16.0 Chili Bar Reservoir Incremental Storage Modification Study Plan

This study is designed to investigate the feasibility, benefits and costs associated with improving water management between the UARP and Chili Bar Project by increasing Chili Bar Reservoir storage capacity using two alternatives: 1) adding a seasonally-operated crest-gate to Chili Bar Dam; and 2) potential sediment removal in Chili Bar Reservoir. The study would be conducted in two phases.

Phase One will be an initial modeling analysis using the UARP/Chili Bar Water Balance Model (and possibly spreadsheet models) that would quantify improvements in water management associated with increased storage at Chili Bar Reservoir. All improvements would be quantified against current operating assumptions, and would include items such as: 1) reductions in spill events at Chili Bar Reservoir; 2) increases in water available for power generation at White Rock or Chili Bar powerhouses; and 3) increased potential for controlled releases for beneficial uses in the Reach Downstream of Chili Bar, including whitewater recreation. Unless the R&A and Aquatics TWGs agree that the analysis in Phase 2 is not needed, the study would move to Phase Two.

In Phase Two, a feasibility analysis will be performed. The analysis would focus on the two alternatives for increasing storage at Chili Bar Reservoir. Consistent with the potential benefits provided by the two alternatives, the study will conclude with an evaluation of operational coordination between White Rock and Chili Bar Powerhouses in a manner to provide similar water management benefits. The feasibility analysis will include but not be limited to developing costs related to engineering, procurement, construction and maintenance of the storage capacity alternatives. This analysis will also address potential environmental considerations; jurisdictional implications; dam safety, financial feasibility, and impacts to the Chili Bar Project and UARP (land use and operations).

16.1 Pertinent Issue Questions

The Chili Bar Reservoir Incremental Storage Modification Study Plan would be used to address the following Issue Questions reviewed by the Aquatic Technical Working Group (TWG) on March 11, 2004:

- Has PG&E looked into the alternative of raising Chili Bar Reservoir?
- How does the idea of raising Chili Bar Dam cross-jurisdictional boundaries with the UARP?
- What are viable options for increasing Chili Bar Reservoir storage capacity to allow for more flexibility in the management of flows from the UARP? The study should consider increase in dam height.

16.2 Background

Interested parties in SMUD's UARP Relicensing and Pacific Gas and Electric Company's Chili Bar Relicensing have postulated that increasing storage in Chili Bar Reservoir would allow the Licensees to better coordinate UARP and Chili Bar operations, thereby improving water management of the two projects. This has been raised as a possibility because, at times, releases by SMUD from White Rock Powerhouse have resulted in uncontrolled spills over Chili Bar Dam. The parties felt that if additional storage capability occurred in Chili Bar Reservoir, the operators might have been able to capture some or all of the spilled water and release it in a controlled fashion. Also, the parties postulated that at times in the future Pacific Gas and Electric Company might not have adequate water stored in Chili Bar Reservoir to meet requests for future water releases. Therefore, the interested parties would like to know the potential benefits, costs and feasibility of increased storage in Chili Bar Reservoir and/or improving operational coordination.

16.3 Study Objective

The study objectives are to: 1) determine if a reasonable increase in storage at Chili Bar Reservoir could result in improvements in water management between the projects that would protect beneficial uses, 2) if so, evaluate how this increase in storage could be best accomplished, and 3) determine whether the cost and other considerations (e.g., generation impacts to Whiterock powerhouse) make the increased storage a viable option compared to operational coordination as an alternative.

16.4 Study Area

The study area would include the entire UARP and Chili Bar projects for the purpose of modeling (Phase One). The feasibility analysis (Phase Two) will focus on Chili Bar Dam and reservoir related-storage enhancements and potential water management improvements of the South Fork American River in the Reach Downstream of Chili Bar.

16.5 Information Needed From Other Studies

Information needed from other studies includes runs of the UARP/Chili Bar CHEOPS™ Water Balance Model, the results from the Chili Bar Reservoir Sediment Study (i.e., reservoir bathymetric information), and various environmental reports. Note that all analyses will be compared against the current operating assumptions model run.

16.6 Study Methods, Analyses, and Schedule

As described above, the study would be described in two sequential phases, each of which is described below.

Phase One - Model Analysis

Using historical records, Pacific Gas and Electric Company estimates that the current Chili Bar Reservoir usable storage volume is 1,339 acre-feet (ac-ft). In this context, "usable" means the volume of water between the preferred minimum operating elevation of 984 feet and the spill crest elevation of 997.5 feet that can be used by the Chili Bar Powerhouse during routine, unattended operation.). The Licensees acknowledges that another 320 ac-ft of water is potentially available between the preferred 984 feet water elevation and mandatory Powerhouse-shutdown water elevation of 980 feet. There is an additional 1,480 ac-ft of storage between 980 feet water elevation and the 5-foot diameter, low-level outlet, but this storage is not available for routine operation. Note that this Chili Bar Reservoir usable storage volume is the volume currently included in current operating assumptions runs (one with and one without the Iowa Hill Development) of the UARP/Chili Bar CHEOPS™ Water Balance Model. To perform the Phase One Analysis, the Licensees would make four runs of the model with the Iowa Hill Development to simulate increasing storage in approximately 225 ac-ft increments. The only difference from the current operating assumptions run will be that the Chili Bar Reservoir usable storage will be 1,563 ac-ft in Run 1, 1,792 ac-ft in Run 2, 2,027 ac-ft in Run 3, and 2,268 ac-ft in Run 4. The Licensees will then repeat this analysis using the model without the Iowa Hill Development. The maximum usable storage (2,268 ac-ft, or 929 ac-ft more than the current usable storage) to be included in the final model run would equate to the usable storage when the Chili Bar Reservoir was constructed (based on project drawings) plus the additional storage associated with raising Chili Bar Dam by approximately 8 feet. The output from each model run would be compared to the current operating assumptions by Agencies' Proposed Water Types and overall, and include: 1) gains in the amount of water (daily median, minimum and maximum) that would be available for downstream releases from Chili Bar Powerhouse; 2) changes in White Rock and Chili Bar powerhouses' generation; and 3) number of Chili Bar Dam spill days and magnitude of spills. The effect of the recovery of lost storage capacity due to potential sediment removal from Chili Bar Reservoir would be evaluated based on the same three criteria and based on reasonable incremental sediment volume estimates derived from the results from the Chili Bar Reservoir Sediment Study**.**

A feasibility analysis will be performed in Phase Two, unless the Aquatic and Recreation TWGs agree that the analyses in Phase Two is not needed.

Phase Two - Feasibility Analysis

The feasibility analysis would focus on alternatives to increase usable storage in Chili Bar Reservoir to a level that the Phase One analysis indicated reasonable benefits. The analysis would include dam safety, financial feasibility and environmental considerations (i.e. permitting, impacts, effects on privately owned lands and impacts due to inundation of additional riverine habitat upstream of Chili Bar Reservoir); jurisdictional implications (i.e. affect to BLM land and impacts on the UARP); and affects on electrical generation at the White Rock and Chili Bar powerhouses. The feasibility analysis may include results from the Chili Bar Reservoir Sediment Study Plan and other engineering investigations to better assess potential impacts caused by the inundation of the White Rock Powerhouse tailrace and operational coordination approaches. The analysis would consist of a comparison of the frequency and magnitude of spills and volume of available water between each model run and the current operating

assumptions, including the cost of providing equal water management benefits in the Downstream Reach through coordinated operations between White Rock Powerhouse and Chili Bar Powerhouse without project modifications.

The Licensee would implement the study plan upon approval by the UARP Relicensing Plenary Group, and expects to complete the study in about 90 days, if no unforeseen complications arise.

16.7 Study Output

The study plan output would be a technical report prepared in the same format as the UARP Relicensing technical reports have been prepared to date, unless requested to be revised by the TWGs. It is anticipated that the report would be summarized in SMUD's UARP license application and Pacific Gas and Electric Company's Chili Bar Project license application, and appended to each application.

16.8 Aquatic TWG And Plenary Group Endorsement

The Aquatics TWG approved this plan on March 25, 2004. The participants at the meetings who said they could "live with" this study plan were CDFG, BLM, SWRCB, Camp Lotus, PG&E and SMUD. None of the participants at the meeting said they could not "live with" this study plan. Other TWG participants have been requested to provide email comments prior to April 1, 2004.

As requested at the Aquatic TWG meeting, this study plan was also presented to the Recreation TWG for consideration and approval at their April 6, 2004 meeting. With non-substantive changes, this study plan was approved at the meeting. None of the participants at the meeting said they could not "live with" this study plan.

The study plan was approved by the Plenary Group on April 7, 2004 without modification. There was no one present at the meeting who objected to the study plan going forward for implementation.

16.9 Literature Cited

Pacific Gas and Electric Company, May 2003. Chili Bar Project, FERC No. 2155, First Stage Consultation Document for Application for New License.