Placer County Water Agency
Middle Fork American River Project
(FERC Project No. 2079)

SUPPORTING DOCUMENT B
Detailed Existing Project Description

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

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CONTENT

Supporting Document B (SD B) contains the Detailed Existing Project Description for Placer County Water Agency's (PCWA's) Middle Fork American River Project (MFP or Project).

Draft versions of this document were developed prior to the submittal of the Pre-Application Document (PAD) and distributed to the resource agencies and other stakeholders for review and comment in June 2006. In addition, PCWA presented the Project description and operation information at several Plenary and Technical Working Group meetings in 2006 and 2007. During these meetings, updated materials (tables and maps) were distributed to relicensing participants. Information about Project facilities, operation, and maintenance activities were discussed early in the relicensing process to assist stakeholders in the identification of potential resource issues and development of the technical study plans included in SD H of this PAD.

TABLE OF CONTENTS

Page

List of Tables

List of Figures

List of Maps

List of Appendices

1.0 INTRODUCTION

The following Detailed Existing Project Description summarizes Middle Fork American River Project (MFP or Project) facilities, maintenance activities, operations, net investment, and compliance history.

This document is organized to meet the requirements regarding the description of the existing project as specified in Title 18 of the Code of Federal Regulations (CFR) Part 5 § 5.6(d)(2). The names of each person authorized to act as an agent for PCWA on relicensing the MFP are provided in Appendix A. Information regarding potential Project betterments/improvements is provided in SD C. SD B includes the following major sections:

2.0 Existing Project Components

3.0 Routine Facility Maintenance

4.0 Existing Environmental Programs, Measures or Facilities

5.0 Current FERC License Requirements and Water Rights

6.0 Operating Agreements

7.0 Project Operations

8.0 Project Generation and Outflow Records

9.0 Current Net Investment

10.0 Compliance History

2.0 EXISTING PROJECT COMPONENTS

This section details existing MFP project components including dams, reservoirs, diversion pools, water conveyance systems, powerhouses, gaging stations and weirs, communication lines and powerlines, support facilities, roads and access points, trails, and recreation facilities. A list of these Project components is provided in Tables SD B-1 and SD B-2. A summary of the physical characterization of the primary project components is provided in Table SD B-3. Map SD B-1 provides a geographic overview of the MFP. Maps SD B-2a through 2f provide a detailed geographic depiction of Project facilities. The general elevation profile of the Project is shown on Figure SD B-1.

2.1 LARGE DAMS AND RESERVOIRS

The MFP includes two large dams and reservoirs for water storage. They are the French Meadows Dam and French Meadows Reservoir and the Hell Hole Dam and Hell Hole Reservoir. They have a combined gross storage of 342,583 acre-feet (ac-ft) and combined active storage of 332,415 ac-ft.

- French Meadows Dam and French Meadows Reservoir

  French Meadows Dam (also referred to as L L Anderson Dam) is a 231 foot-high, 2,700 foot-long rock and gravel filled structure with a crest elevation of 5,273 feet

above mean sea level (msl). French Meadows Dam impounds the Middle Fork American River forming French Meadows Reservoir. The reservoir has a gross storage capacity of 134,993 ac-ft and an active storage capacity of 127,358 ac-ft. The dam has an approximately 40 foot-wide spillway channel that is controlled by two 20 foot-wide radial spillway gates. The spillway channel joins the Middle Fork American River approximately 1,000 feet downstream of the dam. The spillway channel and gates have a maximum capacity of 19,800 cubic feet per second (cfs).

The dam is equipped with outlet works consisting of one 8 inch-diameter pipe for instream flows and a second 72 inch-diameter pipe with slide gate and a 60 inch ring jet valve for low level discharge. The 8 inch pipe has an estimated maximum discharge capacity of 8 cfs. The 72 inch-diameter pipe for low-level discharge has a maximum release capacity of 1,430 cfs at full reservoir.

- Hell Hole Dam and Hell Hole Reservoir

  Hell Hole Dam is a 410 foot-high, 1,570 foot-long rock fill structure with a crest elevation of 4,650 feet msl. Hell Hole Dam impounds the Rubicon River and Five Lakes Creek to form Hell Hole Reservoir. The reservoir has 207,590 ac-ft of gross storage and an active storage capacity of 205,057 ac-ft. The dam includes a 350 foot-wide uncontrolled spillway with a maximum capacity of 89,500 cfs. An outlet tunnel with control and energy dissipating valves (outlet works) and a weir for measurement of dam leakage are located adjacent to the downstream face of the dam.

  The outlet works consist of a 16 inch-diameter pipe with a 12 inch hollow-cone valve for instream flows, a 48 inch-diameter pipe and hollow-cone valve for low-level discharge. A 20 inch-diameter pipe that supplies water to the Hell Hole Powerhouse is connected to the 48 inch pipe. The 48 inch-diameter discharge pipe has a maximum discharge capacity of 852 cfs at full reservoir. However, PCWA limits discharges from the pipe to prevent spray on the Hell Hole Powerhouse and erosion of the access road to the powerhouse.

2.2 MEDIUM DAMS AND RESERVOIRS

The Project includes two medium dams and reservoirs. They are the Middle Fork Interbay Dam and Middle Fork Interbay and the Ralston Afterbay Dam and Ralston Afterbay.

- Middle Fork Interbay Dam and Middle Fork Interbay

  Middle Fork Interbay Dam is a 70.5 foot-high, 233 foot-long concrete gravity structure with a crest elevation of 2,536 feet msl. The dam impounds the Middle Fork American River forming Middle Fork Interbay. The reservoir has a maximum operating surface area of about seven acres, contains 175 ac-ft of gross storage and 173 ac-ft of active storage capacity. The dam includes a 140 foot-wide spillway, 80 feet of which are controlled by four 20 foot-wide radial spillway gates. The spillway and spillway gates have a maximum capacity of 36,506 cfs.

The dam outlet works consists of a 60 inch-diameter pipe with a slide gate and a 20 inch stream maintenance pipe and slide gate. The 60 inch pipe has a maximum capacity of 890 cfs and the instream flow pipe has a capacity of 23 cfs at full reservoir.

- Ralston Afterbay Dam and Ralston Afterbay

  Ralston Afterbay Dam is an 89 foot-high, 560 foot-long concrete gravity structure with a crest elevation of 1,189 feet msl. The dam is located just below the confluence of the Middle Fork American and the Rubicon rivers. The dam impounds the Middle Fork American River and forms the Ralston Afterbay. Ralston Afterbay has 2,782 ac-ft of gross storage capacity and an active storage capacity of 1,804 ac-ft (at 1,179 feet msl water surface elevation). The dam has a 232 foot-wide controlled spillway; the spillway includes five 40 foot-wide radial spillway gates and has a capacity of 171,200 cfs. The dam includes a 30 inch pipe controlled by a slide gate and ring-jet valve that is used for release of instream flows. The instream flow pipe has a maximum capacity of 155 cfs at full reservoir. The dam also includes a 72 inch-diameter low-level discharge pipe controlled by a slide gate. This pipe has a maximum capacity of 1,132 cfs at full reservoir.

2.3 SMALL DAMS AND DIVERSION POOLS

The MFP includes three small dams and associated diversion pools. They are located on Duncan Creek and the North Fork and South Fork of Long Canyon Creek.

- Duncan Creek Diversion Dam and Diversion Pool

  The Duncan Creek Diversion Dam is a 32 foot-high, 165 foot-long, concrete gravity structure with a crest elevation of 5,275 feet msl. The dam forms the Duncan Creek Diversion Pool, with approximately 20 ac-ft of gross storage. The dam incorporates a 100 foot-wide uncontrolled spillway that has a capacity of 7,200 cfs and includes a 10 inch outlet pipe controlled by an angle valve. This pipe provides instream flows and has a release capacity of up to 8 cfs. The dam also includes a 60 inch-diameter pipe controlled by a 60 inch gate valve.

- North Fork Long Canyon Diversion Dam and Diversion Pool

  The North Fork Long Canyon Diversion Dam is a 10 foot-high, 120 foot-long concrete gravity structure with a crest elevation of 4,720 feet msl. The dam forms a small diversion pool with less than one ac-ft of storage on North Fork Long Canyon Creek. The width of the dam crest acts as an uncontrolled spillway with a 3,000 cfs discharge capacity. The diversion dam includes a 12 inch-diameter pipe instream flow and a 36 inch-diameter outlet pipe controlled with a slide gate.

- South Fork Long Canyon Diversion Dam and Diversion Pool

  The South Fork Long Canyon Dam is a 27 foot-high, 145 foot-long concrete gravity structure with a crest elevation of 4,650 feet msl. The dam forms a diversion pool

with less than one ac-ft of storage on South Fork Long Canyon Creek. The dam includes a 60 foot-wide uncontrolled spillway, which has a capacity of 4,000 cfs. The diversion includes a 12 inch-diameter pipe to provide instream flows and a 36 inch-diameter outlet pipe controlled with a slide gate.

2.4 WATER CONVEYANCE SYSTEMS

The Project includes seven water conveyance systems to transport water from diversions to reservoirs and powerhouses. The water conveyance systems include features such as intakes, tunnels, diversion pipes, drop inlets, surge shafts and tanks, adits, removable sections, portals, gatehouses, valve houses, and penstocks. These water conveyances are described as follows:

- Duncan Creek - Middle Fork Tunnel

  Water is routed from Duncan Creek Diversion to the French Meadows Reservoir via the Duncan Creek - Middle Fork Tunnel. This tunnel is approximately 9 feet-wide by 10 feet-high and is 7,864 feet-long. The tunnel is lined with concrete along 300 feet of its length; the remainder is unlined. The maximum discharge capacity of the tunnel is 400 cfs.

  The tunnel intake is located at the south side of the diversion pool. A trashrack is fitted over the intake structure to prevent debris from entering the tunnel. The tunnel ends at an open portal, located near the north end of the French Meadows Dam. Water discharges from the tunnel into French Meadows Reservoir.

- French Meadows - Hell Hole Tunnel

  The French Meadows - Hell Hole Tunnel routes water from French Meadows Reservoir through French Meadows Powerhouse to Hell Hole Reservoir. The tunnel was constructed with a 12.3 foot-wide horseshoe cross-section and is 13,694 feet long. The first approximately 1,617 feet is concrete lined and the last approximately 317 feet at the end of the tunnel is steel lined. The remaining 11,760 feet of the tunnel is unlined. Water enters the tunnel through an inlet structure located on the reservoir bottom approximately 1,000 feet from the southern shoreline. Flow into the tunnel is controlled by a slide gate at the French Meadows - Hell Hole Gatehouse. The current maximum discharge capacity of the tunnel is approximately 400 cfs.

  The tunnel terminates at the French Meadows Powerhouse Penstock and Butterfly Valve House. The French Meadows - Hell Hole Tunnel Removable Section is located between the tunnel portal and butterfly valve house. This removable section provides access to the tunnel for inspection and maintenance. At the valve house, water flows into a 6.25 foot-diameter, 691 foot-long penstock to the powerhouse. After flowing through the turbine, water is discharged from the powerhouse to Hell Hole Reservoir.

- Hell Hole - Middle Fork Tunnel

  The Hell Hole - Middle Fork Tunnel routes water from Hell Hole Reservoir to the Middle Fork Powerhouse. The tunnel was constructed with a 13.4 foot-wide horseshoe cross-section and is 55,006 feet long. The first approximately 6,780 feet is lined with concrete and the last approximately 5,180 feet is steel lined. The remaining 43,046 feet of its length is unlined. Water enters the tunnel through an inlet located on the reservoir bottom, approximately 400 feet offshore. Water flow is controlled by the Hell Hole - Middle Fork Tunnel Gatehouse, located on the north shore of Hell Hole Reservoir approximately 0.5 miles from the dam. The maximum discharge capacity of the tunnel is approximately 920 cfs.

  Intersecting this tunnel are drop inlets (vertical shafts) from the North Fork and South Fork Long Canyon Creek diversions. The tunnel also includes the Hell Hole - Middle Fork Tunnel Surge Shaft and Tank, located approximately 1,800 feet from the tunnel outlet. The 10 foot-diameter surge shaft and 60 foot-diameter by 22 foot-high above-ground tank provides surge capacity for the tunnel during powerhouse operations.

  At North Fork Long Canyon Creek, the tunnel is above ground for a short distance. At this point, a concrete encased steel pipe crosses North Fork Long Canyon Creek and joins a removable pipe section. The North Fork Long Canyon Crossing Removable Section provides access into the tunnel for inspection and maintenance. Following the removable section, the tunnel continues underground.

  The tunnel terminates at the Middle Fork Powerhouse Penstock and Butterfly Valve House. The butterfly valve house and penstock are located approximately 1,479 feet above the Middle Fork Powerhouse. The Hell Hole - Middle Fork Tunnel Removable Section is located between the tunnel portal and the butterfly valve house. This removable section provides a second access to the tunnel for inspection and maintenance. From the valve house, water flows to the powerhouse through a 3,653 foot-long (7.5-9.0 foot-diameter) penstock.

- North Fork Long Canyon Diversion Pipe and Drop Inlet

  The North Fork Long Canyon Diversion Dam acts as a diversion structure which routes water through a slide gate into North Fork Long Canyon Diversion Pipe and Drop Inlet. The diversion pipe is a 36 inch-diameter buried steel pipe, which is 3,530 feet long. From the pipe, water then falls down a 403 foot-deep, 6 foot-diameter drop inlet shaft to a 54 foot-long tunnel that intersects the Hell Hole - Middle Fork Tunnel. The drop inlet has a vent pipe that extends 20 feet above the surface to provide air to the shaft. The pipe and shaft have a maximum flow capacity of 100 cfs.

- South Fork Long Canyon Diversion Pipe and Drop Inlet

  The South Fork Long Canyon Creek Diversion Dam acts as a diversion structure by routing water through a slide gate into the South Fork Long Canyon Diversion Pipe and Drop Inlet. The diversion pipe is a 50 foot-long, 42 inch-diameter buried steel

pipe. Water then drops down a 387 foot-long vertical shaft to a 27 foot-long tunnel that intercepts the Hell Hole - Middle Fork Tunnel. The drop inlet also has a vent pipe that extends 20 feet above the surface to provide inlet air to the shaft. The shaft has a maximum flow capacity of 200 cfs.

- Middle Fork - Ralston Tunnel

  The Middle Fork - Ralston Tunnel routes water from Middle Fork Interbay to Ralston Powerhouse. The tunnel was constructed with a 13.4 foot-wide horseshoe cross-section. It is 35,397 feet-long, the first 8,245 feet of which is concrete lined and the last 245 feet is steel lined. The remaining 26,907 feet is unlined. Water enters the tunnel through the Middle Fork - Ralston Tunnel Intake and Gatehouse located in the Middle Fork Interbay adjacent to the Middle Fork Interbay Dam. The maximum discharge capacity of the tunnel is approximately 836 cfs.

  The tunnel terminates at the Ralston Powerhouse Butterfly Valve House. The butterfly valve house and entrance to the penstock are located about 1,105 feet above the Ralston Powerhouse. The Middle Fork - Ralston Tunnel Removable Section is located between the tunnel portal and butterfly valve house. This removable section provides access to the tunnel for inspection and maintenance. From the butterfly valve house, water flows to the powerhouse through the 1,670 foot-long Ralston Powerhouse Penstock. This penstock ranges from 8-9.5 feet in diameter. Water is discharged from the powerhouse into the Ralston Afterbay.

  The Middle Fork - Ralston Tunnel Surge Shaft and Tank is located approximately 500 feet from the tunnel portal and consists of a 10 foot-diameter surge shaft and a 60 foot-diameter by 22 foot-high above-ground tank. They provide surge capacity for the tunnel during powerhouse operations.

- Brushy Canyon Adit

  Brushy Canyon Adit is a construction adit located at the mid-point of the Middle Fork - Ralston Tunnel. The entrance to the adit is currently covered by a landslide and is not accessible.

- Ralston - Oxbow Tunnel

  The Ralston - Oxbow Tunnel routes water from Ralston Afterbay to the Oxbow Powerhouse. The tunnel was constructed with a 13.25 foot-wide horseshoe cross-section that is 403 foot-long. It is lined with concrete along 343 feet of its length and with steel along the last 60 feet before the powerhouse. It has a flow capacity of 1,088 cfs. Water from the Ralston Afterbay enters the Ralston - Oxbow Tunnel Intake and flows into a 9 foot-diameter penstock that terminates at the Oxbow Powerhouse. The inlet structure is located approximately 0.15 miles from the north end of the Ralston Afterbay Dam.

2.5 POWERHOUSES

The Project includes four powerhouses with switchyards, one powerhouse without a switchyard, and a substation. The powerhouses have a total combined nameplate operating capacity of 223.7 megawatts (MW). Provided below is a description of each powerhouse, switchyard, and points of interconnection with the PG&E transmission system. A schematic diagram showing the PG&E transmission system and the points of interconnection with the MFP is provided as Figure SD B-2. The PG&E transmission interconnections and transmission system are not part of the MFP.

- French Meadows Powerhouse and Switchyard

  The French Meadows Powerhouse, located on the north shore of the Hell Hole Reservoir, contains a single Francis type turbine and electrical generator with an installed generating capacity of 15.3 MW. The above-grade portion of the powerhouse includes an approximately 45 feet by 68 feet concrete slab, a circular 7 foot-high generator housing, a small rectangular entry building and a transformer. A moveable metal gantry crane stands over the powerhouse. Water to the powerhouse is delivered from French Meadows Reservoir via the French Meadows - Hell Hole Tunnel. Electricity generated at the powerhouse is increased to 60 kilovolts (kV) at the powerhouse main transformer bank and delivered to PG&E's Transmission System at the switchyard adjacent to the powerhouse. The switchyard includes metal towers and electrical switching gear. The French Meadows Powerhouse also includes a motor-generator that provides backup power to the powerhouse. The powerhouse and switchyard are enclosed in an approximately 223 feet by 58 feet fenced area that is graded.

- Hell Hole Powerhouse

  The Hell Hole Powerhouse, located at the outlet works of the Hell Hole Dam, contains a single Francis type turbine and electrical generator with an installed generating capacity of 0.73 MW. All powerhouse equipment is contained in a 24 feet by 26 feet concrete block building that is 10 foot-high. Water to the powerhouse is delivered via a 20 inch-diameter pipe that is connected to the Hell Hole Dam outlet works and serves as the turbine penstock. Electricity generated at this powerhouse is increased to 12.47 kV and is transmitted on a Project powerline to the French Meadows Powerhouse via the Hell Hole Substation. It may also be used to supply power to nearby Project facilities.

- Middle Fork Powerhouse and Upper and Lower Switchyards

  The Middle Fork Powerhouse (also know as the L. J. Stevenson Powerhouse) contains two Pelton type waterwheels, each connected to a 61.2 MW electrical generator with an installed generating capacity of 122.4 MW. The above-grade portion of the powerhouse includes an approximately 62 feet by 154 feet concrete slab, two circular 18 foot-high generator housings, a small rectangular entry building and main transformers. A moveable metal gantry crane stands over the powerhouse. Water to the powerhouse is delivered from Hell Hole Reservoir via the

Hell Hole - Middle Fork Tunnel and Penstock. Water from the powerhouse is discharged to Middle Fork Interbay.

Electricity generated at the powerhouse is increased to 60kV at the powerhouse main transformer bank. There are two switchyards adjacent to the Middle Fork Powerhouse, the Upper and Lower switchyards. One provides interconnection to PG&E's 60kV Transmission System. The second provides interconnection to PG&E's 230kV Transmission System. The switchyards include metal towers and electrical switching gear.

The powerhouse and switchyards are contained within a fenced and graded area that has maximum dimensions of 250 feet by 360 feet.

- Ralston Powerhouse and Switchyard

  The Ralston Powerhouse contains a single Pelton type waterwheel and electrical generator with an installed generating capacity of 79.2 MW. Water to the powerhouse is delivered from the Middle Fork Interbay via the Middle Fork - Ralston Tunnel and Penstock. The above-grade portion of the powerhouse includes an approximately 82 feet by 90 feet concrete slab, a circular 22 foot-high generator housing and small rectangular entry building. A moveable metal gantry crane stands over the powerhouse. Water from the powerhouse is discharged to the Ralston Afterbay. Electricity generated at the powerhouse is increased to 230 kV at the powerhouse main transformer bank. The Ralston Powerhouse is interconnected to PG&E's 60 and 230 kV Transmission System through the switchyard located adjacent to the powerhouse. The switchyard includes metal towers and electrical switching gear.

  The powerhouse and switchyard are enclosed in an approximately 80 feet by 295 feet fenced area that is graded.

- Oxbow Powerhouse and Switchyard

  The Oxbow Powerhouse contains a single Francis type turbine and electrical generator with an installed generating capacity of 6.1 MW. Water to the powerhouse is delivered from the Ralston Afterbay via the Ralston - Oxbow Tunnel. The above-grade portion of the powerhouse includes an approximately 60 feet by 98 feet concrete slab, a small rectangular entry building and transformer. A moveable metal gantry crane stands over the powerhouse. Water passing through the Oxbow Powerhouse is discharged to a short channel that joins the Middle Fork American River. Electricity generated at the powerhouse is increased to 60 kV at the powerhouse main transformer bank and interconnected to PG&E's 60 kV Transmission System at the switchyard adjacent to the powerhouse. The switchyard includes metal towers and electrical switching gear.

  The powerhouse and switchyards are contained within a fenced and graded area that has maximum dimensions of 120 feet by 145 feet.

- Hell Hole Substation

  The Hell Hole Substation located near the French Meadows Powerhouse provides an interconnection to PG&E's 60 kV Transmission System which allows PCWA to receive power from PG&E. This power can be used to run ancillary equipment and support facilities near Hell Hole Reservoir when French Meadows Powerhouse and Hell Hole Powerhouse are not in operation. The Hell Hole Substation is contained with an approximately 20 feet by 30 feet fenced area.

2.6 PROJECT GAGING STATIONS AND WEIRS

PCWA currently maintains a network of stream and reservoir gaging stations and weirs to monitor and record water flow and storage. This network consists of nine stations that measure flow in rivers and creeks, two stations that directly measure diversion, six gages that measure reservoir elevation and storage, four that measure flow at powerhouses, and two that measure leakage from weirs.

2.6.1 Stream Gages and Weirs

Project stream gages and associated weirs have been installed and are maintained at the following locations:

- Duncan Creek - there are two gages and associated weirs located above and below the Duncan Creek Diversion. These gages are used to verify compliance with FERC required instream flows.
- Middle Fork American River - there are four gages and one weir: one gage and weir below French Meadows Dam, one above Middle Fork Powerhouse, one at Middle Fork Interbay Dam and one below Oxbow Powerhouse. Each of these gages, except the gage above Middle Fork Powerhouse, provides flow measurements to verify compliance with FERC required instream flows.
- North and South Fork Long Canyon Diversions - there are two gages and associated weirs at the North Fork and South Fork Long Canyon Diversions. These gages measure flows below the point of diversion.
- Rubicon River Gage and Weir below Hell Hole Dam - this gage and associated weir is located below Hell Hole Dam and Powerhouse and provides flow measurements to determine compliance with FERC required instream flows.

All of the stream gaging stations have been incorporated into the United States Geological Service (USGS) gaging network. All but two of the gages are powered by a photovoltaic cell located on a nearby pole. The gage above the Middle Fork Powerhouse is powered by line from the powerhouse. The gage at the Middle Fork Interbay Dam is powered by an electrical supply from the dam's service power.

2.6.2 Diversion Gages

Diversion gages are located on the diversion inlet at both the North and South Fork Long Canyon diversions. These gages directly measure diversion flows. They are powered by photovoltaic cells located on a nearby pole.

2.6.3 Reservoir Gages

Reservoir gages and reservoir staff gages have been installed at the following locations:

- French Meadows Reservoir - reservoir gage and reservoir staff gage
- Hell Hole Reservoir - reservoir gage and reservoir staff gage
- Middle Fork Interbay - reservoir gage
- Ralston Afterbay - reservoir gage

Reservoir gages are used to directly measure the water surface elevation and determine compliance with FERC License requirements such as minimum pool in the storage reservoirs (French Meadows and Hell Hole). They also provide measurements for use by Project operators.

Reservoir staff gages, which are a series of marked posts near the reservoir shore, are used to measure the water surface elevation quarterly and provide calibration for the reservoir gages.

2.6.4 Powerhouse Gages

Powerhouse gages are located in each of the powerhouses except Hell Hole Powerhouse. These gages measure water flows through the powerhouse.

2.6.5 Leakage Weirs

Six weirs that measure normal leakage are located on the downstream face of the French Meadows Dam. A single leakage weir is located on the downstream face of the Hell Hole Dam near the Hell Hole Powerhouse.

2.7 PROJECT COMMUNICATION AND POWERLINES

Fourteen Project communication lines and powerlines, which total almost 6 miles in length, provide power to operate Project equipment and allow communication between Project facilities. Figure SD B-2 shows a schematic diagram of the transmission lines, communication lines, and powerlines. Maps SD B-2a through SD B-2e show the location of these facilities. Table SD B-4 provides detailed information on each Project power or communication line. Ten lines serve dual purposes by providing both power and communication capabilities to MFP facilities. These dual lines have two types of lines on the same poles.

2.8 PROJECT SUPPORT FACILITIES

Project support facilities consist of ancillary facilities, sediment disposal sites, microwave reflectors and radio towers, Project fences, and snow courses. Each of these support facilities is described below; the larger facilities are shown on Maps SD B-2a through 2f.

- Dormitory Facility, Operator Cottages, Shop and Water Tank

  The Dormitory Facility, Operator Cottages, and Shop located near Hell Hole Dam provide housing for station attendants, as well as meeting facilities and temporary lodging for Project employees and associates. The dormitory consists of a 12 room, 24 bed building, which has kitchen, dining, and meeting areas. The operator housing consists of two cottages. A maintenance shop is located near the cottages. A water tank which supplies potable water to the dorm, cottages, and shop is located on a hill adjacent to the cottages.

- French Meadows Dam and Hell Hole Staging Areas

  Maintenance work staging areas are located adjacent to the French Meadows Dam Spillway Discharge Channel and the Dormitory Facility at Hell Hole Reservoir. These unimproved staging areas are used for equipment mobilization and temporary storage of bulk materials.

- Generator Buildings

  Generator buildings for site power are located at the French Meadows Dam and Ralston Afterbay Dam. These facilities include fuel storage and an engine generator.

- Storage Building at Middle Fork - Ralston Surge Shaft and Tank

  A small storage building is located adjacent to the Middle Fork - Ralston Surge Shaft and Tank.

- Microwave Reflectors and Radio Towers

  Two passive microwave reflector stations and two radio towers with a repeater are maintained for communication purposes in the Project vicinity. The passive microwave reflector stations are located near Middle Fork Interbay and Ralston Afterbay. One radio tower and repeater are located near the Hell Hole - Middle Fork Tunnel Surge Shaft and Tank, and a second tower is located near the French Meadows - Hell Hole Tunnel Gatehouse.

- Sediment Disposal Sites

  The Project maintains five sediment disposal sites. These are located adjacent to Duncan Diversion Dam; near the North Fork Long Canyon Crossing; adjacent to the Middle Fork Interbay Dam and Powerhouse Road (approximately 2.6 miles from the Middle Fork Interbay Dam); near the Middle Fork - Ralston Tunnel Surge Tank, and adjacent to the Indian Bar Rafting Access and General Parking Area. These sites

are used for disposal of sediments removed from the diversion pools at Duncan Creek and North and South Fork Long Canyon creeks, and from Middle Fork Interbay and Ralston Afterbay.

- Project Fences

  Fences are used at some facilities to control rock and debris on slopes adjacent to Project facilities and to protect PCWA workers and the public. Rock fences are maintained near French Meadows Penstock and Powerhouse, Long Canyon Crossing, Middle Fork Powerhouse and Switchyards, Middle Fork Interbay Dam, Ralston Powerhouse and Penstock, and Oxbow Powerhouse. Public safety fences are located adjacent to the Dormitory Facility, Hell Hole Dam General Parking Area and the North Fork Long Canyon Crossing Removable Section.

- Snow Courses

  Four snow courses are maintained and used for estimating snow depth and water content to forecast spring runoff. The location of each snow course is shown on Map SD B-2f. The snow courses include Wabena Meadows located on the North Fork American River, Miranda Cabin located on Grayhorse Creek, Diamond Crossing located on Five Lakes Creek, and Talbot Camp located on the Middle Fork American River above French Meadows Dam. Each snow course is located in open areas with sufficient space for helicopter operations and is marked by small signs on trees. Snow surveys are conducted monthly from February through May each year.

2.9 PROJECT ROADS, ACCESS POINTS AND TRAILS

Thirty-four roads and/or access points (totaling 17.7 miles) and 10 trails (totaling 0.5 miles) are used for ongoing operation and maintenance of the MFP (Map SD B-2a through 2e). A list of these Project features is provided in Table SD B-1. Descriptive information on each road, access point, and trail is provided in Table SD B-5.

2.10 PROJECT RECREATION FACILITIES

PCWA constructed 21 developed recreation facilities as part of the MFP. These facilities are concentrated around French Meadows Reservoir, Hell Hole Reservoir, South Fork Long Canyon Diversion Pool, and Ralston Afterbay (Map SD B-2a through 2e). Amenities at each of the recreation facilities are presented in Table SD B-6. Developed campgrounds are located near the higher elevation Project facilities, including French Meadows Reservoir (six campgrounds with a total of 39 single sites and seven group sites), Hell Hole Reservoir (three campgrounds with a total of 79 single sites), and South Fork Long Canyon Diversion Pool (one campground with two group sites). Day-use facilities such as boat ramps, picnic areas, parking lots and scenic vistas also support recreational activities at the higher elevation reservoirs (French Meadow and Hell Hole reservoirs). These overnight and day-use facilities are typically available from late spring to early fall as inclement weather and snow prevents year-round use. Water supplies have been developed at four locations to serve the recreation facilities at the French Meadows Reservoir, and campgrounds near Hell Hole Reservoir and South

Fork Long Canyon Creek. Detailed information on each water supply and associated maintenance trail is provided in Table SD B-7.

Recreation facilities located near the lower elevation Project facilities are open year-round and consist entirely of day-use facilities. These facilities include one picnic area and cartop boat ramp located near the Middle Fork River American inflow to Ralston Afterbay, and one rafting access and parking area adjacent to the lower Middle Fork American River near the Oxbow Powerhouse.

These recreation facilities are formally part of the MFP and PCWA is responsible for their operation and maintenance. PCWA has an on-going agreement with the Tahoe National Forest (TNF) and El Dorado National Forest (ENF) to continue to provide the financial resources necessary to support a portion of the operation, maintenance, and restoration of these facilities by the respective National Forests.

3.0 ROUTINE FACILITY MAINTENANCE

To maintain and protect system reliability, PCWA conducts routine inspections, testing and maintenance of Project facilities. Annual maintenance is scheduled at a time when the work can be expeditiously completed (during favorable flow and weather conditions) and have the least effect on water supply deliveries and power production. The following describes each of these activities.

3.1 INSPECTION, TESTING AND MAINTENANCE OF POWERHOUSES AND TUNNELS

PCWA conducts annual inspection and testing of Project facilities to verify the structural and/or functional integrity of the facilities and to identify conditions which might disrupt operation or threaten dam safety. At Ralston - Oxbow Tunnel, these inspections require dewatering of the Ralston Afterbay to allow access to the tunnel to identify any structural deterioration. None of the other Project tunnels are routinely inspected due to concerns over tunnel integrity if they are dewatered. PCWA also annually inspects the Hell Hole Dam outlet channel.

PCWA also conducts annual mechanical and electrical inspections and maintenance at all five Project powerhouses. These activities typically occur in the fall for facilities in the lower Project area beginning in late September, and require that the lower MFP powerhouses (Middle Fork, Ralston, and Oxbow) be taken out-of-service for 3-6 weeks. During the fall maintenance period, Middle Fork Interbay and Ralston Afterbay water levels are lowered to allow access to the facilities. Consumptive demands and instream flow requirements downstream of Oxbow Powerhouse during the fall outage are typically met by increasing flow releases from Hell Hole Reservoir into the Rubicon River. Inspection, testing, and the maintenance of facilities in the upper Project area (i.e., French Meadows and Hell Hole powerhouses), typically occur during the spring, once the roads to the Project facilities are passable.

3.2 GATE TESTING

FERC requires partial operation of spillway gates annually, and to full design height at least once every five years. This testing is performed at French Meadows Dam, Middle Fork Interbay Dam, and Ralston Afterbay Dam. At Middle Fork Interbay and Ralston Afterbay dams, the reservoir level are lowered below the spillway crest elevation to conduct these tests.

3.3 OTHER FACILITY MAINTENANCE

PCWA implements routine maintenance activities within and around Project facilities to:

- Preserve Project flow and storage capacities by implementing sediment and debris management
- Protect worker and public health and safety by implementing vegetation management, pest management, signage, and erosion and rock control measures
- Provide facility access by implementing road and trail maintenance
- Protect the facilities by implementing equipment maintenance, erosion and rock control measures, facility painting, and pole replacement

The frequency of these routine maintenance activities are: (1) annual (activity typically occurs once a year), (2) regular (activity will occur one or more times during a five year period, or (3) infrequent (activity typically will occur during a 20 year period, but less than once every five years). Routine maintenance activities conducted in the vicinity of MFP facilities include vegetation management, pest management, sediment management, erosion and falling rock control, debris management, road maintenance, and other maintenance activities (e.g., facility painting and pole replacement). Each of these activities is described below.

3.3.1 Vegetation Management

Vegetation management, which includes vegetation trimming by hand and to a lesser extent, the use of herbicides and fungicides, is implemented by PCWA at Project facilities and features, roads, and trails. Vegetation management at Project recreation facilities is completed by USDA-FS under a collection agreement (No. 03-CO-11051754-014 and No. 03-CO-1105035312). Tables SD B-5, SD B-6, and SD B-7 provide the frequency of Project-related vegetation management activities. Most vegetation management activities occur during the spring and early summer to avoid work during high fire danger periods. Vegetation management is implemented only within the area necessary to reduce fire hazard, protect Project facilities, and provide for worker/public health and safety (refer to table below).

A description of each of the Project-related vegetation management activities implemented for the MFP is provided below.

Trimming by Hand

Manual vegetation management activities include trimming of grasses and forbs using string trimmers, and the removal or trimming of overhanging limbs of shrubs and trees using a chain saw (or other handheld saw) or clippers. These management activities are implemented on an as-needed basis in conjunction with facility inspections. Tables SD B-5, SD B-6, and SD B-7 provide details on the frequency and location of these activities at Project facilities and features, road, trails, recreation facilities, and water supplies.

Vegetation Management Area	Existing Project Facilities, Features, or Recreation Facilities
2 feet	▪ on either side of trails
5 feet	▪ around the perimeter of the dams ▪ outside the perimeter fence of powerhouses, switchyards, and substations ▪ around ancillary support facilities and Project fences
10 feet	▪ on either side of penstocks, valve houses, and removable sections ▪ on either side of communication lines, powerlines, photovoltaic poles and lines, and roads and access points
50 feet	▪ around intakes, gatehouses, surge tanks, adits, portals, microwave reflectors, radio towers, sediment disposal areas, drop inlets, recreation facilities and features, and snow courses

Herbicide and Fungicide Use

Herbicides are used in addition to manual vegetation management activities on an annual basis at Project facilities including: the Ralston - Oxbow Tunnel Intake, within the perimeter fences of the Middle Fork Powerhouse and Upper and Lower Switchyards, the Oxbow Powerhouse and Switchyard, and Ralston Powerhouse and Switchyard (Table SD B-7). Herbicide use is restricted to the graveled parking areas within the perimeter fences of the powerhouses. Small hand-held sprayers are used to apply over-the-counter herbicides (e.g., Roundup®). All herbicides are applied in accordance with label instructions.

Fungicides (e.g., Borax soap) are used infrequently by USDA-FS on tree stumps at Project recreation facilities to prevent the spread of fungus (Ed Moore and John Jue, pers. comm., 2006).

3.3.2 Pest Management

Rodent populations inside Project facilities can pose a human health risk and may damage interior facility components (control panels, wiring, etc.). Rodent control is currently implemented at the following locations: French Meadows Powerhouse and Switchyard, Hell Hole Powerhouse, Hell Hole Substation, Middle Fork Powerhouse and Upper and Lower Switchyards, Oxbow Powerhouse and Switchyard, Ralston Powerhouse and Switchyard, French Meadows Dam Generator Building, Hell Hole Operator Cottages and Shop, Hell Hole Dormitory Facility, Dormitory Facility and Cottages Water Supply Tank, Storage Building at Middle Fork - Ralston Tunnel Surge Shaft and Tank, and the Ralston Afterbay Dam Generator Building. PCWA implements

rodent control as needed in facility interiors using non-restricted rodenticides (e.g., D-Con®). All rodenticides are applied in accordance with the label instructions.

3.3.3 Sediment Management

Streams flowing into Project diversions and reservoirs pass through steep canyons with frequent mass wasting (slides) of the canyon walls. During high flow events, sediments that have collected in or along the stream channel are mobilized and settle in Project reservoirs and diversion pools. During extreme events such as the high flows of 1986 and 1997, it is possible for the diversions at Duncan Creek, North and South Fork Long Canyon creeks, and Middle Fork Interbay to be completely filled with sediment from a single high flow event. Depositions of coarse sediments during high flows in Ralston Afterbay near Ralston Powerhouse can affect turbine operations. Fine sediment deposition in the main body of Ralston Afterbay has substantially reduced active storage.

The purpose of sediment management is to remove excessive sediment deposition at Project diversion and reservoirs to allow continued operations of the MFP by keeping diversion intakes open and free of debris and maintaining overall reservoir storage capacity. PCWA conducts sediment management activities as necessary (i.e., physical removal of sediment with equipment) at the three small diversion pools (Duncan Creek, North Fork Long Canyon, and South Fork Long Canyon) and the two medium reservoirs (Middle Fork Interbay and Ralston Afterbay). Sediment removal activities at each facility type are described below.

Small Diversions

Physical removal is the primary means of sediment management at Duncan Creek Diversion Pool and the North and South Fork Long Canyon Diversion Pools. The sediment is excavated from behind the diversion using equipment such as an excavator, backhoe, or other earth-moving equipment. Sediment is hauled to an approved USDA-FS disposal site, private disposal site, and in some instances, the material is deposited on-site in areas that would not result in erosion into streams. All sediment removal with equipment is completed in accordance with state and federal permit conditions (e.g., USDA-FS Conditional Use Permits, California Department of Fish and Game (CDFG) Streambed Alteration Agreements). Sediment removal typically occurs in the fall (during low flow periods or routine maintenance outages).

Approximately 4,000-5,000 cubic-yards of sediment has been removed from Duncan Creek Diversion. The sediment was disposed of on-site at the upper end of the diversion pool. Historically, sediment removal at the North and South Fork Long Canyon Diversion Pools has been required every 6 to 10 years to maintain diversion operations. The estimated average volume of sediment removed from South Fork Long Canyon Diversion Pool is 5,000-6,000 cubic-yards, and from North Fork Long Canyon Diversion Pool is 4,000-5,000 cubic-yards.

Hydraulic sluicing operations to remove sediment are not conducted at these diversions, although all three diversions have low-level pipes.

Medium Reservoirs

Sediment is excavated from Middle Fork Interbay and Ralston Afterbay on an as-needed basis using earth moving equipment (i.e., backhoe or excavator). In addition to earth moving equipment, a drag line or dredge may be employed. Excavated material is hauled to a suitable nearby disposal site.

Since the MFP has been constructed, four sediment removal projects have been completed at Middle Fork Interbay (1987, 1988, 1997, and 2000). In 1987, approximately 25,000 cubic-yards of sediment was removed from behind Middle Fork Interbay Dam and deposited at a nearby disposal site. In 1988 approximately 35,000 cubic-yards of sediment was removed from behind the Middle Fork Interbay Dam and deposited at a site approximately 0.8 miles away and 300 feet above the reservoir. In 1997, approximately 16,000 cubic-yards of sediment were excavated and deposited at a rock quarry located approximately 3 miles from the dam. In the fall of 2000 approximately 68,375 cubic-yards of material were removed. Of this, 24,225 cubic-yards were also disposed of at a rock quarry. The remaining 44,150 cubic-yards were initially disposed at Mosquito Narrows, approximately 7 miles from the dam. However, the USDA-FS subsequently crushed this material and used it for road base.

Sediment removal projects have been completed at Ralston Afterbay in nine years since construction of the MFP (1969, 1981, 1984, 1985, 1986, 1989, 1994, 1997, and 2002). In 1969 an unknown amount was removed following a storm. In 1981, 1984, and 1985 small amounts of sediment ranging from 10,000 to 12,000 cubic yards were removed and disposed adjacent to the reservoir. In 1986 two projects were conducted that together removed approximately 125,000 cubic yards of material. Approximately 35,000 cubic-yards were removed in 1989 and 65,000 cubic-yards in 1997. In 2002, 88,000 cubic-yards was removed from Ralston Afterbay. These projects have primarily involved the removal of coarse material such as cobbles or larger material from the upper portions of the Ralston Afterbay.

Hydraulic sluicing has been used at both the Middle Fork Interbay Dam (although not since 1976) and Ralston Afterbay Dam. Hydraulic sluicing (implemented on an as-needed basis) uses the force of water to remove fine sediment from behind a dam to keep the intake structures clear and ensure efficient operation.

Ralston Afterbay Sediment Management Project (Pilot Project)

In 2002, PCWA initiated a Pilot Project at Ralston Afterbay to investigate options for long-term sediment management. The first objective of the project was to remove sediment from the afterbay to maintain operational flexibility of Ralston Afterbay Dam and Oxbow Powerhouse and to recover lost storage capacity. The second objective was to improve the natural downstream migration of coarse and fine sediments in the Middle Fork American River below Ralston Afterbay Dam to improve fish habitat. These

objectives were to be met via two project components: (1) removal of approximately 88,000 cubic-yards of sediment from the reservoir in 2002, with placement of 48,000 cubic-yards of these sediments at a 1.96 acre site at Indian Bar, located immediately adjacent to the Middle Fork American near Oxbow Powerhouse (the remaining sediment was deposited at the Ralston Ridge Sediment Disposal Site); and, (2) implementation of a sediment pass-through program.

In 2002, sediment removed from Ralston Afterbay was placed at Indian Bar in a configuration that would allow the sediments to entrain into the Middle Fork American River, naturally during peak flows in the river. In 2005, high flows below Ralston Afterbay mobilized sediment and transported it downstream. Comparison of pre- and post- Project macroinvertebrate and sediment data collected in the river reach downstream of Indian Bar will be summarized in a report available in 2008.

The second project component, consisting of re-operating the dam during high flow to allow for a greater proportion of the river's suspended sediment load to pass through the Ralston Afterbay rather than depositing in the afterbay. The goal of this component is to preserve the reservoir capacity for a longer period of time, reducing the frequency at which sediment excavation needs to occur in the afterbay, and to improve the natural migration of river sediments. This component of the pilot project will be initiated and monitored in future years.

3.3.4 Erosion and Falling Rock Control

PCWA applies gunite and uses slope fences at certain locations to protect Project facilities and ensure public/worker safety from erosion and falling rocks. These measures are summarized below.

Gunite

Gunite is a mixture of sand, cement, and water which is applied to a surface using a high-pressure hose. Gunite is used on an infrequent basis on the Middle Fork Powerhouse Penstock to prevent erosion on the steep slopes beneath the penstock.

Slope Fences

Slope fences have been installed to prevent damage from falling rocks at the following Project locations: French Meadows Powerhouse and Switchyard, Middle Fork Powerhouse and Switchyard, Middle Fork - Ralston Tunnel Butterfly Valve House, Middle Fork - Ralston Tunnel Surge Shaft and Tank, Middle Fork Interbay Dam, Ralston Powerhouse and Switchyard, and Oxbow Powerhouse and Switchyard. Little maintenance is required on slope fences. PCWA removes large rocks trapped in the fences on an as-needed basis.

3.3.5 Debris Management

Debris management activities include removal of large woody debris at Project reservoirs and diversion pools, removal of small debris from trash racks at Project

intakes, and installation of log booms at Project reservoirs. Table SD B-8 summarizes the location and frequency of these activities at Project facilities.

Large woody debris can accumulate in Project reservoirs and diversion pools. PCWA manages woody debris accumulations at the Middle Fork Interbay and Ralston Afterbay by opening upper level gates on an infrequent basis to allow for the passage of woody debris. Woody debris that accumulates in Hell Hole Reservoir near the dam is gathered and burned on an infrequent basis when sufficient staff are available. If staff are not available, the woody debris, which does not affect dam operations, is left in the reservoir.

PCWA also routinely removes debris that build up on the trash racks at Project intake structures. Trash racks are located at Project intakes at the Duncan Creek Diversion, North and South Fork Long Canyon diversions, Middle Fork Interbay, and Ralston Afterbay. Floating log booms have also been installed to control debris accumulation on Project dams and protect public safety at the Duncan Creek Diversion, French Meadows Reservoir, Hell Hole Reservoir, Middle Fork Interbay, and Ralston Afterbay.

3.3.6 Road Maintenance and Snow Removal

PCWA conducts routine road maintenance activities, including road grading, surface maintenance (gravelling or paving), snow removal and/or road sanding, and maintenance of culverts, ditches, and water bars, on an as-needed basis. Other maintenance activities that occur along Project roads and trails include vegetation management, and the maintenance of signage and gates. Table SD B-5 provides information on the location, length, and surface for all Project roads and trails, as well as the type and frequency of maintenance activities conducted along each road and trail.

During the winter, PCWA voluntarily conducts snow removal activities on Mosquito Ridge Road (Forest Route 96) up to its intersection with the Middle Fork Interbay Dam and Powerhouse Road and Ralston Ridge Road (Forest Route 25) up to approximately Craggins Mine to maintain access to Project facilities at lower elevations. When necessary, these activities are conducted according to USDA-FS snow removal standards. PCWA maintains two trucks with scraping blades at Foresthill and a road grader at the Ralston Powerhouse for this duty.

3.3.7 Other Maintenance Activities

Other Project maintenance activities conducted by PCWA include facility painting, utility pole replacement, and recreation water supply chlorination. Each of these is described below and summarized in Table SD B-7 or SD B-8.

- PCWA paints the exterior of Project facilities, including metal power poles, surge shafts and tanks, penstocks, butterfly valve houses, removable sections, and Project buildings, cottages, and dormitories. Facility painting at recreation facilities, including water supply tanks, restrooms, signboards, and picnic tables is conducted on as-needed basis by USDA-FS under agreement with PCWA.

- PCWA replaces damaged power and communication line poles as necessary. New poles are placed in or immediately adjacent to previously existing holes, using line trucks. Helicopters are used if line trucks are unable to access locations where power or communication line poles need to be replaced.
- Project recreation facility water supplies are maintained each year by USDA-FS under the Collection Agreement between PCWA, ENF and TNF. This includes draining of the water supply tanks and pipes during the fall each year and cleaning of the system each spring with chlorine prior to the peak recreation season.

4.0 EXISTING ENVIRONMENTAL PROGRAMS, MEASURES OR FACILITIES

The following section summarizes, by major resource category, existing programs, measures or facilities maintained by PCWA for the protection and enhancement of the watershed resources.

4.1 WATER AND AQUATIC RESOURCES

- Minimum Instream Flow Requirements

  PCWA provides minimum instream flow releases in accordance with existing FERC License conditions. Refer to Section 5.0 for a description of minimum instream flow requirements at Project facilities.

- Project Gaging Stations

  PCWA maintains a network of stream, diversion, reservoir, and powerhouse gaging stations to monitor and record flow releases, flow diversions, and water storage at Project facilities. This network consists of 11 stations that measure flow in streams or at diversions, six stations that measure reservoir elevation and storage at Project reservoirs, and four stations that report flows through Project powerhouses. Refer to Table SD B-1 for a list of Project gaging stations.

4.2 RECREATION RESOURCES

- Maintain Project Recreation Facilities

  PCWA provides the USDA-FS with a portion of the funds to operate and maintain Project recreation facilities. These funds are provided through a Collection Agreement between PCWA and USDA-FS Tahoe National Forest and Eldorado National Forest (#03-CO-11051754-014 2003 and Amendments).

- Coordinate Project Operations to Enhance Recreation Opportunities in the Middle Fork American River below Oxbow Powerhouse
  - Whitewater Boating

    PCWA and PG&E coordinate with representatives from California Department of Parks and Recreation and the local commercial whitewater boating industry to schedule MFP operations to enhance whitewater recreation in the Middle Fork American River below Oxbow Powerhouse. Whitewater boating releases are

scheduled on a voluntary basis such that they do not compromise power generation.

When whitewater flows are provided, the flows typically occur on weekends from June through Labor Day during late morning (10 or 11 a.m.) to early afternoon (3 or 4 p.m.). These flow releases (approximately 950 to 1,000 cfs) are made from Oxbow Powerhouse. On summer weekdays, Project operations are voluntarily modified to accommodate commercial whitewater boating by releasing water one to two hours earlier (10-11 am) than would normally occur to meet peak energy demand. Over the past six years limitation of summer flow releases for whitewater boating has only occurred in two dry years (2001 and 2007).

- Trail Events

  Flows are also voluntarily reduced in the Middle Fork American River below Oxbow Powerhouse for two annual competitive long-distance trail events (the Western States 100 mile Endurance Run and Western States Trail Ride), whose routes cross the river at Poverty Bar. During the races, Project operations are modified, to the extent practicable, to reduce flow release into the river and facilitate river crossings by race participants.

4.3 LAND MANAGEMENT

- Maintain Roads

  PCWA maintains all Project roads and trails that provide exclusive access to MFP facilities. Specific maintenance activities conducted by PCWA on Project roads and trails are listed on Table SD B-5. In addition, PCWA has voluntarily conducted snow removal activities in the winter on Forest Route 96 and Forest Route 25 to maintain access to Project facilities at lower elevations (see Section 3.3.6).

  PCWA has a Forest Road Agreement with the TNF and ENF regarding the maintenance of non-Project general access roads in the vicinity of the MFP. The initial road agreement (Agreement No. 80.1-AG-041988-428) was signed on September 17, 1988. It was revised on April 9, 2007 (Agreement No. 07-RO-11051754-006). As part of the revised agreement, PCWA:

  - Notifies the USDA-FS whenever it intends to take actions, other than normal day-to-day travel, that may significantly affect the use or maintenance of a USDA-FS Road
  - Meets annually with the USDA-FS to develop a maintenance plan for USDA-FS roads. Each party is responsible for the cost of road maintenance made necessary by its respective use of the roads
  - Incorporates up-to-date USDA-FS maintenance standards into each annual maintenance plan

- Implement the Spill Prevention Control and Countermeasure Plan

  PCWA implements a Spill Prevention Control and Countermeasure Plan to address and minimize the potential for fuel and other hazardous material spills. This plan is revised every five years, and describes procedures and available equipment for mitigation of any fuel or other hazardous materials that might occur. PCWA also has specific provisions for periodic inspections of all oil-containing equipment and devices to prevent spilled oil from escaping Project buildings and grounds. In addition, all oil transfer operations follow applicable United States Department of Transportation (USDOT) regulations.

- Implement Fire Plans

  PCWA develops and implements a Fire Plan for each project or activity that it undertakes. These plans outline the responsibilities and measures for fire prevention, detection and reporting, and suppression during planned field activities for the duration of each declared fire season, or when ground litter and vegetation will sustain combustion causing the spread of fire.

  Each plan also includes initial attack and reporting procedures that must be followed in the event of a fire within or adjacent to the Project area or resulting from PCWA Project operations on USDA-FS lands. Specific guidelines for required tools and equipment for fire fighting activities are outlined in the plan. The plan also includes guidelines under which construction activities will be curtailed or shut down.

- Implement the Emergency Action Plan

  PCWA maintains an Emergency Action Plan (EAP) to provide early warning to downstream recreational users, dam operators, and other persons who might be affected by an impending or actual sudden release of water from Hell Hole Reservoir, French Meadows Reservoir, or Ralston Afterbay. This EAP, which is updated at least every five years, includes flowcharts of notification and plans for evacuation in the event of an emergency as well as maps of potential inundation areas resulting from dam failure.

  An annual drill is conducted to satisfy the Code of Federal Regulations Part 12.25(b), which states, “Each licensee or applicant must annually test the state of training and readiness of key licensee or applicant personnel responsible for responding properly during a project emergency to ensure that they know and understand the procedures to be followed throughout a project emergency.”

5.0 CURRENT FERC LICENSE REQUIREMENTS AND WATER RIGHTS

PCWA operates the MFP in accordance with the FERC license, specific water rights permits, and other operating agreements. A summary of pertinent license and water rights requirements related to on-going operations of the MFP are described below. Other operating agreements are described in Section 6.0.

5.1 FERC LICENSE REQUIREMENTS

The MFP was constructed and operates under FERC Project No. 2079 license that was issued on March 13, 1963. This discussion summarizes only terms and conditions related to ongoing operations of the Project (construction-related requirements are excluded). A complete copy of the existing FERC license and amendments is available at PCWA's publicly-accessible Internet website http://relicensing.pcwa.net/ and at a Resource Library, located at the PCWA Business Center, 144 Ferguson Road, Auburn, California.

The current license contains provisions that establish minimum pool requirements for Hell Hole and French Meadows reservoirs and Duncan Creek Diversion Pool. In addition, the license identifies minimum instream flow (MIF) requirements downstream of Project diversions. Table SD B-9 summarizes the current minimum pool and MIF requirements. The license also requires PCWA to annually submit accurate flow and storage records from Project gaging stations to the USGS. The two tainter gates in the French Meadow Spillway must also remain open annually from November 15 to April 1.

The FERC license required development of a recreational plan which was submitted to the FERC on April 11, 1967. The plan specified construction of recreation facilities near Project reservoirs by PCWA. Following a request by FERC for revision to clarify PCWA's responsibility for operations and maintenance of the facilities and some changes to the facilities, PCWA submitted a revised plan. The Revised Recreation Plan was approved by FERC and the License was amended by FERC Order dated April 27, 1992. Table SD B-6 describes the Project recreation facilities and features developed under this plan.

5.2 WATER RIGHTS

PCWA currently has five water rights permits and one license issued by the California State Water Rights Board (now the California Sate Water Resources Control Board - SWRCB) related to the MFP. The water rights permits allow for the diversion and storage of water for consumptive use, power production, and incidental recreation. PCWA holds the necessary water rights to fully utilize all the capacity of MFP facilities. In addition, PCWA also holds sufficient water rights to meet current and reasonably foreseeable future consumptive water demand in Placer County.

State Water Resource Control Board Permits

On January 10, 1963, the SWRCB issued four permits: Nos. 13855, 13856, 13857, and 13858 to PCWA for the MFP. These permits provide for direct diversion and off-stream storage of waters from Duncan Creek, Middle Fork American River, Rubicon River, and the North and South Forks of Long Canyon Creek. These permits were issued for two types of beneficial use: (1) power and incidental recreation; and (2) irrigation and incidental domestic, recreational, municipal, and industrial. Permit No. 18380 was issued to the PCWA for diversions to the Hell Hole Powerhouse. This permit was reissued as License No. 12644 on May 17, 1990. PCWA also received Permit No.

20754 on August 18, 1994 to allow for the diversion of additional water for operation of the Hell Hole Powerhouse.

These permits and license also require:

- Protection of water quality and aquatic species;
- Public access to Project lands and water;
- Minimum pool and minimum instream flow requirements as described in Table SD B-9; and
- Minimum instream flows of 75 cfs below PCWA's American River Pump Station.

Key provisions of the permits relevant to the operations of the MFP are summarized in Table SD B-10.

PCWA's current water rights are scheduled to be reviewed by the SWRCB beginning in December 2007. PWCA plans to file petitions for extension of time to fully develop use under the consumptive water rights (permits 13856 and 13858) with the SWRCB prior to December 1, 2007. PCWA does not expect to file such petitions for permits 13855 and 13857 (power water rights) since these water rights have been fully utilized.

6.0 OPERATING AGREEMENTS

Operating agreements that influence MFP operations include a power purchase contract and several water supply contracts related to the sale and delivery of consumptive water. Each agreement is described below.

6.1 POWER SALES CONTRACT

The electrical output of the MFP is contractually obligated to PG&E pursuant to the Middle Fork Project Power Purchase Contract, dated April 30, 1963. This contract includes limits on the timing of water diversion for consumptive use from the MFP. The limits for monthly diversions of consumptive water from the MFP (at the American River Pump Station or Folsom Reservoir) as a percent of total allowable annual diversions are;

Month	Percent of Total Allowable Diversion
January	0%-5%
February	0%-5%
March	2%-6%
April	5%-10%
May	9%-16%
June	12%-19%
July	13%-19%
August	13%-16%
September	12%-13%
October	4%-8%
November	0%-6%
December	0%-5%

6.2 WATER SUPPLY CONTRACTS

PCWA has contracts with USBR, San Juan Water District, the City of Roseville, and Sacramento Suburban Water District (formerly the Northridge Water District) regarding the sale and delivery of water from the MFP.

PCWA's contractual relationship with USBR is defined in four agreements: (1) the February 20, 1963 contract which pertains to construction and operation of MFP reservoirs and PCWA's rediversion of water; (2) the 1970 Water Service Contact (as amended in 2002) wherein USBR agrees to provide water from the Central Valley Project to PCWA, (3) the 1977 Land Purchase Contract in which USBR agrees to provide for the rediversion of MFP water to PCWA; and (4) the 2002 contract related to the American River Pump Station.

Key provisions of the water supply agreement between PCWA and USBR that are germane to the operations of the MFP include:

- PCWA is limited to a total diversion of 120,000 ac-ft per year from the Middle Fork American River for consumptive use.
- The rediversion of water for consumptive use at the American River Pump Station requires hourly MFP system balancing to meet continuous minimum instream flow requirements below the pumping station. Whereas in regard to the withdrawal of consumptive water from Folsom Reservoir, USBR allows for a 30-day balancing of supply and demand, therefore those hourly or even daily releases from the MFP do not need to explicitly match consumptive deliveries from Folsom Reservoir.
- In dry years, when total flow into Folsom Reservoir is forecasted by California Department of Water Resource (DWR) to be less than 600,000 ac-ft, PCWA may be required to make releases to ensure that the total quantity of water stored in the MFP reservoirs at the end of the year is no more than at the beginning of the year.
- In dry years, PCWA may also be required to release sufficient water during the months of July through December such that the total quantity of water stored in MFP reservoirs at the end of each month is no more than the quantity stored at the beginning of the each month.
- PCWA may, subject to certain limitations, withdraw up to 35,000 ac-ft from USBR's Central Valley Project at Folsom Reservoir or other locations as mutually agreed.

The water supply agreements between PCWA and local water districts provide for delivery of up to 84,000 ac-ft of water annually from the MFP (diverted at Folsom Reservoir) including:

- San Juan Water District - up to 25,000 ac-ft,
- City of Roseville - up to 30,000 ac-ft, and
- Sacramento Suburban Water District - up to 29,000 ac-ft if not required to meet PCWA customer needs in western Placer County.

6.3 WATER FORUM AGREEMENT

PCWA is a member of the Water Forum, which is a regional group of water purveyors, water users, environmental groups, and business interests focused on responsible water use planning for the Sacramento - Placer region. The Water Forum participants have produced a set of agreements outlining water use goals, obligations, and limitations for the American River Watershed.

PCWA's commitment within the framework of these agreements includes limiting its total water usage from the MFP to amounts commensurate with their water rights and water supply contracts. In addition, PCWA has committed, under certain conditions, to release up to 47,000 ac-ft in years to augment flows in the Lower American River, when the total unimpaired inflow into Folsom Reservoir from March through November is expected to be less than 950,000 ac-ft.

7.0 PROJECT OPERATIONS

This section provides an overview of MFP operations. Included are discussions of PCWA's operating objectives and operation of Project facilities during different periods of the annual operating cycle. This section ends with a description of key operating characteristics of the MFP that allow PCWA to meet its operating objectives and a discussion of possible changes to operations that may occur during the next licensing period.

7.1 OPERATIONS OBJECTIVES

The MFP has been operated for over forty years by PCWA as a multi-purpose project to benefit the people of Placer County. The MFP is operated with respect to four objectives, as follows:

- Meet FERC license requirements that protect environmental resources and provide for recreation;
- Meet the consumptive water demands of western Placer County;
- Generate power to help meet California's energy demand and provide valuable support services required to maintain the overall quality and reliability of the state's electrical supply system; and
- Maintain Project facilities to ensure their continued availability and reliability.

7.1.1 Meet License Requirements

PCWA operates the MFP to meet current FERC license requirements that require releases from Project dams and diversions to maintain minimum flows in streams and rivers below Project diversions. These requirements are described in Section 5.0

7.1.2 Meet Consumptive Water Demand

PCWA provides water for consumptive uses to western Placer County from water diverted and/or stored at MFP facilities. Deliveries to meet consumptive demand vary from month to month but follow a general seasonal pattern as shown on Figure SD B-3. Demand is typically lowest during the winter then increases in the early summer to meet irrigation and landscape needs and remains high through the summer. Demand then decreases again in the fall and winter months. Consumptive demand proportionally increases in drier years and decreases in wet years.

PCWA has up to 120,000 ac-ft of water available annually from the MFP for consumptive use and expects to utilize its full allocation during the term of the new FERC license. In drier years, when less water is available in storage, MFP releases to meet consumptive demand will require a larger portion of the available water in storage and may shift the timing of generation slightly to coincide with planned water deliveries. In wetter years, when water in storage is greater, releases can be scheduled to meet both consumptive water demand and peak energy demand.

7.1.3 Generate Power

The MFP has sufficient reservoir storage capacity to operate some, but not all of the hours in a year, so the powerhouses are scheduled to operate at select times. By scheduling energy generation to occur during periods of peak energy demand, the greatest benefit from MFP power generation is realized.

The typical pattern of seasonal energy demand in Northern California is shown in Figure SD B-4. Demand is generally highest in the summer and early fall although a modest rise also occurs in the winter period. Energy demand also varies during different days of the week and hours of the day. Figure SD B-5 illustrates differences in energy demand during the week. Typically, energy demand is higher on weekdays than weekends. Within a day, demand is typically highest in the late afternoon and early evening. Figure SD B-5 also compares the timing of MFP generation with timing of typical peak energy demand. The extent that MFP generation can occur during peak energy demand periods is constrained by water available and physical capacities of Project facilities. In drier years, when less water is available for generation, the hours of daily operation are reduced. In wetter years the hours of daily operation are increased.

At some times MFP generation facilities are run irrespective of the need for peak energy generation. This may occur when water is moved through the system to balance the storage reservoirs during the fill period or to move water from French Meadows Reservoir to Hell Hole Reservoir during the summer. At these times MFP provides base load energy to the state's energy system.

An important characteristic of hydropower generation is its ability to be brought into service very rapidly or shutdown quickly, as hourly and daily energy demands change. This characteristic allows the MFP to follow daily and hourly load requirements to match

peak energy demand and to provide voltage support, spinning reserve and other services (ancillary services) to the states energy supply system.

7.1.4 Maintain Project Facilities

The MFP must be shutdown for maintenance for a limited time each year (see Section 3.1). During this period, Middle Fork Interbay and Ralston Afterbay are often partially drained, facilities (powerhouses, spill gates, etc.) are inspected, and routine maintenance is performed.

7.2 MFP OPERATIONS

Project operations for water supply and electric power generation are constrained by regulatory and contract requirements, the physical capacities of the Project facilities, and water availability. Regulatory and contract requirements include conditions imposed by the FERC license, water rights permits, water delivery contracts, and the existing power purchase contract with PG&E. Water availability is influenced by carryover storage in the Project reservoirs and the timing and quantity of annual runoff.

Typical annual operation of the Project results in the capture of runoff which is diverted to increase storage in French Meadows and Hell Hole reservoirs in the winter and spring (filling period), and drawdown of the reservoirs during the summer, fall, and early winter (release period). Operation of the MFP varies from year-to-year based on the timing and magnitude of spring runoff, which is influenced by the amount of winter snow pack, ambient temperature conditions, and precipitation.

The amount of water annually available for capture and storage based on runoff into Project diversions and reservoirs varies substantially from year to year. Total MFP inflow (combined flows from Duncan Creek, Middle Fork American River, Rubicon River, and Long Canyon Creek) from 1967 to 2003 is shown on Figure SD B-6. During this period, total inflow has averaged approximately 375,000 ac-ft and ranged from a low of approximately 62,000 ac-ft to a high of more than 783,000 ac-ft per year (more than a 10 fold difference). The high variability of historical inflow is one of the most important factors influencing annual MFP operations.

During the filling period (winter and spring), flows through the MFP powerhouses are highly dependent on projected and actual runoff conditions and are used to manage the runoff to maximize capture of water for storage. In drier years, power releases are minimized during the filling period to increase the volume of water in storage to meet upcoming summer consumptive use and peak power demands. In wetter years, power releases during the filling period are increased to minimize spills from the reservoirs. In years, when minimum storage levels to meet consumptive demands are reasonably assured and the chance of spilling is low, power releases are adjusted through the filling season based on the volume of water in storage, projected runoff, and current and projected power demands. Because the water available from runoff varies significantly from one year to the next the amount of water held in storage at the end of the filling period (July 1st) also may vary significantly. Figure SD B-7 shows combined reservoir

storage levels from 1967 through 2007 and spills during the same period. This graph shows that water in storage varied from a low or approximately 150,000 ac-ft in 1977-1978 to a high of approximately 350,000 ac-ft in a number years.

During the release period (summer and fall), after the reservoirs have reached their maximum storage capacity, monthly releases for generation are largely predictable for the remainder of the year. However, daily and hourly releases for generation, which respond to demand for electricity and electrical grid reliability, remain highly variable. During the release period, flows are managed to: (1) meet storage and flow license requirements; (2) meet consumptive water supply requirements; (3) optimize power generation to meet peak electrical demand; and (4) achieve end of year carryover target storage levels.

Decisions on the extent of the drawdown and the carryover target storage level are based on balancing competing needs including: (1) providing sufficient reservoir storage space to minimize potential spills from the reservoirs during the next filling period if the runoff is high (wet year); and (2) retaining enough water in storage to ensure that license requirements and consumptive demands can be met in the following year if the next filling period runoff is low (dry year).

Water supply operations take priority over power generation operations. However, in all but dry years, current water supply demands are easily met as a by-product of power generation. The reason is that both consumptive water and electrical demands tend to coincide seasonally and the MFP generally controls and releases far more water annually than PCWA requires to meet its consumptive water demand. The majority of PCWA's consumptive deliveries are withdrawn from Folsom Reservoir, where the Bureau of Reclamation allows for a 30-day balancing of supply and demand, thus hourly or even daily releases from MFP do not need to explicitly match consumptive deliveries from Folsom Reservoir. Only the rediversion of water for consumptive demand at the American River Pump Station near Auburn (maximum 100 cfs) requires hourly MFP system balancing to meet continuous minimum instream flow requirements below the pumping station.

The Middle Fork and Ralston powerhouses are the heart of MFP generation. These two powerhouses generally run in tandem, using water transported from Hell Hole Reservoir to Ralston Afterbay. Together the two powerhouses have a rated capacity of 201.6 MW and produce about 90% of the MFP annual generation. Although Middle Fork Interbay is located between these powerhouses, Middle Fork Interbay has little ability to re-regulate flows because of its small storage capacity (175 ac-ft). If the flows through the Middle Fork and Ralston powerhouses are not matched, Middle Fork Interbay would be either drained or overtopped very quickly.

These powerhouses, running in tandem, are often used to help maintain reliable operations of the transmission grid by fine-tuning the flow of electricity in the grid to balance supply and demand. When operated to provide grid regulation, flow rates through the powerhouses vary quickly to meet constantly changing energy supply and demand conditions. These powerhouses are also frequently block loaded. When block

loaded, flows through the powerhouses are usually set at an efficient operating level and run for a prescribed number of hours per day depending upon hydrology.

French Meadows Powerhouse is used when water is moved from French Meadows Reservoir to Hell Hole Reservoir. It is nearly always operated in block loaded condition with the duration of the block of operation set depending on the volume of water to be moved.

Ralston Afterbay and Oxbow Powerhouse are the final steps in the MFP system. Oxbow Powerhouse frequently runs in tandem with Middle Fork and Ralston powerhouses. Presently, water is released from Oxbow Powerhouse to the Middle Fork American River at the same rate it enters Ralston Afterbay. However, Ralston Afterbay has sufficient operational storage capacity (about 1,200 ac-ft out of 2,782 ac-ft gross) to allow Oxbow Powerhouse to operate independently of Middle Fork and Ralston powerhouses for several hours at a time. This independent operational flexibility is used to meet the ramping rate requirement downstream of Oxbow Powerhouse, and to make weekend releases for whitewater rafting without requiring operations of the Middle Fork and Ralston powerhouses.

The total water available and physical capacity of the MFP limits the timing and number of hours of generation in a given year. In drier years, when less water is available, generation is concentrated during the summer and early fall as shown on Figure SD B-8 (1987-1992). In wetter years, generation occurs throughout the year as shown on Figure SD B-9 (1995-1998). If the MFP powerhouses are operated at full flow, generation may be limited to an average of approximately five to six hours per day during a dry year. While in a wet year, the powerhouses may be operated at full flow for 17 hours or more per day. Over its history, the average available water has allowed the MFP to produce approximately 50% of the maximum generation possible in a year.

7.3 KEY OPERATING CHARACTERISTICS

There are five key operating characteristics of the MFP that allow PCWA to meet its operating objectives. These characteristics are:

- Storage Flexibility - The flexibility to raise and lower reservoir levels (water storage) at different rates and times throughout the year subject to minimum storage level requirements. This flexibility allows:
  - Reasonable rates of drawdown through the summer to meet consumptive water demands and generate during periods of peak energy demand
  - Evacuation of sufficient reservoir storage space in the fall to provide adequate storage capacity to manage the following spring runoff with minimum potential for spill
  - Higher levels of drawdown of the reservoirs under drought conditions so that consumptive water supply needs can be met and modest energy production levels can be achieved

- Combined Operation of Middle Fork and Ralston Powerhouses - The ability to operate the Middle Fork and Ralston Powerhouses at the same time over a range of flows and schedule periods. This capability is limited only by: (a) powerhouse maximum flow capacity, (b) minimum storage requirements in upstream reservoirs, and (c) flows necessary to meet minimum instream flow requirements
- Operation of Oxbow Powerhouse and Ralston Afterbay - The ability to fluctuate Ralston Afterbay on a daily basis over a range of storage levels, so that releases to the Middle Fork American River below Oxbow Powerhouse meet minimum instream flow requirements and provide whitewater boating recreational opportunities without requiring operation of Middle Fork and Ralston powerhouses
- Meet the Combined Patterns of Water and Energy Demand - The ability to meet the seasonal combined patterns of consumptive water demand and peak energy demand and weekly/daily peak energy demands. To meet these combined patterns of demand, the MFP must have:
  - The ability to release water from storage for downstream delivery at all times of the year in response to consumptive demand patterns
  - The ability to vary on a daily and hourly basis, releases through Middle Fork and Ralston powerhouses for power generation in response to changing electrical demand, grid needs, and water supply conditions
- Fall Maintenance - The ability to shutdown operations during the fall, after the peak energy and water supply demand period and during favorable runoff and weather conditions to perform annual maintenance

7.4 FUTURE OPERATIONS

7.4.1 FERC License Protection Mitigation and Enhancement Measures

PCWA anticipates that the relicensing process may result in changes to required minimum instream flow releases and other current license conditions to further protect and enhance environmental resources affected by MFP operations. Changes to current license conditions may require some alteration to current MFP operations. However, the type and extent of any such changes cannot be determined until the specific license conditions are identified.

7.4.2 Changes in Consumptive Demand

PCWA has been allocated up to 120,000 ac-ft of water to meet consumptive demand needs in Placer County. PCWA expects that population growth and net changes in consumptive use patterns will increase consumptive use in the future. Therefore, within the next licensing period, the entire 120,000 ac-ft allocation will be required to serve western Placer County.

7.4.3 Global Warming

Recent discussions regarding global warming suggest that annual temperature patterns, the amount and type of precipitation (rain vs. snow), and the timing and volume of spring runoff may change in the future. To the extent that long-term temperature and precipitation patterns vary from the current record, MFP operations may need to be changed. For example, if water storage in the snow pack is reduced by warmer winter temperatures and runoff occurs earlier in the year, then carryover storage targets and reservoir management during the reservoir filling period may need to be altered. If climate change increases the frequency of dry and critical dry water years, then changes in carryover storage targets will need to be adjusted to ensure sufficient water supply to meet future regulatory requirements and consumptive demand. These changes may also affect the total amount and timing of energy production from the MFP.

8.0 PROJECT GENERATION AND OUTFLOW RECORDS

Actual MFP generation and outflow for each powerhouse (annually and by quarter) is summarized on Table SD B-11 for the years 2001 through 2005. Average monthly energy production for each powerhouse for the year 2001 through 2005 is summarized in Table SD B-12. This summary presents that last five complete years of available records for MFP operation. During this period, annual generation ranged from 584,040 MWh to 1,082,922 MWh.

9.0 CURRENT NET INVESTMENT

The net book value of the MFP, which is the historical cost less accumulated depreciation, is estimated to be about $91.5 million, as of January 2006.

10.0 COMPLIANCE HISTORY

10.1 FERC INSPECTIONS

PCWA actively operates and maintains the MFP to ensure compliance with terms and conditions in the FERC license. The FERC conducts two types of inspections of the MFP to verify license compliance. Annual Operating Inspections by a qualified engineer are conducted to verify that the Project is being properly maintained to ensure the continued safety of the structures; that no unauthorized modifications have been made to the Project; and that the Project is being operated efficiently and safely and in compliance with the terms and condition in the license. Additionally, FERC also conducts periodic Environmental and Public Use Inspection (EPUI), usually every 3-5 years) to provide a thorough inspection of the public use resources, cultural resources, fish and wildlife resources, other resources, and public safety requirements contained in the license articles. At this time, inspectors review both the physical and operational features of the Project's environmental/public use facilities and review compliance with all applicable license requirements that can be evaluated in the field.

Recent annual Inspection Reports and FERC correspondence (2000-2006) were reviewed by PCWA during preparation of the PAD. In each case, PCWA received a positive report as illustrated by the summary of the 2003 Inspection Report which stated:

> *"All project facilities, including all dams, diversions, and powerhouses, were inspected during the 2003 inspection. The project was observed to be well maintained and in overall good condition. The licensee's inspection and monitoring program has kept the project relatively free of major dam safety issues."*

The 2003 Inspection Report also provided a summary of the September 2000 Environmental and Public Use Inspection (EPUI). The Inspection Report states:

> *"The licensee was found to have complied with the public use, cultural, biological, environmental, and Part 8 requirements. There were some minor issues that were identified as needing repair. All of the follow-up action items have been corrected by the licensee."*

10.2 GATE TESTING

FERC requires partial operation of spillway gates annually, and to full design height at least once every five years. This testing is performed at French Meadows Dam, Middle Fork Interbay Dam, and Ralston Afterbay Dam. At the end of each calendar, PCWA submits an Annual Spill Gate Testing Report to PCWA demonstrating license compliance.

10.3 INCIDENT REPORTING

PCWA carefully monitors operations and maintenance of the MFP and reports to FERC, in writing, any potential deviations in compliance with license terms and conditions. Since 1987, PCWA has filed 44 reports to FERC regarding deviations from existing license requirements. In each case, these deviations were corrected as soon as they were discovered. FERC has reviewed these incidents and determined that all but four were beyond the control of PCWA. In all cases, no penalty or enforcement actions were imposed by FERC. The most frequent cause of these deviations was related to storm events, operator error, or equipment failure or malfunction.

TABLES

Table SD B-1. Project Facilities and Features.

Dams, Reservoirs, and Diversion Pools

Large Dams
French Meadows Dam and Outlet Works
Hell Hole Dam and Outlet Works
Medium Dams
Middle Fork Interbay Dam
Ralston Afterbay Dam
Small Dams
Duncan Creek Diversion Dam
North Fork Long Canyon Diversion Dam
South Fork Long Canyon Diversion Dam
Large Reservoirs
French Meadows Reservoir
Hell Hole Reservoir
Medium Reservoirs
Middle Fork Interbay
Ralston Afterbay
Small Diversion Pools
Duncan Creek Diversion Pool
North Fork Long Canyon Diversion Pool
South Fork Long Canyon Diversion Pool

Water Conveyance Systems

Tunnels
Duncan Creek - Middle Fork Tunnel
French Meadows - Hell Hole Tunnel
Hell Hole - Middle Fork Tunnel
Middle Fork - Ralston Tunnel
Ralston - Oxbow Tunnel
Diversion Pipes and Drop Inlets
North Fork Long Canyon Diversion Pipe and Drop Inlet
South Fork Long Canyon Diversion Pipe and Drop Inlet
Surge Shafts and Adits
Brushy Canyon Adit
Hell Hole - Middle Fork Tunnel Surge Shaft and Tank
Middle Fork - Ralston Tunnel Surge Shaft and Tank
Removable Sections and Portals
Duncan Creek - Middle Fork Tunnel Portal
French Meadows - Hell Hole Tunnel Removable Section
Hell Hole - Middle Fork Tunnel Removable Section
Middle Fork - Ralston Tunnel Removable Section
North Fork Long Canyon Crossing Removable Section
Intakes and Gatehouses
Duncan Creek - Middle Fork Tunnel Intake
French Meadows - Hell Hole Tunnel Gatehouse
French Meadows - Hell Hole Tunnel Intake
Hell Hole - Middle Fork Tunnel Gatehouse
Hell Hole - Middle Fork Tunnel Intake
Middle Fork - Ralston Tunnel Intake and Gatehouse
Ralston - Oxbow Tunnel Intake

Table SD B-1. Project Facilities and Features (continued).

Water Conveyance Systems (continued)
Penstocks and Valve Houses
French Meadows Powerhouse Penstock and Butterfly Valve House
Middle Fork Powerhouse Penstock and Butterfly Valve House
Ralston Powerhouse Penstock and Butterfly Valve House
Powerhouses, Switchyards, and Substations
French Meadows Powerhouse and Switchyard
Hell Hole Powerhouse
Middle Fork Powerhouse and Upper and Lower Switchyards
Ralston Powerhouse and Switchyard
Oxbow Powerhouse and Switchyard
Hell Hole Substation
Gaging Stations and Weirs
Stream Gages and Weirs
Duncan Creek Gage and Weir above Diversion Dam (USGS Gage and Weir No. 11427700)
Duncan Creek Gage and Weir below Diversion Dam (USGS Gage and Weir No. 11427750)
Middle Fork American River Gage and Weir below French Meadows Dam (USGS Gage and Weir No. 11427500)
Middle Fork American River Gage at Interbay Dam (USGS Gage No. 11427770)
Middle Fork American River Gage above Middle Fork Powerhouse (USGS Gage No. 11427760)
Middle Fork American River Gage below Oxbow Powerhouse (USGS Gage No. 11433300)
North Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433085)
South Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433065)
Rubicon River Gage and Weir below Hell Hole Dam (USGS Gage and Weir No. 11428800)
Diversion Gages
North Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433080)
South Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433060)
Reservoir Gages
French Meadows Reservoir Gage (USGS Gage No. 11427400)
French Meadows Reservoir Staff Gage
Hell Hole Reservoir Gage (USGS Gage No. 11428700)
Hell Hole Reservoir Staff Gage
Middle Fork Interbay Reservoir Gage
Ralston Afterbay Reservoir Gage
Powerhouse Gages
French Meadows Powerhouse Gage (USGS Gage No. 11427200)
Middle Fork Powerhouse Gage (USGS Gage No. 11428600)
Oxbow Powerhouse Gage (USGS Gage No. 11433212)
Ralston Powerhouse Gage (USGS Gage No. 11427765)
Leakage Weirs
French Meadows Dam Leakage Weirs Nos. 1 -- 6
Hell Hole Dam Leakage Weir
Project Communication Lines and Powerlines
French Meadows Area
French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline
French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline

Table SD B-1. Project Facilities and Features (continued).

Project Communication Lines and Powerlines (continued)
Hell Hole Area
French Meadows Powerhouse to French Meadows Powerhouse Penstock and Butterfly Valve House Communication Line/Powerline
French Meadows Powerhouse and Switchyard to Hell Hole - Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline
Dormitory and Cottages Water Supply Tank Powerline
Hell Hole Powerhouse to Rubicon River Gage and Weir below Hell Hole Dam Communication Line/Powerline
Middle Fork Interbay Area
Middle Fork Powerhouse to Middle Fork Powerhouse Butterfly Valve House Communication Line/Powerline
Middle Fork Powerhouse Butterfly Valve House to Radio Repeater near Hell Hole - Middle Fork Tunnel Surge Tank (underground) Communication Line/Powerline
Middle Fork Powerhouse to Middle Fork - Ralston Tunnel Intake and Gatehouse Communication Line/Powerline
Middle Fork Powerhouse to Middle Fork American River Gage above Middle Fork Powerhouse Communication Line/Powerline
Ralston - Oxbow Area
Ralston - Oxbow Tunnel Intake to Ralston Powerhouse Communication Line
Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline
Ralston Afterbay Dam Generator Building to Ralston - Oxbow Tunnel Intake Communication Line/Powerline
Oxbow Powerhouse to Ralston Afterbay Dam Generator Building Communication Line/Powerline
Photovoltaic Poles and Powerlines
Photovoltaic Poles and Powerline to Duncan Creek Gage above Diversion Dam
Photovoltaic Pole and Powerline at Duncan Creek Gage below Diversion Dam
Photovoltaic Pole and Powerline at Middle Fork American River Gage below French Meadows Dam
Photovoltaic Pole and Powerline at Middle Fork American River Gage above Middle Fork Powerhouse
Photovoltaic Pole and Powerline at North Fork Long Canyon Gage at Diversion Dam
Photovoltaic Pole and Powerline at South Fork Long Canyon Gage at Diversion Dam
Photovoltaic Pole at Middle Fork American River Gage below Oxbow Powerhouse
Microwave Reflectors and Radio Towers
Passive Microwave Reflector Station above Middle Fork Interbay
Radio Communications Tower near French Meadows - Hell Hole Tunnel Gatehouse
Radio Communications Tower and Repeater near Hell Hole - Middle Fork Tunnel Surge Shaft and Tank
Passive Microwave Reflector Station above Ralston Afterbay
Disposal Sites
Duncan Diversion Dam Sediment Disposal Area
North Fork Long Canyon Crossing Sediment Disposal Area
Middle Fork Interbay Sediment Disposal Area
Ralston Ridge Sediment Disposal Area
Indian Bar Sediment Disposal Area
Ancillary Facilities
French Meadows Dam Generator Building
French Meadows Dam Staging Area
Dormitory Facility
Dormitory and Cottages Water Supply Tank

Table SD B-1. Project Facilities and Features (continued).

Ancillary Facilities (continued)
Hell Hole Staging Areas
Operator Cottages and Shop
Ralston Afterbay Dam Generator Building
Storage Building at Middle Fork - Ralston Tunnel Surge Shaft and Tank
Wabena Meadows Snow Course
Miranda Cabin Snow Course
Diamond Crossing Snow Course
Talbot Camp Snow Course
Project Fences
Slope Fences
French Meadows Powerhouse Penstock Rock Fence
French Meadows Powerhouse Slope Fence
Long Canyon Crossing Slope Fence
Middle Fork Powerhouse Upper Switchyard Slope Fence
Middle Fork Interbay Dam Slope Fence
Oxbow Powerhouse Slope Fence
Ralston Powerhouse Penstock and Butterfly Valve House Slope Fences
Ralston Powerhouse Slope Fence
Public Safety Fences
Dormitory Facility Barrier Fence
Hell Hole Dam General Parking Area Barrier Fence
North Fork Long Canyon Crossing Removable Section Barrier Fence
Project Roads and Access Points
Duncan Creek Area
Duncan Creek Diversion Intake Road and Diversion Pool Access Point
Duncan Creek Diversion Dam Road
Duncan Creek Diversion Pool Road and Access Point
French Meadows Area
Duncan Creek - Middle Fork Tunnel Portal Road and Spillway Access Point
French Meadows - Hell Hole Tunnel Gatehouse Road
French Meadows Dam Outlet Works and Leakage Weirs Road
French Meadows Dam Staging Area Road
Middle Fork American River Gage and Weir below French Meadows Dam Road
Hell Hole Area
Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point
Rubicon River Gage and Weir below Hell Hole Dam Road
Hell Hole Dam Leakage Weir Road
Hell Hole Dam Spillway Northern Access Point
French Meadows - Hell Hole Tunnel Portal Road
French Meadows Powerhouse Road
Hell Hole - Middle Fork Tunnel Gatehouse Road
Dormitory Facility Road
Hell Hole Dam Spillway Discharge Channel Road
Long Canyon Area
North Fork Long Canyon Diversion North Road
North Fork Long Canyon Diversion South Road
North Fork Long Canyon Diversion Drop Inlet Road

Table SD B-1. Project Facilities and Features (continued).

Project Roads and Access Points (continued)

Long Canyon Area (continued)
South Fork Long Canyon Diversion and Drop Inlet Road
North Fork Long Canyon Crossing Removable Section North Road and Parking Area
North Fork Long Canyon Crossing Removable Section South Road
Middle Fork Interbay Area
Middle Fork Powerhouse Butterfly Valve House Road
Middle Fork Powerhouse Penstock and Butterfly Valve House Road
Middle Fork Interbay Dam and Powerhouse Road and Interbay Access Points
Middle Fork Powerhouse Upper Switchyard Road
Ralston-Oxbow Area
Brushy Canyon Adit Road
Oxbow Powerhouse Road
Ralston Powerhouse Butterfly Valve House Road
Ralston - Oxbow Tunnel Intake Road
Ralston Afterbay Road and Boat Ramp
Ralston Afterbay Dam Road and Afterbay Access Point
Ralston Afterbay Sediment Removal Access Point

Project Trails

Duncan Creek Area
Duncan Creek Diversion Dam North Trail
Duncan Creek Diversion Dam South Trail
Photovoltaic Poles and Powerline to Duncan Creek Gage above Diversion Dam Trail
Duncan Creek Gage and Weir above Diversion Trail
Duncan Creek Gage and Weir below Diversion Trail
French Meadows Area
Middle Fork American River Gage and Weir below French Meadows Dam Trail
Middle Fork Interbay Area
Middle Fork American River Gage above Middle Fork Powerhouse Trail
Passive Microwave Reflector Station above Middle Fork Interbay Trail
Ralston Afterbay Area
Passive Microwave Reflector Station above Ralston Afterbay Trail
Middle Fork American River Gage below Oxbow Powerhouse Trail

Table SD B-2. Project Recreation Facilities and Features.

Project Recreation Facilities

French Meadows Area
Ahart Campground
Coyote Group Campground
Poppy Campground
French Meadows Campground
Gates Group Campground
Lewis Campground
French Meadows Picnic Area
McGuire Picnic Area
French Meadows Boat Ramp
McGuire Boat Ramp
Hell Hole Area
Big Meadows Campground
Hell Hole Campground
Upper Hell Hole Campground
Hell Hole Vista
Hell Hole General Parking Area
Hell Hole Boat Ramp Parking Area
Hell Hole Boat Ramp
Ralston Afterbay Area
Ralston Picnic Area
Ralston Picnic Area Cartop Boat Ramp
Indian Bar Rafting Access and General Parking
Long Canyon Area
Middle Meadows Group Campground

Project Recreation Facility Features

Project Recreation Facility Water Supplies and Associated Maintenance Trails
Dolly Creek Water Supply
French Meadows Campground Water Supply and Trail
Big Meadows Campground Water Supply and Trail
Middle Meadows Group Campground Water Supply and Trail

Table SD B-3. Project Facility Specifications.

DUNCAN CREEK DIVERSION	
DAM	
Type	Gravity
Material	Concrete
Height of Dam Crest above Streambed	32 ft
Dam Crest Length	165 ft
Volume	1,750 cubic yards
Elevation of Dam Crest	5,275 ft
Elevation of Streambed	5,243 ft
Elevation of Spillway Crest	5,265 ft
Stream Maintenance Pipe Capacity	8 cfs
SPILLWAY	
Type	Uncontrolled Overflow
Width	100 ft
Capacity	7,200 cfs
RESERVOIR	
Gross Storage	20 ac-ft
DUNCAN CREEK – MIDDLE FORK TUNNEL	
Nominal Size / Shape	9 ft x10 ft / Horseshoe
Length:	
Total	7,864 ft or 1.5 miles
Concrete Lined (Est.)	300 ft
Maximum Diversion Capacity	400 cfs
Invert Gradient	0.0029
FRENCH MEADOWS DAM (LL ANDERSON DAM) AND FRENCH MEADOWS RESERVOIR	
DAM	
Type	Composite
Material	Rock and Gravel Fill
Height of Dam Crest above Streambed	231 ft
Dam Crest Length	2,700 ft
Dam Crest Width	32 ft
Elevation of Dam Crest	5,273 ft
Elevation of Streambed	5,040 ft
Elevation of Spillway Crest	5,244.5 ft
Volume	3,510,000 cubic yards
Slopes – Upstream	2:1
Slopes – Downstream	1.8:1 and 2.0:1
Stream Maintenance Pipe Capacity	8 cfs
Maximum Low Level Outlet Capacity at Water Surface 5262 (full reservoir)	1,430 cfs
SPILLWAY	
Type	Gated Ogee Crest
Type of Gates	Radial
Number of Gates	2
Size of Gates	20 ft x 18.5 ft
Capacity (Res. Water Surface 5271.0, 2' freeboard)	19,800 cfs
RESERVOIR	
Maximum Operating Water Surface	5,262.0 ft
Minimum Operating Water Surface	5,125 ft
Gross Storage	134,993 ac-ft

Table SD B-3. Project Facility Specifications (continued).

DUNCAN CREEK DIVERSION	
FRENCH MEADOWS DAM (LL ANDERSON DAM) AND FRENCH MEADOWS RESERVOIR (continued)	
RESERVOIR (continued)	
Dead Storage (as constructed), at Tunnel Intake lip	7,635 ac-ft
Active Storage (as constructed)	127,358 ac-ft
Area at Maximum Operating Water Surface	1,408 acres
Area at Minimum Operating Water Surface	434 acres
Depth at Minimum Operating Water Surface	77 ft
Shoreline at Maximum Operating Water Surface	9 miles
FRENCH MEADOWS — HELL HOLE TUNNEL	
Nominal Size / Shape	12 ft 4 in / Horseshoe
Length:	
Total	13,694 ft or 2.6 miles
Concrete Lined (Est.)	1,617 ft
Steel Lined (Est.)	317 ft
Maximum Discharge	400 cfs[1]
Invert Gradient	0.0025
FRENCH MEADOWS POWERHOUSE	
PENSTOCK	
Length	691 ft or 0.1 miles
Diameter	6 ft 3 in O.D.
POWER PLANT	
Installed Capacity, Generator	15.3 MW
Type of Turbine	Francis
Maximum Tail Water Surface	4,630 ft
Minimum Tail Water Surface	4,608 ft
Maximum Static Head	654 ft
Minimum Static Head	517 ft
Elevation Runner	4,612 ft
R.P.M.	450
HELL HOLE DAM AND RESERVOIR	
DAM	
Type	Rockfill
Height of Dam Crest above Streambed	410 ft
Dam Crest Length	1,570 ft
Dam Crest Width	35 ft
Elevation of Dam Crest	4,650 ft
Elevation of Streambed	4,240 ft
Volume	8,440,000 cubic yards
Slopes - Upstream	2.5:1
Slopes - Downstream	1.4:1
Stream Maintenance Pipe Capacity	20 cfs
Maximum Low Level Outlet Capacity at water surface 4,630 (full reservoir)	852 cfs

[1] As constructed tunnel capacity is approximately 800 cfs, maximum discharge is limited to 400 cfs in French Meadows Powerhouse.

Table SD B-3. Project Facility Specifications (continued).

HELL HOLE DAM AND RESERVOIR (continued)	
SPILLWAY	
Type	Uncontrolled
Elevation of Spillway Crest	4,630 ft
Width at Lip	350 ft
Capacity (Water Surface 4647.1, 2.8' freeboard)	89,500 cfs
RESERVOIR	
Maximum Operating Water Surface	4,630 ft
Minimum Operating Water Surface	4,340 ft
Gross Storage	207,590 ac-ft
Dead Storage (as constructed), at Tunnel Intake lip	2,533 ac-ft
Active Storage (as constructed)	205,057 ac-ft
Area at Maximum Operating Water Surface	1,253 acres
Area at Minimum Operating Water Surface	185 acres
Depth at Minimum Operating Water Surface	88 ft
Shoreline at Maximum Operating Water Surface	11 miles
HELL HOLE POWERHOUSE	
Installed Capacity, Generator	0.73 MW
Normal Operating Tail Water Surface	4,240 ft
Maximum Static Head	391 ft
Minimum Static Head	101 ft
R.P.M.	1,200
HELL HOLE — MIDDLE FORK TUNNEL	
Nominal Size / Shape	13 ft 5 in / Horseshoe
Length	
Total	55,006 ft or 10.4 miles
Concrete Lined (Est.)	6,780 ft
Steel Lined (Est.)	5,180 ft
Nominal Maximum Discharge, at full reservoir	920 cfs
Invert Gradient	0.0035 and 0.0077
NORTH FORK LONG CANYON DIVERSION	
DAM	
Type	Gravity
Material	Concrete
Height of Dam above Streambed	10 ft
Dam Crest Length	120 ft
Elevation of Dam Crest	4,720 ft
Elevation of Streambed	4,710 ft
Volume	636 cubic yards
Stream Maintenance Pipe Capacity	2 cfs
SPILLWAY	
Type	Uncontrolled Overflow
Elevation of Spillway Crest	4,716 ft
Width of Spillway Crest	95 ft
Capacity	3,000 cfs
NORTH FORK LONG CANYON DIVERSION PIPE AND DROP INLET	
PIPE	
Diameter	36 in.
Length	3,530 ft or 0.7 miles

Table SD B-3. Project Facility Specifications (continued).

NORTH FORK LONG CANYON DIVERSION PIPE AND DROP INLET (continued)	
SHAFT	
Diameter	6 ft
Depth without 6 ft x 20 ft Standpipe	403 ft
Capacity	100 cfs
Invert Gradient	Vertical
SOUTH FORK LONG CANYON DIVERSION	
DAM	
Type	Gravity
Material	Concrete
Height of Dam Crest above Streambed	27 ft
Dam Crest Length	145 ft
Elevation of Dam Crest	4,650 ft
Elevation of Streambed	4,623 ft
Volume	1,341 cubic yards
Stream Maintenance Pipe Capacity	5 cfs
SPILLWAY	
Type	Uncontrolled Overflow
Width of Spillway Crest	60 ft
Elevation of Spillway Crest	4,640 ft
Capacity	4,000 cfs
SOUTH FORK LONG CANYON DIVERSION PIPE AND DROP INLET	
Diameter	6 ft
Depth without 6’ x 6 ft Standpipe	387 ft
Capacity	200 cfs
Invert Gradient	Vertical
MIDDLE FORK POWERHOUSE *(L.J. STEPHENSON POWERHOUSE)*	
PENSTOCK	
Length	3,653 ft or 0.7 miles
Diameter: Above Bifurcation	7 ft 6 in to 9 ft O.D.
Diameter: Below Bifurcation	5 ft 6 in O.D.
POWERPLANT	
Number of Units	2
Generator Installed Capacity (Total)	122.4 MW
Type of Turbine	Impulse
Elevation Nozzles	2,536 ft
Elevation Normal Tail Water Surface	2,529 ft
Maximum Static Head	2,096 ft
Minimum Static Head	1,806 ft
R. P. M.	400
MIDDLE FORK INTERBAY	
DAM	
Type	Gravity
Material	Concrete
Height of Dam Crest above Streambed	70.5 ft
Dam Crest Length	233 ft
Elevation of Dam Crest	2,536 ft
Elevation of Streambed	2,465 ft
Volume	14,360 cubic yards
Stream Maintenance Pipe Capacity	23 cfs

Table SD B-3. Project Facility Specifications (continued).

MIDDLE FORK INTERBAY (continued)	
DAM (continued)	
Low level Outlet Capacity at water surface 2530.0 (full reservoir)	890 cfs
Roadway Width, curb to curb	14 ft
Elevation of Roadway	2,538 ft
SPILLWAY	
Type	Gated Ogee Crest
Capacity (Water Surface 2534)	36,506 cfs
Width of Spillway	80 ft Gated, 60 ft Uncontrolled
Number of Gates	4
Type of Gates	Radial
Size of Gates	20 ft x 20 ft
Elevation of Top of Gates	2,530 ft
Elevation of Sill of Gates	2,510 ft
IMPOUNDMENT	
Maximum Operating Water Surface	2,529 ft
Minimum Operating Water Surface	2,502 ft
Normal Operating Water Surface	2,527 ft
Gross Storage	175 ac-ft
Dead Storage (as constructed), at Tunnel Intake lip	2 ac-ft
Active Storage (as constructed)	173 ac-ft
Area at Maximum Operating Water Surface	7 acres
Area at Minimum Operating Water Surface	3 acres
Depth at Minimum Operating Water Surface	37 ft
MIDDLE FORK — RALSTON TUNNEL	
Nominal Size / Shape	13 ft 5 in / Horseshoe
Length	
Total	35,397 ft or 6.7 miles
Concrete Lined (Est.)	8,245 ft
Steel Lined (Est.)	245 ft
Maximum Discharge	836 cfs
Invert Gradient	0.0054
RALSTON POWERHOUSE	
PENSTOCK	
Length	1,670 ft
Diameter	8 ft to 9 ft 6 in O.D.
POWERPLANT	
Installed Capacity, Generator	79.2 MW
Type of Turbine	Impulse
Elevation Nozzles	1,186 ft
Static Head	1,344 ft
Maximum flow	924 cfs
R. P. M.	240
RALSTON AFTERBAY	
DAM	
Type	Gravity
Material	Concrete
Height of Dam Crest above Streambed	89 ft
Dam Crest Length	560 ft
Volume	76,300 cubic yards

Table SD B-3. Project Facility Specifications (continued).

RALSTON AFTERBAY (continued)	
DAM (continued)	
Elevation of Dam Crest	1,189 ft
Elevation of Streambed	1,100 ft
Streamflow Maintenance Pipe Capacity	155 cfs
Maximum Low Level Outlet Capacity at water surface el. 1179.0 (full reservoir) - calculated	1,132 cfs
Roadway Width, Curb to Curb	12 ft
Elevation of Roadway	1,188.42 ft
SPILLWAY	
Type	Gated Ogee Crest
Capacity at Water Surface 1186	171,200 cfs
Elevation of Top of Gates	1,179 ft
Elevation of Sill of Gates	1,149 ft
Crest Length	232 ft
Number of Gates	5
Type of Gates	Radial
Size of Gates	30'x40'
IMPOUNDMENT	
Gross Storage	2,782 ac-ft
Active Storage	1,804 ac-ft
RALSTON-OXBOW TUNNEL	
Nominal Size / Shape	13 ft 3 in / Horseshoe
Length:	
Total	403 ft or 0.08 miles
Concrete Lined	343 ft
Steel Lined	60 ft
Maximum Discharge	1,088 cfs
Invert Gradient	0.12035
OXBOW POWERHOUSE	
PENSTOCK	
Length	5 ft
Diameter	9 ft I.D.
POWERPLANT	
Installed Capacity, Generator	6.1 MW
Type of Turbine	Francis
Elevation Runner	1,098.5 ft
Static Head	90 ft
Normal Tail Water Surface	1,089 ft
Maximum flow	1,025 cfs
R. P. M.	200
SUMMARY	
Power and Energy Production	
Total Installed Capacity (at 0.9 power factor)	223.7 MW
Total Dependable Capacity (at 0.9 power factor)	224 MW
Average Annual Energy Production (Based on 38 years of operation: 1967-2004)	1,026,975 MWh
Maximum Total Static Head	4,162
Water Supply and Regulation	
Total Gross Storage	345,560 ac-ft

Table SD B-3. Project Facility Specifications (continued).

SUMMARY (continued)	
Project Features	
Earth and Rockfill Dams	11,900,000 cubic yards
Concrete Dams and Diversions	94,000 cubic yards
Tunnels and Penstocks	23.2 miles
Project Completed – 1967	

Notes:

ac-ft = acre-feet
cfs = cubic feet per second
ft = feet
I.D. = inside diameter
in = inch
MW = megawatt
MWh = megawatt hours
O.D. = outside diameter

Table SD B-4. Description of Project Communication Lines and Powerlines and Associated Maintenance Activities.

Name	Start	End	Length (Approximate)	Voltage	Purpose	Project Maintenance	
						Trimming by Hand	Pole Replacement
French Meadows Area							
French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	French Meadows Dam Generator Building	French Meadows Dam Outlet Work	0.23 mi.	208 V	Supplies power from the motor-generator	A	I
French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline	French Meadows Dam Generator Building	French Meadows Dam Spillway Gates	69 ft.	208 V	Operates the spillway control equipment	A	I
Hell Hole Area							
French Meadows Powerhouse to French Meadows Powerhouse Penstock and Butterfly Valve House Communication Line/Powerline	French Meadows Powerhouse and switchyard	Butterfly valve house at the top of French Meadows Powerhouse Penstock	0.1 mi	2.4 kV	Power for lighting and equipment operation and communication to the valve house	A	I
French Meadows Powerhouse and Switchyard to Hell Hole-Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator Cottages and Hell Hole Powerhouse Communication Line/Powerline	French Meadows Powerhouse and Switchyard	Hell Hole-Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator Cottages and Hell Hole Powerhouse	2.29 mi.	12 kV	Power for facility operation and communication between facilities	A	I
Dormitory and Cottages Water Supply Tank Powerline	Water Supply Tank	Dormitory and Cottages	0.08 mi.	2.4 kV	Controls the water tank fill system	A	I
Hell Hole Powerhouse to Rubicon River Gage and Weir below Hell Hole Dam Communication Line/Powerline	Hell Hole Powerhouse	Rubicon River Gage and Weir below Hell Hole Dam	0.12 mi.	12 kV	Power and communication to the gaging station	A	I
Middle Fork Interbay Area							
Middle Fork Powerhouse to Middle Fork Powerhouse Butterfly Valve House Communication Line/Powerline	Middle Fork Powerhouse	Middle Fork Powerhouse Butterfly Valve House	0.62 mi.	2.4 kV	Power for equipment operation and communication between facilities	A	I
Middle Fork Powerhouse Butterfly Valve House to Radio Repeater near Hell Hole - Middle Fork Tunnel Surge Tank (underground) Communication Line/Powerline	Middle Fork Powerhouse	Radio Repeater near Hell Hole-Middle Fork Tunnel Surge Tank	0.34 mi.	2.4 kV	Power and communication between facilities	A	I
Middle Fork Powerhouse to Middle Fork - Ralston Tunnel Intake and Gatehouse Communication Line/Powerline	Middle Fork Powerhouse	Middle Fork-Ralston Tunnel Intake and Gatehouse	0.36 mi.	2.4 kV	Power and communication to operate equipment at the tunnel intake and Middle Fork Interbay Dam	A	I
Middle Fork Powerhouse to Middle Fork American River Gage above Middle Fork Powerhouse Communication Line/Powerline	Middle Fork Powerhouse	Middle Fork American River Gage above Middle Fork Powerhouse	0.09 mi.	102 V	Power to the gaging station	A	I
Ralston - Oxbow Area							
Ralston - Oxbow Tunnel Intake to Ralston Powerhouse Communication Line	Ralston-Oxbow Tunnel Intake	Ralston Powerhouse	1.5 mi.	2.4 kV	Communication between the tunnel intake and Ralston Powerhouse	A	I
Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline	Ralston Powerhouse	Ralston Powerhouse Butterfly Valve House	0.22 mi.	4.16 kV	Communication and power to operate equipment at the butterfly valve house	A	I
Ralston Afterbay Dam Generator Building to Ralston - Oxbow Tunnel Intake Communication Line/Powerline	Ralston Afterbay Dam Generator Building	Ralston-Oxbow Tunnel Intake Gatehouse	0.15 mi.	2.16 kV	Communication and power to operate equipment at the tunnel intake	A	I
Oxbow Powerhouse to Ralston Afterbay Dam Generator Building Communication Line/Powerline	Oxbow Powerhouse	Ralston Afterbay Dam Generator Building	0.17 mi.	2.4 kV	Power and communication between facilities	A	I

A = Activity occurs on an annual basis.
I = Activity occurs on an infrequent basis.

Table SD B-5. Description of Project Roads, Access Points, Trails, and Associated Maintenance Activity.

Name	Start	End	Length/Width (Approximate)	Surface	Road Maintenance						Comments
					Grading	Surface Maintenance	Snow Removal	Culverts/Ditches/ Water Bars	Gates	Vegetation Trimming by Hand	
Project Roads and Access Points											
Duncan Creek Area											
Duncan Creek Diversion Intake Road and Diversion Pool Access Point	Forest Road 96.52	Duncan Creek–Middle Fork Tunnel Intake	0.20 mi./16 ft.	gravel	I	I		I		A	An access point from the road to the diversion pool is located adjacent to the tunnel intake
Duncan Creek Diversion Dam Road	Forest Road 96.52	North End of Duncan Creek Diversion Dam	0.05 mi./10 ft.	unimproved						A	This road provides access to the vicinity of the diversion dam
Duncan Creek Diversion Pool Road and Access Point	Forest Road 96.52	North Side of Duncan Creek Diversion Pool	0.08 mi./10 ft.	unimproved						A	An access point to the diversion pool occurs at the end of the road
French Meadows Area											
Duncan Creek–Middle Fork Tunnel Portal Road and Spillway Access Point	Forest Road 96.69	Duncan Creek–Middle Fork Tunnel Portal	0.29 mi./12 ft.	unimproved						A	Near the end if the road is an access point to the reservoir side of the dam spillway
French Meadows–Hell Hole Tunnel Gatehouse Road	Forest Route 96	French Meadows–Hell Hole Tunnel Gatehouse	0.16 mi./single-lane	gravel	I	I		I	X	A	
French Meadows Dam Outlet Works and Leakage Weirs Road	Forest Route 22	French Meadows Dam Outlet Works and Leakage Weirs	0.53 mi./single-lane	unimproved					X	A	Access to the French Meadows Dam outlet works and the leakage weir are located along the dam face
French Meadows Dam Staging Area Road	Forest Route 96	French Meadows Dam Staging area	0.08 mi./single-lane	unimproved						A	Access to the French Meadows Dam Staging Area is adjacent to the French Meadows Dam Spillway
Middle Fork American River Gage and Weir below French Meadows Dam Road	Forest Route 22	Trail to Middle Fork American River Gage and Weir below French Meadows Dam	0.43 mi./single-lane	unimproved					X	A	The road provides access to the trail leading to the Middle Fork American River Gage and Weir below French Meadows Dam
Hell Hole Area											
Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point	Hell Hole Dam Boat Ramp	Hell Hole Powerhouse and Outlet Works	0.95 mi./single-lane	gravel	I	I		I	X	A	Provides access to the reservoir side of the dam spillway; to the outlet works, and to Hell Hole Powerhouse, both of which are located at the base of Hell Hole Dam
Rubicon River Gage and Weir below Hell Hole Dam Road	Hell Hole Powerhouse	Rubicon River Gage and Weir below Hell Hole Dam	0.07 mi./single-lane	gravel	I	I		I		A	
Hell Hole Dam Leakage Weir Road	Hell Hole Dam and Powerhouse Road	Hell Hole Dam Leakage Weir below Hell Hole Dam	0.05 mi./10 ft.	gravel						A	
Hell Hole Dam Spillway and Northern Access Point	Hell Hole Boat Ramp Road	Hell Hole Dam Spillway	200 ft./single-lane	gravel					X	A	Road is near the Hell Hole Boat Ramp and the reservoir side of the spillway
French Meadows–Hell Hole Tunnel Portal Road	Forest Route 2	French Meadows Powerhouse Penstock and Butterfly Valve House	0.61 mi./10 ft.	gravel	I	I		I	X	A	Road provides access to the French Meadows Powerhouse Penstock and Butterfly Valve House
French Meadows Powerhouse Road	Forest Route 2	French Meadows Powerhouse	1.29 mi./10 ft.	gravel	I	I		I	X	A	
Hell Hole–Middle Fork Tunnel Gatehouse Road	Forest Route 2	Hell Hole–Middle Fork Tunnel Gatehouse	0.38 mi./single-lane	gravel	I	I		I	X	A	
Dormitory Facility Road	Forest Route 2	Hell Hole Dormitory Facility	0.13 mi./single-lane	gravel	I	I		I		A	
Hell Hole Dam Spillway Discharge Channel Road	Forest Route 2	Hell Hole Dam Spillway Discharge Channel below the spillway and dam	0.61 mi./12 ft.	unimproved						A	

Table SD B-5. Description of Project Roads, Access Points, Trails, and Associated Maintenance Activity (continued).

Name	Start	End	Length/Width (Approximate)	Surface	Road Maintenance						Comments
					Grading	Surface Maintenance	Snow Removal	Culverts/Ditches/ Water Bars	Gates	Vegetation Trimming by Hand	
Project Roads and Access Points (continued).											
Long Canyon Area											
North Fork Long Canyon Diversion North Road	Forest Road 14N42.1	North Fork Long Canyon Diversion (north approach)	0.15 mi./single-lane	unimproved						A	
North Fork Long Canyon Diversion South Road	Forest Route 2	North Fork Long Canyon Diversion (south approach)	0.63 mi./single-lane	unimproved						A	
North Fork Long Canyon Diversion Drop Inlet Road	Forest Route 2	North Fork Long Canyon Diversion Drop Inlet	0.09 mi./12 ft.	unimproved						A	A portion of this road also provides access to PG&E's 60 kV transmission line right-of-way between French Meadows Powerhouse and Middle Fork Powerhouse.
South Fork Long Canyon Diversion and Drop Inlet Road	Forest Route 2	South Fork Long Canyon Diversion and Diversion Drop Inlet	0.17 mi./single-lane	unimproved					X	A	
North Fork Long Canyon Crossing Removable Section North Road and Parking Area	Forest Route 2	North Fork Long Canyon Crossing Removable Section and parking area	0.12 mi./12 ft.	Unimproved						A	An unpaved parking area is adjacent to the removable section
North Fork Long Canyon Crossing Removable Section South Road	Forest Road 14N16	North Fork Long Canyon Crossing Removable Section (southern access)	0.38 mi./variable	gravel (final 400 ft. is unimproved)	I	I		I		A	
Middle Fork Interbay Area											
Middle Fork Powerhouse Butterfly Valve House Road	Forest Road 14N31	Middle Fork Powerhouse Butterfly Valve House and Hell Hole–Middle Fork Tunnel Removable Section	1.04 mi./single-lane	gravel	I	I		I		A	
Middle Fork Powerhouse Penstock and Butterfly Valve House Road	Middle Fork Powerhouse	Middle Fork Powerhouse Butterfly Valve House and Hell Hole–Middle Fork Tunnel Removable Section	1.84 mi./single-lane	gravel	I	I		I	X	A	
Middle Fork Interbay Dam and Powerhouse Road and Interbay Access Points	Forest Route 96	Middle Fork Powerhouse	4.84 mi./double-lane	gravel	I	I		I		A	Two access points to the Middle Fork Interbay are also located along this road. The first is at the Middle Fork Interbay Day and the second is located adjacent to the intersection with the Middle Fork Powerhouse Upper Switchyard Road. These access points are used for removal of debris from the reservoir.
Middle Fork Powerhouse Upper Switchyard Road	Forest Road 96.17 (Middle Fork Interbay Dam and Powerhouse Road)	Middle Fork Powerhouse Upper Switchyard	0.05 mi./single-lane	paved		I		I		A	
Ralston - Oxbow–Area											
Brushy Canyon Adit Road	Forest Road 14N30	Brush Canyon Adit (Middle Fork-Ralston Tunnel)	1.62 mi./single-lane	unimproved						A	The road is blocked approximately one mile from the adit due to a road failure
Oxbow Powerhouse Road	Forest Road 23.02	Oxbow Powerhouse	0.15 mi.	gravel	I	I		I		A	
Ralston Powerhouse Butterfly Valve House Road	Forest Route 23	Ralston Powerhouse Butterfly Valve House and Middle Fork–Ralston Tunnel Removable Section at the top of the powerhouse penstock	0.33 mi./single-lane	gravel	I	I		I	X	A	The road provides assess to the Ralston Powerhouse Butterfly Valve House and Middle Fork-Ralston Tunnel Removable Section at the top of the powerhouse penstock

Table SD B-5. Description of Project Roads, Access Points, Trails, and Associated Maintenance Activity (continued).

Name	Start	End	Length/Width (Approximate)	Surface	Road Maintenance						Comments
					Grading	Surface Maintenance	Snow Removal	Culverts/Ditches/ Water Bars	Gates	Vegetation Trimming by Hand	
Project Roads and Access Points (continued).											
Ralston - Oxbow–Area (continued)											
Ralston - Oxbow Tunnel Intake Road	Forest Road 23.02	Ralston–Oxbow Tunnel Intake	0.08 mi.	gravel	I	I		I	X	A	
Ralston Afterbay Road and Boat Ramp	Forest Road 23.02	Ralston Afterbay Boat Ramp	0.04 mi./single-lane	gravel	I	I		I	X	A	
Ralston Afterbay Dam Road and Afterbay Access Point	Forest Road 23.02	Ralston Afterbay Reservoir (south approach)	0.19 mi.	unimproved (crest across the dam is improved)					X	A	
Ralston Afterbay Sediment Removal Access Point	Forest Route 23	Ralston Afterbay Reservoir	100 ft.	gravel						A	The access point is located off of Forest Route 23
Non-Project Access Roads											
Primary Forest Route 96 (Mosquito Ridge Road)	Foresthill Road	French Meadows Dam	34.88 mi./double-lane	paved			A				
Primary Forest Route 23 (Ralston Ridge Road)	Forest Route 96	FR 2	20.02 mi./double-lane	paved			A				
Project Trails[1]											
Duncan Creek Area											
Duncan Creek Diversion Dam North Trail	Duncan Creek Diversion Dam Road	Duncan Creek Diversion Dam (north end)	95 ft./N/A	N/A						A	
Duncan Creek Diversion Dam South Trail	Duncan Creek Diversion Intake Road	Duncan Creek Diversion Dam (south end)	175 ft./N/A	N/A						A	
Photovoltaic Poles and Powerline to Duncan Creek Gage above Diversion Dam Trail	Forest Road 96.52	Duncan Creek Gage above the Diversion Dam	129 ft./N/A	N/A						A	
Duncan Creek Gage and Weir above Diversion Trail	Duncan Creek Diversion Intake Road	Duncan Creek Gage and Weir above Diversion Dam	93 ft./N/A	N/A						A	
Duncan Creek Gage and Weir below Diversion Trail	Forest Road 96.52	Duncan Creek Gage and Weir below Diversion Dam	0.19 mi./N/A	N/A						A	
French Meadows Area											
Middle Fork American River Gage and Weir below French Meadows Dam Trail	Middle Fork American River Gage and Weir below French Meadows Dam Road	Middle Fork American River Gage and Weir	0.04 mi./N/A	N/A						A	

Table SD B-5. Description of Project Roads, Access Points, Trails, and Associated Maintenance Activity (continued).

Name	Start	End	Length/Width (Approximate)	Surface	Road Maintenance						Comments
					Grading	Surface Maintenance	Snow Removal	Culverts/Ditches/ Water Bars	Gates	Vegetation Trimming by Hand	
Project Trails[1] (continued)											
Middle Fork Interbay Area											
Middle Fork American River Gage above Middle Fork Powerhouse Trail	Middle Fork Powerhouse Penstock and Butterfly Valve House Road	Cable crossing of the Middle Fork American River	0.05 mi./N/A	N/A						A	The trail also includes a 40 ft. metal walkway
Passive Microwave Reflector Station above Middle Fork Interbay Trail	Forest Road 16.26	Passive Microwave Reflector Station above Middle Fork Interbay	0.2 mi./N/A	N/A						A	
Ralston Afterbay Area											
Passive Microwave Reflector Station above Ralston Afterbay Trail	Forest Route 23	Passive Microwave Reflector Station above Ralston Afterbay	0.06 mi./N/A	N/A						A	
Middle Fork American River Gage below Oxbow Powerhouse Trail	Forest Road 96.6	Middle Fork American River Gage below Oxbow Powerhouse	0.05 mi./N/A	N/A						A	

[1]Project trails used to access Recreation Facility Water Supplies are identified in Table SD B-7
A = Activity occurs on an annual basis.
I = Activity occurs on an infrequent basis.
X = Activity occurs or ancillary facility is present.
N/A = Not applicable.

Table SD B-6. Description of Project Recreation Facilities and Features and Associated Maintenance Activities.

Project Area	Single Units	Group Units	Picnic Areas	Maximum PAOT[1] Capacity	Flush Toilet	Vault Toilet	Potable Water	RV Dump Station	Boat Launch	Handicap Accessible Units	Amenities[2]	Project Maintenance[3]			
												Vegetation and Pest Management		Facility Painting	Water Supply Chlorination
												Trimming by Hand	Fungicide Use[4]		
French Meadows Reservoir															
Ahart Campground	12 (Non-R)			72		X		Nearby			Bear-proof containers	A	I	I	
Coyote Group Campground		4 (R)		175	X	X	X	Nearby		1	Bear-proof containers	A	I	I	
Poppy Campground	12 (Non-R)			72	X						Hike-in or boat-in access	A	I	I	
French Meadows Campground	75: 32 (R); 43 (Non-R)			450	X	X	X	Nearby		8	Bear-proof containers, driveway lengths from 20 to 50 feet	A	I	I	
Gates Group Campground		3 (R)		125	X		X	Nearby			Bear-proof containers	A	I	I	
Lewis Campground	40 (Non-R)			240	X	X	X	Nearby		1	Bear-proof containers	A	I	I	
Day-Use Areas															
French Meadows Picnic Area/French Meadows Boat Ramp			7 units[5]			X	X		46 parking spaces		Picnic tables, cooking grill			I	
McGuire Picnic Area/McGuire Boat Ramp			10 units[5]			X	X		75 parking spaces		Picnic tables, cooking grill			I	
Hell Hole Reservoir															
Campgrounds															
Big Meadows Campground	54 (Non-R)			324	X		X			1		A	I	I	
Hell Hole Campground	10 (Non-R)			60		X	X					A	I	I	
Upper Hell Hole Campground	15 (Non-R)			90		X					Hike-in or boat-in access	A	I	I	
Hell Hole Vista						X					Picnic tables, trail, 8 parking spaces	A	I	I	
Hell Hole General Parking Area/Hell Hole Boat Ramp and Parking Area						X			50 parking spaces			A		I	

Table SD B-6. Description of Project Recreation Facilities and Features and Associated Maintenance Activities (continued).

Project Area	Single Units	Group Units	Picnic Areas	Maximum PAOT[1] Capacity	Flush Toilet	Vault Toilet	Potable Water	RV Dump Station	Boat Launch	Handicap Accessible Units	Amenities[2]	Project Maintenance[3]			
												Vegetation and Pest Management		Facility Painting	Water Supply Chlorination
												Trimming by Hand	Fungicide Use[4]		
Ralston Afterbay															
Day-Use Areas															
Ralston Afterbay Picnic Area						X	X				Picnic tables, cooking grill	A			
Ralston Picnic Area Cartop Boat Ramp												A		I	
Indian Bar Rafting Access and General Parking												A			
Long Canyon Creek															
Campgrounds															
Middle Meadows Group Campground		2 (R)	5 units[5]	75	X	X	X					A	I	I	
Project Recreation Facility Water Supplies															
Dolly Creek Water Supply												I			A
French Meadows Campground Water Supply and Trail												I			A
Big Meadows Campground Water Supply and Trail												I		I	A
Middle Meadows Group Campground Water Supply and Trail												I			A

Sources: USDA Federal Service Website, reserveusa.com, PCWA Revised Recreation Plan (1989), FERC Order Approving the Revised Recreation Plan (1992)

Notes:

[1]PAOT = Persons At One Time.
[2]Developed campgrounds typically include parking, picnic tables, campfire ring, and cooking grill.
[3]Maintenance of project recreation facilities is completed by USDA-FS under collection agreements No. 03-CO-11051754-014 and No. 03-CO-11050353-012.
[4]Fungicide (Borax soap) is infrequently used on tree stumps in FS campgrounds and picnic areas to prevent the spread of fungus (E. Moore and J. Jue, USDA-FS, pers. comm., 3/29/06).
[5]Assumes 5 person per unit capacity.

R = Reservable, Non-R = Non-reservable
A = Activity occurs on an annual basis.
I = Activity occurs on an infrequent basis.

Table SD B-7. Description of Recreation Facility Water Supplies and Associated Maintenance Access Roads or Trails.

Name	Description	Facilities Serviced	Maintenance Access Roads or Trails
Dolly Creek Water Supply	• Well, pump house, and 10,000 gallon concrete water storage tank (fenced) • Underground water supply pipeline from water supply to campgrounds, picnic area, and boat ramp	• Ahart Campground • Coyote Group Campground • Gates Group Campground • Lewis Campground • McGuire Picnic Area and Boat Ramp	Maintenance access from Forest Route 68 and Forest Road 68.10
French Meadows Campground Water Supply	• Spring and 10,000 gallon concrete water storage tank • 1,000 foot-long aboveground pipeline from the spring to the water storage tank • Underground water supply pipeline from water supply tank to campground, picnic area, and boat ramp	• French Meadows Campground, Picnic Area, and Boat Ramp	Maintenance access from an approximately 2,500 foot-long trail off of Forest Route 68.
Big Meadows Campground Water Supply	• Horizontal well and 5,000 gallon steel water storage tank • 150 foot-long buried pipeline from well to water storage tank • Underground water supply pipeline from water supply to South Fork Long Canyon Creek • Aboveground water supply pipeline from creek to campgrounds	• Big Meadows Campground • Hell Hole Campground	Maintenance access from an approximately 800 foot-long trail from Big Meadows Campground Additional approximately 150 foot-long maintenance access trail between the well to water storage tank

Table SD B-7. Description of Recreation Facility Water Supplies and Associated Maintenance Access Roads or Trails (continued).

Name	Description	Facilities Serviced	Maintenance Access Roads or Trails
Middle Meadows Water Supply	• Spring and 10,000 gallon concrete water storage tank (fenced) • Underground water supply pipeline from water supply to campground	• Middle Meadows Campground	Maintenance access from an approximately 2,200 foot-long trail from Middle Meadows Campground

Table SD B-8. Description of Facility Testing and Maintenance Activities.

	Project Operations			Facility Maintenance Activities													
	Facility Testing			Vegetation and Pest Management			Sediment Management			Erosion and Falling Rock Control		Debris Management					
Project Facility or Feature	Tunnel/Conduit Inspections	Powerhouse Inspections and Maintenance	Gate Testing	Trimming by Hand	Herbicide and Fungicide Use	Rodenticide Use	Physical Removal w/Equipment[1]	Hydraulic Sluicing	Sediment Management Pilot Project	Gunite (erosion control)	Rock Removal/Fence Repair	Large Woody Debris[1]	Cleaning Trash Racks	Log Booms	Facility Painting	Pole Replacement
Dams Reservoirs, and Diversion Pools																
Large Dams																
French Meadows Dam and Outlet Works			A	A												
Hell Hole Dam and Outlet Works	A[2]			A												
Medium Dams																
Middle Fork Interbay Dam			A	A				I[4]								
Ralston Afterbay Dam			A	A				I	X							
Small Dams																
Duncan Creek Diversion Dam								I[5]								
North Fork Long Canyon Diversion Dam								I[5]								
South Fork Long Canyon Diversion Dam								I[5]								
Large Reservoirs																
French Meadows Reservoir														X		
Hell Hole Reservoir												I		X		
Medium Reservoir																
Middle Fork Interbay							I					I	R	X		
Ralston Afterbay							I					I	R	X		
Small Diversion Pools																
Duncan Creek Diversion Pool							I						R	X		
North Fork Long Canyon Diversion Pool							I						R			
South Fork Long Canyon Diversion Pool							I						R			
Water Conveyance Systems																
Tunnels																
Duncan Creek - Middle Fork Tunnel																
French Meadows - Hell Hole Tunnel																
Hell Hole - Middle Fork Tunnel																
Middle Fork - Ralston Tunnel																
Ralston - Oxbow Tunnel	A				A											
Diversion Pipes and Drop Inlets																
North Fork Long Canyon Diversion Pipe and Drop Inlet																
South Fork Long Canyon Diversion Pipe and Drop Inlet																
Surge Shafts and Adits																
Brushy Canyon Adit				A												
Hell Hole - Middle Fork Tunnel Surge Shaft and Tank				A											I	
Middle Fork - Ralston Tunnel Surge Shaft and Tank				A											I	

Table SD B-8. Description of Facility Testing and Maintenance Activities (continued).

	Project Operations			Facility Maintenance Activities												
	Facility Testing			Vegetation and Pest Management			Sediment Management			Erosion and Falling Rock Control		Debris Management				
Project Facility or Feature	Tunnel/Conduit Inspections	Powerhouse Inspections and Maintenance	Gate Testing	Trimming by Hand	Herbicide and Fungicide Use	Rodenticide Use	Physical Removal w/Equipment[1]	Hydraulic Sluicing	Sediment Management Pilot Project	Gunite (erosion control)	Rock Removal/Fence Repair	Large Woody Debris	Cleaning Trash Racks	Log Booms	Facility Painting	Pole Replacement
Removable Sections and Portals																
Duncan Creek - Middle Fork Tunnel Portal				A											I	
French Meadows - Hell Hole Tunnel Removable Section				A											I	
Hell Hole - Middle Fork Tunnel Removable Section				A											1	
Middle Fork - Ralston Tunnel Removable Section				A											I	
North Fork Long Canyon Crossing Removable Section				A											I	
Intakes and Gatehouses																
Duncan Creek - Middle Fork Tunnel Intake				A												
French Meadows - Hell Hole Tunnel Gatehouse				A												
French Meadows - Hell Hole Tunnel Intake				A												
Hell Hole - Middle Fork Tunnel Gatehouse				A												
Hell Hole - Middle Fork Tunnel Intake				A												
Middle Fork - Ralston Tunnel Intake and Gatehouse				A												
Ralston - Oxbow Tunnel Intake				A												
Penstocks and Valve Houses																
French Meadows Powerhouse Penstock and Butterfly Valve House				A											I	
Middle Fork Powerhouse Penstock and Butterfly Valve House				A						I					I	
Ralston Powerhouse Penstock and Butterfly Valve House				A											I	
Powerhouses, Switchyards, and Substations																
French Meadows Powerhouse and Switchyard		A		A		A										
Hell Hole Powerhouse		A		A		A										
Middle Fork Powerhouse and Upper and Lower Switchyards		A		A	A	A										
Ralston Powerhouse and Switchyard		A		A	A	A										
Oxbow Powerhouse and Switchyard		A		A	A	A										
Hell Hole Substation				A		A										
Gaging Stations and Weirs																
Stream Gages and Weirs																
Duncan Creek Gage and Weir above Diversion Dam (USGS Gage and Weir No. 11427700)																
Duncan Creek Gage and Weir below Diversion Dam (USGS Gage and Weir No. 11427750)																
Middle Fork American River Gage and Weir below French Meadows Dam (USGS Gage and Weir No. 11427500)																
Middle Fork American River Gage at Interbay Dam (USGS Gage No. 11427770)																

Table SD B-8. Description of Facility Testing and Maintenance Activities (continued).

	Project Operations			Facility Maintenance Activities													
	Facility Testing			Vegetation and Pest Management			Sediment Management			Erosion and Falling Rock Control		Debris Management					
Project Facility or Feature	Tunnel/Conduit Inspections	Powerhouse Inspections and Maintenance	Gate Testing	Trimming by Hand	Herbicide and Fungicide Use	Rodenticide Use	Physical Removal w/Equipment[1]	Hydraulic Sluicing	Sediment Management Pilot Project	Gunite (erosion control)	Rock Removal/Fence Repair	Large Woody Debris	Cleaning Trash Racks	Log Booms	Facility Painting	Pole Replacement
Gaging Stations and Weirs (continued)																
Stream Gages and Weirs (continued)																
Middle Fork American River Gage above Middle Fork Powerhouse (USGS Gage No. 11427760)																
Middle Fork American River Gage below Oxbow Powerhouse (USGS Gage No. 11433300)																
North Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433085)																
South Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433065)																
Rubicon River Gage and Weir below Hell Hole Dam (USGS Gage and Weir No. 11428800)																
Diversion Gages																
North Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433080)																
South Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433060)																
Reservoir Gages																
French Meadows Reservoir Gage (USGS Gage No. 11427400)																
French Meadows Reservoir Staff Gage																
Hell Hole Reservoir Gage (USGS Gage No. 11428700)																
Hell Hole Reservoir Staff Gage																
Middle Fork Interbay Reservoir Gage																
Ralston Afterbay Reservoir Gage																
Powerhouse Gages																
French Meadows Powerhouse Gage (USGS Gage No. 11427200)																
Middle Fork Powerhouse Gage (USGS Gage No. 11428600)																
Oxbow Powerhouse Gage (USGS Gage No. 11433212)																
Ralston Powerhouse Gage (USGS Gage No. 11427765)																
Leakage Weirs																
French Meadows Dam Leakage Weirs Nos. 1 -- 6																
Hell Hole Dam Leakage Weir																

Table SD B-8. Description of Facility Testing and Maintenance Activities (continued).

	Project Operations			Facility Maintenance Activities													
	Facility Testing			Vegetation and Pest Management			Sediment Management			Erosion and Falling Rock Control		Debris Management					
Project Facility or Feature	Tunnel/Conduit Inspections	Powerhouse Inspections and Maintenance	Gate Testing	Trimming by Hand	Herbicide and Fungicide Use	Rodenticide Use	Physical Removal w/Equipment[1]	Hydraulic Sluicing	Sediment Management Pilot Project	Gunite (erosion control)	Rock Removal/Fence Repair	Large Woody Debris	Cleaning Trash Racks	Log Booms	Facility Painting	Pole Replacement
Project Communication Lines and Powerlines																
French Meadows Area																
French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline				A												I
French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline				A												I
Hell Hole Area																
French Meadows Powerhouse to French Meadows Powerhouse Penstock and Butterfly Valve House Communication Line/Powerline				A												I
French Meadows Powerhouse and Switchyard to Hell Hole - Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline				A												I
Dormitory and Cottages Water Supply Tank Powerline				A												I
Hell Hole Powerhouse to Rubicon River Gage and Weir below Hell Hole Dam Communication Line/Powerline				A												I
Middle Fork Interbay Area																
Middle Fork Powerhouse to Middle Fork Powerhouse Butterfly Valve House Communication Line/Powerline				A												I
Middle Fork Powerhouse Butterfly Valve House to Radio Repeater near Hell Hole - Middle Fork Tunnel Surge Tank (underground) Communication Line/Powerline				A												I
Middle Fork Powerhouse to Middle Fork - Ralston Tunnel Intake and Gatehouse Communication Line/Powerline				A												I
Middle Fork Powerhouse to Middle Fork American River Gage above Middle Fork Powerhouse Communication Line/Powerline				A												I
Ralston - Oxbow Area																
Ralston - Oxbow Tunnel Intake to Ralston Powerhouse Communication Line				A												I
Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline				A												I
Ralston Afterbay Dam Generator Building to Ralston - Oxbow Tunnel Intake Communication Line/Powerline				A												I
Oxbow Powerhouse to Ralston Afterbay Dam Generator Building Communication Line/Powerline				A												I

Table SD B-8. Description of Facility Testing and Maintenance Activities (continued).

	Project Operations			Facility Maintenance Activities													
	Facility Testing			Vegetation and Pest Management			Sediment Management			Erosion and Falling Rock Control		Debris Management					
Project Facility or Feature	Tunnel/Conduit Inspections	Powerhouse Inspections and Maintenance	Gate Testing	Trimming by Hand	Herbicide and Fungicide Use	Rodenticide Use	Physical Removal w/Equipment[1]	Hydraulic Sluicing	Sediment Management Pilot Project	Gunite (erosion control)	Rock Removal/Fence Repair	Large Woody Debris	Cleaning Trash Racks	Log Booms	Facility Painting	Pole Replacement
Photovoltaic Poles and Powerlines																
Photovoltaic Poles and Powerline to Duncan Creek Gage above Diversion Dam				A												I
Photovoltaic Pole and Powerline at Duncan Creek Gage below Diversion Dam				A												I
Photovoltaic Pole and Powerline at Middle Fork American River Gage below French Meadows Dam				A												I
Photovoltaic Pole and Powerline at Middle Fork American River Gage above Middle Fork Powerhouse				A												I
Photovoltaic Pole and Powerline at North Fork Long Canyon Gage at Diversion Dam				A												I
Photovoltaic Pole and Powerline at South Fork Long Canyon Gage at Diversion Dam				A												I
Photovoltaic Pole at Middle Fork American River Gage below Oxbow Powerhouse				A												I
Microwave Reflectors and Radio Towers																
Passive Microwave Reflector Station above Middle Fork Interbay				I												
Radio Communications Tower near French Meadows - Hell Hole Tunnel Gatehouse				I												
Radio Communications Tower and Repeater near Hell Hole - Middle Fork Tunnel Surge Shaft and Tank				I												
Passive Microwave Reflector Station above Ralston Afterbay				I												
Disposal Sites																
Duncan Diversion Dam Sediment Disposal Area																
North Fork Long Canyon Crossing Sediment Disposal Area																
Middle Fork Interbay Sediment Disposal Area																
Ralston Ridge Sediment Disposal Area																
Indian Bar Sediment Disposal Area																
Ancillary Facilities																
French Meadows Dam Generator Building				A		X									I	
French Meadows Dam Staging Area																
Dormitory Facility				A		X									I	
Dormitory and Cottages Water Supply Tank				A		X									I	
Hell Hole Staging Areas																
Operator Cottages and Shop				A		X									I	
Ralston Afterbay Dam Generator Building				A		X									I	
Storage Building at Middle Fork - Ralston Tunnel Surge Shaft and Tank				A												

Table SD B-8. Description of Facility Testing and Maintenance Activities (continued).

	Project Operations			Facility Maintenance Activities													
	Facility Testing			Vegetation and Pest Management			Sediment Management			Erosion and Falling Rock Control		Debris Management					
Project Facility or Feature	Tunnel/Conduit Inspections	Powerhouse Inspections and Maintenance	Gate Testing	Trimming by Hand	Herbicide and Fungicide Use	Rodenticide Use	Physical Removal w/Equipment[1]	Hydraulic Sluicing	Sediment Management Pilot Project	Gunite (erosion control)	Rock Removal/Fence Repair	Large Woody Debris	Cleaning Trash Racks	Log Booms	Facility Painting	Pole Replacement
Ancillary Facilities (continued)																
Wabena Meadows Snow Course				A												
Miranda Cabin Snow Course				A												
Diamond Crossing Snow Course				A												
Talbot Camp Snow Course				A												
Project Fences																
Slope Fences																
French Meadows Powerhouse Penstock Rock Fence											A					
French Meadows Powerhouse Slope Fence				I							A					
Long Canyon Crossing Slope Fence				I							A					
Middle Fork Powerhouse Upper Switchyard Slope Fence											A					
Middle Fork Interbay Dam Slope Fence											A					
Oxbow Powerhouse Slope Fence											A					
Ralston Powerhouse Penstock and Butterfly Valve House Slope Fences											A					
Ralston Powerhouse Slope Fence											A					
Public Safety Fences																
Dormitory Facility Barrier Fence											A					
Hell Hole Dam General Parking Area Barrier Fence											A					
North Fork Long Canyon Crossing Removable Section Barrier Fence											A					

Status:
A = Activity occurs on an annual basis.
I = Activity occurs on an infrequent basis.
R = Completed as needed during diversion season.
X = Activity occurs or ancillary facility is present.

[1]Sediment removal with equipment occurs as needed following high flow events.
[2]Inspection of 1000 feet of outlet conduit.
[3]Minimum instream flow requirements at Oxbow Powerhouse.
[4]Hydraulic sluicing has not occurred at this facility since 1976.
[5]Sluice gates are present at these facilities but they are not effective.

Table SD B-9. Minimum Pool and Minimum Instream Flow Requirements.

Facility	License Requirement
Minimum Pool Requirements	
French Meadows Reservoir	Minimum Pool (ac-ft) Forecast / Folsom Reservoir [1] — June-Sept — Oct-May > 2,000,000 ac-ft — 60,000 — 50,000 1,200,000 – 2,000,000 ac-ft — 60,000 — 25,000 < 1,200,000 ac-ft — 28,000 — 8,700 The spillway gates (tainter gates) must remain open from Nov. 15 to April 1 of each year.
Hell Hole Reservoir	Minimum Pool (ac-ft) Forecast / Folsom Reservoir [1] — June-Sept — Oct-May > 2,000,000 ac-ft — 70,000 — 50,000 1,200,000 – 2,000,000 ac-ft — 70,000 — 25,000 < 1,200,000 ac-ft — 26,000 — 5,500
Duncan Creek Diversion Pool	Maintain water surface elevation at 5,259 feet elevation.
Minimum Stream Maintenance Flow	
Duncan Creek Diversion Dam	Forecast / Folsom Reservoir[1] — Release (cfs) > 1,000,000 ac-ft — lesser of 8 or natural flow < 1,000,000 ac-ft — lesser of 4 or natural flow
French Meadows Dam	Beginning of operations to March 17,1981: Forecast / Folsom Reservoir[1] — Release (cfs) > 1,000,000 ac-ft — 8 at all times Except that total releases shall not exceed 5,800 ac-ft < 1,000,000 ac-ft — 4 at all times Except that total releases shall not exceed 2,900 ac-ft March 18, 1981, and thereafter – no limitation of total release.
Hell Hole Dam	Beginning of operations to March 17, 1981: Forecast / Folsom Reservoir[1] — Release (cfs) > 1,000,000 ac-ft — 20 June 1 – July 25; 15 July 26 – Aug 5; 10 Aug 6 – Oct 31; 14 Nov 1 – Jan 31; 20 Feb 1 – May 31 Except that total releases shall not exceed 11,000 ac-ft. < 1,000,000 ac-ft — 8 June 1 – Dec 1; 6 Jan 1 – March 25; 8 March 26 – May 31 Except that total releases shall not exceed 5,500 ac-ft. March 18, 1981, and thereafter: Forecast / Folsom Reservoir[1] — Release (cfs) > 1,000,000 ac-ft — 20 May 15 – Dec 14; 10 Dec 15 – May 14 No limitation of total release. < 1,000,000 ac-ft — 10 June 1 – Oct 14; 6 Oct 15 – May 31 No limitation of total release.

Table SD B-9. Minimum Pool and Minimum Instream Flow Requirements (continued).

Facility	License Requirement	
Minimum Stream Maintenance Flow (continued)		
South Fork Long Canyon Diversion Dam	Forecast / Folsom Reservoir[1] > 1,000,000 ac-ft < 1,000,000 ac-ft	Release (cfs) lesser of 5 or natural flow lesser of 2.5 or natural flow
North Fork Long Canyon Diversion Dam	Releases to maintain streamflow of 2 cfs or the natural flow, whichever is less, shall be made at all times.	
Middle Fork Interbay	Forecast / Folsom Reservoir > 1,000,000 ac-ft < 1,000,000 ac-ft	Release (cfs) lesser of 23 or natural flow lesser of 12 or natural flow
Oxbow Powerhouse	Releases at Oxbow Powerhouse shall be 75 cfs at all times as measured downstream of the confluence with the North Fork of the Middle Fork. Such releases shall not cause vertical fluctuations (measured in representative section) greater than 3 feet per hour.	

[1]Forecast / Folsom Reservoir = CDWR current year forecast of unimpeded run-off of the American River to Folsom Reservoir.

Table SD B-10. Summary of Water Rights Permits.

Permit/ License No.	Type of Use	Source	Direct Diversion		Off-Stream Storage	
13855	Power/ Incidental Recreation	Duncan Creek to French Meadows Reservoir	150 cfs	Jan 1 - Dec 31	25,000 ac-ft 400 cfs max	Nov 1 - Jul 1
		Middle Fork American at French Meadows Reservoir	290 cfs	Jan 1 - Dec 31	95,000 ac-ft	Nov 1 - Jul 1
		Rubicon River at Hell Hole Reservoir	657 cfs	Jan 1 - Dec 31	129,000 ac-ft	Nov 1 - Jul 1
		South Fork Long Canyon to Hell Hole Reservoir or Middle Fork Power Plant	400 cfs	Jan 1 - Dec 31		
		North Fork Long Canyon to Hell Hole Reservoir or Middle Fork Power Plant	100 cfs	Jan 1 - Dec 31		
		Middle Fork American River at Middle Fork Interbay	1,000 cfs	Jan 1 - Dec 31		
		Middle Fork Am. River at Ralston Afterbay	1,225 cfs	Jan 1 - Dec 31		
13856	Irrigation, and Incidental Domestic, Recreational, Municipal and Industrial	Duncan Creek to French Meadows Reservoir			25,000 ac-ft 400 cfs max	Nov 1 - Jul 1
		Middle Fork American River to French Meadows Reservoir			95,000 ac-ft	Nov 1 - Jul 1
		Rubicon River to Hell Hole Reservoir	657 cfs	Jan 1 - Dec 31	129,000 ac-ft	Nov 1 - Jul 1
13857	Power/ Incidental Recreation	Duncan Creek	50 cfs	Jan 1 - Dec 31		
		Middle Fork American River to French Meadows Reservoir	110 cfs	Jan 1 - Dec 31	10,000 ac-ft	Nov 1 - Jul 1
		Rubicon River at Hell Hole Reservoir	155 cfs	Jan 1 - Dec 31	36,000 ac-ft	Nov 1 - Jul 1
		South Fork Long Canyon to Hell Hole Reservoir			13,000 ac-ft 830 cfs max	Nov 1 - Jul 1
		North Fork Long Canyon to Hell Hole Reservoir			7,000 ac-ft 830 cfs max	Nov 1 - Jul 1
		Middle Fork American River to Ralston Afterbay	705 cfs	Jan 1 - Dec 31		
13858	Irrigation, and Incidental Domestic, Recreational, Municipal and Industrial	North Fork American River	800 cfs	Nov 1 - Jul 1		
		Middle Fork American River to French Meadows Dam			10,000 ac-ft	Nov 1 - Jul 1
		Rubicon River at Hell Hole Reservoir			36,000 ac-ft	Nov 1 - Jul 1
		South Fork Long Canyon to Hell Hole Reservoir			13,000 ac-ft 830 cfs max	Nov 1 - Jul 1
		North Fork Long Canyon to Hell Hole Reservoir			7,000 ac-ft 830 cfs max	Nov 1 - Jul 1

Table SD B-10. Summary of Water Rights Permits (continued).

Permit/ License No.	Type of Use	Source	Direct Diversion		Off-Stream Storage	
13855-13858	Power/ Incidental Recreation Irrigation, and Incidental Domestic, Recreational, Municipal and Industrial	To French Meadows Reservoir			Maximum 133,700 ac-ft	
		To Hell Hole Reservoir			Maximum 208,400 ac-ft	
207541/ 126442	Power/ Incidental Recreation	Hell Hole Reservoir	40 cfs[2]	All Year		
		Hell Hole Reservoir	40 cfs[2]	All Year		
		Hell Hole Reservoir	Maximum 17,640 ac-ft/yr.			

[1]Also known as Permit 20750.
[2] Permit 20754 and License 12644 are additive.

Source:
(a) State of California Water Rights Board (SWRCB). Decision D-1104. Decision Approving Applications in the Matter of Application 18084, 18085, 18086, and 18087. November 21, 1962.
SWRCB. Permit Number 20754 issued 8-18-1994.

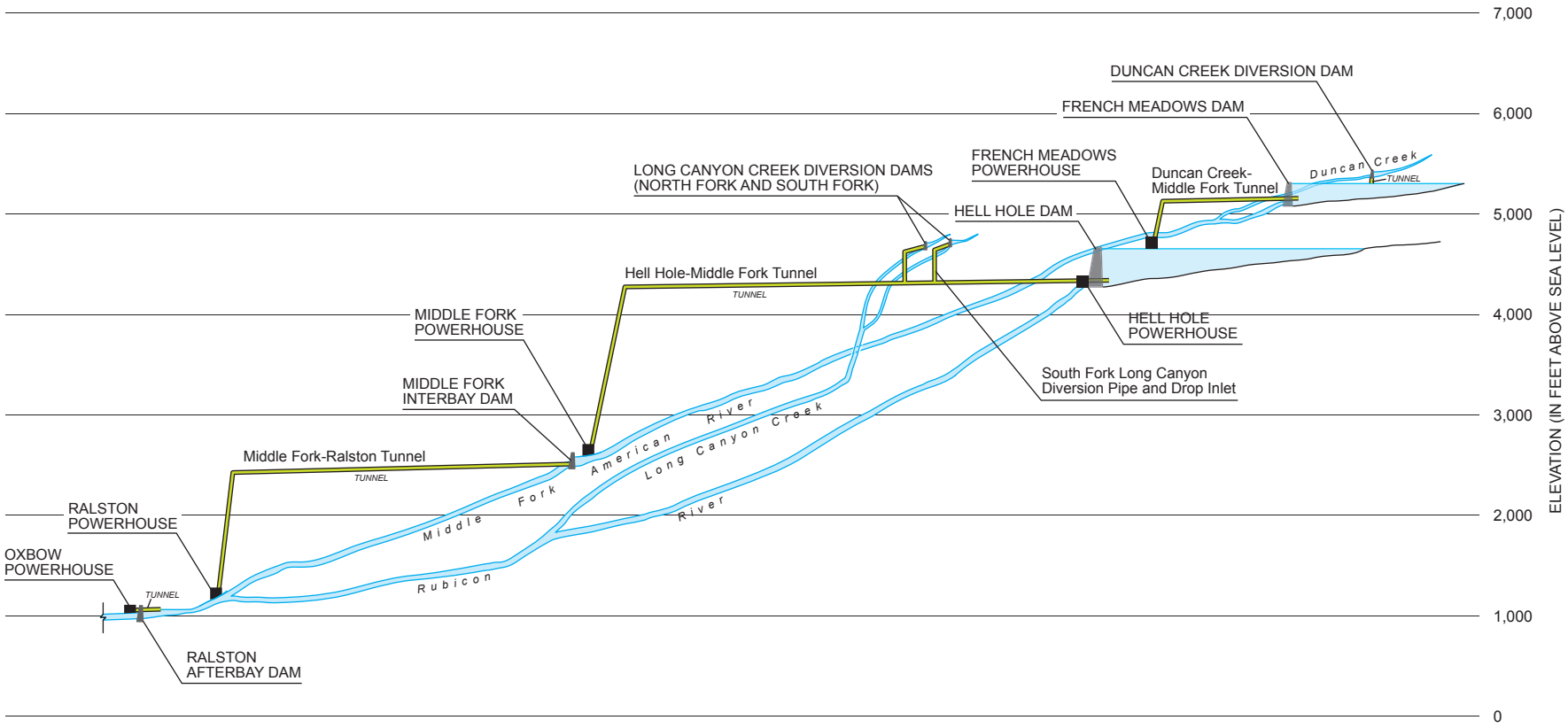
Table SD B-11. Summary of Project Generation and Outflows 2001 – 2005.

		French Meadows		Middle Fork		Ralston		Oxbow Powerhouse		TOTAL
Year	Quarter	Flow (ac-ft)	Generation (MWh)	Flow (ac-ft)	Generation (MWh)	Flow (ac-ft)	Generation (MWh)	Flow (ac-ft)	Generation (MWh)	Generation (MWh)
2001	1	1,888	998	40,322	66,762	48,851	53,934	71,411	4,785	126,479
	2	12,643	6,677	42,502	70,377	50,849	56,146	72,371	4,849	138,049
	3	37,333	19,706	89,724	148,585	95,213	105,115	100,586	6,739	280,145
	4	6,367	3,360	10,205	16,909	15,503	17,112	29,645	1,986	39,367
2001 Annual Total		**58,231**	**30,741**	**182,753**	**302,633**	**210,416**	**232,307**	**274,012**	**18,359**	**584,040**
2002	1	15,433	8,140	36,909	61,133	63,322	69,915	122,414	8,200	147,388
	2	13,043	6,887	47,018	77,860	61,800	68,232	96,879	6,491	159,470
	3	33,521	17,691	56,098	92,902	56,662	62,555	57,982	3,886	177,034
	4	26,128	13,802	45,384	75,157	52,336	57,776	64,802	4,342	151,077
2002 Annual Total		**88,126**	**46,520**	**185,410**	**307,052**	**234,120**	**258,478**	**342,076**	**22,919**	**634,969**
2003	1	29,986	15,828	70,298	116,428	90,032	99,401	136,492	9,144	240,801
	2	27,891	14,718	96,858	160,394	116,545	128,674	174,700	11,721	315,507
	3	40,011	21,127	110,321	182,703	109,109	120,457	123,550	8,278	332,565
	4	33,477	17,673	49,753	82,392	52,397	57,848	64,859	4,346	162,259
2003 Annual Total		**131,364**	**69,346**	**327,229**	**541,917**	**368,082**	**406,380**	**499,602**	**33,489**	**1,051,132**
2004	1	28,094	14,832	66,196	109,616	88,778	98,010	144,266	9,738	232,196
	2	12,680	6,695	66,789	110,605	69,715	77,180	93,158	6,242	200,722
	3	27,636	14,590	91,839	152,265	86,297	95,283	94,701	6,345	268,483
	4	23,944	12,650	83,510	138,302	84,998	94,745	100,463	6,732	252,429
2004 Annual Total		**92,354**	**48,767**	**308,334**	**510,788**	**329,788**	**365,218**	**432,587**	**29,057**	**953,830**
2005	1	11,185	5,908	31,533	52,229	58,294	64,364	131,129	8,785	131,286
	2	44,751	23,629	111,538	184,711	136,076	150,244	178,838	11,990	370,574
	3	40,227	21,241	102,787	170,220	100,449	110,898	113,107	7,578	309,937
	4	39,394	20,798	85,466	141,530	92,386	101,990	101,597	6,807	271,125
2005 Annual Total		**135,556**	**71,576**	**31,325**	**548,690**	**387,205**	**427,496**	**524,671**	**35,160**	**1,082,922**

Table SD B-12 Average Monthly Generation 2001-2005.

Month	French Meadows Powerhouse (MWh)	Middle Fork Powerhouse (MWh)	Ralston Powerhouse (MWh)	Oxbow Powerhouse (MWh)
Jan	3410	27403	23900	2379
Feb	2471	28662	25509	2508
Mar	3260	25169	27716	3244
April	3406	20946	23519	2829
May	2472	44988	36312	2876
June	5844	54855	36265	2553
July	5841	50324	33305	2281
Aug	6535	54299	35813	2311
Sept	6495	44713	29744	1973
Oct	4547	17069	11203	723
Nov	4308	32654	22229	1527
Dec	4801	41135	32462	2593

FIGURES



Horizontal dimension and size of facilities not to scale

PCWA

Placer County Water Agency
Middle Fork American River Project

Figure SD B-1

MFP Facilities - Elevation Profile

MFP Power and Communication Facilities

- Communication
- Power
- Power (underground)
- Communication/Power
- Communication/Power (underground)

Non-project Transmission Facilities

- PG&E Transmission - 60kV
- PG&E Transmission - 230kV

FRENCH MEADOWS DAM GENERATOR BUILDING

FRENCH MEADOWS DAM

French Meadows Dam Spillway

FRENCH MEADOWS DAM OUTLET WORKS

Radio Communications Tower and Repeater Station

2.4 kV/Comm. (underground)

MIDDLE FORK POWERHOUSE BUTTERFLY VALVE HOUSE

2.4 kV/ Comm.

FRENCH MEADOWS POWERHOUSE BUTTERFLY VALVE HOUSE

2.4 kV/ Comm.

MIDDLE FORK - RALSTON TUNNEL GATEHOUSE

2.4 kV/Communication

Powerhouse

120v/Comm.

MIDDLE FORK AMERICAN RIVER GAGE
ABOVE MIDDLE FORK POWERHOUSE

MIDDLE FORK INTERBAY DAM

Middle Fork Interbay Dam Spillway

230 kV | 60 kV

MIDDLE FORK POWERHOUSE AND SWITCHYARDS

PG&E 60 kV (Middle Fork - French Meadows)

60 kV

Powerhouse

60 kV

FRENCH MEADOWS POWERHOUSE AND SWITCHYARD

HELL HOLE SUBSTATION 60 kV

RALSTON POWERHOUSE BUTTERFLY VALVE HOUSE

4.16 kV/ Comm.

PG&E 230 kV (Ralston - Middle Fork)

PG&E 60 kV

PG&E 60 kV to Foresthill/Weimar/ Halsey Junction

HELL HOLE - MIDDLE FORK TUNNEL GATEHOUSE

Water Supply Tank serving Hell Hole Dormitory and Operator Cottages

2.4 kV

Operator Cottages and Shops

Hell Hole Dormitory Facility

12kV/Communication

Communication

OXBOW POWERHOUSE AND SWITCHYARD

60 kV

Powerhouse

RALSTON - OXBOW TUNNEL INTAKE

2.4 kV

RALSTON AFTERBAY DAM GENERATOR BUILDING

Ralston Afterbay Dam Spillway

RALSTON AFTERBAY DAM

Power-house | 230 kV | 60 kV

RALSTON POWERHOUSE AND SWITCHYARD

PG&E 230 kV to Goldhill Substation

HELL HOLE POWERHOUSE

Comm.

RUBICON RIVER GAGE
BELOW HELL HOLE DAM

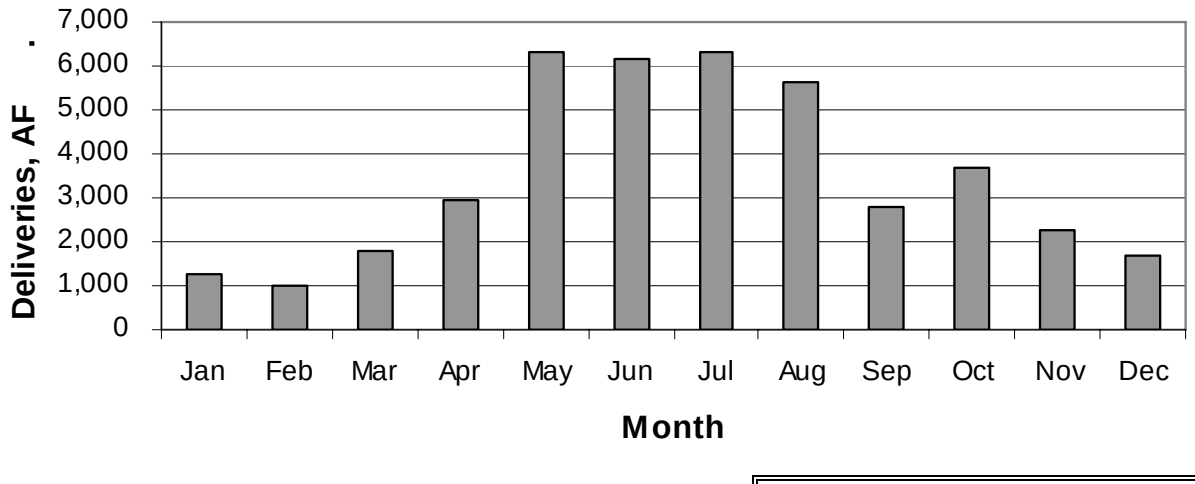
Not to scale

PCWA

Placer County Water Agency
Middle Fork American River Project

Figure SD B-2

Middle Fork Project Transmission, Power, and Communications Schematic



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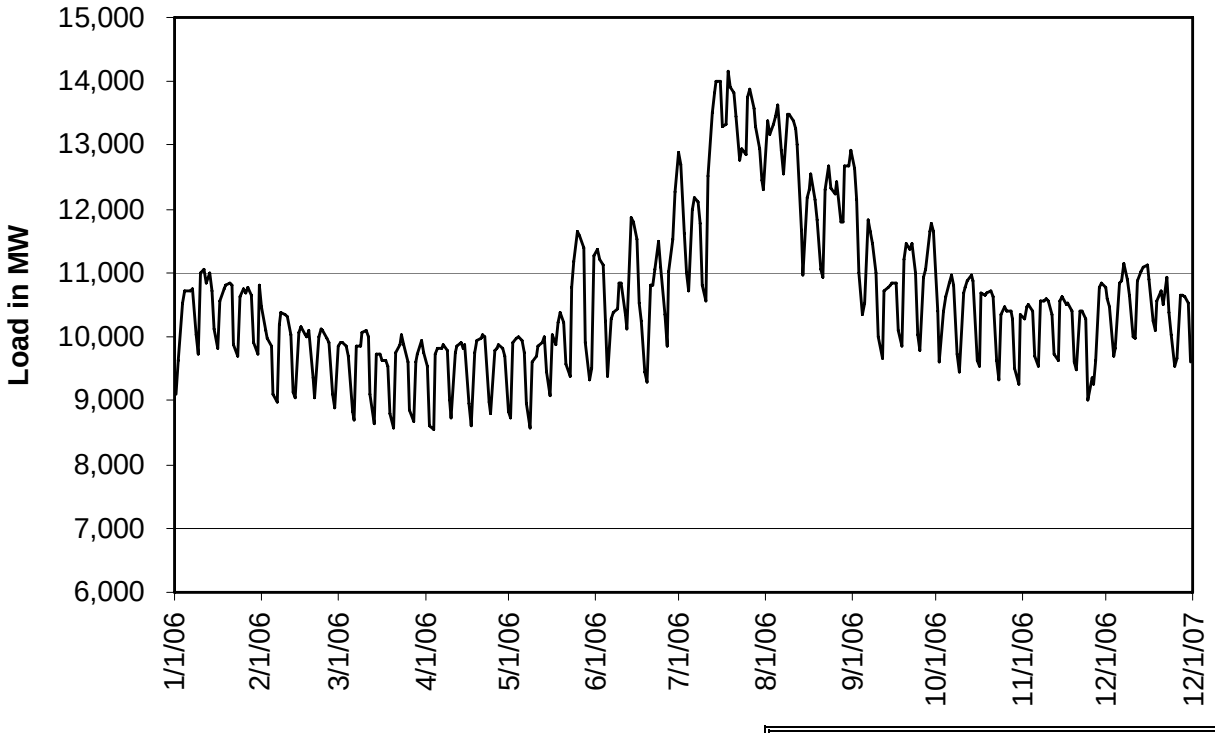
Middle Fork American River Project

Figure SD B-3

PCWA Deliveries for Consumptive Demand – 2004



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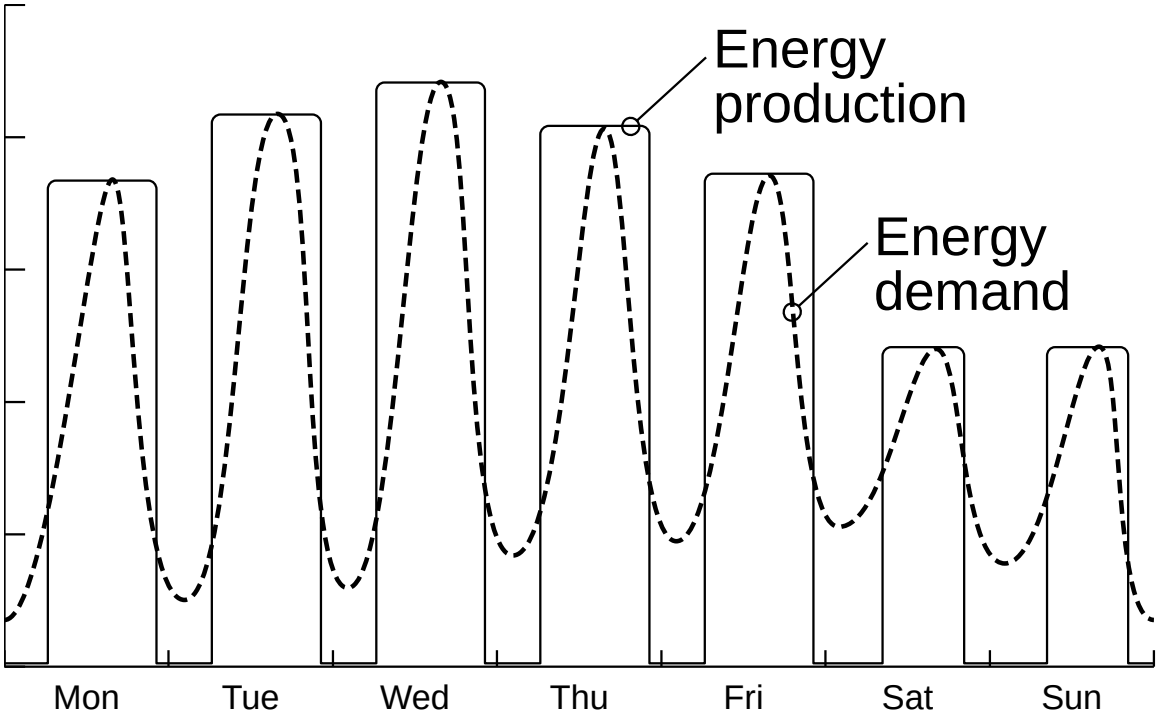
Middle Fork American River Project

Figure SD B-4

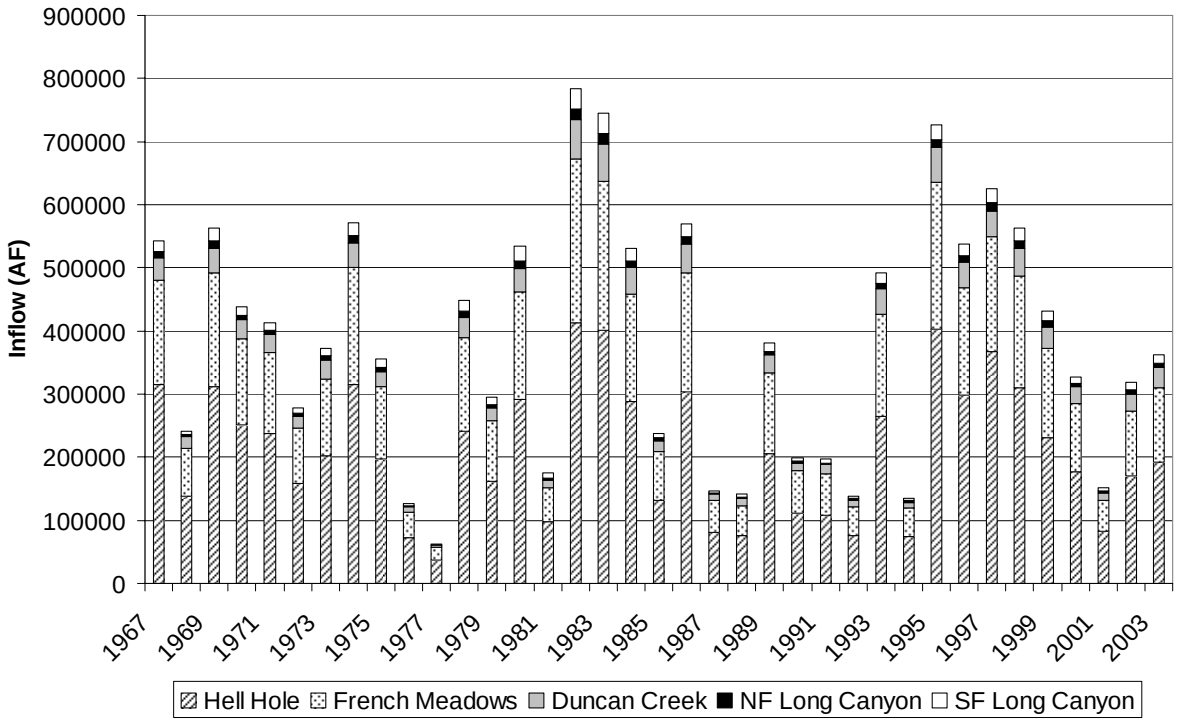
2005 Daily Average Northern California Load



Placer County Water Agency
Middle Fork American River Project

Figure SD B-5

Typical Daily/Weekly Energy Demand



PCWA

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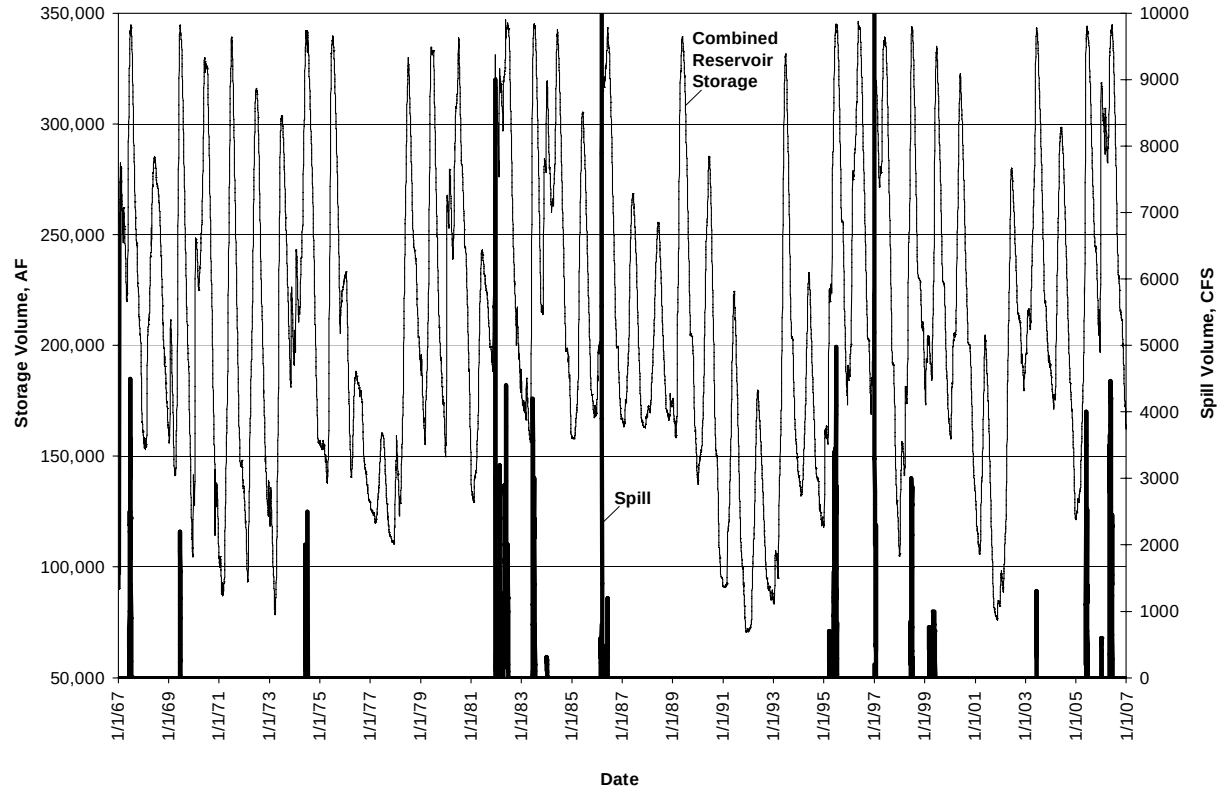
Middle Fork American River Project

Figure SD B-6

Annual MFP Inflows

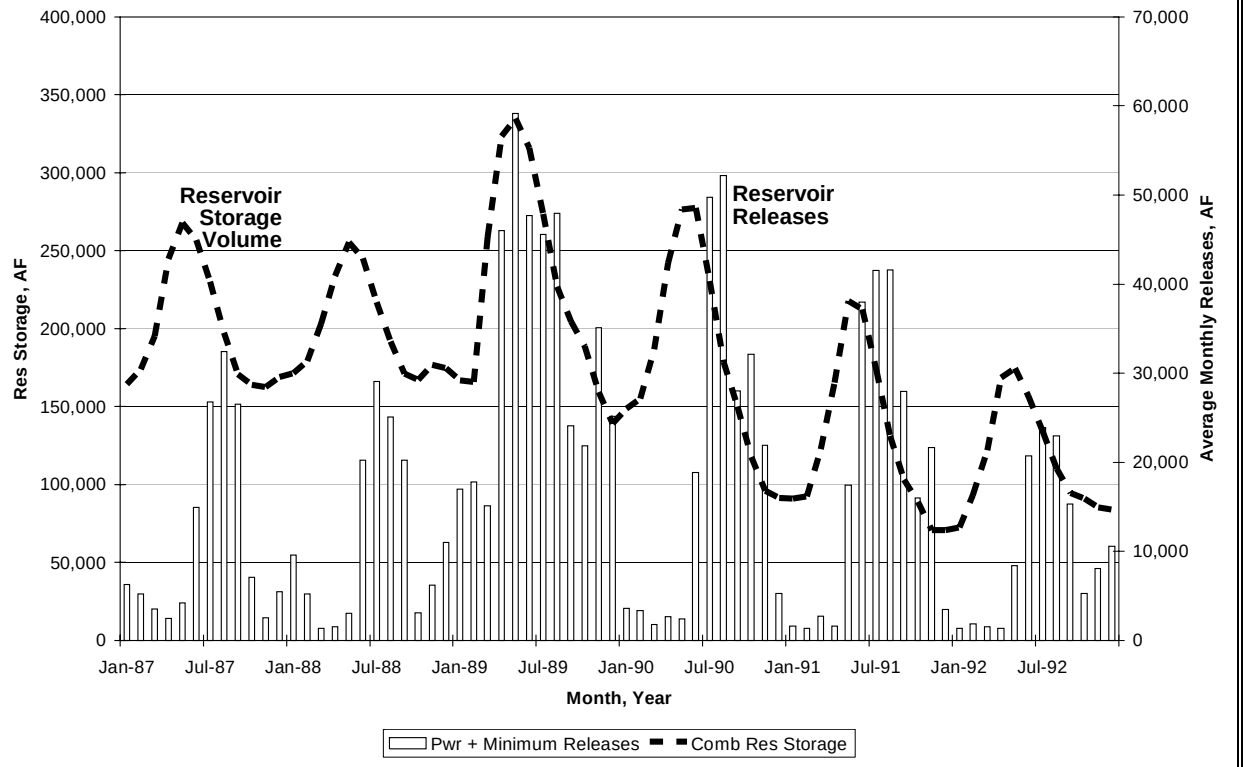


PCWA

Placer County Water Agency
Middle Fork American River Project

Figure SD B-7

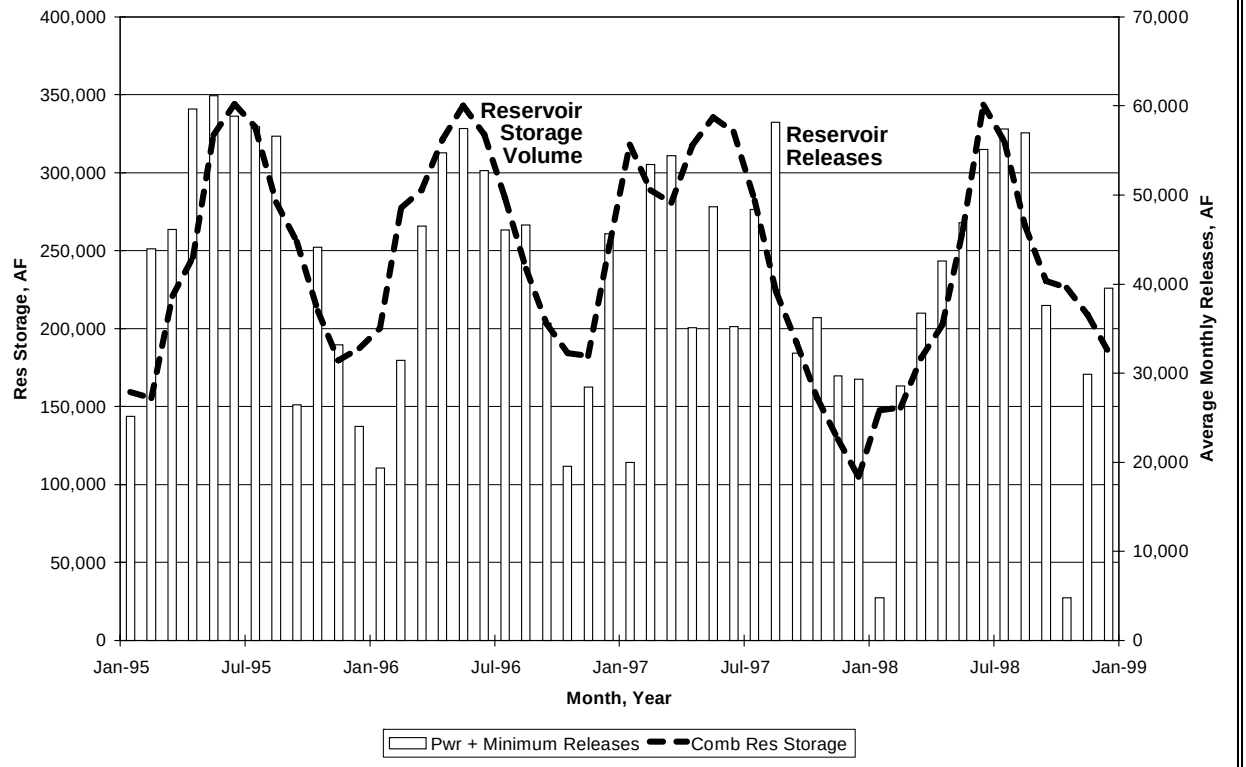
Middle Fork Project Combined Reservoir Storage and Spill



Placer County Water Agency
Middle Fork American River Project

Figure SD B-8

Releases vs Reservoir Storage, Drier Period (1987-1992)



PCWA

Placer County Water Agency
Middle Fork American River Project

Figure SD B-9

Releases vs Reservoir Storage, Wetter Period (1995-1998)

MAPS

APPENDIX A

Agents for Placer County Water Agency

Appendix A provides the exact name, business address, and telephone number of each person authorized to act as agent for the applicant pursuant to 18 CFR § 5.6(d)(2)(i):

David A. Breninger, General Manager
Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604
Telephone: (530) 823-4860
Facsimile: (530) 823-4960

Edward J. Tiedemann
Kronick, Moskovitz, Tiedemann & Girard, P.C.
400 Capitol Mall, 27th Floor
Sacramento, CA 95814
Telephone: (916) 321-4500
Facsimile: (916) 321-4555

