

**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION**

STAFF REPORT FOR REGULAR MEETING OF May 14, 2004

Prepared on April 12, 2004

ITEM NUMBER: 46

SUBJECT: Pacific Gas and Electric Company Diablo Canyon Nuclear Power Plant, Status Report Regarding Resolution of Cooling Water Impacts

KEY INFORMATION

Location: Seven miles West by Northwest of Avila Beach, San Luis Obispo County
Discharge Type: Cooling Water, Industrial Process Wastewater
Flow Limit: 2,760 MGD (maximum for all discharges)
Disposal: Pacific Ocean
Recycling: None
Existing Order: WDR Order No. 90-09 (NPDES Permit No. CA0003751)

SUMMARY

The Regional Board considered a revised NPDES permit for the Diablo Canyon Power Plant on July 10, 2003. The Regional Board closed the Hearing except for further consideration of specific issues, including mitigation options for addressing the Power Plant impacts. The Regional Board directed staff and the Technical Workgroup (TWG) to consider additional mitigation options and related issues, including:

1. Marine Protected Areas (marine reserves)
2. The uncertainty regarding impacts and mitigation measures
3. Performance monitoring for any mitigation projects
4. Thermal effects mitigation projects
5. A reduced thermal effects monitoring program

Of the many mitigation projects being considered, it appears at this time that Marine Protected Areas (marine reserves) and the Conservation Easement are good candidate projects with respect to entrainment mitigation. Marine Protected Areas are likely to offer the greatest nexus and benefit with

respect to entrainment. Staff and the TWG are working with the Resources Legacy Fund Foundation, a non-profit resource protection organization, to scope the Marine Protected Area option, including necessary tasks, issues to be addressed, a time schedule, likelihood of success, and costs.

Regarding thermal effects mitigation, Marine Protected Areas, the Conservation Easement, and a State Parks docent program to reduce intertidal degradation caused by public access are good candidate projects.

The TWG should finalize its recommendation to the Regional Board in June 2004. Staff will continue to work with RLFF to scope a Marine Protected Area proposal unless directed otherwise by the Regional Board.

DISCUSSION

On July 10, 2003, the Regional Board considered waste discharge requirements (NPDES Permit No. CA0003751) regulating discharges to waters of the Pacific Ocean from Pacific Gas & Electric Company's Diablo

Permit incorporates by reference a settlement agreement and form of grant of conservation easement approved by the Board at their meeting on March 23, 2003. At the July 10, 2003 hearing, the Regional Board directed its staff and the Technical Workgroup (TWG) to consider certain aspects of the environmental mitigation and restoration provisions of the settlement agreement and to consider possible alternative mitigation and restoration measures.

As directed by the Regional Board, the TWG is considering:

1. Marine Protected Areas (marine reserves)
2. The uncertainty regarding impacts and mitigation or restoration measures
3. Performance monitoring for any mitigation or restoration projects
4. Thermal effects mitigation projects
5. A reduced thermal effects monitoring program

The TWG is working within these boundaries/understandings:

1. The TWG will not address policy or legal issues. The TWG will make realistic, defensible recommendations based on science.
2. It may not be possible to mitigate or compensate for all environmental losses due to entrainment and/or the thermal discharge. For example, hundreds of species are entrained, and it infeasible to replace these entrained organisms on a one for one basis. Therefore, projects are considered that provide a benefit to habitat known to be critical to impacted species (which should help replace some of the losses).
3. The geographic scale from which entrainment losses occur is relatively large. Proposed projects in response to entrainment losses are therefore considered on a similar scale.
4. The geographic scale of the thermal effects is more local. Projects related to thermal effects are therefore considered on a local scale. The thermal effects of concern are those that are above and beyond the predicted effects considered in

State Water Resources Control Board Order No. 83-1.

5. Research or surveys are also considered. For some projects, research or surveys are needed before the actual project can begin or to track impacts over time.
6. The TWG will scale, balance, and cost projects to the extent possible, with consideration for the major limitations involved. In many cases, costs are likely to be an unknown and only gross estimates will be made.
7. The TWG will consider the uncertainties associated with the power plant impacts and potential projects to allow comparison between likely impacts and likely benefits.
8. The TWG recommendations are based on current knowledge of local conditions, the marine environment and scientific literature. The basis of these recommendations is a consideration of potential projects that would benefit the marine environment (not necessarily replace losses).
9. The TWG will also recommend a thermal effects monitoring program sufficient to follow biological communities over time (likely to be much less comprehensive than the current program).

The TWG is considering several types of mitigation and restoration projects with respect to entrainment, including:

- Creating offshore reef habitat
- Fish hatchery work
- Restoration of marine habitat
- Terrestrial conservation easement (Regional Board/PG&E settlement)
- Use of PG&E lab facilities (Regional Board/PG&E settlement)
- Abalone Research (Regional Board/PG&E settlement)
- Central Coast Ambient Monitoring Program (Regional Board/PG&E settlement)
- CALCOFI work (ocean monitoring/research)
- Marine Protected Areas (establishment of marine reserves)

The TWG is also considering mitigation projects with respect to thermal effects, such

as the terrestrial easement and passive restoration of degraded intertidal areas. The TWG is also drafting a reduced thermal effects monitoring plan.

Potential Projects Regarding Entrainment Losses

The TWG has not concluded its evaluation regarding these options, however, a brief discussion is provided below.

Creating Offshore Reef Habitat: The impacts of entrainment are estimated to be spread fairly thinly over a relatively large geographic scale based on the distance larvae may have traveled prior to being entrained. The source water for entrained larvae is on the geographic scale of tens to hundreds of kilometers of coastline, or tens to hundreds of square kilometers of ocean habitat. Since entrained larvae have a relatively large source water body, the "impact" is likewise spread out over this same area. It does not appear possible to create reef habitat that would offset or mitigate entrainment losses on the applicable scale. One possible solution would be to mathematically integrate the low impacts over a large area to a smaller area of large impact. However, on a local scale, the area offshore of Diablo Canyon is dense reef habitat from Point Buchon to Point San Luis, and there is no ecological justification or physical opportunity for adding to this habitat. Hence, this option does not appear to be defensible because it would provide no realistic benefit relative to entrainment losses.

Fish Hatchery: This option would only potentially benefit one, or perhaps very few, species, would not benefit the overall marine environment, would likely be very costly, and would not offset or mitigate entrainment losses because hundreds of species are entrained. In addition there is considerable debate within the scientific community about the possible negative impact of hatcheries on the genetic stocks of species. Hence, a fish hatchery does not appear to be a realistic option.

Restoration of Marine Habitat: Restoration of marine habitat of the sort that would lead to enhanced larval production of affected species

is not possible in this case. The nearshore habitats of such species are not in need of restoration (from a physical perspective – but see section on Marine Reserves below). That is, from a practical perspective we cannot identify areas of ocean habitat where "restoration" would increase larval productivity. There are examples of degraded ocean habitat, such as the so-called "dead zones" where pollution runoff from terrestrial sources accumulates in the benthic environment, usually offshore from the mouths of major tributaries such as the Mississippi River. The solution to these problems is to minimize pollutant runoff, which will allow the degraded areas to recover over time; there is no practical "restoration" type work that could be implemented to correct the problem. In addition, there are no large-scale degraded areas of ocean habitat off the Central Coast of California (in the relevant geographic area for this case). Therefore, ocean habitat restoration does not appear to be an available option in this case.

Conservation Easement (as described in the draft settlement between the Regional Board and PG&E): Regarding marine habitat, the described easement would provide protection of the intertidal zone from future degradation. Many species identified in the entrainment study are at least users of this intertidal habitat. Moreover, many species that are entrained but not identified in the entrainment study come from intertidal habitats (invertebrate larvae and algae spores). The Easement could confer benefit to these species. Since there is a nexus between the easement benefits and entrainment and thermal effects impacts, this option is applicable.

Abalone Research (Regional Board/PG&E Settlement): Research to develop disease resistant abalone is speculative at best, and even if successful, would benefit only one, or very few, species. It is unclear whether abalone are effected by entrainment, but the TWG considers it unlikely. Black and red abalone are impacted by the thermal discharge. The independent scientists do not recommend this type of research as mitigation for thermal impacts.

Use of PG&E Lab Facilities (Regional Board/PG&E Settlement): The use of PG&E's lab facilities by county educational organizations may be beneficial to the community, but it is not mitigation for impacts. There appears to be little nexus to the impacts or direct benefit to the environment.

CALCOFI Program: The California Oceanic Cooperative Fisheries Investigations (CalCOFI) are a unique partnership of the California Department of Fish and Game, the NOAA Fisheries Service and the Scripps Institution of Oceanography. The organization was formed in 1949 to study the ecological aspects of the collapse of the sardine populations off California. Today its focus has shifted to the study of the marine environment off the coast of California and the management of its living resources. CALCOFI is the longest running oceanographic and near shore monitoring program in California. Data collected in these surveys has been used to detect long-term change in zooplankton communities, ichthyoplankton spatial patterns and detailed current patterns. The CALCOFI program is costly and the State is not providing funding at anywhere near historic levels. While this program is certainly a worthy effort, the data collected is mainly from much further offshore than the estimated area of entrainment influence, and, as a research project, there is no mitigation or restoration nexus to the power plant impacts.

Central Coast Ambient Monitoring Program Funding (Regional Board/PG&E Settlement): The Central Coast Ambient Monitoring Program (CCAMP) is an important and useful program for the Regional Board. Funds provided to CCAMP would be used to instigate new marine monitoring activities in the central coastal areas of our Region, and would be used in conjunction with several other already developed funding sources to achieve region-wide coverage. Monitoring would include regular beach and intertidal monitoring for contaminants, using sand crabs and mussels. These efforts would be coordinated with several other existing marine monitoring efforts. However, general ambient monitoring is not mitigation for

impacts. The independent scientists recommend adaptive performance monitoring, with oversight by independent experts from the relevant fields of study, for any implemented mitigation projects. Adaptive performance monitoring would be done to answer specific questions or address specific hypothesis that determine the degree of success for mitigation and restoration projects. Performance monitoring can be expensive, and given its importance in this case, should take precedence over ambient monitoring.

Marine Protected Areas: There are several potential benefits of Marine Protected Areas, including permanent overall conservation of resources, increased density of fish, increased size, and increased larval productivity relative to non-reserve areas. The degree of benefit (other than conservation) is determined by the amount of "take" (fishing pressure) occurring in the area prior to the reserve being established. Additionally, Marine Protected Areas may benefit both entrained and thermally impacted species. Given the characteristics of entrainment impacts, such as large geographic area of influence and potential ecosystem level impacts, the benefits and flexibility of Marine Protected Areas are particularly attractive. From staff's perspective, this option would provide ecological benefits (i.e., increased populations of fish and shellfish) that minimize entrainment losses, including maintenance or protection of community structure and function in the coastal zone impacted by the facility. Accordingly, the TWG is considering the pros and cons of Marine Protected Areas and their applicability to entrainment losses and thermal effects in detail.

The TWG is evaluating several aspects of the Marine Protected Area option, including ecological benefits, likelihood of success, process for implementation, and costs. A key consideration is that there is legislation requiring development of Marine Protected Areas in California, however, the California Fish and Game process for establishing reserves is currently unfunded (which provides a mitigation/restoration opportunity). Also, there is precedent for establishing Marine Protected Areas in California. In addition,

there is strong scientific support for the establishment of Marine Protected Areas as a resource management tool. No other restoration option appears to offer these strong points (nexus, benefits, feasibility, scientific support, probability of success).

Process for Establishing Marine Protected Areas

Establishing Marine Protected Areas on the Central Coast will require a comprehensive approach, sound management, and assistance from leading experts in the various fields of study. To this end, Regional Board staff have met with the Resources Legacy Foundation Fund (RLFF), a non-profit organization whose mission is to conserve and restore natural landscapes, protect and enhance marine systems, and preserve wildlands and wilderness. RLFF is currently implementing the California Coastal and Marine Initiative, (CCMI) a re-granting program on behalf of the David and Lucile Packard Foundation. The goal of the CCMI is to ensure the health and resilience of California's coastal and marine environment through ecosystem-based conservation and management. A key component of this goal is to focus intensively on the Central Coast, with the intention of creating significant, tangible, and permanent ecosystem benefits in this specific region. The goal of the CCMI directly coincides with the TWG's evaluation of Marine Protected Areas as potential restoration of DCPD impacts, the scale of the DCPD entrainment impacts (a regional scale), and the Regional Board's geographic jurisdiction (Central Coast).

RLFF has directed million of dollars toward conservation projects on the Central Coast. A recent newspaper article from the San Luis Obispo Telegram Tribune regarding an RLFF marine research grant to Cal poly University is included here as attachment 1. Representatives from RLFF will attend the May 14, 2004 Regional Board meeting to help answer questions the Board may have about RLFF or establishing Marine Protected Areas.

If the Regional Board decides to pursue this option, RLFF and the Regional Board would

enter into a Memorandum of Agreement to develop and submit a Marine Protected Area proposal to the California Fish and Game Commission. RLFF has indicated that they may provide additional funds toward this effort. The major steps involved in developing a Marine Protected Area proposal to the California Fish and Game Commission would likely be:

1. The Regional Board enters into an agreement with RLFF, establishing goals, tasks to achieve the goals, responsibilities, matching funds, etc. (similar to the Memorandum of Agreement between the Regional Board and the Elkhorn Slough Foundation).
2. Regional Board and RLFF establish a process for developing a Marine Protected Area proposal. The process should include a mechanism for participation by other agencies and parties.
3. Regional Board and RLFF establish an estimated schedule for developing the proposal (a multi-year schedule is certain).
4. Regional Board and RLFF implement the tasks necessary to develop the proposal, which could include:
 - a. Habitat surveys necessary to design a preferred reserve size and layout, and possible alternative designs.
 - b. A socio-economic study for the preferred reserve design(s), as well as options to mitigate local impacts to the fishing community.
 - c. A stakeholder process to gain public input on the final design.
 - d. A CEQA (or functional equivalent) document for consideration by the Department of Fish and Game and a public participation process (including a scope of work and budget).
 - e. A performance monitoring plan.
5. Regional Board and RLFF form an advisory group to guide the design, implementation, and evaluation of the Marine Protected Areas. Measures of success for the Marine Protected Areas would likely include:

- a. Providing resources that have been lost as a result of impacts at DCPD.
- b. Increased number and size of fish.
- c. Conservation benefits.

The TWG is evaluating these next steps and their associated costs with input from RLFF. The TWG recommendation will include additional information on the various aspects of the Marine Protected Area option.

Potential Projects Regarding Thermal Effects

Conservation Easement (as described in the draft settlement between the Regional Board and PG&E): As noted above, the described easement would provide protection mainly for intertidal resources. Many species identified in the entrainment study are at least users of this intertidal habitat. Moreover, many species that are entrained but not identified in the entrainment study come from intertidal habitats (invertebrate larvae and algae spores). The Easement would confer benefit to these species by preventing future habitat degradation (such as the degradation seen in State Parks due to public access). Since there is a nexus between the easement benefits and entrainment and thermal effects impacts, this option is applicable.

Passive Restoration of Degraded Intertidal Areas: The Regional Board also directed the TWG to consider projects that would restore currently degraded intertidal areas. As noted by Dr. Raimondi in his testimony to the Regional Board for the July 10, 2003 hearing, intertidal areas in some State Parks are degraded due to public access (mainly trampling). This impact could be reduced through a State Parks field-based docent program that educates visitors about the problem and controls trampling and collection of taxa. Monitoring of these areas is already being done by the Partnership for Interdisciplinary Ocean Studies (PISCO), the University of California's intertidal monitoring program along the western United

States. This type of passive restoration (not physical restoration) is applicable because there is a direct nexus to the thermal impacts.

Thermal Effects Monitoring

The TWG is currently reviewing a reduced thermal effects monitoring program submitted by PG&E. The recommended thermal effects monitoring program will likely be a significantly reduced effort focused on detecting biological changes above and beyond what has already been established through twenty-five years of intensive study.

CONCLUSION

The TWG continues to evaluate several options regarding mitigation of cooling water system impacts at DCPD. At this time, it appears that the Conservation Easement and Marine Protected Area projects are good candidates for consideration regarding mitigation for entrainment impacts.

With respect to mitigating thermal impacts, it appears that the Conservation Easement and a State Parks docent program to reduce intertidal impacts are good candidates for consideration.

The TWG will submit its recommendations in June 2004.

RECOMMENDATION

The TWG should finalize its recommendation to the Regional Board by June 1, 2004. Staff will continue to work with RLFF to define the tasks and costs necessary to develop a Marine Protected Area proposal to the California Department of Fish and Game.

ATTACHMENT

Newspaper article from the San Luis Obispo Telegram Tribune regarding a marine research grant from RLFF to Cal Poly University.