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W-13

Energy and Ocean Resources
Staff: SMH, JJL, JD & SONGS Mitigation Program Scientific Team—SF
Staff Report: October 23, 2003
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Item Number: W-13
Commission Action:

San Onofre Nuclear Generating Station (SONGS) Mitigation Program: 2004 and 2005 Two-Year Work Program and Budget

EXECUTIVE SUMMARY

The staff is recommending Commission approval of a two-year work program and $2,338,957 budget for the Commission's independent monitoring and technical oversight of the SONGS mitigation projects. The projects are required under Southern California Edison Company's (SCE) coastal development permit for construction of Units 2 and 3 of the San Onofre Nuclear Generating Station (No. 6-81-330-A, formerly 183-73, originally issued in 1974). The staff is also recommending Commission approval of a $68,000 contingency fund to be used, in consultation with SCE, only to cover the costs of additional time for the Scientific Advisory Panel if needed.

The permit conditions originally were based on the comprehensive studies of the Marine Review Committee established in the 1974 permit and were adopted by the Commission in 1991 to mitigate the adverse impacts of the operation of Units 2 and 3 of the nuclear generating station on the marine environment. The conditions require SCE and its partners to (1) create or substantially restore a minimum of 150 acres of southern California wetlands (Condition A), (2) install fish barrier devices at the power plant (Condition B), and (3) construct an artificial reef large enough to sustain 150 acres of medium to high density kelp bed community together with funding for a mariculture/marine fish hatchery (Condition C). The conditions also require SCE to provide the funds necessary for Commission technical oversight and independent monitoring of the mitigation projects, to be carried out by independent contract scientists under the direction of the Executive Director (Condition D). In 1993, the Commission added a requirement for the permittee to partially fund construction of an experimental fish hatchery. The Commission has since approved amendments to the conditions in April 1997 and October 1998.

Permittee's Funding Requirement

Condition D of the permit requires SCE to fund the Commission's oversight of the mitigation and independent monitoring functions identified in and required by Conditions A through C. The permittee is required to provide "reasonable and necessary costs" for the Commission to retain contract personnel with appropriate scientific or technical training and skills, as well as reasonable funding for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel convened by the Executive Director to provide advice on the design, implementation, monitoring and remediation of the mitigation projects. The Commission has operated under approved work programs and budgets since 1993.

Consultation with Permittee

Pursuant to the permit conditions, the staff has consulted with SCE on the proposed work program and budget for 2004 and 2005. Several issues were raised which have been addressed to SCE's satisfaction (see SCE's October 16, 2003 letter of support, attached).

- Interim monitoring to evaluate the long-term sustainability of giant kelp, understory algae and benthic invertebrates following the conclusion of the five-year kelp reef experiment has been eliminated and costs reduced accordingly.
- Continuing reef process studies have been clarified.
- Wetland pre-restoration monitoring tasks have been revised, reducing the required effort.
- Additional budget reductions have been made where possible.

Implementation of Commission Oversight and Independent Monitoring

The Commission retains a science advisory panel and a small technical oversight team (two scientist positions and administrative support) under contract to provide the necessary scientific expertise to the Commission and serve as project managers for the monitoring program. Field assistants also are retained under contract to conduct the monitoring, and independent consultants and contractors are called upon when specific expertise or assistance is needed for specific tasks.

The staff implements the field monitoring program through a contract with the University of California, Santa Barbara, that uses the existing contract scientists as project managers at no additional cost, with data collection done by contract field assistants under their direction. Based on a comparison of estimated costs from UCSB, other universities, and private consultants, the Commission found that implementing the monitoring program through a contract with UCSB was the most efficient, cost-effective, scientifically rigorous, and timely method of achieving the goals of the independent monitoring required by the SONGS permit.

Work Program for 2004 and 2005

The status of each mitigation project guides the Commission's work program for the next two calendar years.

The environmental review and final planning for the wetland restoration project will continue over the next several months, culminating with SCE's submittal of a coastal development permit application and construction of the wetland. Lawsuits challenging the adequacy of the Final Environmental Impact Report (FEIR) resulted in a court ruling setting aside the certification of the FEIR and remanding the matter back to the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA) for further consideration. The ruling was appealed. During the appeals process, SCE moved forward to address the issues raised by this litigation and to address other outstanding issues. The Court of Appeal ruled in August 2003 that the FEIR is adequate, reversing the judgment of the trial court. The contract scientists' work will focus on assisting with the resolution of remaining issues, completing pre-restoration monitoring, finalizing the wetland monitoring and management plan, assisting the Commission with its review of the coastal development permit application, and initiating construction monitoring.

Construction of the experimental reef was completed in September 1999, and the five-year monitoring phase began in early 2000. Contract scientists and field assistants will conduct the final year of monitoring on the experimental reef, culminating in recommendations to the Commission on the design of the full mitigation reef. Contract scientists also will continue the process studies identified in the monitoring and management plan for the experimental kelp reef approved by the Commission.

In October 2000, the Commission reviewed the conclusions on the effectiveness of the fish behavioral barrier, and has monitored the reduction of fish losses at SONGS. Contract scientists will continue to review SCE's annual reports and investigate any unusual mortality events. In addition permanent Commission staff will continue to participate in the oversight of the fish hatchery program operated by the Department of Fish and Game's Ocean Resources Enhancement and Hatchery Program, with very minor assistance from the contract scientists.

Budget for 2004 and 2005

The proposed budget for calendar years 2004 and 2005 covers the monitoring and technical oversight program costs for the Commission's contract scientists, contract field personnel to monitor the wetlands and experimental reef, science advisory panel, consultants, administrative support, and operating expense. The proposed funding totals $2,338,957 for the two years. Although this budget is somewhat less than the budget for 2002-2003, due to reductions in the field monitoring staff during 2005, the overall personnel costs have increased, and added consulting costs for sonar surveys and consultations with experts in ichthyology and wetland birds keep the overall reduction for 2004-2005 modest.

In addition, staff is proposing pre-approved contingency funds in the amount of $68,000 specifically for the Scientific Advisory Panel. The permit authorizes up to $100,000 *per year*, adjusted annually by any increase in the consumer price index applicable to California. Based on past years' expenditures, staff proposes a *total* of only $132,000 ($64,000 in 2004 and $68,000 in

2005) for the Scientific Advisory Panel. However, it is expected that the Scientific Advisory Panel effort may increase during the next two years beyond what is budgeted to provide advice on both the wetland restoration final design and engineering plan and design of the full mitigation reef. The overall budget does not provide any cushion for such an increase; thus, the staff proposes a pre-approved contingency fund totaling $68,000 be earmarked for the Scientific Advisory Panel. Having the remainder of the original authorized amount (without any cost of living increases) in a pre-approved contingency fund would allow the Scientific Advisory Panel to respond in a timely manner to changing circumstances. Any expenditure of the contingency funds would be made in consultation with SCE. If a dispute arises, the staff would bring the issue to the Commission for resolution.

I. STAFF RECOMMENDATION

The staff recommends that the Commission approve a two-year work program and budget for calendar years 2004 and 2005 for a total amount of $2,338,957 for both years in support of the Commission's independent monitoring and technical oversight of the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 marine resource mitigation projects required in Conditions A through C of permit 6-81-330-A (formerly 183-73). The Commission's independent monitoring and technical oversight program is to be funded by the permittee, Southern California Edison and the other SONGS owners, in accordance with the provisions of Condition D of the permit. In addition, staff recommends that the Commission approve a contingency fund in the amount of $68,000, to be funded by the permittee and to be expended in consultation with SCE for the purposes of increasing the time required from the Scientific Advisory Panel, as specified in the staff report.

II. MOTION AND RESOLUTION

Commission approval of the 2004 and 2005 two-year Work Program and Budget requires the following motion:

> I hereby move that the Commission approve the 2004 and 2005 two-year SONGS (1) Work Program, (2) Budget, and (3) Contingency Fund as recommended by the staff in the staff report dated October 23, 2003.

The staff recommends a **"yes"** vote on the foregoing motion, which will result in the adoption by the Commission of the following resolution:

> The Commission hereby determines that the two-year SONGS (1) Work Program, (2) Budget, and (3) Contingency Fund for the years 2004 and 2005 that are set forth in Sections D, E and F, respectively, of the staff recommendation, dated October 23, 2003, carry out the intent of Condition D of Permit 6-81-330-A (formerly 183-73) by requiring the permittee to provide reasonable and necessary funding for the Commission contract staff's technical oversight and independent monitoring responsibilities pursuant to the mitigation and lost resource compensation conditions (A through C).

III. FINDINGS AND DECLARATIONS IN SUPPORT OF 2004 AND 2005 TWO-YEAR WORK PROGRAM AND BUDGET

A. SONGS PERMIT BACKGROUND

In 1974, the California Coastal Zone Conservation Commission issued a permit (No. 6-81-330-A, formerly 183-73) to Southern California Edison Company for Units 2 and 3 of the San Onofre Nuclear Generating Station (SONGS). A condition of the permit required an independent study of the impacts of the operation of Units 2 and 3 on the marine environment offshore from San Onofre, and mitigation of any adverse impacts. As a result of the impact studies, in 1991 the Coastal Commission added new conditions to mitigate the adverse impacts of the power plant on the marine environment which require the permittee to (1) create or substantially restore at least 150 acres of southern California wetlands, (2) install fish barrier devices at the power plant, and (3) construct a 300-acre kelp reef (Conditions A through C). The 1991 conditions also require SCE to provide the funds necessary for Commission contract staff technical oversight and independent monitoring of the mitigation projects (Condition D). In 1993, the Commission added a requirement for the permittee to partially fund construction of an experimental white sea bass hatchery. Due to its experimental nature, the Commission did not assign mitigation credit to the hatchery requirement.

After extensive review of new kelp impact studies, in April 1997 the Commission approved amended conditions which (1) reaffirm the Commission's prior decision that San Dieguito is the site that best meets the permit's standards and objectives for wetland restoration, (2) allow up to 35 acres credit for enhancement of wetland habitat at San Dieguito Lagoon by keeping the rivermouth permanently open, and (3) revise the kelp mitigation requirements in Condition C. Specifically, the revised Condition C requires construction of an artificial reef large enough to sustain 150 acres of medium to high density kelp bed community (which could result in a reef larger than 150 acres) together with funding for a mariculture/marine fish hatchery as compensation for the loss of 179 acres of high density kelp bed community resulting from the operation of SONGS Units 2 and 3. The artificial reef is to consist of an experimental reef of at least 16.8 acres and a larger mitigation reef to meet the 150-acre requirement. The purpose of the experimental reef is to determine which combinations of substrate type and substrate coverage will most likely achieve the performance standards specified in the permit. The design of the mitigation reef will be contingent on the results of the experimental reef.

The Commission also found in April 1997 that there is continuing importance for the independent monitoring and technical oversight required in Condition D to ensure full mitigation under the permit.

B. COMMISSION OVERSIGHT AND INDEPENDENT MONITORING

Condition D establishes the administrative structure to fund the independent monitoring and technical oversight of the mitigation projects. It specifically: (1) enables the Commission to retain contract scientists and technical staff to assist the Commission in carrying out its oversight and monitoring functions, (2) provides for a scientific advisory panel to advise the Commission

on the design, implementation, monitoring, and remediation of the mitigation projects, (3) assigns financial responsibility for the Commission's oversight and monitoring functions to the permittee and sets forth associated administrative guidelines, and (4) provides for periodic public review of the performance of the mitigation projects.

Pursuant to this condition, the Commission has operated under approved work programs and budgets since 1993. The Commission retains a science advisory panel and a small technical oversight team (two scientist positions and administrative support) under contract to provide the necessary scientific expertise to the Commission and serve as project managers for the monitoring program. Field assistants also are retained under contract to conduct the monitoring. In addition, independent consultants and contractors are called upon when specific expertise or assistance is needed for specific tasks. Costs for permanent Coastal Commission staff that spend a portion of their time on this program are ***not*** paid by the permittee but are absorbed by the Commission as part of their permit compliance workload.

In approving previous years' work programs and budgets for the monitoring and oversight program, the Commission authorized an implementation structure through a contract with the University of California, Santa Barbara, that utilizes the existing contract scientists as project managers at no additional cost, with data collection done by contract field assistants under their direction. The Commission found, based on a comparison of estimated costs from UCSB, other universities, and private consultants, that this implementation structure is the most efficient, cost-effective, scientifically rigorous, and timely method of achieving the goals of the independent monitoring required by the permit. This implementation structure will continue during the two-year period of the 2004 and 2005 work program.

C. STATUS OF MITIGATION PROGRAM

C.1. Status of Wetland Restoration Mitigation

Mitigation Requirement

Condition A of the permit requires the permittee to create or substantially restore a minimum of 150 acres of wetlands to mitigate for impacts to fishes caused by the operation of SONGS. In April 1997, the Commission reaffirmed its 1992 approval of the permittee's choice of the San Dieguito River Valley as the site for the wetland restoration project and allowed for up to 35 acres credit for enhancement at San Dieguito Lagoon on the condition of perpetual inlet maintenance.

Planning and Environmental Review

In November 1997 the Commission approved SCE's preliminary wetland restoration plan as largely conforming with the minimum standards and objectives stated in the permit. The CEQA/NEPA environmental review incorporated the mitigation project into the overall San Dieguito River Valley Regional Open Space Park project. The lead agencies for the CEQA/ NEPA environmental review were the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA) and U.S. Fish and Wildlife Service.

Following the review period on the January 2000 Draft EIR/S, the Final EIR/S was released in September 2000 and certified by the JPA after public hearing. The EIR/S designated the Mixed Habitat plan as the environmentally preferred alternative.

Lawsuits challenging the adequacy of the Final EIR were filed by the Del Mar Sandy Lane Association and Citizens United to Save the Beach. Although in a July 2001 decision the Court rejected certain of the plaintiff's claims, it determined that the FEIR was inadequate with regard to several issues, most significantly that there was insufficient evidence supporting the FEIR's conclusion that the project will not increase scour and loss of sand at the river mouth. The Court set aside the JPA's certification of the FEIR and remanded the matter back to the JPA. The JPA appealed those portions of the Superior Court ruling that were adverse to it, and in August 2003, the Court of Appeal ruled that there is substantial credible evidence supporting each of the JPA's conclusions concerning the environmental impacts of the restoration project and the appropriateness of the mitigation measures, thus reversing the judgment of the trial court. All appeals are final; on October 6, 2003, the Appeals Court issued its order directing the Superior Court to issue the revised judgment.

Now that the lawsuits have concluded, the USFWS expects to issue its final Record of Decision in the fall of 2003.

Outstanding Issues/Next Steps in Implementing Wetland Restoration

The permit requires SCE to submit a final restoration plan to the Commission that substantially conforms to the preliminary restoration plan approved by the Commission in November 1997 unless the CEQA/NEPA review concludes that an alternative plan that meets the conditions for minimum standards and objectives is the environmentally superior alternative. SCE is then required to submit a coastal development permit following receipt of other agency approvals and permits.

Throughout the appeal of the trial court ruling on the FEIR, the JPA, SCE and USFWS moved forward to address the points other than the coastal process issue deemed inadequate by the Court in order to be ready to re-certify the FEIR if necessary. These additional analyses will be needed at the time of the Commission's review of the coastal development permit application for the restoration project.

At the same time, the staff and SCE are continuing to work with USFWS, Department of Fish and Game, the JPA, and the 22nd Agricultural District to resolve the remaining issues involving Least Tern nesting sites. Although the Least Tern nesting sites are included in the overall plan, they are a previous requirement from a coastal development permit granted to the 22nd Agricultural District (CDP No. 6-84-525), and not a requirement of SCE's SONGS permit.

SCE has continued to develop its Final Plan while recognizing that project revisions may be necessary pending resolution of these issues. The staff will continue to work with SCE to ensure that the plan meets the objectives and standards specified in the permit and to ensure that Coastal Act issues will be addressed appropriately at the coastal development permit stage of the project.

Wetland Pre-restoration Monitoring

The SONGS permit establishes physical and biological performance standards that must be met by the restored wetland. As part of the Commission's technical oversight, monitoring and management responsibilities under Condition D, the contract scientists are conducting pre-restoration monitoring in San Dieguito Lagoon and in other southern California wetlands that may be used as reference sites in post-restoration monitoring. Pre-restoration monitoring includes the collection of baseline physical and biological data on the wetland attributes to be monitored during post-restoration monitoring. Pre-restoration data are required to assess changes in the existing wetland following construction. Pre-restoration monitoring data are also needed to develop sampling designs for post-restoration monitoring that can effectively determine whether the various performance standards have been met. Contract scientists continued to collect pre-restoration data on water quality, invertebrates, and fishes in San Dieguito Lagoon and prospective reference wetlands.

Results of the pre-restoration monitoring activities undertaken as part of the previous work plan were reviewed at annual public workshops held on February 27, 2002 and February 24, 2003. During these technical sessions, the Commission's contract scientists discussed selection of sites used for reference in wetland restoration, sampling effort, and statistical methods for estimating similarity in evaluating performance standards with participants from state and federal resource agencies, SCE, members of the Commission's Scientific Advisory Panel, and the general public.

One focus of the pre-restoration monitoring is the analysis of data collected to determine the appropriate number and spacing of samples for use in the post-restoration monitoring of intertidal epibenthic and infaunal invertebrates and fishes. Fieldwork for this study is being carried out in three wetlands that may serve as reference sites in post-restoration monitoring (Tijuana Estuary, Mugu Lagoon, and Carpinteria Salt Marsh). Contract scientists developed and field tested a protocol for sampling benthic fishes using enclosure traps. Data collected on invertebrates and fishes were analyzed using spatial statistics and analysis of variance to determine the appropriate number and spacing of samples for use in post-restoration monitoring of species richness and abundance.

Another major focus of the contract scientist's pre-restoration monitoring tasks is to develop sampling designs that will allow unbiased comparisons of the abundance and number of species of fish in the restored and reference wetlands and will minimize any adverse effects of sampling on fish and invertebrate populations. Recent work has focused on evaluating the effectiveness of enclosure traps. Results to date suggest that enclosure traps are between 50 to 100 times more effective at sampling gobies—small fish that dominate wetland fish communities and serve as an important source of food for larger fish and many species of wading birds—than other sampling gear. Enclosure traps also have minimal impact on wetland habitats. Analyses are now underway to determine whether habitat type influences estimates of abundance obtained using different sampling gear and protocols. Future work will involve fish sampling with beach seines and purse seines to determine the appropriate configuration of gear and minimum sample size for each gear type to minimize impacts on fish populations and the effort per sample. Work will then proceed on determining the appropriate spacing and number of samples for each of these gear types.

Water quality is one of the long-term physical standards that will be used to measure the performance of the restored wetland. The contract scientists monitor salinity and oxygen concentration, which are important to the health, abundance, and richness of estuarine biota. The contract scientists continued collecting baseline data on water quality and tidal height from continuously recording instruments placed in San Dieguito Lagoon and Carpinteria Salt Marsh (a prospective reference wetland).

C.2. Status of Kelp Reef Mitigation

Mitigation Requirement

Condition C of the permit requires construction of an artificial reef that consists of an experimental reef and a larger mitigation reef. The experimental reef must be a minimum of 16.8 acres and the mitigation reef must be of sufficient size to sustain 150 acres of medium to high density kelp bed community. The purpose of the experimental reef is to determine which combinations of substrate type and substrate coverage will most likely achieve the performance standards specified in the permit. The design of the mitigation reef will be contingent on the results of the experimental reef.

In April 1997, the Commission added the requirement for a payment of $3.6 million to the State's Ocean Resource Enhancement and Hatchery Program (OREHP) to fund a mariculture/ marine fish hatchery to provide compensation for resources not replaced by the artificial mitigation reef. SCE has fully satisfied this requirement. Permanent Commission staff participate in the oversight of the fish hatchery program with very minor assistance from the contract scientists (see section D.4, below).

Planning and Construction of Experimental Reef

Following the Commission's approval of the SONGS permit amendments in April 1997, the permittee submitted a preliminary conceptual plan for the experimental reef in June 1997, which was approved by the Executive Director and forwarded to state and federal agencies for review. As lead agency, the State Lands Commission (SLC) determined that under the requirements of CEQA a Program Environmental Impact Report (PEIR) should be prepared to evaluate both the experimental reef and the subsequent full mitigation reef. SLC began the environmental review process in March 1998, and certified the final PEIR and issued the offshore lease for the experimental reef on June 14, 1999.

The Coastal Commission approved the coastal development permit for the experimental reef on July 15, 1999. The final plan approved by the Coastal Commission is for an experimental artificial reef located off San Clemente, California that tests eight different reef designs that vary in substrate composition (quarry rock or recycled concrete), substrate coverage (17%, 34%, and 67%), and presence of transplanted kelp. All eight reef designs are represented as individual 40 m x 40 m modules that are replicated in seven areas (i.e., blocks) for a total of 56 artificial reef modules totaling 22.4 acres. The Army Corps of Engineers issued its permit on August 13, 1999, and SCE completed construction of the experimental reef on September 30, 1999.

Monitoring of Experimental Reef

The contract scientists produced a proposed monitoring plan for the experimental reef that was reviewed by SCE, various resource agencies and other technical specialists, and also was included in the draft PEIR for general public review. The Commission approved the proposed monitoring plan for the experimental reef on July 15, 1999.

The contract scientists hired a local subcontractor (Hydra Marine) to install four permanent 40 m transect lines on each of the 56 modules in the fall of 1999 following the completion of reef construction. These lines are used to mark the areas on each module that are monitored. During this time the contract scientists conducted a national search through the University of California, Santa Barbara for research divers trained in marine biology to assist in carrying out the monitoring plan approved by the Coastal Commission. A team of divers was assembled in January 2000 and the first surveys were begun in March 2000. The monitoring plan specifies that the abundance of giant kelp, macro invertebrates, understory algae, and kelp bed fish, and the area and coverage of hard substrate be surveyed each year for five years in a 2 m wide swath along each of the four permanent transect lines on each of the artificial reef modules. The first year of field surveys was completed in November 2000 and involved 840 diver days and over 2,000 dives. Contract scientists analyzed the data from these surveys and presented the results of their analyses at a public workshop in San Clemente, California in January 2001 and at a symposium on reef ecology organized by SCE for the 2001 Annual Meeting of the Southern California Academy of Sciences.

Some of the major results seen in analyses of the first year's surveys were:

(1) The amount of artificial reef material placed on the reef as determined from dive surveys was considerably higher than the intended nominal coverages of 17%, 34% and 67% (averaging about 39%, 62%, and 83%, respectively).

(2) There was substantial colonization of giant kelp on all reef designs with a trend for declining density of new kelp with increasing distance from the nearest natural kelp bed (San Mateo Kelp bed).

(3) There was relatively poor survivorship of giant kelp transplanted to the artificial reef. It appeared that most transplanted kelp was out competed by faster growing kelp that naturally colonized the reef.

(4) The abundances of benthic invertebrates and understory algae on the artificial reef were generally within the range observed on nearby natural reefs, however, the species composition of invertebrates and algae differed substantially between artificial and natural reefs.

(5) The species composition and abundance of benthic reef fish on the artificial reef modules of the experiment was generally similar to that found on nearby natural reefs.

The second year of surveys was begun in March 2001 and was completed in November 2001. The amount of effort required to conduct the 2001 monitoring surveys was substantially greater than that required to conduct the 2000 surveys because the assemblages of plants and animals on

the artificial reef were more developed. In particular, dense colonization by giant kelp on the artificial reef modules more than doubled the amount of time required to complete the 2001 winter/spring kelp survey. Consequently, additional field assistants were hired to complete the second year of monitoring. However, even with the extra employees, the field crew accrued large amounts of unbudgeted compensation time and unused vacation.

Contract scientists examined the first two years of data in search of ways to streamline the monitoring without compromising the integrity of the five-year experiment and its ability to provide accurate information on suitable designs and locations for the mitigation reef. These analyses resulted in the following changes to the monitoring program, which became effective beginning in the third year of the experiment (2002).

(1) The number of transects sampled per module was reduced from four to two.

(2) The summer/fall kelp survey was eliminated, thereby reducing the number of kelp surveys per year from two to one done in March - May.

(3) The kelp transplant phase of the experiment was deemed complete and monitoring the fourteen modules used to examine kelp transplanting techniques was discontinued.

(4) Sonar mapping of the modules, which was done to evaluate changes in the availability of hard substrate, was suspended until year 5 (2004).

The effort saved in reduced monitoring allowed the contract scientists to perform some of the process studies identified in the monitoring and management plan deemed necessary for evaluating the sustainability of reef biota over the long term. Processes studies initiated in 2002 and 2003 included: (1) investigations of the growth and survival of the invasive sea fan *Muricea,* (2) method development for evaluating fish production (done in collaboration with Dr. T. Anderson at San Diego State University), and (3) investigations of the mechanisms causing differences in the species composition of benthic algae and invertebrates between the experimental and natural reefs.

Some of the major results seen in analyses of the first three years' of data were:

(1) 90% or more of the initial artificial reef substrate continued to remain available for colonization by reef biota in all six experimental reef designs.

(2) The abundances of giant kelp, benthic invertebrates, understory algae, and reef fish of all six artificial reef designs continued to be within or above the ranges observed at the two reference sites.

(3) The numbers of species of kelp bed fish in all six reef designs of the artificial reef were within or above the ranges observed at the two reference sites, while the numbers of species of benthic invertebrates and algae on the artificial reef remained below the ranges observed at the two reference sites.

C.3. Status of Fish Behavioral Mitigation

Mitigation Requirement

Condition B of the SONGS permit (as amended April 1997 and October 1998) requires SCE to install and maintain behavioral barrier devices, including, but not limited to, mercury lights and sonic devices, in Units 2 and 3 to reduce fish impingement losses.

Background

Between 1983 and 1991 the Marine Review Committee found that annual losses of juvenile and adult fish in the cooling water systems of SONGS Units 2 and 3 under normal operations averaged about 20 metric tons. Although the SONGS permit does not specify any criteria for evaluating the effectiveness of these devices, the recommendation of the Marine Review Committee (Section IV–Proposed Findings and Declarations in the SONGS 1991 permit) was that "the techniques" (behavioral barrier devices) "be tested on an experimental basis, and implemented if they reduce impingement by at least 2 metric tons (MT) per year".

Beginning in 1991, prior to the imposition of Condition B, SCE modified its procedure for its heat cleaning treatment of the cooling water intake systems of Units 2 and 3. This modification (termed the Fish Chase procedure) has reduced in-plant fish losses on average by approximately 4.3 MT per year.

Compliance to Date

To comply with Condition B, SCE installed mercury vapor lights in Units 2 and 3 in September 1992 and tested them for approximately one year. Scientists contracted by the Commission evaluated the results of this experiment in a number of ways, and no clear conclusion could be reached concerning the effectiveness of the lights.

In 1994 the staff instructed SCE to conduct a series of laboratory and in-plant experiments to test the behavioral response of fish to lights and sound. (At this time staff also informed SCE that if the experiments indicated that the installed devices would not decrease fish impingement losses by 2 metric tons per year, then compliance with Condition B would be attained without further testing provided the modified heat cleaning treatment (i.e., Fish Chase procedure) was maintained for the operating life of Units 2 and 3.) Pursuant to this instruction, SCE conducted laboratory studies from 1995 to 1997 on the behavioral response of fish to different intensities of light and different frequencies of sound. Results of these experiments indicated that certain species of fish displayed behavioral responses to incandescent light and sound that could be exploited to reduce impingement in the cooling system. However, the use of sonic devices in the plant was determined not to be feasible due to the logistic difficulty and high cost of reproducing in the plant the frequencies and intensities of sound that were needed to elicit a behavioral response in the laboratory. Staff then instructed SCE to begin in-plant testing using incandescent lights. Installation of the lights in Units 2 and 3 was completed in December 1998 and a three-phased experiment investigating the effect of these lights in reducing fish losses was conducted between February and December 1999. Results from these experiments showed no evidence that using lights in the cooling water systems of Units 2 and 3 would reduce fish impingement losses.

Consequently, the Executive Director has determined that the lights and sound devices tested by SCE are not effective as fish behavioral barriers at SONGS.

Although the MRC had recommended testing lights and sound devices as the most promising effective behavioral barriers to reduce fish impingement losses, SCE, in consultation with the Commission's contract scientists, considered other alternatives, including strobe lights, air bubble curtains, pneumatic guns, poppers and electrified nets. Most of these deterrents were inconsistent, either from site to site or from species to species. Some cause adverse effects to marine life and others presented severe installation and maintenance concerns. As a result, the Executive Director also has determined that there are no alternative behavioral barriers that are likely to be effective or feasible at SONGS.

The Executive Director has concluded, and the Commission has concurred, that no further testing of alternative behavioral barriers should be required at this time. Compliance with the requirements of Condition B will be satisfied provided that SCE: (1) continues to implement and monitor the effectiveness of the modification in its heat cleaning treatment that has resulted in an annual average reduction in the loss of fish of 4.3 MT (i.e., the Fish Chase procedure), and (2) makes every effort to test and install, if feasible, future technologies or techniques for fish protection if such techniques become accepted industry standards or are required by the Commission in other power plant regulatory actions.

During the 2002-2003 work period contract scientists reviewed data and analyses on the fish chase procedure at SONGS that were contained in SCE's 2001 and 2002 *Annual Marine Environmental Analysis* reports. Information contained in these reports showed that SCE was in compliance with the requirements of Condition B for the years 2000 and 2001.

C.4. Status of Hatchery Program

Permit Requirement

In 1992 the Commission required the permittee to contribute $1.2 million towards the construction of an experimental marine fish hatchery and an evaluation program to determine whether the hatchery is effective at increasing the stock of fish. (Condition F). The permittee paid the initial sum, therefore fulfilling its permit condition.

Department of Fish and Game Hatchery Program

The marine fish hatchery program is operated by the State of California through the Ocean Resources Enhancement and Hatchery Program (OREHP), which is administered by the Department of Fish and Game (DFG). Hubbs-Sea World Research Institute, under contract to DFG, constructed and operates the fish production hatchery at Agua Hedionda Lagoon in Carlsbad, California.

A ten-member panel, the Ocean Resources Enhancement Advisory Panel (OREAP), assists DFG in establishing policy for the program. Although the permittee provided funding for the hatchery program, the permittee does not take part in it. Instead the program is overseen by DFG and OREAP. Most of the conditions for the hatchery program contained in the permit therefore have

to be met by DFG and OREAP, through a 1994 Memorandum of Agreement (MOA), rather than by the permittee.

The DFG has been overseeing field sampling associated with sea bass enhancement efforts since at least 1989; the formal evaluation program called for in the MOA was initiated in 1994.

White sea bass are cultured at the hatchery until they reach a length of about 3 inches. At that time they are transferred to grow-out pens, which are maintained throughout southern California by a network of community volunteers. After the fish attain a length of about 10 inches they are tagged and released. There is also an ongoing program to sample wild populations of white sea bass. During the first six months of 2003, a total of 26,208 white sea bass were released.

In addition, the hatchery program includes a research program to investigate genetic issues. Work began in 1999 to document the genetic diversity of natural and hatchery-grown populations. Because of continuing difficulties in genotyping large numbers of fish, very little data is available on the genetic make-up of progeny from the hatchery. However, the genetic work to date indicates there is one homogeneous population along the west coast. Due to the small contribution of the hatchery to wild stock, DFG does not believe the hatchery progeny pose a problem to genetic diversity.

Oversight of the hatchery program is conducted primarily by permanent Coastal Commission staff with minor assistance provided by the contract scientists. Because of other workload, Commission staff has spent only minimal time assessing DFG's work.

D. WORK PROGRAM: 2004 AND 2005

Condition D requires the permittee to fund scientific and support staff retained by the Commission to oversee the site assessments, project design and implementation, and monitoring activities for the mitigation projects.

Implementation Structure

Scientific expertise is provided to the Commission by a small technical oversight team hired under contract. The technical oversight team members include three Research Biologists from UC Santa Barbara: Stephen Schroeter, Ph.D., marine ecologist, Mark Page, Ph.D., wetlands ecologist (half time), and Daniel Reed, Ph.D., kelp forest ecologist (half-time). A half-time administrator, Jody Loeffler, completes the contract program staff. In addition, a science advisory panel advises the Commission on the design, implementation, monitoring, and remediation of the mitigation projects. Current science advisory panel members include Richard Ambrose, Ph.D., Professor, UC Los Angeles, Peter Raimondi, Ph.D., Professor, UC Santa Cruz, and Russell Schmitt, Ph.D., Professor, UC Santa Barbara.

In addition to the science advisors, the contract program staff is aided by contract field assistants who are responsible for collecting and assembling the monitoring data. The contract program staff is also assisted on occasion by independent consultants and contractors when expertise for

specific tasks is needed or when additional field assistance is needed for short-term monitoring tasks. The Commission's permanent staff also spend a portion of their time on this program, but their costs are paid by the Commission as part of their permit compliance workload and are not included in the SONGS budget.

The Commission's contract scientists working on the SONGS mitigation project are hired under a contract with the University of California, Santa Barbara. Based on a comparison of estimated costs from UCSB, other universities, and private consultants, the Commission found that also implementing the field monitoring program through a contract with UCSB is the most efficient, cost-effective, scientifically rigorous, and timely method of achieving the goals of the independent monitoring required by the SONGS permit.

The contract scientists serve as project managers for both the artificial reef experiment and pre-restoration monitoring of the wetland. They are responsible for supervising the contract field assistants, authorizing purchases and subcontracts, and interacting with UC administrative staff on issues pertaining to personnel, budget, and UC policies (e.g., boating and diving safety regulations) relevant to the project. Monitoring of these projects is being adaptively managed in order to streamline effort and minimize costs without compromising the integrity of the data and their value in decision making with regards to the performance of the mitigation projects. Continuous interaction between the contract scientists and field assistants is crucial to fulfilling the monitoring tasks for both the wetland restoration and experimental reef.

Consultation with Permittee

Pursuant to the permit conditions, the staff has consulted with SCE on the proposed work program and budget for 2004 and 2005. Several issues were raised which have been addressed to SCE's satisfaction (see SCE's October 16, 2003 letter of support, attached).

- Staff initially proposed a year of interim monitoring for the experimental kelp reef between the conclusion of the five-year experiment and the beginning of construction of the full mitigation reef primarily to evaluate the long-term sustainability of giant kelp, and to determine whether species richness and community structure on the artificial reef converge with those on nearby natural reefs. Staff's proposal was based on technical discussions with SCE earlier this year, but was deleted from this work program due to the cost of full monitoring for an additional year. Staff proposes to reduce the reef monitoring field assistants by half in 2005.

- The continuing reef process studies have been clarified. In particular, sampling of invasive sea fan (Muricea californica) abundance and size in 2005 will provide the necessary data on survivorship from which reasonable predictions of adult densities can be made. Results from all of the process studies will be used in developing the staff's recommendations on the final "build-out" reef design.

- Wetland pre-restoration monitoring tasks have been revised to provide more detail on tasks that remain to be completed prior to the start of wetland construction resulting in some cases in a reduction of the required effort. Staff eliminated its initial proposal for an additional wetland field assistant and reduced the number of assistants in 2005.
- Additional budget reductions have been made in consulting costs, travel, and operating expense. Estimated severance pay required by the University contracts for the four field assistants to be eliminated in 2005 has been included in the budget.

D.1. Wetlands Tasks

1.1 Wetland Restoration Planning

During the 2004-2005 work period, the contract scientists will be involved in the following tasks to facilitate planning and execution of the San Dieguito Wetland restoration:

a. *Review the final design and engineering plan.* Determine whether the plan meets the permit requirements and evaluate the potential for degradation of existing wetlands and other sensitive habitats. Consult with experts as needed in the fields of hydrology, engineering, and Geographic Information System (GIS) databases. Consult with SCE, the resource agencies and other interested parties. Attend meetings to provide guidance on issues related to the completion of the final design and engineering plan.

b. *Verify the accuracy of the acreage estimates for different habitats using the GIS database.*

c. *Assist staff review of a coastal development permit application for the restoration.*

d. *Consult with the permittee on the restoration.* Attend meetings to ensure that restoration proceeds according to the Final Plan approved by the Coastal Commission and the coastal development permit, and in a timely manner.

e. *Synthesize pre-restoration monitoring data and present the results at an annual public workshop that reviews the status of planning and pre-restoration monitoring of the wetland restoration project.*

f. *Prepare a written annual report of the proceedings of the annual workshop and distribute it to SCE and other interested parties.*

g. *Prepare quarterly reports for the Commission on the status of the wetland project.*

h. *Respond to requests from SCE and other parties for data and analyses.*

1.2 Complete Pre-restoration Monitoring

The permit requires contract scientists to conduct and oversee all monitoring associated with evaluating the success of the wetland mitigation project in accordance with the physical and biological performance standards of the permit. The contract scientists and their field assistants will collect and analyze pre-restoration monitoring data at San Dieguito Lagoon and appropriate reference sites. These data are needed to: (1) assess construction-related impacts and changes in the existing wetland following construction and (2) develop cost-effective sampling methods and designs for post-restoration monitoring that minimize adverse impacts to the wetland while effectively determining whether the various performance standards have been met.

The field work for pre-restoration monitoring will be completed in 2004 and the information obtained from these studies will be used to finalize the monitoring and management plan for the wetland restoration project, which will be completed in 2005. Staffing includes a specialist in fish ecology, one field assistant trained in wetland ecology, and undergraduate student helpers, all hired under contract through UCSB to help complete the pre-restoration monitoring. Additional field assistants will be hired under a separate contract to assist UCSB-contract staff on specific, short-term monitoring tasks in San Diego County when student helpers from UCSB are not available. Independent consultants will be retained as needed to assist in aerial photography and computer GIS-based analysis of it, and to assist in developing a post-restoration monitoring program for birds. Specific tasks to determine the best sampling methods and designs include the following:

a. *Determine the most cost effective techniques of using purse seines to obtain precise estimates of species richness and abundance of wetland fish in deepwater/open water habitats.*

   A wide variety of gear has been used to sample estuarine fish and no one type achieves the goal of providing unbiased estimates of species richness and abundance for all species as required by section 3.4b.1 of the SONGS permit. Fish sampling is further complicated by variation within and among habitats in gear efficiency, due to differences in the width, depth, and bottom topography of bodies of water (e.g., tidal creeks, main channels, and basins). Three types of gear have been identified in pre-restoration monitoring that, when used in combination, are expected to provide estimates of richness and abundance suitable for use in evaluating the performance standard for fish. Work to date has focused on designing methods for the use of enclosure traps to sample gobies (the most numerically abundant group of estuarine fishes), and beach seines to sample other taxa in shallow habitats. These two methods, however, cannot effectively sample deepwater and open water habitats (basins and broad or deep channels), which are known to harbor different assemblages of fish. Work scheduled for 2004 will focus on developing cost-effective techniques for using purse seines in deepwater/open water habitats and on determining optimal net size and configuration. Purse seines currently used in sampling southern California estuaries are

very large and consequently require relatively large boats and crews to deploy and retrieve. Substantial effort is also needed to process the sometimes very large numbers of fish captured by a big net. This leads to high costs and limits spatial and temporal replication of sampling, and thus the precision of species richness and abundance estimates. The scheduled work will test a range of net sizes and configurations to determine the purse seine design that will provide the most representative and precise data at the lowest cost over the duration of the post-restoration monitoring project.

b. *Determine the appropriate spatial and temporal scales for sampling fish with seines during post-restoration monitoring.*

Several recent studies have outlined the difficulties of adequately sampling estuarine fishes. Many fish species are highly mobile and variable in their occurrence and relative abundance at nearly all temporal and spatial scales. In addition, the estuarine habitat is heterogeneous and environmental conditions (water depth, current velocity) can change rapidly with tides, affecting spatial patterns of fish abundance over relatively short time scales. To be effective, a monitoring program must provide accurate information on the abundance of species in different habitats while minimizing confounding effects of short-term, small scale variability in fish assemblages. Unfortunately, past studies of estuarine fish assemblages have not employed sampling methods that provide the information on the appropriate spacing and frequency of samples necessary to detect similarity in these assemblages within and across wetlands. Contract scientists will use hierarchical sampling designs to evaluate how samples should be allocated in space and time to detect similarity in the abundance and species richness of fish between the restored and reference wetlands. Such sampling designs produce data that can be used for cost-benefit analysis to determine the optimal allocation of sampling effort to maximize the precision of estimates for a set cost. These analyses will be of great value in crafting a cost-effective post-restoration monitoring program. This work has already been completed for enclosure traps and is partially completed for beach seines. Contract scientists and their assistants will complete this task for beach seines and purse seines during 2004.

c. *Finalize the sampling design for post-restoration monitoring of species richness and abundance of wetland macro-invertebrates.*

This task will help to assess compliance with the biological performance standard for macroinvertebrates. The coastal wetlands of southern California contain tidal habitats that can be distinguished coarsely on the basis of topography and inundation regime (e.g., tidal channel versus main channel). Within each of these major habitats, variation in elevation, sediment characteristics, organic matter, algal coverage, and other physical and biological factors lead to gradients and/or the patchy distribution of benthic fauna. To effectively assess compliance with the performance standard for macroinvertebrates, there is a need to identify methods that account for spatial variation in the distribution

and abundance of these animals in the habitats of interest. Work to date has identified such methods; however, they require a large number of spatial samples. Although the sampling designs are not unduly costly in field time and effort, they are in terms of laboratory analyses. One way to reduce the costs of laboratory analyses to acceptable levels is to combine several individual samples, mix them well, and analyze a subsample for this composite, which represents the average of the combined sample over the spatial scale at which they were collected. This compositing technique is commonly used in many ecological systems, but unfortunately methods have not been worked out for wetland invertebrates. While our past work provides preliminary information about the optimal number and spacing of samples from the different wetland habitats, we have yet to determine how the compositing will affect the accuracy of estimates of abundance and species richness. Most of this work will be done on archived samples sorted in previous work programs with a limited number of samples collected during the first part of the 2004. The method determined to be the most cost effective for compositing wetland invertebrate samples will be incorporated into the wetland monitoring and management plan.

d. *Determine the appropriate methods and spatial and temporal scales of sampling to assess similarity in species richness and abundance of birds among the restored and reference wetlands during post-restoration monitoring.*

This task will develop methods to assess compliance with the biological performance standard requiring that the species richness and abundance of birds be similar in restored and reference wetlands. Pre-restoration monitoring of birds is necessary because past studies of birds have not employed quantitative sampling methods that provide information on the appropriate spacing and frequency of sampling necessary to detect similarity in bird assemblages between San Dieguito Lagoon and the reference wetlands. The density and number of species of birds can be extremely variable within an estuary. Bird densities can vary with habitat type (e.g., channel, mudflat, vegetated marsh), seasonally, from day-to-day, and with tidal level on a single day. Considerations in the design of a post-restoration monitoring plan for birds must include a determination of the appropriate allocation of sampling effort (i.e., the size of the area sampled and the time spent sampling per unit area). Sampling effort should be standardized so that data from restored and reference wetlands can be compared. In addition, since it is easier to detect birds in some habitats than others, different amounts of effort or different sampling methods may be needed to sample different habitats. The post-restoration monitoring for birds should also minimize bias associated with the increased difficulty of distinguishing among species in dense mixed-species aggregations. In addition, since activity patterns of wetland birds vary with time of day, time of year, and tidal height, sampling needs to occur at a standardized time and tidal height. Contract scientists will consult with an expert on wetlands birds to develop sampling methods for these animals. Information obtained during pre-restoration

monitoring will be used to design the most accurate and cost-effective post-restoration monitoring program for wetland birds.

e. *Conduct annual low-level aerial photography of San Dieguito Lagoon and two reference wetlands to monitor changes in proportion of salt marsh vegetation cover and open space prior to wetland construction. Verify accuracy of aerial estimates by conducting ground surveys.*

The aerial photographs will help to assess compliance with the following SONGS permit standards and objectives: (1) Minimum Standard 1.3.h., the restoration project "does not result in loss of existing wetland", (2) Objective 1.4.e. "Restoration involves minimum adverse impacts on existing functioning wetlands and other sensitive habitats", and (3) Long term Physical Standard 3.4a, "The area of different habitats shall not vary by more than 10% from the areas indicated in the final restoration plan". Aerial photographs, along with appropriate ground-truthing, may also provide a cost effective means of assessing the permit standards pertaining to the proportion of total vegetation cover, open space and percent cover of algae (3.4.b.2), *Spartina* canopy architecture (3.4.b.3), and exotics (3.4.b.6). Data collected from the photographs will be compared to those collected during ground surveys to determine the extent to which aerial photographs can be used in construction and post-restoration monitoring as a cost-effective means of assessing the biological performance standards pertaining to habitat areas, vegetation, and exotic species.

f. *Continue to collect data on water quality at San Dieguito Lagoon and potential reference wetlands.*

Water quality is one of the long-term Physical Standards that will be used to measure the performance of the wetland restoration project. Water quality parameters important to the health, abundance, and richness of estuarine biota (e.g., salinity and oxygen concentration), are strongly influenced by tidal flushing, which must be continuously maintained in the restored wetland. Contract scientists will continue to collect baseline data on water quality and tidal height during 2004 and 2005. These baseline data, when compared to data from reference wetlands, will permit an assessment of construction related impacts and post-restoration changes to water quality.

g. *Enter, organize, manage, and analyze data collected during the monitoring and consult with database consultants as needed.*

h. *Maintain database software, hardware, and network services.* Troubleshoot and remedy any problems that arise. Consult with computer consultants as needed to maintain reliability and security of network and desktop operations.

1.3 Finalize the Monitoring and Management Plan

SCE's Coastal Development Permit for SONGS requires the preparation of a Wetland Monitoring and Management Plan concurrently with the permittee's preparation of the Final Restoration Plan. Contract scientists have prepared a draft Wetland Monitoring and Management Plan that will be finalized and submitted to the Commission for approval in early 2005. Tasks completed towards finalizing the Wetland Monitoring and Management Plan in the previous work plan include:

(1) The selection of Tijuana Estuary, Mugu Lagoon, and Carpinteria Salt Marsh as reference sites for evaluating the performance of the restored wetland at San Dieguito Lagoon.

(2) The selection of habitats for the post-restoration monitoring of wetland fish. These habitats are tidal creeks, shallow channels, and deepwater habitats. The constructed basin in the restoration project at San Dieguito Lagoon will be considered equivalent to the deepwater habitat.

(3) The selection of enclosure traps, beach seines, and purse seines as the necessary and appropriate tools for sampling wetlands fish.

(4) The development and selection of a method of enclosure trap sampling for gobies (small fish important in food chain support for larger fish and many species of wading birds) which does not use harmful chemicals and has minimal impact on wetland habitats.

(5) A determination of the appropriate number and spacing of enclosure trap samples for use in the post-restoration monitoring of gobies.

(6) A determination that enclosure trap samples taken on a given date adequately characterize goby abundance for that general time period, and therefore replicate temporal samples need not be taken within a period.

(7) The decision to sample invertebrates at the same stations and times as gobies.

(8) The evaluation of a range of sizes of beach seines to sample fish in tidal creeks and shallow channels and the selection of the 25' length seine as best suited to sample these habitats with adequate spatial replication and minimal impact on wetland habitats.

(9) Testing of methods to expedite sampling wetland fish with seines, including a comparison of the efficiency of sampling fish in tidal creeks and shallow channels with and without blocking nets and using various numbers of net hauls per replicate.

The specific tasks that will be done in 2004-2005 to finalize the Wetland Monitoring and Management Plan are:

a. *Finalize selection of criteria to be used for determining compliance of the wetland mitigation project with the performance standards.* Contract scientists will continue to review recent literature, evaluate existing data, collect and evaluate additional data, and

consult with other experts in wetland ecology and statistics, as needed, to develop and finalize the criteria for assessing similarity between the restored wetland and reference wetlands.

b. *Finalize selection of sampling methods for post-restoration monitoring.* Decide on best sampling designs (e.g., frequency of sample collection, number and spacing of samples).

c. *Consult with permittee, resource agencies and other wetland ecology experts on wetland management issues.* These issues include dredging for inlet maintenance, dredging for restoration-site maintenance, maintenance and maintenance monitoring of least tern nest sites, control of exotic species, and removing trash.

d. *Submit the Monitoring and Management Plan to the Coastal Commission for approval.* The plan will contain details of the sampling designs (methods, spatial and temporal sampling regimes, reference sites, etc.) and a description of the management tasks that are anticipated (e.g. trash removal, control of exotic species).

1.4 Initiate Construction Monitoring

Initiate construction monitoring. Monitoring will be conducted during wetland construction to: (1) determine whether the work is conducted according to plans, and (2) determine whether construction causes adverse impacts to sensitive habitats. This may require consultation with experts in hydrology, engineering, and GIS databases, and with SCE contractors to insure that elevations have been constructed to plan.

1.5 Wetland Management and Oversight

a. *Direct the monitoring studies described in the work plan.* This involves planning these activities and managing a team of University field assistants (i.e., students) to carry them out.

b. *Assist in the collection of data and resolve any issues pertaining to sampling logistics and data analyses that arise.*

c. *Work with University of California administrative staff on project issues pertaining to contracts, payroll, purchasing and personnel.*

d. *Consult with members of the Science Advisory Panel, Coastal Commission staff, other resource agencies, and the permittee and its contractors on the status of the monitoring studies.*

D.2. Reef Tasks

The permit requires that the Commission's contract scientists oversee the monitoring of the artificial reef experiment, analyze and interpret the monitoring data, and provide the Commission and the Executive Director with recommendations for the design of the larger "build out" reef. During 2004-2005, contract scientists and their field assistants will conduct the following activities to accomplish these tasks.

2.1 Experimental Reef Monitoring

a. *Conduct 2004 winter/spring survey of adult giant kelp to assess abundance, size and survival on the artificial reef and natural reference reefs.*

b. *Conduct 2004 summer survey of the abundance and species richness of benthic invertebrates and understory algae, and of the coverage of hard substrate on the artificial reef and natural reference reefs.*

c. *Conduct 2004 fall surveys of the abundance, size, and species richness of reef fish near the bottom, midwater and near the surface (i.e., kelp canopy) on the artificial reef and natural reference reefs.*

d. *Conduct 2004 summer side scan sonar survey of 42 artificial reef modules for purposes of estimating changes in the amount of artificial reef substrate available for colonization by reef biota.*

e. *Process field samples in the laboratory.*

f. *Conduct maintenance at the artificial and reference reefs to repair/replace broken/ missing stakes, transect lines, and labels that mark permanent study areas.*

g. *Service, repair and replace sampling gear, dive equipment, boats, and vehicles.*

h. *Perform assorted tasks to maintain University of California research diver certification (e.g. pass physical exams, attend classes in CPR, First-Aid, Nitrox, O_2 administration, complete dive logs, etc.).*

2.2 Experimental Reef Process Studies

Deciding upon a design for the mitigation reef using information from the experimental reef entails uncertainties that stem from: (1) the short length of the experiment (five years), which may not provide sufficient time for the development of a mature kelp forest community on a newly constructed reef, and (2) the small size of the experimental modules (0.4 acres) compared to the size of the mitigation reef (150 acres). Moreover, because five years is short relative to the generation times of many kelp forest species (other than giant kelp), there is no guarantee that reef designs that appear successful at the end of the experiment (i.e., meet the performance

criteria) will continue to perform successfully in the future. Focused process studies were identified in the Monitoring and Management Plan for the Experimental Reef[1] as a means of reducing uncertainties in decision-making that stem from the small spatial and temporal scales of the experimental reef relative to the mitigation reef. The following process studies were initiated in 2002-2003 and will be continued in 2004-2005.

a. *Colonization, growth and survival of invasive sea fans.* One of the performance standards for the mitigation reef is that its functions shall not be impaired by undesirable or invasive benthic species. One species that has been shown to monopolize space and exclude kelp on artificial reefs is the sea fan, *Muricea californica*. During the spring 2002 survey of giant kelp, dense colonization of *M. californica* was observed on many of the experimental reef modules. The effects of different artificial reef designs on the colonization, growth and survival of *Muricea* recruits are being evaluated by following changes in the density and size structure of *Muricea* in the permanently marked 1 m^2 quadrats that are sampled each summer as part of the benthic monitoring surveys. Data collected on the physical attributes of each quadrat (e.g. substrate type, substrate slope, location on a module, distance from San Mateo kelp bed) will allow contract scientists to evaluate the extent to which sea fan growth and survivorship varies as a function of different reef characteristics. In June 2003 contract scientists began additional studies aimed at following the growth and survivorship of approximately 200 individually marked *Muricea* over the next several years. Marked individuals were located in areas that differed with respect to the density of giant kelp and *Muricea* and to their proximity to the reef/sand interface. Data on growth and survivorship of marked individuals will be used to corroborate the more spatially comprehensive and numerically abundant estimates of *Muricea* growth and mortality that are being obtained from cohort analyses using data collected during the benthic monitoring surveys. Collectively, these data will enable project scientists to make robust predictions concerning how growth and survivorship of *Muricea* is related to a variety of different physical attributes of the reef. Data on the benthic biota collected during the summer benthic monitoring surveys of 2003 and 2004 will provide additional information as to how *Muricea* growth and survival are related to different biological characteristics of the reef.

   Data collected by the Marine Review Committee and analyzed by the contract scientists indicate that the *Muricea* typically excludes giant kelp when adult sea fan densities are ≥ 10 m^2. Because it takes *Muricea* many years to reach adult size, it will not be possible to directly measure how different physical attributes of the reef affect the densities of adult sea fans on SCAR during the five-year experiment. Consequently adult densities of sea fans will need to be predicted from survivorship curves obtained from the cohort

[1] *Monitoring and Management Plan for the SONGS Experimental Kelp Reef*, June 1999, approved by the California Coastal Commission July 15, 1999. See staff report entitled Amendment to SONGS Mitigation Program 1998 and 1999 Work Program and Budget: Experimental Reef Monitoring Plan dated June 24, 1999.

that recruited in 2002. Sampling *Muricea* abundance and size in 2005 will provide three years of data on survivorship, which is the minimum number of years needed to estimate a survivorship function from which reasonable predictions of adult densities can be made. Survivorship of sea fans after three years will be assessed only in relation to physical attributes of the reef because data on reef biota other than *Muricea* will not be collected after 2004 as per the requirements of SCE's Coastal Development Permit.

b. *Effects of reef design on the species compositions of colonizing biota.* Results analyzed to date show that while the overall abundance of benthic invertebrates and understory algae on the artificial reef modules is within or above the range of that of nearby natural reefs, the number of species is lower and the composition of species is substantially different. The reasons for these differences are unknown but may relate to differences in the physical properties of artificial and natural substrates, and/or location effects that reflect site-specific differences between the artificial and natural reefs. Contract scientists initiated an experiment in March 2002 to test whether the type of reef material (artificial vs. natural) or differences in the locations of the artificial and natural reefs affects the species composition and abundance of colonizing reef biota. This experiment involved the reciprocal translocation of scraped and unscraped quarry rock and natural rock boulders to the artificial reef and San Mateo kelp bed. Sampling of reef biota on the translocated boulders was done at the start of the experiment and in June and September in 2002 and in April 2003. The final sampling of this experiment will be done in the spring of 2004.

c. *Estimating fish production on the Experimental and Mitigation Reefs.* Focused studies are being done to evaluate the performance of the various reef designs with respect to fish production (a performance criterion for the mitigation reef). Due to the mobility of fish and the relatively small size and close spacing of the experimental modules, it is difficult to predict how fish production will be influenced by the different reef designs. One solution to this problem is to measure easily sampled attributes that are correlated with fish growth and reproduction. Contract scientists have been collaborating with Dr. Todd Anderson and his students of San Diego State University in studies aimed at determining the extent to which the different reef designs influence fish production (Dr. Anderson received two years of funding from UC Sea Grant in 2000 to study fish recruitment, growth and survival on the experimental reef). Ongoing collaborative investigations in this area include examining the fecundity of common species likely to remain on a single module during most of their adult life (e.g., gobies, black surfperch), and estimating somatic production from size frequency data in species having young-of-year that are likely to maintain residence on a single module for several months. Contract scientists will continue these collaborative studies in 2004 and incorporate their results into their final report on the findings of the artificial reef experiment.

At present there is much uncertainty and debate on how best to estimate fish production. During 2004 contract scientists will convene a workshop to explore the most cost-effective methods for evaluating the performance standard pertaining to fish production on the mitigation reef. Participants at the workshop will include the contract scientists, Science Advisory Panel, SCE and its consultants, and experts in ichthyology. The goal of the workshop will be to identify the most promising and cost effective techniques for evaluating the fish production standard for the mitigation reef. During the summer and fall of 2005 contract scientists will work on developing the methodology of the technique(s) identified by workshop participants.

2.3 Experimental Reef Data Analyses and Reporting

a. *Enter, organize, manage and analyze data collected during the monitoring and process studies and consult with database consultants as needed.*

b. *Maintain database software, hardware, and network services.* Troubleshoot and remedy any problems that arise. Consult with computer consultants as needed to maintain reliability and security of network and desktop operations.

c. *Synthesize data on the monitoring and process studies of the artificial reef experiment and present the results at annual public workshops and at scientific meetings deemed appropriate by the Coastal Commission.*

d. *Prepare a written annual report of the proceedings of the annual workshop and distribute it to SCE and other interested parties.*

e. *Prepare quarterly reports for the Commission on the status of the experimental reef project.*

f. *Prepare final report to the Executive Director on all findings gathered during the five-year artificial reef experiment.* The report will include a recommendation on the substrate types and coverages deemed most suitable for the mitigation reef. A draft final report and the data sets contained within it will be made available to SCE and other interested parties for review and comment. The final report and comments on it will form the basis for the Executive Director's decision on the type(s) and coverage(s) of substrate allowable for the mitigation reef.

g. *Respond to requests from SCE and other parties for data and analyses.*

2.4 Experimental Reef Management and Oversight

a. *Direct the monitoring and process studies described in the monitoring and management plan for the experimental phase of the artificial reef.* This involves planning these

activities and managing a team of University field assistants (i.e., divers trained in marine biology) to carry them out.

b. *Dive at the artificial reef and nearby reference reefs as needed to assist in data collection, resolve issues that arise in the monitoring and process studies, and conduct site visits to inspect routine and unexpected changes in the physical and biological properties of the artificial reef and natural reference reefs.*

c. *Work with University of California administrative staff on project issues pertaining to contracts, payroll, purchasing and personnel.*

d. *Consult with members of the Science Advisory Panel, Coastal Commission staff, other resource agencies, and the permittee and its contractors on the status of the monitoring and process studies.*

D.3. Behavioral Barriers Tasks

3.1 Condition Compliance Review

Review condition compliance. Contract scientists will: (a) review the permittee's annual report on impingement losses, fish chase procedures and efficacy of fish return system, (b) consult with Science Advisory Panel and SCE on issues pertaining to the report, and (c) provide the Executive Director with an annual summary on the status of Condition B and on whether SONGS operations during the previous year were in compliance with it.

D.4. Hatchery Tasks

The majority of the work will be done by permanent Commission staff with very minor assistance from the contract scientists funded through this work program. These tasks add no costs to the overall budget.

4.1 Oversight of the fish hatchery program

a. *Participate on Joint Panel.* Permanent Commission staff member Dr. John Dixon is a member of the Joint Panel that oversees the evaluation of the fish hatchery program and the genetic quality assurance program. The panel's tasks include development of Requests for Proposals, recommendation of contractor selections to the Director of DFG, development of contract terms, and oversight and evaluation of contractor performance in carrying out the evaluation and genetic quality assurance programs.

b. *Review reports on environmental degradation.* Contractors hired by DFG will monitor the hatchery fish to ensure that they are not causing environmental degradation. Each

year the contractors will provide written and verbal reports to the Commission for review.

c. *Review reports on evaluation of success.* A contractor hired by DFG will evaluate the success of the hatchery program by: (1) estimating the contribution of hatchery fish to the catch; and (2) estimating the mortality rate of hatchery fish. Each year the contractor will provide written and verbal reports to the Commission for review.

E. BUDGET: 2004 AND 2005

Condition D of the permit requires SCE to fund the Commission's oversight of the mitigation and independent monitoring functions identified in and required by Conditions A through C. The permittee is required to provide "reasonable and necessary costs" for the Commission to retain personnel with appropriate scientific or technical training and skills, as well as reasonable funding for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel convened by the Executive Director to provide advice on the design, implementation, monitoring and remediation of the mitigation projects. The Commission has operated under approved work programs and budgets since 1993.

The budgets for the Commission's monitoring and oversight program are "zero-based budgets," that is, each budget period begins anew, based on the proposed activities, with no funds from the previous budget carried forward to the new budget period. The total budget to implement the work program is intended as a "not-to-exceed" amount. The permittee provides funds periodically throughout the budget period rather than as a lump sum to minimize the advance outlay of cash. Any funds not expended at the end of the budget period are returned to the permittee.

History of Commission Expenditures

The Commission began its oversight and monitoring program in November 1991 following adoption in July 1991 of the SONGS mitigation requirements. This start-up period was funded directly by SCE and covered the work necessary to establish the implementing structure and the initial administration of the program. The next year the Commission operated under an interim work program and budget, during which time the first contract scientists were hired and the Scientific Advisory Panel convened to begin working with SCE on project planning. The Commission approved annual work programs and budgets for calendar years 1994 through 1997, and then, in accordance with the provisions of the permit, adopted two-year work programs and budgets for 1998-1999, 2000-2001, and 2002-2003. These work programs focused initially on planning and permit compliance issues. The work programs for 2000-2001 and 2002-2003 also contain the Commission's experimental reef monitoring program in addition to continuing wetland restoration planning, environmental analyses, and pre-restoration monitoring. The status section of this report (see Section C, pp. 6-14) summarizes the recent accomplishments of the Commission's program.

The Commission's budgets and expenditures for the SONGS oversight and monitoring program since its inception are summarized below. As a normal practice, the Commission requires an

independent financial audit of its expenditures for each budget period. To date, those audits have disclosed no discrepancies or deficiencies in the financial systems.

Period	Total Budget	Total Expenditures
Nov 1991-Dec 1992	$ 57,654	$ 57,654
Oct 1992-Dec 1993	610,646	334,632
1994	1,173,105	387,096
1995	849,084	467,888
1996	440,139	397,631
1997	423,035	379,571
1998-1999	1,039,072	970,118
2000-2001	2,293,162	2,151,820
2002-2003	2,423,045	2,230,131 (projected)
12-YEAR TOTAL	$9,308,942	$7,376,541

The Commission has consistently come in under budget, and in some years substantially so. The early work programs and budgets were marked by considerable uncertainty in the timing of the planning process for the two major projects (wetland restoration and experimental kelp reef) as well as significant discussions with SCE regarding the Commission staff's interpretation of the permit conditions. In more recent years, the staff has been able to better predict the funding necessary to carry out the program.

The staff, in consultation with SCE, has made its best predictions for the required tasks, timing, and funding necessary to support those tasks in the 2004 and 2005 work program and budget.

Proposed Budget for 2004 and 2005

The proposed budget for calendar years 2004 and 2005 covers the monitoring and oversight program costs for the Commission's contract scientists, contract field personnel to monitor the wetlands and experimental reef, science advisory panel, consultants, contract administrative support, and operating expense during the two-year budget period. Costs associated with the implementation of the SONGS permit and attributable to permanent Coastal Commission staff work are not paid by the permittee and thus are not included in this budget.

All of the current and proposed contract program staff except for the half-time administrator are hired under contract with the University of California, Santa Barbara. Drs. Reed, Schroeter and Page are the principal contract scientists overseeing the Commission's technical oversight and monitoring program; they also serve as project managers for the experimental reef and wetland pre-restoration monitoring programs. Costs for all UCSB contract personnel salaries and benefits, including the field assistants for the wetland and reef monitoring, as well as travel costs for field assistants and general expense under the UCSB contract, are subject to the University's indirect cost rate.

The funding proposed to cover the monitoring and oversight program costs during the two-year budget period (calendar years 2004 and 2005) is $2,338,957, as shown below. This budget is somewhat less than the budget for 2002-2003 due to reductions in field monitoring staff during

2005. However, overall personnel rates (set by U.C Systemwide Administration) have increased, and severance pay will be required by the University for eliminated contract staff. Added consulting costs in 2004-2005 include (1) side scan sonar survey of the experimental reef, which was deferred during the past two years, (2) consultations with experts on ichthyology to identify the most cost-effective techniques for evaluating the fish production standard for the mitigation reef, and (3) consultations with an expert on wetland birds to develop sampling methods for wetland monitoring. The staff believes the proposed budget is the minimum necessary to carry out the tasks, but will continue to contain the costs of the oversight and monitoring program to the maximum extent. Narrative budget notes explaining each budget category are contained in Appendix A.

The tables in Appendices B-F show the estimated effort (labor) and approximate costs for the wetland, reef and behavioral barriers tasks for the contract staff and Scientific Advisory Panel. This information was developed as a general management tool rather than as an accounting device for tracking actual expenditures.

SONGS PROGRAM BUDGET 2004

	2004 Wetland	2004 Reef	2004 Admin/Mgt	2004 Total
SALARIES				
Core Program Staff (2.5 PY)				
Principal Scientist (0.5 PY)	4,680	42,119		46,799
Principal Scientist (1.0 PY)	43,156	43,157		86,313
Principal Scientist (0.5 PY)	31,781			31,781
Senior Administrator (0.5 PY)			35,282	35,282
Monitoring Field Assistants (10.38 PY)				
Assistant Research Biologist (0.75 PY)	38,119	4,235		42,354
Staff Research Associate IV (1.0 PY)		51,120		51,120
Staff Research Associate II (1.0 PY)	34,320			34,320
Staff Research Associate II (1.0 PY)		36,339		36,339
Staff Research Associate II (1.0 PY)		36,339		36,339
Staff Research Associate I (1.0 PY)		34,074		34,074
Staff Research Associate I (1.0 PY)		34,074		34,074
Staff Research Associate I (1.0 PY)		34,074		34,074
Staff Research Associate I (1.0 PY)		34,074		34,074
Staff Research Associate I (1.0 PY)		34,074		34,074
Student Assistant I (1300 hrs; 0.63 PY)	9,425			9,425
SUBTOTAL SALARIES	161,481	383,679	35,282	580,442
UCSB Indirect Cost @ 26%	41,985	99,757	0	141,742
TOTAL SALARIES	**203,466**	**483,436**	**35,282**	**722,184**
BENEFITS				
Core Program Staff				
Principal Scientist	1,076	9,688		10,764
Principal Scientist	9,926	9,926		19,852
Principal Scientist	6,038			6,038
Senior Administrator			16,338	16,338
Monitoring Field Assistants				
Assistant Research Biologist	7,242	805		8,047
Staff Research Associate IV		9,713		9,713
Staff Research Associate II	10,296			10,296
Staff Research Associate II		7,995		7,995
Staff Research Associate II		7,995		7,995
Staff Research Associate I		7,667		7,667
Staff Research Associate I		7,837		7,837
Staff Research Associate I		7,837		7,837
Staff Research Associate I		7,837		7,837
Staff Research Associate I		7,667		7,667
Student Assistant I	415			415
SUBTOTAL BENEFITS	34,993	84,967	16,338	136,298
UCSB Indirect Cost @ 26%	9,098	22,091	0	31,189
TOTAL BENEFITS	**44,091**	**107,058**	**16,338**	**167,487**
SCIENTIFIC ADVISORY PANEL	**32,000**	**32,000**	**0**	**64,000**

	2004 Wetland	2004 Reef	2004 Admin/Mgt	2004 Total
CONSULTANTS AND CONTRACTORS				
Wetlands				
Task 1.1a/1.1b/1.2g-GIS/SAS database consultant	15,000			15,000
Task 1.1a-hydrology/engineering, final design/eng.	15,000			15,000
Task 1.2-field assistance	5,000			5,000
Task 1.2d-bird ecologist consultations	10,000			10,000
Task 1.2e-aerial photo surveys	10,000			10,000
Task 1.2h-computer systems consultant	3,000			3,000
Reef				
Task 1.2d-side-scan sonar survey		25,085		25,085
Task 2.2c-expert ichthyology consultations		10,000		10,000
Task 2.3a-SAS database consultant		5,000		5,000
Task 2.3b-computer systems consultant		7,000		7,000
TOTAL CONSULTANTS & CONTRACTORS	**58,000**	**47,085**	**0**	**105,085**
TRAVEL				
Core Program Staff	12,353	8,235	1,000	21,588
Field Assistants	9,000	3,000		12,000
UCSB indirect cost (excl. core staff)	2,340	780	0	3,120
TOTAL TRAVEL	**23,693**	**12,015**	**1,000**	**36,708**
OPERATING EXPENSE				
General expense (SF office)			9,145	9,145
General expense (UCSB contract, incl. indirect cost)	16,919	89,767		106,686
Facilities operations (Carlsbad office)	13,222	39,663		52,885
Computer technical support, repair & maintenance			1,500	1,500
Review workshop			2,200	2,200
Audit				0
Administrative/financial processing services			18,000	18,000
TOTAL OPERATING EXPENSE	**30,141**	**129,430**	**30,845**	**190,416**
MARINA STORAGE (boats, trailers, equipment)	**1,980**	**4,182**	**0**	**6,162**
EQUIPMENT				
SF office			1,000	1,000
Wetland monitoring boat, motor & trailer	10,052			10,052
Replacement outboard engines, reef boats		20,000		20,000
Computer networking equipment (UCSB contract)	2,000	3,000		5,000
Miscellaneous equipment, as needed	5,000	5,000		10,000
TOTAL EQUIPMENT	**17,052**	**28,000**	**1,000**	**46,052**
TOTAL EXPENSE 2004	**$410,423**	**$843,206**	**$84,465**	**$1,338,094**

SONGS PROGRAM BUDGET 2005

	2005 Wetland	2005 Reef	2005 Admin/Mgt	2005 Total
SALARIES				
Core Program Staff (2.5 PY)				
Principal Scientist (0.5 PY)	4,773	42,960		47,733
Principal Scientist (1.0 PY)	44,019	44,019		88,038
Principal Scientist (0.5 PY)	33,040			33,040
Senior Administrator (0.5 PY)			37,044	37,044
Monitoring Field Assistants (5.74 PY)				
Assistant Research Biologist (0.5 PY)	14,927	14,926		29,853
Staff Research Associate IV (1.0 PY)		52,911		52,911
Staff Research Associate II (1.0 PY)	36,762			36,762
Staff Research Associate II (1.0 PY)		37,611		37,611
Staff Research Associate II (1.0 PY)		37,611		37,611
Staff Research Associate I (1.0 PY)		36,492		36,492
Student Assistant I (500 hrs; 0.24 PY)	3,875			3,875
SUBTOTAL SALARIES	137,396	266,530	37,044	440,970
UCSB Indirect Cost @ 26%	35,723	69,298	0	105,021
TOTAL SALARIES	**173,119**	**335,828**	**37,044**	**545,991**
SEVERANCE PAY				
Four SRA I @ $2988		11,952		11,952
UCSB Indirect Cost @ 26%		3,108		3,108
TOTAL SEVERANCE PAY		**15,060**		**15,060**
BENEFITS				
Core Program Staff				
Principal Scientist	1,098	9,881		10,979
Principal Scientist	10,125	10,124		20,249
Principal Scientist	6,278			6,278
Senior Administrator			17,154	17,154
Monitoring Field Assistants				
Assistant Research Biologist	2,836	2,836		5,672
Staff Research Associate IV		10,053		10,053
Staff Research Associate II	11,029			11,029
Staff Research Associate II		8,274		8,274
Staff Research Associate II		8,274		8,274
Staff Research Associate I		8,393		8,393
Student Assistant I	171			171
SUBTOTAL BENEFITS	31,537	57,835	17,154	106,526
UCSB Indirect Cost @ 26%	8,200	15,037	0	23,237
TOTAL BENEFITS	**39,737**	**72,872**	**17,154**	**129,763**
SCIENTIFIC ADVISORY PANEL	**34,000**	**34,000**	**0**	**68,000**

	2005 Wetland	2005 Reef	2005 Admin/Mgt	2005 Total
CONSULTANTS AND CONTRACTORS				
Wetlands				
Task 1.2-field assistance	5,000			5,000
Task 1.2e-aerial photo surveys	10,000			10,000
Task 1.2h-computer systems consultant	3,000			3,000
Task 1.4-GIS/SAS database consultant	5,000			5,000
Task 1.4-hydrology/engineering, const.monitoring	5,000			5,000
Reef				
Task 2.3a-SAS database consultant		5,000		5,000
Task 2.3b-computer systems consultant		7,000		7,000
TOTAL CONSULTANTS & CONTRACTORS	**28,000**	**12,000**	**0**	**40,000**
TRAVEL				
Core Program Staff	12,677	8,451	1,000	22,128
Field Assistants	4,613	1,537		6,150
UCSB indirect cost (excl. core staff)	1,199	400	0	1,599
TOTAL TRAVEL	**18,489**	**10,388**	**1,000**	**29,877**
OPERATING EXPENSE				
General expense (SF office)			9,375	9,375
General expense (UCSB contract, incl. indirect cost)	9,944	44,998		54,942
Facilities operations (Carlsbad office)	18,286	37,121		55,407
Computer technical support, repair & maintenance			1,500	1,500
Review workshop			2,256	2,256
Audit			8,000	8,000
Administrative/financial processing services			18,000	18,000
TOTAL OPERATING EXPENSE	**28,230**	**82,119**	**39,131**	**149,480**
MARINA STORAGE (boats, trailers, equipment)	**2,030**	**4,287**	**0**	**6,317**
EQUIPMENT				
SF office			1,000	1,000
Computer networking equipment (UCSB contract)	2,050	3,075		5,125
Miscellaneous equipment, as needed	5,125	5,125		10,250
TOTAL EQUIPMENT	**7,175**	**8,200**	**1,000**	**16,375**
TOTAL EXPENSE 2005	**$330,780**	**$574,754**	**$95,329**	**$1,000,863**

TWO-YEAR TOTAL EXPENSE for 2004 and 2005 **$2,338,957**

F. PRE-APPROVED CONTINGENCY FUND

Staff also is proposing a pre-approved contingency fund in the amount of $68,000 specifically for the Scientific Advisory Panel. The permit authorizes up to $100,000 *per year*, adjusted annually by any increase in the consumer price index applicable to California. Based on past years' expenditures, staff proposes a *total* of only $132,000 ($64,000 in 2004 and $68,000 in 2005) for the Scientific Advisory Panel. However, it is expected that the Scientific Advisory Panel effort may increase during the next two years beyond what is budgeted to provide advice on both the wetland restoration final design and engineering plan and design of the full mitigation reef. The overall budget does not provide any cushion for such an increase; thus, the staff proposes a pre-approved contingency fund totaling $68,000 be earmarked for the Scientific Advisory Panel. Having the remainder of the original authorized amount (without any cost of living increases) in a pre-approved contingency fund would allow the Scientific Advisory Panel to respond in a timely manner to changing circumstances. Any expenditure of the contingency funds would be made in consultation with SCE. If a dispute arises, the staff would bring the issue to the Commission for resolution.

APPENDIX A. BUDGET NOTES

Salaries. Includes salaries and wages for the contract program staff, which includes two scientist positions, administrative support, field assistants for the experimental reef monitoring and field assistants for the wetland pre-restoration monitoring. All of the current and proposed contract program staff except a half-time administrator are hired under contract with the University of California, Santa Barbara; costs are subject to the University's indirect costs.[2] The half-time administrator is hired under contract with Simpson & Simpson Business and Personnel Services, the firm that provides financial processing services for the program. The costs for the Commission's permanent staff that spend a portion of their time on this program are not included here; they are paid by the Commission as part of staff's permit compliance workload.

Benefits. Includes benefits and employer-paid payroll taxes for contract program staff. Includes the indirect costs for personnel hired under contract to UCSB.

Scientific Advisory Panel. The Scientific Advisory Panel is a panel of experts established by the Commission pursuant to the permit conditions to provide scientific and technical advice. Expenses cover members' time and expense (primarily travel) and are authorized in the permit at $100,000 per year adjusted annually in accordance with the consumer price index (CPI) applicable to California. CPI adjustments have been made in previous budgets. Based on expenditures in the past four years, staff determined that the originally authorized amount is sufficient. Staff further reduced the amount in the proposed budget and placed the remainder in a pre-approved contingency fund to be expended as needed, in consultation with SCE.

Consultants and Contractors. Includes estimated costs for consultants and contractors to provide the technical and expert advice identified in individual tasks of the work program to assist the contract scientists in completing the specified tasks. Estimated costs are based on previous experience with similar consultants, at rates of $100-150 per hour.

Travel. Covers travel for meetings with SCE, Commission staff, consultants and contractors, field monitoring work, attendance at agency and public workshops and meetings, site visits, and attendance at conferences related to wetland and kelp forest community restoration issues. Total travel costs are based on previous years' expenditures plus anticipated increases in non-field work travel by the principal scientists for consultations on the final design of the wetland restoration and full mitigation reef. A 2.5% escalator is applied for 2005.

General expense (SF office). Covers operating expense for contract program staff working out of the Commission's San Francisco office (half-time administrator). Annual costs are based on the Commission's operating expense per PY for general expense, printing, communications, postage, and facilities operations. A 2.5% escalator is applied for 2005.

General expense (UCSB contract). Covers annual costs for reef monitoring (NITROX for SCUBA), miscellaneous office, laboratory and field supplies for reef monitoring and wetland pre-restoration monitoring, annual boat operating expense, annual insurance, registration and license fees for boats and vehicles, annual dive physicals required of each diver, and on-campus communications services for contract staff located at UCSB. A 2.5% escalator is applied for 2005.

Facilities operations (Carlsbad office). Rented office space in Carlsbad houses one contract scientific staff and contract field assistants for the reef and wetland monitoring programs. Annual costs cover space rental, office services, supplies and utilities, and communications (including telephone, cell phone service, and DSL service). A 2.5% escalator is used for 2005 where anticipated increases are not yet known.

Computer technical support, repair and maintenance. Covers annual costs for maintaining the computers used by contract program staff and field assistants, including regular maintenance, repairs, and technical support needed for troubleshooting problems.

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[2] The indirect cost rate of 26% of direct costs is the U.S. Department of Health and Human Services negotiated, pre-determined off-campus rate for research projects. For these costs, the project receives: office space at UCSB for two 0.5 PY contract scientists (even though the on-campus overhead rate is normally 46%), utilities, internet services, laboratory facilities and equipment, administrative services associated with payroll, employee benefits, liability insurance, dive and boat safety programs, and purchasing for both on-campus staff and staff located in the Carlsbad office, library services, UC subsidized pricing on goods and services, site licenses for software, and access to faculty and staff expertise on a wide variety of issues.

Review workshop. Covers costs for conducting an annual review workshop, excluding costs for consultants who may be requested to attend the workshop. The intent of the review workshop is to determine whether performance standards have been met, whether revisions to the standards are necessary, and whether remedial measures are required. While it is premature to apply these issues to the mitigation projects still in the planning or experimental stages, annual status reviews of the mitigation projects, wetland pre-restoration monitoring, and experimental reef monitoring will be conducted for the Commission and the public during the two-year budget.

Audit. Covers costs for an independent audit of the contract reimbursements and service fees for the Commission's oversight and monitoring program. Independent audits have been conducted since 1994; no deficiencies in the financial systems have been discovered. Costs are estimated for a 2-year audit.

Administrative/financial processing services. Covers the annual cost of administrative and financial processing services provided by Simpson & Simpson Business and Personnel Services, Inc.

Marina storage. Covers costs for storage and launch fees for the reef dive boats and storage fees for the wetland boat and equipment. A 2.5% escalator is applied for 2005.

Equipment. Covers durable equipment for the experimental reef and wetland pre-restoration monitoring programs, including inflatable boat, motor and trailer for the wetland monitoring, and replacement outboard engines for the 2 reef dive boats, to be purchased as needed. May also include computers and networking equipment, office equipment (such as fax and copier), and miscellaneous equipment for the reef and wetland monitoring programs. A 2.5% escalator is applied where applicable for 2005.

APPENDIX B. Approximate Labor Costs by Task: Wetlands 2004

	2004 base*	Task 1.1a-h		Task 1.2a		Task 1.2b		Task 1.2c		Task 1.2d		Task 1.2e	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	133,768	10%	13,377	2%	2,675		0		0	5%	6,688	5%	6,688
PS (.5 PY, 8%)	72,529	4%	2,901		0		0		0		0		0
PS (.5 PY, 100%)	47,652	10%	4,765	2%	953	2%	953	2%	953	10%	4,765	6%	2,859
ARB (.75 PY, 90%)	63,505	5%	3,175	25%	15,876	20%	12,701		0		0		0
SRA II (1 PY, 100%)	56,216		0	10%	5,622	15%	8,432	5%	2,811	15%	8,432	15%	8,432
SA I (.63 PY, 100%)	12,398		0	30%	3,719	35%	4,339	5%	620	15%	1,860	10%	1,240
SAP	64,000	10%	6,400	5%	3,200	5%	3,200	5%	3,200	5%	3,200	5%	3,200
TOTAL BY TASK			**$30,618**		**$32,046**		**$29,626**		**$7,584**		**$24,946**		**$22,420**

	2004 base*	Task 1.2f		Task 1.2g		Task 1.2h		Task 1.3a-d		Task 1.4		Task 1.5a	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	133,768	1%	1,338	4%	5,351		0	5%	6,688		0	8%	10,701
PS (.5 PY, 8%)	72,529		0		0		0	4%	2,901		0		0
PS (.5 PY, 100%)	47,652	6%	2,859	15%	7,148		0	15%	7,148		0	10%	4,765
ARB (.75 PY, 90%)	63,505		0	20%	12,701		0	3%	1,905		0	10%	6,351
SRA II (1 PY, 100%)	56,216	15%	8,432	20%	11,243	5%	2,811		0		0		0
SA I (.63 PY, 100%)	12,398	5%	620		0		0		0		0		0
SAP	64,000		0		0		0		0		0		0
TOTAL BY TASK			**$13,249**		**$36,443**		**$2,811**		**$18,643**		**$0**		**$21,817**

	2004 base*	Task 1.5b		Task 1.5c		Task 1.5d		Total % time
		time	cost	time	cost	time	cost	
PS (1 PY, 50%)	133,768	4%	5,351	3%	4,013	3%	4,013	50%
PS (.5 PY, 8%)	72,529		0		0		0	8%
PS (.5 PY, 100%)	47,652	10%	4,765	6%	2,859	6%	2,859	100%
ARB (.75 PY, 90%)	63,505	5%	3,175		0	2%	1,270	90%
SRA II (1 PY, 100%)	56,216		0		0		0	100%
SA I (.63 PY, 100%)	12,398		0		0		0	100%
SAP	64,000		0		0	7%	4,480	42%
TOTAL BY TASK			**$13,291**		**$6,872**		**$12,622**	

*salaries, benefits + UCSB indirect cost

APPENDIX C. Approximate Labor Costs by Task: Wetlands 2005

	2005 base*	Task 1.1a-h		Task 1.2a		Task 1.2b		Task 1.2c		Task 1.2d		Task 1.2e	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	136,442	10%	13,644		0		0		0		0		0
PS (.5 PY, 8%)	73,977	4%	2,959		0		0		0		0		0
PS (.5 PY, 100%)	49,541	15%	7,431		0		0		0		0	2%	991
ARB (.5 PY, 50%)	44,762	10%	4,476		0		0		0		0		0
SRA II (1 PY, 100%)	60,217	12%	7,226		0		0		0		0	10%	6,022
SA I (.24 PY, 100%)	5,098		0		0		0		0		0	50%	2,549
SAP	68,000	10%	6,800		0		0		0		0		0
TOTAL BY TASK			**$42,537**		**$0**		**$0**		**$0**		**$0**		**$9,562**

	2005 base*	Task 1.2f		Task 1.2g		Task 1.2h		Task 1.3a-d		Task 1.4		Task 1.5a	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	136,442		0	5%	6,822		0	15%	20,466	5%	6,822	5%	6,822
PS (.5 PY, 8%)	73,977		0		0		0	4%	2,959		0		0
PS (.5 PY, 100%)	49,541	5%	2,477	20%	9,908		0	23%	11,394	5%	2,477	10%	4,954
ARB (.5 PY, 50%)	44,762		0	15%	6,714		0	20%	8,952		0		0
SRA II (1 PY, 100%)	60,217	15%	9,033	30%	18,065	3%	1,807	10%	6,022	15%	9,033		0
SA I (.24 PY, 100%)	5,098	5%	255		0		0		0	45%	2,294		0
SAP	68,000		0		0		0	20%	13,600		0		0
TOTAL BY TASK			**$11,765**		**$41,510**		**$1,807**		**$63,394**		**$20,626**		**$11,776**

	2005 base*	Task 1.5b		Task 1.5c		Task 1.5d		Total % time
		time	cost	time	cost	time	cost	
PS (1 PY, 50%)	136,442		0	5%	6,822	5%	6,822	50%
PS (.5 PY, 8%)	73,977		0		0		0	8%
PS (.5 PY, 100%)	49,541		0	10%	4,954	10%	4,954	100%
ARB (.5 PY, 50%)	44,762		0		0	5%	2,238	50%
SRA II (1 PY, 100%)	60,217		0	5%	3,011		0	100%
SA I (.24 PY, 100%)	5,098		0		0		0	100%
SAP	68,000		0		0	10%	6,800	40%
TOTAL BY TASK			**$0**		**$14,787**		**$20,814**	

*salaries, benefits + UCSB indirect cost

APPENDIX D. Approximate Labor Costs by Task: Reef 2004

	2004 base*	Task 2.1a		Task 2.1b		Task 2.1c		Task 2.1d		Task 2.1e		Task 2.1f	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	133,768		0		0		0		0		0		0
PS (.5 PY, 90%)	72,529		0		0		0		0		0		0
ARB (.75 PY, 10%)	63,505		0		0		0		0		0		0
SRA IV (1 PY, 100%)	76,650	12%	9,198	15%	11,498	8%	6,132	2%	1,533		0	5%	3,833
SRA II (1 PY, 100%)	55,861	12%	6,703	15%	8,379	8%	4,469	2%	1,117		0	5%	2,793
SRA II (1 PY, 100%)	55,861	12%	6,703	15%	8,379	8%	4,469	2%	1,117	8%	4,469	5%	2,793
SRA I (1 PY, 100%)	52,594	12%	6,311	15%	7,889	8%	4,208	2%	1,052	10%	5,259	5%	2,630
SRA I (1 PY, 100%)	52,808	12%	6,337	15%	7,921	8%	4,225	2%	1,056	10%	5,281	5%	2,640
SRA I (1 PY, 100%)	52,808	12%	6,337	15%	7,921	8%	4,225	2%	1,056	10%	5,281	5%	2,640
SRA I (1 PY, 100%)	52,808	12%	6,337	15%	7,921	8%	4,225	2%	1,056	10%	5,281	5%	2,640
SRA I (1 PY, 100%)	52,594	12%	6,311	15%	7,889	8%	4,208	2%	1,052	10%	5,259	5%	2,630
SAP	64,000		0		0		0		0		0		0
TOTAL BY TASK			**$54,238**		**$67,798**		**$36,159**		**$9,040**		**$30,830**		**$22,599**

	2004 base*	Task 2.1g		Task 2.1h		Task 2.2a		Task 2.2b		Task 2.2c		Task 2.3a	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	133,768		0	1%	1,338		0		0	1%	1,338		0
PS (.5 PY, 90%)	72,529		0	1%	725		0		0	1%	725		0
ARB (.75 PY, 10%)	63,505		0		0		0		0	10%	6,351		0
SRA IV (1 PY, 100%)	76,650		0	1%	767	5%	3,833	5%	3,833	2%	1,533	30%	22,995
SRA II (1 PY, 100%)	55,861		0	1%	559	5%	2,793	5%	2,793	2%	1,117	35%	19,551
SRA II (1 PY, 100%)	55,861	10%	5,586	3%	1,676	5%	2,793	5%	2,793	2%	1,117	25%	13,965
SRA I (1 PY, 100%)	52,594	5%	2,630	1%	526	5%	2,630	5%	2,630	2%	1,052	30%	15,778
SRA I (1 PY, 100%)	52,808	5%	2,640	1%	528	5%	2,640	5%	2,640	2%	1,056	30%	15,842
SRA I (1 PY, 100%)	52,808	5%	2,640	1%	528	5%	2,640	5%	2,640	2%	1,056	30%	15,842
SRA I (1 PY, 100%)	52,808	5%	2,640	1%	528	5%	2,640	5%	2,640	2%	1,056	30%	15,842
SRA I (1 PY, 100%)	52,594	5%	2,630	1%	526	5%	2,630	5%	2,630	2%	1,052	30%	15,778
SAP	64,000		0		0	10%	6,400	5%	3,200	15%	9,600		0
TOTAL BY TASK			**$18,767**		**$7,700**		**$28,999**		**$25,799**		**$27,053**		**$135,595**

	2004 base*	Task 2.3b		Task 2.3c		Task 2.3d		Task 2.3e		Task 2.3f		Task 2.3g	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	133,768		0	15%	20,065	5%	6,688	2%	2,675		0	1%	1,338
PS (.5 PY, 90%)	72,529		0	30%	21,759	10%	7,253	5%	3,626		0	1%	725
ARB (.75 PY, 10%)	63,505		0		0		0		0		0		0
SRA IV (1 PY, 100%)	76,650	10%	7,665	2%	1,533	2%	1,533		0		0	1%	767
SRA II (1 PY, 100%)	55,861	5%	2,793	2%	1,117	2%	1,117		0		0	1%	559
SRA II (1 PY, 100%)	55,861		0		0		0		0		0		0
SRA I (1 PY, 100%)	52,594		0		0		0		0		0		0
SRA I (1 PY, 100%)	52,808		0		0		0		0		0		0
SRA I (1 PY, 100%)	52,808		0		0		0		0		0		0
SRA I (1 PY, 100%)	52,808		0		0		0		0		0		0
SRA I (1 PY, 100%)	52,594		0		0		0		0		0		0
SAP	64,000		0	20%	12,800		0		0		0		0
TOTAL BY TASK			**$10,458**		**$57,274**		**$16,592**		**$6,302**		**$0**		**$3,388**

	2004 base*	Task 2.4a		Task 2.4b		Task 2.4c		Task 2.4d		Total % time
		time	cost	time	cost	time	cost	time	cost	
PS (1 PY, 50%)	133,768	20%	26,754	1%	1,338	1%	1,338	3%	4,013	50%
PS (.5 PY, 90%)	72,529	30%	21,759	2%	1,451	4%	2,901	6%	4,352	90%
ARB (.75 PY, 10%)	63,505		0		0		0		0	10%
SRA IV (1 PY, 100%)	76,650		0		0		0		0	100%
SRA II (1 PY, 100%)	55,861		0		0		0		0	100%
SRA II (1 PY, 100%)	55,861		0		0		0		0	100%
SRA I (1 PY, 100%)	52,594		0		0		0		0	100%
SRA I (1 PY, 100%)	52,808		0		0		0		0	100%
SRA I (1 PY, 100%)	52,808		0		0		0		0	100%
SRA I (1 PY, 100%)	52,808		0		0		0		0	100%
SRA I (1 PY, 100%)	52,594		0		0		0		0	100%
SAP	64,000		0		0		0	5%	3,200	55%
TOTAL BY TASK			**$48,512**		**$2,788**		**$4,239**		**$11,565**	

*salaries, benefits + UCSB indirect costs

APPENDIX E. Approximate Labor Costs by Task: Reef 2005

	2005 base*	Task 2.1a		Task 2.1b		Task 2.1c		Task 2.1d		Task 2.1e		Task 2.1f	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	136,442		0		0		0		0		0		0
PS (.5 PY, 90%)	73,977		0		0		0		0		0		0
ARB (.5 PY, 50%)	44,762		0		0		0		0		0		0
SRA IV (1 PY, 100%)	79,335		0		0		0		0		0		0
SRA II (1 PY, 100%)	57,815		0		0		0		0		0		0
SRA II (1 PY, 100%)	57,815		0		0		0		0		0		0
SRA I (1 PY, 100%)	56,555		0		0		0		0		0		0
SAP	68,000		0		0		0		0		0		0
TOTAL BY TASK			**$0**		**$0**		**$0**		**$0**		**$0**		**$0**

	2005 base*	Task 2.1g		Task 2.1h		Task 2.2a		Task 2.2b		Task 2.2c		Task 2.3a	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	136,442		0	1%	1,364		0		0	1%	1,364		0
PS (.5 PY, 90%)	73,977		0	1%	740		0		0	2%	1,480		0
ARB (.5 PY, 50%)	44,762		0		0		0		0	50%	22,381		0
SRA IV (1 PY, 100%)	79,335	5%	3,967	1%	793	15%	11,900		0	15%	11,900	40%	31,734
SRA II (1 PY, 100%)	57,815	5%	2,891	1%	578	15%	8,672		0	15%	8,672	50%	28,908
SRA II (1 PY, 100%)	57,815	5%	2,891	3%	1,734	15%	8,672		0	15%	8,672	50%	28,908
SRA I (1 PY, 100%)	56,555	5%	2,828	1%	566	15%	8,483		0	15%	8,483	52%	29,409
SAP	68,000		0		0		0		0	10%	6,800		0
TOTAL BY TASK			**$12,576**		**$5,776**		**$37,728**		**$0**		**$69,753**		**$118,958**

	2005 base*	Task 2.3b		Task 2.3c		Task 2.3d		Task 2.3e		Task 2.3f		Task 2.3g	
		time	cost	time	cost	time	cost	time	cost	time	cost	time	cost
PS (1 PY, 50%)	136,442		0	10%	13,644	5%	6,822	1%	1,364	10%	13,644	1%	1,364
PS (.5 PY, 90%)	73,977		0	15%	11,097	10%	7,398	3%	2,219	20%	14,795	1%	740
ARB (.5 PY, 50%)	44,762		0		0		0		0		0		0
SRA IV (1 PY, 100%)	79,335	10%	7,934	2%	1,587	2%	1,587		0	10%	7,934		0
SRA II (1 PY, 100%)	57,815		0	2%	1,156	2%	1,156		0	10%	5,782		0
SRA II (1 PY, 100%)	57,815		0		0	2%	1,156		0	10%	5,782		0
SRA I (1 PY, 100%)	56,555		0		0	2%	1,131		0	10%	5,656		0
SAP	68,000		0	20%	13,600		0		0	22%	14,960		0
TOTAL BY TASK			**$7,934**		**$41,084**		**$19,250**		**$3,584**		**$68,552**		**$2,104**

	2005 base*	Task 2.4a		Task 2.4b		Task 2.4c		Task 2.4d		Total % time
		time	cost	time	cost	time	cost	time	cost	
PS (1 PY, 50%)	136,442	15%	20,466	1%	1,364	2%	2,729	3%	4,093	50%
PS (.5 PY, 90%)	73,977	25%	18,494	2%	1,480	5%	3,699	6%	4,439	90%
ARB (.5 PY, 50%)	44,762		0		0		0		0	50%
SRA IV (1 PY, 100%)	79,335		0		0		0		0	100%
SRA II (1 PY, 100%)	57,815		0		0		0		0	100%
SRA II (1 PY, 100%)	57,815		0		0		0		0	100%
SRA I (1 PY, 100%)	56,555		0		0		0		0	100%
SAP	68,000		0		0		0	5%	3,400	57%
TOTAL BY TASK			**$38,961**		**$2,844**		**$6,428**		**$11,932**	

*salaries, benefits + UCSB indirect costs

APPENDIX F. Approximate Labor Costs by Task: Behavioral Barriers 2004 and 2005

	2004 base*	Task 3.1 time	Task 3.1 cost	Total % time
PS (.5 PY, 2%)	72,529	2%	1,451	2%
SAP	64,000	2%	1,280	2%
TOTAL BY TASK			**$2,731**	

	2005 base*	Task 3.1 time	Task 3.1 cost	Total % time
PS (.5 PY, 2%)	73,977	2%	1,480	2%
SAP	68,000	2%	1,360	2%
TOTAL BY TASK			**$2,840**	

*salaries, benefits + UCSB indirect cost

SOUTHERN CALIFORNIA
EDISON
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October 16, 2003

Ms. Susan M. Hansch, Chief Deputy Director
Energy and Ocean Resources
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Dear Ms. Hansch:

SUBJECT: SONGS Mitigation Program:
2004-05 Two-Year Work Program and Budget

I have reviewed the draft work program and budget for the SONGS Mitigation Program, as revised, and I am pleased to support your request for its approval by the Coastal Commission.

The revised draft reflects the agreements of our telephone discussion of October 8th. I appreciate your ongoing efforts to help us contain the costs of Coastal Commission oversight and monitoring of the mitigation projects. I also appreciate your efforts to clearly articulate the specific tasks to be undertaken by your contract scientists, the justification for those tasks and the estimated costs of each.

The proposed work program could cost Southern California Edison and the other SONGS owners up to $2.34 million over the next two years. However, I am hopeful that continued collaboration between our respective team members will further reduce the cost of the work program as it progresses.

Please call me at (626) 302-2149 if you should have any questions.

Sincerely,

DAVID W. KAY, D. Env.
Project Manager

Cc: Ms. Jody Loeffler

P. O. Box 800
2244 Walnut Grove Ave.
Rosemead, CA 91770