A Scoping Paper

on the
Kilarc and South Cow License Surrender Study Plans

Suggested Project
Surrender Alternatives

and

Derived Recommended Studies

Presented to

FERC P-606 Stakeholders
including
The *Save Kilarc* committee,
The Friends of Cow Creek Preserve,
The Cow Creek Watershed Management Group,
Associated Ranchers and Water Rights Holders,
and *The People* of Greater Whitmore

Draft
for Comment and Consideration

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Forward

Davis Hydro was asked by various groups, agencies, and individuals to whom this Scoping Paper is presented to provide specific examples of alternatives to PG&E's initial idea of complete removal of facilities licensed by the Federal Energy Regulatory Commission (FERC) as the P-606 Kilarc-Cow Creek Hydroelectric Project. Hopefully this paper will encourage dialogue on that action.

The overall purpose of this paper is to start the process of defining the scope of project surrender alternatives to study in sufficient detail and in a timely manner so that the potential benefits and adverse environmental effects of different alternatives can be evaluated and a preferred option for disposition of facilities following PG&E's License Surrender can ultimately be approved by the FERC.

Davis Hydro would like to do small hydro in this area. We believe that the best opportunity for all stakeholders includes recommissioning some Kilarc-Cow Creek facilities. With equal, if not greater desire, we would like to establish a solid permanent funding mechanism to enhance fish viability in this area and support the restoration of anadromous fish to the extent possible. The two Davis Hydro pursuits are linked in that we believe that the hydro can provide the resources and guidance under FERC to accomplish the fish-related goals and at the same time meet the needs and goals of the surrounding community.

30 July, 2007
Davis

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Executive Summary

The authors of this document believe that time is of the essence and the License Surrender Application process that PG&E is implementing will not result in timely completion of studies necessary for the FERC to take informed, legal action for the optimum future disposition of currently licensed facilities. This document has been prepared to derive a study plan that will serve the process of complete review of the alternatives of the PG&E license surrender. Necessary studies are derived from alternatives. In accordance with the mandatory National Environmental Policy Act (NEPA) process, the first step is the identification of the contemplated action and reasonable alternatives. This document makes clear the length of time needed for studies and makes possible their immediate commencement.

Feasible realistic alternatives reflect possible development paths, including the removal of facilities as initially suggested by PG&E, and recommissioning alternatives to save Kilarc and meet South Cow water rights holders' concerns while meeting fish-related goals. In all cases, ongoing mechanisms must be in place to ensure that any alternative will not perform worse than the facilities removal alternative.

A "Facility Removal" alternative has been put forward as one that is presumed to be preferred for the fish; however, the facilities do provide benefits for endangered species in several areas and the removal of facilities without mitigation will cause the unacceptable loss of such benefits to these species as well as benefits to the human community. Benefits for at least two species downstream include cold water required by salmonids delivered to the Old Cow and a consistent source of water for frogs in the South Cow powerhouse tailrace. Loss of beneficial features by "deconstruction" of project facilities would detract from the project goal that environmental benefits of license surrender outweigh impacts.

The alternatives recommended for study in this document will require agreement of implementing parties and stakeholders such as local landowners, Shasta County, CDFG, NMFS, PG&E, and other agencies and local groups. Once studies of potential environmental effects and measures to mitigate are underway, discussion will occur to fine tune a "post-PG&E license" implementation plan to meet everyone's needs.

The two proposed alternatives developed in this document are divided into separate alternatives that may be considered independently for disposition of facilities associated with the Kilarc (the Old Cow Creek) and the South Cow project developments that are physically unrelated.

Each of the proposed alternatives has a fish enhancement plan associated with it. For both the Kilarc Alternatives (K1 & K2) and the South Cow Alternatives (S1 & S2), it is possible that the revenues and resources generated by the hydropower may be used, under FERC control, to improve the South Cow Creek habitat rather than Old Cow Creek habitat to maximize the net gain to the fish over the entire Cow Creek Watershed.

Many of the effects from river restoration and enhancement activities will take years to mature, so this paper presents the idea that restoration should be judged as an ongoing process by an institution set up and chartered to care for the Creek. A Cow Creek Mitigation Trust is suggested to be formed and funded to provide this long term perspective, as well as management of the enhancement measures.

Kilarc Operation Alternatives

Alternatives K1 and K2 both focus on potential measures to retain the Kilarc reservoir while providing for greater anadromous fish habitat enhancement and population recovery than was required by PG&E's expired hydropower license.

If the Kilarc reservoir is retained, hydropower generation (subject to requirements of a future FERC license) would provide revenue to maintain the diversion dam(s), Kilarc canal, access roads, and recreational aspects of the Kilarc Forebay reservoir, in addition to funding mitigation and anadromous fish enhancement measures.

Alternatives K1 and K2 are differentiated by the amount of water that would be diverted from the natural channel through the Kilarc canal. Studies are recommended to identify the trade-offs between habitat values that would be foregone if the amount of water that would continue to be diverted were not reduced (or only partially reduced some of the time) versus revenues generated by hydropower using diverted water that could be applied to habitat enhancement elsewhere in the Cow Creek Watershed.

In addition to generating revenues for habitat enhancement elsewhere, hydropower operation at Kilarc may be adapted so the Kilarc canal (with fish barriers, bypasses and conduits between the diversion dam on Old Cow Creek and the Kilarc Forebay reservoir) may serve as a nursery for steelhead (rainbow trout) fry to be released downstream to induce anadromous behavior. It is unusual to use a long high cold canal for rearing, but this opportunity to operate an informal but efficient steelhead nursery could be designed to flush small fish downstream exactly when they are most likely to migrate to the sea.

Studies are recommended to determine the existing and potential

- Conditions and Fish Populations in the Bypassed Reach of Old Cow Creek,
- Water Quality and Habitat Conditions downstream of Kilarc Powerhouse, and
- Opportunities to Foster Anadromous Behavior by Kilarc Canal Operations.

South Cow Alternatives

When the South Cow power generation facilities were established, the power company was obligated by agreement between the power company and the land owners to deliver water to the Wagoner (now Tetrick) Ranch and the Abbott Ditch. Alternatives S1 and S2 both focus on potential measures to provide for the delivery of approximately 13 cfs when available to the Abbott Ditch and additional water to the Tetrick Ranch.

Similar to Alternatives K1 and K2 for the Kilarc development, Alternative S1 for the South Cow development would include retention of existing water delivery facilities and at least some hydropower operation (subject to requirements of a future FERC license) that would provide revenue to maintain facilities in addition to funding and implementing mitigation and anadromous fish enhancement measures.

The Alternative S2 proposed for analysis would involve removal of existing water delivery features and hydropower generation facilities and building a new diversion where the South Cow comes onto the Tetrick Ranch, to supply both the Tetrick Ranch and the Abbott Ditch with water.

Introduction

The authors of this document believe that time is of the essence and the License Surrender Application process that PG&E is implementing will not result in timely completion of studies necessary for the FERC to take informed, legal action for the optimum future disposition of currently licensed facilities.

This document has been prepared to derive a starting set of studies that will have to be completed in the process of a complete review of the alternatives of the PG&E license surrender. To do this in accordance with the mandatory NEPA[1] process, the first step is the identification of the contemplated action, reasonable alternatives, and the "no action" alternative. From these alternatives are derived associated study plans. The "contemplated action" from the NEPA perspective is taken by the FERC.[2] PG&E is the "project proponent" who has requested that the FERC take action to accept the surrender of the PG&E license.

PG&E submitted a License Surrender Application Schedule dated March 23, 2007. The FERC accepted the schedule by letter dated June 21, 2007, noting the "proposed schedule includes numerous opportunities for stakeholder involvement" and the License Surrender Application will be filed by March of 2009, which the FERC characterized as "within a reasonable timeframe". The potential environmental effects of Alternatives to the single Decomissioning Plan implied in the March 2005 Agreement signed by an incomplete group of stakeholders, must be studied for the legal reasons described in Appendix I, but more important they should be studied because the Alternatives suggested below may be better for the endangered species, the community and the environment.

The remainder of this document explores a reasonable range of two alternatives that should be considered for study as well as different mitigations that were not originally envisioned by PG&E that address the needs of the community, the Creeks' wildlife and specifically the potential anadromous fish within the area. The preferred alternative will necessarily meet the anadromous fish goals of the NMFS[3]. The FERC will ultimately accept a PG&E license

[1] NEPA = National Environmental Policy Act. Further discussion of the mandatory requirements of NEPA is provided in Appendix I to this document.

[2] FERC = Federal Energy Regulatory Commission. The FERC is also the lead agency responsible for implementing the NEPA review process. According to FERC regulations, the project proponent (PG&E) is delegated responsibility for providing information (study results) necessary for completing the review of effects of the proposed project and alternatives as required by NEPA.

[3] NMFS = National Marine Fisheries Service of the National Oceanic and Atmospheric Administration under the Department of Commerce. NMFS has regulatory jurisdiction under the federal Endangered Species Act (ESA) with regard to anadromous fish (those fish who travel between the ocean and inland waters during their life-cycle, e.g. salmon and steelhead) and may also adopt and incorporate the NEPA documentation prepared to support the FERC action to justify NMFS actions. FERC regulations include a provision for federal agencies to also impose "mandatory conditions" on any future hydropower license that the FERC may choose to issue for subsequent generation following surrender of the PG&E license. These "mandatory conditions" must be incorporated without revision when the FERC grants hydropower licenses, and are often referred to as 4(e) conditions, referencing the section of the Code of Federal Regulations (C.F.R.) that may be cited as grounds for imposing such conditions to protect resources within the designated federal agency's jurisdiction.

surrender while specifying conditions for PG&E to be relieved of the responsibility of holding its current P-606 license.

A "Facility Removal" alternative has been put forward as one that is presumed to be preferred for the fish, however, the facilities do provide benefits for endangered species in several areas and the removal of facilities without mitigation will cause the loss of such benefits to these species. Benefits include cold water for at least two species downstream: salmonids on the Old Cow and frogs in the South Cow powerhouse tailrace.

Background

103 years of use have changed the physical, cultural, and environmental world. Returning to the green field of 103 years ago is not reasonably possible. For example:

- The river beds are now significantly lower due to erosion.
- There are now historic project features such as diversion canals, ponds, and buildings that may be considered too socially desirable to remove for many reasons of aesthetics and utility.
- Man, his animals, the banks, and the forest have encroached into the creek beds and wildlife habitat engendering bank and bed changes.
- Water is now diverted out of the stream as water rights which often exceed the amount of water available.

These changes caused by nature and the arrival of man have changed the landscape from an *uber*-utopian green-field to the existing conditions, and affect what may be feasible now with the project removed. While it would be unfair to ask PG&E to return the countryside to the original near-virginal countryside, it is nonetheless reasonable for the purposes of comparison to use that historic countryside as a baseline to identify what elements of the green-field conditions could be restored and to compare the benefits and costs of undertaking such restoration with elements of other alternatives to achieve comparable goals.

Application of NEPA to PG&E License Surrender

PG&E has agreed, and is now forced, to surrender its FERC P-606 License. PG&E and others have used the term "decommissioning" to describe what is technically the "surrendering" of a FERC license. This is accurate if the word "decommissioning" is used, as it is in the navy, to mean "removing from service". It is not accurate to state that PG&E's license surrender necessarily will destroy, remove, or actually doing anything with a facility. When a ship is decommissioned, it usually goes into non-military service. When government facilities are decommissioned, they are usually turned over to other entrepreneurs for further use, rehabilitation, or destruction. In this case Davis Hydro hopes to Recommission the facilities for new responsibilities of enhancing fish and generating green power.

"License Surrender" requires a study process (defined in FERC and NEPA legislation and regulations[4]) to identify the effects of the FERC's action, releasing PG&E from its obligations under the P-606 License, and the conditions and mitigations that FERC can enforce. The "effects" studied must include direct and secondary impacts on the environment of the FERC taking action and choices that various parties may make in response to the FERC's action.

FERC will not release PG&E from annual licensing until the effects of License Surrender are analyzed and a suitable plan for implementing the License Surrender is approved by the FERC. Ultimately, the FERC determines what alternative plan is "acceptable" based on factors that the FERC considers appropriate. The FERC is not obligated to approve a License Surrender plan that is preferred by the License Surrender applicant (PG&E). Likewise, the FERC is not obligated to approve the environmentally preferred alternative, nor is the FERC required to impose mitigation to address significant environmental effects of its decision, even if such mitigation is feasible. The FERC is obligated to study and disclose the effects of its chosen action and alternatives, and provide an explanation of how and why it makes its decision.[5].

Range of Alternatives for PG&E License Surrender

The "rule of reason" is used to develop Alternatives to serve as the "heart of the EIS" that will disclose the effects of the surrender or "decommissioning" of the P-606 Kilarc-Cow Creek Hydroelectric project. The authors recommend consideration of the alternatives described below for study for the reasons described. The alternatives are divided for simplicity by watershed/powerhouse (Kilarc vs. South Cow) for simplicity in that most elements are different between these two license components. This paper continues by first looking at the Kilarc benefits, and then the surrender Alternatives and their derived studies and this is followed by an examination of the South Cow, its benefits, alternatives, and its derived studies.

These alternatives will require the agreements of stakeholders such as local landowners, Shasta County, CDFG[6], NMFS[7], PG&E, and other agencies and local groups. The intent of including stakeholders for the study design is to concretely define a starting set of alternatives complete with implementing parties. Once studies are underway, discussion will occur to fine tune a "post-PG&E license" implementation plan to meet everyone's needs.

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[4] California Environmental Quality Act (CEQA) requirements for similar analysis will be undertaken by the California State Water Resources Control Board (SWRCB) before granting "Water Quality Certification" in accordance with its authority over the project. Similarly, should a "Streambed Alteration Agreement" be required from the California Department of Fish and Game (CDFG) before implementing certain elements of the project, CDFG will be required to ensure that CEQA requirements have been fulfilled before granting that entitlement to act in waterways within its jurisdiction. Both State agencies will utilize the documentation prepared by the FERC in compliance with NEPA as the foundation for CEQA compliance.

[5] See Appendix I for details to the NEPA process and references to the newer 4(e) requirements and public discussion provisions. In effect the regulations require both the FERC conditions and the mandatory 4(e) conditions to be supported by science or they may be contested in public.

[6] CDFG is a stakeholder on behalf of both the recreational and anadromous fish.

[7] NMFS is focused on the recovery of anadromous fish.

A feasible set of realistic alternatives reflects possible development paths, including the removal of facilities as initially suggested by PG&E, and recommissioning alternatives to save Kilarc and meet South Cow concerns while meeting fish-related goals.

> *In all cases, it will be stipulated that over time, any alternative must not perform worse than the removal alternative, and to provide ongoing enforcement mechanism to ensure that this is so.*

The specific alternatives posed in the text are divided into alternatives for Kilarc (the Old Cow Creek) and the South Cow separately.

Two Alternatives to Total Dismantling and Removal of P-606 Project Facilities

As best can be understood from the March 2005 Agreement signed by PG&E and an incomplete group of stakeholders, the PG&E License Surrender Plan proposes the dismantling and removal of facilities as the preferred course of action to obtain FERC approval to relieve PG&E of its responsibility for the project. The March 30, 2005 letter from PG&E transmitting a copy of the Agreement to the FERC stated "Specific actions necessary to achieve the desired conditions would be determined in the future. The Agreement also addresses the transferring of water rights, upon decommissioning, to a resource agency or other entity to support spring run Chinook salmon and steelhead trout." Based on the Agreement, transmittal letter, and other concerns expressed, it is understood that the following are objectives of PG&E and the signers of the March 2005 Agreement concluded at the time that PG&E reached its decision to not file an application for new license:

- Relieve PG&E of responsibility for a source of power that PG&E could not operate economically
- Support the recovery of threatened anadromous fish in the Cow Creek Watershed[8]
- Ensure that project facilities do not fall into disrepair, addressing safety issues as well as habitat issues, while preserving historical/cultural values and options for future reuse of structures as appropriate
- Preserve other water rights holders' rights
- Compensate for lost recreation opportunities
- Conclude the decommissioning (license surrender) process in a timely manner and within budget approved by the California Public Utilities Commission for recovery from PG&E ratepayers
- Conclude licensee (PG&E) responsibility with scope and cost known for maintaining desired conditions for a specified time period

In summary, the individual objectives identified by signers of the March 2005 Agreement together describe the project goal that environmental benefits of decommissioning (license surrender) outweigh impacts to resources through compliance with laws and conditions of permit approval. This document identifies studies to identify whether the project goal may be achieved by a project alternative that provides for retention rather than "deconstruction" of some project facilities.

Alternatives Proposed to Address Concerns Specific to a Single Project Development

The P-606 Kilarc-Cow Creek project is comprised of two developments that affect two different creeks, Old Cow Creek and South Cow Creek. The two creeks converge within the Cow Creek

[8] Attachment A, Kilarc-Cow Creek Project Agreement, Subjects and Desired Conditions - "17. Deconstruction Activities […] b) Where practicable, no net loss in the health of riparian and aquatic habitat areas as a result of deconstruction activities."

Watershed, downstream of the hydroelectric facilities. For simplicity, project alternatives will be described in this document in two separate sections.

Benefits Common to Both Kilarc-Cow Creek Project Developments

A brief description of the primary benefits that the two developments have in common is provided here, before identifying proposed project alternatives separately for each project development.

Green Power

Both project developments are Green Power sources of renewable energy that, if destroyed, will most likely be replaced at least temporarily by fossil sources. While there is currently maximum effort to develop all possible green sources, destroying this source will preclude substitution of an equivalent amount of fossil generation for the foreseeable future[9]. Both developments also provide a minor local employment benefit associated with caring for the hydropower operation.

Historic Structures

Historic hydropower buildings, dams, canals, and other facilities that are over a century old contribute, to the extent they are maintained, to the local and state heritage record. The community of Whitmore particularly is heavily influenced by the hydropower and the associated recreation in the area. This can be easily seen in the historical picture gallery in the local post office, by visiting the large fishing displays in the local store, and the interest in these proceedings.

Fire Protection

The heavily forested area surrounding Kilarc reservoir burns regularly, consuming houses that are not protected. The area of greater Whitmore is somewhat protected by the proximity and altitude of water available in the Kilarc reservoir. While other, smaller ponds of water exist north of Route 44, the Kilarc Forebay provides the closest, highest, largest, and most easily accessible water source for this population area. There are few ponds with clear approaches in the South Cow area, so the South Cow Forebay is likewise a significant source of water for nearby fire protection.

Other Common Resources

While the importance of both creeks to anadromous fish is discussed at great length for each creek below, the potential effects of any project alternative may be small on ordinary plant and non-water-based wildlife species. Endangered species other than fish that are identified during surveys of each creek, and have evidently adapted to the existing regimes, will have to be considered in the selection of any alternative for implementation.

[9] The effects of fossil fuel pollution on fish are well known. For example, for trout in the Pennsylvania area, including those trout in rivers where Davis Hydro has worked and is presently operating, a major stressor is acid rain from local fossil generation.

Kilarc: A Diversion on Old Cow Creek

The Kilarc Development on Old Cow Creek includes the Kilarc Forebay (reservoir) that provides a unique recreation benefit and contributes to fire protection. The Kilarc Diversion Dam on Old Cow Creek may benefit habitat downstream, and reduce net salmonid threats and stressors in the watershed, by lowering overall water temperature with the return of water that has been held at a higher elevation instead of passing through the natural channel. The bypassed reach of Old Cow Creek has unknown potential for restoring habitat to reduce potential habitat constraints for the spawning lifestage of the existing or potential anadromous salmonid population.

Existing Kilarc Operation Project Benefits

The existing Kilarc development provides the most services to man, and perhaps the fish, by its existence. Loss of the following benefits by "deconstruction" of project facilities would detract from the project goal that environmental benefits of license surrender outweigh impacts.

Recreational Fishing

As was auspiciously[10] witnessed during PG&E's June site tour, it is not uncommon to find handicapped fishers[11] pulling 10 inch long rainbow trout out of the reservoir with such facility that they are fed to the accompanying dog. The Kilarc forebay provides the finest known trout handicapped fishing in California. Hundreds signed the petition to save this fishing hole[12].

Fish Habitat and Spawning Areas

Clean, cold water is delivered by the project from Kilarc reservoir to fish habitat areas downstream of the powerhouse that are in desperate need of colder water during the warm periods of the year. Old Cow Creek below the Kilarc powerhouse provides flows to extensive juvenile habitat and spawning grounds not only for steelhead but also for fall run salmon. The slightly colder water delivered via the Kilarc bypass downstream through the powerhouse may have greatest benefit for the fish because it is colder and cleaner than undiverted water in the creek. How much difference this cold clean water makes downstream is unknown. But its removal may be detrimental to the downstream fish.

Furthermore, the reservoir and canal are replete with rainbow trout of mixed and unknown origin. Some of these fish migrate downstream through the numerous overflow structures in the canal and populate the Cow Creek Watershed with rainbow trout – some of which become steelhead after they migrate down to the sea and return. The canal may contribute to steelhead restoration, even though all fish that pass through the hydro turbines are killed. Trout (and salmon, if any) that pass through the overflows and proceed to the ocean thus contribute to anadromy.

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[10] Encarta Dictionary, adverb corresponding to auspicious (adjective) – promising well for future; marked by lucky signs or good omens, and therefore by the promise of success or happiness

[11] The amputee in this case was a retired PG&E employee. His picture, and another of his dog eating the fish, are shown on the **Kilarc.info** website at http://kilarc.info/Pictures/Forebay/Photos_Forebayanal.htm. It is not uncommon for one or more handicapped people to be fishing the forebay on a weekend or during the week.

[12] See signed copies of the petition on the website maintained by Davis Hydro by selecting *KC0050 Whitmore residents Petition to save Kilarc* at http://kilarc.info/Docs_Maps_Drawings/Documents/docs.htm

Water supply/Groundwater Recharge

The Kilarc Reservoir might be found to be supplying water to housing below the reservoir by recharging groundwater extracted from private wells.

Alternative K1: Existing Conditions with Hydropower

For purposes of comparing the potential effects of Alternative K1 with the effects of total dismantling and removal of P-606 Kilarc development facilities, the following potential post-license plan is proposed for consideration.

Shasta County (or any non-profit organization or property manager qualified to maintain liability insurance) would take over title of the Kilarc canal, Kilarc reservoir (hydro project forebay), and access roads. KC LLC would be granted a hydropower license by the FERC, and leases or easements to access these and any other properties necessary for operation of the project.

KC LLC would pay to Shasta County (from revenues earned by hydroelectric generation) for water conveyance and additional fixed annual support for the canal maintenance. KC LLC would provide day-to-day operation and maintenance of recreation facilities and would perform normal, routine and elements of the annual canal maintenance that could not more cost-effectively be performed by the County.

KC LLC would also pay into a Cow Creek Mitigation Trust fund (that could be administered by a board of representatives of concerned resource agency and local stakeholders) that could allocate monies to be spent on the following or similar items:

- Fish enhancement measures anywhere in the Cow Creek region,
- Research to support optimal habitat and nursery operations,
- Maintenance of other Federally listed species,
- Operation of the experimental Kilarc canal nursery project,
- Expenditures of fish and frog habitat improvements on the South Cow,
- Frog and macroinvertebrate habitat improvement measures,
- Field runoff reduction measures in collaboration with South Cow abutters,
- Construction of experimental Davis Hydro fish herding pilot to persuade migrating fish to go up the South Cow rather than the Old Cow,
- Collaboration with German Ditch association to provide screening and fish passage assistance, and/or
- Collaboration with Abbott Ditch users to examine ways to reduce system leakage and improve field irrigation.

The Cow Creek Mitigation Trust fund would be established with an initial contribution by PG&E comparable to the avoided expense of dismantling project features, to be held for future restoration measures.[13]

[13] In effect, PG&E remains the immediate deep pocket for facility removal, if such is ultimately deemed necessary. By transferring decommissioning funds to the Cow Creek Mitigation Trust, PG&E immediately meets its obligation to ensure that environmental benefits of decommissioning (license surrender) outweigh impacts, and yet a slow careful flexible process is implemented over a longer timeframe that is needed for biological adaptation and provides an environment that is as good or better for the fish.

The manner in which the diversion dams are physically operated would be the same as at present except the amount of water bypassed would conform to new minimum instream flows established as a condition of a new hydropower license. Minimum instream flow requirements may be increased to enhance habitat in the bypassed reach for anadromous fish, although alternative measures to promote the recovery of anadromous fish elsewhere in the watershed are proposed to be considered as a substitute for potential habitat foregone in exchange for revenue to implement potentially more effective measures. It is assumed that a new hydropower license from the FERC will have greater fish habitat enhancement and population recovery requirements than were included in older hydropower licenses.

KC LLC would complete any upgrades that may be warranted to the diversion dam and conveyance structures that were previously licensed before delivering water from Old Cow Creek and Canyon Creek to the project. For example, KC LLC may line the canals further with impermeable membranes to reduce water waste.

KC LLC also proposes to experiment with the Kilarc canal (between the diversion dam on Old Cow Creek and the Kilarc Forebay reservoir) to modify its function to serve as a nursery for steelhead (rainbow trout).[14] This means, in cooperation with NMFS and CDFG, Davis Hydro would work to operate fish barriers, bypasses and conduits to produce juvenile fry to be released downstream. It is recognized that this effort will have to evolve over time as the downstream conditions change and as more is learned about the optimal time to release these fish to induce the desired anadromous behavior.[15] It is unusual to use a long high cold canal for rearing, but this opportunity to operate an informal but efficient steelhead nursery could be designed to flush small fish downstream exactly when the are most likely to migrate to the sea.[16]

Alternative K2: Continued Kilarc Operation with Reduced Hydropower

This alternative is exactly the same as Alternative K1 with the exception that K2 would include greater increases in flows in the bypass reach during periods when there is benefit from such releases. This flow regime would be determined from a study, recommended below, that looks at the expected response of the fish populations in the reach to a different operation of flows in the bypass to see if, and how, fish might flourish in this reach.

Increased flows in the bypass reach would directly reduce the funds available from hydropower generation for other fish enhancement projects. The question to be answered over the long term is how best to use the water in the diverted reach of Old Cow Creek: for fish in the Old Cow

[14] The KC LLC team will work with biologists to define how this can be done best. KC LLC would operate the Kilarc canal both as a hydropower element and as an anadromous fish restoration facility that may provide substantially greater benefits to anadromous fish than restoring flows to the natural channel.

[15] It is likely that the canal will still be cleaned and maintained in late summer; however, there is nothing to prevent most of the canal to be flushed of its fish at another appropriate time through some of the relief gates.

[16] There is no genetic difference between rainbow trout and steelhead. Only the anadromous behavior differentiates the two species, one abundant and stocked from CDFG hatcheries for recreational fishing, the other identified as threatened under the federal Endangered Species Act. Current population recovery actions often suffer from a "hatchery effect" that warrants study and may be diminished using the strategy described here to encourage fish that are already present to behave as desired.

bypass reach or for hydropower to generate revenue to take care of more fish downstream and nearby?

The trade-off between water in the bypass and money available for other fish projects must be studied to determine where the greatest benefits can be obtained from the water resource. A reliable answer will most likely require years of ongoing monitoring. A Cow Creek Mitigation Trust is recommended as the appropriate vehicle to manage this responsibility in the long term while allowing PG&E to leave quickly at a fixed known expenditure.

Kilarc Feasible Alternatives: Derived Studies

The principal difference between the "Facility Removal" alternative put forward as presumed preferred for anadromous fish, and alternatives K1 and K2, is the diversion of water from Old Cow Creek to the Kilarc canal. The potential effects of diverting different amounts of water during different seasons cannot be determined without study.

An underlying question is whether there may be more habitat for certain anadromous life stages (e.g. age classes) than reasonable projections of anadromous fish to populate such habitat in Cow Creek Watershed, even excluding the bypass reach altogether. The operational question is, "Could there be a way to operate the facility to enhance anadromy in the Cow Creek Watershed?" Study to provide answers to these questions is divided to determine the existing and potential

- Conditions and Fish Populations in the Bypassed Reach of Old Cow Creek,
- Water Quality and Habitat Conditions downstream of Kilarc Powerhouse, and
- Opportunities to Foster Anadromous Behavior by Kilarc Canal Operations.

In the Old Cow Creek bypass reach, some fish are presumed lost due to decreased flow.

It is apparent that a much smaller proportion of potential anadromous fish habitat could be developed or restored in the bypass reach than already exists downstream of the Kilarc Powerhouse. Temperature has been identified as a primary habitat limiting factor.[17] The relationship between temperature effects of the Kilarc diversion and downstream fish habitat and health of the population warrants study.

The dynamics of fish migrating out of the warm waters in the Cow Creek Watershed in the summer is not well understood. In the case of Steelhead, the listed species is not genetically differentiable from abundant rainbow trout. Members of the population that do not migrate are not steelhead and therefore are not listed. It is the behavior that is requisite not the population of resident rainbow. The goal is to foster the specific desired behavior to increase the listed steelhead population. Rather than studying how to provide habitat in which the fish survive without migrating, the goal may be achieved by studying how, by changing the operation of existing facilities, to induce large numbers of fish to migrate to the sea.

[17] See the March 2005 Cow Creek Watershed Management Plan prepared by Western Shasta Resource Conservation District and the Cow Creek Watershed Management Group, funded through a grant from the U.S. Fish and Wildlife Service Central Valley Project Restoration Funds, available on the website maintained by Davis Hydro by selecting *KC0029 Cow Creek Watershed Management Plan* at http://kilarc.info/Docs_Maps_Drawings/Documents/docs.htm

Study of the Bypassed Reach of Old Cow Creek

Both data collection (factual studies) and modeling of physical habitat characteristics and usage by anadromous fish are necessary to forecast the different effects of each alternative. Analysis would rely on Factual Studies to answer the following questions:

- What is the current habitat carrying capacity for different fish life stages given different flows upstream of the Kilarc Powerhouse to the first barrier?
- Under what flows is habitat accessible?
- What populations and age classes now populate the bypass reach at different times of the year?
- How many potential steelhead are currently leaving the Kilarc Canal system via overflows and specifically during the annual draining?

and Modeling Studies to answer the following questions:

- How would habitat in the bypassed reach physically be affected with increased flows (up to total hydropower bypass removal)?
- How many anadromous fish would access the bypassed habitat?
- If there were more water, when during the year would it be used best?
- Assuming there were more water, what would the effect on the population be?

Study of Temperature and other Project Effects Downstream of Kilarc Powerhouse Resulting from Diversion of Flows from Old Cow Creek Bypass Reach

Analysis would rely on Factual Studies to answer the following questions:

- What are the cover, temperature, slope, and other inputs to a temperature model of the bypass effects?

and Modeling Studies to answer the following questions:

- What would be the marginal effect on water quality (change in temperature, dissolved oxygen, other factors) in the natural channels below Kilarc Powerhouse if some or all of the bypass flow were not diverted and remained in the natural channel?
- How would downstream habitat and populations, especially populations of listed species, be affected?

Canal Operation Study

To predict whether the Canal could be turned into a fairly effective juvenile breeding facility with the juveniles passing downstream through an existing or new bypass, to deliver large numbers of juvenile fish into the main stem of the Cow at the correct time of the year to induce seaward migration, a variety of operational features should be evaluated to determine

- How could the Kilarc Canal be operated as an anadromous fish breeding facility, to optimally balance hydropower and juvenile fish production?
- What would be the optimal juvenile release schedule to maximize anadromous behavior?

South Cow Alternatives

The South Cow Development provides water delivery to downstream water rights holders (Tetrick Ranch and Abbott Ditch) and contributes to flows that are sometimes necessary for the other beneficiaries of the German Ditch to exercise their water rights. Endangered species of frogs have been found in the South Cow tailrace below the power plant and could be adversely affected if the tailrace facility were "deconstructed" or the flow through the powerhouse into the tail race were discontinued or changed. More generally, the flows diverted for the hydro project that pass through Hooten Gulch provide a source of macroinvertebrates and habitat for fish, increasing the diversity and complexity of the biological resources in this area.

An Infeasible South Cow Alternative: Complete Facilities Removal without Mitigation

When the South Cow hydropower facilities were installed, there was an agreement between the power company that originally built the South Cow Powerhouse and the land owners. The hydropower facilities were built with the expressed obligation to deliver water to the surrounding Wagoner (now Tetrick) Ranch and to the Abbott Ditch. This obligation may make the current diversion point at the PG&E diversion dam the *de facto* diversion for the Tetrick and Abbott Ditches.[18] If delivery facilities are removed, alternative water delivery must be provided to the Tetrick and Abbott Ditches.

PG&E also owns considerable water rights associated with the German Ditch. The exercise of these rights following PG&E's License Surrender may have significant consequences on other water right holders in the area. Using rights associated with the German Ditch, PG&E can divert up to just over 10 percent of flow or a maximum of 1.44 cfs[19]. If the PG&E allocation were to be released downstream, more German Ditch users would go short than occurs today.

Flows must also be delivered to meet the needs of populations of species protected under the Endangered Species Act (frogs, and potentially others) that are resident in Hooten Gulch.

If facilities are removed, it will also be necessary to ensure that sediment from behind the diversion dam is removed rather than discharged downstream, especially to prevent release of unanticipated polluted material dislodged by past mining.

Alternative S1: Continued Operation of the South Cow Diversion

Under this alternative, the existing hydropower-water delivery system would continue to be used to meet the water delivery requirements, and to generate some power. It is understood that the flow required to meet water delivery requirements would probably be less than current diversions for power generation. Actual diversion rates for any power generation would be determined during the hydropower licensing process, taking into consideration the environmental

[18] Cow Creek Adjudication Decree, Schedule 2, Sheet 33, Page 138. Diversion point is S 50^0 E, 730 feet from the NW corner of Section 7 T31N R1W. MDB&M. See www.Kilarc.info for complete document. Separately, perhaps a *de jure* determination might be that actual diversion has become the current PG&E South Cow hydro diversion dam under *adverse possession*. Whatever the operative law, clearly the South Cow has become the *de facto* water diversion point, and equally clearly, the original diversion has been abandoned through disuse.

[19] Cow Creek Adjudication Decree, Page 15

effects on anadromous fish and other species, including those that have adapted to habitat in the tail race water. Operation of the hydropower could be reduced and would be incidental to the current requirement to operate the current diversion as a water supply operation and to address species habitat requirements. As a condition of the hydropower license, a portion of revenues from power generation on the South Cow could be paid to a Cow Creek Mitigation Trust fund, as described under Alternative K1, to be administered jointly or separately from funds generated by operation of the Kilarc hydropower facility.

Operation of the South Cow Diversion to meet water delivery requirements could potentially be made more efficient by burying the whole canal in a large plastic pipe; however, the potential use of the canal as a steelhead hatchery while it is conveying water described below could conflict with piping the canal.

The South Cow Canal between the diversion and the powerhouse provides an opportunity to establish a large carefully managed but informal anadromous salmon and steelhead breeding facility in its length. The fish would be released through gates at a time optimal to induce them to swim downstream to the sea. The key here, as in the Kilarc alternatives, is that in the case of the steelhead, it is a behavior we are trying to preserve. If the facilities could be managed with habitat improvements paid for by hydropower revenues to induce the anadromous behavior, the hydropower would make a significant contribution to restoring the anadromous population. This would be achieved by conserving and releasing juveniles into better habitat than would exist if P-606 project assets were removed.

Alternative S2: New Diversion on Tetrick Land

To meet the water delivery obligation, Mr. Tetrick may permit the building of a new diversion on his land. That diversion might be at the point where the South Cow enters his property. The good side of this alternative is that it meets the obligation to deliver water to meet Tetrick's needs as well as those of the Abbott Ditch.

The down side of this alternative is that the usage of the canal as a breeding facility is lost, as well as hydropower revenues to perform habitat enhancements. PG&E could still endow a non-profit Cow Creek Mitigation Trust that would be motivated to take care of longer term mitigation, but would not be held to performance standards that could be enforced by the FERC as a condition of any future hydropower license.

Other Potential Fish Habitat Enhancement Measures

In addition to integrating fish habitat improvement, juvenile rearing, and anadromy encouragement into future operation of existing P-606 facilities, revenues from hydropower anywhere could be applied to a variety of measures that would most likely be most effective in the South Cow area.

All feasible South Cow alternatives require fish enhancement measures to meet FERC surrender criteria – whether to remove some of the structures or to recommission them in a new dual role of small hydro and fish enhancement. While it would seem that simply removing the dams and restoring the natural flow in the bypass would be the biologically preferred alternative, this

alternative will have negative consequences locally on the listed frog and perhaps other populations, which have become dependent on the conditions that have existed for the past century. Facility removal also has the effect of precluding operating the South Cow canal as juvenile habitat to be flushed to induce steelhead behavior in the fish.

The South Cow area, unlike the Old Cow, is a broad valley with the stream slowly rising over the length. Steelhead are found in significant numbers all up and down the stream in the winter. Generally, the habitat has excellent areas for spawning due to the gentle slopes with good cover. Irrigated fields have border vegetation that provides cover and woody debris for the fish. Unfortunately, there are also significant areas where pollution and warm water run-off from ranches and impact water quality. The area is rich in opportunities to increase fish habitat values, by enhancing positive features and reducing existing features that are deleterious to healthy fish populations. Immediate measures that could be implemented by PG&E as a condition of License Surrender could include restoring stream complexity and addressing channelization problems, restoring pools and creek-side brush vegetation and woody debris for cover, insect production, and thermal protection (may also be effective on Old Cow Creek, and especially necessary to cool any increased flows through the bypass channel), especially where feasible above 1000' elevation for spawning habitat.

If the present water delivery to the Abbott Ditch is preserved, the controlled flows in Hooten gulch provide a benign environment to construct fish screening for the Abbott Ditch. The Abbott ditch is full of fish at present. If screened at some distance downstream from its entrance it also could serve as a fish nursery area. With cooperation from ranchers, and a mechanism to see that this new facility is maintained, this could be a valuable warm water asset for the fall run salmon, in that this nursery area is above the runoff pollution from the fields. Screening off the Creek channel is much simpler than in the stem of the Creek where the screening equipment is subject to annual floods and debris.

The following fish enhancement measures might be integrated into any alternative:

1. **Fencing** cattle to keep them out of the broad shallow stream beds, protecting beds and allowing lateral cover to grow

2. **Regulating irrigation** to minimize field runoff.
    a. Retention ponds to intercept field runoff – especially during first rains in the fall which wash considerable pollution into the path of migrating fall run salmon.
    b. Flow regulation onto fields to assure just sufficient irrigation – saving water and reducing nutrient and thermal pollution that cause algal blooms.

3. **Screening** of ditch diversions. – working with Ditch Associations to provide fish friendly features for the ditches such as:
    a. Screen cleaning service
    b. Screen maintenance/rebuilding service
    c. Inflow adjustments to maintain full supply
    d. Upstream fish passage maintenance

e. Downstream fish passage maintenance
f. Leakage or loss management control

4. **Ditch Tender** (an implementing agent – possibly funded by the Cow Creek Trust)
    a. Under the direction of the Ranchers, a ditch tender would be hired to continually adjust the flow from the ditches into the various uses so as to maximize field coverage and to minimize flow off the fields into the South Cow Creek.
    b. As an extension:, under the direction of the German Ditch beneficiaries, a ditch tender might be responsible for similar fish screen, bypass, and maintenance duties on the German Ditch. This would require the cooperation of the German ditch water rights users.
    c. Use of the first part of the Abbott and German ditches as screening or even nursery areas under the ditch tender's supervision.

5. **Channel Modifications**
    a. Modestly Increasing complexity where permitted
    b. Increasing woody debris where possible
    c. Increasing shade and cover
    d. Increasing protected pool prevalence

South Cow Derivative Studies

An assessment of the feasibility of different methods to meet water delivery requirements of water rights holders must be completed before the effects of implementation can be discerned. Subsequently, the potential effectiveness of various habitat enhancement opportunities described above should be investigated. Baseline information about conditions in the South Cow Creek watershed already exists in the March 2005 Watershed Management Plan (referenced above) and the Watershed Assessment upon which this plan was based. Additional research should build upon progress already made by the Cow Creek Watershed Management Group and other local entities, including the County Farm Advisor and UC Extension, potentially financed by a Cow Creek Mitigation Trust fund established as part of PG&E's License Surrender Plan.

Conclusion

This is a Scoping Paper in which Davis Hydro is asking members of the community and agencies to comment on the ideas presented. We are asking the basic questions, "Is it reasonable to operate the hydro facilities in a communion with the fish?" Can the anadromous fish continue to give up some of the potential Old Cow habitat in exchange for help with better habitat with greater population potential nearby? Can the community help Davis Hydro come up with a plan to not only to save Kilarc, but also to save the fish who need our help as well?

Appendix I Legislative Framework

This Appendix explains why the environmental effects of Project Alternatives must be studied in PG&E's FERC Project 606 License Surrender Application. It closes with a brief discussion of the process for publicly negotiating onerous 4(e) conditions, if necessary.

The Federal Energy Regulatory Commission (FERC) regulations specify that the process for surrendering an existing license is essentially the same as the process for applying for a new license. The FERC has recently accepted PG&E's License Surrender Application Schedule, a schedule that must mirror the process spelled out in FERC regulations for submitting a License Application (18 CFR §6.1). FERC regulations reflect different options available to license a new project or re-license an existing project. However, one requirement common to all options prescribes that the Applicant (in this case, PG&E) is responsible for submitting with its application, sufficient analysis of potential environmental effects for the FERC to meet the requirements of the National Environmental Policy Act (NEPA) before the FERC can make its decision to accept the License Surrender Application, and determine any conditions to impose.

The FERC's decision to accept a License Surrender is a "federal action" that triggers NEPA because it falls in the category of "Approval of specific projects, including private undertakings approved by agency permit or regulatory decision".[20]

NEPA requires that the FERC, before accepting PG&E's License Surrender, develop a public document that either:

a) explains why its action will not have any significant environmental effects (a Finding of No Significant Impact [FONSI][21], following an EA analysis of potential environmental effects), or

b) includes an explanation of alternatives that were considered and those that are environmentally preferable (a Record of Decision [ROD], a written public record explaining why it has taken a particular course of action[22] following an EIS analysis).

The required contents of a ROD are as follows:

- Statement explaining the decision
- Explanation of alternatives that were considered and those that are environmentally preferable
- Factors considered by the agency in making its decision

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[20] 40 C.F.R. 1508; Forty Questions No. 24(a) The interpretation of NEPA legislation and regulations provided in this document is derived, in part, from Bass, Ronald E. and Albert I. Herson, Mastering NEPA: A Step-by-Step Approach, Solano Press Books, Point Arena, California, First Edition, 1993.

[21] A FONSI is a public document that briefly describes why an action that is otherwise not excluded from NEPA will not have any significant environmental effects and will not, therefore, require an Environmental Impact Statement (EIS). An agency preparing an Environmental Assessment (EA) must write a FONSI if it decides not to prepare an EIS [40 C.F.R. 1505.2; Forty Questions Nos. 34(b), 34(c)].

[22] 40 C.F.R. 1505.2; Forty Questions Nos. 34(b), 34(c)

- Explanation of which mitigation measures, if any, were adopted and if mitigation measures were not adopted, an explanation of why not
- Monitoring and enforcement program for any adopted mitigation measures.

Rules Regarding Treatment of Alternatives in an EIS

While it may be possible for the FERC to satisfy all stakeholders and avoid litigation by obtaining a consensus that an EA analysis is sufficient to define the License Surrender conditions and mitigation measures in such a manner that no party would argue that significant environmental effects would result from the FERC's decision to accept PG&E's License Surrender, at the present time it is prudent to prepare for a level of analysis of alternatives suitable for incorporation into an EIS. The following rules regulate the treatment of alternatives in an EIS[23]:

- Alternatives are the "heart of the EIS"
- The evaluation of alternatives is governed by "rule of reason"
- An explanation of why alternatives were eliminated should be included
- The range of alternatives to be considered should include: Alternative ways of meeting the objective, No-action alternative, Alternatives outside the lead agency's jurisdiction, and Alternative locations
- Rigorous evaluation and comparison is required
- The preferred alternative must be identified, if one exists
- The environmentally preferred alternative must be identified
- Mitigation measures for alternatives must be described

EPAct and 4(e) Conditions

The *Federal Power Act* allows certain federal agencies, including NMFS, to impose "4(e)" conditions that must be inserted into any subsequent FERC license, as long as they are supported by science and studies. The Energy Policy Act of 2005 (EPAct) gives the license applicant the right to seek a trial-type hearing from an agency regarding material issues of disputed fact that support the imposition of 4(e) conditions. The EPAct also provides the license applicant with an opportunity to propose alternatives to the 4(e) conditions. This means that just as project alternatives must be examined and defended publicly, so now too must 4(e) conditions if they prove contentious. The dialog is usually contentious and extended if there has been inadequate communication before 4(e) conditions are imposed, and a favorable resolution of any dispute is best based on previously completed studies so as to preclude or minimize ongoing agency involvement.

[23] Bass and Herson (page 65)

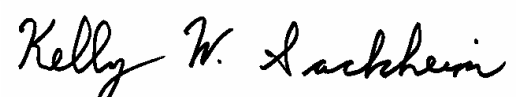
CERTIFICATE OF SERVICE

I hereby certify that I have on this day served the following

Scoping Paper on the Kilarc and South Cow License Surrender Study Plans

document by first class mail postage prepaid or email upon each person designated on the Federal Energy Regulatory Commission's official P-606 service list compiled by the Secretary of the Commission in this proceeding.

Dated at Fair Oaks, CA this 30th day of July 2007.



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