Thompson Falls Hydroelectric Project
FERC Project No. 1869

Final License Application

Volume I of IV (Public)
Initial Statement and
Exhibits A, B, C, D, G, H

Prepared by:
NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
Portland, OR 97239

American Public Land Exchange
Missoula, MT 59802

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Missoula, MT 59808

December 2023

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Thompson Falls Hydroelectric Project
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Initial Statement

Prepared by:

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Butte, MT 59701

December 2023

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UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NorthWestern Energy	Thompson Falls Hydroelectric Project FERC PROJECT NO. 1869

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

INITIAL STATEMENT
(Pursuant to 18 CFR §4.51)

1. NorthWestern Corporation, a Delaware Corporation, d/b/a NorthWestern Energy (Licensee or NorthWestern) applies to the Federal Energy Regulatory Commission (FERC) for a new license for the Thompson Falls Hydroelectric Project (Project), as described in the attached exhibits.

2. The location of the Project is:

State:	Montana
County:	Sanders
City or Town:	Thompson Falls
Stream or other body of water:	Clark Fork River

3. The exact name and business address of the applicant are:

NorthWestern Corporation
A Delaware Corporation
d/b/a NorthWestern Energy
11 East Park Street
Butte, MT 59701

The exact name and business address of each person authorized to act as agent for the applicant in this application are:

Mary Gail Sullivan
Director, Environmental & Lands Permitting & Compliance
NorthWestern Energy
11 East Park Street
Butte, MT 59701
406-497-3382 (o)
406-490-1838 (c)

Andy Welch
Manager, Hydro License Compliance
NorthWestern Energy
208 N Montana Avenue, Suite 200
Helena, MT 59601
406-444-8115 (o)

John Tabaracci
Senior Corporate Counsel
NorthWestern Energy
208 N Montana Avenue, Suite 200
Helena, MT 59601
406-443-8983 (o)
406-299-0223 (c)

4. NorthWestern is a domestic corporation incorporated in the State of Delaware, and doing business in Montana, South Dakota, Nebraska, and Yellowstone National Park and is claiming preference as the incumbent licensee under Section 15(a)(2) of the Federal Power Act, 16 U.S. Code § 808(a)(2).

5. The statutory or regulatory requirements of the State of Montana, the state in which the Project is located, that affect the Project as proposed, with respect to bed and banks, and to the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting, and distributing power, and in any other business necessary to accomplish the purposes of the license under the Federal Power Act, are:

a. 401 Water Quality Certification from the Montana Department of Environmental Quality under Section 401(a)(1) of the federal Clean Water Act of 1977 (CWA), 33 U.S.C. 1341(a)(1).

b. The Montana Water Use Act, Mont. Code Ann. §85-2-101 et. seq. provides for the administration and adjudication of water rights, by the Montana Department of Natural Resources and Conservation.

The steps the applicant has taken, or plans to take, to comply with each of the laws cited above are:

a. The applicant will apply for 401 Water Quality Certification per 18 CFR § 5.23(b).

b. NorthWestern holds eight water right claims from the Clark Fork River for power generation, totaling 30,967 cubic feet per second (cfs) which are sufficient for the operation of the Project.[1] Additionally, NorthWestern holds one water right claim for domestic use. NorthWestern will continue to maintain these water rights to operate the Project for power generation – in compliance with applicable law.

6. All existing Project facilities are owned by:

NorthWestern Corporation
11 East Park Street
Butte, MT 59701

The Thompson Falls Dam is not federally owned or operated.

Additional Information Provided Pursuant to 18 CFR 5.18(a)

1. Identify every person, citizen, association of citizens, domestic corporation, municipality, or state that has or intends to obtain and will maintain any proprietary right necessary to construct, operate, or maintain the project;

   NorthWestern Corporation
   11 East Park Street
   Butte, MT 59701

2. The name and mailing addresses of:

   i. Every county in which any part of the Project, and any Federal facilities that would be used by the Project, are located:

      Sanders County
      111 Main St.
      PO Box 519
      Thompson Falls, MT 59873

      No Federal facilities will be used by the Project.

[1] The State of Montana has not fully adjudicated the Clark Fork Basin below Flathead River, which includes the Project area.

ii. Every city, town, or similar local political subdivision:

A. In which any part of the Project and any Federal facilities that would be used by the Project:

City of Thompson Falls
PO Box 99
Thompson Falls, MT 59873

No Federal facilities will be used by the Project.

B. That has a population of 5,000 or more people and is located within 15 miles of the Project dam:

There are no cities, towns or similar political subdivisions within 15 miles of the Project with a population of 5,000 or more people.

iii. Every irrigation district, drainage district, or similar special purpose political subdivision:

A. In which any part of the Project, and any Federal facilities that would be used by the Project, would be located:

Green Mountain Conservation District
P.O. Box 1329
Trout Creek, MT 59874

No Federal facilities will be used by the Project.

B. That owns, operates, maintains, or uses any project facilities that would be used by the Project:

None.

iv. Every other political subdivision in the general area of the Project that there is reason to believe would likely be interested in, or affected by, the application:

Town of Plains
P.O. Box 567
Plains, MT 59859

v. All Indian tribes that may be affected by the Project:

Confederated Salish and Kootenai Tribes of the Flathead Reservation
P.O. Box 278
Pablo, Montana 59855

Chippewa Cree Tribe of Rocky Boy's Indian Reservation
96 Clinic Road
Box Elder, Montana 59521

Blackfeet Nation
P.O. Box 850
Browning, Montana 59417

Kootenai Tribe of Idaho
P.O. Box 1269
Bonners Ferry, Idaho 83805-1269

Coeur d'Alene Tribe
P.O. Box 408
Plummer, Idaho 83851-0408

Kalispel Tribe of Indians
P.O. Box 39
Usk, Washington 99180-0039

3. Statement of Notification

Given that this is an application for new license under Section 15 of the Federal Power Act, this requirement is not applicable.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NorthWestern Energy

Thompson Falls Hydroelectric Project
FERC PROJECT NO. 1869

Subscription and Verification

This Application for New License for the Thompson Falls Hydroelectric Project is executed in the:

STATE OF: MONTANA

COUNTY OF: SANDERS

by:

John D. Hines
Vice President, Supply and Montana Government Affairs
1313 North Last Chance Gulch
Helena, Montana 59604

John D. Hines, being duly sworn, deposes and says that the contents of this application are true to the best of his knowledge or belief. The undersigned applicant has signed this application this 7 day of Dec, 2023.

NorthWestern Corporation
A Delaware Corporation
D/b/a NorthWestern Energy

By: John D Hines
John D. Hines

Subscribed and sworn to before me, a Notary Public of the State of Montana this 7th day of December, 2023.

/SEAL/

SUMMER SUZANNE MARSTON
NOTARY PUBLIC for the
State of Montana
Residing at Helena, Montana
My Commission Expires
June 27, 2025

NOTARIAL SEAL — SUMMER SUZANNE MARSTON — STATE OF MONTANA

Notary Public No. __________

My Commission expires: __________

Thompson Falls Hydroelectric Project
FERC Project No. 1869

Volume I of IV (Public)

Final License Application
Exhibit A: Project Description

Prepared by:

NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
Portland, OR 97239

American Public Land Exchange Missoula, MT 59802

December 2023

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List of Abbreviations and Acronyms

CFR	Code of Federal Regulations
cfs	cubic feet per second
El.	elevation
FERC	Federal Energy Regulatory Commission
flow	Project discharge
hp	horsepower
kV	kilovolts
kVA	kilovolt amps
kW	kilowatts
MVA	megavolt-amperes
MW	megawatt
rpm	revolutions per minute
USFS	United States Forest Service
V	volts

1. Exhibit A – Project Description

1.1 Thompson Falls Project

The Thompson Falls Project is located on the Clark Fork River in Sanders County, Montana and has an installed capacity of 92,370 kilowatts (kW). Preliminary development of the Thompson Falls Project began in June 1912, by the Thompson Falls Power Company. Construction commenced in May 1913, and the first generating unit was placed in service on July 1, 1915. The sixth generating unit was placed in service in May 1917. An additional powerhouse containing a seventh unit was completed in 1995. NorthWestern acquired the Thompson Falls Project in 2014 and has been operating it continuously since that time as a part of its integrated electric system.

The original license for the Thompson Falls Project was issued effective January 1, 1938, and expired on December 31, 1975. The current license was issued December 28, 1979, amended on April 30, 1990, and expires December 31, 2025.

The Project consists of: (1) a Main Channel Dam, a concrete gravity structure 1,016 feet long and 54 feet high with an overflow section 913 feet long having 8-foot-high fixed wheel panels atop 8-foot-high flashboards with four radial gates; (2) a smaller dam of the same type 449 feet long and 45 feet high with an overflow section 289 feet long having 8-foot-high fixed wheel panels atop 4 -foot flashboards, and located west of the Main Channel Dam in a dry channel of the river; (3) a rock cut canal 450 feet long and 80 feet wide; (4) six main penstocks 14 feet in diameter; (5) the original steel frame and masonry powerhouse containing six generation units, three rated at 7,000 kW, one rated at 6,000 kW and two rated at 6,375 kW; (6) two generator step-up transformers; (7) two 6.6-kilovolt (kV) generator leads; and (8) appurtenant facilities.

The newer development includes: (1) a 78-foot wide, 300-foot long intake channel; (2) a 78-foot wide, 200-foot long powerhouse containing one 52,613 kW generating unit; (3) a 100-foot wide, 1,000-foot long tailrace channel; (4) a 1,000-foot long access road with a 360-foot long bridge over the reservoir and a 135-foot long bridge over dry creek; (5) a short 115 kV generator lead line running from the generator, through a generator step-up transformer, connecting to the transmission grid on the third floor of the Units' 1-6 powerhouse; and (6) appurtenant facilities.

The proposed Project boundary extends approximately 0.3 mile downstream and 10 miles upstream of the Project's dams. The proposed Project boundary encompasses a total of 1,536 acres, consisting of 1,092 acres of reservoir and 444 acres of non-reservoir. The reservoir is 400 to 1,800 feet wide. The active storage capacity of the reservoir is approximately 15,000 acre-feet, with a total storage capacity of approximately 20,400 acre-feet. The Thompson River, a major tributary to the Clark Fork River, enters the reservoir about 6.2 miles upstream of the dam. Its lower 0.2 miles is included within the proposed Project boundary. The proposed Project boundary is a combination of a contour elevation of 2,397 feet elevation at the dam (elevation of contour increase proceeding upstream) for most of the reservoir, and a metes and bounds description that incorporates areas above the contour elevation to encompass Project facilities, recreation sites, and all elements of the Thompson Falls Hydroelectric Dam Historic District.

2. Structures

The primary structures consist of two curved concrete gravity dams with overflow spillways and two powerhouses.

2.1 Dams and Spillways

The Main Channel Dam is a curved gravity structure with an ogee spillway section that is 913 feet long with a net spillway length of 817 feet and an average height of 18 feet above the riverbed. It contains 34 bays divided by concrete piers or permanent steel frames on 24-foot-wide centers, which support the flashboards and removable fixed wheel panels. The remaining part of the Main Channel Dam is a short length of non-overflow gravity wall at the right end of the spillway and two radial gates. The spillway crest is at El. 2,380.0 and the top of the fixed wheel panels establish the normal pond at El. 2,396.5. A concrete apron extends 30 to 50 feet downstream of the entire spillway section. An upstream fish passage facility is located in the right abutment of the non-overflow section.

Four 41-foot-wide by 18-foot-high radial gates are located in spillway bays 16, 17, 26, and 27. An emergency propane-powered generator power supply system is in place at the dam. The fixed wheel panels are installed and removed by a crane, which travels along tracks on a 10-foot-wide bridge over the full length of the spillway. The hydraulic lift is stored permanently in a metal enclosure at the left side of the dam. In a high flow event, the flashboards can be released by torch cutting the bolt that secures the tripping latch and releases the entire assembly free of the flashboard support structure.

Upstream fish passage is provided at the Project via an upstream fish passage facility in the right non-overflow section of the Main Channel Dam. The 48-step pool reinforced concrete fish passage facility includes a fish sampling facility consisting of holding pool and trapping mechanism(s), fish crowder, fish lock, sampling facilities' shelter, several sampling and handling tables, and the sampling facility water supply pipelines.

The Dry Channel Dam, located on a former channel of the river, is separated from the Main Channel Dam by an island. It is a concrete gravity dam curved in plan and consists of two distinct structures. A non-overflow sluiceway section, 122 feet long and 38 feet high is located at the right side of the dam. It contains 10, 5-foot-wide by 6.5-foot-tall sluiceways that were originally controlled by slide gates operated from the crest of the dam. The slide gates were permanently closed circa 1942 and in 1990 bulkheads were constructed within each sluiceway. The second part of the dam is an overflow spillway with an ogee crest. It has an overall length of 289 feet and an average height of 17 feet above the riverbed. The overflow spillway contains 12 bays, each containing six panels, with steel flashboard supports on 24-foot centers. The spillway crest is at

El. 2,384.0, but storage is increased by 4-foot flashboards and 8-foot fixed wheel panels similar to those on the Main Channel Dam, which brings the reservoir level to El. 2,396.5.

A hydraulic lift for removing fixed wheel panels is stored permanently in a metal enclosure at the left side of the dam. As with the Main Channel Dam, the flashboards of the Dry Channel Dam can be released by torch cutting the bolt that secures the tripping latch and releasing the entire assembly from the flashboard support structure.

2.2 Forebay

The forebay for the original powerhouse consists of an excavated channel about 450 feet long and 80 feet wide that broadens out across the face of the powerhouse intake section. A short concrete gravity section borders one end of the forebay adjacent to the powerhouse intake. A 300-foot-long by 78-foot-wide excavated channel leads from the Project reservoir to the new powerhouse containing Unit No. 7 but does not include a forebay.

2.3 Intakes

The intake structure for the original six-unit powerhouse lies at the end of an excavated forebay channel. It is a concrete gravity structure, 258-feet-long and 40-feet-high, with an angled wing wall at each end. The area downstream of the left wingwall was filled with rockfill from the excavation for the powerhouse structure. The intake contains six 14-foot-diameter main turbine penstocks, two 6-foot 8-inch-diameter exciter turbine penstocks, and their associated intake gates and trashracks. The top of the intake is at El. 2,400.0. At the right end of the main wall is a 10-foot by 14-foot gate and sluiceway for diverting trash around the powerhouse.

The reinforced concrete intake and trashrack for the new powerhouse is located at the end of a 140-foot-long by 72-foot-wide and 50-foot-deep rock-cut intake channel and comprises three closed rectangular water passageways each 39 feet high, 18 feet wide, and 75 feet long, sloping directly to the concrete semi-spiral case of the turbine. Each intake passageway is equipped with a service gate operated by a hydraulic hoist. The top of the intake at El. 2,405.0 providing 3.1 feet of freeboard above maximum probable maximum flood water surface elevation and 5.2 feet of freeboard under inflow design flood conditions.

2.4 Powerhouses

The original powerhouse consists of a mass concrete substructure, a masonry rock wall, concrete and structural steel superstructure, and concrete floor and roof slabs supported on steel framing. The structure is 292 feet long, 97 feet wide and 52.5 feet high from the main floor to the eaves and an additional 5.5 feet from the eaves to the ridge. The structure has a concrete foundation with a basement floor approximately 9 feet below the main floor and a concrete substructure 40 feet below the basement floor. A 75-ton traveling crane services the powerhouse. There are five generators rewound to 8.75 megavolt-amperes (MVA) each and one generator rewound to

7.5 MVA. The total installed capacity of the six turbine-generator units is approximately 39.76 megawatts (MW) at a normal net head of 54 feet.

The switchyard and transformers are located inside the powerhouse. Two 3-phase transformers each rated at 30,000 kilovolt amps (kVA)[1] step up the generator voltage of 6.6 kV to a transmission voltage of 115 kV.

The Unit No. 7 powerhouse, completed in 1995, is a cast-in-place reinforced concrete gravity structure founded on rock and includes an integral intake and headworks. A substantial portion of the powerhouse is located below grade. The depth of the powerhouse into rock was established by the amount of submergence below tailwater required by the turbine runner for protection against cavitation damage.

The roof deck of the powerhouse is located at El. 2,370.0. The generator is located immediately below the roof deck, which is provided with a hatch cover to allow installation and removal of the generator and turbine rotating parts. The hatch and all major equipment within the powerhouse are serviced by an external 285-ton traveling gantry crane. The primary laydown area for major equipment is on the roof deck slab. A cantilever on the gantry crane allows the auxiliary hook to handle the draft tube stoplogs.

The configuration of the powerhouse is based primarily on the turbine water passageways and the space needed for auxiliary equipment. The semi-spiral case is designed to direct the water evenly around the turbine distributor ring with minimum hydraulic losses and tapers from 37-feet-high to 12-feet-high. The turbine water passageways are constructed of reinforced concrete. A single pier divides the horizontal leg of the draft tube and two stoplog gates are provided to isolate the turbine water passageways from the tailrace during maintenance.

The turbine is a vertical shaft, double-regulated Kaplan type rated 52.6 MW at 54.5 feet net head and 94.7 revolutions per minute (rpm). Water is directed to the turbine distributor through rectangular concrete intake passageways and a concrete semi-spiral case. The turbine wicket gates and runner blades which control discharge and power are positioned by means of an oil pressure system. The main generator step-up transformer is located on a concrete foundation adjacent to the powerhouse. A concrete curb is provided at the transformer to retain transformer oil in case of a rupture.

2.5 Tailrace

Flow through the original powerhouse is discharged into a tailrace channel that runs perpendicular to the discharge and extends downstream beyond the powerhouse and re-enters the river. Flow

[1] kVA is 1,000-volt amps. A volt is electrical pressure. An amp is electrical current.

from the Unit 7 powerhouse enters a 1,000-foot-long by 100-foot-wide tailrace that flows directly into the river in the direction of the river flow.

3. Impoundment

The Project encompasses about 10 miles of river and reservoir which is 400 to 1,800 feet wide. Active storage capacity of the reservoir is approximately 15,000-acre-feet, total volume is approximately 20,400 acre-feet. At the normal maximum reservoir level El. 2,396.5, the reservoir surface area within the proposed Project boundary is approximately 1,092 acres, not including the islands. The maximum depth of the reservoir is approximately 90 feet.

3.1 Turbines/Generators

The Thompson Falls Project has an authorized installed generating capacity of 92.37[2] MW (**Table 2-1**).

Table 3-1: Authorized Installed Capacity per 18 CFR 11.1

Unit No.	Authorized Turbine Capacity (MW)	Authorized Generator Capacity (MW)	Limiting Factor	Authorized Installed Capacity (MW)	Turbine Flow (cfs)
1	7.65	7.00	Generator	7.00	1,800
2	7.01	7.00	Generator	7.00	1,833
3	7.65	7.00	Generator	7.00	1,800
4	6.38	6.00	Generator	6.00	1,833
5	6.38	7.00	Turbine	6.38	1,833
6	6.38	7.00	Turbine	6.38	1,833
7	52.61	57.06	Turbine	52.61	12,320
Total				**92.37**	**23,252**

Notes: MW = megawatts; cfs = cubic feet per second

3.1.1 Turbines

The original powerhouse Units 1-6 turbines are Vertical Francis units with a rated net head of 54 feet rotating at 100 rpm. Units No. 1 and 3 turbine runners are American Hydro rated at 10,200 horsepower (hp) and 1,800 cubic feet per second (cfs). Unit No. 2 is an Allis Chalmer runner rated at 9,350 hp at 1,833 cfs. Units No. 4, 5 and 6 turbine runners are Allis Chalmer runners with a nameplate rating of 8,500 hp with a rated flow of 1,833 cfs. The Unit 7 turbine is a Kvaener vertical shaft, double-regulated Kaplan type rated 70,150 hp at 54.5 feet net head and 94.7 rpm with a rated flow of 12,320 cfs.

[2] Authorized installed capacities calculated per 18CFR §11.1(i)

3.1.2 Generators

Units No. 1 through 6 generators are three phase, 60-cycle, synchronous type, manufactured by General Electric Company. Units 1, 2, 3, 5, and 6 have been rewound to 8,750 kVA with a power factor of 0.80 and operate at 6,600 volts (V). The Unit No. 4 generator has a nameplate rating of 7,500 kVA with a power factor of 0.8. The Unit No. 7 generator has a nameplate rating of 63,400 kVA with a power factor of 0.9 and operates at 13,800 V.

4. Primary Transmission Lines

The project has three generator lead lines that constitute primary transmission lines under FERC's regulations. Generating Units 1-3 and 4-6 are connected to two generator step-up transformers that are connected to circuit switchers by two 6.6 kV generator lead lines that are approximately 50 ft. long. A 300 ft. long 115 kV generator lead line for Unit 7 also passes through the roof of the Units' 1-6 (original) powerhouse then down to its own breaker. All 5 breakers and both circuit switchers are then connected to the 115kv buss.

Project generation is interconnected to NorthWestern's transmission system by the 115 kV buss on the ceiling of the Units' 1-6 (original) powerhouse. Four 115 kV transmission lines on the roof of the Units' 1-6 (original) powerhouse, the Burke A and B and the Kerr A and B lines, pass through the roof and each are connected to a breaker on the third floor. This is where the Project interconnects to the grid.

5. Appurtenant Facilities and Equipment

5.1 Electrical Equipment

The Units' 1 through 6 powerhouse (original powerhouse) contains two three-phase, air-cooled generator step-up transformers rated at 30,000 kVA each and manufactured by ABB. The Unit 7 powerhouse (new powerhouse) is connected to a three-phase, air-cooled generator step-up transformer rated at 63,000 kVA also manufactured by ABB.

5.2 Mechanical Equipment

The mechanical equipment consists of conventional pumps, compressors, and other powerhouse equipment. A 75-ton bridge crane, which travels over the length of the powerhouse, is provided to service and maintain the Units' 1-6 turbine/generating equipment. A 285-ton outdoor bridge crane is in place to serve the Unit 7 powerhouse.

Each turbine is controlled by electro-hydraulic governors. The governors sense speed fluctuations and cause the hydraulic gate operator to adjust the wicket gate openings.

6. Federal Lands

The proposed Project boundary extends approximately 0.3 mile downstream and approximately 10 miles upstream of the Project's dams. The proposed Project boundary encompasses a total of 1,536 acres, consisting of 1,092 acres of reservoir and 444 acres of non-reservoir. The acreage includes 66.9 acres of federal lands managed by the United States Forest Service (USFS). The federal lands are listed in **Table 6-1**.

Table 6-1: Thompson Falls Project – Federal Lands Within Proposed Project Boundary.

Township	Range	Section	Subdivision	Acres	Agency
21N	28W	15	Government Lot 1	0.3	USFS
21N	28W	17	Government Lots 5-11	49.6	USFS
21N	28W	18	Government Lots 8-10	4.3	USFS
21N	28W	21	Government Lot 1	1.45	USFS
21N	28W	22	Government Lots 3-4	11.25	USFS
Total				**66.9**	

Thompson Falls Hydroelectric Project
FERC Project No. 1869

Final License Application

Volume I of IV (Public)
Exhibit B: Operation and Resource Utilization

Prepared by:
NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
Portland, OR 97239

December 2023

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List of Abbreviations and Acronyms

cfs	cubic feet per second
El.	elevation
FERC	Federal Energy Regulatory Commission
HSO	Hydro System Operator
kW	kilowatt
MW	megawatt
MWh	megawatt hours
NorthWestern	NorthWestern Energy
Project	Thompson Falls Hydroelectric Project
Thompson Falls Project	Thompson Falls Hydroelectric Project
U.S.	United States
USGS	United States Geological Survey

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1. Operation

The Thompson Falls Hydroelectric Project (Thompson Falls Project or Project) is operated in a manner consistent with license conditions and safe operating procedures. NorthWestern Energy (NorthWestern) maintains written procedures to instruct employees on proper methods of operation and maintenance of all structures and equipment. The Project has a robust automation and control system that allows for both automated and manual operation of the plant. The plant is typically run in the automated mode. Detailed procedures are written and available to plant personnel for actions under abnormal operations or emergency conditions. The Emergency Action Plan, on file with the Federal Energy Regulatory Commission (FERC), is to be followed in the event of an incident that results in a potential hazard to life or downstream property.

The Project is staffed during regular business hours and at least one operator is at the plant 10 hours a day, 7 days a week. Routine daily operations result in the Project being fully inspected on weekdays with more limited inspections during weekend periods. Routine or daily operations include the visual inspection of all major Project features.

The Project is also monitored remotely from the Generation Control Center, located in the Rainbow Shop building in Great Falls, Montana, by the Hydro System Operator (HSO). A pool of maintenance personnel is headquartered at the Rainbow Shop and can be dispatched to help address abnormal operations or emergency conditions at any of NorthWestern's hydro facilities.

Satisfactory operation of Plant Control Systems is assured through their continuous use by the HSO, which monitors all key operating parameters during plant operations. Assurance of satisfactory operating conditions for the spillway gates is through the periodic use and testing of the systems. At a minimum, the gates are tested annually.

Other inspections include periodic inspections by NorthWestern engineering personnel on a periodic basis, such as when conducting measurements for the Surveillance and Monitoring Plan, FERC inspections, and the 5-year independent consultant inspections.

1.1 Normal Operations

The Project is operated to provide baseload and flexible generation within the reservoir elevation and minimum flow requirements of the license. Baseflow generation uses the river inflow by matching reservoir outflows to generate electricity while maintaining a stable reservoir elevation. Flexible capacity increases or decreases generation from the baseflow, raising or lowering the reservoir elevation as the flow through the units is changed to support changing capacity needs. Under the new license, NorthWestern will utilize up to the top 2.5 feet of the reservoir for flexible generation.

In addition, NorthWestern will generally maintain minimum flow releases of 6,000 cubic feet per second (cfs) or inflow whichever is less. These releases may be temporarily modified if required by operating emergencies beyond NorthWestern's control and for short periods in consultation between NorthWestern, U. S. Fish and Wildlife Service, U.S. Forest Service, Montana Department of Environmental Quality, and Montana Fish, Wildlife and Parks.

The normal maximum reservoir level of elevation (El.) 2,396.5 results in active storage of approximately 15,000 acre-feet between El. 2,396.5 and 2,380. Due to the relatively small storage volume and lack of any significant drawdowns, except for major maintenance activities, no seasonal rule curves or filling schedules are applicable.

In the normal course of operations, planned drawdowns in excess of 2.5 feet may occur as a result of dam safety or maintenance requirements. For example, maintenance work involving:

- Replacing or repairing boards on the spillways
- Work or restoration of the low-level gates
- Skim gate repair
- Repairs or maintenance on the cooling water intake
- Repair or replacement of trash screens
- Repair to trash boom anchors

These maintenance activities may require the reservoir to be lowered below the normal reservoir fluctuation, and as much as 16.5-feet, to a level near or slightly lower than the Main Channel Dam spillway crest. The required depth and duration of the drawdown would be determined based on the needs of the scheduled work.

Certain environmental and operational conditions outside of NorthWestern's control also require the reservoir to be lowered outside of the typical operating window. These unplanned events occur when spring flows exceed the capacity of the combination of the spillway radial gates (less reserve for plant capacity restoration) and the spillway roller panels. Prior to the installation of the new radial gates in 2019, high flows and debris required tripping of stanchions and spill bays approximately every 7 to 10 years. With the installation of the new radial gates, it is estimated that the flow that will trigger stanchion tripping is approximately 112,000 cfs but is also dependent on the amount of debris accumulating at the dam that cannot be passed through the radial gates or spillway bays. It is anticipated this flow capacity without tripping stanchions to be more than the 10-year flood event of 110,335 cfs but less than the 25-year flood event of 122,947 cfs.

When flows near or exceed 112,000 cfs, NorthWestern may have to activate the trippable stanchions to allow the spillway to pass additional flows. When the stanchions are tripped, NorthWestern has to draw the reservoir down to crest to execute repairs on the spillways.

The duration of the drawdown would be dependent on the inflow values. The reservoir would not be able to be maintained at crest to facilitate the repairs until inflows approach the total powerhouse capacity of 23,320 cfs at which time the reservoir would be drafted approximately 16.5 feet. Once inflows reach a manageable level, dam stanchion and board replacement would take 1 to 3 weeks depending on the number of bays in which stanchions were tripped.

Inflow forecasting is performed by the on-site plant operator and the HSO in Great Falls by monitoring the flow in the Clark Fork River via two United States Geological Survey (USGS) gaging stations located upstream from the Project. The farthest upstream is located at St. Regis, Montana, on the Clark Fork River, 21 miles upriver from its confluence with the Flathead River and is read once a day. The gage at Plains, Montana, located 31 miles upstream of the Thompson Falls Project and 6 miles downstream of the confluence of the Flathead and Clark Fork rivers, is read four times a day. The information from these gages provides an advanced estimate of reservoir inflows.

1.2 Flood (High Water) Operations

Due to a lack of significant storage, the Project is not used in a flood control capacity. Flood control is provided by upstream hydropower projects. The Flathead River is a major tributary to the lower Clark Fork River upstream from the Project. The lower Flathead River is regulated by the upstream Hungry Horse and Sėliš Ksanka Qḷispė (formerly Kerr) projects, located on the South Fork of the Flathead River and the Flathead River respectively. The upper Clark Fork main stem is unregulated.

As described previously, USGS stream gages are monitored and communication is maintained with upstream projects to provide an estimate of expected flows entering the Thompson Falls Reservoir. Based on these estimates, when inflows are expected to exceed the capacity of the powerhouses, two of the four radial gates manage flow changes until the flows require removal of spill panels on the Main Channel Dam to provide additional spillway capacity for the excess flow and maintain reservoir elevation. The two additional Main Channel Dam radial gates are generally not used for this purpose but instead remain closed to be used in the event of a powerhouse load rejection whereby the gates can be opened quickly to discharge the rejected powerhouse flows. Once the capacity of Main Channel Dam spill panels is exceeded, the Dry Channel spill panels are opened. Under very high flow conditions, all four radial gates are used in addition to the removal of the spill panels. If additional capacity is needed beyond the spill panels and radial gates, stanchions are tripped at the Main Channel Dam and Dry Channel Dam thus releasing the lower flashboard sections.

The wheeled panels are removed using rail mounted gasoline-powered hydraulic cranes. If needed under an emergency condition, the stanchions can be released at the Main and Dry Channel dams by releasing the tripping latch or by cutting with a torch. In the event of power failure at the radial gates, a standby generator located at the Main Channel Dam automatically starts. The radial gates can be operated from the dam crest, the powerhouse, or remotely by the HSO in Great Falls.

1.3 Adverse Condition Operations Due to Icing

Ice thickness is monitored during periods of ice accumulation on the reservoir. The Design Basis ice thickness is 7 inches. NorthWestern's response to ice cover formation is to maintain a narrow channel between the structures and ice cover. NorthWestern's operating guidelines require ice cutting at the Main Channel Dam whenever the ice cover reaches the spillway bridge and the thickness exceeds 3 inches. Ice cutting at the Dry Channel Dam begins whenever the ice cover reaches the spillway bridge and thickness exceeds 2 inches. When ice is present, crews operate the movable rail mounted hydraulic hoists on the dam crest with attached ice-breaker mechanisms to break up ice along the face of the dam to avoid pressure build up.

2. Energy Production

The Thompson Falls Project has averaged 475,379 megawatt-hours (MWh) of net energy production annually for the 5-year period from 2018 to 2022. During that time, the plant attained a capacity factor of 57.2 percent and an Equivalent Availability Factor of 84.36 percent showing good availability and reliability.

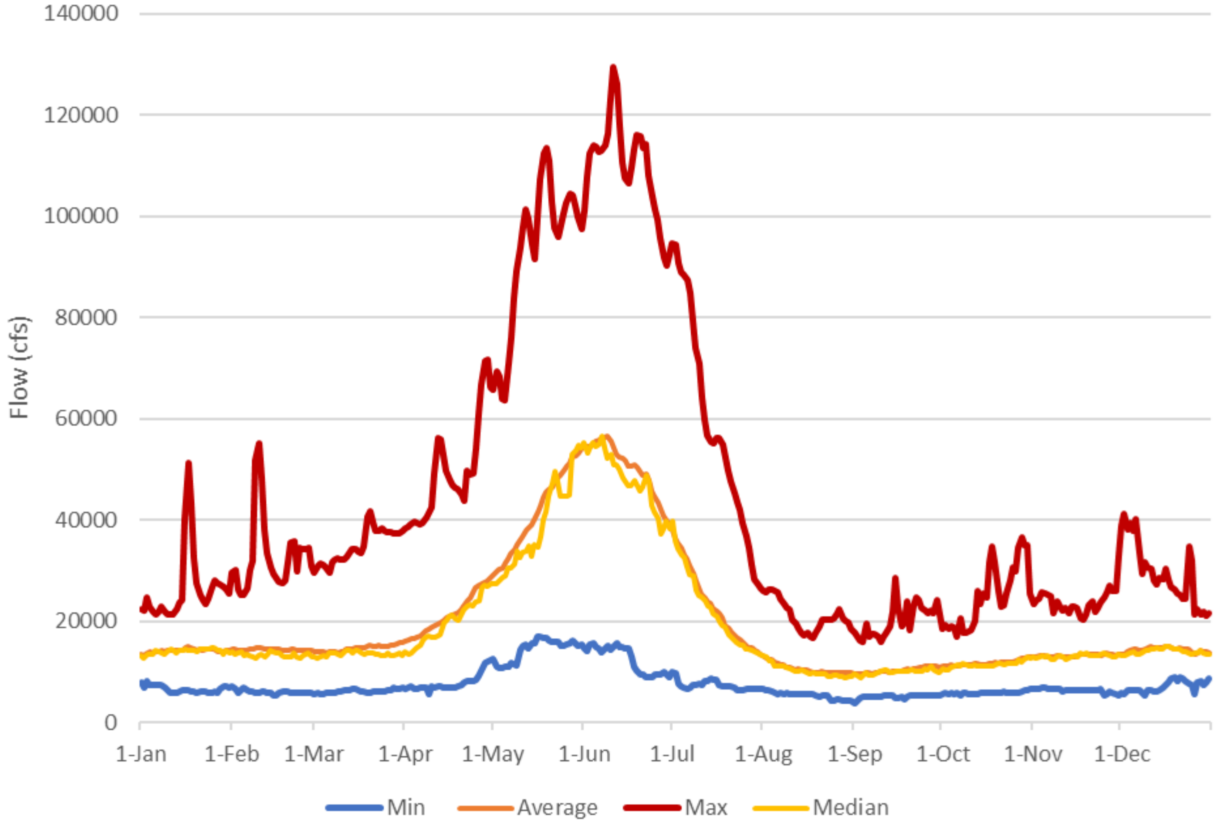
2.1 Flow data

The Clark Fork River is gaged at River Mile 239, near Plains, Montana, 31 miles upstream of Thompson Falls Dam. The Thompson River is the only tributary with significant flow between the Plains gage station and the Project. The Thompson River contributes on average, 2.0 percent of the flow in the Clark Fork River with a range of 0.7 percent up to 5.4 percent. The USGS also maintains a gage on the Thompson River. Flow statistics were derived by combining USGS gages on Clark Fork River at Plains, Montana (USGS gage 12389000) with Thompson River near Thompson Falls (USGS gage 12389500), to calculate streamflow in Clark Fork River at the Project (**Figure 2-1**).

Since October 1, 1910, daily mean streamflow data has been recorded at the USGS gage on the Clark Fork River at Plains. Flow data at the Thompson River (near Thompson Falls) has been recorded from March 1 to September 29, 1911, and then from April 1, 1956, to present. To ensure that the hydrograph is representative of current conditions, Figure 2-1 represents the minimum, maximum, and mean daily flows from April 1, 1956 to 2022. This period of record allows complete datasets for both USGS gages (Clark Fork River at Plains and Thompson River near Thompson Falls) to be analyzed and provides representative data of upstream flows since the construction of upstream dams on the Flathead River.

The ascending limb of the hydrograph begins between mid- and late-March, peaks between late-May and mid-June, and descends to base flow levels around mid-August (Figure 2-1).

Figure 2-1: Daily Minimum, Maximum, Median, and Mean Streamflow at the Thompson Falls Project from April 1, 1956 to 2022.



Source: USGS, Gage Stations 12389000 and 12389500

A summary of the minimum, maximum, and mean daily streamflow from the Clark Fork River at Plains and Thompson River near Thompson Falls gages combined for 2018 through 2022 appears in Table 2-1. Minimum daily streamflow showed little variation from 2018 to 2022, while both mean and maximum daily streamflow showed substantial variation. Mean daily flows were greater in 2018, 2020, and 2022 compared to the 62-year average. Occurrence of annual peak flows ranged from May 19 (2019) to June 14 (2022); this aligns well with the long-term peak flow occurrence (*refer to* Figure 2-1).

Mean daily streamflow in recent years ranged from 16,481 cfs (2021) to 25,467 cfs (2018) and maximum daily streamflow ranged from 59,229 cfs (2021) to 104,475 cfs (2018). Minimum streamflow in 2019 occurred in March; the remaining minimum streamflow values in 2018 and 2020 through 2022 occurred in August or September.

Table 2-1: Summary of estimated minimum, maximum, and mean daily mean streamflow at Thompson Falls Project for 2018, 2019, 2020, 2021, and 2022 and from historic 67-year data (1956-2022).

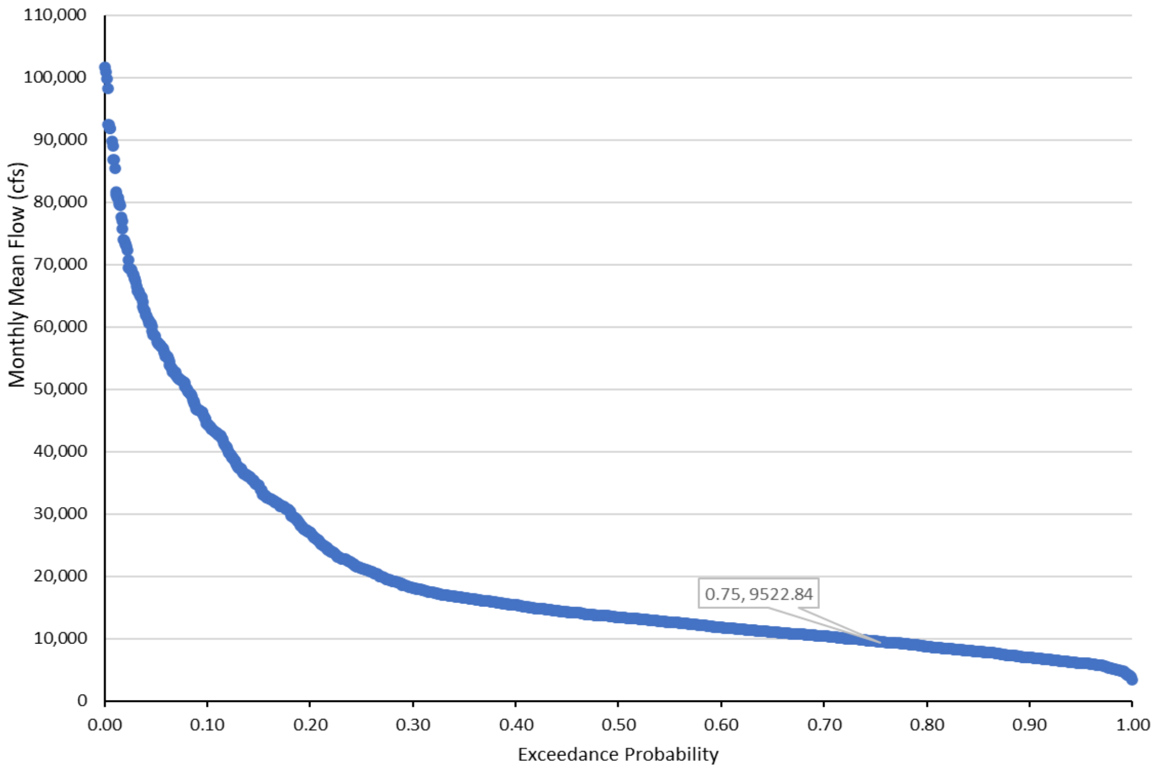
Year	Minimum Daily Streamflow (cfs)	Mean Daily Streamflow (cfs)	Median Daily Streamflow (cfs)	Maximum Daily Streamflow (cfs)
2018	7,895	25,467	16,182	104,475
2019	6,925	16,910	12,088	69,169
2020	7,577	19,712	12,039	79,778
2021	7,164	16,481	12,785	59,229
2022	6,685	20,880	15,662	84,312
1956-2022	**3,806** (1958)	**20,067**	**14,426**	**129,510** (1964)

Note: cfs = cubic feet per second; year of streamflow record in parentheses
Source: USGS, Gage Stations (12389000 and 12389500)

Maximum daily streamflow data was recorded at 129,510 cfs on June 11, 1964, and the minimum daily streamflow for the period of record was 3,806 cfs on September 1, 1958. The average daily streamflow from 1956 to present was calculated from the combined streamflow data of the two recorded USGS gage data to be 20,067 cfs (*refer to* Table 2-1).

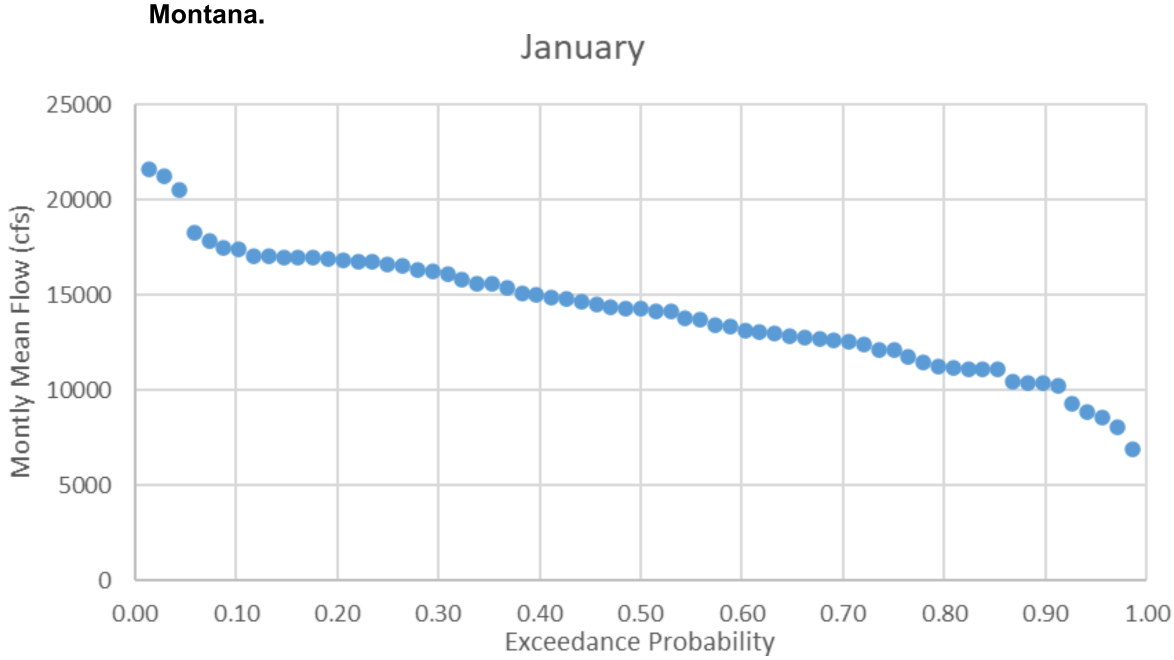
The monthly flow duration curve is shown in **Figure 2-2**. The flow duration curves for each month are shown in **Figures 2-3 – 2-14**.

Figure 2-2: Monthly Flow Duration Curve, Clark Fork River at Thompson Falls Montana.



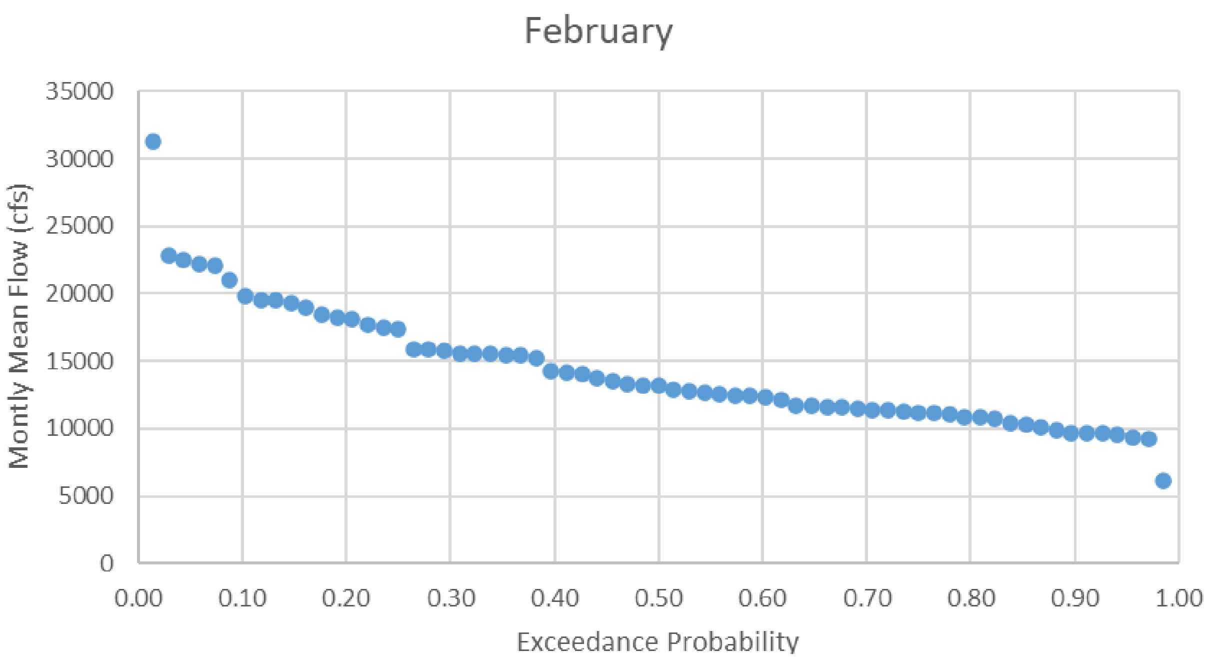
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-3: Monthly Flow Duration Curve for January, Clark Fork River at Thompson Falls Montana.



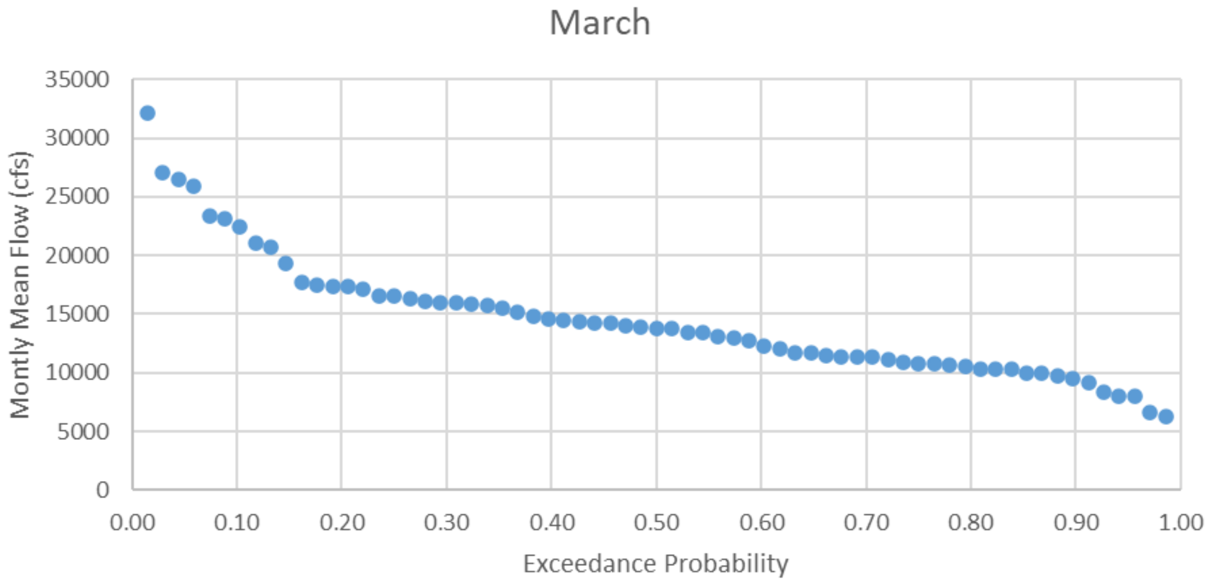
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-4: Monthly Flow Duration Curve for February, Clark Fork River at Thompson Falls, Montana.



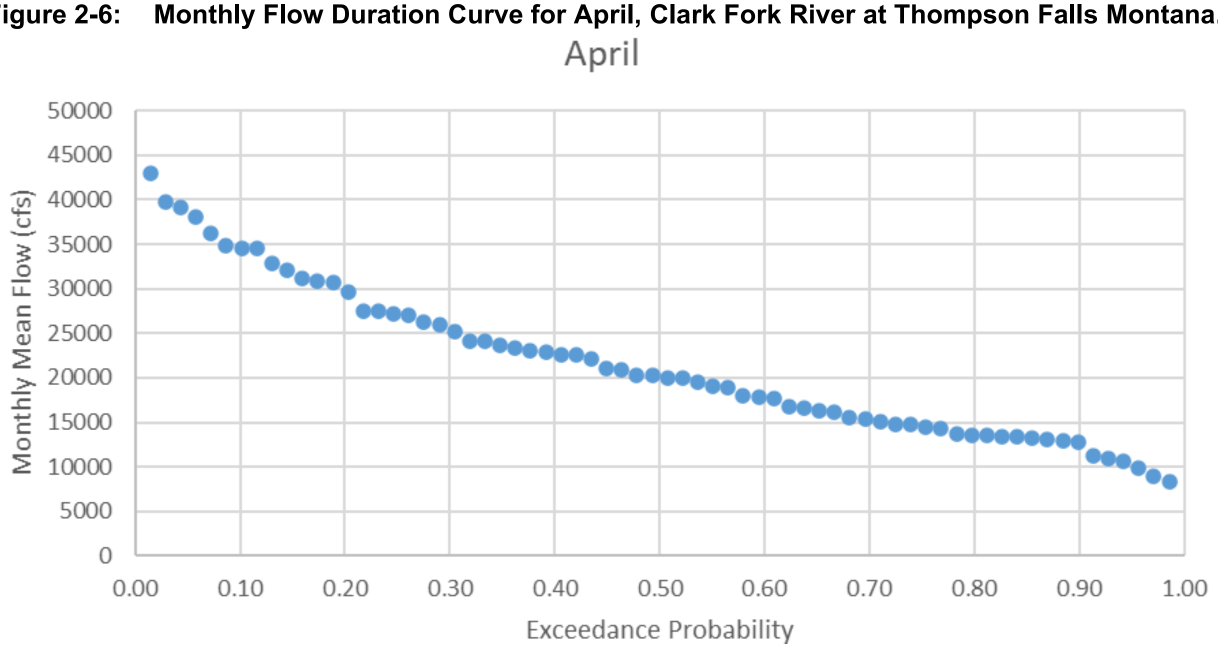
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-5: Monthly Flow Duration Curve for March, Clark Fork River at Thompson Falls, Montana.



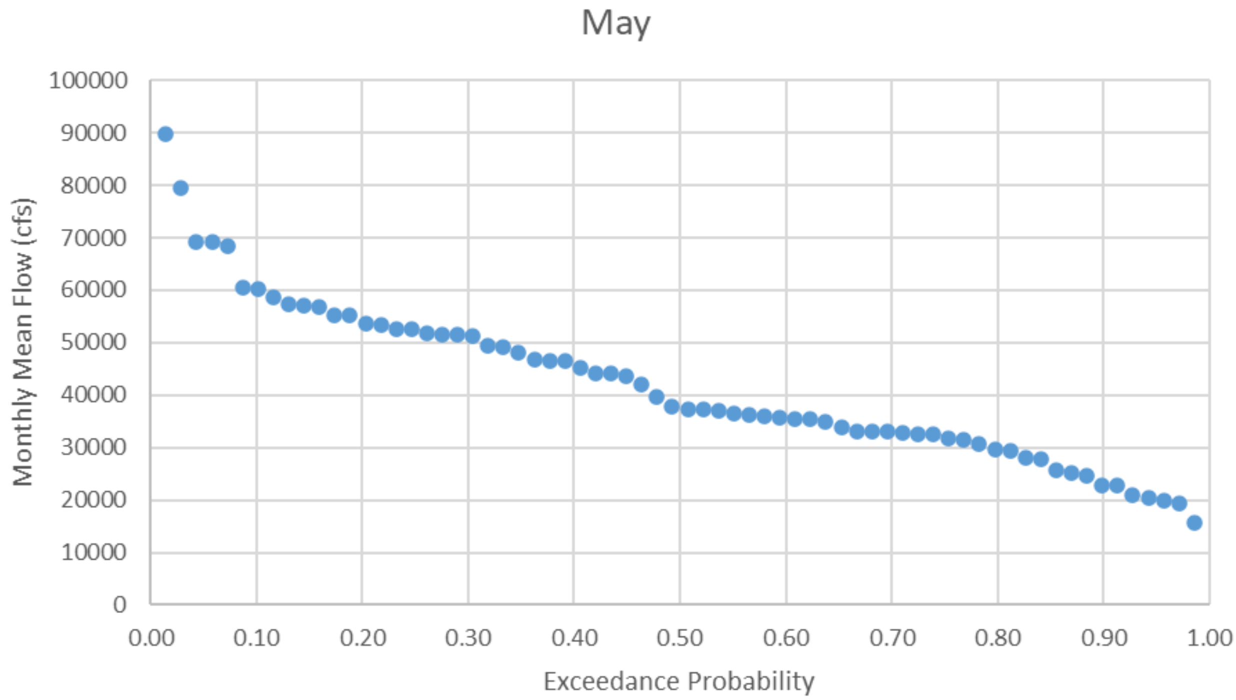
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-6: Monthly Flow Duration Curve for April, Clark Fork River at Thompson Falls Montana.



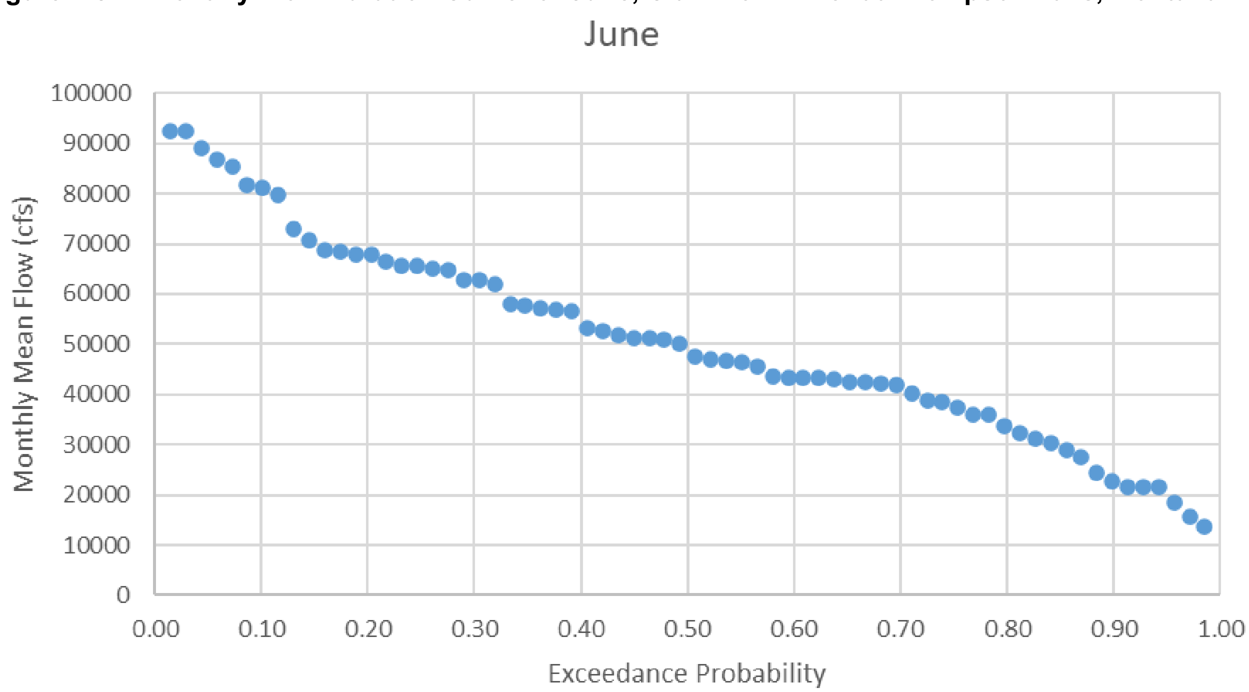
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-7: Monthly Flow Duration Curve for May, Clark Fork River at Thompson Falls, Montana.



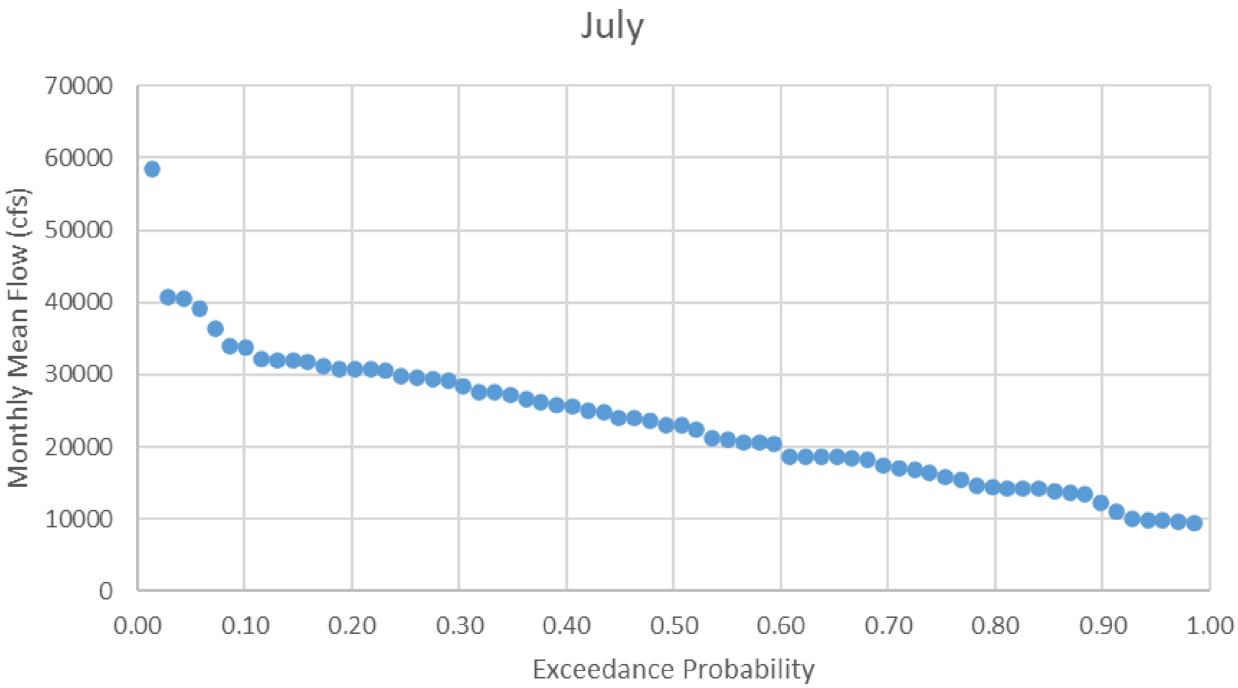
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-8: Monthly Flow Duration Curve for June, Clark Fork River at Thompson Falls, Montana.



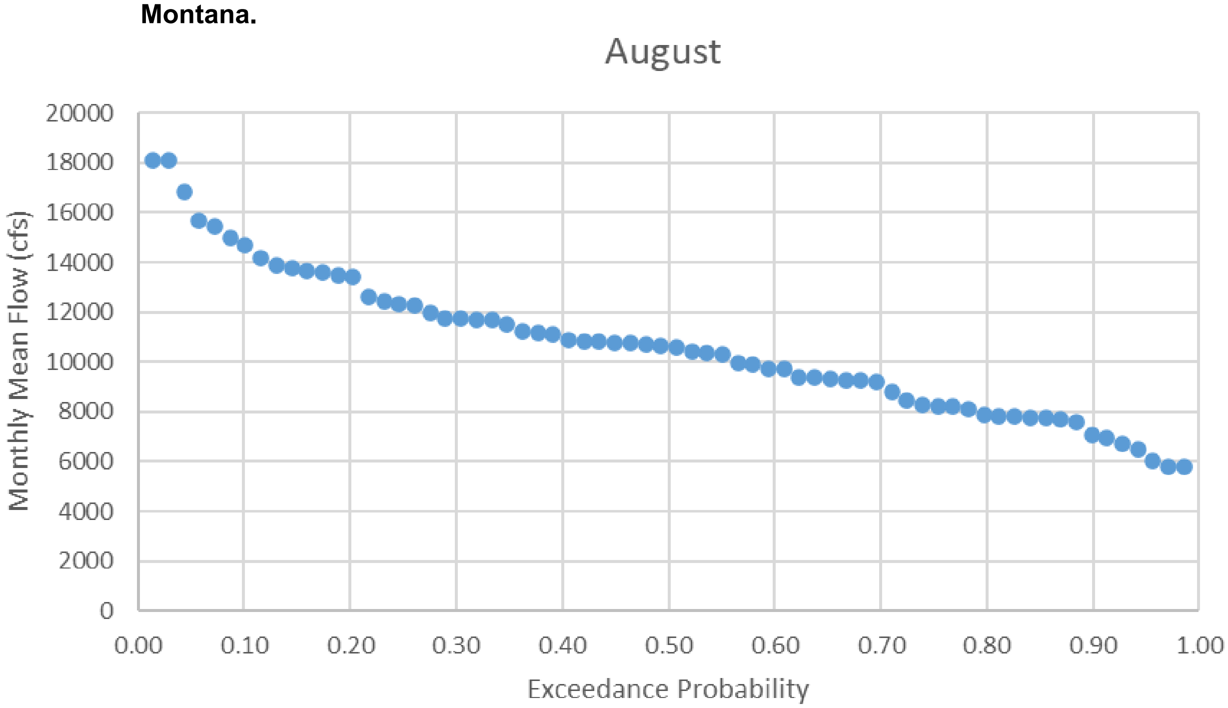
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-9: Monthly Flow Duration Curve for July, Clark Fork River at Thompson Falls, Montana.



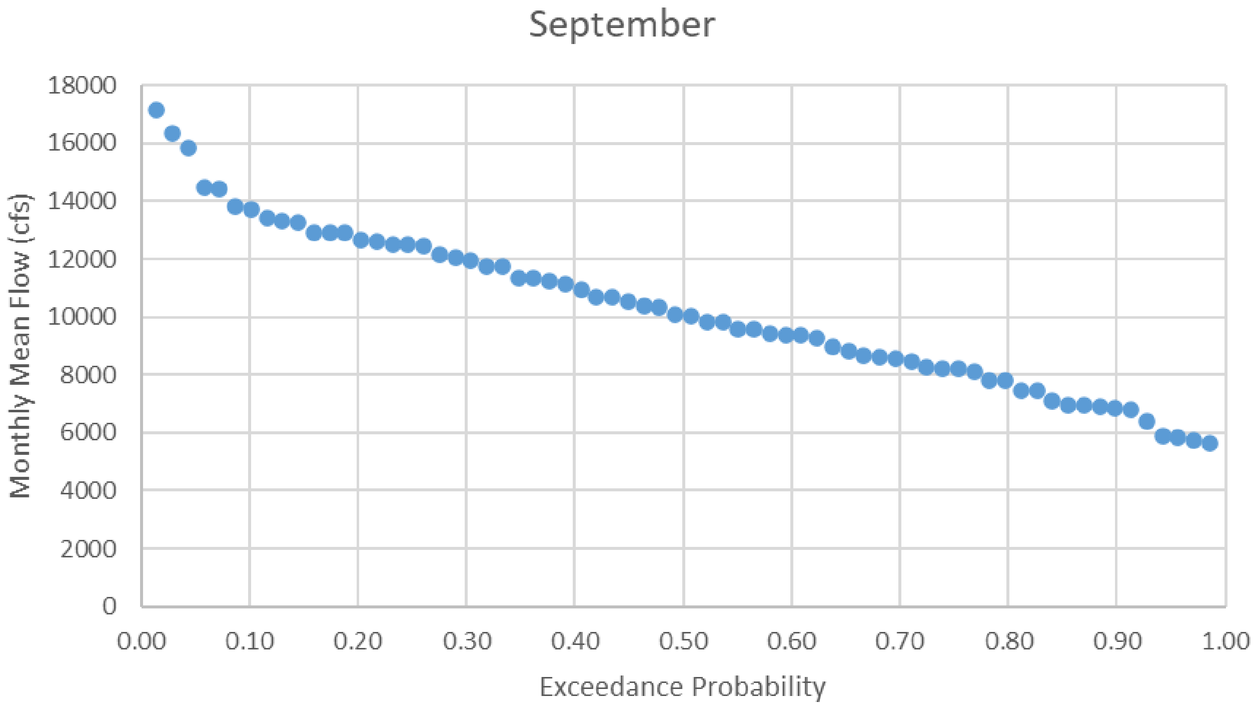
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-10: Monthly Flow Duration Curve for August, Clark Fork River at Thompson Falls, Montana.



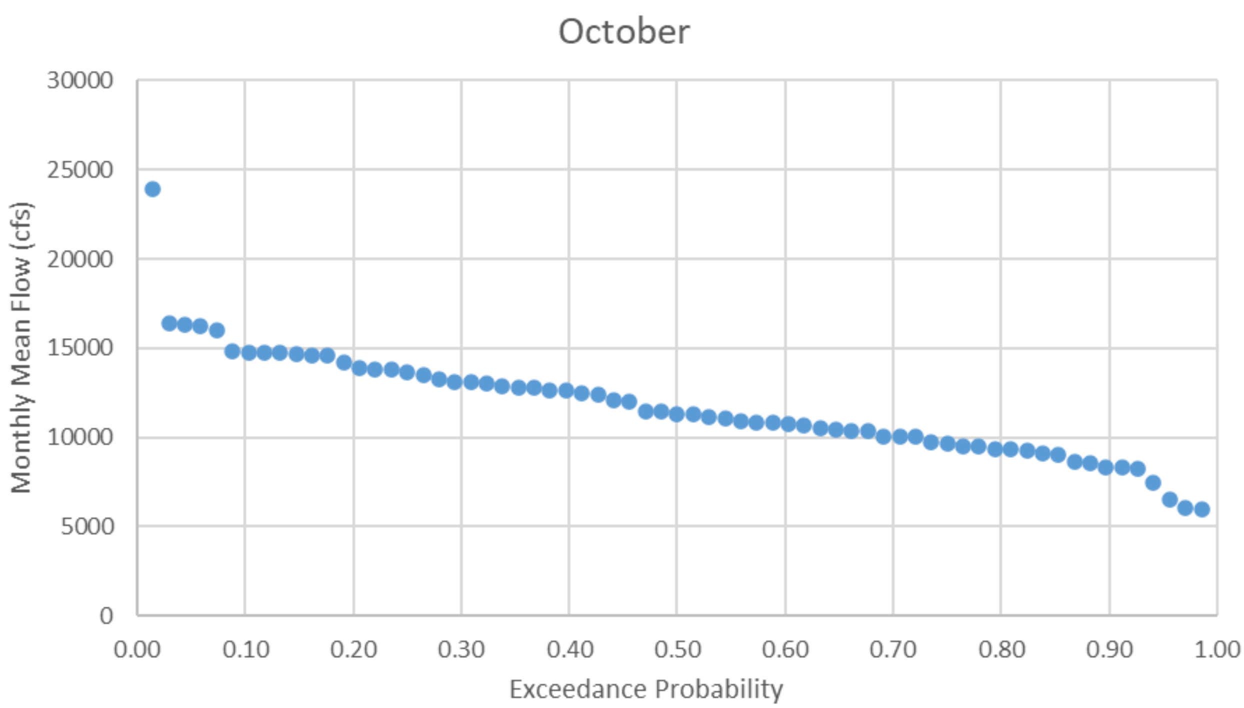
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-11: Monthly Flow Duration Curve for September, Clark Fork River at Thompson Falls, Montana.



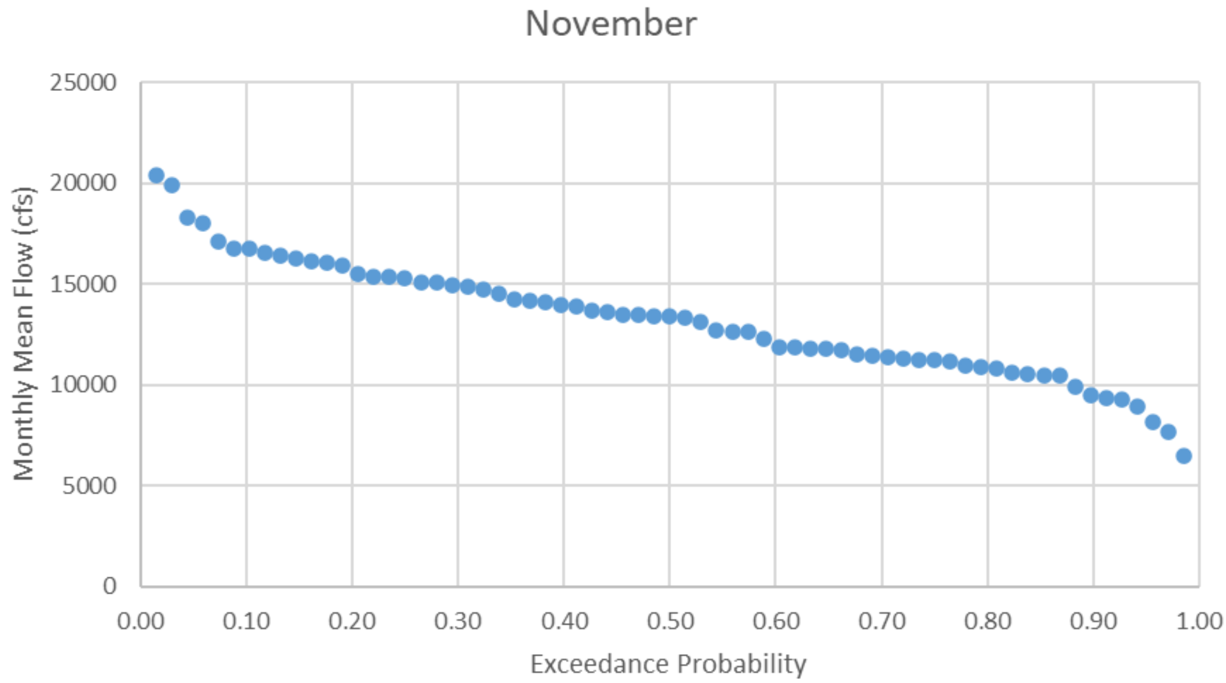
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-12: Monthly Flow Duration Curve for October, Clark Fork River at Thompson Falls, Montana.



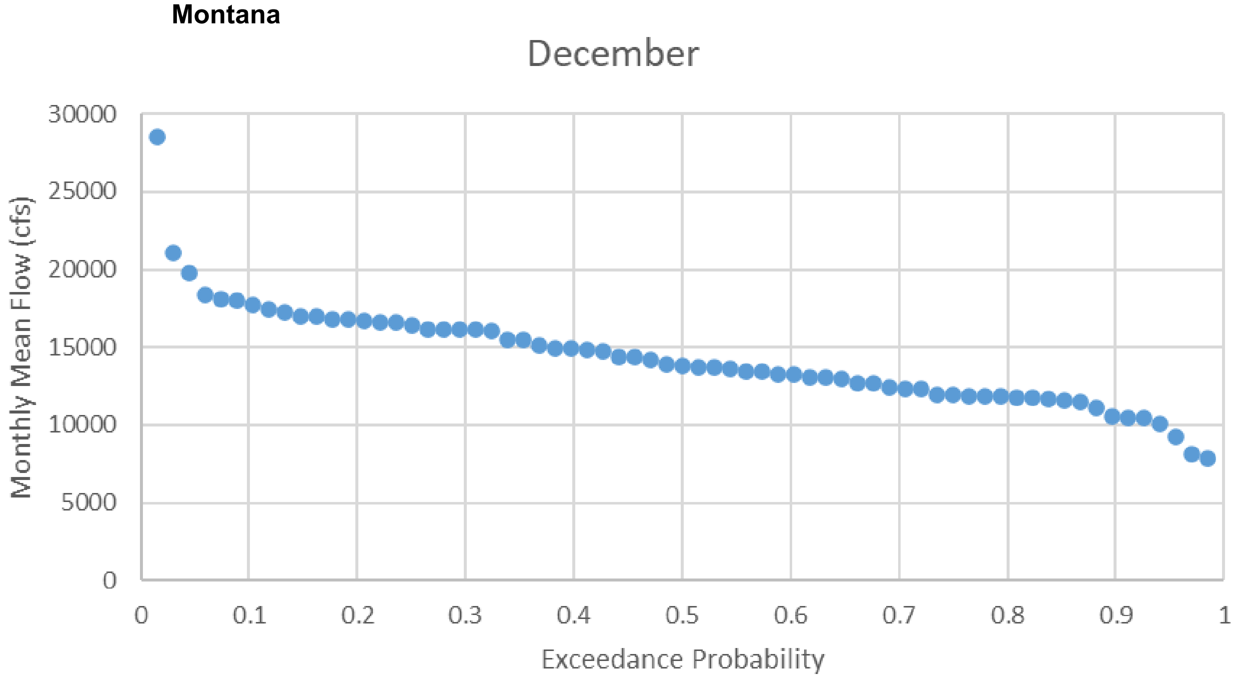
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-13: Monthly Flow Duration Curve for November, Clark Fork River, Thompson Falls, Montana.



Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Figure 2-14: Monthly Flow Duration Curve for December, Clark Fork River, Thompson Falls, Montana



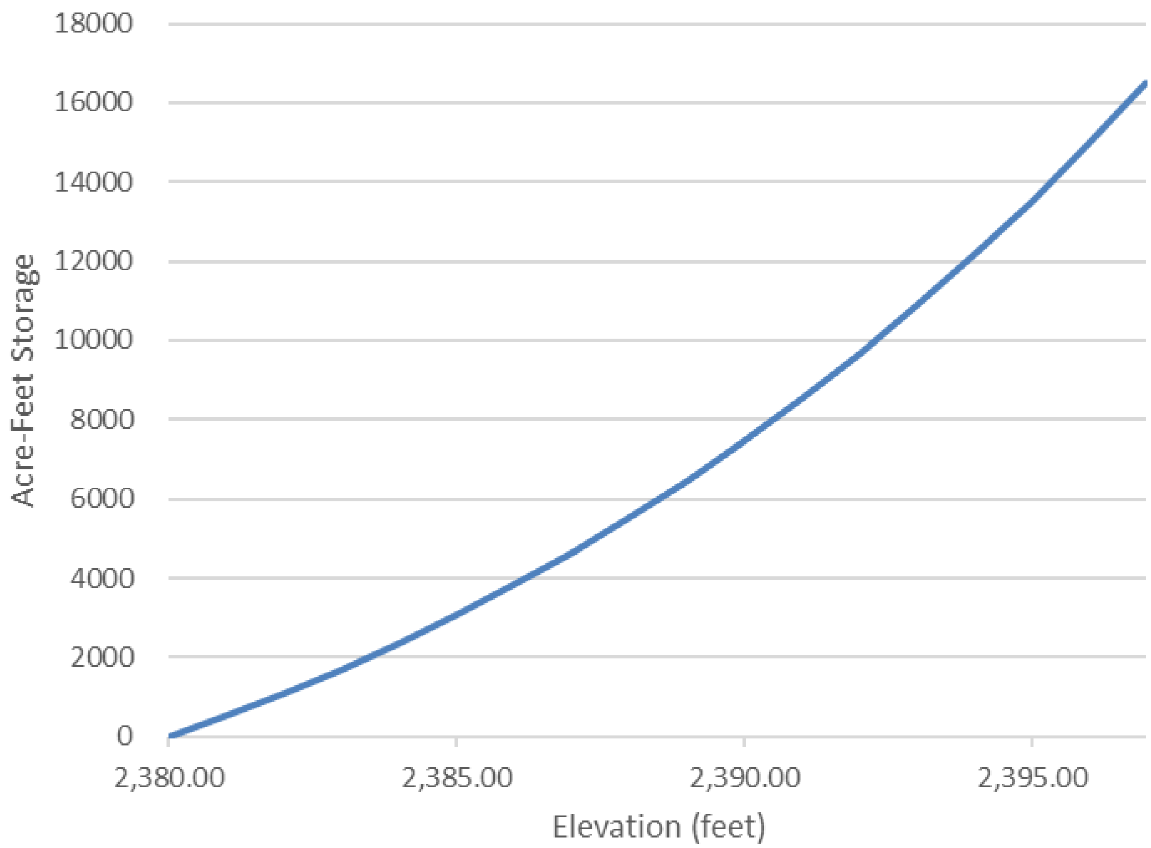
Source: USGS, Sum of Flow at Gage Stations 12389000 and 12389500, April 1, 1956 to February 28, 2023

Dependable capacity is 57 MW, which requires approximately 14,300 cfs, which is at an estimated 50 percent exceedance probability (median monthly flow).

2.2 Impoundment Capacity

Active storage capacity of the Thompson Falls Reservoir is approximately 15,000 acre-feet between crest El. 2,380.0 feet and normal full operating level El. 2,396.5 feet (**Figure 2-15**). Total storage is approximately 20,400 acre-feet. The reservoir surface area is approximately 1,226 acres, not including the islands. The Thompson Falls Reservoir has a maximum depth of more than 90 feet. At full powerhouse flow (both powerhouses) (23,252 cfs) the available storage can be discharged in about 8 hours.

Figure 2-15: Elevation Capacity Curve.



2.3 Hydraulic Capacity

The hydraulic capacity of the original six-unit powerhouse is 10,800 cfs. The hydraulic capacity of the Unit 7 powerhouse is 12,320 cfs. The total combined powerhouse capacity is 23,252 cfs.

2.4 Tailwater Rating Curve

Figures 2-16 and **2-17** show the tailwater rating curve for Units 1-6 and Unit 7, respectively.

Figure 2-16: Tailwater Rating Curve Units 1-6

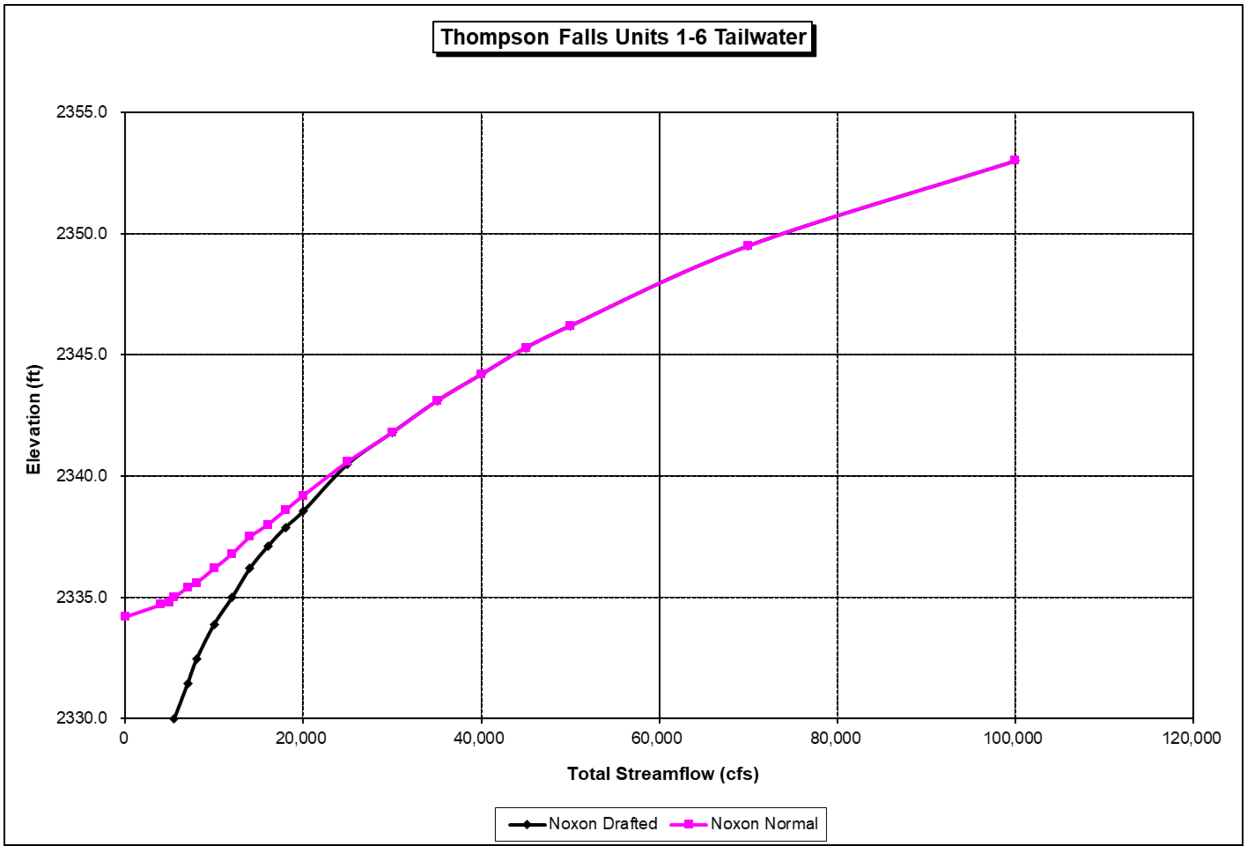
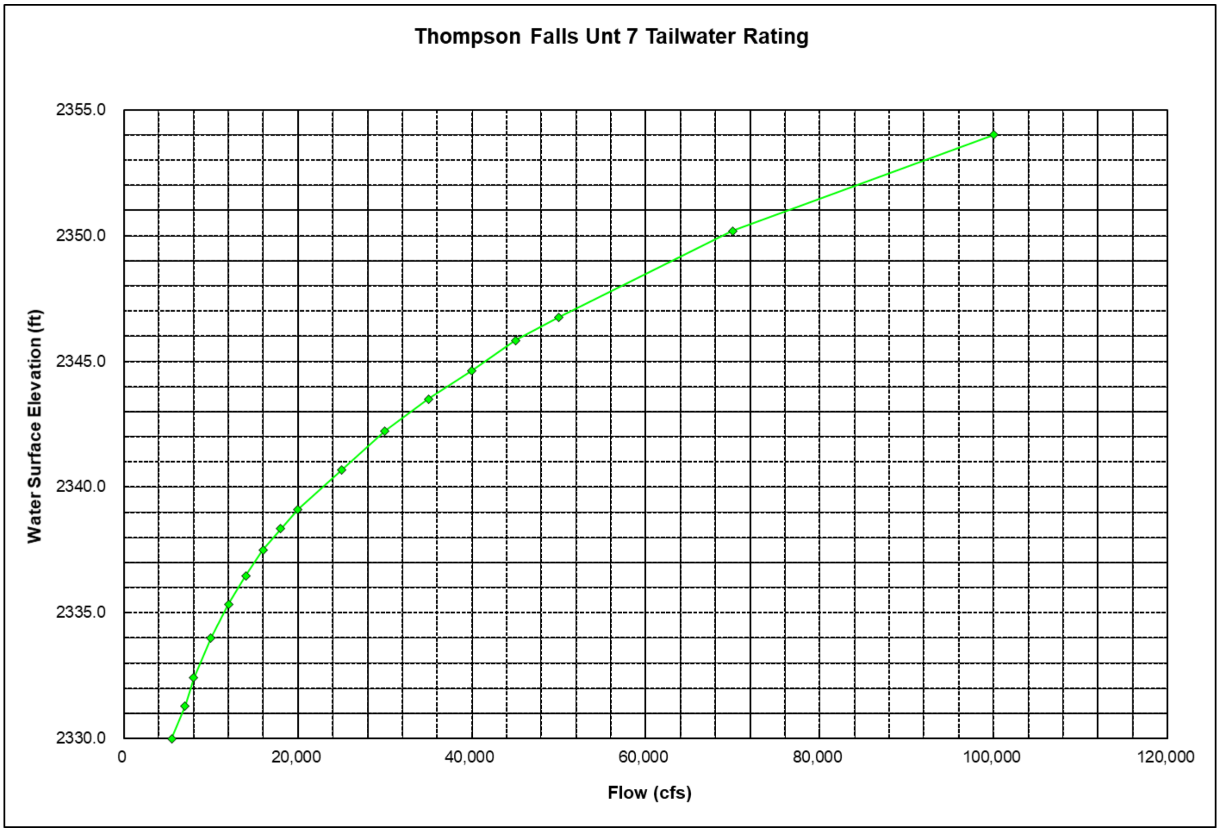


Figure 2-17: Tailwater Rating Curve Unit 7



2.5 Power Plant Capability

Turbine capacities for the Project are shown in **Figures 2-18** through **2-22.**

Maximum operational net head of the Project is 65.5 feet and absolute minimum operational net head is 22 feet. Typical operational net head aside from runoff season is in the 55- to 62-foot range while typical net head during high flows and runoff season are in the 45- to 55-foot range. The decreased net head during high flows is caused by the increase in tailrace elevation.

Figure 2-18: Turbine performance curve for Units 2,4,5,6 (hp)

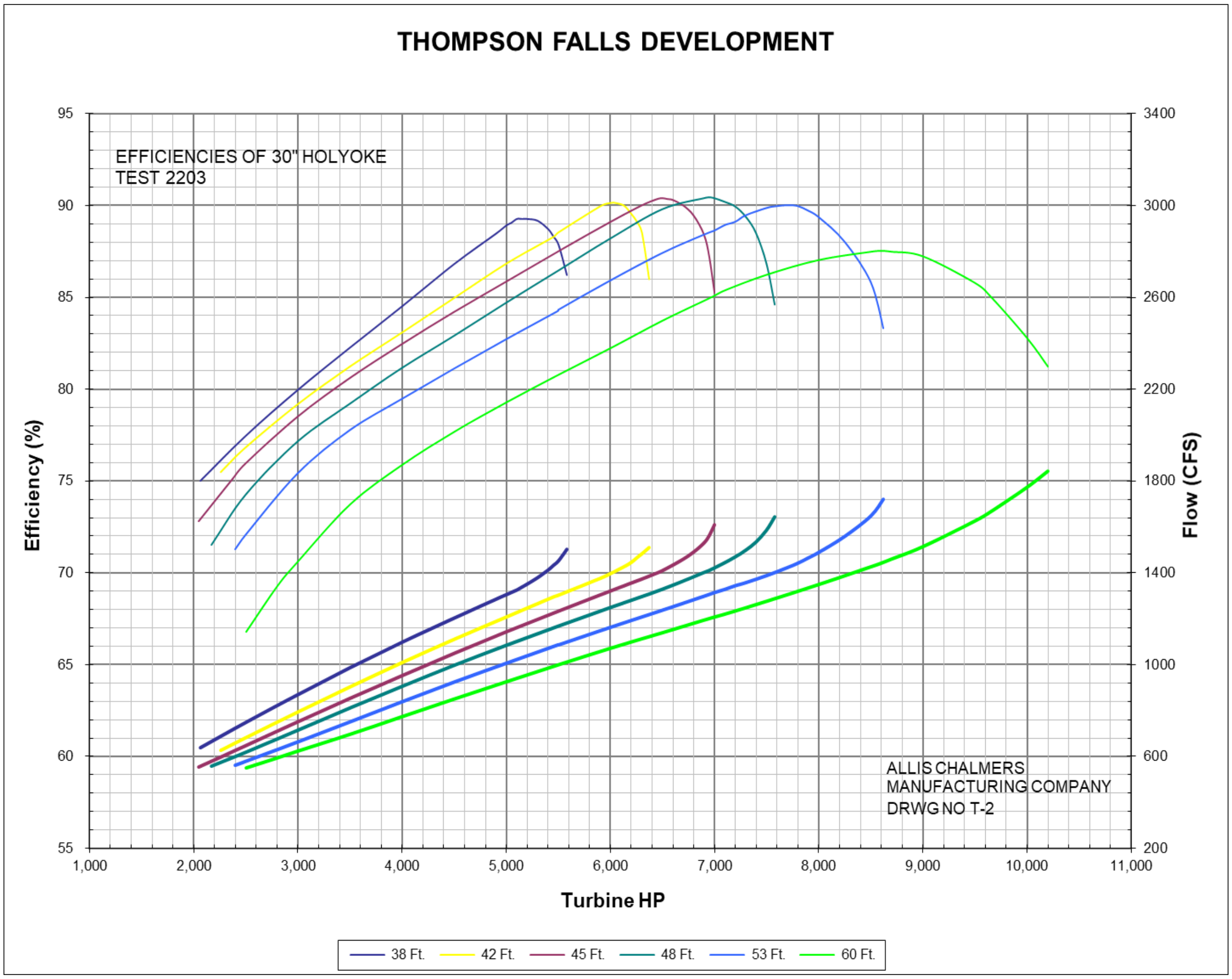
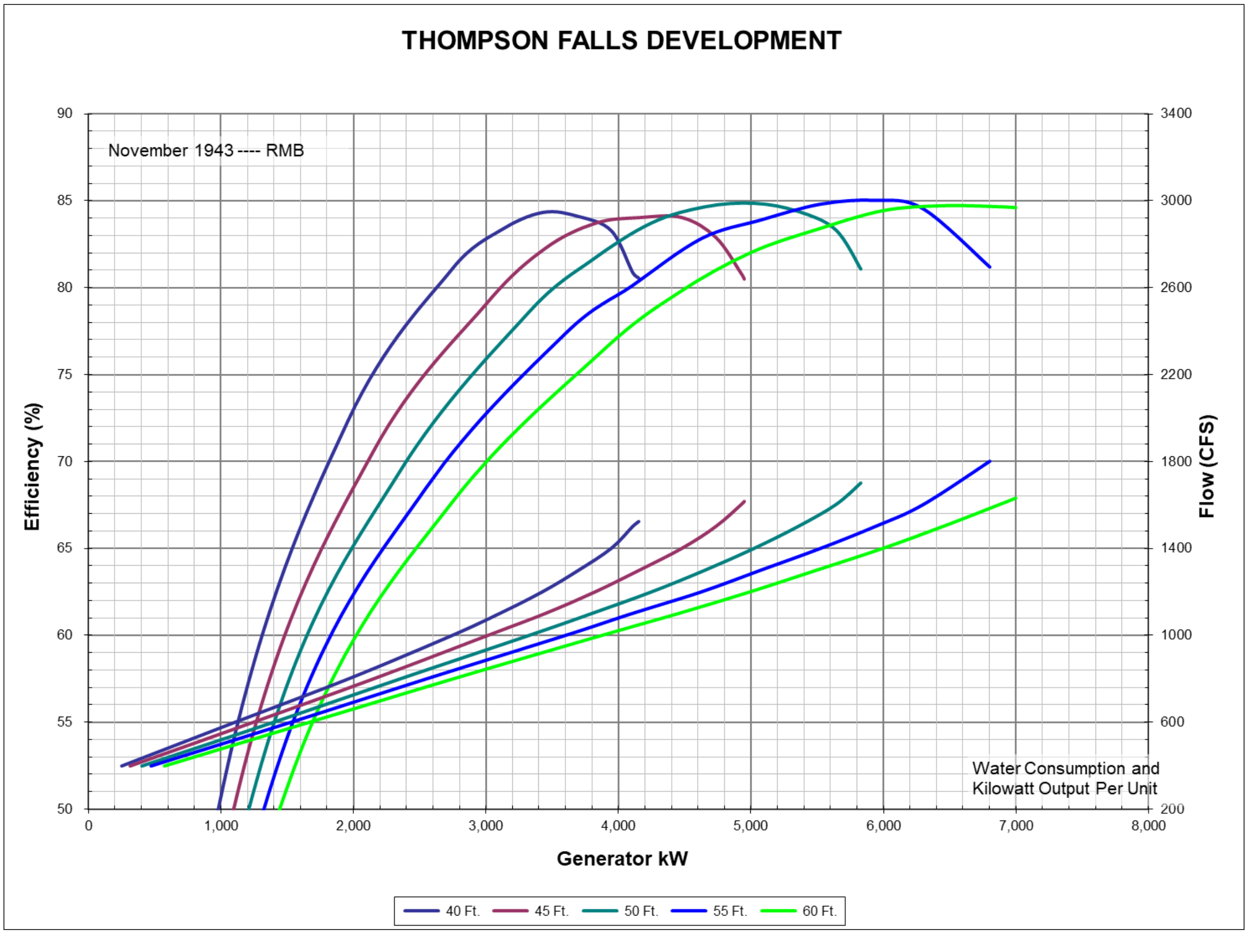


Figure 2-19: Turbine performance curve for Units 2, 4, 5, 6 (kW)



Note: kW = kilowatt

Figure 2-20: Turbine performance curve for Units 1,3 (hp)

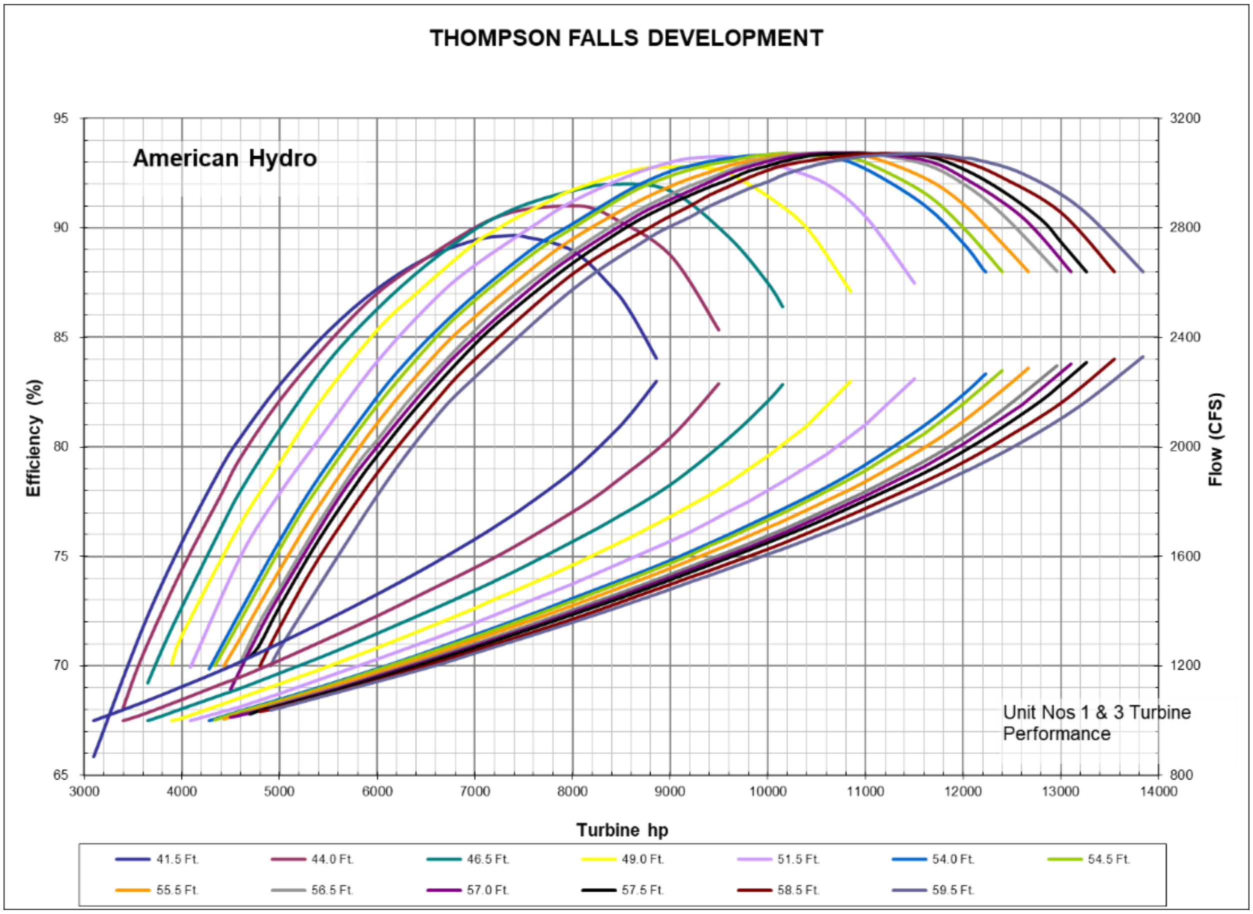
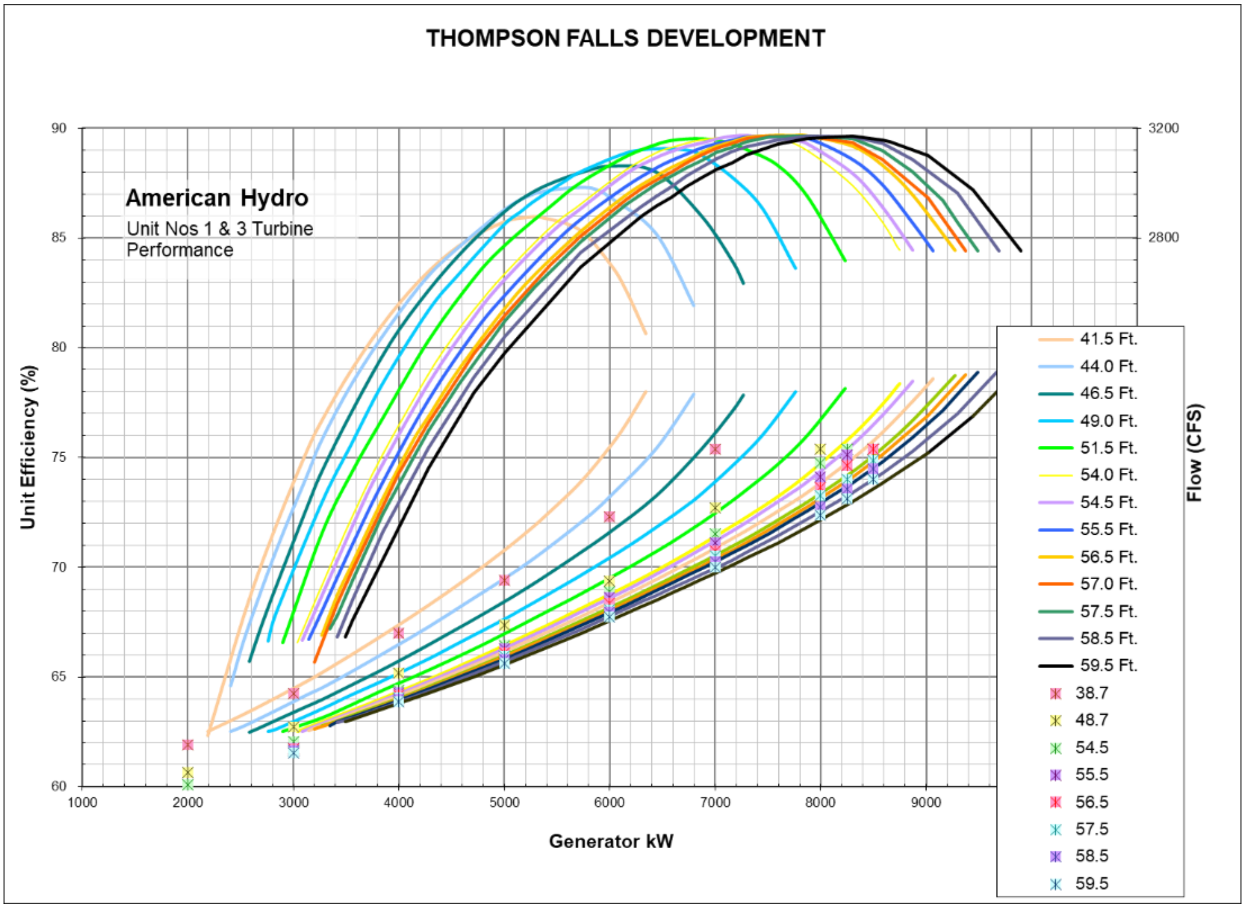
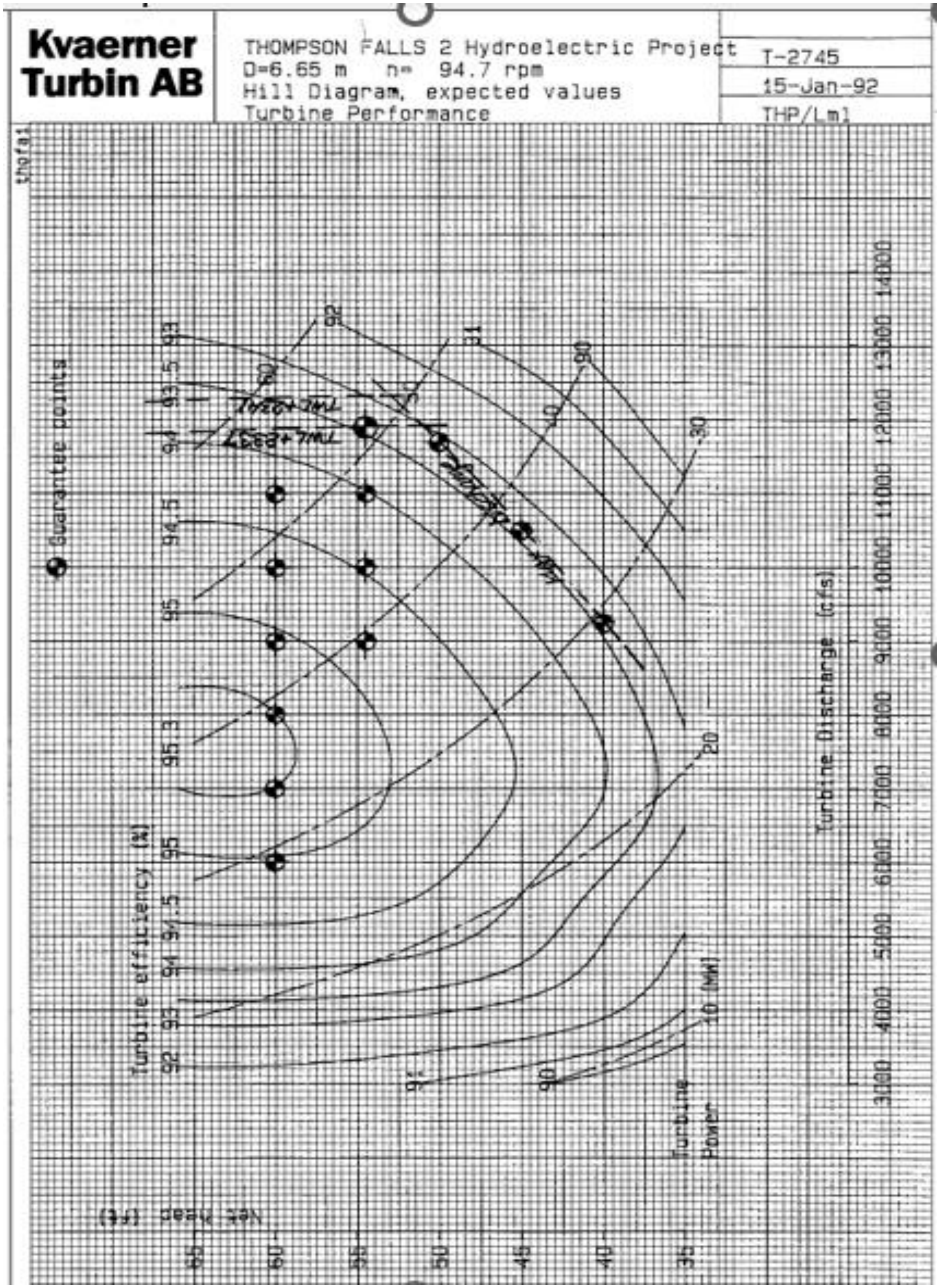


Figure 2-21: Turbine performance curve for Units 1,3 (kW)



Note: kW = kilowatt

Figure 2-22: Turbine performance curve for Unit 7 (MW)



3. Power Utilization

The Thompson Falls Project generated an average of 475,379 MWh annually in the 5-year period of 2018 to 2022 and is interconnected to NorthWestern’s transmission system. NorthWestern delivers energy directly to our customers and sells excess power, when available, on the open market to a variety of external customers. This excess includes generation from additional NorthWestern projects in their service territory.

On average, the Project uses 135,000 kW-hour of auxiliary load monthly and 1,620 MWh annually to support the plants. This represents an average of 0.34 percent of the gross production of the Project.

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4. Future Development

Outside of turbine and generator rehabilitations and other non-capacity upgrades and miscellaneous electrical and mechanical projects required as part of the normal course of business, NorthWestern does not anticipate proposing additional development or rehabilitation of the Project during the new license term.

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NorthWestern Energy

Delivering a Bright Future

Thompson Falls Hydroelectric Project
FERC Project No. 1869

Final License Application

Volume I of IV (Public)
Exhibit C: Construction History and Schedule

Prepared by:
NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
Portland, OR 97239

December 2023

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Table of Contents

1. Construction History/Proposed Construction

The history of the Thompson Falls Hydroelectric Project's (Project) construction is described in **Exhibit H Section 3.3 – Project History**. NorthWestern is not proposing additional development of the Project. Turbine and generator rehabilitations and electrical, civil and mechanical projects may be required during the term of the new license as part of routine plant maintenance, upkeep and/or modernization. However, because of the uncertainty of when those projects might occur and because they lack engineering detail, NorthWestern is not providing information pursuant to 18 Code of Federal Regulations Section 4.51(d).

Thompson Falls Hydroelectric Project
FERC Project No. 1869

Final License Application

Volume I of IV (Public)
Exhibit D: Costs and Financing

Prepared by:
NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
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December 2023

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Table of Contents

List of Tables

List of Abbreviations and Acronyms

ATC	Around-the-Clock
DEC	decrease
EELT	Electrical Energy Producers License
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
INC	increase
kWh	kilowatt hour
M	million
M/yr	million per year
Mid-C	middle Columbia
MW	megawatt
MWh	megawatt hours
NorthWestern	NorthWestern Energy
O&M	operations and maintenance
PM&E	protection, mitigation, and enhancement
Project	Thompson Falls Hydroelectric Project
Thompson Falls Project	Thompson Falls Hydroelectric Project
WET	Wholesale Energy Transaction

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1. Original Cost

NorthWestern Energy (NorthWestern) is not applying for an initial (original) license for the Thompson Falls Hydroelectric Project (No. 1869) (Project, Thompson Falls Project); therefore, a statement of the original cost of Project land or water rights, structures, or facilities is not applicable under 18 Code of Federal Regulations §4.51(e).

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2. Estimated Value

While the Federal Energy Regulatory Commission (FERC) may issue a new license in accordance with Section 15(a) of the Federal Power Act (FPA), under Section 14(a) of the FPA, the federal government may take over any project licensed by the FERC upon the expiration of the original license. If such a takeover were to occur upon expiration of the current license, NorthWestern would have to be reimbursed for the net investment, not to exceed fair value, of the property taken, plus severance damages. To date, no agency or interested party has recommended a federal takeover of the Project pursuant to Section 14 of the FPA.

2.1 Fair Value

The fair value of the Project is dependent on prevailing power values and license conditions, both of which are currently subject to change. One approximation of fair value would likely be the cost to construct and operate a comparable power generating facility. Because of the high capital costs involved with constructing new facilities, transmission congestion, and the increase in fuel costs associated with operation of, for example, a fossil fuel replacement, the fair value would be considerably higher than the net investment amount.

Another approximation of fair value may be made based on prior transactions. In 2014, NorthWestern purchased 11 hydro facilities (and 1 storage facility), including the Project. As part of that transaction, the Project's assets were valued after an acquisition adjustment at $91.6 million (M). Factoring in inflation[1] that would make the Project worth $234.2M in 2023 dollars.

2.2 Net Investment

Northwestern's net investment (book value) in the Project is $137,039,136 as of December 31, 2022. This number includes a capitalized investment of $188,495,716 plus construction work in progress of $661,731 less accumulated depreciation of $52,118,311.

2.3 Severance Damages

In the event of federal takeover, NorthWestern would be entitled to receive severance damages, in addition to its net investment as provided in Section 14 of the FPA. However, applicable principles are uncertain. Such damages should include, among other things, payments for costs incurred in providing new facilities to continue service, payment for additional costs of generation, and

[1] https://www.bls.gov/data/inflation_calculator.htm

payment for diminution of value to the rest of NorthWestern’s system. Due to the uncertainty in the generation market, an estimate of severance damages has not been made.

3. Costs of Proposed Development

3.1 New developments

NorthWestern is not proposing any new development at the Project.

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4. Life-cycle Costs

This section is a statement of the estimated life-cycle cost of the Project.

4.1 Cost of Capital (equity and debt)

NorthWestern's historical weighted average cost of capital is 6.92 percent (NorthWestern 2023) based on a capital structure and rate of return as approved by the Montana Public Service Commission.

Cost of Debt:	2.16% = 4.26% interest rate	x	50.62% portion of assets under debt
Cost of Equity:	4.77% = 9.65% return on equity	x	49.38% portion of assets under equity

Historical Weighted Average Cost of Capital: 6.92%

4.2 Local, State, and Federal Taxes

Montana does not have a general sales, use, or transaction tax. Local property taxes are paid to taxing authorities in Montana. The Montana Department of Revenue determines the enterprise value of NorthWestern Corporation, which includes all real and personal property. A portion of the enterprise value is then allocated to Montana. The Montana value is then apportioned across all Montana counties and local taxing authorities based on the original cost of the property NorthWestern has in each taxing district. The 2022 annual property taxes attributed to the Thompson Falls Project was $2,967,441.

NorthWestern is also subject to the Wholesale Energy Transaction (WET) tax, which is calculated based on generation at a tax rate of $0.15 per megawatt hour (MWh), after allowable MWh deductions. The total 2022 WET taxes attributed to the Project was $61,026 (406,838 MWh x $0.15).

NorthWestern Energy is subject to the Electrical Energy Producers License (EELT) tax, which is calculated based on generation at a tax rate of $0.0002 per kilowatt hour (kWh). The total 2022 EELT taxes attributed to the Project was $99,340.80 (496,704,000 kWh x $0.0002).

NorthWestern Energy is subject to the Hydroelectric Invasive Species fee, which is a quarterly fee that is calculated on the megawatt nameplate capacity. The total 2022 Hydroelectric Invasive Species fee attributed to the Project was $149,602.88 (94 megawatt [MW] x $397.88 x 4).

NorthWestern Corporation's consolidated composite income tax rate is 26.33 percent. This includes the Federal income tax rate of 21 percent and the Montana income tax rate of 6.75 percent.

4.3 Depreciation and amortization

NorthWestern's 2022 depreciation of the Project assets are shown in **Table 4-1**. Table 4-1 does not include any allocation of common hydropower plant or allocation of NorthWestern common/general plant.

Table 4-1: Thompson Falls Project Depreciation of Assets

FERC Accounts	Depreciable Base	SUM
302	$1,760,973.74	$35,219.52
303	$21,908.23	$438.12
331	$28,783,294.78	$397,209.48
332	$23,682,742.96	$355,241.16
333	$26,847,385.92	$375,863.40
334	$7,834,885.80	$126,141.60
335	$4,633,669.00	$89,429.88
336	$102,408.00	$2,119.80
392	$37,496.10	$749.88
394	$98,440.02	$1,968.84
114	$91,579,158.05	$1,831,583.16
	TOTAL	**$3,215,964.84**

4.4 Operation and Maintenance

The Project has a current annual operations and maintenance (O&M) expense cost of approximately $$2,431,826 as displayed below. O&M costs have been increasing approximately 4 to 6 percent over the past few years.

NorthWestern's basic O&M budget covers all typical labor, materials, and contracts for day-to-day O&M of the facility. Special maintenance items are expenses for maintenance projects that are in excess of $25,000 per project. The annual fees include FERC administration, headwater payments, land rental, and United States Geological Survey gaging fees. Insurance charges include both physical property and liability coverage. The fees are not specific to the Project, so the cost shown in **Table 4-2** is an estimated allocation of the total hydropower expenses.

Table 4-2: Thompson Falls Project Operation and Maintenance Expenses[2]

Expense	Cost
Basic O&M	$961,962
Special Maintenance	$99,032
Payments / Annual Fees	$746,769
License compliance administration	$300,000
Insurance (estimate 15% allocation)	$324,063
Total	$2,431,826

4.5 Environmental measures

Estimated costs for proposed PM&E environmental measures are in **Table 4-3**. Costs were estimated to implement the proposed PM&E measures on a recurring annual basis and for one-time capital costs. The capital costs were annualized over a 30-year period and added with the annual costs of implementation resulting in a total annualized costs for the Project PM&E as proposed.

[2] Based on 2024 Budget.

Table 4-3: Estimated costs for proposed PM&E environmental measures.

PM&E Measure	Capital Cost	Annual Cost	Annualized Cost
Fisheries			
Fisheries and Aquatic Resources P, M & E Plan		$200,000	$200,000
Operate and maintain the upstream fish passage facility		$200,000	$200,000
Fisheries population monitoring	$100,000	$150,000	$153,000
Minimum instream flows		$5,000	$5,000
Water Quality			
Implement Thompson Falls Water Quality Monitoring Plan		$40,000	$40,000
Update the 2010 TDG Control Plan	$15,000		$1,000
Terrestrial Resources			
Implement annual noxious weed control measures		$35,000	$35,000
Manage the shoreline pursuant to FERC's Standard Land Use Articles		$25,000	$25,000
Geology			
Develop and implement a Drawdown Management Plan	$12,000	$1,600	$2,000
Recreation			
Implement Recreation Management Plan	$200,000	$189,000	$196,000
Cultural Resources			
Implement HPMP		$55,000	$55,000
Total	**$327,000**	**$900,600**	**$912,000**

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5. Value of Power

This section shows how NorthWestern estimates the cost of obtaining capacity and of energy to replace the amounts provided by the Project. For energy, this is based on a 30-year levelized Around-the-Clock (ATC) Middle Columbia (Mid-C) price. For capacity, this was based on current costs of capacity which assumes renewing the Project license rather than having the need for replacement power. **Table 5-1** shows the On-Peak, Off-Peak, and ATC prices at an annual level for 30 years and **Table 5-2** shows the 30-Year levelized value.

Table 5-1: Annual On-Peak, Off-Peak, and Around -the-Clock Prices

Mid-C Energy Prices - Ascend Aug 2023 ($/MWh)	On-Peak	Off-Peak	ATC
2024	$102	$68	$87
2025	$98	$69	$85
2026	$96	$72	$86
2027	$92	$73	$84
2028	$82	$65	$75
2029	$70	$56	$64
2030	$58	$48	$54
2031	$48	$39	$44
2032	$40	$33	$37
2033	$37	$31	$35
2034	$39	$33	$37
2035	$41	$35	$39
2036	$43	$36	$40
2037	$45	$39	$42
2038	$47	$40	$44
2039	$48	$41	$45
2040	$52	$44	$48
2041	$53	$46	$50
2042	$55	$47	$52
2043	$60	$51	$56
2044	$63	$54	$59
2045	$65	$56	$61
2046	$67	$58	$63
2047	$69	$60	$65
2048	$72	$63	$68
2049	$74	$65	$70
2050	$78	$69	$74
2051	$78	$69	$74
2052	$78	$69	$74
2053	$78	$69	$74

***Source*:** Mid-C power price forecasts as of August 27, 2023

Table 5-2: Thompson Falls Project 30-year Levelized Value

Mid-C Energy Prices – Ascend Aug 2023	On-Peak	Off-Peak	ATC
Levelized Price (2024-2053) ($/MWh)	$68	$54	$61

Note: Mid-C = Middle Columbia

6. Financing of Proposed Development

NorthWestern intends to use internally generated cash flows and external sources of financing to meet costs of continued operation of the Project. NorthWestern's annual revenues in the last 3 years were in the $1.2 to $1.5 billion range. In addition, NorthWestern currently has access to $550M of committed lines of credit from banks and frequently issues long-term debt and equity to finance long-term assets. NorthWestern's credit ratings are investment grade and are as follows: S&P – A- (secured) and BBB (unsecured), Moody's – A3 (secured) and Baa2 (unsecured), and Fitch – A3 (secured) and BBB+ (unsecured.)

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7. Cost of Application

The estimated cost to prepare the Final License Application is $4,681,816.

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8. On and Off-peak Values of Power

On and off-peak values of power are shown in Table 5-1.

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9. Power Generation from Changes in Operations

NorthWestern proposes that the Project will continue to provide baseflow generation and flexible capacity needs in the new license term. Baseflow generation uses the river inflow by matching reservoir inflows to outflows to generate electricity while maintaining a stable reservoir elevation. The Project has generated an average of 475,379 MWh of energy over the 5-year period of 2018 to 2022. While annual generation is dependent upon river flows and generating unit availability, no change in typical baseflow generation is expected due to future operations. The economic value of baseflow generation over this 5-year period averaged approximately $21M/year based on market rates for power at the Mid-C point of receipt. This value represents the avoided cost of replacement power. The future economic value of baseflow generation from the project is estimated at approximately $29M/year based on a projected Mid-C future flat-rate price of $61/MWh. In addition to baseload generation of electricity, the project provides additional value through the provision of flexible capacity.

Flexible capacity increases (INC) or decreases (DEC) generation from the baseflow, raising or lowering the reservoir elevation as the flow through the units is changed to support flexible capacity needs. Under normal operations, NorthWestern will maintain the reservoir between elevation 2,396.5 and 2,394 feet (2.5 feet below normal full operating level). The units may INC or DEC generation during normal operations within the above defined reservoir elevations. Spill gates may be used to maintain reservoir elevation if needed in times of decreased generation. In general, a minimum flow of the lesser of 6,000 cubic feet per second or inflow will be maintained downstream during normal operations. The project can currently provide an average annual INC of 8.1 MW and an average annual DEC of 14.7 MW.

The value of flexible capacity (**Table 9-1**) was estimated using recent costs of comparable battery installations at an average $4,332 ($/MW-month per hour). These value estimates limited provision of flexible capacity to a maximum of 10 hours to better align with the battery costing. The current license allows for use of the top 4 feet of reservoir which has an estimated value of $4,107,416 annually (Table 9-1). Operations have more commonly used the top 1.5 feet of the reservoir which has an estimated value of $2.3M. NorthWestern's proposed operation for this Final License Application is the use of the top 2.5 feet of reservoir storage which has an estimated value of $3,391,827.

Table 9-1: Value of Flexible Capacity

Feet of reservoir use	1.5 ft	2.5 ft	4.0 ft
Annual estimated value ($)	$2,271,914	$3,391,827	$4,107,416

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10. Literature Cited

NorthWestern Energy. 2023. Annual Report of NorthWestern Energy Electric Utility. Docket 2023.01.001. to the Public Service Commission, Helena, Montana. 2022-electric-utility-report.pdf (northwesternenergy.com) Accessed June 30, 2023.

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Thompson Falls Hydroelectric Project FERC Project No. 1869

Final License Application

Volume I of IV (Public)
Exhibit G: Project Boundary

Prepared by:

NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
Portland, OR 97239

American Public Land Exchange
Missoula, MT 59802

DJ & A
Missoula, MT 59808

December 2023

Table of Contents

List of Figures

List of Tables

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1. Project Boundary Maps

Exhibits G-1 through G-5 denote the proposed Thompson Falls Hydroelectric Project (Project) boundary. The Project boundary maps show the Project vicinity, location, and boundary in sufficient detail to provide a full understanding of the Project. The Exhibit G maps were prepared in accordance with the requirements of 18 C.F.R. § 4.41(h).

The current Project boundary does not accurately encompass the lands and waters that are needed for Project purposes. Thus, the Project boundary maps contain several refinements proposed to the Project boundary. The proposed Project boundary extends approximately 0.3 mile downstream and 10 miles upstream of the Project's dams. The proposed Project boundary encompasses a total of 1,536 acres, consisting of 1,092 acres of reservoir and 444 acres of non- reservoir. The Thompson River, a major tributary to the Clark Fork River, enters the reservoir about 6.2 miles upstream of the dam. Its lower 0.2 miles is included within the proposed Project boundary. The proposed Project boundary is a combination of a contour elevation of 2,397 feet elevation at the dam (elevation of contour increase proceeding upstream) for most of the reservoir, and a metes and bounds description that incorporates areas above the contour elevation to encompass Project facilities, recreation sites, and all elements of the Thompson Falls Hydroelectric Dam Historic District. **Exhibit E- Section 2.2.3 – Proposed Project Boundary** includes a detailed description of the proposed modifications to the Project boundary.

This Project boundary was developed in reference to the Montana State Plane Coordinate system, North American Datum 1983 (NAD 83) meters, and is within reasonable accuracies as required by 18 CFR 4.41 to the geographic location based on a graphical positioning in reference to United State Geological Survey quadrangle mapping within ± 40 feet. The associated electronic file (e.g., ESRI shapefile) are provided with this filing. NorthWestern proposes to complete the metes and bounds tables after the new license is issued.

Figure 1-1. Project Boundary Map Exhibit G-1

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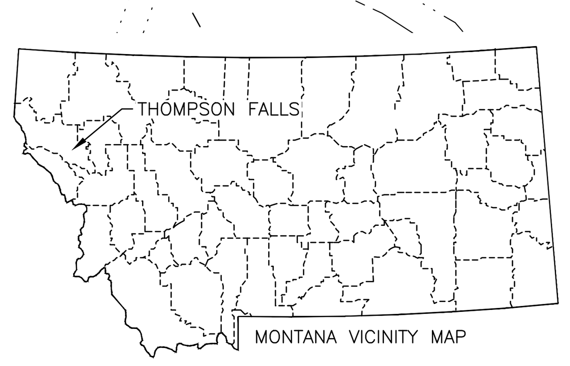


SURVEYORS STATEMENT

I HEREBY STATE THAT THE NORTHWESTERN ENERGY PROJECT BOUNDARY DELINEATION FOR THE THOMPSON FALLS PROJECT AS SHOWN ON THIS EXHIBIT "G" IS DEVELOPED IN REFERENCE TO THE MONTANA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83) AND IS WITHIN REASONABLE ACCURACIES AS REQUIRED IN FERC CODES AND REGULATIONS 18 CFR 4.41 TO THE GEOGRAPHIC LOCATION BASED ON A GRAPHICAL POSITIONING IN REFERENCE TO USGS QUADRANGLE MAPPING WITHIN ±40 FEET. THE NORTHWESTERN ENERGY DOCUMENTED PROJECT BOUNDARY LINE WAS ADJUSTED AND OR ROTATED TO BEST FIT WITH THE USGS QUADRANGLE MAP. THIS WORK WAS NOT FIELD SURVEYED.

BY: 12/19/2023
BOB RINFRET # 38990LS DATE:
DJ&A, P.C.

MONTANA ROBERT C. RINFRET No. 38990LS LICENSED PROF. LAND SURVEYOR

LEGEND

- FOUND PLSS CORNER
- PROJECT BOUNDARY – DLA 2023
- LIDAR DERIVED EDGE OF WATER
- PROJECT RECREATION SITE
- PLSS TOWNSHIP LINE
- PLSS SECTION LINE
- PLSS ONE–QUARTER LINE
- PLSS ONE–SIXTEENTH LINE
- PLSS NON–USFS–ISLANDS
- U.S. FOREST SERVICE BOUNDARY LINE
- DAM STRUCTURE AND BUILDINGS
- PRIMARY AND SECONDARY ROADS
- RAILROAD TRACKS
- OVERHEAD POWER LINES
- GAS — GAS LARGE PETROLEUM PIPELINE

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH
L1	N??°??'W	???.?'
L2		

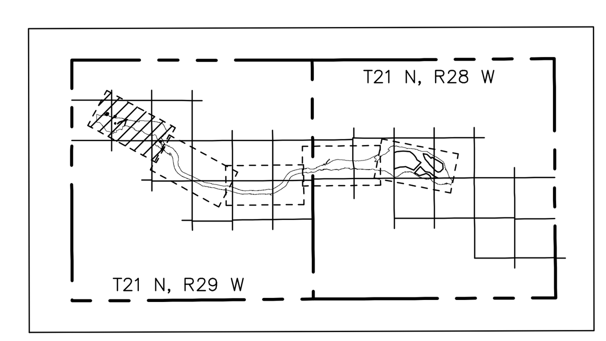
PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

METES AND BOUNDS TABLES WILL BE COMPLETED POST LICENSE ISSUANCE.



SCALE: 1"=300'

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NORTHWESTERN ENERGY

BY:_______________________
MANAGER HYDRO OPERATIONS

EXHIBIT G-1

MONTANA

NorthWestern Energy

PROJECT 1869

THOMPSON FALLS PROJECT
PROJECT BOUNDARY

FERC #_____-_____ _____-__-_-_

SHEET 1 OF 5

P-1869,THOMPSON FALLS PROJECT BOUNDARY,12-19-2023.dwg

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Figure 1-2. Project Boundary Map Exhibit G-2

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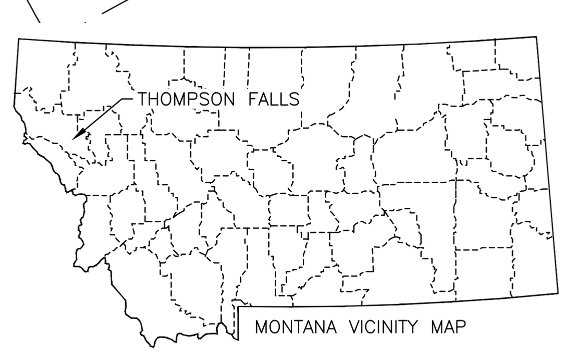


SURVEYORS STATEMENT

I HEREBY STATE THAT THE NORTHWESTERN ENERGY PROJECT BOUNDARY DELINEATION FOR THE THOMPSON FALLS PROJECT AS SHOWN ON THIS EXHIBIT "G" IS DEVELOPED IN REFERENCE TO THE MONTANA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83) AND IS WITHIN REASONABLE ACCURACIES AS REQUIRED IN FERC CODES AND REGULATIONS 18 CFR 4.41 TO THE GEOGRAPHIC LOCATION BASED ON A GRAPHICAL POSITIONING IN REFERENCE TO USGS QUADRANGLE MAPPING WITHIN ±40 FEET. THE NORTHWESTERN ENERGY DOCUMENTED PROJECT BOUNDARY LINE WAS ADJUSTED AND OR ROTATED TO BEST FIT WITH THE USGS QUADRANGLE MAP. THIS WORK WAS NOT FIELD SURVEYED.

BY: ______ 12/19/2023
BOB RINFRET # 38990LS DATE:
DJ&A, P.C.

MONTANA ★ ROBERT C. RINFRET No. 38990LS LICENSED PROF. LAND SURVEYOR

LEGEND

FOUND PLSS CORNER
PROJECT BOUNDARY – DLA 2023
LIDAR DERIVED EDGE OF WATER
PROJECT RECREATION SITE
PLSS TOWNSHIP LINE
PLSS SECTION LINE
PLSS ONE–QUARTER LINE
PLSS ONE–SIXTEENTH LINE
PLSS NON–USFS–ISLANDS
U.S. FOREST SERVICE BOUNDARY LINE
DAM STRUCTURE AND BUILDINGS
PRIMARY AND SECONDARY ROADS
RAILROAD TRACKS
OVERHEAD POWER LINES
GAS —— GAS LARGE PETROLEUM PIPELINE

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH
L1	N??°??'W	???.?'
L2		

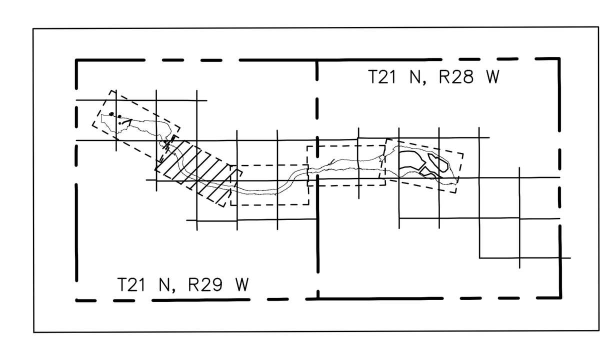
PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

METES AND BOUNDS TABLES WILL BE COMPLETED POST LICENSE ISSUANCE.



INDEX MAP

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SCALE: 1"=300'

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NORTHWESTERN ENERGY

BY:____________________
MANAGER HYDRO OPERATIONS

EXHIBIT G-2

MONTANA

PROJECT 1869

NorthWestern Energy

THOMPSON FALLS PROJECT
PROJECT BOUNDARY

FERC #_____-_____ _____-__-_-_

SHEET 2 OF 5

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Figure 1-3. Project Boundary Map Exhibit G-3

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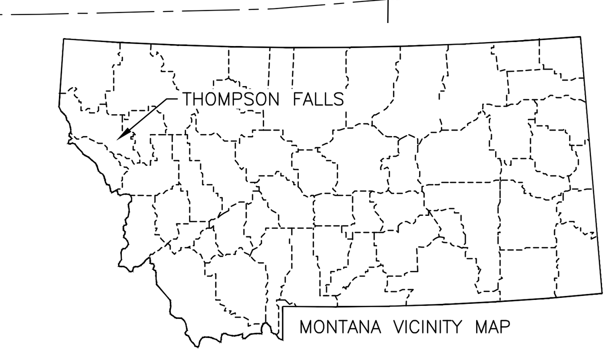

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BY: BOB RINFRET # 38990LS
DJ&A, P.C.
DATE: 12/19/2023

MONTANA
ROBERT C. RINFRET
No. 38990LS
LICENSED
PROF. LAND SURVEYOR

LEGEND

- FOUND PLSS CORNER
- PROJECT BOUNDARY – DLA 2023
- LIDAR DERIVED EDGE OF WATER
- PROJECT RECREATION SITE
- PLSS TOWNSHIP LINE
- PLSS SECTION LINE
- PLSS ONE–QUARTER LINE
- PLSS ONE–SIXTEENTH LINE
- PLSS NON–USFS–ISLANDS
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- OVERHEAD POWER LINES
- GAS —— GAS LARGE PETROLEUM PIPELINE

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH
L1	N??°??'W	???.?'
L2		

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

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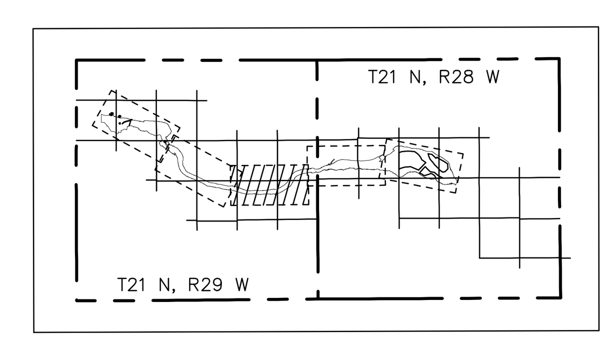
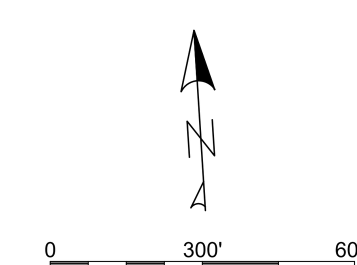


INDEX MAP



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MANAGER HYDRO OPERATIONS

EXHIBIT G-3

MONTANA

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PROJECT 1869

THOMPSON FALLS PROJECT
PROJECT BOUNDARY

FERC #_____-_____ _____-_-_-_

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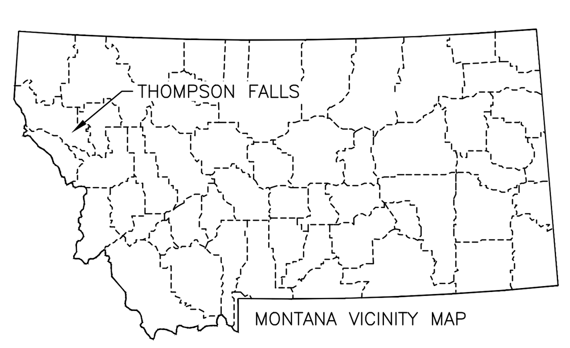
Figure 1-4. Project Boundary Map Exhibit G-4



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BY: 12/19/2023
BOB RINFRET # 38990LS DATE:
DJ&A, P.C.

MONTANA
ROBERT C. RINFRET
No. 38990LS
LICENSED
PROF. LAND SURVEYOR

LEGEND

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PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH
L1	N??'??'W	???.?'
L2		

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

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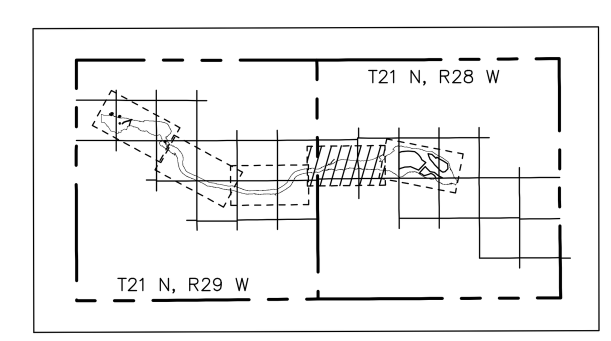

INDEX MAP

N

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NORTHWESTERN ENERGY

BY:_________________________
MANAGER HYDRO OPERATIONS

EXHIBIT G-4

MONTANA

NorthWestern Energy

PROJECT 1869

THOMPSON FALLS PROJECT
PROJECT BOUNDARY

FERC #_____-_____ _____-__-_-_

SHEET 4 OF 5

F:\7338 THOMPSON FALLS DAM EXHIBIT G\SURVEY\08_DWG\P-1869,THOMPSON FALLS PROJECT BOUNDARY,12-19-2023.DWG 12/19/2023 2:29 PM Johnh

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Figure 1-5. Project Boundary Map Exhibit G-5

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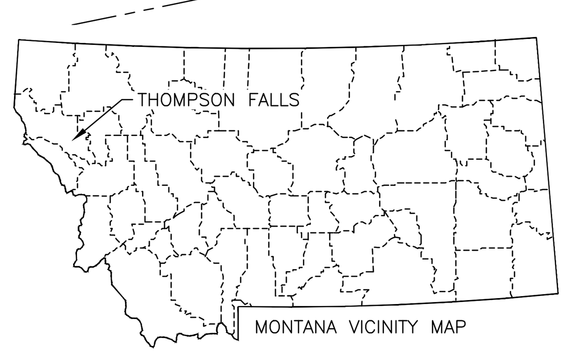

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BY: ______________ 12/19/2023
BOB RINFRET # 38990LS DATE:
DJ&A, P.C.

MONTANA ROBERT C. RINFRET No. 38990LS LICENSED PROF. LAND SURVEYOR

LEGEND

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- PROJECT BOUNDARY – DLA 2023
- LIDAR DERIVED EDGE OF WATER
- PROJECT RECREATION SITE
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- PLSS SECTION LINE
- PLSS ONE–QUARTER LINE
- PLSS ONE–SIXTEENTH LINE
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- RAILROAD TRACKS
- OVERHEAD POWER LINES
- GAS — GAS — LARGE PETROLEUM PIPELINE

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH
L1	N??°??'W	???.?'
L2		

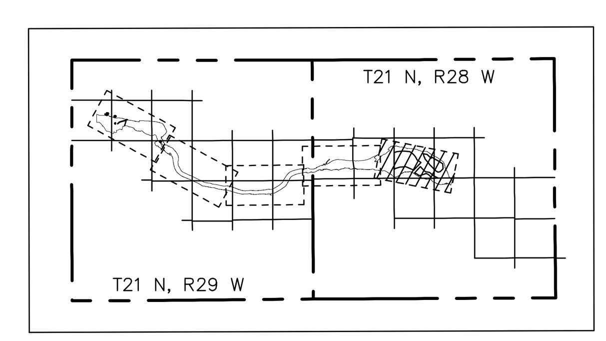
PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

PROJECT BOUNDARY LINE TABLE

LINE	BEARING	LENGTH

METES AND BOUNDS TABLES WILL BE COMPLETED POST LICENSE ISSUANCE.



INDEX MAP

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SCALE: 1"=300'

P-1869,THOMPSON FALLS PROJECT BOUNDARY,12-19-2023.dwg

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NORTHWESTERN ENERGY

BY: ______________
MANAGER HYDRO OPERATIONS

EXHIBIT G-5

MONTANA

NorthWestern Energy

PROJECT 1869

THOMPSON FALLS PROJECT
PROJECT BOUNDARY

FERC #_____-_____ _____-__-_-_

SHEET 5 OF 5

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2. Federal Lands

The proposed Project boundary includes 66.9 acres of Federal land managed by the USFS (National Forest System Lands), which are largely open space forest lands (**Table 2-1**).

Table 2-1: Thompson Falls Project – Federal Lands Within Proposed Project Boundary.

Township	Range	Section	Subdivision	Acres	Agency
21N	28W	15	Government Lot 1	0.3	USFS
21N	28W	17	Government Lots 5-11	49.6	USFS
21N	28W	18	Government Lots 8-10	4.3	USFS
21N	28W	21	Government Lot 1	1.45	USFS
21N	28W	22	Government Lots 3-4	11.25	USFS
Total				**66.9**	

FERC Form 587 is attached **(Figure 2-1**).

Figure 2-1. FERC Form 587

Form FERC-587
OMB No. 1902-0145
(Expires 07/30/2012)

LAND DESCRIPTION

Public Land States
(Rectangular Survey System Lands)

1. STATE Montana 2. FERC PROJECT NO. P-1869

3. TOWNSHIP 21 N RANGE 28 W MERIDIAN Montana Principal Meridian

4. Check one:
X License
___ Preliminary Permit

Check one:
X Pending
___ Issued

If preliminary permit is issued, give expiration date:___

5. EXHIBIT SHEET NUMBERS OR LETTERS

Section 6	**5**	**4**	**3**	**2**	**1**
7	**8**	**9**	**10**	**11**	**12**
18 G-4	**17** G-4 G-5	**16**	**15** G-5	**14**	**13**
19	**20** G-5	**21** G-5	**22** G-5	**23**	**24**
30	**29**	**28**	**27**	**26**	**25**
31	**32**	**33**	**34**	**35**	**36**

6. contact's name Mary Gail Sullivan, NorthWestern Energy

telephone no. (406-497-3382)

Date submitted December 29, 2023

This information is necessary for the Federal Energy Regulatory Commission to discharge its responsibilities under Section 24 of the Federal Power Act.

Thompson Falls Hydroelectric Project
FERC Project No. 1869

Final License Application

Volume I of IV (Public)
Exhibit H: Project Management and Need for Power

Prepared by:
NorthWestern Energy
Butte, MT 59701

With Support From:
GEI Consultants, Inc.
Portland, OR 97239

December 2023

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List of Tables

Abbreviations and Acronyms

Applicant	NorthWestern Energy
ADA	Americans with Disabilities Act
CAISO	California Independent System Operator
CFR	Code of Federal Regulations
cfs	cubic feet per second
City	city of Thompson Falls
CSKT	Confederated Salish and Kootenai Tribes
DSM	Demand Side Management
E+	Efficiency Plus
EIM	Energy Imbalance Market
ELCC	effective load-carrying capacity
FERC	Federal Energy Regulatory Commission
IRP	Integrated Resource Plan
kips	kilo pounds
kV	kilovolts
kW-yr	kilowatts per year
Licensee	NorthWestern Energy
MID-C	mid-Columbia
MPSC	Montana Public Service Commission
MW	megawatt
MWh	megawatt-hour
NEM	net-metering
new powerhouse	the Project's second powerhouse containing Unit No. 7
NERC	North American Reliability Council
NorthWestern	NorthWestern Energy
OSHA	Occupational Health and Safety Administration
PRM	planning reserve margin
Project	Thompson Falls Hydroelectric Project
PSP	Public Safety Plan
RFP	Request for Proposal
Thompson Falls Project	Thompson Falls Hydroelectric Project
USB	Universal System Benefits
VPP	Voluntary Protection Program
WRAP	Western Resource Adequacy Program

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1. Introduction

18 Code of Federal Regulations (CFR) §5.18(c) requires all applicants for a new license to provide certain information that pertains to an applicant's plans and ability to operate and maintain the project. Such information required in 18 CFR §5.18(c)(1)(i) is provided in **Section 2 – Information to be Provided by all Applicants** of this Exhibit. Furthermore, 18 CFR §5.18(c)(1)(ii) requires information to be provided by an applicant who is an existing licensee. The required information in 18 CFR §5.18(c)(1)(ii) is provided in **Section 3 – Information to Be Provided by Applicant Who is an Existing Licensee (NorthWestern)** of this Exhibit.

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2. Information to be Provided by all Applicants

2.1 Plans and Ability of NorthWestern to Operate and Maintain the Project

Since 2002, NorthWestern Energy (NorthWestern) has provided reliable and affordable natural gas and electricity to customers in the western two-thirds of Montana, including serving electricity to Yellowstone National Park. For more than 100 years, Northwestern has also provided reliable and affordable natural gas and electricity to customers in eastern South Dakota and natural gas service in Nebraska. In total, NorthWestern currently serves 764,200 customers.

NorthWestern's hydropower system is the foundation of the company's energy generation portfolio in Montana. In 2022, 32 percent of energy for Montana customers came from NorthWestern's hydropower facilities. The Thompson Falls Hydropower Project (Thompson Falls Project or Project) has been generating electricity since 1915. NorthWestern purchased the Thompson Falls Project in 2014 and has been the Federal Energy Regulatory Commission (FERC) licensee ever since.

2.1.1 Plans to Increase Capacity or Generation

No capacity or generation upgrades are being proposed at this time.

2.1.2 Plans to Coordinate Operation with Other Water Resource Projects

The Thompson Falls Project is located on the Clark Fork River downstream of the confluence of the Clark Fork and Flathead rivers. Flood control is provided as appropriate at upstream projects. The Flathead River is a major tributary to the lower Clark Fork River upstream from the Project. The lower Flathead River is regulated by the upstream Hungry Horse and Sėliš Ksanka Qḷispė (FERC Project # P--5 (formerly Kerr)) projects, located on the South Fork of the Flathead River and the Flathead River respectively. The upper Clark Fork River main stem is unregulated.

USGS stream gages are monitored and communication is maintained with upstream projects to provide an estimate of expected flows entering the Thompson Falls Reservoir. The Sė liš Ksanka Qḷispė facility is owned by the Confederated Salish and Kootenai Tribes (CSKT) and operated by Energy Keepers, Inc., a CSKT-owned corporation. Outflows from the Sė liš Ksanka Qḷispė facility directly impact river flows and operation of the Project. Energy Keepers, Inc. provides notification of planned outflows and flow changes.

The Noxon Rapids facility (P-2058), licensed by Avista Corporation, is directly downstream of the Project. The project boundary for the Noxon Rapids Hydroelectric Project is contiguous with the Thompson Falls Project boundary downstream of the original powerhouse. The actual backwater of Noxon Rapids Dam varies depending on flow in the Clark Fork River and the operation at Noxon powerhouse. Influence from the downstream Noxon Rapids Hydroelectric Project on the tailrace of the Thompson Falls Project is observed when Noxon Reservoir is operated near full pool and Clark Fork River Flows are near baseflow. However, the Birdland Bay Bridge is typically considered the upstream end of Noxon Reservoir (NorthWestern 2023). There are currently no formal coordination efforts between Noxon Rapids and the Project.

2.1.3 Coordination of Operation with Other Electrical Systems

NorthWestern operates and maintains the Project in accordance with both the Western Electric Coordinating Council and the North American Reliability Council (NERC). NorthWestern is a registered Transmission Owner, Transmission Operator, and Balancing Authority through these entities and is responsible for grid stability and reliability. The Thompson Falls Project is interconnected into the NorthWestern system and located in its Balancing Authority Area. The following NERC defined roles apply to NorthWestern.

- Transmission Owner – The entity that owns transmission facilities.
- Transmission Operator – The entity that operates and maintains the transmission system and is responsible for its reliability.
- Balancing Authority – The Transmission Owner and Transmission Operator that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.

NorthWestern currently participates in the Energy Imbalance Market (EIM) hosted by the California Independent System Operator (CAISO). The EIM is a voluntary inter-hour market established to share energy through load balancing for the purpose of grid stability and reliability. The Project is a participating resource in the EIM.

2.2 Short and Long Term Need for Project Power

2.2.1 Costs and Availability of Alternative Sources of Power

NorthWestern relies on the Project in the short and long term to provide the following:

- Energy to serve NorthWestern customer load, (5-year average production of 475,379 megawatt-hours (MWh) (2018-2022).
- Capacity to help meet NorthWestern’s planning reserve margin (PRM) for resource adequacy in the Western Power Pool’s Western Resource Adequacy Program (WRAP), 94 MW of deliverable capacity, and currently estimated qualifying capacity credit amounts of 73 MW for the winter and 84 MW for the summer under the WRAP.
- Stable, zero variable cost electricity to reduce exposure to price volatility and high market prices from relying on market purchases for energy and capacity.
- Load following capability and contingency reserves depending on conditions.

- Non-carbon emitting generation to help meet portfolio carbon emission reduction goals.

Alternative sources of energy and capacity could in theory be obtained from short-term market purchases and long-term contracts with other entities in the region. However, the availability of the regional market to supply capacity and energy has been changing in recent years. The following is stated in Section 1.2 of NorthWestern's 2023 Montana Integrated Resource Plan (IRP).

> Resource adequacy is a top priority of NorthWestern. Currently, NorthWestern does not have adequate supply resources to fully serve load throughout the year. Due to the deficiency of supply, NorthWestern relies frequently on imported energy purchases to meet demand. Regionally, the Pacific Northwest is facing tight supply conditions which will likely persist into the future with projected coal retirements and the lack of adequate replacement capacity. NorthWestern cannot count on continued imports given the risk of declining generation regionally. An adequate portfolio would ensure that NorthWestern customers will become less reliant on volatile and uncertain energy purchases and provide protection against transmission congestion which limits import availability.

NorthWestern's current forecasts of Mid-Columbia Hub market power prices over the next 30 years suggest a levelized around-the-clock price of $64/MWh for energy. Assuming there will be capacity available for contracts, current estimates for capacity contracts based on the least cost capacity resource identified in the 2023 IRP, would be around $205 per kilowatt-year (kW-yr).

In addition, NorthWestern could build new resources to replace energy and capacity. The least-cost potential energy resource that could be built in Montana, on a $/MWh basis, would be a large wind farm that would have an estimated cost of $61/MWh (unsubsidized). For capacity, NorthWestern's current estimate of first year total fixed costs of a large reciprocating internal combustion engine resource in 2024 is around $205/kW-yr of nameplate capacity. However, this does not include any costs related to electric or natural gas (if applicable) transmission upgrades to NorthWestern's existing system to accommodate a new build of a comparable size resource.

2.2.2 Cost Increases for Alternative Power if License Denied

As a zero variable cost resource, replacement power would likely cost more to purchase or generate. In addition, there would potentially be missed opportunity costs to sell the Project's power into the market in hours where it is economical to do so. Total portfolio capital costs would increase for building or buying new replacement resources including transmission upgrades.

2.2.3 Effects of Alternative Sources of Power on Customers

NorthWestern's customers would likely pay more for alternate sources of power. In addition, replacement power could potentially increase costs and issues related to transmission of imported power. Other resources would potentially be dispatched more often to provide replacement power and their availability would be reduced accordingly. It is not anticipated that area or system load would be impacted by the use of alternate sources of power.

2.2.3.1 Effects of Alternative Sources of Power on Operating and Load Characteristics

Operating and load characteristics are not expected to be affected by alternative sources of power with comparable characteristics.

2.2.3.2 Effects of Alternative Sources of Power on Communities Served or to Be Served

The Project provides real power delivery to the local area, voltage support for the interconnecting transmission system, cost effective imbalance energy, and Frequency Reserve Response for the Western Interconnection. If the Project's FERC license is not renewed, real power to support local area loading and reactive power to support transmission voltage would be required to flow from other interconnected resources or voltage control devices. These resources are not located close to the local area loads, thus real and reactive power flow would be subject to greater transmission losses and less efficient delivery to end users. Except as provided in **Exhibit H – Section 2.2.3 - Effects of Alternative Sources of Power on Customers** as related to increased cost, or during contingency events, it is not anticipated that communities in the area would be affected by the use of alternate sources of power.

2.3 Need, Cost, and Availability of Alternative Power

The cost and availability of alternative sources of power are discussed in **Exhibit H – Section 2.2.1 - Costs and Availability of Alternative Sources of Power**.

2.3.1 Average Annual Cost of Power Produced

The Project has an annual revenue requirement currently estimated at $29,456,671 with a 5-year average annual generation of 475,379 MWh (2018-2022), for an average cost of power at $61.96/MWh.

2.3.2 Resources Required by NorthWestern to Meet Capacity and Energy Requirements Over Short and Long Term

2.3.2.1 Energy and Capacity Resources

Table 2-1 lists resources that NorthWestern considers for the Energy Supply portfolio in various planning processes. These resources are listed by fuel type and include owned and contracted hydro, planned upgrades to owned hydro resources, natural gas, coal and other thermal, wind, solar, and hybrid resources, contracts for capacity, contracted projects from the most recent long-term capacity request for proposal (RFP), and potential Qualifying Facility projects.

Attributes listed below include maximum deliverable capacity, capacity factor, average annual generation over the last 3 years, online date, and expiration date. Also, winter and summer accredited capacity values are shown based on both NorthWestern's effective load-carrying capacity (ELCC) calculations using NorthWestern's Energy Supply portfolio and customer load, as well as initial WRAP ELCC estimates using resources and load in the WRAP footprint.

Table 2-1: Resource Tables from the 2023 IRP Volume II.

Hydro Generation - Online	Maximum Capacity (MW)	WRAP Winter Accredited Capacity (MW)	WRAP Summer Accredited Capacity (MW)	Capacity Factor (%) (ave prod /nameplate)	3 Year Avg. Production (2019 - 2021; MW)	Online Date	Expiration Date
Thompson Falls	94	73	84	57%	466,231	1915	Rate Based
Cochrane	62	64	64	52%	283,280	1958	Rate Based
Ryan	72	54	52	70%	443,480	1915	Rate Based
Rainbow	64	37	46	69%	387,983	1910	Rate Based
Holter	50	29	34	64%	281,236	1918	Rate Based
Morony	49	28	33	67%	285,862	1930	Rate Based
Black Eagle	23	13	15	60%	120,201	1927	Rate Based
Hauser	21	14	14	64%	118,538	1911	Rate Based
Mystic	12	5.8	11	53%	55,727	1925	Rate Based
Madison	12	5.1	7	17%	17,493	1906	Rate Based
Turnbull Hydro LLC	13	0.0	13	24%	27,104	2011	2032
State of MT DNRC (Broadwater Dam)	10	4.7	6	49%	42,827	1989	2024
Tiber Montana LLC	7.5	5.0	5	82%	53,546	2004	2025
Flint Creek Hydroelectric LLC	2	0.9	2	75%	13,141	2013	2037
Hydrodynamics Inc (South Dry Creek)	2	0.0	2.0	22%	3,775	1985	2041
Wisconsin Creek LTD LC	0.6	0.2	0.4	16%	775	1989	2024
Boulder Hydro Limited Partnership	0.5	0.2	0.4	31%	1,369	1988	2022
Lower South Fork LLC	0.5	0.2	0.4	15%	584	2012	2037
Ross Creek Hydro LC	0.5	0.2	0.4	58%	2,296	1996	2032
Gerald Ohs (Pony Generating Station)	0.4	0.2	0.3	23%	821	1989	2025
Allen R. Carter (Pine Creek)	0.3	0.1	0.2	49%	1,278	1989	2024
Donald Fred Jenni (Hanover Hydro)	0.2	0.1	0.2	15%	326	1988	2034
Hydrodynamics Inc (Strawberry Creek)	0.2	0.1	0.2	67%	1,112	1987	2023
Total	497	333	390		2,608,984		

Hydro Generation - "Additions" (* - estimates)	Maximum Capacity (MW)	WRAP Winter Accredited Capacity (MW)	WRAP Summer Accredited Capacity (MW)	Capacity Factor (%)	3 Year Avg. Production (2019 - 2021; MW)	Online Date	Expiration Date
Black Eagle U3 *	2.0	1.2	1.3	TBD	TBD	2023	Rate Based
Hauser U1 *	1.4	0.9	0.9	TBD	TBD	2025	Rate Based
Hauser U3 *	1.4	0.9	0.9	TBD	TBD	2027	Rate Based
Holter U1 *	2.0	1.2	1.4	TBD	TBD	2023	Rate Based
Holter U2 *	2.0	1.2	1.4	TBD	TBD	2024	Rate Based
Holter U4 *	2.0	1.2	1.4	TBD	TBD	2025	Rate Based
Cochrane U2 *	2.0	2.0	2.1	TBD	TBD	2024	Rate Based
Cochrane U1 *	2.0	2.0	2.1	TBD	TBD	2026	Rate Based
Morony U1 *	1.7	1.0	1.2	TBD	TBD	2026	Rate Based
Morony U2 *	1.7	1.0	1.2	TBD	TBD	2028	Rate Based
Thompson Falls U6 *	1.3	1.0	1.1	TBD	TBD	2025	Rate Based
Thompson Falls U5 *	1.3	1.0	1.1	TBD	TBD	2026	Rate Based
Thompson Falls U2 *	1.3	1.0	1.1	TBD	TBD	2027	Rate Based
Thompson Falls U4 *	1.3	1.0	1.1	TBD	TBD	2028	Rate Based
Total	23	16	18				

Thermal/Natural Gas Generation - Online	Maximum Capacity (MW)	WRAP Winter Accredited Capacity (MW)	WRAP Summer Accredited Capacity (MW)	Capacity Factor (%) (ave prod /nameplate)	3 Year Avg. Production (2019 - 2021; MW)	Online Date	Expiration Date
Basin Creek	52	52	51	24%	111,126	2006	2036
DGGS 1	50	50	50	17%	221,910	2011	Rate Based
DGGS 2	50	48	49				
DGGS 3	50	50	49				
Total	202	199	199		333,036		

Thermal/Coal Generation - Online	Maximum Capacity (MW)	WRAP Winter Accredited Capacity (MW)	WRAP Summer Accredited Capacity (MW)	Capacity Factor (%) (ave prod /nameplate)	3 Year Avg. Production (2019 - 2021; MW)	Online Date	Expiration Date
Colstrip	222	221	218	66%	1,286,568	1984	Rate Based
Colstrip Aquistion (Effective 2026)	222	221	218	--	--	2026	--
Yellowstone Energy Limited Partnership (BGI)	52	57	32	100%	459,361	1995	2028
Colstrip Energy Limited Partnership	42	12	33	81%	298,510	1990	2024
Total	538	511	501		2,044,439		

In addition to these resources, NorthWestern has an indexed-based contract for energy (25 MW during heavy load hours in peak months through July 2024). NorthWestern also purchases energy to meet load as needed and balance the system as a participant in the Western EIM

NorthWestern forecasts customer load reductions due to Demand Side Management (DSM) and energy efficiency measures as well as net-metering (NEM) customer generation, typically rooftop solar. Current forecasts for load, DSM, and NEM, by year, shown in **Table 2-2**.

Table 2-2: Summer and Winter Peak Demand Forecast

Summer Peak Demand Forecast (MW)				
Historic and Forecast Values Include Losses				
	2022	Less	Less	2022
Year	Actual/ Regression	DSM[2]	NEM[1,2]	Forecast
2012	1133			
2013	1162			
2014	1115			
2015	1146			
2016	1147			
2017	1210			
2018	1196			
2019	1119			
2020	1171			
2021	1248			
2022	1221	6	5	1210
2023	1235	12	10	1213
2024	1249	18	17	1215
2025	1263	24	24	1215
2026	1277	30	33	1214
2027	1291	35	42	1213
2028	1304	41	51	1212
2029	1318	47	59	1212
2030	1332	53	66	1213
2031	1345	59	73	1214
2032	1359	65	79	1215
2033	1372	71	84	1218
2034	1385	77	87	1221
2035	1398	83	90	1225
2036	1411	89	93	1229
2037	1423	89	95	1240
2038	1436	89	96	1251
2039	1448	89	98	1262
2040	1461	89	99	1273
2041	1473	89	100	1284
2042	1485	89	101	1296
20 Year CAGR	1.0%			0.3%
20 Yr Avg Increase (MW)	13			4

1 Navigant LOW case solar pv - net meter forecast
2 Incremental DSM and NEM

Winter Peak Demand Forecast (MW)				
Historic and Forecast Values Include Losses				
	2022	Less	Less	2022
Year	Actual/ Regression	DSM[2]	NEM[1]	Forecast
2012	1074			
2013	1272			
2014	1176			
2015	1054			
2016	1163			
2017	1119			
2018	1171			
2019	1165			
2020	1190			
2021	1182			
2022	1205	6		1199
2023	1216	13		1203
2024	1227	19		1208
2025	1237	25		1211
2026	1247	32		1215
2027	1258	38		1219
2028	1268	45		1223
2029	1278	51		1227
2030	1289	57		1231
2031	1299	64		1235
2032	1309	70		1239
2033	1319	76		1242
2034	1329	83		1246
2035	1338	89		1249
2036	1348	95		1252
2037	1357	95		1262
2038	1367	95		1271
2039	1376	95		1281
2040	1385	95		1290
2041	1395	95		1299
2042	1404	95		1308
20 Year CAGR	0.8%			0.4%
20 Yr Avg Increase (MW)	10			5

1 No NEM impact on Winter peak assumed
2 Incremental DSM

2.3.2.2 Resource Analysis

NorthWestern is committed to participating in the WRAP which is currently in the binding phase with a potential implementation date in 2025 or 2026. WRAP requires a dynamically calculated monthly capacity PRM based on sub-region within the WRAP footprint. **Tables 2-3** and **2-4** show NorthWestern's applicable PRM values for WRAP 2022 Winter and 2023 Summer seasons.

Table 2-3: WRAP Planning Reserve Margins for 2022-2023 Winter Forward Showing

Month	Northwest Sub-region (MID-C)
November	21.6%
December	17.7%
January	19.0%
February	19.9%
March	26.9%

Notes: MID-C = mid-Columbia

Table 2-4: WRAP Planning Reserve Margins for 2023 Summer Forward Showing

Month	Northwest Sub-region (MID-C)
June	16.5%
July	10.4%
August	10.3%
September	17.9%

Notes: MID-C = mid-Columbia

To meet these PRM requirements, NorthWestern evaluates the capacity credit of generation and storage resources based on WRAP's seasonal accredited capacity values *refer to* Table 2-1.

NorthWestern does not currently plan a reserve margin for energy needs. The current portfolio of online resources generate energy more than our load in many hours.

2.3.2.3 Load Management Measures Effects on Projected Capacity and Energy Requirements

NorthWestern's forecast for retail customer load and peak demand including transmission line losses is shown in **Table 2-5.** NEM and DSM load reductions are shown separately but are also included in load and peak demand forecasts.

Table 2-5: NorthWestern's Forecast for Retail Customer Load and Peak Demand

	2022 Load Forecast Including Losses & DSM & NEM MWh	2022 Winter Peak Forecast Including Losses & DSM * MW	2022 Summer Peak Forecast Including Losses, DSM & NEM MW	2022 DSM Forecast MWh	2022 NEM Forecast MWh	2022 DSM Winter Peak Forecast MW	2022 DSM Summer Peak Forecast MW	2022 NEM Summer Peak Incremental Forecast * MW
2022	6,639,811	1,199	1,210	35,443	12,674	6	6	5
2023	6,659,426	1,203	1,213	70,885	27,002	13	12	10
2024	6,680,045	1,208	1,215	106,328	43,595	19	18	17
2025	6,688,836	1,211	1,215	141,771	63,430	25	24	24
2026	6,695,593	1,215	1,214	177,213	85,464	32	30	33
2027	6,699,927	1,219	1,213	212,656	109,970	38	35	42
2028	6,704,821	1,223	1,212	248,099	133,984	45	41	51
2029	6,713,704	1,227	1,212	283,541	153,972	51	47	59
2030	6,724,600	1,231	1,213	318,984	171,999	57	53	66
2031	6,735,321	1,235	1,214	354,426	189,327	64	59	73
2032	6,747,037	1,239	1,215	389,869	204,797	70	65	79
2033	6,760,692	1,242	1,218	425,312	217,581	76	71	84
2034	6,776,030	1,246	1,221	460,754	227,962	83	77	87
2035	6,793,391	1,249	1,225	496,197	235,593	89	83	90
2036	6,811,814	1,252	1,229	531,640	241,537	95	89	93
2037	6,865,765	1,262	1,240	531,640	246,818	95	89	95
2038	6,920,129	1,271	1,251	531,640	251,185	95	89	96
2039	6,974,908	1,281	1,262	531,640	254,606	95	89	98
2040	7,029,871	1,290	1,273	531,640	257,449	95	89	99
2041	7,084,559	1,299	1,284	531,640	260,111	95	89	100
2042	7,139,179	1,308	1,296	531,640	262,470	95	89	101
2043	7,193,816	1,317	1,307	531,640	264,361	95	89	101
2044	7,248,211	1,326	1,318	531,640	266,313	95	89	102
2045	7,302,028	1,335	1,329	531,640	268,767	95	89	103
2046	7,355,086	1,344	1,340	531,640	271,799	95	89	104
2047	7,407,159	1,353	1,350	531,640	275,751	95	89	106
2048	7,458,659	1,362	1,361	531,640	280,257	95	89	108
2049	7,509,875	1,371	1,371	531,640	285,039	95	89	109
2050	7,560,817	1,380	1,381	531,640	290,188	95	89	111
2051	7,612,082	1,389	1,392	531,640	295,393	95	89	112
2052	7,663,672	1,398	1,403	531,640	300,652	95	89	114
2053	7,715,588	1,407	1,414	531,640	305,968	95	89	115
2054	7,767,834	1,416	1,425	531,640	311,341	95	89	116
2055	7,820,410	1,425	1,435	531,640	316,771	95	89	117
2056	7,873,319	1,434	1,446	531,640	322,258	95	89	118
2057	7,926,564	1,443	1,457	531,640	327,804	95	89	119
2058	7,980,146	1,452	1,468	531,640	333,408	95	89	120
2059	8,034,067	1,461	1,479	531,640	339,072	95	89	121
2060	8,088,330	1,470	1,490	531,640	344,796	95	89	123
2061	8,142,936	1,479	1,501	531,640	350,579	95	89	124
2062	8,197,889	1,488	1,512	531,640	356,424	95	89	125
2063	8,253,190	1,497	1,523	531,640	362,330	95	89	126
2064	8,308,841	1,506	1,533	531,640	368,298	95	89	127
2065	8,364,844	1,514	1,544	531,640	374,329	95	89	128

* Net Energy Metering customer (NEM) generation largely consists of rooftop solar and is considered as a summer peak reduction

2.3.2.4 Total Annual Cost of Alternative Sources of Power

Alternative sources of power include market purchases for energy, contracts for capacity, increased generation from other dispatchable resources, and potentially an RFP for alternate capacity resources. Forecasted costs for purchased energy is estimated above at $64/MWh, and at the full average annual generation, would total $34,399,605 per year. This alternative would have increased risks due to exposure to market price increases and volatility, particularly during peak load hours. There would also be an increased risk of potential transmission issues with importing this power. The cost of building new long-term capacity is estimated above at $205/kW-yr, and at 84 MW of accredited capacity, would total up to $17,220,000 annually. Historically, short-term capacity contracts have been procured at costs up to $150/kW-yr that are supplied by existing resources. However, there are concerns about the future availability and costs of capacity contracts in this capacity deficient region. The costs of increased generation from alternative existing resources would depend on the resources, fuel type, and variable costs involved. Variable costs and fuel costs would increase due to the nature of NorthWestern's current thermal dispatchable resources. It is also likely that these dispatchable resources would not be able to cover the amount of replacement power needed in some hours. Winning bids from an RFP for capacity have costs that would depend on the ownership/contract structure, resource type, fuel type, fixed and variable costs.

2.4 Effect of Obtaining or Losing Power on Industrial Facilities

This section discusses the effect on an applicant which uses power for its own industrial facility and related operations, pursuant to 18 CFR § 5.18 (c)(1)(i)(D). This section is not applicable as all power generated by the Thompson Falls Project, except for some minimal station service load, is transmitted via the Project's transmission lines to the grid.

2.5 Statement on Tribes Need for Power

Pursuant to 18 CFR § 5.18 (c)(1)(i)(E), this section is required if an applicant is an Indian tribe applying for a license for a project located on a tribal reservation. This section is not applicable as NorthWestern is not an Indian tribe, nor is the Project located on a tribal reservation.

2.6 Impact on Transmission System

2.6.1 Effects Resulting from Redistribution of Power Flows

The Project provides real power delivery to the local area, voltage support for the interconnecting transmission system, cost effective imbalance energy, and Frequency Reserve Response for the Western Interconnection. If the Project's FERC license is not renewed, real power to support local area loading and reactive power to support transmission voltage would be required to flow from other interconnected resources or voltage control devices. These resources are not located close to the local area loads, thus real and reactive power flow would be subject to greater transmission losses and less efficient delivery to end users. In addition, if real and reactive power, provided by the Thompson Falls Project, was no longer available, it would drive the need for additional voltage control devices in the interconnecting area and inhibit the ability to take transmission system outages to complete local area transmission system maintenance. In addition, if generation from the Thompson Falls Project was not available, there would be a decline in the deployment for Frequency Reserves Response used to support the Western Interconnection and a decline in available capacity to support energy imbalance.

2.6.2 Advantages of NorthWestern Transmission System

The Thompson Falls Project is located in northwest Montana. The facility provides real power to local area loads and dynamic reactive power to support transmission system voltage. The facility also provides Frequency Reserve Response to support the Western Interconnection. The Thompson Falls Project interconnects to NorthWestern's 115 kilovolts (kV) Transmission System and the facility is approximately 20 miles from the Idaho-Montana State border. The Project is also approximately 20 miles from the metered boundaries of the interconnected transmission tie lines – Thompson Falls – Burke 115 kV and Crow Creek – Burke 115 kV. These two transmission tie lines are a part of the Western Interconnection Path 8, Montana to Northwest which provides transmission path flow between adjacent entities' transmission systems and supports reliable operation of the synchronous grid.

The Thompson Falls Project is currently a Participating Resource in the CAISO EIM and provides imbalance energy to NorthWestern and participating entities in the CAISO EIM when there is an imbalance between supply and demand.

2.6.3 Single-Line Diagram

The Project's single line diagram is being filed under separate cover as Critical Electric Infrastructure Information, not for public distribution.

2.7 Modifications to Facilities or Operations

2.7.1 NorthWestern Plans to Modify Operations

NorthWestern proposes that the Project will continue to provide baseflow generation and flexible capacity needs in the new license term. Baseflow generation uses the river inflow by matching reservoir inflows to generate electricity while maintaining a stable reservoir elevation. Flexible capacity increases or decreases generation from the baseflow, raising or lowering the reservoir elevation as the flow through the units is changed to support flexible capacity needs. Under normal operations, NorthWestern will maintain the reservoir between El. 2396.5 and 2394 feet (2.5 feet below normal full operating level). In the spring during periods of spill, the reservoir may be up to El. 2395.7. The units may increase or decrease generation during normal operations within the above defined, reservoir elevations. Spill gates may be used to maintain reservoir elevation if needed in times of decreased generation. Generally, a minimum flow of the lesser, or 6,000 cubic feet per second (cfs), or inflow will be maintained downstream during normal operations.

2.7.2 NorthWestern Plans to Modify Project Facilities

NorthWestern is not proposing additional development or rehabilitation of the Project in this license application. No capacity upgrades are being proposed at this time.

2.8 Consistency with Comprehensive Plans

See Exhibit E, **Section 18.5 – Consistency with Comprehensive Plans**.

2.9 Financial and Personnel Resources

Pursuant to 18 CFR § 5.18 (c)(1)(i)(I), this section provides a statement describing NorthWestern's financial and personnel resources to meet its obligations under a new license, including specific information to demonstrate that the applicant's personnel are adequate in number and training to operate and maintain the Project in accordance with the provisions of the license.

NorthWestern has adequate financial resources to meet its obligations under a new license for the Project. NorthWestern's financial information is available in NorthWestern's FERC Form 1, filed with FERC annually, and is also available in the annual Securities and Exchange Commission Form 10-K report which can be accessed online at:
https://www.sec.gov/ix?doc=/Archives/edgar/data/73088/000007308823000028/nwe-20221231.htm

NorthWestern Corporation, doing business as NorthWestern Energy, provides essential energy infrastructure and valuable services that enrich lives and empower communities while serving as long-term partners to its customers and communities. NorthWestern provides electricity and / or natural gas to approximately 764,200 customers in Montana, South Dakota, Nebraska, and Yellowstone National Park (Wyoming). NorthWestern has provided service in South Dakota and Nebraska since 1923 and in Montana since 2002. NorthWestern employs approximately 1,530 people in three principal business segments: electric utility operations, natural gas utility operations, and other services.

NorthWestern's regulated electric utility business in Montana includes generation, transmission, and distribution. NorthWestern's service territory covers approximately 107,600 square miles, representing approximately 73 percent of Montana's land area. During 2022 in Montana, NorthWestern delivered electricity to approximately 202 communities and their surrounding rural areas, 11 rural electric cooperatives and, in Wyoming, to Yellowstone National Park. Hydropower is by far NorthWestern's largest and most important electric generation resource. At 94 MW of actual maximum capacity, the Thompson Falls Project is NorthWestern's largest source of hydropower.

Currently NorthWestern has five full-time, on-site operations employees that provide 24/7 coverage for the Project. NorthWestern also owns and operates a Generation Control Center located in Great Falls, Montana with an additional four full-time operators and two relief operators. NorthWestern has a full time Hydro support staff including nine managers/supervisors, 14 engineers (supporting capital projects, FERC Dam Safety, O&M support, and plant controls), an admin, and a drafter. In addition, there are five NorthWestern Energy Hydropower License Compliance staff and management and contractors that support the Thompson Falls Project and other company hydroelectric projects with engineering and environmental compliance; additional support services and personnel are in Great Falls, Butte, Helena, and Missoula Montana. The local employees, along with the hydropower support staff, are adequate in number and have the appropriate training to operate the Project in accordance with the provisions of the license.

2.10 Additional Lands Notification

NorthWestern proposes to modify the Project boundary to encompass the following:

- The South Shore Dispersed Recreation Area. This recreation area is connected to Island Park by the historic High Bridge and is used frequently by recreationists visiting the Project. The land to be added to the proposed Project boundary is owned by NorthWestern and would not affect any adjacent lands or landowners. Therefore, no notification is needed.

- The Power Park recreation site. Under the current license, Power Park is not a recreation site and is outside of the Project boundary. NorthWestern seeks to add Power Park as a project recreation site under the new license. Therefore, NorthWestern proposes to modify the Project boundary to include Power Park. Most of the land to be added to the proposed Project boundary is owned by NorthWestern and would not affect any adjacent lands or landowners. However, a portion of the Power Park recreation site is on a city street right-of-way that is not developed for and is not being used as a street, which is owned by the City of Thompson Falls. Northwestern has notified the City of Thompson Falls by certified mail of the proposed modification to the Project boundary. NorthWestern met with representatives of the City of Thompson Falls to discuss the proposed Project boundary and acquiring appropriate land use rights for the area (*see* consultation record in Exhibit E Section 19). NorthWestern has acquired an easement from the City to operate and maintain the entire recreation site.

- The North Shore Parking Area. This is a parking area for the public to use to access Island Park. The land to be added to the proposed Project boundary is owned by NorthWestern Energy and would not affect any adjacent lands or landowners. Therefore, no notification is needed.

- The Gallatin Street Bridge gate and Americans with Disabilities Act (ADA) -accessible parking spot. A gate on Gallatin Street prevents motorized access across the Gallatin Street bridge by the public to Island Park, which is a pedestrian park. The ADA-accessible parking spot provides a parking spot near the gate for ADA-users to access

Island Park. These features are on City of Thompson Falls owned street right-of-way. Northwestern notified the City of Thompson Falls by certified mail of the proposed modification to the Project boundary. NorthWestern met with representatives of the City of Thompson Falls to discuss the proposed Project boundary and acquiring appropriate land use rights for the area (*see* consultation record in Exhibit E Section 19). NorthWestern has acquired an easement from the City to operate and maintain the entire recreation site.

- Wild Goose Landing Park. Wild Goose Landing Park is an existing Project recreation site under the current license and is being proposed for continuation as a Project recreation site under the new license. A portion of this recreation site is not within the current Project boundary. The proposed Project boundary will encompass the entire recreation site. The land is owned by the City of Thompson Falls. Northwestern notified the City of Thompson Falls by certified mail of the proposed modification to the Project boundary. NorthWestern with representatives of the City of Thompson Falls to discuss the proposed Project boundary and acquiring appropriate land use rights for the area (*see* consultation record in Exhibit E Section 19). NorthWestern has acquired an easement from the City to operate and maintain the entire recreation site.
- Prospect Creek Powerhouse. The land to be added to the proposed Project boundary is owned by NorthWestern Energy and would not affect any adjacent lands or landowners. Therefore, no notification is needed.
- Two road segments solely used by NorthWestern for Project access. The land to be added to the proposed Project boundary is owned by NorthWestern Energy and would not affect any adjacent lands or landowners. Therefore, no notification is needed.

2.11 Electricity Consumption Efficiency Improvement Program

This section describes the NorthWestern electricity consumption efficiency improvement program, as defined under Section 10(a)(2)(C) of the Federal Power Act, including, a statement of the applicant's record of encouraging or assisting its customers to conserve electricity and a description of its plans and capabilities for promoting electricity conservation by its customers; and a statement describing the compliance of the applicant's energy conservation programs with any applicable regulatory requirements.

NorthWestern offers services and programs to assist its Montana customers with the wise and efficient use of energy. Over the years, the Efficiency Plus (E+) programs have included energy audits and virtual home energy assessments, electric and natural gas energy efficiency rebate programs, low-income energy assistance, and small-scale renewable activities. NorthWestern also provides training and continuing education to contractors and trade allies.

In 2022, NorthWestern E+ programs spent $13.6 million to produce energy savings totaling an estimated 74,377 MWh. Recovery of the costs associated with NorthWestern's electric DSM programs are funded through energy supply rates and costs associated with NorthWestern's

Universal System Benefits (USB) programs are collected from NorthWestern electric distribution customers through a USB Charge.

2.11.1 NorthWestern's Energy Conservation Programs

NorthWestern invests in energy efficiency pursuant to its 20-year 2017 DSM Acquisition Plan, which is currently in revision, and its Montana IRP 2023. NorthWestern's E+ programs, services and resources encourage its Montana customers to better manage energy costs through the following methods, available online at: www.NorthWesternEnergy.com/Eplus. Examples include:

- E+ Energy Audit for the Home through a free virtual energy assessment or mail-in survey audit.
- Rebates and incentives available to residential and commercial electric customers for qualifying electric measures.
- Market transformation through the Northwest Energy Efficiency Alliance's regional leveraging.
- E+ Free Weatherization Program provides efficiency improvements at no cost to Low Income Home Energy Assistance Program qualified space-heating customers of NorthWestern.
- E+ Renewable Energy Program provides financial incentives to non-profit and government/public electric customers for qualifying small-scale solar photovoltaic, wind, and hydroelectric systems in Montana.
- Building Operator Certification is an international professional development program for managers and operating engineers of commercial and public facilities and is available to commercial customers in partnership with the Northwest Energy Efficiency Council.

2.11.2 Statement of Compliance with Energy Conservation Programs

Montana law and the MPSC's rules on electricity supply resource planning require NorthWestern to include DSM options in its supply resource planning and procurement processes. NorthWestern implements its USB programs and activities consistent with the requirements of legislation for USB, the Department of Revenue administrative rules for USB Programs, and tariffs and orders of the MPSC.

2.12 Tribal Lands

18 CFR § 5.18(c)(1)(i)(L) requires that NorthWestern include the names and mailing addresses of every Indian tribe with land on which any part of the proposed Project would be located or which the applicant reasonably believes would otherwise be affected by the proposed Project.

The existing and proposed Project is not located on or otherwise affecting the land of any Indian tribes. However, it is possible that tribal members may attach religious and cultural significance to historic properties within the Project boundary (*see* **Exhibit E** for more detail regarding Tribal interests). At this time, no Indian traditional or religious cultural properties are known in or near the Project boundary. The names and addresses of these tribes are listed below.

Tom McDonald, Chairman
Confederated Salish and Kootenai Tribes of the Flathead Reservation
P.O. Box 278
Pablo, Montana 59855
council@cskt.org

Harlan Gopher Baker, Chairman
Tribal Business Committee
Chippewa Cree Tribe of Rocky Boys' Indian Reservation
96 Clinic Road
Box Elder, Montana 59521
chairman@chipppewa-cree.org

Scott Kipp Sr., Chairman
Blackfeet Nation
P.O. Box 850
Browning, Montana 59417
skipp@blackfeetnation.com

Jennifer Porter, Tribal Chair
Kootenai Tribe of Idaho
P.O. Box 1269
Bonners Ferry, Idaho 83805-1269
jennifer@kootenai.org

Glen Nenema, Chairman
Kalispel Tribe of Indians
P.O. Box 39
Usk, Washington 99180-0039
kmonkiewicz@kalispeltribe.com

Chief Allan, Chairman
Coeur d'Alene Tribe
P.O. Box 408
Plummer, Idaho 83851-0408
chief.allan@cdatribe-nsn.gov

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3. Information to Be Provided by Applicant Who is an Existing Licensee (NorthWestern)

3.1 Measures Taken to Ensure Safe Management, Operation, and Maintenance of the Project

3.1.1 Operation During Flood Conditions

Due to a lack of significant storage capacity, the Project is not used in a flood control capacity. Flood control is provided as appropriate at upstream projects. The Flathead River is a major tributary to the lower Clark Fork River upstream from the Thompson Falls Project. The Flathead River is regulated by the upstream Hungry Horse and Sėliš Ksanka Ql̓ispė (formerly Kerr) projects located on the South Fork of the Flathead River and the Flathead River respectively. The upper Clark Fork River main stem is unregulated.

USGS stream gages are monitored and communication is maintained with upstream projects to provide an estimate of expected flows entering the Thompson Falls Reservoir. Based on these estimates, when inflows are expected to exceed the capacity of the powerhouses, two of the four radial gates manage flow changes until the flows require removal of spill panels on the Main Channel Dam to provide spillway capacity for the excess flow and maintain reservoir elevation. The two additional Main Channel Dam radial gates are generally not used for this purpose but instead remain closed to be used in the event of a powerhouse load rejection whereby the gates can be opened quickly to discharge the rejected powerhouse flows. Once the capacity of Main Channel Dam spill panels is exceeded, the Dry Channel spill panels are opened. Under very high flow conditions all four radial gates are used in addition to the removal of the spill panels. If additional capacity is needed beyond the spill panels and radial gates, stanchions are tripped at the Main Channel Dam and Dry Channel Dam thus releasing the lower flashboard sections.

The wheeled spill panels are removed using rail mounted gasoline-powered hydraulic cranes. If needed under emergency conditions, the stanchions can be released at the Main and Dry Channel dams by releasing the tripping latch or by cutting with a torch. In the event of power failure at the radial gates, a standby generator located at the Main Channel Dam automatically starts. The radial gates can be operated from the dam crest, the powerhouse, or remotely by the Hydro System Operator in Great Falls.

3.1.2 Warning Devices for Public Safety

There are adequate fencing, barriers, and signs on Project structures to restrict public access for safety purposes. In addition, there are upstream and downstream warning signs to ensure public safety, as well as a warning signal that alerts individuals downstream of the dams when gates are operated to change spill volume. By Administrative Rules of Montana, the Project area is closed to boating, sailing, floating, and swimming from 1,020 feet upstream of the Main Channel Dam to 500 feet downstream of the dams.

3.1.3 Changes Affecting Emergency Action Plan

NorthWestern is not proposing any changes to the operation of the Project or downstream development that might affect the existing Emergency Action Plan, that was filed with FERC on December 30, 2022.

3.1.4 Monitoring Devices

NorthWestern's existing monitoring devices are described in detail in the Supporting Technical Information Document, filed with FERC May 28, 2021, which includes Critical Energy Infrastructure Information is not included here.

3.1.5 Employee Safety and Public Safety Record

The operations and maintenance crew at the Thompson Falls Project have one of the best safety records in the NorthWestern hydroelectric system. The crew has incurred only one Occupational Health and Safety Administration (OSHA) recordable injury since NorthWestern purchased the facility in November of 2014. The Thompson Falls Project is an OSHA Voluntary Protection Program (VPP) Star site. VPP Star sites provide recognition for employers and employees who demonstrate exemplary achievement in the prevention and control of occupational safety and health hazards as well as the development, implementation, and continuous improvement of their safety and health management system (OSHA 2023).

3.2 Current Operation of the Project

The Project is currently operated to maximize production from available baseflows while providing flexible capacity with available reservoir volume.

The Project has a maximum hydraulic capacity of 23,320 cfs for a maximum production of 94 MW of actual electric production. The Project typically generates 450,000 to 500,000 MWh of electricity annually based on available river flows.

River flows not passing through the plant are passed through the spillgates or over the spillway of the dam. Generally, the Project has a minimum flow requirement of 6,000 cfs that must be always maintained (unless inflows dropbelow 6,000 cfs).

The Project is operated to provide baseload and flexible generation within the reservoir elevation and minimum flow requirements of the license. Baseflow generation uses the river inflow by matching reservoir outflows to generate electricity while maintaining a stable reservoir elevation. Flexible capacity increases or decreases generation from the baseflow, raising or lowering the reservoir elevation as the flow through the units is changed to support flexible capacity needs. Under the current license, NorthWestern may use the top 4 feet of the reservoir from full pool while maintaining minimum flows. NorthWestern has typically managed the reservoir within 1.5 feet of full pool, with occasional brief periods when the reservoir is drafted up to 4 feet. Availability of flexible capacity is dynamic and based on Project baseflows, available generating unit(s), current production, and reservoir elevation. The dynamic nature of the flexible capacity availability and NorthWestern's obligation to maintain grid reliability makes it difficult to accurately predict the frequency and extent of fluctuations.

3.3 Project History

The Project is built across the Clark Fork River in the city of Thompson Falls, Montana. Construction of the Project commenced in 1913 and was completed in 1915, and the plant was commissioned in the same year. The Project consists of two curved concrete gravity dams (Dry Channel Dam and Main Channel Dam) with overflow spillways and two powerhouses.

An investigation conducted in 1967 on the Main Channel and Dry Channel dams concluded that post-tensioned anchors should be installed in both dams to eliminate tensile stresses in the concrete under normal loading conditions. In 1968 the post-tension anchor work was implemented as recommended. The anchors used were post tensioned multiple-strand rock anchors supplied by VSL Corporation of Los Gatos, California. In the Main Channel Dam, two anchors were installed in each of the spillway bays. Vertical holes were drilled into rock an average depth of 16.5 feet, with a minimum of 13.0 feet. The tendons were inserted into holes and grouted in at the base. When the grout had set, the anchors were stressed, and the total length of the hole was grouted. In Bays 1 to 27, eight-strand tendons were used, and they were locked-off at an average initial pre-stress of 219 kilo pounds (kips), with a minimum of 155 kips in one anchor. In Bays 28 to 38, six-strand tendons were used, and were locked-off at an average initial pre-stress of 162 kips, with a minimum of 140 kips.

In the Dry Channel Dam, one anchor was installed in each of the 12 spillway bays. Holes were drilled through the structure and into the bedrock for depths ranging from 13.0 to 15.8 feet. Five-strand tendons were used and were locked-off at an average initial pre-stress of 131 kips, with a minimum of 120 kips.

In 1982, two radial gates 41 feet wide by 18 feet high were installed in the Main Channel Dam structure. Also, the top 8 feet of the original flashboard system was replaced by 4-foot-wide by 8-foot-high roller-equipped spill panels which are mechanically handled by a hydraulic crane.

In 1989, rehabilitation measures included the repair of the deteriorated left abutment downstream training wall and the concrete spillway piers on the Main Channel Dam by installing 1/4-inch-wide steel plate and grouting between plate and concrete. In addition, deteriorated concrete on the log sluice wall of the Main Channel Dam right abutment was repaired and a portion of the log sluice wall was removed to provide drainage for the area downstream of the right abutment. In 1989 through 1992, Units No. 1 through No. 6 in the original powerhouse were automated.

In 1990, the horizontal construction joint in the right abutment at the Main Channel Dam was repaired by pressure injection of epoxy grout and the downstream surface of the right abutment of the Main Channel Dam was repaired by the addition of a reinforced concrete cap. At the Dry Channel Dam, the downstream surface and top surface of the right abutment were repaired by the addition of a reinforced concrete cap, and bulkheads were constructed and installed in all sluiceway passages. At the intake structure, the existing timber headgates and seals were replaced with timber gates and steel seals. The area between the existing wood seals and new metal seals was sealed by epoxy grout injection, the wooden intake gates rebuilt, and the existing screen racks removed, and new screen racks installed.

A 50-MW Expansion Project was completed in 1995 with the construction of a second powerhouse containing Unit No. 7 (new powerhouse). The new powerhouse was constructed in a rock cut through the island between the existing powerhouse and the Dry Channel Dam. The powerhouse structure is a cast-in-place reinforced concrete gravity structure containing a single, vertical shaft, Kaplan type turbine and synchronous generator rated at 52.6 MW.

Also, in 1995, the right end of the Main Channel Dam spillway was grouted to fill voids that were discovered during the 1993 site investigation program. The origin of the voids is thought to be diversion channels at the base of the dam that were not completely filled during completion and closure of the dam. In 1996, the wood operating deck upstream of the Units No. 1 through No. 6 intake was replaced with a concrete deck.

In June 1999, one of the rail mounted cranes, used to remove and install fixed wheel spill panels, tipped upstream when maneuvering a panel for reinstallation. No injuries occurred and the unit was secured with chains. A new clamping unit that secures the hoist to the track rails when lifting has since been installed.

In 2000, a new turbine runner was installed in Unit No. 1, and the Unit No. 3 turbine runner was replaced in 2003.

A detailed inspection of the spillway radial gates was conducted in 2001 and resulted in a recommendation of cleaning and painting of the gates. The FERC inspection of 2002 noted small areas of missing grout under the radial gate trunnion bearing plates. The voids under the spillway gate bearing pads were grouted. Painting of the downstream side of the gates was completed in 2006 and 2007. Maintenance of the upstream side of the radial gates is complicated by the lack of a floating bulkhead available for use at the site. In 2011, high water required tripping of some stanchions and allowed for the radial gates to be lifted out of the water. This allowed for a detailed inspection of the gates, sandblasting and repainting of the upstream side of the gates, and replacement of cables and seals.

In 2011, a 48-pool reinforced concrete upstream fish passage facility was completed in the right abutment of the non-overflow section of the Main Channel Dam. Most of the new features are constructed on excavation from abutment rock, with the exit requiring a small breach in a short section of the non-overflow section. Other modifications included the auxiliary and attraction water supply, which was added to the log sluice section of the dam. Construction of the fish passage facility required limited excavation of existing bedrock close to the right dam abutment and close to the bottom of the downstream toe of the dam near the right abutment.

In 2017, construction commenced on two additional radial gates near the left abutment on the Main Channel Dam. The new gates became operational in April 2019. The additional gates, located in bays 25 through 29, are similar in dimension and configuration to the radial gates installed in 1982. The additional gates allow for greater overall spill capacity at the Main Channel Dam. Each radial gate passes approximately 10,000 cfs of water. With the two additional radial gates, spill capacity is just over 40,000 cfs for all four radial gates combined.

3.4 Discussion of Power Losses

Pursuant to 18 CFR § 5.18(c)(ii)(E), this section summarizes all generation lost at the Project over the last 5 years because of unscheduled outages, including the cause, duration, and corrective action taken.

The Project has a proven record of high reliability and availability. For the 5-year period of 2018 through 2022, the facility had an Equivalent Unplanned Outage Factor (less low-water) of only 0.72 percent which accounted for only 0.42 percent of lost generation (MWh) due to unplanned outages in that same timeframe (**Table 3-1**). The facility had a total of 10,246 MWh total lost generation due to unplanned outages for the 5-year time frame, with an average of 2,049 MWh lost per year.

The two largest unplanned outages in the 5-year period included an extended outage to support a governor overhaul in 2019 and a downed transmission line due to wind in 2021 that forced the plant offline. Corrective actions for the governor overhaul included improved planning and parts and materials acquisition. Corrective actions for the transmission line failure were to repair the lines and ensure proper tree clearance along the lines' right-of-way.

Table 3-1: Thompson Falls Hydroelectric Plan Reliability and Availability Metrics

		Thompson Falls Hydroelectric Plan Reliability and Availability Metrics						
		2018	2019	2020	2021	2022	total	average
Lost generation								
PO	(MW-hrs)	0	35932.4	770.1	0	0	36702.5	7340.5
Unplanned	(MW-hrs)	149.4	8151.97	69.2	1847.3	28.3	10246.2	2049.2
PO	(%)	0.00%	7.29%	0.16%	0.00%	0.00%		1.49%
Unplanned	(%)	0.03%	1.65%	0.01%	0.39%	0.01%		0.42%
EAF	(%)	87.59%	84.49%	85.49%	81.25%	82.97%		84.36%
EUOF	(%)	7.36%	8.77%	8.36%	13.48%	11.56%		9.91%
EPOF	(%)	5.04%	6.74%	6.15%	5.28%	5.47%		5.74%
Low water	(%)	6.65%	6.80%	8.28%	12.72%	11.49%		9.19%
EUOF less low water	(%)	0.71%	1.97%	0.08%	0.76%	0.07%		0.72%
Capacity Factor	(%)	55.90%	54.50%	58.30%	57.00%	60.30%		57.20%

3.5 Compliance Record

NorthWestern's review of its compliance history for the Project indicates that no violations of License conditions have been reported, and all required compliance filings have been completed on schedule.

FERC conducted environmental compliance inspections of the Project on June 30, 2005, August 24, 2017, and again on July 14, 2022. During all three inspections, the Project was found to be in compliance with the License articles related to operations, fish, wildlife, recreation, public safety, and cultural resources. No follow up items requiring attention were noted during the inspections (Letters from FERC dated July 20, 2005, September 20, 2017, and July 26, 2022).

3.6 Actions Affecting the Public

Pursuant to 18 CFR § 5.18(c)(ii)(G), this section discusses any actions taken by NorthWestern related to the Project which affect the public.

3.6.1 Economic Benefits

Sanders County and the Thompson Falls area benefit directly and indirectly from the Project. Property taxes that support county budgets are paid annually by NorthWestern and totaled $2,967,441 in 2022. Salaries for five permanent staff are paid and filter through the local economy, as well as out-of-area staff, contractors, and supporting positions such as fisheries biologists with Montana Fish, Wildlife and Parks that work at the Thompson Falls Project periodically and provide an economic benefit through their travel and accommodation expenses (NorthWestern 2020).

The Project's reservoir draws landowners who desire water frontage, a feature that increases property values and property taxes paid by landowners.

Finally, providing high-quality, well-managed recreation sites to the public allows personal disposable income to support recreation trips (food, drinks, boat gas, fishing supplies, etc.) rather than site use fees. Included in this are the annual operation and maintenance funds that NorthWestern currently pays to the City of Thompson Falls for managing Wild Goose Landing Park ($11,038 in 2023) and the multitudes of recreation improvements (trail building, facility repairs, etc.) that NorthWestern funds in addition to the in-kind contribution of staff time to support operation and maintenance efforts (NorthWestern 2020).

3.6.2 Recreational Opportunities

NorthWestern generally allows public recreation access to Thompson Falls Reservoir and the surrounding Project lands. However, as necessary, NorthWestern restricts public access to specific areas that pose a threat to the public, employees, or Project safety. Generally, restrictions to public recreation access occur only in the vicinity of the Project dams, powerhouses, canal intakes, and appurtenant structures.

There are ten recreation sites in the Project area that offer developed and dispersed recreation opportunities. These sites support water-based activities such as fishing, motor boating, use of personal motorized watercraft, non-motorized canoes, kayaks, and similar vessels, along with floating and swimming. These sites also offer terrestrial-based activities including day hiking, running, and picnicking, as well as passive activities such as photography, wildlife viewing, and sight-seeing (NorthWestern 2020).

NorthWestern conducted a visitor survey of the Thompson Falls Project in 2021 and found that visitor satisfaction with the recreation sites overall was high, with an average rating of 4.0 (very satisfied) out of 5.0 (NorthWestern 2022). The survey found that visitors to the Thompson Falls Project area recreation sites are satisfied with the sites and amenities offered, though a few minor improvements were suggested. Visitors reported they do not feel crowded and are largely repeat visitors from the local area that utilize the sites for both passive and active recreation pursuits (NorthWestern 2022).

See **Exhibit E – Section 11 – Recreation** for a more detailed description of recreational opportunities at the Project.

3.6.3 Carbon-Free Generation

Generating electricity at the Thompson Falls Project does not produce greenhouse gases and does not contribute to air pollution.

3.7 Ownership and Operating Expenses That Would Be Reduced if the Project License Were Transferred

There is no competing application to take over the Project. Because there is no proposal to transfer the Project license, this section is not applicable to the Project.

3.8 Statement Of Annual Fees

NorthWestern pays the following annual fees in support of the Thompson Falls Project.

Annual Charges for U.S. Lands (2023)	$ 2,160
Federal Administrative Fees (2023)	$406,443
Headwater Payments (2022)*	$302,606
Total	**$711,209**

*per the Pacific Northwest Coordination Agreement (subsection 13A)

4. Literature Cited

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