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MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

AUG 04 2017

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Ms. Debbie Powell
Senior Director, Power Generation Operations
Pacific Gas and Electric Company
P.O. Box 770000
San Francisco, CA 94177

Dear Secretary Bose and Ms. Powell:

STUDY REQUESTS AND COMMENTS ON THE PRE-APPLICATION DOCUMENT AND SCOPING DOCUMENT 1 FOR POTTER VALLEY HYDROELECTRIC PROJECT, FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 77; MENDOCINO AND LAKE COUNTIES

Pacific Gas and Electric Company (PG&E or Licensee) owns and operates the Potter Valley Hydroelectric Project (Project), also known as Federal Energy Regulatory Commission (Commission) Project No. 77. On April 6, 2017, PG&E filed its Project's Pre-Application Document (PAD) with the Commission. On June 1, 2017, the Commission issued Scoping Document 1 (SD1) for the Project. State Water Resources Control Board (State Water Board) staff's comments on PG&E's PAD and the Commission's SD1 are provided in Attachment A and Attachment B, respectively. State Water Board staff's study requests are provided in Attachment C.

Items 1 and 3 of the *Pre-Application Filing Activities Under the Integrated Licensing Process (ILP)* section of the Memorandum of Understanding (MOU) executed between the Commission and State Water Board on November 19, 2013¹ apply to this phase of the ILP process. Based upon the Process Plan and Schedule PG&E put forth in its PAD, State Water Board staff provides the following initial estimate of process milestones for water quality certification²:

- Application for water quality certification: August 2020
- Issuance of draft water quality certification for public review: December 2022
- Issuance of final water quality certification: December 2023

¹ A copy of the MOU is available online at:
http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/ferc_mou/index.shtml.

² These milestones assume the draft National Environmental Policy Act (NEPA) document will provide substantial information to support the development of the State Water Board's California Environmental Quality Act document. The timeline assumes the draft NEPA document will be released approximately 12 months following the Commission's release of the Ready for Environmental Analysis.

Regulatory Authority

Before the Commission can issue a new license, the Licensee must obtain water quality certification, or waiver thereof, from the State Water Board pursuant to section 401(a)(1) of the federal Clean Water Act (CWA) (33 U.S.C. §1341(a)(1)). Section 401 of the CWA requires any applicant for a federal license or permit, which may result in any discharge to navigable waters, to obtain water quality certification or waiver from the State Water Board that the discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of the CWA, and other appropriate requirements of state law.

Under section 303 of the CWA and under the Porter-Cologne Water Quality Control Act, the North Coast Regional Water Quality Control Board adopted, and the State Water Board and United States Environmental Protection Agency (USEPA) approved, the *Water Quality Control Plan for the North Coast Region* (Basin Plan). The Basin Plan designates the beneficial uses of waters to be protected along with the water quality objectives necessary to protect those uses. The Project facilities are located in two Hydrologic Subareas (Lake Pillsbury and Coyote Valley) identified in the Basin Plan, which have the following beneficial uses: municipal (MUN); agricultural (AGR); industrial service supply (IND); groundwater recharge (GWR); freshwater replenishment (FRSH); navigation (NAV); power (POW); contact recreation (REC-1); non-contact recreation (REC-2); commercial and sport (COMM); warm freshwater habitat (WARM); cold freshwater habitat (COLD); wildlife habitat (WILD); rare, threatened, or endangered species (RARE); spawning, reproduction, and/or early development (SPWN); migration of aquatic organisms (MIGR); and aquaculture (AQUA). In addition, the Lake Pillsbury and Coyote Valley Hydrologic Subareas are designated as a potential beneficial use of industrial process supply (PRO). Though the Project is located in the Lake Pillsbury and Coyote Valley Hydrologic Subareas, Project operations have the potential to effect addition hydrologic subareas located both upstream and downstream of the Project facilities, and in both the Russian and Eel Rivers.

The beneficial uses together with the water quality objectives that are contained in the Basin Plan, along with state and federal anti-degradation requirements, constitute California's water quality standards under section 303 of the CWA. The water quality objectives set or describe the water quality necessary to achieve and protect the beneficial uses. The State Water Board must evaluate the impacts of the Project on the associated water bodies to determine whether the Project complies with all applicable water quality objectives in the Basin Plan, and protects the designated beneficial uses. Water quality certification also may address a project's effects on public trust resources. In developing a water quality certification the State Water Board looks not only at proposed modifications to Project operations from the existing condition, but also on whether past, existing, or future operations may impair or degrade water quality.

PG&E must file an application for water quality certification once the Commission issues the Notice of Ready for Environmental Analysis. The State Water Board may request additional information to clarify, amplify, correct, or otherwise supplement the contents of the application (Cal. Code Regs., tit. 23, § 3836.). A complete application for a water quality certification must include a description of any steps that have been, or will be taken to avoid, minimize, or compensate for loss of or significant adverse impacts to beneficial uses of water. (Cal. Code Regs. tit. 23, § 3856, subd. (h)(6)). If the Project does not comply with one or more of the water quality objectives or criteria, then PG&E must describe the actions that it will take to bring the Project into compliance in order to protect and maintain the beneficial uses of the State's waters. During the licensing process, State Water Board staff will act in an advisory role to inform PG&E of the information necessary for a complete application for water quality

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certification. Filing requirements for an application for water quality certification are specified in California Code of Regulations, title 23, section 3856. State Water Board staff cannot prejudge the outcome of any proceeding before the State Water Board on an application for water quality certification.

If you have questions regarding this letter, please contact me at (916) 341-5321 or by email at Parker.Thaler@waterboards.ca.gov. Written correspondence should be directed to:

State Water Resources Control Board
Division of Water Rights
Water Quality Certification Program
Attn: Parker Thaler
P.O. Box 2000
Sacramento, CA 95812

Sincerely,



for

Parker Thaler
Senior Environmental Scientist, Specialist
Water Quality Certification Program
Division of Water Rights

Enclosures: Attachment A – Comments on the Application Document for the Potter Valley Hydroelectric Project
Attachment B – Comments on Scoping Document 1 for Potter Valley Hydroelectric Project
Attachment C – Study Plan Requests for Potter Valley Hydroelectric Project

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ATTACHMENT A:
COMMENTS ON THE PRE-APPLICATION DOCUMENT
FOR POTTER VALLEY HYDROELECTRIC PROJECT

Pre-Application Document Comments

The following comments are provided by State Water Resources Control Board (State Water Board) staff on the Pre-Application Document (PAD) for Pacific Gas and Electric Company's (PG&E) Potter Valley Hydroelectric Project (Project), Federal Energy Regulatory Commission (Commission or FERC) Project No. 77.

General Comments

The following comments are on the information contained in PG&E's PAD. However, State Water Board staff request the Commission's consideration of the comments below when developing its preliminary list of issues and alternatives to be addressed in the Environmental Assessment required by the National Environmental Policy Act. Many of the issues addressed in these comments will be applicable to the request for information in the Commission's Scoping Document 1 (SD1).

Definitions of Terms, Acronyms, and Abbreviations

Page xxiii lists the abbreviation "LWD – Large Woody Debris". State Water Board staff requests the abbreviation and definition be changed as follows: LWM – Large Woody Material. Natural large woody material contributes to river ecology, and geomorphology.

Section 2.2 – Proposed Communication Protocols

State Water Board staff understands PG&E has created a website that has some information regarding the Project and plans to expand the website's information. Updating the website to improve public input should be a priority. State Water Board staff has observed significant public interest in the Project, especially from parties whom reside around Project reservoirs. In order to facilitate effective communication with the public, State Water Board staff recommends that PG&E set up a relicensing website that includes a description of the Project, a calendar of meetings and deadlines, access to Project related documents, and any other information related to the relicensing of the Project.

Section 2.2 states, "effective communication is essential for a timely, cost effective relicensing." State Water Board staff agrees with this statement, and to assist in effective communication, recommends that PG&E make every effort to provide remote access to meetings. Many relicensing participants and interested parties may find it difficult to attend all relicensing meetings in person and would benefit for conference lines or online web access for relicensing meetings. Such provisions will ensure effective communication and maximize the level of participation.

In addition, State Water Board staff recommends PG&E consider when appropriate, use of an impartial facilitator for relicensing meetings to encourage and facilitate effective communication for all relicensing participants.

Section 3.3 – Eel River Watershed

Section 3.3.3, page 3-13 states, "Below the Middle Fork Eel River, potential hydraulic effects of the Project are significantly diminished due to inflow from the Middle, South, and North Forks of

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the Eel River, and the Van Duzen River.” This statement is vague and does not provide information on the extent to which the various tributaries diminishes the Project hydraulic effects. In addition, this statement and the associated discussion lack information regarding the scale and location where on the Eel River Project hydraulic effects are diminished, and the extent of such diminishment. Please clarify to what extent potential hydraulic effects of the Project are diminished due to inflow from tributaries of the Eel River and Van Duzen River under current tributary inflow conditions as well as unimpaired tributary inflow conditions. Unimpaired tributary inflow conditions in relation to Project hydraulic effects is needed, as the Project is diverting a significant portion of the Eel River in the upper portion of the watershed to the East Branch Russian River.

Section 3.4 – Russian River Watershed

Section 3.4.3 *Potentially Affected Tributary Rivers and Streams* states, “Project operations directly affect the 11-mile-long segment of the East Branch Russian River between Potter Valley Powerhouse and the ordinary high water mark of Lake Mendocino. Additionally, the water diverted by the Project from the Eel River to the Russian River constitutes a significant portion of inflow to Lake Mendocino. Although PG&E does not control releases from Lake Mendocino, the water diverted by the Project ultimately affects the Russian River to its confluence with the Pacific Ocean.” Please clarify how Project’s water releases from the Potter Valley Powerhouse effect Lake Mendocino operations (e.g., how much of Potter Valley water is stored or spilled in Lake Mendocino). Please note, due to the interactions between the Project and Sonoma County Water Agency’s operations on the Russian River, coordination between PG&E and Sonoma County Water Agency may be needed to fully address the Project’s water contribution to the Lake Mendocino.

In addition, the State Water Board requests PG&E and the Commission (see SD1 comment titled “Section 4.1.2 Geographic Scope”) extend the geographic scope of the Potter Valley Project to below Lake Mendocino on the Russian River to a minimum extent of the Russian River’s confluence with Dry Creek, and potentially to the Pacific Ocean, as PG&E have stated in its PAD that Project flows affect flows in the Russian River to its confluence with the Pacific Ocean.

Section 4.5.2.1 – Lake Pillsbury

Section 4.5.2.1 states, “Due to concerns of bank instability in the reservoir and the potential for sloughing material to block the outlet needle valve or be released downstream creating high turbidity and streambed sedimentation, the reservoir is operated to maintain a minimum reservoir storage of at least 10,000 ac-ft [acre-feet], resulting in a normal usable storage of 66,875 ac-ft. Verification of the minimum storage level necessary to protect project infrastructure and downstream resources is part of on-going analysis.”

On April 3, 2017, PG&E completed and filed with the Commission a Technical Memorandum (TM) to evaluate the current low level operation constraints at Lake Pillsbury. The analysis was performed as a condition of State Water Board staff’s approval for a Project drought flow variance in 2015. PG&E’s April 3, 2016, TM analysis states:

“From a dam safety perspective, the TM recommends that the reservoir be operated to prevent draw down below a minimum storage of 5,000 acre-feet (water surface elevation ~1,849 feet

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PG&E datum). The primary constraint establishing the proposed lower storage limit of 5,000 acre-feet is stability of the underwater retaining wall protecting the low level outlet (LLO) inlet.”

PG&E’s April 3, 2016, TM should be considered during the Commission’s relicensing process when Lake Pillsbury operations or making decisions regarding future Project flow variances.

Section 4.5.2.2 Van Arsdale Reservoir

Section 4.5.2.2 *Van Arsdale Reservoir*, states, “The gross capacity of Van Arsdale Reservoir was originally 1,457 ac-ft with a usable capacity of 1,140 ac-ft. Accumulation of sediment over time has resulted in significant loss of reservoir capacity. Based on the most recent bathymetric and topographic surveys in 2002 and 2006, the current reservoir capacity is less than 390 ac-ft.” Given the capacity of Van Arsdale Reservoir has reduced from 1,457 ac-ft to 390 ac-ft, does PG&E have plans to address sedimentation of the Van Arsdale Reservoir?

Section 4.5.3.1 – Van Arsdale Intake

Section 4.5.3.1 *Van Arsdale Intake* states, “During August and September, the fish screens and the return system may be taken out of service for maintenance as long as entrainment below the powerhouse is monitored 1 day (24-hour duration) per week when the diversion is unscreened to document the absence of fish.” Please provide supporting rationale to justify monitoring for fish presence one day out of seven days when the screens are down for maintenance is sufficient to ensure no entrainment at the diversion. In addition, please document over the known period of record the number of times and duration of time that the fish screens were taken out of service, but diversions continued. Additionally, include information regarding how often fish were present during the one day of monitoring prior to maintenance.

Section 4.5.3.1 further states, “However, the [fish] screens have been derated to 50% capacity due to current mechanical limitations, and so only 240 cfs total can be diverted through the screens.” Please explain the mechanical limitations that have derated the screen capacity and clarify if it is related to sedimentation of Van Arsdale Reservoir.

Section 4.11 – Proposed License Modifications

PG&E is proposing to exclude lands within the current Commission Project boundary not necessary for the operation and maintenance of the Project. PG&E has not included a description on the type, amount, or location of lands it would like to exclude from the Commission’s Project boundary. Without additional information on the lands PG&E would like to remove from the Project, State Water Board staff cannot accurately review and comment on a PG&E proposal and therefore reserves the right to comment on this issue when PG&E provides additional information.

ATTACHMENT B:
COMMENTS ON THE SCOPING DOCUMENT 1
FOR THE POTTER VALLEY HYDROELECTRIC PROJECT

Scoping Document 1 Comments

The following comments are provided by State Water Resources Control Board (State Water Board) staff on Scoping Document 1 (SD1) for Pacific Gas and Electric Company's (PG&E) Potter Valley Hydroelectric Project (Project), Federal Energy Regulatory Commission (Commission) Project No. 77.

Section 3.0 – Proposed Action and Alternatives

The Commission has stated it plans to consider at a minimum: (1) No-Action Alternative; (2) PG&E's proposed action; and (3) alternatives to the proposed action. Identification of "alternatives to the proposed action" could include a wide range of alternatives. State Water Board staff recommends the Commission consider Project alternatives that reduce environmental impacts associated with the Project, specifically impacts to water quality and aquatic resources such as listed anadromous fish in both the Eel and Russian Rivers. Currently Scott Dam is the limit of anadromy in the Eel River as it was constructed with no fish passage facilities.

It is likely the State Water Board will consider fish passage at Scott Dam in its California Environmental Quality Act (CEQA) document, which will be developed as part of the Clean Water Act Section 401 water quality certification process. To streamline the relicensing process, the Commission should evaluate fish passage options (volitional and/or non-volitional) for Scott Dam as part of its National Environmental Policy Act (NEPA) process in this relicensing proceeding.

In addition, as the CEQA lead agency the State Water Board will be required to examine environmental effects associated with PG&E's proposed project of continued operations. Given recent decisions made by PG&E on other hydroelectric projects in California, and the public interest in Project removal expressed during the Commission's scoping process, the State Water Board recommends the Commission consider a dam removal alternative in its relicensing proceedings.

Section 4.1.1– Resources that could be Cumulatively Affected

Commission staff has identified water quality and fisheries as resources that could cumulatively be affected by the proposed continued operation and maintenance of the Project in combination with other activities in the Eel River Basin. State Water Board staff recommends that the Commission also include terrestrial resources (specifically related to amphibians and aquatic reptiles) and water supply in its cumulative impacts analysis.

Section 4.1.2 – Geographic Scope

State Water Board staff recommends the project's geographic scope for analyzing cumulative impacts be extended. At a minimum on the East Branch Russian River the geographic scope should extend from Potter Valley Powerhouse to the confluence of the Russian River and Dry Creek; and potentially extend to the Pacific Ocean as PG&E has determined Project flows affect flows in the Russian River to its confluence with the Pacific Ocean.

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The Project diverts water from the Eel River into the East Branch Russian River where it supplies flow into Lake Mendocino. Preliminary modeling data provided to State Water Board staff by Sonoma County Water Agency staff on July 21, 2017, illustrate the Project's contribution to water (inflow) into Lake Mendocino (Figure 1). Sonoma County Water Agency staff modeled current Project operations as conditioned in 2004, with the hydrologic period of 1959 to 2006, and compared it to actual operations for the same hydrologic period (refer to Figure 1). Preliminary results show a 47 percent reduction in flows from the Project to the East Branch Russian River with the change in operations that occurred in 2004.

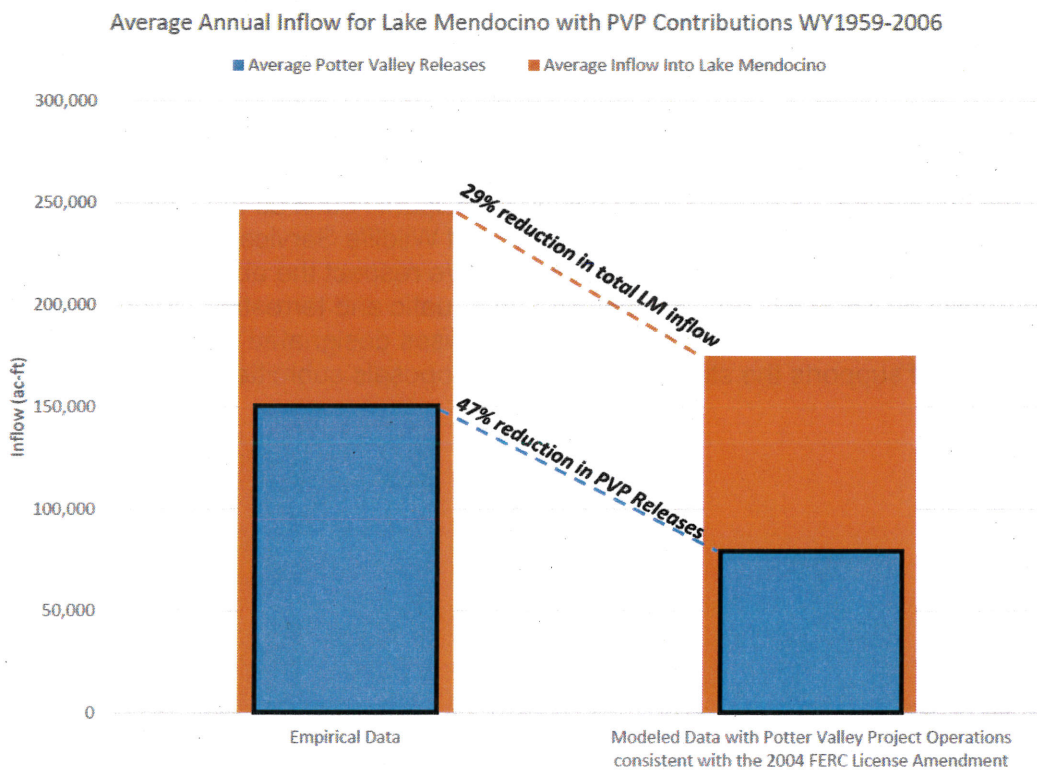


Figure 1. Average Annual Inflow into Lake Mendocino with Potter Valley Project Contributions for water years 1959 through 2006. Graph produced and provided by Sonoma County Water Agency staff.

Project flow releases contribute to flow in the East Branch Russian River and Lake Mendocino. Lake Mendocino supplies water for multiple beneficial uses in the Russian River watershed. Although Lake Mendocino is not part of the Project, its operations may be directly impacted by Project releases into the East Branch Russian River and should be analyzed appropriately.

In the Commission's relicensing process, the State Water Board's role is to ensure the protection of water quality objectives and beneficial uses of water. In evaluating the Project, the State Water Board will consider the Project's contribution to flow and storage in the Russian River. To streamline the Commission's relicensing process, State Water Board staff recommends the Commission reconsider its geographic scope of the Project as noted earlier in this document.

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Section 6.0 – Request for Information and Studies

In this section of SD1, the Commission requests that any additional information or studied be forwarded to the Commission to assist in conducting an accurate and through analysis of Project-specific and cumulative effects associated with the relicensing of the Project.

State Water Board staff recommends that the Commission consider using or incorporating the water management model currently in development by Sonoma County Water Agency, in partnership with the United States Geological Survey and State Water Board staff. This model, along with additional information and quantitative data that could be provided to the Commission by Sonoma County Water Agency, may lend evidence to support expanding the geographic scope of the Project, and help to identify potentially significant Project-related environmental or socioeconomic issues in the Russian River watershed that may not be evaluated otherwise.

In addition, please refer to Attachment C for State Water Board staff's study requests. In addition to the study requests contained in Attachment C, State Water Board staff acknowledges the specialized expertise of relicensing participants such as the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, National Marine Fisheries Service, and the United States Forest Service. We respect the ability of these agencies to rigorously evaluate the Project's impacts on aquatic and terrestrial biological resources which are integral components of the beneficial uses designated in the Basin Plan. State Water Board staff supports the study requests and proposals submitted by these resource agencies.

ATTACHMENT C:
STUDY PLAN REQUESTS FOR
POTTER VALLEY HYDROELECTRIC PROJECT
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Study Plan Requests

Information collected through the implementation of study plans in the Federal Energy Regulatory Commission (Commission) process will be used by the Commission to develop license conditions and fulfill its requirements under the National Environmental Policy Act (NEPA), and by other agencies that must take permitting actions during the Commission's relicensing proceedings. Study plan information will assist the State Water Resources Control Board (State Water Board) in developing water quality certification conditions to ensure compliance with the Clean Water Act and California Environmental Quality Act (CEQA). It is State Water Board staff's understanding that that the State Water Board will act as lead agency for the Potter Valley Hydroelectric Project's (Project) CEQA process.

As a mandatory conditioning agency under the Commission's relicensing process, the State Water Board will act in an advisory role to inform Pacific Gas and Electric Company (PG&E) of the information that is necessary to fulfill the requirements of the water quality certification process. The State Water Board exercises independent authority in issuing water quality certifications therefore its role in any pre-decisional activities is advisory, rather than necessarily reflective of the State Water Board's ultimate determinations.

In this advisory role, State Water Board staff will participate in the Study Plan Development process and submit study plan requests and comments in accordance with the Commission's Integrated Licensing Process (ILP) (included below). If the study plans approved by the Commission do not cover those requested by State Water Board staff, or are otherwise insufficient to provide information needed in connection with the issuance of the water quality certification, the State Water Board may choose to request such information under the Porter-Cologne Water Quality Control Act (Cal. Wat. Code, § 13000 et seq.), Water Code section 13383, or other applicable authority.

In an effort to avoid unnecessary delays in the Project's relicensing process, State Water Board staff strongly encourages PG&E to consider the below requested studies, and to work collaboratively with State Water Board staff and other relicensing participants to resolve differences. When possible, working collaboratively with all relicensing participants often allows for expedited resolution to issues while avoiding However, State Water Board staff understands the Commission's dispute process may be necessary to resolve some issues that may occur during relicensing.

State Water Board staff was disappointed that PG&E deviated from standard practices demonstrated in other Commission relicensing processes³ of proactively developing and proposing draft study plans in its PAD. State Water Board staff looks forward to working with PG&E and all relicensing participants to develop study plans and ensure they adequately analyze potential Project impacts and meet the regulatory needs of all resource agencies.

³ For example: the Yuba River Development Project (FERC Project No. 2246); and the Pit 3, 4, and 5 Hydroelectric Project (FERC Project No. 233).

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POTTER VALLEY HYDROELECTRIC PROJECT
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The following is the list of seven studies requested by State Water Board staff:

- 1) Water Quality Monitoring Study
- 2) Water Temperature Model Study
- 3) Water Balance / Operations Model Study
- 4) Instream Flow Study
- 5) Fluvial Processes Study
- 6) Fish Population Study in the East Branch Russian River
- 7) Special Status Amphibians and Reptiles Study

Study plan requests by State Water Board staff are described in detail, using the study plan criteria outlined in Appendix A of the Commission's Scoping Document 1, as follows:

1. Water Quality Monitoring Study

Goal and Objective of the Water Quality Monitoring Study

The goals and objectives of the Water Quality Monitoring Study are to: (1) characterize existing water quality conditions in the Project reservoirs and Project affected reaches of the Eel and East Branch Russian Rivers; (2) determine consistency with state and federal water quality objectives, standards, and criteria; and (3) identify potential Project operation and maintenance related causes for any failure to meet water quality objectives or interference with beneficial uses of water identified in the Water Quality Control Plan for the North Coast Region (Basin Plan).

Specifically, State Water Board staff requests PG&E monitor:

- In-situ water quality parameters (dissolved oxygen, pH, temperature, and turbidity)
- General water quality parameters (inorganic ions, nutrients, metals (total and dissolved))
- Bacteria (fecal coliform, *Escherichia coli*, and total coliform)
- Petroleum Hydrocarbons
- Blue Green Algae species and toxins (specifically microcystin and anatoxin-a)

Monitoring locations and frequency should be collaboratively determined with relicensing participants to ensure adequate information is collected. At a minimum the below reaches should be monitored:

- Eel River above Lake Pillsbury (necessary to assess pre-project impacted water quality)
- Lake Pillsbury
- Eel River below Lake Pillsbury and above Van Arsdale Reservoir
- Van Arsdale Reservoir
- Eel River below Van Arsdale Reservoir
- Discharge below the Potter Valley Powerhouse on the East Branch Russian River

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Resource Management Goal of the State Water Board

The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters, and the regulate water diversion and use through the water right priority system in accordance with the State Water Board's reasonable use and public trust responsibilities. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

Throughout the Commission's relicensing process the State Water Board maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project as described has the potential to impact water quality in the Eel and East Branch Russian Rivers, including multiple beneficial uses. The Project's operations require public trust balancing and a balancing of public interest in water use and water quality. The analysis of these potential impacts requires information on current water quality conditions of Project reservoirs and the Eel and East Branch Russian Rivers with the current flow schedule that was fully implemented in 2007.

Existing Information

PG&E's Pre-Application Document (PAD) Section 5.2.2 describes existing information related to water quality monitoring and the Project. PAD Table 5.2-3 provides ranges (low and high) for analytics for water quality, but does not provide specific values, the number values, the specific sites each value was recorded (table groups several sites together into a range of values), or the project operations in relation to each recorded value. State Water Board staff finds this information insufficient to make adequate determinations of the Project impacts to water quality and beneficial uses of water. In addition, much of the collected water quality information predates the current flow schedule that was implemented in 2007. Comprehensive water quality data collection with the current flow schedule is needed to fully assess the Project's potential impacts to water quality and beneficial uses of water.

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse which directly discharges into the East Branch Russian River. The Project is responsible for maintaining minimum instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River via diversions from the Eel River. Project operations and maintenance activities may directly impact water quality in the Eel River below the diversions, East Branch Russian River below the Potter Valley Powerhouse, and in the Project impoundments. In addition, Recreational uses at the Project impoundments and facilities have the potential to impact water quality through human contact (e.g. bacteria and hydrocarbons).

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Adequate water quality data with current flow schedules is needed to inform the State Water Board's water quality certification and associated CEQA processes. Water quality information will inform conditions of the Project's future water quality certification which will become mandatory conditions at the issuance of a Commission license.

Study Methodology

Water quality monitoring with current flow schedules as part of a Commission relicensing process is a standard practice used in most California Commission relicensings to inform project impacts to water quality and conditions of a water quality certification. PG&E Projects including: Bucks Creek Hydroelectric Project (FERC Project No. 619), Pit 3, 4, and 5 Hydroelectric Project (FERC Project No. 233), and McCloud-Pit Hydroelectric Project (FERC Project No. 2106), all conducted water quality monitoring as part of the Commission study plan process. In addition, other recent Commission relicensing processes such as: Yuba County Water Agency's Yuba River Development Project (FERC Project No. 2246), Placer County Water Agency's Middle Fork American River Hydroelectric Project (FERC Project No. 2079), and South Sutter Water District's Camp Far West Hydroelectric Project (FERC Project No. 2997), all conducted, or are currently conducting, water quality monitoring as part of the Commission study plan process.

As PG&E is proposing no water quality monitoring and State Water Board staff are recommending near standard water quality monitoring practices used in the majority of Commission relicensing processes in California, our recommended methodologies are more appropriate.

The Water Quality Monitoring Study should be performed in eight general steps: (1) select specific water quality parameters; (2) select sampling locations; (3) collect water samples; (4) perform laboratory analyses using standard methods adequately sensitive to determine consistency with state and federal water quality standards; (5) prepare quality assurance/quality control review; (6) determine consistency with Basin Plan objectives and beneficial uses protection needs; (7) consult with relicensing participants; and (8) prepare a report summarizing results. The report should be made available to relicensing participants.

Level of Effort and Cost

The water quality monitoring study should run at a minimum for two consecutive years and include specific monitoring items described in the goals and objectives section. In addition, PG&E working collaboratively with relicensing participants to further refine the water quality monitoring study will take additional effort and costs. Based upon previous relicensing processes in California that have conducted similar water quality monitoring, State Water Board staff estimate the cost to be between \$165,000 to \$250,000, with cost dependent on collaborative development of study specifics such as monitoring locations and frequency.

2. Water Temperature Model

Goal and Objective of the Water Temperature and Quality Model Study Request

The goal of the Water Temperature Model Study is to accurately quantify the effects of the Project on water temperature at relevant temporal and geographic scales necessary to help

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inform water quality certification conditions, and accomplish the resource goals and objectives of the State Water Board.

The objectives of the Water Temperature Model Study are to: (1) develop a model to simulate different temperatures given potential flow changes in the Project reservoirs and Project affected reaches of the Eel and East Branch Russian Rivers; (2) accurately reproduce observed reservoir and stream water temperatures, within acceptable calibration standards over a range of hydrologic conditions; (3) be sensitive to both flow and meteorological conditions; (4) determine consistency with state and federal water temperature objectives, standards, and criteria; (5) identify potential Project operation and maintenance related causes for any unmet water temperature objectives and beneficial uses of water identified in the *Water Quality Control Plan for the North Coast Region* (Basin Plan). Modeling efforts should focus on operational effects during the summer months (June through September) when high water temperatures can be a limiting factor to aquatic resources, however, modeling efforts should not be limited to the summer months. Specific information and detailed objectives to be obtained from this study request should be collaboratively developed with PG&E, resources agencies, and other relicensing participants.

Resource Management Goal of the State Water Board

The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters, and the regulate water diversion and use through the water right priority system in accordance with the State Water Board's reasonable use and public trust responsibilities. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

Throughout the Commission's relicensing process the State Water Board maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project has the potential to impact water temperature in the Eel and East Branch Russian Rivers, including multiple beneficial uses. The Project's operations require public trust balancing and a balancing of public interest in water use and water quality. The analysis of these potential impacts requires information on water temperature conditions in Project reservoirs and the Eel and East Branch Russian Rivers with the current flow schedule that was fully implemented in 2007.

Existing Information

Available water temperature data are described in Section 5.2 of the PAD. PG&E is actively collecting stream water temperature data upstream, within and downstream of the Project area, and is also collecting limited reservoir water temperature data in Lake Pillsbury. The data provided in the PAD needs to be supplemented with increased water temperature monitoring to provide the temporal and spatial resolution of measurements in order to accurately quantify its effects on aquatic habitat and wildlife, and the beneficial uses of water (Water Quality Monitoring Study includes temperature). Particularly, the majority of temperature information

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collected in the past occurred during the summer months below Scott Dam, but not within Lake Pillsbury.

Water temperature monitoring that is limited to the summer months creates significant data gaps in spring and fall when stratification and de-stratification of temperature dynamics within Lake Pillsbury occur. Understanding temperature stratification occurring in the spring and the associated volume of cold water availability within Lake Pillsbury should inform instream flow releases downstream of Scott Dam during the summer months when sustaining preferable summer rearing conditions for cold-water for anadromous fish. The continuation of current temperature monitoring, the extension of the temperature monitoring season (including the spring and fall months), and the addition of real-time water temperature gages to inform block-water type management actions, will help to ensure a complete and accurate data set to inform timely future water operations and for the development of a robust predictive water temperature model downstream of Scott Dam, within Lake Pillsbury, and upstream of Lake Pillsbury.

PG&E did not provide information or data of Project impacts on water temperature discharges into the East Branch Russian River below the Potter Valley powerhouse. In order to produce a temperature model that simulates different water temperatures given potential flow changes in the East Branch Russian River, additional data for water temperature records below the Potter Valley Powerhouse in the East Branch Russian River should be obtained and included in the model's analysis in order to determine Project impacts to beneficial uses and aquatic habitat in the East Branch Russian River.

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse which directly discharges into the East Branch Russian River. The Project is responsible for maintaining minimum instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River via diversions from the Eel River. The results of water temperature model simulations will be used to: (1) better understand Project effects on water temperature in Project-affected reaches of the Eel and East Branch Russian River; (2) evaluate what Project operation alternative (or combination of alternatives) can best protect aquatic wildlife, such as anadromous fish; and (3) evaluate the effects of Project operational alternatives on the thermal environment and impacts to beneficial uses.

Continued Project operation and maintenance may directly impact water temperature in the Eel River below the diversions, East Branch Russian River below the Potter Valley Powerhouse, and in the Project impoundments. These water temperature effects may be associated with seasonal changes to water quality in Project-affected reaches of the Eel and East Branch Russian River. Anadromous fish species, such as salmonids and lamprey in the mainstem Eel River, may be impacted by water temperatures associated with Project operations. Development of a Water Temperature Model will allow for State Water Board staff and other relicensing participants to assess Project related temperature impacts to the Eel and East Branch Russian River systems under different modeled flow and operations scenarios. The Water Temperature Model will inform certification and license conditions. State Water Board staff believes that the creation of predictive Water Temperature Model would improve the ability to evaluate and manage water temperatures within Project-affected reaches of the Eel and East

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Branch Russian River. In addition, PG&E's creation of a water temperature model for relicensing will allow all relicensing participants to use the same water temperature model when determining Project impacts.

Study Methodology

PG&E has implemented a network of temperature monitoring stations listed in section 5.2 of the PAD and within PG&E's Summer Water Temperature Monitoring Plan (PG&E 2005)⁴. In addition to these locations, PG&E should install water temperature loggers that record water temperature at one hour intervals in stream locations that are collaboratively decided upon with relicensing participants.

PG&E should develop a tool comprised of one or more models to predict water temperature in Project-affected stream reaches and Project reservoirs. The model should seamlessly incorporate upstream projects (if any) and inflows, project reservoirs operations and diversions with downstream accretion flows in order to model the Eel River mainstem from above Lake Pillsbury downstream to the confluence with the Middle Fork Eel River. Coupling this with various flow prescriptions discharged from Scott Dam and associated diversions at Van Arsdale, will also provide necessary management tools to best assess impacts of the Project relative to cold-water beneficial uses, such as maintaining anadromous fish cold-water habitat.

It is essential that an instream temperature model is developed for the Potter Valley Project to simulate water temperatures within various reaches and under different hydrologic regimes. There are a number of water temperature modeling platforms that can accomplish the objectives of the study element. For example, the CE-QUALW2 model has been widely used for reservoir and temperature projections using data that was collected from those respective environments. It is expected that PG&E will choose an appropriate platform in an open and transparent manner in collaboration with ILP participants. It is also expected that the model(s) will be calibrated and verified using accepted scientific methodology and the best available data.

A water temperature model with current flow schedules as part of a Commission relicensing process is a standard practice used in several California Commission relicensing processes to inform project impacts to water temperature and conditions of a water quality certification. For example, recent Commission relicensing processes such as: Yuba County Water Agency's Yuba River Development Project (FERC Project No. 2246), and South Sutter Water District's Camp Far West Hydroelectric Project (FERC Project No. 2997), developed, or are currently developing, water temperature models as part of the Commission study plan process.

As PG&E is proposing no water temperature model and State Water Board staff are recommending standard water temperature modeling practices used in recent Commission relicensing processes in California, our recommended methodologies are appropriate.

Level of Effort and Cost

⁴ Pacific Gas and Electric. 2005. Summer water temperature monitoring plan. Addressing NMFS Measure 8 (in part) and License Article 57. Potter Valley Hydroelectric Project FERC Project No.77.

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The Water Temperature Model Study should include items described in the goals and objectives section. In addition, PG&E working collaboratively with relicensing participants to further refine the Water Temperature Model Study will take additional effort and costs. State Water Board staff estimate the cost to be between \$100,000 to \$350,000, with cost dependent on collaborative development of study specifics, and amount of additional water temperature data collection necessary.

3. Water Balance / Operations Model Study

Goal and Objective of the Water Balance / Operations Model Study

The goal of the Water Balance / Operations Model Study is to develop a water balance and operations computer model (Operations Model) that can be used by all relicensing participants to simulate current and potential future operations of the Project. Study objectives include developing a model that simulates current Project operations for a period of analysis that covers a range of historical hydrologic conditions. The Operations Model should also be able to simulate basic decisions made during Project operations including the management of flood control reservation, water supply management, dam releases, reservoir levels, and hydropower generation. Objectives also include:

- Address operational decisions made during Project operations and maintenance (O&M) including: water supply, recreation, stream flows, and hydropower generation;
- Accurately reproduce observed reservoir levels, reservoir releases, and hydropower generation within acceptable calibration standards over a range of hydrologic conditions;
- Provide output to inform other studies, analyses, and models; and
- Allow simulation of changes in Project O&M to determine effects on reservoir levels, reservoir releases, hydropower generation, and instream flow releases from Scott Dam, Cape Horn Dam, and Potter Valley powerhouse.

Resource Management Goal of the State Water Board

The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters. In accordance with the State Water Board's reasonable use and public trust responsibilities, they may regulate water diversion and use through the water right priority system. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

Throughout the Commission relicensing process, State Water Board staff maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project has the potential to impact stream flows and reservoir levels in the Eel and East Branch Russian Rivers, including multiple beneficial uses. The Project's operations require balancing of public trust and interest in water use and water quality.

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Existing Information

State Water Board staff believes adequate information exists to develop an Operations Model that meets the above objectives, and that PG&E working collaboratively with relicensing participants has the capability to supplement data where gaps currently exist. Section 5.1 in the PAD summarizes the hydrology of Eel and East Branch Russian River including area-storage-elevation information, historical operations data levels, reservoir releases, power generation, and flows downstream of the Project. PG&E also has access to U.S. Army Corps of Engineers' flood control requirements and objectives. The existing Commission license specifies historic required releases and flows downstream of the Project. Information on physical capacities of the reservoirs, outlets, and powerhouses is also known by PG&E and listed in the PAD.

PG&E mentioned in their PAD that the water discharged from the Potter Valley Powerhouse into the East Fork Russian River "...provides inflow to Lake Mendocino and benefits many downstream users". However, PG&E did not provide information or data on how the Project impacts water supply into Lake Mendocino. Preliminary data pertaining to the relationship between the Project and water supply into Lake Mendocino does exist, and has been collected and analyzed by the Sonoma County Agency. PG&E should incorporate this information and data into their draft license application for the Project as changes in Project releases into the East Branch Russian River could impact water in the Russian River.

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse that directly discharges into the East Branch Russian River. The Project is responsible for instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River. Operation of the Project affects reservoir storage levels and releases in both reservoir bodies. This study request seeks to provide a tool for examining water quantity and flow under various potential operational scenarios that may inform development of certification requirements. This modeling tool will aid in assessing multiple preliminary resource issues identified in Scoping Document 1 and will allow relicensing participants, including the Commission, to examine the effects of various flow regimes on water supply and generation while using the same model, vs different models prepared by each relicensing participant to inform their actions on the Project.

Study Methodology

The study area should include Lake Pillsbury and Van Arsdale reservoirs, intake structures, and diversion structures (tunnels, adits, conduits, penstocks, and valve houses). This model should also include Project-affected stream reaches on: (1) Eel River from Scott Dam to Van Arsdale Reservoir; (2) Eel River from Cape Horn Dam and downstream to the confluence of the Eel River and Middle Fork of the Eel River; and (3) East Branch Russian River from Potter Valley Powerhouse to Lake Mendocino. For Project-related impacts downstream of Lake Mendocino, PG&E should consider utilizing the model under development by the Sonoma County Water Agency in coordination with the U.S. Geological Survey and State Water Board staff.

The specific type of model should be developed collaboratively with PG&E, resource agencies, and other relicensing participants. The model should be developed in five general steps that

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include: (1) model development; (2) model validation; (3) base case development; (4) model documentation; and (5) final report. One type of model that PG&E could consider is the HEC-ResSim or similar platform to develop the Project Water Balance/Operations Model in consultation with relicensing participants. HEC-ResSim is a publicly-available reservoir simulation software package that was developed by the U.S. Army Corps of Engineers, Hydrologic Engineering Center. HEC-ResSim has been used on numerous recent hydropower licensing proceedings, including the Upper American River Project (FERC No. 2101), the DeSable-Centerville Project (FERC No. 803), the Yuba-Bear Project (FERC No. 2266), the Drum-Spaulding Project (FERC No. 2310), and the McCloud-Pit Project (FERC No. 2106). As PG&E is proposing no water operations model and State Water Board staff is recommending standard practices of water operations model development used in other Commission relicensing processes in California, our recommended methodologies are appropriate.

Level of Effort and Cost

Due to the size of the Project, the Operations Model required for the Project may be less complex than those developed for other project relicensing efforts. State Water Board staff estimate cost of Operation Model to be in the range of \$100,000 to \$250,000, with cost dependent on collaborative development of study specifics.

4. Instream Flow Study

Goal and Objective of the Instream Flow Study

The goal of the Instream Flow Study is to determine how Project operations affect habitat for aquatic species in Project-affected river reaches. The objective of the Instream Flow Study is to characterize the relationship between instream flow and aquatic habitat for target fish species.

Specifically, State Water Board staff requests PG&E to include the following habitat characteristics in the Instream Flow Study:

- Stream channel topography and cross-sectional area;
- Benthic substrate type and riparian cover type mapping;
- Hydraulic parameters, such as depth and velocity; and
- Water temperature.

Specific study locations should be collaboratively determined with relicensing participants to ensure adequate information is collected to achieve the goal and objectives of the Instream Flow Study. At a minimum, the Project-affected stream reaches listed below should each contain at least one study location:

- Eel River above Lake Pillsbury
- Eel River below Scott Dam
- Eel River below Cape Horn Dam
- East Branch Russian River below Potter Valley powerhouse

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Resource Management Goal of the State Water Board

The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters, and the regulate water diversion and use through the water right priority system in accordance with the State Water Board's reasonable use and public trust responsibilities. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

Throughout the FERC relicensing process the State Water Board maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project as described has the potential to impact water quality in the Eel and East Branch Russian Rivers, including multiple beneficial uses. The Project's operations require public trust balancing and a balancing of public interest in water use and water quality. The analysis of these potential impacts requires information on the relationship between Project operations and the characteristics of aquatic habitat in the Eel and East Branch Russian Rivers with the current flow schedule that was fully implemented in 2007.

Existing Information

PG&E's PAD, Section 5.2, describes existing information related to water use and hydrology, and Section 5.3 describes existing information related to fish and aquatic resources in Project affected reaches. Section 6.2.1.5 lists relevant information compiled by PG&E as it relates to the potential proposed study for Instream Flows. The information described and references listed in the PAD, however, either focus solely on water temperature as the aquatic "habitat" related to flow, or contain data and information on the relationship between physical habitat and discharge in the Eel River that was collected prior to implementation of the 2007 Project flow regime. Regarding the East Branch Russian River, PG&E stated in their PAD that "very little information is available to describe aquatic habitat conditions in the East Branch Russian River."

Overall, the PAD did not contain information that comprehensively described physical habitat attributes, such as stream cross-sectional area, substrate and riparian cover type mapping, and depth and velocity, as they relate to instream flow under the current Project operations that were fully implemented beginning in 2007. State Water Board staff finds PG&E's PAD information to be insufficient to make adequate determinations of Project impacts to beneficial uses of the Eel and East Branch Russian Rivers. Comprehensive data on the relationship between physical habitat attributes and hydraulic parameters that are collected with the current flow schedule is required to be able to fully assess the Project's potential impacts to aquatic habitat and the beneficial uses of water.

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse which directly discharges into the East Branch Russian River. The Project is responsible for maintaining minimum

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instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River via diversions from the Eel River. Project operations and maintenance activities may directly impact aquatic habitat in the Eel River below the diversions, East Branch Russian River below the Potter Valley Powerhouse, and in the Project impoundments.

Adequate data on the relationship between physical habitat attributes and hydraulic parameters with current flow schedules is needed to inform the State Water Board's water quality certification and associated CEQA processes. Information from the Instream Flow Study will inform conditions of the Project's future water quality certification which will become mandatory conditions at the issuance of a Commission license.

Study Methodology

Instream Flow studies as part of a Commission relicensing process is a standard practice used in most California Commission relicensing processes to inform project impacts to aquatic habitat and conditions of a water quality certification. PG&E Projects including: Pit 3, 4, and 5 (FERC Project No. 233), McCloud-Pit (FERC Project No. 2106), and Pit 1 (FERC Project No. 2687) all conducted instream flow studies as part of the FERC study plan process. In addition, other FERC relicensing processes such as: Yuba County Water Agency's Yuba River Development Project (FERC Project No. 2246), Placer County Water Agency's Middle Fork American River (FERC Project No. 2079), Southern California Edison's Six Big Creek Hydroelectric Projects (FERC Project Nos. 67, 120, 2085, 2086, 2174, 2175), and South Sutter Water District's Camp Far West Hydroelectric Project (FERC Project No. 2997), all conducted, or are currently conducting, instream flow studies as part of the Commission's study plan process.

The Instream Flow Study should be performed in seven general steps: (1) select specific physical habitat attributes and hydraulic parameters; (2) select study locations; (3) collect data; (4) prepare quality assurance/quality control review; (5) determine consistency with Basin Plan objectives and beneficial uses protection needs; (6) consult with relicensing participants; and (7) prepare a report summarizing results. The report should be made available to relicensing participants.

PG&E did not propose an instream flow study in their PAD. State Water Board staff is recommending standard instream flow protocols used in the majority of FERC relicensing processes in California, and therefore our recommended methodologies are appropriate.

Level of Effort and Cost

The Instream Flow Study should run for at least two consecutive water-years and include data collection described in the goals and objectives section. In addition, PG&E working collaboratively with relicensing participants to further refine the Instream Flow Study will take additional effort and costs. Based upon previous, and concurrent, relicensing processes in California that have conducted similar instream flow studies, State Water Board staff estimate the cost to be between \$200,000 and \$650,000 with cost dependent on collaborative development of study specifics, such as specific habitat attributes and technical methodologies.

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5. Fluvial Processes Study

Goal and Objective of the Fluvial Processes Study

The goal of the Fluvial Processes Study is to determine how Project operations affect fluvial processes in Project-affected reservoirs and stream reaches. The objectives of the Fluvial Processes Study are to: (1) characterize the relationship between Project operations and fluvial processes; (2) identify the potential impacts of the relationship between Project operations and fluvial processes on aquatic species and habitat; and (3) identify sources of Project-related erosion and sedimentation.

Specifically, State Water Board staff requests PG&E to include the following elements in the Fluvial Processes Study:

- Quantify sedimentation rates in Lake Pillsbury, and subsequent loss or transport of sediment to: (i) the Eel River below Scott Dam; (ii) Eel River below Cape Horn Dam; (iii) East Branch Russian River below the Potter Valley Powerhouse.
- Quantify large woody material (LWM) frequency and volume trapped on an annual basis by Lake Pillsbury and Van Arsdale Reservoir. In addition, explain the current LWM management practices in Project reservoirs.
- Survey the volume of mobile, coarse sediment stored in the active channel in the Eel River below Scott Dam and Cape Horn Dam.
- Survey the volume of fine sediment stored in the active channel, including pool in-filling, in the Eel River below Scott Dam and Cape Horn Dam.
- Quantify the frequency and volume of LWM stored in the bankfull channel in the Eel River below Scott Dam and Cape Horn Dam.
- Identify areas of significant erosion that are likely caused by Project operations in: (i) Lake Pillsbury and Van Arsdale Reservoir; (ii) the Eel River below Scott Dam and Cape Horn Dam; and (iii) in the East Branch Russian River below the Potter Valley Powerhouse.
- Synthesize results from this study with the results from all other State Water Board study requests, as applicable.

Specific study locations should be collaboratively determined with relicensing participants to ensure adequate information is collected to achieve the goal and objectives of the Fluvial Processes Study.

Resource Management Goal of the State Water Board

The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters, and the regulate water diversion and use through the water right priority system in accordance with the State Water Board's reasonable use and public trust responsibilities. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

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Throughout the Commission relicensing process the State Water Board maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project as described has the potential to impact fluvial processes in the Eel River and East Branch Russian River, including multiple beneficial uses. The Project's operations require public trust balancing and a balancing of public interest in water use and water quality. The analysis of these potential impacts requires information on the relationship between Project operations and fluvial process, and the potential impacts on aquatic species in the Eel and East Branch Russian Rivers with the current flow schedule that was fully implemented in 2007.

Existing Information

PG&E's PAD, Section 5.7, describes existing information related to Geomorphology. The PAD includes descriptions of recent bathymetric surveys of Lake Pillsbury and sediment evaluation in Van Arsdale Reservoir. However, the information described and many of the references listed in the PAD as it relates to the Project-affected stream reaches in the Eel River, contain data and information that was collected prior to implementation of the 2007 Project flow regime. The PAD also does not contain information on coarse gravel or LWM in Project-affected stream reaches. PG&E has access to the necessary hydrology data, historical operations data on reservoir storage, release, power generation, and observed flows directly downstream of the Project to achieve some the objectives described in this study request.

PG&E states in their PAD that "The Eel River has the highest recorded average suspended sediment load per unit area of any river of its size or larger in the conterminous United States (Lisle 1990)"⁵. However, PG&E did not provide information or data in their PAD that describes Project impacts on the geomorphology and fluvial processes within the East Branch Russian River. It is not known how much, what type, or to what affect the suspended sediment that is transported to the East Branch Russian River may have on beneficial uses and aquatic wildlife.

Overall, the PAD does not contain information that comprehensively described fluvial processes related to the current Project operations that were fully implemented beginning in 2007. State Water Board staff finds this lack of information to be insufficient to make adequate determinations of Project impacts to beneficial uses of the Eel and East Branch Russian Rivers. Comprehensive data on the relationship between fluvial processes and the current operations is required to be able to fully assess the Project's potential impacts to aquatic wildlife and habitat, and the beneficial uses of water.

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse which directly discharges into the East Branch Russian River. The Project is responsible for maintaining minimum

⁵ Reference cited in the PAD is: Lisle, T.E. 1990. The Eel River, Northwestern California: high sediment yields from a dynamic landscape. In *Surface Water Hydrology, v O-1. The Geology of North America*, M.G. Wolman and H.G. Riggs, eds, pp. 311-314. Geological Society of America.

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instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River via diversions from the Eel River. Project operations and maintenance activities may directly impact aquatic habitat in the Eel River below the diversions, East Branch Russian River below the Potter Valley Powerhouse, and in the Project impoundments.

Lake Pillsbury effectively traps large amounts sediment and LWM inputs from the upper Eel River watershed and eliminates the delivery of these key resources for proper channel morphology condition and function to the Eel River below the Project. In addition, the Project has altered the frequency, magnitude, and duration of peak flows to the lower Eel River, which may limit key geomorphic processes such as bed mobilization, fine sediment flushing, channel migration and avulsion, LWM recruitment, riparian vegetation stand establishment, and development and maintenance of a natural bankfull channel dimensions.

This study specifically looks to quantify how resource inputs (sediment and LWM) are removed from the system by entrapment at Lake Pillsbury and Van Arsdale Reservoir, and how this reduced supply translates into available habitat in the Eel River (e.g., anadromous fish spawning gravel, instream wood, and sediment storage). This study would also provide information on suspended sediment transport to the East Branch Russian River, which is currently an information gap.

Adequate data on the relationship between fluvial processes with current operations is needed to inform the State Water Board's water quality certification and associated CEQA processes. Information from the Fluvial Processes Study will inform conditions of the Project's future water quality certification which will become mandatory conditions at the issuance of a Commission license.

Study Methodology

Fluvial processes studies as part of a FERC relicensing process is a standard practice used in many California Commission relicensing processes to inform project impacts to geomorphology and conditions of a water quality certification. Commission relicensing processes such as: Yuba County Water Agency's Yuba River Development Project (FERC Project No. 2246), PG&E's McCloud-Pit Hydroelectric Project (FERC Project No. 2106), and South Feather Water and Power Agency's Power Project (FERC Project No. 2088) conducted fluvial processes or geomorphology studies as part of the Commission study plan process.

PG&E did not propose a fluvial processes study in their PAD. State Water Board staff is recommending standard fluvial processes protocols used in the Commission relicensing processes in California, and therefore our recommended methodologies are appropriate.

The Fluvial Processes Study should be performed in seven general steps: (1) develop specific data collection protocols to achieve study goals and objectives; (2) select study locations; (3) collect data; (4) prepare quality assurance/quality control review; (5) determine consistency with Basin Plan objectives and beneficial uses protection needs; (6) consult with relicensing participants; and (7) prepare a report summarizing results. The report should be made available to relicensing participants.

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Level of Effort and Cost

The Fluvial Processes Study should run for at least two consecutive water-years and include data collection described in the goals and objectives section. In addition, PG&E working collaboratively with relicensing participants to further refine the Fluvial Processes Study will take additional effort and costs. State Water Board staff estimate the cost to be between \$150,000 and \$200,000 with cost dependent on collaborative development of study specifics.

6. Fish Population Study in the East Branch Russian River

Goal and Objective of the Fish Population Study in the East Branch Russian River

The goal of the Fish Population Study in the East Branch Russian River is to provide current information on the fish community in the Project-affected stream reach of the East Branch Russian River between the Potter Valley Powerhouse and Lake Mendocino. The objectives of the study are to: (1) characterize fish species composition; and (2) estimate total or relative abundance of fish by species, and by native or non-native species status. Specific study location(s) should be collaboratively determined with relicensing participants to ensure adequate information is collected to achieve the goal and objectives of the study.

Resource Management Goal of the State Water Board

The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters, and the regulate water diversion and use through the water right priority system in accordance with the State Water Board's reasonable use and public trust responsibilities. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

Throughout the Commission relicensing process the State Water Board maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project as described has the potential to impact fish communities in the East Branch Russian River. The Project's operations require public trust balancing and a balancing of public interest in water use and water quality. The analysis of these potential impacts requires information on the fish species composition and abundance in the East Branch Russian River, in conjunction with the current flow schedule and operations that were fully implemented in 2007.

Existing Information

PG&E's PAD, Section 5.3, describes existing information related to fish populations in Project affected reaches. The information described in the PAD primarily contain information on fish populations in the Eel River and does not fully address fish populations in the East Branch Russian River. The PAD discusses that fish stocking occurred in the East Branch Russian River from the 1970s to the mid-1990s, and that it is likely some fish species were entrained in

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the Van Arsdale intake prior to installation of the current fish screens and now inhabit the East Branch Russian River. The PAD does not contain information on the current fish species composition and abundance in the East Branch Russian River, or how flows from current Project operations may affect fish communities in the East Branch Russian River. Furthermore, Section 6.2.1.9 in the PAD, identifies fish population characteristics in the East Branch Russian River as a potential information gap.

State Water Board staff finds this lack of information to be insufficient to make adequate determinations of Project impacts to fish communities and beneficial uses of the East Branch Russian River. Comprehensive data on the fish community that is collected with the current flow schedule and Project operations is required to be able to fully assess the Project's potential impacts to fish communities and the beneficial uses of water.

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse which directly discharges into the East Branch Russian River. The Project is responsible for maintaining minimum instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River via diversions from the Eel River. Project operations and maintenance activities may directly impact the fish community in the East Branch Russian River below the Potter Valley Powerhouse.

Adequate data on the fish community in the East Branch Russian River with current flow schedules and Project operations is needed to inform the State Water Board's water quality certification and associated CEQA processes. Information from the study will inform conditions of the Project's future water quality certification which will become mandatory conditions at the issuance of a Commission license.

Study Methodology

Fish populations studies as part of a Commission relicensing process is a standard practice used in most California Commission relicensing processes to inform project impacts to aquatic habitat and conditions of a water quality certification. PG&E Projects including: Pit 3, 4, and 5 (FERC Project No. 233), McCloud-Pit (FERC Project No. 2106), and Pit 1 (FERC Project No. 2687) all conducted fish population studies as part of the FERC study plan process. In addition, other FERC relicensing processes such as: Yuba County Water Agency's Yuba River Development Project (FERC Project No. 2246), Placer County Water Agency's Middle Fork American River (FERC Project No. 2079), Southern California Edison's Six Big Creek Hydroelectric Projects (FERC Project Nos. 67, 120, 2085, 2086, 2174, 2175), and South Sutter Water District's Camp Far West Hydroelectric Project (FERC Project No. 2997), all conducted, or are currently conducting, fish population studies as part of the Commission study plan process.

PG&E did not propose a fish population study in the East Branch Russian River in their PAD. State Water Board staff is recommending standard fish population sampling protocols used in the majority of FERC relicensing processes in California, and therefore our recommended methodologies are appropriate.

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The Fish Population Study in the East Branch Russian River should be performed in six general steps: (1) select study locations and develop sampling protocols; (2) collect data; (3) prepare quality assurance/quality control review; (4) determine consistency with Basin Plan objectives and beneficial uses protection needs; (5) consult with relicensing participants; and (6) prepare a report summarizing results. The report should be made available to relicensing participants.

Level of Effort and Cost

The Fish Population Study should run for two consecutive water-years and include data collection described in the goals and objectives section. In addition, PG&E working collaboratively with relicensing participants to further refine the fish population study will take additional effort and costs. Based upon previous, and concurrent, relicensing processes in California that have conducted similar fish population studies, State Water Board staff estimate the cost to be between \$60,000 and \$100,000 with cost dependent on collaborative development of study specifics, such as number of study locations and specific sampling methodologies.

7. Special Status Amphibians and Reptiles Study

Goal and Objective of the Special Statue Amphibians and Reptiles Study

The goal of the Special Status Amphibians and Reptiles Study is to provide information regarding the distribution and potential suitable habitat for Foothill Yellow-Legged Frog (FYLF) and Western Pond Turtle (WPT) in Project-affected stream reaches and Project reservoirs.

Specific study objectives include:

- Identify and map habitats in the study areas that are potentially suitable for different life stages of FYLF and WPT, and evaluate the suitability of these habitats for each species by life stage.
- Perform biological surveys in suitable habitats and document the distribution and abundance of FYLF and WPT in the study areas, and determine the approximate period in which breeding and rearing occurs. Identify, compile, and map known occurrences of FYLF and WPT including life history stage and associated habitat information, as available.
- Characterize habitat (water stage, velocity, and temperature) of various flow regimes as it relates to FYLF habitat for various life stages coordination with any flow study or temperature study.
- Identify appropriate ramping rates at know breeding sites in coordination with site specific timing and length of FYLF breeding season.
- Compile incidental observations of other aquatic special-status and non-native species from other aquatic studies that may affect the distribution of FYLF and WPT.

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The State Water Board has broad authority under the federal Clean Water Act (33 U.S.C. § 1251-1387), the state constitution, and the state water code and regulations to restore and maintain the chemical, physical and biological integrity of the state's waters, and the regulate water diversion and use through the water right priority system in accordance with the State Water Board's reasonable use and public trust responsibilities. Section 401 of the federal Clean Water Act allows for broad application of appropriate state and federal environmental laws when entities apply for new or renewed federal licenses that may result in a discharge to navigable water of the state. (33 U.S.C. § 1341.)

Throughout the FERC relicensing process the State Water Board maintains independent regulatory authority to condition the operation of the Project to protect water quality and beneficial uses of stream reaches consistent with section 401 of the federal Clean Water Act, the Basin Plan, State Water Board regulations, California Environmental Quality Act, and any other applicable state laws. The Project as described has the potential to impact special status amphibians and reptiles in Project-affected stream reaches and Project reservoirs. The Project's operations require public trust balancing and a balancing of public interest in water use and water quality. The analysis of these potential impacts requires information on the distribution and potential suitable habitat for special status amphibians and reptiles, in conjunction with the current flow schedule and operations that were fully implemented in 2007.

Existing Information

Existing and relevant information regarding known and potentially occurring locations of special-status amphibians and aquatic reptiles in the Project vicinity were identified by PG&E in their PAD, Section 5.3. Although FYLF and WPT have been incidentally observed within the Project area during other studies, existing information is too general to meet the objectives of the study. Additional information that is needed includes specific and current localities of the species and their habitats in relation to Project facilities; and sufficient information on current Project operations and maintenance activities that might affect populations. Furthermore, PG&E's PAD identifies that FYLF presence is "Unknown" and may occur or likely occur around Lake Pillsbury's tributaries or in the East Branch Russian River. This information is needed in order to inform the certification and Commission license conditions (i.e., instream flow releases and ramping rates).

Project Nexus

The Project has two dams and impoundments on the Eel River, as well as an Eel River water diversion at Van Arsdale Reservoir to the Potter Valley Powerhouse which directly discharges into the East Branch Russian River. The Project is responsible for maintaining minimum instream flows in the Eel River below Cape Horn Dam and in the East Branch Russian River via diversions from the Eel River. Project operations and maintenance activities may directly impact the special statue amphibians and reptiles in Project-affected stream reaches and Project reservoirs. For example, Project operations that result in flow fluctuations could create changes in water stage and velocity that could affect the suitability of instream habitat and potentially scour or strand FYLF egg masses and tadpoles. Additionally, water temperature regimes downstream of Project facilities could alter the timing of breeding and subsequent tadpole development.

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Adequate data on the distribution and potential suitable habitat for special status amphibians and reptiles with current flow schedules and Project operations is needed to inform the State Water Board's water quality certification and associated CEQA processes. Information from the study will inform conditions of the Project's future water quality certification which will become mandatory conditions at the issuance of a Commission license.

Study Methodology

The study area should consist of suitable aquatic habitats within Project reservoirs and Project-affected stream reaches. For FYLF and WPT this should include the following locations:

- Lake Pillsbury and 1.0 miles upstream of the reservoir tributaries since FYLF could occur depending on lake levels.
- Eel River from Scott Dam to Van Arsdale Reservoir.
- Eel River from Cape Horn Dam to Middle Fork Eel River.
- East Branch Russian River from Potter Valley Powerhouse Tailrace to Lake Mendocino.

The study should be completed in six general steps: 1) identify and map known occurrences of FYLF and WPT; 2) Identify and map potential habitat for FYLF and WPT; 3) select survey sites for FYLF and WPT; 4) conduct surveys and compile incidental observations; 5) prepare and perform quality assurance/ quality control on data; and 6) prepare final report and consult with relicensing participants.

Special status amphibian and reptiles studies as part of a Commission relicensing process is a standard practice used in several California Commission relicensing processes to inform project impacts and conditions of a water quality certification. PG&E Projects including: Pit 3, 4, and 5 (FERC Project No. 233), and McCloud-Pit (FERC Project No. 2106), conducted special status amphibian and reptile studies as part of the FERC study plan process. In addition, other FERC relicensing processes such as: Yuba County Water Agency's Yuba River Development Project (FERC Project No. 2246), Placer County Water Agency's Middle Fork American River Hydroelectric Project (FERC Project No. 2079), and Southern California Edison's Six Big Creek Hydroelectric Projects (FERC Project Nos. 67, 120, 2085, 2086, 2174, 2175), conducted special status amphibian and reptile studies as part of the FERC study plan process.

PG&E did not propose a special status amphibian and reptile study in their PAD. State Water Board staff is recommending standard amphibian and reptile study methodologies used in many of FERC relicensing processes in California, and therefore our recommended methodologies are appropriate.

Level of Effort and Cost

The Special Status Amphibian and Reptiles study should run for two consecutive water-years and include data collection described in the goals and objectives section. In addition, PG&E working collaboratively with relicensing participants to further refine the study will take additional effort and costs. Based upon previous relicensing processes in California that have conducted similar amphibian and reptile studies, State Water Board staff estimate the cost to be between \$200,000 and \$320,000 with cost dependent on collaborative development of study specifics and methodologies.