

GIBSON DAM PROJECT

FERC No. 12478

**Gibson Dam Hydroelectric Company LLC
Bellingham, Washington**

INITIAL CONSULTATION DOCUMENT

INTRODUCTION

Gibson Dam Hydroelectric Company LLC (GDHC), Applicant, of Bellingham, Washington, holds a Preliminary Permit (Permit) from the Federal Energy Regulatory Commission (FERC) in Washington D.C. to develop a hydroelectric generating facility on an existing dam near Augusta, Montana. The proposed hydroelectric generating facility, called the Gibson Dam Project (Project), is located at Gibson Dam on the Sun River. The Permit, specifying a 15 megawatt (MW) generating capacity project, was issued on April 20, 2004 and expires on March 31, 2007. The Permit was issued for the purpose of allowing the Applicant protection under the Federal Power Act (FPA) from competitive applications while conducting the studies and processes necessary to complete a FERC application for license.

Under Permit conditions, GDHC is required to conduct a consultation process whereby the public and appropriate state and federal natural resource agencies are apprised of the Project's features, operation and development schedule. This Initial Consultation Document (ICD) is the first in a series of information and decision documents the GDHC is required to prepare under the conditions of the Permit and prior to submission of an application for FERC license.

PROJECT CONTACT INFORMATION

The name, business address and telephone number of Applicant are:

Gibson Dam Hydroelectric Company, LLC
3633 Alderwood Ave.
Bellingham, WA 98225
360-738-9999, extension 122

The name, business address and contact numbers of person authorized to act as agent for Applicant is:

Steven C. Marmon
Project Manager
Gibson Dam Hydroelectric Company, LLC
3633 Alderwood Ave.
Bellingham, WA 98225
360-738-9999, extension 122
e-mail: smarmon@tollhouseenergy.com

All questions, comments, or correspondence related to licensing for the Project should be directed to Mr. Marmon at the above address. Changes in this contact information will be notified directly to all interested parties and through announcements in a local newspaper.

PURPOSE AND NEED FOR THE PROJECT

The primary purpose of the Gibson Dam Project would be to produce electrical energy from water released from the Gibson Dam for irrigation purposes, or to maintain prescribed reservoir levels, or for downstream flow requirements. In this sense, the Project would produce electricity from available water, without the need for additional water storage or releases.

Further, at the present time, 54 percent of Montana's electricity is generated by coal-fired power plants. Addition of a hydropower generating resource would provide the potential to reduce impacts related to coal burning, and to reduce the state's reliance on fuel sources which might increase in price over time.

If the Gibson Project's estimated 40 gigawatt-hours of electrical energy per year were produced by a coal-fired powerplant, the coal plant would emit more than 6 tons of nitrous oxides (NO_x), 17 tons of carbon monoxide (CO), 22,000 tons of carbon dioxide (CO₂) and 6,000 tons of carbon (C) annually. With current concerns for both air pollution and the potential for global warming, the Gibson Project offers an energy alternative free from both air quality impacts and escalating fuel costs.

THE LICENSING PROCESS.

Licensing, as directed by FERC regulations under the Federal Power Act, is a process that culminates in issuance of a license to construct and operate the Project. Prior to license issuance, federal regulations require consultation to determine the need for studies or information gathering to provide information on potentially affected environmental resources.

The FERC regulations require that licensing proceed in three steps with respect to interactions with resource agencies, affected Indian Tribes, the public and Non-Governmental Organizations (NGO's), collectively referred to as the "stakeholders":

Stage 1. Initial Stage Consultation. In this stage, the Applicant prepares an ICD intended to inform readers of the project features, affected resources and the licensing process and schedule. The Applicant holds a public meeting or meetings, facilitates a site visit, and solicits comments from reviewers. The Applicant and resource agencies consult on study plans; final plan submittal marks the end of Stage I.

Stage II. Conduct Studies, Draft License Application Preparation. In this stage, the Applicant conducts the studies approved during Stage I and distributes the Draft Application to the consulting parties, with a request for comment within

90 days. The Applicant revises the Application relative to the comments received.

Stage III. License Application Submittal. In this stage, the Applicant submits the final Application to the FERC, with copies supplied to all parties previously consulted.

After Final Application submittal, the FERC conducts an independent analysis of the Applicant's proposals, prepares draft and final environmental documents, and issues its Order Issuing License, marking completion of the licensing process.

Throughout the licensing process, the Applicant and stakeholders work closely to assure technical adequacy of studies and evaluation methods. Prior to issuance of the license, the FERC regulations require that equal consideration be given to both the developmental (relating to project economic and other water management and use benefits) and the non-developmental (relating to environmental, cultural, aesthetic and recreational) aspects of the Project.

PURPOSE OF THIS ICD IN STAGE I CONSULTATION.

This ICD is required by FERC, and is intended to provide the following information:

- Descriptions of the location, features and operation of the project, and pertinent project maps and design drawings;
- Environmental resources which might be affected by licensing and any proposed protection, mitigation or enhancement measures for those effects, as known at the time of the ICD;
- Environmental and engineering studies which the Applicant may perform, as known at the time of the ICD;
- The steps and schedule involved in the licensing process.

The FERC regulations require that the Applicant hold a public meeting and site visit no less than 30 days and nor more than 60 days after distribution of the ICD. The cover letter for this ICD also requests public and stakeholder comment. The request is for oral comments at the time of the meeting/site visit, and for written comments to be delivered no more than 60 days after the public meeting/site visit.

These written and oral comments are very important to the GDHC in the licensing process. Comments received early in the process inform the GDHC of issues which might accompany the licensing, such as environmental resources which might be affected by the licensing, economic factors, or the rights and privileges of individuals whose property or lifestyle might be affected.

LICENSING PROCESS ALTERNATIVES.

Under a recent amendment of the FPA, Applicants may elect to use traditional licensing approach or either of two alternative approaches: 1) the Alternative Licensing Procedure (ALP) and 2) the Integrated Licensing Approach (ILP).

Under the Traditional Approach, all activities and documents required under the National Environmental Policy Act (NEPA) are conducted by the FERC or their contractor after acceptance of the Application. This FERC action may take as long as two years to complete.

Under the ALP and ILP, the Applicant may conduct NEPA Scoping (the public participation process to solicit comments on environmental issues) and may prepare a preliminary draft Environmental Assessment (EA) (first in a series of EA's) prior to submittal of the Application.

Both the ALP and ILP processes may save as much as two years, but requires greater Applicant and stakeholder time and effort prior to Application submittal. GDHC currently favors using the ALP, but has not formally notified the FERC of this position. The public and other stakeholders will be notified on GDHC's request to use the ALP if that is our decision and the FERC must consider all stakeholder comments on that decision prior to approval of the process.

THE LICENSING SCHEDULE.

Generally, the schedule is divided into pre-filing (Applicant's activities prior to submittal of the final Application) and post-filing (FERC and Applicant's activities after Application submittal). The pre-filing period extends from Permit issuance to submission of the final application for license to the FERC. During this period, GDHC will consult with stakeholders to determine information and study needs, conduct studies, conduct the preliminary NEPA process phases (if ILP or ALP are selected), negotiate recommendations, and prepare the Draft and Final Applications.

Post-filing activities will extend approximately two years after final license application to issuance or denial of the license. During the post-filing period, the FERC may request additional information prior to preparation of its own NEPA documents and the Order Issuing License.

An important phase of the licensing process is Scoping. The FERC's NEPA regulations require that Scoping meetings be held after distribution of a Scoping Document. In this phase, preliminarily scheduled for summer or fall, 2005, impact issues will be established and initial mitigation measures proposed and reviewed.

STAYING INVOLVED WITH THE PROCESS

The public, agencies and other stakeholders will be notified of meetings, documents and other milestones in the licensing process through various formal and informal means. Under FERC regulations, all public meetings and site visits must be announced at least two weeks in advance in a local newspaper. Meeting minutes must be transcribed and made available to all interested parties. Upon acceptance by FERC, Draft and Final Applications will be noticed in the US Federal Register, with notes on the availability of the documents for review and comment.

In addition to the required notifications, GDHC may elect to maintain a project information system via web page, newsletters or other means of contact. Details of the information system, will be announced at the Public Meeting(s) and will be further developed during initial consultation based on participant comment.

PROJECT DESCRIPTION

GENERAL

The Project would be located at or near Gibson Dam on the Sun River about 18 miles NW of Augusta, MT (Figure 1). Gibson Dam is a water storage and supply facility owned by the US Bureau of Reclamation (USBR). The Project power generating facilities would be constructed at or near the base of Gibson Dam on USBR land.

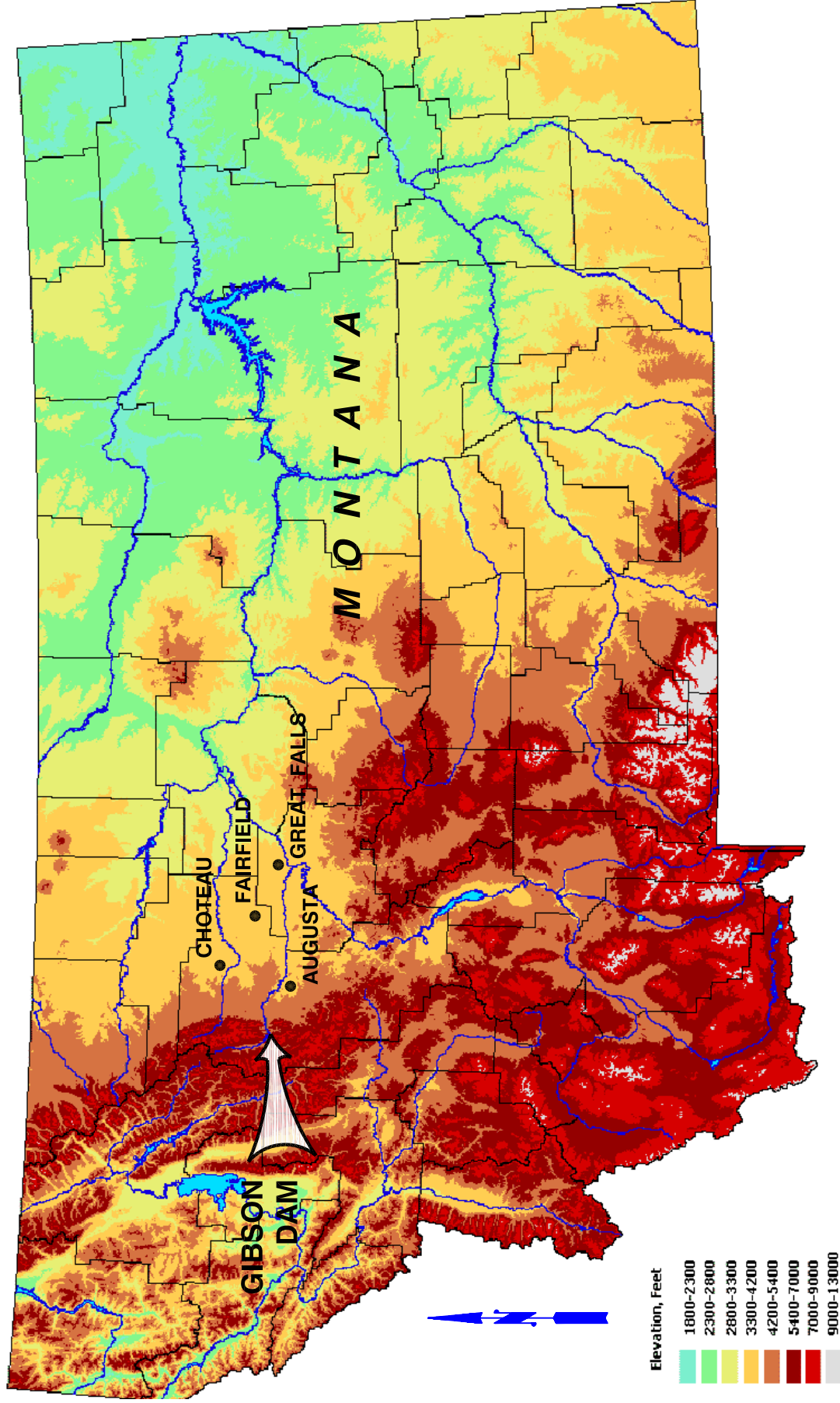
GIBSON DAM PROJECT HISTORY

Gibson Dam was constructed in 1926-1929 by the USBR as part of the Sun River Project. The project purpose for Gibson Dam was irrigation; however, during the construction two penstock outlets were provided for future hydroelectric generation. Gibson Dam lies within the Lewis & Clark National Forest, administered by the US Department of Agriculture Forest Service (USFS).

Gibson Dam impounds Gibson Reservoir, a 5.5-mile long by 1-mile wide water body. The drainage area above the reservoir is approximately 575 square miles.

While the USBR owns Gibson Dam, Greenfields Irrigation District (Greenfields) operates the dam and controls the water releases. In addition to Gibson Dam, Greenfields operates Diversion Dam, Pishkun Reservoir, Willow Creek Reservoir and many interconnecting canals and laterals. Greenfields serves approximately 81,000 irrigated acres.

In 1989 the FERC issued a license for FERC Project No. 6863 to the Grisdale Hill Company for a hydroelectric development at Gibson Dam. The license was for a Project with an installed capacity of 15 MW and a projected annual output of 46.1 GWH of energy.



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FIGURE 1. VICINITY MAP
GIBSON DAM HYDROELECTRIC PROJECT
 LEWIS AND CLARK CO. MT

GIBSON DAM
HYDROELECTRIC
COMPANY LLC
 3633 ALDERWOOD AVE.
 BELLINGHAM WA 98225
 PH 360-738-9999

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A substation was to be built within a mile of the dam. A 35-mile cross-country transmission line was to be constructed between the substation and a point of delivery near Choteau, MT. The project did not go forward, primarily due to poor power market conditions. Grisdale Hill Company subsequently surrendered the FERC license.

PROJECT FEATURES

Names of project features are in bold type on first reference in this section to introduce project terminology that will be used throughout this document. Elevations are referenced as heights in feet above or below mean sea level, denoted by the term “Elev.”.

Gibson Dam

Gibson dam is a 199-ft high concrete arch dam with a crest length of 960 ft and a crest width of 15 ft. The morning glory-type **spillway** has a discharge capacity of 30,000 cubic feet per second (cfs) at a reservoir water surface of Elev. 4724 ft. The **outlet works** at the base of the dam has a discharge capacity of 3050 cfs at reservoir water Elev. 4724 ft. The outlet works are comprised of two **jet flow pipes** which emanate from the **control house** at the base of the dam. There are two **power penstocks** on the downstream dam face at Elev. 4650. These were installed during initial construction to facilitate possible hydroelectric development.

Powerhouse

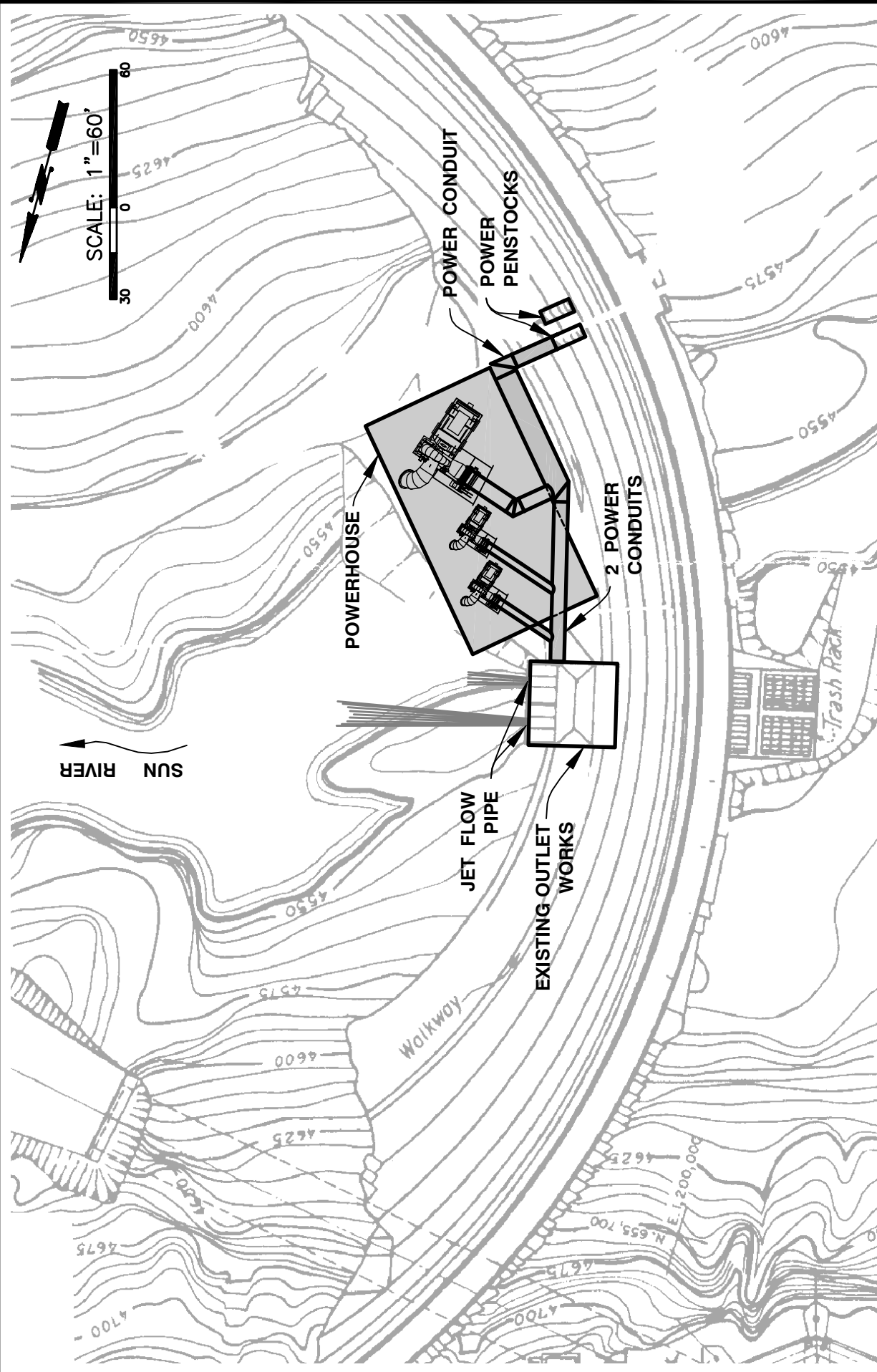
Two alternative powerhouse designs of approximately 10 MW are currently under consideration. Both designs would involve a roughly 60 ft X 110 ft **powerhouse** which would house one 7 MW and two 1.5 MW horizontal shaft Francis-type **turbine/generators**. Larger turbines with a combined capacity of up to 18 MW are possible under the Permit.

The powerhouse substructure and superstructure for both design options would be reinforced concrete with an appearance similar to the existing outlet works. The two alternatives currently under evaluation are:

- 1). The Outlet Works Powerhouse Alternative.** Under this alternative, there would be three power conduits, two from the outlet works (one above the other) and one from the power penstocks. The powerhouse would be located near the outlet works (Figure 2). Under this alternative, additional discharge capability could be obtained by constructing the second power penstock to discharge directly to the river.

- 2). The Power Penstock Powerhouse Alternative.** Under this alternative, there would be three power conduits, two from the power penstocks and one from the outlet works. The powerhouse would be located near the access road at the base of the dam (Figure 3). Under this alternative, the jet flow pipes at the outlet works would discharge directly to the river.

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**FIGURE 2. SITE PLAN FOR OUTLET
 WORKS POWERHOUSE ALTERNATIVE
 GIBSON DAM HYDROELECTRIC PROJECT**

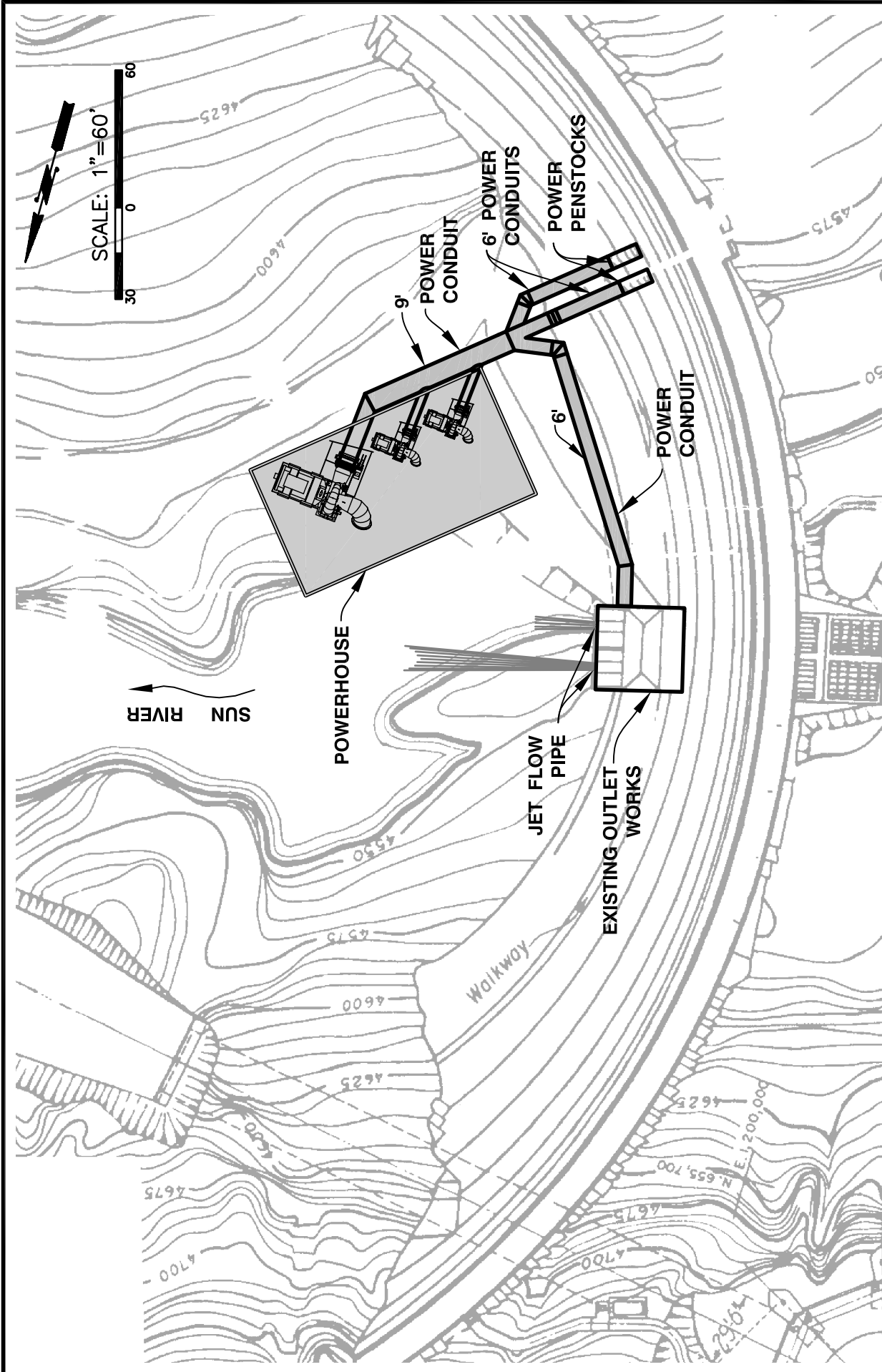
**GIBSON DAM
 HYDROELECTRIC
 COMPANY LLC**

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LEWIS AND CLARK CO. MONTANA



DRAWN: <u>RDM</u> CHECKED: <u>TAF</u> DATE: <u>11/11/04</u>	FIGURE 3. SITE PLAN FOR POWER PENSTOCK/OUTLET WORKS POWERHOUSE ALT. GIBSON DAM HYDROELECTRIC PROJECT LEWIS AND CLARK CO. MONTANA		
	GIBSON DAM HYDROELECTRIC COMPANY LLC 3633 ALDERWOOD AVE. BELLINGHAM WA 98225 PH 360-738-9999		
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Transmission Facilities

Project power would be conveyed via transmission facilities to users in Sun River Canyon and to the existing electrical grid at Augusta, MT (Figure 4). Two transmission alternatives are under consideration at this time: 1) the “County Road” Alternative and 2) the “Cross-Country” Alternative.

County Road Alternative.

This alternative would consist of three primary components (Figure 4):

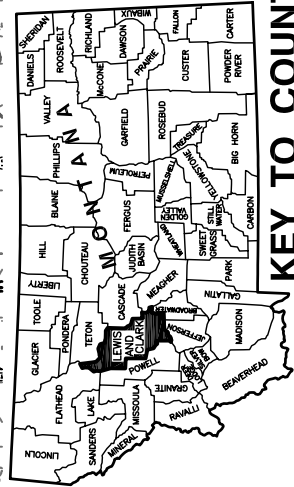
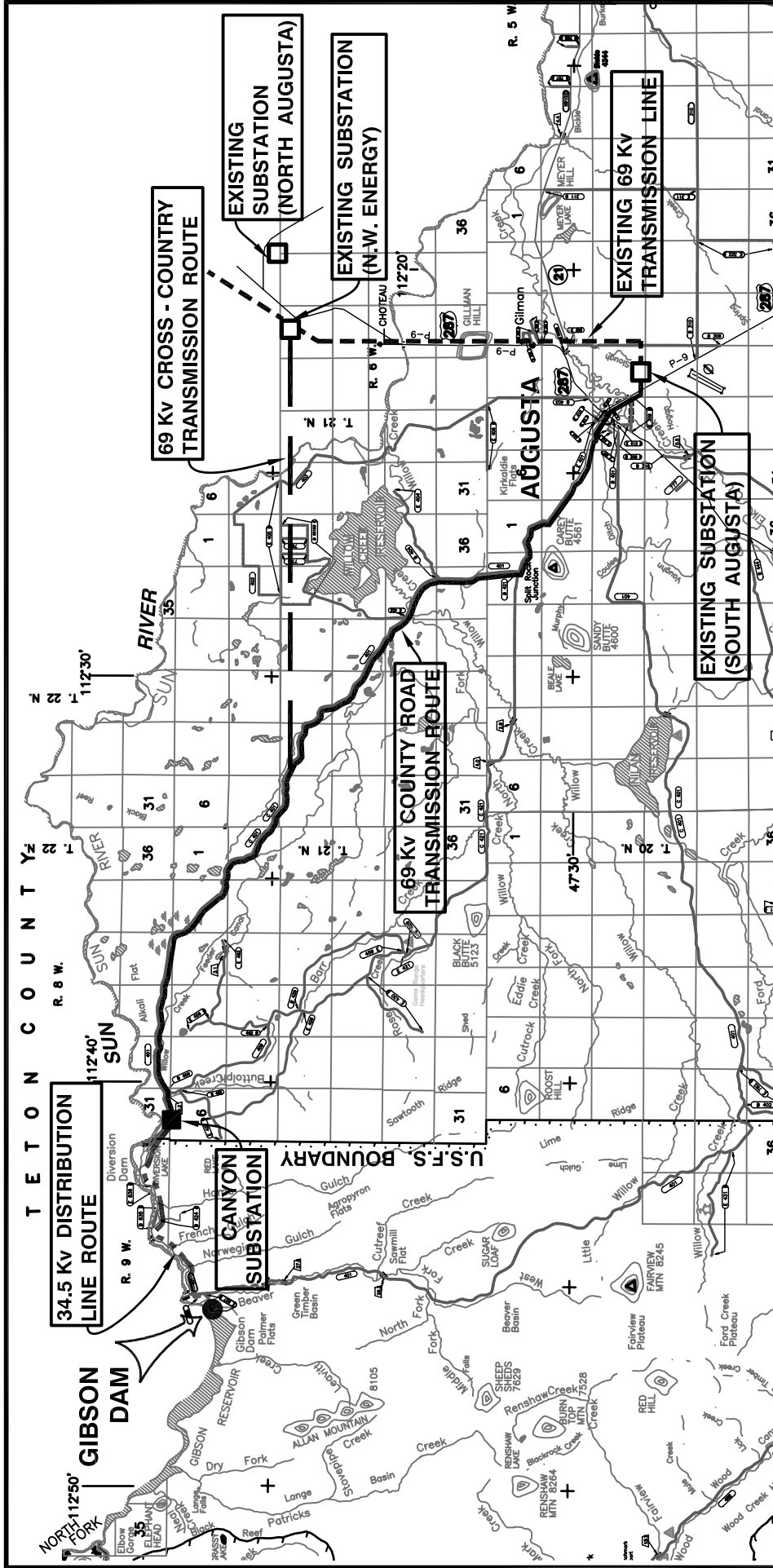
- 1) a 4-mile-long, 34.5 kilovolt (kV) **Distribution Line** in Sun River Canyon;
- 2) a step-up **substation** (called the “**Canyon Substation**” under both transmission alternatives) located near the USFS boundary to transform the 34.5 kV distribution voltage to the required 69 Kv transmission voltage; and
- 3) The 69 kV wood pole **County Road Transmission Line** extending approximately 18 miles along Sun River Canyon County Road to the existing electrical grid facilities (the South Augusta Substation) near Augusta, Montana

The Canyon Substation would require an approximately 50 ft by 80 ft parcel of land.

Cross-Country Alternative

This alternative would consist of three primary components (Figure 4):

- 1) The same 4-mile-long, 34.5 kV Distribution Line in Sun River Canyon as for the County Road Alternative;
- 2) The Canyon Substation, (same as for the Country Road Alternative), to transform power to 69 kV; and
- 3) A 69 kV cross-country transmission line that would leave Sun River Canyon Road half way to Augusta, and run due east cross-country approximately seven miles to one of two existing substations near SR 287. The selected substation (either the Northwest Energy Substation or the North Augusta Substation) would then become the point of integration with the grid.



SCALE: 1" = 3 MILES
 3 2 1 0 3 MILES

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PROJECT LANDS

The existing Gibson Dam facilities and reservoir occupy approximately 2000 acres of U.S. lands administered by the USBR. Of this total, the reservoir and beach (approximately 300 horizontal feet from high water line) occupy 1841 acres.

The project lies within U.S. Geological Survey (USGS) Patricks Basin and Sawtooth Ridge, MT quadrangle map(s), within the locations presented in Table 1.

Table 1. Map Locations of Gibson Dam Project Features.

Project Features	Map Locations
Dam, Powerhouse	112deg, 47 min. W, 47 deg, 36 min. N
Canyon Substation	112deg, 41min. W, 47 deg, 37 min. N
Cross-country substations	112 deg, 20min. W, 47 deg, 35 min. N
Augusta Substation interconnection	112 deg, 23min W, 47 deg, 29min N

PROJECT OPERATION

Operation of the Proposed Project would result in no change in the existing flow regime of the Sun River. Under either generation alternative described above, water would be discharged to the Sun River from 1) the existing jet flow pipes at the outlet works, to a maximum discharge of approximately 3000 cfs, and 2) the generator's draft tubes to a maximum discharge of approximately 1000 cfs. The two water release devices would be balanced to provide combined flow equal the flows required by Greenfields and the USBR. Project discharge would be continuously and remotely monitored and the monitoring system coordinated with the Gibson Dam operation center.

During periods of high flow the turbine/generators would operate at maximum capacity and flow. The jet flow pipes would discharge any additional required flows in order to maintain the established flow regime. Under high flow and reservoir elevation conditions, additional discharge would require use of Gibson Dam spillway.

At flows less than the maximum discharge capacity of the Project turbines, the jet flow pipes would be closed and the flow regulated at the turbines. At very low flows, successive shutdown of turbines would be implemented to maintain the required releases.

AFFECTED ENVIRONMENT

Much of the information presented in this section was derived from the FERC Order Issuing License for the Grisdale Hill Project and the accompanying Environmental Assessment prepared by the FERC staff. Study results from that Project Application's Exhibit E, although somewhat dated, represent a good compilation of relevant environmental data. They are used here, in some cases verbatim, noting that GDHC intends to consult with resource agencies and stakeholders to determine the need for and

scope of additional studies necessary to characterize and quantify existing resources and expected construction and operational Project impacts.

GENERAL DESCRIPTION OF THE LOCALE

Topography

Gibson Dam and Sun River Canyon are at a point where the great plains meets the Rocky Mountains (the “Rocky Mountain Front”). The Sun River at Gibson Dam is about Elev. 4550. The town of Augusta, MT is Elev. 4067 and the town of Fairfield, MT is at Elev. 3977. The Rocky Mountain Front is characterized as distinct ridges and narrow valleys comprised of steep rocky slopes. The land east of the Rocky Mountain Front is characterized as rolling hills consisting of grasslands and irrigated cropland.

Access to Gibson Dam is by the Sun River Canyon Road from Augusta, MT. The USFS boundary is near the entrance to Sun River Canyon. The USFS maintained road in Sun River Canyon extends to Gibson Dam.

Climate

The climate varies considerably from the Great Plains to the Rocky Mountain Front. The climate in the adjacent plains area around Fairfield and Augusta is arid with annual precipitation of 10-15 inches coupled with high average winds of approximately 15 mph. In the Sun River Canyon area the rainfall increases up to 20 inches and to over 60 inches in the surrounding hills.

Population

The population density in the Sun River Canyon area and the plains area immediately adjacent to the Rocky Mountain Front is shown on census maps as 0-2 persons per square mile. This population density level increases in the areas immediate to Fairfield and Augusta.

Land Use

Most of the land ownership east of USFS lands are privately owned with a few sections of State owned land. For the first five miles east of the USFS boundary the primary land use appears to be livestock grazing. Most of the irrigated land use begins ten miles east of the USFS boundary. Fairfield is nearly in the center of the irrigated lands. The USFS leases land within Sun River Canyon to various lodges, outfitters and trail guides.

GEOLOGY AND SOILS

Affected Environment.

The project powerhouse and County Road transmission facilities occupy geologic areas which typify both the Rocky Mountain Front and the upper great plains. The proposed powerhouse would be built on limestone bedrock near the base of the dam.

Unconsolidated deposits in the area include alluvial clays, silts, sands, and gravels, which are periodically redistributed by high river flows.

Geology in the lower elevation areas and those on or near the Cross Country transmission route include agricultural areas with modified soils and native grasslands. Further review will be required to determine soil types and geology of these areas.

Studies

At this time GDHC does not envision extensive geologic or soils studies for the Sun River Canyon area. This is based on availability of existing data from the Grisdale Hill Application, and the fact that there have been no changes in the area due to earthquakes, road building or other major construction since that study. We expect to review existing soils surveys for the Cross Country transmission route.

WATER QUANTITY AND QUALITY

Affected Environment

Water Quantity

The flow regime of the Sun River has been altered by irrigation releases from the Gibson dam. The existing dam stores winter and early spring runoff and as a result reduces peak discharges during this period. The natural flow regime of the river is augmented during the late spring and summer period when releases are made for irrigation needs.

The USBR maintains daily records of dam discharge and reservoir elevation. The highest recorded discharge occurred in 1964 in excess of 60,000 cfs. The lowest discharge was approximately 50 cfs. Discharges during the irrigation season are usually greater than 1500 cfs. Average monthly stream flows are highest during May (2,450 cfs), June (4,000 cfs), and July (1,850 cfs), and lowest during December (200 cfs), January (180 cfs), February (175 cfs), and March (205 cfs).

A targeted instream flow of 200 cfs is released from the dam to the Sun River from fall through early spring.

Water Quality

Water quality in the Gibson reservoir and in the Sun River is designated as B-D. It is suitable for the following uses: (1) drinking and food processing, after adequate treatment; (2) contact recreation; (3) growth and propagation of salmonid fish and associated aquatic life, waterfowl, and furbearers; and (4) agricultural and industrial water supply. The state standard for this class of water is; 7 milligrams per liter (mg/l) for dissolved oxygen (DO); a range of 6.5 to 8.5 for ph; an upper limit of 5 Jackson turbidity units above existing turbidity levels; and a temperature range of 32 F to 66 F.

Grisdale Hill Project studies conducted in September 1984, showed that the water temperature 10 feet below the surface was 50 F and the DO was 12 mg/l. In the Sun River 500 yards downstream from the dam outlet, the temperature was 48 F and the DO was 13 mg/l (Grisdale, 1984, Application Exhibit E). According to data collected by Grisdale, the reservoir develops some thermal stratification and no chemical stratification. The data indicated that water temperature ranged from 55 F at the surface to 45 F near the bottom and the DO ranged from 10 mg/l at the surface to 11 mg/l near the bottom.

Although these data indicate that this 150 foot-deep reservoir was not chemically stratified during sampling, it is anticipated that during the late summer low-flow period, when reservoir retention time increases, that some chemical stratification could occur. During this period DO levels in the bottom of the reservoir near the outlet may occur at concentrations less than the state standard levels. Given the aeration effect of the dam outlet structure and overflow spillway, the DO levels of the river downstream of the project are expected to be at or above the state standard.

Studies

Water Quantity

No specific field studies of water quantity are planned. GDHC will be required to present all relevant reservoir and streamflow data in the FERC License Application material, and it is to the GDHC's benefit to have acquired all available information on the system's hydrology. In addition to gathering background hydrology information, GDHC will also be required to present a description of the basin's general water rights structure and specific water rights, as they relate to USBR, municipal, irrigation and industrial uses. Water quantity study planning will be coordinated, at a minimum, with the Montana Department of Natural Resources and Conservation (MDNRC), the agency responsible for issuing and administering Montana's water rights.

Water Quality

Because quality of Gibson dam water is well-monitored by various state and federal agencies as part of the Sun River Project authorization, we do not expect to conduct detailed studies of Sun River or Gibson reservoir water quality. Water quality study planning will be coordinated, at a minimum, with the Montana Department of

Environmental Quality (MDEQ), the agency responsible for administering Montana's water quality standards and monitoring.

FISHERY RESOURCES

Affected Environment

Fish communities in the project area consists of both coldwater and warmwater populations including northern pike (*Esox lucius*), white fish (*Prosopium williamsoni*), yellow perch (*Perca flavescens*), brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), cutthroat trout (*clarki*), and rainbow trout (*Oncorhynchus mykiss*). MDFW&P has recently begun stocking arctic grayling (*Thymallus arcticus*) in the forks of the Sun River upstream of Gibson Reservoir. These introductions have resulted in grayling populations in the upper Sun River and upper Gibson Reservoir. While the grayling may possibly be listed as a threatened species, there are no other threatened or endangered fish species in the project area.

The MDFW&P rates the quality of the fishery below the dam as low to moderate. The relatively large discharges in spring and summer associated with the irrigation flow release schedule are not conducive to fish propagation. In addition, the cold temperature of the flow releases is not conducive to fish spawning. The downstream diversion dam is a barrier to fish migration and prohibits recruitment of fish from downstream portions of the river to the 5-mile long reach located between the diversion dam and project dam.

Studies

GDHC expects to conduct, through a qualified and approved contractor, baseline surveys of fish populations, their habitats and general life histories in both Gibson Reservoir and Sun River over the licensing period. Study plans for these surveys will be developed in consultation with Montana State and federal resource agencies, including MDFW&P, the US Fish and Wildlife Service (FWS), USBR and USFS.

Gibson Reservoir. Gibson Reservoir surveys may include, but not be limited to:

- Literature review, to determine existing lake fish and invertebrate species;
- Limited lake sampling, if necessary to update literature;

Sun River. Sun River fisheries studies may include:

- Literature review to gather existing data on Sun River fisheries;
- Limited field surveys to augment literature review results, if necessary;
- Limited water quality surveys to determine the production potential of the stream, and to serve as monitoring base of any future construction activities.

WILDLIFE AND TERRESTRIAL RESOURCES

Affected Environment

Vegetation

Vegetation varies greatly within the Project area. In the Sun River canyon, subalpine fir (*Abies lasiocarpa*) is dominant and represents climax on most of the timberline forest. Stands of spruce (*Picea spp.*), white-bark pine (*Pinus albicaulis*), lodgepole pine (*Pinus flexilis*), aspen (*Populus tremuloides*), and black cottonwood (*Populus trichocarpa*) are found on select locations, depending on landform, aspect, and elevation (Anne and Brannon, 1987).

At the mouths of the gulches are wide, flat, floodplain terraces, covered by grasses (*Agropyron spp.* and *Festuca spp.*), cottonwoods, aspens, firs, and pines.

At the mouth of the canyon, approximately 4.77 miles east of Gibson dam, the forest ends abruptly and the vegetation turns into prairie grasslands, rangelands, and farmland, with dispersed zones of riparian woodlands.

Vegetation found in the prairie zones include native grasses (*Agropyron spp.*, *Bromus spp.*, *Calamagrostis spp.*, and others), forbs, and yucca (*Yucca glauca*). Boxelder (*Acer negundo*) is the dominant tree species. Other species include cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*), Russian olive (*Elaeagnus angustifolia*), choke cherry (*Prunus virginiana*), peachleaf willow (*Salix amygdaloides*), and other willows (*Salix spp.*). Wild rose (*Rosa spp.*) is the principal understory species.

Wildlife

Wildlife in the project is generally abundant and diverse. The diversity and extent of suitable habitats, the low levels of human disturbance, and the closeness of wilderness areas, game preserves, and game ranges contribute to this highly valued wildlife area.

The project vicinity contains habitat for a wide variety of game and nongame birds, raptors, and waterfowl. The major gamebird species are Franklin grouse (*Canachites franklini*), ruffed grouse (*Bonasa umbellus*), blue grouse (*Dendragapus obscurus*), and white-tailed ptarmigan (*Lagopus leucurus*). In the foothills and prairie outside the canyon, species include sharp-tailed grouse (*Tympanuchus phasianellus*) and ring-necked pheasant (*Phasianus colchicus*).

Numerous nongame birds are also found in the area, including mourning dove (*Zenaida macroura*), common snipe (*Gallinago*), belted kingfisher (*Ceryle alcyon*), and many passerines (songbirds) (Mitex, Inc., 1984, application, exhibit E).

Raptors found in the canyon, foothills, and prairie of the project area, include golden eagle (*Aquila chrysaetos*), northern goshawk (*Accipiter gentilis*), Cooper's hawk (*A.*

cooperii), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*B. swainsoni*), red-tailed hawk (*B. jamaicensis*), and prairie falcon (*Falco mexicanus*). The project area contains wintering territories, breeding territories, and migration routes of these species.

The Sun River Basin bisects one of the major migration routes for waterfowl in North America. During peak migration periods, as many as 1 million waterfowl pass through the project vicinity. Of these waterfowl, as many as 300,000 are snow geese (*Chen caerulescens*), 80,000 (in spring) are tundra (Cygnus columbianus) and trumpeter swans (*C. buccinator*). Trumpeter swans also nest in the project vicinity.

Rare species noted in the project vicinity are Ross' goose (*Chen rossii*), white-faced ibis (*Plegadis chihi*), and sandhill crane (*Grus canadensis*).

Vegetation Studies

GDHC intends to conduct baseline surveys for potentially-affected botanical resources, according to study plans approved by BOR, MDFW&P, USFS, and other agencies. Typically, baseline plant surveys include:

- Aerial inventories of vegetative type, primarily from existing imagery;
- Foot surveys, to ground-truth the aerial inventories;
- A Preliminary Jurisdictional Determination (PJD), to determine location, type, function and extent of wetlands, uplands, and Waters of the US in the Project area;
- Sensitive Plant surveys, if deemed necessary during consultation.

Wildlife Studies

GDHC expects to conduct wildlife surveys during the licensing period. All wildlife-related study plans will be developed in association with Montana State and federal resource agencies. Typically, wildlife surveys include:

- Literature review to determine existing wildlife resources;
- Limited field observations of or large and small game animals, birds and non-game species;

THREATENED AND ENDANGERED SPECIES

Affected Environment

Plants

There are no federally listed threatened or endangered plants in the project area; however, there are some rare, highly specialized plants that occupy unique environmental niches that the USFS considers worthy of protection. These include: *Telesonix jamesii*, *Kelseya uniflora*, *Androsace lehmanniana*, *Eritrichium howardii*,

Aquilegia jonesii, *Lilium philadelphium*, *Cardamine rupicola*, *Cyripedium passerinum*, *Orchis rotundifolia*, *Listera borealis*, and *Habenaria obtursata*.

Wildlife

In the project area, threatened or endangered species that are federally listed or proposed for federal listing are gray wolf (*Canis lupus*), grizzly bear (*Ursus horribilus*), peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), and possibly black-footed ferret (*Mustela nigripes*).

The gray wolf is known to occur throughout the year in the project vicinity. Wolves hunt prey on big game wintering areas along the eastern front of the Rocky Mountains in the project area. Over the past several years, wolf observations have been reported in the Sun River drainage. Population density is believed to be very low, and no pack activity has been documented. Potential prey species in the area include elk, bighorn sheep, mule deer, whitetail deer, and beaver. The area does have suitable habitat for den and rendezvous sites, should it be occupied by a pack in the future.

The Sun River below Gibson dam is an occupied bald eagle wintering area. In the winter and early spring, most bald eagle usage is in or near the mouth of the canyon. The project area also contains suitable unoccupied essential habitat for bald eagles. Bald eagles migrate through the project area in the canyon and adjacent plains during late fall and early spring. Eagles are frequently seen feeding on fish, small mammals, and carrion during this time.

Peregrine falcons are known to migrate through the project area. Peregrine falcons have been sighted in the project area, but no nest sites have been found. The project area also contains suitable unoccupied essential habitat for the falcons.

The Sun River Canyon and the surrounding areas contain habitat of extreme importance to the grizzly bear population of the Lewis and Clark National Forest. Seasonal ranges, denning habitats, breeding areas, and travel corridors are found in or near the project area.

Grizzly bears and grizzly bear habitats are particularly sensitive to human disturbance, and the decline in grizzly bear populations that accompanies increased human activity is well documented.

Studies

GDHC does not currently propose studies for threatened or endangered species. We expect through further consultation with US Fish and Wildlife Service and other agencies, and through results of our pre-application wildlife and vegetation studies, to determine an exact list of endangered species, and to determine any need for additional studies.

CULTURAL RESOURCES

Affected Environment

Surveys conducted for the Grisdale Hill Project indicated that 5 of 22 archeological and historic sites inventoried in the survey were eligible for inclusion in the National Register of Historic Places. The eligible sites were all historic structures associated with the construction and operation of the USBR's Sun River Irrigation Project, specifically Gibson Dam (site 24LC797), the Engineer's Residence (site 24LC798), the Diversion Dam (site 24LC805), the Diversion Dam construction camp (site 24LC806), and the Pishkun Canal (site 24LC808).

The eligible sites are significant because they are important components of the Sun River Project and because the project played a significant part in the historic development of the area. The irrigation of the Greenfields Bench led to the establishment of the town of Fairfield and the stabilization of the local economy. Previous to this, Teton County was dominated by livestock ranching. After construction of the Sun River Project, farming became the chief industry of the county.

Studies

GDHC intends to conduct, using a qualified and approved contractor, an inventory of cultural resources sufficient to document the following:

- Eligibility of any project feature for listing the National Registry of Historic Places (it is generally thought that no project feature is currently eligible);
- Existence of cultural resources within areas currently occupied by project features, or in areas which might be affected by future project use such as road clearing, logging or other ground clearing.

These surveys will be in two stages: Stage I survey would be less-intensive reconnaissance surveys designed to define the direct and indirect impact area of the project and the potential of the areas for containing sites. The more intensive Stage II survey would follow in those areas identified in the Stage I survey as having a reasonable likelihood of containing sites.

The scope of all survey work will be determined in consultation with the State Historic Preservation Office (SHPO) the USFS and the USBR, at a minimum.

RECREATION AND VISUAL RESOURCES

Affected Environment

The Gibson dam and Sun River Canyon landscape is one of unique scenery and beauty, characterized by a wide, open, heavily forested valley, surrounded by high mountain peaks. The canyon and reservoir are important recreational areas within in the Lewis and Clark National Forest.

In the Sun River Canyon, there are 43 summer recreational residences. The landscape crossed by the cross-country transmission line route extends from the canyon onto broad open plains, vegetated principally with grasses and crops. We will further determine recreational use of these areas during the licensing period.

Studies

GDHC will review existing USFS and USBR recreation use plans and levels prior to license application. Based on the outcome of the consultation, we may interview certain recreation users at USFS campgrounds, or obtain information from campground hosts or rangers. We will obtain sport fishing and hunting data from MDFW&P.

PROJECT ALTERNATIVES

The FERC regulations require that the ICD present any alternative project designs or operations as they may be known at the time of submittal. GDHC has begun the process of evaluating alternative Project designs and operations, and will intensify efforts in this area as we receive input from the stakeholders.

The only current alternative designs involve the alternative powerhouse designs and transmission routing facilities described in the Project Features Section. The generation, economic and environmental consequences of these alternatives will be evaluated and discussed in detail during the licensing process.

GLOSSARY OF LICENSING TERMS

af	Acre foot or feet
ALP	Alternative Licensing Process
cfs	Cubic foot or feet per second
CMT	Culturally-Modified tree
EA	Environmental Assessment
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
HPA	Historic Preservation Act
ICD	Initial Consultation Document
ILP	Integrated Licensing Process
kW	Kilowatt
MDFW&P	Montana State Department of Fish, Wildlife and Parks
MDEQ	Montana State Department of Environmental Quality
MDNRC	Montana State Department of Natural Resources and Conservation
mgd	Million gallons per day
mw	Megawatt
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
PJD	Preliminary Jurisdictional Determination
SHPO	State Historic Preservation Office
SM	Stream Mile
T	Tons
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USBR	United State Bureau of Reclamation

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