OD-ORDER, 113 FERC ¶62,137, Yuba County Water Agency, Project No. 2246-047 November 22, 2005

Yuba County Water Agency, Project No. 2246-047

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Yuba County Water Agency, Project No. 2246-047

Order Modifying and Approving Amendment of License

(Issued November 22, 2005)

George H. Taylor, Chief, Biological Resources Branch, Division of Hydropower Administration and Compliance.

On March 29, 2005, Yuba County Water Agency (Licensee) filed a request to amend its license to include the installation of a full-flow bypass for the Narrows 2 development and to implement more stringent ramping and flow fluctuation criteria for flows downstream of the Narrows 2 development. The Narrows 2 development is a hydropower generating facility that is part of the Yuba River Development Project (FERC License No. 2246), which also includes New Bullards Bar Reservoir and the New Colgate power plant. The project is located on the North Yuba River downstream of Englebright Dam in Yuba County, California, about 20 miles northeast of Marysville and about 24 miles upstream from the confluence of the Yuba and Feather Rivers.

Background

Englebright Dam is a debris dam that was constructed on the Yuba River by the U.S. Army Corps of Engineers (Corps) in 1941 to capture sediment produced by upstream hydraulic mining activities. The dam has no low-level outlet. As a result, water flowing from Englebright Reservoir to the lower Yuba River must discharge through one of the two developments located downstream or spilled over the top of the dam. The two developments are licensee's Narrows 2 development and the Narrows 1 Project (FERC Project No. 1403), which is owned by Pacific Gas and Electric Company (PG&E).

Both Narrows 1 and Narrows 2 have intakes that take water from lower water levels in Englebright Reservoir. Englebright Reservoir is used as the afterbay to the New Colgate hydroelectric powerhouse, resulting in reservoir levels that commonly fluctuate about 10 feet over the period of a week. Narrows 1 and 2 are operated to maintain a relatively constant flow in the lower Yuba River, pass storm flows, and make seasonal flow changes.

Under an existing power purchase agreement between PG&E and the licensee, PG&E can require the release of water from New Bullards Bar Reservoir for power generation based on monthly quotas and available storage in the reservoir above an established index or "critical line." The licensee and PG&E currently coordinate the operation of Narrows 1 and Narrows 2 for hydropower efficiency and flow stability in the lower Yuba River. The penstocks to the two developments are the only outlets from Englebright Dam, and are the only means of discharging water downstream, except for spills over the top of the dam. Both

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developments are operated as base-load plants and are dependent on available storage in New Bullards Bar and Englebright reservoirs.

Under current operating procedures, the Narrows 1 development is usually operated when total releases from

Englebright Dam are 730 cubic feet per second (cfs) or less. When releases are 730 to 2,560 cfs, the Narrows 2 development normally is operated. When releases exceed 2,560 cfs, both developments normally operate.

The Narrows 2 development, approximately 400 feet south of the dam on the west bank of the Yuba River, consists of a single 70,000-horsepower, Francis-type turbine with a capacity of 50 megawatts (MW). This hydropower generating facility produces an average of 248 million kilowatt hours per year. Narrows 2 has a discharge capacity of 3,400 cfs and a maximum bypass flow capacity (when the generator is not operating) of approximately 650 cfs. The existing intake structure is a "tower" about 200 feet upstream of the dam that draws water from the reservoir surface down to an elevation of 439 feet mean sea level (m.s.l.), about 80 to 85 feet below the typical reservoir surface elevation. The bottom of Englebright Reservoir in the vicinity of the intake structure is approximately elevation 333 feet m.s.l.; the bottom of the existing intake structure, therefore, is located approximately 100 feet above the bottom of the reservoir.

The plant has no turbine shutoff valve and a fixed-wheel gate in the intake structure controls the discharge to the powerhouse. Water is delivered to the turbine from the intake structure in Englebright Reservoir through a 717-foot-long tunnel. The upstream portion of the tunnel (approximately 350 feet) is a concrete-lined horseshoe (9 foot 2 inch radius) and the downstream portion of the tunnel (approximately 370 feet) is a 14-foot- diameter circular, steel-lined tunnel. A 36-inch bypass valve on the turbine scroll case provides up to 650 cfs of downstream bypass flow through the plant if the intake gate is open.

As the water (up to 3,400 cfs) passes through the Narrows 2 development, the turbine generates at 13.8 kilovolts of electricity, which is then stepped up to 60 kilovolts and transmitted through PG&E power lines. The water then leaves the development on the south side and flows down the Yuba River.

The Narrows 1 development is about 1,500 feet downstream of Narrows 2 on the opposite bank of the Yuba River. Narrows 1 is a 12-MW project with a discharge capacity of approximately 730 cfs and a bypass flow capacity of about 540 cfs.

The 1965 California Department of Fish and Game (CDFG) Agreement with the licensee and the current project license placed limits on the magnitude and rate of controlled flow reductions at the Smartville Gage during October and November. Those limits are stated in Article 33(d), footnote 3B-G, as follows:

B. Variations from the scheduled uniform releases of not more than 15 percent is permissible but shall be minimized whenever possible.

C. Reduction in the average continuous flow from October 15 to 31 shall be not more than 35 percent of the average flow during the preceding seven-day period and shall be minimized whenever possible.

D. Reduction in the average continuous flow from November 1 to 30 shall be not more than 15 percent of the average flow during the preceding 15-day period and shall be minimized whenever possible.

E. Increase in uniform releases during October and November shall be permitted when water storage is sufficient, provided no reduction in December releases is necessary as a result of the increases.

F. Changes in flow releases due to project operation during the period January 16 to October 15 shall not fluctuate at an hourly rate of more than 500 cfs and shall be changed as gradually as possible within the hourly period.

G. These provisions shall be subject to re-evaluation and revisions at such time as Marysville or other downstream reservoir is constructed on the Yuba River.

Under normal operating conditions, the operations of the Narrows 1 and Narrows 2 facilities are coordinated to provide continuous releases in conformance with the conditions of the project license, including flow fluctuation and ramping conditions. However, under emergency conditions such as outages of one or both of the facilities, it may not be possible to adhere to flow fluctuation and ramping criteria with the existing physical facilities and capabilities of the developments.

Between 1998 and 2001, there were nine uncontrolled flow events at the Narrows 2 development that resulted in flow fluctuations. Seven of these events were caused by PG&E-maintained systems --six electric transmission line outages on PG&E's transmission line connecting the licensee's Narrows 2 development to the electric grid, and one outage on the transfer relay. The two other events were caused by Narrows 2 development systems.

The bypass at the Narrows 2 development does not allow the plant's full-flow capacity to be bypassed when the plant is not operating. Even a brief loss of power could result in shutdown, during which flows into the river may drop from 3,400 cfs to 650 cfs or possibly to zero. The ramping- down process takes place in less than 1 minute. In the event of an emergency shutdown, the Narrows 1 plant can be activated remotely to provide an additional 540 cfs of flow through its bypass, but the activation process takes approximately 30-60 minutes to complete (possibly longer depending on the response time of the operator).

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Any shutdown of the Narrows 2 development, particularly during the warm and dry summer months, could cause flow and temperature conditions in the lower Yuba River to fluctuate in ways detrimental to fish. Adverse effects on fish could result when flow through the plant ceases or when warm water is spilled from the reservoir into the river, in either case allowing water temperatures in the river to rise.

Three types of shutdowns can take place at the Narrows 2 development. Short-term emergency shutdowns can be caused by momentary failure of the PG&E transmission line as a result of interference by birds, fire, lightning, storm, failure of transmission equipment, or by a momentary plant malfunction. Flows can be reduced from 3,400 cfs to 0-650 cfs for a period ranging from about a minute to more than an hour. Although corrective actions have been taken by both the licensee and PG&E to minimize shutdowns of this type, they still can occur.

Long-term emergency shutdowns can result from catastrophic failure of the PG&E transmission system that links the plant to the transmission grid or from major component failure at the plant. Flows through the plant can be reduced from 3,400 cfs to 0-650 cfs, depending on whether the malfunction allows the bypass to be operated. Such shutdowns are rare (two in the last 30 years) but could last from days to months. Partial downstream flow can be restored through the PG&E Narrows 1 Powerhouse within about 30-60 minutes, and full downstream flow can be resumed in 1-2 days by allowing water to spill over the top of Englebright Dam. High spill rates between May and October, however, can increase downstream temperatures.

Maintenance activity shutdowns are required for generator brush replacement, which in the past involved a 6-hour shutdown two or three times per year, and annual maintenance, which typically requires a shutdown of 2-3 weeks or longer (in some instances, months) if major maintenance is performed. In recent years, maintenance activities typically have been scheduled during a time when no impact would result on downstream flows. During brush replacement, the licensee can open the 650-cfs bypass valve and can request that PG&E operate the Narrows 1 Project to maintain downstream flow when flow is 1,350 cfs or less. During the annual maintenance period, the bypass valve usually cannot be operated, so downstream flow is entirely dependent on Narrows 1 releases or Englebright Reservoir spill. In recent years, annual maintenance has been conducted when Narrows 1 can handle the entire flow or during the winter so that the river flow can be held relatively constant with cool-water spills over Englebright Dam.

Although emergency and maintenance shutdowns are infrequent, a full-flow bypass can eliminate most flow fluctuations that would result from such shutdowns. The National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) in its Biological Opinion (BO), Operations of Englebright Dam/Englebright Lake and Daguerre Point Dam on the Yuba River, California (March 2002), and the Commission in its Final Biological Evaluation (June 2002), stated that impacts on listed species under the Endangered Species Act (ESA) from flow fluctuations at the Narrows 2 development were one of the more significant concerns related to the Yuba River Development Project.

One major factor that can be affected by shutdowns and the resulting flow reductions is water temperature. Water flowing into Englebright Reservoir settles into layers according to temperature, with the coolest water at the bottom and the warmest water at the top. Consequently, shutdown of the Narrows 2 generator could cause river temperatures to rise if warm surface water must be spilled over the dam or if downstream flow is reduced enough that ambient conditions warm the water. Elevated water temperatures can adversely affect downstream protected

fish species.

Licensee's Plan

The licensee proposes to install a turbine shutoff valve and construct a 3,000 cfs synchronous flow bypass system at the Narrows 2 development to maintain more stable releases and water temperatures in the lower Yuba River during emergency and maintenance shutdowns. The turbine shutoff valve and the new flow bypass valve would be synchronized to maintain constant flow (to a maximum of 3,000 cfs) to the river as the shutoff valve or turbine wicket gates close or open. The turbine shutoff valve would close for all emergency conditions that previously caused the intake gate to close, and the new flow bypass valve would then open to permit a relatively smooth transfer of flow from the turbine to the bypass into the lower Yuba River.

Under the proposed project, a turbine shutoff valve would be installed in the development that would enable operators to shut down the turbine and allow water to be diverted through the bypass. The 14-foot-diameter butterfly valve (complete with servomotor, automatic remote controls, and other auxiliary equipment) would be installed in the powerhouse between the 14-foot-diameter, 7/8-inch-thick steel tunnel liner (penstock) and the scroll case. Installation of the valve would require removing part of the existing steel liner, welding flanges on the ends of the liner to accommodate the valve, and reinstalling the coupling downstream of the valve. Some structural modifications to the powerhouse would be required to create the space and clearances necessary for valve installation.

A flow bypass tunnel (40-60 feet deep, 35 feet long, and approximately 10 feet in diameter) would be constructed that would intercept the penstock at a new wye or "T" branch (bifurcation) about 50 feet upstream of the turbine shutoff valve. The wye or "T" bifurcation would be installed

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by excavating an approximately 35-foot-diameter vertical intake shaft approximately 65 feet deep near the upstream wall of the plant to intersect the existing penstock, removing a 25-foot- long section of the existing penstock, and installing a prefabricated steel wye or "T." In case of a plant shutdown, the bypass tunnel would divert water to a 40-foot-tall concrete valve structure in the riverbed north of the plant. The structure would house a 78-inch-diameter fixed-cone valve that, within approximately 2 to 4 minutes of being activated, would allow up to 3,000 cfs of water to flow through the bypass tunnel and directly into the Yuba River without passing through the turbine.

Excavation will involve the use of explosives as well as mechanical removal methods. Access to the in-channel construction area will be from the powerhouse deck and the adjacent gravel fill area. The preferred method of accessing the area is to use a crane situated on top of or next to the powerhouse to lift and swing equipment and materials down into the lower construction area.

The majority of the work, including tunnel excavation and installation of the bifurcation and turbine shut-off valve, would occur outside the ordinary high water mark near the landing for the Narrows 2 powerhouse. Construction activities will also include intermittent periods of ground disturbing activities (like tunnel excavation, rubble removal, and outlet structure construction) below the ordinary high water mark. Due to the highly controlled nature of the flows within the construction area, and the fact that nearly all river flows originate downstream from the construction site (at the two power houses), flows passing through the construction area will be limited to seepage that occurs through Englebright dam and the backwater effect of water released from the Narrows 2 powerhouse. It is therefore expected that no construction activities will occur within the wetted portion of the channel at any time.

Operation of the bypass system will be controlled by the existing Narrow 2 powerhouse control system. In the event of a planned power outage, flows through the Narrows 2 powerhouse turbine gradually will be ramped down while the bypass is slowly opened. Upon completion of this process all flows from Narrows 2 will be going through the bypass. In the event of an unplanned (emergency) outage, the transition between turbine and bypass flows will happen quickly, in about 2 to 4 minutes. In either case, total net flow to the river from the Narrows 2 powerhouse should not fluctuate significantly for more than a few minutes.

When the flow bypass system is installed and operational, the licensee indicates it would be able to consistently operate the plant under the revised flow reduction and fluctuation criteria. The revised criteria would be more protective of downstream fish species than the criteria currently stated in the license. The licensee's proposed flow fluctuation and reduction criteria would replace the current criteria identified as Article 33(d), footnote 3B-G, and be replaced as Article 33(d), footnote 3B, as follows:

B. With the exception of emergencies, releases required by U.S. Army Corps of Engineers flood control criteria, releases required to maintain a flood control buffer or for other flood control purposes, bypasses of uncontrolled flows into Englebright Reservoir, uncontrolled spilling, or uncontrolled flows of tributary streams downstream of Englebright Dam, Licensee shall make reasonable efforts to operate New Bullards Bar Reservoir and Englebright Reservoir to avoid fluctuations in the flow of the lower Yuba River downstream of Englebright Dam, and daily changes in project operations affecting releases or bypasses of flow from 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 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 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 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 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 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.

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Agency Comments

On April 14, 2005, the Commission issued a public notice of the application and requested comments, motions to intervene, or protests. The comment closing date was May 16, 2005. In response to the notice, the Commission received a motion to intervene by PG&E, filed on May 4, 2005, and comment from the U.S. Department of the Interior's Office of the Secretary, filed May 13, 2005. Both entities provide comments in support of the licensee's application.

A draft Biological Assessment, Yuba River Development Project (FERC Project No. 2246) Proposed License Agreement (draft BA) was prepared to assess the potential impacts of the proposed project on Central Valley spring-run chinook salmon and Central Valley steelhead. The draft BA was prepared as part of an early consultation in accordance with Section 7(a)(3) of the Endangered Species Act (16 U.S.C. §1536(a)(3)); 50 C.F.R. §§402.11, 402.12, and 402.14; and the March 1998 Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act issued by NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS). The draft BA was forwarded to NOAA Fisheries on

October 18, 2003. On January 26, 2005, NOAA Fisheries provided Commission staff with a preliminary Biological Opinion (BO). By letter dated June 14, 2005, Commission staff requested from NOAA Fisheries confirmation of the preliminary BO and conversion into a final BO. The June 14 letter also requested initiation of conferencing on: (1) proposed critical habitat for Central Valley spring- run Chinook salmon and Central Valley steelhead; and (2) proposed listing of green sturgeon.

A Final Rule designating critical habitat for spring-run Chinook salmon and steelhead was published on September 2, 2005 (70 *Fed. Reg.* 52488). This rule becomes effective on January 1, 2006.

In a letter dated November 4, 2005, NOAA Fisheries concludes in its BO that the proposed amendment is not likely to jeopardize the continued existence of Central Valley spring-run Chinook salmon or Central Valley steelhead, or destroy or adversely modify designated critical habitat for these species. In the same letter, NOAA Fisheries indicates that it is its conference opinion that the effects of the proposed amendment are not likely to jeopardize the continued existence of the southern distinct population segment (DPS) of North American green sturgeon.

The NOAA Fisheries provides, in its November 5, 2005 letter, an incidental take statement under Section 9 of the ESA and provides reasonable and prudent measures, along with the associated terms and conditions, to be included as part of the license amendment.

By letter dated September 19, 2005, the California State Water Resources Control Board issued water quality certification for the proposed amendment. The September 19 letter certifies that the construction and operation of the Narrows 2 full- flow bypass will comply with Sections 301, 302, 303, 306, and 307 of the Clean Water Act.

Discussion

The proposed project will include the installation of a synchronous full-flow bypass at the Narrows 2 powerhouse that is expected to eliminate most short-term flow fluctuations by providing nearly simultaneous restoration of flows. Other than the short-term minor impacts associated with the construction activities, there will be an overall benefit to the fish resources and their habitat below the project. The revised flow criteria will also provide more protection for these species than the current requirements.

The NOAA Fisheries issued a biological and conference opinion pursuant to ESA Section 7 regarding the effects of the project with respect to Central Valley spring-run Chinook salmon and Central Valley steelhead, designated critical habitat for Central Valley spring-run Chinook salmon and steelhead, and the proposed threatened southern DPS on North American green sturgeon. NOAA Fisheries found that the project as proposed is not likely to jeopardize the continued existence of Central Valley spring-run Chinook salmon or Central Valley steelhead, or destroy or adversely modify designated critical habitat for these species. It is NOAA Fisheries conference opinion that the effects of the proposed amendment is not likely to jeopardize the continued existence of the southern DPS of North American green sturgeon.

The NOAA Fisheries did conclude that the proposed action is likely to result in the taking of listed species incidental to the action and included an incidental take statement pursuant to Section 7(b)(4) of the ESA. The incidental take statement includes reasonable and prudent measures (RPMs) and associated terms and conditions for implementing the RPMs. The RPMs and terms and conditions for the project are attached to this order, which also adds an ordering paragraph requiring them to be implemented.

The NOAA Fisheries also included Essential Fish Habitat (EFH) conservation recommendations for Pacific salmon as required by the Magnuson-Stevens Fishery Conservation and Management Act since the proposed amendment will adversely affect the EFH of Pacific salmon. The EFH recommendations adopt the ESA reasonable and prudent measures and associated terms and conditions from the BO. The NOAA Fisheries states that terms and conditions listed in the incidental take statement be adopted as EFH conservation recommendations. These will be required in the ordering paragraph requiring the RPMs to be implemented.

The licensee included in the filing five drawings showing alternative bypass alignments, the proposed turbine shutoff valve, and the proposed bypass

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valve. According to §4.201(c) of the Commission's regulations, non-capacity related amendments must contain those exhibits that require revision in light of the nature of the proposed amendments. Therefore, this order will relabel the drawings as Exhibit L drawings to be consistent with the currently approved exhibits for the project, as shown in Ordering Paragraph (C). A north arrow should be added to Exhibit L-43. With this change the exhibit drawings depicting the proposed project features will conform to the Commission's regulations and are approved by this order. The licensee will be required to file aperture cards of the approved drawings as directed by Ordering Paragraph (D) of this order.

The filing did not include Exhibit K drawings showing a project boundary, as revised to enclose the proposed bypass system. Therefore, Ordering Paragraph (E) requires the licensee, following completion of construction, to file as-built Exhibit K drawings showing a revised boundary enclosing the constructed bypass. Section 4.41 of the Commission's regulations requires the licensee to provide project boundary data in a geo-referenced format. Each drawing must contain a minimum of three known reference points. The latitude and longitude coordinates, or state plane coordinates, of each reference point must be shown. In addition, each project boundary drawing must be stamped by a registered land surveyor. Because this amendment results in a change in the project boundary, Ordering Paragraph (E) also requires the licensee to file all remaining project boundary maps in accordance with Sections 4.39 and 4.41.

At least 60 days before starting construction of the full flow bypass facility, the licensee should submit one copy to the Division of Dam Safety and Inspections-San Francisco Regional Engineer (Regional Engineer) and two copies to the Commission (one of these should be to the Director, Division of Dam Safety and Inspections), of a supporting design report and final contract plans and specifications. The licensee shall indicate in this filing its selection of the wye or tee junction for the bypass tunnel. The Commission may require changes to the plans and specifications to ensure the work is completed in a safe and environmentally sound manner. Construction may not commence until authorized by the Regional Engineer.

Also, at least 60 days before starting construction of the full flow bypass facility, the licensee should submit one copy to the San Francisco Regional Engineer and two copies to the Commission (one of these should be to the Director, Division of Dam Safety and Inspections), of the Quality Control and Inspection Program for the Commission's review and approval.

The licensee's amendment request and proposed new flow criteria should be more protective of the aquatic resources downstream of the project and should, therefore, be approved.

The Director orders:

(A) The licensee's request to amend its license to include the installation of a full-flow bypass for the Narrows 2 development and to implement more stringent ramping and flow fluctuation criteria for flows downstream of the Narrows 2 Project (FERC Project No. 2246), as filed March 29, 2005, is approved.

(B) Article 33(d), footnote 3B-G, is replaced as follows and shall be identified as Article 33(d), footnote 3B:

B. With the exception of emergencies, releases required by U.S. Army Corps of Engineers flood control criteria, releases required to maintain a flood control buffer or for other flood control purposes, bypasses of uncontrolled flows into Englebright Reservoir, uncontrolled spilling, or uncontrolled flows of tributary streams downstream of Englebright Dam, Licensee shall make reasonable efforts to operate New Bullards Bar Reservoir and Englebright Reservoir to avoid fluctuations in the flow of the lower Yuba River downstream of Englebright Dam, and daily changes in project operations affecting releases or bypasses of flow from 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 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 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 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 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 Englebright Dam to less than the minimum streamflow

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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.

(C) The following drawings, filed on March 29, 2005, relabeled as Exhibit L drawings, conform to the Commission's rules and regulations, and are approved and made a part of the license.

EXHIBIT No.	FERC. DRAWING No.	DRAWING TITLE
L-42	2246-156	General Arrangement Site Plan --Option A, Wye Junction
L-43	2246-157	General Arrangement Site Plan --Option B, Tee Junction
L-44	2246-158	Turbine Shutoff Valve --General Arrangement
L-45	2246-159	Bypass Valve Structure --Equipment Arrangement --Sheet 1
L-46	2246-160	Bypass Valve Structure --Equipment Arrangement --Sheet 2

(D) Within 45 days of the date of issuance of this order, the licensee shall file the approved exhibit drawings in aperture card and electronic file formats. The approved drawings must be labeled as Exhibit L and a north arrow must be added to Exhibit L-43.

(a) Three sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on Type D (31/4 " × 73/8 ") aperture cards. Prior to microfilming, the FERC Drawing Number (*e.g.*, 2246-156 through 2246-160) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (*e.g.*, L-42 through L-46), Drawing Title, and date of this order shall be typed on the upper left corner of each aperture card. *See* Figure 1.

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections San Francisco Regional Office.

(b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections San Francisco Regional Office. Exhibit F drawings must be identified as **(CEII) material under 18 C.F.R. §388.113(c).** Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC

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Exhibit, Drawing Title, date of this order, and file extension in the following format [P-2246-156, L-42, General Arrangement Site Plan --Option A, Wye Junction, MM-DD-YYYY.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY --black & white raster file

FILE TYPE --Tagged Image File Format, (TIFF) CCITT Group 4

RESOLUTION --300 dpi desired, (200 dpi min.)

DRAWING SIZE FORMAT --24" × 36" (min), 28" × 40" (max)

FILE SIZE --less than 1 MB desired

(E) Within 90 days from the completion of construction of the flow bypass facility, the licensee shall file, for Commission approval, revised exhibit drawings describing and showing the project as- built, including Exhibit K drawings showing a revised boundary enclosing the constructed bypass. The Exhibit K drawings shall include the project boundary data in a geo-referenced electronic format, have three control points with latitude and longitude or state plane coordinates, and be stamped by a Registered Land Surveyor pursuant to 18 C.F.R. §§4.39 and 4.41 . The licensee shall also file all remaining project boundary exhibit drawings, updated to the current standards, for inclusion in the license.

(F) At least 60 days before starting construction of the full flow bypass facility, the licensee shall submit one copy to the Division of Dam Safety and Inspections-San Francisco Regional Engineer (Regional Engineer) and two copies to the Commission (one of these should be to the Director, Division of Dam Safety and Inspections), of a supporting design report and final contract plans and specifications. The licensee shall indicate in this filing its selection of the wye or tee junction for the bypass tunnel. The Commission reserves authority to require changes to the plans and specifications. Construction shall not commence until authorized by the Regional Engineer.

(G) At least 60 days before starting construction of the full flow bypass facility, the licensee shall submit one copy to the San Francisco Regional Engineer and two copies to the Commission (one of these should be to the Director, Division of Dam Safety and Inspections), of the Quality Control and Inspection Program for the Commission's review and approval. Construction shall not commence until authorized by the Regional Engineer.

(H) The licensee shall implement the Reasonable and Prudent Measures and associated terms and conditions attached to this order in Appendix A.

(I) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. §385.713.

Appendix A

Biological and Conferencing Opinion Terms and Conditions

Reasonable and Prudent Measures

Pursuant to Section 7(b)(4) of the Endangered Species Act (ESA), the following reasonable and prudent measures are necessary and appropriate to minimize take of Central Valley spring-run Chinook salmon, Central Valley steelhead, and North American green sturgeon:

1. Measures shall be taken to minimize the potential impacts of blasting and other in- channel construction activities on listed salmonids and proposed North American green sturgeon.

2. Measures shall be taken during construction activities to minimize stream bank erosion, sediment transport and discharge of hazardous materials into waterways.

3. Measures shall be taken to minimize salmonid and green sturgeon stranding and redd dewatering associated with controlled, operational ramping and flow fluctuations.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, FERC and the applicant must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and/or monitoring requirements. These terms and conditions are non- discretionary.

1. Measures shall be taken to minimize the potential impacts of blasting and other in- channel construction activities on listed salmonids and North American green sturgeon.

    a. Monitoring of hydrostatic pressure fluctuations and noise levels shall be conducted within Narrows 2 outlet pool, at the closest point to the blasting area during all blasting activities taking place in the in-channel (lower) construction area. The creation of hydrostatic pressure waves in exceedance of 100 kilopascals (kPa)[1] or noise levels exceeding 190 decibels (dB) shall be reported to the Sacramento Area Office of NOAA Fisheries within 24 hours. A final report on the results of monitoring shall be provided to the Sacramento Area Office of NOAA Fisheries within six months of completion of blasting activities for the project.

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    b. To reduce the amount of blasting and other in-channel construction activities necessary to complete this project, every effort shall be made to avoid the construction of a road into the channel. If it is found that it is necessary to build a road, a detailed plan for its construction shall be furnished for approval by NOAA Fisheries prior to the commencement of any construction activities.

2. Measures shall be taken during construction activities to minimize stream bank erosion, sediment transport, and discharge of hazardous materials into waterways.

a. FERC shall review the storm water pollution prevention plan (SWPPP) and the sediment prevention plan (SPP) described in the project description and ensure that the measures and requirements put forth in those plans are incorporated as binding conditions of any license amendment issued for the proposed project.

3. Measures shall be taken to minimize salmonid and North American green sturgeon stranding and redd dewatering associated with controlled, operational ramping and flow fluctuations.

a. The fry stranding and redd dewatering study discussed in the biological assessment for this project shall be completed within three years of the final signing date of the Biological and Conference Opinion and the results of that investigation shall be used as the basis for development of a flow reduction and fluctuation management plan (FRFMP). This plan is to be developed in collaboration with NOAA Fisheries, YCWA, California Department of Fish and Game, and the U.S. Fish and Wildlife Service.

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On March 29, 2005, Yuba County Water Agency (Licensee) filed a request to amend its license to include the installation of a full-flow bypass for the Narrows 2 development and to implement more stringent ramping and flow fluctuation criteria for flows downstream of the Narrows II development. The Narrows 2 development is located on the North Yuba River downstream of Englebright Dam in Yuba County, California, about 20 miles northeast of Marysville and about 24 miles upstream from the confluence of the Yuba and Feather Rivers.

1.0 *Background*

The Narrows 2 development is a hydropower generating facility that is part of the Yuba River Development Project (FERC License No. 2246), which also includes New Bullards Bar Reservoir and the New Colgate Powerplant (Figure 1). Narrows 2 was completed in 1969. Englebright Dam is

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a debris dam that was constructed on the Yuba River by the U.S. Army Corps of Engineers (Corps) in 1941 to capture sediment produced by upstream hydraulic mining activities. The dam has no low-level outlet. As a result, water flowing from Englebright Reservoir to the lower Yuba River must discharge through one of the two developments located downstream or spilled over the top of the dam. The two developments are licensee's Narrows 2 development and the Narrows 1 Project (FERC Project No. 1403), which is owned by Pacific Gas and Electric Company (PG&E).

Both Narrows 1 and Narrows 2 have intakes that take water from lower water levels in Englebright Reservoir. Englebright Reservoir is used as the afterbay to the New Colgate hydroelectric powerhouse, resulting in reservoir levels that commonly fluctuate about 10 feet over the period of a week. Narrows 1 and 2 are operated to maintain a relatively constant flow in the lower Yuba River, pass storm flows, and make seasonal flow changes.

Under an existing power purchase agreement between PG&E and licensee, PG&E can require the release of water from New Bullards Bar Reservoir for power generation based on monthly quotas and available storage in the reservoir above an established index or "critical line." The licensee and PG&E currently coordinate the operation of Narrows 1 and Narrows 2 developments for hydropower efficiency and flow stability in the lower

Yuba River. The penstocks to the two developments

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are the only outlets from Englebright Dam, and are the only means of discharging water downstream, except for spills over the top of the dam. Both developments are operated as base- load plants and are dependent on available storage in New Bullards Bar and Englebright reservoirs.

Under current operating procedures, the Narrows 1 development is usually operated when total releases from Englebright Dam are 730 cubic feet per second (cfs) or less. When releases are 730 to 2,560 cfs, the Narrows 2 development normally is operated. When releases exceed 2,560 cfs, both developments normally operate. During water years 1970 through 1990, staff estimated that daily average flows of 730 and 2,560 cfs were exceeded 74.4% and 33.4% of the time, respectively (FERC 1992). These estimates indicate that Narrows 2 development operates alone up to 41% of the time, and together with the Narrows 1 Project up to 33.4% of the time, for a total of up to 74.4% of the time.

The Narrows 2 development, approximately 400 feet south of the dam on the west bank of the Yuba River, consists of a single 70,000-horsepower, Francis-type turbine with a capacity of 50 megawatts (MW). This hydropower generating facility produces an average of 248 million kilowatt hours per year. Narrows 2 has a discharge capacity of 3,400 cfs and a maximum bypass flow capacity (when the generator is not operating) of approximately 650 cfs. The existing intake structure is a "tower" about 200 feet upstream of the dam that draws water from the reservoir surface down to an elevation of 439 feet mean sea level (m.s.l.), about 80 to 85 feet below the typical reservoir surface elevation (Bookman-Edmonston Engineering 1998). The bottom of Englebright Reservoir in the vicinity of the intake structure is approximately elevation 333 feet m.s.l.; the bottom of the existing intake structure, therefore, is located approximately 100 feet above the bottom of the reservoir.

The plant has no turbine shutoff valve and a fixed-wheel gate in the intake structure controls the discharge to the powerhouse. Water is delivered to the turbine from the intake structure in Englebright Reservoir through a 717-foot-long tunnel. The upstream portion of the tunnel (approximately 350 feet) is a concrete-lined horseshoe (9 foot 2 inch radius) and the downstream portion of the tunnel (approximately 370 feet) is a 14-foot- diameter circular, steel-lined tunnel. A 36-inch bypass valve on the turbine scroll case provides up to 650 cfs of downstream bypass flow through the plant if the intake gate is open.

As the water (up to 3,400 cfs) passes through the Narrows 2 development, the turbine generates at 13.8 kilovolts of electricity, which is then stepped up to 60 kilovolts and transmitted through PG&E power lines. The water then leaves the development on the south side and flows down the Yuba River.

The Narrows 1 Project is about 1,500 feet downstream of Narrows 2 on the opposite bank of the Yuba River. Narrows 1 is a 12-MW project with a discharge capacity of approximately 730 cfs and a bypass flow capacity of about 540 cfs. The licensee's proposed amendment is not expected to alter operations of the Narrows 1 Project.

The 1965 California Department of Fish and Game (CDFG) Agreement with the licensee and the current project license placed limits on the magnitude and rate of controlled flow reductions at the Smartville Gage during October and November. Those limits are stated in Article 33(d), footnote 3B-G, as follows:

B. Variations from the scheduled uniform releases of not more than 15 percent is permissible but shall be minimized whenever possible.

C. Reduction in the average continuous flow from October 15 to 31 shall be not more than 35 percent of the average flow during the preceding seven-day period and shall be minimized whenever possible.

D. Reduction in the average continuous flow from November 1 to 30 shall be not more than 15 percent of the average flow during the preceding 15-day period and shall be minimized whenever possible.

E. Increase in uniform releases during October and November shall be permitted when water storage is sufficient, provided no reduction in December releases is necessary as a result of the increases.

F. Changes in flow releases due to project operation during the period January 16 to October 15 shall not

fluctuate at an hourly rate of more than 500 cfs and shall be changed as gradually as possible within the hourly period.

G. These provisions shall be subject to re-evaluation and revisions at such time as Marysville or other downstream reservoir is constructed on the Yuba River.

Under normal operating conditions, the operations of the Narrows 1 and Narrows 2 facilities are coordinated to provide continuous releases in conformance with the conditions of the project license, including flow fluctuation and ramping conditions. However, under emergency conditions such as outages of one or both of the facilities, it may not be possible to adhere to flow fluctuation and ramping criteria with the existing physical facilities and capabilities of the developments.

Between 1998 and 2001, there were nine uncontrolled flow events at the Narrows 2 development that resulted in flow fluctuations. Seven of these events were caused by PG&E-maintained systems --six electric transmission line outages on PG&E's transmission line connecting the licensee's Narrows 2 development to the electric grid, and one outage on the transfer relay. The two

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other events were caused by Narrows 2 development systems.

The bypass at the Narrows 2 development does not allow the plant's full-flow capacity to be bypassed when the plant is not operating. Even a brief loss of power could result in shutdown, during which flows into the river may drop from 3,400 cfs to 650 cfs or possibly to zero. The ramping- down process takes place in less than 1 minute. In the event of an emergency shutdown, the Narrows 1 plant can be activated remotely to provide an additional 540 cfs of flow through its bypass, but the activation process takes approximately 30-60 minutes to complete (possibly longer depending on the response time of the operator).

Any shutdown of the Narrows 2 development, particularly during the warm and dry summer months, could cause flow and temperature conditions in the lower Yuba River to fluctuate in ways detrimental to fish. Adverse effects on fish could result when flow through the plant ceases or when warm water is spilled from the reservoir into the river, in either case allowing water temperatures in the river to rise.

Three types of shutdowns can take place at the Narrows 2 development. Short-term emergency shutdowns can be caused by momentary failure of the PG&E transmission line as a result of interference by birds, fire, lightning, storm, failure of transmission equipment, or by a momentary plant malfunction. Flows can be reduced from 3,400 cfs to 0-650 cfs for a period ranging from about a minute to more than an hour. Although corrective actions have been taken by both the licensee and PG&E to minimize shutdowns of this type, they still can occur.

Long-term emergency shutdowns can result from catastrophic failure of the PG&E transmission system that links the plant to the transmission grid or from major component failure at the plant. Flows through the plant can be reduced from 3,400 cfs to 0-650 cfs, depending on whether the malfunction allows the bypass to be operated. Such shutdowns are rare (two in the last 30 years) but could last from days to months. Partial downstream flow can be restored through the PG&E Narrows 1 Powerhouse within about 30-60 minutes, and full downstream flow can be resumed in 1-2 days by allowing water to spill over the top of Englebright Dam. High spill rates between May and October, however, can increase downstream temperatures.

Maintenance activity shutdowns are required for generator brush replacement, which in the past involved a 6-hour shutdown two or three times per year, and annual maintenance, which typically requires a shutdown of 2-3 weeks or longer (in some instances, months) if major maintenance is performed. In recent years, maintenance activities typically have been scheduled during a time when no impact would result on downstream flows. During brush replacement, the licensee can open the 650-cfs bypass valve and can request that PG&E operate the Narrows 1 Project to maintain downstream flow when flow is 1,350 cfs or less. During the annual maintenance period, the bypass valve usually cannot be operated, so downstream flow is entirely dependent on Narrows 1 releases or Englebright Reservoir spill. In recent years, annual maintenance has been conducted when Narrows 1 can handle the entire flow or during the winter so that the river flow can be held relatively constant with cool-water spills over Englebright Dam.

Although emergency and maintenance shutdowns are infrequent, a full-flow bypass can eliminate most flow fluctuations that would result from such shutdowns. The National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) in its Biological Opinion, Operations of Englebright Dam/Englebright Lake and Daguerre Point Dam on the Yuba River, California (March 2002), and the Commission in its Final Biological Evaluation (June 2002), stated that impacts on listed species from flow fluctuations at the Narrows 2 development were one of the more significant concerns related to the Yuba River Development Project.

One major factor that can be affected by shutdowns and the resulting flow reductions is water temperature. Water flowing into Englebright Reservoir settles into layers according to temperature, with the coolest water at the bottom and the warmest water at the top. Consequently, shutdown of the Narrows 2 generator could cause river temperatures to rise if warm surface water must be spilled over the dam or if downstream flow is reduced enough that ambient conditions warm the water. Elevated water temperatures can adversely affect downstream protected fish species.

2.0 *Proposed Action and Alternatives*

2.1 *Proposed Action*

The licensee proposes to install a turbine shutoff valve and construct a 3,000-cfs synchronous flow bypass system at the Narrows 2 development to maintain more stable releases and water temperatures in the lower Yuba River during emergency and maintenance shutdowns. The turbine shutoff valve and the new flow bypass valve would be synchronized to maintain constant flow (to a maximum of 3,000 cfs) to the river as the shutoff valve or turbine wicket gates close or open. The turbine shutoff valve would close for all emergency conditions that previously caused the intake gate to close, and the new flow bypass valve would then open to permit a relatively smooth transfer of flow from the turbine to the bypass into the lower Yuba River.

Under the proposed project, a turbine shutoff valve would be installed in the development that would enable operators to shut down the turbine and allow water to be diverted through the bypass. The 14-foot-diameter butterfly valve (complete with servomotor, automatic remote controls, and

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other auxiliary equipment) would be installed in the powerhouse between the 14-foot-diameter, 7/8-inch-thick steel tunnel liner (penstock) and the scroll case. Installation of the valve would require removing part of the existing steel liner, welding flanges on the ends of the liner to accommodate the valve, and reinstalling the coupling downstream of the valve. Some structural modifications to the powerhouse would be required to create the space and clearances necessary for valve installation.

A flow bypass tunnel (40-60 feet deep, 35 feet long, and approximately 10 feet in diameter) would be constructed that would intercept the penstock at a new wye branch (bifurcation) about 50 feet upstream of the turbine shutoff valve. The wye bifurcation would be installed by excavating an approximately 35-foot-diameter vertical intake shaft approximately 65 feet deep near the upstream wall of the plant to intersect the existing penstock, removing a 25-foot-long section of the existing penstock, and installing a prefabricated steel wye. In case of a plant shutdown, the bypass tunnel would divert water to a 40-foot-tall concrete valve structure in the riverbed north of the plant. The structure would house a 78-inch-diameter fixed-cone valve that, within approximately 2 to 4 minutes of being activated, would allow up to 3,000 cfs of water to flow through the bypass tunnel and directly into the Yuba River without passing through the turbine.

Excavation will involve the use of explosives as well as mechanical removal methods. Access to the in-channel construction area will be from the powerhouse deck and the adjacent gravel fill area. The preferred method of accessing the area is to use a crane situated on top of or next to the powerhouse to lift and swing equipment and materials down into the lower construction area.

The majority of the work, including tunnel excavation and installation of the bifurcation and turbine shut-off valve, would occur outside the ordinary high water mark near the landing for the Narrows 2 powerhouse.

Construction activities will also include intermittent periods of ground disturbing activities (like tunnel excavation, rubble removal, and outlet structure construction) below the ordinary high water mark. Due to the highly controlled nature of the flows within the construction area, and the fact that nearly all river flows originate downstream from the construction site (at the two power houses), flows passing through the construction area will be limited to seepage that occurs through Englebright dam and the backwater effect of water released from the Narrows 2 powerhouse. It is therefore expected that no construction activities will occur within the wetted portion of the channel at any time.

Operation of the bypass system will be controlled by the existing Narrows 2 powerhouse control system. In the event of a planned power outage, flows through the Narrows 2 powerhouse turbine gradually will be ramped down while the bypass is slowly opened. Upon completion of this process all flows from Narrows 2 will be going through the bypass. In the event of an unplanned (emergency) outage, the transition between turbine and bypass flows will happen quickly, in about 2 to 4 minutes. In either case, total net flow to the river from the Narrows 2 powerhouse should not fluctuate significantly for more than a few minutes.

When the flow bypass system is installed and operational, the licensee indicates it would be able to consistently operate the plant under the revised flow reduction and fluctuation criteria. The revised criteria would be more protective of downstream fish species than the criteria currently stated in the license. The licensee's proposed flow fluctuation and reduction criteria are as follows:

B. With the exception of emergencies, releases required by U.S. Army Corps of Engineers flood control criteria, releases required to maintain a flood control buffer or for other flood control purposes, bypasses of uncontrolled flows into Englebright Reservoir, uncontrolled spilling, or uncontrolled flows of tributary streams downstream of Englebright Dam, Licensee shall make reasonable efforts to operate New Bullards Bar Reservoir and Englebright Reservoir to avoid fluctuations in the flow of the lower Yuba River downstream of Englebright Dam, and daily changes in project operations affecting releases or bypasses of flow from 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 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 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 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 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.

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v. During the period from November 1 to March 31, the licensee shall not reduce the flow downstream of 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.

2.2 *No-Action Alternative*

Under the no-action alternative, the project would be required to operate according to its license with the current flow fluctuation and reduction criteria.

3.0 *Consultation and Compliance*

3.1 *Comments and Interventions*

On April 14, 2005, the Commission issued a public notice of the application and requested comments, motions to intervene, or protests. The comment closing date was May 16, 2005. In response to the notice, the Commission received a motion to intervene by PG&E, filed on May 4, 2005, and comment from the U.S. Department of the Interior's Office of the Secretary, filed May 13, 2005. Both entities provide comments in support of the licensee's application.

3.2 *Statutory Requirements*

3.2.1 *Endangered Species Act*

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species.

A draft Biological Assessment, Yuba River Development Project (FERC Project No. 2246) Proposed License Agreement (draft BA) (Surface Water Resources 2003) was prepared to assess the potential impacts of the proposed project on Central Valley spring-run chinook salmon and Central Valley steelhead. The draft BA was prepared as part of an early consultation in accordance with Section 7(a)(3) of the federal ESA (16 U.S.C. 1536 (a)(3)); 50 C.F.R. §§402.11, 402.12, and 402.14; and the March 1998 Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act issued by NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS). The draft BA was forwarded to NOAA Fisheries on October 18, 2003. On January 26, 2005, NOAA Fisheries provided Commission staff with a preliminary Biological Opinion (BO). By letter dated June 14, 2005, Commission staff requested from NOAA Fisheries confirmation of the preliminary BO and conversion into a final BO. The June 14 letter also requested initiation of conferencing on: (1) proposed critical habitat for Central Valley spring-run Chinook salmon and Central Valley steelhead; and (2) proposed listing of green sturgeon.

A Final Rule designating critical habitat for spring-run Chinook salmon and steelhead was published on September 2, 2005 (70 *Fed. Reg.* 52488). This rule becomes effective on January 1, 2006.

In a letter dated November 4, 2005, NOAA Fisheries concludes in its BO that the proposed amendment is not likely to jeopardize the continued existence of Central Valley spring-run Chinook salmon or Central Valley steelhead, or destroy or adversely modify designated critical habitat for these species. In the same letter, NOAA Fisheries indicates that it is its conference opinion that the effects of the proposed amendment are not likely to jeopardize the continued existence of the southern distinct population segment (DPS) of North American green sturgeon.

NOAA Fisheries provides, in its November 5, 2005 letter, an incidental take statement under Section 9 of the ESA and provides reasonable and prudent measures, along with the associated terms and conditions, to be included as part of the license amendment.

3.2.2 *Fishery Conservation and Management Act*

In the 1996 reauthorization of the Magnuson- Stevens Fishery Conservation and Management Act (MSFCMA), the U.S. Congress required the regional fishery management councils to designate essential fish habitat (EFH) for

all life stages of all federally managed species. Section 305(b)(2) of the MSFCMA requires federal agencies to consult with the NOAA Fisheries regarding all activities it funds, permits, or carries out that may adversely affect designated EFH.

In its November 4, 2005 letter, NOAA Fisheries concludes that the proposed Yuba River Development Project license amendment will adversely affect the EFH of Pacific salmon in the action area. As the habitat requirements of Central Valley fall/late fall-run Chinook salmon within the action area are similar to those of the federally-listed species addressed in the BO, NOAA Fisheries recommends that Terms and Conditions 1b and 2a listed in the Incidental Take Statement prepared for the Central Valley spring run Chinook salmon and Central Valley steelhead ESUs in the biological opinion be adopted as EFH conservation recommendations.

3.2.3 *National Historic Preservation Act*

The National Historic Preservation Act (NHPA) requires federal agencies to manage cultural resources under their jurisdiction and authorizes the Secretary of the Interior to maintain the *National Register of Historic Places* (National Register). Section 106 of the NHPA requires federal agencies take into account the effect of the proposed undertaking on any district, site, building, structure, or

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object that is included in or eligible for inclusion in the National Register. The agency must afford the Advisory Council on Historic Preservation, established under Title II of NHPA, a reasonable opportunity to comment on such undertaking.

The NHPA also provides for the appointment of State Historic Preservation Officers (SHPOs) to facilitate the implementation of federal cultural resource policy at the state level, and requires the federal agency to consult with Native American tribes who attach religious or cultural importance to cultural resources under their jurisdiction.

Commission staff has determined that the proposed action will not have an adverse effect on historic properties or tribal religious or cultural values.

3.2.4 *Clean Water Act*

Under Section 401(a)(1) of the Clean Water Act, an applicant for a federal license or permit to conduct an activity that may result in a discharge into waters of the United States must provide the licensing or permitting agency with water quality certification (WQC) that the discharge would not violate water quality standards from the applicable state. The federal agency may not authorize the activity unless certification has been obtained or the state has waived certification through failure to act on the request for certification within 1 year after receipt of that request.

By letter dated September 19, 2005, the California State Water Resources Control Board issued water quality certification for the proposed amendment. The September 19 letter certifies that the construction and operation of the Narrows 2 full- flow bypass will comply with Sections 301, 302, 303, 306, and 307 of the Clean Water Act.

4.0 *Environmental Analysis and Impacts*

4.1 *Proposed Action*

4.1.1 *Geology, Soils, Sediment*

In general, the soils in the project area are classified as Sobrante-Auburn Association. These are moderately deep and shallow, well drained soils formed in material from metavolcanic rock. The rock slope in the area of the bypass tunnel is predominately of hard massive amphibolite and hornblend gneiss with a blocky joint system. Mineral resources in Yuba County include precious metals (gold, platinum, and molybdenite), copper, zinc, sand,

gravel, and crushed stone. Most of Yuba County is within the Sierra Nevada gold belt districts with sparse seam-type auriferous deposits (QUAD Consultants 1994).

The liquefaction potential of a soil deposit to earthquake motions depends on the characteristics of the soil, the stresses acting on the soil, and the characteristics of the earthquake. In general, uniformly graded soils and fine sands tend to liquefy more easily than coarse materials. The foothill and mountain areas of Yuba County are generally underlain by a thin soil mantle developed on metamorphosed bedrock. The potential for liquefaction in these areas is limited to locations where unconsolidated clean, saturated silts and sands are typically encountered along drainage and stream channels. The potential for landslides in these areas is limited to locations where unconsolidated Cenozoic or Mesozoic bedrock units are encountered and on hillsides exceeding 60 percent slopes. The area in which the project site is located is considered to have a low-moderate landslide potential (QUAD Consultants 1994).

Activities related to excavation and construction of the bypass tunnel and construction of the bypass valve tower may contribute to the potential for erosion and associated landsliding during a strong seismic event. Part of the rock slope west of the current parking area would be excavated to expand the work area around the bypass tunnel. The excavation and slope modification could increase the risk of injury associated with landslide potential.

Construction of the valve tower, the temporary access road to the river, and the bypass tunnel would require excavation. The primary period of construction activity would extend for 5 months. Excavation and exposure of surface soil to weather during that period may result in soil erosion, and the project area has a potential for erosion. To minimize the impacts, the licensee will have its contractor prepare and follow an erosion control plan.

4.1.2 *Water Resources*

The Narrows 2 powerplant is 400 feet south of Englebright dam and reservoir on the west bank of the Yuba River. At present, maintenance and emergency shutdowns of the Narrows 2 powerplant result in reduced or interrupted flows from Englebright dam into the Yuba River.

The south, middle, and north forks of the Yuba River make up the Yuba River watershed. The watershed is bounded by the basins of the Feather River to the north, the Truckee River to the east, and the Bear and American rivers to the south. The watershed drains approximately 1,300 square miles on the western slope of the Sierra Nevada from a maximum height of 9,100 feet at Mt. Lola to 30 feet at the mouth of the river.

The north fork of the river flows into New Bullards Bar Reservoir and is joined by the middle fork about 5 miles downstream from New Bullards Bar Dam. The south fork of the river begins with runoff near Donner Pass in the Sierra Nevada. The south fork flows for 64 miles before joining the north and middle forks at Englebright Reservoir to form the main stem of the Yuba River.

Englebright Dam is a concrete arch structure that spans 1,142 feet and is 260 feet high. It was constructed on the Yuba River by the U.S. Army Corps of Engineers in 1941 to capture sediment produced by hydraulic mining activities upstream. The dam has no low-level outlet. As a result, water being passed to the lower Yuba River must be

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discharged through the inlet structure and penstocks at either the Narrows 1 powerplant or the Narrows 2 powerplant.

The reservoir is at an elevation of 527 feet and has a surface area of 815 acres with a shoreline of 24 miles that extend 9 miles upstream of the dam. The reservoir has a storage capacity of 70,000 acre-feet.

Operation of the proposed project would not cause additional erosion or sedimentation because the flows permitted by the bypass tunnel and shutoff valve would be in the same location as existing flows. No project construction would take place directly in water. The installation of the construction access plate and a concrete pad for the foundation of the valve tower at the site could result in alterations of runoff patterns and could increase the amount of runoff generated on the project site following construction. The total amount of impervious surface added with these features is anticipated to be less than 2,200 square feet (less than 0.05 acre). The addition of

this small amount of impermeable surface is expected to result in only minor changes in the amount and pattern of runoff at the site, and this area is not expected to contribute additional pollutants to runoff. The additional site runoff and changes in runoff patterns would not substantially alter the risk of onsite or offsite flooding.

4.1.3 *Fisheries and Aquatic Resources*

Several species of fish inhabit the stretch of the Yuba River downstream of Englebright dam. Chinook salmon (*Oncorhynchus tshawytscha*) and Central Valley steelhead (*O. mykiss*), discussed in more detail under Section 4.1.5, spend part of their life cycle in the lower Yuba River. The lower Yuba River supports fall run, and possibly spring run, Chinook salmon. Resident fish include rainbow trout (*O. mykiss*), smallmouth bass (*Micropterus dolomieui*), largemouth bass (*M. salmoides*), Sacramento sucker (*Catostomus occidentalis occidentalis*), Sacramento pikeminnow (*Ptychocheilus grandis*), common carp (*Cyprinus carpio*), and prickly sculpin (*Cottus asper*). The reach below Daguerre Point dam provides spawning habitat in spring for American shad (*Alosa sapidissima*).

The proposed project will include the installation of a synchronous full-flow bypass at the Narrows 2 powerhouse that is expected to eliminate most short-term flow fluctuations by providing nearly instantaneous restoration of flows. Other than the short-term minor impacts associated with the construction activities, there will be an overall benefit to the fish resources below the project. The revised flow criteria will also provide more protection for these species than the current requirements.

4.1.4 *Terrestrial Resources*

Vegetation on the upland portion of the project site is generally disturbed and weedy. Plant life at proposed staging and construction areas is dominated by native and non-native grasses and other herbaceous annuals. The Yuba River channel is mostly devoid of vegetation. Small, isolated clumps of willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), and other riparian species are widely scattered along the otherwise barren, rocky banks of the Yuba River downstream of the Narrows 2 powerplant and along the shoreline of Englebright reservoir. Blue oak-foothill pine habitat is common on the hillsides that surround the project site.

The project site is not considered important wildlife habitat because of its small size, disturbed condition, and absence of native plant communities. Wildlife species expected at the proposed staging and construction areas are limited to common animals found in the foothills of the Sierra Nevada, such as mule deer (*Odocoileus hemionus*), western fence lizard (*Sceloporous occidentalis*), and mourning dove (*Zenaida macroura*). Wildlife species expected along the Yuba River include black phoebe (*Sayornis nigricans*), belted kingfisher (*Ceryle alcyon*), and waterfowl such as common merganser (*Mergus merganser*).

The proposed project would not have any impact on terrestrial resources as the project area is limited and these species are not likely to be present in the construction area.

4.1.5 *Endangered Species*

According to NOAA Fisheries Final BO (which is summarized below), Central Valley spring-run Chinook salmon and Central Valley steelhead, both listed as threatened species, occur in the proposed action area and may be affected by the proposed amendment. Green sturgeon (*Acipenser medirostris*) has been proposed for listing and may occur in the project area.

Central Valley Spring-Run Chinook Salmon and Designated Critical Habitat

The NOAA Fisheries listed the Central Valley spring-run Chinook salmon evolutionary significant unit (ESU) as threatened on September 16, 1999 (64 *Fed. Reg.* 50394). A Final Rule designating critical habitat for spring-run Chinook salmon in the lower Yuba River was published on September 2, 2005 (70 *Fed. Reg.* 52488). The rule becomes effective January 2, 2006. Historically, spring-run Chinook salmon were the dominant run in the Sacramento River Basin, occupying the middle and upper elevation reaches (1,000 to 6,000 feet) of most streams and rivers with sufficient habitat for over-swimming adults (Clark 1992). Clark (1992) estimated that there were 6,000 miles of salmon habitat in the Central Valley Basin (much of which was high elevation spring- run Chinook salmon habitat) and that by 1928, 80 percent of this habitat had been lost. Yoshiyama *et al.* (1996) determined that, historically, there were approximately 2,000 miles of salmon habitat available prior to dam construction and

mining and that only 18 percent of that habitat remains.

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Upon entering fresh water, spring-run Chinook salmon are sexually immature and must hold in cold water for several months to mature. Typically, spring-run Chinook salmon use mid-to high- elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow over-summering. Spring-run Chinook salmon may also use tailwaters below dams if cold water releases provide suitable habitat conditions. Spawning occurs between September and October and, depending on water temperature, emergence occurs between November and February.

Part of the significance of the Yuba River fishery is that it supports natural reproduction which is not augmented with hatchery transplants, although the CDFG did conduct a one-time stocking of a small number of juvenile spring-run fish from the Feather River Hatchery into the Lower Yuba River in 1980 (CDFG 1991).

Little is known about the size of the spring-run Chinook salmon population in the Lower Yuba River. Congregations of adult Chinook salmon (approximately 30 to 100 fish) have been observed in the outlet pool at the base of Narrows 2 powerhouse, generally in late August or September when the powerhouse is shut down for maintenance, and the pool becomes clear enough to see the fish. While it is impossible to visually distinguish spring-run from fall-run Chinook salmon in this situation, the fact that these fish are congregated this far up the river at this time of year makes it likely that some of them are spring-run Chinook salmon. This documented holding site is directly adjacent to the proposed construction site for this project.

Central Valley Steelhead

The NOAA Fisheries listed the Central Valley steelhead ESU as threatened on March 19, 1998 (63 *Fed. Reg.* 13347). The ESU includes all naturally-produced Central Valley steelhead in the Sacramento-San Joaquin River Basin. The NOAA Fisheries published a final 4(d) rule for steelhead on July 10, 2000 (65 *Fed. Reg.* 42422). A Final Rule designating critical habitat for Central Valley steelhead in the lower Yuba River was published on September 2, 2005 (70 *Fed. Reg.* 52488). The rule becomes effective on January 2, 2006.

All steelhead stocks in the Central Valley are winter-run steelhead (McEwan and Jackson 1996). Steelhead are similar to Pacific salmon in their life history requirements. They are born in fresh water, emigrate to the ocean, and return to freshwater to spawn. Unlike other Pacific salmon, steelhead are capable of spawning more than once before they die. The majority of the steelhead spawning migration occurs from October through February and spawning occurs from December to April in streams with cool, well oxygenated water that is available year round.

Part of the significance of the Yuba River population is that it supports natural reproduction which is no longer augmented with hatchery fish (McEwan and Jackson 1996). As with the spring- run Chinook salmon, there has been very little information published regarding population trends and absolute abundance of steelhead in the Yuba River.

Southern DPS of North American Green Sturgeon

The green sturgeon is the most widely distributed member of the sturgeon family Acipenseridae (70 *Fed. Reg.* 17386). In assessing North American green sturgeon, NOAA Fisheries determined that two DPSs exist. The northern DPS is made up of known North American green sturgeon spawning (or single stock populations) in the Rogue, Klamath, and Eel Rivers. The southern DPS presently contains only a single spawning population in the Sacramento River (70 *Fed. Reg.* 17386). The NOAA Fisheries proposed to list the southern DPS of North American green sturgeon as threatened on April 6, 2005 (70 *Fed. Reg.* 17386).

Although there is very little indication that North American green sturgeon are present in the Yuba River, there are no physical impediments preventing green sturgeon from reaching the lower river (below Daguerre Point Dam) and the river does provide some of the primary constituent elements necessary for green sturgeon spawning and rearing (deep, fast water, large pools, and cool water temperatures). The NOAA Fisheries therefore assumes that North American green sturgeon may now, or could in the future, inhabit the Yuba River.

Conclusions in NOAA's Biological and Conference Opinions

Populations of Chinook salmon and steelhead in California have declined drastically over the last century. The southern DPS of North American green sturgeon have been cut off from much of their historic spawning grounds and are thought to be limited to a single spawning population in the mainstem Sacramento River. The current status of Central Valley spring-run Chinook salmon and steelhead, based upon their risk of extinction, has not significantly improved since the ESUs were listed by NOAA Fisheries in 2003. This severe decline in population over many years demonstrates the need for actions which will assist in the recovery of listed salmonids in the Yuba River, and that if measures are not taken to reverse these trends, the continued existence of these species could be at risk.

The most significant long-term effect of the proposed project would be to improve overall conditions for listed salmonids and green sturgeon by reducing the potential for severe flow reductions and fluctuations to adversely affect these species in the lower Yuba River. Short-term, construction- related effects include a slight potential to cause harm and harassment due to blasting, increased sediment loading, or other water quality impacts due to accidental spills of hydrocarbons and other contaminants. These impacts may cause physiological

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stress to the extent that the normal behavior patterns (*e.g.*, feeding) of affected individuals may be disrupted. Several impact avoidance and minimization measures have been incorporated into the project plan that are expected to protect listed salmonids and water quality in the lower Yuba River.

The primary long-term impact associated with the proposed project is the implementation of specific flow fluctuation and ramping criteria. While these new criteria are expected to provide increased protection for listed salmonids and green sturgeon over the current license requirements, the new criteria still have the potential to cause juvenile salmonid stranding and isolation and redd dewatering. Juvenile stranding and isolation can cause mortality through dessication, intolerable water temperatures, predation or starvation. Dewatering of eggs can cause mortality through dessication, oxygen depletion and/or intolerable water temperatures. The extent of the risks of such impacts under the proposed criteria are not well known, but the licensee has initiated a comprehensive study to address this question and provide information on the most suitable criteria for minimizing such impacts. Implementation of the plan is expected to minimize the take of listed salmonids and proposed North American green sturgeon due to controlled operational ramping and flow fluctuations on the Yuba River.

There is also the potential for emergency shutdowns of Narrows 2 powerhouse to cause severe flow reductions and fluctuations in the lower Yuba River. This potential will exist until the new bypass facility (intended to alleviate this potential impact) becomes operational.

The adverse effects that are anticipated to result from the proposed project are not of the type or magnitude that would be expected to appreciably reduce the likelihood of survival and recovery of the affected species within the action area. The NOAA Fisheries expects that any adverse effects of this project will be greatly outweighed by the long-term benefits to the species survival produced by the improvement in control over the flows released from Narrows 2 powerhouse.

Critical Habitat

The most significant long-term effect of the proposed project would be to improve overall critical habitat conditions by reducing the potential for severe flow reductions and fluctuations to adversely affect these habitats and the primary constituent elements which support salmonid populations in the lower Yuba River. There also are expected to be some minor, short-term adverse effects on critical habitat associated with construction of the Narrows 2 bypass as well as some potential long-term effects associated with the revised flow fluctuation and ramping criteria. Additionally, there is the potential of adverse impacts to critical habitat associated with emergency shutdowns of Narrows 2 powerhouse until the proposed new bypass is functioning.

The primary long-term effect on critical habitat associated with the proposed project is the implementation of specific flow fluctuation and ramping criteria. While these new criteria are expected to provide increased protection and stability to critical habitat conditions over the current license requirements, the new criteria still have the potential to adversely affect spawning and juvenile rearing habitat in the Yuba River. Impacts to rearing

habitats can result in juvenile stranding and isolation and lead to a mortality of listed salmonids through desiccation, intolerable water temperatures, predation, or starvation. Dewatering of spawning habitat can cause mortality through desiccation, oxygen depletion and/or intolerable water temperatures. The extent of the risks of such impacts under the proposed criteria are not well known, but the licensee has initiated a comprehensive study to address this question and provide information on the most suitable criteria for minimizing such impacts. Implementation of this plan is expected to minimize impacts to critical habitat due to controlled operational ramping and flow fluctuations on the Yuba River.

There is also the potential for emergency shutdowns of Narrows 2 powerhouse to cause severe flow reductions and fluctuations in the lower Yuba River. This potential will exist until the new bypass facility (intended to alleviate this potential impact) becomes operational.

The adverse effects that are anticipated to result from the proposed project are not of the type or magnitude that would be expected to modify critical habitat to the extent that it could lead to an appreciable reduction in the likelihood of recovery of the affected species within the action area. The NOAA Fisheries expects that any adverse effects to critical habitat from this project will be greatly outweighed by the long-term benefits to habitat and overall species survival produced by the improvement in control over the flows released from Narrows 2 powerhouse.

4.1.6 *Cultural Resources*

The licensee's cultural resource specialist performed an in-field reconnaissance-level survey of the area of potential disturbance on October 17, 2002. The survey included the exterior of the power plant, the immediate surrounding area, and the locations that would be used for staging and spoils disposal. No cultural resources were identified at that time. It was determined that the steep slopes of the canyon made this location unsuitable for early historic or prehistoric occupation despite the area's proximity to the Yuba River. In addition, the narrow width of the canyon at the project site likely resulted in strong river flows, especially during the rainy season. Any evidence of prehistoric or early historic occupation and activities present in or near the project area are likely to have been destroyed by these natural processes. Given the steep slopes and narrow canyons of the project area, it is unlikely that any documented cultural

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resources are present within or in the immediate vicinity of the project.

4.1.7 *Recreation Resources*

The Englebright Reservoir is maintained and operated by the U.S. Army Corps of Engineers. The reservoir is unique in that it offers boat-in camping only. Other recreational activities on and around the reservoir include boating, canoeing, fishing, swimming, water skiing, picnicking, and hiking.

Recreationists on the reservoir and near the plant during the construction period could be exposed to somewhat increased noise levels. The increased noise levels resulting from project construction activities would be intermittent, and occasional recreationists, such as anglers and boaters, can move to quieter areas if noise levels are disturbing. For these reasons, any increase in noise levels experienced would be minimal.

4.2 *No-Action Alternative*

Under the no-action alternative, the licensee would be required to operate according to its license with the current flow fluctuation and reduction criteria. The bypass flow valve would not be installed and major flow reductions would continue when the project goes off-line. The impacts to threatened steelhead and spring-run Chinook salmon and other aquatic species downstream of the project will continue as a result of these fluctuations.

5.0 *Conclusions*

5.1 *Proposed Action*

The proposed action, an amendment of license to include the installation of a full-flow bypass for the Narrows 2 development and to implement more stringent ramping and flow fluctuation criteria for flows downstream of the Narrows 2 development, would not have any impact on geology, soils, and sediments; water quality and water quantity; terrestrial resources; cultural resources; and recreation other than the minor, short-term construction related impacts. The impacts to fish and the other aquatic resources (including threatened steelhead and salmon) associated with the proposed ramping and flow fluctuation criteria would be offset by the benefits associated with the full-flow bypass to be installed.

5.2 *No-Action Alternative*

Under the no-action alternative, the amendment application would be denied and the current license requirements would remain in effect.

5.3 *Staff Recommendation*

Approval of the licensee's installation of a full- flow bypass structure on the Narrows 2 development, along with amending the flow criteria, should provide a long-term benefit to the aquatic resources below the project. The approval should be conditioned upon the inclusion of the reasonable and prudent measures and associated terms and conditions in NOAA Fisheries' November 4, 2005 BO on the effects of the proposal.

6.0 *Finding of No Significant Impact*

This environmental assessment was prepared pursuant to the National Environmental Policy Act of 1969. Approval of the license amendment would not be a major federal action significantly affecting the quality of the human environment.

7.0 *References*

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8.0 *List of Preparers*

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[1] One hundred kilopascals equals approximately 14.5 pounds per square inch.