

PRELIMINARY BLASTING SAFETY AND ENVIRONMENTAL PROTECTION PLAN



ENLOE HYDROELECTRIC PROJECT (FERC PROJECT NO. 12569)

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1.0 INTRODUCTION

This Preliminary Blasting Safety and Environmental Protection Plan (Plan) identifies measures to be taken by the Okanogan Public Utility District No. 1 (the District) and its contractors (Contractor) to ensure that blasting operations associated with the Enloe Hydroelectric Project on the Similkameen River are carried out in accordance with Federal, state, and local rules and regulations. The measures identified in this Plan apply to controlled blasting work required to construct the project features that will be founded in rock, including the intake channel, penstock intake structure, powerhouse and tailrace channel (Figure 1).

This Plan was developed as the implementing document for Proposed Protection, Mitigation and Enhancement (PM&E) measure FISH-01: Blasting Plan Best Management Practices in the Enloe Hydroelectric Project Final License Application (FERC Project # 12569). It describes safety standards and practices that are typically implemented during construction to minimize health, safety, and environmental concerns related to blasting activities at the project site. The final Plan for the proposed project will be a site specific plan prepared by the Contractor's specialist blasting consultant pursuant to the District's technical, environmental, and safety requirements. The final Plan will be based on detailed project design and engineering information and the Contractor's construction plan.

2.0 DESCRIPTION OF PROJECT FACILITIES AND BLASTING ACTIVITIES

Rock excavation by controlled blasting and mechanical excavation techniques will be required to construct the intake channel, penstock intake structure, powerhouse and tailrace channel. Each of these project facilities is described below.

INTAKE CANAL

An intake canal will 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 will carry inflow from the river intake structure to the penstock intake structure. The canal will be a 190 foot long unlined trapezoidal cross section canal excavated in rock. The canal will 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.

PENSTOCK INTAKE

The penstock intake will be located at the downstream end of the intake canal, in a rock cut through the east abutment of the dam. The intake will be a 35 foot long by 30 foot

wide reinforced concrete gravity type structure founded on bedrock and connected to two steel penstocks.

PENSTOCKS

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

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 will be about 70 feet long and 30 feet wide. The reinforced concrete substructure will 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. A concrete training wall constructed at the west end of the powerhouse will separate the powerhouse and tailrace channel from the stilling basin area downstream of Enloe Dam.

TAILRACE

The tailrace channel will convey water a distance of about 180 feet from the powerhouse to the Similkameen River, downstream of the Similkameen Falls. It will be an unlined steep-sided trapezoidal channel excavated in rock by controlled blasting techniques. The channel width will 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 will be 20 feet. The invert of the channel will be about 30 to 40 feet below the existing rock terrace on the east side of Similkameen Falls.

CONTROLLED BLASTING

Controlled blasting involves careful planning of blasting, use of small charges, and careful monitoring of blast vibrations to avoid vibration damage to existing structures. Controlled blasting is also used to limit pressure waves in nearby water bodies, which can potentially harm fish. Modern controlled rock blasting procedures are relatively safe and enable rock excavation in close proximity to other existing structures. Techniques can also be used to limit noise and vibration in water and the rock foundation.

POTENTIAL IMPACTS TO FISH AND WILDLIFE

Most blasting will occur in dry ground away from the river bank except for the mouth of the intake channel and the exit of the tailrace channel. These portions of the work, which will each last about one week, will be carried out during low flow periods so that

fish can be temporarily excluded from the excavation area by nets. The final connection of the tailrace to the large pool at the base of the falls will pose the greatest risk to fish from blasting. Although fish will be removed from the pool prior to rock excavation, the size and depth of the pool make it likely that some fish will remain and may be exposed to blasting vibration.

Blasting may also disturb wildlife in the immediate vicinity. Bald eagles and other wildlife may be temporarily displaced from the immediate project area. Most wildlife would be expected to return to the area once activities diminish and work is completed.

There are no unique or rare habitats in the project area and most habitats in the project area are already affected by human disturbance. Because blasting activities will be limited to daylight hours only, no impacts on foraging bats are anticipated. An irrigation water tunnel that has served as a roost for Townsend's big-eared bat in the past is located approximately 550 feet from the blasting area. This tunnel does not face the blast area and no blasting or other construction activities would occur within the tunnel. Therefore, no impacts on roosting Townsend's big-eared bats are anticipated.

Section 9.0 of this plan identifies a number of protection, mitigation and enancement measures that will be implemented as part of this project to address potential impacts on fish and wildlife.

3.0 APPLICABLE RULES AND REGULATIONS

The Contractor will obtain all necessary permits for, and will comply with, the rules and regulations of the Occupational Safety and Health Administration (OSHA) and all Federal, state, county, and local regulations and permits for the use, storage, transportation, and handling of explosive materials. The Contractor will provide the District with copies of all relevant permits prior to commencing blasting operations.

Federal regulations that apply include, but are not limited to, the following:

- Bureau of Alcohol, Tobacco and Firearms Publication P5400.7 (1990) Organized Crime Control Act of 1970, Title XI (Public Law 91452)
- 27 CFR 55—Storage of Explosives
- 27 CFR 181—Commerce in Explosives
- 49 CFR 177—Carriage by Public Highway
- 29 CFR 1926.900 et seq. Sub Part U—Safety and Health Regulations for Construction— Blasting and Use of Explosives
- 29 CFR 1910.109—Explosives and Blasting Agents OSHA

4.0 AGENCY COORDINATION

U.S. FISH WILDLIFE SERVICE (USFWS)

The USFWS is part of the U.S. Department of the Interior (USDI). The agency is responsible for fish and wildlife on Federal lands in the United States, with the stated mission of “working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.” The agency shares this role with NOAA Fisheries (U.S. Department of Commerce) in the administration of the Endangered Species Act of 1973 (ESA). Under the ESA, USFWS is also responsible for issuing Biological Opinions and incidental take statements for FERC Projects, if needed for "incidental" taking of a listed species while conducting an otherwise lawful activity. USFWS also oversees the designation of critical habitat and the development of recovery plans for listed species.

NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION – NATIONAL MARINE FISHERIES SERVICE (NOAA FISHERIES)

NOAA Fisheries is part of the U.S. Department of Commerce. Under the ESA, NOAA Fisheries, as delegated by the Secretary of Commerce, is responsible for the protection of those marine species listed as threatened or endangered, and for identifying candidate species for such listings. The ESA mandates that NOAA consult with other federal agencies to assess the impacts of actions that may affect listed species, and to minimize those impacts, either through regulation or other means. As described above for USFWS, NOAA Fisheries also mandates conservation of critical habitat for threatened and endangered species, and prepares recovery plans for listed species.

U.S. BUREAU OF LAND MANAGEMENT (BLM)

As part of the USDI, the BLM is responsible for balanced management of public lands and resources. BLM is the major landowner in the vicinity of the project and owns most of the land above the Ordinary High Water Mark (OHWM) within the project area. As a part of their management directive, the BLM is responsible for managing habitat and fisheries resources.

WASHINGTON DEPARTMENT OF FISH & WILDLIFE (WDFW)

An appointed commission of 9 members (The Washington Fish & Wildlife Commission) sets WDFW policy and makes regulatory decisions. The commission is responsible for the management and long-term preservation of indigenous fish and wildlife populations in Washington State. WDFW’s policy concerning fish and wildlife resources is formally established under the Washington Administrative Code (WAC). Chapter 220 WAC contains principles, policy and goals for managing Washington’s fish resources. These rules cover fish management and hatchery operations information. Specific rules address classification of endangered species, management of non-native aquatic

species, management of coastal waters, and establishment of regional fisheries enhancement groups. Chapter 220, division 32 (WAC 220-32-050 through 220-32-060) deals specifically with the management of the Columbia River Basin.

WASHINGTON DEPARTMENT OF ECOLOGY (ECOLOGY)

Ecology is responsible for protecting and enhancing the state's water and air quality and for managing other environmental issues. The department works with state and federal agencies to implement the Clean Water Act. Under section 401 of the Clean Water Act (CWA), Ecology must certify compliance with applicable water quality standards before a license to operate a hydroelectric project can be issued by FERC.

WASHINGTON DEPARTMENT OF NATURAL RESOURCES (WDNR)

The WDNR protects and manages 5.6 million acres of state-owned land. Much of this land is state trust land that provides revenue to help pay for construction of public schools, universities, and other state institutions, and funds services in many counties. WDNR is also responsible for management of state aquatic lands, which includes the beds and banks of navigable water bodies. WDNR manages these lands to provide fish and wildlife habitat, clean water and public access.

COLVILLE CONFEDERATED TRIBES (CCT)

The CCT Natural Resources Department - Fish & Wildlife Division is a co-manager of fish and wildlife resources in the project area with WDFW, USFWS, and NMFS. The mission for the CCT Natural Resource Department is to create a balance within natural resource management actions, which reflect social, cultural, economic, and natural resource values of reservation residents. The CCT Fish & Wildlife Division is responsible for the management of fish and wildlife resources in Washington that are designated for tribal use and management by treaty with the U.S. Government.

NOTIFICATION

Once the project is licensed and final design plans have been prepared, all agencies and the CCT will receive a copy of the Blasting Plan.

5.0 EXPLOSIVES STORAGE

The Contractor will obtain necessary permits and comply with all conditions of 27 CFR 55 governing the storage of explosives. All powder magazines will be located in a secure remote area and will be kept locked. Powder and detonators will never be stored together in the magazine, and any vehicle used to transport explosives from the magazine to the blast site will conform to applicable federal and state regulations. As required by federal statutes, the Contractor will maintain an inventory and use record for all explosives and detonating caps that will be reconciled at the end of each working

day, and will include the number of misfires and their disposition. The inventory and use record will be available for inspection by the District and jurisdictional authorities

6.0 CONTRACTOR BLASTING PROCEDURE QUALIFICATION

Contractor's written blasting procedures must be submitted to the District before commencing blasting. Only workmen thoroughly experienced in handling explosives will be permitted to supervise, handle, haul, or detonate explosives. If requested, the Contractor will provide the District with proof of the required certification for every person directing or conducting blasting operations. In no instance will the Contractor allow a person to conduct or direct a blasting operation unless that person is the holder of a valid Blaster's Certificate

7.0 NOTIFICATIONS

The Contractor will be required to comply with all notification requirements of applicable Federal State and Local regulations. Procedures for notifications shall be documented in the Project Blasting Plan to be prepared by the Contractor's blasting specialist prior to commencement of blasting.

8.0 BLASTING PROCESS

The following section provides a brief overview of the typical sequence of activities associated with blasting operations. The actual sequence of activities will be determined by the Contractor's blasting consultant.

- Drilling—Holes are drilled in the rock with pneumatic drills to allow insertion of the explosive charge. Holes are drilled in a predetermined pattern in order to control the blast as appropriate. Signs are installed at the limits of the blast area noting blasting signals, access, and radio restrictions.
- Loading—Holes are loaded with explosives and are filled with sand or soil to contain the blast within the work area. (Previously conducted tests on charges and drill patterns determine the appropriate combination of explosive charge and drill pattern for a particular geologic area that will provide adequate fracturing of the rock, and appropriate control of air blast, vibrations, and flyrock.)
- Padding/Matting—Soil padding or blasting mats will be placed over the blast area to contain the blast and control flyrock/debris when in close proximity to structures. The Contractor's blasting procedure and test shots will adequately address and confirm acceptable flyrock parameters. Topsoil will not be used as padding.

- Warning—The blaster examines the blast area to ensure that vehicles and personnel have withdrawn to a safe distance. Access through the area is restricted and a series of “blast imminent” warning signals are sounded.
- Blast—Following the warning signals, the explosives will be detonated.
- Clearance—The Contractor's blasting foreman or blaster will conduct a thorough postblast inspection of the blast area for cutoffs or misfires and will ensure that any undetonated explosives are properly destroyed by detonation prior to any other work proceeding. Once the area is verified clear of unexploded charges and hazards such as falling rock, the “all clear” signal is given.

9.0 PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

Blasting has the potential to effect fish and wildlife, including sensitive and federally listed species. The following measures will be implemented to avoid and minimize the potential impacts to fish and wildlife:

- Proven, controlled blasting techniques will be employed for rock excavation. This involves careful planning of the timing of blasting operations, use of special drilling patterns, and use of small charges that are set off with time delays to minimize peak vibration and pressure waves.
- Blasting activities will be limited to daylight hours to avoid potential impacts on foraging bats.
- Blasting pressure waves that could coincide with occupation of area by fish will be monitored using hydrophones. The creation of pressure waves in exceedance of 100 kilopascals (kPa or about 14.5 pounds per square inch) will be avoided, as practical.
- Impacts will be minimized by timing near and in-water blasting to coincide with the lowest water levels (low flows) combined with lowest potential for fish occupation in the area. Scheduling will avoid periods where federally listed or sensitive salmonid species are present. Blasting adjacent to the river will take place prior to spring high flow or during fall low flow.
- The amount of time that near- or in-water construction and blasting occurs will be minimized. The primary period of concern will be when the downstream end of the tailrace channel is excavated. Excavation of bedrock at the exit of the tailrace channel will be scheduled for a period of low flow during fall or winter so that anadromous fish can be excluded from the area. During this period, construction activities will be expedited to reduce the amount of time fish may be exposed to the effects of blasting activities.

- Impacts will be minimized or avoided by removing as many fish as practical from the area adjacent to the proposed blasting and installing an exclusion barrier downstream of the potentially affected area to prevent entry of additional fish into the affected area.
- Mechanical excavators with hydraulic rock hammer attachments will also be used in lieu of blasting to trim the excavation, excavate rock in areas unsuitable for blasting and to excavate loose rock. When removing materials from areas that are excavated through blasting, the District will remove residues from the blasting operation to the extent practical.

10.0 DAMAGE PREVENTION MEASURES

Standard safety measures will be employed during blasting operations to prevent damage to adjacent resources, residences, utilities, and roadways. As discussed above, these measures will include blasting controls to limit flyrock, air blast, and vibrations near sensitive areas. Final damage prevention measures will be determined by the Contractor's blasting consultant.

No blasting will be done without prior approval by the District. The District will secure any approvals from the BLM and WDNR prior to authorizing the Contractor to conduct blasting activities. The Contractor will be liable for any and all damages resulting from blasting operations.

Special blasting controls will be required in the vicinity of power lines, telephone lines, fiber optic lines, existing pipeline facilities, structures, water wells, springs, or buildings or where directed by the District to preclude the possibility of damage due to flyrock, shock waves, vibrations, or changes to hydraulic conductivity of the bedrock near important springs and wells. This will be accomplished by a combination of blast design, adequate collaring, and matting. Matting to control flyrock includes, but is not limited to, fabricated mats, overburden, and sandpad matting.

11.0 SAFETY MEASURES

Typical warning signals, signage, and procedures to protect human health and safety are discussed below. Final safety measures will be determined by the Contractor's blasting consultant.

GENERAL SAFETY REQUIREMENTS

The Contractor will at all times protect its workers and the public from any injury or harm that might arise from drilling dust and the use of explosives. Only workers thoroughly experienced in handling explosives will be permitted to supervise, handle, haul, load, or shoot explosives.

Loading and blasting will occur during daylight hours (Monday through Friday), with some blasting occurring on weekends during critical phases of construction. Explosives will only be primed immediately before use. The Contractor will not leave loaded holes overnight, unattended, or unprotected. No explosives or blasting agents will be abandoned in the work area.

During the blasting procedure, all personnel not involved in the actual detonation will be removed from the area. Workers involved with the detonation will stand back a safe distance from the time the “blast imminent” signal is given until the “all clear” has been sounded. The Contractor will ensure that the blast area is clear of personnel and public prior to blasting.

SIGNS AND ACCESS CONTROL

The Contractor will develop a plan to post highly visible warning signs and guards at points of access to the blasting area, including trails. Warning signs will also be installed at the limits of the blast area noting warning signals and access and radio restrictions. All access roads to the blasting site will be blocked off and signed while blasting operations are taking place.

BLAST SITE CLEARANCE

The following sequence of activities represents a typical blast clearance procedure. The final blast clearance procedure will be determined by the Contractor’s blasting consultant.

Prior to initiating the blast warning system, the blaster will:

- complete the blast inspection,
- clear all personnel not involved with blasting operations from the blast area,
- ensure that all traffic and, if applicable, road and access road traffic is halted,
- confirm that the guards are posted and the controlled area is secure, and
- retreat to a safe firing distance.

BLAST SIGNALS

The Contractor develop a plan for blast signals involving use of an acceptable air horn or siren to give the proper blasting warning and “all clear” signals. The warning system used for blast signals will produce a sound (air horn or siren) that is distinct from any other signals used on construction. Use of vehicle horns as blast signals is not permitted. A typical audible blast warning system includes the following signals:

- Blast Imminent—Three minutes before the blast is to be detonated, the blaster will give three short blasts of the air horn or siren. If there is an interruption to the blast routine once the “Blast Imminent” signal has been given, the entire blast signal procedure will begin again.
- Blast Signal—Three minutes after the “blast imminent” signal has been given, the blaster will give one short blast of his air horn or siren, followed by detonation of the explosives.
- All Clear Signal—The blaster will check the blast site to ensure that all charges have detonated. Once this assessment has been confirmed, the blaster will give one long blast of the air horn or siren.

FIRE SAFETY

The presence of explosive materials on the project site could potentially increase the risk of fire during construction. As part of the Contractor’s Blasting Plan, the Contractor will be required to implement precautions related to blasting operations as follows:

- Prohibit ignition devices or sources near an explosives storage area.
- Maintain magazine sites so that they are clear of fuels and combustible materials, and that the structures are well ventilated and fire resistant.
- If blasting is scheduled during periods of high fire danger, protect magazines from wildfires that could occur in the immediate area by removing all vegetation within a reasonable distance of the storage container.
- Remove empty explosive storage boxes from the right-of-way and dispose of at a project approved disposal site.