

EXHIBIT A

PROJECT DESCRIPTION

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A.1 PROJECT FACILITIES

The Public Utility District No. 1 of Okanogan County (District) proposes to restore hydropower generation at Enloe Dam on the Similkameen River.

The history of hydropower development at the Enloe site is reviewed in Exhibit C, Section C.3. The previous 3.2 MW powerplant sited on the west bank of the Similkameen River about 900 feet downstream of Enloe Dam ceased operation in 1958. Restoration of this powerplant has been proposed by the District in previous license applications.

The present application proposes relocating the site for hydropower development to the opposite (east) bank. The proposed site is nearer to the dam and offers environmental and constructability advantages. The proposed 9.0 MW facility has a footprint that is about half the size of the existing facilities while providing nearly three times the generating capacity of the existing decommissioned plant and about twice the average annual energy output¹.

The proposed project arrangement reduces the length of river affected by diversion of a portion of outflow from the reservoir through the powerplant. The proposed project tailrace returns water diverted through the powerplant to the river at a point some 480 feet downstream of the crest of the dam whereas the existing project tailrace returned water to the river some 930 feet downstream of the dam. Relocating the tailrace exit further upstream about 450 feet closer to the falls provides for better circulation of water to the deep pool at the base of the falls, which provides a cool-water refugia for fish using the Similkameen River. Orienting the tailrace in such a manner also reduces the bypass reach to 370 feet, from the top of the dam to the base of the falls². Construction access is also improved since the east bank of the river is readily accessible from existing roads and there is sufficient room to build access road spurs for construction and maintenance of the facilities. Figure A-1 shows the Project Boundary and conceptual design.

¹ The increase in annual energy output is less than the increase in capacity because normally there is only sufficient streamflow in the Similkameen River to operate the powerplant at full capacity during the spring/summer freshet. For the rest of the year the plant output would be regulated according to flow in the river.

² The frequency, duration, and volume of the diversions are described in Exhibit E.2.

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DAM AND SPILLWAY

The proposed project would utilize the hydroelectric potential of the approximate 80 feet elevation change between the surface of Enloe Reservoir and the pool downstream of Similkameen Falls.

Enloe Dam is a concrete gravity arch dam that was constructed in the period 1919-1923 as part of the second power development constructed at Similkameen Falls. The dam is 315 feet long with an arch radius of 200 feet and a maximum hydraulic height of 54 feet. The central overflow spillway crest that occupies most of the dam has a length of 276 feet and a crest elevation of 1044.3 feet. The dam structure is 40 feet thick at the base of the spillway tapering to a 6 feet thick rounded ogee at the crest of the spillway. The spillway has provision for installing 5-foot high flashboards which increase the spillway crest elevation to 1049.3 feet.

Hydraulic energy in reservoir outflow that plunges about 54 vertical feet down the spillway chute is dissipated in a stilling zone downstream of the spillway in the river channel between the Dam and Similkameen Falls. About 340 feet downstream of the dam crest the river plunges 22 vertical feet³ over Similkameen Falls into a narrow deep plunge pool that has been eroded in bedrock at the toe of the falls. The elevation of the pool's water surface varies with river flow but is normally elevation (E.I.) 966 feet under average flows.

The short east abutment of the dam has a deck elevation of 1049.3 feet. The west abutment of the dam has a deck elevation of 1053.3 feet and a 4-foot high parapet wall on the downstream side of its crest. A gated intake structure in the abutment block controlled flow from the impoundment into two above ground woodstave penstocks that delivered water to the Enloe powerhouse. One of these old penstocks has been removed and the other remains in place. The old intake gates appear to be partially covered with sediment and a small amount of gate leakage is visible downstream of the dam. However, the leakage is not sufficient to inundate the area and has created no new wetlands. The District intends to decommission the old intake by backfilling the conduits through the dam with concrete.

The proposed project includes restoring the functionality of the flashboards on the crest of the existing spillway by retrofitting crest gates. These gates would be 5 feet high, and would increase the water level upstream of the dam and the hydraulic head available for power generation. Due to the curvature of the crest, the steel flap gates would be installed in short straight sections with flexible connections. The gates would be raised

³ This is the hydrologic height of the falls under average flow conditions, reflecting the vertical distance from the top of the water falling over the rock to the top of the pool below. Under extreme high flows, the falls would be submerged. In Exhibit E.4, a 33 foot falls is described, which measures the vertical distance of the rock feature itself, from the rock at the top of the falls to the streambed at the bottom of the plunge pool below. Since the bottom of the plunge pool is well below the water surface elevation above it, the falls described this way has a greater height. This rock feature is described as a traditional cultural property.

by air bladders installed between the gate and the spillway crest. Two small piers would be added to the spillway crest to divide the crest into three gated sections and provide air intakes for the spillway overflow. Operation of the gates is described in Exhibit B.

INTAKE CANAL

An intake canal would divert a portion of streamflow from the Similkameen River to the penstock intake structure that serves the proposed new powerplant.

The canal is designed to be wide and shallow at the upstream end to minimize disturbance to existing sediment in the reservoir, and deep at the penstock intake structure to provide adequate submergence.

The intake canal would carry inflow from the river intake structure to the penstock intake structure. The canal would be a 190 foot long unlined trapezoidal cross section canal excavated in rock. The canal would taper from about 120 feet wide and 8 feet deep at the riverbank to about 30 feet wide and 26 feet deep at the penstock intake structure.

Depending on rock bedding and jointing, benching and rock bolting may be required during the excavation, to ensure long term stability of the side slopes. Some grouting may also be required to control seepage losses through joints in bedrock that forms the east abutment of the dam.

PENSTOCK INTAKE

The penstock intake would be located at the downstream end of the intake canal, in a rock cut through the east abutment of the dam. The intake would be a 35 foot long by 30 foot wide reinforced concrete gravity type structure founded on bedrock and connected to two steel penstocks.

Two bell-mouthed entrances and transitions within the structure to the circular diameter of the penstocks would provide for smooth flow into the penstocks during plant operation, with adequate submergence and minimal hydraulic losses. Trashracks would be provided to protect the turbine water passages from blockage by debris. The trashracks would be 22 feet high by 12.5 feet wide and would be constructed either from steel or high density polyethylene (HDPW) supported by a steel frame. A one-inch clear spacing is proposed between trashrack bars to prevent adult resident fish in the reservoir and small debris from entering the intake. A motorized trashrake mounted on a monorail would be provided to remove accumulated trash and debris.

Two vertical-lift wheeled gates, approximately 10 feet high by 8.5 feet wide, would be provided for emergency closure at rated flow. Two bulkhead gate slots located upstream of the main gates, would be provided for dewatering of the main gates for maintenance. An enclosure on top of the intake structure would house the gate hoists and controls.

PENSTOCKS

Two above-ground steel penstocks, 8.5 feet in diameter and approximately 150 feet long, would slope steeply from the intake to the powerhouse and would carry water to the turbines. The penstocks would be supported on concrete saddles and by concrete anchor blocks at the penstock bends. Both the exterior and interior of the penstock would be protected against corrosion.

POWERHOUSE

The proposed powerhouse location is sited in an alcove on the east bank of the Similkameen River about 230 feet downstream of the east abutment of Enloe Dam and 140 feet upstream of Similkameen Falls.

The reinforced concrete powerhouse structure would be about 70 feet long and 30 feet wide and would house two vertical axis Kaplan turbine/generator units, controls, switchgear and a repair bay. The reinforced concrete substructure would be founded in an open rock excavation in bedrock that outcrops in the banks of the river and the broad terrace upstream of the falls. To accommodate a large fluctuation in tailrace water level, the powerhouse walls would be of reinforced concrete to El. 995 feet. Above this elevation, the walls would be structural steel with insulated metal cladding. The repair bay and laydown area would be located at the east end of the powerhouse, with a floor elevation of approximately El. 995 feet.

A concrete training wall constructed at the west end of the powerhouse would separate the powerhouse and tailrace channel from the stilling basin area downstream of Enloe Dam.

Anadromous fish would be excluded from the draft tubes during periods of part load operation by a conical physical net barrier at the outlet of each draft tube. The barriers would be made of conventional heavy duty fishnet with one inch mesh. The area of each net would be about 600 square feet to achieve a design gross approach velocity of 1.25 fps. An escape exit comprised of a short tube with a narrow one-way exit would be provided at the apex of the conical net to allow small debris and any resident fish that pass through the turbine to escape downstream. The escape exit would be made of dark material and have a narrow flexible opening with trailing streamers to discourage upstream swimming fish from attempting to enter.

TAILRACE

The tailrace channel would convey water a distance of about 180 feet from the powerhouse to the Similkameen River, downstream of the Similkameen Falls. It would be an unlined steep-sided trapezoidal channel excavated in rock by controlled blasting techniques. The channel width would taper from about 40 feet at the powerhouse to about 20 feet at a distance of about 75 feet downstream of the powerhouse. Downstream of this point, to the river, the channel width would be 20 feet. The invert of

the channel would be about 30 to 40 feet below the existing rock terrace on the east side of Similkameen Falls.

The tailrace is designed to discharge to the deep pool at the base of the falls, so that water temperature and dissolved oxygen are not adversely affected. An open tailrace channel offers an aesthetic advantage over a pipe from the Key Observation Points (KOPs). The tailrace channel would be generally similar in appearance to the natural gorge that has been excavated by the river and to the existing channels cut through the east terrace in the early 1900's for the original (run of river) power development at the site.

ACCESS ROAD

Two unpaved roads shown in Figure A-2 provide access to the dam site: Enloe Dam Road and the old Oroville-Tonasket Irrigation District (OTID) Ditch Road:

- Enloe Dam Road is a county road, designated by Okanogan County as an unmaintained primitive road. Due to its steep grade, deep ruts and loose gravel surfacing the road is only suitable for careful use by vehicles with four-wheel drive.
- Currently, the OTID Ditch Road provides access for Oroville Golf Club personnel to reach an irrigation diversion upstream of Enloe Dam, as well as informal access for recreationists, ranchers, agencies, and tribes.

The District proposes to work with the County to close Enloe Dam Road to public use and provide weather-permitting access by rehabilitating the OTID Ditch Road. The Enloe Dam Road would be maintained for use only by the District to provide maintenance access to the power distribution line. It would be gated at the Loomis-Oroville Road intersection.

No public vehicle access would be provided beyond the proposed parking and recreation area shown on Figure A-2; access beyond this point would be limited to authorized vehicles for security reasons. The OTID Ditch Road would be improved to a single lane gravel road with several turnouts within line of sight for use by larger construction traffic and recreation vehicles.

The OTID Ditch Road enters the Project Area from the Loomis-Oroville Road (County Road #9425) approximately 1.3 miles northwest of Enloe Dam Road. From its intersection with the Loomis-Oroville Road, the OTID Ditch Road travels approximately 1.5 miles to the proposed Project recreation site. Although the OTID ditch is no longer in use (as explained in Exhibit E.9), the ditch and some associated structures remain in place. Several small informal spur roads lead from the OTID Ditch Road; none of these are maintained for passenger vehicles.

From its intersection with the Loomis-Oroville Road, the OTID Ditch Road parallels the now decommissioned OTID concrete lined canal for about 0.7 miles to a point just past the FERC boundary (Segment A see Figure A-2). At this point the road bifurcates with one leg descending to a wide riverbank terrace that lies within the flood pool of the reservoir (Segment B, see Figure A-2). This lower leg of the OTID Ditch Road traverses a riparian area and is impassable in spring and early summer due to a seasonally inundating water table. It parallels the reservoir for about 0.6 miles; the first 0.2 miles of Segment B is normally flooded during high water.

The upper leg of the OTID Ditch Road is the abandoned irrigation canal and is not useable for motorized transportation (Segment C, see Figure A-2). Segment C would be reconstructed over the abandoned irrigation canal as the primary Project access road, while the lower leg of the road (Segment B) would be abandoned to a point downstream of the inundated riparian area. Segment C crosses several small gullies in short lengths of elevated concrete flume. These gullies would be crossed by embankments constructed with excavated rockfill from the project. The reconstructed upper leg (Segment C) would travel along the ditch for 1530 feet before descending 475 feet to an existing spur road to rejoin Segment B at a point beyond the inundated riparian area. Segment D would continue from that point 1375 feet to terminate public access at a proposed recreation site near the dam, as illustrated in Figure A-2.

The OTID Ditch Road traverses the Project boundary. The FERC boundary was drawn to include the portion of this road which would be reconstructed (Segments C and D), as described above. The portion of the road that would not be reconstructed (Segment A) would be improved as a graveled, single-lane road with turnouts. That portion of the road lies outside the FERC boundary.

The headworks and the east abutment of the dam would be accessible to the District from a 400 foot long section of road (Segment E) that would run east then south along the east side of the intake channel then turn west to cross the penstock intake structure to end at a turnaround area near the east abutment of the dam.

District vehicle access to the penstocks, powerhouse and tailrace downstream of the dam would be developed by realigning and widening an existing road that runs south along the east bank of the river downstream of the dam to a point about 500 feet downstream (also Segment E). At this location the road would turn back upstream and a 230 foot long section of new road would run along the east side of the tailrace channel to the new powerhouse.

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A.2 IMPOUNDMENT

The Enloe Project utilizes the existing impoundment created by Enloe Dam as its headpond. The reservoir (impoundment) occupies the narrow, river channel and is fairly shallow due to accumulation of sediment. Because it has a very high inflow/volume ratio, the reservoir is more riverine (i.e., river-like) than lacustrine (i.e., lake-like) in character.

The existing reservoir is approximately 2 miles in length and varies from about 120 feet wide to 440 feet wide. Its surface area at spillway crest elevation of 1044.3 feet is estimated to be 60.1 acres, with a storage capacity of 507 acre-feet, and a mean depth of 8.4 feet. The area and volume increase to 67.1 acres and 613 acre-feet, respectively, at the mean annual flow of 2290 cfs (at 1046 feet water surface elevation).

With the proposed crest gates installed the top of the crest gates, the spillway crest elevation would be at El. 1049.3 feet. The normal maximum reservoir elevation with no spill would be El. 1049.3 feet and the water surface elevation would normally be kept just below the crest of the gates at about El. 1048.3 feet to avoid uncontrolled spill due to surge or waves. At this elevation, the pool extends about 2.2 miles upstream from the dam, has a surface area of 76.6 acres, a mean depth of 10.1 feet, and a volume of 775 acre-feet.

During spill periods which normally occur during the spring and early summer, the water surface elevation would be controlled at El. 1050.3 feet by progressively lowering the crest gates. At this elevation the pool extends about 2.3 miles upstream from the dam, has a surface area of 88.3 acres, a mean depth of 10.6 feet, and a volume of 938 acre-feet. Once the crest gates are fully lowered the water surface elevation would be controlled by the stage discharge relationship of the spillway crest with the gates down.

The mean hydraulic residence time is estimated to be about 2.4 hours for the mean annual flow. It reduces to just 45 minutes at the mean annual peak flow of 16,100 cfs, and increases to 7.3 hours at the mean September flow of 596 cfs. Residence time would exceed 20 hours at flows less than 200 cfs.

Previous studies conducted for the 1991 License Application suggests that, for all likely flow scenarios, thermal stratification does not occur in the Enloe Reservoir (HDR 1991, Appendix B). This situation is considered to continue unchanged.

A.3 GENERATION EQUIPMENT

The powerhouse would have a total nameplate generation capacity of 9.0 MW and a total hydraulic capacity of 1600 cfs.

The two turbines would be vertical Kaplan tube type machines, each with adjustable blades and wicket gates and with a rated capacity of 6170 horsepower (hp) at 360 revolutions per minute (rpm) under a rated net head of approximately 76 feet. The two

vertical synchronous generators, rated at 4.5 MW, 4160V (volts) and 0.90 power factor, would be mounted above the inlet elbows of the turbines.

A.4 POWER TRANSMISSION

The new powerhouse would interconnect with the existing District distribution system. A new 13.2 kilovolt (kV) primary transmission line, approximately 100 feet in length, would be constructed and connected to the District's existing distribution system at an existing pole immediately to the east of the proposed Project location. This new line would be the Project's primary transmission line (see Figure A-1).

A new substation adjacent to the powerhouse would step up the voltage of the output from 4.6 kV to 13.2 kV. The substation would also house isolating breakers, current and potential transformer instrumentation and lightning arrestors.

The proposed primary transmission line would interconnect with the District's existing 13.2 kV distribution line that follows the Loomis-Oroville Road immediately east of the Project. The existing overhead power line is suspended on wood poles and would not need to be replaced for the Project.

A.5 ADDITIONAL MECHANICAL OR ELECTRICAL EQUIPMENT

The spillway crest gates would be raised and lowered by compressed air that would be piped from a compressor located in the powerhouse. Under normal operation the gates would be operated to maintain water level on the reservoir within a control range. During a plant outage a section of the gates would partially open to maintain streamflow in the downstream reach of the river.

The intake gates in the intake structure would be operated by electric hoists and would close automatically in case of emergency shutdown of the turbine.

The generating units in the powerhouse would be installed and serviced with a mobile crane through hatches in the powerhouse roof. Other smaller hoists would be provided for raising the draft tube gates and for regular maintenance operations.

The powerhouse would operate automatically and would be unattended. The turbine generator controls and other auxiliary systems would be remotely monitored from the District's Okanogan control center via a Supervisory Control and Data Acquisition (SCADA) and communications system.

A.6 LANDS OF THE UNITED STATES

Lands of the United States that are enclosed within the Project Boundary total 35.47 acres (all under the jurisdiction of BLM), being portions of lots within sections 11, 12, and 13, Township 40 North, Range 26 East, Willamette Meridian. Figure A-3 shows the ownership of all parcels within the Project Boundary and delineates those that are overlain by the Project Boundary. The Okanogan County Assessor's Office has

assigned parcel numbers to some of these parcels, as shown in Figure A-4. The figure also shows the relevant portion of the BLM's Master Title Plat.

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