

SECTION 6

PROJECT LOCATION, FACILITIES, AND OPERATIONS

This section of the Pre-Application Document provides a description of Yuba County Water Agency's (YCWA or Licensee) Yuba River Development Project (Project).

This section is divided into seven subsections. Sections 6.1 and 6.2 describe the Project location and Project facilities, respectively. Section 6.3 provides a description of Project operations including operational considerations as well as figures that show reservoir levels and streamflows in representative normal, wet and dry water years. Section 6.4 contains an annotated version of the current Federal Energy Regulatory Commission (FERC) license, a list of Project maps and drawings, and a history of Licensee's compliance with the license. Section 6.5 summarizes Project generation and releases. Financial aspects of the Project are described in Section 6.6. The status of Licensee's evaluation of potential generation enhancements is described in Section 6.7. Photographs of Project facilities are at the end of this section.

6.1 Project Location

Licensee's Project is a water supply/flood control/power project located northeast of the city of Marysville on the west slope of the Sierra Nevada in the Yuba River watershed in Yuba, Nevada, and Sierra counties, California. A portion of the area within the FERC Project Boundary¹ is public land managed by the United States Department of Agriculture, Forest Service as part of the Plumas National Forest and Tahoe National Forest.

An overview of the Yuba River Basin is shown in Figure 6.1-1. Figure 6.1-2 shows the Project Vicinity² including Project facilities and features.

¹ For the purposes of this document, the existing FERC Project Boundary is the area Licensee uses for normal Project operations and maintenance, and is shown on Exhibits G, J, and K of the current license.

² For the purposes of this document, the Project Vicinity is defined as the area surrounding the Project on the order of a United States Geological Survey (USGS) 1:24,000 topographic quadrangle.

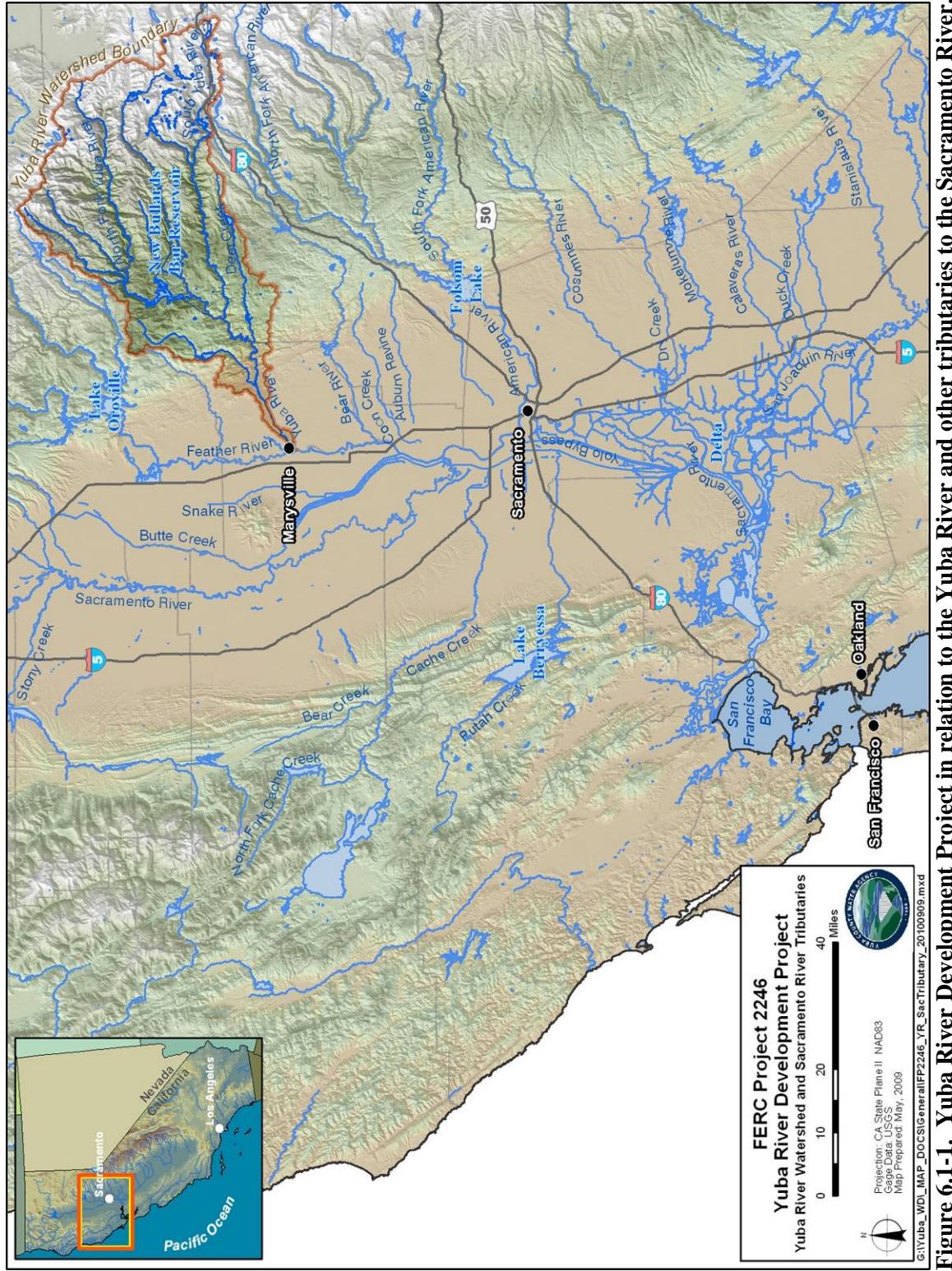


Figure 6.1-1. Yuba River Development Project in relation to the Yuba River and other tributaries to the Sacramento River.

6.2 Project Facilities

The Project was constructed in the mid 1960s and began operating in spring 1970. The Project, which ranges in elevation from about 300 feet (ft) to 2,050 ft,³ consists of three power developments: New Colgate, New Bullards Minimum Flow, and Narrows 2. In total, the Project includes:

- 1 dam and associated storage reservoir – New Bullards Bar
- 2 diversion dams – Our House and Log Cabin
- 2 diversion tunnels – Lohman Ridge and Camptonville
- 2 underground power tunnels – New Colgate and Narrows 2
- 1 above ground penstock – New Colgate
- 3 powerhouses – New Colgate, New Bullards Minimum Flow and Narrows 2
- 7 recreation areas - Emerald Cove Marina, Hornswoggle Group Camp, Schoolhouse Family Camp, Dark Day Campground, Dark Day Boat Ramp, Garden Point Campground, and Madrone Cove Campground

The Project does not include any other water conveyance facilities (i.e., canals, flumes, or ditches), or any transmission lines,⁴ distribution lines, rights-of-way, recreation facilities, spoil piles, or borrow areas. The Project does not include any water conveyance systems or other facilities, features, or appurtenant structures that are used by Licensee or any other party solely for the purpose of providing consumptive water. The Project does not include the United States Army Corps of Engineers' (USACE) Englebright Dam and Reservoir or USACE's Daguerre Point Dam. The Project also does not include the Narrows Powerhouse, which is located near the USACE's Englebright Dam and is part of Pacific Gas and Electric's (PG&E) Narrows Project (FERC Project No. 1403).⁵

FERC-jurisdictional facilities that comprise each of the developments are described below.

6.2.1 **New Colgate Development**

6.2.1.1 **Our House Diversion Dam**

Our House Diversion Dam is a 130-foot radius, double curvature, concrete arch dam located on the Middle Yuba River 12.0 miles upstream of its confluence with the North Yuba River. The dam is 70 ft high with a crest length of 368 ft, a crest elevation of 2,049 ft, and a drainage area of 144.8 square miles. The dam has a capacity of 280 acre-feet (ac-ft), but storage and water levels

³ All elevation data are in United States Department of Commerce (USDOC), National Oceanic and Atmospheric Association (NOAA), National Geodetic Survey (NGS) Vertical Datum of 1983 (NAVD 83).

⁴ While the Yuba River Development Project does not include any transmission lines, PG&E is the owner, operator and holder of a FERC Minor-Part License (FERC Project No. 2678) for the 60 kilovolt (kv) transmission line that extends from YCWA's Narrows 2 Powerhouse Switchyard. The FERC license for Project 2678 expires on April 30, 2016. A copy of the Order Issuing Minor-Part License for Project 2678 can be found on the Relicensing Website (www.ycwa-relicensing.com).

⁵ The Federal Energy Regulatory Commission (FERC) license for Pacific Gas and Electric Company's (PG&E) Narrows Project expires on January 31, 2023.

do not fluctuate under Project operations. The diversion dam has a spillway capacity of 60,000 cfs.

The diversion dam has two outlets to the Middle Yuba River in addition to the uncontrolled spillway. The first is a 5-foot diameter steel pipe acting as a low-level outlet and controlled by a slide gate on the upstream face of the dam with a maximum capacity of 800 cubic feet per second (cfs). The outlet centerline is at elevation 1,990 ft, and the gate is operated by use of a motor. The second is a 24-inch diameter release pipe with a maximum capacity of 60 cfs located just above the low-level outlet. A downstream gate valve operated by hand controls this outlet.

6.2.1.2 Lohman Ridge Diversion Tunnel

The Lohman Ridge Diversion Tunnel is 12.5 ft high by 12.5 ft wide, and conveys a maximum flow of 860 cfs through its 19,410 ft (90% unlined and 10% lined) length from the Middle Yuba River to Oregon Creek.

6.2.1.3 Log Cabin Diversion Dam

The Log Cabin Diversion Dam is a 105-foot radius, concrete arch dam on Oregon Creek that has a drainage area of 29.1 square miles and a maximum spillway capacity of 12,000 cfs. The dam has a storage capacity of 90 ac-ft, but storage and water levels do not fluctuate under Project operations.

The diversion dam has two outlets to Oregon Creek in addition to the uncontrolled spillway. The first is a 5-foot diameter steel pipe acting as a low-level outlet and controlled by a slide gate on the upstream face of the dam with a maximum capacity of 800 cfs. The outlet centerline is at elevation 1,938 ft, and the gate is operated by use of a motor. The second is an 18-inch diameter release pipe with a maximum capacity of 13 cfs located just above the low-level outlet. A downstream gate valve operated by hand controls this outlet.

6.2.1.4 Camptonville Diversion Tunnel

The Camptonville Diversion Tunnel is 6,107 ft long and has the capacity to convey 1,100 cfs of water to New Bullards Bar Reservoir on the North Yuba River. The first 4,275 ft of the conduit is an unlined, horseshoe-shaped tunnel 14.5 ft wide by 14.5 ft high, which (for the last 1,832 ft) becomes a lined, horseshoe-shaped tunnel 11.7 ft wide by 13 ft high.

6.2.1.5 New Bullards Bar Reservoir

The New Bullards Bar Reservoir is a storage reservoir on the North Yuba River formed by New Bullards Bar Dam. At normal maximum water surface elevation (1,956 ft), New Bullards Bar Reservoir extends about 8.5 miles upstream, has an estimated storage capacity of 966,103 ac-ft, a surface area of 4,790 acres, a shoreline of about 71.9 miles, and a drainage area of 488.6 square miles.

6.2.1.6 New Bullards Bar Dam

The New Bullards Bar Dam is a 1,110-foot radius, double curvature, concrete arch dam located on the North Yuba River about 2.3 miles upstream of its confluence with the Middle Yuba River. The dam is 645 ft high with a maximum elevation of 1,965 ft. The dam includes one low-level outlet — a 72-inch Hollow Jet Valve (invert elevation 1,395 ft) with a maximum design capacity of about 3,500 cfs at full reservoir pool, and an actual capacity of 1,250 cfs (actual release capacity is limited to 1,250 cfs because of valve vibrations at higher release rates).

6.2.1.7 New Bullards Bar Dam Spillway

The New Bullards Bar Dam Spillway is an overflow-type spillway with a width of 106 ft and a crest elevation of 1,902 ft. Control gates on the spillway consist of three Tainter Gates measuring 30 ft wide and 54 ft tall, and hoisted by 10 horsepower drum hoists. The maximum design capacity of the spillway is 160,000 cfs.

6.2.1.8 New Colgate Power Tunnel and Penstock

The New Colgate Power Tunnel and Penstock is 5.2 miles long and composed of four different types of conveyance structures: an unlined horseshoe-shaped tunnel 26 ft square; a lined horseshoe-shaped tunnel 20 ft wide and 14.5 ft high; a lined circular tunnel 14 ft in diameter; and 2,809 ft of steel penstock with a diameter ranging from 9 ft to 14.5 ft. The tunnel and penstock have a maximum flow capacity of 3,500 cfs.

6.2.1.9 New Colgate Powerhouse

The New Colgate Powerhouse is an aboveground, steel reinforced, concrete powerhouse located adjacent to the Yuba River. The powerhouse contains two Voith Siemens Pelton type turbines with a total actual measured capacity of 340 megawatts (MW) under a design head of 1,306 ft and a measured flow of 3,430 cfs.⁶

6.2.1.10 New Colgate Switchyard

The New Colgate Switchyard is located adjacent to New Colgate Powerhouse.

6.2.1.11 Project Recreation Facilities

Project Recreation Facilities are all located on New Bullards Bar Reservoir. These facilities include Emerald Cove Marina, Hornswoggle Group Camp, Schoolhouse Family Camp, Dark Day Campground, Dark Day Boat Ramp, Garden Point Campground, Madrone Cove Campground, and Cottage Creek Boat Ramp.

⁶ Note that based on a June 10, 1992, FERC order, the FERC-authorized installed capacity in kilowatts (kW) for each of the two units in New Colgate Powerhouse is 157,500 kW, for a total powerhouse capacity of 315,000 kW.

6.2.1.12 Appurtenant Facilities and Features

Appurtenant facilities and features include access roads within the FERC Project Boundary.

6.2.2 New Bullards Bar Minimum Flow Development

6.2.2.1 New Bullards Minimum Flow Powerhouse Penstock

The New Bullards Minimum Flow Powerhouse Penstock is a 70-foot long, 12-inch diameter steel penstock with a maximum flow capacity of 6 cfs.

6.2.2.2 New Bullards Minimum Flow Powerhouse

The New Bullards Minimum Flow Powerhouse includes a single Pelton turbine with a capacity of 150 kilowatts (kW) at a flow of 5 cfs. The flow through this Powerhouse is normally set at 6 cfs to ensure compliance with the license-required minimum streamflow of 5 cfs below New Bullards Bar Dam.

6.2.2.3 New Bullards Minimum Flow Transformer

The New Bullards Minimum Flow Transformer is located adjacent to the New Bullards Minimum Flow Powerhouse.

6.2.2.4 Appurtenant Facilities and Features

Appurtenant facilities and features include access roads within the FERC Project Boundary.

6.2.3 Narrows 2 Development

6.2.3.1 Narrows 2 Powerhouse Penstock

The Narrows 2 Powerhouse Penstock is a tunnel that is 20 ft in diameter and concrete lined in the upper 376 ft, and 14 ft in diameter and steel lined for the final 371.5 ft. The penstock has a maximum flow capacity of 3,400 cfs.⁷

⁷ In its Revised Decision 1644 adopted in 2003, the SWRCB directed Licensee to “diligently pursue” the development of a Narrows 2 Powerhouse Intake Extension Project in coordination with CDFG, USFWS, and NMFS. This project would involve extending the intake of the tunnel for the Narrows 2 Powerhouse Penstock upstream and deeper into the USACE’s Englebright Reservoir where it would presumably receive cooler water, thereby reducing water temperatures in the lower Yuba River. Since 2003, new biological issues regarding lower Yuba River temperature conditions have arisen. For example, one issue is the question of whether warmer summer temperatures could trigger beneficial outmigrations of steelhead from the lower Yuba River. In addition, the Yuba Accord River Management Team is undertaking a comprehensive evaluation of lower Yuba River water-temperature conditions. This work, which is expected to be complete in 2012, should provide additional guidance on what temperature conditions in the lower Yuba River are beneficial for the fish there. For these reasons, and because Licensee construction of the Narrows 2 Powerhouse Intake Extension Project would require FERC approval, Licensee has proposed to the SWRCB that evaluation of this project be conducted through the Relicensing process for the Yuba River Development Project.

Narrows 2 flow bypass is a valve and penstock branch off the main Narrows 2 penstock that was added to the Project in 2008 to provide the capability to bypass flows of up to 3,000 cfs around the Narrows 2 Powerhouse during times of full or partial Powerhouse shutdowns.

6.2.3.2 Narrows 2 Powerhouse

The Narrows 2 Powerhouse is an indoor powerhouse located at the base of the USACE's Englebright Dam. The powerhouse consists of one vertical axis Francis turbine with a capacity of 55 MW at a head of 236 ft and flow of 3,400 cfs.⁸

6.2.3.3 Narrows 2 Powerhouse Switchyard

The Narrows 2 Powerhouse Switchyard is located adjacent to the powerhouse.

6.2.3.4 Appurtenant Facilities and Features

Appurtenant facilities and features include access roads within the FERC Project Boundary.

6.3 Project Operations

6.3.1 Major Operational Considerations

This section describes in general Licensee's considerations when operating the Project, excluding the physical constraints related to Project facilities and features described in Section 6.2. The considerations are generally presented in order of decreasing priority.

6.3.1.1 Assurance of Public and Employee Safety

Safety is Licensee's first and foremost operational consideration. Licensee operates the Project in a safe manner and provides its employees with all necessary training and equipment to operate the Project safely. Licensee cooperates fully with FERC during inspections of Project facilities, including annual FERC inspections, Part 12 Dam Safety Inspections, and Environmental and Public Use Inspections, and in other similar safety-related areas such as requirements for appropriate Emergency Action Plans (EAP) and Public Safety Plans. These inspections and plans are discussed in more detail in Section 6.4.2.4.

6.3.1.2 Anticipated Water Availability

One of Licensee's major considerations each year is anticipated water availability. Licensee begins estimating water availability each year in January and continually updates the estimate throughout the spring runoff period. When estimating available water supply, Licensee considers current reservoir storage and California Department of Water Resources (CDWR)

⁸ Note that based on a June 10, 1992, FERC order, the FERC-authorized installed capacity in kilowatts (kW) for the one unit Narrows 2 Powerhouse is 46,750 kW.

Bulletin 120 forecasts of unimpaired flow at the Smartville⁹ gage on the lower Yuba River and the Goodyears Bar gage on the North Yuba River. Estimates of available water supply and other water needs are compared to estimates of required releases, consumptive demands within YCWA, and target levels for fall carryover storage in New Bullards Bar Reservoir.

Although the specific hydrology of each year can vary widely, Licensee typically operates New Bullards Bar Reservoir by capturing winter and spring runoff from rain and snowmelt. The North Yuba River inflow to New Bullards Bar Reservoir is augmented by diversions from the Middle Yuba River to Oregon Creek through the Lohman Ridge Tunnel, and by diversions from Oregon Creek into the reservoir through the Camptonville Tunnel. Consequently, New Bullards Bar Reservoir normally reaches its peak storage at the end of the spring runoff season, and then is gradually drawn down until its lowest elevation in early to mid-winter. The reservoir does not undergo significant daily changes in elevation.

New Bullards Bar Reservoir has mandatory reserved flood storage space criteria from mid-September through the end of May that limit maximum authorized storage (See Section 6.3.1.5). The Our House and Log Cabin diversion dam impoundments have very little storage, and Licensee operates them exclusively to divert water to New Bullards Bar Reservoir in the winter and spring during high flow periods.

In the spring of each year, Licensee makes a determination of anticipated runoff into New Bullards Bar Reservoir relying upon snow course measurements and forecasts of runoff provided by CDWR. Licensee also makes estimates of water needs for local water deliveries and for releases to meet required instream flows for the current water year and for the following year. Based on these forecasts, a target carryover storage level for the end of the water year (i.e., end-of-September storage) is determined that will provide a level of drought protection for the following year. Carryover storage targets may be reduced to account for the amount of qualifying water transfers made during the current water year. New Bullards Bar Reservoir is operated to meet minimum carryover storage requirements designed to ensure that instream flow requirements and at least 50 percent of the surface water deliveries to Licensee's service area are met during the next year. The carryover storage requirement is a drought protection measure. Reservoir carryover storage is used to make up the difference between the available surface water supply and system demands (e.g., diversion demands, instream flow requirements, and system operational losses) under drought conditions.

In addition to a minimum target carryover storage level for New Bullards Bar Reservoir, in wetter years Licensee operates to an end-of-September target storage level for the Lower Yuba River Accord of 650,000 ac-ft, as well as other target storage levels for various times in mid-winter that are parts of power generation operations and flood control operations.

⁹ In 2008, the people of this community petitioned to have the name changed to "Smartsville," with an 's' in the middle of the name. However, the USGS gage refers to the former spelling of the community name. Therefore, in this document, the community is referred to as such.

The average total inflows to New Bullards Bar Reservoir from the North Yuba River and diversions from the Middle Yuba River and Oregon Creek are about 1,200,000 ac-ft per year, and have ranged from a low of 163,000 ac-ft in 1977 to a high of 2,800,000 ac-ft in 1982.

6.3.1.3 Compliance with Water Rights

Licensee holds pre-1914 appropriative rights dating from 1897, and post-1914 appropriative water rights confirmed by water-right licenses, for the purposes of operating the Project for hydroelectric power generation. Table 6.3.1-1 lists the post-1914 appropriative water-right licenses held by Licensee for power generation.

Table 6.3.1-1. Water right licenses held by Licensee for operation of the Project for power generation.

Priority (date)	SWRCB Designation (application)	SWRCB Designation (license)	Source (Waterbody)	Amount & Place of Diversion or Storage (amount & place)	Season (period)	Place of Beneficial Use (powerhouse)
2/11/1921	2197	435	North Yuba River	700 cfs at New Bullards Bar Dam	1/1 - 12/31	New Colgate Powerhouse
				5,000 ac-ft/yr at New Bullards Bar Dam	about 12/15 to about 7/15	
9/7/1922	3026	436	North Yuba River	10,000 ac-ft/yr at New Bullards Bar Dam	about 12/15 to about 7/15	New Colgate Powerhouse
4/30/1926	5004	777	North Yuba River	15,000 ac-ft/yr at New Bullards Bar Dam	about 12/15 to about 7/15	New Colgate Powerhouse
7/30/1927	5631	11565	Middle Yuba River	810 cfs at Our House Dam	1/1- 12/31 (dir. div.)	New Colgate Powerhouse and Narrows 2 Powerhouse
			Oregon Creek	240 cfs at Log Cabin Dam	1/1- 12/31 (dir. div.)	
			North Yuba River	1,800 cfs at New Bullards Bar Dam	11/1- 7/31 (dir. div.)	
			Yuba River	1,800 cfs at USACE's Englebright Dam	1/1- 12/31	
3/1/1939	9516	3050	North Yuba River	100 cfs at New Bullards Bar Dam	1/1 - 12/31	New Colgate Powerhouse
9/12/1941	10282	5544	North Yuba River	5,335 ac-ft/yr at New Bullards Bar Dam	about 10/1 to about 3/1	New Colgate Powerhouse
						Narrows 2 Powerhouse
2/20/1953	15205	11566	Middle Yuba River	3,200 ac-ft/yr at Log Cabin Dam; storage in New Bullards Bar Res.	5/1- 6/30	New Colgate Powerhouse and Narrows 2 Powerhouse
			North Yuba River	245 cfs and 700 ac-ft/yr at New Bullards Bar Dam	3/15- 6/15 (dir. div.); 5/1- 6/30 (stor.)	
			Yuba River	800 cfs at USACE's Englebright Dam	11/1-7/15	

Table 6.3.1-1. (continued)

Priority (date)	SWRCB Designation (application)	SWRCB Designation (license)	Source (Waterbody)	Amount & Place of Diversion or Storage (amount & place)	Season (period)	Place of Beneficial Use (powerhouse)
10/2/1953	15563	11567	Middle Yuba River	30,000 ac-ft/yr at Our House Dam	10/15 - 6/30	New Colgate Powerhouse and Narrows 2 Powerhouse
			Oregon Creek	1,400 ac-ft/yr at Log Cabin Dam		
			North Yuba River	146,000 ac-ft/yr at New Bullards Bar Dam		
			Yuba River	910 cfs at USACE's Englebright Dam	11/1 - 6/30	

Licensee operates the Project consistent with the terms and conditions of these water rights.

6.3.1.4 Compliance with the FERC License

Licensee operates the Project in compliance with the current FERC license. Articles 33, 34, 40, and 46 in the existing FERC license are most germane to Project operations. The texts of these four articles are in Section 6.4.1. Each of these articles is summarized below.

Article 33. This article requires Licensee to maintain the following minimum streamflow releases in wet and normal years during the periods from April 15 through June 15 and from June 16 through April 14: 50 cfs and 30 cfs, respectively, or the natural flow, whichever is less, below Our House Diversion Dam; 12 cfs and 8 cfs, respectively, or the natural flow, whichever is less, below Log Cabin Diversion Dam; and 5 cfs or the natural flow, whichever is less, in both periods below New Bullards Bar Dam. This article provides for reductions in these minimum streamflow requirements in critically dry water years.

This article requires that minimum streamflows of 245 cfs from January 1 through June 30, 70 cfs from July 1 through September 30, and 400 cfs from October 1 through December 31 be maintained downstream of USACE's Daguerre Point Dam. Licensee measures these flows at the USGS Marysville Gage.

This article also requires that the following minimum streamflows be maintained immediately downstream of the Narrows and Narrows 2 powerhouses (which Licensee measures at the Smartville Gage): 600-1,050 cfs from October 16 through 31; 600-700 cfs in November; 600-1,400 cfs in December; 1,000-1,830 cfs from January 1 through 15; and 600 cfs from January 16 through March 31. (Although these latter streamflow requirements are stated as ranges in this article, actual river flows often exceed the upper ends of these ranges because of uncontrolled inflows into and outflows from USACE's Englebright Reservoir and flood-control and related releases from New Bullards Bar Reservoir.) During 2001 and subsequent dry years, License has asked FERC to authorize variances from the 1,000-cfs minimum-flow requirement for January 1 through 15. NMFS, USFWS and CDFG have supported these requests and FERC has granted them.

This article also specifies ramping rates for changes in releases downstream of USACE's Englebright Dam. These ramping rates were updated by a FERC order in November 2005.

Article 34. This requires Licensee to maintain a minimum pool in New Bullards Bar Reservoir of no less than elevation 1,730 ft, which is a storage level of 234,000 ac-ft.

Article 40. This article requires Licensee to operate within limits of the Project the multi-level power intakes at New Bullards Bar Dam to provide water of quality in the Yuba River below USACE's Englebright Dam for the production of anadromous fish. At the request of the California Department of Fish and Game, the multi-level power intakes in New Bullards Bar Dam have not been used since 1993, and instead water is always released through the low-level outlet at elevation 1620 ft. to the power penstock to provide a continuous flow of cold water.

Article 46. This article requires Licensee to operate the Project in accordance with an agreement with the USACE regarding flood control operations.

6.3.1.5 Adherence to USACE Flood Control Requirements¹⁰

New Bullards Bar Reservoir must be operated from September 16 to May 31 to comply with Part 208 "Flood Control Regulations, New Bullards Bar Dam and Reservoir, North Yuba River, California," pursuant to Section 7 of the Flood Control Act of 1944 (58 Stat. 890). Under the contract between the United States and Licensee that was entered into on May 9, 1966, Licensee agreed to reserve in New Bullards Bar Reservoir 170,000 ac-ft of storage space for flood control in accordance with rules and regulations enumerated in Appendix A of the Report on Reservoir Regulation for Flood Control (USACE 1972). The seasonal flood storage space allocation schedule is presented in Table 6.3.1-2.

Table 6.3.1-2. New Bullards Bar Reservoir flood storage space allocation in thousands of acre-feet.

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Storage Allocation	170	170	170	170	170	170	70	0	0	0	0	56

In addition to reservation of flood control space in New Bullards Bar Reservoir, the flood control regulations include rules governing ramping rates as well as target maximum flows in the lower Yuba River and in the Feather River below the confluence with the Yuba River.

Licensee also coordinates operations with PG&E's Narrows Powerhouse at USACE's Englebright Dam to use storage in USACE's Englebright Reservoir to capture winter storm freshets and reduce storm flows on the lower Yuba River. This operation is accomplished by evacuating storage space in USACE's Englebright Reservoir in anticipation of storm peak flows.

¹⁰ The USACE contributed \$12 million to the construction of New Bullards Bar Dam in exchange for flood control space the reservoir would provide.

6.3.1.6 Adherence to the Lower Yuba River Accord Minimum Flow Schedules

In 2005, Licensee and 16 other interested parties signed memoranda of understanding that specify the terms of the Lower Yuba River Accord (Yuba Accord), a comprehensive, consensus-based program to protect and enhance aquatic habitat in the Yuba River downstream of USACE's Englebright Dam. Following environmental review, Licensee and parties executed the following four agreements in 2007, which together comprise the Yuba Accord: 1) the Lower Yuba River Fisheries Agreement, which specifies the Yuba Accord's lower Yuba River minimum streamflows and creates a detailed fisheries monitoring and evaluation program; 2) the Water Purchase Agreement, under which CDWR purchases water, some of which is provided by the Yuba Accord's minimum streamflows, from Licensee for CALFED's¹¹ Environmental Water Account and State Water Project and Central Valley Project contractors; 3) the Conjunctive Use Agreements with seven of Licensee's member units, which specify the terms of the Yuba Accord's groundwater conjunctive-use program; and 4) amendments to the 1966 Power Purchase Contract between Licensee and PG&E. Together, this package of agreements provides more water for instream flows and greater reliability for both instream and consumptive uses than would have been possible without the agreements.

The Yuba Accord was developed by a multi-agency resource team, including representatives from the National Marine Fisheries Service, the US Fish and Wildlife Service, the California Department of Fish and Game (CDFG), and a group of non-governmental organizations. The Yuba Accord flow schedules were developed to essentially optimize habitat conditions during high flow years for this highly regulated river system. Subsequently additional flow schedules were developed by the resources team for drier conditions that included a "balancing of resources" approach.

Licensee has been operating the Project in conformance with the Yuba Accord since 2006. The 2006, 2007, and early 2008 operations were under one-year pilot programs that were approved by the State Water Resources Control Board (SWRCB). On May 20, 2008, SWRCB adopted its Corrected Order WR 2008-0014, which approved the long-term amendments to Licensee's water-right permits that were necessary so that Licensee may continue to implement the Yuba Accord.

The Yuba Accord includes a specific set of flow schedules for the lower Yuba River. The flow schedule that is in effect at any particular time is determined by the North Yuba Index (NYI), a hydrologic index that was developed as a part of the Yuba Accord. The flow schedules are listed in Table 6.3.1-3. The NYI is shown in Figure 6.3.1-1.

Table 6.3.1-3. Yuba Accord flow schedules.

Schedule	Oct	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Aug	Sep	Total Annual Vol. (ac-ft)
	1-15	16-30	1-30	1-31	1-31	1-29	1-31	1-15	16-30	1-15	16-31	1-15	1-15	1-30	1-31	1-30	
MARYSVILLE GAGE (cfs)																	
1	500	500	500	500	500	500	700	1,000	1,000	2,000	2,000	1,500	1,500	700	600	500	574,200
2	500	500	500	500	500	500	700	700	800	1,000	1,00	800	500	500	500	500	429,066
3	500	500	500	500	500	500	500	700	700	900	900	500	500	500	500	500	398,722

¹¹ Interagency committee with management and regulatory responsibility for Bay-Delta Estuary.

Table 6.3.1-3. (continued)

Schedule	Oct	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Aug	Sep	Total Annual Vol. (ac-ft)
	1-15	16-30	1-30	1-31	1-31	1-29	1-31	1-15	16-30	1-15	16-31	1-15	16-30	1-31	1-31	1-30	
MARYSVILLE GAGE (cfs) (continued)																	
4	400	400	500	500	500	500	500	600	900	900	600	400	400	400	400	400	361,944
5	400	400	500	500	500	500	500	500	600	600	400	400	400	400	400	400	334,818
6	350	350	350	350	350	350	350	350	500	500	400	300	150	150	150	350	232,155
SMARTVILLE GAGE (cfs)																	
A	700	700	700	700	700	700	700	700	--	--	--	--	--	--	--	700	--
B	600	600	600	550	550	550	550	600	--	--	--	--	--	--	--	500	--

Notes:

Marysville Gage flows represent average volumes for the specified period. Actual flows may vary from the indicated flows according to established criteria.

Marysville Gage Schedule 6 flows do not include an additional 30,000 ac-ft that must be made available from groundwater substitution and that will be allocated to instream flows according to established criteria during Schedule 6 years.

Smartville Gage Schedule A is used with Marysville Schedules 1, 2, 3, and 4.

Smartville Gage Schedule B is used with Marysville Schedules 5 and 6.

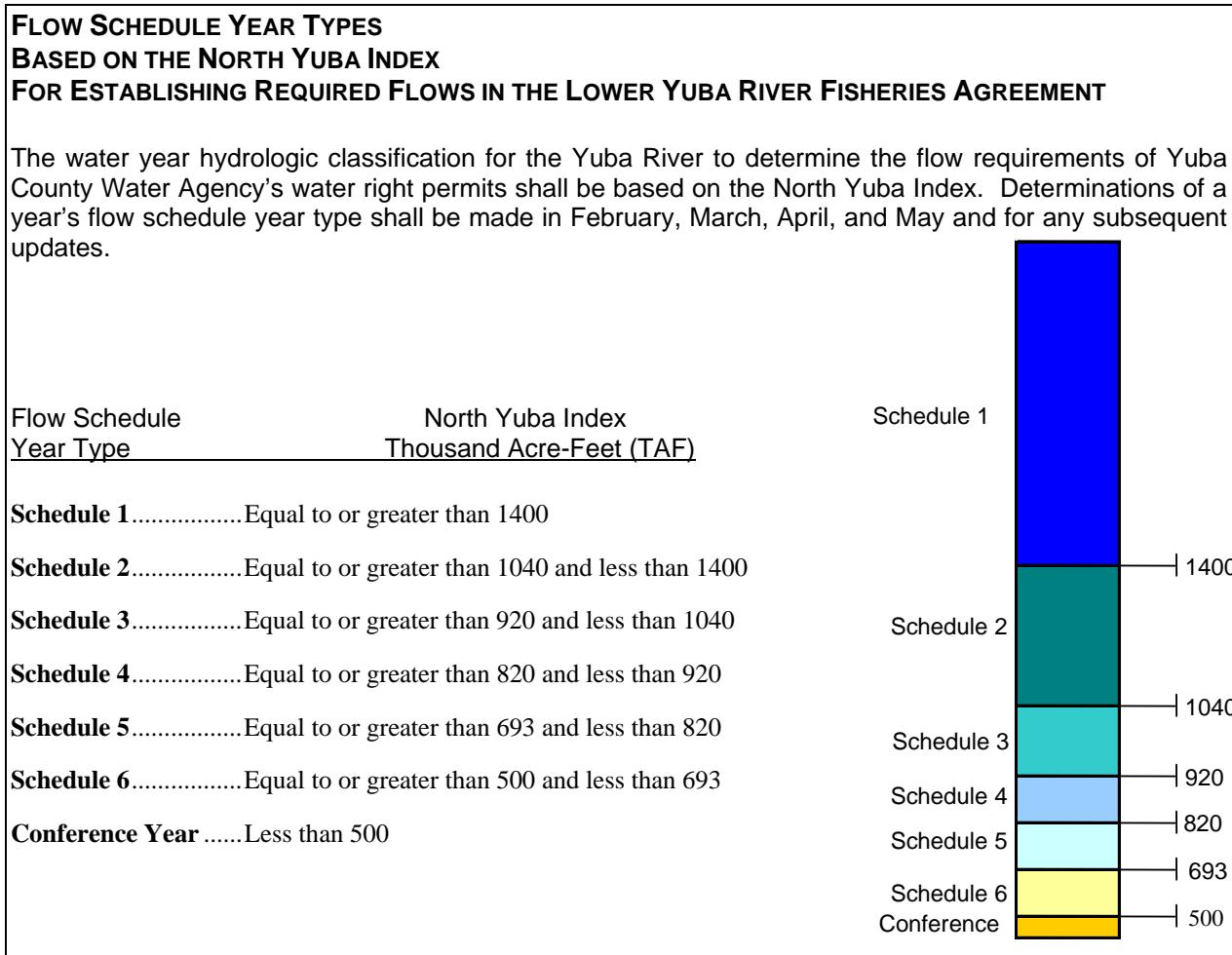


Figure 6.3.1-1. Yuba Accord North Yuba Water Year Type Index.

During Conference Years (or years when the NYI is less than 500,000 ac-ft, which are expected to occur approximately 1% of the time), YCWA is required: 1) to maintain minimum instream flows in the lower Yuba River at the levels specified in Article 33 of Licensee's existing FERC license without the reductions authorized by subsections (c) and (d) of that article; 2) to release any supplemental flows recommended by the Lower Yuba Accord River Management Team (RMT) Planning Group and approved by the SWRCB's Deputy Director for Water Rights or, if no such recommended flows are effective by April 11 of such a Conference Year, then to release any supplemental flows ordered by the SWRCB, after a hearing under California Code of Regulations, title 23, section 767; and 3) to limit total water supply diversions at Daguerre Point Dam to 250,000 ac-ft.

For additional information regarding the Yuba Accord, refer to <http://www.ycwa.com/>.

6.3.1.7 Compliance with Minimum Flow Requirements

Licensee complies with the terms of the prevailing minimum flow requirements for the Project diversion reaches. Historically, before the Yuba Accord was adopted and implemented, minimum instream flow requirements were much lower, and due to the need to manage the Project to accommodate natural flows, storm flows, flood-control releases, and releases for consumptive uses and generation, instream flows significantly exceeded these earlier minimum instream flow requirements during many months of most years. Now, under the Yuba Accord, Project operations more closely match the higher minimum instream flow requirements for much of the year. However, instream releases higher than the Yuba Accord instream flow schedules still occur at certain times of the year, due to storm flows, flood control requirements, and for Groundwater Substitution and other water transfers. Since the Project went into operation in 1970, three different sets of minimum flow requirements have successively governed Project operations. These are: 1) the minimum flow requirements in the current FERC license, which were adopted from a 1965 agreement between YCWA and CDFG (1965 Agreement); 2) the interim flow requirements in SWRCB water rights Decision 1644 (D-1644), which were in effect from May 2001 through March 2008; and 3) the Lower Yuba River Accord requirements, which YCWA began to implement in late April 2006 when the SWRCB issued the first of two one-year orders for the Lower Yuba River Accord pilot programs for 2006 and 2007. In March 2008, the Accord flow schedules went into effect on a long-term basis.

From 1970 to 2001, the 1965 Agreement flow requirements were in place. During this period, YCWA water rights permit terms specifying minimum flows were identical to these requirements. These requirements specified minimum flows below all Project facilities including Our House Diversion Dam, Log Cabin Diversion Dam, New Bullards Bar Dam, and Narrows 2 Powerhouse. With the exceptions of storm and flood flows, typically flows below Our House, Log Cabin, and New Bullards Bar Dam were the minimum specified flows. However, typical flows in the Yuba River below the USACE's Englebright Dam releases for consumptive use or generation significantly exceeded required minimum flows, except in the fall of very dry years.

The D-1644 interim flow requirements that were in effect from 2001 to 2006 did not change minimum release requirements below Our House Diversion Dam, Log Cabin Diversion Dam, or

New Bullards Bar Dam. The D-1644 interim flow requirements did specify different minimum flows below Narrows 2 Powerhouse. Flows in the Yuba River below Narrows 2 Powerhouse typically were higher than required minimum flows because of additional releases to meet consumptive and other water management targets. In some years, however, D-1644 minimum releases governed spring, early summer and fall flows.

The Yuba Accord flow requirements did not change minimum release requirements below Our House Diversion Dam, Log Cabin Diversion Dam, or New Bullards Bar Dam. The Yuba Accord flow requirements do include minimum flow requirements for the Lower Yuba River below Narrows 2 Powerhouse that are substantially higher than the corresponding requirements in the FERC license and the interim requirements in D-1644. Implementation of the Yuba Accord flow requirements, which started in spring 2006 with a pilot program, has resulted in operational changes that affect Project operations during all seasons of the year. The Accord flow requirements are higher than previous requirements in most months of most years. Figures 6.3.1-2 and 6.3.1-3 show the flow requirements in place at the Smartville and Marysville gages, respectively, for 2008, and also show the D-1644 and 1965 Agreement (FERC License) requirements. Actual flows are also shown. The actual flows from June 1 to August 30, 2008, also included releases of water to implement a groundwater substitution transfer.

Summer flows in July and August in drier water years have included water transfer releases, which in turn resulted in flows substantially above minimum instream flows. Water transfer releases of varying magnitude occurred in all of the drier years from 1987 to 2009.

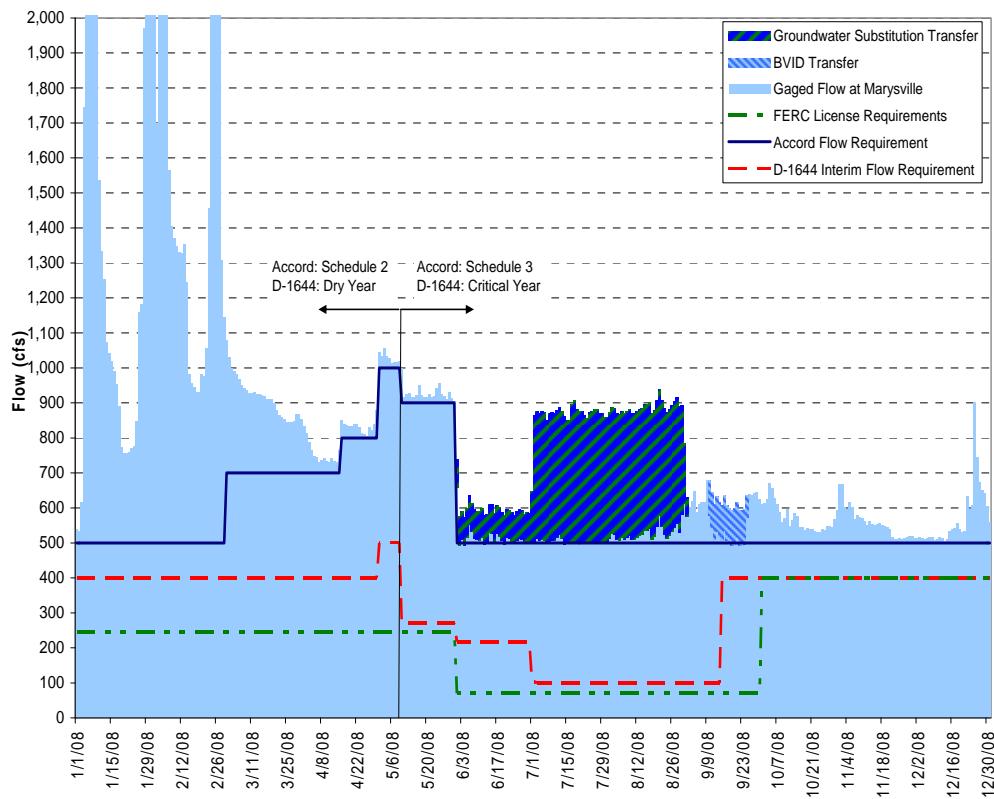


Figure 6.3.1-2. Minimum instream flow requirements and actual flows at Marysville Gage in 2008

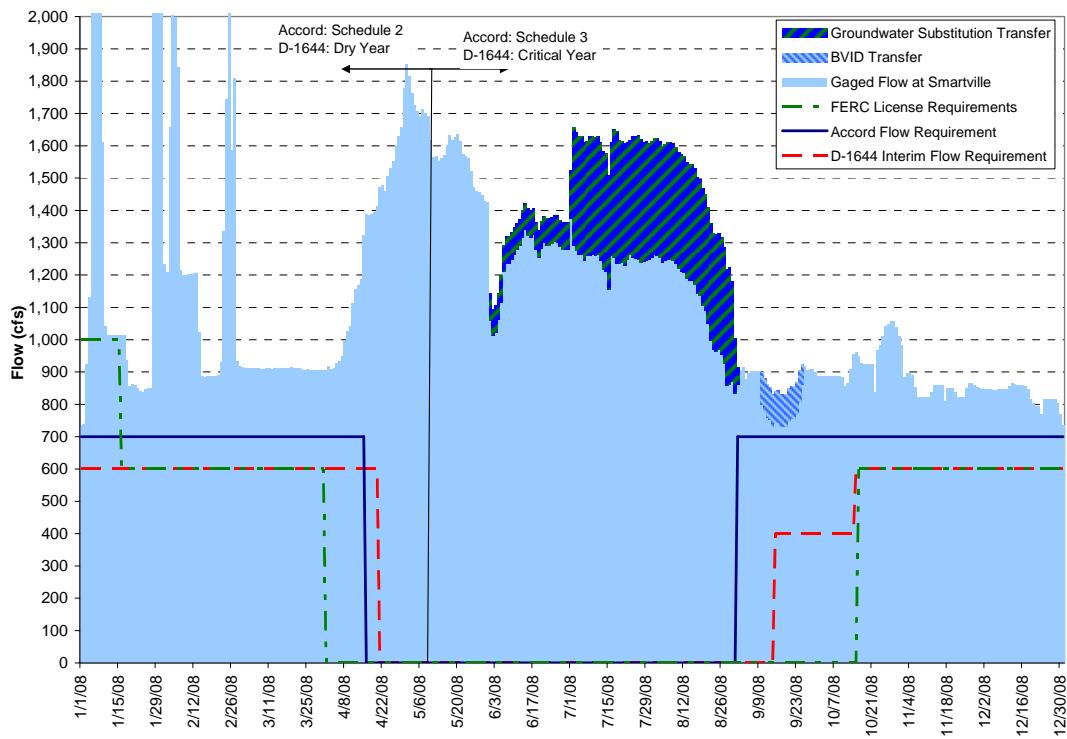


Figure 6.3.1-3. Minimum instream flow requirements and actual flows at Smartville Gage in 2008

In addition to changes to minimum instream flows for the Yuba River below Narrows 2 Powerhouse, the Lower Yuba River Accord agreements specify additional operations requirements. Annual minimum flow requirements are set based on the NYI, which is specific to the Lower Yuba River Accord. Additionally, the Lower Yuba River Accord includes a target reservoir storage in New Bullards Bar Reservoir of 650,000 ac-ft on September 30. Typically, the New Bullards Bar Reservoir storage will continue to decline through the fall, depending on precipitation and runoff patterns. Under the Lower Yuba River Accord, end of year storage (December 31) in New Bullards Bar Reservoir may be substantially lower than under the 1965 Agreement or D-1644 flow requirements, reflecting the additional water that is released under the Lower Yuba River Accord.

6.3.1.8 Water Supply Deliveries

6.3.1.8.1 From Project Reservoir

Licensee pumps some water directly from New Bullards Bar Reservoir to supply water to the Cottage Creek Water Treatment Plant for domestic and recreational uses adjacent to the reservoir. The amount of this pumping averages approximately 6 ac-ft per year. The amount of this pumping is so small that it does not affect operations of the Project. Licensee anticipates that pumping of these small amounts of water for these purposes will continue during the period of the new license.

6.3.1.8.2 Downstream of the Project

YCWA is a major water rights holder on the Yuba River. YCWA diverts water for consumptive and other beneficial uses under SWRCB water right Permits 15026, 15027, and 15030. YCWA's permits authorize direct diversions from the lower Yuba River from September 1 to June 30 at total rates up to 1,593 cfs for irrigation and other uses, and diversions of up to 1,250,000 ac-ft per water year from October 1 to June 30 to storage in New Bullards Bar Reservoir. During the summer and early fall, stored water is released from New Bullards Bar Reservoir and re-diverted just above USACE's Daguerre Point Dam for use by YCWA Member Units for irrigation.

Various water districts, irrigation districts, and mutual water companies have contracts with YCWA for delivery of water. Some of the parties that receive water from YCWA also have their own appropriative rights for direct diversions of water from the Yuba River. Annual water diversions at Daguerre Point Dam for irrigation have totaled about 300,000 ac-ft in recent years.

In 2009, the Wheatland Canal was completed. This canal provides up to 40,000 ac-ft per year of surface water to the Wheatland Water District, which until now has relied solely upon groundwater for irrigation.

Refer to Section 7.2.8 for more detail regarding upstream and downstream water deliveries.

6.3.1.9 Power Generation

After meeting all of the considerations described above, Licensee schedules releases from Project facilities for power generation when water is available for this purpose. Seasonal release patterns are typically developed 2 to 8 months in advance, in consultation with PG&E, and considering hydrologic and meteorological factors, seasonal instream flows, and consumptive needs.

The New Bullards Bar Minimum Flow Powerhouse is operated as a “base load” facility, where flows are set at a constant rate to provide the required instream flows below New Bullards Bar Dam. Similarly, the Narrows 2 Powerhouse is operated as a base load facility, with stable flows, as required by the Yuba Accord flow schedules and seasonal irrigation demands.

The New Colgate Powerhouse is a highly versatile facility, and is used for a combination of peaking and base generation. Depending upon energy demand, the New Colgate Powerhouse generation can be fluctuated in less than 10 minutes from a minimum of 1 MW with only one unit operating to maximum load of 340 MW with both units operating, if both units are ramped up at the same time. This ability to rapidly fluctuate generation, together with substantial storage available in New Bullards Bar Reservoir, makes the New Colgate Powerhouse important and unique to the Northern California power grid. The average annual flow through the New Colgate Powerhouse from water year 1970 through water year 2008 was 1,078,776 ac-ft. Modeled flows through New Colgate Powerhouse for the same period average 1,033,127 ac-ft per year. The modeled average annual generation for this period is 1,188,257 megawatt hours (MWh). With a theoretical powerhouse capacity of almost 3 million MWh per year (if the powerhouse were

always operated at full capacity), New Colgate Powerhouse has a plant factor of 40 percent. This is comparable to the national average hydropower plant factor of 43 percent.

For most of the year, New Colgate Powerhouse is operated as a peaking facility, or to provide ancillary services such as spinning reserves or regulation. Under peaking operations, releases through the powerhouse are concentrated to hours of the day when power is most valuable or when power is needed most (such as weekdays from mid-morning through early evening, largely corresponding to warmer times of the day and/or peak workday and early evening hours). Under ancillary services operations, the generating station may be ramped upwards or downwards quickly, to respond to power system load changes on a near-real-time basis, and generating station output and flows may vary substantially minute-to-minute. The New Colgate Powerhouse also often operates under a combined peaking/ancillary service protocol, with one unit operating in peaking mode and the other unit responding to ancillary service requirements. During some of the late 1990s and early 2000s, New Colgate Powerhouse operations were focused on weekday peak generation. More recently, power generation has shifted to a schedule driven by a balance of peak period generation and providing ancillary services to the region.

At many times, New Colgate Powerhouse provides a significant percentage of the required ancillary service for grid regulation of the region, as dispatched by the California Independent System Operator (ISO), the entity responsible for maintaining grid reliability in California. Peaking operations dominate power generation operations at New Colgate Powerhouse. However, under high flow conditions some or all of the available capacity is used for base load generation, generating inexpensive power while excess water must be moved through the system anyway.

6.3.1.10 Ramping and Flow Fluctuations

Releases from the Narrows 2 Powerhouse are governed by the ramping and flow fluctuation criteria specified in FERC License Article 33 (see Section 6.4, below). Additionally, the Lower Yuba River Accord gives the RMT some discretion (subject to review by the SWRCB's Division of Water Rights) to adjust flow patterns for fisheries benefits. For additional information regarding the Lower Yuba River Accord.

6.3.2 Typical Operations

This section provides an overview of typical Project operations in representative water years.

6.3.2.1 Baseflow, Storm Runoff, and Flood Control Flows

Releases from New Bullards Bar Reservoir are made through the New Colgate Powerhouse, and through the dam's bottom outlet or its gated spillway. Operations of New Bullards Bar Reservoir can be described in terms of: 1) water management operations (baseflow operations); 2) storm runoff operations; and 3) flood control operations.

Baseflow operations describe the normal reservoir operations that occur when system flows are controlled or controllable through storage regulation. These operations occur outside periods of

flood control operations, spilling, bypassing uncontrolled flows into USACE's Englebright Reservoir, and outside periods of high, unregulated inflows from tributary streams downstream from USACE's Englebright Dam.

Storm runoff operations occur during the storm season, typically between October and May, and include operations of the reservoirs or powerhouses to avoid or reduce uncontrolled flows. Typically, storm runoff operations are driven by the USACE's Englebright Reservoir operations, because it is the downstream control point for releasing water into the lower Yuba River. Storm runoff standard operating procedures for USACE's Englebright Reservoir use target storage levels, maximum release rates, coordination considerations based on flow targets at the confluence of the Feather and Yuba rivers, and ramping criteria for USACE's Englebright Reservoir to guide operations.

Flood control operations typically are conducted in accordance with directives of the USACE Water Control Manual for New Bullards Bar Reservoir. During flood control operations, the seasonal flood pool specified in the USACE Water Control Manual for New Bullards Bar Reservoir is utilized for flood protection, and to avoid unnecessary high flood control releases. Reservoir releases may be required to maintain flood control space between September 15 and June 1.

Baseflow operations can be further separated into two distinct release patterns: 1) baseflow operations that are responding to downstream demands; and 2) baseflow operations to reach a target storage level.

Baseflow operations that are responding to downstream demands typically involve releases to implement minimum instream flow requirements and to meet consumptive requirements. Downstream demand response baseflow operations occur frequently in drier water years, as well as during the fall and early winter of most years.

Baseflow operations involve release patterns designed to meet specific storage targets and are scheduled to meet power generation objectives. The predominant target storage level for New Bullards Bar Reservoir is the end of water year storage level, which occurs on September 30. From 1970 to 2005, this level was established by the YCWA/PG&E Power Purchase Agreement, which included terms for a September 30 storage level of 705,000 ac-ft. With the implementation of the Yuba Accord, which included an amended YCWA/PG&E Power Purchase Agreement, the target storage level for September 30 is now 650,000 ac-ft. For late winter through September, if operations to meet the required downstream minimum flows and downstream demands will result in a storage level less than the target September 30 storage level, then the downstream required flows and demands will govern operations. Generally, operations in September through the time of significant winter runoff are to meet downstream requirements. As discussed in Section 6.3.1.7, prior to implementation of the Yuba Accord, operations during most times of most years were under baseflow storage operations. With the Yuba Accord's higher required minimum flows, operations for downstream requirements now occur more often.

For most of the year when storm and flood control regulations do not govern Project releases, USACE's Englebright Reservoir is used as an afterbay for releases from New Bullards Bar Reservoir through the New Colgate Powerhouse and is used as a regulating reservoir to capture uncontrolled flows from the Middle and South Yuba rivers to manage downstream releases to the lower Yuba River. USACE's Englebright Reservoir levels are maintained within a range of roughly 517 ft to 525 ft in the spring, summer, and fall during the recreational boating season to accommodate marina and boating operations. This range of water levels is used on a daily and weekly basis for moderating the power generation peaking operations of the New Colgate Powerhouse.

Additional storage target operations include the flood pool reservation mandated by the USACE flood control manual.

6.3.2.2 Representative Water Year Examples

Licensee has selected 1998, 2005, and 2001 as representative Wet, Normal, and Dry water years, respectively, because these years approximate the 10, 50, and 90 percent exceedance intervals for unimpaired annual runoff in the Yuba River at the USGS's Smartville Gage. Figures 6.3.2-1 through 6.3.2-3 show for each representative water year: 1) daily water surface elevations in New Bullards Bar Reservoir; 2) mean daily water releases from New Bullards Bar Reservoir; 3) mean daily flows below USACE's Englebright Dam; and 4) mean daily flows at the Marysville Gage.

All three of these years were before the implementation of the Yuba Accord. The 50 percent and 10 percent exceedance years both ended with New Bullards Bar Reservoir storage at or near 705,000 ac-ft, which was the target storage level for these years. As stated above, under the Yuba Accord, the target storage level is 650,000 ac-ft. Releases from New Bullards Bar Reservoir were at the maximum New Colgate Powerhouse flow capacity for most of January through July of 1998, while New Colgate Powerhouse releases in 2001 reached this level regularly in the summer with the higher transfer releases, but only on a weekday peaking schedule. There were no releases on many weekends in 2001.

These figures demonstrate that in the 90 percent exceedance year, flows are significantly lower during all times of the year, and that storage drawdown begins in late May, compared to the 50 and 10 percent years when storage reductions begin in late June or early July. During the 90 percent exceedance year of 2001, flows at the Marysville Gage at or below 300 cfs started in early May and only increased in July with the start of a water transfer release for the months of July through September. Without the transfer flows in these months, flows would have been in the range of 300 cfs. With the Yuba Accord, the minimum flow for this period of 2001 would have been at or above 400 cfs for the months of July through September and as much as 900 cfs in May. Figure 6.3.2-3 also clearly shows the fluctuations in releases from New Bullards Bar Reservoir through the New Colgate Powerhouse to provide weekday peaking operations.

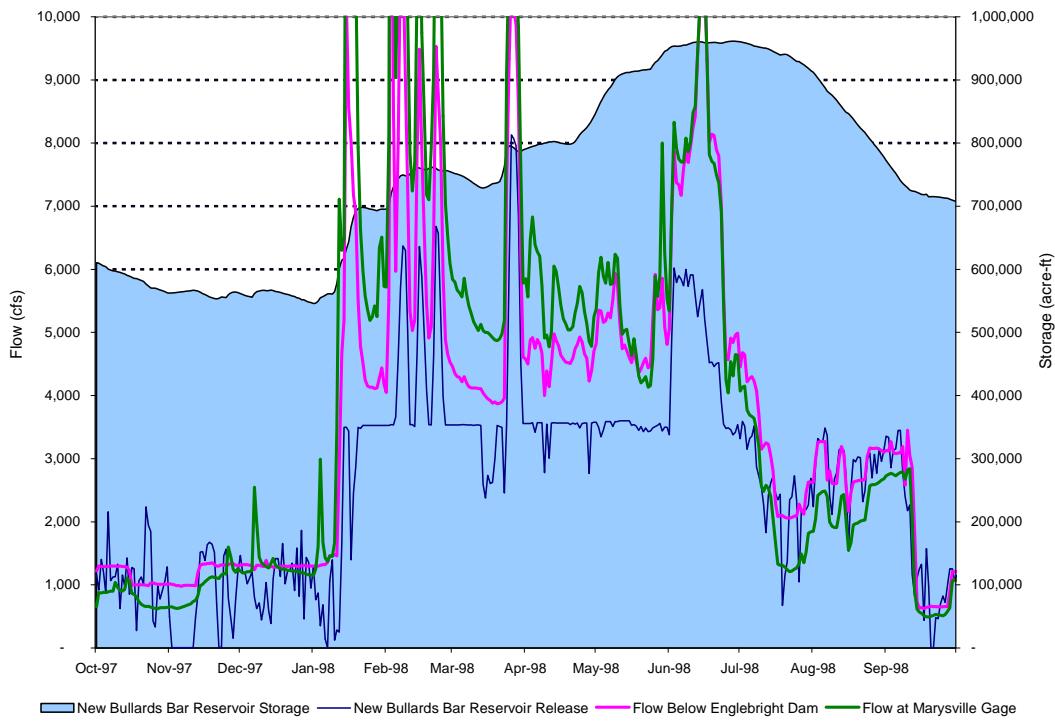


Figure 6.3.2-1. Project releases and storage in a representative Wet Water Year – 1998.

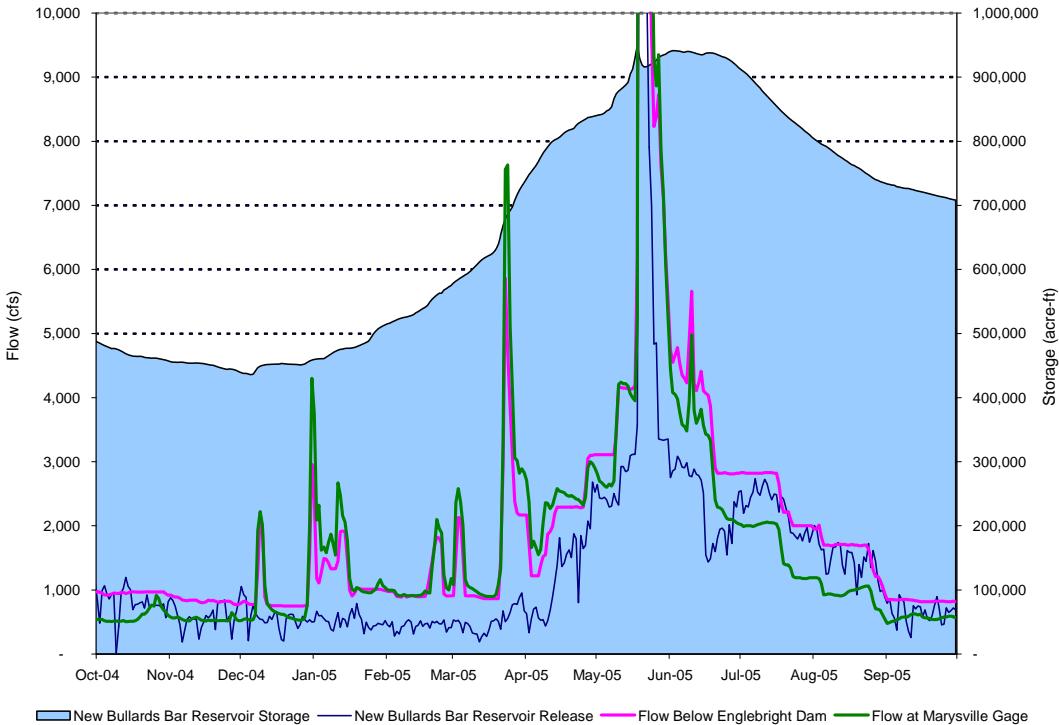


Figure 6.3.2-2. Project releases and storage in a representative Normal Water Year – 2005.

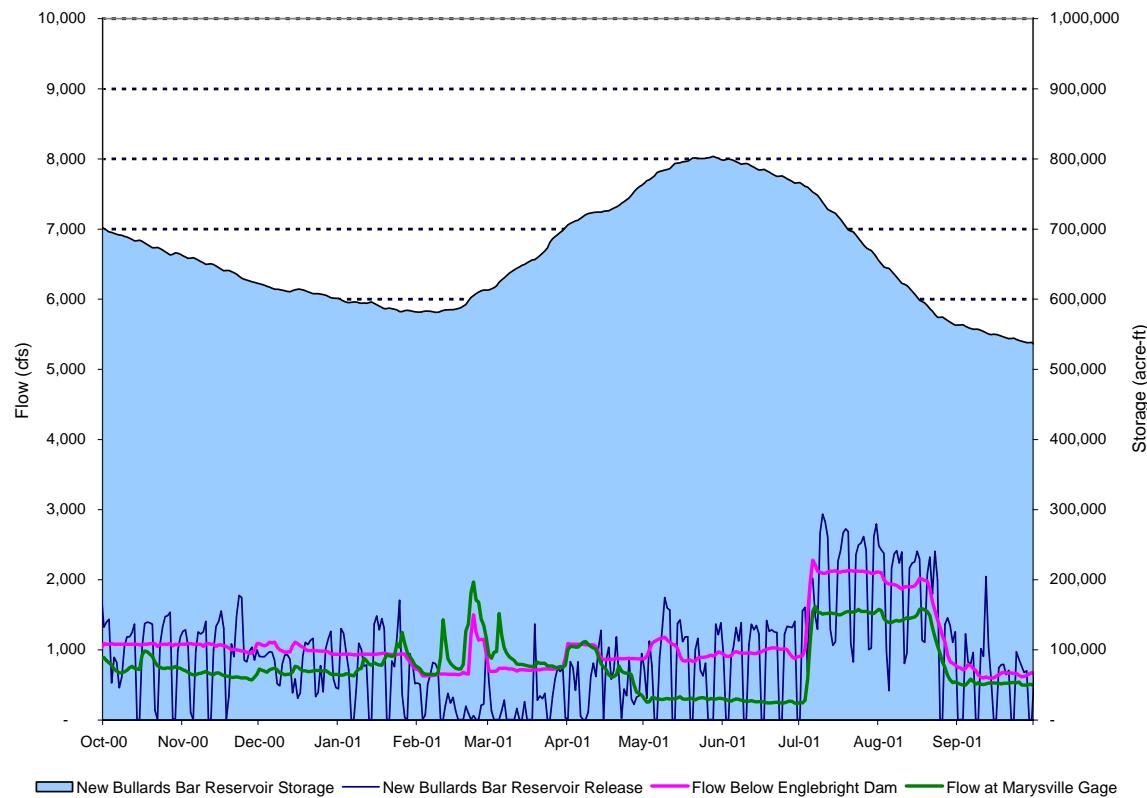


Figure 6.3.2-3. Project releases and storage in a representative Dry Water Year – 2001.

More recently, daily and weekly power generation have shifted to a schedule driven by a balance of peak period generation and providing ancillary services to the region.

6.4 FERC License and Other Project Information

6.4.1 Current FERC License Requirements

The Federal Power Commission (FPC), FERC's predecessor, issued the Project initial license to Licensee on May 16, 1963. Subsequently, on May 6, 1966, the FPC issued an order ruling that the license would be effective for the period from May 1, 1966 through April 30, 2016. The initial license included 50 articles numbered 1 through 57 (articles 9, 14, 15, 16, 17, 23, and 24 were left blank by the FPC). Since the initial license was issued, the FPC and FERC have added 10 articles to the license, numbers 58 through 67. As a result, the existing license contains 60 articles. Of these, Licensee considers 19 articles (articles 28, 29, 30, 35, 36, 41, 42, 43, 44, 48, 50, 51, 52, 58, 60, 62, 65, 66, and 67), "expired" or "out of date" because each pertains to a construction activity that has been completed, a filing related to a construction activity that has been completed, or another activity that has been completed. As a result, the existing license contains 41 "active" articles. The general topic that each of the 41 active articles addresses is listed below.

Table 6.4.1-1. List of active requirements in Yuba County Water Agency's current Federal Energy Regulatory Commission license for the Yuba River Development Project (FERC Project No. 2246).

Article	Description	Article	Description
1	General - Compliance	32	Construction of fish handling facilities by US
2 & 3	FERC approval of changes	33	Minimum flow
4	FERC inspection and supervision	34	Minimum pool
5	Project boundary	37	Sediment control
6	Gaging and stream gaging	38	Minimization of habitat alteration
7	Public access to Project waters and permitting of roads, boat docks, piers, etc.	39	Mitigation of damage to wildlife
8	Approval of facilities by US land management agency	40	Operation of New Bullards Bar Dam to maintain water quality for anadromous fish
10	Public safety related to safety of transmission lines, telephone lines, etc.	45	Fire suppression
11	Avoid inductive interference	46	Flood control
12	Clear t-line right-of-ways on federally owned lands	47	Supplying storage for water in USACE's Englebright Reservoir for New Narrows Power Plant
13	Merchantable timber on federally owned lands	49	Interference with future water projects
18	US rights to waters	53	Additional transmission facilities if ordered by FERC
19	Use of water for fire suppression, sanitary, and domestic needs on federally owned lands	54	Install additional capacity if ordered by FERC
20	Construction liability	55	Coordinate with others if ordered by FERC
21	Permit use of federally owned lands for transportation and communication	56	Recreation facilities
22	Takeover of Project roads	57	Annual fees to US for administration of authorized capacity and compensation for lands
25	Lease of Project lands	59	US not liable for damages to New Narrows Power Plant from construction of Federal reservoir downstream
26	Ownership of Project property	61	Recreation plan
27	Terms and conditions of Federal Power Act	63	DO monitoring plan
31	Construction of fish and wildlife protective devices and structures by Licensee	64	SHPO consultation prior to construction activities

Articles in the existing FERC Project license are shown below. Comments, including specifying any subsequent orders related to the article, are listed at the end of the article if the article has been modified from the initial Order Issuing License. Unless otherwise noted, the article was included in the May 16, 1963, Order Issuing the License, and has not been amended. Articles Licensee considers out-of-date are noted. Primary FERC orders (i.e., an order that modified an existing license article) can be found on Licensee's Relicensing Website (www.ycwa-relicensing.com) under the folder labeled "Initial License" and the subfolder labeled "FERC Orders."

Article 1. The entire project, as described in the order of the Commission, shall be subject to all the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: provided, however, that if the license or the Commission deems it necessary or desirable that said approved exhibits, or

any of them, be changed, there shall be submitted to the Commission for approval amended, supplemental, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. Said project works shall be in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct. The Licensee shall comply with such rules and regulations of general or special applicability as the commission may from time to time prescribe for the protection of life, health, or property.

Article 4. The construction, operation, and maintenance of the project and any work incident to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Power Commission, San Francisco, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of any such alterations to the project. Construction of the project works or any feature thereof shall not be initiated until the program of inspection for the alterations or any feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such information as he may require concerning the construction, operation, and maintenance of the project, and any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow him and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties.

[Included in May 16, 1963 Order Issuing License, and amended by P-2246 35 FPC Order Amending License (Major) issued May 6, 1966 to read as shown above.]

Article 5. Upon the completion of the project, or at such other time as the Commission may direct, the Licensee shall submit to the Commission for approval revised maps, plans, specifications, and statements insofar as necessary to show any divergence from or variations in

the project area and project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the maps, plans, specifications, and statements approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the Licensee necessitated or justified variations in or divergence from the approved maps, plans, specifications, and statements. Such revised maps, plans, specifications, and statements shall, if and when approved by the Commission, be made a part of the license under the provisions of article 2 hereof.

Article 6. For the purpose of determining the stage and flow of the stream or streams from which water is to be diverted for the operation of the project works, the amount of water held in and withdrawn from storage, and the effective head on the turbines, the Licensee shall install and thereafter maintain such gages and stream-gaging stations as the Commission may deem necessary and best adapted to the requirements; and shall provide for the required readings of such gages and for the adequate rating of such stations. The Licensee shall also install and maintain standard meters adequate for the determination of the amount of electric energy generated by said project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission and may be altered from time to time if necessary to secure adequate determinations, but such alteration shall not be made except with the approval of the Commission or upon the specific direction of the Commission. The installation of gages, the ratings of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of said project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient record of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 7. So far as is consistent with the proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and recreational purposes, including fishing and hunting, and shall allow to a reasonable extent for such purposes the construction of access roads, wharves, landings, and other facilities on its lands the occupancy of which may, in appropriate circumstances, be subject to payment of rent to the Licensee in a reasonable amount: Provided, that the Licensee may reserve from public access, such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property and Provided further, that the Licensee's consent to the construction of access roads, wharves, landings, and other facilities shall not, without its express agreement, place upon the Licensee any obligation to construct or maintain such facilities.

Article 8. In the construction and maintenance of the project the location and standards of roads and trails, and other land uses, including the location and condition of quarries, borrow pits, spoil

disposal areas, and sanitary facilities, shall be subject to the approval of the department or agency of the United States having supervision over the lands involved.

Article 9. *[The May 16, 1963, Order Issuing License did not include an Article 9.]*

Article 10. In the construction and maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines, and telegraph, telephone, and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling and obstructing traffic and endangering life on highways, streets, or railroads.

Article 11. The Licensee shall make provision, or shall bear the reasonable cost, as determined by the agency of the United States affected, of making provision for avoiding inductive interference between any project transmission line or other project facility constructed, operated, or maintained under the license, and any radio installation, telephone line, or other communication facility installed or constructed before or after construction of such project transmission line or other project facility and owned, operated, or used by such agency of the United States in administering the lands under its jurisdiction.

Article 12. The Licensee shall clear such portions of transmission line rights-of-way across lands of the United States as are designated by the officer of the United States in charge of the lands; shall keep the areas so designated clear of new growth, all refuse, and inflammable material to the satisfaction of such officer; shall trim all branches of trees in contact with or liable to contact the transmission line; shall cut and remove all dead or leaning trees which might fall in contact with the transmission line; and shall take such other precautions against fire as may be required by such officer. No fires for the burning of waste material shall be set except with the prior written consent of the officer of the United States in charge of the lands as to time and place.

Article 13. Timber on lands of the United States cut, used, or destroyed in the construction and maintenance of the project works or in the clearing of said lands shall be paid for in accordance with requirements of and at the current stumpage rates applicable to the sale of similar timber by the agency of the United States having jurisdiction over said lands; and all slash and debris resulting from the cutting or destruction of such timber shall be disposed of as the officer of such agency may direct.

Article 14. *[The May 16, 1963, Order Issuing License did not include an Article 14.]*

Article 15. *[The May 16, 1963, Order Issuing License did not include an Article 15.]*

Article 16. *[The May 16, 1963, Order Issuing License did not include an Article 16.]*

Article 17. *[The May 16, 1963, Order Issuing License did not include an Article 17.]*

Article 18. The United States specifically retains and safeguards the right to use water in such amount, as determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the Licensee, so far as they affect the use, storage, and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of waters for power purposes and for other beneficial public uses, including recreational purposes; and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 19. The Licensee shall interpose no objection to, and shall in no way prevent, the use by the agency of the United States having jurisdiction over the lands of the United States affected, or by persons or corporations occupying lands of the United States under permit, of water for fire suppression from any stream, conduit or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license, or to the use by said parties of water for sanitary and domestic purposes from any stream or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license.

Article 20. The Licensee shall be liable for injury to, or destruction of, any buildings, bridges, roads, trails, lands, or other property of the United States, occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Arrangements to meet such liability, either by compensation for such injury or destruction, or by reconstruction or repair of damaged property, or otherwise, shall be made with the appropriate department or agency of the United States.

Article 21. The Licensee shall allow any agency of the United States, without charge, to construct or permit to be constructed on, through, and across the project lands, conduits, chutes, ditches, railroads, roads, trails, telephone and power lines, and other means of transportation and communication not inconsistent with the enjoyment of said lands by the Licensee for the purposes stated in the license. This article shall not be construed as conferring upon the Licensee any right of use, occupancy, or enjoyment of the lands of the United States other than for the construction, operation, and maintenance of the project as stated in the license.

Article 22. There is reserved to the appropriate department or agency of the United States, or of the state or county involved, the right to take over, maintain, and supervise the use of any project road as a public road after construction of the project works is completed.

Article 23. [*The May 16, 1963, Order Issuing License did not include an Article 23.*]

Article 24. [*The May 16, 1963, Order Issuing License did not include an Article 24.*]

Article 25. No lease of the project or part thereof whereby the lessee is granted the exclusive occupancy, possession, or use of project works for purposes of generating, transmitting, or

distributing power shall be made without the prior written approval of the Commission; and the Commission may, if in its judgment the situation warrants, require that all the conditions of the license, of the act, and of the rules and regulations of the Commission shall be applicable to such property so leased to the same extent as if the lessee were the Licensee: Provided, that the provisions of this article shall not apply to parts of the project or project works which may be used by another jointly with the Licensee under a contract or agreement whereby the Licensee retains the occupancy, possession, and control of the property so used and receives adequate consideration for such joint use, or to leases of land while not required for purposes of generating, transmitting, or distributing power, or to buildings or other property not built or used for said purposes, or to minor parts of the project or project works, the leasing of which will not interfere with the usefulness or efficient operation of the project by the Licensee for such purposes.

Article 26. The Licensee, its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties necessary or useful to the project and to the development, transmission, and distribution of power there from will be voluntarily sold, transferred, abandoned, or otherwise disposed of without the approval of the Commission: Provided, that a mortgage or trust deed or judicial sales made there under, or tax sales, shall not be deemed voluntary transfers within the meaning of this article. In the event the project is taken over by the United States upon the termination of the license, as provided in section 14 of the act, or is transferred to a new Licensee under the provisions of section 15 of the act, the Licensee, its successors and assigns will be responsible for and will make good any defect of title to or of right of user in any of such project property which is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and will pay and discharge, or will assume responsibility for payment and discharge, of all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, that the provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment of other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear, or to require the Licensee, for the purpose of transferring the project to the United States or to a new Licensee, to acquire any different title to or right of user in any of such project property than was necessary to acquire for its own purposes as Licensee.

Article 27. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms or conditions of the Federal Power Act which are not expressly set forth herein.

Article 28. The Licensee shall commence construction of the project works within one year from May 1, 1966, shall thereafter in good faith and with due diligence prosecute such construction, and shall complete construction within 4 1/2 years from May 1, 1966.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 29. The Licensee shall within one year from the date of completion of the project, file with the Commission revised Exhibits F and K to define the final project boundary in accordance with the rules and regulations of the Commission.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 30. The Licensee shall submit, in accordance with the Commission's rules and regulations, final design Exhibit L drawings for the finally adopted New Bullards Bar Dam and Spillway and shall not begin construction of these or any project works contingent thereon until the Commission has approved the Exhibit L drawings.

[FPC Order 05-06-66 deleted this article from the license.]

Article 31. The Licensee shall construct, maintain and operate such protective devices and shall comply with such reasonable modifications of the project structures and operation in the interest of fish and wildlife resources, provided that such modifications shall be reasonably consistent with the primary purpose of the project, as may be prescribed hereafter by the Commission upon its own motion or upon recommendation of the Secretary of the Interior or the California Department of Fish and Game after notice and opportunity for hearing and upon a finding that such modifications are necessary and desirable and consistent with the provisions of the Act: *Provided further*, that subsequent to approval of the final design drawings prior to commencement of construction no modifications of project structures in the interest of fish and wildlife resources which involve a change in the location, height or main structure of a dam, or the addition of or changes in outlets at or through a dam, or a major change in generating units, or a rearrangement or relocation of a powerhouse, or major changes in a spillway structure shall be required.

Article 32. Whenever the United States shall desire, in connection with the project, to construct fish handling facilities or to improve the existing fish handling facilities at its expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such fish handling facilities or such improvements thereof. In addition, after notice and opportunity for hearing the Licensee shall modify the project operation as may be prescribed by the Commission, consistent with the primary purpose of the project, in order to permit the maintenance and operation of the fish handling facilities constructed or improved by the United States under the provision of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish handling facilities or to relieve the Licensee of any obligation under this license.

Article 33. The Licensee shall maintain the following minimum streamflow schedules for maintenance of fishlife in the several streams listed:

(a)

Stream	Flow (cfs) ¹	
	April 15 to June 15	June 16 to April 14
Middle Yuba (below Our House Diversion)	50	30
Oregon Creek (below Log Cabin Diversion)	12	8
North Yuba (below New Colgate Diversion)	5	5

¹ Or natural flow, whichever is less. Maximum 24-hour fluctuations of plus or minus 10 percent are permitted for flows in Middle Yuba below Our House Diversion and in Oregon Creek below Log Cabin Diversion.

(b)

Stream	Flow (cfs) ¹		
	January 1 to June 30	July 1 to September 30	October 1 to December 31
Yuba River (below Timbuctoo Dam)	245	70	400

¹ Measured at a point not more than one-half mile downstream from the Irrigation Diversion Weir and provided that these flows shall be in addition to releases made to satisfy existing downstream water rights.

(c) Water releases for fish life as specified in paragraphs (a) and (b) of this article shall be subject to the following reduction in any critical dry year, defined as a water year for which the April 1 forecast of the California Department of Water Resources predicts that streamflow in the Yuba River at Smartville be 50 percent or less of normal:

(d)

Yuba River at Smartville streamflow forecast percent of normal	Reduction in water Release for fishlife, percent
50	15
45	20
40 or less	30

However, in no event shall releases for fishlife below USACE's Daguerre Point Dam be reduced to less than 70 cfs. The critical dry year provisions herein shall be effective from the time the aforesaid forecast is available until the April 1 forecast of the following year.

(e) In addition to maintaining winter minimum water releases for fishlife in Yuba River below USACE's Daguerre Point Dam, as specified in paragraphs (b) and (c) of this article, the Licensee shall maintain uniform and continuous releases from USACE's Englebright Dam within the limits of the following schedule:

(f)

Period	Releases (cfs) ¹	Measurement Point
October 16 to 31	600-1,050	New station to be built downstream from the two Narrows powerhouses.
November	600-700	
December	600-1,400	
Jan. 1 to 15	1,000-1,850	
Jan. 16 to Mar. 31	800	

¹ Provided that:

- A. Variations from this schedule are permissible during emergencies, uncontrollable flood flows, and critical dry year curtailments.
- B. With the exception of emergencies, releases required by USACE's flood control criteria, releases required to maintain a flood control buffer or for other flood control purposes, bypasses of uncontrolled flows into USACE's Englebright Lake, uncontrolled spilling, or uncontrolled flows of tributary streams downstream of USACE's Englebright Dam, Licensee shall make reasonable efforts to operate New Bullards Bar Reservoir and USACE's Englebright Lake to avoid fluctuations in the flow of the lower Yuba River downstream of USACE's Englebright Dam, and daily changes in project operations affecting releases or bypasses of flow from USACE's Englebright Dam shall be continuously measured at the USGS gage at Smartville, and shall be made in accordance with the following conditions:
 - i. Project releases or bypasses that increase streamflow downstream of USACE's Englebright Dam shall not exceed a rate of change of more than 500 cfs per hour.
 - ii. Project releases or bypasses that reduce streamflow downstream of USACE's Englebright Dam shall be gradual and, over the course of any 24-hour period, shall not be reduced below 70 percent of the prior day's average flow release or bypass flow.

- iii. Once the daily project release or bypass level is achieved, fluctuations in the streamflow level downstream of USACE's Englebright Dam due to changes in project operations shall not vary up or down by more than 15 percent of the average daily flow.
- iv. During the period from September 15 to October 31, the Licensee shall not reduce the flow downstream of USACE's Englebright Dam to less than 55 percent of the maximum five-day average release or bypass level that has occurred during that September 15 to October 31 period or the minimum streamflow requirement that would otherwise apply, whichever is greater.
- v. During the period from November 1 to March 31, the Licensee shall not reduce the flow downstream of USACE's Englebright Dam to less than the minimum streamflow release or bypass established under (iv) above; or 65 percent of the maximum five-day average flow release or bypass that has occurred during that November 1 to March 31 period; or the minimum streamflow requirement that would otherwise apply, whichever is greater.

[Initial Article 33 revised by P-2246 30 FPC 1610 Order Modifying Order on Rehearing issued December 27, 1963 and P-2246 35 FPC Order Amending License (Major) issued May 6, 1966. Order amended by 113 FERC 62,137 Order Modifying and Approving Amendment of License issued November 22, 2005.]

Article 34. The Licensee shall maintain a minimum pool in New Bullards Bar Reservoir at Elevation 1,730 feet.

[Included in May 16, 1963 Order Issuing License and amended by P-2246 35 FPC Order Amending License (Major) issued on May 6 1966. Temporarily waived by 13 FERC 62,225 Order Approving Temporary Waiver of the Requirement of License Article 34 issued December 2, 1980.]

Article 35. The Licensee shall so regulate releases from Timbuctoo Afterbay Dam during normal operation that they shall not fluctuate at an hourly rate of more than 300 cfs, such fluctuations to be measured within one-half mile below Timbuctoo Afterbay Dam.

[FPC Order 05-06-66 deleted this article from the license.]

Article 36. The Licensee shall construct and maintain at Timbuctoo Afterbay Dam such facilities for trapping and removing salmon and steelhead trout as have been approved by the Commission.

[FPC Order 05-06-66 deleted this article from the license.]

Article 37. The Licensee shall take whatever steps are required to prevent entry into any streams or waters in or below the project area of any clay, silt, fines, sand, gravel, detritus, oil, or other substance deleterious to fish and aquatic life and/or their habitat, resulting from construction or operation of the project.

Article 38. The Licensee shall construct and operate the project in a manner providing minimum possible alteration of fish and wildlife habitat, consistent with reasonable economic practices, except where habitat changes result from specific modifications of construction and operation designed to enhance fish and wildlife under ways and means approved by the California Department of Fish and Game, the Secretary of Agriculture, and the Secretary of the Interior.

Article 39. Mitigation of damages to wildlife resulting from project activities shall be made by the Licensee as directed by the Commission based upon investigations by the California Department of Fish and Game and the Licensee as to the extent of such damages and means of

mitigation, or upon recommendation of the Secretary of the Interior or of the Secretary of Agriculture.

Article 40. Consistent with the primary purpose of the power intakes in the New Bullards Bar Dam, the Licensee shall operate, within limits of the project, the multiple-level power intakes in New Bullards Dam to provide water of suitable quality in the Yuba River downstream from the New Narrows Power Plant for the production of anadromous fish as may be prescribed by the Commission upon the recommendations of the Director of the California Department of Fish and Game and the Fish and Wildlife Service, Department of the Interior.

[Included in May 16, 1963 Order Issuing License, and amended by P-2246 30 FPC 1610 Order Modifying Order on Rehearing issued December 27, 1963 and the P-2246 35 FPC 691 Order Amending License (Major) issued May 6, 1966, to read as shown above.]¹²

Article 41. The Licensee shall, prior to the impounding of water, clear the area of project reservoirs as follows: *New Bullards Bar Reservoir*—All vegetation between elevation 1,700 feet and 1,955 feet, except that in precipitous and inaccessible areas of the reservoir. Timber, slash, and woody debris from logging and clearing operations may be removed by flotation in accordance with the “YUBA RIVER DEVELOPMENT CLEARING PLAN FOR THE NEW BULLARDS BAR RESERVOIR” and *Other Project Reservoirs* (not including USACE’s Englebright Lake)—all lands in the bottom and margins up to high-water level; shall clear and keep clear to an adequate width lands of the United States along open conduits; and shall dispose of all temporary structures, unused timber, brush, refuse, or inflammable material resulting from the clearing of the lands or from the construction and maintenance of the project works. In addition, all trees along the margins of reservoirs that may die from the operation of the reservoir shall be removed. The clearing of the lands and the disposal of the material shall be done with a due diligence and to the satisfaction of the authorized representative of the Commission. Any debris permitted to be floated to central disposal points shall be removed from the reservoir as soon as possible during the initial storage of water in the reservoir.

[Included in May 16, 1963 Order Issuing License and amended by P-2246 40 FPC 1001 Order Further Amending License (Major) issued October 3, 1968. Authorizing Commencement of Construction of Power Intake at New Bullards Bar Dam of Project. Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 42. The Licensee shall strip and stockpile top soil from all borrow areas prior to borrow operations, and shall regrade these areas as practicable and replace top soil upon completion of borrow operations. Additionally, all borrow areas on lands of the United States shall be

¹² In 1993, Licensee convened a Temperature Advisory Committee to obtain more refined recommendations for the operation of New Bullards Bar Reservoir’s multilevel outlet. The committee was composed of Licensee, USFWS, and CDFG. After reviewing temperature model data and the operating options, USFWS and CDFG recommended that water releases from New Bullards Bar Reservoir be as cold as possible at all times. Licensee immediately implemented this recommendation and, since 1993, all controlled releases of water from New Bullards Bar Reservoir through New Bullards Bar Minimum Flow Powerhouse into the north Yuba River and through New Colgate Powerhouse into the Yuba River have been from the deepest port of the New Bullards Bar Power Intake.

revegetated with browse species. This stipulation does not apply to areas inundated by reservoirs.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 43. All construction activity shall be carried on with the least possible erosion damage and least possible disfiguration of the landscape. Insofar as practicable, spillways from dams and conduits shall be located in natural stream channels and and/or on relatively stable material.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 44. During construction of the project, the Licensee shall keep a road open across the North Yuba River in the vicinity of Bullards Bar, at all times, for National Forest use and protection.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 45. The Licensee shall do everything reasonably within its power and shall require its employees, contractors, and employees of contractors to do everything reasonably within their power, both independently and upon the request of officers of the agency concerned to prevent, make advance preparations for suppression, and suppress fires on the lands to be occupied or used under the license. The Licensee shall be liable for and pay the costs incurred by the United States in suppressing fires caused from the construction, operation, or maintenance of the project works or of the work appurtenant or accessory thereto under the license.

Article 46. The Licensee shall operate the project reservoirs for flood control in accordance with rules prescribed by the secretary of the Army, such rules to be specified in a formal agreement between the Licensee and the District Engineer, U.S. Army Engineers District, Sacramento, California. Said agreement shall be subject to review from time to time at the request of either party; provided, however, that a different procedure of review may be prescribed by formal agreement.

[Included in May 16, 1963 Order Issuing License, and amended by P-2246 30 FPC 1610 Order Amending Order on Rehearing issued December 27, 1963 to read as shown above.]

Article 47. The Licensee shall enter into contractual arrangements with the District Engineer, U.S. Army Engineer district, Sacramento, California, pursuant to the River and Harbor Act of June 25, 1938, with respect to supplying storage for water in USACE's Englebright Reservoir for power development at the New Narrows Power Plant, upon such conditions of delivery, use and payment as the Secretary of the Army may approve, such payments to be deposited to the credit of the Englebright Reservoir.

Article 48. The Licensee shall assume liability for any structural damage to USACE's Englebright Project incurred as a result of construction of the proposed New Narrows power facilities.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 49. The Licensee shall operate the project in such manner as will not conflict with future depletion of the water of the Yuba River and its tributaries or prevent or interfere with the future diversion and use of such water for the irrigation of lands or other beneficial consumptive uses.

[Included in May 16, 1963 Order Issuing License.]

Article 50. The Licensee shall enter into a formal agreement with the Bureau of Reclamation on river operations within the Yuba Basin which agreement shall be subject to the approval of the commission.

[Included in May 16, 1963 Order Issuing License. Agreement date June 12, 1963 approved by P-2246 30 FPC 1610 Order Modifying Order on Rehearing issued December 27, 1963. [Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 51. The Licensee shall negotiate with the National Park Service for archeological survey and salvage within project reservoir sites to be accomplished prior to inundation and to be financed by the Licensee in an amount not to exceed \$60,000.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 52. The Licensee shall not commence construction of any of the project works of the New Colgate Development until the Commission has approved the final design for New Bullards Bar Dam.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 53. The Commission reserves the right to determine at a later date what additional transmission facilities, if any, shall be included in this license as part of the project works.

Article 54. The Licensee shall install additional capacity and make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so, after notice and opportunity for hearing.

Article 55. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other power systems and in such manner as the Commission may direct in the interest of power and other beneficial uses of water

resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 56. The Licensee shall, within one year from the effective date of this license, file with the Commission a recreational use plan, which shall include not only recreational improvements, which may be provided by others, but the recreational improvements the Licensee plans to provide.

Article 57. The Licensee shall pay to the United States the following annual charges:

- (i) For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable annual charge in accordance with the provisions of Part II of the Commission's regulations in effect from time to time. The authorized capacity for that purpose is 482,500 horsepower.
- (ii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 3834.47 acres of its lands, exclusive of transmission line rights-of-way, an amount to be determined from time to time pursuant to the Commission's Regulations

[Included in May 16, 1963 Order Issuing License and amended by P-2246 35 FPC Order Amending License issued May 6, 1966; P-2246 47 FPC Order Approving Revised Exhibit L Drawings and Revised Exhibit M and Adjusting Authorized Installed Capacity issued January 4, 1972; 12 FERC 62,014 Order Approving As-Built Exhibit K and Amending License issued July 8, 1980; 31 FERC 62,186 Order Amending License issued May 9, 1985; and 59 FERC 62,257 Order Amending License, Approving Revised Exhibit M, and Revising Annual Changes issued June 10, 1992.]

Article 58. The Licensee shall engage at least three qualified, independent consultants for the purpose of reviewing and reporting on the foundation treatment of the New Bullards Bar arch dam and other hydraulic structures, including tunnels. The report of the consultant shall be submitted prior to the initiation of foundation treatment. The Licensee shall also submit a final report of the board covering the construction of the project upon completion.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 59. The Licensee shall not hold the United States liable for any damage to New Narrows Power Plant due to inundation or backwater resulting from a downstream Federal reservoir with a water surface elevation of up to and including 345 feet (USGS datum) measured at the downstream dam, nor shall the Licensee hold the United States liable for any loss of power head or reduction in power protection due to said reservoir within the limits of a normal water surface elevation not in excess of 340 feet (USGS datum) measured at the downstream dam.

Article 60. The Licensee shall not commence construction of the multi-level power intake at New Bullards Bar Dam until specifically authorized by the Commission following concurrence

with the Licensee by the Director of the California Department of Fish and Game and by the Fish and Wildlife Service, Department of the Interior, on the location and functional design of the intake.

[Added to license by P-2246 35 FPC Order Amending License. Authorized to commence construction by October 3, 1968 issued May 6 1966. P-2246 40 FPC Order Further Amending License (Major) and Authorizing Commencement of Construction of Power Intake at New Bullards Bar Dam of Project. Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 61. The Licensee shall construct, maintain and operate or shall arrange for the construction, maintenance and operation of such recreational facilities including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities and utilities, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal and State agencies, after notice and opportunity for hearing and upon findings based upon substantial evidence that such facilities are necessary and desirable, and reasonably consistent with the primary purpose of the project.

[Added to license by P-2246 35 FPC Order Amending License issued May 6, 1966. Recreation study plan approved by 54 FERC 62,082 Order Modifying and Approving Recreation Study Plan issued February 4, 1991. Article 61 amended as read above by 64 FERC 62,117 Order Approving Recreation Plan with Modification, Requiring Study Plan, and Amending License issued August 19, 1993. Study Plan for the Assessment of Recreation at Log Cabin and Our House Diversion Dams made part of license by 66 FERC 62,182 Order Approving Recreation Study and Boating Speed Restriction Plan issued March 25, 1994. The amendment to the Yuba River Project recreation plan for the continued use of the Cottage Creek Picnic Area for overflow camping was approved by 104 FERC 62,226 Order Amending Recreation Plan issued September 30, 2003. Recreation Plan modified by 107 FERC 62,004 Order Approving Revision of the Recreation Plan with a seasonal closure of Moran Road to vehicular traffic from October 15 to May 1 each year, road surface and drainage improvements, a parking area for approximately 7 cars, an accessible portable toilet, and all construction and maintenance activities scheduled between May 2 and October 14 issued April 5, 2004.]

Article 62. The Licensee shall install instruments in the dam and foundation for the purpose of measuring foundation stresses and movements, deflections in the dam, and stresses and temperatures in the concrete, and shall submit to the Commission annually, for a period of five years after completion of construction of the New Bullards Bar Dam, reports evaluating the results of the instrumentation.

[Licensee considers this article out-of-date since it pertains to initial Project construction, which has been completed.]

Article 63. The Licensee shall maintain the State of California dissolved oxygen (DO) standard in the North Fork of the Yuba River, as measured downstream of the minimum flow release tailrace, for the protection of water quality. Further, Licensee, in cooperation with the Central

Valley Regional Water Quality Control Board, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service, shall develop and implement a mutually satisfactory monitoring plan to assess the impact of project operation on the DO concentrations of the North Fork of the Yuba River. Within 6 months from the date of issuance of this license, the Licensee shall file a description of the monitoring plan, a schedule for completion, and a date for filing a final report with the Director, Office of Hydropower Licensing, along with comments from the above agencies on the adequacy of the plan. The Director may require modification of the plan. The results of the monitoring program shall be submitted to the Commission. If the results of the monitoring program indicate that changes in project structures or operations are necessary to maintain the State of California DO standard, the Licensee also shall file for Commission approval, as part of the final report, a schedule for implementing the specific changes in project structures or operations, along with comments from the agencies listed above on the adequacy of the specific changes in project structures or operations. At the same time that the implementation schedule is filed with the Commission, copies of the schedule shall be served on the agencies consulted.

[Added by 31 FERC 62,186 Order Amending License issued May 9, 1985. Dissolved oxygen monitoring plan filed on September 24, 1985, supplemented March 7, 1986, and added to license by Order Approving Dissolved Oxygen Monitoring Plan issued April 16, 1986.]

Article 64. The Licensee shall, prior to any future construction at the project, consult with the California State Historic Preservation Officer (SHPO) about the need for cultural resource survey and salvage work. Documentation of the nature and extent of consultation, including a cultural resources management plan, shall be filed with the Commission 6 months before any construction activity. The Licensee shall make available funds in a reasonable amount for any such work, as required. If any previously unrecorded archeological or historical sites are discovered during the course of the construction or development of any project works or other facilities at the project, construction activity in the vicinity shall be halted, a qualified archeologist shall be consulted to determine the significance of the sites, and the Licensee shall consult with the SHPO to develop a mitigative plan for the protection of significant archeological or historical resources. If the Licensee and the SHPO cannot agree on the amount of money to be expended on archeological or historical work related to the project, the Commission reserves the right to require the Licensee, at its own expense, to conduct any such work found necessary.

Article 65. The Licensee shall commence construction of the New Bullards Bar Dam Project within two years from the issuance date of this order and shall complete construction of the project within four years from the issuance date of this order.

[Added to License in 31 FERC 62,186 Order Amending License issued May 9, 1985. Licensee considers this article out-of-date since it pertains to Project construction, which has been completed.]

Article 66. The Licensee shall provide one copy to the Commission's Regional Engineer and two copies to the Director, Division of Inspections, of the final contract drawings and specifications for pertinent features of the project, such as water retention structures, powerhouse, and water conveyance structures, at least 60 days prior to start of construction. The

Director, Division of Inspections, may require changes in the plans and specifications to assure a safe and adequate project.

[Added to License in 31 FERC 62,186 Order Amending License issued May 9, 1985. Licensee considers this article out-of-date since it pertains to Project construction, which has been completed.]

Article 67. The Licensee shall within 90 days of completion of construction file with the Commission for approval by the Director, Division of Project Management, revised Exhibits A and F to describe and show the project as-built.

[Added to License in 31 FERC 62,186 Order Amending License issued May 9, 1985. Licensee considers this article out-of-date since it pertains to Project construction, which has been completed.]

6.4.2 Current FERC License Maps, Design Drawings and Plans

6.4.2.1 Project Maps (Exhibits J and K)¹³

The current FERC license includes 14 maps that show the area within the existing FERC Project Boundary. These maps include:

<u>Exhibit No.</u>	<u>FERC Map No.</u>	<u>Title</u>
2246-88	J-1	Yuba River Development Project – General Map
2246-89	J-2	Oregon Creek Diversion – General Map
2246-90	J-3	Colgate and Narrows 2 – General Map
2246-129	K-1-A	Bullards Bar Project—Reservoir Map
2246-130	K-2-A	Bullards Bar Project—Reservoir Map
2246-131	K-3-A	Bullards Bar Project—Reservoir Map
2246-132	K-4-A	Bullards Bar Project—Reservoir Map
2246-133	K-5-A	Bullards Bar Project—Reservoir Map
2246-134	K-6-A	Bullards Bar Project—Reservoir Map
2246-135	K-7-A	Bullards Bar Project—Reservoir Map
2246-136	K-8-A	Bullards Bar Project—Reservoir Map
2246-137	K-9-A	Middle Yuba—Oregon Creek Diversion Project—Log Cabin and Our House Reservoir Map
2246-154	K-10-A	New Colgate Project Map
2246-139	K-11-A	Narrows Project—Detailed Map

Copies of Project maps are available on request from Licensee. For maps that show the existing FERC Project Boundary, refer to Appendix D.

¹³ All Exhibit J and K maps depicting the existing FERC Project Boundary will be included in Exhibit G of the application for a new license, in conformance with 18 CFR § 4.51(h).

6.4.2.2 Project Design Drawings (Exhibit L)¹⁴

The current FERC license for the Project includes 35 plan-and-profile design drawings of Project facilities:

<u>Exhibit No.</u>	<u>FERC Drawing No.</u>	<u>Title</u>
2246-149	F-1	New Bullards Bar Dam – Site Plan
2246-144	F-2	Bullards Bar Dam – Site Plan and Profile
2246-150	F-2	New Bullards Bar Dam – Turbine Building
2246-145	F-3	Bullards Bar Dam – Powerhouse Site Plan
2246-146	F-4	Bullards Bar Dam – Penstock Profile and Details
2246-147	F-5	Bullards Bar Dam – Powerhouse Plan and Details
2246-148	F-6	Bullards Bar Dam – Powerhouse Sections and Details
	L-14	Dam Spillway Power Intake
	L-15	New Bullards Bar Project Dam Layout and Geometric Data
	L-16	New Bullards Bar Project – Plan Profile and Rating Curves
	L-17	New Bullards Bar Project Powerplant Plans El. 1378.5 & El.1394.5
	L-18	New Bullards Bar Project Power Plant Plans El. 1358.0 & 1370.0
	L-19	New Bullards Bar Project Powerplant Sections
	L-20	Log Cabin Dam and Camptonville Tunnel – Dam General Arrangement
	L-21	Log Cabin Dam and Camptonville Tunnel – Camptonville Tunnel Plan – Profile & Sections
	L-22	Our House Dam & Lohman Ridge Tunnel – Dam General Arrangement
	L-23	Our House Dam & Lohman Ridge Tunnel – Lohman Ridge Tunnel Plan – Profile & Sections
2246-155	L-24	New Colgate Project – Tunnel Plan, Profile, and Sections
	L-25	New Colgate Project – General Arrangement Plan – Control Room
	L-27	New Narrows Project – Site Plan Sht 1 of 2
	L-28	New Narrows Project – Site Plan Sht 2 of 2
	L-29	New Narrows Project – Profile Sections and Steel Liner
	L-30	New Narrows Project – Powerplant General Arrangement Longitudinal Section
	L-31	New Narrows Project – Powerplant General Arrangement Plan El. 348 & 324
	L-32	New Narrows Project – General Arrangement Plan El. 304 & 292
	L-35	New Colgate Project – Powerplant Site Plan

¹⁴ All design drawings showing plan-and-profiles of Project facilities will be included in Exhibit F of the application for a new license, in conformance with 18 CFR § 4.51(g).

<u>Exhibit No.</u>	<u>FERC Drawing No.</u>	<u>Title</u>
	L-36	New Colgate Project – General Arrangement Cross Section B-B
	L-37	New Bullards Bar Project – Dam Right Thrust Block Details
	L-38	New Bullards Bar Project – Dam Left Thrust Block Details
	L-39	New Colgate Project – General Arrangement Plan – Generator Deck El. 598.00
	L-40	New Narrows Project – Powerplant General Arrangement Sections
	L-41	Powerplant General Arrangement Cross Section A-A
2246-156	L-42	General Arrangement Site Plan – Option A, Wye Junction
2246-157	L-43	General Arrangement Site Plan – Option B, Tee Junction
2246-158	L-44	Turbine Shutoff Valve – General Arrangement
2246-159	L-45	Bypass Valve Structure – Equipment Arrangement – Sheet 1
2246-160	L-46	Bypass Valve Structure – Equipment Arrangement – Sheet 2

Copies of Exhibit L drawings are available on request from Licensee.

6.4.2.3 Project Recreation Map (Exhibit R)

The current FERC license includes 20 maps that show Project recreation areas and facilities. These include:

<u>Exhibit No.</u>	<u>FERC Map No.</u>	<u>Title</u>
2246-140	R-1-2	New Bullards Bar Project – Recreational Facilities
2246-141	R-1-3	New Bullards Bar Project – Recreational Facilities
2246-119	R-2-2	New Bullards Bar Project – Recreational Facilities
2246-120	R-3	New Bullards Bar Project – Recreational Facilities
2246-121	R-4-1	New Bullards Bar Project – Recreational Facilities
2246-122	R-4-2	New Bullards Bar Project – Recreational Facilities
2246-123	R-5	New Bullards Bar Project – Recreational Facilities
2246-124	R-6-1	New Bullards Bar Project – Recreational Facilities
2246-125	R-6-2	New Bullards Bar Project – Recreational Facilities
2246-126	R-7-1	New Bullards Bar Project – Recreational Facilities
2246-127	R-7-2	New Bullards Bar Project – Recreational Facilities
2246-128	R-7-3	New Bullards Bar Project – Recreational Facilities
2246-156	R-9	Moran Road Improvements
2246-157	R-10	Cottage Creek Layout
2246-158	R-11	Cottage Creek Layout
2246-159	R-12	Cottage Creek Layout
2246-160	R-13	Cottage Creek Pavement Delineation
2246-161	R-14	Cottage Creek Restroom Plan

Exhibit No.	FERC Map No.	Title
2246-162	R-15	Bullards Bar Road Work
2246-163	R-16	Dark Day Test Campground

Copies of Exhibit R maps are available on request from Licensee.

6.4.2.4 Other FERC License Plans

Outside of the existing license but still under FERC jurisdiction, Licensee has developed and now maintains two plans related to the Project. These are:

- Yuba River Development Project Public Safety Plan (1995). This plan was prepared by Licensee at the direction of FERC's Regional Engineer, and filed with FERC. The plan describes the facilities and measures undertaken by Licensee for public safety purposes at Project facilities. Licensee participates in FERC public safety inspections on a regular basis.
- Yuba River Development Project Emergency Action Plan (2006). This plan was prepared by Licensee at the direction of FERC's Regional Engineer and filed with FERC. The plan describes the procedures Licensee and emergency response agencies would take in the event of imminent failure of Project dams. The EAP is tested (i.e., tabletop and functional exercise) every 5 years with the last test in 2005.

6.4.3 Compliance History of the Project

Licensee is in compliance with terms and conditions of the existing license. During annual FERC Project inspections and the 5-year public safety, environmental, and recreation inspections, various remedial actions are recommended as a result of the inspections. Licensee initiates actions and proposes plans and schedules for more significant actions to correct any issues of safety, compliance, or other issues as recommended from the inspections and provides written confirmation of the actions taken.

In the event of a non-compliance action such as deviation from the required minimum flows, Licensee immediately notifies FERC, initiates an investigation and provides a written report to FERC regarding the incident and corrective action. There have been no such events since 2000.

6.5 Summary of Project Generation and Outflow Records

6.5.1 Flow and Generation

Appendix F provides regulated and synthesized hydrology in mean daily flow at Project powerhouses and downstream of dams, as well as at other nodes in the Project Area, for Water Year 1970 through Water Year 2008. The appendix also includes reservoir elevations. Data are provided in USACE Hydrologic Engineering Center's (HEC) Data Storage System (DSS) and in Microsoft Excel formats.

In general, Project facilities normally generate their maximum electrical outputs during the late spring and early summer months when streamflows are high from winter precipitation and snowmelt and downstream consumptive water demands are high. However, considerable variation occurs in any given year due to storm timing as well as timing and magnitude of snowmelt.

6.5.2 Monthly and Annual Energy Generation and Dependable Capacity

6.5.2.1 Monthly and Annual Energy Generation

Table 6.5.2-1 shows the total monthly generation at New Colgate, New Bullards Bar Minimum Flow, and Narrows 2 powerhouses, and combined generation from these powerhouses from 2004 through 2005. Table 6.5.2-1 also shows the annual average generation for each powerhouse and the Project over this 5-year period.

Table 6.5.2-1. Average monthly gross generation for calendar year 2004 through 2008 at Project powerhouses.

Month	Monthly Total Generation (MWH)					Average Generation (MWH)
	2004	2005	2006	2007	2008	
NEW COLGATE POWERHOUSE						
January	112,385	36,481	194,527	71,218	45,647	92,051
February	97,448	28,596	183,246	75,358	43,080	85,546
March	122,271	36,088	199,789	73,689	28,437	92,055
April	125,198	91,081	194,846	53,995	63,738	105,771
May	144,370	198,253	213,307	96,829	88,863	148,325
June	117,850	176,738	171,297	89,962	79,965	127,162
July	131,456	167,583	166,315	108,352	108,906	136,523
August	99,761	104,314	95,808	92,342	93,987	97,242
September	43,512	45,904	44,167	56,190	57,691	49,493
October	57,729	56,970	44,079	56,300	663	43,148
November	40,330	68,131	46,627	61,650	0	43,347
December	41,423	116,875	42,667	44,565	17,512	52,608
<i>Subtotal</i>	<i>1,133,732</i>	<i>1,127,014</i>	<i>1,596,674</i>	<i>880,450</i>	<i>628,488</i>	<i>1,073,272</i>
NEW BULLARDS BAR MINIMUM FLOW POWERHOUSE						
January	93	87	82	97	71	86
February	85	85	88	55	70	77
March	94	99	43	96	99	86
April	82	94	57	95	71	80
May	101	102	100	95	0	80
June	92	100	96	82	0	74
July	104	100	97	92	0	79
August	64	100	94	97	57	82
September	101	90	95	95	95	95
October	97	99	97	96	76	93
November	101	98	88	94	102	97
December	100	99	94	97	83	95
<i>Subtotal</i>	<i>1,113</i>	<i>1,154</i>	<i>1,032</i>	<i>1,090</i>	<i>723</i>	<i>1,022</i>
NARROWS 2 POWERHOUSE						
January	26,315	11,923	39,431	11,668	11,454	20,158
February	26,725	9,017	34,075	16,367	10,636	19,364
March	30,099	17,659	38,376	18,107	0	20,848
April	25,315	25,612	35,286	10,487	11,737	21,687
May	29,224	37,756	33,646	19,180	18,279	27,617
June	21,941	36,923	28,100	13,973	13,251	22,838
July	24,054	32,497	31,158	18,381	18,397	24,897

Table 6.5.2-1. (continued)

Month	Monthly Total Generation (MWH)					Average Generation (MWH)
	2004	2005	2006	2007	2008	
NARROWS 2 POWERHOUSE						
August	18,159	19,768	16,862	15,197	16,821	17,361
September	3,061	0	0	1,449	35	909
October	8,727	4,566	0	5,381	2,598	4,254
November	4,962	11,791	0	9,924	1,442	5,624
December	5,197	25,168	0	5,679	0	7,209
<i>Subtotal</i>	<i>223,778</i>	<i>232,681</i>	<i>256,933</i>	<i>145,794</i>	<i>104,649</i>	<i>192,767</i>
TOTAL PROJECT						
January	138,793	48,490	234,040	82,983	57,172	112,295
February	124,258	37,698	217,409	91,781	53,785	104,986
March	152,464	53,846	238,208	91,892	28,536	112,989
April	150,595	116,788	230,189	64,577	75,545	127,539
May	173,695	236,112	247,053	116,104	107,142	176,021
June	139,883	213,761	199,493	104,016	93,216	150,074
July	155,613	200,180	197,570	126,825	127,303	161,498
August	117,984	124,182	112,764	107,637	110,864	114,686
September	46,674	45,994	44,261	57,734	57,820	50,497
October	66,552	61,635	44,176	61,776	3,337	47,495
November	45,392	80,020	46,715	71,668	1,543	49,068
December	46,721	142,142	42,761	50,341	17,596	59,912
Total	1,358,624	1,360,850	1,854,639	1,027,335	733,860	1,267,061

Some of the generated power is used at the powerhouses for station use. Station power use annually is about 1 MW hr at New Colgate Powerhouse, less than 0.1 MW hr at New Bullards Bar Minimum Flow Powerhouse, and negligible at Narrows 2 Powerhouse.

6.5.2.2 Dependable Capacity

The dependable capacity of a generating facility is defined as “the generating capacity that the plant can deliver under the most adverse water supply conditions to meet the needs of an electric power system with a given maximum demand.”¹⁵ One of the critical parameters for defining dependable capacity is the period over which the capacity must be provided. Traditionally, a year or season from time of maximum storage to minimum storage, is used for the time period over which capacity is calculated. For a peaking plant, the dependable capacity critical period is less precisely defined and is specific to the plant demand and constraints. Because the New Colgate Powerhouse provides both base load generation and peaking, its dependable capacity can be calculated for both types of generation.

For base load generation, the time period of the most adverse hydrology was the 1977 Water Year, which was characterized by the most extreme one-year drought conditions that followed a critically Dry Water Year, 1976. The annual unimpaired runoff of the Yuba River measured at the Smartville Gage was 370,000 ac-ft in Water Year 1977, which was about a 1-in-200 year drought year. In the 1977 Water Year, the amount of inflow to New Bullards Bar Reservoir, including diversions from the Middle Yuba River and Oregon Creek, totaled about 164,000 ac-ft of water, or an annual average flow rate of 226 cfs. For the 1977 Water Year, storage in New Bullards Bar Reservoir played a significant role in augmenting the water supply available for

¹⁵ Standard Handbook of Powerplant Engineering, Second Edition; Thomas C. Elliott, Kao Chen, Robert C. Swanekamp.

release through the New Colgate Powerhouse. Modeling studies made for the Yuba Accord Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) of releases and generation for the 1977 Water Year, using current minimum flow requirements (the Lower Yuba River Accord) and current consumptive demands, indicates that a total annual release of 319,000 ac-ft would occur during a repeat of 1977 Water Year hydrological conditions and there would be an annual generation of 328,000 MWh of electricity. This represents the annual dependable capacity of the New Colgate Powerhouse.

New Colgate Powerhouse generation is operated for peaking on hourly, daily, and weekly schedules. USACE's Englebright Reservoir, which is directly downstream of the New Colgate Powerhouse, has storage that may fluctuate from day to day, but that is generally brought back to a preferred target storage level within a week. Flow below the USACE's Englebright Dam is constrained by downstream demands, minimum flow requirements, and flow fluctuation restrictions. Therefore, USACE's Englebright Reservoir storage is used for daily and weekly fluctuations in peaking load demand, and the available amount of storage that can be fluctuated is used to augment the range of releases for peaking operations while maintaining a relatively constant flow below USACE's Englebright Dam.

Calculation of the dependable capacity of the New Colgate Powerhouse can be made by determining the minimum constant release from USACE's Englebright Reservoir, subtracting the amount of uncontrolled inflow, and adding the amount of storage that can be fluctuated in USACE's Englebright Reservoir. This approach assumes that for a week time period of maximum peaking demand, USACE's Englebright Reservoir would be drawn down so that the full amount of usable storage is available to capture New Colgate Powerhouse releases that are above the net of outflow from and inflow to USACE's Englebright Reservoir.

The maximum demand for peaking generation from New Colgate Powerhouse is usually in the hot summer months of June to October. USACE's Englebright Reservoir usable storage for weekly peaking generation during this period is governed by recreation on the reservoir. Reservoir water levels can be drawn down to about 516 feet and increased to about 523 feet without causing safety concerns or operational limitations on the marina at the reservoir. This range of elevations corresponds to a storage change of 5,300 ac-ft (i.e., 61,500 ac-ft to 66,800 ac-ft). Examination of Water Years 1970 to 2008 shows that the most constrained month for that period of record was August of 1977 when the average monthly release rate was 154 cfs. This release rate is extremely low compared to the normal release rate and is affected by the fact that diversion demand on the lower Yuba River was severely restricted in 1977. A more representative period of dependable capacity that does not have such a low probability of occurrence has a release rate of about 600 cfs. This occurred during several months of the driest years of record. The inflow to USACE's Englebright Reservoir varied during these periods, but averaged about 30 cfs. Therefore, the dependable generation for this adverse period would be based on a net outflow of 570 cfs from USACE's Englebright Dam, and a storage fluctuation of 5,300 ac-ft.

Given the re-regulating capability of USACE's Englebright Reservoir, the hourly dependable capacity of the New Colgate Powerhouse would be the full capacity of the powerhouse, or 340 MW. Weekly dependable capacity can be calculated based on the average weekly flow through

the reservoir. For a one-week period, this would result in a total release rate of 951 cfs (i.e., 381 cfs storage plus 570 cfs outflow). The release rate of 951 cfs, with a storage level of about 1800 feet (i.e., about 500,000 ac-ft storage) results in an average generation capacity of 82.6 MW for a week.

Inspection of historical system operations shows many months with significantly less than the calculated dependable capacity for the New Colgate Powerhouse release, which occurs almost always in the winter months. However, these release rates were low due to the priority of increasing storage in New Bullards Bar Reservoir for water supply, which was an operational decision based on system preference and which was at a time of less than maximum peak load demand, therefore these lower release time periods do not meet the criteria for demand capacity that is constrained. Also, major overhauls and maintenance activities are often scheduled during the winter months.

As discussed in previous sections, the Narrows 2 Powerhouse is a base-loaded power generation facility. Therefore, the dependable capacity of the Narrows 2 Powerhouse is determined by the period of the most adverse hydrology, which was the 1977 Water Year. The annual flow volume at USACE's Englebright Reservoir for Water Year 1977, based on Yuba Accord EIR/EIS model studies, was 392,500 acre-ft, which included 318,000 ac-ft of releases from New Bullards Bar Reservoir and the remaining 74,500 ac-ft from local accretions and flows from the Middle and South Yuba rivers. Not all of the flow at USACE's Englebright Reservoir Dam was available for power generation through the Narrows 2 Powerhouse because some of this water was used to generate power at PG&E's Narrows Powerhouse. The annual flow volume available to Narrows 2 Powerhouse in 1977 was 193,000 ac-ft, with an annual generation of about 51,000 MWh, which is the dependable capacity of the Narrows 2 Powerhouse.

6.6 Current Net Investment

Licensee estimates the Project's net book value (assets minus liabilities) at this time (2010) is about \$131,000,000.

6.7 Proposed New Generation Facilities and/or Changes in Project Operation to Increase Generation

Licensee is in the process of evaluating potential physical enhancements to increase Project power generation. The status of Licensee's evaluation of potential generation enhancements that Licensee might propose for inclusion in the new license will be described in the Proposed Study Plan.

6.8 List of Attachments

None.



Photo 1. Our House Diversion Dam.



Photo 2. Log Cabin Diversion Dam.



Photo 3. New Bullards Bar Dam and New Bullards Bar Minimum Flow Powerhouse.



Photo 4. New Colgate Powerhouse and Penstock.

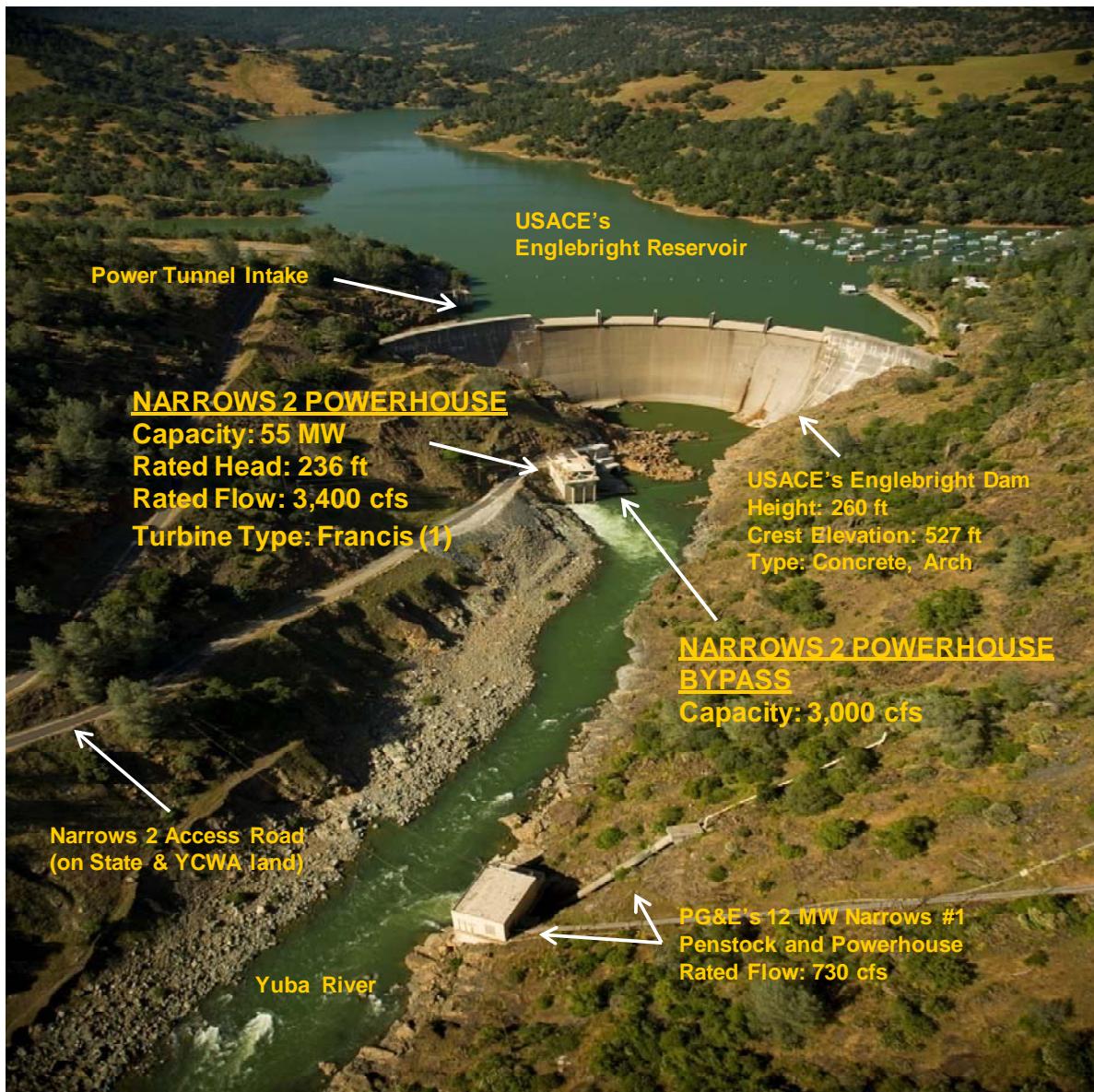


Photo 5. Narrows 2 Powerhouse.

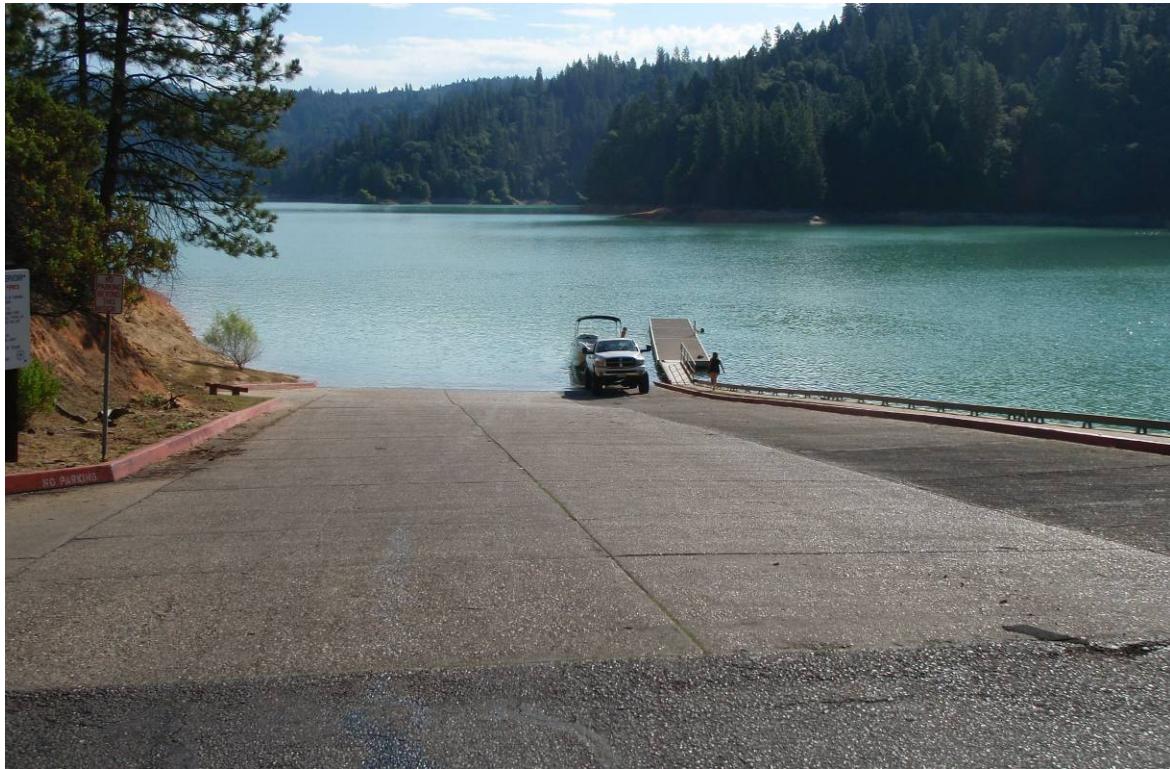


Photo 6. Dark Day Boat Launch, New Bullards Bar Reservoir.



Photo 7. Dark Day Campground, New Bullards Bar Reservoir.



Photo 8. Schoolhouse Campground, New Bullards Bar Reservoir.



Photo 9. Hornswoggle Group Campground (Madrone Unit), New Bullards Bar Reservoir.



Photo 10. Sunset Vista Point picnic unit, New Bullards Bar Reservoir.



Photo 11. Cottage Creek Boat Launch parking area, New Bullards Bar Reservoir.



Photo 12. Emerald Cove Marina from Cottage Creek Boat Launch ramp, New Bullards Bar Reservoir.