

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

STAFF REPORT FOR REGULAR MEETING OF SEPTEMBER 9, 2005

Prepared on August 19, 2005

ITEM NUMBER: 15

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

This item is a status report on PG&E's Diablo Canyon Nuclear Power Plant NPDES permit. The Water Board considered a revised NPDES permit for the Diablo Canyon Power Plant on July 10, 2003. At that hearing the Board considered all aspects of the draft permit. After several hours of presentations and deliberation, the Board closed the hearing except for further consideration of specific issues, including mitigation options for addressing the Power Plant impacts.

Staff provided a follow-up status report to the Water Board on May 14, 2004. Our status report explained that few mitigation options exist to address marine impacts, and concluded that establishment of marine reserve areas along the Central Coast would likely provide the greatest benefit to the marine environment. After discussing the limited options, the Water Board directed staff to further investigate the possibility of constructing artificial reef habitat as a mitigation option. The Water Board's Independent scientists on this project (Drs. Raimondi, Cailliet, and Foster) submitted a paper titled *Independent Scientists' Recommendations to the Regional Board*

Regarding "Mitigation" for Cooling Water Impacts, July 2005. The paper discusses several mitigation alternatives for entrainment and thermal impacts, including an expanded section on artificial reefs (expanded beyond the version presented to the Water Board on May 14, 2004). The two primary mitigation options for addressing entrainment impacts are marine reserves and artificial reefs. The paper does not recommend one of these options over the other; however, Water Board staff believes that marine reserves would provide the greatest ecological benefit over the long-term.

Dr. Peter Raimondi, one of the Water Board's independent scientists, will present the new information on artificial reefs at the September 9 Water Board meeting. Dr. Raimondi's evaluation concludes that 210 to 500 acres of artificial reef habitat, at a cost of \$10.6 million to \$26 million, would compensate for most entrainment losses.

This status report also discusses the status of the USEPA's 316(b) regulations under Clean Water Act section 316(b), regarding cooling water intake structures.

Several attachments are included with this report. Note that hard copies of the attachments are provided to Water Board members only. Electronic copies of these attachments are located at: <http://www.swrcb.ca.gov/rwqcb3/Facilities/Diablo/Diablo.htm>

1. *Independent Scientists' Recommendations to the Regional Board Regarding "Mitigation" for Cooling Water Impacts* (Raimondi, Foster, Cailliet), July 2005
2. PG&E's comments on the Mitigation Paper, May 2005
3. CA Department of Fish and Game comments on the Mitigation Paper, April 2005
4. PG&E's Benefits Valuation Study for Diablo Canyon Power Plant, February 2005
5. *Research on Estimating the Environmental Benefits of Restoration to Mitigate or Avoid Environmental Impacts Caused by California Power Plant Cooling Water Intake Structures*, Stratus Consulting, October 2004
6. *The Science of Marine Reserves*, PISCO, 2002

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 Canyon Nuclear Power Plant in San Luis Obispo County (DCPP). The draft NPDES Permit incorporates by reference a settlement agreement and a conservation easement approved by the Board at their meeting on March 23, 2003. At the July 10, 2003 hearing, staff presented evidence regarding alternatives to address impacts caused by the once-through cooling system at DCPP. Impacts are caused by entrainment of planktonic life forms in the intake system and by the thermal discharge.

Entrainment impacts are extraordinarily difficult to quantify and interpret. Agencies have been struggling to define and address entrainment impacts for several decades. The

entrainment study at DCPP is the most comprehensive study of its type ever done. Nevertheless, fisheries are characterized by great natural variability, which results in large statistical errors in any sampling program. There is no practical solution to this problem.

Technological alternatives to address once-through cooling water impacts include:

1. Moving the intake and/or discharge structure offshore.
2. Retrofitting the power plant with a closed cooling system (fresh water or salt water cooling towers, or a dry cooling system)
3. Retrofitting the intake structure with fine mesh screens.

On July 10, 2003, staff presented evidence from the literature and site-specific studies (including independent evaluations) that demonstrate the infeasibility of the options listed above. These alternatives have major limitations and extremely high costs for DCPP, as summarized below.

Moving the Intake and Outfall Offshore

Moving the intake or discharge structure offshore would cause major ecological impacts in the near shore rocky reef habitat. This option has never been done for a setting like DCPP, where the bathymetry is steep, rocky, and the depth increases rapidly offshore. The offshore intake and discharge structures would be similar in size to a subway, and would have to be moved thousands of feet offshore. The Water Board's independent engineers (Tetra Tech) reported that this option is difficult to cost because it has never been done, but general estimates are in the hundreds of millions of dollars. This option is not feasible at DCPP.

Cooling Towers

Saltwater cooling towers are used on several smaller facilities throughout the United States. However, the County Air Pollution Control District would not permit saltwater towers at DCPP because the towers discharge salt drift, which impacts the surrounding local landscape. In addition, the massive physical area required for this option does not exist near DCPP. If this option were feasible at DCPP, the Water Board's independent engineers estimate the cost of salt water towers at \$1.3 billion or more.

Freshwater cooling towers are also used at several smaller facilities. Freshwater towers at DCPD would require 50 million gallons per day of make-up water. Make-up water is needed to replace the water lost to evaporation. Since there are only minor freshwater supplies available at DCPD, a massive desalination unit would have to be built to provide the necessary make-up water. As with saltwater cooling towers, the physical area needed for this option (plus the massive desalination unit) does not exist at DCPD. The Water Board's independent engineers did not provide cost estimates for this option because it is incomprehensible. If the option were feasible, the cost would be in the billions of dollars.

Dry Cooling

Dry cooling completely eliminates once-through cooling and is used on relatively few smaller scale facilities in the United States. Dry cooling is not feasible at DCPD because it would be physically impossible to locate the massive cooling units close enough to the power plant. The required dry cooling units would require a footprint the size of five football fields, with a height of over 100 feet. Engineering limitations require dry cooling units to be within a certain distance of the power generation units. This is not possible at DCPD. If this option were feasible, it would cost several billion dollars.

Fine Mesh Screens

Fine mesh screens are an experimental technology and have not been used at a facility like DCPD. Utility companies have conducted limited larval survivability studies on fine mesh screens, but the data are highly variable and do not indicate that fine mesh screens kill fewer larvae than once-through cooling. It is physically possible to retrofit the intake structure at DCPD with fine mesh screens, however, due to debris loading, biofouling, and the experimental nature of fine mesh screens, staff does not consider this option to be feasible. This option would cost \$650 million or more at DCPD.

Tentative Settlement Agreement

Staff presented the information above to the Water Board on July 10, 2003, and substantial

supporting evidence is in the record. Considering the infeasibility of technology alternatives, Water Board staff and legal counsel negotiated a tentative settlement with PG&E to address the cooling water impacts at DCPD (i.e., entrainment, impingement and thermal impacts). The settlement agreement included permanent protection of 5.7 miles of coastline habitat (measured by following the contours of the coastline) and approximately \$6 million for other projects. However, after lengthy deliberation on July 10, 2003, the Water Board directed staff to reconvene the Technical Workgroup (TWG) and further investigate potential mitigation options, particularly the establishment of marine reserves.

Mitigation Options

TWG members include Water Board staff, the Water Board's independent scientists, PG&E's staff and consultants, and staff for the Department of Fish and Game. During our initial meetings, Water Board staff realized that the TWG members did not agree on the mitigation options for Diablo Canyon Power Plant. Staff therefore directed the Water Board's independent scientists (Drs. Raimondi, Foster, and Cailliet) to evaluate mitigation options based on science and practicality. The Water Board's independent scientists drafted a paper evaluating mitigation options (*Diablo Canyon Power Plant: Independent Scientists' Recommendations to the Regional Board Regarding "Mitigation" for Cooling Water Impacts*, hereafter Mitigation Paper).

Staff provided a status report on the Mitigation Paper to the Water Board on May 14, 2004. Staff presented the benefits of marine reserves as a potential mitigation option as discussed in the Mitigation Paper. The Water Board directed staff to further evaluate artificial reefs, including scale and cost, as an option for addressing entrainment impacts at DCPD. Accordingly, the Water Board's independent scientists have since revised the Mitigation Paper based on empirical data from the artificial reef project at the San Onofre Nuclear Generating Station. Dr. Raimondi is the principle author of this revision and will summarize the mitigation paper and the

available information on artificial reefs at the September 9 Water Board meeting. The current version of the Mitigation Paper is included here as Attachment 1. Comments on the Mitigation Paper, from PG&E and the Department of Fish and Game, are also included as Attachments 2, and 3.

The Mitigation Paper provides a detailed discussion on scaling an artificial reef to compensate for the entrainment losses at DCP. The Mitigation Paper concludes that 210 to 500 acres of artificial reef habitat, at a cost of \$10.6 million to \$26 million, would compensate for most DCP entrainment losses. The new 316(b) regulations require existing facilities to reduce entrainment by 60 to 90% (subject to certain cost limits, discussed later in this staff report). Assuming that the 60 to 90% reduction applies, the size of the artificial reef could be reduced accordingly. The scale and cost would then be 126 to 450 acres, at a cost of \$6.36 million to \$23.4 million. The current settlement includes \$6 million for marine projects plus the easement. At the time the settlement was negotiated, staff estimated its value at \$16 to \$26 million.

PG&E disagrees with the approach described in the Mitigation Paper (see PG&E's comments, Attachment 2). PG&E does not agree with the concept of converting larval losses to acres of habitat, and does not agree with the method of determining larval loss values based on the cost of creating habitat. PG&E submitted its estimate for the value of entrainment losses in March 2005. PG&E's report is included here as Attachment 4. PG&E estimates the value of entrainment losses at DCP at \$18,635 to \$34,206 per year, with a mean of approximately \$26,000 per year. PG&E estimates that the present value of eliminating all impingement and entrainment until 2053 (the latest potential closure date for the plant) is between \$563,986 and \$1,035,240, and that the present value of meeting the performance standards of the 316(b) regulations through 2053 is between \$401,915 and \$823,809.

Staff acknowledges that habitat replacement costs are in fact "costs" and not the true value

of entrainment losses. Ideally, the true value of entrainment losses would be determined based on the value of "services" provided by entrained larvae. These services would include ecological benefits and benefits to humans. Ecological benefits are sometimes called "non-use" benefits. These benefits can be impossible to determine and are often ignored or given a token value. Benefits to humans are estimated by converting entrained larvae to adult fish and estimating the value of the adult fish based on commercial fish landings (market price). Utility companies most often use some version of this latter approach.

Water Board staff believe habitat creation or restoration costs are a better indication of value than the commercial value of adult fish. Habitat creation or restoration is an ecosystem level approach that addresses all entrained taxa. The commercial fish approach focuses on a tiny subset of entrained taxa and ignores the larger ecosystem level impacts.

Water Board staff used the habitat approach for the Moss Landing Power Plant NPDES permit, where we converted entrainment losses to acres of habitat, and then converted acres to dollars based on habitat restoration costs. The Water Board, Energy Commission, and Duke Energy agreed on \$7 million as an appropriate "value" for the mitigation fund at Moss Landing. Water Board staff used the same approach for the Morro Bay Power Plant Energy Commission certification. Water Board staff, the Energy Commission, and Duke Energy agreed during the certification process that \$12.5 million was an appropriate value for the habitat restoration fund. Water Board staff believe that converting entrainment losses to habitat units is the most reasonable way to value entrainment losses and to understand the magnitude of impact.

The Duke Energy valuations were made before the 316(b) regulations for existing power plants took effect. The new 316(b) regulations allow habitat restoration as a compliance alternative, but the application is not straightforward. Several lawsuits have been filed against the USEPA challenging the new regulations, as summarized later in this

staff report under the section: Status of USEPA's 316(b) Regulations.

Water Board staff's habitat-based approach is similar to the mitigation options and scaling discussed in Attachment 5, the report titled: *Research on Estimating the Environmental Benefits of Restoration to Mitigate or Avoid Environmental Impacts Caused by California Power Plant Cooling Water Intake Structures*, Stratus Consulting, October 2004. The Energy Commission contracted with Stratus Consulting to provide an independent evaluation of restoration actions that would benefit entrained species and describe methods for scaling restoration actions to the impacts. The paper discusses artificial reefs, habitat restoration and enhancement, and marine reserves as mitigation options. The Stratus report is provided for background information.

Water Board staff and PG&E are pursuing peer review for both PG&E's valuation report and the independent scientists' Mitigation Paper.

The Mitigation Paper also discusses other options, as discussed below:

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 feasible option.

Restoration of Marine Habitat: Restoration of marine habitat that would lead to enhanced larval production for most entrained 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" work that could be implemented to correct the problem, other than terrestrial restoration. 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 to address entrainment.

However, passive intertidal restoration (allowing for natural restoration by preventing or limiting access) is a possible mitigation option. Water Board staff and Dr. Raimondi have discussed intertidal impacts associated with public access in places like Montana de Oro State Park. The Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) has documented major intertidal impacts in State Parks. Mitigation funds could be directed toward better management of public access in these areas to directly improve habitat and habitat productivity. This option would directly benefit the same habitat and species impacted by the thermal discharge. This option would also benefit entrained larval species that use the intertidal zones. Water Board staff and the Board's independent scientists consider passive restoration of intertidal areas in State Parks to be a feasible and beneficial option.

Conservation Easement (as described in the 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. There is also a direct nexus between intertidal species affected by the thermal discharge and the intertidal habit

protected by the easement. Water Board staff and the independent scientists consider the easement to be a beneficial option.

In December 2004, the Coastal Commission adopted a permit for PG&E's Spent Fuel Storage Installation and required increased public access to PG&E lands as a mitigation measure. This requirement for increased public access includes adding a bluff top trail along the easement property, and up to 275 visitors per day. Ironically, this is the type of land use activity, and associated impact, Water Board staff were trying to prevent with the easement. As stated above, the PISCO program has documented major intertidal impacts where public access occurs.

As part of the process of developing the access plan, the Coastal Commission convened a Task Force to review the existing environmental information compiled by PG&E and make recommendations about any further data or studies that might be required to assist in developing the access plan.

The Task Force members have expertise in marine biology, terrestrial biology, cultural resources, and managed grazing, and includes staff from the Coastal Commission, the Water Board (Dr. Peter von Langen), other state agencies, PG&E's technical staff, and academia.

PG&E must submit to the Coastal Commission a baseline environmental inventory by March 2006, and an access plan and access monitoring plan by June 2006. The Access Plan must be implemented by December 2005. As noted above, Water Board staff is participating in this effort, but the details, including the amount of resource protection that will be provided in the Access Plan, are unknown at this time. Staff plans to work with PG&E and the Coastal Commission to develop an Access Plan that is as protective of natural resources as possible. One option is to develop an Access Plan that results in no impacts to natural resources, and to export the management practices to other locations, like Montana de Oro State Park, as part of an overall mitigation package.

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.

The Department of Fish and Game submitted comments to the Water Board stating support for this option.

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) is 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. This type of monitoring is also required by the 316(b) regulations.

Marine Reserves: There are several potential benefits of marine reserves, 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 reserves would 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 reserves are particularly attractive. In staff's opinion, this option would provide ecological benefits (i.e., increased populations of fish and shellfish), including maintenance or protection

of community structure and function in the coastal zone impacted by the facility.

The Department of Fish and Game also submitted comments on this option, stating that funds could be applied to marine reserves, but marine reserves should not be the only option funded. DFG recommends funding for their abalone research work, and states support for artificial reefs (Attachment 3).

Status of USEPA's 316(b) Regulations

The USEPA published 316(b) regulations for existing power plants on July 9, 2004. The regulations allow five options to comply with entrainment and impingement reduction standards. The regulations require an entrainment reduction of 60 to 90%, and an impingement reduction of 80 to 95%, from a "baseline" operating condition. These numeric requirements are the regulatory "performance standards." The discharger may use technology, operational measures, and/or mitigation to comply with the entrainment and impingement reduction standards. While this standard is relatively straightforward (except for the "baseline" definition), there are two important cost tests that dischargers can apply. These are the cost-cost test and the cost-benefit test. The cost-cost test is based on USEPA's national cost estimates for retrofitting existing facilities with certain intake technologies, such as fish return systems and fine mesh screens. If the site-specific cost to retrofit a facility with fine mesh screens is "significantly greater" than USEPA's national cost estimates for a similar facility, the discharger can request site-specific alternative requirements that are as close as practicable to the performance standards, without costs that are "significantly greater" than the USEPA cost estimates. USEPA does not define the term "significantly greater."

The cost-benefit test is based on the "value" of entrainment and/or impingement losses. If the site-specific cost to comply with the entrainment/impingement reduction standard is "significantly greater" than the value of the benefits that would be derived, the discharger can request site-specific standards that produce benefits as close as practicable to the

performance standards, without costs that are "significantly greater" than the benefits.

USEPA has provided limited information on appropriate methodologies for valuing benefits. USEPA did not use the habitat replacement cost (HRC) method for calculating the national benefits of the regulations. HRC is similar to the method Water Board staff used at Moss Landing Power Plant and Morro Bay Power Plant. HRC is also similar to the method used by the Water Board's independent scientists to scale artificial reefs for DCP.

PG&E asserts that HRC cannot be used to value benefits under the regulations. However, USEPA did not rule out this method for purposes of applying the cost-benefit rule. A benefits valuation must consider both use and non-use benefits. Valuations can be "quantitative" or "qualitative." Quantitative benefits assessments "should" follow accepted best practices for such studies, including guidance by USEPA and the Office of Management and Budget. USEPA did not provide guidance on "qualitative" benefits assessments in the 316(b) context, but this language is broad enough to include an HRC analysis, at least as one component of the analysis, even if HRC is not determined to be a "quantitative" method.

At this point it is important to keep in mind that the independent scientists' charge was to determine what projects could mitigate for DCP's impacts, and not to determine compliance with the regulations. HRC is an accepted way to scale mitigation projects to a facility's impacts, despite the controversy surrounding its use as a valuation methodology.

The cost-cost test and cost-benefit test, the mitigation option, and the valuation requirements of the regulations are extraordinarily contentious issues. Several parties have filed lawsuits against the USEPA regarding these and other issues associated with the new 316(b) regulations. The cases are pending before the same court that issued the decision in *Riverkeeper v. USEPA*, 358 F.3d 174 (2d Cir. 2004), holding that new facilities cannot use mitigation measures to satisfy section 316(b).

The States of Connecticut, Delaware, Massachusetts, New Jersey and New York, several power companies and the Utility Water Act Group (UWAG), and a number of environmental groups have challenged the regulations. The cases were consolidated and are now pending in the Second Circuit Court of Appeal, *Surfrider Foundation et al. v. USEPA* (2d Cir. Case No. 04-6692-ag(L)). Final briefs are due in late March 2006, and the court may not issue a decision until late in 2006, or even later.

The environmental Petitioners and the States argue that USEPA lacks authority to allow power plants to comply with CWA section 316(b) by implementing mitigation or "restoration" measures. These Petitioners argue that the Clean Water Act requires the USEPA to find that the "best technology available" (BTA) standard requires closed-cycle cooling or dry cooling. A list of other issues in the case follows.

Environmental Petitioners also argue that:

1. USEPA violated the Clean Water Act (CWA) when it retracted a proposed requirement in a draft of the regulations mandating closed-cycle cooling for the largest 10 percent of existing facilities. The Environmental Plaintiffs argue the withdrawal was to maximize economic benefit to the power-generating industry, rather than to minimize environmental impact as the CWA requires.
2. The regulations' performance standards for impingement and entrainment violate the CWA because they are expressed as ranges that do not require facilities to maximize performance within those ranges, and the final regulations allow a second margin of error below the ranges' lower bounds.
3. The cost-benefit test is inconsistent with the CWA amendments because it bases permitting on: (a) a site-specific assessment of each facility's consequential impact on fish populations and aquatic ecosystems; and (b) "monetization" of the goods and services that accrue from avoiding aquatic mortality.

4. The cost-cost test does not create national uniformity of regulations. USEPA violated public participation requirements when it promulgated this part of the regulations.

5. The regulations allow "stand alone" facilities built at the site of an existing facility to be considered "existing facilities" for purposes of section 316(b) (and avoid more stringent standards that apply to new facilities), if the stand alone facilities use existing, unmodified intake structures.

The States also argue that:

1. The cost-cost test and cost-benefit test create exemptions to the technology requirement of section 316(b) that ensure that closed cooling will never be required, and closed cooling constitutes BTA for existing facilities.

2. The regulations establish performance standards that are too lenient.

3. The regulations improperly allow permit writers to consider the already degraded quality of receiving waters when applying the cost-benefit test.

4. The regulations place an undue administrative burden on the States.

PSEG Fossil LLC and PSEG Nuclear LLC argue that:

1. USEPA cannot reverse its practice of defining "adverse environmental impact" in section 316(b) with reference to population-level effects on fish and shellfish (the standard used in the "wholly disproportionate" test), and instead use a more stringent standard based on loss of aquatic organisms, without regard to whether population-level effects result.

2. USEPA cannot require consideration of "qualitative" non-use benefits as part of the cost-benefit test. Qualitative considerations of non-use benefits involve placing a value on killed fish and shellfish that do not have

commercial or recreational monetary value (i.e., fish and shellfish that are not harvested).

3. In calculating the impacts of an intake structure, the regulations assume that all entrained and impinged organisms are killed. This is improper because there is evidence that some organisms survive.

Appalachian Power Company, Illinois Power and UWAG argue that:

1. See PSEG argument No. 3.

2. USEPA violated notice requirements in adopting, and provided no basis for, provisions of the regulations requiring facilities that receive cooling water from someone else's intake.

3. If the Court agrees with the States and Environmental Petitioners and invalidates the restoration provisions, the cost-cost test and/or the cost-benefit test, then the performance standards for impingement and entrainment are too stringent.

Entergy argues that:

1. Congress did not intend section 316(b) to apply to power plants with existing intake structures that already necessarily have been located, designed, constructed, and sized with respect to capacity.

2. The regulations improperly require nuclear power plants to employ technologies that the administrative record indicates are not "available" to such facilities, and the regulations disproportionately impacts nuclear power plants.

3. The regulations' application of section 316(b) to existing facilities is not economically practicable as required by federal law.

PG&E's Options for Compliance

PG&E has several options for complying with the regulations. First, the regulations include a grandfather provision, which allows a discharger until no later than January 2008 to

provide the extensive documentation that the regulations require to support 316(b) findings. Pending a 316(b) determination based on this information, the "best professional judgment" (BPJ) standard applies. USEPA has stated that BPJ is determined based on existing USEPA guidance and other legal authorities, which include the wholly disproportionate cost analysis.

Second, PG&E may request a site-specific standard under the cost-benefit test. Presumably, PG&E would base this standard on its 2005 Benefits Valuation Study (Attachment 4). However, the Benefits Valuation Study has not yet been peer reviewed. (The regulations require the discharger to provide a peer review if the Board requests one, and staff has requested a peer review.) Finally, PG&E could propose a combination of technology, operational measures and/or mitigation that achieves the performance standards. Although PG&E must decide which option to request, the regulations required the Board to review the application and then determine which compliance option applies. Since a revised settlement agreement would determine how PG&E will satisfy the 316(b) requirements, staff has not requested a revised permit application.

If the court strikes down the regulations, the Board and staff would base section 316(b) determinations on BPJ until revised regulations become effective.

Status of the Water Board's Cease and Desist Order Regarding Thermal Effects

In 2000, staff issued a draft cease and desist order (CDO) alleging that PG&E was in violation of certain receiving water standards and a standard provision (all related to thermal effects of the discharge). Water Board staff alleged PG&E was in violation of the existing permit, and proposed a CDO on that basis. The draft CDO required PG&E to submit a report describing the physical and operational power plant modifications necessary to comply with its NPDES permit, or, submit a proposal and schedule for achieving protection of marine beneficial uses through other alternative measures.

The Water Board held a hearing on March 30, 2000, to consider evidence regarding the CDO. After hearing evidence, the Water Board closed the hearing on the draft CDO and continued the matter. Prior to the Water Board reconvening the hearing, PG&E agreed to settle allegations in the draft CDO. Staff presented an outline of the settlement agreement to the Water Board in July 2000, and a presented a formal settlement proposal in October 2000. The Water Board approved the settlement proposal in October 2000, and directed staff to draft a consent judgment describing the details of the agreement. In July 2003, the Water Board directed staff to consider additional mitigation options with respect to entrainment, including funding support for marine reserves. Since the settlement agreement has not become final, the CDO matter is still pending.

The draft CDO did not directly impose any administrative civil liability (ACL). In order to collect ACL for violation of a CDO, the Board issues an ACL complaint alleging that the CDO was violated. Instead of or in addition to issuing a CDO when there is a permit violation, the Board can assess ACLs for violation of the permit terms (as opposed to violation of a CDO).

CONCLUSION

Water Board staff have established a substantial record of evidence that demonstrates the lack of feasible technology alternatives to reduce entrainment at DCP. Staff also considered mitigation options to address cooling water impacts. The Water Board's independent scientists drafted a Mitigation Paper that concludes 210 to 500 acres of artificial reef habitat, at a cost of \$10.6 to \$26 million, would compensate for most entrainment impacts. The Mitigation Paper's recommendation is based on the conclusion that artificial reefs would provide the most direct mitigation for entrainment impacts. The Mitigation Paper does not conclude, however, that artificial reefs are the best alternative or that they provide the best environmental benefits.

The mitigation paper also discusses other options, such as funding for marine reserves, the terrestrial easement, and passive restoration of degraded intertidal areas. Staff agrees these are viable options that would provide significant benefits. Staff also believes that long-term funding for marine reserves, as part of the State's on-going Marine Life Protection Act process, would provide the greatest ecological benefit on a regional scale.

Several parties have filed petitions against the USEPA's new 316(b) regulations, challenging many aspects of the rule, including the legality of restoration as a compliance option. The state of the law is unclear. In general, utility companies are reluctant to propose or negotiate mitigation options because of the uncertainty regarding the 316(b) rule. It will likely be at least one year before the Court resolves the legal arguments, which may include striking down the rule or specific sections. This in turn may cause USEPA to reevaluate other provisions of the regulations as well.

NEXT STEPS

As noted above, staff considers long-term funding for marine reserves to be the most beneficial mitigation option for power plant impacts. Marine reserves on the central coast are likely to be established as part of the Marine Life Protection Act process. However, long-term funding, separate from the State's volatile budget process, is essential to ensure success of any established marine reserve network. Mitigation funding from coastal power plants, where technology alternatives are not feasible, is a reasonable and appropriate source of funds for this purpose. Once-through cooling presents a statewide ecological issue, and marine reserves are a statewide ecological tool to help protect the marine ecosystem. Funding for marine reserves would benefit the overall ecosystem and the overall community, not a particular agency or group. Staff will continue to pursue this option with the Department of Fish and Game, the Fish and Game Commission, the Coastal Commission, and other agencies.

Staff looks forward to discussing this project with the Water Board, and seeks direction from the Board.

Staff will also continue to participate in the Coastal Commission process regarding development of the access plan.

ATTACHMENTS

Several attachments are included with this report. Note that hard copies of the attachments are provided to Water Board members only. Electronic copies of these attachments are located at: <http://www.swrcb.ca.gov/rwqcb3/Facilities/Diablo/Diablo.htm>

1. *Independent Scientists' Recommendations to the Regional Board Regarding "Mitigation" for Cooling Water Impacts* (Raimondi, Foster, Cailliet), July 2005
2. PG&E's comments on the Mitigation Paper, May 2005
3. CA Department of Fish and Game comments on the Mitigation Paper, April 2005
4. PG&E's Benefits Valuation Study for Diablo Canyon Power Plant, February 2005
5. *Research on Estimating the Environmental Benefits of Restoration to Mitigate or Avoid Environmental Impacts Caused by California Power Plant Cooling Water Intake Structures*, Stratus Consulting, October 2004
6. *The Science of Marine Reserves*, PISCO, 2002