

Application for New License
Major Project – Existing Dam

Exhibit H
Miscellaneous Filing Material

Security Level: Public

Yuba River Development Project
FERC Project No. 2246



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April 2014

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None.

EXHIBIT H

MISCELLANEOUS FILING MATERIAL

1.0 Introduction

Yuba County Water Agency (YCWA) has prepared this Exhibit H, Miscellaneous Material, as part of its Application for a New License Major Project – Existing Dam - (Application) from the Federal Energy Regulatory Commission (FERC) for the Yuba River Development Project (Project), FERC Project Number 2246. This exhibit is prepared in conformance with Title 18 of the Code of Federal Regulations, Subchapter B (Regulations under the Federal Power Act), Part 5 (Integrated Licensing Process). In particular, this exhibit conforms to the regulations in Title 18 of the Code of Federal Regulations (Section) § 5.18(c), which requires that the application include an Exhibit H that provides miscellaneous filing information. As a reference, this section states:

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

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

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

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

(1) Increase capacity or generation at the Project;

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

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

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

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

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

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

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

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

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

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

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

- (2) The projected resources required by the applicant to meet the applicant's capacity and energy requirements over the short and long term including:
 - (i) Energy and capacity resources, including the contributions from the applicant's generation, purchases, and load modification measures (such as conservation, if considered as a resource), as separate components of the total resources required;
 - (ii) A resource analysis, including a statement of system reserve margins to be maintained for energy and capacity; and
 - (iii) If load management measures are not viewed as resources, the effects of such measures on the projected capacity and energy requirements indicated separately;
 - (iv) For alternative sources of power, including generation of additional power at existing facilities, restarting deactivated units, the purchase of power off-system, the construction or purchase and operation of a new power plant, and load management measures such as conservation: The total annual cost of each alternative source of power to replace Project power; the basis for the determination of projected annual cost; and a discussion of the relative merits of each alternative, including the issues of the period of availability and dependability of purchased power, average life of alternatives, relative equivalent availability of generating alternatives, and relative impacts on the applicant's power system reliability and other system operating characteristics; and the effect on the direct providers (and their immediate customers) of alternate sources of power.
- (D) If an applicant uses power for its own industrial facility and related operations, the effect of obtaining or losing electricity from the Project on the operation and efficiency of such facility or related operations, its workers, and the related community.
- (E) If an applicant is an Indian tribe applying for a license for a Project located on the tribal reservation, a statement of the need of such Indian tribe for electricity generated by the Project to foster the purposes of the reservation.
- (F) A comparison of the impact on the operations and planning of the applicant's transmission system of receiving or not receiving the Project license, including:
 - (1) An analysis of the effects of any resulting redistribution of power flows on line loading (with respect to applicable thermal, voltage, or stability limits), line losses, and necessary new construction of transmission facilities or upgrading of existing facilities, together with the cost impact of these effects;
 - (2) An analysis of the advantages that the applicant's transmission system would provide in the distribution power; and
 - (3) Detailed single-line diagrams, including existing system facilities identified by name and circuit number, that show system transmission elements in relation to the Project and other principal interconnected system elements. Power flow and loss data that represent system operating conditions may be appended if applicants believe such data would be useful to show that the operating impacts described would be beneficial.
- (G) If the applicant has plans to modify existing Project facilities or operations, a statement of the need for, or usefulness of, the modifications, including at least a reconnaissance-level study of the effect and projected costs of the proposed plans and any alternate plans, which in conjunction with other developments in the area would conform with a comprehensive plan for improving or developing the waterway and for other beneficial public uses as defined in section 10(a)(1) of the Federal Power Act.
- (H) If the applicant has no plans to modify existing Project facilities or operations, at least a reconnaissance-level study to show that the Project facilities or operations in conjunction with other developments in the area would conform with a comprehensive plan for improving or developing the waterway and for other beneficial public uses as defined in section 10(a)(1) of the Federal Power Act.

- (I) A statement describing the applicant's financial and personnel resources to meet its obligations under a new license, including specific information to demonstrate that the applicant's personnel are adequate in number and training to operate and maintain the Project in accordance with the provisions of the license.
 - (J) If an applicant proposes to expand the Project to encompass additional lands, a statement that the applicant has notified, by certified mail, property owners on the additional lands to be encompassed by the Project and governmental agencies and subdivisions likely to be interested in or affected by the proposed expansion.
 - (K) The applicant's electricity consumption efficiency improvement program, as defined under section 10(a)(2)(C) of the Federal Power Act, including:
 - (1) A statement of the applicant's record of encouraging or assisting its customers to conserve electricity and a description of its plans and capabilities for promoting electricity conservation by its customers; and
 - (2) A statement describing the compliance of the applicant's energy conservation programs with any applicable regulatory requirements.
 - (L) The names and mailing addresses of every Indian tribe with land on which any part of the proposed Project would be located or which the applicant reasonably believes would otherwise be affected by the proposed Project.
- (ii) Information to be provided by an applicant licensee. An existing licensee that applies for a new license must provide:
- (A) The information specified in paragraph (c)(1).
 - (B) A statement of measures taken or planned by the licensee to ensure safe management, operation, and maintenance of the Project, including:
 - (1) A description of existing and planned operation of the Project during flood conditions;
 - (2) A discussion of any warning devices used to ensure downstream public safety;
 - (3) A discussion of any proposed changes to the operation of the Project or downstream development that might affect the existing Emergency Action Plan, as described in Subpart C of Part 12 of this chapter, on file with the Commission;
 - (4) A description of existing and planned monitoring devices to detect structural movement or stress, seepage, uplift, equipment failure, or water conduit failure, including a description of the maintenance and monitoring programs used or planned in conjunction with the devices; and
 - (5) A discussion of the project's employee safety and public safety record, including the number of lost-time accidents involving employees and the record of injury or death to the public within the Project boundary.
 - (C) A description of the current operation of the Project, including any constraints that might affect the manner in which the Project is operated.
 - (D) A discussion of the history of the Project and record of programs to upgrade the operation and maintenance of the Project.
 - (E) A summary of any generation lost at the Project over the last five years because of unscheduled outages, including the cause, duration, and corrective action taken.
 - (F) A discussion of the licensee's record of compliance with the terms and conditions of the existing license, including a list of all incidents of noncompliance, their disposition, and any documentation relating to each incident.
 - (G) A discussion of any actions taken by the existing licensee related to the Project which affect the public.
 - (H) A summary of the ownership and operating expenses that would be reduced if the Project license were transferred from the existing licensee.
 - (I) A statement of annual fees paid under Part I of the Federal Power Act for the use of any Federal or Indian lands included in the Project boundary.

Besides this introductory material, this exhibit includes 20 sections. Section 2.0 provides YCWA's plans to maintain and operate the Project in an efficient and reliable fashion. Section 3.0 describes YCWA's need for the power generated by the Project. Section 4.0 describes alternatives to generate the power and cost for such alternatives. Sections 5.0, 6.0 and 7.0 relate to industrial facilities, the need for Project power by Native American tribes and effects of the Project on the transmission system, respectively. Section 8.0 addresses the comprehensive development of the waterway. YCWA's financial and personnel resources to operate the Project are described in Section 9.0. Section 10.0 documents YCWA's notification to land owners potentially-affected by YCWA's plan to expand the existing FERC Project Boundary. Section 11.0 describes YCWA's existing and proposed electricity consumption efficiency programs. The names and mailing addresses of potentially-affected Native American tribes are included in Section 12.0. Section 13.0 describes YCWA's plans to manage, operate and maintain the Project in a safe manner. Section 14.0 describes YCWA's current operation of the Project including any constraints. Section 15.0 presents the Project's history. Section 16.0 lists lost Project power instances over the past five years due to unscheduled outages. YCWA's compliance record is described in Section 17.0. Section 18.0 describes operations of the Project that may affect the public. Section 19.0 describes the effects of transferring the license to a third party on YCWA's ownership and expenses. Section 20.0 presents the annual fees paid by YCWA for use of federal and Indian lands. Section 21.0 includes a list of references cited in this Exhibit H.

See Exhibit A for a description of Project facilities and features, Exhibit B for a description of proposed Project operations and resource utilization, Exhibit C for a construction history and a proposed construction schedule, Exhibit D for costs and financing information, and Exhibit E for a discussion of potential environmental effects and YCWA's proposed resource management measures. Project general design drawings and maps are included in Exhibits F and G, respectively.

2.0 Efficient and Reliable Electric Service

YCWA has consistently demonstrated its capability to manage, operate and maintain the Project in a manner that delivers efficient, reliable electricity at low cost and in an environmentally sensitive manner. The Project has consistently been operated to generate power when energy demands are highest, consistent with reservoir operation restrictions for environmental and recreational purposes and consumptive water supply.

Over the years, YCWA has implemented several enhancements to increase energy recovery from the Project. These include, rewinds to improve the efficiency of the powerhouse generating units, installation of a penstock guard valve on the New Colgate Powerhouse penstock to enable dewatering of the penstock without the dewatering of the Colgate tunnel, which would require an extensive shutdown, and installation of electronic governors on New Colgate units 1 and 2 that provide a more efficient operation of the units.

Additionally, YCWA's preventative maintenance and inspection program is designed to pinpoint potential trouble spots so that repairs can be made before the equipment fails. As new test

equipment becomes available and monitoring technologies improve, YCWA will look for applications that will continue to improve efficiency and reliability.

2.1 Increase in Capacity or Generation

YCWA's proposed Project does not include new capacity. YCWA's proposed Project does include a proposed tailwater depression system (TDS) at New Colgate Powerhouse. The TDS will introduce compressed air into the turbine discharge chamber to lower the tailwater to a level that does not interfere with turbine operation, thereby allowing continued turbine operation during high flows. The primary purpose of the TDS is to enhance flood control operations (i.e., enhance the ability of YCWA to release water from New Bullards Bar Reservoir during flood periods by allowing releases of up to 3,400 cfs to be made through New Colgate Powerhouse), and an added benefit is that the powerhouse will be able to generate electricity during periods of high river stage. YCWA estimates the increased generation is an annual average of 6,110 megawatt-hours.

2.2 Project Coordination with Other Water Resources Projects

YCWA actively coordinates Project operations with three water projects. Coordination with each of these projects is described below.

2.2.1 YCWA's Water Supply Project

YCWA provides surface water from the Yuba River for irrigation of farmland to eight Member Units, which are irrigation districts located within Yuba County. Ditch tenders that oversee the diversion and delivery of irrigation water periodically communicate with Project operators with regard to planned or anticipated needs for water diverted from the Yuba River. These diversions occur just upstream of the United States Army Corps of Engineers' (USACE) Daguerre Point Dam on the north and south sides of the river. Irrigation needs are communicated to the ditch tenders by farmers that have lands within the Member Units' areas. The ditch tenders then aggregate the calls for water to obtain a total diversion flow rate needed for the north and south diversions. These diversion flow rates are communicated to Project operators so that the operators can plan releases from Project facilities to ensure sufficient flows for diversion and to maintain required streamflows. The communications are typically made when the ditch tenders have orders for water that in aggregate constitute a significant change in required diversions from the Yuba River.

2.2.2 Pacific Gas and Electric Company's Narrows Project

YCWA and Pacific Gas and Electric Company (PG&E) have a 2000 Coordinated Operations Agreement that includes provisions governing the coordinated releases of water from the Project's Narrows 2 Powerhouse and PG&E's Narrows 1 Powerhouse, part of PG&E's Narrows

Project (FERC Project No. 1403).¹ Under the agreement, operations of these two powerhouses are coordinated to ensure compliance with downstream required minimum flows on the Yuba River and to manage inflows to Englebright Reservoir. To facilitate these coordinated operations, YCWA holds periodic conference calls between the YCWA hydro system operators and PG&E's operators to plan releases from the two powerhouses. In times other than during storms or floods, or when planning coordination surrounding an outage, these coordination calls occur about every 2 weeks. Communications can be as much as more than once a day before, during and after storms. The Coordinated Operations Agreement terminates with a new FERC license for the Project, at which time a new agreement is contemplated between YCWA and PG&E.

YCWA also coordinates operations with PG&E's Narrows Powerhouse at USACE's Englebright Dam to use storage in 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 Englebright Reservoir in anticipation of storm peak flows

2.2.3 California Department of Water Resources' State Water Project

As part of the Lower Yuba River Accord (Yuba Accord), YCWA releases water to meet the Yuba Accord required flow schedules and a portion of these flows include water that is transferred to the California Department of Water Resources (DWR). In addition, YCWA facilitates the delivery of Member Unit groundwater substitution transfer water to DWR. Yuba Accord surface water transfer flows occur in most years and groundwater substitution transfers occur in drier years when Member Units elect to transfer water. As part of these transfers, YCWA communicates every few weeks with the DWR's State Water Project operators to inform them of expected flows on the Yuba River so that the State Water Project operators can manage the transfer flows.

2.2.4 California Department of Water Resources' Oroville Project

YCWA operates New Bullards Bar Reservoir 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 YCWA² that was entered into on May 9, 1966, YCWA 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 2.2-1.

¹ Article 411 in the existing the existing FERC license for the Narrows Project states: "*The Licensee [PG&E] shall, for the limited purpose of coordinating operations with Project 2246 for the development of fish resources in the Yuba River downstream of Englebright dam, comply with such reasonable modifications of project operations, as may be ordered by the Commission upon the relicensing or amendment of the license for FERC Project No. 2246, after notice and opportunity for hearing.*" The existing FERC license for PG&E's Narrows Project expires in January 2023.

² The USACE contributed \$12 million to the construction of New Bullards Bar Dam in exchange for flood control space the reservoir would provide.

Table 2.2-1. 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

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.

In addition to reservation of flood control space in New Bullards Bar Reservoir, YCWA coordinates with DWR under its Forecasted Coordinated Operations (FCO) program for flood operations of Lake Oroville and New Bullards Bar Reservoir, and using improved inflow forecasts, guides reservoir releases in advance of and during major flood events to reduce peak flood flows, resulting in additional levels of protection downstream.

2.3 Project Coordination with Other Electrical Systems to Minimize Cost of Production

YCWA does not currently own or operate an independent electrical transmission system.

YCWA’s powerhouses are connected to the Power Grid via existing PG&E transmission and distribution lines. Each of these is described below.

- The Project’s New Bullards Bar Minimum Flow Powerhouse is connected to PG&E’s local distribution system by a 12 kilovolt (kV) tie line. The Minimum Flow Powerhouse tie line connects to the PG&E “Dobbins 1101” distribution circuit.
- The Project’s New Colgate Powerhouse is connected to the California Independent System Operator (CAISO)-controlled grid via a direct connection to the Palermo-Rio-Oso 230 kV circuit. Additionally, the New Colgate Powerhouse is connected to PG&E’s regional distribution system via the Colgate – Smartsville #1 60 kV line.
- The Project’s Narrows 2 Powerhouse is connected to PG&E’s regional distribution system by a 1,638 foot long, 60 kV tie line, which extends from the Narrows 2 Powerhouse switchyard to the Narrows 2 Powerhouse substation.

3.0 YCWA’s Need for the Project

3.1 Power to Northern California

YCWA plans to develop a reliable revenue stream by selling the Project electricity output wholesale, which will then be used to serve the electric loads primarily in the State of California. Historically, YCWA’s electric output has been delivered to PG&E for use in its service area. Since the advent of industry restructuring and creation of the California Independent System Operator (CAISO, or ISO), YCWA, through PG&E, sells its generation to the ISO.

The CAISO assumed computerized command of the long-distance, high-voltage power lines that deliver electricity throughout California and between neighboring states and Mexico. The mission of the CAISO is to ensure that the power grid is safe and reliable, ensure equal access to the power grid and ensure that there is a competitive market for electricity in California. The ISO controls 75 percent of California's power-grid transmission systems formerly operated by the three investor-owned utilities in the state. The ISO-controlled portion of the Grid covers 124,000 square miles, or three-quarters of the State of California. The California Power Grid delivers 164 billion kilowatt hours (kWh) of electricity each year, or enough power to serve the annual energy needs of 27 million current customers of investor-owned utilities. In addition, the Grid transports significant amounts of power for others in the region. Power plants meeting up to 45,000 megawatts of peak demand are connected to the ISO grid, making the control area the second largest in the United States³ and the fifth largest in the world.

In addition to operating the Power Grid, the CAISO conducts three open-competition markets that not only help lower the cost of providing electricity, but most importantly, assist the ISO in maintaining reliability of the transmission grid. These markets also provide the CAISO with electrical services such as regulation and voltage support that it needs to maintain the reliability of the power grid. The Ancillary Services Market takes place a day ahead and an hour ahead of when customers actually use the electricity. The Ancillary Services Auction includes:

- Regulation. Generation that is already up and running (synchronized with the power grid) and can be increased or decreased instantly to keep energy supply and energy use in balance.
- Spinning Reserve. Generation that is running, with additional capacity that can be dispatched within minutes.
- Non-Spinning Reserve. Generation that is not running, but can be brought up to speed, within ten minutes.
- Replacement Reserve. Generation that can begin contributing to the grid within an hour.

As the California electricity industry evolves and with the imminent expiration of YCWA's power purchase contract with PG&E on April 30, 2016, YCWA is exploring various options with regard to marketing the energy output of the Project and the staffing and transmission needs of each option.

3.2 Cost and Availability of Alternative Sources of Power

From YCWA's perspective, to truly be considered an alternative to the Project's energy supply, any alternative must meet two criteria: 1) it must be able to be developed by YCWA so that it could create a revenue stream to offset various bond debt payments and the costs for flood control and irrigation and consumptive water supply; and 2) it must deliver power benefits in terms of flexibility, reliability, cost-security and operating characteristics, including ancillary

³ The Pennsylvania-New Jersey-Maryland Inter-connection is the largest single Grid in the United States.

benefits that are equivalent to the existing Project. YCWA is aware of no other non-hydro large-scale generating source that can meet both these criteria. Further, hydroelectric energy sources like the Project provide renewable and cheap sources of power.

Purely with regards to power and from a Northern California perspective, if a new license for the Project is not issued, the Yuba River Development Project's contribution to the Power Grid would need to be replaced with an alternative source. These alternative sources might include importing power from sources outside the region and/or siting a new generation facility or facilities in California.

While importing power into the region to offset Project generation will be possible during some seasons, imports will be impossible during some seasons and hydrologic year types given the physical limits of the current transmission grid. To the extent that imported generation is available, it would be priced at CAISO market prices and would, therefore, yield a price consistent with the market rate estimate provided above.

For a new generation facility within Northern California, it is likely that replacement power would be produced by a combined cycle natural gas-fired generating facility. The CPUC's Market Price Referent (MPR) process (2011, California Public Utilities Commission at <http://www.cpuc.ca.gov/PUC/energy/Renewables/mpr>) includes a model and process to estimate long-term price of electricity for a combined cycle natural gas-fired facility. Utilizing the CPUC model and process, with updated assumptions, the MPR methodology yields a levelized power value of \$0.0751/kWhr.

In addition, capital and O&M costs for a new gas pipeline and electric transmission, both of which are unknown at this time since they depend on the location of the new facility, would need to be added to the overall cost of the alternative. However, siting a combined cycle natural gas-fired plant in Northern California would be challenging given the limited availability of emission offsets in the region.

If a combined cycle natural gas-fired generating facility were to be sited to replace the power generation of the Project and the CPUC market Pricing Ruling cost of \$0.751/kW is used, the annual average cost of replacement power would be \$105,700,000.

3.3 Effects of Alternative Source of Power

It is unlikely that YCWA would develop a new power Project to replace the Project power, though the power would need to be replaced by a third party to continue to meet California's power needs.

3.4 Effects on YCWA to Purchase or Generate Replacement Power

If YCWA is not granted a new license for the Project, YCWA would continue to operate the Project facilities, excluding the power generating facilities, outside of FERC jurisdiction as flood

control and water supply facilities (i.e., no electricity generation facilities). YCWA would not enjoy the revenue from power sales, so YCWA's water customers would be affected. Furthermore, YCWA's debt that is being used to fund the relicensing effort is secured with hydro revenue. If revenue is not being obtained from the Project, this would put a large financial burden onto YCWA's water customers.

If a new license is not issued, it is unlikely that YCWA would develop a new power Project to replace the Project power, so YCWA would not incur any increase in fuel, capital or other related costs.

YCWA anticipates, though, that a third party would likely develop a power source to replace the power lost to California. That party would incur new costs related to development and operations of a new source of power and fuel costs related to operations of the new source. Since that third party would pass these costs onto retail customers and given that the Project power is relatively inexpensive, it is possible that electricity costs for the communities served would increase.

4.0 Cost of Production and Alternative Sources of Power

4.1 Average Annual Cost of Project Power

Exhibit D includes a detailed estimate, including the basis for the calculations, of YCWA's cost of electricity production under both the No Action Alternative and YCWA's Proposed Project Alternative.

4.2 Projected Resources to Meet YCWA's Capacity and Energy Requirements

As stated above, YCWA does not support an electricity service territory, and therefore does not have any electricity capacity or energy requirements. Therefore, this item is not applicable, as it is not related to this Exhibit H.

5.0 Effect on Industrial Facility

YCWA does not use the Project power for its own industrial facility. Therefore, this item is not applicable.

6.0 Indian Tribe Need for Electricity

YCWA is not a Native American tribe. Therefore, this item is not applicable.

7.0 Effect on Transmission System

YCWA does not own or operate an electric transmission system. Therefore, this item is not applicable, except with regards to a single-line diagram. Single-line electric diagrams are included in Volume VI of YCWA's Application for New License. This information is considered Critical Energy Infrastructure Information (CEII), and will not be made available to the public.

8.0 Comprehensive Development of the Waterway

At the outset of the current relicensing process, YCWA undertook a reconnaissance-level study to identify potential Project modifications that would enhance the Project's contribution to the comprehensive improvement and development of the waterway and for other beneficial public uses. This study and the resulting proposed modifications are described below.

8.1 Modifications Considered

Upon review of the existing Project, YCWA identified the following potential enhancements to the Project:

- Modify the Lohman Ridge and Camptonville diversion tunnels to increase the maximum diversion capacity of the tunnels
- Construct new diversion dams on unregulated tributaries to increase diversions to New Bullards Bar Reservoir
- Improve hydraulic capacity of New Colgate Power Tunnel and Penstock
- Increase maximum storage capacity of New Bullards Bar Reservoir by a dam raise
- Add a pumped storage component to the Project
- Add minimum flow powerhouses to Our House and Log Cabin diversion dams
- Add a Tailwater Depression System (TDS) in New Colgate Powerhouse
- Replace Narrows 2 Powerhouse turbine runner
- Change Project operations for flood control and/or water supply
- Modify New Bullards Bar Dam outlet for flood control

All of the potential enhancements failed screening analysis except for two: 1) addition of the new flood control outlet at New Bullards Bar Dam; and 2) installation of the New Colgate Powerhouse TDS. The anticipated facilities, their operations, construction and costs are described in Exhibits A, B, C and D of the Application for New License. The additional release capacity provided by the new flood control outlet would provide substantial flood control benefits from New Bullards Bar Reservoir by increasing operational flexibility during storm

events, which would result in lower flood stages downstream and provide flood system resiliency. The TDS would allow New Colgate Powerhouse to operate at higher flows and provide both flood control and generation benefits.

9.0 Financial and Personnel Resources

9.1 Financial Resources

YCWA's sources of financing and revenue are sufficient to meet the continuing O&M needs of the Project. Historically, YCWA's O&M, capital and debt service costs were paid by PG&E in exchange for the power produced by the Project. As the California electricity industry evolves and with the imminent expiration of YCWA's power purchase contract with PG&E on April 30, 2016, YCWA is exploring various options with regard to marketing the energy output of the Project and the transmission needs of each option.

9.2 Personnel Resources

YCWA has extensive experience operating and maintaining the Project in a safe, efficient and reliable manner. YCWA has been operating and maintaining the Project for 45 years. YCWA has had responsibility for generating wholesale electricity that historically has been delivered to PG&E. YCWA is confident that its hydro resources will continue to be critical to providing efficient and reliable electric service to consumers in California.

YCWA currently has staff of about 39 full-time, 10 seasonal employees, with all of those staff dedicated to the safe and efficient operation of the Project. The following is a list of the personnel who are headquartered near the Project in Dobbins, CA, and are responsible on a day-to-day basis for maintenance and operation of the Project:

- 7 administrative, engineering and supervisory personnel
- 6 electrical and communication maintenance personnel
- 7 mechanical maintenance personnel
- 5 operating personnel

In addition, management, accounting, environmental, human resources, safety, and management information systems staff located in YCWA's headquarters in Marysville support the Project on an as-needed basis.

10.0 Project Boundary Expansion Notification

As described in Exhibit G, YCWA proposes to modify the existing FERC Project Boundary. This modification would entail reducing the boundary in certain locations and expanding it in other locations. YCWA has notified, by certified mail, property owners on the additional lands to be encompassed by the Project and governmental agencies and subdivisions likely to be interested in or affected by the expansion. These property owners are listed below in Table 10.0-1.

Table 10.0-1. List of property owners impacted by the FERC Project boundary expansion.

County	APN	Owner's Name
NARROWS 2 DEVELOPMENT		
Yuba County	5300014000	Pacific Gas & Electric Company
NEW COLGATE DEVELOPMENT		
Nevada County	61-010-01	Stratford Margaret H Trust Etal
Yuba County	48170017000	Middlebrook Fam Tr B Udt Dtd 1/17/92
	48200007000	Warren Vick
	48200008000	Skarr Robert R & June E
	48200010000	Pacific Gas & Electric Company
	48200028000	Knox Gerald A & Bonnie Lee Trustees
	48200029000	Evans Maurice & April J Jt
	54250002000	Chy Company (The)
	64180006000	Sierra Pacific Industries
	64190026000	Chy Company (The)
	64190029000	Siller Brothers Inc
	64200001000	Siller Brothers Inc
	64200005000	Lacey Fred Scott
	64200007000	Charles Wharton
	64200030000	Zane Baker
	64200032000	Lee Mary T
	64200035000	Barry Michael Patrick
	64200036000	James Walsh
64210003000	Siller Bros Inc	

11.0 Electricity Consumption Efficiency Improvement Program

YCWA does not currently serve a retail load from the Project. Therefore, this item is not applicable. However, YCWA does encourage energy efficiency improvements especially in regards to agricultural users within its Member Units. For example, as part of the Lower Yuba River Accord, YCWA paid approximately \$884,000 for the conversion of 72 diesel groundwater pump motors to cleaner, more efficient electrical groundwater pump motors. Also, YCWA constructed the Wheatland Project to provide surface water supplies to farmers in southwestern Yuba County that previously relied entirely on groundwater pumping.

12.0 Indian Tribes Names and Mailing Addresses

The names and mailing addresses of local Native American tribes who would likely be interested in this Project relicensing are included in the Initial Statement of YCWA's Application for New License.

13.0 Safe Management, Operation and Maintenance of the Project

All facilities are maintained to ensure safe and reliable operation. Each Project facility is visited at least several times weekly by YCWA's personnel who are experienced and familiar with the Project. Potential problems are identified and corrected, or scheduled for repair as they are discovered, in order of the severity of the potential problems. Project operations personnel are on duty seven days a week, between 7:00 am and 3:30 pm, and maintenance personnel are on duty Monday through Friday between 7:00 am and 3:30 pm.

In addition, remote operation and monitoring of the different Project facilities is automatically controlled by a Supervisory Control and Data Acquisition (SCADA) from PG&E's Wise Powerhouse. The Wise Powerhouse is staffed 24 hours a day 7 days a week. Reservoir levels, and power facilities are continuously monitored and any parameters out of the normal operating range are brought to the Wise Powerhouse operator's attention with an alarm, and further communicated to a YCWA operator by phone notification. The YCWA operator evaluates and determines further action including call-out of maintenance personnel.

If a hazardous situation develops at one of the Project dams, Wise Powerhouse follows the current Emergency Action Plan (EAP) guidelines and notification flowcharts to provide early warning of an emergency condition to emergency management agencies. The EAP guidelines include requirements for dam monitoring in the event of an emergency.

YCWA has implemented other public safety measures at Project facilities. Potentially hazardous areas are secured, to the extent practicable, against public entry. Multiple warning devices (e.g., signs, fences and barriers) have been installed to warn the public. Both FERC and the California DWR, Division of Safety of Dams (DSOD) inspects Project dams annually.

13.1 Operation during Flood Conditions

YCWA operates the reservoir for flood control operations in accordance with the USACE's flood control manual for the Project. Flood control operations consist of making releases from the New Colgate Powerhouse or the New Bullards Bar Dam gated emergency spillway (or both) to maintain the New Bullards Bar Reservoir flood pool and to ensure releases below the dam do not exceed prescribed flow rates. Emergency operations that are part of the flood control manual are also prescribed to ensure dam safety.

13.2 Warning Devices for Public Safety

Public safety warning signs are provided at locations where changes in Project operations have the potential to quickly alter water levels. These include public warning signs below Project dams and powerhouses; a siren is activated in advance of Narrows 2 Full Bypass releases.

Exclusion buoy lines are in place at New Bullards Bar Dam to prevent boating access near the intake and spillway.

13.3 Emergency Action Plan

YCWA completed a comprehensive revision of its Project EAP in 2011. YCWA conducts Tabletop and Functional exercises on a 5-year cycle. The last Tabletop and Functional exercises were in 2010. The EAP is reviewed annually to ensure that all information is up to date.

13.4 Monitoring Devices

The civil structures are outfitted with a variety of monitoring devices to detect settlement or displacement movement and leakage in dams, and to protect from conduit failure. Devices installed and maintained include: leakage weirs, survey pedestals, level sensors, and loss of pressure alarms.

YCWA monitors civil structures by conducting regular, periodic visual observations and by reviewing and analyzing data collected from various instruments throughout the Project. This monitoring measures critical indicators of structural behavior. Data are collected, observations are made, and qualified personnel evaluate and make recommendations based on the collected data. Results are presented in reports and distributed to FERC and the DSOD. All facilities are observed and attended weekly. Periodic scheduled inspections are made less frequently (i.e., monthly, quarterly, or annually) for collection of monitoring data. The results of these inspections are recorded and placed into databases used for tracking history of the measurements.

Annual inspections are conducted with a Field Engineering Inspector from FERC and DSOD.

An integral part of the maintenance and monitoring program includes the Part 12D Independent Consultant's Inspection and reports completed every 5 years. These inspections and reports provide an independent, third party assessment of the instrumentation and performance-monitoring program. These reports also include recommendations by the independent inspector for any additional instrumentation that would improve monitoring. The devices used for monitoring civil structures and water conduits are described below.

As required by FERC regulation at Section 12.41, *Dam Safety Surveillance Monitoring Plan*, YCWA also completes and files with FERC periodic surveillance monitoring reports.

13.4.1 Leakage Weirs

Leakage weirs are located throughout New Bullards Bar Dam. The data are tabulated and provided to FERC in YCWA's periodic surveillance monitoring reports.

13.4.2 Survey Pedestals

New Bullards Bar Dam survey pedestals consist of six-inch long steel pipes secured by concrete.

13.4.3 Level Sensors

Sensors provide for New Bullards Bar Reservoir elevations and are monitored via SCADA at Wise Powerhouse, including monitoring for high and low water conditions.

13.4.4 Loss of Pressure Alarm

There is a pressure sensor that provides a loss of pressure alarm to SCADA for the New Colgate and Narrows 2 powerhouse penstocks.

13.5 Employee Safety and Public Safety Record

Based on California Division of Occupational Safety and Health Form 300 annual reports, from 2009 through 2012, there have been 19 lost-time accidents for a total of 165 days away for work involving YCWA's Yuba River Development Project operations employees.

From 2008 through 2012, there have been no fatalities at the Project.

No injury incidents at or below Project facilities that required emergency medical responses have been reported to YCWA from 2008 through 2012.

14.0 Current Operations

Current Project operations and constraints are described in Exhibit B.

15.0 History of the Project

The Yuba River rises at the crest of the Sierra Nevada some 8,000 feet (ft) above the Pacific Ocean and tumbles through a hundred miles of canyons to join the Feather River at a confluence that stands only 67 ft above sea level. It drains 1,357 square miles (sq mi) of a watershed never more than 35 miles (mi) wide.

As early as 1875, levees were rising to protect against the winter flow in farm country and Marysville was beginning to surround itself with dikes that now stand 35 ft above its urban streets. Bullards Bar Dam was built between 1922 and 1924 by the Yuba River Power Company. Lower downstream, the California Debris Commission, established by the Federal Government in 1893, created the debris dam at the Narrows and Englebright Reservoir, just prior to World War II. Even the checking of the river's mining debris and the erection of small dams did little to

safeguard the downstream communities against the potential dangers of the Yuba River during a flood event.

There have been ten major floods on the Yuba River during this century. In 1950, the Yuba River cut through its banks at Hammonton and inundated southern Yuba County, causing millions of dollars in damage. Then in 1955, as every watershed in California was hit by tropical storms, the Yuba River poured over the dams at Bullards Bar and Englebright Reservoir and surged into the valley. The 1955 Yuba River flood came within inches of flooding Marysville, wreaked havoc in Yuba City, killed 40 people, forced almost 30,000 people to flee the county, and reinforced the opinion that there was an urgent need for a major water program.

Since the wake of the 1950 flood that impacted Linda and Olivehurst communities, located south of the Yuba River, residents worked in Yuba County on a water program that would control the Yuba River against disastrous floods and develop water resources for farmers who were pushing their wells ever deeper into dwindling underground reservoirs. The population of Yuba County, and Sutter County as well had been growing steadily since World War II, and the flood of 1950 had emphasized the danger to lives as more suburban home sites developed.

Therefore, the Yuba County Board of Supervisors created in December 1951 the Yuba County Water Resources Board. The board had been able to do little more than evolve preliminary plans, locate water rights, and help the component water districts until after the 1955 flood.

The first problem that had to be resolved was the creation of an effective water agency that could take firm action. In January 1959, Yuba County went to the State Legislature with a bill to create a water agency. The bill was signed by Governor Edmund G. "Pat" Brown Sr. on June 1, 1959. YCWA became a reality in 1959 and started a long, arduous, and stormy campaign that was not to reach a climax for almost 7 years.

YCWA employed the International Engineering Company of San Francisco, one of the leading engineering firms in the world, to conduct a feasibility study and, in January 1961, they filed a report outlining the Yuba River Development Project that would cost approximately \$185 million.

Key concepts of the Project were development of sufficient hydroelectric power to repay bond financing, without any tax obligation on the part of local landowners, and a long term contract for sale of power to PG&E at a guaranteed annual payment, which would be the sole security for the bond issue. In addition, some help was sought for a federal contribution in recognition of Project flood control accomplishments, and a state contribution in recognition of statewide benefits to recreation and fish enhancement. Even so, the Project posed a financial burden beyond all other obstacles that would have tried the resources of a state government, no less that of a county, which was rich in history but short on financial assets. In fact, at this point in its history, YCWA had exhausted its funds. It had committed to several years of tax revenues for a loan from the county general fund that was needed to pay engineering costs.

Few people in the local, state, or federal water bureaus believed that Yuba County, one of the state's smaller counties with an assessed valuation of only \$65 million, could develop a Project that carried a price tag of almost \$200 million. However, when the ballots were counted on May 16, 1961, Yuba County voters had approved, by an 11-1 margin, the \$185 million in revenue bonds needed to fund the Project. This was almost three times the total assessed valuation of all property in the county at that time. Further, YCWA faced some complex political maneuvers that had to be carried out despite its lack of political muscle at either the state or federal level.

The Federal Power Commission (FPC) required a Federal Power Act license. Obtaining this license required an agreement with the United States Department of Agriculture, Forest Service, which administers the Plumas and Tahoe national forests within the Yuba watershed to ensure protection of National Forest System land; a recreation plan acceptable to the Forest Service; a negotiated agreement with Cal Fish and Wildlife that would provide fish protection and enhancement; and an agreement with the United States Department of Interior, Bureau of Reclamation (Reclamation) and the State of California for future downstream development.

YCWA moved forward with successful appeals for a federal cash contribution from Congress in recognition of flood control benefits, and authorization from the State Legislature for carrying out recreation and fish enhancement through a grant under the State's Davis-Grunsky Act. Meanwhile, YCWA faced the problem of finding financing for final design of the Project and preparation of plans for construction bids. This was partly accomplished through a \$400,000 loan from the Federal Community Facilities Administration with repayment obligated only if the Project became a reality.

Finally, there were the complicated negotiations with PG&E for a 50-year contract for the sale of power that would provide revenues be used to finance the revenue bonds and to acquire the existing power generating plant that PG&E had long been operating at the Old Bullards Bar Dam.

Final designs were prepared and by the summer of 1964, YCWA could look at the framework of its Project. A decision was made to call for bids to get construction under way before a lethargic bond market and a depression in the price of power put it out of business. The request for bids in September of 1964 elicited considerable interest on the part of several contractors, but in the end, they all declined to bid. The consensus was that there were too many contingencies and not enough money.

After a reappraisal by YCWA and its engineers, a revised plan was developed to produce more power in a more efficient manner by eliminating the proposed New Bullards Bar Power Plant and the old PG&E Colgate Power Plant, and by increasing the capacities of the proposed New Colgate Power Plant and the associated tunnel and penstock. To save additional money, the irrigation diversion dam and canals, the New Narrows afterbay, and other Project amenities were eliminated. Irrigation diversions and the canals were left for later stages of construction.

Bids were called for again in December of 1965, and this time all the necessary contracts, licenses, and permits were accomplished facts. Costs had continued to climb sharply since the fall of 1964 and power values continued to fall, and shortly before the bid date, the bond market interest rates rose by more than one percent. YCWA received two sealed packages in response to its invitation for bids. One was not a bid, but a substitute proposal for a negotiated cost plus “target estimate” contract. The other was a bona fide bid, but for \$26 million higher than the estimated funds available, from a contracting combine called Perini-Yuba Associates.

Upon finding that the bidding contractor was willing to negotiate a contract, YCWA officials obtained the cooperation of the Governor in a special call to the Legislature and - as interest rates continued to climb - were granted legislative authority to execute a negotiated contract with the bidder for the largest single public works contract ever awarded in California up to that time.

After intensive negotiation, involving concessions on the part of YCWA, as well as the contractor and PG&E, it was found that there was still a gap between costs and revenues amounting to \$8.7 million. Interest rates continued to climb, with each 0.12 percent representing almost \$4 million less cash available for construction, while power values were declining. The impasse was solved by a novel and unprecedented arrangement, under which the contractor, the engineer, and PG&E agreed jointly to purchase sufficient Series B subordinate lien revenue bonds to close the actual fund gap at completion of construction. These bonds mature after retirement of Series A Bonds in 50 years.

The Series A Bonds were sold to a single bidder on May 24, 1966, Blythe and Co. and Smith-Barney Inc. of San Francisco. It appears in retrospect that there were only a very few days when market conditions were such that this issue could have been absorbed. On June 1, 1966, the money and bonds were delivered, and a unique construction Project was underway.

The construction was undertaken by Perini-Yuba Associates. They would hire up to 3,000 workers, hailing from every state in the United States. A score of local firms including H. Earl Parker, Baldwin Contracting Co., and Tenco made major contributions to the development. The task before them was monumental and the time line was set by the contract, which stated, *“the Project must be completed and operational 4 years and 1 month from the starting date.”*

The challenges lay in the geography of the land where the construction was to take place - steep, rocky canyons accessible only by narrow roads located miles from any large city - and weather in the form of torrential rains that could wipe out months of excavation work in a few hours. Both could cause delays, which no one could afford. YCWA and the contractor knew that lives, homes, and businesses would be lost if the Project was not completed before the Yuba River rose up again. A half mile of vapor lights strung across the canyon allowed shifts of men to work 24 hours a day for more than 2 years. Day in and day out, concrete was continuously placed 20 hours a day. In January 1969, a storm hit that produced a historic runoff on the river. Engineers had foreseen such an event and had required that the center block of the dam be left lower to handle the Yuba River. The waterfall that spilled over that center block was spectacular; even in its unfinished state the new dam had kept the Yuba River from turning deadly and destructive.

By the end of 1969, the Project was moving toward completion. New Bullards Bar Dam was completed and water was being stored in the new reservoir.

In early 1970, the New Colgate Powerhouse, which contained two of the largest turbines of their kind ever built, was ready for trial tests to produce electricity. The 1,300 foot drop of water from behind New Bullards Bar Dam boosted the force of the water at each turbine to the equivalent of 212,000 horsepower. However, within a month the powerhouse was shut down when a crack was discovered in the 47-ton stainless steel runner on the number two unit. Men worked 24 hours a day at Colgate to grind out the crack in the runner, while experts from Switzerland and Germany hurried across the Atlantic to figure out a solution to the problem. The repair was made within 3 weeks, and the runner was back in service as good as new.

The New Narrows 2 Powerhouse, which began producing electricity in February 1970, had problems too. A 10-inch long strap of steel broke loose, tore up the stator and pole windings, and set fire to the generator. The generator was taken back to Japan by ship. There it was rebuilt, reshipped, and returned to the Project for installation and was generating power by May 10, 1970 (YCWA 2009).

In 2008, YCWA added to the Project the Narrows 2 Powerhouse Full Bypass (Full Bypass), which is composed of a branch off the Narrows 2 Powerhouse Penstock that can discharge up to 3,000 cfs of water at full head into the Yuba River immediately upstream of the Narrows 2 Powerhouse through a 72-in diameter fixed-cone valve in a concrete structure. The purpose of the Full Bypass is to minimize the possibility that emergencies or other events that require the Narrows 2 Powerhouse be taken off line cause violations of YCWA's flow requirements in the FERC license, which are measured at the Smartsville and Marysville streamflow gages.

16.0 Generation Lost Over the Last Five Years

YCWA typically takes scheduled outages for about 2 to 3 weeks per powerhouse in the fall for annual maintenance. Work includes equipment maintenance, testing and inspecting, and cleaning and repair of water conduits. YCWA schedules the outages in this period because in the fall consumptive demands for irrigation water are minimal, power values are low, and there is a low probability of rain.

Unscheduled outages that impact the Project's power production may be caused by a variety of factors, many of which are beyond YCWA's control. "Momentary" outages may be caused by transmission trouble; YCWA is usually able to quickly restore the Project to service shortly after these occur. Unscheduled outages may also occur so that YCWA may respond to emergency conditions (e.g., response to equipment failure). Table 16.0-1 lists unscheduled outages that extended for more than 24 hours and that have impacted power production from Calendar Year 2008 through 2012.

Table 16.0-1. Dates when the Yuba River Development Project powerhouses were shut down for unscheduled (forced) outages for more than 24 hours from Calendar Year 2008 through 2012 and the reason for each outage.

Period	Period of Shut Down	Estimated Lost Power (MWh)	Reason for Shut Down
NEW BULLARDS BAR MINIMUM FLOW POWERHOUSE			
11/9/10 – 12/18/10	943 hrs	101	PG&E Circuit Breaker
NEW COLGATE POWERHOUSE			
8/14/09 – 8/16/09	95 hrs	4,674	New Colgate Powerhouse Unit 1 Fire
11/9/10 – 11/11/10	943 hrs	0 ¹	PG&E Circuit Breaker
NARROWS 2 POWERHOUSE			
11/9/10 – 12/18/10	943 hrs	15,353	PG&E Circuit Breaker
TOTAL PROJECT			
--	1,038 hrs	20,128	--

¹ For this period outage resulted in deferred generation, but not quantifiable lost generation.

17.0 YCWA’s Compliance Record

YCWA is in compliance with terms and conditions of the existing license. During the annual FERC Project inspections and the 5-year environmental inspections, various remedial actions are recommended as a result of the inspections. YCWA initiates 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, YCWA immediately notifies FERC, initiates an investigation and provides a written report to FERC regarding the incident and corrective action.

From 2008 through 2012, there was one violation of the existing license. On July 29, 2011, YCWA notified FERC of non-compliance with the ramping rate requirements downstream of Narrows 2 Powerhouse in Article 33. YCWA included the actions it had implemented to avoid similar non-compliances. In a letter dated January 26, 2012, FERC advised YCWA that it considered the non-compliance events to be violations of the license.

18.0 Actions Taken by YCWA Affecting the Public

The operation of Project reservoirs has the most significant direct benefit to the public by providing flat-water recreation opportunities. The operation of the reservoirs for flood control, power generation, water supply and environmental purposes generally result in declining reservoir levels at the end of summer and into the winter, thus reducing the convenience and opportunity for recreation.

From 2008 through 2012, there has been one reported accident involving the public related to the Project. In a letter dated March 7, 2012, YCWA advised FERC that a motorist was stuck at an access gate.

19.0 Ownership and Operating Expenses if License Is Transferred

Estimates of the Project O&M, administration, capital improvements and proposed mitigation costs are described in Exhibit D. If the license were transferred, the costs for future operations estimated would not be necessary, although some costs of operating the facilities for irrigation and consumptive water supply would remain. Other costs that would not be incurred include future capital improvements and the costs of proposed mitigation measures described in Exhibit D.

20.0 Annual Fees for Federal or Indian Lands

The Project occupies federal land managed by the Forest Service. No Native American tribal lands are included within the FERC Project Boundary.

In 2013, YCWA paid \$303,000 for use of federal lands (see Table D5.1-2 in Exhibit D).

21.0 References Cited

United States Army Corps of Engineers (USACE). 1972. New Bullards Bar Reservoir, Reservation for Flood Control, Appendix V, Master Manual of Reservoir Regulation Sacramento River Basin, California. Department of the Army, Sacramento District, Corps of Engineers, 1972.

Yuba County Water Agency (YCWA). 2009. History of YCWA. Located at: <http://www.ycwa.com/about/development-of-agency>.