VERIFICATION

This Application for New License for Major Project – Existing Dam is executed in the

STATE OF CALIFORNIA
COUNTY OF PLACER

By: Einar L. Maisch, P.E.
Director of Strategic Affairs
Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604
144 Ferguson Road
Auburn, CA 95603

Einar Maisch, being first duly sworn, deposes and says: that he is the Director of Strategic Affairs of Placer County Water Agency, the Licensee making the Application for New License for the Middle Fork American River Project (FERC Project No. 2079); that the contents of this Application are true to the best of his knowledge and belief. The undersigned Applicant has signed the Application on this 14th day of February, 2011.

Einar L. Maisch, P.E.
Director of Strategic Affairs
Placer County Water Agency

State of California

County of Placer

On Feb. 14, 2011 before me, Beverly Sue Bell, Notary Public personally appeared Einar L. Maisch; who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

BEVERLY SUE BELL
Commission # 1840341
Notary Public - California
Placer County
My Comm. Expires Apr 10, 2013

Beverly Sue Bell

Notary Public

Initial Statement

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

APPLICATION FOR LICENSE FOR MAJOR WATER POWER PROJECT

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) refers to Section 4.51 (License for Major Project - Existing Dam) for a description of information that an applicant must include in the initial statement of its license application.

(1) (Name of Applicant) applies to the Federal Energy Regulatory Commission for (license or new license, as appropriate) for the (name of project) water power project, as described hereinafter. (Specify any previous FERC project number designation.)

(2) The location of the project is:
State or territory:_____
County:_____
Township or nearby town:_____
Stream or other body of water:_____

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

_____

_____

_____

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

_____

_____

_____

(4) The applicant is a [citizen of the United States, association of citizens of the United States, domestic corporation, municipality, or State, as appropriate] and (is/is not) claiming preference under section 7(a) of the Federal Power Act. See 16 U.S.C. 796.

(5)

(i) The statutory or regulatory requirements of the state(s) in which the project would be located that affect the project as proposed with respect to bed and banks and the appropriation, diversion, and use of water for power purposes, and with respect to the right to engage in the business of developing, transmitting, and distributing power and in any other business necessary to accomplish the purposes of the license under the Federal Power Act, are:

[provide citation and brief identification of the nature of each requirement; if the applicant is a municipality, the applicant must submit copies of applicable state or local laws or a municipal charter or, if such laws or documents are not clear, any other appropriate legal authority, evidencing that the municipality is competent under such laws to engage in the business of developing, transmitting, utilizing, or distributing power.]

(ii) The steps which the applicant has taken or plans to take to comply with each of the laws cited above are: [provide brief description for each requirement].

(6) The applicant must provide the name and address of the owner of any existing project facilities. If the dam is federally owned or operated, provide the name of the agency.

(1) Placer County Water Agency (PCWA or Applicant) applies to the Federal Energy Regulatory Commission (FERC or Commission) for a new license for the existing Middle Fork American River Project (MFP or Project), as described in the attached exhibits. The existing Project is designated as Project No. 2079 in the records of the Commission, pursuant to a license issued by the Commission on March 13, 1963, and effective on March 1, 1963, for a period of 50 years and terminating on March 1, 2013. This Application For New License for Major Project - Existing Dam is filed pursuant to 18 CFR § 5.18.

(2) The location of the Project is:

State: California
Counties: Placer and El Dorado
Township or Nearby Towns: Foresthill, Colfax, and Georgetown
Stream or Other Body of Water: Middle Fork American River, Rubicon River, and North Fork American River

(3) The exact name and business address of the Applicant are as follows:

Placer County Water Agency
Attention: General Manager
P.O. Box 6570
Auburn, CA 95604
144 Ferguson Road
Auburn, CA 95603
Telephone: (530) 823-4860

The exact name and business address of the person authorized to act as agent for the Applicant in this application is:

Einar Maisch, Director of Strategic Affairs
Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604
144 Ferguson Road
Auburn, CA 95603
Telephone: (530) 823-4889

(4) The Applicant is a municipality and is not claiming preference under Section 7(a) of the Federal Power Act. See 16 U.S.C. 796.

(5)

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

A. *California Water Code § 1200, et seq.; Title 23 California Code of Regulations § 650 et seq.* - permits an application to be filed with the State Water Resources Control Board (State Water Board) to obtain a permit to appropriate water, which is otherwise declared unappropriated, for beneficial uses including power uses.

B. *California Fish and Game Code § 1601* - requires that parties notify the California Department of Fish and Game (CDFG) prior to conducting any work in a streambed.

C. *California Water Code § 13160; Title 23 California Code of Regulations § 3855* - regulates the federally required filing of applications for water quality certification with the State Water Board.

D. *Public Utilities Code § 201, et seq.* - regulates the right of the public utility to produce, generate, transmit, or furnish power to the public.

E. *California Water Code § 6102* - requires owners of dams to cooperate with the California Division of Safety of Dams (CDSOD) in the inspection and maintenance of dams.

(ii) The steps which the Applicant has taken or plans to take to comply with each of the laws cited above are:

A. Applicant has either obtained the necessary permits and licenses or otherwise acquired water rights by appropriation and/or prescription for existing use of Project water. Applicant will file a request for a new water right with the State Water Board for additional water stored and

used for generation associated with the Hell Hole Reservoir Seasonal Storage Increase Improvement.

B. Applicant will submit a § 1601 notification to CDFG should work in a streambed be required.

C. The Applicant will request a water quality certification, including proof of the date on which the certifying agency received the request, no later than 60 days following FERC's issuance of the Notice of Acceptance and Ready for Environmental Analysis (REA).

D. The California Public Utilities Commission has authorized PCWA to produce, generate, transmit, or furnish power to the public.

E. Applicant cooperates with CDSOD on annual inspections of Project dams.

(6) The Applicant is the owner and existing licensee of the Project. The dams associated with the Project are not federally owned or operated.

Date: 2/14/2011

By: _____

Einar L. Maisch, P.E.
Director of Strategic Affairs
Placer County Water Agency

Section 5.18 Application Content

Section 5.18(a) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) describes general content requirements that an applicant for a new license (License for Major Project - Existing Dam) must include in its license application.

a) *General content requirements*. Each license application filed pursuant to this part must:

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

(2) Identify (providing names and mailing addresses):

(i) Every county in which any part of the project, and any Federal facilities that would be used by the project, would be located;

(ii) Every city, town, or similar local political subdivision:

(A) In which any part of the project, and any Federal facilities that would be used by the project, would be located; or

(B) That has a population of 5,000 or more people and is located within 15 miles of the project dam;

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

(A) In which any part of the project, and any Federal facilities that would be used by the project, would be located; or

(B) That owns, operates, maintains, or uses any project facilities that would be used by the project;

(iv) Every other political subdivision in the general area of the project that there is reason to believe would likely be interested in, or affected by, the application; and

(v) All Indian tribes that may be affected by the project.

(3)

(i) For a license (other than a license under section 15 of the Federal Power Act) state that the applicant has made, either at the time of or before filing the application, a good faith effort to give notification by certified mail of the filing of the application to:

(A) Every property owner of record of any interest in the property within the bounds of the project, or in the case of the project without a specific project boundary, each such owner of property which would underlie or be adjacent to any project works including any impoundments; and

(B) The entities identified in paragraph (a)(2) of this section, as well as any other Federal, state, municipal or other local government agencies that there is reason to believe would likely be interested in or affected by such application.

(ii) Such notification must contain the name, business address, and telephone number of the applicant and a copy of the Exhibit G contained in the application, and must state that a license application is being filed with the Commission.

(4)

(i) As to any facts alleged in the application or other materials filed, be subscribed and verified under oath in the form set forth in paragraph (a)(3)(B) of this Section by the person filing, an officer thereof, or other person having knowledge of the matters set forth. If the subscription and verification is by anyone other than the person filing or an officer thereof, it must include a statement of the reasons therefore.

(ii) This application is executed in the:

State of: _____
County of:_____

By: _____
(Name): _____
(Address):_____

being duly sworn, depose(s) and say(s) that the contents of this application are true to the best of (his or her) knowledge or belief. The undersigned Applicant(s) has (have) signed the application this __ day of _____, 2___.

(Applicant(s))
By: _____

Subscribed and sworn to before me, a [Notary Public, or title of other official authorized by the state to notarize documents, as appropriate] this __ day of _____, 2___.

/SEAL [if any]
(Notary Public, or other authorized official)

(1) To the knowledge of the Applicant, no person, citizen, association of citizens, domestic corporation, municipality, or state, other than the Applicant has or intends to obtain any proprietary right necessary to construct, operate, or maintain the Project.

(2)

(i) All Project boundaries and facilities are located in Placer and El Dorado counties. The principal administrative office locations are:

Placer County
Board of Supervisors
175 Fulweiler Avenue
Auburn, CA 95603

El Dorado County
Board of Supervisors
330 Fair Lane
Placerville, CA 95667

(ii) None of the Project boundaries or facilities are located within any city, town, or other similar local political subdivision. There are no communities of 5,000 or more people located within 15 miles of the Project.

(iii) There are no irrigation districts, drainage districts, or other similar special purpose political subdivisions located within the Project area or which own, operate, or maintain any Project facilities. No Federal facility is used or to be used by the Project.

(iv) The following political subdivisions or organizations in the general area of the Project may be interested in the Application for New License (License Application):

Auburn Chamber of Commerce
601 Lincoln Way
Auburn, CA 95603

Foresthill Municipal Advisory Committee
P. O. Box 207
Foresthill, CA 95631

Placer County Resource Conservation District
251 Auburn Ravine Road, Ste 105
Auburn, CA 95603

Auburn Union School District
255 Epperle Lane
Auburn, CA 95603

Foresthill Union School District
24750 Main Street
Foresthill, CA 95631

Placer Union High School District
P.O. 5048
Auburn, CA 95604-5048

There are no other political subdivisions in the general area of the Project. However, the Sacramento Municipal Utilities District (SMUD) owns property upstream of the Project and is likely to be interested in this notification.

SMUD's address:
Sacramento Municipal Utilities District
c/o James Shetler
Assistant General Manager, Energy Supply
P.O. Box 153830
Sacramento, CA 95852-1830

(v) The Federally recognized Indian tribes and other Indian organizations that may be affected by or interested in the Project include:

Colfax-Todds Valley
Consolidated Tribe
Tribal Chairperson
P.O. Box 4884
Auburn, CA 95604

El Dorado Intertribal Council
P.O. Box 564
El Dorado, CA 95623

Miwok Tribe of the El Dorado
Rancheria
Tribal Chairperson
P.O. Box 711
El Dorado, CA 95623

Nisenan Maidu
April Moore
19630 Placer Hills Rd
Colfax, CA 95713

*Shingle Springs Rancheria
Tribal Chairperson
P.O. Box 1340
Shingle Springs, CA 95682

Todd Valley Miwok-Maidu Cultural
Foundation
P.O. Box 1490
Foresthill, CA 95631

Tsi-Akim Maidu
Tribal Chairperson
1275 E Main St
Grass Valley, CA 95945

*United Auburn Indian Community
of the Auburn Rancheria
Tribal Chairperson
10720 Indian Hill Rd
Auburn, CA 95603

*Washoe Tribe of Nevada and
California
Tribal Chairperson
919 Highway 395 South
Gardnerville, NV 89410

*Denotes federally recognized tribal organizations

(3)

(i) For a license (other than a license under section 15 of the Federal Power Act) state that the applicant has made, either at the time of or before filing the application, a good faith effort to give notification by certified mail of the filing of the application to:

(A) Every property owner of record of any interest in the property within the bounds of the project, or in the case of the project without a specific project boundary, each such owner of property which would underlie or be adjacent to any project works including any impoundments; and

(B) The entities identified in paragraph (a)(2) of this section, as well as any other Federal, state, municipal or other local government agencies that there is reason to believe would likely be interested in or affected by such application.

(ii) Such notification must contain the name, business address, and telephone number of the applicant and a copy of the Exhibit G contained in the application, and must state that a license application is being filed with the Commission.

The Applicant consulted with the following property owners, federal and state resource agencies and municipal and other governmental agencies regarding relicensing of the Project:

Lone Star Timber II LP
c/o New Forestry LLC
3340 Peachtree Road NE
Suite # 1150
Atlanta, GA 30326

Sierra Pacific Industries
P.O. Box 496014
Redding, CA 96049-6014

American Bar Quartz Mining Company
Walter W. Stevens III
164 Mae Avenue
Pittsburg, CA 94565

US Forest Service - El Dorado National Forest
Ramiro Villalvazo, Forest Supervisor
100 Forni Road
Placerville, CA 95667

US Forest Service - Tahoe National Forest
Tom Quinn
Forest Supervisor
631 Coyote St.
Nevada City, CA 95959-2250

US Bureau of Reclamation
Regional Director
2800 Cottage Way,
Suite W-2605
Sacramento, CA 95825-1846

US Army Corps of Engineers
Patrick Dwyer
Civil Works Office
1325 J Street
Sacramento, CA 95814-2928

US Bureau of Land Management
William Haigh
63 Natoma Street
Folsom, CA 95630

US Environmental Protection Agency
Region 9 (AZ, CA, HI, NV)
75 Hawthorne Street
San Francisco, CA 94105

US Fish & Wildlife Service
Jeremiah Karuzas
2800 Cottage Way,
Room W-2605
Sacramento, CA 95825-1846

National Park Service
Stephen Bowes
CA Hydro Program Wild & Scenic Rivers Coordinator
1111 Jackson Street,
Suite 700
Oakland, CA 94607

California Department of Fish & Game
Robert Hughes
830 S Street
Sacramento, CA 95814

California State Parks
Bill Deitchman
501 El Dorado St
Auburn, CA 95603

State Water Resources Control Board
Russ Kanz
Division of Water Rights
PO Box 2000
Sacramento, CA 95812-2000

National Marine Fisheries Service
Habitat Manager
777 Sonoma Avenue, Rm. 325
Santa Rosa, CA 95404

National Oceanic & Atmospheric Adminstration - Fisheries
Eric Theiss
650 Capitol Mall, Suite 8300
Sacramento, CA 95814

Information Available to the Public

The Applicant makes the following information available to the public:

- Complete copy of this document (with the exception of confidential or sensitive materials);
- Complete copy of the current license, including all exhibits, appendices, and any amendments;
- Comments, pleadings, and supplementary or additional information received regarding the current license; and
- Correspondence served, filed, and received by the Applicant in connection with the current license and the License Application.

The above information is available to the public during regular business hours (9:00 a.m. to 5:00 p.m., Monday through Friday) at the Applicant's place of business:

Placer County Water Agency
144 Ferguson Road
Auburn, CA 95603

The public is instructed to contact Beverly Bell, Administrative Aide by e-mail at relicensing@pcwa.net or by telephone at (530) 823-4973 to make an appointment to review the information.

A copy of this document is available at the following public libraries:

Placer County Library 350 Nevada Street Auburn, CA 95603 (530) 886-4550 (530) 886-4555 (Fax)	El Dorado County Library 345 Fair Lane Drive Placerville, CA 95667 (530) 621-5540 (530) 622-3911 (Fax)

A copy of this document is available on PCWA's public Internet website, which can be accessed at http://relicensing.pcwa.net/. The website also contains information related to the Integrated Licensing Process (ILP), past and current relicensing activities, including meeting notices and agendas, meeting summaries, documents distributed to or received from participants, study plans and study reports, reference materials, and key decisions.

Notice of Availability

The Applicant will publish a notice of availability of this document twice within 14 days of the date it was submitted to agencies and Indian tribes in the following newspapers of general circulation:

Auburn Journal
Phone: (530) 885-5656
Fax: (530) 885-7235
1030 High St.
Auburn, CA 95603

Mail: P.O. Box 5910
Auburn, CA 95604

Mountain Democrat
Phone: (530) 622-1255
1360 Broadway
Placerville, CA 95667

Exhibit A Description of Project

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) refers to Section 4.51 (License for Major Project – Existing Dam) for a description of information that an applicant must include in Exhibit A of its license application.

Exhibit A is a description of the project. This exhibit need not include information on project works maintained and operated by the United States Army Corps of Engineers, the Bureau of Reclamation, or any other department or agency of the United States, except for any project works that are proposed to be altered or modified. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The description for each development must contain:

(1)	The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces, or other structures, whether existing or proposed, to be included as part of the project;
(2)	The normal maximum surface area and normal maximum surface elevation (mean sea level), gross storage capacity and usable storage capacity of any impoundments to be included as part of the project;
(3)	The number, type, and rated capacity of any turbines or generators, whether existing or proposed, to be included as part of the project;
(4)	The number, length, voltage, and interconnections of any primary transmission lines, whether existing or proposed, to be included as part of the project [see 16 U.S.C. 796(11)];
(5)	The specifications of any additional mechanical, electrical, and transmission equipment appurtenant to the project; and
(6)	All lands of the United States that are enclosed within the project boundary described under each paragraph (h) of this section (Exhibit G), identified and tabulated by legal subdivisions of a public land survey of the affected area or, in the absence of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary.

(1) General Configuration

Placer County Water Agency (PCWA or Licensee) owns and operates the Middle Fork American River Project (Project), a system consisting of five powerhouses, two major storage reservoirs, and five smaller regulating reservoirs and diversion pools that began operation in 1967. The Project supplies water for homes, industry, and agriculture and clean renewable energy to the California electric grid.

The Project is located within the Middle Fork American River Watershed, the majority of which is located in Placer County, California. A small component (a portion of Ralston Afterbay Dam) is located in El Dorado County, California. The FERC Project boundary encompasses 4,554 acres of land including: 1,883 acres within Tahoe National Forest (TNF) and 1,385 acres within Eldorado National Forest (ENF) both of which are administered by the United States Department of Agriculture-Forest Service (USDA-FS). The remainder of the MFP is located on PCWA-owned land or private land. An overview of the Project is presented in Figure A-1 and an elevation profile is provided in Figure A-2.

The Project has a total dependable generation capacity of 223.7 megawatts (MW) and has an average annual energy production of 1,039 gigawatt-hours[1] (GWh). The five powerhouses associated with the Project consist of French Meadows Powerhouse, Hell Hole Powerhouse, Middle Fork Powerhouse, Ralston Powerhouse, and Oxbow Powerhouse. The Project's major storage reservoirs, French Meadows and Hell Hole, have a combined gross storage of 342,583 acre-feet (ac-ft) and a combined active storage of 332,415 ac-ft. Electricity generated by the project is distributed by Pacific Gas & Electric Company (PG&E) through their transmission system; however, the PG&E transmission interconnections and transmission system are not part of the Project. A schematic diagram showing the PG&E transmission system and the points of interconnection with the Project is provided as Figure A-3. A description of the Project powerhouses and their associated facilities including dams, diversions, switchyards, and tunnels is provided below and summarized in Table A-1.

French Meadows Powerhouse and Associated Facilities

The facilities and infrastructure associated with the French Meadows Powerhouse are described below.

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-foot by 68-foot 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

[1] Generation from French Meadows, Middle Fork, Ralston, and Oxbow powerhouses is averaged over a 40-year period of record (1967 to 2006). Hell Hole Powerhouse was constructed in 1983; therefore, generation from Hell Hole Powerhouse is averaged over the 24-year period that the facility has been in operation (1983 to 2006). The Average Annual Energy Production represents the sum of the average net generation for the five Project powerhouses based on their respective period of record. Refer to Table B-5.

to the powerhouse. The powerhouse and switchyard are enclosed in a graded, fenced area that is approximately 223 feet by 58 feet.

The penstock associated with French Meadows Powerhouse consists of a 691-foot (0.1-mile)-long, 6.25-foot-diameter pipe located between French Meadows Powerhouse Penstock and Butterfly Valve House and French Meadows Powerhouse.

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 within an approximately 20-foot by 30-foot fenced area.

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 existing approximately 40-foot-wide spillway channel that is controlled by two 20-foot-wide radial spillway gates. PCWA is currently engaged in widening the existing spillway to conform to a revised Probable Maximum Flood (PMF) calculation. The existing spillway is being widened and new larger gates are being installed; work is anticipated to be completed in 2012. The new spillway will be 82 feet wide and controlled by two 36.5-foot-wide spillway gates. The new spillway structure will have a capacity of 39,957 cubic feet per second (cfs). The spillway channel joins the Middle Fork American River approximately 1,000 feet downstream of the dam. The existing spillway channel and gates have a maximum capacity of 19,800 cfs.

The dam is equipped with outlet works consisting of one 8-inch-diameter pipe with an 8-inch-diameter Howell-Bunger (HB) valve for instream flows and a second 72-inch-diameter pipe with an upstream slide gate and a 60-inch ring jet valve for low-level discharge. The 8-inch pipe has a nominal capacity of 8 cfs. The 72-inch-diameter pipe for low-level discharge has a maximum calculated release capacity of 1,430 cfs at full reservoir. Trash racks are installed over both inlets.

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 Ogee spillway that has a capacity of 7,200 cfs and

includes a 10-inch outlet pipe (Duncan Creek Stream Maintenance Pipe) controlled by an angle valve. The pipe has a slide gate and is equipped with a trash screen. This pipe provides instream flows and has a release capacity of 8 cfs. The dam also includes a 60-inch-diameter pipe (low level outlet) controlled by a 60-inch manually operated sluice gate equipped with a grizzly. The low level outlet has a nominal hydraulic capacity of 310 cfs.

Duncan Creek – Middle Fork Tunnel

Water is routed from Duncan Creek Diversion to the French Meadows Reservoir via the Duncan Creek – Middle Fork Tunnel. The tunnel intake is located at the south side of the diversion pool and is approximately 9 feet wide by 10 feet high and 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. A trash rack is fitted over the intake structure to prevent debris from entering the tunnel. Stop logs are used to stop flow through 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, 13,694-foot-long horseshoe cross-section. 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 that is situated approximately 1,000 feet from the southern shoreline. The inlet is an 8-foot-diameter pipe equipped with a trash rack. 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 vertical Francis turbine, water is discharged from the powerhouse to Hell Hole Reservoir.

French Meadows Dam Staging Area

A maintenance work staging area is located adjacent to the French Meadows Dam Spillway Discharge Channel. This unimproved staging area is used for equipment mobilization and temporary storage of bulk materials.

Radio Tower

One radio tower and repeater are located near the French Meadows – Hell Hole Tunnel Gatehouse and are maintained for communication purposes in the Project vicinity.

Proposed Structures – Duncan Creek Diversion

PCWA proposes to modify the Duncan Creek Diversion facility to:

- Improve system reliability;
- Increase natural sediment delivery and transport of bedload and fine material downstream of the diversion;
- Re-establish sediment connectivity; and
- Reduce operation and maintenance costs by reducing the need for manual debris removal and periodic sediment removal for the diversion.

The modifications will result in increased water supply, as well as have power generation benefits.

In general, modification of the diversion will include retrofitting the existing structures with a self-cleaning, wedge-wire screen intake. The wedge-wire screen intake is a stream bottom intake screen that allows water to be diverted into the Project diversion intake while concurrently permitting mobilized sediments (bed load and fine material) to naturally be transported downstream. Specific modifications include: (1) modifying the existing diversion dam and intake structure into a self-cleaning, wedge-wire intake; (2) raising the dam abutment to avoid overtopping during floods; (3) modification to the existing instream flow outlet so that it can maintain a bypass flow and has first priority for water flowing into the wedge-wire intake; and (4) modification to the existing low-level outlet so that it can still be used for dewatering the diversion pool in addition to dewatering the wedge-wire intake collection channel.

The design is still under discussion with relicensing participants and jurisdictional resource agencies, and it is anticipated that final design specifications will be completed after the issuance of a new license for the Project. Additional details for the diversion improvement are provided below.

The existing Duncan Creek Diversion intake is located at the entrance to the tunnel which is 150 feet upstream of the diversion weir. The proposed design is comprised of the following principal components:

- A new self-cleaning, wedge-wire screen intake will be located on the upstream side of the existing ogee section of the diversion weir.
- A new concrete collection channel will be constructed upstream of the existing concrete diversion dam ogee spillway and a new concrete overflow weir will be constructed on the upstream side of the concrete collection channel.
- A new buried concrete conduit will be constructed between the intake and the existing tunnel portal.
- The dam abutments and the existing intake structure will be raised above flood levels (3.5 feet).
- The existing trash rack on the existing tunnel intake will be covered with stop logs to block off direct flow from the existing intake into the tunnel.
- A remote controllable slide gate will be installed to control inflow to the tunnel.
- The existing low-level outlet through the dam will be modified so that it can still be used for dewatering the impoundment and dewatering the intake collection channel.
- The existing instream flow outlet will be modified so that it can maintain a bypass flow and has first priority for water flowing into the intake.
- Diversion flow measuring equipment will be installed.
- Security improvements will be implemented.
- New communications uplinks will be installed.
- A self-contained solar/thermal electric power supply system will be installed.
- Access to the east abutment of the dam will be improved by extending the existing Duncan Creek Diversion Dam Intake Road to the Duncan Creek Dam south abutment. Access would be on top of the proposed conduit between the tunnel intake and the diversion dam.

Hell Hole Powerhouse and Associated Facilities

The facilities and infrastructure associated with the Hell Hole Powerhouse are described below.

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-foot by 26-foot- and 10-foot-high concrete block building. 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. The electricity is also used to provide power to nearby Project facilities.

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 has a rectangular inlet with a trash rack into a horizontal 13-foot horseshoe shaped tunnel. The tunnel leads to a 16-inch-diameter pipe equipped with a 12-inch hollow-cone valve for instream flows (Instream Flow Pipe), and a 48-inch-diameter pipe equipped with a hollow-cone valve for low-level discharge (Low Level Outlet). A 20-inch-diameter pipe with valve control that supplies water to the Hell Hole Powerhouse is connected to the 48-inch pipe. The 48-inch-diameter HB valve has a maximum calculated discharge capacity of 852 cfs at full reservoir. However, non-emergency flow through the dam outlet works is limited to approximately 200 cfs to protect structural integrity of the upstream butterfly valve. In addition, releases from the 48-inch HB valve have the potential to flood the powerhouse and erode the powerhouse access road. The maximum nominal hydraulic capacity of the instream flow pipe is 20 cfs.

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.

Hell Hole Staging Area

A maintenance work staging area is located adjacent to the Dormitory Facility at Hell Hole Reservoir. This unimproved staging area is used for equipment mobilization and temporary storage of bulk materials.

Proposed Structures

In preparation for the relicensing of the Project, PCWA conducted an assessment to identify potential modifications to existing Project facilities that would improve operations or maintenance of the Project, and result in an increase in annual or peaking generation. As a result of this assessment, PCWA has identified one Project improvement—Hell Hole Reservoir Seasonal Storage Increase Improvement. The purpose of this improvement is to seasonally increase the

storage capacity of Hell Hole Reservoir by approximately 7,600 ac-ft, utilizing a portion of the existing flood pool above the present normal maximum operating water level to store additional water during the spring and summer after the peak of the runoff period. This increase would be achieved by modifying the existing 350-foot-long Hell Hole Dam ogee spillway to allow for installation of 6-foot-high pneumatically operated steel spillway crest gates (Hell Hole Dam Spillway Crest Gates). Operation of the crest gates would seasonally increase the reservoir's inundation area, within the existing flood pool, by approximately 36 acres.

In years when either French Meadows or Hell Hole reservoirs would have spilled, this improvement would allow the Project to capture additional water in storage in Hell Hole Reservoir which could later be used to increase annual energy generation. In all but the driest years, the improvement would also allow the Project to shift the timing of some generation from the spring runoff period to the summer peak energy demand period. While the shift in the timing of the generation will not increase total annual Project generation, it will increase the benefit of the Project by increasing generation during the peak energy demand period. This improvement would require a new water right to allow for additional storage at Hell Hole Reservoir. Additional information on the Hell Hole Reservoir Seasonal Storage Increase is provided in Exhibit H (i)(A)(1).

This improvement requires construction of three new Project facilities in addition to the 6-foot-high crest gates including:

- Hell Hole Dam Spillway Crest Gates Control Building – A small (20-foot by 20-foot) concrete block control building on the east abutment of the dam between the dam and spillway to provide power (propane powered emergency electric generator with an outdoor propane tank) to operate the spillway crest gates.
- Hell Hole Dam Spillway Crest Gates Control Building Powerline – A short spur line from the control building to an existing 12 kV distribution line (the French Meadows Powerhouse and Switchyard to Hell Hole – Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator Cottages, and Hell Hole Powerhouse Communication Line/Powerline) that currently serves Hell Hole Powerhouse to provide power for spillway crest gate operations. The powerline will run in a conduit attached to the existing bridge over the Hell Hole Dam Spillway and then underground for approximately 60 feet to the new control building.
- Hell Hole Dam Spillway Gates Road – A new road will be constructed to access the new spillway gates.

Middle Fork Powerhouse and Associated Facilities

The facilities and infrastructure associated with the Middle Fork Powerhouse are described below.

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-foot by 154-foot 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 60 kV at the powerhouse's main transformer bank. There are two switchyards adjacent to the Middle Fork Powerhouse, the Upper and Lower switchyards. The switchyards provide interconnection to PG&E's 60 kV and 230 kV 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 250-foot by 360-foot dimensions.

The penstock associated with the Middle Fork Powerhouse is 3,653 feet (0.7 mile) long, and 7.5–9 feet in diameter above the bifurcation. The penstock extends from the Middle Fork Powerhouse Penstock and Butterfly Valve House to the Middle Fork Powerhouse. Below the bifurcation, the penstock is 5.5 feet in diameter.

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 7 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 is equipped with a grizzly (Middle Fork Interbay Dam Low Level Outlet) and a 23-inch-diameter stream maintenance pipe and slide gate equipped with a trash rack (Middle Fork Interbay Dam Stream Maintenance Pipe). The 60-inch pipe has a maximum calculated capacity of 890 cfs at full reservoir and the instream flow pipe has a maximum capacity of 23 cfs at full reservoir.

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 1 ac-ft of storage on North Fork Long Canyon Creek. The width of the dam crest acts as an uncontrolled Ogee spillway with a 3,000 cfs discharge capacity. The diversion includes a 12-inch-diameter pipe (North Fork Long Canyon Stream Maintenance Pipe) with a manually controlled12-inch slide gate and a 36-inch-diameter outlet pipe (North Fork Long Canyon Low Level Outlet).

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 1 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 (South Fork Long Canyon Stream Maintenance Pipe) with a 12-inch slide gate and a 36-inch-diameter outlet pipe manually controlled with a slide gate (South Fork Long Canyon Low Level Outlet).

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. The inlet is an 11.5-foot-diameter pipe equipped with a trash rack. Water flow is controlled by the Hell Hole – Middle Fork Tunnel Gatehouse, located on the north shore of Hell Hole Reservoir approximately 0.5 mile 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 8-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. After 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- to 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 Parshall flume with a slide gate into North Fork Long Canyon Diversion Pipe and Drop Inlet. The diversion pipe is a 36-inch-diameter, 3,530-foot-long buried steel pipe. 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 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 with an inlet weir equipped with a trash rack. 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.

Microwave Reflector and Radio Tower

One passive microwave reflector station and one radio tower with a repeater are maintained for communication purposes in the vicinity of Middle Fork Powerhouse. The passive microwave reflector station is located near Middle Fork Interbay and the radio tower and repeater are located near the Hell Hole – Middle Fork Tunnel Surge Shaft and Tank.

Proposed Structures – North Fork Long Canyon and South Fork Long Canyon Diversions

PCWA proposes to modify the North Fork Long Canyon and South Fork Long Canyon diversion facilities to:

- Improve system reliability;
- Increase natural sediment delivery and transport of bedload and fine material downstream of the diversions;
- Re-establish sediment connectivity; and

- Reduce operation and maintenance costs by reducing the need for manual debris removal and periodic sediment removal for each diversion.

The modifications will result in increased water supply, as well as have power generation benefits.

In general, modifications of the diversions will include retrofitting the existing structures with self-cleaning, wedge-wire screen intakes. The wedge-wire screen intake consists of a stream bottom intake screen that allows water to be diverted into the Project diversion intakes while concurrently permitting mobilized sediments (bed load and fine material) to naturally be transported downstream. Specific improvements include: (1) installation of a wedge-wire intake; (2) raising dam abutments to avoid overtopping during floods; (3) modification to the existing instream flow outlets so that they can maintain the bypass flows and have first priority for water flowing into the wedge-wire intake; and (4) modification to the existing low-level outlets so that they can still be used for dewatering the diversion pools in addition to dewatering the wedge-wire intake collection channels.

The designs are still under discussion with relicensing participants and jurisdictional resource agencies, and it is anticipated that final design specifications will be completed after the issuance of a new license for the Project. The proposed design for each diversion is comprised of the following principal components:

- A new self-cleaning, wedge-wire screen intake will be constructed on the upstream side of the existing ogee section of the diversion weirs at both diversions.
- A new concrete chamber will be constructed to connect the intake channels with the existing intakes to the existing buried discharge pipelines at the North Fork Long Canyon and South Fork Long Canyon diversions that convey the diverted flow to the top of the shafts that drop into the Hell Hole – Middle Fork Tunnel.
- The height of the weir abutments will be increased to provide adequate freeboard during floods (2.7 feet at North Fork Long Canyon Diversion and 3.5 feet at South Fork Long Canyon Diversion).
- A remote controlled slide gate to control inflow to the tunnel will be installed.
- The existing low-level outlets will be modified through the dams so that they can be used for dewatering the impoundments and for discharging instream flows downstream of the weirs. The existing instream flow release outlet at North Fork Long Canyon Diversion in the center of the existing weir would be decommissioned.
- The existing in-stream flow outlets will be modified to maintain bypass flows and will have first priority for water flowing into the intake.
- Flow measuring equipment will be installed (new gages) downstream of the diversions.

- Security improvements will be implemented.
- New communications uplinks will be installed.
- A self-contained solar/thermal electric power supply system will be installed.

Ralston Powerhouse and Associated Facilities

The facilities and infrastructure associated with the Ralston Powerhouse are shown described below.

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-foot by 90-foot 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 into Ralston Afterbay.

Electricity generated at the powerhouse is increased to 230 kV at the powerhouse's main transformer bank. The Ralston Powerhouse is interconnected to PG&E's 60 kV 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-foot by 295-foot fenced area that is graded.

The penstock associated with Ralston Powerhouse is 1,670 feet long and ranges from 8 to 9.5 feet in diameter. It extends from the Ralston Powerhouse Butterfly Valve House to Ralston Powerhouse.

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 and Rubicon rivers 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 amount of Ralston Afterbay storage available for use by the Oxbow Powerhouse is 756 ac-ft. 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 with a grizzly and is controlled by a slide gate. This pipe has a maximum calculated capacity of 1,132 cfs at full reservoir.

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, 35,397-foot-long horseshoe cross-section. The first 8,245 feet of the tunnel 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 intake tunnel is equipped with a slide gate and trash rack.

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.

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.

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 Reflector

A passive microwave reflector station is maintained for communication purposes near Ralston Afterbay.

Oxbow Powerhouse and Associated Facilities

The facilities and infrastructure associated with the Oxbow Powerhouse are described below.

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-foot by 98-foot 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 120-foot by 145-foot maximum dimensions.

The penstock associated with Oxbow Powerhouse is 5 feet long and 9 feet in diameter. Water from Ralston Afterbay enters the Ralston – Oxbow Tunnel Intake and flows through this penstock into Oxbow Powerhouse.

Ralston – Oxbow Tunnel

The Ralston – Oxbow Tunnel routes water from Ralston Afterbay to the Oxbow Powerhouse. 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 intake structure is located approximately 0.15 mile from the north end of the Ralston Afterbay Dam. The tunnel was constructed with a 13.25-foot-wide, 403-foot-long horseshoe cross-section. It is lined with concrete along 343 feet of its length and with steel along the last 60 feet before the powerhouse. The inlet tunnel is equipped with a slide gate and a trash rack. It has a flow capacity of 1,088 cfs when Ralston Afterbay is full.

(2) Storage Capacity

The Project includes two major storage reservoirs (French Meadows Reservoir and Hell Hole Reservoir), two smaller regulating reservoirs (Middle Fork Interbay and Ralston Afterbay), and three diversion pool impoundments (Duncan Creek Diversion Pool, North Fork Long Canyon Diversion Pool, and South Fork Long Canyon Diversion Pool) as described in Item (1) above and Table A-1. The following provides a summary of the normal maximum surface area, normal maximum surface elevation, gross storage capacity, and usable storage capacity for the major storage reservoirs, smaller regulating reservoirs, and the Duncan Creek Diversion Pool. All the information is not available for the small diversion pools associated with North Fork Long Canyon Diversion and the South Fork Long Canyon Diversion which have gross storage capacities of less than 1 acre-foot (ac-ft).

French Meadows Reservoir

- Normal maximum surface area – 1,408 acres
- Normal maximum surface elevation – 5,262 feet mean sea level (msl)

- Gross storage capacity – 134,993 ac-ft
- Usable storage capacity (active storage) (as constructed) – 127,358 ac-ft

Hell Hole Reservoir

- Normal maximum surface area – 1,253 acres
- Normal maximum surface elevation – 4,630 feet msl
- Gross storage capacity – 207,590 ac-ft
- Usable storage capacity (active storage) (as constructed) – 205,057 ac-ft

Middle Fork Interbay

- Normal maximum surface area – 7 acres
- Normal maximum surface elevation – 2,529 feet msl
- Gross storage capacity – 175 ac-ft
- Usable storage capacity (active storage) – 173 ac-ft

Ralston Afterbay

- Normal maximum surface area – 83 acres
- Normal maximum surface elevation – 1,177[2] feet msl
- Gross storage capacity – 2,782 ac-ft
- Usable storage capacity (active storage) – 1,804 ac-ft

Duncan Creek Diversion Pool

- Normal maximum surface area – 2 acres
- Normal maximum surface elevation – 5,265 feet msl
- Gross storage capacity – 20 ac-ft
- Usable storage capacity (active storage) – n/a

North Fork Long Canyon Diversion Pool

- Normal maximum surface area – <2 acres
- Normal maximum surface elevation – 4,716 feet msl
- Gross storage capacity – <1 ac-ft
- Usable storage capacity (active storage) – n/a

South Fork Long Canyon Diversion Pool

- Normal maximum surface area – <2 acres
- Normal maximum surface elevation – 4,640 feet msl
- Gross storage capacity – <1 ac-ft
- Usable storage capacity (active storage) – n/a

[2] 1,177 feet msl is the normal maximum operating level, although the top of the spill gates is at 1,179 feet msl.

(3) Turbines and Generators

The Project includes five powerhouses (French Meadows Powerhouse, Hell Hole Powerhouse, Middle Fork Powerhouse, Ralston Powerhouse, and Oxbow Powerhouse) as described in Item (1) above and Table A-1. A summary of the number, type, and rated capacity of the existing turbines and generators associated with the project is provided below. No new turbines or generators are proposed for the Project.

- *French Meadows Powerhouse* – The French Meadows Powerhouse contains one, Francis-type turbine and one electrical generator with an installed generating capacity of 15.3 MW at 450 revolutions per minute (RPM).

- *Hell Hole Powerhouse* – The Hell Hole Powerhouse contains one, Francis-type turbine and one electrical generator with an installed generating capacity of 0.73 MW at 1,200 RPM.

- *Middle Fork Powerhouse* – The Middle Fork Powerhouse contains two, Pelton-type waterwheel turbines that are each connected to 61.2 MW electrical generators to provide an installed generating capacity of 122.4 MW at 400 RPM.

- *Ralston Powerhouse* – The Ralston Powerhouse contains one, Pelton-type waterwheel turbine and one electrical generator with an installed generating capacity of 79.2 MW at 240 RPM.

- *Oxbow Powerhouse* – The Oxbow Powerhouse contains one, Francis-type turbine and one electrical generator with an installed generating capacity of 6.1 MW at 200 RPM.

The Project includes two generator buildings for site power that are located at the French Meadows Dam and Ralston Afterbay Dam. These facilities include fuel storage and an engine generator.

(4) Primary Transmission Lines

Electricity generated by the Project is distributed by PG&E through their transmission system; however, the PG&E transmission interconnections and transmission system are not part of the Project. Accordingly, the Project does not include any primary transmission lines.

(5) Mechanical, Electrical, and Transmission Equipment

In addition to the facilities and equipment discussed in Items (1) and (3) above, the Project also includes transformers, stationary cranes, powerlines, communication lines, stream and staff gages, and weirs as summarized below.

Transformers

Transformers are located at the French Meadows, Middle Fork, and Ralston powerhouses.

Station Cranes

One PCWA-owned crane is located at French Meadows Powerhouse (50-ton) and two are located at Oxbow Powerhouse (45-ton and 7.5-ton). The cranes are used to move equipment around the powerhouse deck.

Powerlines and Communication Lines

Fourteen Project powerlines and communication lines, which total approximately 6.5 miles in length, provide power to operate Project equipment and allow communication between Project facilities. Figure A-3 shows a schematic diagram of the transmission lines, communication lines, and powerlines, and Table A-2 provides detailed information, including the length, voltage, and interconnections, on each Project power or communication line. Ten lines serve dual purposes by providing both power and communication capabilities to Project facilities. These dual lines have two types of lines on the same poles.

In addition to the existing powerlines, the Hell Hole Reservoir Seasonal Storage Increase Improvement includes the construction of one powerline, the Hell Hole Dam Spillway Crest Gates Control Building Powerline. This proposed powerline consists of an approximately 525-foot spur line extending from the proposed Hell Hole Dam Spillway Crest Gates Control Building to an existing 12 kV distribution line (the French Meadows Powerhouse and Switchyard to Hell Hole – Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator Cottages, and Hell Hole Powerhouse Communication Line/Powerline). The proposed powerline will provide power for operations of the spillway crest gates. The powerline will run in a conduit attached to the existing bridge over the Hell Hole Dam Spillway and then underground for approximately 60 feet to the new control building.

Gaging Stations and Weirs

A description of the gages and weirs associated with the Project is provided below and in Table A-3.

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 stream gages and associated weirs located above and below the Duncan Creek Diversion. These gages are used to verify compliance with the Federal Energy Regulatory Commission (FERC) instream flow requirements.

- Middle Fork American River – There are four stream gages and one weir located along the Middle Fork American River as follows:
  - one gage and weir below French Meadows Dam;
  - one gage above Middle Fork Powerhouse;
  - one gage at Middle Fork Interbay Dam; and
  - one gage below the Oxbow Powerhouse.

Each of these gages, except for the gage above Middle Fork Powerhouse, provides flow measurements to verify compliance with FERC instream flow requirements.

- North and South Fork Long Canyon Diversions – There are two stream gages and associated weirs located at the North Fork and South Fork Long Canyon Diversions. These gages are situated downstream of the diversions and measure FERC-required instream flows.
- Rubicon River Gage and Weir below Hell Hole Dam – This gage and associated weir are located below Hell Hole Dam and Powerhouse and provide flow measurements to determine compliance with FERC instream flow requirements.

All of the stream gaging stations have been incorporated into the United States Geological Survey (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 supplied with electricity by a line from the powerhouse. The gage at the Middle Fork Interbay Dam is supplied with electricity from an existing powerline.

Diversion Gages

Flow gages are located at the diversion inlets to both the North and South Fork Long Canyon diversions. These gages provide direct measurements of diversion flows and are powered by photovoltaic cells located on a nearby pole.

Reservoir Gages

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

- French Meadows Reservoir – one reservoir gage and one staff gage;
- Hell Hole Reservoir – one reservoir gage and one staff gage;
- Middle Fork Interbay – one reservoir gage; and
- Ralston Afterbay – one reservoir gage.

Reservoir gages are used to directly measure the water surface elevation and determine compliance with FERC requirements such as minimum pool in the

storage reservoirs (French Meadows Reservoir and Hell Hole Reservoir). 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.

Powerhouse Gages

Gages are located in each of the Project powerhouses except for the Hell Hole Powerhouse. Flow is currently calculated for each powerhouse based on the measured power generated. In the future, flow will be measured directly with electronic measuring equipment.

Leakage Weirs

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

Proposed Gages

PCWA proposes to install new gages for documenting compliance with the proposed instream flow measures associated with the new license including minimum instream flows, pulse flows, ramping rates, and recreation flows. In addition, PCWA proposes to include two existing gages in the Project for dissemination of real-time flow information to the public. The timing of the construction and installation of the new gages is discussed in Exhibit C. The new gages that are proposed to be installed include:

- Duncan Creek – Duncan Creek Diversion Tunnel will be constructed to monitor minimum instream flows and pulse flows for compliance with the new license.

- Middle Fork American River – There are five new stream gages that will be located on the Middle Fork American River as follows:
    - Flow measurement equipment will be installed at the French Meadows Dam Outlet Works—one on the instream flow pipe and one on the low level outlet to monitor minimum instream flows, pulse flows, and down ramp of spill flows for compliance with the new license (Middle Fork American River at French Meadows);
    - A new gage will be installed below Middle Fork Interbay Dam to monitor minimum instream flows and pulse flows for compliance with the new license (Middle Fork American River below Interbay Dam);
    - Flow measurement equipment will be installed on the instream flow pipe at Ralston Afterbay Dam Outlet Works to monitor minimum instream flows for compliance with the new license (Middle Fork American River at

Ralston Afterbay Dam); and

- Flow measurement equipment will be installed on the Oxbow Powerhouse Penstock (Oxbow Powerhouse Penstock).

- North Fork American River – One proposed gage will be installed to monitor recreation flow releases on the North Fork American River, downstream of the Middle Fork American River confluence, and collect flow data for real-time flow dissemination to the public (North Fork American River above American River Pump Station).
- North Fork Long Canyon Creek – One new gage will be installed downstream of the diversion dam to monitor minimum instream flows and pulse flows for compliance with the new license (North Fork Long Canyon Creek below Diversion Dam). North Fork Long Canyon Gage at Diversion Tunnel (USGS Gage No. 11433080) will be modified to monitor minimum instream flows for compliance with the new license.
- South Fork Long Canyon Creek – One new gage will be installed downstream of the diversion dam to monitor minimum instream flows and pulse flows for compliance with the new license (South Fork Long Canyon Creek below Diversion Dam). South Fork Long Canyon Gage at Diversion Tunnel (USGS Gage No. 11433060) will be modified to monitor minimum instream flows for compliance with the new license.
- Rubicon River – PCWA proposes three new gages on the Rubicon River, as follows:
  - Flow measurement equipment will be installed at the Hell Hole Dam Outlet Works—one on the instream flow pipe and one on the low level outlet (Rubicon River at Hell Hole Dam) to monitor minimum instream flows, pulse flows, and down ramp of spill flows for compliance with the new license; and
  - One new gage will be installed on the Hell Hole Dam Spillway to monitor pulse flows and down ramp of spill flows for compliance with the new license (Rubicon River at Hell Hole Dam Spillway).

The two existing gages that PCWA proposes to include in the Project for dissemination of real-time flow information to the public are located on the Rubicon River as follows:

- Rubicon River above Ralston Powerhouse; and
- Rubicon River above Ellicott Bridge.

(6) Lands of the United States within Project Boundaries

Lands of the United States that are within the Project boundaries, including legal subdivisions and acreage are listed in Table A-4.

TABLES

Table A-1. 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 cu yd
Elevation of Dam Crest	5,275 ft
Elevation of Streambed	5,243 ft
Elevation of Spillway Crest	5,265 ft
Stream Maintenance Pipe Capacity (10-in pipe)	8 cfs
Maximum Low-Level Outlet Capacity (60-in pipe)	310 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 mi
Concrete Lined (Est.)	300 ft
Maximum Diversion Capacity	400 cfs
Invert Gradient	0.0029
French Meadows Dam (*L L Anderson Dam*) and 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 5,262 (full reservoir)	1,430 cfs

Table A-1. Project Facility Specifications (continued).

French Meadows Dam (*L L Anderson Dam*) and Reservoir (continued)	
Spillway	
Type	Gated Ogee Crest
Type of Gates	Radial
Number of Gates	2
Size of Gates	36.5 ft x 18.5 ft
Capacity (Res. Water Surface 5,271, 2 ft freeboard)	39,957 cfs
Reservoir	
Maximum Operating Water Surface	5,262.0 ft
Minimum Operating Water Surface	5,125 ft
Gross Storage	134,993 ac-ft
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 mi
French Meadows – Hell Hole Tunnel	
Nominal Size/Shape	12 ft 4 in/Horseshoe
Length:	
Total	13,694 ft or 2.6 mi
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 mi
Diameter	6 ft 3 in O.D.
Powerhouse	
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
Minimum Estimated Hydraulic Capacity	50 cfs
Maximum Estimated Hydraulic Capacity	400 cfs
R.P.M.	450

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

Table A-1. Project Facility Specifications (continued).

Hell Hole Dam and Reservoir	
Dam	
Type	Rock Fill
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 cu yd
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
Spillway	
Type	Uncontrolled
Elevation of Spillway Crest	4,630 ft
Width at Lip	350 ft
Capacity (Water Surface 4,647, 2.8 ft 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 mi
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
Minimum Estimated Hydraulic Capacity	10 cfs
Maximum Estimated Hydraulic Capacity	35 cfs
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 mi
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

Table A-1. Project Facility Specifications (continued).

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 cu yd
Stream Maintenance Pipe Capacity (12-in pipe)	2 cfs
Maximum Low-Level Outlet Capacity (36-in pipe)	100 cfs
Spillway	
Type	Uncontrolled Overflow
Elevation of Spillway Crest	4,716 ft
Width of Spillway Crest	95 ft
Capacity	3,000 cfs
Reservoir	
Gross Storage	<1 ac-ft
North Fork Long Canyon Diversion Pipe and Drop Inlet	
Pipe	
Diameter	36 in
Length	3,530 ft or 0.7 mi
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 cu yd
Stream Maintenance Pipe Capacity (12-in pipe)	5 cfs
Maximum Low-Level Outlet Capacity (36-in pipe)	140 cfs
Spillway	
Type	Uncontrolled Overflow
Width of Spillway Crest	60 ft
Elevation of Spillway Crest	4,640 ft
Capacity	4,000 cfs
Reservoir	
Gross Storage	<1 ac-ft

Table A-1. Project Facility Specifications (continued).

South Fork Long Canyon Diversion Pipe and Drop Inlet	
Diameter	6 ft
Depth without 6 ft 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 mi
Diameter: Above Bifurcation	7 ft 6 in to 9 ft O.D.
Diameter: Below Bifurcation	5 ft 6 in O.D.
Powerhouse	
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
Minimum Estimated Hydraulic Capacity	50 cfs
Maximum Estimated Hydraulic Capacity	940 cfs
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 cu yd
Stream Maintenance Pipe Capacity	23 cfs
Low-Level Outlet Capacity at Water Surface 2,530 (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 2,534)	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

Table A-1. Project Facility Specifications (continued).

Middle Fork Interbay (continued)	
Reservoir	
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 mi
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.
Powerhouse	
Installed Capacity, Generator	79.2 MW
Type of Turbine	Impulse
Elevation Nozzles	1,186 ft
Static Head	1,344 ft
Minimum Estimated Hydraulic Capacity	75 cfs
Maximum Estimated Hydraulic Capacity	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 cu yd
Elevation of Dam Crest	1,189 ft
Elevation of Streambed	1,100 ft
Streamflow Maintenance Pipe Capacity (30-in pipe)	155 cfs
Maximum Low-Level Outlet Capacity at water surface 1,179 (full reservoir) - calculated (72-in pipe)	1,132 cfs

Table A-1. Project Facility Specifications (continued).

Ralston Afterbay (continued)	
Dam (continued)	
Roadway Width, Curb to Curb	12 ft
Elevation of Roadway	1,188.42 ft
Spillway	
Type	Gated Ogee Crest
Capacity at Water Surface 1,186	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 ft x 40 ft
Reservoir	
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 mi
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.
Powerhouse	
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
Minimum Estimated Hydraulic Capacity	200 cfs
Maximum Estimated Hydraulic Capacity	1,025 cfs
R.P.M.	200

Table A-1. Project Facility Specifications (continued).

Summary	
Power and Energy Production	
Total Installed Capacity (at 0.9 power factor)	223.7 MW
Total Dependable Capacity (at 0.9 power factor)	223.7 MW
Average Annual Energy Production[1]	1,039,078 MWh
Maximum Total Static Head	4,162
Water Supply and Regulation	
Total Gross Storage	345,560 ac-ft
Project Features	
Earth and Rock Fill Dams	11,900,000 cu yd
Concrete Dams and Diversions	94,000 cu yd
Tunnels and Penstocks	23.2 mi
Project Completed – 1967	

[1]Generation from French Meadows, Middle Fork, Ralston, and Oxbow powerhouses is averaged over a 40-year period of record (1967 to 2006). Hell Hole Powerhouse was constructed in 1983, therefore, generation from Hell Hole Powerhouse is averaged over the 24-year period that the facility has been in operation (1983 to 2006). The Average Annual Energy Production represents the sum of the average net generation for the five Project powerhouses based on their respective period of record. Refer to Table B-5.

Notes:
ac-ft = acre-feet
cfs = cubic feet per second
cu yd = cubic yards
ft = feet
I.D. = inside diameter
in = inch
MW = megawatt
MWh = megawatt hours
mi = miles
O.D. = outside diameter

Table A-2. Description of Project Communication Lines and Powerlines.

Name	Start	End	Length (Approximate)	Voltage	Purpose
French Meadows Area					
French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	French Meadows Dam Generator Building	French Meadows Dam Outlet Works	0.23 mi.	208 V	Supplies power from the motor-generator
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
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
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	2.35 mi.	12 kV	Power for facility operation and communication between facilities
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
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
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

Table A-2. Description of Project Communication Lines and Powerlines (continued).

Name	Start	End	Length (Approximate)	Voltage	Purpose
Middle Fork Interbay Area (continued)					
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	0.37 mi.	2.4 kV	Power and communication between facilities
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
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 and communication to the Powerhouse
Ralston – Oxbow Area					
Ralston – Oxbow Tunnel Intake to Ralston Powerhouse Communication Line	Ralston – Oxbow Tunnel Intake	Ralston Powerhouse	1.51 mi.	2.4 kV	Communication between the tunnel intake and Ralston Powerhouse
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
Ralston Afterbay Dam Generator Building to Ralston – Oxbow Tunnel Intake Communication Line/Powerline	Ralston Afterbay Dam Generator Building	Ralston – Oxbow Tunnel Intake Gatehouse	0.14 mi.	2.16 kV	Communication and power to operate equipment at the tunnel intake
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

Table A-3. Project Gages and Weirs.

Location	No.
Stream Gages and Weirs	
Duncan Creek near French Meadows	USGS Gage No. 11427700
Duncan Creek below Diversion Dam	USGS Gage No. 11427750
Middle Fork American River below French Meadows	USGS Gage No. 11427500
Middle Fork American River below Interbay Dam	USGS Gage No. 11427770
Middle Fork American River above Middle Fork Powerhouse	USGS Gage No. 11427760
Middle Fork American River near Foresthill	USGS Gage No. 11433300
North Fork Long Canyon Creek below Diversion Dam	USGS Gage and Weir No. 11433085
South Fork Long Canyon Creek below Diversion Dam	USGS Gage and Weir No. 11433065
Rubicon River below Hell Hole Dam	USGS Gage and Weir No. 11428800
Diversion Gages	
North Fork Long Canyon Creek Diversion Tunnel	USGS Gage No. 11433080
South Fork Long Canyon Creek Diversion Tunnel	USGS Gage No. 11433060
Reservoir Gages	
French Meadows Reservoir	USGS Gage No. 11427400
French Meadows Reservoir Staff Gage	-
Hell Hole Reservoir	USGS Gage No. 11428700
Hell Hole Reservoir Staff Gage	-
Middle Fork Interbay Reservoir	-
Ralston Afterbay Reservoir	-
Powerhouse Gages	
French Meadows Powerhouse	USGS Gage No. 11427200
Middle Fork Powerhouse	USGS Gage No. 11428600
Oxbow Powerhouse	USGS Gage No. 11433212
Ralston Powerhouse	USGS Gage No. 11427765
Leakage Weirs	
French Meadows Dam Leakage Weirs Nos. 1–6	-
Hell Hole Dam Leakage Weir	-

Table A-4. Lands of the United States Within the Boundaries of the Middle Fork American River Project.

Location	Acreage
Bureau of Land Management (BLM)	
T14 R11 S33, T13 R11 S4	3.75
USDA-FS Eldorado National Forest	
T13 R11 S1	1.54
T13 R11 S2	13.64
T13 R11 S2	3.42
T13 R11 S2	7.85
T13 R11 S2	17.78
T13 R11 S2,S11	0.26
T13 R11 S3	16.47
T13 R12 S6	8.18
T13 R13 S6	1.80
T14 R12 S32	0.01
T14 R12 S32	1.90
T14 R12 S32	7.80
T14 R12 S34	12.54
T14 R12 S35	6.34
T14 R12 S36	2.80
T14 R12 S36	5.27
T14 R12 S36	5.22
T14 R12 S36	4.06
T14 R12 S36	6.43
T14 R12 S36	4.13
T14 R12 S36	0.04
T14 R13 S24	3.59
T14 R13 S24	0.57
T14 R13 S24	0.58
T14 R13 S24	1.92
T14 R13 S26	13.93
T14 R13 S31	10.73
T14 R13 S32	13.40
T14 R13 S34	13.90
T14 R13 S34	1.21
T14 R14 S10	458.94
T14 R14 S12	105.67
T14 R14 S16	2.32
T14 R14 S16	0.09
T14 R14 S16	371.98
T14 R14 S16	5.67
T14 R14 S16	6.00
T14 R14 S16	0.47
T14 R14 S18	0.33
T14 R14 S2	124.51
T14 R14 S20	0.04
T14 R14 S21	0.57

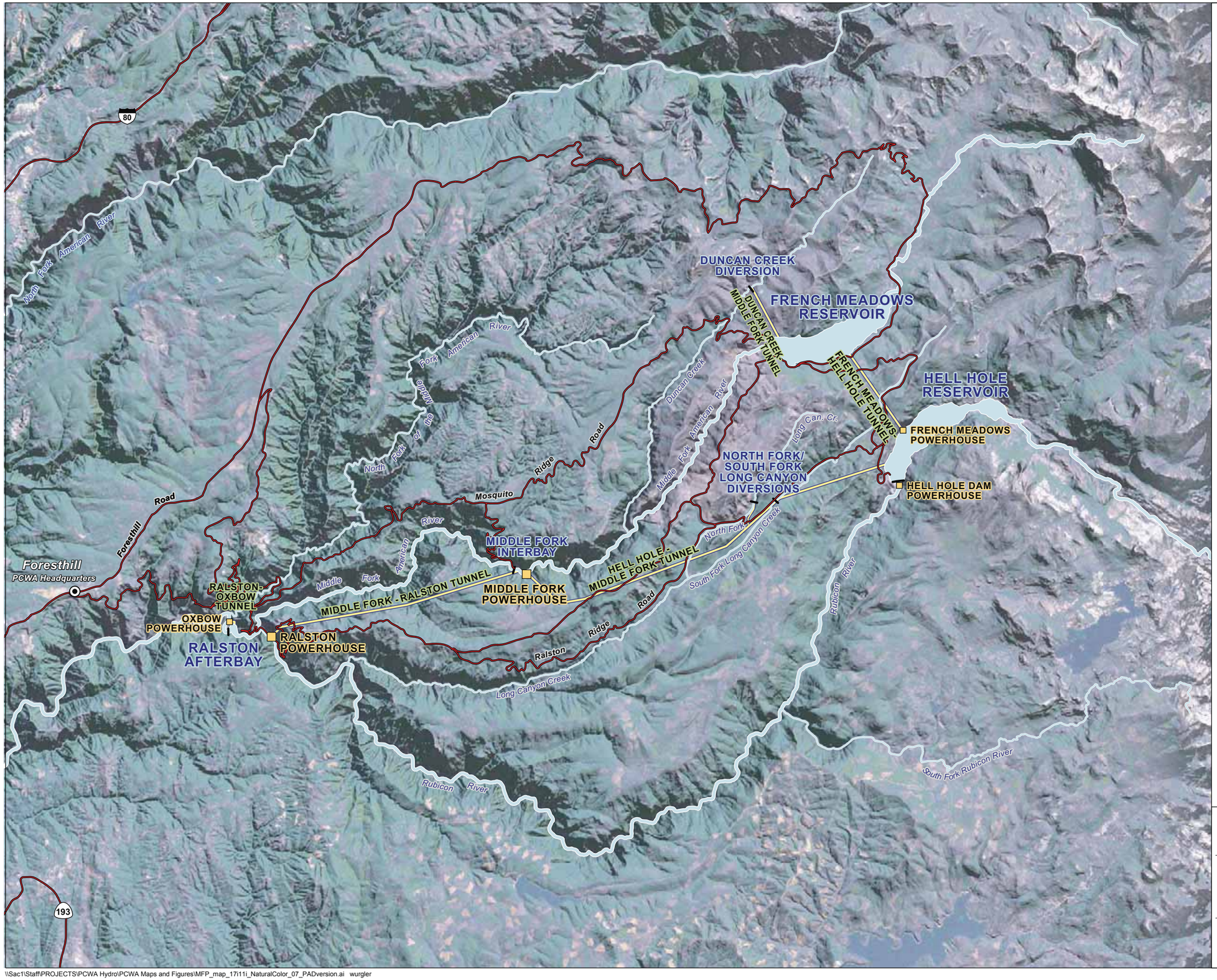
Table A-4. Lands of the United States Within the Boundaries of the Middle Fork American River Project (continued).

Location	Acreage
USDA-FS Eldorado National Forest (continued)	
T14 R14 S4	11.81
T14 R14 S8	15.93
T14 R14 S8	0.78
T14 R14 S8	1.44
T14 R14 S8,S9,S16	1.55
T14 R14 S9	2.32
T14 R14 S9	0.49
T14 R14 S9	8.05
USDA-FS Tahoe National Forest	
T13 R11 S3	58.15
T13 R11 S3	3.02
T13 R11 S4	17.28
T13 R11 S4	0.05
T14 R12 S22,S23,S26	26.92
T14 R12 S26	1.05
T14 R13 S30	0.25
T14 R14 S15,S22	2.39
T15 R13 S23	0.19
T15 R13 S23,S26	8.08
T15 R13 S24	17.18
T15 R13 S24	4.62
T15 R13 S25	56.57
T15 R13 S25	4.31
T15 R13 S25	6.96
T15 R13 S36	277.48
T15 R14 S11	4.76
T15 R14 S21	0.47
T15 R14 S21	1.28
T15 R14 S21	148.74
T15 R14 S21	19.03
T15 R14 S21,S28	1.51
T15 R14 S22	24.42
T15 R14 S28	245.68
T15 R14 S28	99.60
T15 R14 S29	326.56
T15 R14 S30	37.47
T15 R14 S30	9.61
T15 R14 S31	205.92
T15 R14 S31	40.24
T15 R14 S31	24.68
T15 R14 S32	12.33
T15 R14 S32	4.81
T15 R14 S32	2.19
T15 R14 S32	34.79

Table A-4. Lands of the United States Within the Boundaries of the Middle Fork American River Project (continued).

Location	Acreage
USDA-FS Tahoe National Forest (continued)	
T15 R14 S32	4.03
T15 R14 S32,S33	0.59
T15 R14 S32,S33	1.07
T15 R14 S33	9.65
T15 R14 S33	1.61
TOTAL ACREAGE OF FEDERAL LANDS	**3,055.56**

FIGURES



Middle Fork Project Facts and Figures

PROJECT SUMMARY

Project Completed 1967	
Total Energy Production Capacity:	223.7 MW
Average Annual Energy Production:	1,039,078 MWh
Total Gross Water Storage:	345,560 acre-feet (af)
Earth and Rockfill Dams:	11,900,000 cubic yards
Concrete Dams and Diversions:	94,000 cubic yards
Tunnels and Penstocks:	23.2 miles

RESERVOIRS AND DIVERSIONS	Elevation	Storage Capacity
Duncan Creek Diversion	5,265´	20 af
French Meadows Reservoir	5,244.5´	134,993 af
Hell Hole Reservoir	4,630´	207,590 af
North Fork Long Canyon Diversion	4,716´	0.39 af
South Fork Long Canyon Diversion	4,640´	0.83 af
Middle Fork Interbay	2,529´	175 af
Ralston Afterbay	1,179'	2,782 af

POWERHOUSES		Production Capacity
French Meadows Powerhouse	4,630´	15.3 MW
Hell Hole Powerhouse	4,240´	0.73 MW
Middle Fork Powerhouse	2,529´	122.4 MW
Ralston Powerhouse	1,175´	79.2 MW
Oxbow Powerhouse	1,089´	6.1 MW

TUNNELS		Discharge Capacity
Duncan Creek-Middle Fork Tunnel	-	400 cfs
French Meadows-Hell Hole Tunnel	-	400 cfs
Hell Hole-Middle Fork Tunnel	-	920 cfs
Middle Fork-Ralston Tunnel	-	836 cfs
Ralston-Oxbow Tunnel	-	1,088 cfs

PCWA

Placer County Water Agency
Middle Fork American River Project

Fig A-1
Middle Fork Project and Vicinity

0 1 2 Miles

Rev. Date: 1/27/11

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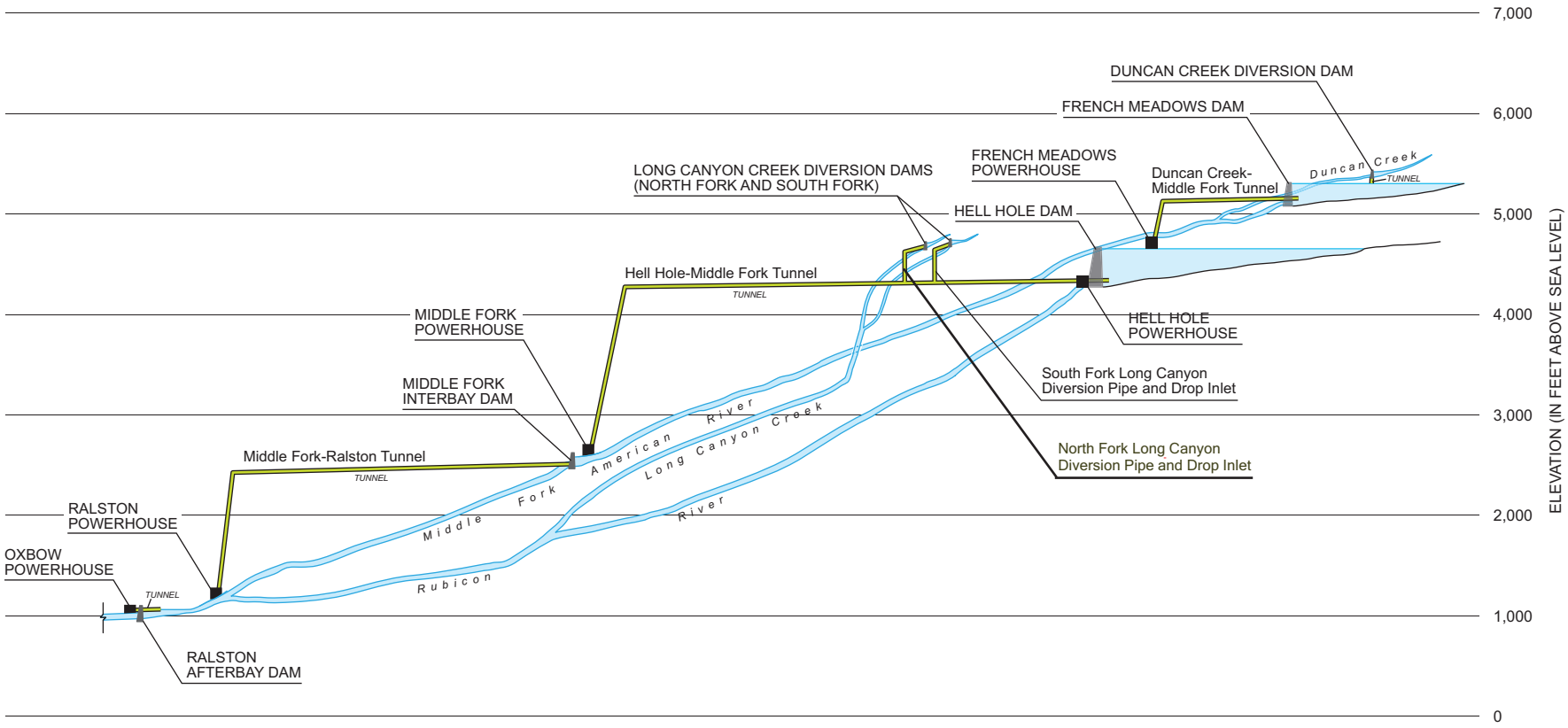


Horizontal dimension and size of facilities not to scale

PCWA

Placer County Water Agency
Middle Fork American River Project

Figure A-2

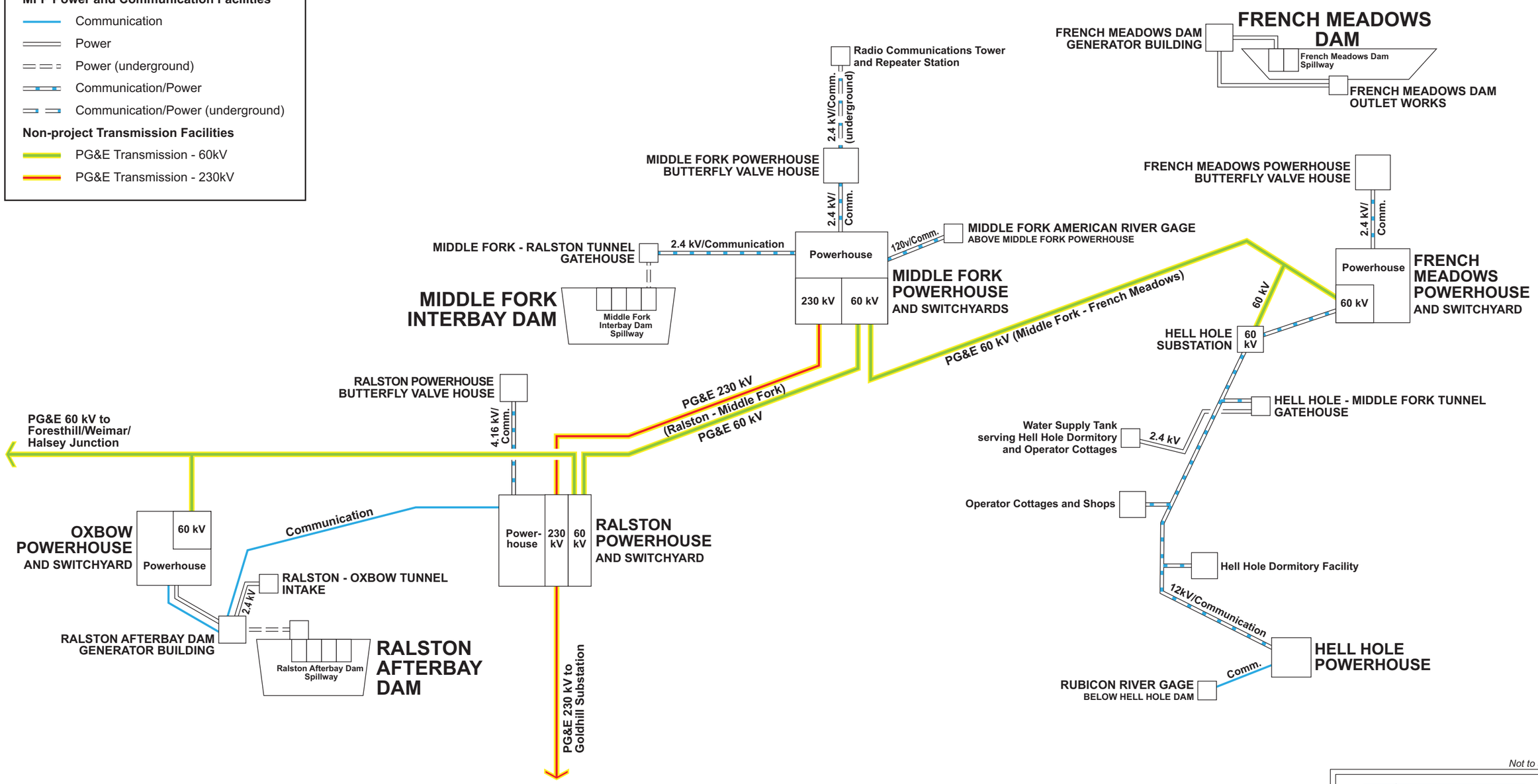
Middle Fork American River Project Facilities Elevation Profile

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



Not to scale

PCWA

Placer County Water Agency
Middle Fork American River Project

Figure A-3
Middle Fork Project Transmission, Power, and Communications Schematic

Exhibit B Statement of Operation and Resource Utilization

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) refers to Section 4.51 (License for Major Project – Existing Dam) for a description of information that an applicant must include in Exhibit B of its license application.

Exhibit B is a statement of project operation and resource utilization. If the project includes more than one dam with associated facilities, the information must be provided separately for each such discrete development. The exhibit must contain:

(1) A statement whether operation of the powerplant will be manual or automatic, an estimate of the annual plant factor, and a statement of how the project will be operated during adverse, mean, and high water years;

(2) An estimate of the dependable capacity and average annual energy production in kilowatt-hours (or a mechanical equivalent), supported by the following data:

- (i) The minimum, mean, and maximum recorded flows in cubic feet per second of the stream or other body of water at the powerplant intake or point of diversion, with a specification of any adjustments made for evaporation, leakage, minimum flow releases (including duration of releases), or other reductions in available flow; monthly flow duration curves indicating the period of record and the gauging stations used in deriving the curves; and a specification of the period of critical streamflow used to determine the dependable capacity;
- (ii) An area-capacity curve showing the gross storage capacity and usable storage capacity of the impoundment, with a rule curve showing the proposed operation of the impoundment and how the usable storage capacity is to be utilized;
- (iii) The estimated hydraulic capacity of the powerplant (minimum and maximum flow through the powerplant) in cubic feet per second;
- (iv) A tailwater rating curve; and
- (v) A curve showing powerplant capability versus head and specifying maximum, normal, and minimum heads;

(3) A statement, with load curves and tabular data, if necessary, of the manner in which the power generated at the project is to be utilized, including the amount of power to be used on-site, if any, the amount of power to be sold, and the identity of any proposed purchasers; and

(4) A statement of the applicant's plans, if any, for future development of the project or of any other existing or proposed water power project on the stream or other body of water, indicating the approximate location and estimated installed capacity of the proposed developments.

(1) Type of Operation

French Meadows, Middle Fork, Ralston, and Oxbow powerhouses can be controlled onsite or can be started and operated remotely from either Ralston Powerhouse or from a switching center offsite. Hell Hole Powerhouse can only be started or have flows changed onsite. All five powerhouses have automatic oversight that is internal to the powerhouse, which will shut off the powerhouse and invoke alarms as appropriate in the event of a malfunction, powerhouse security breach, or other problem. Various output, levels, and other data are continuously monitored via the supervisory control and data acquisition (SCADA) system. The data are collected at Ralston Powerhouse, Placer County Water Agency (PCWA) offices in Foresthill and Auburn, and Pacific Gas & Electric Company (PG&E). The overall estimated annual plant factor for the Middle Fork American River Project (Project) is 55%.

The Project has been operated for over 40 years by PCWA as a multi-purpose project to benefit the people of Placer County. The Project is operated with respect to four objectives, as follows:

- Meet Federal Energy Regulatory Commission (FERC) license requirements that protect environmental resources and provide for recreation;
- Meet PCWA's consumptive water demands;
- 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.

There are five key operating characteristics of the Project 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; and
    - Increased drawdown of the reservoirs under drought conditions so that consumptive water supply needs can be met.

- Combined Operation of Middle Fork and Ralston Powerhouses – The ability to operate the Middle Fork and Ralston powerhouses simultaneously over a range of flows and schedule periods. This capability is limited only by: (1) powerhouse maximum flow capacity; (2) minimum pool (storage) requirements in upstream reservoirs; and (3) 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 Project must have:
    - The ability to release water from storage for downstream delivery at all times of the year in response to consumptive demand patterns; and
    - 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 demand.
- 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.

The Project was constructed and operates under a 50-year license (FERC Project No. 2079), which was issued on March 13, 1963. The following discussion summarizes only terms and conditions related to ongoing operations of the Project (construction-related requirements are excluded). Subsequent to issuance of the original license by FERC, there have been several amendments including: changes to exhibits identifying Project facilities; the addition of Hell Hole Powerhouse; changes to original license articles; inclusion of new license articles; and adjustments to rated generating capacity of Project facilities. 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, CA 95604.

Overview of Existing Project Operations for Power Generation and Water Supply

Project operations for water supply and electric power generation are constrained by regulatory requirements; operating agreements and contracts; the physical capacities of the Project facilities (e.g., tunnels and penstocks, reservoir volumes, spillway capacities, and inlet and outlet capacities); and water availability.

Regulatory and contract requirements affecting Project operations include conditions imposed by the existing FERC license, and water rights permits and license issued by the State Water Board. Operating agreements/contracts affecting Project operations include conditions required in the existing power purchase contracts with PG&E, water supply contracts, and the Water Forum Agreement. These constraints are described below.

Regulatory and Contract Requirements

FERC License Requirements. PCWA's current license contains provisions that establish minimum pool (storage) 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. The current minimum pool and MIF requirements are summarized in Table B-1. The license also requires PCWA to annually submit accurate flow and storage records from Project gaging stations to the United States Geological Survey (USGS). In addition, the two tainter gates in the French Meadows Spillway must remain open annually from November 15 to April 1.

Water Rights Permits. PCWA currently has five water rights permits and one license issued by the California State Water Rights Board (now the California State Water Resources Control Board [State Water Board]) related to the Project. 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 Project facilities. In addition, PCWA also holds sufficient water rights to meet current and reasonably foreseeable future consumptive water demand. The key provisions relevant to the operations of the Project of each of these water rights permits are summarized in Table B-2. The permits and license also require protection of water quality and aquatic species; public access to Project lands and water; minimum pool and minimum stream requirements as described in Table B-2; and minimum instream flows of 75 cubic feet per second (cfs) below PCWA's American River Pump Station.

On January 10, 1963, the State Water Board issued four permits (Nos. 13855, 13856, 13857, and 13858) to PCWA for the Project. 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. Water for consumptive purposes is released from the American River Pump Station, located on the North Fork American River near the City of Auburn and Folsom Reservoir. Both points of re-diversion are located downstream of Project facilities and neither are part of the Project as defined by the FERC license.

In addition, Permit No. 18380 was issued to 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.

PCWA's water right permits Nos. 13856 and 13858 are currently under review by the State Water Board. PCWA filed petitions for extension of time to fully develop use under the consumptive water rights for these permits with the State Water Board on November 15, 2007. PCWA is currently undertaking an environmental analysis for the petition for extension of time. Per State Water Board direction, this environmental analysis will be completed subsequent to the issuance of the new FERC License Order and State Water Board 401 Certification associated with the relicensing of the Project.

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 referred to as the Water Forum Agreement (January 2000).

PCWA's commitment within the framework of these agreements includes limiting its total water usage from the Project to amounts commensurate with their water rights and water supply contracts. In addition, PCWA has committed, under certain conditions depending on consumptive water deliveries, to release up to 47,000 acre-feet (ac-ft) in drier 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. PCWA's release obligation increases linearly as Folsom Reservoir inflow decreases from 950,000 to 400,000 ac-ft between March and November (Figure B-1). The maximum Water Forum Release daily average flows are:

Water Forum Releases – 47,000 ac-ft in driest years at full build-out	
July	191 cfs
August	210 cfs
September	146 cfs
October	0
November	122 cfs
December	103 cfs

Water Supply Contracts. PCWA has contracts with the United States Bureau of Reclamation (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 to the Project. PCWA's contractual relationship with the USBR is defined in four agreements:

• February 20, 1963	Pertains to construction and operation of the Project reservoirs and PCWA's rediversion of water
• 1970 Water Service Contract (as amended in 2002)	USBR agrees to provide water from the Central Valley Project to PCWA
• 1977 Land Purchase Contract	USBR agrees to provide for the rediversion of Project to PCWA
• 2002 Contract	Related to the American River Pump Station

The key provisions of these agreements and contracts that are germane to the operations of the Project are summarized in Table B-3.

Power Purchase Contract. The electrical output of the Project is currently contractually obligated to PG&E pursuant to the Middle Fork Project Power Purchase Contract, dated April 30, 1963. The contract expires on April 30, 2013.

PCWA is currently negotiating a new power purchase contract, which will be in place prior to the expiration of the current PG&E contract. It is anticipated that the new contract will be from three to ten years in length with provisions for renewal with the mutual agreement of both parties. This power purchase contract would be consistent with the FERC license conditions, water rights, and existing operating agreements/contracts and would not result in additional limitations or constraints in Project operations.

Typical Annual Operations – Consumptive Water and Power Demands

The Project is operated to meet PCWA's consumptive water demands and generate power to help meet California's energy demands and provide valuable support services to maintain the overall quality and reliability of the state's electrical supply system. The following describes consumptive water demand and power demands associated with the Project.

Consumptive Water Demand. PCWA provides water for consumptive uses from water diverted and/or stored at Project facilities. Deliveries to meet consumptive demand vary from month to month but follow a general seasonal pattern as shown on Figure B-2. 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 (Table B-4).

Current water demand from the Project is approximately 42,000 ac-ft. However, during the term of the next license, PCWA expects to utilize its full allocation of 120,000 ac-ft of water available annually from the Project to meet increasing consumptive demand. In drier years, when less water is available in storage, Project releases to meet consumptive demand at full build-out may shift the timing of generation slightly to coincide with planned water deliveries. In wetter years,

when water in storage is greater, releases to meet both consumptive water demand and peak energy demand can be scheduled without restrictions.

Power Demand. The Project 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 Project power generation is realized.

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. Typically, energy demand is higher on weekdays than weekends. Within a day, demand is typically highest in the late afternoon and early evening. The designation of peak hours by month, day of the week, and hour of the day is summarized in Figure B-3. The extent that Project 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, Project 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, Project 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 Project 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 state's energy supply system.

Routine 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. These activities include annual inspection and testing to verify the structural and/or functional integrity of the facilities and to identify conditions which might disrupt operation or threaten dam safety. In addition, 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 Project powerhouses (Middle Fork, Ralston, and Oxbow) be taken out-of-service for three to six weeks. During the fall maintenance period, Middle Fork Interbay and Ralston Afterbay water levels are lowered to allow access to the facilities. Ralston Afterbay is lowered to 1,149 feet to allow for annual inspections

of the radial gates that are required by FERC. 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 up to about 70 cfs 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.

Water Management

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 (Figure B-4) in the winter and spring (filling period) and drawdown of the reservoirs during the summer, fall, and early winter (release period). Operation of the Project 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 also varies substantially from year-to-year. Total Project inflow (combined flows from Duncan Creek, Middle Fork American River, Rubicon River, and Long Canyon Creek) from 1975 to 2007 is shown on Figure B-5. During this period, total inflow has averaged approximately 379,015 ac-ft and ranged from a low of approximately 62,638 ac-ft to a high of more than 790,820 ac-ft per year (more than a tenfold difference). The high variability of inflow is one of the most important factors influencing annual Project operations.

During the filling period (winter and spring), flows through the Project powerhouses are highly dependent on projected and actual runoff conditions. Flows through the powerhouses are used to manage the runoff to maximize water storage while minimizing spills. 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 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 1) also may vary significantly. Figure B-6 shows combined reservoir storage levels (French Meadows and Hell Hole) and spills from 1974 through 2007. Combined reservoir storage varied from a low of approximately 70,400 ac-ft to a high of approximately 346,700 ac-ft.

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). Historic combined carry over levels for each year between 1975 and 2006 have ranged from a high of greater than 165,000 ac-ft to less than 100,000 ac-ft (Figure B-7). Historically, the average carryover was about 142,000 ac-ft.

Project operations are prioritized to first ensure consumptive water demand (deliveries) are met and second to maximize peak power generation.

However, in all but dry years, 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. In addition, Project generally controls and releases far more water annually in most water years (except in dry years) than PCWA requires to meet consumptive water demand. Further, the majority of PCWA's consumptive deliveries are withdrawn from Folsom Reservoir (28.2 miles downstream of the last Project powerhouse), where USBR allows for a 30-day balancing of supply and demand. Thus hourly and daily releases from the Project do not need to explicitly match withdrawals from Folsom Reservoir. Only the rediversion of water for consumptive demand at the American River Pump Station near Auburn (maximum 100 cfs) requires hourly Project system balancing to meet continuous MIF requirements below the pumping station.

French Meadows Powerhouse generates electricity 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.

Hell Hole Powerhouse, located at the base of Hell Hole Dam, has an installed generating capacity of 0.73 megawatt (MW). This powerhouse generates electricity opportunistically from flow releases from Hell Hole Dam. Project operations are not modified for power generation at Hell Hole Powerhouse.

The Middle Fork and Ralston powerhouses are the heart of Project 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 Project's annual

generation. Occasionally, PCWA curtails Middle Fork Powerhouse operations to take advantage of accretion flows into Middle Fork Interbay. 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.

PCWA varies releases on a daily and hourly basis through the Middle Fork and Ralston powerhouses in response to changing electrical demand, grid needs, and water supply conditions. The powerhouses 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 Middle Fork and Ralston 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.

Oxbow Powerhouse frequently runs in tandem with Middle Fork and Ralston powerhouses. The capacity of Oxbow Powerhouse (1,025 cfs) is slightly higher than the present capacity of Ralston Powerhouse (924 cfs), which allows Oxbow Powerhouse to utilize water supplied by Ralston Powerhouse as well as inflow from the Middle Fork American and Rubicon rivers. Ralston Afterbay also has sufficient operational storage capacity to allow Oxbow Powerhouse to operate independently of Middle Fork and Ralston powerhouses for several hours at a time, depending on generation level. This independent operational flexibility is used to meet the ramping rate requirement downstream of Oxbow Powerhouse and to make releases for whitewater boating without requiring operation of the Middle Fork and Ralston powerhouses. Because Ralston Afterbay is used primarily as a regulating facility, water surface elevations (WSE) may fluctuate on a day-to-day or hour-to-hour basis. Ralston Afterbay does not follow a seasonal fill and release pattern like Hell Hole or French Meadows reservoirs.

Fluctuations at Ralston Afterbay occur daily throughout the year, but the daily pattern varies depending upon season. Hourly and daily WSE plots for representative winter, spring, summer, and fall weekdays are provided as Figures B-8 through B-11, respectively. Ralston Afterbay WSE fluctuation patterns vary with water year type, electrical demand, and Project scheduled and emergency maintenance activities.

The largest fluctuations in WSE in Ralston Afterbay typically occur when the source of inflow is predominantly from Ralston Powerhouse generation (Figures B-10 and B-11). For example, during a typical 24-hour period in the summer of 2008, WSEs in Ralston Afterbay were highest from midnight to about 7:00 AM. Around 7:00 AM, energy production released through Oxbow Powerhouse began to ramp up, while Ralston Powerhouse was off-line. Water

levels in Ralston Afterbay decline as energy production continues through Oxbow Powerhouse.

Water levels in Ralston Afterbay also fluctuate during the spring, but fluctuations may not be not as regular or as large, depending on water year type. For example during this time in 2008, Ralston and Oxbow powerhouses were run more synchronously. In a typical 24-hour period in the spring, WSEs in Ralston Afterbay were highest during the late afternoon, usually at about 6:00 PM. WSE then receded through the evening and was at its lowest at about midnight at which point WSE began to increase. During the spring, accretion flows (runoff from the Middle Fork and Rubicon watersheds) contribute substantially more water to Ralston Afterbay than during the summer, which tends to attenuate fluctuations in Ralston Afterbay.

During the winter, regular daily fluctuations are generally minimal, but fluctuations may occur over the course of days or weeks to allow for management of runoff resulting from winter storms. In the winter, Ralston and Oxbow powerhouses are typically run more synchronously. In general, WSEs in Ralston Afterbay remain relatively stable during the winter, although not at full pool, to allow the capture of runoff from winter storm events and to minimize reservoir spilling. If a large storm event is projected, Ralston Afterbay may be drawn down substantially in advance in preparation for high flows.

The total water available and physical capacity of the Project 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 B-12 (1987–1992). In wetter years, generation occurs throughout the year as shown on Figure B-13 (1995–1998). If the Project 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 Project to produce approximately 55% of the maximum generation possible in a year.

PCWA and PG&E currently coordinate with representatives from California Department of Parks and Recreation (State Parks) and a designated commercial whitewater boating representative to schedule Project operations during the summer and early fall (June through Labor Day) to accommodate whitewater recreation in the Middle Fork American River below Oxbow Powerhouse. Whitewater boating releases are scheduled on a voluntary basis such that they minimize effects to power generation and do not compromise consumptive water deliveries or maintenance activities. When sufficient water is available, whitewater recreation flows (approximately 950 to 1,000 cfs) are provided by scheduling generation through Oxbow Powerhouse approximately two to three hours earlier than would otherwise occur to meet peak energy demand. Over the last decade, limitation of summer flow releases for whitewater boating has only occurred in one year (2001).

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.

Future Operations

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 Project operations. Changes to current license conditions may require some alteration to current Project operations. However, the type and extent of any such changes cannot be determined until the specific license conditions are identified.

In addition, PCWA holds water rights up to 120,000 ac-ft of water to meet consumptive demand needs. 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 water right will be required to meet PCWA's consumptive water demands.

Recent information on climate change suggests 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. However, information on how global climate change may affect the timing or magnitude of inflows and future operations of the Project is speculative at this time. To the extent that long-term temperature and precipitation patterns vary from the historical record, Project 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 implemented to ensure sufficient water supply to meet future consumptive demand. These changes may also affect the total amount and timing of energy production from the Project, but are likely to have a far smaller impact than existing annual variation in runoff volume and timing.

(2) Capacity and Production

The Project has dependable operating capacity of 223.7 MW. The Project's dependable capacity is based on its load carrying ability during the critical hydrologic period (water year 1977). The dependable operating capacities and average annual capacity factors and energy production for each of the Project powerhouses between 1967 and 2006 are as follows:

Powerhouse	Dependable Capacity (KW)	Average Annual Capacity Factor	Average Annual Energy Production (GWh)
Hell Hole Powerhouse[1]	725	47%[1]	3
French Meadows Powerhouse	15,300	49%	66
Middle Fork Powerhouse	122,400	51%	546
Ralston Powerhouse	79,200	57%	395
Oxbow Powerhouse	6,128	56%	30

[1]Hell Hole Powerhouse was constructed in 1983; therefore, dependable capacity, average annual capacity factor, and energy production were determined for 1983-2006.

The average annual energy production for the Project between 1967 and 2006 was 1,039 gigawatt-hours (GWh)[1]. The annual Project generation for the Project and French Meadows, Middle Fork, Ralston, Oxbow, and Hell Hole powerhouses is provided in Table B-5.

(i) Daily Average Available Flows

This section presents data regarding available flows at the points of diversion associated with the Project. The data were developed using the Middle Fork Project Operations Simulation Model (Model) that was prepared for the Project to aid in analyzing the potential effects of proposed FERC license conditions on streamflows, reservoir conditions, water supply, and hydroelectric generation. The Model was developed by PCWA in coordination with the Model Technical Team Subgroup which was composed of members from the California Department of Fish and Game (CDFG), the State Water Board, and the United States Department of Agriculture-Forest Service (USDA-FS).

The Model uses unimpaired inflow data over a 33-year period from 1975 to 2007 which encompasses the wettest and driest years on record in the watershed. The unimpaired flow data were calculated based on historic hydrology records with the exception of the Rubicon River watershed which includes flows impaired by the Sacramento Municipal Utility District (SMUD), Upper American River Project (UARP) diversions. The current FERC license for the Project contains three water year types for reservoir storage requirements (wet, normal, and dry) and two water year types for minimum instream flows (wet and dry). The water year type structure is based on the Folsom Reservoir Unimpaired Inflow (FUI) forecasts published in the California Department of Water Resources (DWR) Bulletin 120. The current FERC license for the Project requires the water year type to be established in June 1 of each year based on the April FUI forecast.

[1] Generation from French Meadows, Middle Fork, Ralston, and Oxbow powerhouses is averaged over a 40-year period of record (1967-2006) and Hell Hole Powerhouse is averaged over a 24-year period of record (1983-2006). The average annual energy production of the project represents the sum of the average net generation for the five Project powerhouses based on their respective period of record. Refer to Table B-5.

The total available flow at each diversion was calculated by subtracting the minimum instream flow (MIF) that is required downstream of the diversion in the current FERC license from the total inflow to the diversion. The available flow was calculated using (1) the period of record used for the potential effects analyses of proposed FERC license conditions (1975–2007); (2) dry years; and (3) wet years (MIFs vary at each diversion per the current FERC license [Table B-1]). The period of record (1975–2007) included six dry years and 27 wet years. The flow statistics for each diversion and the specific methodology used to develop the statistics are described below.

Duncan Creek Diversion

The available flow at the Duncan Creek Diversion was derived by subtracting the MIF required for Duncan Creek downstream of the diversion from the total inflow to the diversion. The flow statistics for the Duncan Creek Diversion are presented below and the monthly flow duration curves are presented in Figure B-14.

Duncan Creek Diversion Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	34.7	1.6	0.0	2,792
Wet Water Years	35.7	2.0	0.0	2,792
Dry Water Years	30.2	0.6	0.0	916

French Meadows – Hell Hole Tunnel (French Meadows Reservoir)

The available flow at the French Meadows – Hell Hole Tunnel was derived by subtracting the MIF required for the Middle Fork American River downstream of French Meadows Reservoir from the sum of the total inflow to French Meadows Reservoir. The total inflow to French Meadows Reservoir includes inflows from the Middle Fork American River and the Duncan Creek Diversion through the Duncan Creek – Middle Fork Tunnel[2].

The flow statistics for the French Meadows – Hell Hole Tunnel are presented below and the monthly flow duration curves are presented in Figure B-15.

French Meadows – Hell Hole Tunnel Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	189.4	35.9	0.0	10,665
Wet Water Years	195.0	39.8	0.0	10,665
Dry Water Years	164.2	22.5	0.0	4,260

[2] Flows in Duncan Creek – Middle Fork Tunnel were calculated for the Operations Model as the difference between flow measured at the USGS gaging station 11427700 upstream of the diversion and the USGS gaging station1142750 downstream of the diversion.

Hell Hole – Middle Fork Tunnel (Hell Hole Reservoir)

The available flow at the Hell Hole – Middle Fork Tunnel was derived by subtracting the MIF required for the Rubicon River downstream of Hell Hole Reservoir from the sum of the total inflow to Hell Hole Reservoir from the Rubicon River and other tributaries (e.g., Five Lakes Creek) and the inflow from the French Meadows – Hell Hole Tunnel.

The flow statistics for the Hell Hole – Middle Fork Tunnel are presented below and the monthly flow duration curves are presented in Figure B-16.

Hell Hole – Middle Fork Tunnel Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	428.0	293.3	0.0	24,212
Wet Water Years	452.4	310.8	0.0	24,212
Dry Water Years	318.4	148.1	0.0	6,645

North Fork Long Canyon Diversion

The available flow at the North Fork Long Canyon Diversion was derived by subtracting the MIF required for North Fork Long Canyon Creek downstream of the diversion from the total inflow to the diversion.

The flow statistics for the North Fork Long Canyon Diversion are presented below and the monthly flow duration curves are presented in Figure B-17.

North Fork Long Canyon Diversion Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	8.6	0.2	0.0	763
Wet Water Years	8.9	0.6	0.0	763
Dry Water Years	7.3	0.0	0.0	220

South Fork Long Canyon Diversion

The available flow at the South Fork Long Canyon Diversion was derived by subtracting the MIF required for South Fork Long Canyon Creek downstream of the diversion from the total inflow to the diversion.

The flow statistics for the South Fork Long Canyon Diversion are presented below and the monthly flow duration curves are presented in Figure B-18.

South Fork Long Canyon Diversion Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	15.5	0.0	0.0	1,339
Wet Water Years	15.8	0.1	0.0	1,339
Dry Water Years	14.5	0.0	0.0	387

Middle Fork – Ralston Tunnel (Middle Fork Interbay)

The available flow at the Middle Fork – Ralston Tunnel was derived by subtracting the MIF required for the Middle Fork American River downstream of Middle Fork Interbay from the sum of the inflow from the Hell Hole – Middle Fork Tunnel and the total inflow to Middle Fork Interbay. The total inflow to Middle Fork Interbay consists of (1) the MIF downstream of the Duncan Creek Diversion (or natural if less than the MIF), (2) accretion flow along Duncan Creek downstream of the diversion, (3) MIF downstream of French Meadows Reservoir (or natural if less than the MIF), and (5) accretion flow along the Middle Fork American River downstream of French Meadows Reservoir.

The flow statistics for the Middle Fork – Ralston Tunnel are presented below and the monthly flow duration curves are presented in Figure B-19.

Middle Fork – Ralston Tunnel Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	478.8	450.6	0.0	3,615
Wet Water Years	509.5	494.1	0.0	3,615
Dry Water Years	340.5	244.4	0.0	1,744

Ralston – Oxbow Tunnel (Ralston Afterbay)

The available flow at the Ralston – Oxbow Tunnel was derived by subtracting the MIF required for the Middle Fork American River downstream of Ralston Afterbay from the sum of the inflow from the Middle Fork – Ralston Tunnel and the total inflow to Ralston Afterbay. The total inflow to Ralston Afterbay consists of (1) the MIF downstream of Hell Hole Reservoir, (2) accretion flow along the Rubicon River downstream of Hell Hole Reservoir, (3) MIF downstream of North Fork Long Canyon Creek Diversion, (4) MIF downstream of South Fork Long Canyon Creek Diversion, (5) accretion flow along Long Canyon Creek downstream of the diversions, (6) MIF downstream of Middle Fork Interbay; and (7) accretion flow along the Middle Fork American River downstream of Middle Fork Interbay.

The flow statistics for the Ralston – Oxbow Tunnel are presented below and the monthly flow duration curves are presented in Figure B-20.

Ralston – Oxbow Tunnel Available Flow (1975–2007).

Water Year Type	Average (cfs)	Median (cfs)	Minimum (cfs)	Maximum (cfs)
All Years	745.4	584.1	0.0	39,313
Wet Water Years	788.5	626.1	0.0	39,313
Dry Water Years	551.4	276.8	0.0	8,800

(ii) The following figures present area-capacity curves, with rule curves, for Project-related impoundments:

- Figure B-21 presents the area-capacity curve for the Duncan Creek Diversion Impoundment;
- Figure B-22 presents the area-capacity curve for French Meadows Reservoir;
- Figure B-23 presents the area-capacity curve for Hell Hole Reservoir;
- Figure B-24 presents the area-capacity curve for the Middle Fork Interbay; and
- Figure B-25 presents the area-capacity curve for the Ralston Afterbay.

This information is not available for the North and South Fork Long Canyon Diversion impoundments, each with less than 1 ac-ft of gross storage capacity.

There are no regulatory or contractual limitations of reservoir operation other than the minimum and maximum storage values. Annual water surface elevations depicting typical operations during the different hydrologic year types for Hell Hole Reservoir, French Meadows Reservoir, and Ralston Afterbay are provided in Figures B-26, B-27, and B-28. As described previously, Hell Hole and French Meadows reservoirs fill in the winter and spring from storm and snow melt runoff (Figures B-26 and B-27). Excess runoff during this period is spilled from the dams to the Rubicon and Middle Fork American rivers, respectively. In the summer and fall, the reservoirs are drawn down to maintain required instream flow releases and to increase the available storage capacity for anticipated runoff in the winter and spring. As shown in Figure B-28, Ralston Afterbay does not have a seasonal operating pattern.

(iii) Hydraulic Capacity

The estimated operating ranges for each of the Project powerhouses are as follows:

Powerhouse	Minimum Estimated Hydraulic Capacity (cfs)	Maximum Estimated Hydraulic Capacity (cfs)
Hell Hole Powerhouse	10 cfs	35 cfs
French Meadows Powerhouse	50 cfs	400 cfs
Middle Fork Powerhouse	50 cfs	940 cfs

Powerhouse	Minimum Estimated Hydraulic Capacity (cfs)	Maximum Estimated Hydraulic Capacity (cfs)
Ralston Powerhouse	75 cfs	924 cfs
Oxbow Powerhouse	200 cfs	1,025 cfs

(iv) Tailwater Rating Curves

The tailwater rating curves for the Ralston Powerhouse and the Oxbow Powerhouse are provided in Figures B-29 and B-30 respectively. The Ralston Powerhouse discharges to the Ralston Afterbay and the Oxbow Powerhouse discharges to the Middle Fork American River. Tailwater rating curves are not available for French Meadows Powerhouse which discharges into Hell Hole Reservoir, Hell Hole Dam Powerhouse which discharges to the Rubicon River, or Middle Fork Powerhouse which discharges to the Middle Fork Interbay.

(v) Figures B-31 through B-35 present capability versus head curves for French Meadows Powerhouse, Middle Fork Powerhouse, Ralston Powerhouse, Oxbow Powerhouse, and Hell Hole Powerhouse, respectively.

The Middle Fork Project includes relatively large, high elevation reservoirs with seasonal storage that can vary significantly. The range in water surface elevation can be as much as 290 feet. In addition, flow rates in some of the conveyance facilities can range from 50 cfs to almost 1,000 cfs.

Potential variations in head within the Project are large, as head is the sum of the difference in water surface elevation and head losses in the conveyance facilities. Generation and net head were calculated and graphed using historical generation data for the most frequently used flow rates for the French Meadows, Middle Fork, Ralston, and Oxbow powerhouses. The water surface elevation varied from the minimum to maximum operating water surface elevations.

(3) Use of Generated Energy

The Project powerhouses primarily operate as peaking facilities that are used to generate power during peak energy demand periods, but are also sometimes used during off-peak periods to provide baseload energy. All energy generated by the Project, minus that necessary to operate the Project facilities (energy used onsite), is conveyed to PG&E's transmission system under the terms of the Power Purchase Agreement. The amount of energy necessary to operate the Project powerhouse facilities averaged 269.7 megawatt hours (MWh) per month between 1967 and 2006. The average amount of energy per month necessary to operate the Project powerhouse facilities between 1967 and 2006 is as follows:

- French Meadows Powerhouse – 50.3 MWh;
- Middle Fork Powerhouse – 130.7 MWh;
- Ralston Powerhouse – 67.5 MWh;

- Oxbow Powerhouse – 21.2 MWh; and
- Hell Hole Powerhouse – <1 MWh[3].

(4) Plans for Future Development

The Application for New License (License Application) for the Project includes one improvement that consists of modifying the existing Hell Hole Dam Spillway to increase the active storage capacity of the Project. The project involves the installation of new 6-foot-high crest gates on the existing concrete spillway and the construction of two new facilities, and will increase the active storage in Hell Hole Reservoir by approximately 7,600 ac-ft. The increase in storage capacity is seasonal and would occur when the gates are in place from April through October of each year. The improvement does not include a new powerhouse. Therefore, an estimate of installed capacity of the improvement is not applicable. The proposed improvement is described further in Exhibit A.

[3] Hell Hole Powerhouse was constructed in 1983; therefore amount of energy necessary to operate the powerhouse is for 1983-2006.

TABLES

Table B-1. 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 B-1. 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 B-2. 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 River 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 American 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		

Table B-2. Summary of Water Rights Permits (continued).

Permit/ License No.	Type of Use	Source	Direct Diversion		Off-Stream Storage	
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
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 B-3. Summary of Water Supply Agreements between Placer County Water Agency and the US Bureau of Reclamation (USBR) and other Local Water Districts.

Agency or Water District	Key Provisions
USBR	▪ PCWA is limited to a total diversion of 120,000 acre feet per year from the Middle Fork American River for consumptive use. ▪ Rediversion of water for consumptive use at the American River Pump Station requires hourly Middle Fork Project (Project) system balancing to meet continuous minimum instream flow (MIF) requirements below the pumping station. USBR allows for a 30-day balancing of supply and depend for withdrawals of consumptive water from Folsom Reservoir. Therefore, hourly and daily releases from the Project do not need to explicitly match consumptive deliveries from Folsom Reservoir. ▪ In dry years (total flow forecast into Folsom Reservoir is less than 600,000 acre feet), PCWA may be required to make releases to ensure that the total quantity of water stored in the Project reservoirs at the end of the year is not more than at the beginning of the year. ▪ In dry years, PCWA may be required to releases sufficient water during the months of July through December such that the total quantity of water stored in Project reservoirs at the end of each month is no more than the quantity stored at the beginning of each month. ▪ PCWA may withdraw up to 35,000 acre feet (with certain limitations) from USBR's Central Valley Project at Folsom Reservoir or other locations as mutually agreed.
San Juan Water District	▪ PCWA to provide up to 25,000 acre feet of water annual from the Project (diverted at Folsom Reservoir).
City of Roseville	▪ PCWA to provide up to 30,000 acre feet of water annual from the Project (diverted at Folsom Reservoir).
Sacramento Suburban Water District	▪ PCWA to provide up to 29,000 acre feet of water annual from the Project (diverted at Folsom Reservoir) if not required to meet PCWA customer needs.

Table B-4. Limits for Monthly Diversions of Consumptive Water from the Middle Fork Project at the American River Pump Station or Folsom Reservoir as a Percent of Total Allowable Annual Diversions.

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

Table B-5. Summary of Project Generation (1967–2006).

Year	Net Generation (GWh)					
	Powerhouse					Project Total
	French Meadows	Middle Fork	Ralston	Oxbow	Hell Hole[1]	
1967	103	845	552	40	-	**1,540**
1968	42	368	283	25	-	**718**
1969	101	872	616	45	-	**1,634**
1970	76	656	477	37	-	**1,246**
1971	68	529	399	35	-	**1,031**
1972	50	458	354	31	-	**893**
1973	78	528	425	34	-	**1,065**
1974	93	752	573	40	-	**1,458**
1975	52	451	364	32	-	**899**
1976	34	295	209	14	-	**552**
1977	8	113	85	5	-	**211**
1978	57	565	441	34	-	**1,097**
1979	83	557	414	36	-	**1,090**
1980	93	799	554	39	-	**1,485**
1981	35	285	221	18	-	**559**
1982	126	995	677	47	-	**1,845**
1983	125	970	669	48	1.5	**1,814**
1984	91	814	562	41	3.3	**1,511**
1985	38	306	231	20	2.9	**598**
1986	85	714	444	34	4.2	**1,281**
1987	25	192	139	11	3.0	**370**
1988	26	198	148	11	1.7	**385**
1989	76	630	460	34	3.2	**1,203**
1990	43	332	236	19	2.9	**633**
1991	36	318	236	19	2.5	**611**
1992	20	165	126	11	2.3	**324**
1993	86	655	499	38	2.8	**1,281**
1994	30	236	173	13	1.9	**454**
1995	112	851	600	42	4.1	**1,609**

Table B-5. Summary of Project Generation (1967–2006) (continued).

Year	Net Generation (GWh)					
	Powerhouse					Project Total
	French Meadows	Middle Fork	Ralston	Oxbow	Hell Hole[1]	
1996	94	759	558	41	3.4	**1,455**
1997	86	757	420	36	4.1	**1,303**
1998	89	696	534	40	3.2	**1,362**
1999	40	632	502	37	3.1	**1,214**
2000	68	543	402	32	3.1	**1,048**
2001	30	301	231	18	1.8	**582**
2002	45	306	258	23	2.7	**635**
2003	68	540	405	33	3.3	**1,049**
2004	47	507	363	29	3.2	**949**
2005	70	543	426	35	3.6	**1,078**
2006	93	793	518	33	4.8	**1,442**
Average[2]	**66**	**546**	**395**	**30**	**3.0**	**1,039**

[1]Hell Hole Powerhouse was constructed in 1983.

[2]Generation from French Meadows, Middle Fork, Ralston, and Oxbow powerhouses is averaged over a 40-year period of record (1967-2006) and Hell Hole Powerhouse is averaged over a 24-year period of record (1983-2006). The Project Total represents the sum of the average net generation for the five Project powerhouses based on their respective period of record.

Note: Average net generation for the 24-year period when all five Project powerhouses were in operation (1983-2006) is 1,007,986 MWh.

FIGURES

Figure B-1. Water Forum Release Obligation.

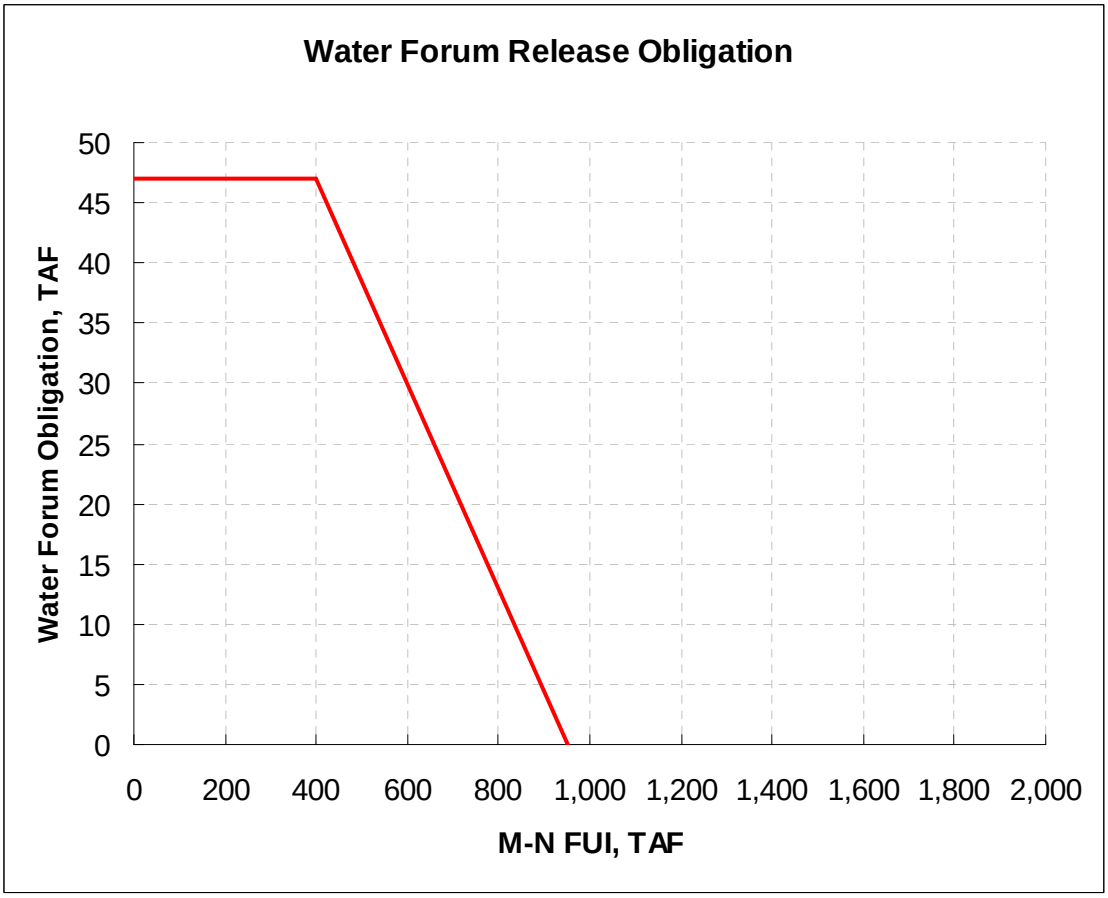
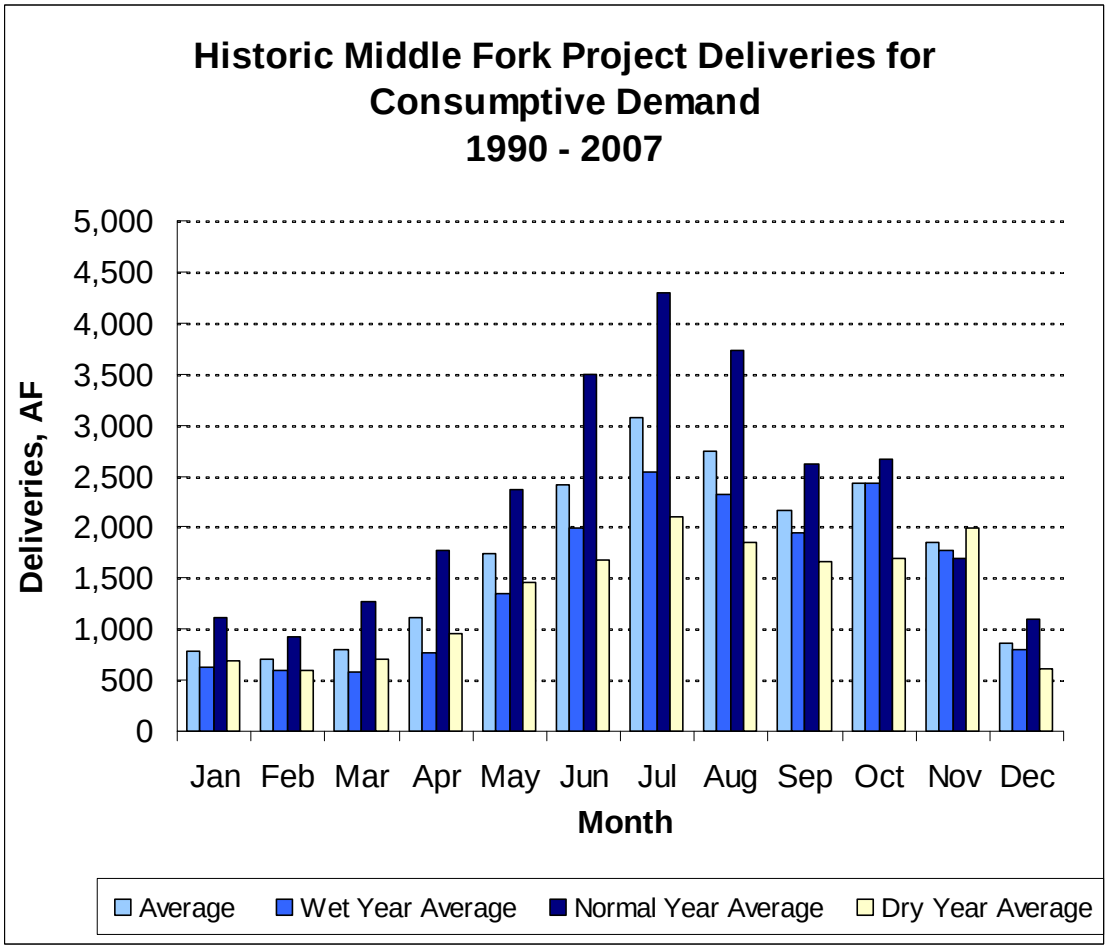


Figure B-2. PCWA Deliveries for Consumptive Demand (1990–2007).



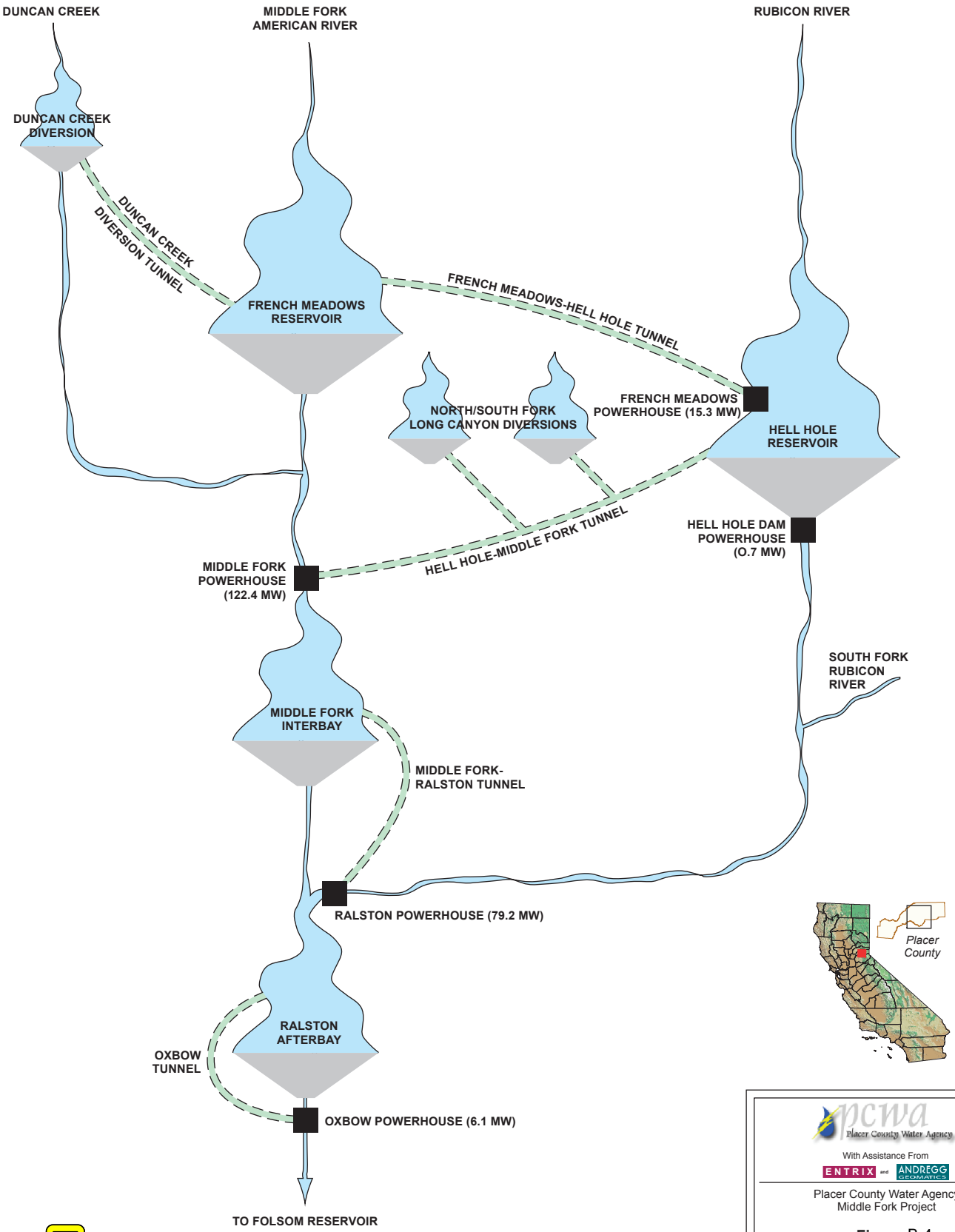
Water year designation are based on the April forecasted inflow to Folsom Reservoir. Wet: >2,000,000 AF (10 years); Normal: 2,000,000–1,200,000 AF (4 years); and Dry: <1,200,000 AF (4 years).

Totals do not include out-of-county sales.

Figure B-3. Peak Hours Designation.

Hour of day	Weekdays Jul - Aug	Weekdays Jun, Sep	Weekdays Nov - Feb	Weekends Jun - Sep	Weekdays Mar - May & Oct	Weekends Oct - May
0	Off Peak	Off Peak	Off Peak	Off Peak	Off Peak	Off Peak
1	Super Off Peak	Super Off Peak	Super Off Peak	Super Off Peak	Super Off Peak	Super Off Peak
2						
3						
4						
5	Off Peak	Off Peak	Off Peak	Off Peak	Off Peak	Off Peak
6						
7						
8	Low Partial Peak	Low Partial Peak	Low Partial Peak	Low Partial Peak	Low Partial Peak	
9						
10	High Partial Peak	High Partial Peak				
11						
12	Peak	Peak	High Partial Peak	High Partial Peak		
13						
14	Crit Peak					
15						
16						
17						
18	Peak	High Partial Peak				
19						
20	High Partial Peak	Low Partial Peak		Low Partial Peak		
21			Low Part Pk			
22	Off Peak	Off Peak	Off Peak	Off Peak	Off Peak	
23						

SOURCE: PCWA. 2009. Operations Model Manual.



pcwa Placer County Water Agency

With Assistance From ENTRIX and ANDREGG GEOMATICS

Placer County Water Agency
Middle Fork Project

Figure B-4

Project Schematic Diagram

Not to scale

Date: 9/14/04

Figure B-5. Total Middle Fork Project Inflow (Combined Flows from Duncan Creek, Middle Fork American River, Rubicon River, and Long Canyon Creek) from 1975–2007.

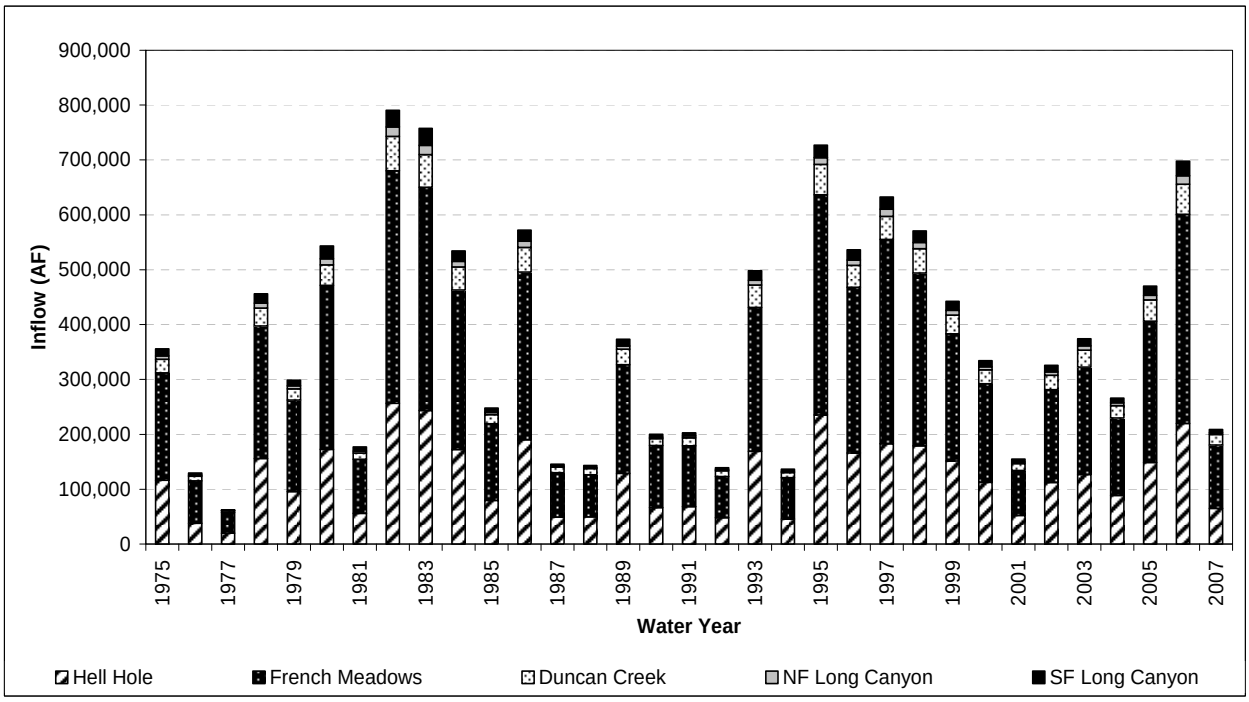


Figure B-6. Combined Reservoir Storage Levels (French Meadows and Hell Hole) and Spills from 1974 through 2007.

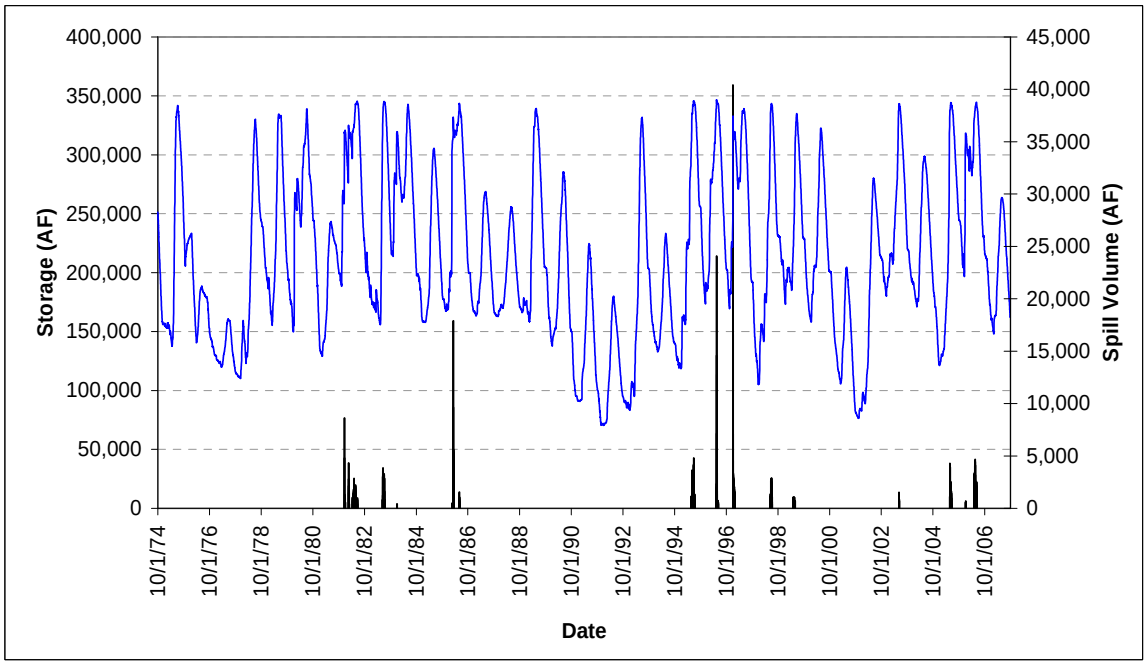
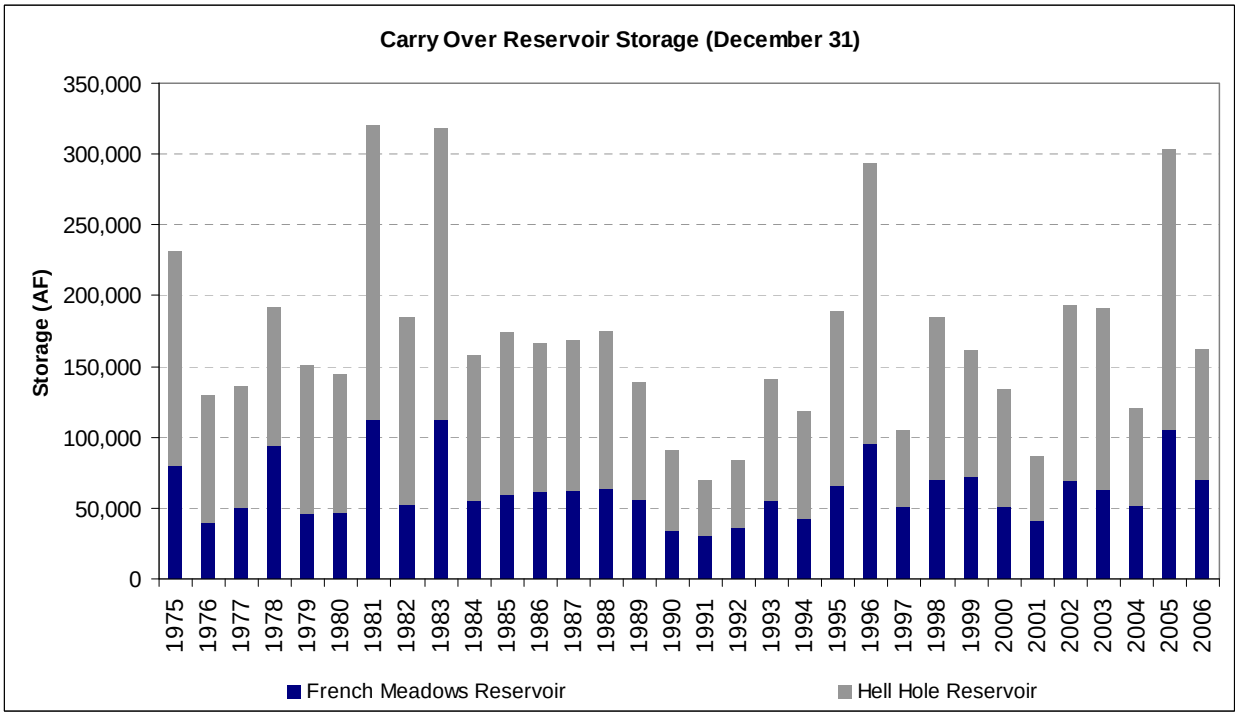
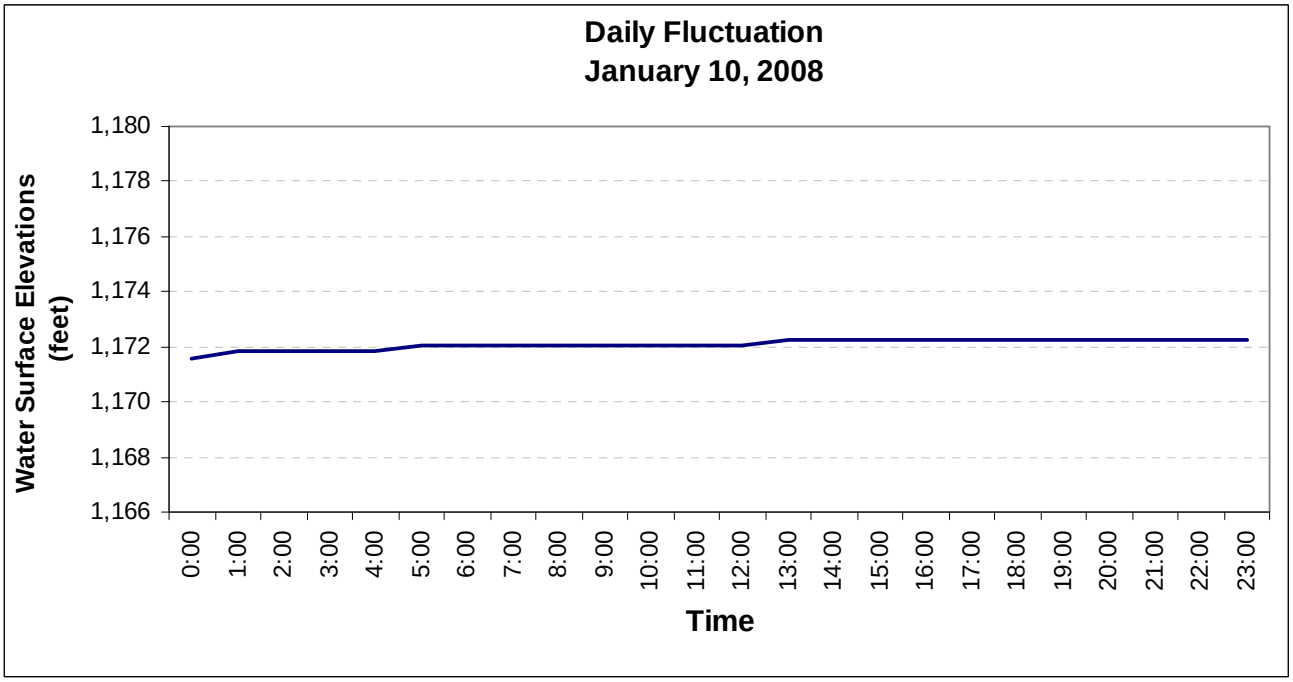


Figure B-7. Historic Combined Carry Over Levels (1975-2006).



Carry over storage was calculated for December 31st of each calendar year.

Figure B-8. Water Surface Elevations at Ralston Afterbay – Winter 2008.



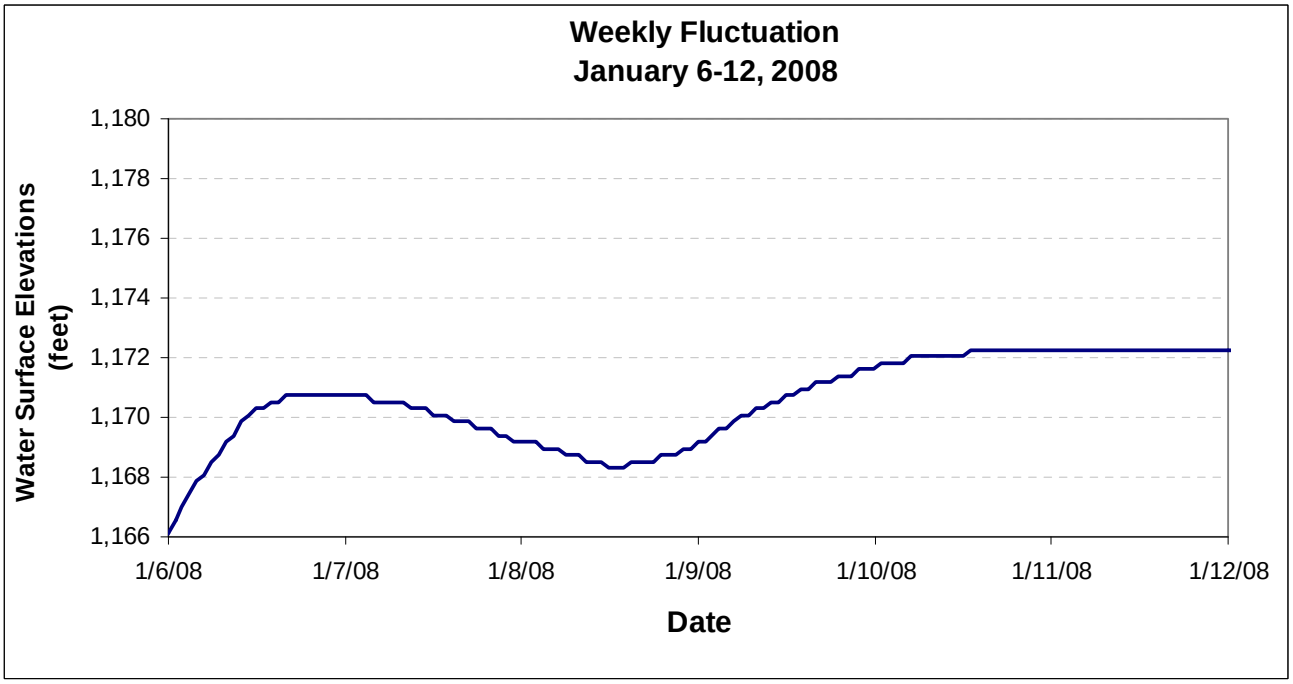
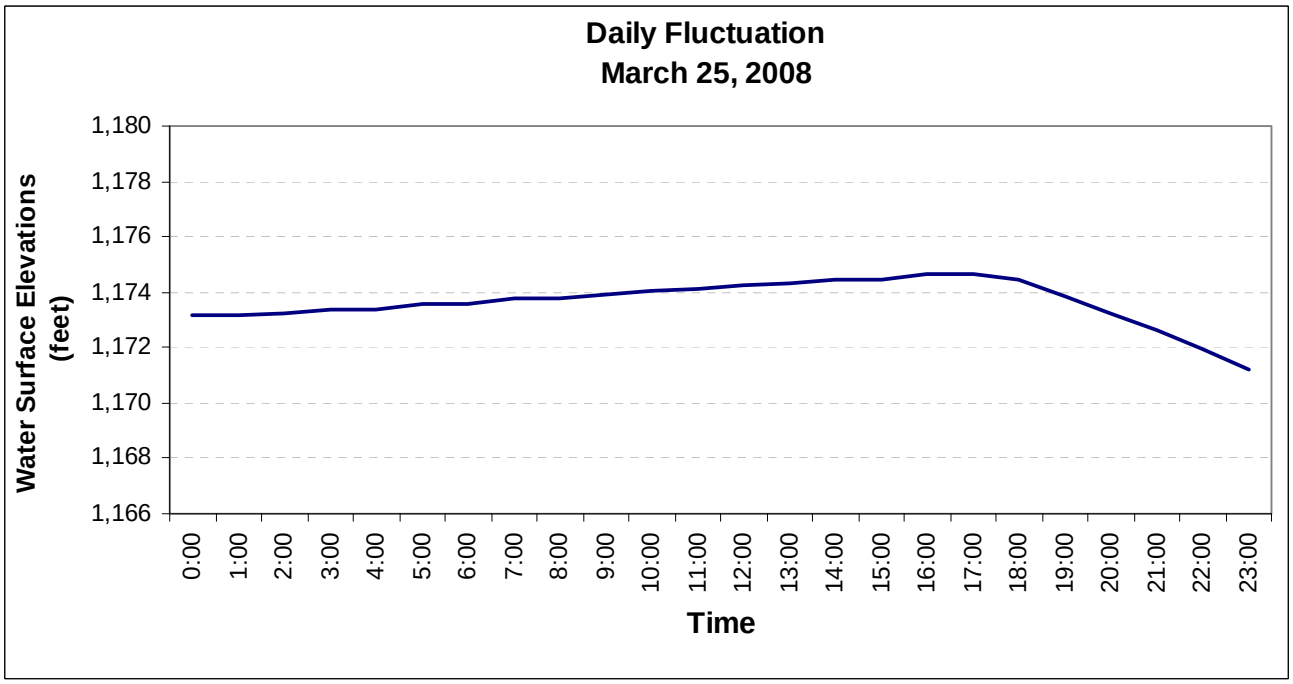


Figure B-9. Water Surface Elevations at Ralston Afterbay – Spring 2008.



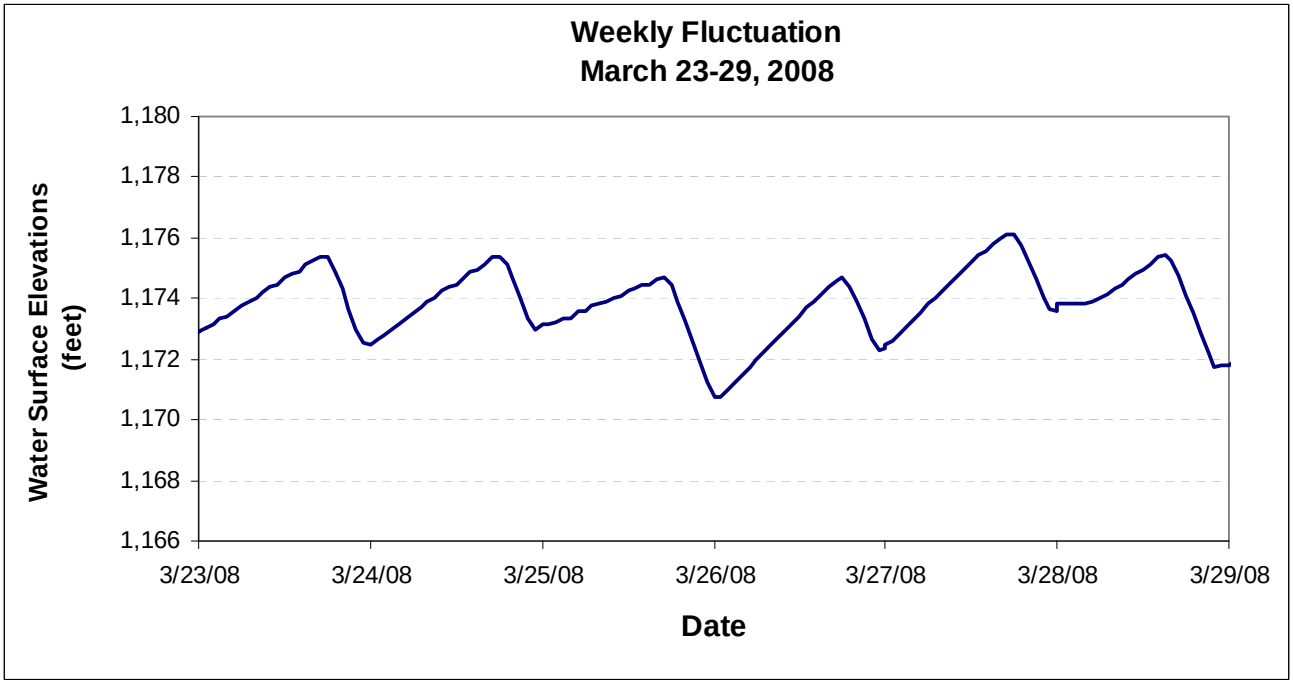
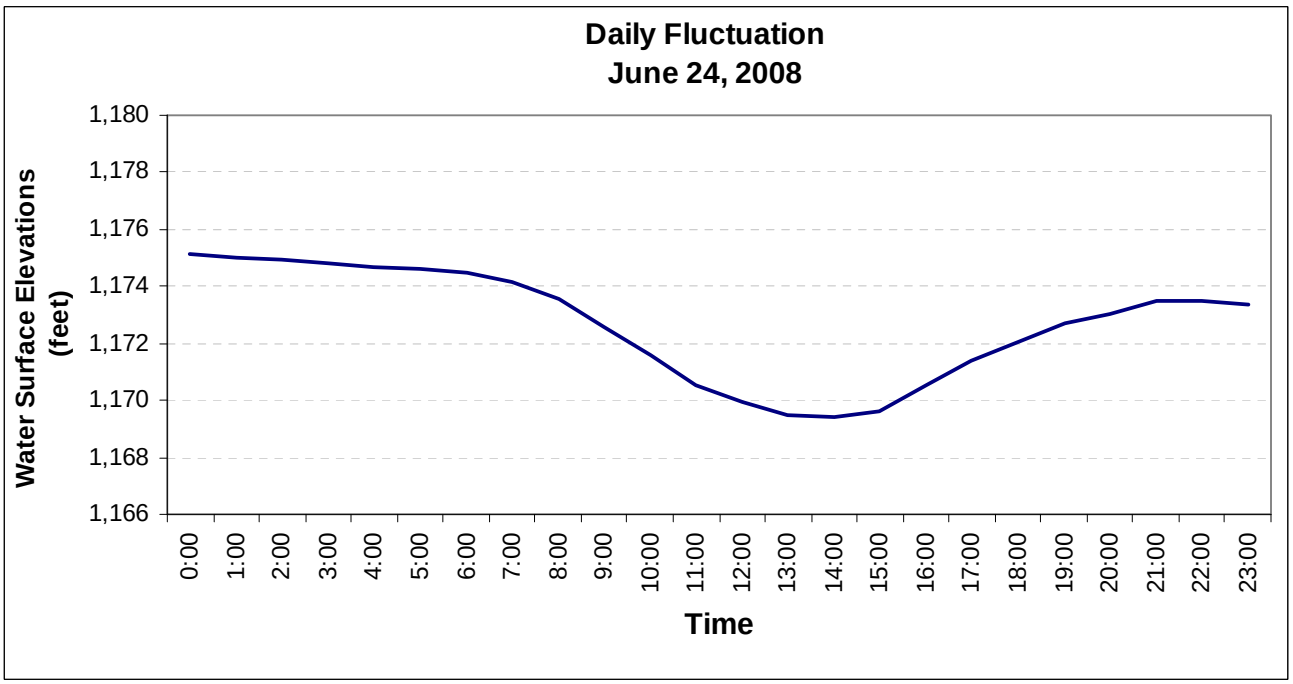


Figure B-10. Water Surface Elevations at Ralston Afterbay – Summer 2008.



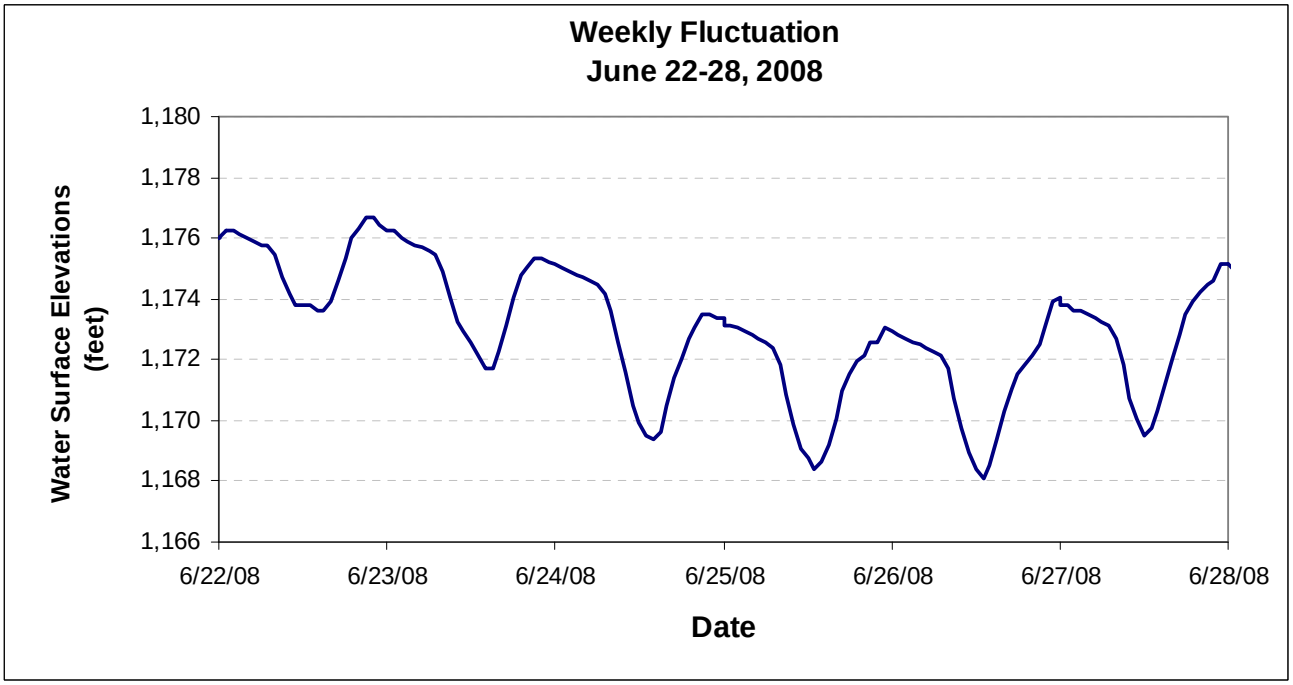
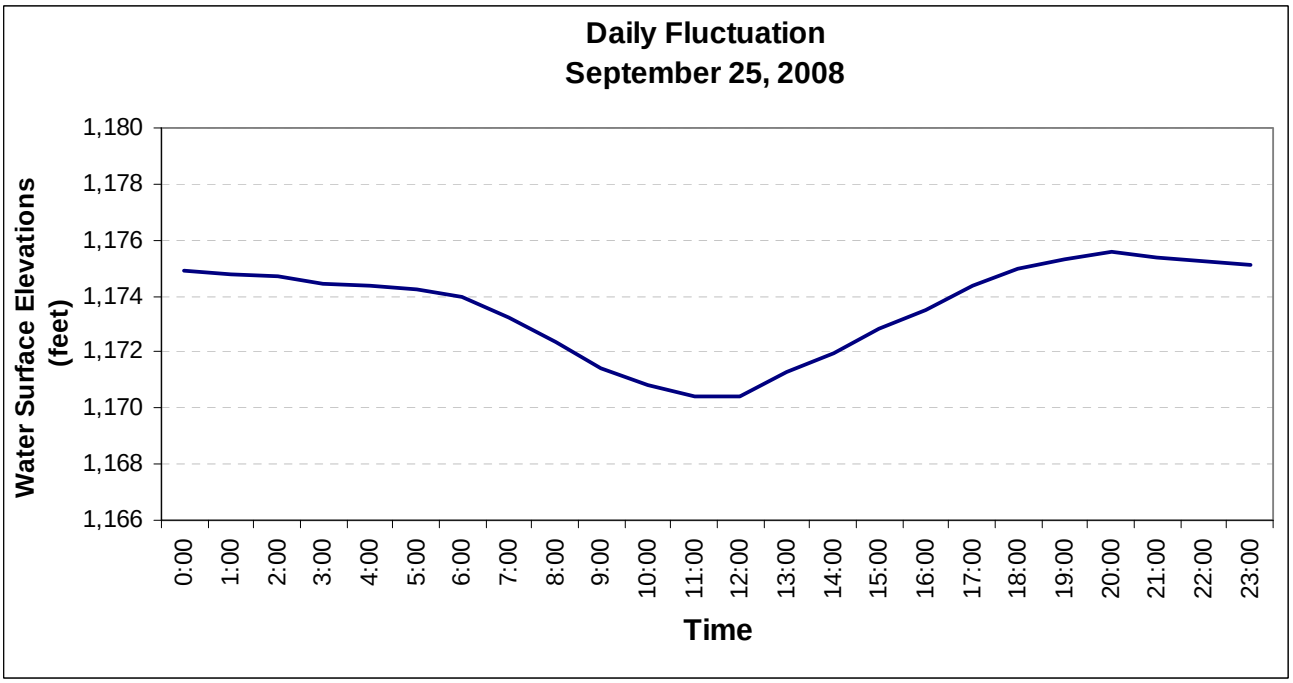


Figure B-11. Water Surface Elevations at Ralston Afterbay – Fall 2008.



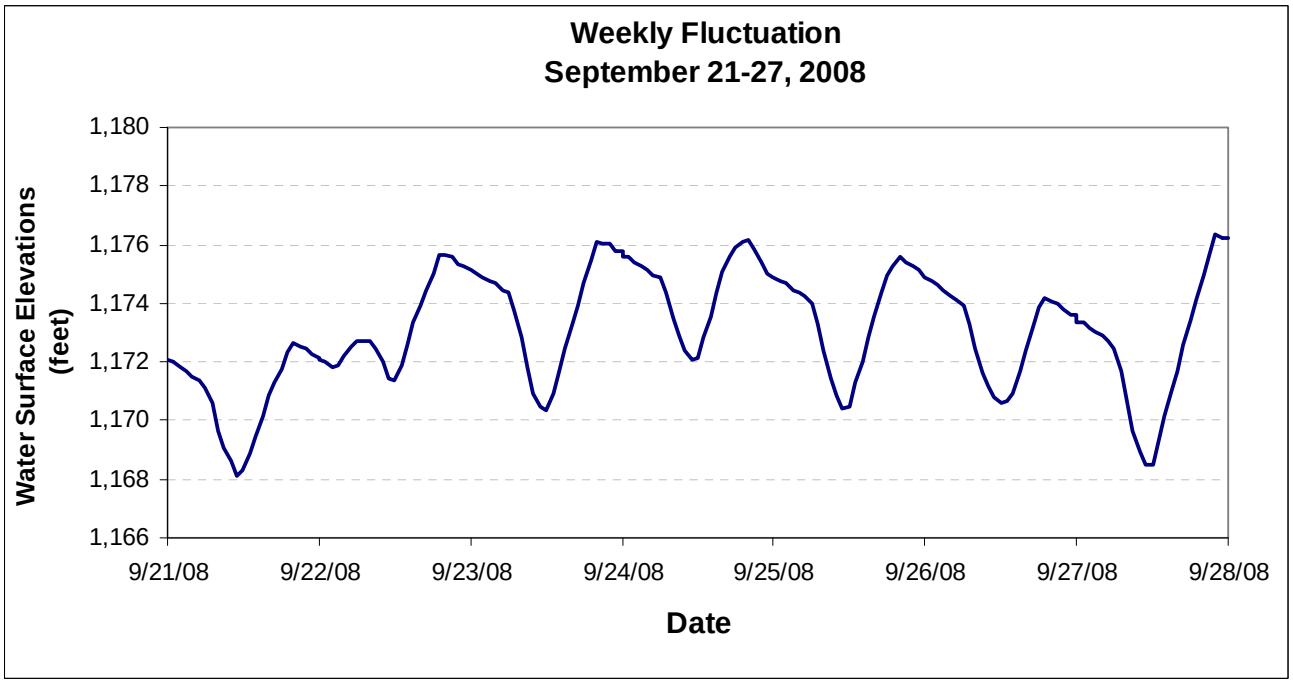
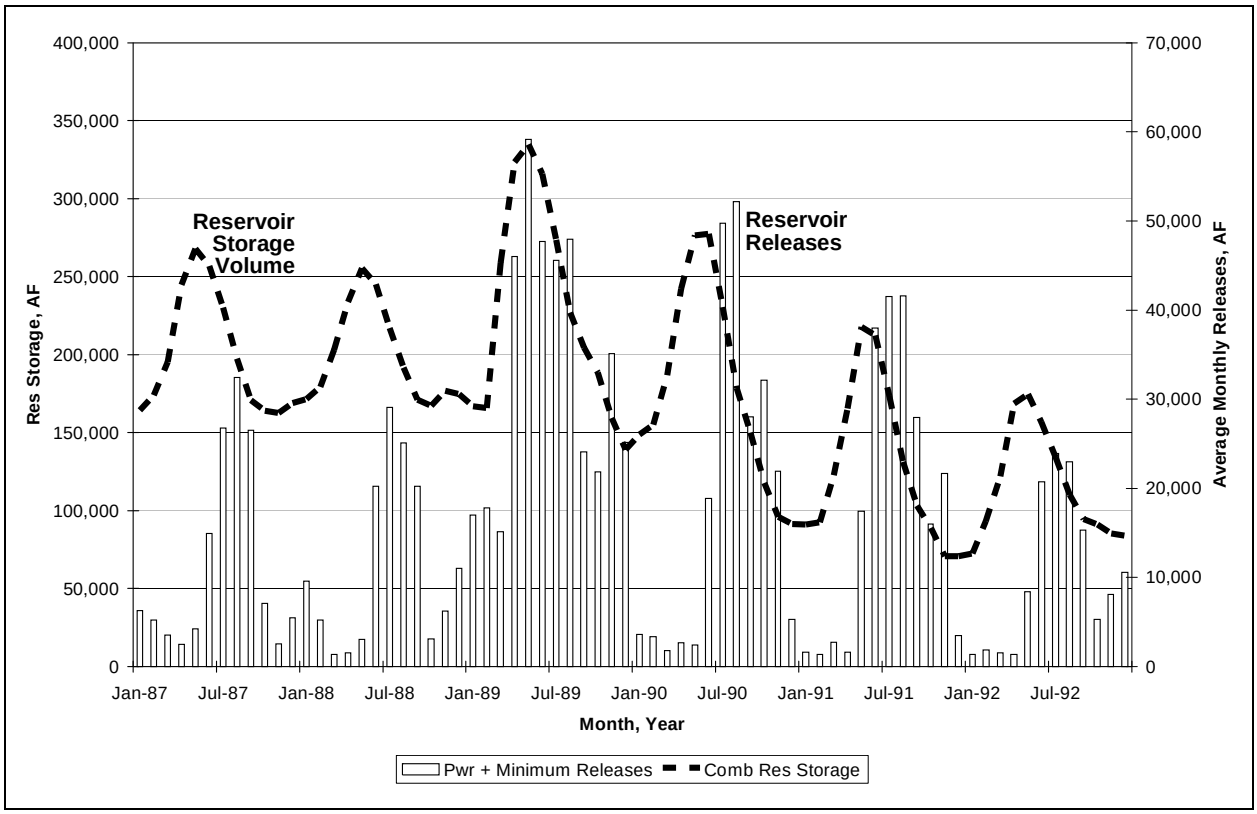
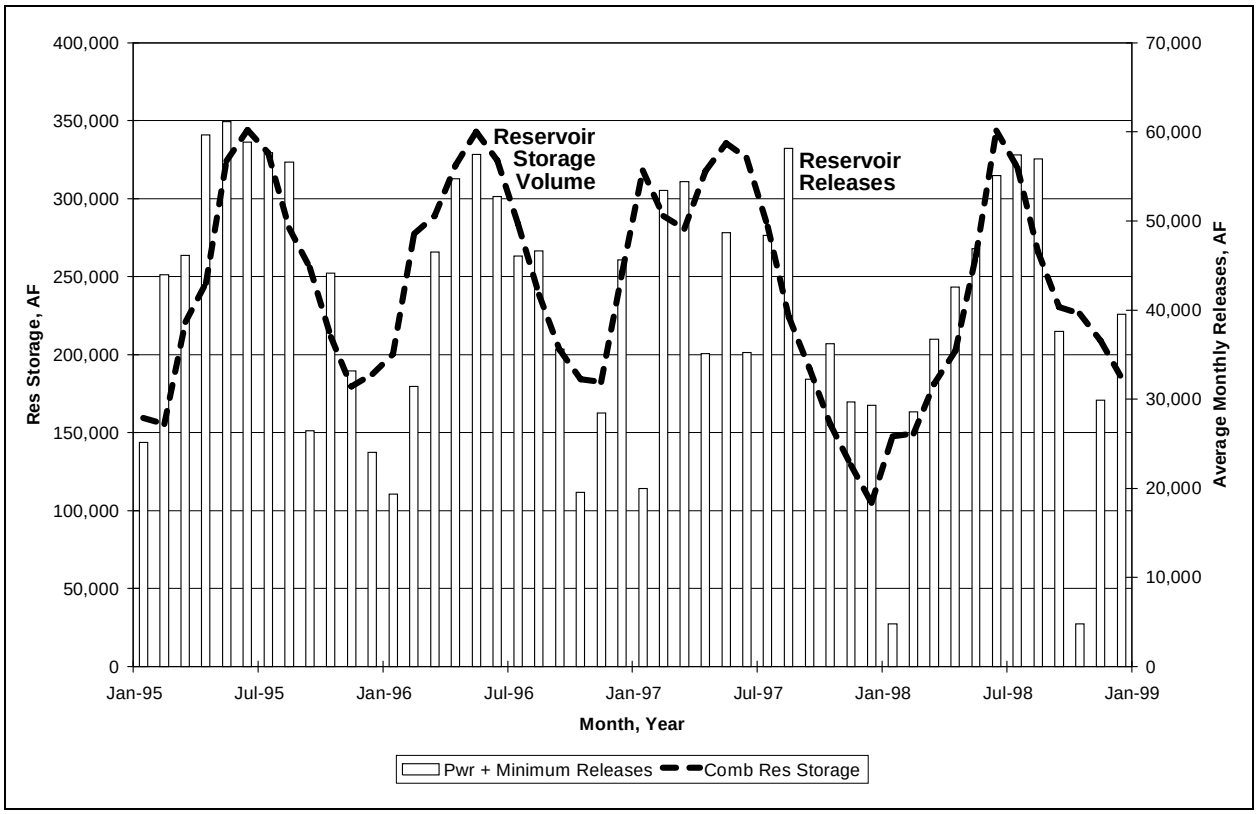


Figure B-12. Releases vs. Reservoir Storage, Drier Period (1987–1992).



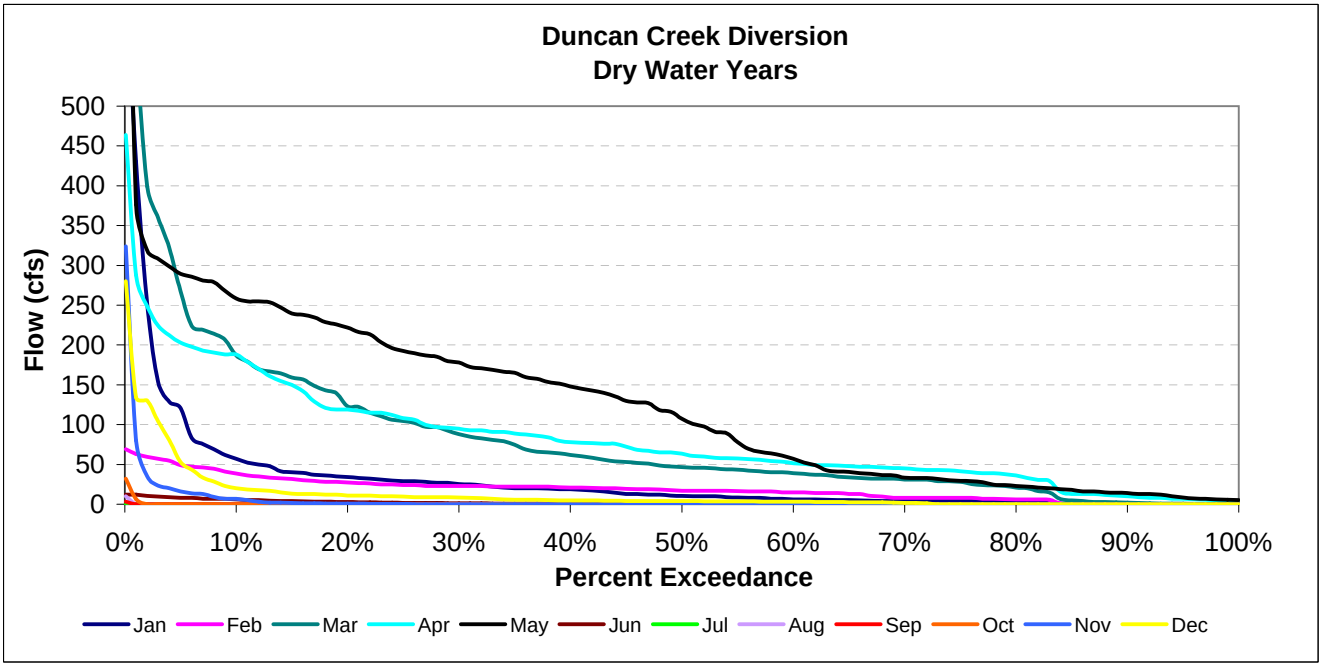
Res Storage = Combined Hell Hole Reservoir and French Meadows Reservoir Storage
Average Monthly Releases = Releases through Middle Fork Powerhouse

Figure B-13. Releases vs. Reservoir Storage, Wetter Period (1995–1998).



Res Storage = Combined Hell Hole Reservoir and French Meadows Reservoir Storage
Average Monthly Releases = Releases through Middle Fork Powerhouse

Figure B-14. Duncan Creek Diversion Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).



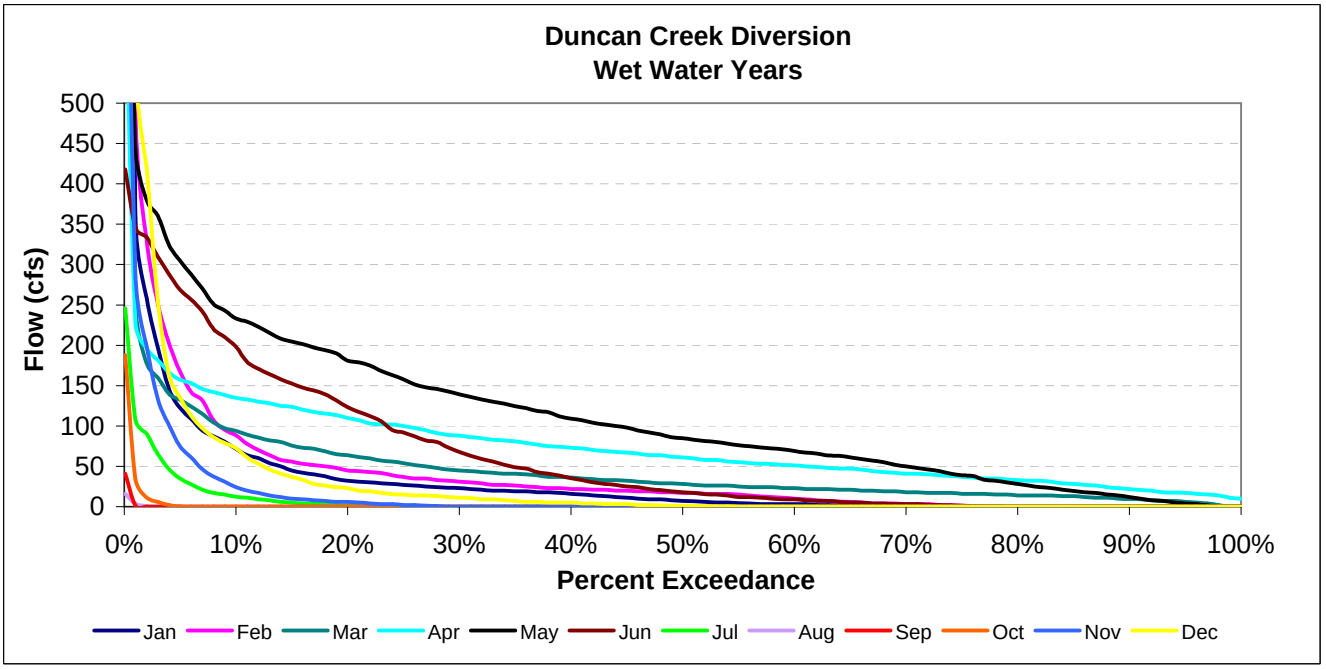


Figure B-15. French Meadows-Hell Hole Tunnel Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).

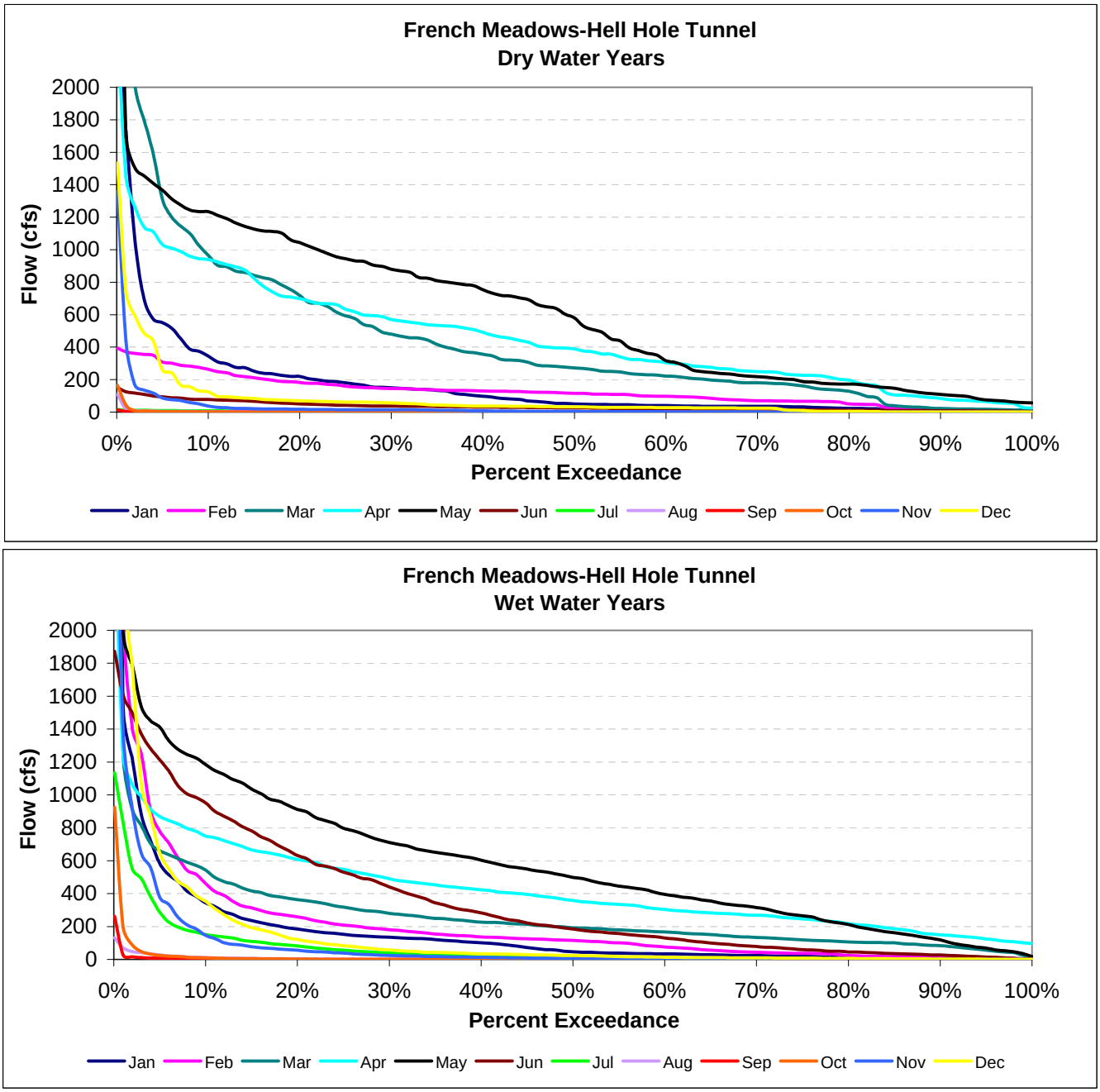


Figure B-16. Hell Hole-Middle Fork Tunnel Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).

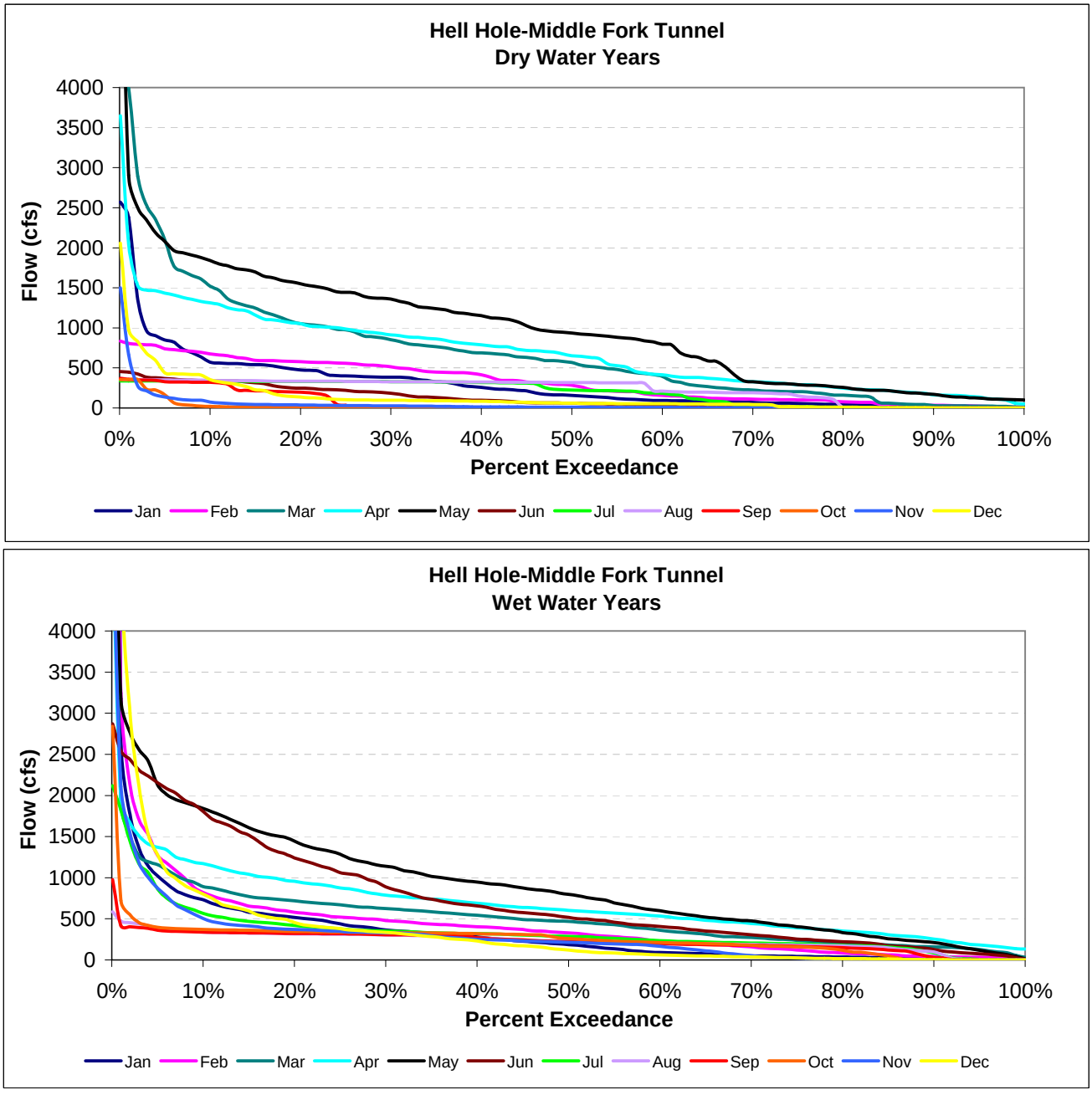
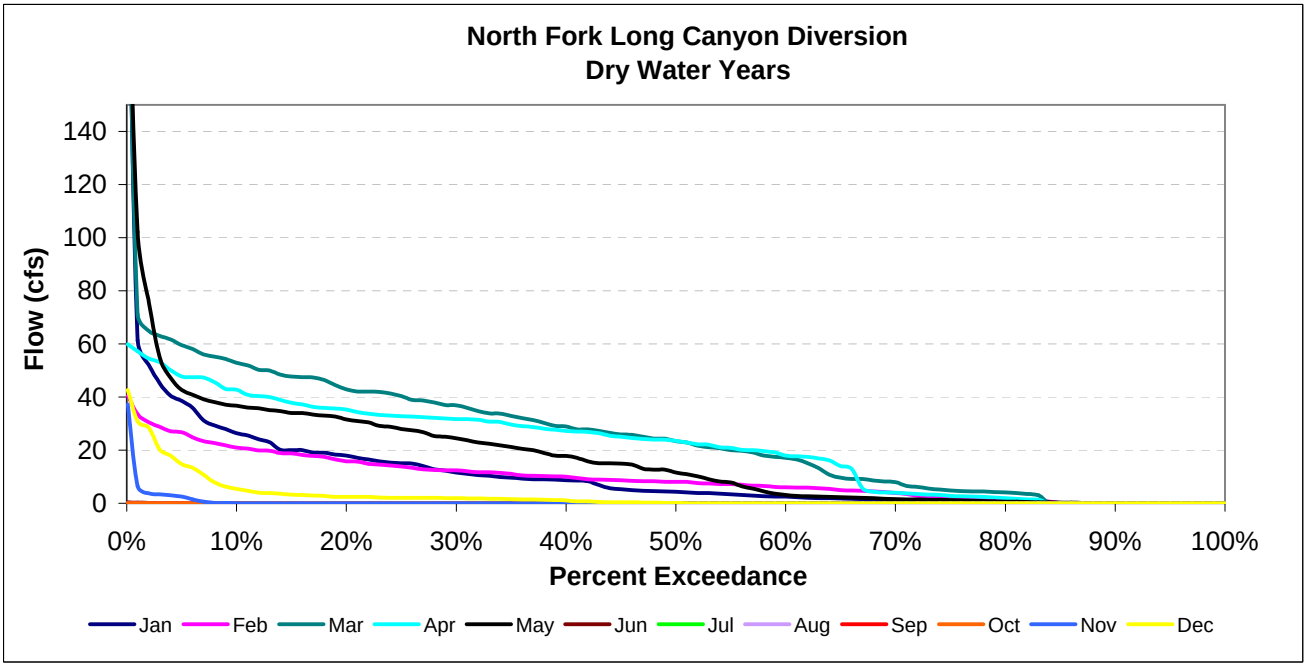


Figure B-17. North Fork Long Canyon Diversion Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).



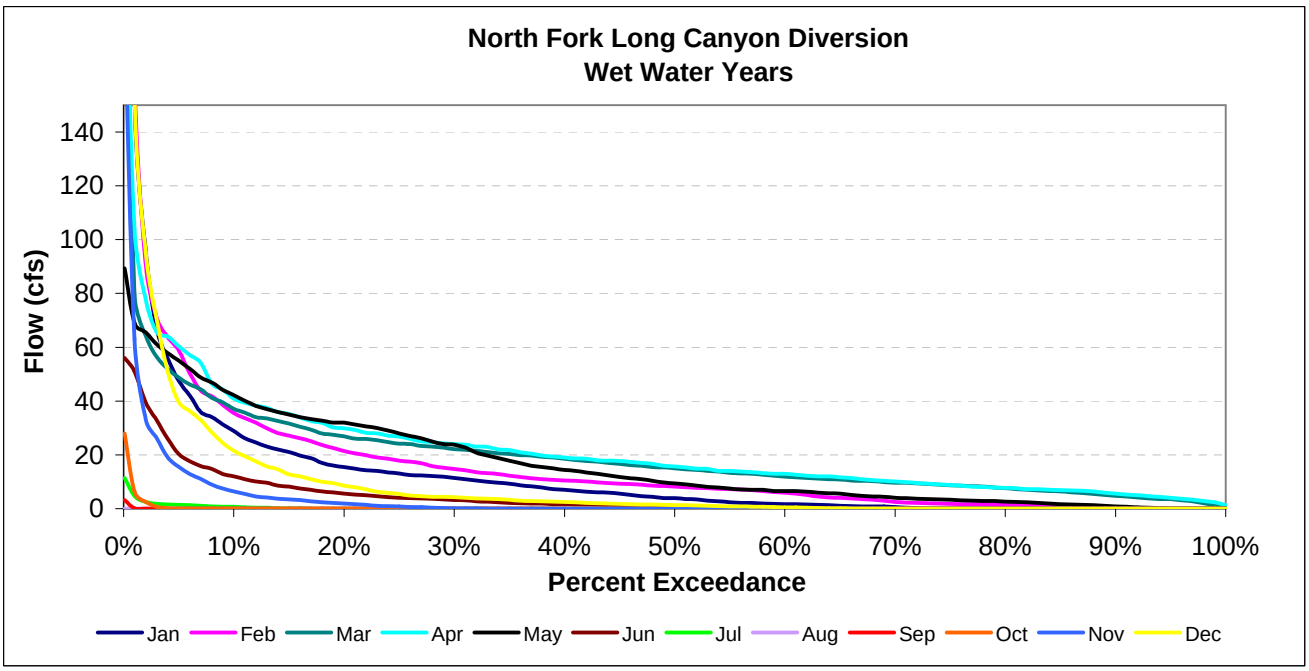
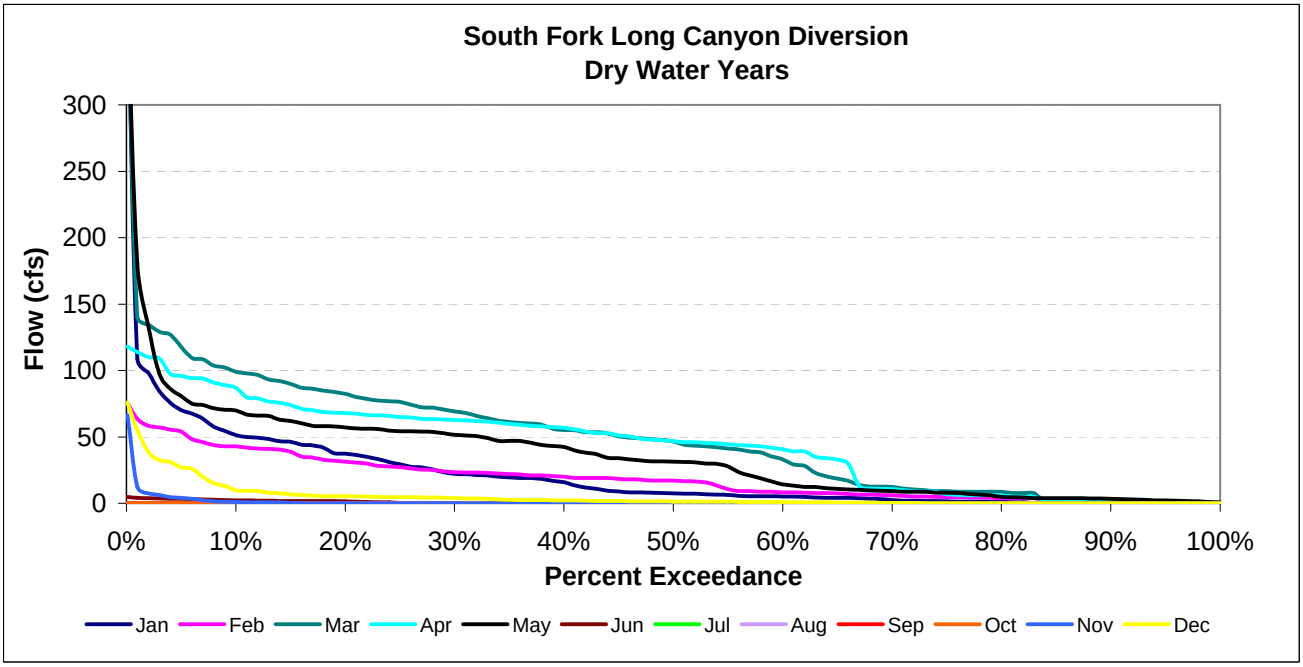


Figure B-18. South Fork Long Canyon Diversion Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).



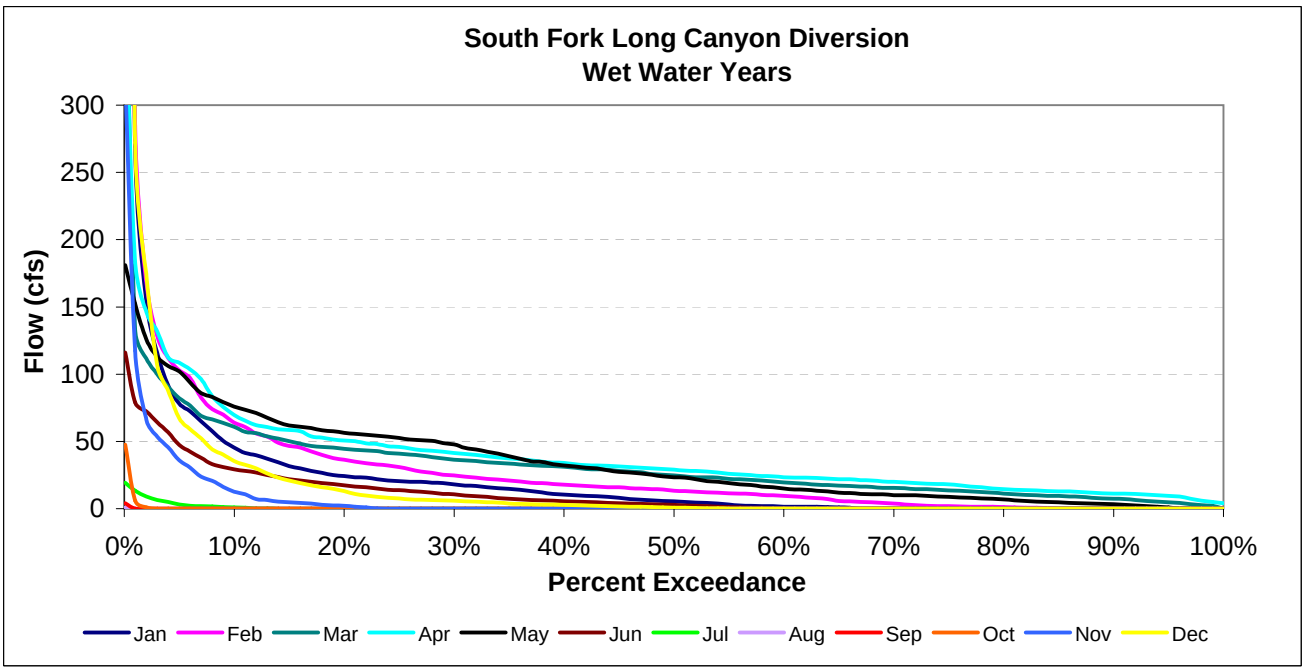
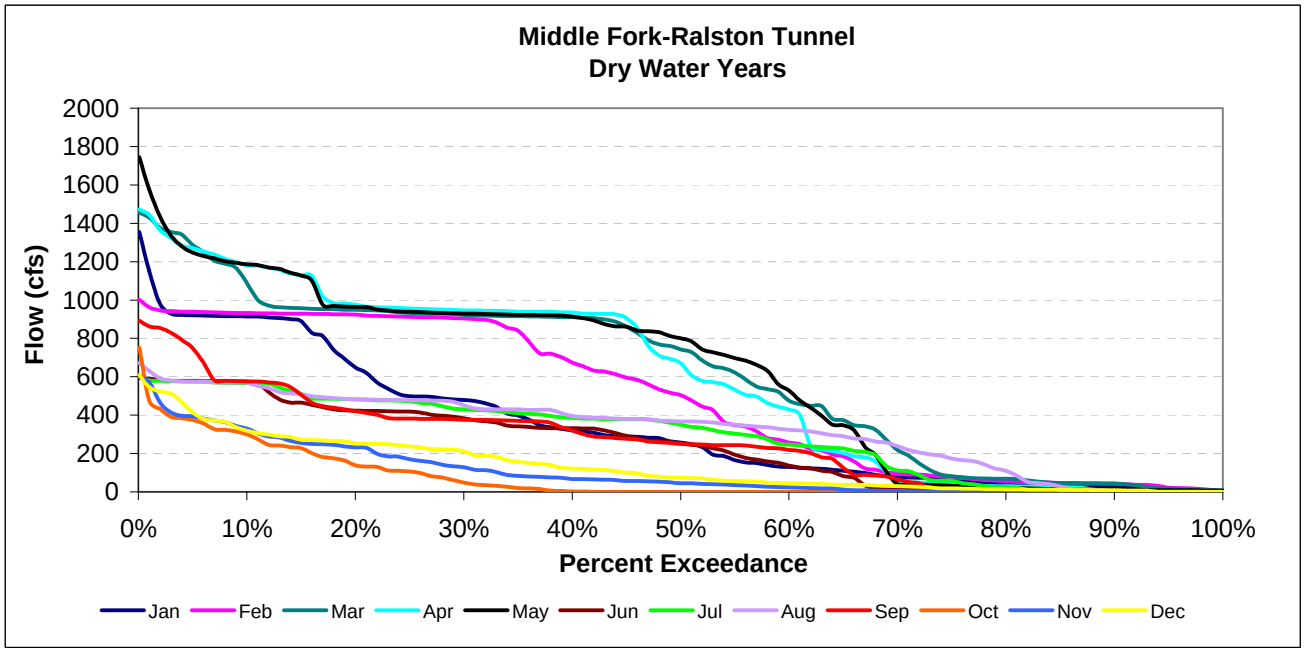


Figure B-19. Middle Fork-Ralston Tunnel Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).



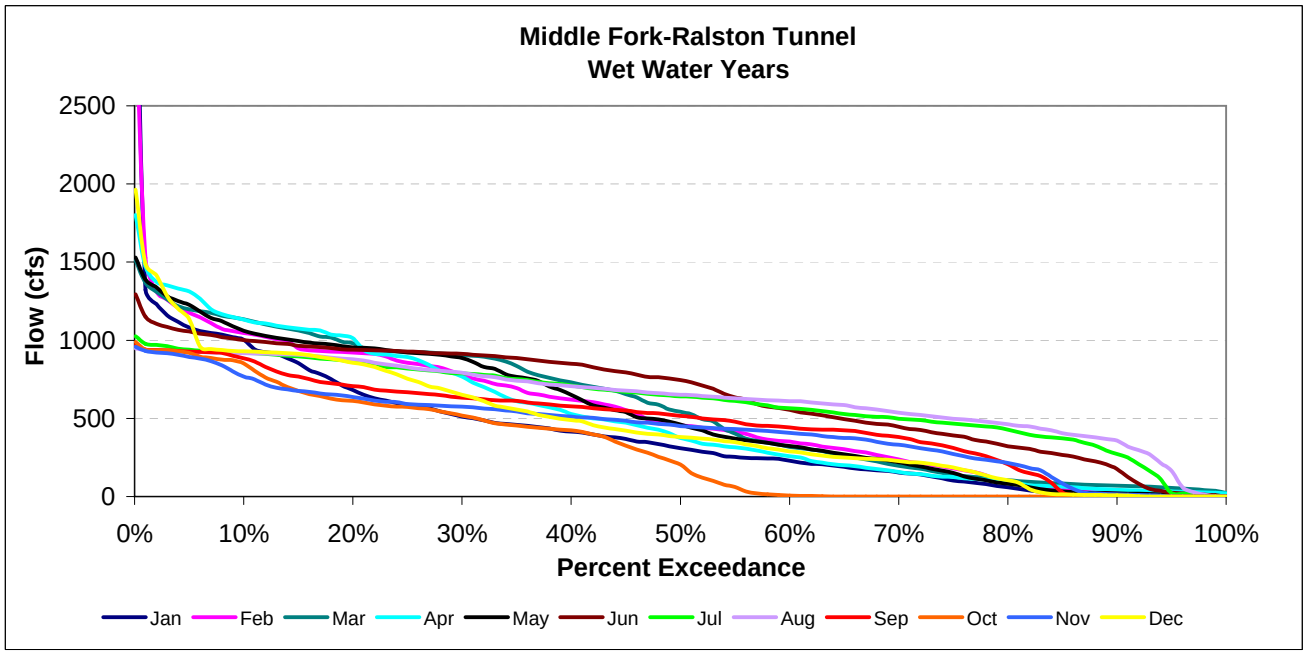


Figure B-20. Ralston-Oxbow Tunnel Available Flow Exceedance (1975 - 2007) in Dry Water Years (Top) and Wet Water Years (Bottom).

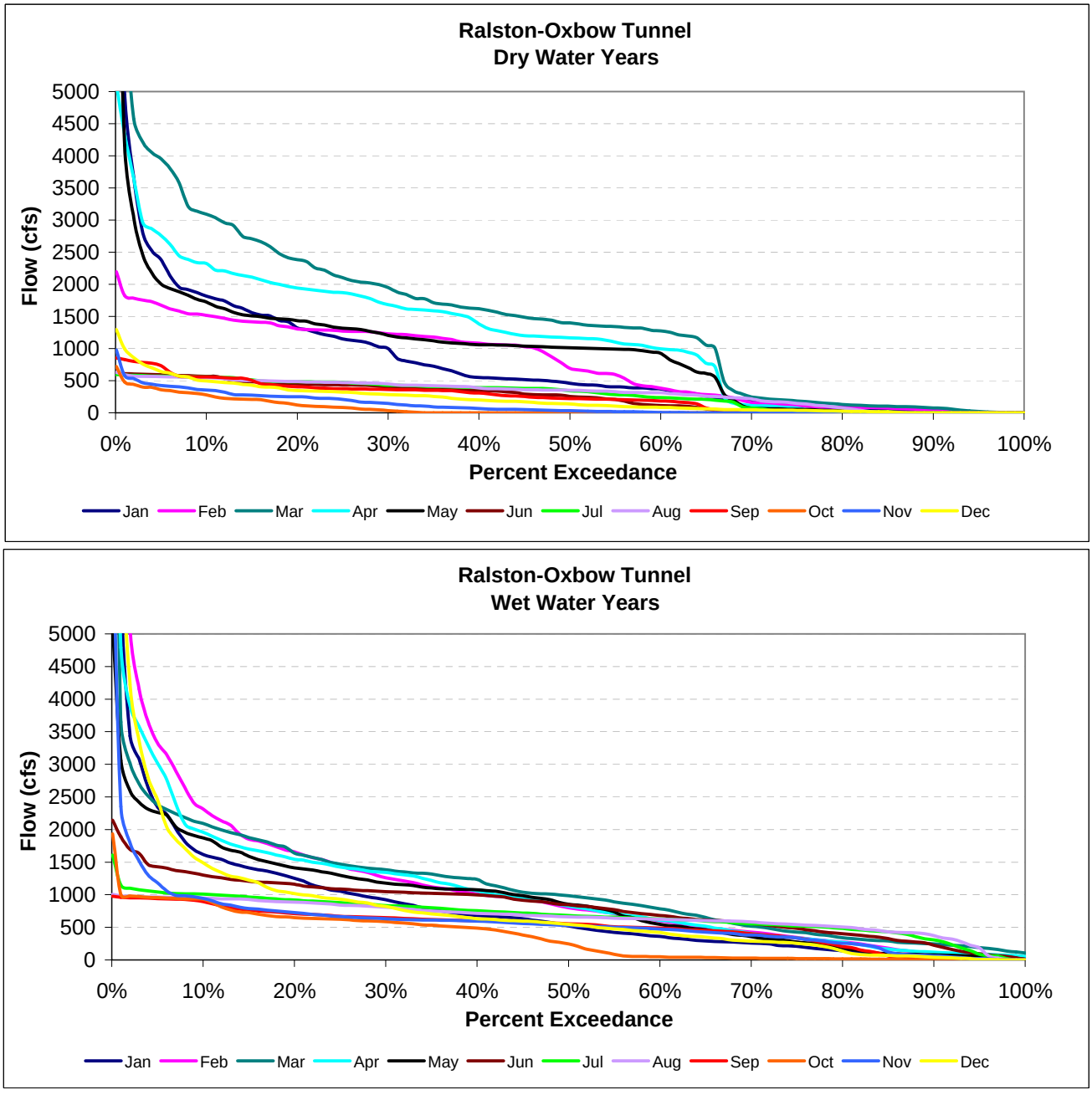


Figure B-21. Duncan Creek Diversion Impoundment Storage Capacity Curve.

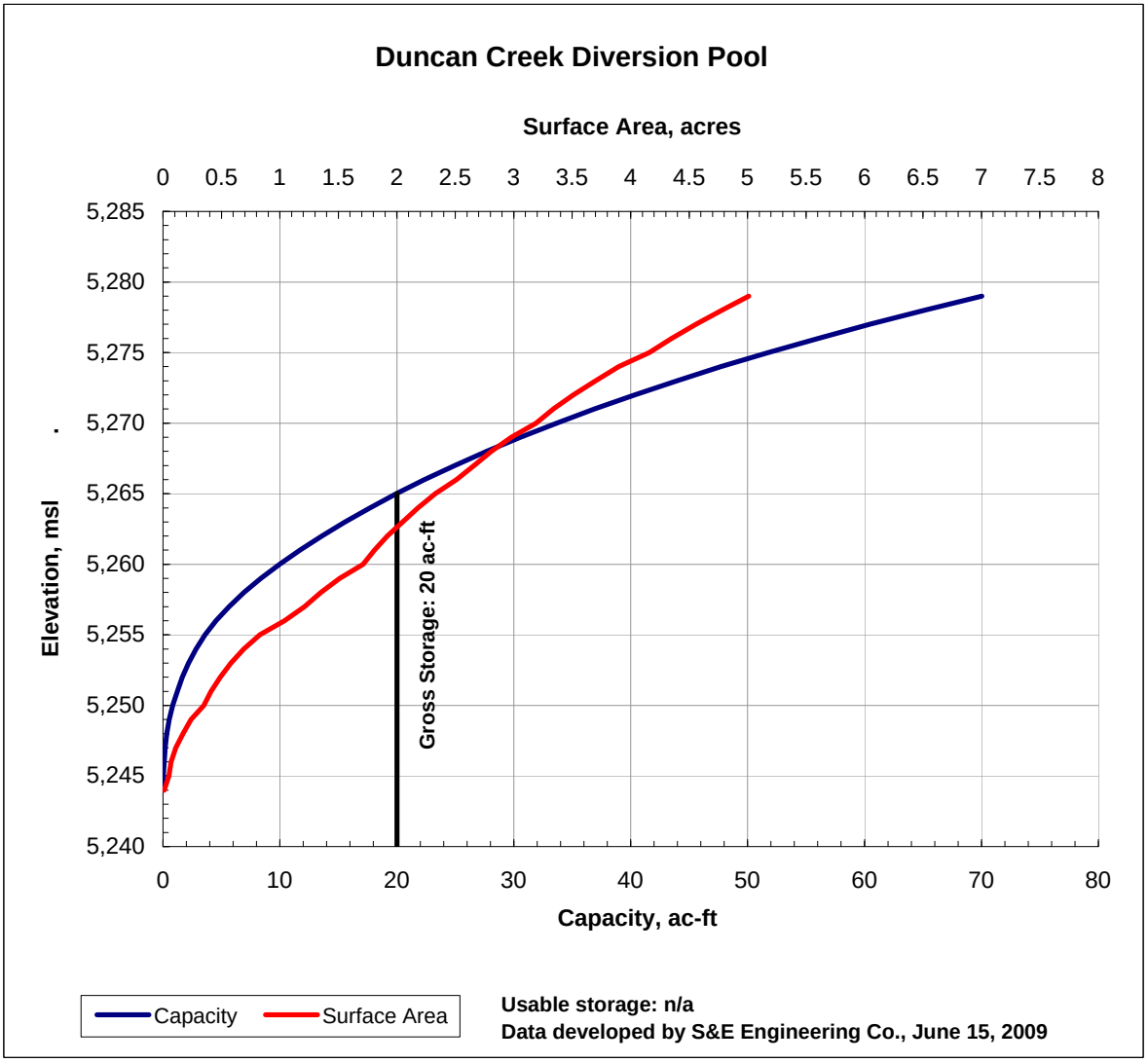


Figure B-22. French Meadows Reservoir Storage Capacity Curve.

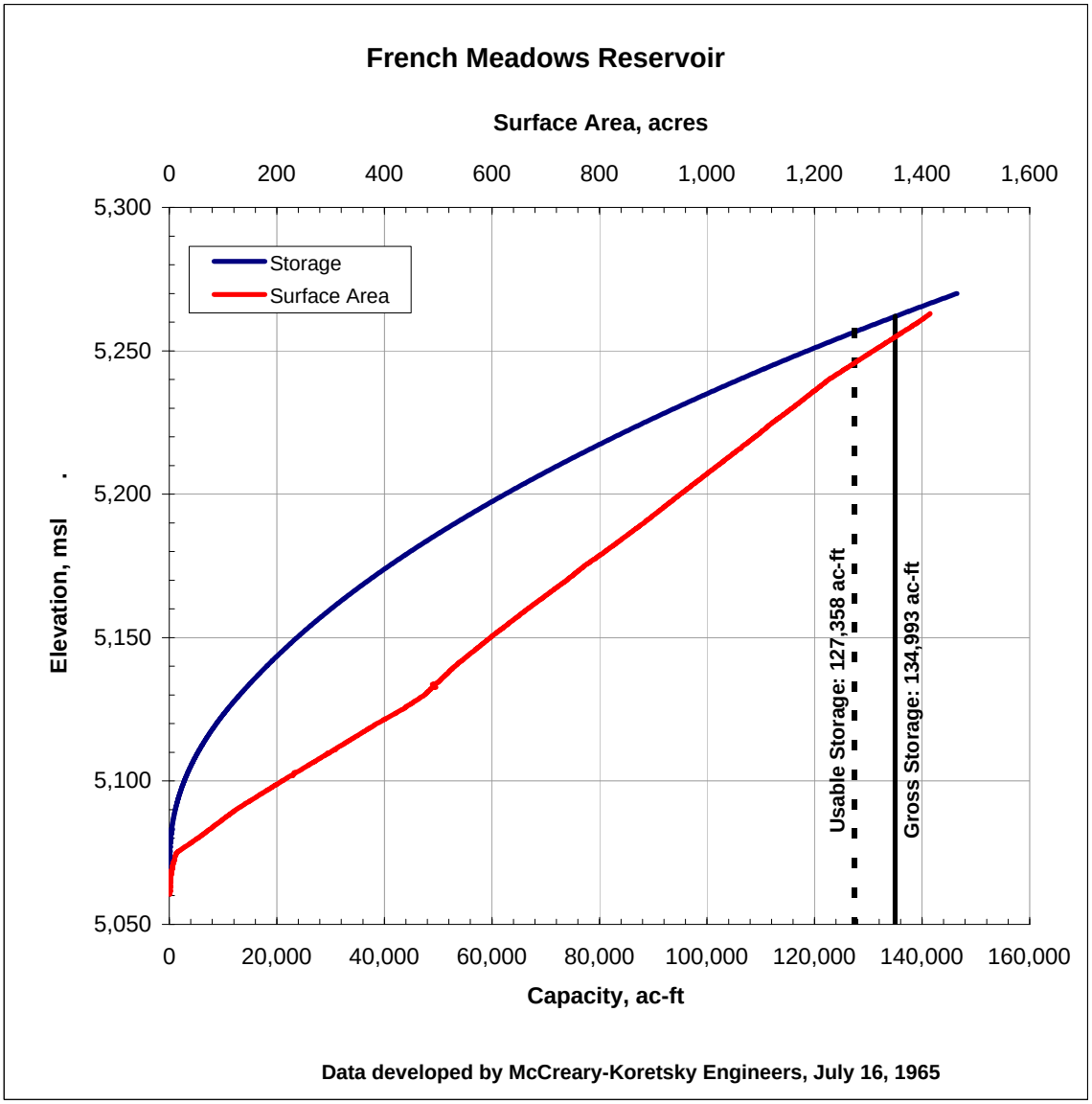


Figure B-23. Hell Hole Reservoir Storage Capacity Curve.

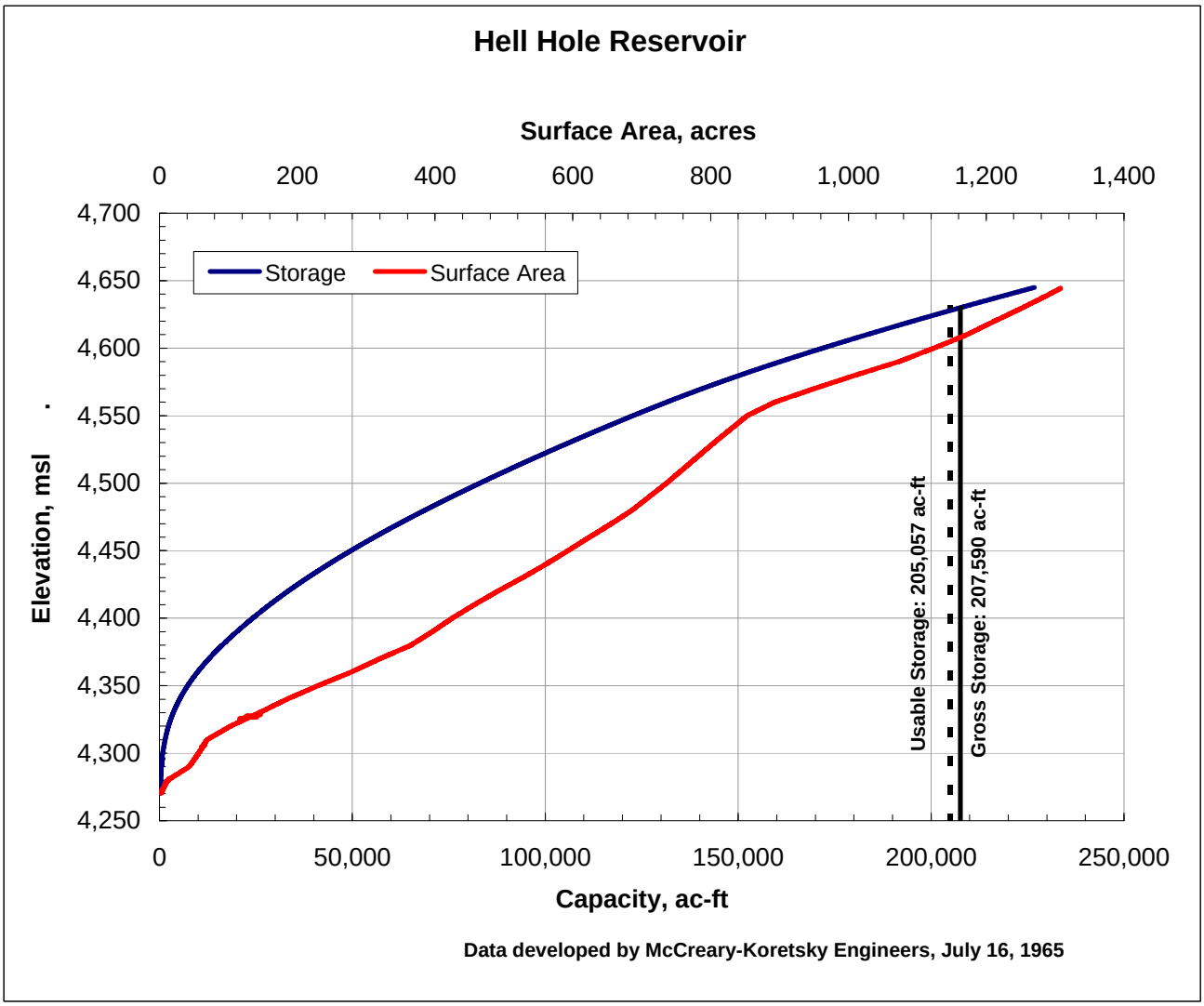


Figure B-24. Middle Fork Interbay Storage Capacity Curve.

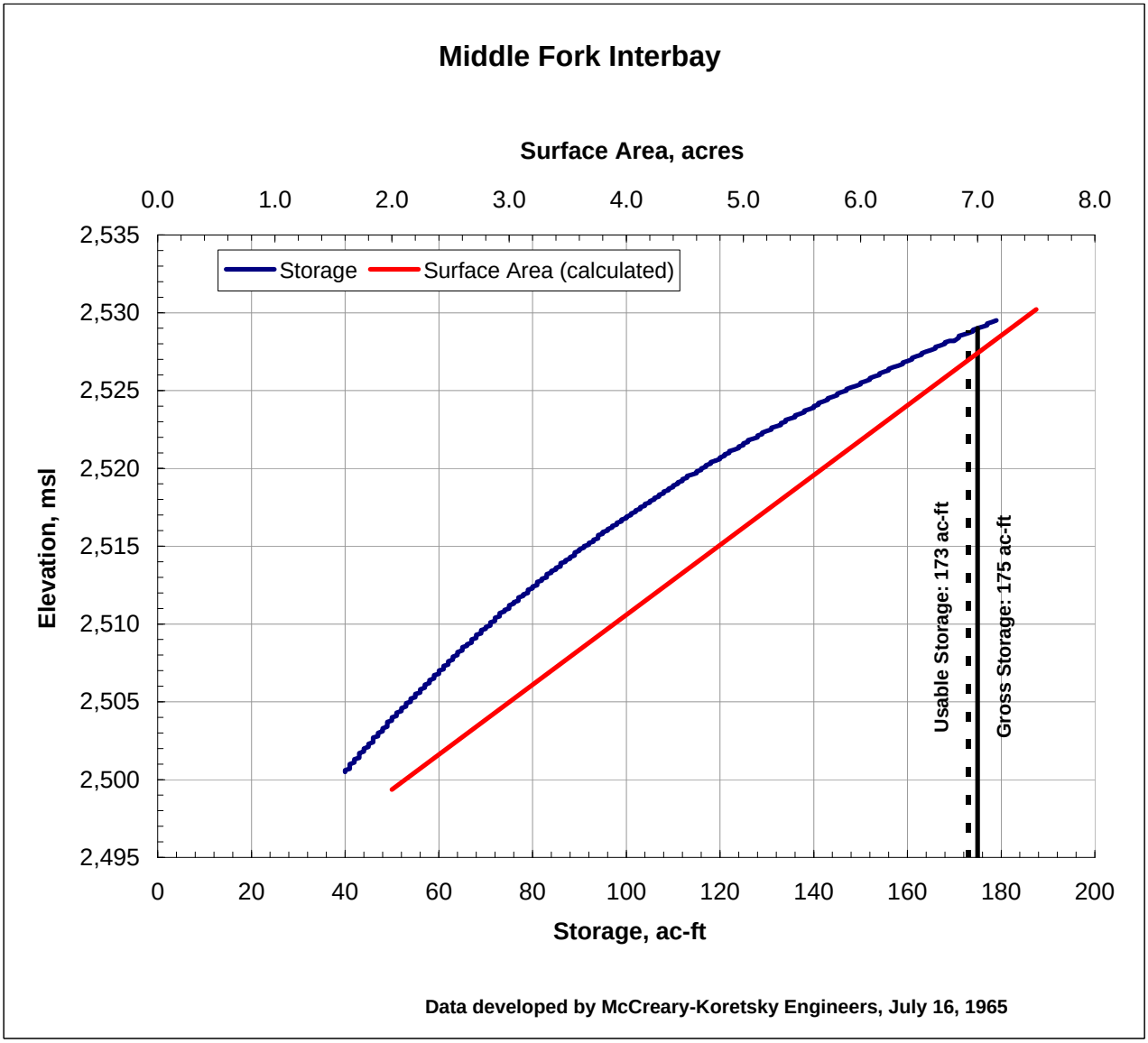


Figure B-25. Ralston Afterbay Storage Capacity Curve.

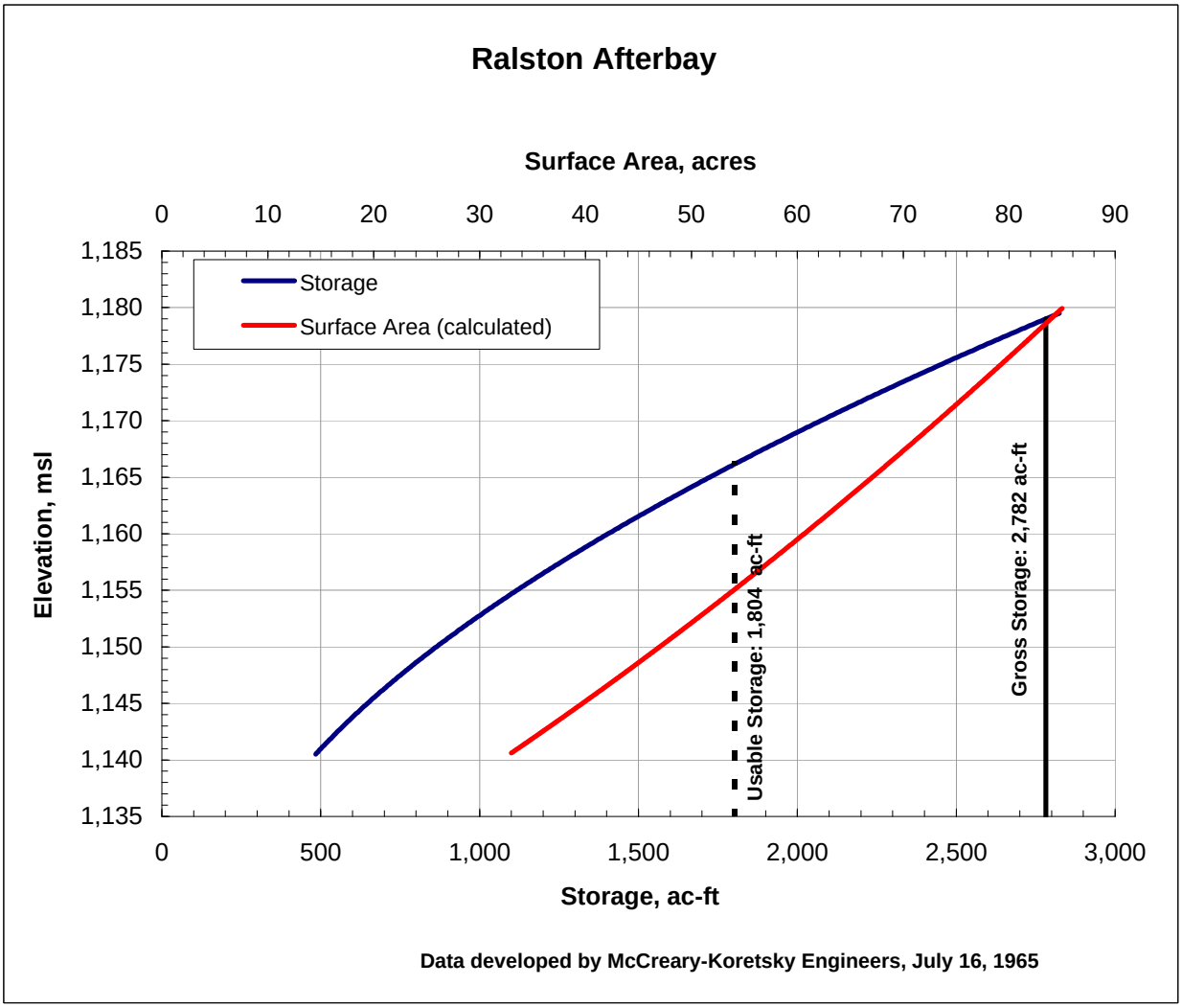
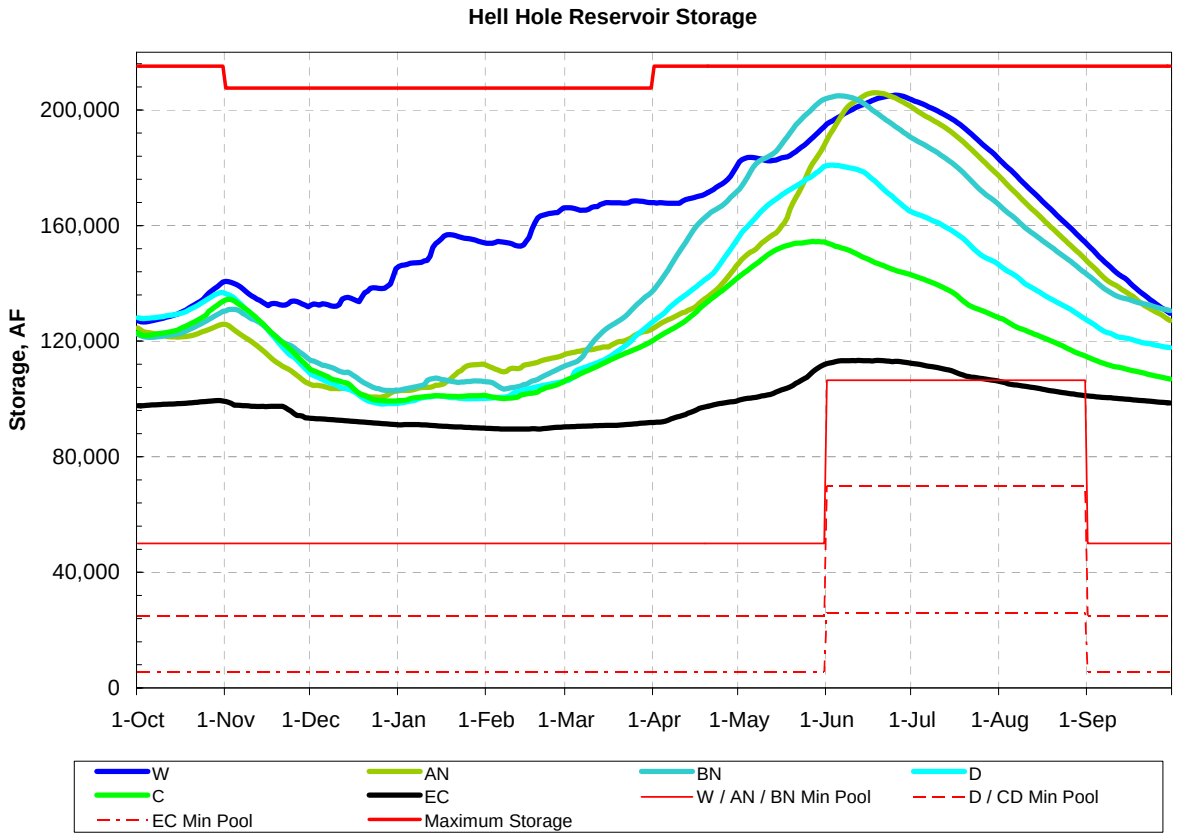


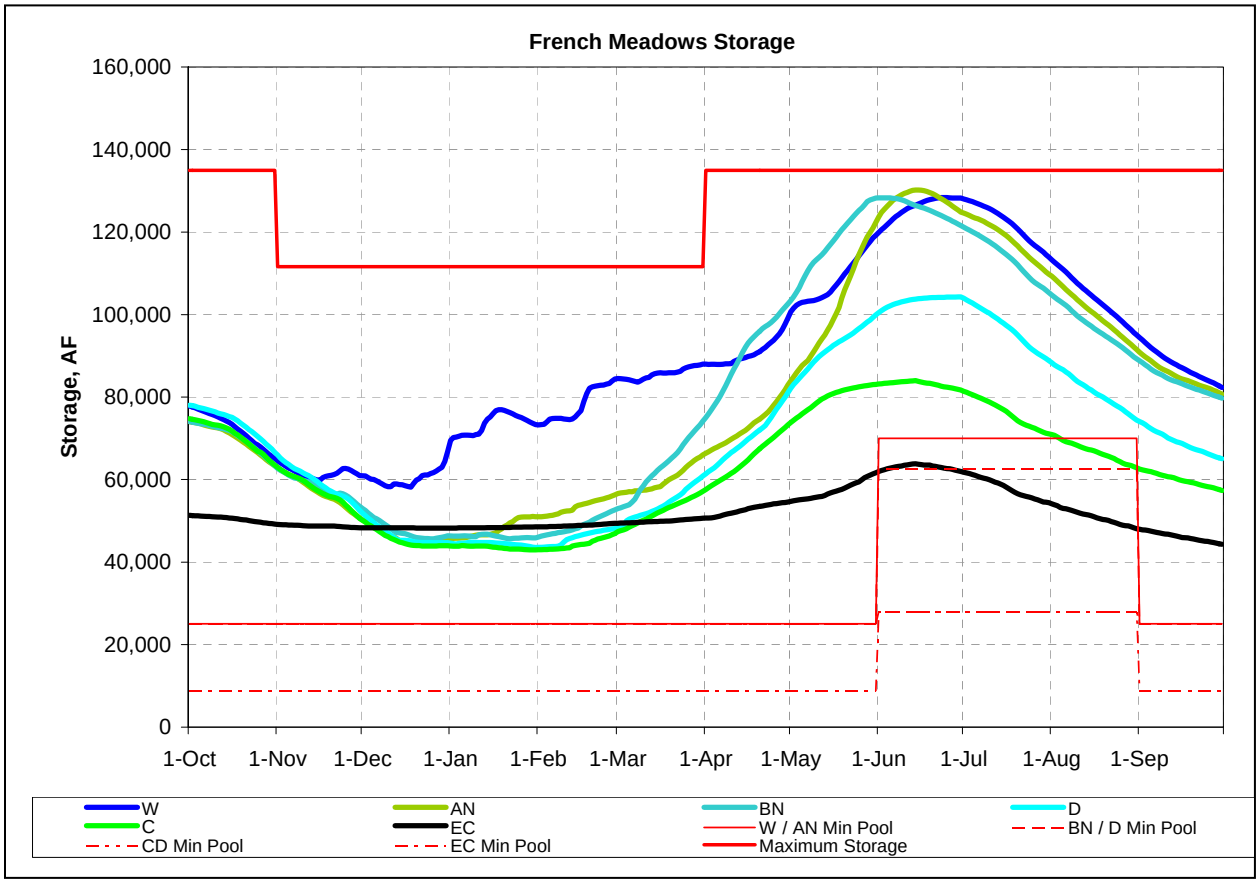
Figure B-26. Hell Hole Reservoir Typical Operations during Different Water Year Types.



The storage curves represent an average of the modeled daily storage values by water year type[1]. The data were developed based on the Proposed Action (including the Hell Hole Reservoir Seasonal Storage Increase), historic unimpaired hydrology, and a synthesized energy demand curve. While these curves represent reasonable operational response to the combination of these assumptions, real world conditions likely elicit differing operational strategies and, therefore, operational flexibility will be necessary to respond future conditions.

[1] Water year types: W=Wet; AN=Above Normal; BN=Below Normal; D=Dry; C=Critical; and, EC=Extreme Critical.

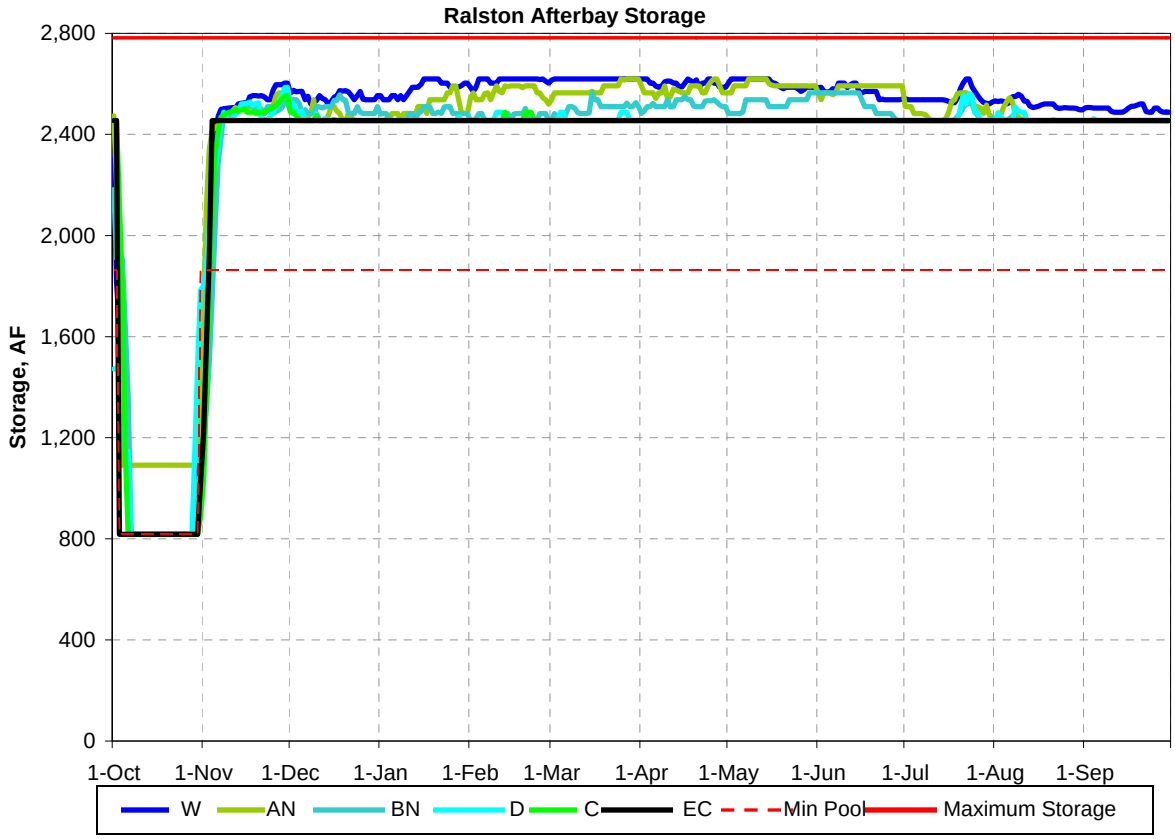
Figure B-27. French Meadows Reservoir Typical Operations during Different Water Year Types.



The storage curves represent an average of the modeled daily storage values by water year type[1]. The data were developed based on the Proposed Action (including the Hell Hole Reservoir Seasonal Storage Increase), historic unimpaired hydrology, and a synthesized energy demand curve. While these curves represent reasonable operational response to the combination of these assumptions, real world conditions likely elicit differing operational strategies and, therefore, operational flexibility will be necessary to respond future conditions.

[1] Water year types: W=Wet; AN=Above Normal; BN=Below Normal; D=Dry; C=Critical; and, EC=Extreme Critical.

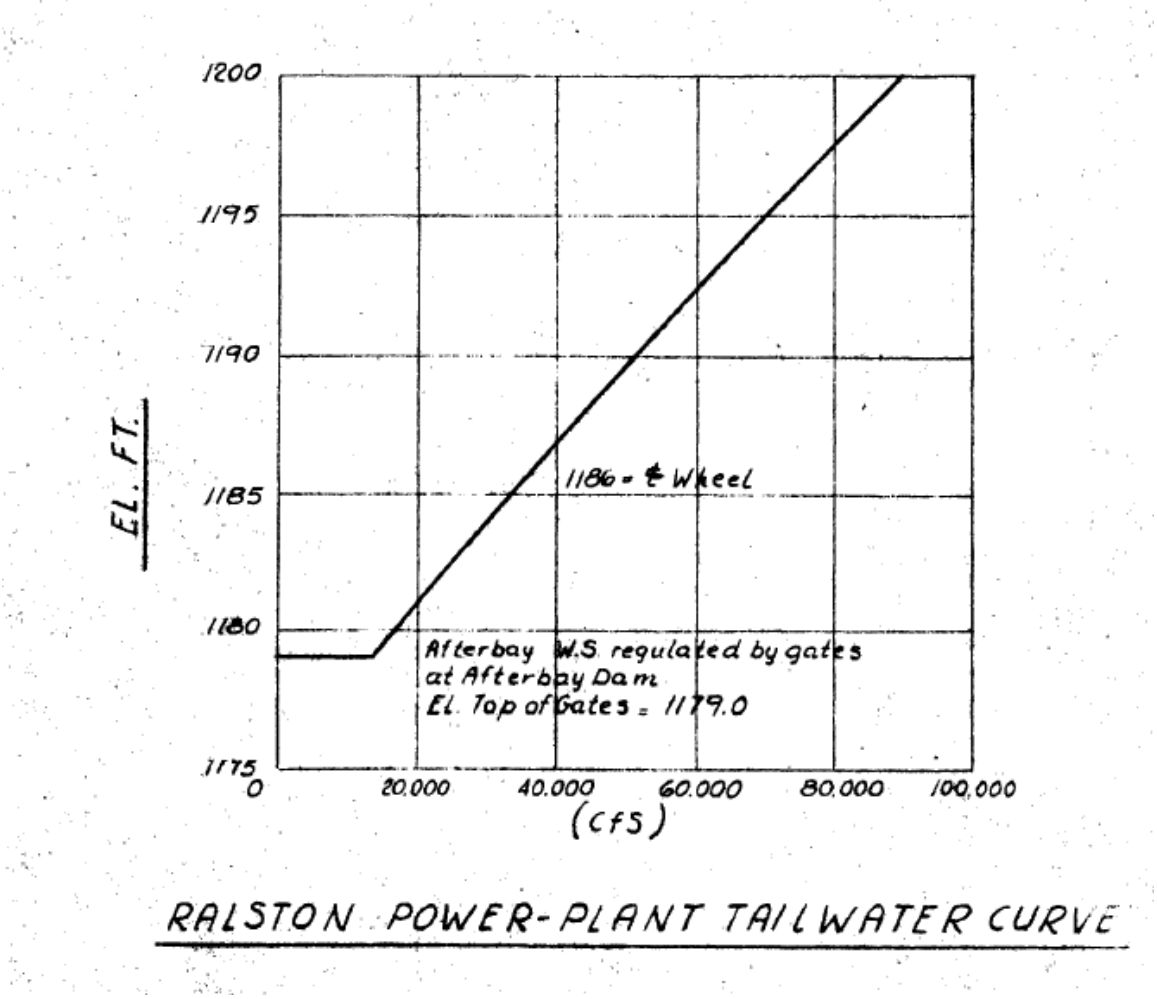
Figure B-28. Ralston Afterbay Typical Operations during Different Water Year Types.



The storage curves represent an average of the modeled daily storage values by water year type[1]. The data were developed based on the Proposed Action (including the Hell Hole Reservoir Seasonal Storage Increase), historic unimpaired hydrology, and a synthesized energy demand curve. While these curves represent reasonable operational response to the combination of these assumptions, real world conditions likely elicit differing operational strategies and, therefore, operational flexibility will be necessary to respond future conditions.

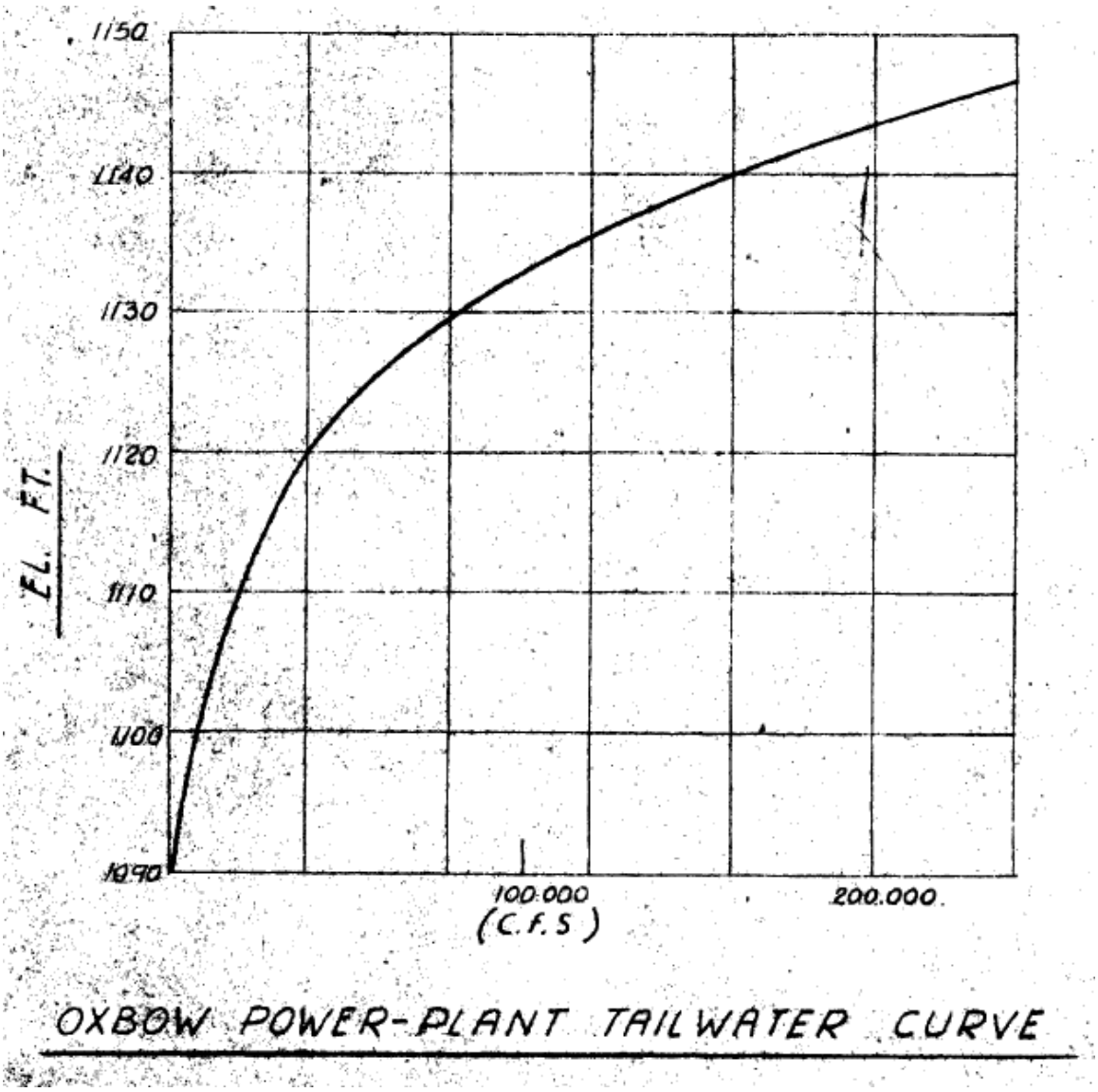
[1] Water year types: W=Wet; AN=Above Normal; BN=Below Normal; D=Dry; C=Critical; and, EC=Extreme Critical.

Figure B-29. Tailwater Rating Curve for Ralston Powerhouse.



Revised November 15, 1967. From Exhibit I, sheet 4.

Figure B-30. Tailwater Rating Curve for Oxbow Powerhouse.



Revised November 15, 1967. From Exhibit I, sheet 4.

Figure B-31. Capability Versus Net Head for French Meadows Powerhouse.

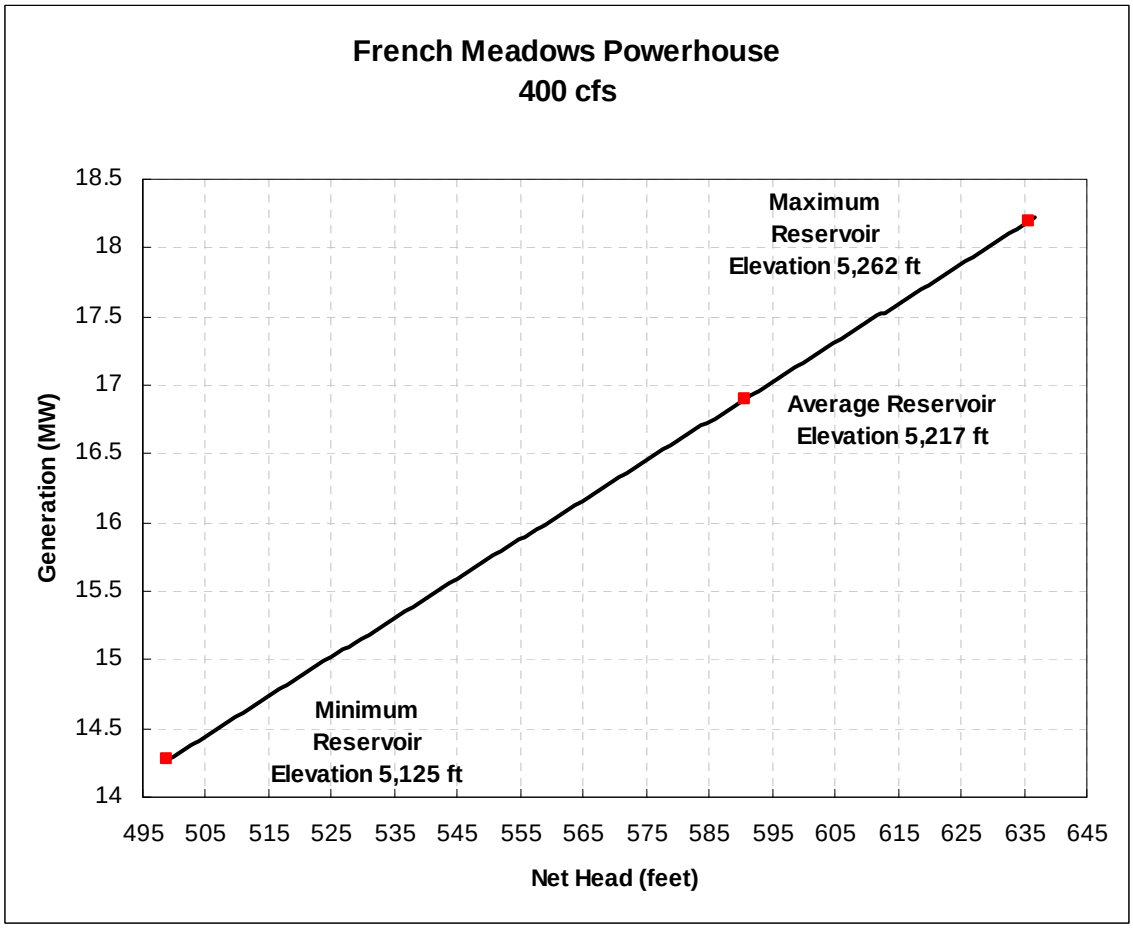


Figure B-32. Capability Versus Net Head for Middle Fork Powerhouse.

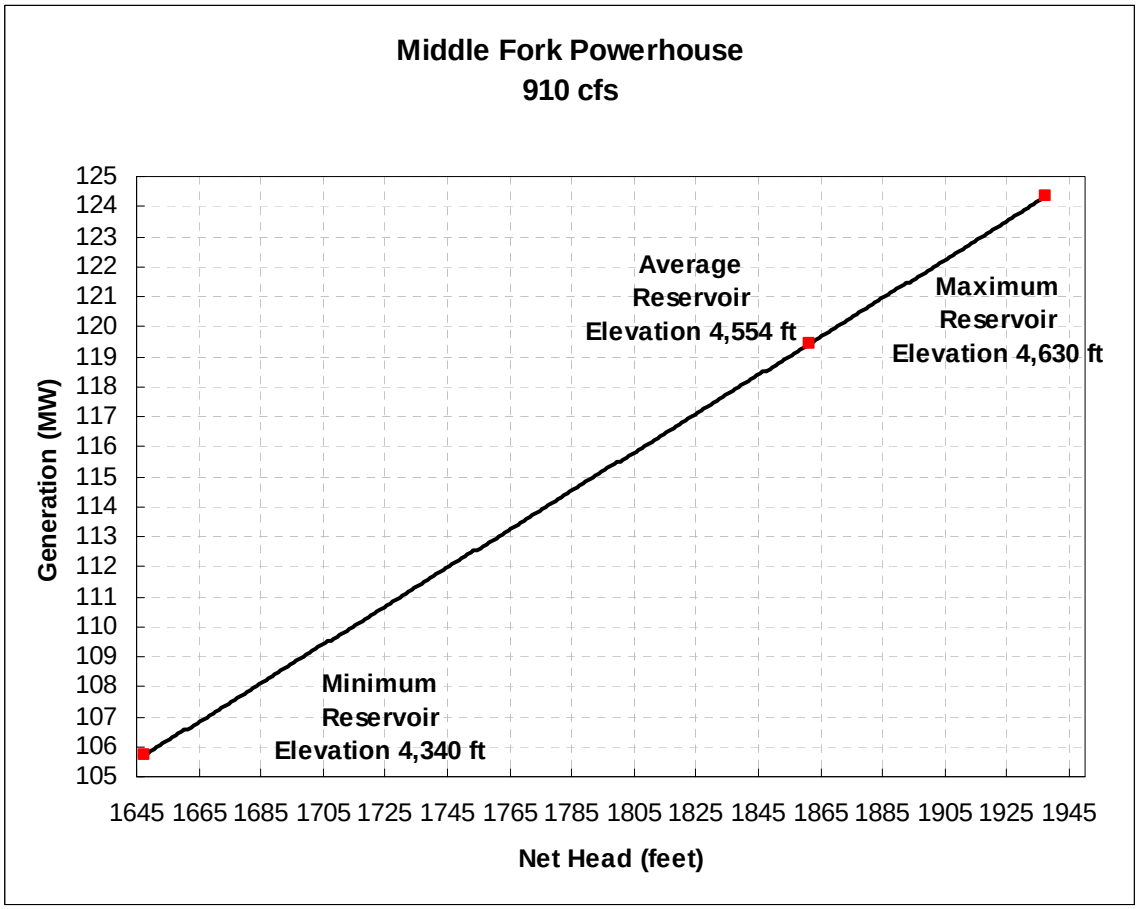


Figure B-33. Capability versus Net Head for Ralston Powerhouse.

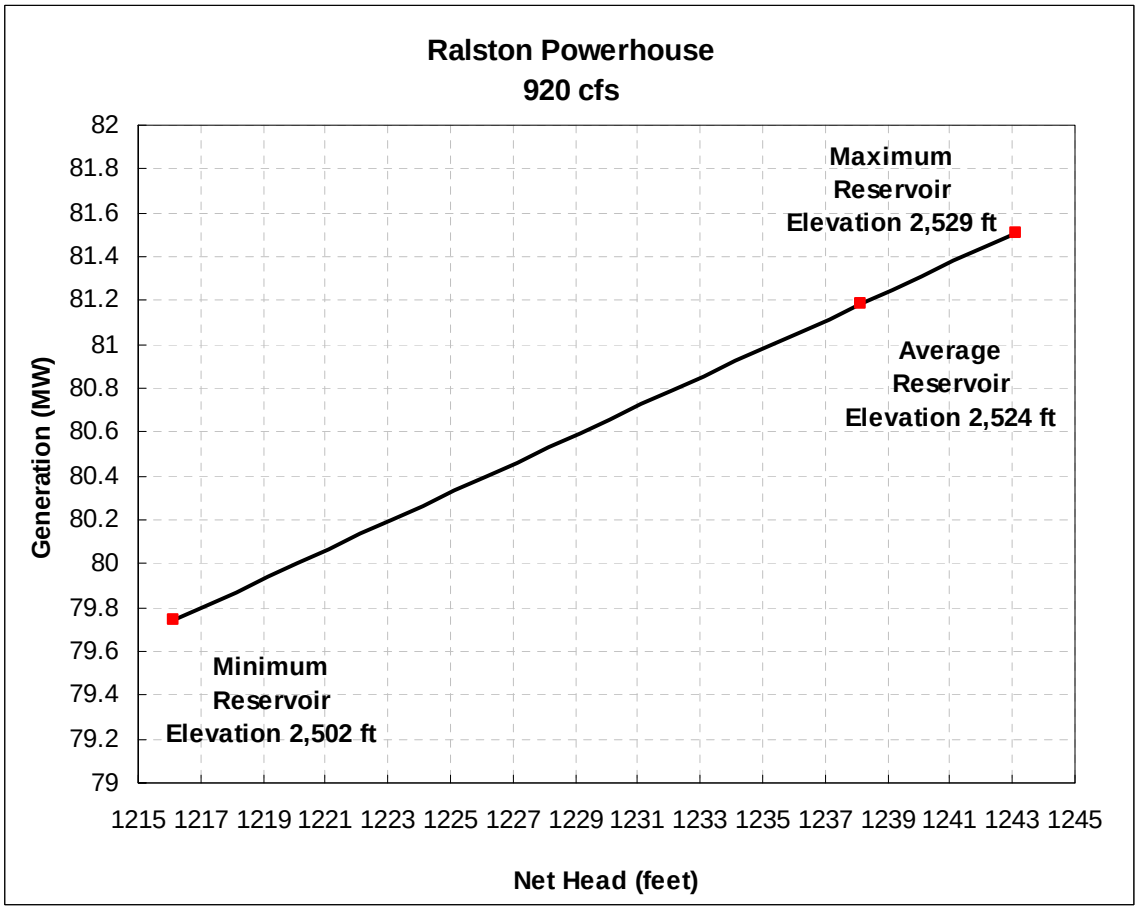


Figure B-34. Capability versus Net Head for Oxbow Powerhouse.

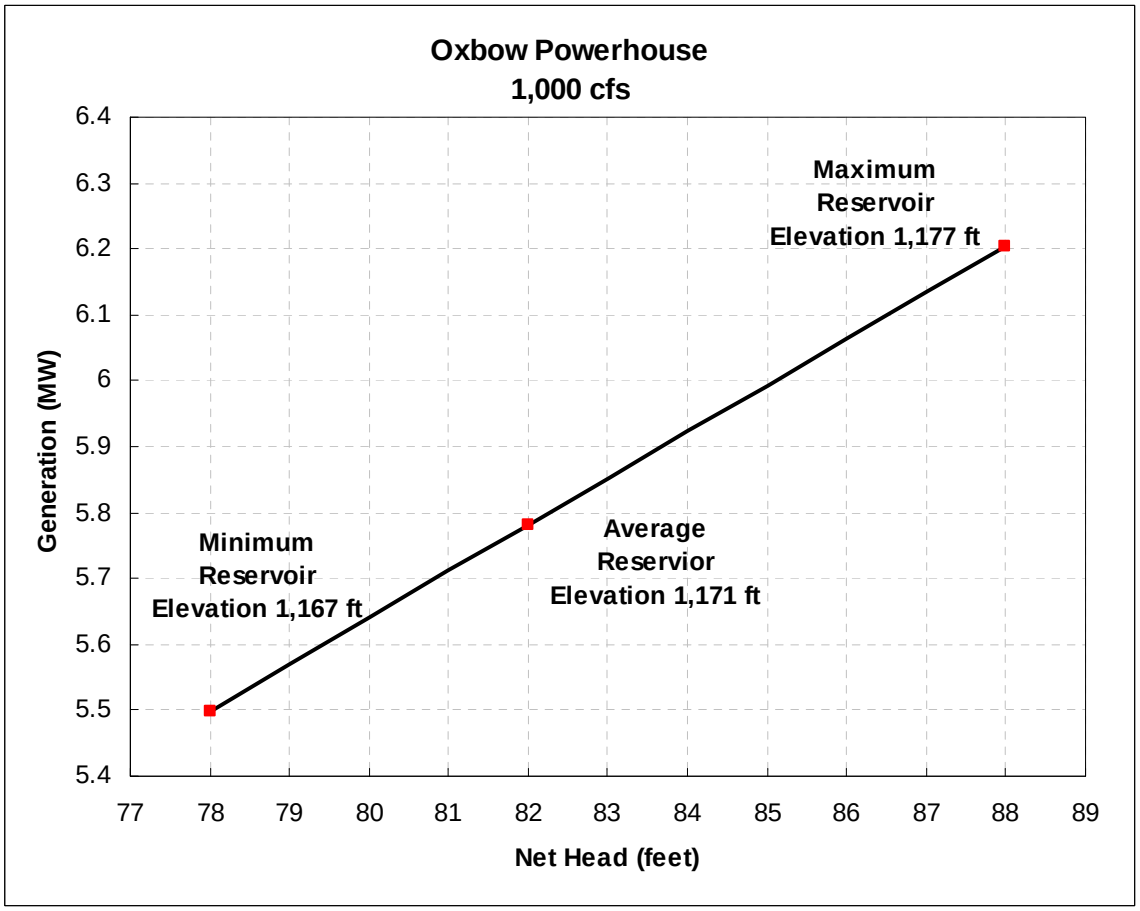


Figure B-35. Capability versus Net Head for Hell Hole Powerhouse.

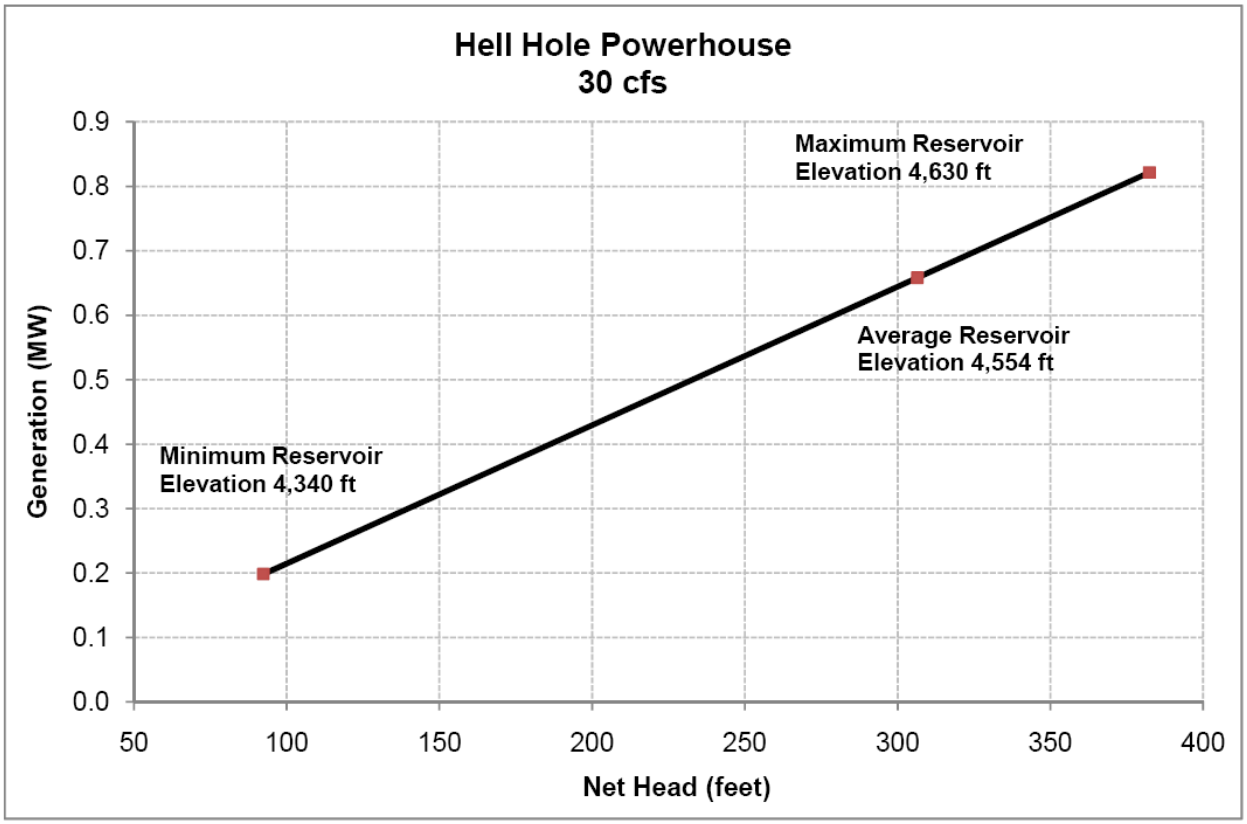


Exhibit C Construction History and Proposed Construction Schedule

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) refers to Section 4.51 (License for Major Project – Existing Dam) for a description of information that an applicant must include in Exhibit C of its license application.

Exhibit C is a construction history and proposed construction schedule for the project. The construction history and schedules must contain:

(1) If the application is for an initial license, a tabulated chronology of construction for the existing projects structures and facilities described under paragraph (b) of this section (Exhibit A), specifying for each structure or facility, to the extent possible, the actual or approximate dates (approximate dates must be identified as such) of:

  (i) Commencement and completion of construction or installation;

  (ii) Commencement of commercial operation;

  (iii) Any additions or modifications other than routine maintenance; and

(2) If any new development is proposed, a proposed schedule describing the necessary work and specifying the intervals following issuance of a license when the work would be commenced and completed.

(1) Construction History

Placer County Water Agency (PCWA) is applying to the Federal Energy Regulatory Commission (FERC) for a new license, not an initial license for this Middle Fork American River Project (Project or MFP). Therefore, the requirement of 18CFR §4.51(d) does not apply. Below is a brief summary of the (i) commencement and completion of construction or installation; (ii) commencement of commercial operation; and (iii) additions and modifications to the Project. Please refer to Exhibit H 5.18(1)(ii)(D) for additional discussion of the history of the Project and record of programs to upgrade the operation and maintenance of the Project.

(i) The Project was constructed between 1963 and 1968 as follows:

1963	Construction begins on the Middle Fork Project.
1963–1964	Construction of the following facilities:
	• Duncan Creek Diversion Dam
	• Duncan Creek – Middle Fork Tunnel
	• French Meadows Dam and Reservoir
	• French Meadows Powerhouse
	• French Meadows – Hell Hole Tunnel
1964–1965	Construction of Hell Hole Dam and Reservoir
1965	Construction of the following facilities:
	• Hell Hole – Middle Fork Tunnel
	• North Fork Long Canyon Diversion
	• South Fork Long Canyon Diversion
1965–1966	Construction of the following facilities:
	• Middle Fork Powerhouse
	• Middle Fork Interbay
1967–1968	Construction of the following facilities:
	• Middle Fork – Ralston Tunnel
	• Ralston Powerhouse
	• Ralston Afterbay
	• Ralston – Oxbow Tunnel
	• Oxbow Powerhouse
1980–1983	Construction of Hell Hole Powerhouse

(ii) French Meadows powerhouse commenced operations in 1964. Middle Fork Powerhouse began operations in 1966. Ralston and Oxbow powerhouses commenced operations in 1968. Hell Hole Powerhouse began operations in 1983.

(iii) The Project has undergone the following upgrades and modifications since start-up:

1975	Hell Hole – Middle Fork Tunnel Remediation
1986–1987	Repair Flood – caused Damage at Various Facilities
1997–1999	Lower Portion of French Meadows Dam Spillway Completion
1997–1999	Repair Flood – caused Damage at Various Facilities
2006–2008	Middle Fork Surge Shaft Repairs
2008-2010	SCADA and Communications System Upgrades
2010–2012	French Meadows Spillway Probable Maximum Flood Retrofit

(2) New Development

The Application for New License (License Application) includes one proposed improvement, which consists of the Hell Hole Reservoir Seasonal Storage Increase Improvement (Exhibit A). In addition, several projects are proposed to improve operations and maintenance of the Project, enhance environmental resources, and/or meet the requirements specified in the new environmental programs and measures. These projects include modifications to existing and construction of new Project facilities and features, including:

- Hell Hole Reservoir Seasonal Storage Increase Improvement;
- Small Diversion Modifications (Duncan Creek Diversion, South Fork Long Canyon Diversion, North Fork Long Canyon Diversion);
- Outlet Works Modifications (French Meadows Reservoir, Hell Hole Dam, and Middle Fork Interbay); and
- Gage and/or Weir Construction.

No other construction activities are planned, except those that occasionally arise during the course of routine operations and maintenance of the Project. The preliminary construction schedule for these projects is provided below.

PCWA will evaluate the likely construction approach, and access needs to determine the appropriate infrastructure modification and to complete the preliminary engineering work for each modification needed for the minimum instream and pulse flow releases (Instream Flow and Reservoir Minimum Pool Measure) identified above. Based on the preliminary work, PCWA will obtain necessary permits from resource agencies other than FERC prior to the construction of the infrastructure modifications.

An approximate schedule for completing each of these projects by location is estimated below.

Project	Activity	Approximate Schedule (Years after License Issuance)
Hell Hole Reservoir Seasonal Storage Increase Improvement	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – install spillway crest gates anchor, hinge, and control system; construct control building and powerline; install spillway crest gates on the Hell Hole Dam Ogee Spillway Weir; and, construct new road (Hell Hole Dam Spillway Gates Road).	3 to 5
Hell Hole Dam Outlet Works Modification	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – modify existing Howell Bunger valve by installing a new energy absorbing hood; install new flow measurement equipment on the instream flow pipe and low level outlet; modify outlet works for instream flows; and, enlarge discharge channel.	2 to 3
Rubicon River Gage at Hell Hole Dam Spillway	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – install new gage and weir on the modified existing spillway (see Hell Hole Reservoir Seasonal Storage Increase Improvement above).	3 to 5

Project	Activity	Approximate Schedule (Years after License Issuance)
Small Diversion (Diversion Dam Modifications[1])	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – establish access and staging areas, construct small coffer dams and temporary culvert, excavate stream bed material upstream of dams for new intakes, modify existing dams and intake structures, install gates and auxiliary electrical and mechanical equipment, install wedge-wire screen panels, and modify or install new flow measuring equipment.	2 to 4
French Meadows Dam Outlet Works (modified)	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – modify outlet works for minimum instream flow releases and install new flow measurement equipment (one each on the instream flow pipe and low level outlet).	1 to 2
Middle Fork Interbay Dam Outlet Works (modified)	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – modify outlet works for instream flow releases and install a new gage downstream of the dam.	1 to 2
Ralston Afterbay Dam Outlet Works (modified)	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – install new flow measurement equipment on instream flow release pipe.	1 to 2

Project	Activity	Approximate Schedule (Years after License Issuance)
Oxbow Powerhouse Penstock Gage	▪ Install new flow measurement equipment within the existing powerhouse penstock.	1 to 2
North Fork American River above American River Pump Station	▪ Preliminary engineering and site evaluation; ▪ Permitting and continued engineering; ▪ Continued engineering and equipment ordering; and ▪ Construction – install new gage.	1 to 2

[1]Includes Duncan Creek, South Fork Long Canyon, and North Fork Long Canyon diversions.

Exhibit D Project Costs and Financing

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) refers to Section 4.51 (License for Major Project – Existing Dam) for a description of information that an applicant must include in Exhibit D of its license application.

Exhibit D is a statement of costs and financing. The statement must contain:

(1) If the application is for an initial license, a tabulated statement providing the actual or approximate original cost (approximate costs must be identified as such) of:

  (i) Any land or water right necessary to the existing project; and

  (ii) Each existing structure and facility described under paragraph (b) of this section (Exhibit A).

(2) If the Applicant is a licensee applying for a new license, and is not a municipality or a state, an estimate of the amount which would be payable if the project were to be taken over pursuant to section 14 of the Federal Power Act upon expiration of the license in effect [see 16 U.S.C. 807], including:

  (i) Fair value;

  (ii) Net investment; and

  (iii) Severance damages.

(3) If the application includes proposals for any new development, a statement of estimated costs, including:

  (i) The cost of any land or water rights necessary to the new development; and

  (ii) The cost of the new development work, with a specification of:

    (A) Total cost of each major item;

    (B) Indirect construction costs such as costs of construction equipment, camps, and commissaries;

    (C) Interest during construction; and

    (D) Overhead, construction, legal expenses, taxes, administrative and general expenses, and contingencies.

(4) A statement of the estimated average annual cost of the total project as proposed specifying any projected changes in the costs (life-cycle costs) over the estimated financing or licensing period if the applicant takes such changes into account, including:

  (i) Cost of capital (equity and debt);

  (ii) Local, state, and Federal taxes;

  (iii) Depreciation and amortization;

(iv) Operation and maintenance expenses, including interim replacements, insurance, administrative and general expenses, and contingencies; and

(v) The estimated capital cost and estimated annual operation and maintenance expense of each proposed environmental measure.

(5) A statement of the estimated annual value of project power, based on a showing of the contract price for sale of power or the estimated average annual cost of obtaining an equivalent amount of power (capacity and energy) from the lowest cost alternative source, specifying any projected changes in the cost of power from that source over the estimated financing or licensing period if the applicant takes such changes into account.

(6) A statement specifying the sources and extent of financing and annual revenues available to the applicant to meet the costs identified in paragraphs (e) (3) and (4) of this section.

(7) An estimate of the cost to develop the license application;

(8) The on-peak and off-peak values of project power, and the basis for estimating the values, for projects which are proposed to operate in a mode other than run-of-river; and

(9) The estimated average annual increase or decrease in project generation, and the estimated average annual increase or decrease of the value of project power, due to a change in project operations (i.e., minimum bypass flows; limits on reservoir fluctuations).

(1) Original Cost

Original cost of Middle Fork American River Project (Project) construction and obtaining land and water rights does not apply because the Project is not an application for an initial license and all necessary water rights and privately-owned lands have already been obtained.

(i) Not Applicable.

(ii) Not Applicable.

(2) Takeover Cost

Placer County Water Agency (PCWA) is a municipal utility, created under its own state legislations entitled the ”Placer County Water Agency Act”, adopted in 1957 by the California State Legislature, which is within the meaning of Section 3(7) of the Federal Power Act. Therefore, the Project is not subject to takeover provisions of Section 14 of the Federal Power Act (16 U.S.C. §807). Accordingly, Federal Energy Regulatory Commission’s (FERC) regulations do not require PCWA to include an estimate of takeover costs or net investments.

(i) Not Applicable.

(ii) Not Applicable.

(iii) Not Applicable.

(3) Cost of New Development

(i) Purchase of additional lands is not necessary for the Hell Hole Reservoir Seasonal Storage Increase Improvement. Cost of additional water rights is estimated at $250,000 (in 2010 dollars).

(ii) Preliminary estimated costs of constructing the Hell Hole Reservoir Seasonal Storage Increase (in 2010 dollars), including the total cost of each major item, indirect construction costs; interest during construction; and overhead, construction, legal expenses, taxes, administrative and general expenses, and contingencies are as follows:

Item	Preliminary Estimated Cost
Supply	$1,300,000
Supply of gates, compressors and controls, FOB site	
Subtotal Supply	**$1,300,000**
Installation	
Installation of weir sections	$70,000
Construction of 16-foot by 16-foot split concrete block building on concrete slab foundation	$80,000
Back up power supply, controls, monitoring equipment, and communications	$140,000
Conduit and cable	$60,000
Installation of control piping on spillway	$150,000
Mobilization allowance	$50,000
Subtotal	**$550,000**
Contractor's overhead and profit (20%)	$110,000
Subtotal Installation	**$660,000**
Subtotal Supply and Install	**$1,960,000**
Contingency allowance	$260,000
Construction Costs	**$2,220,000**
Indirect Cost Allowances	
Engineering and construction management	$300,000
Environmental permits/ monitoring	$300,000
Owners legal and administrative costs	$200,000
Subtotal Indirect Costs	**$800,000**
Interest During Construction (assumes 6.2%)	**$284,000**
Contingency Costs	**$1,696,000**
Total Costs	**$5,000,000**

Preliminary estimated costs for the modifications at Duncan Creek, South Fork Long Canyon, and North Fork Long Canyon diversions (in 2010 dollars) are as follows:

Item	Preliminary Estimated Costs

	Duncan Creek Diversion	South Fork Long Canyon Diversion	North Fork Long Canyon Diversion
Direct Costs			
Civil and structural	$2,360,000	$380,000	$890,000
Electrical and mechanical	$170,000	$150,000	$160,000
Contingency allowance	$380,000	$80,000	$160,000
Bond allowance	$60,000	$12,000	$24,000
Subtotal Direct Costs	**$2,970,000**	**$622,000**	**$1,234,000**
Indirect Costs			
Engineering and administration	$600,000	$130,000	$250,000
Environmental studies and permits	$150,000	$50,000	$75,000
Environmental protection and mitigation	$150,000	$78,000	$75,000
Subtotal Indirect Costs	**$900,000**	**$230,000**	**$400,000**
Interest During Construction (assumes 6.2%)	**363,000**	**80,000**	**153,000**
Total Costs	**$4,233,000**	**$960,000**	**$1,787,000**

(4) Cost of Financing

(i) PCWA's current cost of Capital on the Project is 3.34%. As discussed in Section D(6), PCWA has entered into a Joint Powers Agreement for relicensing expenses at a current rate of 5.351% (as of December 31, 2010). It is anticipated that this agreement will continue to fund additional capital at a rate not to exceed 6.25%.

(ii) As a Special District with the State of California, PCWA is exempt from federal, state, and local income and property taxes.

(iii) Depreciation Expense for the year ending December 31, 2009 on the Project was $2,139,649.

PCWA's capital assets purchased or constructed are capitalized at historical cost, while contributed assets are recorded at estimated fair market value at the time received for assets with an individual cost of more than $5,000 and a useful life of one year or greater.

PCWA capitalizes interest costs, net of investment income earned from tax-exempt borrowings, on constructed assets that are specific to the borrowings incurred to construct those assets.

The purpose of depreciation is to spread the cost of capital assets over the life of the assets. The amount charged to depreciation expense each year represents that year's pro rata share of depreciable capital assets.

Depreciation of all capital assets in service, excluding land, is charged as an expense against operations each year and the total amount of depreciation taken over the years, called accumulated depreciation, is a reduction in the book value of the capital assets.

Capital assets are depreciated using the straight-line method of depreciation over the useful life of the asset. PCWA has assigned the useful lives listed below to capital assets:

- Dams, tunnels and waterways 40 - 100 years
- Reservoirs 40 years
- Treatment and pumping plants, transmission and distribution 30-40 years
- Heavy equipment 10 years
- Vehicles, tools, shop and office equipment and furniture 5 years

Given the age of many of the critical assets that make up the Middle Fork Project, PCWA intends to renovate or replace major electrical, civil and mechanical components during the term of the new license. Hence, depreciation has been calculated based on these replacement costs, as well as the additional infrastructure needed to implement the conditions specified in the license application.

(iv) Estimated annualized expenses for the Project are as follows:

Operations and Maintenance Expenses: (including approximately $1.3 million of annual fees)	$14.04 million
Administrative and General Expenses:	$5 million
Insurance:	$1 million

Annual fees are detailed in Exhibit H ii(I). Also refer to Section 11.0, Table 11-3.

(v) The estimated capital cost and estimated annual operation and maintenance expense of each proposed environmental measure is listed in Table D-1 and totals $1,609,500 as annualized value.

(5) Value of Project Power

The Middle Fork Project does not have a power purchase contract in place for the new term of the license. In 1961, Placer County voters, with over 95% approval, authorized a $140 million revenue bond to fund the construction of the Middle Fork Project (MFP). Prior to construction of the MFP, Placer County Water Agency (PCWA) entered into a long-term (50-year) contract with Pacific Gas & Electric Company (PG&E) for the purchase of power generated from the MFP. The contract specified that in return for the power generated from the MFP, PG&E would provide sufficient funding to PCWA to support ongoing operations and maintenance of the MFP and to retire the debt (bond) incurred for the construction of the Project. Per the current contract with PG&E, PCWA does not receive any revenue from PG&E for the sale of electrical energy beyond reimbursement of debt and operation and maintenance costs. Several publicly available sources of information are available to estimate the value of Project power.

The California Independent System Operator (CAL-ISO) operates markets for energy and ancillary services for California under a revised market system implemented in April 2009. The CAL-ISO believes that "The overall performance of the new day-ahead and real-time markets in 2009 were highly efficient and competitive. Prices in the energy markets were approximately equal to competitive baseline prices that DMM estimates would result under highly competitive conditions."[1]

Pursuant to the CAL-ISO, the total estimated wholesale costs for serving system load in 2008 were $53/megawatt hour (MWh), and in 2009 were $38/MWh, yielding a two-year average of $45.50/MWh. These prices reflect a downward trend in California energy prices, as identified by the CAL-ISO (Figure D-1)[2].

California prices are also tracked by various exchanges and indices. The Intercontinental Exchange (ICE) publishes peak and non-peak prices for northern California (NP-15). For the period April 16, 2009 through April 15, 2010, the ICE average peak price was $41.66/MWh, and the average off-peak price for the same period was $30.07/MWh.

California energy prices are heavily influenced by natural gas, as nearly 50% of the electrical generating capacity in California is natural gas fired. Thus, natural gas price trends heavily influence energy prices in California. Evaluation of natural gas price trends as tracked by the United States Energy

[1]The energy price Cal-ISO reported in its Annual Report on Market Issues and Performance for 2009 is $37.69 (rounded to $38/MWh). Refer to Table 3.1 - Monthly Wholesale Costs: 2009, page 3.4, Total 2009 Average Cost of Energy ($/MWh load), 2009 Annual Report on Market Issues and Performance, California Independent System Operator (Cal-ISO), Department of Market Monitoring, Folsom, CA, April 2010.
[2]Ibid.

Information Agency (EIA) show a decline in natural gas prices in the past few years, which is attributed to three factors: (1) the general economic slowdown across the United States, with resulting decline in demand; (2) multiple discoveries of vast shale rock natural gas reserves in the continental United States, along with rapid advances in drilling technology that make those reserves accessible at lower prices, and (3) increased use of renewable resources that diminish the demand for natural gas supplies. While it is anticipated that the economic recovery will see expansion of demand in line with historic trends, the increased availability of supply and continued development of renewable energy sources will have a depressing effect on natural gas prices. As a result, it is reasonable to expect that energy prices in California will tend to remain low for the foreseeable future, and the trend in California energy prices tabulated by the CAL-ISO is not anomalous.

The current value of Project energy is based on the energy price CAL-ISO reported in its Annual Report on Market Issues and Performance for 2009, which is $37.69 (rounded to $38.00). The 2010 Capacity Value is $36/kW-year. This value is based on verbal communication between PCWA and staff of the Northern California Power Agency[3]. Refer to Table 3.1, Monthly Wholesale Costs: 2009, page 3.4, Total 2009 Average Cost of Energy ($/MWh load), 2009 Annual Report on Market Issues and Performance, California Independent System Operator (Cal-ISO), Department of Market Monitoring, Folsom, CA, April 2010.

(6) Sources of Financing and Revenues

Middle Fork Project Finance Authority

On January 10, 2006, PCWA entered into a Joint Powers Agreement with Placer County. The agreement called for the formation of the "Middle Fork Project Finance Authority" (MFPFA). The purpose of this agreement is to establish an Authority to serve the mutual interests of PCWA and Placer County, exclusively, to provide the financing of studies, program, procedures, projects, services, improvements, modifications, and other costs that may be required to obtain a new FERC license or which may be completed under the current or subsequent FERC license of the Middle Fork Hydroelectric Project by PCWA, to approve Future Electrical Energy Sale contracts, and to distribute revenues from Future Electrical Energy Sales. In March 2006, the MFPFA issued the Middle Fork Project Finance Authority Revenue Bond, Series 2006 (Bond) in the amount of $100 million to provide funds for relicensing costs and related expenses. Payment of principal and interest on the Bond shall commence in February 2015 from Middle Fork Project hydroelectric revenue received by the Authority. The Bond is secured by a pledge of Middle Fork Project hydroelectric revenue received subsequent to February 2013 and matures on April 1, 2036.

[3] Verbal communication between PCWA and staff of the Northern California Power Agency, 651 Commerce Drive, Roseville, CA. August 5, 2010.

(7) Application for New License (License Application) Development Cost

The cost incurred to this Project's FERC License Application through December 31, 2010 is approximately $52.1 million, including capitalized interest.

(8) Value of On-Peak and Off-Peak Project Power

California prices are tracked both by the CAL-ISO and by various exchanges and indices. The CAL-ISO typically does not categorize power into peak and non-peak; however the ICE publishes peak and non-peak prices for northern California (NP-15). For the period April 16, 2009 through April 15, 2010, the ICE average peak price was $41.66/MWh, and the average off-peak price for the same period was $30.07/MWh.

(9) Effects of Change in Project Operations

Under the Proposed Action, it is estimated that the average annual project generation will be decreased by 47,694 MWh, resulting in a net reduction in the value of project power of approximately $1,812,360, due to changes in project operations.

TABLE

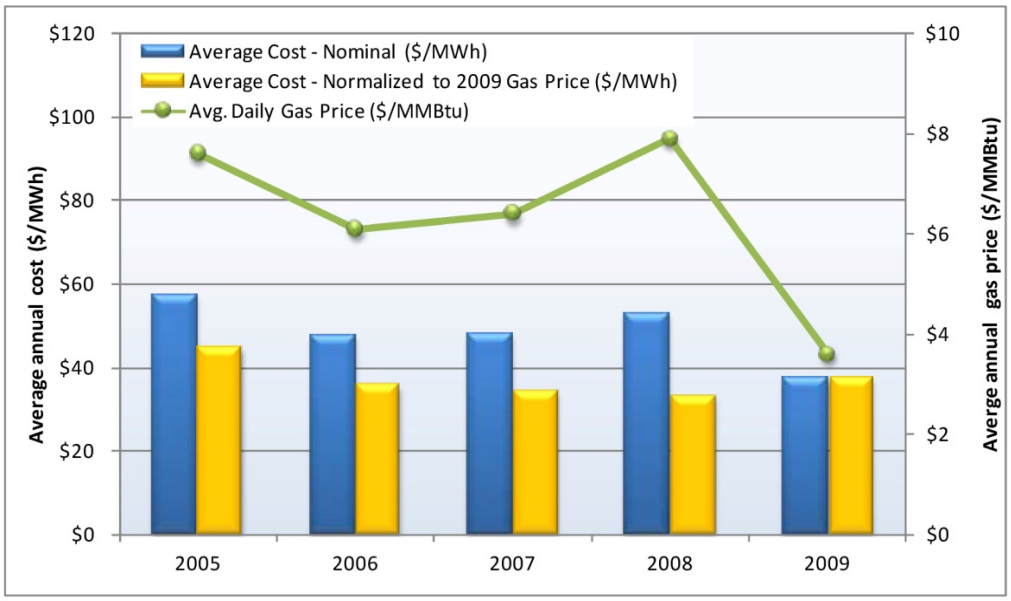
Table D-1. Proposed Action - Cost of Environmental Programs, Measures, and Facilities for the Middle Fork American River Project (2010 Dollars).

Environmental Program, Measure, or Facility	Total Capital and One-time Costs (2010$)	Annual O&M Costs[1] (2010$)	Total Annualized Costs[2] (2010$)
Compliance			
Additional PCWA Compliance Staff	–	$420,000	$420,000
Water and Aquatic Resources			
Implement Instream Flow and Reservoir Minimum Pool Measure[3]	$2,500,000	$60,000	$110,000
Implement Flow and Reservoir Monitoring Plan[4]	$100,000	$120,000	$122,000
Implement Aquatic Monitoring Plans	$115,000	$281,000	$284,000
Implement Sediment Management Plan	$5,500	($39,000)	($39,000)
Terrestrial Resources			
Implement Bald Eagle Management Plan	$33,000	$33,000	$34,000
Implement Vegetation and Integrated Pest Management Plan	–	$160,000	$160,000
Recreation Resources			
Implement Recreation Plan	$1,222,000	$319,000	$343,000
Implement Visual Resource Management Plan	–	$9,500	$9,500
Land Management			
Implement Transportation System Management Plan	$2,100,000	$77,000	$119,000
Implement Fire Suppression and Prevention Plan	–	$9,000	$9,000
Cultural Resources			
Implement Historic Properties Management Plan	–	$38,000	$38,000
TOTAL	**$6,075,500**	**$1,487,500**	**$1,609,500**

[1]Operation and maintenance costs annualized over the term of the new license (50 years).
[2]Total one-time capital costs plus total operation and maintenance costs annualized over the term of the new license (50 years).
[3]Capital costs associated with infrastructure modifications necessary to implement new instream flow measures (i.e., outlet works modifications).
[4]Capital costs associated with infrastructure modifications necessary to implement Flow and Reservoir Monitoring Plan (i.e., installation of four new gages).

FIGURE

Figure D-1. Total Wholesale Cost of Electricity in $/MWh: 2005–2009[1].



[1]Source: California Independent System Operator, Department of Market Monitoring, *2009 Annual Report*.

Exhibit G Project Maps

Section 5.18(a)(5)(iii) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) refers to Section 4.51 (License for Major Project – Existing Dam) for a description of information that an applicant must include in Exhibit G of its license application.

Exhibit G is a map of the project that must conform to the specifications of 18 CFR §4.39. In addition, to the other components of Exhibit G, the Applicant must provide the project boundary data in a geo-referenced electronic format—such as ArcView shape files, GeoMedia files, MapInfo files, or any similar format. The electronic boundary data must be positionally accurate to ±40 feet, in order to comply with the National Map Accuracy Standards for maps at a 1:24,000 scale (the scale of United States Geological Survey [USGS]) quadrangle maps). The electronic exhibit G data must include a text file describing the map projection used (i.e., Universe Transverse Mercator [UTM], State Plane, Decimal Degrees, etc.), the map datum (i.e., feet, meters, miles, etc.). Three sets of the maps must be submitted on compact disk or other appropriate electronic media. If more than one sheet is used for the paper maps, the sheets must be numbered consecutively, and each sheet must bear a small insert sketch showing the entire project and indicate that portion of the project depicted on that sheet. Each sheet must contain a minimum of three known reference points. The latitude and longitude coordinates, or state plane coordinates, of each reference point must be shown. If at any time after the application is filed there is any change in the project boundary, the applicant must submit, within 90 days following the completion of project construction, a final Exhibit G showing the extent of such changes. The map must show:

(1) *Location of the project and principal features*. The map must show the location of the project as a whole with reference to the affected stream or other body of water and, if possible, to a nearby town or any other permanent monuments or objects, such as roads, transmission lines or other structures, that can be noted on the map and recognized in the field. The map must also show the relative locations and physical interrelationships of the principal project works and other features described under paragraph (b) of this section (Exhibit A).

(2) *Project boundary*. The map must show a project boundary enclosing all project works and other features described under paragraph (b) of this section (Exhibit A) that are to be licensed. If accurate survey information is not available at the time the application is filed, the applicant must so state, and a tentative boundary may be submitted. The boundary must enclose only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources (see paragraph (f) of this section (Exhibit E)). Existing residential, commercial, or other structures may be included within the boundary only to the extent that underlying lands are needed for project purposes (e.g., for flowage, public recreation, shoreline control, or protection of environmental resources). If the boundary is on land covered by a public survey, ties must be shown on the map at sufficient points to permit accurate platting of the position of the boundary relative to the lines of the public land survey. If the lands are not covered by a public land

survey, the best available legal description of the position of the boundary must be provided, including distances and directions from fixed monuments or physical features. The boundary must be described as follows:

(i) *Impoundments*.

(A) The boundary around a project impoundment must be described by one of the following:

(1) Contour lines, including the contour elevation (preferred method);

(2) Specified courses and distances (metes and bounds);

(3) If the project lands are covered by a public land survey, lines upon or parallel to the lines of the survey; or

(4) Any combination of the above methods.

(B) The boundary must be located no more than 200 feet (horizontal measurement) from the exterior margin of the reservoir, defined by the normal maximum surface elevation, except where deviations may be necessary in describing the boundary according to the above methods or where additional lands are necessary for project purposes, such as public recreation, shoreline control, or protection of environmental resources.

(ii) *Continuous features*. The boundary around linear (continuous) project features such as access roads, transmission lines, and conduits may be described by specified distances from center lines or offset lines of survey. The width of such corridors must not exceed 200 feet unless good cause is shown for a greater width. Several sections of a continuous feature may be shown on a single sheet with information showing the sequence of contiguous sections.

(iii) *Noncontinuous features*.

(A) The boundary around noncontinuous project works such as dams, spillways, and powerhouses must be described by one of the following:

(1) Contour lines;

(2) Specified courses and distances;

(3) If the project lands are covered by a public land survey, lines upon or parallel to the lines of the survey; or

(4) Any combination of the above methods.

(B) The boundary must enclose only those lands that are necessary for safe and efficient operation and maintenance of the project or for other specified project purposes, such as public recreation or protection of environmental resources.

(3) *Federal lands.* Any public lands and reservations of the United States (Federal lands) [see 16 U.S.C. 796 (1) and (2)] that are within the project boundary, such as lands administered by the U.S. Forest Service, Bureau of Land Management, or National Park Service, or Indian tribal lands, and the boundaries of those Federal lands, must be identified as such on the map by:

(i) Legal subdivisions of a public land survey of the affected area (a protraction of identified township and section lines is sufficient for this purpose); and

(ii) The Federal agency, identified by symbol or legend, that maintains or manages each identified subdivision of the public land survey within the project boundary; or

(iii) In the absence of a public land survey, the location of the Federal lands according to the distances and directions from fixed monuments or physical features. When a Federal survey monument or a Federal bench mark will be destroyed or rendered unusable by the construction of project works, at least two permanent, marked witness monuments or bench marks must be established at accessible points. The maps show the location (and elevation, for bench marks) of the survey monument or bench mark which will be destroyed or rendered unusable, as well as of the witness monuments or bench marks. Connecting courses and distances from the witness monuments or bench marks to the original must also be shown.

(iv) The project location must include the most current information pertaining to affected Federal lands as described under 18CFR §4.81(b)(5).

(4) *Non-Federal lands.* For those lands within the project boundary not identified under paragraph (h)(3) of this section, the map must identify by legal subdivision:

(i) Lands owned in fee by the applicant and lands that the applicant plans to acquire in fee; and

(ii) Lands over which the applicant has acquired or plans to acquire rights to occupancy and use other than fee title, including rights acquired or to be acquired by easement or lease.

All Exhibit G maps proposed for inclusion in the new Project license and showing the locations of the Project facilities follow this text.

Included in Exhibit G are the Project boundary data in a geo-referenced ESRI shapefile format, with an accompanying projection file. A text file describing the map projection and datum used is also provided.

MAPS

Exhibit H

Section 5.18(c) of Title 18 of the Code of Federal Regulations (CFR) (revised 4/1/10) describes information that an applicant for a new license (License for Major Project – Existing Dam) must include in Exhibit H of its license application.

The information required to be provided by this paragraph (c) must be included in the application as a separate exhibit labeled "Exhibit H."

(1) *Information to be provided by an applicant for new license: Filing requirements*

(i) *Information to be supplied by all applicants.* All Applicants for a new license under this part must file the following information with the Commission:

(A) A discussion of the plans and ability of the applicant to operate and maintain the project in a manner most likely to provide efficient and reliable electric service, including efforts and plans to:

(1) Increase capacity or generation at the project;

(2) Coordinate the operation of the project with any upstream or downstream water resource projects; and;

(3) Coordinate the operation of the project with the applicant's or other electrical systems to minimize the cost of production.

(B) A discussion of the need of the applicant over the short and long term for the electricity generated by the project, including:

(1) The reasonable costs and reasonable availability of alternative sources of power that would be needed by the applicant or its customers, including wholesale customers, if the applicant is not granted a license for the project;

(2) A discussion of the increase in fuel, capital, and any other costs that would be incurred by the applicant or its customers to purchase or generate power necessary to replace the output of the licensed project, if the applicant is not granted a license for the project;

(3) The effect of each alternative source of power on:

(i) The applicant's customers, including wholesale customers;

(ii) The applicant's operating and load characteristics; and

(iii) The communities served or to be served, including any reallocation of costs associated with the transfer of a license from the existing licensee.

(C) The following data showing need and the reasonable cost and availability of alternative sources of power:

(1) The average annual cost of the power produced by the project, including the basis for that calculation;

(2) The projected resources required by the applicant to meet the applicant's capacity and energy requirements over the short and long term including:

(i) Energy and capacity resources, including the contributions from the applicant's generation, purchases, and load modification measures (such as conservation, if considered as a resource), as separate components of the total resources required;

(ii) A resource analysis, including a statement of system reserve margins to be maintained for energy and capacity; and

(iii) If load management measures are not viewed as resources, the effects of such measures on the projected capacity and energy requirements indicated separately;

(iv) For alternative sources of power, including generation of additional power at existing facilities, restarting deactivated units, the purchase of power off-system, the construction or purchase and operation of a new power plant, and load management measures such as conservation: The total annual cost of each alternative source of power to replace project power; the basis for the determination of projected annual cost; and a discussion of the relative merits of each alternative, including the issues of the period of availability and dependability of purchased power, average life of alternatives, relative equivalent availability of generating alternatives, and relative impacts on the applicant's power system reliability and other system operating characteristics; and the effect on the direct providers (and their immediate customers) of alternate sources of power.

(D) If an applicant uses power for its own industrial facility and related operations, the effect of obtaining or losing electricity from the project on the operation and efficiency of such facility or related operations, its workers, and the related community.

(E) If an applicant is an Indian tribe applying for a license for a project located on the tribal reservation, a statement of the need of such Indian tribe for electricity generated by the project to foster the purposes of the reservation.

(F) A comparison of the impact on the operations and planning of the applicant's transmission system of receiving or not receiving the project license, including:

(1) An analysis of the effects of any resulting redistribution of power flows on line loading (with respect to applicable thermal, voltage, or stability limits), line losses, and necessary new construction of transmission facilities or upgrading of existing facilities, together with the cost impact of these effects;

(2) An analysis of the advantages that the applicant's transmission system would provide in the distribution of the project's power; and

(3) Detailed single-line diagrams, including existing system facilities identified by name and circuit number, that show system transmission elements in relation to the project and other principal interconnected system elements. Power flow and loss data that represent system operating conditions may be appended if applicants believe such data would be useful to show that the operating impacts described would be beneficial.

(G) If the applicant has plans to modify existing project facilities or operations, a statement of the need for, or usefulness of, the modifications, including at least a reconnaissance-level study of the effect and projected costs of the proposed plans and any alternate plans, which in conjunction with other developments in the area would conform with a comprehensive plan for improving or developing the waterway and for other beneficial public uses as defined in Section 10(a)(1) of the Federal Power Act.

(H) If the applicant has no plans to modify existing project facilities or operations, at least a reconnaissance-level study to show that the project facilities or operations in conjunction with other developments in the area would conform with a comprehensive plan for improving or developing the waterway and for other beneficial public uses as defined in Section 10(a) (1) of the Federal Power Act.

(I) A statement describing the applicant's financial and personnel resources to meet its obligations under a new license, including specific information to demonstrate that the applicant's personnel are adequate in number and training to operate and maintain the project in accordance with the provisions of the license.

(J) If an applicant proposes to expand the project to encompass additional lands, a statement that the applicant has notified, by certified mail, property owners on the additional lands to be encompassed by the project and governmental agencies and subdivisions likely to be interested in or affected by the proposed expansion.

(K) The applicant's electricity consumption efficiency improvement program, as defined under Section 10(a)(2)(C) of the Federal Power Act, including:

(1) A statement of the applicant's record of encouraging or assisting its customers to conserve electricity and a description of its plans and capabilities for promoting electricity conservation by its customers; and

(2) A statement describing the compliance of the applicant's energy conservation programs with any applicable regulatory requirements.

(L) The names and mailing addresses of every Indian tribe with land on which any part of the proposed project would be located or which the applicant reasonably believes would otherwise be affected by the proposed project.

(ii) *Information to be provided by an applicant licensee.* An existing licensee that applies for a new license must provide:

(A) The information specified in paragraph (c)(1) of this section.

(B) A statement of measures taken or planned by the licensee to ensure safe management, operation, and maintenance of the project, including:

(1) A description of existing and planned operation of the project during flood conditions;

(2) A discussion of any warning devices used to ensure downstream public safety;

(3) A discussion of any proposed changes to the operation of the project or downstream development that might affect the existing Emergency Action Plan, as described in subpart C of part 12 of this chapter, on file with the Commission;

(4) A description of existing and planned monitoring devices to detect structural movement or stress, seepage, uplift, equipment failure, or water conduit failure, including a description of the maintenance and monitoring programs used or planned in conjunction with the devices; and

(5) A discussion of the project's employee safety and public safety record, including the number of lost-time accidents involving employees and the record of injury or death to the public within the project boundary.

(C) A description of the current operation of the project, including any constraints that might affect the manner in which the project is operated.

(D) A discussion of the history of the project and record of programs to upgrade the operation and maintenance of the project.

(E) A summary of any generation lost at the project over the last five years because of unscheduled outages, including the cause, duration, and corrective action taken.

(F) A discussion of the licensee's record of compliance with the terms and conditions of the existing license, including a list of all incidents of noncompliance, their disposition, and any documentation relating to each incident.

(G) A discussion of any actions taken by the existing licensee related to the project which affect the public.

(H) A summary of the ownership and operating expenses that would be reduced if the project license were transferred from the existing licensee.

(I) A statement of annual fees paid under part I of the Federal Power Act for the use of any Federal or Indian lands included within the project boundary.

(iii) *Information to be provided by an applicant who is not an existing licensee.* An applicant that is not an existing licensee must provide:

(A) The information specified in paragraph (c) (1) of this section.

(B) A statement of the applicant's plans to manage, operate, and maintain the project safely, including:

(1) A description of the differences between the operation and maintenance procedures planned by the applicant and the operation and maintenance procedures of the existing licensee;

(2) A discussion of any measures proposed by the applicant to implement the existing licensee's Emergency Action Plan, as described in subpart C of part 12 of this chapter, and any proposed changes;

(3) A description of the applicant's plans to continue safety monitoring of existing project instrumentation and any proposed changes; and

(4) A statement indicating whether or not the applicant is requesting the licensee to provide transmission services under section 15(d) of the Federal Power Act.

(d) *Consistency with comprehensive plans.* An application for license under this part must include an explanation of why the project would, would not, or should not, comply with any relevant comprehensive plan as defined in Sec. 2.19 of this chapter and a description of any relevant resource agency or Indian tribe determination regarding the consistency of the project with any such comprehensive plan.

(e) *Response to information requests.* An application for license under this Section must respond to any requests for additional information-gathering or studies filed with comments on its preliminary licensing proposal or draft license application. If the license applicant agrees to do the information-gathering or study, it must provide the information or include a plan and schedule for doing so, along with a schedule for completing any remaining work under the previously approved study plan, as it may have been amended. If the applicant does not agree to any additional information-gathering or study requests made in comments on the draft license application, it must explain the basis for declining to do so.

(f) *Maps and drawings.* All required maps and drawings must conform to the specifications of Sec. 4.39 of this chapter.

(i)

(A) Efficient and Reliable Electric Service

Placer County Water Agency (PCWA) has owned and operated the Middle Fork Hydroelectric Project (MFP or Project) for 50 years, and has provided efficient and reliable electric service over this time. During the Federal Energy Regulatory Commission's (FERC) relicensing process, PCWA has evaluated several improvements with the potential to increase productivity and efficiency of the Project. The improvements that provide the most benefit with regard to increasing efficiency and the least impacts are included in this Application for New License (License Application).

(1) Increased Capacity or Generation at the Project

PCWA is proposing to increase the energy production of the Project through the construction of the Hell Hole Reservoir Seasonal Storage Increase Improvement. This project consists of installing 6-foot-high crest gates on the existing Hell Hole Dam Spillway to allow increased storage in Hell Hole Reservoir during late spring and summer months. The gates would increase the reservoir elevation by 6 feet, providing approximately 7,600 acre-feet (ac-ft) of additional storage in Hell Hole Reservoir by allowing the reservoir to be raised from 4,630 to 4,636 feet.

In order to not reduce the flood discharge capacity of the spillway during winter and spring when the largest floods are expected to occur, the spillway crest gates will be retracted (i.e., down) from October 1 through April 15. The gates will be raised at the end of the flood season and will be automatically operated to provide a 6-foot increase in normal operating water level from 4,630 to 4,636 feet. When the water level exceeds 4,636 feet, the gates will automatically open to maintain the water level at the maximum operating level. The status of the water level at the spillway, and all the parameters of the gate operation and status, power, weather, as well as security, would be sent real-time via a communications link to the PCWA operations center.

In addition to the Hell Hole Reservoir Seasonal Storage Increase Improvement, PCWA proposes to modify the Duncan Creek, North Fork Long Canyon, and South Fork Long Canyon diversion facilities for debris and sediment management, which will increase reliability and functionality of the diversions. This will result in power generation benefits, as well as increase water supply and reduce operation and maintenance costs associated with periodic

removal of sediment and debris accumulations from diversion impoundments.

The modifications will be similar for all three diversion structures and will generally include retrofitting the existing structures with self-cleaning, wedge-wire screen intakes. The wedge-wire screen intake consists of a stream bottom intake screen that allows water to be diverted into the Project diversion intakes while concurrently permitting mobilized sediments (bed load and fine material) to naturally be transported downstream.

The designs of the diversion improvements are still under discussion with relicensing participants and jurisdictional resource agencies, and it is anticipated that final design specifications will be completed after the issuance of a new license for the Project.

Coordinate the Operation of the Project with any Upstream or Downstream Water Resources Projects

Two other significant water resources projects exist in the watershed, one upstream and one downstream of the Project. Presently, PCWA coordinates the operation of the Project with these other projects to varying degrees of informational exchange based upon formal agreements and information coordination. A description of the level of existing coordination between PCWA and these two projects, along with any proposed changes to the existing relationships, is described below.

The only dams upstream of PCWA's dams are on, or flow into, the Rubicon River, and belong to the Sacramento Municipal Utility District (SMUD) (FERC Project No. 2101). Rubicon and Buck Island reservoirs are both less than 1,500 ac-ft, and feed into Hell Hole Reservoir. Loon Lake (76,200 ac-ft) and Gerle (1,200 ac-ft) reservoirs feed into the Rubicon River below Hell Hole Dam. SMUD diverts most of the water in the Rubicon basin reservoirs into the South Fork American River. PCWA and SMUD do not coordinate the operations of their projects, except in the event of a suspected failure of Hell Hole Dam. If this situation were to occur, PCWA coordinates with SMUD to minimize inflows from their Rubicon and Buck Island reservoirs into Hell Hole Reservoir and to stop any substantial releases into the South Fork Rubicon River from Loon Lake and/or Gerle reservoirs.

Downstream of PCWA facilities, the United States Bureau of Reclamation (USBR) owns and operates Nimbus and Folsom dams. Nimbus Dam is located about 5 miles downstream of Folsom Dam and is a small flow regulating dam. Folsom

Reservoir is located at the confluence of the North and South Forks of the American River. It has a capacity of approximately 977,000 ac-ft and is located approximately 29 miles downstream of Ralston Afterbay Dam. The USBR manages and operates Folsom Reservoir for flood control, water supply, water transfer, and environmental protection. The USBR management of the reservoir is tied to an index of seasonal storage volumes of major reservoirs upstream of Folsom Reservoir in the upper American River basin, including Hell Hole and French Meadows reservoirs. The USBR uses the index in the establishment of Folsom Reservoir storage levels in spring and winter. PCWA confers with USBR about Project operations annually. PCWA also has a water contract with the USBR, which is summarized below (Water Supply Contracts).

PCWA also participates in the California Snow Survey Program, which is operated by the California Department of Water Resources (DWR) and coordinates the collection and sharing of snowpack information by utilities and water agencies for predicting and planning for spring snowmelt.

Operating Agreements/Contracts

PCWA also has a number of operating agreements/contracts that influence Project operations, including a power purchase contract; several water supply contracts related to the sale and delivery of consumptive water; and the Water Forum Agreement that outlines water use goals, obligations, and limitations for the American River Watershed. Each agreement/contract is described below.

Power Purchase Contract

The electrical output of the Project is currently contractually obligated to Pacific Gas and Electric Company (PG&E) pursuant to the Middle Fork Project Power Purchase Contract, dated April 30, 1963. The contract expires on April 30, 2013.

PCWA is currently negotiating a new power purchase contract, which will be in place prior to the expiration of the current PG&E contract. It is anticipated that the new contract will be from three to ten years in length, with provisions for renewal with the mutual agreement of both parties. This power purchase contract would be consistent with the FERC license conditions, water rights, and existing operating agreements/contracts and would not result in additional limitations or constraints in Project operations.

Water Supply Contracts

PCWA has contracts with the 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 Project.

PCWA's contractual relationship with USBR is defined in four agreements: (1) the February 20, 1963 contract, which pertains to construction and operation of Project reservoirs and PCWA's rediversion of water; (2) the 1970 Water Service Contract (as amended in 2002) wherein USBR agrees to provide water from the Central Valley Project (CVP) to PCWA; (3) the 1977 Land Purchase Contract in which USBR agrees to provide for the rediversion of Project water to PCWA; and (4) the 2002 contract related to the American River Pump Station (i.e., consumptive water diversion; not part of the Project).

Key provisions of the water supply agreement between PCWA and USBR that are germane to the operations of the Project 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 Project system balancing to meet continuous minimum instream flow (MIF) 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 Project do not need to explicitly match consumptive deliveries from Folsom Reservoir.
- In dry years, when total flow into Folsom Reservoir is forecasted by the 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 Project 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 Project reservoirs at the end of each month is no more than the quantity stored at the beginning of each month.
- PCWA may, subject to certain limitations, withdraw up to 35,000 ac-ft from USBR's CVP 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 depending on water year type from the Project (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.

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, referred to as the Water Forum Agreement (January 2000).

PCWA's commitment within the framework of these agreements includes limiting its total water usage from the Project to amounts commensurate with their water rights and water supply contracts. In addition, PCWA has committed, under certain conditions depending on consumptive water deliveries, to release up to 47,000 ac-ft in drier 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.

(2) Coordinate the Operation of the Project with Other Electrical Systems to Minimize the Cost of Production

PCWA operates the Project as a merchant providing power through the California Independent System Operator (CAL-ISO) to power purchasers throughout the state. The competitive supply and demand market assures that power is produced and distributed by the most efficient means thereby keeping costs to a minimum.

(B) Need for Project and Need, Cost, and Availability of Alternative Sources of Power

PCWA is a wholesale energy producer rather than a load serving entity that provides electric service to end-users. Electricity generated by the Project is distributed to wholesale power purchasers through the CAL-ISO. Accordingly, this requirement is not applicable to the Project.

PCWA has not served end-use customers in the past, nor does it anticipate doing so in the future. Under the terms of the new power purchase contract, PCWA would remain a wholesaler of Project electrical output to the northern California marketplace.

(1) Costs and Availability of Alternative Sources of Power
Not Applicable.

(2) Increase in Fuel, Capital, and Other Costs
Not Applicable.

(3) Effect of Alternative Sources of Power
Not Applicable.

i. Customers, including wholesale customers
Not Applicable.

ii. Operating and load characteristics
Not Applicable.

iii. Communities served or to be served
Not Applicable.

(C) Need and Reasonable Cost and Availability of Alternative Sources of Power

PCWA operates the Project as a merchant providing power through the CAL-ISO to power purchasers throughout the state. The competitive supply and demand market assures that power is produced and distributed by the most efficient means thereby keeping costs to a minimum.

(1) Average Annual Cost of Power Produced by the Project
Not Applicable.

(2) The Project Resources Required by PCWA to Meet Capacity and Energy Requirements
Not Applicable.

i. Energy *& Capacity Resources as Separate Components of Total Resources Required*
Not Applicable.

ii. Resources *Analysis and System Reserve Margins*
Not Applicable.

iii. *Effects of Efficiency and Load Management Measures*
Not Applicable.

iv. Cost *and Merits of Project Alternatives*
Not Applicable.

Annual Costs for Alternative Sources of Power
Not Applicable.

Basis for Determination of Projected Annual Cost
Not Applicable.

Relative Merits of Each Alternative
Not Applicable.

The Effect on the Direct Providers of Alternative Sources of Energy
Not Applicable.

(D) Effect on Industrial Facilities

PCWA does not use the power associated with the Project for its own industrial facility or related operations, with the exception of support buildings located at each powerhouse (station service).

(E) Tribal Need for the Project on a Reservation

Applicant is not an Indian tribe nor is the Project on a Tribal reservation.

(F) Effect on Transmission System

PCWA does not own or operate any electrical distribution or primary transmission facilities nor are there any distribution or transmission facilities included in the FERC license for the Project. Accordingly, this requirement is not applicable to the Project.

(1) Redistribution of Power Flows and Cost Impacts
Not Applicable.

(2) Advantages of Transmission System
Not Applicable.

(3) Single Line Diagrams
Not Applicable.

(G) Statement of the Need for Modifications

In preparation for the relicensing of the Project, PCWA conducted an assessment to identify potential improvements to existing Project facilities with the potential to improve operations or maintenance of the Project, and result in an increase in annual or peaking generation. The approved Technical Study Plans (TSP) for the Project included investigations of the potential effects of the improvements, when appropriate, and their conformance with comprehensive plans for improving or developing the waterway and for other beneficial pubic uses as defined in Section 10(a)(1) of the Federal Power Act.

Based on preliminary engineering evaluations completed since the approval of the TSPs, the Hell Hole Reservoir Seasonal Storage Increase Improvement is included in the Application for New License. The purpose of this project is to seasonally increase the storage capacity of Hell Hole Reservoir by approximately 7,600 ac-ft. It would utilize a portion of the existing flood pool, above the present normal maximum operating water level, to store additional water during the spring and summer after the peak of the runoff period. This increase would be achieved by installing 6-foot-high crest gates on the existing dam spillway. Operation of the crest gates would seasonally increase the reservoir's inundation area, within the existing flood pool, by approximately 36 acres. This will allow the Project to store additional water that would have spilled, and can then be used later to increase net annual energy generation. In addition, in all but the driest years, the timing of some generation would be shifted from the spring runoff period to the summer peak energy demand period. No new diversions are proposed on Project-affected streams.

In addition to the Hell Hole Reservoir Seasonal Storage Increase, PCWA proposes to modify the Duncan Creek, South Fork Long Canyon, and North Fork Long Canyon diversion facilities for debris and sediment management, which will increase reliability and functionality of the diversions. These modifications will result in increased water supply and reduced operation and maintenance costs associated with periodic removal of sediment and debris accumulations from the diversion impoundments, as well as have power generation benefits. The modifications will increase the natural sediment delivery and transport of bedload and fine material downstream of the diversions.

Preliminary estimated costs of constructing the Hell Hole Reservoir Seasonal Storage Increase Improvement and the modifications at the small diversions (in 2010 dollars) are found in Exhibit D (3)(ii).

The FERC-approved TSPs that identified a nexus between the Project and the Hell Hole Reservoir Seasonal Storage Increase Improvement and/or included specific evaluations of the improvements are listed below.

AQ 1 - Instream Flow Technical Study Plan
AQ 2 - Fish Population Technical Study Plan
AQ 3 - Macroinvertebrate & Aquatic Mollusk Technical Study Plan
AQ 4 - Water Temperature Modeling Technical Study Plan
AQ 5 - Bioenergetics Technical Study Plan
AQ 6 - Fish Passage Technical Study Plan
AQ 7 - Entrainment Technical Study Plan
AQ 8 - Fish Habitat Technical Study Plan
AQ 9 - Geomorphology Technical Study Plan
AQ 10 - Riparian Resources Technical Study Plan
AQ 11 - Water Quality Technical Study Plan
AQ 12 - Special-Status Amphibian & Aquatic Reptile Technical Study Plan
CUL 1 - Cultural Resources Technical Study Plan
LAND 1 - Transportation System Technical Study Plan
LAND 2 - Fire Prevention and Response Technical Study Plan
LAND 3 - Emergency Action & Public Safety Technical Study Plan
LAND 4 - FERC Project Boundary and Authorization Technical Study Plan
REC 3 - Reservoir Recreation Opportunities Technical Study Plan
REC 5 - Visual Quality Assessment Technical Study Plan
TERR 1 - Vegetation Communities & Wildlife Habitat Technical Study Plan
TERR 2 - Special-Status Plants Technical Study Plan
TERR 3 - Noxious Weeds Technical Study Plan
TERR 4 - Special-Status Wildlife Technical Study Plan
TERR 5 - Bald Eagle Technical Study Plan
TERR 6 - Special-Status Bats Technical Study Plan

(H) The Applicant plans to modify existing Project facilities and operations. Accordingly, this requirement is not applicable to the Project.

(I) Financial and Personnel Resources

Financial Resources

PCWA's source and extent of financing and annual revenues are sufficient to meet the continuing operation and maintenance needs of the Project. For more detailed financial information, refer to PCWA's Comprehensive Annual Financial Report available at www.pcwa.net.

As of December 31, 2009, PCWA had a debt coverage ratio of 6.62 (a minimum of 1.20 is required), and over $159M in cash and investments on hand. Additionally, PCWA has entered into an agreement with the Placer County via a Joint Powers Agreement under which Placer County will make available a line of credit for non-routine Project expenses. On April 16, 2010, Moody's Investor Services upgraded the PCWA's municipal rating to Aa2 from A1 as part of a change in scale. The Standard and Poors rating remains at AA.

Personnel Resources

In addition to the Project, PCWA operates over 165 miles of canals, ditches and other raw water delivery facilities, eight water treatment plants, and hundreds of miles of distribution piping and delivery facilities. PCWA provides retail or wholesale treated and raw water supplies for over 35,000 customers.

PCWA has operated the Project efficiently and reliably since 1963 as a vital part of the PCWA's upcountry water supply system. PCWA has personnel resources necessary to meet license obligations for the Project. PCWA is comprised of administrative, technical, and field services; and the Power System division, with employees with various skill sets, including skilled labor who perform hydropower maintenance and operation; underground construction; heavy equipment, vehicle and machine maintenance; high voltage, standard, and communication electrical; machining, and welding; technical support and professional engineers; and analysts and managers of finance and human resources.

The Project is operated by PCWA's Power System Division. It has 18 employees who operate the Project and perform routine and non-routine maintenance on the Project. Additional administrative, technical, and field services resources from PCWA are also available to support Power System needs. Legal and other professional services are also provided through various contractor consultants.

Project personnel receive training in a variety of subjects to ensure compliance with the provisions of the license. A variety of training resources and approaches are used, including classroom training, workshops, textbooks, on-the-job training, and safety training to all personnel. Safety training is conducted through a combination of regularly scheduled monthly meetings, crew meetings, on-the-job training, and special programs as needed. The training covers PCWA's standard Occupational Safety, Health, and Fire Prevention rules and hazardous materials handling, as well as programs mandated by governmental agencies such as the California Occupational Safety and Health Division, as well as training related to compliance with Commission license articles, and environmental and cultural protection programs. Additionally, PCWA routinely dispatches personnel to specialized or specific training seminars, including workshops offered by FERC, various manufacturers, and other sources. PCWA routinely shares information and training (including seconding of personnel) to other hydro operators including PG&E, SMUD, Yuba County Water Agency (YCWA), and Northern California Power Agency (NCPA).

(J) Notification of Proposed Expansion of Project Lands

PCWA proposes to expand the Project to encompass additional lands (please refer to Exhibits A and G for the locations of these lands). PCWA notified, by certified mail, all of the property owners and government agencies of these changes. No subdivisions will be affected by expansion of the Project.

(K) Electricity Consumption Efficiency Improvement Program

The Applicant does not own or operate any electrical distribution or primary transmission facilities nor are there any distribution or transmission facilities included in the FERC license for the Project. Accordingly, this requirement is not applicable to the Project.

(1) Energy and Electrical Conservation
Not Applicable.

(2) Compliance of Energy Conservation Programs
Not Applicable.

(L) List of Indian Tribes and Addresses

The following Indian tribal contacts are believed by PCWA to potentially have an interest in the Project; although, no Project facilities are located on any tribal lands:

Colfax-Todds Valley Consolidated Tribe
Tribal Chairperson
P.O. Box 4884
Auburn, CA 95604

Miwok Tribe of the El Dorado Rancheria
Tribal Chairperson
P.O. Box 711
El Dorado, CA 95623

*Shingle Springs Rancheria
Tribal Chairperson
P.O. Box 1340
Shingle Springs, CA 95682

Tsi-Akim Maidu
Tribal Chairperson
1275 E Main St
Grass Valley, CA 95945

*Washoe Tribe of Nevada and California
Tribal Chairperson
919 Highway 395 South
Gardnerville, NV 89410

El Dorado Intertribal Council
P.O. Box 564
El Dorado, CA 95623

Nisenan Maidu
April Moore
19630 Placer Hills Rd
Colfax, CA 95713

Todd Valley Miwok-Maidu Cultural Foundation
P.O. Box 1490
Foresthill, CA 95631

*United Auburn Indian Community of the Auburn Rancheria
Tribal Chairperson
10720 Indian Hill Rd
Auburn, CA 95603

*Denotes federally recognized tribal organizations

(ii)

(A) Safe Management, Operation, and Maintenance

The Applicant implements numerous measures to ensure safe management, operations, and maintenance of the Project as described below.

(B) Safe Management, Operation, and Maintenance

(1) Operation during Flood Conditions

Operation during emergency conditions (including a flood) is detailed in PCWA's Emergency Action Plan (EAP) (PCWA 2004, updated February 2010). PCWA developed and maintains an EAP for the Project in compliance with FERC regulations (18 CFR Part 12). The primary purposes of the EAP are to: (1) provide early warning to downstream recreational users, dam operators, and other persons in the vicinity of the Middle Fork American River Canyon and Folsom Reservoir who might be affected by an imminent or actual sudden release of water from Hell Hole, French Meadows, Ralston Afterbay or Duncan Creek Diversion dams; and, (2) minimize property and environmental damage in these areas. North and South Fork Long Canyon diversion pools and dams (<1 ac-ft storage) and Middle Fork Interbay and Dam (173 ac-ft storage) are not addressed in the EAP as public safety and flooding risk associated with failure of these individual facilities is considered minimal. In addition to potential dam failures, the EAP can be implemented in a situation that requires emergency releases from spill gates (e.g., if a reservoir is full in June and an unseasonably extreme thunderstorm occurs); hazardous material spill (e.g., oil spill); and damage to or sabotage of spill gates or outlet valves. If a major oil spill occurs, PCWA then implements the Spill Prevention Control and Countermeasure (SPCC) plan developed for each powerhouse that includes additional information on emergency responses.

The EAP specifies pre-planned actions to be followed in the event of an emergency. The plan includes provisions for: (1) maintenance, operation, and inspection of the dams and related facilities; (2) early warning of developing emergency conditions; (3) evaluation of emergency situations and operational responses; and, (4) timely notification of emergency response agencies and individuals in remote locations. The EAP discusses procedures for timely and reliable detection, evaluation, and classification of an existing or potential emergency situation. The EAP specifically addresses procedures for responding to emergencies in darkness, on weekends and holidays, and during adverse weather conditions.

The EAP includes access routes to various locations in the vicinity of the Project.

If flooding is anticipated, a dam failure is imminent, or a potentially hazardous situation is developing, PCWA notifies the appropriate emergency management officials, as specified in the EAP. In the event of an emergency, PCWA personnel call "911" and notify the PCWA Power System Employees and Headquarters Management specified in the EAP, who then notify local authorities. PCWA is also responsible for the initial evacuation of any people immediately downstream of the dam. PCWA acts as the lead agency responding to an event until the Placer County Sheriff's Office or other designated emergency response agency assumes authority. The Placer County Sheriff's Office is responsible for notifying the appropriate local emergency organizations, alerting the public, and overseeing the affected areas. Once the Placer County Sheriff's Office's assumes command, they are responsible for any evacuations. PCWA relies on the substantial resource capabilities that the emergency service agencies bring to an emergency to communicate with the public during an emergency. Helicopter resources, employed by Placer County Sheriff's Office, California Highway Patrol, California Department of Forestry and Fire Protection (CAL FIRE), and possibly PG&E are typically used to notify individuals downstream and in remote areas. The default location for managing emergency situations is the Placer County Emergency Operations Center at 2968 Richardson Blvd, Auburn, California.

PCWA is responsible for training its employees in the protocols and procedures specified in the EAP, implementing measures for the detection of potential emergency situations, and taking specific actions once the EAP is implemented. PCWA provides annual EAP training for its Project operators and other responsible personnel and general orientation training for the maintenance crew. To the extent feasible, PCWA conducts annual EAP training exercises with participation from all the responsible response agencies and organizations. The most recent training exercise occurred on May 20, 2009.

PCWA annually reviews and updates the EAP as required by FERC. PCWA notifies FERC each year if any changes are made or if none are required. PCWA also distributes any annual revisions with specific instructions for replacing outdated sections to all participating agencies/departments identified in the EAP, including the Office of Emergency Services (OES) and the land management agencies. Copies of the EAP are kept at PCWA's

Foresthill Headquarters, each of the five powerhouses (French Meadows, Hell Hole, Middle Fork, Ralston, and Oxbow), Hell Hole Dormitory, Hell Hole Garage, French Meadows Spillway Engine-Generator House, and Ralston Afterbay Dam Control Building.

(2) Warning Devices for Downstream Public Safety

FERC is authorized by Section 10(c) of the Federal Power Act to provide regulatory oversight of dam operators to create and maintain safe hydropower projects (FERC 1992). FERC provides guidelines for establishing safety devices and other measures that could be used to enhance protection of the public from specific types of hazards. FERC also provides specific guidelines on safety signage at hydropower plants for dam operators (FERC 2001). Information on key concepts for planning, design, construction, and maintenance of signs and examples of safety signage that would be suitable for different types of conditions and facilities are provided as guidance for operators of hydroelectric projects.

In accordance with the aforementioned FERC guidelines, PCWA implements the following public safety programs and measures:

- PCWA utilizes various audible (sirens and security alarms) and visual warning devices (lights, signage, buoys, and log booms) to warn the public of hazardous areas and potentially dangerous conditions.
- PCWA uses various devices to restrict public access to hazardous areas including: fences around Project facilities; gates limiting access onto Project roads; trashracks in tunnel intake structures; and, guard rails on dams.
- PCWA maintains and operates several gaging stations that monitor water surface elevations in the rivers and reservoirs with alarms that transmit to the PCWA and PG&E communications systems. The alarm systems are activated if changes in river stage or reservoir water surface elevation exceed specified rates.
- There are two helicopter landing sites located in the vicinity of the Project (near the Hell Hole Dormitories and near the Oxbow Powerhouse). These landing sites may be used by emergency responders during emergencies in the vicinity of the Project.

(3) Changes Affecting the Emergency Action Plan

PCWA annually reviews and updates the EAP as required by FERC. PCWA notifies FERC each year if any changes are made or if none are required. PCWA also distributes any annual revisions with specific instructions for replacing outdated sections to

all participating agencies/ departments identified in the EAP, including the Placer County OES and the land management agencies.

(4) Monitoring Devices

Routine facility inspections, testing, and maintenance activities are implemented at Project facilities and Project recreation facilities to:

- Meet regulatory testing and inspection requirements;
- Maintain system reliability;
- Maintain facility access;
- Protect Project facilities and recreation facilities;
- Protect worker and public health and safety; and
- Preserve Project flow and storage capacities.

Routine facility testing and maintenance activities include completion of testing, inspections, and maintenance at Project tunnels, powerhouses, and gates; and completion of vegetation management; sediment management; slope stabilization (falling rock control); debris management; facility painting; pole replacement; road maintenance; and recreation facility water supply maintenance. The activities that are related to the detection of movement or stress, seepage, uplift, equipment failure or water conduit failure are described below.

Dams

PCWA-trained operators visually inspect the dams for settlement, plugging of drains, sloughing, cracking, leakage, turbidity, vegetation, and rodent activity. Hell Hole and Ralston Afterbay dams are inspected daily, and French Meadows and Duncan Creek Diversion dams are inspected at least once per week. The leakage weirs at French Meadows and Hell Hole dams are monitored weekly, when accessible, and the data are analyzed for adverse trends.

All dams are surveyed for settlement at designated locations every other year. The survey data are analyzed and compared to previous surveys to determine if settlement is within expected limits. Piezometers (water level monitoring wells) at Ralston Afterbay and French Meadows dams are regularly monitored. Water levels in the piezometers at Ralston Afterbay are recorded daily and are analyzed monthly. Water levels in the piezometers at French Meadows Dam are checked and recorded monthly.

Engineers from FERC and the DWR Division of Safety of Dams (DSOD) conduct annual inspections at each dam (Hell Hole, French Meadows, Ralston, and Middle Fork Interbay) and review the collected monitoring data. Once every five years, PCWA's FERC-approved dam safety consultant inspects French Meadows, Hell Hole, and Ralston Afterbay dams in accordance with FERC's Part 12 inspection criteria, and issues a report on the stability and condition of the dams to FERC.

In addition, the EAP specifies various surveillance and inspection measures to assist in detecting potential problems at the Project dams in a reliable and timely manner.

Spillway Gates

FERC requires partial operation of spillway gates on an annual basis 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 French Meadows Dam the spillway gates are operated when the reservoir level is below the spillway crest elevation. At Middle Fork Interbay and Ralston Afterbay dams, the spillway gates are tested during the maintenance outage when the reservoir levels are below the spillway crest elevation. At the end of each calendar year, PCWA submits an Annual Spill Gate Testing Report to FERC demonstrating license compliance. In accordance with FERC requirements, PCWA also thoroughly inspects and evaluates the spillway gates every ten years.

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.

Penstocks

PCWA conducts annual inspections of the exteriors of the penstock saddles and fittings. PCWA also conducts annual testing of the emergency butterfly valve shut down. Penstock pressure is monitored at the scroll case. A sudden drop in pressure will cause the butterfly valve to close and the unit to shut down.

Powerhouses

PCWA also conducts annual mechanical and electrical inspections and maintenance at all five Project powerhouses. For facilities in the lower Project area, these activities typically occur in the fall beginning in late September, and require that the lower Project powerhouses (Middle Fork, Ralston, and Oxbow) be taken out-of-service for approximately three to six 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.

River Stage and Reservoir Water Surface Elevations

PCWA also maintains and operates several gaging stations that monitor water surface elevations in the rivers and reservoirs. Alarms located at the gaging stations are routed through PCWA and PG&E communications systems. The alarm systems are activated if changes in river stage or reservoir water surface elevation exceed specified rates. PCWA regularly monitors and checks all the remote sensing and transmitting equipment associated with the detection system. Any failure is immediately investigated and repaired.

(5) Employee Safety and Public Safety Record

PCWA takes pride in its safety record, and strives for a safe work environment at all facilities including the Project. PCWA has few lost time injuries. The past ten years of lost time injuries for the Project are summarized below.

These accidents consist of the following:

Date	Type of Lost Time Injury
3/22/2006	Strain/Sprain – left knee
5/17/2005	Strain – left leg
9/10/2003	Laceration – left leg
5/22/2002	Lower Back Strain

One recent incident was reported to the FERC (letter dated August 3, 2010). A subcontractor employee working on the French Meadows Dam Spillway Modification project was injured when he

fell down a rock slope while a piece of construction was being moved on July 22, 2010. PCWA initially contacted the FERC by email on the day of the incident and submitted a written incident report on August 3, 2010.

According to records maintained by the Placer County Sheriff's Department, Foresthill Fire Protection District, Grass Valley CAL FIRE, Camino CAL FIRE, United States Department of Agriculture-Forest Service (USDA-FS) Tahoe National Forest and USDA-FS Eldorado National Forest, and the El Dorado County Sheriff's Department in 2006 and 2007 and FERC from 1980 through 2007, a total of two incidents resulting in injury or death to the public have occurred within the Project boundary as summarized in the following:

- May 15, 1999, Middle Fork American River immediately downstream of Middle Fork Interbay Dam
    - **Incident Summary.** On May 15, 1999, four people (one adult and three minors) descended down to the river using the short ladder and long stairway located at the left abutment of the dam. The Middle Fork Interbay Dam spilled while these people were fishing along the river. No emergency responders were contacted. No injuries or deaths resulted, although fishing tackle was lost. There are two ways to access this reach of river: (1) by a stairway located 200 feet downstream of the dam's right abutment that ends at an old concrete weir, and, (2) by a short ladder and long stairway located along the left abutment of the dam. A warning sign indicating that water may discharge at any time was located on the stairs near the old concrete weir.
    - **Action.** PCWA immediately added additional signage above the short ladder access down to the river warning of possible water discharges and placed a siren on the dam to provide an estimated 15- to 20-second warning before the spillway radial gates open. PCWA took measures to prevent public access down to the river at this location, by fencing off the stairways and removing the ladder in the summer of 2000.
- June 11, 2009, Hell Hole Reservoir
    - **Incident Summary**. A drowning occurred on June 11, 2009. The accident involved three men in a small boat overloaded with camping gear. The men launched from Hell Hole Boat Ramp. As they traveled to the upper end of Hell Hole Reservoir their boat began to take on water and capsized. Two of the men made it to shore, but one did not. The two

men camped out overnight and the next morning encountered some fishermen who, upon learning of the accident, called "911." As a result of the "911" call, a Placer County Sheriff's Department Search and Rescue helicopter and diving team was dispatched to Hell Hole Reservoir. Eldorado National Forest fire personnel later arrived to perform a ground search for the missing man on the perimeter area of the reservoir. Despite the search and rescue effort, the body was not found.

- **Action**. PCWA verbally reported this accident to FERC on June 12, 2009 and submitted written documentation on July 24, 2009. In a letter dated August 10, 2009, FERC acknowledged receipt of PCWA's report stating that no further action by PCWA was required.

(C) Current Operations and Constraints

The Project was constructed in 1963 and has operated since 1967 under the FERC license that was issued on March 13, 1963. French Meadows Powerhouse went online in 1964, Middle Fork Powerhouse commenced operation in 1966, Ralston and Oxbow Powerhouse went into service in 1968, and Hell Hole Powerhouse commenced operation in 1983. The specifications for the generators and turbines associated with each powerhouse are provided in Exhibit A, Section (3). Project operation and constraints are discussed further in Exhibit B, Section (1).

The Project is a multi-purpose project that is operated to benefit the people of Placer County. The Project is operated with respect to the following four objectives: (1) meet FERC license requirements that protect environmental resources and provide for recreation; (2) meet PCWA's consumptive water demands; (3) 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 (4) maintain Project facilities to ensure their continued availability and reliability.

There are five key operating characteristics of the Project that allow PCWA to meet its operating objectives. These characteristics are: (1) flexibility to raise and lower reservoir levels (water storage) at different rates and times throughout the year subject to minimum storage level requirements; (2) ability to operate the Middle Fork and Ralston powerhouses simultaneously over a range of flows and schedule periods; (3) 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; (4) ability to meet the seasonal combined patterns of consumptive water demand and peak energy demand and weekly/daily peak energy demands; and (5) 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.

During the release period (summer and fall), 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 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).

Project operations for water supply and electric power generation are constrained by regulatory requirements; operating agreements and contracts; the physical capacities of the Project facilities; and water availability. Regulatory requirements affecting Project operations include conditions imposed by the existing FERC License, and water rights permits and license issued by the State Water Board. Operating agreements/contracts affecting Project operations include conditions required in the existing power purchase contracts with PG&E, water supply contracts, and the Water Forum Agreement.

Project operations are prioritized to first ensure consumptive water demand (deliveries) are met and second to maximize peak power generation. However, in all but dry years, 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. In addition, Project generally controls and releases far more water annually in most water years (except in dry years) than PCWA requires to meet consumptive water demand.

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 Project 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. 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 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.

French Meadows Powerhouse generates electricity 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.

Hell Hole Powerhouse, located at the base of Hell Hole Dam, has an installed generating capacity of 0.73 megawatt (MW). This powerhouse generates electricity opportunistically from flow releases from Hell Hole Dam. Project operations are not modified for power generation at Hell Hole Powerhouse.

The Middle Fork and Ralston powerhouses are the heart of Project generation. These two powerhouses generally run in tandem, using water transported from Hell Hole Reservoir to Ralston Afterbay. These powerhouses, running in tandem, are often used to help maintain reliable operations of the state's 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. Middle Fork Interbay is located between these two powerhouses, but has little ability to re-regulate flows due to its small capacity.

Oxbow Powerhouse frequently runs in tandem with Middle Fork and Ralston powerhouses. The capacity of Oxbow Powerhouse (1,025 cubic feet per second [cfs]) is slightly higher than the present capacity of Ralston Powerhouse (924 cfs), which allows Oxbow Powerhouse to utilize water supplied by Ralston Powerhouse, as well as inflow from the Middle Fork American and Rubicon rivers. Ralston Afterbay also has sufficient operational storage capacity to allow Oxbow Powerhouse to operate independently of Middle Fork and Ralston powerhouses for several hours at a time, depending on generation level. This independent operational flexibility is used to meet the ramping rate requirement downstream of Oxbow Powerhouse and to make releases for whitewater boating without requiring operation of the

Middle Fork and Ralston powerhouses. Because Ralston Afterbay is used primarily as a regulating facility, water surface elevations (WSE) may fluctuate on a day-to-day or hour-to-hour basis.

(D) History of Project and Upgrades

The Project was constructed between 1963 and 1968 as follows:

1963	Construction begins on the Middle Fork Project.
1963–1964	Construction of the following facilities: • Duncan Creek Diversion Dam • Duncan Creek-Middle Fork Tunnel • French Meadows Dam and Reservoir • French Meadows Powerhouse • French Meadows-Hell Hole Tunnel
1964–1965	Construction of Hell Hole Dam and Reservoir
1965	Construction of the following facilities: • Hell Hole-Middle Fork Tunnel • North Fork Long Canyon Diversion • South Fork Long Canyon Diversion
1965–1966	Construction of the following facilities: • Middle Fork Powerhouse • Middle Fork Interbay
1967–1968	Construction of the following facilities: • Middle Fork-Ralston Tunnel • Ralston Powerhouse • Ralston Afterbay • Ralston-Oxbow Tunnel • Oxbow Powerhouse
1980–1983	Construction of Hell Hole Powerhouse

PCWA has implemented numerous repairs, improvements, and major maintenance projects, including repair and replacement of turbine runners, and generator rewinds for the Middle Fork and Ralston units. Additional significant project upgrades and modifications since start-up of the project are summarized below.

1975	Hell Hole-Middle Fork Tunnel Remediation
1986–1987	Repair Flood-caused Damage at Various Facilities (primarily Ralston Afterbay)
1997–1999	Lower Portion of French Meadows Dam Spillway Completion
1997–1999	Repair Flood-caused Damage at Various Facilities
2006–2008	Middle Fork Surge Shaft Repairs
2007	Duncan Canyon Creek Access Road Remediation
2008-2010	SCADA and Communications System Upgrades
2009–2011	French Meadows Spillway Probable Maximum Flood Retrofit

(E) Lost Power History Due to Unscheduled Outages

Five years of unscheduled (forced) outages, 2005 to 2009 inclusive, are listed below by year and powerhouse:

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2005						
French Meadows	3/14/2005	04:57	35.37	FM-MF 60 kv line relayed – very windy over ridges – flashed over insulators caused by tree limb across 2 phases on pole 3/1 out from FMPH	Line returned to service by PG&E	Non-Project
	5/21/2005	06:32	2.39	Low wearing ring water flow trip	Project returned to service	Project
	6/14/2005	11:57	1.03	Electronic governor surge protection failure	Repaired	Project
	10/14/2005	10:16	1.44	Repair of fill valve leak	Leak repaired	Project
	12/21/2005	15:41	0.57	Lightning	Line returned to service by PG&E	Non-Project
	12/31/2005	11:58	0.79	Cooling water (cw) low flow trip	Cooling water flow restored	Project
	12/31/2005	19:35	0.6	No SCADA control	SCADA sorted, returned to service	Project
Hell Hole	1/7/2005	14:10	146	FM-MF 60 KV Line Tested no good	Line returned to service by PG&E	Non-Project
	3/14/2005	04:57	38	FM-MF 60 kv line relayed – very windy over ridges – flashed over insulators caused by tree limb across 2 phases on pole 3/1 out from FMPH	Line returned to service by PG&E	Non-Project
	12/21/2005	15:41	1.07	Lightning	Line returned to service by PG&E	Non-Project
Middle Fork #1 + 2	1/2/2005	05:29	392.52	C phase main bank failure	C Phase bank replaced	Project
	12/31/2005	05:26	80.7	High tail water – high rain storm	Returned to service after storm	Non-Project
Middle Fork #1	10/26/2005	18:43	54.32	SCADA Related shutdown	SCADA sorted, returned to service	Project
	12/22/2005	18:38	1.88	Cooling water low flow trip	Cooling water flow restored	Project
	12/30/2005	17:21	1.89	Cooling water low flow trip	Cooling water flow restored	Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2005 (continued)						
Middle Fork #2	1/28/2005	10:36	0.2	Gen lower guide brg low oil level trip – add oil to normal Op level	Unit checked and returned to service	Project
	5/10/2005	08:00	1.73	Unit trip on CW Low Flow	Cooling water flow restored	Project
	10/25/2005	09:31	1.01	SCADA Related shutdown	SCADA sorted, returned to service	Project
	10/26/2005	18:42	54.39	SCADA Related shutdown	SCADA sorted, returned to service	Project
	11/2/2005	10:17	1.29	False indication from Lower Guide bearing flow meter	Unit checked and returned to service	Project
Oxbow	1/2/2005	05:29	35.78	Line relay trip	Line returned to service by PG&E	Non-Project
	3/22/2005	23:04	0.83	Upper wearing ring low cooling water flow trip	Cooling water flow restored	Project
	3/23/2005	00:25	0.47	Upper wearing ring low cooling water flow trip – cutout low flow trip until the device is repaired	Cooling water flow restored	Project
	3/27/2005	03:50	1.18	Rotary seal cooling water low flow trip	Cooling water flow restored	Project
	4/28/2005	15:57	3.42	Unit shutdown to recharge intake hydraulic system with nitrogen	Charging complete, unit returned to service	Project
	5/5/2005	11:48	3.14	Unit shutdown to recharge intake hydraulic system with nitrogen and isolated one accumulator that is leaking nitrogen	Charging complete, unit returned to service	Project
	5/16/2005	10:11	1.35	Unit trip on false Upper Wearing Ring low flow.	Unit checked and restarted	Project
	5/17/2005	09:34	0.1	Unit trip on false Upper Wearing Ring low flow.	Unit checked and restarted	Project
	6/24/2005	16:55	1	Faulty reading on cooling water flow meter caused cooling water low flow	Unit checked and restarted	Project
	9/6/2005	10:15	0.3	A phase Generator over current trip – 60 KV line relay also	Unit checked and restarted	Project
	10/26/2005	18:13	54.93	SCADA related shutdown.	SCADA sorted, returned to service	Project
	11/27/2005	18:17	0.85	Turbine bearing cooling water low flow trip – clogged cooling water flow meter	Unit checked and restarted	Project
	12/12/2005	09:55	0.03	Complications of installing communications high voltage protection equipment	Unit checked and restarted	Project
	12/12/2005	12:16	0.1	Complications of installing communications high voltage protection equipment	Unit checked and restarted	Project
	12/31/2005	02:37	104.75	High tail water – high rain storm	Returned to service after storm	

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2005 (continued)						
Ralston	1/2/2005	05:29	5.68	Line relay trip	Line returned to service by PG&E	Non-Project
	3/25/2005	12:33	1.53	Cleaned sludge out of governor components to prevent load from drifting	Unit checked and restarted	Project
	4/4/2005	15:37	0.13	False arc detector trip	Unit checked and restarted	Project
	10/23/2005	03:47	28.55	SCADA Related shutdown. No drops or targets. SCADA system out of service	SCADA sorted, returned to service	Project
	10/26/2005	01:30	71.54	SCADA related shutdown.	SCADA sorted, returned to service	Project
	12/22/2005	20:58	2.87	Cooling water low flow trip	Cooling water flow restored	Project
	12/31/2005	00:56	87.5	High tail water – high rain storm	Returned to service after storm	Non-Project
2006						
French Meadows	2/4/2006	09:54	0.42	Turbine bearing cooling water low flow trip	Cooling water flow restored	Project
	8/3/2006	17:11	1.6	Gen U/G low oil level trip	Project returned to service	Project
	8/3/2006	18:50	4.18	86 E trip Gen O/C	Project returned to service	Project
	9/7/2006	18:05	279.7	RALSTON FIRE	Returned to service after fire	Non-Project
	10/7/2006	03:35	5.36	Cooling water low flow trip	Project returned to service	Project
Hell Hole	1/14/2006	12:04	4.98	12 KV Line Relay – Snow Storm	Line returned to service by PG&E	Non-Project
	1/15/2006	09:23	1.43	12 KV Line Relay – Snow Unloading	Line returned to service by PG&E	Non-Project
	4/16/2006	18:49	16.28	12 KV relay. A phase – B phase Under voltage. Snow condition related.	Line returned to service by PG&E	Non-Project
	6/1/2006	14:08	0.53	Possible relation to Ralston unit trip at same time.	Unit checked and restarted	Project
	9/28/2006	00:10	11.28	False stator overtemp trip	Unit checked and restarted	Project
	11/11/2006	12:06	46.62	Unit trip on 80LX Low 125VDC voltage	DC voltage resolved	Project
	11/17/2006	12:27	1.25	Low Gov Oil level	Oil checked, returned to service	Project
Middle Fork #1 + 2	9/7/2006	15:56	306.22	RALSTON FIRE	Returned to service after fire	Non-project
Middle Fork #1	9/21/2006	17:04	1.57	CW pumps tripped at main breaker	Unit checked and restarted	Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2006 (continued)						
Middle Fork #2	6/1/2006	14:28	1.17	Ralston unit trip causing high tail water @ MF	Returned to service when Ralston restored	Project
	9/20/2006	19:35	13.17	Lower Guide bearing low oil	Oil level restored, unit checked	Project
	9/21/2006	17:04	1.75	CW pumps tripped at main breaker	Pumps checked	Project
	10/27/2006	22:15	15.69	False trip on lower guide bearing Hi/Lo oil level	Unit checked and restarted	Project
	10/28/2006	14:20	50.54	False trip on lower guide bearing Hi/Lo oil level	Adjustments, unit checked and restarted	Project
	10/30/2006	18:18	18.19	False trip on lower guide bearing Hi/Lo oil level	Adjustments, unit checked and restarted	Project
Oxbow	2/28/2006	05:30	9.3	Excess debris during storm to operate unit	Returned to service after storm	Non-Project
	3/9/2006	14:56	0.5	Intake Gate Slip trip	Cycle gate, returned to service	Project
	4/3/2006	19:30	65.18	Storm condition outage	Returned to service after storm	Non-Project
	5/20/2006	00:39	1	Penstock Low Pressure	Unit checked & restarted	Project
	6/6/2006	07:59	1.17	Wiemar 60KV line relayed	Line returned to service by PG&E	Non-Project
	6/22/2006	00:25	0.83	Oxbow unit tripped on Intake Gate slip	Cycle gate, returned to service	Project
	6/23/2006	14:50	0.85	Oxbow unit relayed on Gen OC C phase on time when Wiemar 60KV line relayed and tested OK	Line issue resolved by PG&E	Non-Project
	6/23/2006	15:43	2.35	Separated unit due to problems with voltage regulation and gov oil pump fail	Spares, unit checked and restarted	Project
	7/5/2006	03:26	0.78	Trip on intake gate slip	Project returned to service	Project
	7/20/2006	12:10	0.37	Trip on intake gate slip	Cycle gate, returned to service	Project
	7/22/2006	17:09	13.78	Unit relayed on excessive gov low oil press, due to low voltage on Wiemar 60kv line	Line issue resolved by PG&E	Project
	7/23/2006	15:47	16.21	Separated unit due to excessive low line voltage on Wiemar	Line issue resolved by PG&E	Non-Project
	7/24/2006	14:18	17.17	Separated unit due to excessive low line voltage on Wiemar	Line issue resolved by PG&E	Non-Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
	7/25/2006	14:33	16.99	Separated unit due to excessive low line voltage on Wiemar	Line issue resolved by PG&E	Non-Project
2006 (continued)						
Oxbow (continued)	9/7/2006	18:23	306.31	RALSTON FIRE	Return to service after fire	Non-Project
	11/9/2006	07:05	2.96	Unit trip on Low UPPER GUIDE BEARING OIL LEVEL (oil was in new filter)	Unit checked and restarted	Project
Ralston	2/28/2006	04:08	1.89	c/w low flow trip	Cooling water flow restored	Project
	6/1/2006	14:07	0.51	Amplidyne failure resulting in false field ground trip.	Spares	Project
	9/7/2006	15:56	0.06	RALSTON FIRE	Return to service after fire	Non-Project
	9/7/2006	18:05	303.26	RALSTON FIRE	Return to service after fire	Non-Project
2007						
French Meadows	1/17/2007	10:56	170.17	60 KV line relay – squirrel	Line returned to service by PG&E	Non-Project
	2/10/2007	19:38	15.69	MF-GH 230 KV Line trouble	Line returned to service by PG&E	Non-Project
	2/25/2007	16:57	0.3	60 KV relay	Line returned to service by PG&E	Non-Project
	2/27/2007	02:15	1.77	60 KV relay	Line returned to service by PG&E	Non-Project
	5/21/2007	18:00	0.29	Loss SCADA	SCADA sorted, return to service	Project
	10/8/2007	16:14	25.83	60 KV relay – Fire	Return to service after fire	Non-Project
	10/14/2007	07:02	0.84	Vacaville switching	PG&E issue resolved by PG&E	Non-Project
	11/7/2007	09:17	31.48	Install new power line carrier	Project returned to service	Project
	11/29/2007	07:44	0.52	Loss of SCADA – FORCED OUT BY DRUM	PG&E issue resolved by PG&E	Non-Project
Hell Hole	2/10/2007	19:38	1882.78	MF-GH 230 KV Line trouble	Line returned to service by PG&E	Non-Project
	5/12/2007	02:00	6.55	Bearing overtemp	Unit checked and restarted	Project
	5/12/2007	09:40	55.07	Loss of SCADA	SCADA sorted, returned to service	Project
	5/26/2007	23:00	15.5	Bearing overtemp	Unit checked and restarted	Project
	5/30/2007	05:22	9.13	Bearing Over temp	Unit checked and restarted	Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
	6/16/2007	06:18	1	Stator overtemp	Unit checked and restarted	Project
2007 (continued)						
Hell Hole (continued)	6/17/2007	16:35	0.1	Stator Overtemp	Unit checked and restarted	Project
	6/17/2007	21:30	11.83	Stator Overtemp	Unit checked and restarted	Project
	6/20/2007	16:15	0.32	Stator Overtemp	Unit checked and restarted	Project
	10/8/2007	16:07	26.67	60 KV relay – Fire	Return to service after fire	Non-Project
	10/14/2007	07:02	1.48	Vacaville Switching	PG&E issue resolved by PG&E	Non-Project
Middle Fork #1 & 2	2/8/2007	22:36	9.44	MF BV closed on seismic trip.	Unit checked and restarted	Non-Project
	2/10/2007	19:38	13.37	MF-GH 230 KV Line trouble	Line returned to service by PG&E	Non-Project
	2/11/2007	09:00	55.32	MF-GH 230 KV Line trouble	Line returned to service by PG&E	Non-Project
	6/6/2007	09:19	2.64	MF 600amp CW breaker replacement	Breaker replacement	Project
	6/6/2007	14:14	21.27	MF 600amp CW breaker replacement	Breaker replacement	Project
Middle Fork #2	6/7/2007	21:21	12.73	Neutral under voltage	Unit checked and restarted	Project
Oxbow	2/28/2007	08:32	0.05	60kv relay	Line returned to service by PG&E	Non- Project
	4/9/2007	09:04	1.8	Low gov. sump oil level trip	Project returned to service	Project
Ralston	2/10/2007	19:38	68.92	MF-GH 230 KV Line trouble	Line returned to service by PG&E	Non-Project
	8/14/2007	09:28	1.81	BFVH pump motor went out on over load (during part travel test)	Unit checked and restarted	Project
	8/30/2007	23:01	2.31	unit tripped on excess vibration High tail water	Project returned to service	Project
2008						
French Meadows	1/4/2008	11:52	197.45	60 KV relay	Line returned to service by PG&E	Non-Project
	1/12/2008	23:09	35.22	Loss of SCADA	SCADA sorted, returned to service	Project
	5/19/2008	17:11	1.64	Rotary seal low flow	Project returned to service	Project
	6/14/2008	09:11	0.87	CW flow false indication – Normal shutdown	Unit checked and restarted	Project
	7/12/2008	10:50	0.15	Unit tripped during RTU work	Project returned to service	Project
	9/28/2008	18:28	16.87	Thrust bearing overtemp	Unit checked and restarted	Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2008 (continued)						
Hell Hole	1/4/2008	10:03	22.97	60 KV Relay	Line returned to service by PG&E	Non-Project
	2/15/2008	10:30	0.7	Low Governor Oil	Unit checked and restarted	Project
	5/15/2008	13:35	2.7	Low Gov Oil	Unit checked and restarted	Project
Middle Fork #1	6/8/2008	16:25	0.85	Tripped off line low cooling water Turbine bearing flow false indication	Unit checked, returned to service	Project
Oxbow	7/23/2008	19:13	1.64	60 KV Line Relay	Line returned to service by PG&E	Non-Project
Ralston	7/24/2008	09:49	0.55	tripped on differential , 86N contacts did not pick up when operated during BFV part travel test	Project returned to service	Project
2009						
French Meadows	8/2/2009	03:38	3.02	Surface Cooling – Possible Lightning related	Unit checked, returned to service	Project
	9/19/2009	09:44	5.02	Governor air compressor went out, repair and recondition with spare	Spares	Project
	10/29/2009	09:25	3.55	Governor air compressor failed, repair and recondition with spare	Spares	Project
	11/2/2009	18:56	2.95	CB 22 OPENED SCADA WORK @ MFPH	Line cleared unit restarted	Project
Hell Hole	2/17/2009	06:13	2.18	CB 32 Opened	Line cleared unit restarted	Project
	4/27/2009	00:13	9.28	Bearing overtemp	Unit checked, returned to service	Project
	5/30/2009	15:23	67.82	Tripped on pulled fuse. Held out for replacement of battery charger	Spares	Project
	7/14/2009	10:30	2.8	Elect tech installing new battery charger and under voltage tripped	Unit checked, returned to service	Project
	7/19/2009	15:50	22.72	38G1 – Bearing overtemp	Unit checked, returned to service	Project
	8/10/2009	13:02	0.77	38GT Bearing Overtemp	Unit checked, returned to service	Project
	8/10/2009	14:09	19.15	38GT Bearing Overtemp	Unit checked, returned to service	Project
	9/19/2009	13:09	0.38	65qplx Gov. low oil pressure	Unit checked, returned to service	Project
	10/18/2009	18:02	5.87	60 KV trouble	Line returned to service by PG&E	Non-Project
	10/24/2009	06:29	16.12	Start-up relay 4 dropped out	Unit checked, returned to service	Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2009 (continued)						
Hell Hole (continued)	11/2/2009	18:56	3.35	CB 22 OPENED SCADA WORK @ MFPH	Line cleared unit restarted	Project
	11/20/2009	13:43	2.8	1202/2 OPENED, LOST 12 KV LINE	Line returned to service by PG&E	Project
Middle Fork #1	2/24/2009	07:35	1.93	Clogged CW strainer	Cooling water flow restored	Project
	3/9/2009	19:01	2.08	TURBINE BEARING COOLING WATER FLOW FAILURE	Cooling water flow restored	Project
	5/3/2009	20:21	1.52	Turbine Bearing CW Flow	Cooling water flow restored	Project
	5/6/2009	19:42	1.73	Turbine Bearing C/W flow	Cooling water flow restored	Project
	9/25/2009	02:57	16.12	Needle #3 stuck open – causing vibration trip	Check and cycle needle	Project
	11/10/2009	15:21	26.25	Unit unavailable due to no SCADA control of unit load	SCADA sorted, returned to service	Project
Middle Fork #2	2/24/2009	20:59	2.19	Clogged CW Strainer	Cooling water flow restored	Project
	3/2/2009	19:57	1.6	TURBINE BEARING COOLING WATER FLOW FAILURE	Cooling water flow restored	Project
	3/8/2009	21:52	1.18	TURBINE BEARING COOLING WATER FLOW FAILURE	Cooling water flow restored	Project
	5/3/2009	18:40	3.25	Turbine Bearing CW Flow	Cooling water flow restored	Project
	5/5/2009	11:40	0.83	Turbine Bearing CW flow	Cooling water flow restored	Project
	5/8/2009	09:23	2	Turbine Bearing CW flow	Cooling water flow restored	Project
	5/9/2009	09:31	1.28	Turbine Bearing CW flow	Cooling water flow restored	Project
	5/19/2009	21:30	1.2	Turbine Bearing CW flow	Cooling water flow restored	Project
	5/27/2009	12:15	4.22	ARC GUARD TRIP – carbon build-up behind brushes	Cleaned, checked	Project
	11/13/2009	10:50	1.07	Lower guide Bearing Low Oil Level	Oil, restarted	Project
Oxbow	1/19/2009	20:07	24.83	High upper guide bearing level Unit held out since Annual maintenance to start on 1/21	Spares, restarted	Project
	2/9/2009	03:47	2.2	60 KV Relay	Line returned to service by PG&E	Non-Project
	2/13/2009	08:02	2.45	Gen OC Trip – Lightning	Unit checked and restarted	Non-Project
	2/17/2009	11:48	1.15	Gen OC Trip – Lightning	Unit checked and restarted	Non-Project
	2/17/2009	22:13	1.47	60 KV Relay	Line returned to service by PG&E	Non-Project
	3/16/2009	07:48	7.94	60KV Relay	Line returned to service by PG&E	Non-Project
	6/4/2009	00:22	1.68	Lightning strikes	Unit checked and restarted	Non-Project

Unit	Date	Time	Duration (hours)	Description	Corrective Action Taken	Project or Non-Project Outage
2009 (continued)						
Oxbow (continued)	6/4/2009	04:22	2.05	Lightning strikes	Unit checked and restarted	Non-Project
	7/14/2009	13:33	0.85	Top roll exciter brushes replaced	Spares, restarted	Project
	7/16/2009	22:01	0.77	Repair scroll case vent valve (oil leak)	restarted	Project
	12/7/2009	03:15	0.78	60 KV LINE OUTAGE (STORM)	Unit checked and restarted	Non-Project
	12/13/2009	12:00	98.87	Microwave Communications disrupted by rock into line	Move rock, checked out, restarted	Non-Project
Ralston	2/17/2009	13:41	0.19	Amplidyne AC Breaker opened	Unit checked and restarted	Project
	2/24/2009	04:55	2.84	Vibration from high tail water	Unit checked and restarted	Project
	3/2/2009	20:54	0.68	TRIPPED ON VIBRATION	Unit checked and restarted	Project
	6/16/2009	10:31	0.2	Trip during Auto-Test –CW flow test – unknown cause	Unit checked and restarted	Project
	6/16/2009	10:45	0.1	Trip during Auto-Test -CW flow test – unknown cause	Unit checked and restarted	Project

(F) Record of Compliance with Terms and Conditions of Existing License

PCWA actively operates and maintains the Project to ensure compliance with terms and conditions in the FERC license and it has a good record of compliance with the terms and conditions of the license.

The FERC conducts two types of inspections of the Project to verify license compliance. Annual Operating Inspections by a qualified engineer are conducted to verify that: (1) the Project is being properly maintained to ensure the continued safety of the structures; (2) no unauthorized modifications have been made to the Project; and (3) the Project is being operated efficiently, safely, and in compliance with the terms and conditions in the license. Additionally, FERC also conducts periodic Environmental and Public Use Inspection (EPUI), usually every three to five 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. PCWA initiates actions to address any recommendations by FERC following the inspections and provides written conformation of the actions taken.

PCWA carefully monitors operations and maintenance of the Project and reports to FERC, in writing, any potential deviations in compliance with license terms and conditions. Since 1981, four deviations in compliance and two pending incidents have occurred. The incidents of noncompliance and the two pending incidents are listed below.

	Incident Date	Incident Description	Documentation
1	Sep 26, 2002	Required minimum instream flow release in the Middle Fork American River below Ralston Afterbay Dam of 75 cfs was not met due to operations error during inspection and maintenance of Oxbow Powerhouse. PCWA modified unit shutdown procedure to avoid recurrence of this problem.	PCWA letter to FERC dated November 8, 2002 FERC letter to PCWA dated January 17, 2002 stated determination of violation of license.

	Incident Date	Incident Description	Documentation
2 3	Oct 17, 2004 Oct 19, 2004	Required minimum instream flow release of 8 cfs or natural flow, whichever is less, below Duncan Creek Diversion Dam was not met.	PCWA letter to FERC dated August 2, 2005 FERC letter to PCWA dated October 10, 2005 stated that two short-term violations of minimum instream flow occurred.
4	Jun 27, 2005	Required minimum instream flow release of 20 cfs from Hell Hole Dam when the Folsom Reservoir runoff equal or exceeds 1 million ac-ft was not met for 3.5 hours due to operator error. PCWA improved the procedures for making flow adjustments, including monitoring stream gages.	PCWA letter to FERC dated July 29, 2005 FERC letter to PCWA dated October 24, 2005 stated determination of violation of license. PCWA letter to FERC dated November 30, 2005 in response to FERC's request to report on the delay in the low-flow warning at the operations center.
	Jun 7–8, 2009	Required minimum instream flow release of 5 cfs or natural flow, whichever is less, from South Fork Long Canyon Creek Diversion Dam was not met due to the inlet to the stream maintenance pipe being covered by a large piece of large woody debris, likely by recreationists.	PCWA letter to FERC dated July 14, 2009. Pending
	Oct 17, 2010	Required minimum instream flow release of 23 cfs or the natural flow, whichever is less, from Middle Fork Interbay Dam was not met for approximately 2.75 hours. PCWA reviewed and modified operating procedures to avoid recurrence of this problem.	PCWA letter to FERC dated December 6, 2010. Pending

(G) Actions that may Affect Public

PCWA has various public safety programs and measures, including visual and audible warnings, physical restraining devices, and public operations to protect the public (as described in (ii)(B) above).

PCWA maintains an EAP (described in (ii)(B)(1) above) to provide early warning to downstream recreational users, dam operators, and other persons who might be affected by an impending sudden release of

water from Hell Hole or French Meadows reservoirs or Ralston Afterbay. PCWA also has established procedures to follow if an emergency occurs that are not covered under the EAP. Specifically, PCWA personnel call ”911” and notify various PCWA Power System Employees and Headquarters Management. PCWA personnel also notify the operators at PG&E’s Drum Spaulding Powerhouse. Information on the emergency is also dispatched to other PCWA personnel working in the vicinity of the Project, as appropriate. PCWA cooperates with federal and state agencies and other local emergency responders when an emergency occurs within the FERC boundary.

In addition, PCWA follows PG&E’s Code of Safe Practices (PG&E 2002) and PCWA’s Storm Book (PCWA 2008). The Code of Safe Practices includes basic safety requirements and helicopter safety. It also specifies safety procedures for operating motor vehicles; working on pole handling operations, live line work projects, and electric transmission lines; and working in electric substations and hydro plants. The Storm Book outlines preparations for winter storm events and procedures for operations during these events. It also includes a master phone list, including rental equipment numbers, gasoline supplies, and other emergency-related numbers.

PCWA also maintains various programs or facilities for the enhancement of watershed resources that affect the public which are summarized as follows:

- *Maintain Project Recreation Facilities.* PCWA provides the USDA-FS with a portion of the funds to operate and maintain recreation facilities through collection agreements between PCWA and the Tahoe and Eldorado National Forests.
- *Coordinate Project Operations to Enhance Whitewater Boating in the Middle Fork American River below Oxbow Powerhouse.* PCWA and PG&E currently coordinate with representatives from the California Department of Parks and Recreation (State Parks) and a designated commercial whitewater boating representative to schedule Project operations during the summer and early fall (June through Labor Day) to accommodate whitewater recreation in the Middle Fork American River below Oxbow Powerhouse. Whitewater boating releases are scheduled on a voluntary basis such that they minimize effects to power generation and do not compromise consumptive water deliveries or maintenance activities. When sufficient water is available, whitewater recreation flows (approximately 950 to 1,000 cfs) are provided by scheduling generation through Oxbow Powerhouse approximately two to three hours earlier than would otherwise occur to meet peak energy demand. Over the past decade, limitation of summer flow releases

for whitewater boating has only occurred in one year (2001). The flow releases typically occur daily from June through Labor Day during late morning to early afternoon.

- *Trail Events.* Flows are 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 [Western States 100 Mile] and Western States Trail Ride [Tevis Cup]), whose routes cross the river at Poverty Bar. Flows are reduced to 125 to 200 cfs (cable assist at 350 cfs) and 250 cfs for the Western States 100 Mile and Tevis Cup, respectively, to facilitate river crossings by the race participants.

(H) Reduced Ownership and Operating Expense if the License were Transferred

If the Project license were transferred, ownership and operating costs that would be reduced include:

Operation and Maintenance Costs (Annualized over 50-year License Life)	$14.04 million
Depreciation (2010)	$10 million
Administrative & General Expenses (Calculated from 2010 Net Invest)	$5 million
Total (with 4.8% discount rate)	**$29.04 million**

(I) Annual Fees for Federal or Native American Lands

The annual fees for FERC Bill Year 2009, paid under part I of the Federal Power Act, are as follows:

Water for Power	$390,181
Federal Land Rents	$880,493
Total	**$1,270,674**

Water for Power – Charges for the purpose of reimbursing the United States for the costs of the administration of Part I of the Federal Power Act.

Federal Land Rents – Annual fees paid for the occupancy of federal lands for reservoirs, dams, flumes, forebays, penstocks, and powerhouses.

The annual fee structure is being revised by FERC as a result of litigation. Future land and water use fees could be structured differently than what is depicted in this License Application. The amounts shown above were actual fees paid in 2009, but have been partially refunded by FERC in anticipation of a revised fee structure.

No Indian lands are included within the Project boundary.

(iii) Information to be provided by an applicant who is not an existing licensee.
Not Applicable.

(d) Consistency with Comprehensive Plans

Section 10(a)(2) of the Federal Power Act (FPA) requires FERC to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, and conserving the waterways associated with a project. In addition, an explanation of consistency with relevant comprehensive plans is required in Exhibit H.

The FERC's Revised List of Comprehensive Plans, dated January 2011, includes 14 planning documents that are relevant to the Project. These plans, as cited in the January 2011 list identified below. In some cases, updated versions of the planning documents identified in the FERC's January 2011 List of Comprehensive Plans are available and were used for this filing. Planning documents that have been updated are identified with an asterisk (*).

- California Department of Fish and Game. 1979. Rubicon River wild trout management plan. Sacramento, California. July 1979. 46 pp.
- California Department of Fish and Game. U.S. Fish and Wildlife Service. 2010. Final Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement. Sacramento, California. January 2010.
- California Department of Fish and Game. 2007. California Wildlife: Conservation Challenges, California's Wildlife Action Plan. Sacramento, California. 2007.
- *California Department of Parks and Recreation. 1998. Public opinions and attitudes on outdoor recreation in California. Sacramento, California. March 1998.
    - o This survey has since been updated with data obtained in 2008 and a revised report was published in 2009.
- California Department of Parks and Recreation. 1980. Recreation outlook in Planning District 3. Sacramento, California. June 1980. 82 pp.
- California – The Resources Agency. Department of Parks and Recreation. 1983. Recreation needs in California. Sacramento, California. March 1983. 33 pp. and appendices.
- *California Department of Parks and Recreation. 1994. California outdoor recreation plan (SCORP) – 1993. Sacramento, California. April 1994. 154 pp. and appendices.

  - The FERC's January 2011 List of Comprehensive Plans cites the 1993 California Outdoor Recreation Plan (CORP), which was published in 1994 by the DPR. This plan has since been updated with the 2008 CORP, published in 2009.

- *California Department of Water Resources. 1983. The California water plan: projected use and available water supplies to 2010. Bulletin 160-83. Sacramento, California. December 1983. 268 pp. and attachments.
  - The FERC's January 2011 List of Comprehensive Plans identifies two California water planning documents, the 1983 California Water Plan referred to as Bulletin 160-83 (DWR 1983) and the California Water Plan Update referred to as Bulletin 160-93 (DWR 1994). These documents are part of a series of documents that are periodically updated to accommodate California's changing water supply and demands. For instance, the Bulletin 160-93 series has been updated by Bulletin 160-98 (DWR 1998) and the most recent update to the California Water Plan is entitled, "California Water Plan: Update 2009."
- *California Department of Water Resources. 1994. California water plan update: Bulletin 160-93. Sacramento, California. October 1994. Two volumes and executive summary.
- *California State Water Resources Control Board. 1995. Water quality control plan report. Sacramento, California. Nine volumes.
  - The FERC's January 2011 List of Comprehensive Plans identifies a water-planning document entitled, "Water quality control plan report" (SWRCB 1995). This report includes nine volumes, organized by region, that are periodically updated to reflect changes in policies and regulations. The most recent update is entitled, The Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board – Control Valley Region (Fourth Edition revised September 2004). The updated version is available on the RWQCB website (2009).
- Forest Service. 1988. Eldorado National Forest land and resource management plan. Department of Agriculture, Placerville, California. December 1988. 752 pp.
- *Forest Service. 1990. Tahoe National Forest land and resource management plan. Department of Agriculture, Nevada City, California. March 1990. 687 pp. and appendices.
  - The FERC's January 2011 List of Comprehensive Plans cites the Tahoe National Forest Land and Resource Management Plan published by the USDA-FS in March 1990. This plan was amended in 2005 to provide direction for managing the Tahoe National Forest (TNF) for the next 10-15 years.

- State Water Resources Control Board. 1999. Water Quality Plans and Policies Adopted as Part of the State Comprehensive Plan. August 1999. Three enclosures.
- United States Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C. 11 pp.

Eleven additional planning documents that are not included on the FERC's January 2011 List of Comprehensive Plans were also considered as part of this review, as follows:

- National Park Service. 2009. The Nationwide Rivers Inventory. U.S. Department of Interior.
    - The NRI is considered relevant because it identifies the Rubicon River as a candidate for Wild and Scenic status.
- Placer County. 1994. Placer County General Plan: Countywide General Plan Policy Document.
    - The Placer County General Plan (Placer County 1994) is considered relevant because the Project is primarily located within Placer County.
- Placer County Planning Department (PCPD). 2000. Placer Legacy: Open Space and Agricultural Conservation Program – Implementation Report.
    - This document pertains to Placer County and is therefore considered relevant to the Project.
- PCPD. 2008. Foresthill Divide Community Plan: Placer County, California, December 2008.
    - This plan is considered relevant because it contains management direction regarding the Middle Fork American River watershed.
- United States Bureau of Reclamation (USBR). 1992. Auburn State Recreation Area Interim Resource Management Plan.
    - This plan is considered pertinent because the Auburn State Recreation Area is situated immediately downstream of the Project, encompassing portions of the Middle and North Forks of the American River.
- USBR. 1993. American River Water Resources Investigation: Wild and Scenic River Eligibility Study and Preliminary Classification.
    - This document includes portions of the Middle and North Forks of the American River downstream of Oxbow Powerhouse.
- USDA-FS. 1993. Granite Chief Wilderness Management Plan, Wilderness Implementation Schedule and Decision Notice.
    - This document dictates management of the Granite Chief Wilderness, which is located within the Middle Fork American River watershed immediately east of the Project.

- USDA-FS. 1998. Desolation Wilderness Management Guidelines – Land Management Plan Amendment.
    - o This document dictates management of the Desolation Wilderness, a portion of which is located within the Middle Fork American River watershed, southeast of the Project.
- USDA-FS. 2004. Sierra Nevada Forest Plan Amendment, including 2010 supplemental environmental impact statement, final environmental impact statement and record of decision. Department of Agriculture, Vallejo, California. January 2004.
- United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS). 2009. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and California State Water Project (OCAP BiOP).
- NMFS. 2009. Public Draft Recovery Plan for Central Valley Winter-run and Spring-run Chinook Salmon and Steelhead.

Through the course of consultation with the public, resource agencies, and non-governmental organizations, no inconsistencies with these plans have been identified. Descriptions of each of these plans, as well as a discussion of how the Project complies with each plan are provided in Section 12 in Exhibit E.

(e) Response to Environmental Requests

PCWA has addressed all comments received on the Draft Application. The response to comment table is included in Section 14.0, Appendix D.

Literature Cited

Federal Energy Regulatory Commission (FERC). 2001. Safety Signage at Hydropower Projects. October 2001. Available at: http://www.ferc.gov/industries/hydropower/safety/guidelines/signage/report/Safety_signage.htm. 42 pp.

_____. 1992. Public Safety at Hydropower Projects. March 1992. Available at: http://www.ferc.gov/industries/hydropower/safety/guidelines/public-safety.pdf. 28 pp.

Pacific Gas and Electric Company (PG&E). 2002. Code of Safe Practices, Safety and Health Program (Accident Prevention Rules). 2002 Edition. Published by the Safety, Health, and Claims Department, Pacific Gas and Electric Company.

Placer County Water Agency (PCWA). 2004. Middle Fork American River Project: Emergency Action Plan. Updated February 2010.

_____. 2008. Draft for the Storm Book. Version September 26, 2008.