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From: "Donald Schulz" <surfdad@hotmail.com>
To: <dstone@energy.state.ca.us>
Date: 9/20/2006 2:47:06 PM
Subject: State Board OTC Comment Letter.

Hi Donna;

The attached letter to the SWRCB regarding Clean Water Act Section 316(b) regulations is submitted on behalf of our environmental stakeholder coalition for the consideration of the CEC Staff and Board members at the forthcoming CEC AES Permit Workshop on Sept. 25.

Hard copy to follow.

Thanks for your attention to this issue.

Don Schulz P.E. (562)430-2260
Surfrider Foundation; Huntington Beach/Seal Beach Chapter

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September 15, 2006

Ms. Tam Doduc, Chair and Board Members
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814
Via Email: commentletters@waterboards.ca.gov

Re: Comments on "Proposed Statewide Policy on Clean Water Act Section 316(b) Regulations"

Dear Chair Doduc and Members:

The undersigned groups respectfully submit the following comments with respect to the State Water Resources Control Board ("State Board") staff's proposed policy ("draft policy") on once-through cooling ("OTC"). We thank the State Board and staff for its dedication to this issue. Staff has done an excellent job engaging the public through workshops and expeditiously preparing a draft state policy that implements state law and represents a much-needed, and legally required, improvement over the federal Clean Water Act section 316(b) regulations. We also appreciate the State Board's ongoing coordination with the California Energy Commission ("CEC"), Ocean Protection Council ("OPC") and its member agencies, and other agencies in the continued development of this policy.

Multiple federal and state agencies, including the Environmental Protection Agency ("EPA"), CEC, OPC, and State Lands Commission ("SLC"), have recognized that once-through cooling causes significant, ongoing devastation to our valuable marine resources. In June of 2005, the CEC released a comprehensive staff report identifying OTC as a contributing factor to the degradation of California's fisheries, estuaries, bays and coastal waters.[1] The SLC, which includes the Lt. Governor, Director of Finance and State Controller, unanimously adopted a recent resolution opposing the continued use of OTC, finding that "the Governor's Ocean Action Plan calls for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands, a goal which can best be met by prohibiting, phasing out, or reducing to insignificance the impacts of once-through cooling."[2] The SLC's resolution contained a number of findings, including that "once-through cooling significantly harms the environment by killing large numbers of fish and other wildlife, larvae and eggs as they are drawn through the screens and other parts of the power plant cooling system" and that "once-through cooling also significantly adversely affects marine, bay and estuarine environments by raising the temperature of the receiving waters, and by killing and displacing wildlife and plant life."[3]

Similarly, through a resolution adopted in April 2006, the OPC, representing the Secretaries of the Resources Agency and Cal-EPA and the Chair of the State Lands Commission, unanimously urged the State Board to go beyond the federal rule and implement "more stringent state

[1] California Energy Commission (2005) Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants: Staff Report. Available at: www.energy.ca.gov/2005publications/CEC-700-2005-013/CEC-700-2005-013.PDF. Accessed 8.2.06. ("CEC Staff Report").
[2] Resolution By The California State Lands Commission Regarding Once-Through Cooling In California Power Plants (adopted April 17, 2006) (emphasis added). Available at: archives.slc.ca.gov/Meeting_Summaries/2006_Documents/04-17-06/ITEMSANDEXHIBITS/R71ExhA.pdf Accessed 8.2.06 ("SLC Resolution").
[3] *Id.*

requirements requiring reductions in entrainment and impingement at existing coastal power plants." The OPC further encouraged the State Board to "implement the most protective controls to achieve a 90-95 percent reduction in impacts."[4] Through both resolutions, **the top elected and appointed officials in the State, including officials overseeing the health of the state's economy, agreed that: (a) once-through cooling causes significant, devastating impacts to California's coastal and estuarine ecosystems, and (b) this antiquated technology needs to be phased out on an expeditious schedule that reflects the state's strong commitment to a healthy coast and ocean.**

In a state where over 86% of our total economic activity is fueled by the health of our coastal resources, and in a state leading the nation in a strong commitment to sustainable energy, there is no question that California has the right and responsibility to move beyond the minimum standards outlined in section 316(b) of the Clean Water Act ("CWA").[5] Accordingly, **we support the draft policy's stated goal of 90-95% reductions in impacts**, language that follows the guidance in the OPC's and SLC's Resolutions, and that reflects the leadership asserted by the Governor in support of policies that steer California towards both a sustainable energy infrastructure and a sustainable environment. We also support the proposal to disallow economically-based exceptions in the draft policy, which similarly underscores California's dedication to protecting our marine and coastal environment by minimizing impingement and entrainment in our waters.

We encourage the State Board to continue along this path and adopt a final policy that effectively and fully prevents impacts from OTC to California's marine and estuarine environment. Any interim industry steps to evaluate or potentially implement methods to comply with the federal requirements of CWA section 316(b) regulations (which are under legal challenge in the U.S. Court of Appeals for the Second Circuit, *Surfrider Found. v. U.S. EPA*, No. 04-6692) should not deter the State Board from pursuing its own policy on OTC that reflects state law and state needs, as such steps can serve as the basis for plans to comply with the pending state policy.

We provide the following recommendations and comments to address potential loopholes and implementation gaps in the draft policy that may impede progress towards the stated goals. In particular, **to ensure the goal of 90-95% reduction in impacts is achieved rather than thwarted, we urge that, among other things, the draft policy be amended to**: (a) include all plants (rather than exempting the numerous plants impacting our environment and generating little electricity), (b) ensure that the method for calculating the reductions is based on the flow needed to actually generate electricity, (c) narrow the definition of what a "feasible" reduction to prevent a rush to seek exemptions from required prevention of impacts, (d) avoid use of restoration, mitigation and credits in place of actual prevention of impacts, (e) put responsibility for nuclear safety issues on the Nuclear Regulatory Commission, and (f) set clear deadlines for action and for achieving the stated goals. Only if these and other loopholes and gaps are addressed will the policy be effective at protecting the beneficial uses of the waters of the state from OTC's devastating impacts.

These comments are further delineated in the following pages as outlined below:

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[4] Resolution of the California Ocean Protection Council Regarding the Use of Once-Through Cooling Technologies in Coastal Waters (adopted April 20, 2006). Available at: resources.ca.gov/eopc/docs/060418_OTC_resolution_LH2_adopted_2006-4-20.pdf Accessed 8.1.06. ("OPC Resolution").

[5] National Ocean Economics Program (July 2005) California's Ocean Economy: Report to the Resources Agency, State of California, p.1. Available at: resources.ca.gov/press_documents/CA_Ocean_Econ_Report.pdf Accessed 9.12.06.

I. The Policy Goal of 90-95% Reduction in Impingement and Entrainment Impacts is Appropriate for California
   A. It Is Well-Established that Once-Through Cooling Systems Significantly Impact Surrounding Ecosystems
   B. The Goals Set by the Policy Are Consistent with State and Federal Law
   C. The Proposed Reductions Are Technologically and Economically Practical
   D. The Draft Policy Is Consistent with California's Energy Action Plan
   E. The Role of the Expert Review Panel Should Be Expanded to Include Review of All Technical Analyses Required by the Policy
II. Potential Loopholes in the Draft Policy Should Be Closed to Ensure that 90-95% Reduction in Impacts from Existing Power Plants Is Actually and Expeditiously Achieved
   A. All Plants Must Be Included in the Policy
   B. "90-95% Reduction from What?" The Calculation Baseline Must Be Set to Ensure that Required Reductions Are Achieved
   C. There Must be Limits Governing Determinations of "Feasibility"
   D. Credits Should Be Allowed Only to Reward Decisions Intended to Reduce Impacts
   E. The Policy Must Include Seasonal Protections for Larval Organisms to Effectively Meet Entrainment Reductions
   F. Existing Facilities that Repower or Retool Must Be Classified as "New" Facilities.
   G. The Policy Should Provide a Well-Defined and Expeditious Compliance Deadline
III. Restoration and Mitigation Are Not Effective Substitutes for Preventing Impacts
   A. Compliance Alternatives that Rely on Restoration And Mitigation Should Not Be Included in the State Policy, as the Use of Restoration Cannot Achieve the Goals of the Clean Water Act and Porter-Cologne
   B. A Rigorous Analysis of All Feasible Technological and Cooling Alternatives, Including Use of Treated Wastewater as Coolant, Should Be Conducted at Each Facility
IV. Nuclear Safety Questions Should Be Addressed to the Nuclear Regulatory Commission
V. The Policy Must Include Needed Details to Ensure Consistent Implementation
   A. The Plants Required to Conduct Cumulative Impact Studies Should Be Explicitly Identified
   B. The Monitoring Provisions Must Be Further Specified to Ensure Consistent Implementation and to Characterize Compliance Accurately
VI. Conclusions

The State Water Board would never approve a state policy that allowed chemical pollutants to continually destroy fish, wildlife and habitats impacted by a Clean Water Act-regulated facility. Similar commitment to the Clean Water Act and Porter-Cologne is needed to control impacts associated with once-through cooling. Accordingly, we applaud the goals of staff's proposed policy as not only implementing the letter and intent of state and federal law, but also California's strong commitment towards a sustainable environment and energy future. We urge the Board to make the changes outlined in these comments in order to effectuate those goals most closely. With the amendments suggested below, the State Board will have a policy that finally protects the state's long-suffering coastal waters and habitats from the enormous local and regional impacts associated with once-through cooling.

I. THE POLICY GOAL OF 90-95% REDUCTION IN IMPINGEMENT AND ENTRAINMENT IMPACTS IS APPROPRIATE FOR CALIFORNIA

As noted above, we support the draft policy's proposed requirements that impingement be reduced by 95% from the calculation baseline, and entrainment by up to 90% but not less than 60% of the calculation baseline. These goals reflect the significant, ongoing damage caused by once-through cooling systems, and are consistent with both California's commitment to a healthy coastal ecosystem and to a sustainable energy policy.

A. It Is Well-Established that Once-Through Cooling Systems Significantly Impact Surrounding Ecosystems

After a thorough review of the comprehensive rulemaking record for implementation of section 316(b) of the Clean Water Act, the U.S. EPA determined conclusively that there are multiple types of undesirable and unacceptable environmental impacts associated with once-through cooling technology. Specifically, the EPA found the impacts to include entrainment and impingement; associated reductions of threatened and endangered species; damage to critical aquatic habitats and organisms, including important elements of the food chain; diminishment of a population's compensatory reserve; losses to populations including reductions of indigenous species populations, commercial fisheries stocks, and recreational fisheries; and stresses to overall communities and ecosystems, as evidenced by reductions in diversity or other changes in system structure and function.

The CEC has come to similar conclusions. In its comprehensive June 2005 staff report on OTC, the CEC identified OTC as a contributing factor to the degradation of California's fisheries, estuaries, bays and coastal waters.[6] The CEC further found that in addition to the entrainment and impingement impacts, once-through cooling technology causes damage to the nearby aquatic ecosystem through thermal impacts from the discharge of cooling water; this harm is especially damaging in more enclosed water bodies and in areas that are subjected to cumulative effects from closely sited plants.

The SLC and the OPC also both recognized and confirmed the serious impacts OTC has on our marine and estuarine environment in their resolutions, both unanimously passed in April 2006. In addition, the OPC's April Resolution noted that, contrary to industry's assertions in the August 2006 State Water Board workshop, the full negative impacts of OTC have yet to be fully assessed, stating:

> a recent report by the California Energy Commission found that, of the 21 Californian coastal power plants that use once-through cooling, only seven have recent studies of entrainment impacts that meet current scientific standards; and all these studies have found that adverse impacts occur due to entrainment of aquatic organisms; impingement and entrainment result in changes to community structure; thermal impacts from the discharge of cooling water may be significant, particularly in enclosed water bodies; and the possible cumulative impacts of entrainment and impingement are currently unknown.

[6] CEC Staff Report, *supra* note 1, p.1.

This daily assault on California's valuable coastal environment causes ongoing, serious harm. As exhibited in the recent Los Angeles Times 5-part series, *Altered Oceans*, our marine and coastal environments are under incredible amounts of stress and threatened, both globally and locally, by a diverse array of impacts.[7] The decrease of biodiversity in the world's oceans and declining populations of commercially and non-commercially important marine species are well documented.[8] Recreational fish landings in the Southern California Bight have decreased from an annual mean of 4.25 million fish in 1963 to 2.5 million fish in 1998.[9] Many marine populations, including certain species of rockfish and abalone, are at strikingly low levels, and some species which were common decades ago are now rare off the coast of California. The perilous state of California's coastal and ocean ecosystems make a meaningful OTC policy all the more important.

Some examples of the local and regional impacts of OTC are instructive. Michael Foster from the **Moss Landing Marine Laboratory estimates that 50 million marine and estuarine fish are entrained by coastal power plants each day in California.**[10] The California Energy Commission has also stated in testimony before the State Water Board that "[o]nce-through cooling is a major, ongoing environmental issue with California power plants," with "potentially widespread" cumulative effects in Santa Monica Bay and the SF-Bay Delta Estuary in particular.[11] Three facilities – Scattergood, Redondo Beach and El Segundo Generating Station - located within the same six-mile stretch of the Santa Monica Bay consume 13% of nearshore waters in the Bay every six weeks.[12] Even more astonishing is the impact of the facilities on Alamitos Bay; **Haynes and Alamitos Generating Stations turn over the entire Alamitos Bay every five days.**[13] The resulting indiscriminate take of plankton, fish, invertebrates, and other marine life help deplete commercially and recreationally important species; decrease species diversity; and cause further threat to species at risk of extinction and fisheries at risk of economic collapse. **The combined impingement from power plants south of Point Conception amounts to up to 30% of the recreationally caught fish in this region each year.**[14] These impacts can no longer be justified at coastal facilities, given that technologies to reduce these impacts have existed for decades and are used at non-coastal power facilities in California.

Nowhere has OTC's severe impacts on the California coastal environment been more well-documented than at the San Onofre Generating Station. The intake of this plant is estimated to have destroyed over 200 acres of kelp forest (approximately 59,000 kelp plants).[15] This, in turn, caused

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[7] Weiss, Ken and McFarling Usha Lee (July 30 – August 3, 2006) Altered Oceans: A five-part series on the crisis in the seas, *Los Angeles Times*. Available at: http://www.latimes.com/news/local/oceans/la-oceans-series,0,7842752.special. Accessed 8.12.06.

[8] Myers and Worm (May 2003) Rapid worldwide depletion of predatory fish communities, *Nature*, vol. 423; Hutchings and Reynolds (April 2004) Marine Fish Population Collapses: Consequences for Recovery and Extinction Risk, *BioScience*, vol. 54, no. 4.

[9] Dotson and Charter (2003) Trends in the Southern California Sport Fishery, CalCOFI Rep., Vol. 44, 2003, p.94.

[10] Foster, Michael, Presentation to the SWRCB (Sept. 26, 2005) http://www.swrcb.ca.gov/npdes/docs/wrkshp_laguna2005/pres_mosslandingfoster.pdf Accessed 8.10.06.

[11] CEC, Presentation to SWRCB (Sept. 26, 2005), http://www.waterboards.ca.gov/plnspols/docs/pres_cecmckinney.pdf.

[12] CEC Staff Report, *supra* note 1, p.37.

[13] Tenera Environmental and MBC Applied Environmental Science (October 2005) Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Sampling Plan for Haynes Generating Station, p.2

[14] CEC Staff Report, *supra* note 1, p.31.

[15] UN Atlas of the Oceans, Foster, S. and Shiel, David, "The Ecology of Giant Kelp Forests in California: A Community Profile" (1985), http://www.oceansatlas.org. Accessed 9.10.06.

the displacement or death of thousands of individuals from numerous other species. In total, the kelp fish population in the water surrounding San Onofre Generating Station is estimated to have declined by 80%.[16] To understand the magnitude of these kelp losses, one need only compare the plant's destruction of 200 acres (0.3125 square miles) of kelp forest with all existing stands of kelp forest along the entire Southern California mainland coast (3.7 square miles, according to the California Department of Fish & Game's Living Marine Resources Status Report).[17] In other words, this single power plant alone destroyed almost 10% of the kelp forests along Southern California's mainland coast, forests that cannot come back while OTC is in use. These calculations do not even include the associated losses of fish, invertebrate, and other marine life, as well as the ongoing destruction that occurs from the other coastal power plants using OTC. For example, a fish kill due to entrainment in the San Onofre cooling system in August 2005 wiped out over five tons of anchovies in a single event.[18]

OTC also has significant impacts on estuarine environments. For example, a pair of Contra Costa County power plants that have killed up to tens of millions of fish a year are being scrutinized by researchers investigating potential causes of the ecological crash in the Delta.[19] Regulators say that while the pumping stations at Byron and Tracy that deliver water to the San Joaquin Valley and Southern California are heavily scrutinized, **the Mirant pumps in Contra Costa County are almost completely ignored, even though the power plants take water out of more sensitive habitat, "right in the heart of [endangered] Delta smelt area."**[20]

At the State Water Board's Sacramento workshop on July 31, 2006, industry consultants alleged that these decreasing fish populations and other negative resource trends have not been occurring in regions around coastal power plants, and specifically stated that recreational catch per unit effort in and around the waters of the Diablo Canyon nuclear plant has not changed since before the plant was built.[21] These claims are misleading. Both recreational effort and catch in the waters adjacent to Diablo Canyon have been declining since the late 1980s.[22] Concurrently, commercial landings from nearshore rocky habitats in this region have been declining since the late 1990s, and Morro Bay landings have been in decline over the past 15 years.[23] For example, recent studies show that some recreationally and commercially important and threatened fish, including rockfish, croaker, and rock crabs, are among the most abundant species entrained by Diablo

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[16] *Id*, see also CA Department of Fish and Game, "California's Living Marine Resources: A Status Report" (Dec. 2001) ("Marine Resources Report").

[17] Marine Resources Report, *supra* n. 16, at 279.

[18] NC Times, San Onofre Reports Fish Kill (August 22, 2005) http://www.nctimes.com/articles/2005/08/23/news/top_stories/82205191806.txt Accessed 9.10.06.

[19] *See* Taugher, Mike, "Mirant plants attract attention in Delta crisis," *Contra Costa Times* (March 15, 2006), http://www.sfbayjv.org/news_summaries/2006/march/Mirant_plants_attract_attention_in_Delta_crisis.html Accessed 9.14.06

[20] *Id.*, Statement by Jerry Johns, Deputy Director, California Department of Water Resources.

[21] Oral comments given at the Proposed Statewide Policy for Once-Through Cooling [Clean Water Act 316(b) Regulations] Public Scoping Meeting on July 31, 2006 by John Steinbeck, Tenera Environmental

[22] Starr, Richard M, et al. (2002) Trends In Fisheries and Fishery Resources Associated with the Monterey Bay National Marine Sanctuary from 1981 – 2000. Available at: http://montereybay.noaa.gov/research/techreports/fisherytrends.pdf. Accessed 9.10.06

[23] California Coastal Commission (February 2, 2001) Periodic Review of the San Luis Obispo County LCP: Preliminary Report (As revised to incorporate errata/clarifications of the July 12, 2001 action). Available at: http://www.coastal.ca.gov/recap/slo/slo-ch11.pdf Accessed 9.10.06; Starr, Richard M, et al. (2002) Trends In Fisheries and Fishery Resources Associated with the Monterey Bay National Marine Sanctuary from 1981 – 2000. Available at: http://montereybay.noaa.gov/research/techreports/fisherytrends.pdf. Accessed 9.10.06

Canyon.[24] Although many factors contribute to species decline, OTC is an unnecessary and significant added stressor that can be controlled by a meaningful state policy.

Moreover, **the impacts from OTC are likely far more extensive than determined to date**. For example, as stated in our February 23, 2006 letter (Attachment A), the state policy must consider environmental impacts beyond just entrainment and impingement of small organisms. Neither CWA § 316(b) nor Porter-Cologne § 13142.5 make any distinction as to the type or size of marine organism impacted by once-through cooled facilities. In fact, voluntary reporting from marine mammal rescue personnel continues to illustrate that protected species including sea lions, harbor seals, and some sea turtles are "taken" by these facilities.[25] Nevertheless, Regional Boards do not appear to gather data consistently on the impacts of cooling structures on larger, non-fish species, such as marine mammals and sea turtles, although they have been documented to be caught in power plant intakes.[26] The state policy should change this practice and require permit applications to include information on cooling systems' impacts on larger organisms, including number and type of species swept into plant forebays, as well as those impinged against intake screens. This is all the more important because, despite long-standing mandates in the Endangered Species Act, Marine Mammal Protection Act, and other authorities, the National Oceanic and Atmospheric Administration also has not formally collected data on the impact of these power plants on larger organisms.[27] **Impacts on marine mammals, sea turtles, and other larger organisms, in addition to fish and invertebrates must be evaluated.** Although the scoping document addresses the need to minimize impacts to threatened, endangered, and protected species, this concept is not reflected in the draft state policy itself. We encourage the State Board to incorporate into the policy directorial language requiring evaluation of these species in any permit reviews.

B. The Goals Set by the Policy Are Consistent with State and Federal Law

Both federal and state law mandate the use of the best technology available for minimizing environmental impacts. For the past thirty years, closed-cycle recirculating cooling has been in wide use globally and achieves the 90-95% reductions called for by the draft policy. Also in wide use for many years are technologies that reduce impacts even further, including dry cooling and hybrid cooling systems. The applicable laws do not distinguish among power plants based on capacity factors or particular combustion types. Nor do the statutes speak to cost-benefit analysis or economics; rather, the statutes reflect decades of successful mechanisms intended to ensure the use of modern technology across the state.[28]

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[24] CEC Staff Report, *supra* note 1, p. 15.

[25] *See, e.g.*, 67 Fed. Reg. 61 (Jan. 2, 2002), "Small Takes of Marine Mammals Incidental to Specified Activities; Taking of Marine Mammals Incidental to Power Plant Operations," http://www.epa.gov/fedrgstr/EPA-IMPACT/2002/January/Day-02/i32238.htm Accessed 9.10.06 (Letter of Authorization granted pursuant to Marine Mammal Protection Act to take certain number of harbor seals, gray seals, harp seals, and hooded seals from in power plant operations).

[26] "Radioactive Leak Reaches Nuclear Plant's Groundwater," Los Angeles Times (Aug. 18, 2006), available at: http://www.latimes.com/news/local/la-me-radioactive18aug18,0,1132872,print.story?coll=la-home-local Accessed 9.10.06. ("Radio Active Leak Reaches Nuclear Plant's Groundwater").

[27] Voluntarily reported data is collected for the Marine Mammal Stranding Network by the National Marine Fisheries Service Southwest Regional Office. This data includes take information from only a subset of plants.

[28] See, *e.g.*, Lisa Heinzerling, *Statutory Interpretation in the Era of OIRA*, 33 Fordham L. J. 101 (2006).

1. The Clean Water Act

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[29] To effectuate this goal, in 1972, Congress fundamentally reformed the Act in what this Court has described as a "sea change" in this country's water pollution control strategy.[30] As amended, the Act prohibits all discharges of pollutants to waters of the United States, except as permitted in a National Pollutant Discharge Elimination System (NPDES) permit.[31] NPDES permits, issued by State agencies or EPA's regional offices, transform the generally applicable effluent limitations and other standards into specific obligations borne by the individual discharger.[32] These obligations were determined by Congress's focus on uniform technology standards in the 1972 amendments, which "predicated pollution control on the application of control technology on the plants themselves...."[33] These national technology standards, moreover, become more stringent over time. **As the Supreme Court has recognized, the potential for economic consequences does not dampen these mandates.**[34] Indeed, with the passage of time and the tightening of the standards, cost considerations were to be relegated to a more peripheral role in the selection of best technology.[35]

2. Clean Water Act Section 316(b)

"[W]ell aware of the dangers posed to aquatic life by the withdrawal of large volumes of water through cooling water intake structures"[36] and of the availability of alternatives (such as closed-cycle cooling), Congress included section 316(b) in the 1972 Act as part of its technology-based framework. Section 316(b) provides:

> Any standard established pursuant to [CWA §§ 301 or 306] and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the <u>best technology available for minimizing adverse environmental impact</u>.[37] (Emphasis added.)

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[29] CWA § 101(a), 33 U.S.C. § 1251(a).

[30] *Riverkeeper, Inc. v. EPA*, 358 F.3d 174, 184 (2d Cir. 2004) ("*Riverkeeper*"). The Act defines "pollution" broadly to include aquatic mortality caused by power plants: "The term 'pollution' means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." CWA § 502(19), 33 U.S.C. § 1362(19).

[31] CWA §§ 301, 402, 33 U.S.C. §§ 1311, 1342.

[32] *EPA v. California, ex rel. State Water Res. Control Bd.*, 426 U.S. 200, 205 (1976).

[33] *Hooker Chemicals*, 537 F.2d at 623. Water quality standards were retained in the 1972 Act as a supplementary mechanism that can be used to set limitations stricter, but not more lenient, than technology-based limitations. *Riverkeeper*, 358 F.3d at 184 n.10.

[34] *EPA v. National Crushed Stone*, 449 U.S. 64, 80 (1980) ("Comments in the Senate debate were explicit: 'There is no doubt that we will suffer some disruptions in our economy because of our efforts; many marginal plants may be forced to elose.'").

[35] *NRDC v. EPA*, 822 F.2d 104, 110 (D.C. Cir. 1987); *see also Riverkeeper*, 358 F.3d at 185 *citing cases* (EPA "should give decreasing weight to expense as facilities have time to plan ahead to meet tougher restrictions.").

[36] In re Brunswick Steam Electric Plant, USEPA, Decision of the General Counsel, EPA GCO 41 at 3 (June 1, 1976). During CWA debate, Senator Buckley cited with approval newspaper articles reporting a decision to require closed-cycle cooling at Hudson River power plants to abate massive fish kills caused by their cooling water intake structures. *Id.* at n.10, citing Senate Com. on Public Works, "A Legislative History of the Water Pollution Control Act Amendments of 1972," 93d Cong., 1st Session, at 196-197.

[37] For a comprehensive discussion of section 316(b)'s legislative history, see Karl R. Rabago, *What Comes Out Must Go In: Cooling Water Intakes and the Clean Water Act*, 16 Harv. Envtl. L. Rev. 429, 445-455 (1992).

Although they govern withdrawals rather than discharges, section 316(b)'s limitations are "technology-based performance requirements analogous to those derived for point sources under sections 301 (existing sources) and section 306 (new sources)."[38] Congress's use of "best technology available" (BTA) language in section 316(b) – which is textually similar to "best available technology" (BAT)[39] and "best available demonstrated control technology" (BADCT)[40] – and its explicit cross-reference to sections 301 and 306, illustrates its intent to incorporate cooling water standards as an integral component of the NPDES program. In fact, regulations issued under section 316(b) are also promulgated under section 301 and 306.[41] As the Fourth Circuit explained in *VEPCO*, section 316(b) "requires § 301 and § 306 standards to deal with cooling water intake structures."[42] *VEPCO* cited *Bethlehem Steel*[43] as support for its conclusion that section 316(b) regulations are "closely related to the effluent limitations and new source standards of performance of §§ 301 and 306" and distinguishable from "state-imposed water quality standards under § 303."[44]

Section 316(b) requires the "best technology available to minimize adverse environmental impact." Section 301, pursuant to which the Rule was also issued, requires the "best available technology economically achievable" (BAT).[45] BAT should represent "a commitment [by an industrial category] of the maximum resources economically possible to the ultimate goal of eliminating all polluting discharges."[46] The most critical aspect of BAT is that it is a "technology forcing" standard, compelling polluting industries to meet ever more stringent limitations on the path towards complete elimination of water pollution.[47] Sections 316(b) and 301 therefore require EPA to select the technology that both minimizes impact and represents the maximum commitment of industry resources economically achievable.

Finally, Section 316(b) creates a mandatory duty for EPA to promulgate standards for cooling water intake structures within the time limits of sections 301 and 306.[48] Thus, EPA was required to promulgate section 316(b) regulations for new facilities by January 18, 1974,[49] and for existing facilities by July 1, 1977.[50]

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[38] 66 Fed. Reg. 65255, 65285 (Dec. 18, 2001).
[39] See CWA § 301(b)(2), 33 U.S.C. § 1311(b)(2).
[40] See CWA § 306(a)(1), 33 U.S.C. § 1316(a)(1).
[41] *Riverkeeper*, 358 F.3d at 185, citing *Va. Elec. and Power Co.* ("VEPCO") *v. Costle*, 566 F.2d 446, 449-50 (4th Cir. 1977); *Cronin v. Browner*, 898 F. Supp. 1052, 1059 (S.D.N.Y. 1995).
[42] *VEPCO*, 566 F.2d at 450.
[43] *Bethlehem Steel Corp. v. EPA*, 538 F.2d 513, 515 (2d Cir. 1976).
[44] *VEPCO*, 566 F.2d at 450-51 & n.17.
[45] CWA § 301(b)(2)(A), 33 U.S.C. § 1311 (b)(2)(A).
[46] *NRDC v. EPA*, 863 F.2d 1420, 1426 (9th Cir. 1988).
[47] *NRDC v. EPA*, 822 F.2d 104, 123 (D.C. Cir. 1987).
[48] *Cronin*, 898 F.Supp. at 1059.
[49] *See* CWA §§ 306(b)(1)(A), (B) (requiring new source performance standards no later than one year and ninety days after October 18, 1972); *see also Riverkeeper*, 358 F.3d at 185-86 ("When the EPA 'established' new source performance discharge 'standard[s]' 'pursuant to section . . . 306,' it ought *then* to have regulated new intake structures because, by virtue of section 316(b), section 306's standards 'shall require that . . . cooling water intake structures reflect the best technology available.") (emphasis in original).
[50] *See* CWA § 301(b)(1)(A), (B) (effluent limitations for existing sources no later than July 1, 1977).

3. California Constitution and the Public Trust Doctrine

California has a duty, mandated by the state Constitution and a long line of state Supreme Court cases, to hold coastal lands in trust for the people of California. Historically, this Public Trust Doctrine provided for the public our waterways for "commerce, navigation, and fisheries." Later court rulings added hunting, fishing, swimming and recreational boating, and in 1971 expanded the list to include "preservation of those lands in their natural state," in order to protect both scenic and wildlife habitat values. The California Supreme Court held that the State has an "affirmative duty to take the public trust into account" in making decisions affecting public trust resources, and also the duty of continuing supervision over these resources, which allows and may require modification of such decisions.[51]

The Court found in *City of San Diego v. Cuyamaca Water Company*[52] that the public trust doctrine does not allow authorities to make concessions to individuals for the perpetual and exclusive use of portions of the waters without reference to the needs of other inhabitants. Such concessions would be a clear abuse of the public trust. Failure to set stringent regulations for use of once-through cooling by coastal power plants would amount to a grant of such a perpetual and exclusive use of portions of public trust waters, since these plants are destroying coastal resources on a daily basis. **Allowing these plants to use these outdated technologies unfettered, when less harmful technologies are feasible, and giving them a competitive advantage over inland plants by allowing them to use billions of gallons of publicly held seawater each day essentially for free, arguably is an abuse of the public trust that would be recognized by the courts.**

The State Water Board should take strong and decisive action to exercise its public trust responsibilities, by implementing stringent regulations for these coastal plants, in order to protect the interests of its coastal residents and other industries that have made California by far the country's biggest coastal treasure and economy.

4. California Law Governing Protection of Coastal and Marine Resources

Numerous authorities have been enacted in California to provide increasing protection, enhancement, and restoration of the State's coastal and marine resources. The California Coastal Act, Marine Life Protection Act and the Marine Life Management Act are models for the nation. Most recently, the Governor's *Ocean Action Plan,* California Ocean Protection Act (signed into law in 2004), and Ocean Protection Council again put California in the forefront of ocean and coastal management nationwide. These initiatives symbolize the Golden State's recognition of the many values of its world-renowned marine and coastal environment, a recognition that should be considered in developing a policy to protect those resources from the devastating local and regional impacts of once-through cooling.

5. Porter-Cologne Water Quality Control Act

In continuing to develop the statewide policy, it is imperative that the State Board recall Water Code section 13142.5, which mandates that the "best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of

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[51] *National Audubon Society v. Superior Court*, 33 C.3rd 419 (1983).
[52] *City of San Diego v. Cuyamaca Water Company*, 209 Cal. 105 (1930).

marine life." Given the inherently destructive nature of once-through cooling systems, anything less than best available technology would fail to meet Porter-Cologne's mandate to protect the beneficial uses of the waters of the state.

The regulated community has attempted to extricate itself from the requirements of Porter-Cologne by arguing in public workshops that other OTC should not be regulated to the required extent of the law because other threats to marine life, such as fishing, have greater impacts than OTC. This argument is specious on both the facts and the law. First, by making sweeping generalizations about entire ocean ecosystems, this argument ignores the clear facts of the severe localized and regional impacts of OTC, particularly on unique coastal ecosystems such as National Estuarine Research Reserves, among others.

Second, there is no legal support for the regulated community's argument that some threats to beneficial uses can be ignored or minimized because of the mere existence of other threats to the same beneficial uses. If that were the case, Porter-Cologne would never be implemented. For example, by that logic a municipal POTW could discharge wastewater doused with enough chlorine to kill virtually every living thing in the vicinity of the discharge pipes without penalty, simply because fishing is also a threat to marine life. **It is a rare comment letter where we must emphasize that Porter-Cologne does not allow for unfettered impacts to California's waters; we urge the Board to reject this argument and to implement the mandates of Porter-Cologne fully in order to protect the waters of the state.**

C. The Proposed Reductions Are Technologically and Economically Practical

Despite the unsupported, sweeping generalizations by some in the regulated community that the proposed, legally required reductions in impacts are "technologically impossible," **the proposed reductions are both technologically and economically practical**, as has been proven time and again around the country. Steam plants in other states such as New York have been successfully retrofit to updated cooling technology without harm to their energy supply. A nuclear plant in Michigan has also been safely retrofit with updated cooling technology.[53]

In addition, although many coastal plants in California might claim that there is not enough space to build cooling towers as an alternative cooling technology, this is simply untrue. For example, many coastal steam plants are considering the co-location of desalination plants. Any steam plant with space available for a large desalination plant generally has adequate space for a wet cooling tower retrofit.[54] A review of aerial photographs of San Onofre and Diablo Canyon nuclear plants indicates there should be adequate space at both facilities for wet towers.[55] To

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[53] EPA Federal Clean Water Act 316(b) Phase II Technical Development Document, Chapter 4 - Cooling System Conversions at Existing Facilities (April 2002) p. 4-3. Available at: http://www.epa.gov/waterscience/316b/devdoc/ch4.pdf#search=%22michigan%20nuclear%20retrofit%20once%20through%22 ("EPA 316(b) Phase II TDD Ch.4")

[54] For example, a 50 million gallon/day desalination plant is under evaluation for an 11-acre site at the AES Huntington Beach steam plant. (City of Huntington Beach, "Seawater Desalination Project at Huntington Beach - Draft Reeirculated EIR," May 2005, p. 3-1.) Units 3 and 4 steam units at Huntington Beaeh, a total of 450 MW, were recently repowered. (CEC, Huntington Beach Project Description, available at: http://www.energy.ca.gov/sitingcases/huntingtonbeach/index.html accessed 9.1.06) Less than 2 acres of land would be needed for inline wet towers for Units 3 and 4. ("CEC Huntington Beach Projeet Description").

[55] For example, San Onofre has two reactors and sits on a 257 acre site. (Utilities Service Alliance, San Onofre webpage: http://www.usainc.org/sanonofre.asp.) The cooling tower for each 1,100 MW reactor would require from 2 to

address more directly these and other industry claims of technological "impossibility," the California Coastal Conservancy, as directed by the Ocean Protection Council in its April 2006 Resolution, is currently undertaking a six-month study that will "analyze each of the existing coastal plant's conversion to alternative cooling technologies or installation of best technology available."

Conversion and/or phase-out of aging OTC systems can occur concurrently with modernization of coastal steam plants with high efficiency, gas turbine combined-cycle plants, which is a stated goal of California's Energy Action Plan and recent California energy legislation that supports California's progress toward reducing greenhouse gases.[56] There are currently 13,000 MW of new power plants under construction (960 MW), approved for construction (7,643 MW), or under formal review by the CEC (approx 4,500 MW).[57] This compares to approximately 14,000 MW of existing aging OTC steam boilers along the California coast.[58] Most steam plants are 30 to 50 years old and at or beyond their expected service life.[59] The MW capacity of these aging OTC plants could be replaced almost entirely by projects already approved or about to be approved by the CEC.

The overall cost of power production of coastal plants would decline over time as more fuel-efficient combined-cycle plants displace steam plants and OTC technology is replaced at those converted plants, as the cooling system is a small part of the overall cost of a new power plant. There is very little difference in the cost of a new combined-cycle plant whether it incorporates OTC, closed-cycle wet cooling, or dry cooling.[60] At plants that are not converted, the cost of power production related to an OTC retrofit would increase by not more than 3 to 4 percent.[61]

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6 acres of land, depending on whether an inline or round cooling tower is used. Inline wet cooling towers can provide 500 to 600 MW of steam plant cooling per acre (210 feet by 210 feet area). (Powers, William, direct and rebuttal testimony, Danskammer Power Station draft permit proceeding – SPDES NY-0006262, October 2005 and December 2005.) Testimony describes design basis for retrofit plume-abated tower measuring 50 feet by 300 feet for 235 MW of steam plant capacity. Only 2 to 4% of the San Onofre site would be needed for the towers.

[56] *See, e.g.*, AB 32 (Nuñez), passed by the Legislature Sept. 2006 to address greenhouse gas emissions; *see also* AB 1576 (Nuñez, 2005), which authorizes utilities to enter into long-term contracts for the electricity generated from the replacement or repowering of older, less-efficient electric generating facilities.

[57] California Energy Commission Power Plant Fact Sheet (August 9, 2006), Attachment D, bar chart on p. 3. Also available at http://www.energy.ca.gov/sitingcases/FACTSHEET_SUMMARY.PDF Accessed 9.9.06. ("CEC Power Plant Fact Sheet Attachment D")

[58] California Energy Commission comment letter to SLC dated April 12, 2006, p. 3. MW capacity for each coastal plant category in 2004 (steam, nuclear, combined-cycle, combustion turbine) is calculated from data provided in table on p. 3. Total MW for all four plant categories is calculated at 20,650 MW.

[59] California Energy Commission Staff Paper (July 2003) , *Aging Natural Gas Power Plants in California*, Table 1. Available at: http://www.energy.ca.gov/reports/2003-07-17_700-03-006.PDF#search=%22Aging%20Natural%20Gas%20Power%20Plants%20in%20California%22 Accessed 9.12.06. ("CEC *Aging Natural Gas Power Plants in California*").

[60] John Maulbetsch presentation on cost of cooling technologies to the State Water Resources Control Board at State Board Workshop in Oakland on December 7, 2005. Available at: http://www.swrcb.ca.gov/npdes/docs/wrkshp_oakland2005/pres_jmaulbetch.pdf Accessed 9.8.06.

[61] *See* fn. 19 (xix) of Attachment B (Fact Sheet on Energy and OTC) for calculation. Retrofitting to a wet tower is fundamentally simple - the OTC pipes going to and from the ocean are rerouted to a cooling tower. At facilities that have been retrofit, the hook-up of the new cooling system has generally been carried-out without requiring an extended unscheduled outage. The cost to retrofit 800 MW Palisades Nuclear (MI) was to wet towers was $68/kW (1999 dollars). The cost to retrofit 750 MW Pittsburg Unit 7 (CA) was $46/kW (1999 dollars). EPA 316(b) Phase II TDD Ch.4, *supra* note 53.

The power industry estimates that the capital cost to retrofit all existing facilities, approximately 20,700 MW of capacity, ranges from $2.0 billion for wet cooling to $2.5 billion for dry cooling.[62] The complete retrofit of the existing fleet of aging coastal steam plants, which represents 14,000 MW of the 20,700 MW total, is not a credible scenario. In reality only the two nuclear plants and a few of the steam units that have recently been upgraded are likely to still be operational in 2020. It is probable that all other steam plants will have converted to combined-cycle using closed-cycle wet or dry cooling technology or been retired by that time.

It is useful, however, to use the industry retrofit cost figure to determine the cost impact of a closed-cycle conversion at California's two coastal nuclear power plants. A large capital investment like a wet tower retrofit would be amortized over 20 to 30 years. Industry estimates the cost to retrofit 20,700 MW of coastal power plant capacity with wet towers at $2 billion, or $100 million per 1,000 MW of capacity. Assuming 30 years and 7% interest, the payment per year on the $100 million capital cost would be $8 million per year. Nuclear plants are baseload units with high usage levels, typically 90 percent of potential output or greater. The relative cost impact of a wet tower retrofit at nuclear plants would be low relative to natural gas-fired boiler plants due to the very high usage rates, and associated revenue streams, of nuclear plants. Each reactor at SONGS and Diablo Canyon generates approximately 1,000 MW. At a 90 percent annual capacity factor each reactor will produce approximately 8 million MW-hr of electricity per year. The average price of wholesale power in California in 2005 was in the range of $70/MW-hr.[63] Each reactor would generate a revenue stream of approximately $550 million per year at a 90 percent capacity factor and current wholesale electricity rates.[64] **The annual capital cost expense of a wet tower retrofit at either SONGS or Diablo Canyon would be in the range of 1.5 percent of annual revenue** using industry's own generic wet tower retrofit cost estimate of $100 million per 1,000 MW of capacity.[65]

Another cost issue that industry has raised as justification for not retrofitting nuclear plants is the revenue that would be lost during the outage required for the hook-up of the closed-cycle cooling system. However, nuclear plants are characterized by periodic extended outages. If the retrofit hook-up is coordinated with one of these extended periodic outages, **no unplanned downtime** will be caused by the hook-up of the closed-cycle cooling system. As the EPA states:[66]

> The Agency learned that for 2000 the industry mean nuclear refueling outage was approximately 40 days (Nucleonics Week, January 18, 2001). In addition, NUREG-1437 shows that nuclear plants undergo periodic and predictable outages for inspections. The following excerpts from NUREG-1437 explain the NRC's view of outages at nuclear plants:

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[62] Letter from CCEEB to State Lands Commission, "Comments on Proposed Staff Resolution" (March 24, 2006).
[63] Energy News Data – Western Price Survey, 2005 weekly archives: http://www.newsdata.com/wps/archives.html Accessed 8.2.06.
[64] Nuclear Energy Institute 2006. Nuclear Energy Fact Sheet. Available at: www.nei.org Accessed 9.1.06.
[65] The industry estimate of $100 million per 1,000 MW of capacity is equivalent to $100/kw. Capital costs are typically presented in the "$/kw" format in the power industry. The capital cost of the one closed-cycle retrofit carried out on a U.S. nuclear power plant, the Palisades Nuclear Plant in Michigan, was $68/kw in 1999 dollars. EPA 316(b) Phase II TDD Ch.4 *supra* note 53, p.4-6. The industry estimate is conservative, though reasonable, in the context of the actual cost to retrofit the Palisades Nuclear Plant in Michigan.
[66] Nuclear Energy Institute 2006. Nuclear Energy Fact Sheet. Available at: www.nei.org Accessed 9.1.06.

From Section 2.2.6- Nuclear power plants must periodically discontinue the production of electricity for refueling, periodic in-service inspection (ISI), and scheduled maintenance. Refueling cycles occur approximately every 12 to 18 months. The duration of a refueling outage is typically on the order of 2 months. Enhanced or expanded inspection and surveillance activities are typically performed at 5- and 10-year intervals. These enhanced inspections are performed to comply with Nuclear Regulatory Commission (NRC) and/or industry standards or requirements such as the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. Five-year ISIs are scheduled for the 5th, 15th, 25th, and 35th years of operation, and 10-year ISIs are performed in the 10th, 20th, and 30th years. Each of these outages typically requires 2 to 4 months of down time for the plant. For economic reasons, many of these activities are conducted simultaneously (e.g., refueling activities typically coincide with the ISI and maintenance activities).

Many plants also undertake various major refurbishment activities during their operational lives. These activities are performed to ensure both that the plant can be operated safely and that the capacity and reliability of the plant remain at acceptable levels. Typical major refurbishments that have occurred in the past include replacing PWR steam generators, replacing BWR recirculation piping, and rebuilding main steam turbine stages. The need to perform major refurbishments is highly plant-specific and depends on factors such as design features, operational history, and construction and fabrication details. The plants may remain out of service for extended periods of time, ranging from a few months to more than a year, while these major refurbishments are accomplished. Outage durations vary considerably, depending on factors such as the scope of the repairs or modifications undertaken, the effectiveness of the outage planning, and the availability of replacement parts and components.

In fact, both SONGS and Diablo Canyon have received authorization from the CPUC to conduct boiler replacement projects. The cost at each facility will be approximately $700 million.[67] One ideal time to convert SONGS and Diablo Canyon to closed-cycle cooling would be at the time the boiler replacement projects are underway. This approach would eliminate any issues associated with downtime or construction in the vicinity of an operating reactor.

In sum, substantial evidence from both government agencies and the industry itself indicates that the proposed 90-95% reductions in impacts are both technologically and economically practical, and should be adopted and implemented.

D. The Draft Policy Is Consistent with California's Energy Action Plan

California's Energy Action Plan calls for California to move towards cleaner, more efficient technology. The overarching goal is for "California's energy to be adequate, affordable, technologically advanced, and environmentally-sound," and for our energy to be reliable and

[67] *Id.*

"provided when and where needed and with minimal environmental risks and impacts."[68] In order to reach this goal, the Energy Action Plan calls for the establishment of "appropriate incentives for the development and operation of new generation [sic] to replace the least efficient and least environmentally sound of California's aging power plants."[69] The Energy Action Plan outlines specific actions needed to achieve electricity adequacy, reliability, and infrastructure including "significant capital investments" to "augment existing facilities, replace aging infrastructure, and ensure that California's electrical supplies will meet current and future needs at reasonable prices and without over-reliance on a single fuel source."[70]

Many of the coastal steam plants are 30-50 years old and are beyond their expected lifetimes.[71] It would be inconsistent with state environmental and energy policy to artificially prolong the life of these antiquated, inefficient, polluting power plants with a weak OTC policy. It is not the province of the State Board to facilitate re-licensing of energy plants or to preserve antiquated technology. In fact, California state law mandates the opposite. Moreover, the required changes necessary for power plants to comply with the law would in no way threaten California's energy supply. According to the CEC website, there is a total of 4056 MW of new energy capacity currently under review by the CEC, some of which include renewable energy developments.[72] Further, the state has a backup of licensed but not-yet-built capacity. [73]

We strongly encourage the State Board to consult with the expert staff at the CEC to answer any questions about the State's demonstrated, strong support for a sustainable, environmentally-friendly energy supply. The alarmist claims made by industry of power shortages resulting from the draft 316(b) policy can be soundly resolved through careful consideration of all of the facts. Please see Attachment B's "Energy and OTC Fact Sheet" for more information and supporting documentation.

Modernization of coastal steam plants with newer technologies such as high efficiency, gas turbine combined-cycle plants is not only consistent with California's Energy Action Plan - it is also consistent with recent California energy legislation and with the state's clear commitment towards reducing greenhouse gases, as evidenced by, among other things, the recent enrollment by the Legislature of AB 32.[74] As stated by Lt. Governor Cruz Bustmante, "new technology [can] provide a way to resolve both our economic issues, our energy issues, as well as the environmental issues. I don't buy the idea that we have to continue to degrade the environment and do business. I think you can do good environmental work and still have good business." [75]

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[68] California's Energy Action Plan II, p. 1 (emphasis added). Adopted by the CA Public Utilities Commission and the CA Energy Commission on September 21, 2005. Available at: http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF accessed 8/30/06.
[69] *Id* at p. 7.
[70] *Id.*
[71] CEC *Aging Natural Gas Power Plants in California, supra* note 59.
[72] *See* CEC Expected and Disclosed Energy Facility Projects in Review 8/9/06, Attachment C. Table created from data available at: www.energy.ca.gov/sitingcases/all_projects.html Accessed 8.8.06. ("CEC Projects in Review 8/9/06, Attachment C")
[73] CEC Power Plant Fact Sheet Attachment D, *supra* note 57.
[74] *See also* AB 1576 (2005) - authorizes utilities to enter into long-term contracts for the electricity generated from the replacement or repowering of older, less-efficient electric generating facilities.
[75] Lieutenant Governor Cruz Bustamante, February 9, 2006, speaking at State Lands Commission Hearing regarding the State Lands Commission Resolution regarding Once-Through Cooling.

California's Lt. Governor, State Controller and Director of Finance all concluded that "the elimination, or reduction to insignificance of the adverse environmental impacts, of once-through cooling technologies can be accomplished without threatening the reliability of the electrical grid."[76] We urge the State Water Board to follow their leadership, and adopt a strong state 316(b) policy that protects the environment consistent with the state's commitment to a sustainable energy supply.

E. The Role of the Expert Review Panel Should Be Expanded to Include Review of All Technical Analyses Required by the Policy

We commend the State Board for proposing to convene an Expert Review Panel to assess the entrainment and impingement impact studies and advise the State Board on technical issues related to OTC. Given the technical focus of the draft policy, we encourage the State Board to expand the role of this Panel to assess additional technical analyses required for the implementation of, and compliance with, the state policy. For example, in addition to the responsibilities of the panel outlined in the draft policy, the Expert Review Panel should also evaluate how the calculation baseline is determined for each plant; how the capacity utilization factor is determined for each plant; the feasibility analyses of alternative technologies (including the use of wastewater for cooling) conducted by each plant; and the design, results, and interpretation of the cumulative impact studies. Expanding the role of this group will maximize the use of its collective technical expertise and assure that the implementation of, and compliance with, the policy is a truly science-based process. Broadening the purview of the Expert Review Panel will also ensure that the analyses conducted by industry consultants for compliance with the policy are given adequate review.

Although we support the State Board's efforts to identify a balanced expert panel to review the technical aspects required by the policy, we have concerns surrounding the structure of this group. The draft policy proposes that the panel be comprised of three academic members, two technical experts representing industry, two environmental group representatives, and one consulting scientist. However, the role and background of the single consulting scientist is not outlined in the draft policy. Without better characterizing this representative, there is potential that the final composition of the panel will be unbalanced. The single consulting scientist may be biased toward industry or the environmental groups. Instead of featuring an unspecified consulting scientist, we recommend this seat be filled by a member from the CEC staff. Including a member from the CEC staff on the Expert Review Panel would provide additional technical expertise regarding capacity utilization rate, feasibility analyses, and other technical assessments, as well as facilitate further collaboration between the State and Regional Water Boards and CEC.

II. Potential Loopholes in the Draft Policy Should Be Closed to Ensure that 90-95% Reduction in Impacts from Existing Power Plants Is Actually and Expeditiously Achieved

In order to ensure that the policy's appropriate goal of 90-95% reduction in impacts is achieved, the loopholes and potential implementation gaps in the draft policy must be closed and filled. These are described in detail below.

[76] SLC Resolution, *supra* note 2. (emphasis added).

A. All Plants Must Be Included in the Policy

Loopholes created for little-used, inefficient plants must be closed. Entrainment standards should apply to all power plants, not just those with a capacity utilization rate greater than 15%. As the draft policy is written, plants that have a 15% or less capacity utilization rate will not be subject to the entrainment standards. According to data presented by the CEC at the State Board workshop on July 31, 2006 ("Sacramento workshop"), nine of the old coastal steam powered "peaker" plants operate at a capacity utilization rate less than 15% and so would be exempted from the proposed entrainment standards. Taking into account the recent and upcoming closures of some coastal plants, this means that about 40% of the coastal steam plants potentially affected by this policy would be excused from complying with the new entrainment standards.[77] This exemption was simply lifted from the federal CWA section 316(b) regulations (which, as noted above, are under legal challenge by numerous groups). Yet according to CEC staff, it is difficult to understand why this exemption should apply to California.[78]

California's coastal power plants are old and inefficient, and should not be given artificial life support through harmful and unsupportable exemptions. Industry claims that such exemptions are essential to the energy grid, but as described in detail above, this is simply not true. It is important to remember that these outdated, now little-used "peaker" plants are only one part of the electrical grid, and they do not operate in a vacuum. According to the CEC, there are new energy projects currently under review that would bring online more capacity using state of the art, cleaner technology. The CEC website shows that fourteen new projects are currently under review, totaling 4,506 MW capacity.[79] Of these new projects, eight are designed as "peaking" plants, and would provide 2,238 MW of peaking capacity.[80] Not only is there new peaking capacity coming on line, but many of these plants are owned by the very same companies that own the coastal, now-"peaking" plants that are using outdated and harmful cooling technology. For example, the CEC is currently reviewing a request by subsidiary company of Southern California Edison to develop two 500 MW "peaker" plants that use new, cleaner technology.[81] Companies with coastal "peaker" plants clearly already are planning for and implementing new generating capacity with more efficient and less polluting inland plants they already own or are building.[82]

The State Board should not encourage the continuance of impacts caused by outdated, polluting, inefficient plants through loopholes. Instead, the loopholes should be eliminated so that the market runs its course and these plants are replaced as needed with more efficient, cleaner, technologically superior alternatives, as was recently done with the Humboldt and Encina power plants. Exempting extremely low capacity plants from the rule makes no sense, as they are the most inefficient of all of the once-through cooled plants and also cause significant environmental

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[77] Oral Comments given at State Water Resources Control Board on July 31, 2006 by California Energy Commission Staff.
[78] *Id.*
[79] CEC Energy Projeets in Review 8/9/06, Attachment C, *supra* note 72.
[80] *Id.*
[81] *Id.*
[82] *See, e.g.*, California Energy Commission, "In the Matter of: Application for Certification, AES Highgrove Power Plant Project" (Aug. 16, 2006), http://www.energy.ca.gov/sitingcases/highgrove/notices/2006-08-16_notice_pubhring_sitevisit.html (describing construction by AES of 300 MW inland peaking power plant).

damage. The law does not allow them to continue to damage the public's resources and kill marine life, particularly when peaking power can be generated using more efficient technology.

Finally, a significant related loophole is that the draft policy considers capacity at the plant, not the unit, level. This perspective would enable generators to include old or retired units in the calculation of annual capacity factor. In other words, plants operating over 15% capacity utilization rate may have some inactive units. These plants may factor their idle units into the calculation of capacity utilization rate to reduce it to 15% or less. Given that the average capacity utilization rate of each coastal steam plants is less than 20%, this provision could provide a significant loophole for virtually all of the coastal plants. [83] Calculating capacity utilization rate at the unit, rather than plant level would also more closely correlate with actual generational flow, which we urge the State Board to use as the basis for determining calculation baseline (further explained below). Thus, **the final policy should be revised to require capacity utilization rate to be calculated at the unit, not plant, level.**

B. "90-95% Reduction from What?" The Calculation Baseline Must Be Set to Ensure that Required Reductions Are Actually Achieved.

As described in detail above, and as documented in years of U.S. EPA, CEC, and other agency records, the persistent use of OTC at coastal power plants clearly has contributed to the loss of biodiversity and the documented population decline of many marine species over the past 50 years. The draft state policy on once-through cooling appropriately improves upon the federal regulations by requiring facilities to implement reductions in impacts at the upper ends of the performance standards in the federal rule. The approach for calculating these reductions in impacts is critically important to whether these reductions are actually achieved in the environment. In other words, **the baseline from which the 90-95% reductions in impacts is calculated – the "calculation baseline" – must be set to actually achieve reductions, rather than mask inactivity by the regulated community.**[84]

However, the discussion of how exactly the calculation baseline should be determined and reductions measured remains vague in the draft policy. Without explicit direction, there is significant risk that the calculation baseline will not be determined in a consistent manner for each facility in the state and great potential for confusion among Regional Boards, facilities, and the public surrounding this issue. More significant than inter-state inconsistency, however, is the real risk that use of varying assumptions in such calculations will result in little to no real reductions in impacts. We urge the State Board to provide detailed direction regarding the determination of

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[83] Letter from CEC to SLC (April 12, 2006), p.3. MW capacity for each coastal plant category in 2004 (steam, nuclear, combined-cycle, combustion turbine) is calculated from data provided in table on p. 3. Total MW for all four plant categories is calculated at 20,650 MW.

[84] The baseline is also significant in that para. 2.d. of the draft policy ties the baseline to the requirement to reduce intake flow when energy is not being produced. Specifically, the draft policy states that entrainment must be minimized when electrical energy will not be produced for two or more consecutive days, by reducing the intake flow to "ten percent of the baseline flow rate." The more the policy allows the baseline flow to be set over the amount actually needed to produce electricity, the less likely it will be that this necessary shut-down measure will be implemented. [CA State Water Resources Control Board, "Scoping Document: Proposed Statewide Policy on Clean Water Act Section 316(b) Regulations (June 13, 2006)," Appendix I, p.2. Available at: http://www.swrcb.ca.gov/npdes/docs/ewa316b/316b_scoping.pdf Accessed 9.1.06].

calculation baseline in the revised policy, one that ensures that the reductions in impacts are actually achieved. Our recommendations of how to provide this direction are further delineated below.

1. ***The relationship between generational and actual flow should be explored and if differences exist, the calculation baseline should be determined using generational flow rather than actual flow***

We support State Board staff's effort to improve on the federal rule by requiring that facilities use flow other than the permitted maximum flow to determine calculation baseline. Although intuitively the actual flow, which is the proposed basis for the calculation baseline in the draft policy, appears to reflect the flow required for a facility to operate, **in many cases the actual flow is significantly greater than the flow required to generate electricity** (*i.e*, the "generational flow"). For example, generating Units 1 & 2 at El Segundo Generating Station ceased producing electricity in 2002; however the mean annual flow at Intake 001 (which draws in cooling water for Units 1 & 2) continued at or above the level prior to 2002. Industry has argued these high flow levels – which, at El Segundo range from 50 to over 200 million gallons per day - are needed to control biofouling for maintenance of pipes.[85] However, the regulated community has provided no support for such an assertion. Indeed, numerous other options either exist or are in active development to address fouling that are far more environmentally sound than running the pumps almost continuously, with no regard for whether the plant is generating electricity.[86] Thus, **we urge the State Board to identify the true volume of water actually needed at each facility before making any decisions to base entrainment and impingement reductions on actual flow.**

Moreover, if the baseline for reductions is calculated using actual flow, then depending on how long it takes the policy to be adopted, facilities may be able to elevate their flow levels beyond the necessary amount for generation to augment the baseline. This would make it easier for generators to comply with performance standards without actually making real reductions (similar to problems with early efforts to reduce residential water use in the face of droughts – those over-using water when the baseline was set were "rewarded" while conservers punished). Accordingly, we also urge the State Board to consider how to set a **fair and meaningful time frame** for determining the calculation baseline.

We understand that researching this issue as needed will require cooperation among the State Board, Regional Boards, and CEC. However, CEC staff representatives at the State Water Board's July workshop affirmed that determining the relationship between actual and generational flow will provide valuable information for the State Board's policy development and implementation process. The CEC staff also offered their assistance in researching this relationship. We encourage the State Board staff to work with CEC staff to develop a process for determining the calculation baseline that will best implement the goal of 90-95% reduction in impacts. At a minimum, **we urge the State Board to revise the draft policy to require that the calculation baseline be determined according to generational flow**. We also encourage the State Board to explore the use of deterrents, such as a negative credit that lowers the baseline, to ensure that facilities do not seek creative compliance avoidance strategies.

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[85] El Segundo Generating Station Report flow data 1996-2004 (El Segundo Power, LLC), available at http://www.swrcb.ca.gov/rwqcb4/html/permits/316b_Issues.html. Accessed 8.1.06.

[86] *See, e.g.*, http://www.onr.navy.mil/sci_tech/3t/transition/tech_tran/stories/adv_fouling/ Accessed 9.12.06; *see also* http://www.epri.com/portfolio/product.aspx?id=1160 . Accessed 9.12.06.

2. *Reference sites should be used in determining the calculation baseline to reflect the true impacts power plants have on marine and coastal resources*

In our February letter to the State Board regarding OTC policy development (see Attachment A), we raised the concern that allowing facilities to establish a calculation baseline derived solely from historic levels of intake, entrainment, and impingement, as well as potentially depleted source waters surrounding the facility, will generate biased results that produce no meaningful environmental improvement. To reconcile this problem, we recommended that the policy require facilities to be responsible for past entrainment and impingement damages at their sites by using reference sites to assist in determining the calculation baseline. Although the staff has considered these comments in the draft policy by giving discretion to the Expert Review Panel to determine whether or not reference sites are appropriate, the draft policy fails to commit to the use of reference sites in determining the calculation baseline.

The scientific community broadly accepts the use of reference sites in study design to determine the extent of environmental impacts. These studies typically use a control, or reference site, to provide the data necessary to make comparisons between an impacted and unimpacted site and quantify the ecosystem effects of an environmental stressor.[87] In addition to academic studies, reference sites have historically been used in management to determine the extent of industrial impacts on marine and coastal resources. For example, both Hyperion Treatment Plant's and the Joint Water Pollution Control Plant's permits have historically and continue to require monitoring both within their zone of initial impact and at reference stations to determine the impacts of discharging primary sewage to benthic infaunal, demeral fish, and macroinvertebrate community composition and species abundance.[88]

Taking a reference approach to determining the calculation baseline would help account for the years of degradation that has occurred in waters adjacent to power plant facilities. This approach is consistent with sections 13142.5(c) and (d) of the Porter-Cologne Act, which raise concerns about the coastal region's ecological balance. The reference studies we recommend align with the "independent baseline studies" foreseen by the Legislature, which to date have been largely ignored. Additionally, community composition and population structure have likely changed since the establishment of coastal power plants decades ago. This reference approach will help provide current data at a site that is undisturbed by OTC for which to compare the ecological structure of marine life at coastal power plant facilities.

We uphold the recommendations outlined in our February letter and strongly urge the state to take a sound scientific approach by incorporating the use of reference sites to determine the calculation baseline. This approach will avoid the possible confounding effects from potentially depleted source waters caused by historic impingement and entrainment at each facility. For example, the facilities on Alamitos Bay - Haynes and Alamitos Generating Stations - are located in close proximity to one another, and both impact the same small body of water. Based on circulation

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[87] Schroeter *et al.*, "Detecting the Ecological Effects of Environmental Impacts: A Case Study of Kelp Forest Invertebrates," *Ecological Applications*, Vol. 3, No. 2., May 1993; Osenberg *et al.*, "Detection of Environmental Impacts: Natural Variability, Effeet Size, and Power Analysis," *Ecological Applications*, Vol. 4, No. 1, Feb 1994.
[88] Thompson, SCCWRP, "Hyperion Monitoring Report" http://www.lacity.org/SAN/EMD/products/_pdf/SMB_Reports/2001_02/Chapter1.pdf. Accessed 9.10.06

and volumetric relationships, the combined OTC systems of these two power plants consume all of the water in Alamitos Bay every five days, and have done so for decades.[89] It is very likely that organisms living in Alamitos Bay have been severely depleted by the operation of these two power plants. It is imperative that a reference approach be used in situations like Alamitos Bay to determine the true baseline for facilities.

In this reference approach, we recommend the State Board convene an independent technical working group (through the Expert Review Panel or otherwise) to collaboratively select a series of reference sites that represent habitats characteristic of each facility, but are not impacted by cooling water intake systems. Monitoring should be conducted at both reference sites and power plants. The team should be charged with developing and implementing a monitoring plan to characterize the composition, abundance and diversity of marine life that are entrained or impinged at each power plant and compare the data to monitoring conducted at reference sites.

Although this approach does not provide baseline data from before establishment of coastal power plants, it does provide data from sites that have not suffered decades of damage from entrainment and impingement. Thus, taking a reference approach indirectly addresses these ongoing impacts because samples are not limited to a potentially depleted source water area (as they are in the currently outlined Proposal for Information Collection report and Comprehensive Demonstration Studies). Such a process is essential if the state foresees continued use of once-through cooling.

C. There Must be Limits Governing Determination of "Feasibility"

Porter-Cologne section 13142.5(b) requires application of the best available technology "feasible" to "minimize the intake and mortality of all forms of marine life." It is important to note that the interpretation and application of this state law cannot be less stringent than federal law, which calls for the "best technology available for minimizing adverse environmental impact."

However, **the draft policy defines "feasible" in a way that almost eviscerates the BAT standard in the Clean Water Act.** Specifically, the draft policy defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."[90] This definition is vague to the point of being unimplementable, allocating practically unbridled discretion to the Regional Board staff responsible for implementing the policy. For example, the draft policy arguably would allow a plant operator simply to demonstrate (to no particular identified standard) that no combination of operational and structural controls can feasibly achieve the 90% entrainment standard, at which point the operator would become eligible to use restoration measures to meet the standard (further discussion is provided below on the significant limitations of restoration or mitigation to address the impacts of OTC). Just examining, for example, economics: how is staff to know when economic factors make a project infeasible? Is it when the cost of a certain measure decreases annual profits by a certain proportion? When that cost exceeds the cost of air pollutant reduction technology?

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[89] Tenera Environmental and MBC Applied Environmental Science, "Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Sampling Plan," (September 28, 2005) p. 2.

[90] CA State Water Resources Control Board, "Scoping Document: Proposed Statewide Poliey on Clean Water Act Section 316(b) Regulations (June 13, 2006)," Appendix I, p.4. Available at: http://www.swrcb.ca.gov/npdes/docs/cwa316b/316b_scoping.pdf Accessed 9.1.06. ("Scoping Document").

When that cost makes financing impossible? When that cost cannot be passed on to ratepayers? When that cost exceeds the cost of fuel for operating the plant? These questions do not even address how the other factors are to be measured, much less compared to the economic factor. Indeed, the questions left open by this definition could fill pages of this comment letter.

Because of how it is presently defined, the interpretations of "feasible" by Regional Board staff are likely to be extremely divergent. Implementation of the policy will result in a hodgepodge of compliance measures determined mainly by the persuasiveness of industry representatives at the regional level, rather than by consistent and fair application of the performance standards across the state. Such inconsistency is all the more nonsensical in the contemporary market, where merchant generators compete against one another to sell electricity on the open market.

But most importantly, the definition transports the policy dangerously away from the requirement in both state and federal law that plants adopt the "best available technology." **The practical effect of the current "feasible" definition is essentially to provide a wide-open, site-specific compliance loophole.** This clearly is inconsistent with the draft policy's express prohibition of the site-specific options.[91] It is also inconsistent with established policy in the State of New York, which "will not consider a 'site-specific' alternative BTA determination."[92]

A better definition of "feasible" would follow the generally-accepted definition of "capable of being done or carried out."[93] This is the definition being applied in New York State, which defines "feasible" as "'capable of being done' with respect to the physical characteristics of the facility site but does not involve consideration of cost."[94] Application of this accepted definition of "feasible" allows Regional Board staff to apply objective technical knowledge and focus on technological infeasibility. Moreover, since application of the term could have large consequences for statewide consistency, the state policy could vest the Expert Review Panel with review and approval of feasibility determinations that are in question. The State Board would be on solid legal footing with these changes, because applicable law certainly does not require the State Board to carve such large loopholes into the state policy.

Futhermore, **if economic factors remain in the policy (a position with which we strongly disagree), consideration of economic data <u>must</u> be comprehensive and transparent**. The policy must place the burden on the permit applicant, who alone holds all the economic data for a facility, to spell out, among other things, how the cost of the purportedly infeasible technology was calculated; over what time period the plant would have financed the technology; and how this cost relates to investments in other pollution-reduction technologies (including, for example, the use of selective catalytic reduction), other plant costs including fuel and capital expenditures, gross revenues, etc. All data must be presented for public review, and Regional Board staff must explain thoroughly and transparently how the conclusion on infeasibility was derived.[95]

These protections are essential in light of expected actions based on past experience in this area. For example, the Stanford Environmental Law Clinic's experience with Moss Landing was

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[91] *Id.* Appendix I, p.3

[92] *Id.* Appendix II, "Memorandum from Lynette Stark, NY Department of Environmental Conservation to Benjamin Grumbles U.S. EPA", (Jan. 24, 2005). p.4.

[93] Merriam-Webster OnLine, http://www.m-w.com/dictionary/feasible.

[94] Scoping Document, *supra* note 90, Appendix II at p.4.

[95] Requiring this type of eost information is also consistent with the New York policy. *See id.*

that the company's own estimates of the cost of OTC relative to other forms of cooling changed by $20 million over four years, to serve the company's changing goals.[96] In addition, when determining the amount of money to put in a "restoration fund," the company valued the land in the restoration plan around the plant at $18,000 per acre, when all estimates in the record showed such land to be worth between $60K and $260K per acre. Had the company simply valued the land appropriately and contributed proper funding, OTC plus the restoration plan would have been more expensive than alternative technologies, which should have been adopted based on a complete and accurate economic analysis.[97] Finally, the company said that the total commercial value of the marine life that its OTC system would kill was $2,900 over 30 years. The Moss Landing Plant alone cycles 1.224 billion gallons per day at maximum permitted capacity. This represents over a quarter of the volume of the adjacent Elkhorn Slough (a National Estuarine Research Reserve) and Moss Landing Harbor, cycled through the plant each and every day.[98] It is extremely unlikely that the value of coastal, estuarine, and marine life and habitats affected by the Moss Landing plant amounts to less than $100 a year, or the current market value of seven pounds of wild-caught salmon.

In addition, if economic factors remain in the policy, generators should not be allowed to use the potential for co-located desalination at their facilities to evade compliance with impingement and entrainment reductions though the "feasibility loophole." In other words, generators may argue that the potential loss of product water from the co-located desalination facility should be a factor in the cost of transitioning to the best technology available. Several coastal generators considering proposals for co-located desalination facilities have been on notice that these facilities need to be analyzed as "stand alone" plants, in part because of the pending state regulation of OTC.[99] Given clear notice, both the desalination projects as well as the co-located generators should not be allowed to prematurely create circumstances that undermine state policy.

Similarly, generators may assert that they do not have sufficient space to upgrade to alternative technologies because they anticipate building a co-located desalination facility at their site. However, as previously stated, steam plants with space available for a large-scale desalination plant generally have space for a wet cooling tower retrofit.[100] Furthermore, arguments of infeasibility based on the potential future of co-located desalination at a site should be discredited; the policy should apply only to the structural configuration of existing facilities at the date of approval for the final policy. Lastly, it should be noted that viable alternatives such as beach well intakes allow development of desalination facilities without connection to OTC facilities.

In contrast to these arguments, which selectively apply the rules of economics to bolster the status quo, the economics of alternative cooling technologies make sense for California. Look no further than the prosperity of inland power plants, for which using OTC is simply not an option. In sum, economics should not be considered in the definition of "feasible," but if they are, a

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[96] Testimony of Ben Rottenborn, Stanford Law School Environmental Law Clinic, before the State Water Resources Control Board (Dec. 7, 2005, Oakland, CA).
[97] *Id.*
[98] Available at http://www.energy.ca.gov/sitingcases/mosslanding/documents/index.html. Accessed 9.1.06.
[99] May 26, 2005 California Coastal Commission letter to the City of Huntington Beach regarding the Draft Recirculated Environmental Impact Report No. 00-02 – Proposed Poseidon Corporation Desalination Facility SCH#2001052092 http://www.ci.huntington-beach.ca.us/files/users/planning/state_agencies.pdf
[100] CEC Huntington Beach Project Description, *supra* note 54.

comprehensive, publicly-heard review of all the economic data is absolutely essential to thoughtful, careful decision-making.

Finally, the State Board should make it immediately clear to affected generators that there will be no allowance for "feasibility" factors that are created by coastal generators between now and the time of implementation of this policy. To do otherwise would create incentives for the affected generators to prematurely undermine the intent of reducing entrainment and impingement.

D. Credits Should Be Allowed Only to Reward Decisions Intended to Reduce Impacts

The draft policy on once-through cooling loosely allows facilities to receive credit towards achieving performance standards for past efforts to reduce impingement and entrainment. However, it fails to clearly expound which measures would be appropriately considered impingement and entrainment reduction strategies, and how the appropriate credits would be determined. Identifying a consistent and justifiable approach to assigning credits would be an arduous task for staff. Thus, **we urge the State Board to eliminate the opportunity for facilities to receive credits from the policy**. Removing the credit provision from the policy would considerably streamline its application and implementation.

If the State chooses to move forward with this element of the policy, credits should only be allowed in cases where operational and/or structural controls were implemented for the primary (*i.e.* not incidental) purpose of reducing environmental impacts. Credits should not be given for designs that were not originally intended for environmental protection. Furthermore, power plants should bear the burden of proof in demonstrating the motive behind each measure to be considered for credit. In the absence of clear and convincing proof, the State Board should presume that such measures and controls have been implemented exclusively or primarily for business or other non-environmental purposes, and facilities should not be awarded credits.

The federal regulations (which, as noted, are being challenged as inconsistent with the Clean Water Act) allow for a variety of credits towards impingement and entrainment reductions that are not likely to be consistent with state law or facts, or even the current version of the draft policy. For example, the federal rule allows facilities to receive credit towards the performance standards for intake pipes located within the water column, because it characterizes the calculation baseline relative to impingement and entrainment that would occur at the sea surface. This type of credit should not be allowed in the state policy. Most facilities along the coast of California have submerged intake pipes. There is no evidence that this structural design was originally intended to reduce entrainment. Instead, plants were most likely designed in this fashion solely for practical purposes. *I.e.*, if intake pipes were placed along the surface, they would impede boat traffic, suffer potential damage from storms and wave action, have functionality restricted by tidal fluxes, etc. Although submerged intakes may have less impact on the planktonic community than surface intakes, there is substantial evidence that even with submerged intakes, OTC has significant adverse environmental impacts.[101] Instead of contemplating various sleight-of-hand scenarios like plants moving their intakes from the water column to the surface in order to avoid mandatory reductions, the intention and application of a new state policy must be to promote real reductions in environmental impact.

[101] CEC Staff Report, *supra* note 1; Michael Foster (September 26, 2005) Presentation at State Water Board 316(b) Laguna Beach workshop.

As currently outlined in the draft policy, the language addressing the assignment of credits for already-implemented impingement and entrainment reductions is vague and potentially misleading. We urge the State Board to strengthen the policy by eliminating the opportunity for facilities to receive credits, which would be a difficult and time-consuming exercise that would take up staff time better suited to implementing reductions. At a minimum, however, the policy should clarify in what cases, and how credits will be allotted, and ensure that credits are allowed only for past actions clearly, demonstrably and specifically taken to protect the environment. The State cannot weaken the law by adopting a policy that allows credits for actions not demonstrably and specifically intended to reduce OTC's environmental impacts.

E. The Policy Must Include Seasonal Protections for Larval Organisms to Effectively Meet Entrainment Reductions

As previously stated, it is the intent of both state and federal law to protect marine and coastal species from impacts associated with entrainment and impingement. However, as currently written, the draft policy would allow for continued high levels of entrainment because it fails to provide detailed guidance for how entrainment reductions should be calculated. Although the policy proposes using flow as a proxy for entrainment, it does not specify whether these flow reductions should be calculated on a daily, monthly, annually, or some other basis. Without such specification, it is likely that policy implementation will not be consistent throughout the state. For example, facilities that choose to calculate flow reductions on an annual basis may not provide necessary protection to critical fish eggs, larvae and plankton in some areas of California.

In southern California, peak larval abundance coincides directly with peak energy needs in the state – during the summer. Because of the ambiguity of the proposed policy, facilities may choose to calculate flow reductions on an annual basis. In doing so, facilities might reduce their intake flow (shutting down the pumps or reducing them to the minimum intake necessary) during the winter, and continue using high flow rates in the summer. While such a practice could technically meet the flow reduction standard as written, it would not reduce the entrainment impacts in southern California. The relative abundance of fish larvae and eggs is so great during the summer in southern California that if operations were restricted to only the summer months, it would still account for the majority of year-long entrainment impacts.[102] Thus, it is imperative that the policy include protections for seasonally abundant organisms to truly achieve the intended entrainment and impingement reductions. **We recommend that impingement and entrainment reductions be calculated on a monthly basis, rather than leaving these calculations unspecified, in order to ensure real reductions in entrainment impacts.**

F. Existing Facilities that Repower or Retool Must be Classified as "New" Facilities

State Board staff should amend the proposed definition of "new power plant" to include <u>all</u> existing facilities that repower and retool. A "new power plant" must comply with

[102] AES Huntington Beach L.L.C. Generating Station Entrainment And Impingement Study Final Report (April 2005) Prepared by MBC Applied Environmental and Tenera Environmental, see section 4.4.3 *Entrainment Results*; Ichthyoplankton and station data for California Cooperative Oceanic Fisheries Investigations survey eruises, CalCOFI website: http://swfse.nmfs.noaa.gov/FRD/CalCOFI/On-LineDataSystem/documentation.htm#data.

the federal Phase I rule mandating performance equivalent to closed-cycle wet cooling towers or better. The proposed definition of "new power plant" in the draft policy currently reads:

> a) Any power plant that is issued an NPDES permit and which commenced construction after January 17, 2002, or b) any power plant that was in operation prior to January 17, 2002 but, as of the effective date of this Policy, has undergone or will undergo a major modification, such that its electrical production capacity will increase and its intake flow rate will increase.[103]

The scoping document states that the definition was intended to "capture as a new power plant modifications to the plant that fall short of construction of a greenfield or stand-alone facility as long as the modifications increase both the plant's electrical production capacity and the design capacity of the existing intake structure."[104]

As currently worded, it could be argued that the definition of "new power plant" does not apply to plants going through repowering (a process in which the generation units are replaced) or retooling (applying to lesser modifications including replacing burners), because such changes might not be "major modifications" under the definition. These modifications might not increase electrical production capacity (repowering upgrades combustion facilities to state-of-the-art technology but does not always increase production capacity) and/or flow rates. However, it is obvious that repowering and retooling are major modifications in any sense of the term. Both require an elaborate proceeding at the CEC. Retooling and especially repowering involve the expenditure of up to hundreds of millions of dollars and significant disruption to plant generation and site logistics—the very same kind of expenditures and site disruption occurring during development of a greenfield facility. The implicit justification for a different policy governing new versus non-new facilities is the assumption that retrofit costs are higher than newly-built costs; importantly, however, the State Board has cited no evidence to buttress this assumption. Moreover, simple common sense prompts the question: how are costs different where there is nothing on the land after an old facility is razed and removed (as is sometime the case in repowering) and where there is nothing on the land to start with (as in greenfield development)? In addition, the disruption and investment associated with repowering and retooling make that an ideal time to implement changes in cooling systems needed to prevent impacts to the beneficial uses of impacted waters.

Thus, staff should revise the definition of "new power plant" to clearly capture repowering and retooling facilities, as there is no rational basis for why these facilities should be upgrading to state-of-the-art generation and air pollutant-reducing technology without also upgrading their antiquated cooling systems. Moreover, such an approach would be consistent with the CEC staff recommendation from its June 2005 report on once-through cooling, which recommends disallowing the use of OTC for any repower or replacement project unless there is no other viable alternative. In that report, the CEC staff suggested a policy whereby the CEC would "approve once-through cooling by power plants it licenses, or for licenses it amends related to cooling system modifications, only where alternative water supply sources or alternative cooling technologies are shown to be both environmentally undesirable and economically unsound."[105]

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[103] Scoping Document, *supra* note 90, Appendix I, p. 4.
[104] *Id.* at p. 20.
[105] CEC Staff Report, *supra* note 1, p.4.

G. The Policy Should Provide a Well-Defined and Expeditious Compliance Deadline

At present the draft policy does not provide an ultimate deadline by which power plants must be in compliance with entrainment and impingement reductions. Instead, the draft policy directs the Regional Boards to implement the policy when a permit for an existing plant is first reissued (after the effective date of the policy) or when the permit is reopened, whichever occurs first. This implementation strategy fails to account for frequent administrative delays in reissuing permits by some Regional Boards. For example, the most recent reissuance of the Potrero's NPDES permit was delayed for more than 10 years.[106] Due to these delays, **a circumscribed deadline is necessary to ensure that this policy is robust and enforceable.**

In determining this deadline, the State Board should consider the timeline for compliance under the federal rule. Under the Phase II schedule, Comprehensive Demonstration Studies examining impingement and entrainment at each facility will be finished at the latest in January 2008. Thus, actions towards compliance at the state level should reasonably begin by no later than mid-2008. Accordingly, **we urge the State Board to require implementation within the first permit cycle immediately following the effective date of the final policy, or when the permit is reopened, <u>or no later than five years after adoption of the policy</u>, whichever occurs first.**

III. RESTORATION AND MITIGATION ARE NOT EFFECTIVE SUBSTITUTES FOR PREVENTING IMPACTS

A. Compliance Alternatives that Rely on Restoration And Mitigation Should Not Be Included in the State Policy, as the Use of Restoration Cannot Achieve the Goals of the Clean Water Act and Porter-Cologne

The draft policy allows restoration to be used when the facility operator proves that operational and structural controls cannot "feasibly" (see above discussion regarding "feasible") be used to achieve the required 90% reduction in entrainment. In such cases, the draft policy states that the facility may use restoration to achieve the required 90% reduction in entrainment (of course, the policy requires that a minimum of 60% reduction in impacts be achieved in any event, a position that we strongly support).

Compliance alternatives that rely on restoration (or, for the same reasons, mitigation) should not be included in the state policy, which instead should require the 90-95% reductions be achieved through <u>prevention</u>, as encouraged by the OPC and SLC. The plaintiffs in both the Phase I and Phase II federal lawsuits (including California Coastkeeper Alliance and Surfrider) have consistently argued that restoration is not allowed under the language of CWA section 316(b). This argument was successful in the Phase I case regarding new power plants.[107] Among other things, the court in that case said that **restoration measures are "plainly inconsistent with the statute's text and Congress's intent in passing the 1972 amendments."**[108] The court added that:

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[106] New permit issued May 10, 2006 retrievable at http://www.waterboards.ca.gov/sanfranciscobay/Agenda/05-10-06/mirantfinalorder.pdf.

[107] *Riverkeeper, supra* note 30, 358 F.3d at 189-191.

[108] *Id.*, at 189 (emphasis added).

> [restoration measures,] however beneficial to the environment, have nothing to do with the location, the design, the construction, or the capacity of cooling water intake structures, because they are unrelated to the structures themselves. Restoration measures correct for the adverse environmental impacts of impingement and entrainment; they do not minimize those impacts in the first place.[109]

The court concluded that "we find that the EPA exceeded its authority by allowing compliance with section 316(b) through restoration methods, and we remand that aspect of the Rule."[110] A decision in the Phase II case is likely in the next year.

As the United States Court of Appeals for the Second Circuit held in reviewing EPA's national cooling water intake structure regulations, section 316(b) of the CWA requires facilities to minimize, *i.e.* **prevent**, environmental impacts, rather than attempt to make up for them after they occur. It is for this reason that the New York policy does not consider restoration as an appropriate or acceptable best technology available, stating that restoration is inconsistent with Clean Water Act section 316(b) because "such measures merely attempt to correct for the adverse environmental impacts of impingement and entrainment; they do not minimize those impacts in the first instance."[111] California should follow suit.[112] Additionally, California Water Code section 13142.5 mandates that all new or expanded power plants (and industrial installations) use the best available site, design, technology, and mitigation measures feasible *to minimize the intake and mortality of all forms of marine life*. For the same reasons as restoration, mitigation cannot be viewed as a substitute for preventing impacts from occurring in the first instance, most importantly because the "best technology available" is capable of exceeding the high-end of the entrainment and impingement performance ranges.

Thus, we urge the State Board to eliminate restoration as a compliance alternative under the draft policy, just as New York State has done. However, if the state policy does include a restoration component, it should be considered the exception, not the rule, and should be only the minimum amount necessary to achieve the required 90% reduction in entrainment impacts. In particular, the policy should more carefully define the hierarchy of restoration measures and exactly when a plant might derogate from the top-level priority of in-kind, on-site restoration to lower priorities (which should be severely discouraged). We further recommend the State Board assign the Expert Review Panel to assess and approve any limited situations where restoration may be acceptable to achieve the 90% reduction goal, and validate acceptable restoration actions that can be taken to comply with the policy.

Additionally, the scoping document for the draft policy states that the State Board will require the "habitat production foregone" methodology to be used when assessing entrainment losses to apply towards restoration.[113] This methodology places all entrainment losses in the same context – acres of damages done. However, the habitat production forgone method was not

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[109] *Id.*
[110] *Id.* at 191.
[111] Scoping Document, *supra* note 90, Appendix II at p. 6 (emphasis added); *see also Riverkeeper*, 358 F.3d at 189-192.
[112] It should be noted that the Second Circuit's decision in *Riverkeeper* is binding nationwide. The decision confirms that restoration measures are not authorized under section 316(b) for new facilities. The question of whether restoration measures are authorized under section 316(b) for existing facilities is presently under review by the Second Circuit in Riverkeeper, Inc. v. EPA, 04-6692-ag(L), which was transferred to the Second Circuit by the Ninth Circuit.
[113] Scoping Document, *supra* note 90, p.18.

originally developed for restoration purposes, and consequently no mitigation ratio was built into the development of this model. Thus, solely using habitat production foregone to determine restoration needs would only achieve a mitigation ratio of 1:1, which is not sufficient and is rarely if ever used in practice in other restoration situations. If the State Board continues to include restoration in its policy, a mitigation of 3:1 to 5:1 or greater should be required to account for the high level of uncertainty surrounding whether or not restoration actually mitigates for any of the environmental damages caused by OTC. This approach would be consistent with other restoration requirements, as the Coastal Conservancy and other agencies have historically required mitigation ratios of 3:1 and higher for habitat loss.

B. A Rigorous Analysis of All Feasible Technological and Cooling Alternatives, Including Use of Treated Wastewater as Coolant, Should Be Conducted at Each Facility

In the past, restoration and mitigation options (or worse, minimal one-time "payments" in lieu of actual restoration or mitigation) have been quickly turned to, with little to no analysis of alternatives that would actually prevent the impacts that such restoration and mitigation ostensibly would address. A far more rigorous analysis of alternatives to once-through cooling technology should be conducted at each site to ensure that beneficial uses are best protected. While the scoping document cites the availability of less damaging, alternative cooling technologies to once-through systems,[114] the policy should go further to ensure the mandates in the Clean Water Act and Porter-Cologne are achieved. It should specify that, in permitting proceedings, applicants must analyze and report on the potential for adoption of alternative cooling technologies at their facilities. In turn, Regional Board staff should consider these reports and state the basis for adopting or rejecting any given technology. In making these determinations, Regional Board staff could consider the results of a forthcoming report from the OPC concerning the potential of such alternative cooling technologies at each site. This requirement would improve consistency of State Board decisions with the resolutions passed by the SLC and OPC earlier this year, inform the feasibility demonstration that facilities must make to gain approval for restoration measures (if such a provision is included in the final policy), and bolster the Regional Board staff's interpretation of Cal. Water Code 13142.5 and implementation of Clean Water Act section 316(b). As with our suggestion regarding feasibility determinations, we also recommend that the Expert Review Panel review staff determinations concerning adoption of alternative cooling technologies, to ensure consistency with state and federal law across the state.

Similarly, the draft policy only requires plants to "consider" the use of "treated wastewater" for plants that are "in close proximity" to POTWs.[115] State law and policy strongly encourages the use of recycled water (*see, e.g.*, Cal. Water Code sec. 13142.5(e); State Board "Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling" (1975)[116]; "Recycled Water Task Force Final Report" (June 2003)[117]). Accordingly, **the State Board's policy should impose a presumption that where the use of treated/recycled wastewater is technically feasible, a facility must demonstrate with clear and convincing evidence why an alternative source of water is superior.**

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[114] *Id.* at p.27

[115] *Id.* at Appendix I, p. 3.

[116] This policy states clearly that "[i]t is the Board's position that from a water quantity and quality standpoint the source of power plant cooling water should come" first from "wastewater being discharged to the ocean" over all other sources of water." This policy should be reflected clearly in the Board's 316(b) policy.

[117] Available at: http://www.owue.water.ca.gov/recycle/docs/TaskForceReport.htm. Accessed 9.1.06.

IV. NUCLEAR SAFETY QUESTIONS SHOULD BE ADDRESSED TO NUCLEAR REGULATORY COMMISSION

The nuclear plants account for well over half of the once-through cooling water flow currently used in the state. It is noteworthy that while the California nuclear power plants utilize once-through cooling with significant impacts on the marine environment, other nuclear plants around the country use closed-cycle cooling effectively and safely.

Despite using the majority of once-through cooling water in the state, the draft policy gives the nuclear facilities a virtually blanket exemption from complying with the impingement and entrainment standards. If the owner or operator simply "demonstrates that implementation of operational and/or technological measures for the reduction of impingement and entrainment will conflict with safety requirements instituted by the Nuclear Regulatory Commission," then according to the current draft policy they are exempt from the operational or structural controls.[118] Because neither "demonstration" nor "conflict with safety requirements" are defined in the draft policy, this provision would allow for almost any statement by an owner or operator of a nuclear facility to opt out of the policy on the allegation that there was a "safety conflict." Given the overall contribution of the nuclear facilities to the damages associated with once-through cooling, if they were exempt from compliance, the proposed policy would provide significantly less environmental protection for our marine environment.

Safety is obviously important. However, the people of the state and the state's resources would be better protected if resolution of any safety questions raised by the owner or operator were left to the Nuclear Regulatory Commission ("NRC"), which is charged with the oversight of such matters. The NRC has shown that it will properly interject if it sees a potential safety issue. For example, the NRC became closely involved immediately in the recent discovery of a radioactive leak from the San Onofre Nuclear Generating Station that had reached local groundwater.[119] NRC officials said "they were concerned because the contamination was found in a place 'it should not be'."[120]

The draft policy should be rewritten to put the responsibility for resolving safety issues back on the NRC, not on the power plants, who might benefit from any "demonstration" of a claimed "safety conflict."

It is also important to note that the **EPA thoroughly examined the issue of retrofitting nuclear power plants in its CWA 316(b) Phase II Technical Development Document (TDD),** and at no time did the EPA identify retrofits at nuclear plants as infeasible due to safety issues. The two issues raised in the TDD that distinguish nuclear plants from fossil fuel boiler plants are the potential sensitivity of nuclear plants to excavation in the vicinity of the reactors, and an increased safety margin in the upgrading of surface condensers at nuclear plants.[121] The EPA addresses these possible safety issues appropriately by adding a cost premium for excavation and surface condenser upgrades at nuclear plants.

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[118] Scoping Document, *supra* note 90, Appendix I, p. 2, para. 2.c.
[119] *See, e.g., "Radioactive Leak Reaches Nuclear Plant's Groundwater" supra* note 26.
[120] *Id.*
[121] EPA 316(b) Phase II TDD Ch.4, *supra* note 53 pp. 2.31, 2.35.

Conversions at nuclear plants have been shown to be feasible and safe for some time. The Palisades Nuclear Generating in Plant in Michigan, for example, successfully and safely carried out a conversion from once-through cooling to closed cycle cooling in 1974.[122] Additionally, the owner (Entergy, Inc.) of the 2,000 MW Indian Point nuclear power plant on the Hudson River in New York carried out an extensive wet tower retrofit design assessment as a component of the plant's NPDES permit renewal process in 2003. The wet tower evaluated, a 500-foot diameter round tower in hilly terrain, required extensive blasting and excavation of granite near the operational reactors. One element of the retrofit analysis conducted by Entergy was determination of the effect of the blasting on the reliable operation of the reactors.[123] The result of the study was that the extensive blasting presented no safety concerns if conducted as planned and would have no impact on the operational reliability of the reactors. It is unlikely that such significant disturbances would be necessary at either SONGS or Diablo Canyon due to the coastal sedimentary geology of these two sites. Even if such disturbances were necessary, the Entergy study would indicate that such disturbances in the vicinity of a nuclear power plant can be done is a safe fashion, and in no way represents an automatic technical or safety impediment to a wet tower retrofit at a nuclear power plant. **The NRC, which has expertise in safety issues raised and resolved around the country, is the most appropriate arbiter of potential safety concerns**, more so than a local plant facing regulation under section 316(b). Coordination can be undertaken with the Expert Review Panel and the State Water Board to ensure full public vetting of such issues.

V. THE POLICY MUST INCLUDE NEEDED DETAILS TO ENSURE CONSISTENT IMPLEMENTATION

A. The Plants Required to Conduct Cumulative Impact Studies Should be Explicitly Identified

We support the requirement in the draft policy that power plants with overlapping intake water source areas conduct a cumulative ecological study analyzing their collective impacts, even when the closely-sited plants fall under the jurisdiction of different Regional Water Boards. Although we support this provision, however, we are concerned that the phrase "overlapping intake water source areas" is too vague. The draft policy does not clearly establish how facilities should determine whether or not they have "overlapping intake water source areas." To clarify this section of the policy, we recommend the State Board or Expert Review Panel specify which facilities are required to conduct a cumulative impact study. For example, facilities on the same enclosed bay (such as Alamitos and Haynes Generating Stations on Alamitos Bay) and those closely located along the coast (for example, the three power plants in Santa Monica Bay) should be defined has having overlapping intake water source areas. Given that there are only 21 coastal power plants in California, this should be a relatively simple task that will streamline implementation by circumventing potential arguments raised by various facilities to the State Board as to whether or not a cumulative impact study is required at their power plants.

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[122] *Id.* at p. 3.

[123] Calvin Konya, PhD, *Indian Point Blasting Feasibility Study*, prepared for Enercon Services (consultant to Entergy), May 22, 2003, Appendix 6A to June 2003 Enercon report "*Economic and Environmental Impacts Associated with Conversion of Indian Point Units 2 and 3 to a Closed-Loop Condenser Cooling Water Configuration.*"

B. The Monitoring Provisions Must Be Further Specified to Ensure Consistent Implementation and to Characterize Compliance Accurately

The draft policy outlines impingement and entrainment monitoring provisions to be completed as part of permitting following adoption of the policy. This monitoring is essential for policy implementation, as its results will be used to determine compliance. Thus, it is imperative that this monitoring generates results that accurately reflect impingement and entrainment at each facility. It is also vital that monitoring be consistent for all power plants, so that impacts of entrainment and impingement can be examined on a statewide basis.

As currently written, the monitoring provisions within the draft policy are too open-ended and need more detail. For example, prior to permit issuance or renewal, the draft policy requires a year-long impingement and entrainment characterization study, but no sampling frequency is determined. We recommend that both impingement and entrainment sampling be conducted at least once monthly, to account for changing facility and ocean conditions. Furthermore, after the permit is effective, the draft policy requires "periodic" impingement sampling; however the term "periodic" is not defined. This and other indistinct terms should be explicitly characterized to streamline implementation and ensure that the policy is interpreted consistently across all facilities. The draft policy also states that the need for new impingement studies must be evaluated at the end of a permit period, but does not define who will conduct this evaluation. We recommend that an entity separate from the power plants or their hired consultants determine the level of future impingement studies that are necessary, and suggest that the State Board, in consultation with the Expert Panel, take on this role.

The proposed monitoring provisions also discuss the need for ongoing entrainment studies and state that entrainment studies shall be performed "unless the permittee demonstrates that prior studies accurately reflect current impacts." It is unreasonable and unrealistic for the permittee to determine accurately whether or not past studies accurately reflect current conditions. The ocean is a dynamic system, and entrainment should be continually monitored to ensure that progress towards policy compliance is made and once met, compliance continues. Furthermore, as reflected in the recent CEC report, many of the past entrainment studies are no longer valid because they are outdated and/or inconsistent sampling techniques were employed.[124] Power plants should not be allowed to use these studies to gauge whether or not they are meeting current entrainment reductions. The current language in the draft policy provides a potential loophole for power plants to neglect entrainment sampling, and should be revised. Unless structural changes (*e.g.* dry cooling) are made that assure unequivocally that entrainment standards are met, ongoing entrainment studies are necessary to evaluate compliance at each facility. These studies also should continually monitor entrainment during the peak annual period of larval density, to test the efficacy of the structural or operational compliance strategies implemented to achieve needed entrainment reductions.

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[124] CEC Staff Report, *supra* note 1; *see e.g.* pages 3, 14, and 71. For example: "The review showed that because of problems with study designs and analyses, and lack of current information, the accuracy of the described impacts of over half of these plants (13) is unknown" (p.3); and " To evaluate that argument, Energy Commission staff carefully reviewed [the Scattergood study] and found it had 'a number of serious scientific problems,' particularly with sampling methods, and concluded most concentration estimates for larval fish used in the Scattergood analysis are highly unreliable" (p.71).

VI. CONCLUSION

The time is ripe for the state to embrace a policy on once-through cooling that reflects Californians' demand for providing the utmost protection for our valuable marine and coastal resources, and for investing in a sustainable, environmentally sound future energy supply. California has consistently set high standards for the protection of the state's world-renowned coastal and marine resources, through the Marine Life Protection Act, the California Ocean Protection Act, and the Marine Life Management Act, among others. The State Water Board's policy on once-through cooling should be consistent with these laws, and with similar state laws and policies that commit California to a sustainable energy path. We urge the State Water Board to adopt and implement a state policy on once-through cooling that charts a course for California's future, consistent with the Clean Water Act and Porter-Cologne.

Thank you for your consideration of our comments.

Sincerely,

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Yakout Mansour, President and CEO, California ISO
Dominic Gregorio, Division of Water Quality, State Water Resources Control Board
Tom Luster, Environmental Specialist, California Coastal Commission

Attachments
A. Coalition Letter to the SWRCB dated February 23, 2006
B. Fact Sheet on Energy and OTC
C. CEC Expected and Disclosed Energy Facility Projects
D. CEC Power Plant Fact Sheet August 9, 2006

ATTACHMENT A

February 23, 2006 Coalition Letter to
the State Water Resources Control Board

February 23, 2006

Ms. Tam Doduc, Chair
Members of the Board
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Re: State Policy Governing Once-Through Cooling at Coastal Power Plants

VIA EMAIL: commentletters@waterboards.ca.gov

Dear Chair Doduc and Members:

The undersigned groups respectfully submit the following comments regarding the development of a statewide policy on once-through cooling.

First of all, we thank the State Water Resources Control Board ("State Board") for its attention to this issue, and for providing the opportunity for public participation at workshops in Laguna Beach and Oakland. We also appreciate the State Board's continuing coordination with the California Ocean Protection Council in the development of a once-through cooling policy. We also support the efforts of other state agencies addressing once-through cooling. Many of us attended the State Lands Commission (SLC) hearing on February 9th to support their initiative opposing once-through cooling. We will send the State Board a copy of our separate comments to the SLC regarding this topic.

Through a statewide policy, the State Board, together with other agencies, can fulfill the Legislature's recognition that "the preservation of the state's ocean resources depends on healthy, productive, and resilient ocean ecosystems," and that "the governance of ocean resources should be guided by principles of sustainability, ecosystem health, precaution, recognition of the interconnectedness between land and ocean, decisions informed by good science and improved understanding of coastal and ocean ecosystems, and public participation in decision-making."[1] We look forward to playing a constructive role in developing a policy that is appropriately protective of the state's invaluable coastal resources.

We strongly support the implementation of a consistent statewide policy and appreciate the State Board staff recommendations regarding this policy. We attended both the September 26th and December 7th workshops on this issue. This letter highlights our perspective on the draft recommendations for a statewide policy on once-through cooling presented by Regional Board staff at the December 7th workshop. We also take up elements of the pending policy that were not addressed by staff at either workshop.

[1] Pub. Resources Code, section 35505(c).

Based on the information presented at these workshops, we have the following main points regarding a statewide policy on once-through cooling:

- Compliance alternatives that rely on restoration and mitigation should not be included;
- The cost exceptions presented in the federal rule as site-specific determinations of best technology available should not be included;
- A scientific and consistent approach should be used to determine the calculation baseline, which provides the basis from which impingement and entrainment reductions are evaluated;
- A rigorous analysis of all feasible technological and cooling alternatives should be conducted at each facility;
- Power plants going through repowering should be treated as "new facilities" and
- The Regional Boards should evaluate impacts on marine mammals, sea turtles, and other larger organisms, in addition to fish and invertebrates.

Response to State Board Staff Draft Recommendations for a Statewide Policy

Following the preliminary State Board discussion at the Oakland workshop on December 7, 2005, we have recommendations about what to include in the state policy for Phase II facilities. Above all, we believe that restoration/mitigation and the site-specific compliance alternatives that allow for economically based exceptions (both elements permitted in the federal rule) should not be included in this policy.[2]

First, we strongly support the following staff recommendations for a statewide policy presented at the Oakland workshop:

- Utilize standardized data collection methods;
- Use actual flow, rather than the permitted maximum to determine the calculation baseline. Most power plants use a lower volume of seawater than permitted for normal operations; we support basing impingement and entrainment reductions on the actual flow used by each facility;
- Set targets at the upper end of the federal performance standards (95% reduction for impingement, and 90% for entrainment);
- Discourage cooling water use when power is not generated; and
- Require a cumulative impact evaluation for areas where power plants are in close proximity, such as Santa Monica Bay.

In addition to supporting these recommendations, we have further suggestions for improvement. In continuing to develop the statewide policy, it is imperative that the State Board recall Water Code section 13142.5, which mandates that the "best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life." This Water Code section echoes numerous other state authorities enacted to protect, enhance, and restore the State's coastal resources. The following list summarizes our main points:

[2] As has been noted in both workshops, the viability of restoration and the site-specific compliance alternatives (as provided in the federal Phase II rule) is pending litigation in the Second Circuit Court of Appeals.

- Calculation baseline: While we agree that calculation baseline should be based on actual rather than permitted flow levels, the term "actual flow" needs to be more clearly defined. Further recommendations regarding the calculation baseline are discussed below.

- Performance Standards: We support using the upper end of the performance standards as reduction targets, but there must be clear and enforceable deadlines set in order to meet these targets.

- Mitigation/Restoration: Although we appreciate the State Board staff's effort to specify types of mitigation that are acceptable (*e.g.* in-kind mitigation), we do not believe that mitigation/restoration should be considered as an option for a compliance alternative. Restoration does not mitigate directly for the impacts of once-through cooling, and it has been consistent practice in the past to vastly under-fund mitigation in comparison with the ecological costs of once-through cooling impacts. Mitigation and/or restoration should be permitted in this policy only with respect to ensuring that 100% of the impacts associated with once-through cooling are mitigated; that is, mitigation would be allowed only for the difference between the upper end of the performance standards (95% for impingement and 90% for entrainment) and 100% of the damage.

- Thermal Plan: Although we support placing this policy in an enforceable document, we are concerned that amending the Thermal Plan may be a slow process. This policy is of high importance and needs to be implemented soon to provide guidance for the Regional Boards and industry. We encourage the State Board to proceed expeditiously with the policy and Thermal Plan amendment process, and to ensure that all permits issued include such policy requirements whether or not the Thermal Plan process is complete.

The State Policy Should Address the Potential Loopholes Afforded By the Federal Rule to Protect Water Quality and Marine Resources

While we applaud many of the recommendations made by staff at the December workshop held in Oakland (summarized on slide 9 of the staff Presentation), all of staff's good intentions could be meaningless unless the State closes off potential loopholes in the federal rule. If these loopholes remain, the time and resources spent by the State Board and other agencies on this issue *will likely result in little to no environmental benefit.* Loopholes exist in the form of site-specific determinations, the range of feasible options that must be considered, and the "new facility" definition currently allowed by the Phase II rule.[3]

1. Site-Specific BTA Determinations: The "Cost Exceptions"

Despite attempting to promote a national standard, the Phase II regulations allow for site-specific determinations of best technology available ("BTA").[4] If either (1) the costs of compliance with

[3] Again, as stated above, the site-specific alternatives are currently subject to federal litigation in the Second Circuit. The same litigation also challenges the scope of the Phase I and Phase II rules as it relates to which facilities fall under each rule.

[4] 69 Fed. Reg. 41597-98; 40 C.F.R. Part 125.

the performance standards and/or restoration requirements would be significantly greater than the costs considered by the EPA Administrator for a similar facility (cost-cost exception), or (2) the costs of compliance with the performance standards and/or restoration requirements would be significantly greater than the benefits from compliance, the plant can request a site-specific BTA determination. In either case, the State Board must ensure that these requirements achieve an efficacy "as close as practicable to the performance standards and/or restoration requirements." However, for the reasons stated below, the undersigned environmental groups oppose both avenues for site-specific determinations.

The site-specific determinations raise a number of questions that will be nearly impossible to answer accurately and consistently. What are "significantly greater" costs? Are these greater costs offset by other advantages the plant possesses due to location or other attribute? How should environmental benefits be monetized? Are non-market and non-use values fully and accurately depicted? Should plants situated near commercial fisheries be favored or disfavored against plants in other locations? How do the Regional Boards know when proposed measures operate as close as practicable to the performance standards? These are just a few of the challenges awaiting Regional Board staff. Moreover, preliminary indications from the Proposals for Information Collection (PICs)[5] suggest that plant operators will frequently pursue site-specific determinations, not rarely as EPA apparently anticipated.[6]

Compounding these larger questions are uncertainties inherent in the calculation of compliance costs and environmental benefits. These uncertainties are likely to favor the plant operators at the expense of the coastal environment.

Calculation of Compliance Costs

Calculations of compliance costs are a critical basis for determining plant eligibility for the more lenient site-specific standards. However, calculation of these costs is notoriously difficult; the technical development documents supporting the Phase II rule attest to EPA's own difficulties in this area. Under both cost exceptions as currently stated, plant operators have an incentive to overstate such costs because they are hard for regulators to verify and the lure of more lenient standards means higher profits. Complicating matters, because neither the State Board nor Regional Boards routinely evaluate the operations of electricity generators, the Boards are not currently prepared to rigorously evaluate the cost figures to be provided by the power plants.

One common sense requirement of these cost analyses is to evaluate compliance costs in the context of plant operations. For example, if a given technology costing $20 million will satisfy the desired performance standards, how significant is this cost when compared to the annual or expected lifetime operating costs? How significant is the cost compared to other regulatory costs imposed on the plant to meet other regulations? Can the cost be financed over the lifetime of the plant? It appears that Regional Board staffs have historically not requested contextual data. And

[5] 40 C.F.R. §125.95(b)(1) [The PICs are blueprints for impingement and entrainment studies which are required by the Phase II rule when plants elect not to reduce their flow commensurate with closed-cycle recirculating cooling systems.]

[6] 69 Fed. Reg. 41590. ["In most cases, EPA believes that these performance standards can be met using design and construction technologies or operational measures."]

when environmental groups have requested these data directly from plants, plants have raised confidentiality concerns. However, when the allocation of public resources is in question, it is not sufficient to evaluate cost without reference to context, nor is it acceptable that necessary data are shielded from agency review.

If the State Board is to rely on a policy that depends on assertions of compliance cost, the Board should retain an independent panel of experts that is qualified to review such data in appropriate context. Data from the presentation by agency consultant John Maulbetsch at the Oakland workshop could be a good starting point for this panel's inquiry. In his presentation, Mr. Maulbetsch showed that fuel costs are by far the largest cost of production at combined cycle plants, and that capital costs, of which the cooling system is only one component, appear to range around 11 to 16 percent.[7,8] The independent panel could review these variables and other relevant ones in determining the true significance of compliance costs.

Calculation of Environmental Benefits

Just as plant operators have an incentive to shield or overstate data on compliance costs, operators also have an incentive to understate the benefits of compliance with the Phase II performance standards under the second cost exception. Because the precise calculation of environmental benefits is challenging and subject to debate, plants will likely stop after calculating only the most immediate and transparent benefits. In doing so, plants will ignore or avoid the quantification of non-use and non-market benefits. Calculation of these benefits pushes the frontiers of environmental economics; indeed, EPA itself could not quantify the non-use benefits to be afforded by the national rule.[9] Given this reality, rather than encouraging a simplistic and inaccurate approach to benefits calculation, the State Board should reject any alternative that relies on it.

The latest example in the monetization of environmental benefits comes from a study concerning the Huntington Beach Generating Station. This study, published in 2005, focused only on the impacts of the plant to commercially valuable fish species. In doing so, the study ignored certain use and non-use categories. The study concluded that the power plant reduced environmental benefits by $317-$2887 annually, which is likely to be a gross underestimation.[10]

As can be seen at Huntington Beach, the cost-benefit exception would give plants an incentive to dramatically understate environmental benefits. In so doing, the exception essentially shifts the burden to the State Board to prove that other environmental benefits really do exist. This concept would turn environmental regulation on its head, asking government to prove harm before industry can be regulated. Clean Water Act section 316,[11] the statute on which the Phase II regulation is in principle based, takes a different approach, commanding simply that steps are

[7] Fuel costs may be even higher at traditional steam plants, where more fuel is necessary for a given output of electricity.
[8] Maulbetsch Presentation at Oakland Workshop, December 7, 2005, Slides 28-29.
[9] EPA, Final Rule Economic and Benefits Analysis, Chapter D-1: comparison of Costs and Benefits, http://www.epa.gov/waterscience/316b/econbenefits/final.htm.
[10] AES Huntington Beach L.L.C. Generating Station Entrainment And Impingement Study Final Report, April 2005.
[11] 33 U.S.C. §1316(b).

taken to minimize environmental impact from once-through cooling systems. The State Board should do the same.

California's Deregulated Energy Market

Finally, because California now has a deregulated energy market, the State Board's once-through cooling policy will affect not only coastal plants but *all* plants selling energy on this open market. In the free market, plants of all types compete to sell electricity to the public. At the same time, plants are subject to individual review when first built or when repowering. Because of water supply and other concerns, inland plants have been forced over time to operate with cooling systems that use small amounts of water. These plants have demonstrated that the use of such technologies is feasible even in the warmest areas of the State. In this context, prolonging the lifespan of the ageing fleet of once-through cooling systems, whether through site-specific exceptions or otherwise, amounts to an undeserved subsidy to coastal plants using the public's coastal resources to pay for it. Because sanctioning site-specific determinations will exacerbate and extend inequalities in the energy market, the State Board should further avoid them as a matter of public policy.

2. The State Policy Should Require Rigorous Analysis of All Feasible Technological and Cooling Measures

Although plants are still submitting the PICs required by the Phase II rule, those submitted to date suggest that plants are not evaluating all "feasible" measures. In past permit proceedings, the determination of what is "feasible" and what is "infeasible" appears to have resided with the plant operators, with little oversight from the Regional Boards. These assertions of technological or economic infeasibility have at times rested on a paragraph or less of support.

On this issue, the New York State policy takes a better approach. New York requires evaluation of *all* feasible alternatives, where feasibility is defined as "'capable of being done' with respect to the physical characteristics of the facility site but does not involve consideration of cost." Furthermore, New York requires that the power plant "explore the feasibility of closed-cycle cooling at each existing facility." Then, as part of a later technological review, New York considers the cost of each alternative.[12]

New York's feasibility policy is a good one. What has happened in California is that claims of infeasibility have rarely been aired before the Regional Board and contested by all stakeholders. Without a broad view of feasibility at the outset, the consideration of alternatives is artificially narrowed, and State and Regional Board staff and members are not able to choose meaningfully among alternatives. One example of this has been the limited analysis of the use of recycled water for cooling at coastal plants, despite efforts in the water supply and wastewater treatment communities to reclaim water. This approach neither furthers the goals of sound science nor the mission of the State and Regional Boards. It also hinders public participation.

[12] Letter to Benjamin Grumbles from New York State Department of Environmental Conservation, January 24, 2005, p. 4.

3. The State Policy Should Classify Plants As New Facilities When Old Generation Structures are Razed or New Discharge Permits are Required

Under the current federal regulatory structure, the Phase I rule governs *new* power plants, while the Phase II rule controls *existing* power plants. While the contours of this distinction are presently the subject of litigation, the current federal policy focuses solely on changes to the capacity of a plant's cooling water intake structure in dividing new plants from existing plants. Thus, an entire power plant can be razed and built from new, but so long as the design capacity of the cooling structure is not increased, the plant will fall under the more lenient rules for existing plants.[13] In California, the same plant might be subject to *new* waste discharge requirements while perversely falling under the *old* intake requirements.

State policy can and should distinguish between existing and new plants more rationally. Under the federal rules, existing plants receive more lenient treatment because *retrofitting* a facility with an alternative cooling technology is thought to be significantly more costly than when building a new facility from the ground up. However, when plants "repower," a process in which generally all of the plant's structures are replaced except for the intakes, these higher retrofit costs do not exist. Thus, in cases of repowering, the reasons for more leniently treating "existing" facilities are no longer valid. Power plants that go through repowering should comply with either the federal rules for new facilities or more stringent state rules.

The State Policy Should Take a Scientific and Consistent Approach to Determine the Calculation Baseline

To date, much of the discussion concerning once-through cooling has involved simply trying to understand the federal Phase II rule. However, in fashioning a policy for California, the State Board, together with other agencies with responsibilities for the health of our ocean and coast, must ask: to what conditions shall our coastal waters be restored? Congress and the Legislature have already provided some answers. The Clean Water Act famously commands that waters be restored to fishable and swimmable conditions. The Porter-Cologne Act calls for activities affecting water quality to be regulated to attain the highest water quality reasonable and that measures be taken to minimize the intake and mortality of all forms of marine life. Similarly, the Coastal Act insists that uses of the marine environment be conducted in a manner that sustains biological productivity and maintains healthy populations of all marine species adequate for long-term commercial, recreational, scientific, and educational purposes. Most recently, similar goals were embraced in the California Ocean Protection Act.

Because the federal rule seeks only to impose a performance standard, without reference to existing or future environmental conditions, it is critical that the State Board develop a policy that will help achieve the goals our elected representatives have long pursued.

We especially urge the State Board to establish a method for determining the calculation baseline (the basis on which impingement and entrainment reductions are evaluated) using sound science,

[13] 69 Fed. Reg. 41578-79.

involving reference sites, and to promote consistency for all coastal power plants in California. A clear approach for determining the calculation baseline is paramount to the state policy because it is the level from which all impingement and entrainment reductions are evaluated. We applaud the State Board for proposing to base the calculation baseline on actual rather than maximum permitted flows. However, we are concerned that allowing facilities to establish a calculation baseline derived solely from historic levels of intake, entrainment, and impingement, as well as potentially depleted source waters surrounding the facility, will produce biased results that result in no meaningful environmental improvement.

The decrease of biodiversity in the world's oceans and declining populations of commercially and non-commercially important marine species are well documented.[14] Recreational fish landings in the Southern California Bight have decreased from an annual mean of 4.25 million fish in 1963 to 2.5 million fish in 1998.[15] Many marine populations, including certain species of rockfish and abalone, are at strikingly low levels, and some species which were common decades ago are now rare off the coast of California. Historic impingement studies (1978-1979) at Harbor Generating Station document the take of pacific pompano, a species which is almost never seen today in the coastal waters of Southern California.[16]

The persistent use of once-through cooling at coastal power plants arguably contributes to the loss of biodiversity and the evident population decline of many marine species over the past 50 years. Thus, a balanced and scientific approach is needed for determining the calculation baseline. The historic data taken by power plant facilities is rarely comprehensive, and should not be the single basis for evaluation of impingement and entrainment reductions. Furthermore, determining the calculation baseline solely on present data does not account for the decades of destruction imparted by coastal power plants and other anthropogenic impacts on marine life. Taking a reference approach to determining the calculation baseline would help account for the years of slow degradation that have occurred in waters adjacent to power plant facilities, and it would be consistent with section 13142.5(d) of the Porter-Cologne Act (requiring such baseline studies), which to date has been largely ignored. Additionally, population sizes and species compositions have likely changed since the establishment of coastal power plants. This reference approach will help provide current data at a site that is undisturbed by once-through cooling for which to compare the density of marine life at coastal power plant facilities.

We recommend the State Board to convene an independent technical working group to determine the calculation baseline for all generating facilities in California. This group should be charged with collaboratively selecting a series of reference sites that represent habitats characteristic of each facility. In addition, we recommend that the team develop a monitoring plan to characterize the density of marine life at each reference site. Using the same methods and sampling regime as these reference surveys, the density of marine life should be determined in the source water at each power plant. Additionally, impingement and entrainment studies should be conducted at the

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[14] Myers and Worm, Rapid worldwide depletion of predatory fish communities, *Nature,* vol. 423, May, 2003; Hutchings and Reynolds, Marine Fish Population Collapses: Consequences for Recovery and Extinction Risk, *BioScience*, vol. 54, no. 4, April, 2004.

[15] Dotson and Charter, Trends in the Southern California Sport Fishery, CalCOFI Rep., Vol. 44, 2003, p.94.

[16] Tenera Environmental and MBC *Applied Environmental Sciences*, Summary of Existing Physical and Biological Information and Impingement Mortality and Entrainment Characterization Study Sampling Plan, October 2005, p.5.

intake pipes of each power plant. Based on the density of entrainable marine life in the source water and the reference site, a simple ratio can be used to determine the multiplier between these sites. This multiplier can be used to evaluate the entrainment reduction required for each facility. Similar methods can be used to determine the appropriate impingement reductions. We also recommend that the baseline is revisited every few years to monitor its effectiveness.

We understand that this proposal will require significant resources; however, it is essential if the state foresees any continuation of the use of once-through cooling technology, which is extremely damaging to the coastal and marine environment. This approach provides an unbiased approach to managing problems associated with potentially depleted source waters surrounding power plants due to decades of impingement and entrainment.

The State Policy Should Require Data Collection on All Natural Resource Impacts

Neither Clean Water Act section 316(b) nor Porter-Cologne section 13142.5 make any distinction as to type or size of marine organism impacted by once-through cooled facilities. Nevertheless, Regional Boards do not appear to have gathered data on the impacts of these facilities on larger, non-fish species, such as marine mammals and sea turtles. Despite long-standing mandates in the Endangered Species Act, Marine Mammal Protection Act, and other authorities, the National Oceanic and Atmospheric Administration has also failed to routinely collect data of the impact of these power plants on larger organisms. However, voluntary reporting and information from marine mammal rescue efforts illustrate that it is not unusual for sea lions, harbor seals, and some sea turtles to be "taken" by these facilities.[17] We urge the state policy to require evaluation of these types of impacts in the permitting process.

Conclusion

Thank you for the opportunity to provide our comments regarding the development of a California state policy on once-through cooling. As described in detail above, we encourage the State Board to exclude both the restoration and site-specific compliance alternatives from the impending state policy. We also urge the State Board to take a scientific approach in determining the calculation baseline for each power plant that involves the use of reference sites. A state policy on once-through cooling will affect coastal resources for decades into the future. With this policy, the State Board has the opportunity to either protect our marine and coastal environment, or subject it to continued harm. Thus we urge the State Board to take vigilant approach that upholds California's legacy of coastal protection by adopting a protective policy regarding Phase II facilities to safeguard our valuable marine resources. Please contact us if you have any questions regarding our comments.

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[17] *See, e.g.*, 67 Fed. Reg. 61 (Jan. 2, 2002), "Small Takes of Marine Mammals Incidental to Specified Activities; Taking of Marine Mammals Incidental to Power Plant Operations," http://www.epa.gov/fedrgstr/EPA-IMPACT/2002/January/Day-02/i32238.htm (Letter of Authorization granted pursuant to Marine Mammal Protection Acto to take certain number of harbor seals, gray seals, harp seals, and hooded seals from in power plant operations).

Respectfully,

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The Honorable Steve Westly, Chair, and Commissioners, California State Lands Commission
The Honorable Mike Chrisman, Chair, and Members of the Council, Ocean Protection Council
Jim McKinney, Environmental Policy Specialist, California Energy Commission
Tom Luster, Environmental Specialist, California Coastal Commission

ATTACHMENT B

Fact Sheet on Energy & OTC

ONCE-THROUGH COOLING & ENERGY

1. How Critical Are the Coastal OTC Plants to the State's Energy Supply?

The steam plants have low usage rates. Combined, the 21 coastal plants using OTC in California have a capacity of approximately 21,000 MW.[i] Of this capacity a total of approximately 14,000 MW is from natural gas-fired steam plants.[ii] These steam plants are old and inefficient and have low usage rates as a result, averaging less than 20 percent in 2004.[iii] The power production from the coastal steam plants accounted for less than 10% of California's power demand in 2004.[iv]

The two nuclear plants are used more extensively. In contrast, two nuclear plants (Diablo Canyon and San Onofre) with a combined capacity of approximately 4,250 MW, operated at nearly 80 percent capacity in 2004.[v] These two nuclear plants accounted for well over half the once-through cooling water utilized by the state's combined population of coastal nuclear and steam boiler plants in 2004.

2. Aren't the Coastal Steam Plants Needed in the Summer When Power Demand Is Highest?

This power can be generated by steam plants or modern replacement plants. There is nothing unique about the steam plants. As the CEC notes in its April 12, 2006 letter to the SLC, "*Over time, it is anticipated that many of the steam boilers will be replaced with more efficient generating technologies.*"

3. Does California Have a Commitment to Modernizing the Coastal Steam Plants?

Yes. Modernization of coastal steam plants with high efficiency, gas turbine combined-cycle plants is a stated goal of California's Energy Action Plan and recent California energy legislation, and better supports California's progress toward reducing greenhouse gases.[vi] Most steam plants are 30 to 50 years old and at or beyond their expected service life.[vii] An OTC ban by 2020 or earlier would simply reinforce an <u>existing</u> state commitment to phase-out coastal steam plants.

4. Will Eliminating OTC Add to the Cost of New Coastal Plants?

Not significantly. The cooling system is a small part of the overall cost of a new power plant. There is very little difference in the cost of a new combined-cycle plant whether it incorporates OTC, closed-cycle wet cooling, or dry cooling.[viii]

5. Will the New Coastal Plants Increase or Decrease Air Emissions?

The new plants will decrease air emissions. Air emissions from gas turbine plants using closed-cycle wet or dry cooling will be lower than air emissions from steam plants using OTC, due to the much higher efficiency of combined-cycle in baseload operation.[ix,x]

6. Will Retrofitting to Wet Towers Jeopardize the Reliability of the State's Electrical Grid?

No. Both nuclear and steam plants have been cost-effectively and efficiently retrofit to closed-cycle wet cooling in the United States.[xi] Retrofits more costly and complex than a wet tower retrofit are already planned for California's two nuclear plants.[xii]

7. Is Space Available at the Coastal Plants for Cooling Towers?

Yes. For example, any steam plant with space available for a large desalination plant generally has adequate space for a wet cooling tower retrofit.[xiii] Many coastal steam plants are considering the co-location of desalination plants. A review of aerial photographs of San Onofre and Diablo Canyon nuclear plants indicates there should be adequate space at both facilities for wet towers.[xiv]

8. *Will the Retrofits Cause a Drop in Plant Efficiency and/or an Increase in Air Emissions?*

No. The overall energy penalty of a nuclear plant wet cooling tower retrofit is approximately 1.5%, not 10% as cited by SCE in its March 20, 2006 letter to SLC.[xv] The air emissions that SCE attributes to this energy penalty are

overstated by a factor of 7 in the same letter. The energy penalty for a steam plant wet tower retrofit is less than that at a nuclear plant, at approximately 1%.

9. How Much Would Air Emissions Increase if the Two Nuclear Plants Are Retrofitted to Wet Towers?

A very small and insignificant amount. About 1.5%, or 30 MW, of the output of each nuclear plants' 2,100 MW capacity would be dedicated to the wet towers, primarily to meet wet tower pumping and fan energy requirements. If this 30 MW is generated by a combined-cycle plant, the annual NO_x and PM_{10} emissions from this 30 MW would be a maximum of 9 tons/year (0.05 tons/day) and 5 tons/year (0.03 tons/day), respectively.[xvi,xvii,xviii]

10. How Much Will It Cost to Retrofit the Coastal OTC Plants?

Relatively little, as only a few plants are likely to be affected. CCEEB claims in its March 24, 2006 letter to the SLC that the capital cost to retrofit all existing facilities, approximately 20,700 MW of capacity, ranges from $2.0 billion for wet cooling to $2.5 billion for dry cooling. This is not a credible scenario. In reality only the two nuclear plants and a few of the steam units that have recently been upgraded are likely to still be operational in 2020. It is probable that all other steam plants will have converted to combined-cycle using closed-cycle wet or dry cooling technology (which have only minimal additional costs if done during conversion as noted above), or been retired by that time.

11. How Will the Cost of the Retrofits Affect the Cost to Generate Power?

The overall cost of power production from coastal plants will decline over time as more fuel-efficient combined-cycle plants displace steam plants and OTC technology is replaced at those converted plants. At those few plants that are not converted, the cost of power production related to an OTC retrofit will increase 3 to 4%.[xix]

12. What Will Be the Source of Water for the Cooling Towers?

Recycled water is preferred for use in the wet towers. However, seawater is a viable option and is used in cooling towers at numerous large nuclear and steam plants in the United States. Use of seawater in closed-cycle cooling towers at either San Onofre or Diablo Canyon would reduce seawater usage by 95 percent or more.[xx] Seawater may also be used to augment recycled water supplies if these supplies are not sufficient.

13. Will the Cooling Towers Emit Visible Plumes?

Not necessarily. Wet towers can be equipped with plume abatement technology to minimize or eliminate vapor plumes. This is now standard practice in California for power plant cooling towers in urban areas. See Figures 1 and 2.

14. Will the Cooling Towers Emit Particulates?

Yes, some particulate (salt drift) emissions would be generated by the cooling tower. Advanced "drift" eliminators are incorporated into cooling towers to minimize this water droplet carryover. Cooling towers using recycled water account for only a small amount of overall power plant PM_{10} emissions.[xxi] An industry survey of operators of seawater cooling towers notes these operators have not reported any problems associated with salt drift at their facilities.[xxii]

15. How Are Other States and Regions Addressing OTC Plants?

Other states and regions are aggressively pursuing wet tower retrofits. EPA Region 1 (New England) has required the retrofit of a 1,600 MW coal plant (Brayton Point Station, Massachusetts) to wet towers.[xxiii] New York Department of Environmental Conservation (NYDEC) has recommended that the 2,000 MW Indian Point nuclear plant be retrofitted to wet towers. NYDEC determined that a wet tower cost impact of less than 6 percent of revenue was not an unreasonable financial burden on the owner.[xxiv]

ENDNOTES

[i] CEC comment letter to SLC dated April 12, 2006, p. 3. MW capacity for each coastal plant category in 2004 (steam, nuclear, combined-cycle, combustion turbine) is ealculated from data provided in table on p. 3. Total MW for all four plant categories is calculated at 20,650 MW.

[ii] Ibid.

[iii] Ibid.

[iv] Ibid.

[v] Ibid.

[vi] AB 1576 (2005) - authorizes utilities to enter into long-term eontracts for the electricity generated from the replacement or repowering of older, less-efficient electric generating facilities.

[vii] CEC report, *Aging Natural Gas Power Plants in California*, July 2003, Table 1.

[viii] John Maulbetseh presentation on cost of cooling technologies to the State Water Resources Control Board on behalf of California Energy Commission, December 7, 2005.

[ix] Utility boiler NO_x limit is generally 0.15 lb/MW-hr in California coastal air districts. NO_x limit is 0.10 lb/MW-hr in Ventura County.

[x] EPA AP-42, Table 1.4-2 Emission Factors for Natural Gas Combustion – External Combustion (utility steam boilers), 1998, p. 1.4-6. Particulate emission factor is 7.6 lb/10^6 cubic feet of natural gas. Average heat rate of coastal boilers is approximately 10,000 Btu/kw-hr (see footnote 7). Each cubic foot of natural gas has a heating value of approximately 1,000 Btu. Therefore the emission factor for coastal boilers is 0.076 lb/MW-hr.

[xi] Retrofitting to a wet tower is fundamentally simple - the OTC pipes going to and from the ocean are rerouted to a cooling tower. At facilities that have been retrofit, the hook-up of the new eooling system has generally been carried-out without requiring an extended unscheduled outage. The cost to retrofit 800 MW Palisades Nuclear (MI) was to wet towers was $68/kW (1999 dollars). The cost to retrofit 750 MW Pittsburg Unit 7 (CA) was $46/kW (1999 dollars) [ref: EPA 316(b) Phase II Teehnical Development Document, Chapter 4].

[xii] 2,100 MW Diablo Canyon was recently authorized by the CPUC to replacing aging steam generators at a cost of $700 million [ref: California Energy Circuit, *CPUC Approves $706 million for Diablo Canyon*, February 25, 2005, p. 1]. A steam turbine replacement projeet authorized by the CPUC for 2,100 MW San Onofre is estimated to cost $680 million [ref: CPUC San Onofre Steam Generator Replacement Proceeding, Decision 05-12-040 December 15, 2005] These steam generator retrofits will cost in the range of $320/kw to $330/kw, much higher than the probable cost to retrofit these plants to wet towers.

[xiii] For example, a 50 million gallon a day desalination plant is under evaluation for an 11-acre site at the AES Huntington Beaeh steam plant [ref: City of Huntington Beach, Seawater Desalination Project at Huntington Beach - Draft Recirculated EIR, May 2005, p. 3-1]. Units 3 and 4 steam units at Huntington Beach, a total of 450 MW, were recently repowered [ref: CEC, Huntington Beach project description, http://www.energy.ca.gov/sitingeases/huntingtonbeach/index.html]. Less than 2 acres of land would be needed for inline wet towers for Units 3 and 4.

[xiv] For example, San Onofre has two reactors and sits on a 257 acre site [ref: Utilities Service Alliance, San Onofre webpage: http://www.usaine.org/sanonofre.asp]. The eooling tower for each 1,100 MW reactor would require from 2 to 6 acres of land, depending on whether an inline or round cooling tower is used. Inline wet cooling towers ean provide 500 to 600 MW of steam plant cooling per acre (210 feet by 210 feet area) [ref: B. Powers, direct and rebuttal testimony, Danskammer Power Station draft permit proceeding – SPDES NY-0006262, October 2005 and December 2005]. Testimony describes design basis for retrofit plume-abated tower measuring 50 feet by 300 feet for 235 MW of steam plant capacity. Only 2 to 4% of the San Onofre site would be needed for the towers.

[xv] EPA 316(b) Phase II Technical Development Document, Chapter 5, Sections 5.6.1 through 5.6.3, p. 5-34. The measured annual efficiency penalty at 346 MW Jeffries Station is 0.16%. The cooling tower pump and fan energy demand for steam plants is estimated by EPA at 0.73%. Total energy penalty for Jeffries Stations would be approximately 0.9%. EPA also estimates the overall energy penalty for Catawba and McGuire nuclear plants at 1.7%, and for the Palisades nuclear plant at 1.8%. The generic annual efficiency penalty calculated by EPA (Table 5-10) for nuclear plants operating at 100% load is 0.4%. The generic nuclear plant cooling tower pump and fan energy demand is estimated by EPA (Table 5-16) at 0.9%. The total generic energy penalty for nuclear plants operating at 100% load is estimated by EPA at 1.3%. EPA shows a mean annual nuclear plant energy penalty of 1.7% in Table 5-1. However, when nuclear plants are operational they generally operate at 100% load.

[xvi] CARB, Guidance for the Permitting of Electric Generation Technologies, Stationary Source Division, July 2002, p. 9 (NO_x emission factor = 0.07 lb/M-hr combined-cycle plants)

[xvii] San Diego County Air Pollution Control District (APCD), Otay Mesa Power Project (air-cooled), Authority To Construct 973881, 18 lb/hr particulate without duct firing (510 MW output), equals ~ 0.04 lb/MW-hr.

[xviii] San Onofre is located in San Diego County. The NO_x and PM_{10} emissions offset thresholds defined by San Diego County APCD Rule 20.1 – New Source Review General Provisions, are 50 tons/year for NO_x and 100 tpy for PM_{10}. Diablo Canyon is located in San Luis Obispo County. The NO_x and PM_{10} emissions offset thresholds defined by San Luis Obispo APCD Rule 204 - Requirements, where Diablo Canyon is located, are 25 tons/year for NO_x and 25 tpy for PM_{10}.

[xix] A large capital investment like a wet tower retrofit would be amortized over 20 to 30 years. CCEEB estimates the cost to retrofit 20,700 MW of coastal power plant capacity with wet towers at $2 billion, or $100 million per 1,000 MW of capacity. Assuming 30 years and 7% interest, the payment per year on the $100 million capital cost would be $8 million per year. A baseload power plant, meaning one that operates most of the time at a fairly high load like 1,000 MW Encina (Carlsbad) prior to deregulation, would generally have a usage rate of 70% or more. This means the plant averages 70% of its power production potential over the entire year. Total kw-hr produced by 1,000 MW Encina per year at 70% usage rate is: 1,000 MW x 1,000 kw/MW x 8,760 hours/yr x 0.70 = 6,132,000,000 kw-hr per year. Therefore, the annual cost to pay for cooling system is: $8,000,000 ÷ 6,132,000,000 kw-hr = $0.0013/kw-hr (0.13 cents per kw-hr) The average wholesale power price in Southern California (SP-15) in 2005 was approximately $70/MW-hr ($0.07/kw-hr) [ref: Energy News Data – Western Price Survey, 2005 weekly archives: http://www.newsdata.com/wps/archives.html]. Therefore the cost of the cooling system would add ~2% to the cost of power production at baseload plants that are retrofit. For low usage power plants (20%) the retrofit would add ~6% to the cost of power production. The energy penalty imposed by the retrofit would be the same for high or low usage plants and would add another 1 to 2% to the cost of power production (see footnote 15).

[xx] Dr. Shahriar Eftekharzadeh – Bechtel, *Feasibility of Seawater Cooling Towers for Large-Scale Petrochemical Development*, Cooling Technology Institute Journal, Summer 2003, Vol. 24 No. 2, pp. 50-64. Operators of seawater cooling towers have not reported any problems associated with salt drift at their facilities. Site inspections of two long-time saltwater cooling tower installations did not exhibit any visible signs of salts fallout.

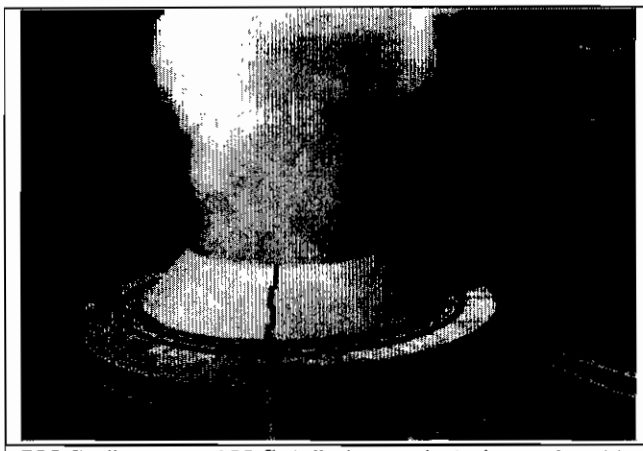
[xxi] U.S. DOE, Final EIS - Imperial-Mexicali 230 kV Transmission Lines, December 2005. Table G-1, Power Plant Emissions, p. G-4.

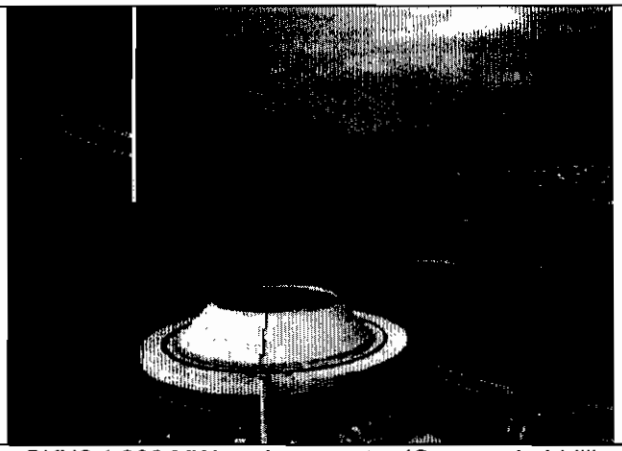
[xxii] Dr. Shahriar Eftekharzadeh – Bechtel, *Feasibility of Seawater Cooling Towers for Large-Scale Petrochemical Development*, Cooling Technology Institute Journal, Summer 2003, Vol. 24 No. 2, pp. 50-64. Operators of seawater cooling towers have not reported any problems associated with salt drift at their facilities. Site inspections of two long-time saltwater cooling tower installations did not exhibit any visible signs of salts fallout.

[xxiii] EPA Region 1, MA0003654 - Brayton Point Station Final NPDES Document, July 22, 2002, Chapter 7, p. 7-128. http://www.epa.gov/boston/braytonpoint/

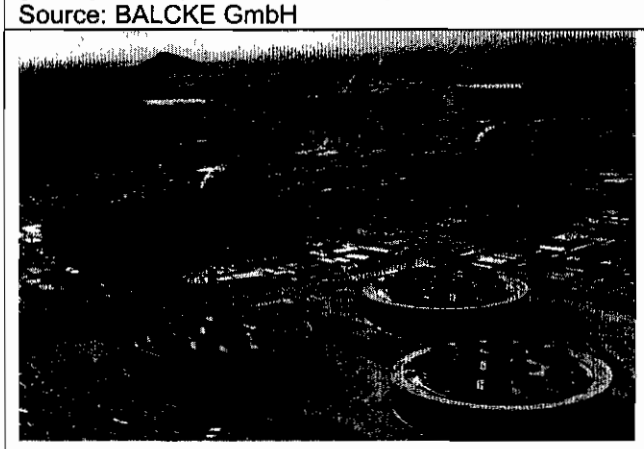
[xxiv] New York Department of Environmental Conservation, *Fact Sheet - New York State Pollutant Discharge Elimination System (SPDES) Draft Permit Renewal With Modification,* Indian Point Electric Generating Station, Buchanan, NY - November 2003.

Figure 1. Retrofit Cooling Tower Options for California Nuclear Power Plants



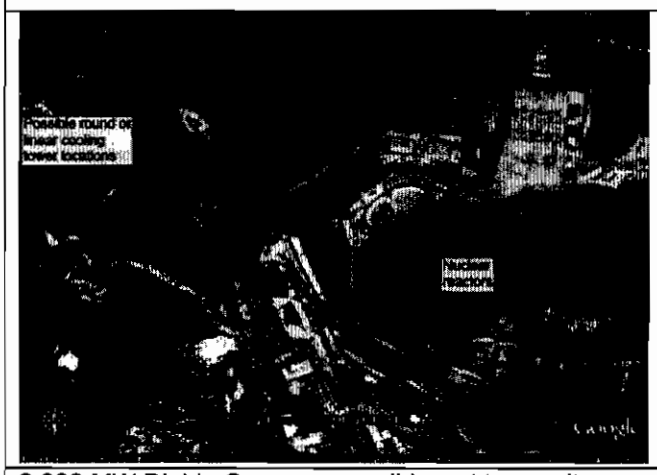


500 ft. diameter, 160 ft. tall plume-abated round wet tower, GKN2 1,300 MW nuclear reactor (Germany), 1 billion gal/day cooling water flow. Left photo – plume abatement off. Right photo – plume abatement on.
Source: BALCKE GmbH



Conventional round towers, Palo Verde Nuclear (AZ)

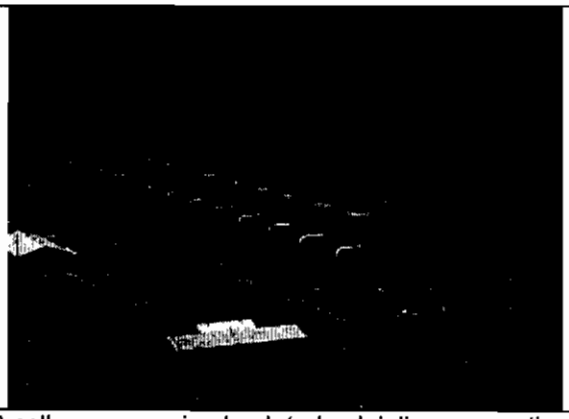
Conventional linear towers, Prairie Island Nuclear (MN)



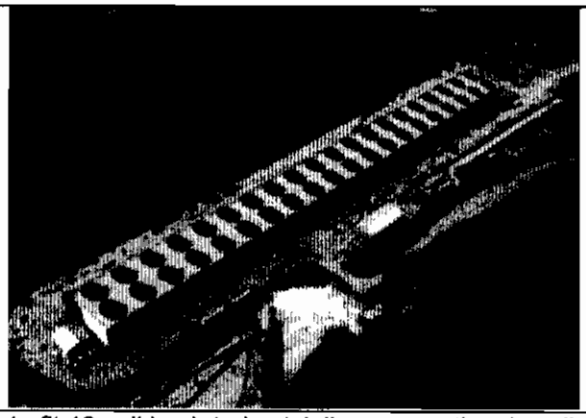
2,000 MW Diablo Canyon - possible wet tower sites

2,000 MW San Onofre - possible wet tower sites

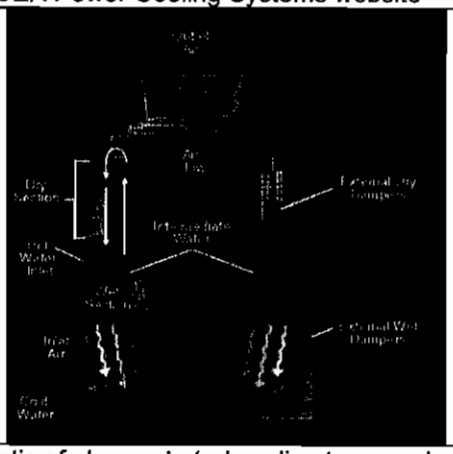
Figure 2. Back-to-Back Inline Wet Towers and Inline Plume-Abated Towers



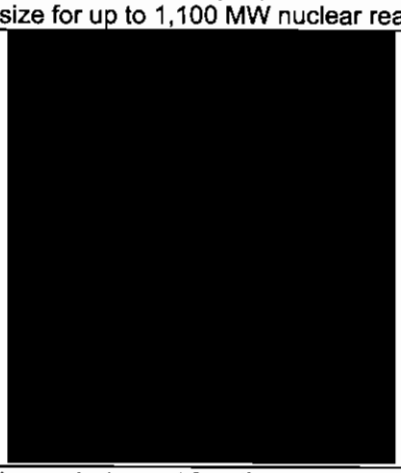
36-cell, space saving back-to-back inline conventional cooling tower.
From: GEA Power Cooling Systems website



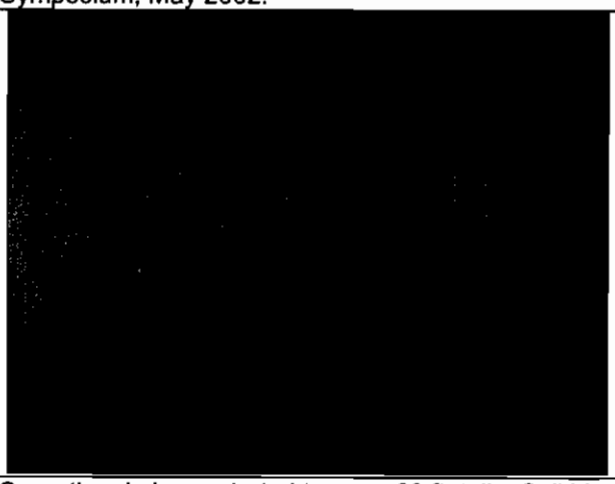
Retrofit 40-cell back-to-back inline conventional cooling tower, coal-fired Plant Yates (GA) – 40 cells is adequate size for up to 1,100 MW nuclear reactor.



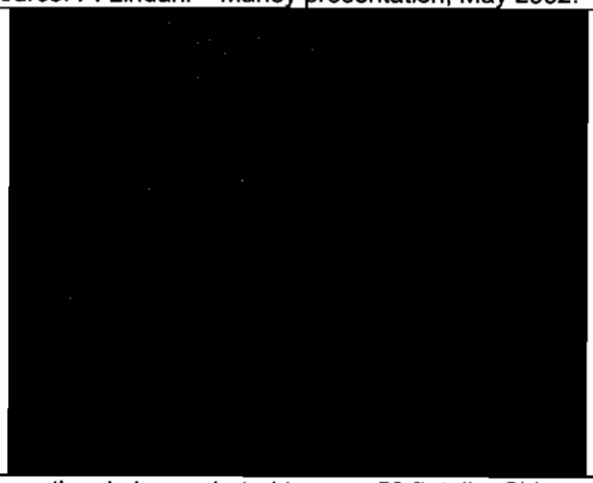
Schematic of plume-abated cooling tower – dry (radiator) section above, conventional wet below.
Source: P. Lindahl – Marley presentation, Dry Cooling Symposium, May 2002.



Effect of plume abatement function –
Plume abatement off, left two cells.
Plume abatement 100% on, adjacent two cells.
Source: P. Lindahl – Marley presentation, May 2002.



Operational plume-abated tower, ~60 ft. tall – Selkirk 2 Cogen, 330 MW (NY)
Source: P. Lindahl – Marley presentation, May 2002.



Operational plume-abated tower, ~50 ft. tall – Chicago O'Hare Airport
Source: P. Lindahl – Marley presentation, May 2002.

ATTACHMENT C

CEC Expected and Disclosed Energy Facility Projects in Review

California Energy Commission Energy Facility Status

Expected and Disclosed Projects as of 8/9/2006*

	Projects in Review								
	(Arranged By Estimated Decision Date)	Docket Number	Process	Capacity (MW)	Project Type	Location	Date Filed	Estimated Decision Date	Estimated On-Line Date
1	Pastoria Phase 2 Expansion Project - simple cycle addition - Calpine	05-AFC-1	12-mo. AFC	160	Expansion	Kern Co.	4/29/2005	8/06	unknown
2	SF Reliability Project - City of SF	04-AFC-1	12-mo. AFC	145	Brown Field	San Francisco	3/18/2004	8/06	3/08
3	Los Esteros 2 Combined Cycle - Calpine**	03-AFC-2	12-mo. AFC	140	Brown Field	Santa Clara Co.	12/30/2003	8/06	unknown
4	Blythe I Transmission Line - Blythe Energy, LLC	99-AFC-8C	Amendment	230 kV	Transmission Line	Riverside Co.	10/12/2004	9/06	unknown
5	Niland Peakers - Imperial Irrigation District**	06-SPPE-1	SPPE	93	Green Field	Imperial Co.	3/13/2006	10/06	5/08
6	El Centro Unit 3 Repower - Imperial Irrigation District{7}	06-SPPE-2	SPPE	85	Brown Field	Imperial Co.	5/19/2006	12/06	5/09
7	Walnut Creek Energy Park - Edison Mission Energy**	05-AFC-2	12-mo. AFC	500	Green Field	Los Angeles Co.	11/22/2005	1/07	8/08
8	Bottle Rock Geothermal - U.S. Renewables Group	79-AFC-4C	Amendment	20	Repower	Lake Co.	8/4/2006	2/07	unknown
9	Sun Valley Energy Project (simple cycle/peaker) - Edison Mission Energy**	05-AFC-3	12-mo. AFC	500	Green Field	Riverside Co.	12/1/2005	2/07	8/08
10	Avenal Combined Cycle - National Power	01-AFC-20	12-mo. AFC	600	Green Field	Kings Co.	10/9/2001	7/07	unknown
11	Highgrove Grand Terrace Peaker - AES**	06-AFC-2	6/12-mo. AFC	300	Expansion	San Bernardino	5/25/2006	8/07	9/08
12	South Bay Combined Cycle - L.S. Power	04-AFC-3	12-month AFC	620	Replacement	San Diego Co.	6/30/2006	9/07	5/10
13	Vernon Power Plant Combined Cycle - City of Vernon	06-AFC-4	12-mo. AFC	943	Brown Field	Los Angeles Co.	6/30/2006	?	?
14	EIF Firebaugh Panoche - Energy Investors Fund	06-AFC-5	12-mo. AFC	400	Green Field	Fresno Co.	8/2/2006	9/07	8/09
	UNDER REVIEW TOTAL (MW)			**4506**					
	TOTAL PLANNED FOR PEAKING CAPACITY (MW)			**2238**					

*Information gathered from: http://www.energy.ca.gov/sitingcases/all_projects.html

**Yellow highlighting indicates projects that are planned for peaking capacity.

ATTACHMENT D

CEC Power Plant Fact Sheet August 9, 2006

California Energy Commission Media Office
POWER PLANT FACT SHEET

Updated: 8/9/06

(Reflects Riverside Energy Center - Unit 2 on line 7/26/06, EIF Panoche filed 8/2/06, and Bottle Rock re-power filed 8/4/06)

Since 1998 when deregulation occurred, the Energy Commission has approved (or given Small Power Plant Exemptions to) 54 power plants totaling *22,906 megawatts (MW). Thirty-six of these plants are in operation, producing 12,910 MW. Seven projects came on-line in California in 2005, adding 3,112 MW; and five plants came on line in 2006 adding 1,487 MW to the grid. Thirteen projects remain in active review in the Energy Commission power plant licensing process, representing 4,506 MW.

* 893 MW of total is from projects that will not be built because the applicant either withdrew the license after approval or license expired.

Energy Commission Approved Projects (1998-2006)		
Projects Approved and On-line	36	12,910 MW
Projects Approved and Under Construction	2	960 MW
Projects Approved and Available for Construction	10*	7,643 MW
Projects Approved but then Cancelled by Applicants or Whose Licenses Expired	6	1,393 MW
Total Projects Approved Post-Restructuring	**54**	**22,906 MW**

* The ten projects have placed their construction on hold. The total megawatts of projects approved and available for construction includes 51 MW Unit 2 of Valero Cogeneration.

Total of Projects in Active Review	14*	4,506 MW
Project Applications Submitted Since October 2003	14*+	4,689 MW
Projects Suspended or Terminated in 2006 While In Review: Potrero Unit 7 [540 MW] suspended application was terminated by Commission 3/1/06. City of Vernon [610 MW] filed 3/2/06 and withdrawn 4/6/06.	2	1,150 MW

*Includes one transmission line project. + Includes City of Vernon filed 3/2/06 and withdrawn 4/6/06. Filing does not include 20 MW Bottle Rock re-powering amendment.

Power Plants Approved by Year		
2006	None yet	MW
2005	2 facilities	680 MW
2004	8 facilities	4,575 MW+
2003	8 facilities	3,770 MW
2002	4 facilities	1,045 MW
2001	23 facilities	6,270 MW (includes 265 MW amendment)
2000	6 facilities	4,347 MW
1999	3 facilities	2,219 MW
Total 1999-2006	***54 facilities***	***22,906 MW***
MW On-line or Under Construction		13,870 MW*

+ **Includes** 1,200 MW for Morro Bay (2 units mothballed).
* **Excludes** 1,393 MW unused licenses (see chart on right) and 7,643 MW approved and construction on hold.

Power Plants On-Line by Year		
2006	5 facilities	1,487 MW*
2005	7 facilities	3,112 MW*
2004	0 facilities	0 MW
2003	7.5 Facilities	3,668 MW*
2002	7 Facilities	2,729 MW*
2001	9.5 Facilities	1,914 MW*
1999 & 2000	0 Facilities	0 MW
2001-2006	36 Facilities	12,910 MW

* Note: Some units split date they come on line. We generally use the earliest date project first unit is on line in the totals for each year. See below for years.

2006: Riverside (Unit 1 on line 6/1/06, Unit 2 on line 7/26/06)
2005: Mountainview (Unit 3 on line 12/9/05, Unit 4 on line 1/19/06, total MW added to 2005)
2003: Sunrise Combined Cycle (265 MW in 2003) is added separately from Sunrise Simple Cycle (320 MW in 2001) because was done as amendment, but is counted as one facility in 2001.
2002: Huntington Beach (Unit 3 on line 7/31/02, Unit 4 on line 8/7/03, total MW added to 2002.)

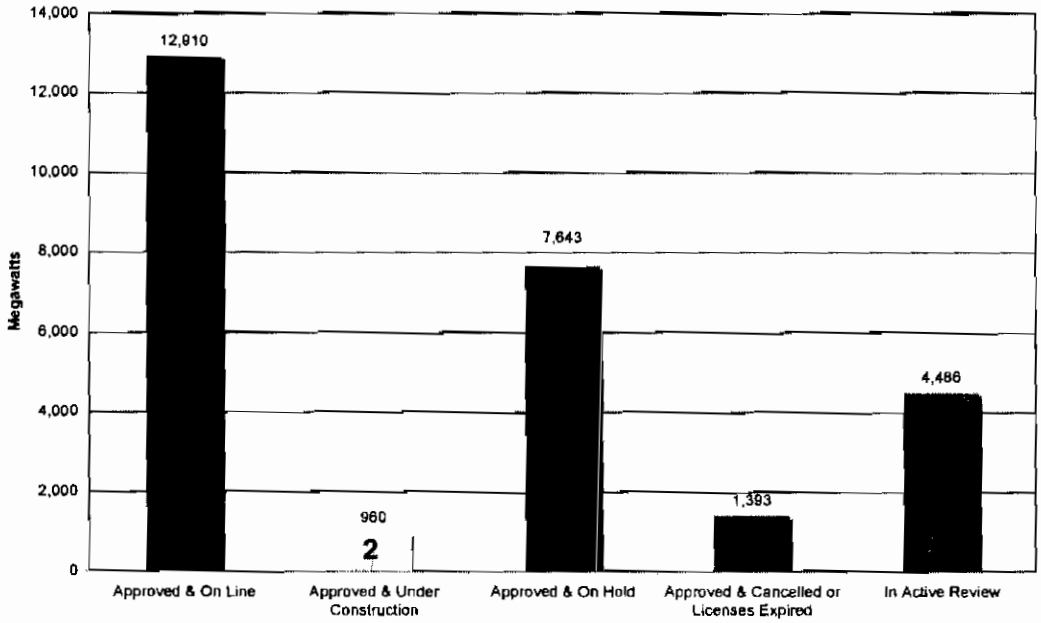
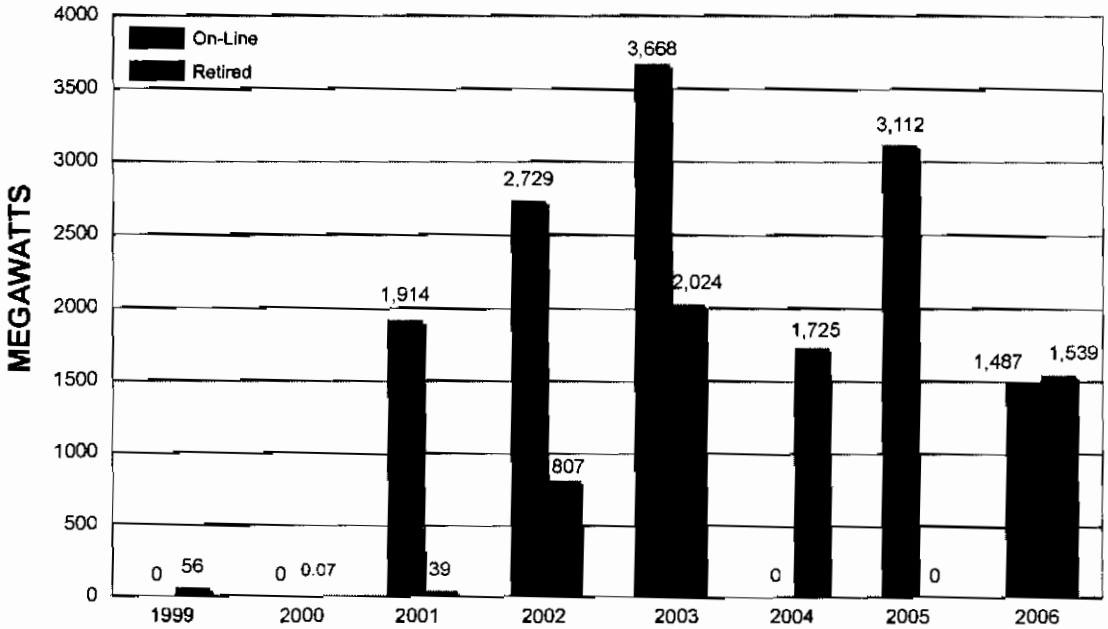
Power Plants Retired by Year		
2006	2 units	1,539 MW
2005	0 units	0 MW
2004	20 units	1,725 MW
2003	25 units	2,024 MW
2002	23 units	807 MW
2001	3 units	39 MW
2000	1 unit	0.7 MW
1999	2 units	56 MW
Total 2001-2006	**76 units**	**6,190.7 MW**

Power Plants On-line Approved Outside CEC Jurisdiction Since 1999 (as of 7/1/05, projects *less than 50 MW*)	2,664 MW

Power Plants Mothballed	
As of 6/2/2006	1,358 MW

Unused Power Plant Licenses	
3 facilities cancelled by applicants after CEC approval (Pegasus Energy, Ramco Chula Vista 2, Hanford Energy Park)	342 MW
1 license expired due to lack of site control (Golden Gate Phase 1, 00-AFC-5)	51 MW
1 license expired after no construction progress (Midway-Sunset, 99-AFC-9)	500 MW
1 license expired after no construction progress (Three Mountain, 99-AFC-2)	500 MW
Total	**1,393 MW**

CALIFORNIA POWER PLANTS – 1998 TO PRESENT



New California Power Plants On-Line and Old Plants Retired (1999 to 2006 by Year)