on bedrock and the right end is keyed into the near vertical bedrock riverbank. The interior chamber of the overflow spillway is separated into bays by 2.5-foot-thick concrete buttresses spaced 16 feet on center. Each bay, except the last two bays on the right side, have vents and a drain on the downstream face of the structure. The left side of the leftmost bay is supported by one of the concrete piers located on either end of the gated spillway.

2.1.3 Gated Spillway Section

The gated spillway section is 30-feet-long, 65.6-feet wide at the base, and 40-feet-high. It is a mass concrete structure with an ogee-shaped crest and downstream face. The elevation of the gate sill is 984.1 feet. The gated spillway has an access tunnel that extends from the non-overflow concrete gravity dam section to the interior chamber of the overflow spillway section. Concrete

[2] Unless otherwise cited, all facility descriptions are from the Supporting Technical Information Document filed with the FERC on March 13, 2014 (NSPW, 2014).
[3] Dam length 190 feet, earthen embankment 250 feet in Exhibit F-2 plan view.
[4] Direction of left or right, when describing facilities, is given looking downstream.
[5] All elevations in this document are referenced in the 1929 National Geodetic Vertical datum (NGVD).

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piers are located on both ends of the gated spillway and support the steel radial-type gate, the concrete operator's deck, and gate hoist equipment. The radial-type gate is 13-feet-high by 26-feet-wide.[6] The gate hoist has an electric motor-driven lift mechanism that is manually operated.

2.2 Non-Overflow Concrete Gravity Dam

The non-overflow concrete gravity dam is 12 feet long, 29.2-feet-wide at its base, and 46.1-feet-high, with a crest elevation of 1,004.1 feet.[7] It was modified as part of a 1990 reconstruction of the intake structure. The structure sill still includes the remains of the 1990 concrete. There is a low-flow orifice outlet located on the downstream face between the dam and powerhouse that provides minimum flows to the river channel[8]. The downstream face of the concrete gravity dam slopes from the intake section to the gated spillway section.

2.3 Intake Structure

The intake structure was reconstructed in 1990. It consists of a mass concrete structure that is 19 feet long, 45.2 feet wide at its base, 36.6-feet-high and is located between the non-overflow concrete gravity dam and the non-overflow mass concrete dam. The elevation of the top of the intake structure is 1,004.1 feet. The intake structure controls flow into the steel conduit that extends downstream to the powerhouse. Trash racks, a flap gate for conduit dewatering, and a hoist for the flap gate are located on the upstream end of the intake structure. The trash racks are 20-feet-high by 15-feet-wide with 1-inch clear spacing.[9] A steel frame gatehouse, located over the intake structure, houses the gate hoist and operations and maintenance equipment.

2.4 Non-Overflow Mass Concrete Dam

The non-overflow mass concrete dam is 57 feet long, 53 feet wide at the base, and varies in height from 19.1 feet to 29.1 feet. It has a crest elevation ranging from 1,004.1 feet to 1,005.2 feet. It serves as a transition between the intake structure and the left earthen dam.

2.5 Left Earthen Dam

The left earthen dam is 260 feet long, 119.6 feet wide at its base, and 15 to 17.6 feet high.[10] It extends southeast from the non-overflow mass concrete dam. It has crest elevations ranging from 1,005.0 feet to 1,007.6 feet. It is an embankment dam constructed of a homogenous earth fill that includes a sheet pile cutoff wall driven into bedrock. Rip-rap has been placed on the upstream face to protect against wave action and a drain filter is located on the downstream side.

[6] Height measured from Exhibit F-2, Section BB.
[7] Height measured from Exhibit F-2, Section CC.
[8] The low-flow orifice outlet is composed of a 12-inch (inside diameter) ductile pipe imbedded in the non-overflow concrete gravity dam. The intake center elevation is 993.0 feet NGVD and the outlet center elevation is 969.42 feet NGVD. The upstream side of the pipe has a knife gate shutoff valve where the stem extends to the top of the section and can be adjusted with a horizontal hand wheel. The downstream end of the pipe is capped with a blind flange that acts as an orifice plate.
[9] The top of the trash racks is angled downstream 9 degrees from vertical, with a bar thickness of 0.25 inches. The rack is submerged during all times, and it is supported by the dam structure on the top and three 1.2-foot-high I-beam supports. There are no other vertical frame supports. The spacing of the bars is held in place by eight horizontal, 2-inch high tie bars welded to the downstream side of the 0.25-inch vertical trash rack bars. However, only five of the horizontal tie bars restrict flow beyond the restrictions provided by the other supports. The effective vertical height of the trash rack is 19.83 feet minus 4.43 feet or 15.4 feet. The effective width is 15 feet minus 3 feet or 12 feet total effective width. This results in an effective opening of approximately 184.8 square feet.
[10] Length from plan note in Exhibit F-2.

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3. Description of Reservoir

The reservoir encompasses approximately 65.5 acres with a storage capacity of approximately 524 acre-feet at the maximum reservoir elevation of 997.0 feet. It has a maximum depth of 12 feet and an estimated average depth of 8 feet. The substrate consists of 70% sand, 0% gravel, 0% rock, and 30% muck (WI Department of Natural Resources, n.d.).

4. Description of Conveyance Systems

Conveyance systems at the Project consist of a steel conduit, a steel surge tank, and two steel penstocks.

4.1 Conduit

The conduit is a 5/16-inch-thick steel pipe with an inside diameter of 6 feet. It extends 1,607 feet downstream from the intake structure to the surge tank. The conduit crosses the Montreal River from the Wisconsin side to the Michigan side approximately 700 feet downstream of the dam. It is supported by six concrete piers and 29 ring anchor supports. Thrust blocks are located at each horizontal curve and expansion joints are located regularly along the length of the conduit.

4.2 Surge Tank

The surge tank is constructed on a reinforced concrete base and is located at the edge of the high riverbank on the Michigan side of the Montreal River overlooking the powerhouse. The surge tank is situated between the conduit and the steel penstocks which connect to the powerhouse. It is a 3/8-inch-thick steel-walled tank that is 23.5 feet in diameter and 59.5 feet high.

4.3 Penstocks

The penstocks consist of two steel pipes that extend 156 feet downward from the surge tank to the powerhouse. Each pipe is 1/2 inch in thickness and 54 inches in diameter. Each one has a butterfly valve located in a masonry gate house immediately downstream of the surge tank.

5. Description of Powerhouse

The reinforced concrete powerhouse is 52 feet long by 30 feet wide and is 16 feet high from the generator floor to the ceiling. The powerhouse is located in Michigan and has an average head of 135 feet.

5.1 Turbines

The powerhouse contains two horizontal shaft, Francis-type units manufactured by the James A. Leffel Company and are rated at 1,000 horsepower (hp) each. The minimum flow to operate one turbine is 48 cfs. The maximum hydraulic capacity with both turbines operating is 170 cfs.

5.2 Generators

The Project features two General Electric 2,300-volt, 600 rpm, 0.8 power factor AC generators each with an original nameplate capacity of 625 kW and operating at a nominal voltage of 2,400. The generators were rewound in 1957 and are now rated at 750 kW each. The combined plant capacity is 1,500 kW.

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6. Tailrace

Water is released from the powerhouse directly to the Montreal River. The Project boundary extends downstream on the Wisconsin side of the river for approximately 675 feet and on the Michigan side of the river for approximately 1,350 feet.

7. Transmission Equipment

There is a 0.25-mile-long, three phase overhead 2/0 wire 2.4 kV transmission line extending from the powerhouse to the non-project distribution substation. The 2.4 kV transmission line is isolated from the generators by 400 A generator breakers. The equipment required to transmit the electrical generation to the non-project, 34.5 kV electrical grid contains a three phase, 2,000 kVA, 2.4/34.5 kV step-up transformer. NSPW is the entity receiving the Project generation.

8. Appurtenant Equipment

Appurtenant equipment includes, but is not limited to, bearing lubrication systems, generator ventilation systems, switchboards, additional gate hoist equipment, switchgear, protective devices, and metering devices.

9. Project Operation

The Project currently operates in a run-of-river mode where discharge measured immediately downstream of the Project tailrace approximates the sum of inflows into the Project reservoir. This operation mode protects water quality, fish, and wildlife resources in the Montreal River. A minimum aesthetic flow of 5 cfs or inflow, whichever is less, is currently released from the minimum flow outlet into the bypass reach of the Montreal River immediately below the Saxon Falls Dam during the ice-free season.

NSPW is proposing under the pending subsequent license to modify the minimum aesthetic flow requirements to the following:

- Maintain a minimum aesthetic flow of 5 cfs, or inflow, whichever is less, from the Saturday before Memorial Day to October 15[11], except on weekends and holidays, when a minimum aesthetic flow of 10 cfs, or inflow, whichever is less, will be released between the hours of 8 am to 8 pm.

In order to minimize reservoir fluctuations, a minimum reservoir elevation of 997.0 feet (NGVD)[12] is required to be maintained between ice-out and June 1 and a minimum reservoir elevation of 996.5 feet is required to be maintained from June 2 to ice out.

Under the proposed operation, just prior to spring runoff, the Applicant may need to deviate from the maximum reservoir elevation (by no more than an increase of 0.5 feet) to remove ice from the downstream side of the radial-type gate for dam safety purposes. The duration of the deviation shall be no longer than necessary (normally less than a few days) to remove the ice and will be conducted as a planned deviation under the requirements outlined in Section 5.9 of Exhibit E.

[11] This timeframe provides for operational consistency as it aligns with the aesthetic flow timeframe at the downstream Superior Falls Project.
[12] The current license lists the elevations in mean sea level, which is not a true survey datum. NGVD 1929 was created to approximate mean sea level. Therefore, for the purposes of listing the elevations in a true survey datum, all elevations are listed herein as NGVD 1929.

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The Project is operated in conjunction with the Superior Falls Project located a short distance downstream. Two operators are assigned to oversee the daily operation and routine maintenance of both Projects. Eight-hour coverage is provided five days a week, Monday-Friday. An operator for the facility is on call 24 hours per day, seven days per week. The plant is manually operated with controls installed for automatic shutdown in case of operational emergencies. Whenever a plant shutdown occurs or if high or low water occurs (reservoir elevation greater than 996.95 feet or lower than 996.60 feet NGVD), the continually staffed control center at the Licensee's Wissota Hydroelectric Project is automatically notified. Readings are taken every quarter hour at all times.

The trash rack is manually raked and any trash mixed with the aquatic vegetation and woody debris is removed and disposed of before the remaining material is flushed downstream. Raking occurs at least weekly during the spring season, after storms during the summer season, and at least weekly during the fall season. Raking is not normally required during the winter season. Large woody debris is typically not encountered at this facility.

For emergency operation of the facility, an operator is available 24 hours a day and can also be supported by the operator from White River Hydro, local line crews, the Ashland Bay Front Plant maintenance staff, and personnel from NSPW's Hydro Maintenance Department in Chippewa Falls, Wisconsin.

10. Safe Management, Operation, and Maintenance

NSPW has a robust Owners Dam Safety Program that incorporates all dam safety inspection components, monitoring responsibilities, and communications required for this dam classification. It also assures adequate resources are allocated for fulfillment of FERC dam safety requirements. The current Owners Dam Safety Program was revised and submitted to FERC on June 28, 2019 (NSPW, 2019).

NSPW developed a public safety plan in consultation with the FERC. The plan is reviewed on an annual basis to determine if changes are necessary. The plan was last updated in 2015 (NSPW, 2015).

As a result of a July 2016 flood incident, NSPW improved communication at the facility by installing cell phone boosters in the Superior Falls Dam Office. In addition, cell phone coverage has improved in the general locale. NSPW did not need to update rating curves for this facility.[13]

11. Average Annual Generation

Average annual generation for the Saxon Falls Project averaged approximately 10,015.3 Megawatt-hours (MWh) for the five-year period ending in 2021.

12. River Flow Characteristics

Streamflow information from the United States Geological Survey (USGS) Gaging Station No. 04029990 was used to develop flow duration curves for the Montreal River. According to the National Water Information System Web Interface, daily discharge values are provided by NSPW from the gage location (Saxon Falls powerhouse) listed as Latitude 46.53689°N, Longitude -90.37990°W (US Geological Survey,

[13] See Accession No. 20170531-5159.

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n.d.).[14] The gage location has a drainage area of 262 square miles. Based on the data for the analyzed period of October 1, 1986 to December 2021[15], the average annual calendar year flow at the Project was 313 cfs; the maximum annual calendar year flow at the Project was 604 cfs in 2016; and the minimum annual calendar year flow was 154 cfs in 1987.

Streamflow duration data show the percentage of time a given flow is equaled or exceeded. Monthly flow duration curves and the annual exceedance table are based on data collected for the period of record from October 1, 1986 to December 31, 2021 and are included in **Appendix A-4**.

Other than an increase in the minimum flow being released into the bypass reach for aesthetic purposes, NSPW is not proposing any changes in Project operations.

13. Purpose of the Project

The purpose of the Project is to generate renewable hydroelectric energy. NSPW is a public utility that produces, purchases, transmits, and distributes power to retail customers. The power generated by the Saxon Falls Project is delivered to NSPW's system for sale to customers.

14. Estimated Project Cost

The Project is an existing FERC licensed facility. As of December 31, 2021 the net book value (net investment) was calculated at $83,561 and the gross book value was calculated at $1,768,688. These figures will include the land and land rights, structures and improvements, waterway improvements, generating equipment, accessories, and miscellaneous equipment.

15. Estimated Costs of Proposed Environmental Measures

The estimated capital and annual Operation and Maintenance (O&M) costs for proposed environmental measures are outlined in **Table A-1**.

Table A-1 Estimated Capital and Annual O&M Costs for Proposed Environmental Measures in 2022 Dollars

Item		Capital Cost	O&M Cost
Develop Aquatic and Terrestrial Species Plan and conduct biennial invasive surveys		$40,000	$35,000[16]
Develop Historic Resources Management Plan and conduct shoreline erosion surveys every 5 years		$20,000	$15,000[17]
Develop an Operation Monitoring Plan		$25,000	$5,000
Saxon Falls Boat Launch, Canoe Portage Take-out Improvements	Relocate canoe portage from left side of dam to boat launch area and relocate or add directional signage, as necessary	$10,000	$3,000
	Conduct maintenance of boat launch area via grading or addition of gravel	$3,000	$0 Additional

[14] Since flow data is provided by NSPW, there is no physical gage in this location.
[15] There is no available flow data prior to October 1, 1986. The flow duration curves use data from October 1, 1986 to December 31, 2021. USGS data was used from October 1, 1986 to September 30, 2015. Data from October 1, 2015 to December 31, 2021 was provided by NSPW as operational data.
[16] This cost is per survey event.
[17] This cost is per survey event.

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Item		Capital Cost	O&M Cost
			Cost
	Add new directional signage along relocated canoe portage route	$2,000	$400
	Review Part 8 signage and update as necessary to meet current FERC standards	$2,000	$0 Additional Cost
Saxon Falls Scenic Overlook Improvements	Establish and maintain scenic overlook as a FERC-approved recreation site, including parking lot and portable toilet	$0	$10,000
	Install safety signage directing recreationists to stay behind safety fencing	$1,000	$200
	Review Part 8 signage and update as necessary to meet current FERC standards	$2,000	$0 Additional Cost
	Trim trees blocking view of the falls	$0	$1,000
Saxon Falls Tailwater Access, Canoe Portage Put-in Improvements	Review Part 8 signage and update as necessary to meet current FERC standards	$2,000	$400
	Replace signage on gate prohibiting use of the stairs to access the tailwater area	$500	$100
	Develop a program where an electronic key can be purchased (for a one-time fee). The key would provide access through the locked gate at the top of the stairs which leads to the tailwater area.	$30,000	$5,000
	Add daily flow information to website	$30,000	$2,500
Saxon Falls Whitewater Release	Conduct two annual whitewater releases, each for a duration of 3 hours, between the months of May and September.	$NA	$5,000
Saxon Falls Whitewater Release	Conducting the whitewater releases as proposed will increase the generation from 4,154 MWh/year to 4,177 MWh/year for a dry season (2012 model year), from 6,360 MWh/year to 6,366 MWh/year for a normal season (2003 model year), and from 9,405 MWh/year to 9,410 MWh/year for a wet season (2016 model year).[18]	$NA	$(163)[19]
Saxon Falls Whitewater Recreation Plan	Develop a Whitewater Recreation Plan in consultation with AW and NPS that includes the following items: • Number, timing, and duration of flows to be released • Ramping rates • Details on the proposed access improvements, including the card reader access system • Details on providing online access to flow information (average daily flows).	$25,000	$0

[18] This information was calculated using the preliminary Reservoir Flow Routing Model filed with the Commission on August 18, 2023 as Appendix E-28 of the Final License Application for the Gile Flowage Storage Reservoir Project (FERC Project #: 15055). See Accession # 20230818-5101.

[19] This value is based upon 6 MWH of lost generation per normal year and replacement value of power of $27.32/MWH as stated in Exhibit H of the Final License Application for the Superior Falls Hydroelectric Project (FERC Project No. 2587) and Accession No. 20221230-5395.

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Item		Capital Cost	O&M Cost
Saxon Falls Increased Aesthetic Flow	Increasing the aesthetic flow as proposed[20], will decrease the generation from 4,154 MWh/year to 4,142 MWh/year for a dry season (2012 model year), from 6,360 MWh/year to 6,345 MWh/year for a normal season (2003 model year), and from 9,405 MWh/year to 9,401 MWh/year for a wet season (2016 model year).[21]	$0	$410[22]
Total Cost		**$192,500**	**$82,847**

*cost per survey event

16. License Application Development Costs

The costs for NSPW to relicense under the Traditional Licensing Process through the filing of the FLA are estimated to be $316,432.

17. Estimated Value of On-Peak and Off-Peak Power

The Project operates in a run-of-river mode of operation; therefore, this section is not applicable.

18. Average Annual Increase or Decrease in Project Generation and Value of Power Due to Changes in Project Operations

NSPW is proposing to increase the minimum flow released into the bypass reach from 5 cfs to 10 cfs. It is estimated the change will have no material effect on power generation at the Saxon Falls Project. The average annual amount and value of project power for the term of the new license is projected to remain the same.

19. Remaining Undepreciated Net Investment, or Book Value, of the Project

The undepreciated net investment of the Project is $83,561 (book cost of $1,768,688 less accumulated depreciation of $1,685,127).

20. Annual Operation and Management Costs

The average annual cost to operate and maintain the Saxon Falls Project for the period 2017-2021 is $362,536. These costs are outlined in **Table A-2** and include general O&M expenses, insurance, taxes, and depreciation. A breakdown of the individual components of the general O&M expense category is shown in **Table A-3**.

[20] Change releases from the period each year of Saturday before Memorial Day to October 15 where 5 cfs is released 24 hours per day to releasing an additional 5 cfs between 8 am and 8 pm on the weekends.
[21] This information was calculated using the preliminary Reservoir Flow Routing Model filed with the Commission on August 18, 2023 as Appendix E-28 of the Final License Application for the Gile Flowage Storage Reservoir Project (FERC Project #: 15055). See Accession # 20230818-5101.
[22] This value is based upon 15 MWH of lost generation per normal year and replacement value of power of $27.32/MWH as stated in Exhibit H of the Final License Application for the Superior Falls Hydroelectric Project (FERC Project No. 2587) and Accension No. 20221230-5395.

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Table A-2 Annual Operation and Management Costs

Item	Cost
General O & M Expenses (5-year average)	$230,107
Insurance	N/A[23]
2021 Property Taxes	$46,206
2021 Depreciation	$86,223
Average Annual O & M Cost	**$362,536**

Table A-3 Cost Breakdown of General O&M Expense Category[24] (2017 to 2021)

Cost	2017	2018	2019	2020	2021	2017-2021 Mean
Employee Expenses	$15,720	$9,978	$13,127	$2,728	$24,456	$13,202
Labor	$197,415	$157,676	$148,130	$93,699	$219,001	$163,184
Materials & Commodities	$28,883	$16,106	$17,168	$8,835	$11,098	$16,418
IT Costs	$225	$62	-	-	-	$143
Miscellaneous	$39,427	$38,024	$20,962	$22,140	$17,912	$27,693
Outside Services	$7,268	$33,937	$4,601	$1,960	-	$11,941
Total General O&M Costs	**$288,938**	**$255,783**	**$203,988**	**$129,363**	**$272,466**	**$230,107**

21. One-Line Diagram of Electrical Circuits

The One-line Diagram of Electrical Circuits is shown in **Appendix A-4**.

22. Lands of the United States

There are no federal lands located within the Project boundary.

23. Public Utilities Regulatory Policy Act

The Licensee reserves any future rights it may have under the Public Utility Regulatory Policies Act (PURPA) as it pertains to the Project.

24. Supporting Design Report

The supporting design report is considered Critical Energy Infrastructure Information and has been filed as such as a separate document.

[23] NSPW pays a lump sum for insurance costs per operating company (i.e., NSPW, NSPM), therefore there are no insurance costs specific to the Saxon Falls Project
[24] Includes administrative costs

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25. Applicant's Electricity Consumption Efficiency Improvement Programs

The Applicant is committed to energy conservation by using demand side management (DSM) measures as a means to meet customer energy needs. Cost-effective DSM resources, in the form of capacity and energy savings, are in essence "purchased" from the customer through incentives, subsidies, rate structures, or other means needed to meet system DSM goals and commitments. NSPW offers programs for the residential sector, business sector, and agricultural sectors. Specific options in these programs include but are not limited to:

Residential Programs

- Residential Rate Plans
    - Time of Day Service
    - Optional Off-Peak Service
    - Savers Switch Credit
- Residential Rewards {Focus on Energy (FOE)[25]}
    - Energy Saving Tips
    - Home rebates
        - Home Performance
        - Simple Energy Efficiency
        - New Homes
- Renewable Choices
    - Renewable Connect
    - Solar Connect Community
    - Net metering

Business Programs

- Equipment Rebates
- Energy Audits
- Renewable Programs
    - Renewable Connect
    - Solar
    - Working with Third Party Providers
- Energy Efficient Buildings
    - Multi-Family Building Efficiency (FOE)
    - Custom Efficiency
    - Efficient Facilities (FOE)
    - Energy Benchmarking
- Rate Programs
    - Electric Rate Savings
    - Savers Switch for Business

[25] Funded through the Focus on Energy® program. Focus on Energy® is Wisconsin's energy efficiency and renewable resource program. It is funded by Wisconsin's investor-owned utilities and participating municipal and electric cooperative utilities, including NSPW's parent company, Xcel Energy.

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Farm Programs

- Farm Rewiring
- Agriculture and Farm Rebates

The Applicant's conservation programs have been approved by the Public Service Commission of Wisconsin.

26. Works Cited

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Superior Falls Hydroelectric Project
FERC No. 2587

Revised Exhibit A
Description of Project

Final License Application

Prepared for

Northern States Power Company
a Wisconsin Corporation

Prepared by

Mead & Hunt
meadhunt.com

August 2023

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TABLE OF CONTENTS

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TABLES

APPENDICES[1]

[1] All Appendices are located in *Volume 3 of 4, Appendices*.

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LIST OF ABBREVIATIONS

AC .....alternating current
cfs.....cubic feet per second
FERC.....Federal Energy Regulatory Commission
FLA.....Final License Application
hp .....horsepower
kV .....kilovolt
kVA.....kilovolt-amperes
kW .....kilowatt
NGVD .....National Geodetic Vertical Datum 1929
NSPW.....Northern States Power Company, a Wisconsin corporation
O&M .....Operation and management
Project .....Superior Falls Hydroelectric Project
RCP.....reinforced concrete pipe
rpm .....revolutions per minute
USGS .....United States Geological Survey
WDNR .....Wisconsin Department of Natural Resources

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1. Introduction

Northern States Power Company, a Wisconsin corporation (NSPW), is the Licensee for the Superior Falls Hydroelectric Project (FERC No. 2587). The Superior Falls Dam is located approximately 0.4 miles upstream of the Montreal River's confluence with Lake Superior in the town of Saxon in Iron County, Wisconsin and Ironwood Township in Gogebic County, Michigan. The Project is located approximately 14 miles northwest of the neighboring cities of Hurley, Wisconsin and Ironwood, Michigan and approximately 23 miles east of the city of Ashland, Wisconsin. **Appendix A-5** of this application includes a map showing the general location of the Project. **Appendix A-6** presents an aerial photograph showing the Project's primary facilities. The Project includes a reservoir, dam, powerhouse, conduit, surge tank, penstocks, tailrace, transmission equipment, and appurtenant equipment. These features are described in the following paragraphs.[2]

2. Description of Dam Structures

The dam is 240 feet long, 30 feet wide at its base, and 28.5 feet high. From right to left looking downstream[3], the main structures of the dam consist of a non-overflow section with intake, right gate section, middle overflow section, left gate section, and left overflow weir section. In addition to the main dam structures, a right earthen embankment is located on the right side of the dam that extends upstream of the non-overflow section for 213.1 feet.

2.1 Non-Overflow Section and Intake Structure

The non-overflow section of the dam is approximately 70 feet long, 17.6 feet wide at its base, and 25.2 feet high. It is a concrete wall with buttresses on the downstream end.[4] The intake structure for the reinforced concrete pipe (RCP) conduit is 29.25 feet high, 30 feet wide at its base, and 23 feet long and included in the non-overflow section. The intake includes a 15.25-foot wide by 24-foot high (measured on incline[5]) metal trash rack with one-inch spaced vertical bars; a mechanical trash rake for maintenance; a mechanically operated timber headgate; an air shaft, which also acts as an accessway; and a concrete collar connecting the intake to the 84-inch-diameter RCP conduit. A walkway with handrails is located on the upstream and downstream sides along the length of the non-overflow section.

2.2 Spillway

The spillway is divided into four components: the right gate section, the middle overflow section, the left gate section, and the left overflow weir section.

[2] Unless otherwise cited, all Superior Falls Project facility description attributes are from the Supporting Technical Information Document dated March 22, 2014 (NSPW, 2014).
[3] Direction of left or right, when describing facilities, is given looking downstream.
[4] In the Pre-Application Document, the Right Non-overflow Section was further described as having three sections. In order to be consistent across documents, in this exhibit the Right Non-overflow Section is described as it is described in the STID and shown in the Exhibit F drawings.
[5] The top of the trash rack is angled downstream 12 degrees from vertical with a bar thickness of 0.1875 inches. The top of the rack is exposed at the minimum required elevation of 739.7 feet NGVD. It is supported by the dam structure on the top, two 1.25-foot-high horizontal supports across the middle, and a 0.66-foot-high notch in the concrete base at the bottom. There are no other vertical frame supports. The spacing of the bars is held in place by twelve horizontal, 1-inch high tie bars welded to the downstream side of the 0.1875-inch vertical trash rack bars. However, only ten of the horizontal tie bars restrict flow beyond the restrictions provided by the other supports. The effective vertical height of the trash rack is 21.5 feet at the minimum reservoir elevation of 730.7 feet NGVD (without the obstruction of the 0.66-foot-high vertical notch at the bottom) minus 3.33 feet or 18.16 feet. The effective width is 15.25 feet minus 2.34 feet or 12.91 feet total effective width. This results in an effective opening of approximately 230 square feet.

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2.2.1 Right Gate Section

The right gate section consists of two 16-foot-wide by 18-foot-high radial-type steel gates with a crest elevation of 740.2 feet National Geodetic Vertical Datum (NGVD) and a sill elevation of 722.2 feet NGVD.[6] These two gates replaced the original wooden radial-type gates as part of the 1999 rehabilitation. A hydraulic cylinder hoist system is used to raise the radial-type gates. The hoist is located on a steel frame with wheels and is moved along a concrete bridge with steel tracks between the two large bays. This section is approximately 40.5 feet long, 35 feet wide at its base, and 27 feet high when measuring from top of bedrock to the operator's bridge.

2.2.2 Middle Overflow Section

The middle overflow section was added as part of the 1999 spillway rehabilitation and replaced a portion of the original wooden radial-type gates. This section is approximately 18.6 feet long, 30 feet wide at its base, and 27.1 feet high when measuring from top of bedrock to the operator's bridge. It was constructed by filling the old Ambursen-type dam with mass concrete and extending the crest to the normal pool elevation of 740.2 feet. Piers were added on each side, with the remaining overflow section having a width of 15.5 feet. The crest is an ogee shape and has two small trash gates. The right trash gate within the section is a vertical slide gate with a hand-winch operator.[7] The left trash gate or minimum flow gate within the section is also used to release the minimum flow. It is a sluice-type gate with a handwheel and threaded stem operator.[8]

2.2.3 Left Gate Section

The left gate section consists of an 18-foot-wide by 15-foot-high radial-type steel gate with a gate sill elevation of 726.2 feet and a gate crest elevation of 741.2 feet. It was installed in 1999 between the new middle overflow section and the existing left overflow weir section. This section is approximately 22 feet long, 30 feet wide at its base, and 27.1 feet high when measuring from top of bedrock to the operator's bridge.

2.2.4 Left Overflow Weir Section

The left overflow weir section consists of three concrete bulkhead overflow weir bays which are referenced as Bay 6, Bay, 7, and Bay 8. Each bay is 12 feet wide with a crest elevation of 740.7 feet. A steel beam and grafting walkway with handrails spans Bays 6 and 7. There is a concrete walkway with handrails spanning Bay 8. The section is approximately 41.4 feet long, 9 feet wide at its base, and 28.5 feet high when measuring from top of bedrock to the concrete walkway.

2.3 Right Earthen Embankment

The right earthen embankment was installed in 2019 to replace the existing jersey barriers that were temporarily used to prevent water from overflowing through the operations and maintenance buildings and the relatively flat wooded area to the right of the dam. The right earthen embankment has a top elevation of 745.01 feet NGVD, it is 213 feet long, 3 feet tall, and 23.6 feet wide at the base.[9]

[6] All elevations in this document are referenced in the 1929 National Geodetic Vertical Datum (NGVD).
[7] The right sluice-type gate is 4.0 feet wide and 2.0 feet high with a top of gate elevation of approximately 740.2 feet NGVD and a crown sill elevation of 738.2 feet NGVD.
[8] The left vertical slide gate is 5.0 feet wide and 2.5 feet high covering a 21-inch inside diameter pipe with a top elevation of 738.2 feet NGVD. The gate sill elevation is approximately 736.1 feet NGVD.
[9] Height and width from typical north south profile (along the reservoir).

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3. Description of Reservoir

The reservoir encompasses an area approximately 16.3 acres with a gross storage capacity of 78.2 acre-feet at a reservoir elevation of 740.2 feet. It has a maximum depth of 18 feet near the dam and average depth of 4.8 feet (NSPW, 1991). The substrate consists of 70% sand and 30% muck (WI Department of Natural Resources, n.d.).

4. Description of Conveyance Systems

Conveyance systems at the Project consist of a conduit, surge tank, and penstocks.

4.1 Conduit

The conduit conveys water from the intake structure to the surge tank along and above the steep riverbank for hydropower use. The conduit is a buried 84-inch-diameter RCP and is approximately 1,697 feet long. The conduit makes three small 7.5-degree bends near the intake and one large 45-degree bend just upstream of the surge tank. The conduit was installed in 1972 and replaced the original wood-stave structure.

4.2 Surge Tank

The surge tank is an 18-foot-diameter steel tank with a concrete base, a 15-foot-high concrete lower section and a steel upper section that extends 28 feet above the concrete section. It reduces pressure variation (including water hammer) by storing or releasing water at a location near the turbine during changing or transient flow conditions. The 84-inch-diameter concrete conduit enters the surge tank on the upstream end and two 54-inch-diameter steel penstocks exit the surge tank on the downstream end and extend to the powerhouse. The conduit and penstocks are anchored to the surge tank structure with reinforced concrete collars. The surge tank was installed in 1972 and the interior and exterior were painted in 1987.

4.3 Penstocks

Two 54-inch steel penstocks extend down the steep, 100-foot-high riverbank from the surge tank to the powerhouse. Each penstock is 207 feet long from the surge tank to the concrete thrust block located adjacent to the upstream wall of the powerhouse.[10] Each penstock has a concrete collar at the surge tank and an expansion joint located a short distance downstream of the surge tank. The penstocks are suspended approximately 3 feet above the ground from a series of steel frames. Each frame is oriented perpendicular to the pipe axis and consists of steel wide-flange columns, double channel beams, and a 1.25-inch-diameter U-shaped hoop around a flat ring girder on each penstock. The steel columns are founded on concrete footings keyed into the exposed bedrock. The penstocks were installed in 1964 and their exteriors were painted in 1987. The embedded steel liners and surrounding concrete thrust blocks were replaced in 1987.

[10] Length from Exhibit F4.

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5. Description of Powerhouse

The powerhouse is located in the State of Michigan approximately 207 feet downstream of the surge tank and 1,800 feet downstream of the dam. It is a reinforced concrete building measuring 32 feet long, 62 feet wide, and 43 feet high. The building features a generating room, a lower level, two tailpits and tailraces, and conical steel draft tubes. There is 135 feet of head at the dam with 127 feet of net operating head.

The tailpits and tailraces are located below the powerhouse and are rectangular in shape with an upstream wall, side piers, and a base slab. They direct the vertical flow from the draft tube downstream. In 1987, the pier walls were armored with steel plates near the waterline in conjunction with concrete repairs to the piers.

5.1 Turbines

The powerhouse contains two horizontal shaft, Francis-type turbines. Each turbine has a rated capacity of 1,250 horsepower (hp) at an operating head of 127 feet and a speed of 600 revolutions per minute (rpm). The turbines have a minimum hydraulic capacity (one unit) of 25 cfs, and a combined maximum hydraulic capacity of 220 cfs.

5.2 Generators

The Project contains two generator units with original capacities of 660 kilowatts (kW) each. They were both rewound in 1954 and 1957 and each now has the capability to produce 825 kW at unity power factor for a maximum plant capacity of 1,650 kW at unity power factor.

6. Tailrace

The tailrace is approximately 55 feet wide at the powerhouse and extends downstream from the dam for approximately 80 feet to its confluence with the Montreal River.[11]

7. Transmission Equipment

There is a 200 foot-long, three phase overhead 2/0 wire 2.4 kV transmission line extending from the powerhouse to the non-project distribution substation, which serves as the point of interconnection. The 2.4 kV transmission line is isolated from the generators by 400A generator breakers. The equipment required to transmit the electrical generation to the non-project, 34.5 kV electrical grid contains a three phase, 2,000 kVA, 2.4/34.5 kV step-up transformer. NSPW is the entity receiving the Project generation.

8. Appurtenant Equipment

Appurtenant equipment includes, but is not limited to, a log boom upstream of the intake, bearing lubrication systems, generator ventilation systems, switchboards, additional gate hoist equipment, switchgear, protective devices, and metering devices.

9. Project Operation

The Project operates in a run-of-river mode where discharge measured immediately downstream of the Project tailrace approximates the sum of inflows to the Project reservoir. This operation mode protects

[11] Length and width of tailrace measured via Google Earth.

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fish spawning in the Project impoundment, riparian vegetation above and below the Project, and recreation opportunities.

To ensure run-of-river operation, the Licensee maintains a reservoir water surface elevation at a minimum of 739.7 feet (NGVD)[12] as measured immediately upstream from the dam. A minimum flow of 8 cfs is required to be released into the bypass reach of the Montreal River from the Saturday before Memorial Day through October 15 for enhancement of scenic resources. A minimum flow of 20 cfs is required to be released into the bypass reach from 8 am to 8 pm on weekends and holidays during the same timeframe, also for the enhancement of aesthetic resources.

Under the proposed operation, just prior to spring runoff, the Applicant may need to deviate from the maximum reservoir elevation (by no more than an increase of 0.5 feet) to remove ice from the downstream side of the radial-type gate for dam safety purposes.[13] The duration of the deviation shall be no longer than necessary (normally less than a few days) to remove the ice and will be conducted as a planned deviation under the requirements outlined in Section 5.9 of Exhibit E.

The Project is operated in conjunction with the Saxon Falls Project located approximately 3.5 miles upstream. Two operators are assigned to oversee the daily operation and routine maintenance of both Projects. Eight-hour coverage is provided five days a week, Monday-Friday. An operator for the facility is on call 24 hours per day, seven days per week. The plant is manually operated with controls installed for automatic shutdown in case of operational emergencies. Whenever a plant shutdown occurs or if high or low water alarms are activated (reservoir elevation greater than 741.5 feet or lower than 739.75 feet NGVD), the continually staffed control center at the Licensee's Wissota Hydro Project is automatically notified. The high and low water conditions are monitored with the existing headwater monitor. Readings are taken every quarter hour at all times.

The trash rack is manually raked, and the material cleaned from the trash rack is collected, garbage removed and properly disposed of, and flushed downstream. Raking occurs at least weekly during the spring season, after storms during the summer season, and at least weekly during the fall season. Raking is not normally required during the winter season. Large woody debris is also sluiced downstream.

For emergency operation of the facility, an operator is available 24 hours a day and can be supported by the Licensee's White River Hydro operator, local line crews, the Ashland Bay Front Plant maintenance staff, and personnel from the NSPW's Hydro Maintenance Department in Chippewa Falls, Wisconsin.

NSPW is not proposing any changes to Project operations.

10. Safe Management, Operation, and Maintenance

NSPW has a robust Owners Dam Safety Program that incorporates all dam safety inspection components, monitoring responsibilities, and communications required for this dam classification. It also

[12] The current license lists the elevations in mean sea level, which is not a true survey datum. NGVD 1929 was created to approximate mean sea level. Therefore, for the purposes of listing the elevations in a true survey datum, all elevations are listed in NGVD 1929.
[13] The radial gate in the left gate section has a downstream enclosure that is heated to allow for winter operation.

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assures adequate resources are allocated for fulfillment of Federal Energy Regulatory Commission (FERC) dam safety requirements. The current Owners Dam Safety Program was revised and submitted to FERC on June 28, 2019 (NSPW, 2019).

NSPW developed a public safety plan in consultation with the FERC. The plan is reviewed on an annual basis to determine if changes are necessary. The plan was last updated in 2015 (NSPW, 2015).

As a result of a July 2016 flood incident, NSPW improved communication at the facility by installing cell phone boosters in the Superior Falls Dam Office. In addition, cell phone coverage has improved in the general locale. The rating curves for Gates 1 and 2 were updated and submitted to the Commission on May 31, 2017.[14]

11. Average Annual Generation

Annual generation for the Superior Falls Project averaged approximately 11,436.4 Megawatt-hours (MWh) for the five-year period ending in 2021.

12. River Flow Characteristics

Streamflow information from the United States Geological Survey (USGS) gaging station No. 04029990 (Saxon Falls powerhouse) was used to develop flow duration curves for the Montreal River. According to the National Water Information System Web Interface, daily discharge values were provided by NSPW from the gage location at Latitude 46.53689°N, Longitude -90.37990°W (US Geological Survey, n.d.).[15] The gage location has a drainage area of 262 square miles. The drainage basin for the Project is 264 square miles. Based on streamflow data for the period of October 1, 1986 to December 31, 2021[16], the average annual calendar year flow at the Project is 316 cfs; the maximum annual calendar year flow was 609 cfs in 2016; and the minimum annual calendar year flow was 156 cfs in 1987.

Streamflow duration data shows the percentage of time a given flow is equaled or exceeded. Monthly flow duration curves and the annual exceedance table are based on data collected for the period of record from October 1, 1986 to December 2021 and are included in **Appendix A-7**.

13. Estimated Project Cost

The Project is an existing, FERC licensed facility. As of December 31, 2021, net book value (net investment) was calculated at $294,773 and the gross book value was estimated at $2,561,284. This figure includes land and land rights, structures and improvements, waterway improvements, generating equipment, accessories, and miscellaneous equipment.

14. Estimated Costs of Proposed Environmental Measures

[14] Accession No. 20170531-5159.
[15] Since flow data is provided by NSPW, there is no physical gage in this location.
[16] There is no available flow data prior to October 1, 1986. The flow duration curves use data from October 1, 1986 to December 31, 2021. USGS data was used from October 1, 1986 to September 30, 2015. Data from October 1, 2015 to December 31, 2021 was provided by NSPW as operational data.

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The estimated capital and estimated annual Operation and Management (O&M) costs for proposed environmental measures in 2022 dollars are outlined in **Table A-1**.

Table A-1 Estimated Capital and Annual O&M Costs for Proposed Environmental Measures in 2022 Dollars

Item		Capital Cost	O&M Cost
Develop Aquatic and Terrestrial Species Plan and conduct biennial invasive species surveys		$40,000	$35,000*
Develop Historic Resources Management Plan and conduct shoreline erosion surveys every 5 years		$20,000	$15,000*
Develop an Operations Monitoring Plan		$25,000	$5,000
Superior Falls Canoe Portage Take-out Improvements	Remove existing canoe portage take-out signage along State Hwy 122; establish a new put-in access/canoe portage take-out site a short distance upstream of the dam to improve safety for users; and establish a gravel parking area with a capacity for up to six vehicles	$50,000	$3,000
	Install new Part 8 signage to meet current FERC standards, as well as directional signage and regulatory signage	$2,000	$400
Superior Falls Scenic Overlook Improvements	Conduct maintenance of parking area and portable toilet	$3,000	$0 Additional Cost
	Replace weathered informational signage at parking area	$500	$0 Additional Cost
Superior Falls Tailwater Fishing Area	Conduct routine maintenance (i.e., mowing, litter removal, trail maintenance) over term of new license	$0	$0 Additional Cost
	Replace weathered safety signage	$2,000	$0 Additional Cost
Saxon Falls Whitewater Release	Conducting the whitewater releases at Saxon Falls as proposed, will increase the generation at Superior Falls from 4,569 MWh/year to 4,586 MWh/year for a dry season (2012 model year), from 6,902 MWh/year to 6,911 MWh/year for a normal season (2003 model year), and from 10,446 MWh/year to 10,457 MWh/year for a wet season (2016 model year).[17]	$NA	$(246)[18]

[17] This information was calculated using the preliminary Reservoir Flow Routing Model filed with the Commission on August 18, 2023 as Appendix E-28 of the Final License Application for the Gile Flowage Storage Reservoir Project (FERC Project #: 15055). See Accession # 20230818-5101.

[18] This value is based upon 9 MWH of lost generation per normal year and replacement value of power of $27.32/MWH as stated in Exhibit H of the Final License Application for the Superior Falls Hydroelectric Project (FERC Project No. 2587) and Accession No. 20221230-5395. NSPW is reporting these costs at the request of the Commission.

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Saxon Falls Increased Aesthetic Flow	Increasing the aesthetic flow as proposed[19], will decrease the generation at Superior Falls from 4,569 MWh/year to 4,510 MWh/year for a dry season (2012 model year), from 6,902 MWh/year to 6,857 MWh/year for a normal season (2003 model year), and from 10,446 MWh/year to 10,411 MWh/year for a wet season (2016 model year).[20]	$0	$1,229[21]
Total Cost		**$142,500**	**$59,383**

*cost per survey event

15. Purpose of the Project

The purpose of the Project is to generate renewable hydroelectric energy. NSPW is a public utility that produces, purchases, transmits, and distributes power to retail customers. The power generated by the Superior Falls Project is delivered to NSPW's system for sale to customers.

16. License Application Development Costs

The costs for NSPW to relicense under the Traditional Licensing Process through the filing of the FLA are estimated to be $272,656.

17. Estimated Value of On-Peak Power and Off-Peak Power

The Project operates in a run-of-river mode of operation; therefore, this section is not applicable.

18. Average Annual Increase or Decrease in Project Generation and Value of Power Due to Changes in Project Operations

NSPW is not proposing any changes that would have a material effect on power generation at the Superior Falls Project. The average annual amount and value of project power for the term of the new license is projected to remain the same.

19. Remaining Undepreciated Net Investment, or Book Value of the Project

The undepreciated net investment of the Project is $294,773 (book cost of $2,561,284 less accumulated depreciation of $2,266,511).

20. Annual Operation and Maintenance Costs

The average annual cost to operate and maintain the Superior Falls Project for the period 2017-2021 is $518,034. These costs are outlined in **Table A-2** and include general O&M expenses, insurance, taxes,

[19] Change releases at Saxon Falls only from the period each year of Saturday before Memorial Day to October 15 where 5 cfs is released 24 hours per day to releasing an additional 5 cfs between 8 am and 8 pm on the weekends.
[20] This information was calculated using the preliminary Reservoir Flow Routing Model filed with the Commission on August 18, 2023 as Appendix E-28 of the Final License Application for the Gile Flowage Storage Reservoir Project (FERC Project #: 15055). See Accession # 20230818-5101.
[21] This value is based upon 45 MWH of lost generation per normal year and replacement value of power of $27.32/MWH as stated in Exhibit H of the Final License Application for the Superior Falls Hydroelectric Project (FERC Project No. 2587) and Accession No. 20221230-5395. NSPW is reporting these costs at the request of the Commission.

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and depreciation. A breakdown of the individual components of the general O&M expense category is shown in **Table A-3**.

Table A-2 Annual Operation and Management Costs

Item	Cost
General O & M Expenses (5-year average)	$273,288
Insurance	N/A[22]
2021 Property Taxes	$85,485
2021 Depreciation	$159,261
Average Annual O & M Cost	**$518,034**

Table A-3 Cost Breakdown of General O&M Expense Category[23] (2017 to 2021)

Cost	2017	2018	2019	2020	2021	2017-2021 Mean
Employee Expenses	$4,705	$5,371	$3,778	$5,195	$23,034	$8,416
Labor	$159,168	$182,838	$158,382	$155,016	$228,535	$176,788
Materials & Commodities	$17,105	$15,335	$17,379	$22,435	$24,745	$19,400
IT Costs	$55	$33	-	-	-	$44
Miscellaneous	$58,617	$61,595	$37,922	$36,725	$36,174	$46,207
Outside Services	$11,217	$23,936	$18,842	$273	$58,031	$22,460
Total General O&M Costs	**$250,867**	**$289,108**	**$236,303**	**$219,646**	**$370,519**	**$273,288**

21. One-Line Diagram of Electric Circuits

The One-line Diagram of Electrical Circuits is shown in **Appendix A-8**.

22. Lands of the United States

There are no federally owned lands within the Project boundary.

23. Public Utilities Regulatory Policy Act

The Licensee reserves any future rights it may have under the Public Utility Regulatory Policies Act (PURPA) as it pertains to the Project.

24. Supporting Design Report

The supporting design report is considered Critical Energy Infrastructure Information and has been filed as such as a separate document.

[22] NSPW pays a lump sum for insurance costs per operating company (i.e., NSPW, NSPM), therefore there are no insurance costs specific to the Superior Falls Project
[23] Includes administrative costs

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25. Works Cited

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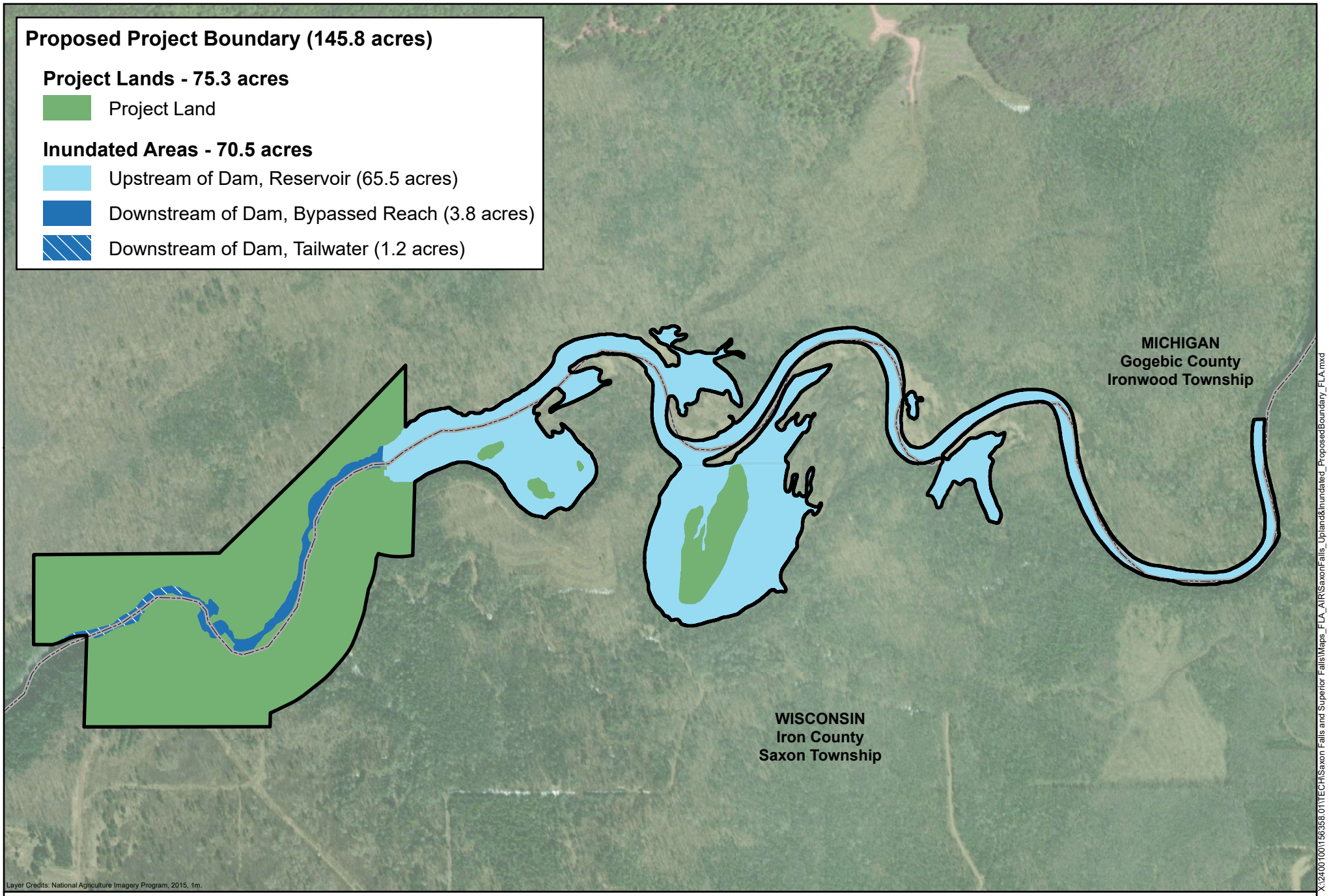
Appendix AIR-2 – Revised Appendix E-51

This information has been submitted as a separate file.

APPENDIX E-51 Saxon Falls Project Land and Inundated Area Maps



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Xcel Energy®

Mead & Hunt

Proposed Project Boundary

State Boundary

N

0 500 1,000 Feet

Saxon Falls Hydroelectric Project
Proposed Project Lands and Inundated Areas

FERC No. 2610

Appendix AIR-3 – Revised Exhibit F Drawings

This information has been submitted as a separate file and is considered Critical Energy Infrastructure Information and is not distributed to the general public.