UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-6528

November 14, 2005

In response refer to:
150304SWR03SR8649:DKW

Arthur Hagood
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NOAA's NMFS' Comments on Synergies Energy Services' Initial Information Package, Kilarc-Cow Creek Project, FERC No. 606, Old and South Cow Creeks, Shasta County

Dear Mr. Hagood:

NOAA's National Marine Fisheries Service (NMFS) received a copy of the Initial Information Package (IIP) for the Kilarc-Cow Creek Project (Project), FERC No. 606, filed by Synergies Energy Services (SES) in July 2005. Representatives of NMFS also attended the joint agency and public meetings hosted by SES in mid-September 2005. At this meeting, SES requested comments on the IIP from all interested parties be submitted by November 14, 2005. NMFS appreciates the opportunity to provide comments on the information in the IIP and the public meeting. These comments address many of the issues raised in our November 2002, letter to Pacific Gas and Electric (PG&E) (in response to their First Stage Consultation Document). The studies and information requested are necessary to analyze project impacts on anadromous fish and are consistent with our requests of other, similar projects during relicensing.

NMFS **Interest in these Proceedings**

Several species of anadromous fish occur in the Project area. NMFS is responsible for the conservation and management of these species under the Federal Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. §§ 1531 *et seq.*), the Federal Power Act (FPA), the Magnuson-Stevens Fishery Conservation Act (16 U.S.C. §§ 1801 *et seq.*), and other laws. Under the ESA, the following Evolutionarily Significant Units (ESUs) are either listed, or are candidates for listing: Central Valley Fall and late-fall Chinook (candidates for *threatened* status); Central Valley steelhead (*threatened*);Central Valley Spring-run Chinook salmon *(threatened* under both the ESA and the California Endangered Species Act). Each of these stocks has declined in recent years. In

years. In fact, the estimated Chinook salmon population in Cow Creek alone was 7, 540 in 1968, but only 75 in 1990.[1]

Comments on Project Decommissioning

In the past 3½ years, staff representatives of PG&E, the City of Redding, and the California Energy Commission all recommended against relicensing the Project for economic and environmental reasons. Each of these recommendations has been made part of the Federal Energy Regulatory Commission (FERC) record. In March 2005, after 1½ years of cooperative effort, PG&E, NMFS, the California Department of Fish and Game (CDFG), the State Water Resources Control Board (SWRCB), the U.S. Fish and Wildlife Service (USFWS), the National Park Service (NPS), and Trout Unlimited and Friends of the River signed an agreement that stated PG&E would not seek a new license.

Given the presence of several sensitive and special status species, at least 52 miles of potential anadromous habitat, and designated critical habitat within the Project, and considering our work of the last 1½ years with PG&E and other interested parties, our preference is implementation of the decommissioning alternative described in the 2005 Agreement. Our goals for the decommissioning alternative are included in the attachment to the agreement. Therefore, we refer SES to these documents and emphasize our expectation that the agreement and the attachment constitute the benchmark for any future licensee that opts to abandon the Project. Given the economic decisions of both PG&E and the City of Redding, we consider it very possible that any new licensee will eventually determine the Project is not economically viable. At such time as this Project is once again abandoned, we would request the FERC order the new licensee to implement a surrender license which meets or exceeds the desired conditions identified by the agreement signatories in early 2005.

It is also possible that FERC, in its analysis of a license application for this Project, will determine that the environmental benefits of removing this small facility outweigh its electricity benefits (as did the California Energy Commission in its review). FERC has the authority (and statutory obligations under section 10(a)(l) of the FPA) to consider dam decommissioning.[2, 3] In such a case, we would also request the FERC order the licensee to implement a surrender license which meets or exceeds the desired conditions identified by the agreement signatories in early 2005.

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[1] Mills, T.J., and F. Fisher. 1994. Central Valley Anadromous Run Size, Harvest, and Population Estimates, 1967 through 1991. California Department of Fish and Game, Inland Fisheries Technical Report, Third Draft, August 1994 Revision.

[2] See FERC Policy Statement on Decommissioning, RM-93-23-000. Further, many new licenses contain broad provisions authorizing FERC oversight, to the point of reserving authority to require dam decommissioning in certain cases. See, *e.g.*, 66 FERC ¶ 61,316 (March 18, 1994) (License order for Reusens Hydropower Project).

[3] In the Edwards Dam proceeding, FERC found that fish protection devices at the project were economically infeasible and thus inconsistent with its obligation "to make licensing decisions that make the best comprehensive use of the waterway". Accordingly, FERC ordered the project decommissioned and the structures removed. 65 FERC at 64,083; see Federal Power Act § 10(a), 16 U.S.C. § 803(a) (1988).

NMFS **Resource Goals and Objectives**

FERC's Licensing Regulations direct resource agencies to list the resource management goals and objectives to serve as the basis for study recommendations and subsequent prescriptions, and recommendations for Project "protections, mitigation, and enhancement measures" (PM&E) to be incorporated into the new License.

Resource Goals

1. Protect, conserve, enhance, and recover native anadromous salmonids and their habitats by providing access to historic habitats and by restoring fully functioning habitat conditions.

2. Identify and implement measures to protect, mitigate or minimize direct, indirect, and cumulative impacts to, and enhance native anadromous salmonid resources, including related spawning, rearing, and migration habitats and adjoining riparian habitats.

Resource Objectives

1. ***Flows*** - Implement scheduled flows to the benefit of native anadromous salmonids and their habitats. This includes providing a range or schedule of flows necessary to: a) optimize suitable habitat; b) stabilize flows during spawning and incubation of ingravel forms; c) facilitate the efficient migration of spawning adults, safe and timely emigration of smolts, and movement of rearing juveniles between feeding and sheltering areas; d) ensure redd placement in viable areas; and e) develop channel forming processes, riparian habitat protection, and maintenance movement of forage communities. This also includes impacts of flood control, irrigation, or other project structures or operations that act to displace individuals or their forage or destabilize, scour, or degrade the physical, chemical, or biological quality of habitat.

2. ***Water Quality*** - Modify project structures or operations necessary to mitigate direct, indirect, or cumulative water temperature and water quality impacts associated with project structures and operations, or enhance water temperature and water quality conditions in salmonid habitat.

3. ***Water Availability*** - Coordinate operations with other projects, programs or initiatives, and/or use water transfers, water exchanges, water purchases, or other forms of agreements to maximize potential benefits to anadromous salmonids from limited water supplies.

4. ***Fish Passage*** - Provide access to historic spawning, rearing, migration, and seasonal habitats necessary for salmonids. This includes modifications to project facilities and operations necessary to ensure: the safe, timely, and efficient passage of upstream migrating adults; the downstream passage of emigrating juveniles; and passage necessary for rearing juveniles to disperse and access habitat necessary for feeding and sheltering.

5. ***Channel Maintenance*** - Implement flow regimes and non-flow related measures necessary to mitigate and minimize direct, indirect and cumulative impacts of project operations on sediment movement and deposition, river geometry, and channel characteristics. This includes impacts on stream geomorphology, capacity, flood plain conductivity, and bank stability. It

also includes impacts to the extent, duration, and repetition of high flow events, as well as habitat diversity and complexity.

6. ***Predation*** - Minimize and mitigate the impact of project structures or operations that introduce predators, create suitable habitat to harbor predators, or are conducive to the predation of native anadromous salmonids.

7. ***Riparian Habitat*** - Mitigate or minimize direct, indirect, and cumulative impacts to riparian habitat. Enhance riparian habitat and habitat functions necessary to mitigate and minimize impacts of project facilities and operations.

8. ***Coordination*** - In developing alternatives for relicensing, include a full range of alternatives for modifying project and non-project structures and operations to the benefit of anadromous salmonids and their habitats, while minimizing conflicts with operational requirements and other beneficial uses. This includes developing alternatives for greater coordination with other stakeholders, and water development projects to ensure project structures and operations are consistent with on-going and future restoration efforts, and to potentially enhance these efforts.

Projects Impacts on Salmonids

Salmonids require cool, clear, running water to support their freshwater life history stages (Bjornn and Reiser 1991). Incubating salmon eggs require clean gravel substrates. Juvenile habitats typically consist of free-flowing streams providing a complex of alternating shallow, swift riffles, and low-velocity pools with abundant cover in the form of woody debris, boulders, and undercut banks. Dams convert natural stream habitats to artificial pond environments. Habitats for salmonids are adversely affected by project facilities because dams change stream flow patterns, reduce habitat diversity, diminish water quality, and create barriers to the natural instream movements of salmonids. Dams can also enhance habitats for species that prey upon juvenile salmon and steelhead.

Specific Resource Issues and Recommended Studies

The August 18, 2005, SES letter requests agencies identify any additional studies or information considered necessary to support an application for the Project. SES also requests explanations for why additional studies are "more appropriate than the studies already agreed upon during PG&E's relicensing process." This statement fails to acknowledge key aquatic species and habitat studies that PG&E and the agencies did not reach agreement on; namely the stream flow monitoring study, the aquatic habitat study, the fish barrier analysis, and the instream flow study. These studies were not done. PG&E instead opted for decommissioning the Project.

We also note that the IIP is a summary prepared by SES of information compiled by PG&E, much of which is not part of the administrative record or available for our review. (For example, of the 20 listed on-going studies, only the Red-Legged Frog Survey Report has been finalized and submitted into the public record.) As such, the IIP is not a stand alone document. We understand that SES is still in the process of obtaining data from PG&E and completing studies. Based on the IIP, it is not clear to what extent SES intends to develop and disseminate additional data. There

are also conclusions within the IIP that erroneously suggest a comprehensive set of data has been submitted and analyzed. We emphasize that there are no anadromous fish or habitat study results in the public record, nor were the associated study protocols ever agreed upon by stakeholders. In an effort to facilitate development of a more complete Second Stage Consultation document, we will highlight several significant areas that require additional information and are relevant to our resource goals and objectives.

The Existing Water Use (section 4.2.2) provides a brief narrative including a few summary statistics *(e.g.*, monthly average maximums and average minimums), and refers to Figure 4.2-3 as depicting the 20th and 80th percentiles (page 20). However, we cannot find Figure 4.2-3 in the IIP, and the few isolated quantities do not provide a meaningful basis for interpretation. Similarly, the Existing Water Quality (Section 4.2.3) references a table of multiple parameters (page 23) but this table is not within the IIP. The Temperature section on page 24 presents over a dozen water temperature values in a narrative format from locations throughout the watershed without a table/graph to facilitate interpretation. As best we can determine, the narrative does not provide insight into the relationship of water temperature to project operations *(e.g.,* flow). These data gaps involve important "existing" water quality conditions. The conclusion on page 25: "the relatively short diversions are not believed to have negative impacts on water quality in the Project Area" is not supported by information within the IIP and appears to be conjecture. The IIP should highlight the areas lacking documentation, propose methods to collect information, and refrain from making unsupported statements about project impacts.

Spring run are known occur below Whitmore Falls. NMFS considers the fish distribution information provided to date by PG&E and SES as incomplete, and requests specific additional fish distribution studies as described herein (Fish Barrier Analysis section). Without the specified information, we presume that available habitat would have been populated by these fish before flow and temperature changes associated with development occurred.

The first paragraph of the Fish Abundance and Distribution in the Project Area (Section 4.4.2.1) reads, in part; "there are many passage barriers in the Cow Creek drainage caused by falls or steep streambed conditions which limit the extent of anadromous fish" (page 35). However there is no accompanying description of the location or dimensions of these barriers and steep conditions. In evaluating potential passage barriers, we recommend that the Powers and Orsborn (Powers, P.D., *et al.*, 1985) methodology be followed, to supplement the elements in SES's #10 proposed study. Additionally, in consultation with USFWS and CDFG, a statistically significant number of spring run Chinook salmon and steelhead trout should be collected from the pool below Whitmore Falls, and from South Cow Creek and radio tagged. Tagging should be commenced early enough in the season that tagged fish have the opportunity to ascend falls or partial barriers during a freshet. These fish should be tracked to determine the upper extent of their passage. Automated recorders should be placed at the first potential barrier above Whitmore Falls and approximately 2 miles upstream from the mouth of South Cow Creek. A potential location for this recorder could be at the outfall of the powerhouse on South Cow Creek, where the study could simultaneously address concerns with false attraction.

With these additions, we anticipate that SES's #10 proposed study, Passage Barrier Survey will provide the data necessary to put this statement into context and allow assessment of project

impacts. Until the relevant information is collected and presented, a statement that barriers exist within the watershed is too vague to be helpful in identifying project impacts or designing appropriate mitigation measures. We would add that the statement "fish distribution and abundance are also affected by the low summer flow and high water temperatures typical of the Cow Creek drainage" (page 35) is most applicable to elevations below 1,000 feet. As the Project area occurs from 820 to 3,940 feet, we consider the majority of the aquatic habitat within the Project to be suitable for trout and salmon unless SES provides site specific information to the contrary.

The fish resources section provides some estimates of fish densities in Old Cow Creek downstream of the bypass reach, but does not include information on the fish resources within the bypass reach. Beyond fish density, we recommend condition factor and variation in length be examined in both full flow and bypassed reaches to quantify impacts on fish resources.

Determining appropriate instream flows will be an important element of future consultation with the resource agencies. In the Project Impacts section, the IIP notes past studies in the watershed such as the "Waters Method" in South Cow from 1978, and an "instream flow assessment" from a portion of Old Cow upstream of the Project 1985. Actual methods are not presented, nor any results such as Weighted Useable Area curves, just broad statements such as the general frequency of spill events under current operations. Identification of the impacts of the Project on the aquatic resources of both Old Cow and South Cow creeks will require an up-to-date and rigorous analysis of the relationship of flow to habitat. The analysis should be based on site specific field data obtained at flows representative of the unimpaired hydrograph. The minimum requirements of an acceptable instream flow study for this Project are outlined in the additional study portion of this letter.

The Project Impacts on Stream Temperature section is nearly identical to the HP's Existing Conditions presentation. Limited data from isolated times and places is summarized without graphs, tables or clear correlation with project operations. The IIP notes that water temperature data collected during "lower flow releases" in the South Cow reach are "too high to provide suitable rearing habitat for steelhead or resident trout" (page 47). Such statements require much greater detail and context to enable resource agencies to develop appropriate mitigation measures.

The Project Impacts on Passage/Entrainment section references an evaluation from 1984 that showed that the South Cow facilities provided adequate passage and protection for anadromous fish. Actual methods and data from the study performed over 20 years ago are not provided in support of this statement. Similar to the field of instream flow assessment, salmonid fishway criteria have changed dramatically in the past two decades and this issue should be revisited using modern technologies.

Beyond the PG&E studies referenced in the IIP, we recommend SES conduct additional field work and analyses in the areas of: 1) hydrology and aquatic habitat, 2) water quality, and 3) fish passage. In the following paragraphs, we provide the relevant authority and rationale for these recommendations. We also describe appropriate methodologies for addressing each resource area.

Hydrology - Aquatic Habitat

The scientific rationale for water bypass flow requirements is not provided in the IIP. Given our current understanding of the ecological processes tied to hydrology, we cannot concur that flows of 2 to 4 cubic feet per second (cfs) are protective of aquatic resources. Flows influence a wide range of fish habitat conditions including thermal refugia in critically hot months, the availability of edge habitat for newly emerged fry, and the timing of spawning activities. Hydrology also influences the composition of riparian vegetation and streambed substrate. NMFS maintains that given the relative magnitude of the Project's diversions, such bypass flows have had, and will continue to have, significant impacts on the aquatic resources of Old and South Cow creeks. NMFS requests that SES establish the relationship between project operations that influence stream hydrology and downstream aquatic and riparian habitat conditions *(e.g.*, water quality, fish distribution and abundance, fluvial geomorphology, and vegetation distribution and abundance) utilizing current ecological principles and theory. An understanding of the relationships between flow and the natural resources will be an essential component of any new license application, which must include a bypass flow regime adequate to maintain the aquatic and riparian resources of Old and South Cow creeks.

The first step in determining an adequate bypass flow regime is synthesizing an unimpaired hydrograph to provide the ecological foundation for management decisions. NMFS supports implementing a flow regime with seasonal variations patterned after the unimpaired hydrograph to help restore normative habitat conditions in a regulated system (see Stanford, *et al.*, 1996). Determining the unimpaired hydrograph is a challenging task on this system, given the lack of gauges in bypassed channels and the added complexity of an adjudicated system. Actual flow measurements should be taken. Such field data will be essential to calibrate estimates of flow from existing records. Year-round flow measurements are particularly relevant in the bypassed reaches since, from a hydrologic perspective, these are both the most heavily impacted portions of the Project and currently the least quantified.

We recommend installation of a U.S. Geological Survey gauge in the bypassed reach of South Cow Creek as soon as feasible. However, it is our understanding that the gradient and sediment load of Old Cow Creek preclude installation of a permanent gauge in that reach. Thus, we would accept weekly use of hand held flow meters for as much of the 2005-06 water year as can be monitored. Flow should also be measured at stations that bracket all significant diversions (such as the two project canals) and inputs (such as North Canyon and Mill creeks and powerhouse discharges). Beyond the two locations proposed in PG&E's May 2003 Study Plan document (the Kilarc powerhouse on Old Cow Creek and above the diversion dam on South Cow Creek), we recommend that flow monitoring stations also be placed above the Kilarc diversion dam, below the confluence with North Canyon Creek on Old Cow Creek, below Mill Creek, and upstream of the confluence with Hooten Gulch in South Cow Creek. Information from these added stations will facilitate extrapolation from the synthesized hydrology as well as providing a means of verifying estimated flows.

Once created, the unimpaired hydrograph will provide a basis for determining the impacts of the Project on the hydrology of Old and South Cow creeks as well as informing additional studies such as instream flow, aquatic habitat, and water quality. To facilitate the first objective of understanding hydrologic project impacts, the basic project hydrology should be presented as the

daily average flow (both unimpaired and actual) and segregated into the three standard water year classifications of wet, normal, and dry. Water years should be classified as follows (with respect to mean annual flow): an unimpaired flow of ≥125 percent equals "wet year"; an unimpaired flow of ≥75 percent and ≤125 percent equals "normal year"; and an unimpaired flow of ≤75 percent equals "dry year".

Once the unimpaired hydrograph is synthesized, it should provide the range of flows to be addressed in the proposed "Physical Habitat Simulation" (PHABSIM) of the instream flow study. We also recommend that the PHABSIM study include collection of at least two sets of velocity data. While a middle calibration flow may be used to reliably predict habitat available at lower flows, based on our experience, we question the reliability of using such flow data to extrapolate habitat estimates upwards.

The transect selection protocol for the instream flow study is not provided in the IIP but it should be representative of the variability both between and within different mesohabitat types *(e.g.,* run, riffle, pool) to be statistically valid. This will require habitat mapping of the Project area. The most useful habitat information would be acquired during moderate unimpaired flows. Based on the preliminary flow estimates provided at the back of PG&E's May 2003 document, the average unimpaired low flow during the past 50 years in September and October ranged between 25 and 35 cfs in Old Cow Creek, and between 55 and 65 cfs in South Cow Creek. Under current operations, the base flows in the bypass reaches are between 2 and 4 cfs. While flows of less than 5 cfs facilitate stream access and observation of substrate, we do not expect mapping conducted under such extreme flow conditions to provide representative habitat types. We recommend that aquatic habitat mapping be performed at flows of at least 30 cfs in the Old Cow bypass reach, and at least 50 cfs in the South Cow Creek bypass reach *(i.e.,* at the lower end of the unimpaired hydrograph) in order to capture a more representative assessment of habitat type distribution. Any data gaps resulting from constraints created by moderate flows, such as impaired water clarity or researcher safety issues, could later be addressed with a supplemental mapping effort at the base flow.

The instream flow study should model available habitat for the two resident trout species and "anadromous salmonids" on both Old Cow and South Cow creeks. As presented previously, until appropriate fish sampling data reasonably establish the absence of steelhead in the Project area, the CDFG considers Old Cow Creek to be potential steelhead habitat. Given their special status *(i.e.,* Federally threatened), Central Valley steelhead trout habitat requirements will be an important factor in future flow management decisions not only in the currently occupied project habitat *(i.e.,* South Cow Creek) but also in the potentially restorable project habitat *(i.e.,* Old Cow Creek). Therefore, we reiterate our recommendation for modeling weighted usable area for anadromous salmonids in all portions of the Project, not just South Cow Creek.

Water Quality

Based on the information provided in the IIP, weekly water temperature maximums within the project boundaries on Old Cow Creek can exceed 20° Celsius (C), the upper limit of acceptable temperatures for rainbow trout and well above the preferred range for steelhead (Bjornn, T.C., and Reiser, D.W., 1991, and Raleigh, R.F., *et al.,* 1984). Water temperatures in South Cow Creek are even more compromised with average summer water temperatures exceeding the acceptable range for trout and maximums exceeding the lethal threshold for steelhead (24°C). Given the range of

temperatures documented in both drainages over the past several years, determination of project impacts on summertime water temperature will be essential.

To implement a water temperature monitoring program, we recommend temperature recorders be spaced at least every mile along the bypass reaches to provide an estimated rate of change in temperature per mile, as well as absolute values. To be able to isolate project impacts, it will be necessary to monitor water temperatures immediately above project diversions as well as below the mixing zones created by project discharges.

Once SES establishes the existing rate of change in water temperature and isolates the impacts of the various diversions and tributaries, we recommend combining the data with the hydraulic information to be collected to allow modeling of the daily water temperature minima, maxima, and means under a range of flows. The range of flows modeled should include both those provided under current operations as well as those that would exist without the Project in order to be able to quantify project impacts on water temperature.

Fish Passage

As mentioned previously, PG&E's Passage Barrier Study should provide an inventory and catalog of potential fish passage barriers within the bypass reaches to compliment the general aquatic habitat study. The geographic scope of the proposed study is too narrow. This Project provides fish passage facilities at only one of the five diversions, namely the South Cow Creek diversion. The other four diversions represent potentially significant barriers and need to be evaluated for purposes of designing appropriate mitigation measures. The effectiveness of the South Cow ladder installed in 1984 has not been reevaluated since the initial study. The current effectiveness of the passage facilities at the South Cow Creek diversion should be assessed for both anadromous and resident species under a range of flows, including when the diversion is just beginning to spill as well as during the summertime when elevated water temperatures may combine with low flow to impede passage.

Summary

This completes our comments on the IIP prepared by SES. We appreciate the opportunity to comment on the studies necessary for relicensing of the Kilarc-Cow Creek Hydroelectric Project. My staff is available to consult with SES regarding design and review of specific studies. If you have any questions regarding the above comments and recommendations, please contact David White of my staff at (707) 575-6810.

Sincerely,

(acting for)

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cc:

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