

MINUTE ITEM

This Calendar Item No. 71 was approved as
Minute Item No. 71 by the California State Lands
Commission by a vote of 3 to 0 at its
04-17-06 meeting.

**Minute Item
71**

04/17/06

CALIFORNIA STATE LANDS COMMISSION

Regular Item 71. The Commission listened to a staff report on once-through cooling resolution and took comments from the public. The Commission approved the revised resolution as presented by a 3-0 vote.

001005

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CALENDAR ITEM
71

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S Statewide

04/17/06
P. Thayer

**CONSIDER ADOPTION OF A RESOLUTION ON ONCE-THROUGH
COOLING AT COASTAL POWER PLANTS**

The California State Lands Commission is considering adoption of a resolution which would express its intent not to approve any leases for new power plants using once-through cooling (OTC) systems and imposing certain conditions on lease renewals and extensions for existing facilities.. Intake of large volumes of water for OTC has impacts on coastal organisms by entrainment and impingement. Impingement occurs when marine organisms are trapped against components of the cooling water system, such as screens, where they die. Entrainment is the induction of smaller marine organisms into and through the cooling water system where most, if not all, of the organisms are destroyed by mechanical damage, temperature increases or toxic stress. In addition, OTC results in biological impacts through thermal discharge. Thermal discharge refers to the release of cooling water at temperatures above ambient conditions resulting in elevation of the temperature of marine waters in the immediate vicinity of the outfall. These effects adversely impact coastal and ocean resources and uses that are within the jurisdiction of the State Lands Commission.

The Facilities:

There are presently 22 coastal power plants that utilize OTC systems with cumulative cooling water intake flow estimated at 16 billion gallons per day. Of these, ten have leases issued by the Commission. The other 12 coastal power plants are located within legislative grants to cities and counties. The ten power plants that discharge into sovereign lands under the jurisdiction of the Commission are as follows:

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<u>Power Plant Name</u>	<u>Power Plant Location</u>	<u>Location of Discharge</u>	<u>Lessee/Operator</u>	<u>Lease Term</u>
Mirant-Delta	Antioch, Contra Costa County	2 discharges into San Joaquin River	Southern Energy Delta, LLC	25 years 6/14/99 to 6/13/24
Gaylord Container	Near Antioch/Doland Island, Contra Costa County	1 discharge into San Joaquin River	Gaylord Container	10 years 1/8/81 – 1/7/97
Pittsburg	Near city of Pittsburg, Contra Costa County	Sacramento River	Mirant Delta, LLC	35 years 6/21/80 to 6/20/15
GWF Power Plant	Antioch and Suisun Bay, Contra Costa County	San Joaquin River (currently not discharging) and Suisun Bay	GWF Power Systems, LP	30 years 8/1/88 to 7/31/18
Diablo Canyon	Pt. Buchon, San Luis Obispo County	Pacific Ocean	PG&E	49 years 6/1/70 – 5/31/19
Ormond	Ormond Beach, Ventura County	Pacific Ocean, 1 intake channel/ 1 discharge channel	Reliant Energy Ormond Beach	14 years 2/24/03 – 4/23/17
El Segundo	Santa Monica Bay, LA County	Pacific Ocean, 2 intake channels/ 2 discharge channels	El Segundo Power, LLC	49 years 10/27/53 – 10/26/02 Lease in holdover
San Onofre Nuclear	San Onofre near San Clemente, San Diego County	Pacific Ocean	Southern California Edison Co	42 years 3/1/81 to 2/28/23
Huntington Beach Generation Station POTENTIAL DESAL	Huntington Beach, Orange County	Pacific Ocean	AES Huntington Beach, LLC	49 years 8/8/57 to 8/7/06
Encina POTENTIAL DESAL	Carlsbad, San Diego County	2 intake lines, 2 discharge lines, Pacific Ocean	Cabrillo Power	10 years 7/8/89 to 7/7/99 Lease in holdover

The 21 coastal plants generate approximately 24,000 megawatts of power annually. Many of these plants are “peaker” facilities, operated (or operated at higher output) at times of greatest demand. Commission staff has no information indicating a firm date for plants that are to be shut down within the foreseeable future. However, operators of the South Bay Power Plant in San Diego and the Humboldt facility have stated that they will re-power using methods other than OTC.

Other State Agencies:

California Energy Commission (CEC)

In addition to the State Lands Commission, the state agencies that exercise jurisdiction over coastal power plants are the CEC and the Regional Water Quality Control Boards. The CEC is the State's primary energy policy and planning agency. In addition to forecasting energy needs, developing energy technologies and promoting energy efficiency, the CEC licenses thermal power plants having a capacity of 50 megawatts or more. Substantial modifications to such plants in the form of expansion, replacement or re-powering are also reviewed by the CEC. (The California Coastal Commission does not have jurisdiction to issue coastal development permits for plants having a capacity of 50 megawatts or more). Applications for new plants or modifications of existing facilities are assessed in compliance with the Warren-Alquist Act and the California Environmental Quality Act. This includes an assessment of cooling water impacts to coastal resources and mitigation for those impacts. The CEC has also been conducting studies of coastal power plants in order to document and analyze the engineering and environmental issues associated with each power plant to address such issues when applications are received to expand, re-power or replace existing power plants. The CEC has prepared an inventory of existing facilities, permits, and operational levels in order to understand the facilities and their role in meeting the state's electrical power needs. Finally, the CEC has conducted studies to define and analyze the performance, economic, and environmental tradeoffs among the available cooling system alternatives.

Regional Water Quality Control Boards

There are nine Regional Water Quality Control Boards (Boards) in California. The Boards have jurisdiction over discharges to land or surface waters under the Porter-Cologne Act and have Clean Water Act authority exercised through the National Pollution Discharge Elimination System (NPDES). NPDES permits are reviewed every five years. Thus, the primary responsibility for the assessment of thermal, impingement and entrainment impacts rests with the Boards. The Boards have in some cases issued temporary extensions of NPDES permits in light of pending litigation challenging the U.S. Environmental Protection Agency's rules on OTC issued in 2004. Those rules require that existing facilities permitted to pump/discharge 50 million gallons per day must perform impingement and entrainment analyses. The facilities must demonstrate reductions in impingement and entrainment of fish and shellfish of 80-95% and 60-90% respectively. The rules allow for these reductions to be made while the facilities continue to use the existing OTC systems.

State Water Quality Control Board (SWQCB)

To date, the State Water Board has held two public workshops to gather information on whether a Statewide 316(b) Policy should be adopted. At the December 7, 2005, State Water Board Workshop in Oakland, staff proposed the development of a Statewide 316(b) Policy that would become part of the existing State Water Board's California Thermal Plan. Thermal requirements for power plants are currently covered by this Plan. Except for the potential addition of 316(b) requirements to the California Thermal Plan, no new action is planned for thermal requirements at this time. The California Thermal Plan requirements will be addressed and updated at a later date.

As described above, to date, the requirements under 316(b) have been primarily implemented independently by the Regional Water Boards through the National Pollutant Discharge Elimination System (NPDES) permitting program. However, the current approach of the staff of the SWQCB would result in the development of a Statewide 316(b) Policy (Policy) with requirements for both new and existing OTC power plants.

The staff's recommended approach to the development of the Policy includes the following points:

- Include the policy in the California Thermal Plan.
- Standardize data collection methods for consistency throughout the State.
- Develop baseline calculation – Actual vs. Permitted maximum
- The upper end of the U.S. EPA 316(b) Performance Standards should be targets for the Policy (reductions of 95% and 90% for impingement and entrainment, respectively).
- Discourage cooling water use when no power is being generated in order to reduce impacts.
- Standardize Mitigation/Restoration Requirements.
- Cumulative impacts will need to be evaluated when more than one plant is in close proximity.

The proposed Policy will take a statewide approach in order to assure consistency throughout the various RWQCBS. The proposed Statewide 316(b) Policy could go before the State Water Board by the end of 2006; however all existing dates are tentative and the proposed plan and policy will be subject to approval of the SWQCB.

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Desalination:

At the February Commission meeting and in subsequent discussions, interested parties have questioned whether the proposed resolution would present unreasonable barriers to the location of desalination facilities at coastal plants using OTC. Based on these comments, staff has concluded:

- 1) The principal benefit afforded to desalination projects located with power plants would be savings in construction costs because it would not be necessary to construct intake and discharge facilities serving only the desalination plant. Instead, the desalination facility would use intake and discharge conduits previously built to serve the power plant's cooling water system.
- 2) Desalination requires a great deal of electricity, which is a significant cost of operating a desalination plant. Co-location of desalination facilities with existing coastal power plants may help to reduce the electricity costs of a desalination plant because co-location utilizes both the power plant's seawater cooling system and the direct power supplied at the plant. However, existing regulations generally do not allow for a preferential electrical rate, so this benefit is not currently available. Anticipated lower rates could come about only through a change in state or federal utility laws.
- 3) The merits of proposed desalination projects at existing power plants will be greatly affected by the specific location and impacts of the power plant's OTC system. For example, systems drawing large volumes of water from coastal estuaries, enclosed bays and lagoons would be expected to have far greater biological impacts than would facilities on the open coast. The benefits of co-location of desalination facilities at the power plants having these greater impacts require site-specific analysis, but may not justify the long-term impacts of OTC systems.
- 4) In theory, any of the 21 coastal power plants could be used in conjunction with a desalination facility. However, as mentioned above, at least two of the plants have already indicated that they will modify plant operations so as to eliminate OTC.
- 5) Coordination of operations with a power plant will have its own economic and regulatory costs and those costs, including mitigation requirements, will vary depending on the characteristics and location of the power plant.

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- 6) Co-location of desalination facilities and power plants can reduce environmental impacts of each. Desalination facilities can help cool discharges from power plants and power plant discharges can dilute the high salt content of desalination discharges.
- 7) Co-location can also interfere with phasing out OTC facilities because the desalination facility could occupy land otherwise needed for replacement cooling facilities. The economic advantages of co-location could also cause a power plant to remain economically viable for a longer period of time.

The California Coastal Commission also exercises jurisdiction over desalination plants. While the Coastal Commission recognizes that seawater desalination will provide some of California's future water supply, each proposed facility has different design characteristics and each proposed location raises different issues, so the Coastal Commission will evaluate proposals on a case-by-case basis. The most common issues of review will likely be the following: a facility's effects on marine organisms if open-water intakes are used; feasible and less environmentally damaging alternatives to various components of a proposed project including energy use; whether a project is a public or private and whether private ownership would affect the state's ability to regulate the facility's effects on coastal resources; how the water supply fits into local or regional water quality portfolios and growth plans and whether the project will affect public access and use of the shoreline.

Information on Individual Power Plants:

At the February Commission meeting, the Commissioners asked several questions about particular plants and their susceptibility to conversion to systems other than OTC. Whether a facility is a likely candidate for conversion depends, however, on a detailed analysis of many site-specific factors. For example, the relative need for and availability of alternatives to OTC systems will require consideration of such issues as the magnitude of impacts of the existing cooling system, site constraints limiting the construction of alternative systems, engineering and technical feasibility, water supplies, energy costs of alternative systems and the relative costs and benefits of the alternatives. Such an analysis is beyond the scope of this discussion. The Commission will consider these site-specific variables as it decides the conditions of renewal of individual power plant leases. In some cases, these variables have, to some extent, been considered by other state agencies. For example, on February 2, 2005 the CEC approved the application to replace two existing generating units at the El Segundo Power Plant with a natural gas-fired combined cycle generation facility. The new units were, however, permitted to use the existing OTC system without modification of the

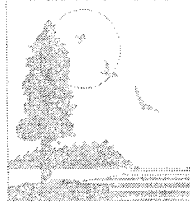
CALENDAR ITEM NO. 71 (CONT'D)

intake lines or flow rates. The CEC found that conversion of the facility to use water from the nearby Hyperion wastewater facility for cooling, as was suggested by staff of the Coastal Commission, would result in greater environmental impacts than the proposed project as conditioned.

Similarly, the analysis of the Diablo Canyon nuclear power plant by the Regional Water Quality Control Board concluded that it would be very difficult, if not impossible, to construct an alternative cooling system there. Staff of the Board estimated the cost would be between one and three billion dollars.

Incentives:

The Commission has almost no ability to offer financial incentives for conversion of OTC to other technologies. To encourage coastal power plant owners/operators to replace OTC with alternative cooling systems, the Commission could offer extended lease terms that would coincide with the useful life of the facility. This incentive would provide the owners/operators with some assurance that they would be able to operate without having to apply to the Commission for reauthorization. However current law restricts the term to 49 years. Further, the Commission has often found that long lease terms interfere with its ability to update mitigation requirements or respond to changing needs for public trust lands.

**CALIFORNIA STATE
LANDS COMMISSION**

CRUZ M. BUSTAMANTE, *Lieutenant Governor*
STEVE WESTLY, *Controller*
MICHAEL C. GENEST, *Director of Finance*

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PROPOSED - APRIL 14, 2006

**RESOLUTION BY THE CALIFORNIA STATE LANDS COMMISSION REGARDING
ONCE-THROUGH COOLING IN CALIFORNIA POWER PLANTS**

WHEREAS, The California State Lands Commission (Commission) and legislative grantees of public trust lands are responsible for administering and protecting the public trust lands underlying the navigable waters of the state, which are held in trust for the people of California; and

WHEREAS, the public trust lands are vital to the recreational, economic and environmental values of California's coast and ocean; and

WHEREAS, the Commission has aggressively sought correction of adverse impacts on the biological productivity of its lands including, litigation over contamination off the Palos Verdes Peninsula and at Iron Mountain, the adoption of best management practices for marinas and litigation to restore flows to the Owens River; and

WHEREAS, California has twenty-one coastal power plants that use once-through cooling, the majority of which are located on bays and estuaries where sensitive fish nurseries and populations exist for many important species, including species important to the commercial and recreational fishing industries; and

WHEREAS, these power plants are authorized to withdraw and discharge approximately 16.7 billion gallons of ocean, bay and Delta water daily; and

WHEREAS, 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

WHEREAS, 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; and

WHEREAS, various studies have documented the harm caused by once-through cooling including one study that estimated that 2.2 million fish were annually ingested into eight southern California power plants during the late 1970s and another that estimated that 57 tons of fish were killed annually when all of the units of the San Onofre Nuclear Generating Station were operating; and

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WHEREAS, the public trust doctrine must be acknowledged and respected by the Commission in all of the Commission's work, thus, the least environmentally harmful technologies must be encouraged and supported by the Commission; and,

WHEREAS, once-through cooling systems adversely affect fish populations used for subsistence by low-income communities and communities of color thereby imposing an undue burden on these communities and

WHEREAS, regulations adopted under Section 316 (b) of the federal Clean Water Act recognize the adverse impacts of once-through cooling by effectively prohibiting new power plants from using such systems, and by requiring existing facilities to reduce impacts by up to 90-95%; and

WHEREAS, state law under the Porter-Cologne Water Quality Control Act requires the state to implement discharge controls that protect the beneficial uses of the waters and habitats affected by once-through cooling; and

WHEREAS, alternative cooling technologies and sources of cooling water, such as the use of recycled water, are readily available, as witnessed by their widespread use at inland power plants and many coastal plants nationwide; and

WHEREAS, 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; and

WHEREAS, members of the California Ocean Protection Council have called for consideration of a policy at its next meeting to discourage once-through cooling; and

WHEREAS, the California Energy Commission and the State Water Resources Control Board have the authority and jurisdiction over the design and operation of power plants and are conducting studies into alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water and cooling towers; and

WHEREAS, in its 2005 Integrated Energy and Policy Report, the California Energy Commission adopted a recommendation to work with other agencies to improve assessment of the ecological impacts of once-through cooling and to develop a better approach to the use of best-available retrofit technologies; and

WHEREAS, it is premature to approve new leases or extensions, amendments or modifications of existing leases to include co-located desalination facilities or other uses of once-through cooling water systems until first considering whether the desalination facility would adversely affect compliance by the power plant with requirements imposed to implement both the federal Clean Water Act Section 316(b) requirements and any additional requirements imposed by the State Water Resources Control Board and appropriate Regional Water Quality Control Board under state law and their delegated Clean Water Act authority; and

WHEREAS, at many locations, there are alternative, feasible and available subsurface seawater intake technologies and practices for coastal desalination facilities that do not rely on surface seawater intakes used for once-through cooling; and

WHEREAS, 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; therefore, be it

RESOLVED, by the California State Lands Commission that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously develop and implement policies that eliminate the impacts of once-through cooling on the environment, from all new and existing power plants in California; and be it further

RESOLVED, that as of the date of this Resolution, the Commission shall not approve leases for new power facilities that include once-through cooling technologies; and be it further

RESOLVED, that the Commission shall not approve new leases for power facilities, or leases for re-powering existing facilities, or extensions or amendments of existing leases for existing power facilities, whose operations include once-through cooling, unless the power plant is in full compliance, or engaged in an agency-directed process to achieve full compliance, with requirements imposed to implement both Clean Water Act Section 316(b) and California water quality law as determined by the State Water Resources Control Board, and with any additional requirements imposed by state and federal agencies for the purpose of minimizing the impacts of cooling systems on the environment, and be it further

RESOLVED, that the Commission shall include in any extended lease that includes once through cooling systems, a provision for noticing the intent of the Commission to consider re-opening the lease, if the State Water Resources Control Board or the California Energy Commission has decided, in a permitting proceeding for the leased facility, that an alternative, environmentally superior technology exists that can be feasibly installed, and that allows for continued stability of the electricity grid system, or if state or federal law or regulations otherwise require modification of the existing once-through cooling system; and, be it further

RESOLVED, that the Commission calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction; and be it further

RESOLVED, that the Commission's Executive Officer transmit copies of this resolution to the Chairs of the State Water Resources Control Board, the California Energy Commission, and the California Ocean Protection Council, all grantees, and all current lessees of public trust lands that utilize once-through cooling.

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04-17-06

CALIFORNIA STATE LANDS COMMISSION

LETTERS OF SUPPORT/CONCERN

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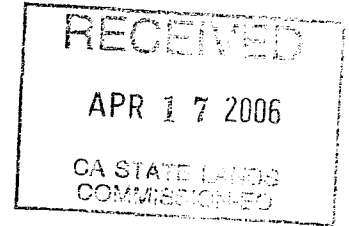
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P.O. Box 210171
Chula Vista, CA 91921
Phone/Fax (619) 421-9121
www.rewater.com

April 14, 2006

Paul D. Thayer, Executive Officer
California State Land Commission
100 Howe Ave Suite 100 South
Sacramento, CA 95825-8202



Re: Support for Banning Once-Through Cooling

Dear Mr. Thayer:

We support a California State Land Commission decision banning once-through cooling on California's coast.

Considering the minimal cost involved in retrofitting power plants to contained-water cooling and the tremendous amount of environmental gain from the contained-cooling method, the only people who have anything to gain from once-through cooling are the desalination proponents and their potential clients. Their potential clients are the southern California water agencies who blatantly violate virtually every urban water conservation and reuse law, rule, and agreement on the books right now.

Here in San Diego alone, Article X, Section Two of the California Constitution, California Water Code Sections 100, 275, and 461, the State Water Resources Control Board's Decisional Order #1630, the San Diego Regional Water Quality Control Board Order #90-32, California Water Code Section 13142.5, 13577, 13550, 13551, 13553, 13555.2, and 13555.3, Government Code Section 65597 et seq., City of San Diego Ordinance #17327, the entire California Urban Water Conservation Council's Memorandum of Understanding on Urban Water Use, and the federal Ocean Pollution Reduction Act (33 USC 1311 et seq), all designed to increase water supplies, are ignored or rationalized away by those agencies.

Those laws, rules, and agreements collectively comprise the federal Beneficial Use law, which, if followed, would provide all the water southern California needs for growth without allowing once-through cooling.

Thus, there is no good reason for continuing the antiquated practice of once-through cooling, and it should be banned.

Sincerely,

Stephen Wm. Bilson
Chairman & CEO "THE WORLD'S MOST EFFICIENT IRRIGATION SYSTEM"

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Attention:

Cruz M. Bustamante, Lt. Governor

RE: California State Lands Commission (proposed)
Resolution regarding once-through cooling in
California power plants

From:

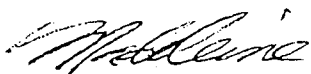
Madeleine Clark, Director
Elkhorn Slough Coalition

Faxed 5 pages (not including cover)

Dear Lt. Governor Bustamante:

We applaud the commission's desire to eliminate once-through cooling in California power plants. We are pursuing this at the local level by asking the Central Coast Regional Water Quality Control Board to address Duke Energy's expired NPDES permit for their Moss Landing facility. As a personal and professional courtesy we are forwarding our communications to the water board to your attention. The Lands Commission's (proposed) resolution sounds like it was specifically written to protect the Elkhorn Slough. We are very grateful for your leadership on this important issue.

Sincerely,



Madeleine Clark, Director
Elkhorn Slough Coalition

FAXED APRIL 5, 2006 to (916) 574-1810

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8145 Messick Road Prunedale, CA 93907 Tel/Fax: (831) 663-3130 E-mail: madeleine@wgprints.com

Chair Jeffrey S. Young
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

April 5, 2006

RE: Duke Energy's expired NPDES permit and California State Lands Commission proposal to eliminate once-through cooling systems at coastal power plants.


Dear Chair Jeffrey S. Young:

This communication is a follow-up to our original written correspondence dated February 23, 2006 (copy attached and made a part hereof) requesting that the water board address Duke Energy's expired NPDES No. CA0006254 and Waste Discharge Requirements Order No. 00-04, for Duke's Moss Landing power plant.

We take issue with water board staff's response that "...discharge from Cal Am's proposed pilot (desalination) project will have no measurable effect on the environment." Due to economic inefficiency, Duke no longer operates the old part of the power plant which uses 90% of the (permitted) intake water slated for brine dilution. The physical reality is, neither intake or discharge water is available for desalination and won't be in the foreseeable future. Comparing intake and discharge is moot.

Duke's permit may be on official administrative extension but the public considers that a legal technicality. The permit has expired and is much too controversial not to address at this time, in light of Cal Am's proposed desalination project. "Limited staff resources" does not justify circumventing due process and does not absolve the water board from their responsibility to review and renew the permit with modification and/or mitigation accommodating changes to public policy.

On Friday, May 12, the water board will hold its monthly meeting in Watsonville. If you will agendize Duke's NPDES permit renewal for discussion, members of the public will have a chance to voice concerns about the continued use of once-through cooling and proposed partnerships with desalination facilities that rely on discharge waters for brine dilution from Duke's Moss Landing power plant.


Madeleine Clark, Director
Elkhorn Slough Coalition

Attached:

Correspondence to CCRWQCB, February 23, 2006
California State Lands Commission (staff) Proposed Resolution
Monterey County Weekly "Power Grab" newspaper article, January 19-25, 2006

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Chair Jeffrey S. Young and Members of the Board
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

February 23, 2006

RE: Duke Energy expired NPDES permit and California State Lands Commission proposal to eliminate once-through cooling systems at coastal power plants.

Dear Chair Jeffrey S. Young and Members of the Board:

The enclosed articles recently appeared in local newspapers and report on Duke's expired NPDES permit and the California State Lands Commission's desire to phase out the use of antiquated once-through cooling technology at coastal power plants. It appears the commission may also wish to prevent future codependency from desalination projects on the intake and discharge waters from these power plants.

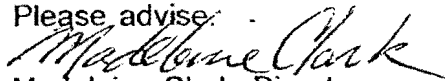
Notably, "The goal of the commission is to protect marine life by phasing out power plant systems that suck ocean water in for cooling purposes and then pump it back out to sea. Backed by environmental groups, the proposal could also alter the plans of five large desalination projects in the state which are proposed to "co-locate" with power plants specifically to utilize water in their once-through systems."

Of immediate interest to us is Cal Am's pilot desalination project in Moss Landing that plans to use Duke Energy's once-through cooling water, primarily for brine dilution. Due to economic inefficiency, the older part of the power plant which uses 90% of the cooling water is rarely operated. Discharge water for brine dilution is negligible.

Duke's NPDES permit expired at the end of 2005. The Regional Water Quality Control Board has no plans to review permit renewal until the end of 2006. Water board staff doesn't know how the existing (expired) permit will be modified to accommodate brine discharge. Immediate action by the water board to bring Duke's NPDES permit forward is necessary if Duke (or new owners, LS Power Group) and Cal Am's proposed desalination project are to comply with mandates of the Clean Water Act.

Duke's "automatic administrative extension" is inappropriate. We consider this permit too controversial to process without full public disclosure. "Pending litigation" is a separate issue and doesn't exempt the Regional Water Quality Control Board from due diligence to compel Duke to review, modify and renew their NPDES permit.

Please advise:


Madeleine Clark, Director
Elkhorn Slough Coalition

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STATE OF CALIFORNIA

ARNOLD SCHWARZENEGGER, Governor

**CALIFORNIA STATE
LANDS COMMISSION****EXECUTIVE OFFICE**
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Sacramento, CA 95825-8202CRUZ M. BUSTAMANTE, *Lieutenant Governor*
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(916) 574-1800 Fax (916) 574-1810
California Relay Service TDD Phone 1-800-735-2929
Voice Phone 1-800-735-2922**STAFF PROPOSED****RESOLUTION BY THE CALIFORNIA STATE LANDS COMMISSION REGARDING
ONCE THROUGH COOLING IN CALIFORNIA POWER PLANTS**

WHEREAS, The California State Lands Commission and legislative grantees of public trust lands are responsible for the administering and protecting the public trust lands underlying the navigable waters of the state, which are held in trust for the people of California; and

WHEREAS, the public trust lands are vital to the recreational, economic and environmental values of California's coast and ocean; and

WHEREAS, the commission has aggressively sought correction of adverse impacts on the biological productivity of its lands including, litigation over contamination off the Palos Verdes Peninsula and at Iron Mountain, the adoption of best management practices for marinas and litigation to restore flows to the Owens River; and

WHEREAS, California has twenty-one coastal power plants which use once-through cooling, the majority of which are located on bays and estuaries where sensitive fish nurseries for many important species are located; and

WHEREAS, these power plants are authorized to withdraw and discharge approximately 16.7 billion gallons of ocean water daily; and

WHEREAS, once-through cooling harms the environment by killing large numbers of fish and other wildlife, larvae and eggs as they are drawn through fish screens and other parts of the power plant cooling system; and

WHEREAS, once through cooling also adversely affects the coastal environment by raising the temperature of adjacent water, killing and displacing wildlife and plant life; and

WHEREAS, various studies have documented the harm caused by once-through cooling including one study that estimated that 2.2 million fish were annually ingested into eight southern California power plants during the late 1970s and another that estimated that 57 tons of fish were killed annually when all of the units of the San Onofre Nuclear Generating Station were operating; and

WHEREAS, regulations adopted under Section 316 (b) of the federal Clean Water Act recognize the adverse impacts of once-through cooling by effectively prohibiting new power plants from using such systems; and

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WHEREAS, 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 be better met by eliminating the impacts of once-through cooling; and

WHEREAS, members of the California Ocean Protection Council have called for consideration of a policy at its next meeting to discourage once-through cooling; and

WHEREAS, the California Energy Commission and the State Water Resources Control Board have the authority and jurisdiction over the design of power plants and are conducting studies into alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water and cooling towers; and

WHEREAS, in its 2005 Integrated Energy and Policy Report, the California Energy Commission adopted a recommendation to work with other agencies to improve assessment of the ecological impacts of once-through cooling and to develop a better approach to the use of best-available retrofit technologies; and

WHEREAS, the Commission recognizes that the coastal power plants currently utilizing once-through cooling make an important contribution to California's energy supply, but believes that the elimination of these cooling systems, through conservation, conversion, construction of new facilities, or utilization of other sources can be feasible and will be facilitated by establishing a deadline for this to occur; therefore, be it

Resolved by the California State Lands Commission that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously complete all necessary studies and develop policies that eliminate once-through cooling from all new and existing power plants in California; and be it further

Resolved, that the Commission shall not approve new leases or extensions of existing leases for facilities associated with once-through cooling after 2020 and calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction; and be it further

Resolved, that the Commission's Executive Officer transmit copies of this resolution to the Chairs of the State Water Resources Control Board, the California Energy Commission, and the California Ocean Protection Council, all grantees, and all current lessees of public trust lands that utilize once-through cooling.

Power Grab

Environmentalists hope Duke Energy sale and permit expiration will make for a more Slough-friendly plant. **By Ryan Masters**

It's too soon to tell how Duke Energy's plans to sell its Moss Landing power plant may affect the proposed desalination project. But local environmentalists hope that the sale—coupled with the impending renewal of the plant's pollution discharge permit—will give the public a bargaining chip in the ongoing effort to clean up the power plant's operation, with or without a desal project onsite.

Last week, Duke Energy announced the sale of eight power plants—four of them in California—to a subsidiary of LS Power Equity Partners, an investment firm that specializes in the energy industry, for about \$1.5 billion. The other California plants to be sold are a 165-watt peaker plant in Oakland; a 1,002-megawatt plant at Morro Bay, and a 10-year lease on a 700-megawatt plant in Chula Vista.

Coincidentally, Duke Energy's National Pollutant Discharge Elimination System (NPDES) permit for the 538-megawatt Moss Landing power plant expired at the end of 2005. The Clean Water Act prohibits the discharge of pollutants without a NPDES permit. The Central Coast Regional Water Quality Control Board will review that permit in June. In the meantime, the permit has been automatically renewed.

Environmentalists like Madeline Clark of the Elkhorn Slough Coalition say the timing for the renewal of the permit, which expires every five years, is "perfect."

"With that permit coming up for renewal," she says, "it gives us a great opportunity for full disclosure and what the intentions or options are regarding the desal plant. These permits are only good for five years so it gives the public an opportunity to weigh in on mitigation measures and lessen effects that the power plant may have on the environment."

Clark has reason to be optimistic. The permit's renewal in 2000 resulted in significant changes to power plant

operations, which proved beneficial to the Slough.

"We were delighted with the last go around," Clark says. "When Duke bought the power plant [from PG&E in 1998] and had to get their first permit in 2000, a lot of things were brought to the public's attention. The old part of the plant used 90 percent of the facility's water. Consequently, because of strong objections, Duke no longer uses the old part of the plant. The impact was too great."

In this go round, when the permit review process begins in five months, Clark says she hopes that the old part of the plant, which is still used as a "peaker plant" to meet high demands for energy during cold snaps and heat waves, will be permanently mothballed.

David Hicks, a Duke spokesperson, says that there is no correlation between the plant's sale and the expiration of the NPDES permit.

"Moss is one of eight plants being sold," Hicks says. "There are much larger stakes here."

As for the desalination plant, Hicks is optimistic that the sale will not hinder the project.

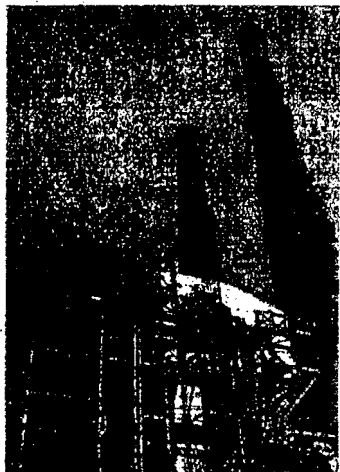
"Duke and the new owners will live up to whatever agreements were made," he says. "It's safe to say that the pilot plant

will go forward as planned."

Clark is quick to point out that her organization is not "against" the power plant.

"We just want to make sure the Elkhorn Slough is protected and whatever is done is done right," she says. "That means little or no impact to the Slough. We just want to save the Elkhorn Slough."

Darpan Kapadia, managing director of the LS Power Group, told the Weekly that "there's very little or nothing" he could say about the transaction or its repercussions other than the fact that the firm is "committed to making the transition of assets from Duke to LS Power a smooth one for the employees and the local communities." *



Fall of Energy: Despite potential hold-ups due to the sale of their plant, Duke spokespeople insist it's full steam ahead.

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CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



March 13, 2006

Mr. Paul Thayer, Executive Officer
State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

VIA FACSIMILE (916) 574-1810

RE: Proposed State Lands Commission Resolution to Phase Out Power Plant Once-Through Cooling Systems and Its Effects on Seawater Desalination in California.

Dear Mr. Thayer:

This letter provides information about the likely effects of the above-referenced resolution on coastal desalination in California. For several reasons, we believe the resolution will have minimal negative impacts on California's development of new desalination facilities, and, in fact, may benefit efforts in the state to develop seawater desalination.

We are providing this letter to augment the comments Coastal Commission staff made at the State Lands Commission hearing on February 9, 2006 and at the roundtable discussion you hosted on February 28, 2006. At both the hearing and the roundtable meeting, you received a number of comments about the resolution's potential negative effects on proposals to co-locate desalination facilities with power plant once-through cooling systems. We believe many of those comments overstated the resolution's significance on California's ability to develop environmentally and economically appropriate seawater desalination.

The proposed phase-out of once-through cooling will affect only a small number of proposed desalination facilities. For several reasons, these proposals to co-locate will raise difficult environmental and permit review issues, with or without the resolution. These reasons include:

- 1) The potential for co-located desalination is limited due to uncertainties about the future of power plant once-through cooling systems.
- 2) The resolution would adversely affect only those desalination facilities proposing to use environmentally harmful power plant cooling systems.
- 3) Many purported benefits of co-location would be of limited value and many would be largely offset by associated costs and impacts.
- 4) The resolution would increase incentives for more environmentally and economically appropriate desalination facilities.

Each of these points is discussed in greater detail below, following some brief background information. We recognize that each of these issues applies to the various proposed desalination facilities to a different degree and will therefore require site-specific review, but we hope that the general discussion in this letter will be of use in your preparation for the Commission's upcoming reconsideration of the resolution.

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BACKGROUND – EXISTING & PROPOSED CO-LOCATED SEAWATER DESALINATION FACILITIES IN CALIFORNIA

Existing: There are currently thousands of desalination facilities worldwide, although only a handful are co-located with power plants. California has about a dozen full-scale desalination facilities along the coast. They produce relatively small amounts of water and are used primarily for backup or emergency water supplies or for particular industrial purposes. Just one of these is co-located with a power plant (at Diablo Canyon). It is used to provide high-quality water for the power production process and for drinking water for plant personnel.

In addition, there are small desalination test facilities located at three coastal power plants – El Segundo, Encina, and Haynes. They use a small proportion of the power plant cooling water to test various types of desalination methods and equipment. All are intended to operate for a relatively short-term period, and none provide a public drinking water supply.

Proposed: California has 21 coastal power plants that use once-through cooling. While any of them could theoretically be used for co-location, desalination would likely be feasible only at those with several specific characteristics:

- Close to a large enough population base to support the higher cost of water production;
- Close to an adequate water distribution system; and,
- Limited local water supplies that would allow desalination to be competitive.

Many of these plants are located close to large populations, but would require extensive pumping and delivery systems to connect to existing local or regional water distribution systems. In many cases, the costs of pumping and delivery would add substantially to the end cost of the produced water. The power plants located further from large populations would require even more extensive water delivery improvements. The overall feasibility of California's coastal power plants is further limited since at least two of the 21 plants have already committed to switching to a different cooling method, and several more are likely to switch due to regulatory requirements or plant upgrades. Even at those plants where these issues are not a concern, the purported benefits of co-location are likely to be less than advertised, as noted in the examples below.

There are currently about two dozen desalination facilities being proposed along the California coast. Of these, five or six are proposed to co-locate with an operating power plant once-through cooling systems – at Moss Landing, Scattergood, El Segundo, Haynes¹, Huntington Beach, and Encina. These proposed co-located facilities represent just less than half of the currently proposed water supply that would be produced through seawater desalination in California. One additional facility being considered would use an inactive once-through cooling structure at the San Onofre Nuclear Generating Station. None of these proposals have yet completed their environmental review and permitting, and it is not yet clear that all of them can be found consistent with the various applicable laws and regulations or that any of them would actually produce the full amount of water being proposed.

¹ The Long Beach Water Department is considering use of the Haynes Power Plant, but is also conducting research into the feasibility of using subsurface intakes for desalination at sites other than the power plant.

KEY CONSIDERATIONS

1) THE POTENTIAL FOR CO-LOCATED DESALINATION IS LIMITED DUE TO UNCERTAINTIES ABOUT THE FUTURE OF POWER PLANT ONCE-THROUGH COOLING SYSTEMS.

There is sufficient uncertainty about the future of power plant once-through cooling systems to limit their potential use for co-located desalination. Along with the uncertainties about how the recent U.S. EPA once-through cooling rule will be implemented and how a federal court will decide in a case related to that rule, there are uncertainties created by the energy market, energy costs, and the increasing inefficiencies of aging coastal power plants that result in a substantial risk for co-location. The California Energy Commission has identified many of the state's coastal power plants as being inefficient or of low competitive value in the current energy market, and these characteristics are likely to worsen as other power sources are developed and come online.

These uncertainties, along with several other characteristics of co-location described below, support the assumption that for some period of time – short-term or long-term – a power plant's cooling system will not operate during the expected operating life of the co-located desalination facility. As a result, the environmental and permit review for these co-located proposals will need to evaluate the environmental impacts they would cause both with and without the power plant operating. For several key aspects of these reviews, this will essentially double the analysis necessary to ensure conformity with applicable regulations, which will increase the costs and time required for such reviews.

2) THE RESOLUTION WOULD ADVERSELY AFFECT ONLY THOSE DESALINATION FACILITIES PROPOSING TO USE ENVIRONMENTALLY HARMFUL POWER PLANT COOLING SYSTEMS.

The California Desalination Task Force recently identified "environmentally and economically appropriate" seawater desalination as part of the state's future water supply portfolio². The many adverse environmental impacts caused by power plant cooling systems suggest that the proposed use of these systems for desalination does not represent the most environmentally or economically appropriate approach to develop desalination for California.

California's coastal power plant intakes were sited and designed before we knew of the significant adverse impacts they cause. Each of the recently completed entrainment studies done at California's coastal plants – including Moss Landing, Morro Bay, Huntington Beach, and South Bay – showed that these once-through cooling systems cause significant adverse impacts to the local or regional marine ecosystem. These studies also help establish that continued use of those systems – for power plant cooling water, for desalination, or both – will result in continued and increasingly significant losses to the marine environment. Even a co-located desalination facility operating on its own at a lower volume after a power plant switched to an alternative cooling system could still cause a substantial and ongoing adverse effect.

² See the state Desalination Task Force Final Findings and Recommendations (2004) at: <http://www.owue.water.ca.gov/recycle/Desal/Docs/FinalReport.htm>

An associated concern with co-location is the potential overdependence on a single coastal site for both water and electricity. Many of California's coastal power plants are located in areas subject to geologic hazards (earthquakes, liquefaction, tsunami runup, etc.), and it may not be the best practice to combine critical utilities on sites subject to these hazards.

3) MANY PURPORTED BENEFITS OF CO-LOCATION WOULD BE OF LIMITED VALUE AND MANY WOULD BE LARGELY OFFSET BY ASSOCIATED COSTS AND IMPACTS.

There are a number of potential benefits of co-locating a desalination facility with an existing once-through cooling system. However, not all of the purported benefits are actually available, and many of those that are available may be offset by costs that negate all or part of the anticipated benefits. Although determining the costs and benefits of any particular co-located facility requires case-by-case review, the following general examples show how several of the key purported benefits are likely minimal or are offset by associated costs and impacts.

- **Purported cost savings of using an existing power plant once-through cooling structure:**
An oft-stated benefit of co-location is that a desalination facility would be able to use the existing power plant intake and discharge structure and would not have to construct a new structure. However, for most desalination projects, the costs of building a new intake/outfall system represent a relatively small proportion of the overall project costs. Additionally, for several reasons described below, using an existing power plant structure may not actually result in savings or may not be entirely beneficial.
 - o Increased costs for pre-treatment: Water drawn from a power plant open-water intake requires extensive and expensive pre-treatment. As noted in the State Lands Commission resolution, open-water intakes draw in and kill billions of organisms and cause extensive environmental damage. Along with representing significant environmental harm, these dead organisms and particles must be removed from the water before it goes through the desalination facility's reverse osmosis membranes. The pre-treatment methods used to remove them are often costly, sensitive, and subject to upset and ongoing maintenance needs. Where feasible, alternative intakes such as subsurface beach wells, allow the overlying sands and gravels to act as a natural filter for the water and provide much of this pre-treatment process for free. During the life of the facility, these savings in operational costs from using an alternative intake may more than make up for the initial capital costs of constructing that new subsurface structure.
 - o Costs of coordinating with power plant operations: Many coastal power plants are highly variable in their production of electricity and their use of cooling water. They may operate at low levels or shut down for short- or long-term periods due to maintenance needs, market conditions, energy demand, or other conditions. These variations will change the amount and the characteristics of the water available to a co-located desalination facility, and the facility must be designed to operate under these changing conditions. Also, as noted above, these power plant characteristics result in additional review requirements to determine the effects caused by the co-located desalination facility operating both with and without the power plant operating.

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- o **Increased mitigation requirements:** Given the substantial environmental impacts open-water intakes cause to marine biology, any permits issued for use of these intakes for desalination are likely to include mitigation measures necessary to minimize those impacts. These measures could include mitigation in the form of wetland restoration, creation of reef habitat, or others, and would likely require ongoing monitoring and compliance reporting. The costs of these measures could be extensive and would be added to the cost of producing the water. Alternatively, building a subsurface intake or a new intake at a less biologically sensitive location would likely reduce or eliminate the need for these mitigation measures and the associated costs.
- **Purported cost savings through lower electrical rates:** One purported benefit of co-location is that a desalination facility would be able to obtain lower cost electrical power from the adjacent power plant. Desalination requires relatively high levels of continuous electrical power (approximately 30-35 MW for a 50 mgd desalination facility), so this could result in a substantial savings. However, existing regulations generally do not allow for this type of preferential rate, so this benefit is not currently available.

The anticipated lower rates could come about only through a change in state or federal utility law. Additionally, two recent state and federal reports have recommended against subsidizing desalination's energy costs. In California, Assembly Bill 2918 (Laird, 2004) directed the California Public Utilities Commission to investigate whether providing desalination facilities with a preferential rate would result in higher rates for other electrical users. In its report published in December 2005³, the PUC found that such a subsidized rate would result in higher rates for other users and suggested that the PUC would have a difficult time justifying such a subsidy. At the federal level, the Congressional Budget Office testified before Congress last year that a proposed bill to subsidize electrical rates for desalination facilities was economically inefficient and would further distort existing water prices⁴.

We note that while lower electrical rates are often touted as a potential benefit of co-location, the desalination projects currently undergoing environmental and permit review do not claim lower rates as a benefit, possibly in acknowledgement of the realities identified above. The most recent reviews done for proposed co-located desalination facilities⁵ all state that electrical power for the facility would be obtained from wherever it is available, be it the overall power grid or the adjacent power plant. None of these reports assert that lower rates would be available, and in fact, testimony by the proponent in the Moss Landing review states that they expect electrical rates to be based on standard market rates.

³ Available at: http://www.cpuc.ca.gov/static/water/desalinationreportdecember30_printed.pdf

⁴ See CBO Comments on H.R. 1071, a Bill on Subsidizing New Desalination Facilities before the Subcommittee on Water and Power Committee on Resources, U.S. House of Representatives, May 24, 2005.

⁵ These include a Final Environmental Impact Report for Huntington Beach, a Draft Environmental Impact Report for Encina, and testimony from the Public Utility Commission's rate setting proceedings for the proposed Moss Landing facility.

- **Benefits of using the power plant discharge to dilute the high-salinity desalination discharge:** Desalination facilities currently proposed to co-locate would use from about two to 20 percent of the power plants' maximum permitted cooling water volumes. At times when a power plant once-through cooling system operated at or near its maximum capacity, the desalination facility's high-salinity discharge would be well diluted by the power plant's larger discharge by the time the combined discharges reached the receiving water.

Combining these discharges is likely to be overall beneficial, although for several reasons, any benefits may be limited or absent. Most coastal power plants operate at less than their full capacity at times or may at times shut down entirely, so they would provide less dilution than described above. Additionally, there is not yet adequate information about possible adverse synergistic effects of combining these two types of discharges. There is little research available, for example, on what biological interactions might result from combining a high salinity desalination discharge with the high temperatures and dead biomass contained in power plant discharges.

Importantly, there may be even greater benefit in combining a desalination discharge with other types of outfalls – for example, where feasible, it may be more beneficial overall to combine a high-salinity desalination discharge with a municipal wastewater discharge rather than a power plant discharge. First, this could help mix the wastewater plume more quickly in its receiving water, thus reducing the overall “footprint” of its impact. Additionally, the connection between the desalination facility and the treatment plant would better ensure the level of treatment that may be necessary for those desalination discharges containing other than just increased salinity levels and increased concentrations of naturally occurring seawater constituents. The desalination facility will at times need to clean or maintain its equipment using various cleaning agents, de-scalers, and other compounds that include toxic or hazardous chemicals, and discharges containing those constituents may need to be routed to the treatment facility. Therefore, for proposed facilities where this option is feasible, the benefits of co-locating the discharge with a power plant discharge may be overstated.

- **Purported use of no additional seawater beyond that used by the power plant:** Many proposals for co-located facilities assert that they would not use seawater beyond that already used by the power plant cooling system. This is likely not the case for several reasons:
 - o Additional seawater needed during times when the power plant is not producing electricity: As noted above, most power plants are expected to shut down or operate at low levels for various periods of time during the anticipated life of a co-located desalination facility. During these periods, the desalination facility would often be using water that would otherwise not be pumped through the power plant intake.
 - o Additional seawater needed due to electrical demand: As noted above, a 50 mgd desalination facility requires about 30 to 35 megawatts of electricity, or about 720 to 840 megawatt hours per day. Coastal power plants using once-through cooling systems require from about 10,000 to 15,000 gallons of seawater to produce each megawatt. If a 50 mgd desalination facility uses electricity from its co-located power plant, that electricity production would require from about 7 to 12 million gallons per day. While some of this water would probably be routed to the desalination process, some portion of it would be seawater that would not otherwise need to be pumped into the intake system.

- o Additional seawater needed to adjust water temperatures: Reverse osmosis membranes generally operate more efficiently at higher water temperatures than those found in seawater along the California coast. Therefore, the heated discharge from an operating power plant may provide increased efficiencies in the desalination process. This may be wholly or partially offset, however, when the desalination facility needs to pump in additional ambient temperature seawater to reduce the temperature of the power plant discharge to the membranes' optimum operating range, which is based not only on temperature, but also on salinity and particulate concentrations.
- o Additional seawater needed to dilute the discharge: As noted above, proposals to co-locate desalination facilities cite the benefits provided by the power plant discharge diluting the high salinity desalination discharge, though this benefit is absent or minimal when the power plant is not operating or is operating at a reduced level. One aspect of a co-located facility needing evaluation is to determine whether it will need to pull in additional water through the once-through cooling system to dilute its brine discharge.

4) THE RESOLUTION WOULD INCREASE INCENTIVES FOR MORE ENVIRONMENTALLY AND ECONOMICALLY APPROPRIATE DESALINATION FACILITIES.

While the majority of California's proposed desalination facilities would not be co-located with power plants, the largest facilities are proposing to co-locate, and these are the proposals receiving the most attention. Much of the focus has been due to the purported benefits described above, and as noted above, while there are some benefits to co-location, many of those benefits have been overstated.

We believe that the State Lands Commission's proposed resolution may help re-focus efforts in California on those desalination facilities that may be more economically and environmentally appropriate than co-located facilities. The resolution would support the findings of the state's Desalination Task Force and would also help support much of the research being funded through the state's Proposition 50 grants for desalination, which include several research efforts on determining the feasibility of alternatives to co-locating with once-through cooling systems.

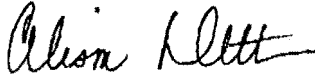
This re-focusing would also help acknowledge some of the difficulties that will be faced by desalination facilities proposing to co-locate. As noted above, the proposed use of once-through cooling systems creates several review and permitting difficulties that are not a concern for desalination proposals that would use alternative intakes – for example, while proposed subsurface intakes will require extensive review of geological issues, that review is likely to be somewhat less complex than the review needed to determine the biological effects caused by using a once-through cooling system intake.

CLOSING

In closing, California's ability to develop seawater desalination as part of its water supply portfolio is likely to continue despite the necessary phase-out of power plant once-through cooling systems. Your Commission's resolution to phase them out, in fact, will likely be overall beneficial, in that it would focus further desalination development on the most economically and environmentally appropriate types of desalination.

Thank you for the opportunity to provide these comments for your consideration. I would be happy to answer any questions you have or provide more information.

Sincerely,



Alison Dettmer, Manager
Energy and Ocean Resources Unit

Cc: Ocean Protection Council – Jon Gurish
State Water Resource Control Board – Dominic Gregorio

April 12, 2006

Steve Westley
100 Howe Ave Suite 100 South
Sacramento, CA 95825-8202

RE: San Diego Bay Council request for letter of support for phase out of once-through water cooling of power plants

Dear Mr. Westley:

I am writing in support of the member organizations of the San Diego Bay Council to request support of the resolutions regarding development and implementation of state and federal policies that will ultimately eliminate once-through water cooling from all new and existing power plants in California.

Since the State Lands Commission, Ocean Protection Council, state regulatory agencies, and the federal Environmental Protection Agency have all acknowledged that the impacts of once-through cooling are environmentally significant, it's clear that they can be avoided. Hopefully, my support will help to advance a statewide policy to phase out this harmful technology on a schedule that will ensure the continued reliability of the electrical grid. Even if OTC is phased out on a different time tables for different types of plants, it is still important to set the ultimate goal of phase out of these systems.

It is well established that once-through cooling processes are devastating to marine life in the shallow bays and estuaries like San Diego Bay and in the near-shore zones in the ocean. These areas are the most biologically productive marine zones and absolutely the worst place to allow these impacts to continue. Many studies, even those conducted by the power plant owners themselves, have demonstrated massive impacts to the marine life in the Bay.

The South Bay Power Plant located in Chula Vista is a classic example. It destroys the bay's marine environment, impacts the health of downwind residents, and is an economic blight on several communities desperately trying to increase economic development in their communities. The South Bay Power Plant has been allowed to utilize bay water out of the most shallow and sensitive estuary in the region, South San Diego Bay where it has operated since 1960. The South Bay Power Plant is also a

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significant blight on the Bayfront and has frustrated local community redevelopment efforts.

Several studies done on the OTC impacts of the South Bay Power Plant have demonstrated significant impacts to the marine life in the Bay. I find the current research alarming, such as the work done by SDSU Professor Emeritus of Biology, Dr. Richard Ford, who reported in April, 2003 that the thermal impacts of the power plant discharges had adverse effects on several major groups of benthic invertebrates by reducing the number and diversity of species. As you may be aware, the power plant discharge heats the habitat where juvenile halibut would be expected to thrive to temperatures that exceed their tolerance for heat.

The cumulative impacts of these cooling systems statewide are having a devastating impact. The June 2005 staff report issued by the California Energy Commission states that cumulative impacts of impingement at Southern California coastal power plants may be as high as 30% of the fish caught in the Southern California recreational fishery. This did not even include impacts from Encina or the South Bay power plant.

In closing, continuation of these avoidable impacts are no longer acceptable and I would like to urge the State and Federal agencies to act to bring this era of such damage to sensitive resources to a close. Please set a phase out for once-through cooling systems as soon as possible. It is time that we set a schedule for the end of use of these archaic systems and to begin to heal our coastal ecosystems from the damage that decades of misuse has caused.

Sincerely,

Kevin Faulconer
Councilmember
City of San Diego, District Two

KF:jfr

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THE CITY OF SAN DIEGO



DONNA FRYE

COUNCILMEMBER

SIXTH DISTRICT

March 14, 2006

Chair Tam Doduc and Boardmembers
State Water Resources Control Board
PO Box 100
Sacramento, CA 95812

Re: SUPPORT for guidance eliminating once-through cooling in California power generating facilities

Dear Chair Doduc and Boardmembers,

I strongly support the State Water Resources Control Board adopting guidance eliminating once-through cooling in California power generating facilities.

Once-through cooling is an antiquated cooling system used by coastal power plants that pulls up to 16.7 billion gallons of seawater – and the life it contains – into the power plants each and every day. This daily assault on California's valuable coastal environment causes serious harm, which each of the regulatory agencies responsible for attempting to manage these impacts has acknowledged.

The Ocean Protection Council, state regulatory agencies, and the federal Environmental Protection Agency have all acknowledged that the impacts of once-through cooling are environmentally significant, and that they can be avoided. Passing this guidance will help to advance a statewide policy to phase out this harmful technology on a schedule that will ensure the continued reliability of the electrical grid.

Thank you for acknowledging this serious problem, and for taking decisive action to exercise your public trust responsibilities to protect California's world-renowned coastal resources.

Sincerely,

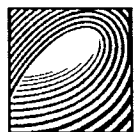
A handwritten signature in cursive script that reads "Donna Frye".

Donna Frye

Cc: Steve Westly, State Lands Commissioner

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**Surfrider
Foundation.**

www.surfrider.org

April 4, 2006

The Honorable Steve Westly, Chair, and Commissioners
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

RE: Once-Through Cooling & Co-Located Desalination

VIA EMAIL OTCres@slc.ca.gov

Dear Chair Westly and Commissioners,

We are writing in regard to the draft Resolution on Once-Through Cooling currently under consideration by the California State Lands Commission. Surfrider Foundation is writing on behalf of several coastal and ocean environmental organizations – representing tens of thousands of Californians who care deeply about protecting our coast and ocean habitat. We thank you and the Commission Staff for taking this long-overdue step towards restoring our coast and ocean.

This letter is intended to restate our support for a resolution that phases out once-through cooling (OTC) in a timely manner and to clarify any confusion about the relevance of the draft resolution in regard to ocean desalination planning.

Coastal Generators & Once-Through Cooling

As you are well aware, our marine environment has suffered from mismanagement over the past several decades. The loss of healthy fisheries and marine ecosystems is dramatically impacting our coastal economy. Two recent reports from the US Commission on Ocean Policy and the Pew Ocean Commission have highlighted the dramatic loss of healthy fisheries and marine ecosystems, as well as our fragmented ocean governance and the absence of an “ecosystem-based management” approach to restoration and future management. To many of us, this was not news. In fact, many of the Findings in these reports mirrored the very same problems identified in the Stratton Commission Report – published for Congress in 1969.

Congress passed the Clean Water Act in 1972 and included specific language to address the destruction of aquatic ecosystems from cooling water intakes. This technology-forcing provision compels the use of “best technology available” for cooling systems. After three

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decades of fragmented efforts, in 2004 the US Environmental Protection Agency finally promulgated regulations for existing facilities that identify readily available technology to reduce marine life mortality by upwards of 90 percent. In fact, these alternative cooling technologies are already in place at many of our country's generators. The US EPA has also made it clear that the regulations on cooling water intakes are a "floor" for meeting the Clean Water Act § 316(b) standards, and that "delegated states" such as California have the authority, if not the duty, to strengthen these minimum requirements.

In short, the "writing is on the wall" and the power generating industry has been on notice for over three decades. The State Lands Commission Resolution is a clear and responsible announcement to the industry that Californians insist on the greatest protection of our coast and ocean available.

As explained below, recent interest in ocean desalination can also benefit from the Resolution. By clarifying California's insistence on technologies that avoid unnecessary destruction of marine life and dramatic adverse impacts on healthy marine ecosystems, desalination proponents and water management agencies can avoid wasted investment on desalination facilities that rely on outdated once-through cooling. There are better options for the design of ocean desalination facilities.

Co-Located Desalination

Recent advancements in desalination technology have renewed an interest in utilizing the ocean as a source of freshwater for our growing demands – even though the energy demand and price of the water still far exceeds even the most expensive alternatives. There is no immediate emergency that compels the development of massive co-located desalination facilities. More investment in water-use efficiency and wastewater recycling can meet much, if not all, of the near-term increase in demand for freshwater. It is important to note that these alternative sources of freshwater also provide improved water quality in our waterways and nearshore environment by reducing polluted runoff and ocean discharges. Nonetheless, if it is properly designed to avoid environmental impacts, ocean and brackish groundwater desalination may fill a necessary niche in local water supply portfolios in the not-too-distant future. Therefore, a clear resolution by the State Lands Commission that once-through cooling is no longer acceptable will give clear direction to our water managers to plan accordingly.

Alternative Desalination Intakes & Possible Efficiencies

Currently there are several proposals for co-located desalination facilities that would utilize once-through cooling intakes as "feed water." None of these proposals have been granted final permits or associated entitlements. These proposals will only serve to undermine the goal of reducing marine life mortality from once-through cooling. As explained in more detail below, use of once-through cooling for desalination feed water, or any other purpose, is unnecessary. There are alternatives for collecting desalination feed water that do not rely on the continued destruction of marine life. It is important for the State to make a clear and unequivocal statement that ocean desalination will be held to the same standards for avoiding marine life mortality and marine ecosystem impacts as cooling water intakes.

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With public funding through Proposition 50, several local water agencies are researching sub-surface intakes for ocean desalination that avoid impacts on marine life. Importantly, these research projects and feasibility studies show promise that an environmentally acceptable solution to ocean desalination intakes is available by utilizing "beach wells" and intake galleries. Beach wells are already in use at desalination facilities in numerous foreign countries. Important side benefits from these alternative intakes may include improved efficiencies in "pre-filtration" and, if properly planned, allowing the location of smaller desalination facilities closer to the point where the water is needed. Minimizing the distance the water is pumped for delivery will dramatically reduce energy consumption, and the environmental impacts associated with electricity generation.

Notice and Proper Planning

Desalination project proponents are well aware of the foreseeable elimination of once-through cooling. The environmental community has gone to extremes to comment on every proposal for a co-located desalination facility, strongly and clearly emphasizing that reliance on cooling water intakes is not prudent planning. We have also attended numerous desalination industry conferences to make the same point. The desalination industry cannot suggest that they did not have sufficient notice that these antiquated cooling systems would not be available in the near future. In fact, they have repeatedly argued that their reliance on cooling water intakes as source water for ocean desalination was prudent because any changes to those systems was "speculative." Therefore, your resolution will not only provide long-overdue protection for marine resources, but will also serve the desalination industry by clearing up any potential "speculation" on the future of cooling water intakes.

In closing, we want to emphasize that the elimination of once-through cooling will not prohibit reasonable and environmentally responsible ocean desalination. In fact, the proposed resolution will only compel the desalination industry to utilize intake systems that avoid the unnecessary destruction of marine life. This is entirely consistent with the millions of dollars in public funds being currently allocated to desalination research.

Once again, thank you for your leadership in restoring our coast and ocean and acting on your public trust responsibility by protecting our natural resources for future generations.

Sincerely,



Joe Geever
Southern California Regional Manager
Surfrider Foundation
8117 W Manchester Ave., #297
Playa del Rey, CA 90293

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(949) 492-8170 – FAX (949) 492-8142 – www.surfrider.org - E-MAIL info@surfrider.org

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Executive Director
Glen H. Spain
Northwest Regional Director
Mitch Farro
Fishery Enhancement Director
Vivian Bolin
Watershed Conservation Director
Duncan MacLean
Salmon Advisor

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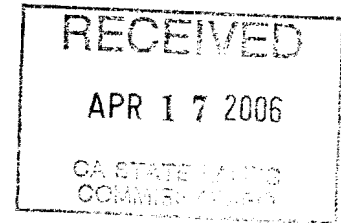
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Tel: (541) 689-2000
Fax: (541) 689-2500

11 April 2006

The Honorable Steve Westly, Chair and Commissioners
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202



RE: Agenda Item 71: Commission consideration of a resolution supporting the elimination of once through cooling in California power generating facilities.

Dear Chair Westly and Commissioners,

The Institute for Fisheries Resources (IFR) and the Pacific Coast Federation of Fishermen's Associations (PCFFA) would like to thank the State Lands Commission for being a leader in the elimination of antiquated, once-through cooling (OTC) systems along the California coastline. PCFFA and IFR support the State Lands Commission's OTC resolution and urge you to pass it on 17 April 2006.

The Institute for Fisheries Resources is a non-profit organization focused on the conservation and stewardship of fish and fish habitat through research, outreach, advocacy and restoration. The Pacific Coast Federation of Fishermen's Associations is the largest organization of fishing men and women on the West Coast and is the voice of the commercial fishing fleet up and down the Pacific Coast. PCFFA supports and helps commercial fishing men and women in the struggle to create a sustainable livelihood from fishing. Their offices are located on the shores of the San Francisco Bay.

Once-through cooling systems can draw up to 16 billion gallons of water a day along the California coastline. Although said to mostly impact bait species and not economically valuable species, bait species like sardines, anchovies and herring are an important forage source for many of our commercial fish stocks and important food sources in their own right. PCFFA and IFR are alarmed at the inadequate attention being paid to the impact that once-through cooling systems have on California's fisheries.

The San Francisco Bay is the largest estuarine habitat on the West Coast of North and South America supporting two of California's most important commercial fisheries, Dungeness crab and Chinook salmon. The estuary is also home to the threatened River Delta Smelt and Striped Bass. In addition, the San Francisco Bay is home to the nation's only urban commercial herring fishery, which takes place early each winter.

On the whole, these fisheries are as important to the West Coast culturally as they are economically, in places such as San Francisco, Dungeness Crab is the icon for the west's most popular tourist destination. Our marine and fishery resources need to be sustained.

As you probably know, California's salmon industry has been dealt a low blow with the decision by the Pacific Fisheries Management Council at the behest of the Bush Administration to savagely cut the 2006 ocean salmon season due to low returning salmon stock numbers in the Klamath Basin caused by the Administration's water policies. California fisheries are suffering and there is no need to keep antiquated systems in place to the further detriment of our marine resources. Antiquated once-through cooling systems should be removed and/or replaced with more efficient, less harmful technology.

Patrick Tennant, an aquatic biologist from Edison International, wrote in his 2 December 2005 Letter to Jerry Secundy of the Department of Water Resources that the majority of fish impinged at SONGS, the facility he uses for much of his analysis in his letter, are bait species, particularly sardines and anchovies. Tennant alleges that the impingement of these species matters little because they are not the species that sport and recreational fishermen depend on. Both sardines and anchovies, however, are vital food sources for both commercial and recreational/sport species such as halibut, Chinook and Coho salmon, rockfish and striped bass, among others. Tennant's statement that SONGS does not impact recreational fishing is misleading, and goes on to say that SONGS does impact commercial take of sardines and anchovies, while the impact of SONGS on other species through the disappearance of their food source is not calculated.

The Pittsburg Power Plant, closely located to the Contra Costa Power Plant, has its cooling water systems intakes located in a nursery area for striped bass. The impacts of the power plant on the striped bass have been documented. Mirant Delta LLC has taken steps to remediate some of the impacts of their facilities on Bay-Delta fish species, but we feel this just further reinforces the need for stronger statewide regulations to protect California's valuable marine resources, like our state fisheries up and down the coast.

San Francisco Bay Delta aquatic life is also severely impacted by water withdrawals from the Sacramento and San Joaquin Rivers, the two primary sources of water to the Bay. The threatened Delta smelt, Coho and Chinook salmon, and striped bass young already fight against

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State Lands Commission
11 April 2006
Page Three

impingement and entrainment as Delta waters are pumped out of the estuary. Any actions that can be made to lessen the impacts made to them will only quicken the much needed restoration of our San Francisco Bay ecosystem.

The Institute for Fisheries Resources and the Pacific Coast Federation of Fishermen's Associations support the California State Lands Commission's resolution calling for the elimination of once-through cooling in California power generating facilities.

Sincerely,



Zeke Grader

Executive Director

Pacific Coast Federation of Fishermen's Associations

cc: Paul Thayer

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Commissioners, my name is Michael Hertel. I am Director of Corporate Environmental Policy for Southern California Edison. Thank you for the opportunity to address the Commission on this important matter.

Edison appreciates the willingness of the staff to entertain our suggestions to improve the resolution. Unfortunately, we find ourselves unable to overcome our concerns. We very much would like to withdraw our opposition to the proposed resolution. As the majority owner and operator of the San Onofre Nuclear Generating Station, we have worked very hard with the State Water Resources Control Board, its San Diego Regional Board and the California Coastal Commission, to identify the impacts of the plant on the marine environment and to mitigate fully those impacts with a margin of safety. Indeed, I can say without fear of contradiction that the San Onofre plant is the most studied and heavily regulated once through cooling plant in the nation.

We ask the Commission to consider a change to one whereas clause and four changes to the proposed resolved clauses. With these changes SCE would withdraw its opposition to the resolution.

In the third whereas clause before the first resolved clause, we ask that the word "new" be inserted at the end of the second line so that the clause would read:

WHEREAS, it is premature to approve new leases or extensions, amendments or modifications of existing leases to include co-located desalination facilities or other **new** uses of once-through cooling water systems until first considering whether the desalination facility would adversely affect compliance by the power plant with requirements imposed to implement both the federal Clean Water Act Section 316(b) requirements and any additional requirements imposed by the State Water Resources Control Board and appropriate Regional Water Quality Control Board under state law and their delegated Clean Water Act authority;

It seemed to us the intent of this whereas clause is to deal with co-located desalination facilities with power plants and not the use of once through cooling at existing power plants.

In the first resolved clause, we ask the Commission to add the phrase "or reduce to insignificance" in line three, so that the clause would read:

RESOLVED, by the California State Lands Commission that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously develop and implement policies that eliminate **or reduce to insignificance** the impacts of once-through cooling on the environment, from all new and existing power plants in California; and be it further

The added language gives recognition to the acceptability of once through cooling systems that do not significantly impact the environment.

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M. Hertel

In the second resolved clause, we ask that the Commission add language making it clear it will not approve leases for new plants that do not have cooling systems approved by the State Water Resources Control Board. The revised resolved clause would read:

RESOLVED, that as of the date of this Resolution, the Commission shall not approve leases for new power facilities that include once-through cooling technologies **unless applicants for such leases have approval of the cooling system from the State Water Resources Control Board**

While the requirements for new power facilities using once through cooling are indeed, very stringent, nevertheless, should a plant be able to meet those tests we think it should not be barred.

In the third resolved clause we ask the Commission to clarify that any additional requirements (second to last line) to minimize impacts of once through cooling added by agencies other than the Water Resources Control Board be done by agencies with appropriate authority under the law. The clause would read:

RESOLVED, that the Commission shall not approve new leases for power facilities, or leases for re-powering existing facilities, or extensions or amendments of existing leases for existing power facilities, whose operations include once-through cooling, unless the power plant is in full compliance, or engaged in an agency-directed plan to achieve full compliance, with requirements imposed to implement both Clean Water Act Section 316(b) and California water quality law as determined by the State Water Resources Control Board, and with any additional requirements imposed by state and federal agencies **authorized to regulate once through cooling systems** for the purpose of minimizing the impacts of cooling systems on the environment

The revised language would make it clear that only restrictions by agencies with jurisdiction would trigger action by this Commission to deny once through cooling leases by this Commission.

In the fourth resolved clause, we ask that the Commission clarify that action to reopen leases depends upon Water Board final determination with regard to a plant's compliance with Clean Water Act Section 316(b) so that the resolved clause would read:

RESOLVED, that the Commission shall include in any extended lease that includes once through cooling systems, a provision for noticing the intent of the Commission to consider re-opening the lease, if there is a finding made by the Commission that the State Water Resources Control Board **when acting pursuant to Clean Water Act Section 316 (b)** or the California Energy Commission has made **a final decision**, in a permitting proceeding for the leased facility, that an alternative, environmentally superior technology exists that can be feasibly installed, and that allows for continued stability of

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M. Helto

the electricity grid system, or if state or federal law or regulations otherwise require modification of the existing once-through cooling system;

This change would make it clear that a reopening of lease ~~would~~ ^{NOT} occur only when a final determination is made that the plant's cooling system is in compliance with the Clean Water Act. This would allow a plant to come into compliance or make necessary changes by implementing a compliance plan issued by the Water Board.

Again, we appreciate the Commission's willingness to hear us on this matter.

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M. HARTER

Sandpiper Technical Services
Attn: Mr. Timothy M. Kirby
2366 La. Hwy. 1
Grand Isle, LA 70358-9750
(985) 787-2020, ext. 201
sandpiper@mobiletel.com

April 10, 2006

California State Lands Commission
Attn: Mr. Paul Thayer, Executive Officer
100 Howe Avenue, Suite – 100 South
Sacramento, CA 95825



Dear Mr. Thayer:

We are writing to the Commission in support of the proposed resolution to eliminate “once-through cooling” for facilities that draw cooling water from, and/or discharge heated effluent back to, ecologically sensitive aquatic habitats. In addition, we would like to inform the Commission of a newly patented technology, one that will enable the goals of the resolution to be achieved immediately, and will generate additional revenues for the effected facilities (i.e., compliance with the resolution’s goals will make these facilities more profitable for their owners).

On September 27th, 2005, the United States Patent & Trademark Office granted us a patent covering our Waste Heat Recycling Thermal Power Plant (WHRTPP) technology. WHRTPP technology is the long sought after replacement, for the wasteful cooling means that are currently used by industry today. Instead of rejecting “waste” heat to the environment, WHRTPP technology converts much of this “useable” heat into productive mechanical/electrical power, thereby significantly improving the fuel efficiency of America’s energy-intensive industries.

In addition to the substantial fuel savings, WHRTPP technology (a new form of dry-cooling) also generates the following ancillary benefits, that we believe will be of interest to the Commission:

WHRTPP technology greatly reduces, if not virtually eliminates, thermal pollution emissions, and by improving the overall efficiency of the power plants connected to the electrical grid; decreases the amount of chemical pollution discharged into the atmosphere.

It has been suggested in the media that we need a “Manhattan Project” directed to achieve energy independence for the United States and its allies. We submit that WHRTPP technology will play a vital role in achieving this goal. Further, WHRTPP technology can help to achieve it now, not two decades hence, and that it will do so while reducing the amount of pollutants released into the environment.

We stand ready to assist the Commission and the State of California, to protect and improve the environment, while simultaneously increasing the fuel efficiency of its energy-intensive industrial facilities.

Respectfully,

A handwritten signature in cursive script, appearing to read "Timothy M. Kirby".

Timothy M. Kirby
Owner – Sandpiper Technical Services

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US006948315B2

(12) **United States Patent**
Kirby et al.

(10) **Patent No.:** US 6,948,315 B2
(45) **Date of Patent:** Sep. 27, 2005

(54) **METHOD AND APPARATUS FOR A WASTE HEAT RECYCLING THERMAL POWER PLANT**

(76) **Inventors:** Timothy Michael Kirby, 2366 Louisiana Hwy. 1, Grand Isle, LA (US) 70358; Wanda Murie Kirby, 2366 Louisiana Hwy. 1, Grand Isle, LA (US) 70358

Hans Gartmann (Editor), De Laval Engineering Handbook—C 1970, ppg. 3-57, 4-21-4-26, 5-2-5-3, 5-5-5-7, 6-2-6-3, 6-6, 6-9, 6-61-6-62, 6-64-6-66 8-1-8-7, 8-14, & 8-15, C 1970, ISBN 07-022908-2, McGraw-Hill, Inc. New York, NY.
Robert L. Daugherty, & Joseph B. Franzini, Ph.D, Fluid Mechanics with Engineering Applications—ppg 520 & 521, C 1977, ISBN 0-07-015427-9, McGraw-Hill, Inc. New York, NY.

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 164 days.

(Continued)

Primary Examiner—Hoang Nguyen

(57) **ABSTRACT**

(21) **Appl. No.:** 10/774,880

(22) **Filed:** Feb. 9, 2004

(65) **Prior Publication Data**

US 2005/0178124 A1 Aug. 18, 2005

(51) **Int. Cl. 7** F01K 7/34

(52) **U.S. Cl.** 60/653; 60/676; 60/679

(58) **Field of Search** 60/653, 670, 676, 60/679

This invention, a waste heat recycling thermal power plant (1000), extracts heat from the environment, and concentrates this heat to produce a cfc super-ambient temperature heat source (1330) having an elevated temperature sufficient to supply a useable heat flow to an incorporated heat engine (e.g., Rankine cycle, Stirling cycle, Seebeck cycle, etc.) flow circuit (1400). Further, waste heat recycling thermal power plant (1000) produces an sfc sub-ambient temperature heat sink (1250), thus increasing the applied temperature differential, thereby permitting the thermal efficiency of the pressure expansion device (1460) to be increased as well. Lastly, waste heat recycling thermal power plant (1000) captures for reuse, much of the waste heat that its own operation liberates, thus lowering its net energy utilization per unit of mechanical power produced (a.k.a., heat rate, Btu/kwhr). In the main embodiment of its use, waste heat recycling thermal power plant (1000) would be used as the driver for a mod driven mechanical device (1520), specifically an electrical generator. Deriving its source heat by intercepting the heat that would be rejected to the environment by an electrical power generating station's cooling device, and routing this heat to waste heat recycling thermal power plant (1000). Then converting this heat to mechanical power, and subsequently to electrical power. This would result in an improvement of the electrical power generating station's net electrical power generating capacity and fuel efficiency, while simultaneously reducing the quantity of thermal (and potentially chemical) pollution released to the environment.

(56) **References Cited**

U.S. PATENT DOCUMENTS

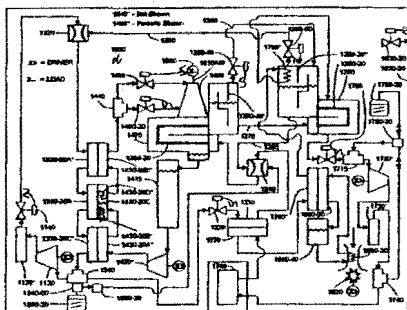
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24 Claims, 10 Drawing Sheets

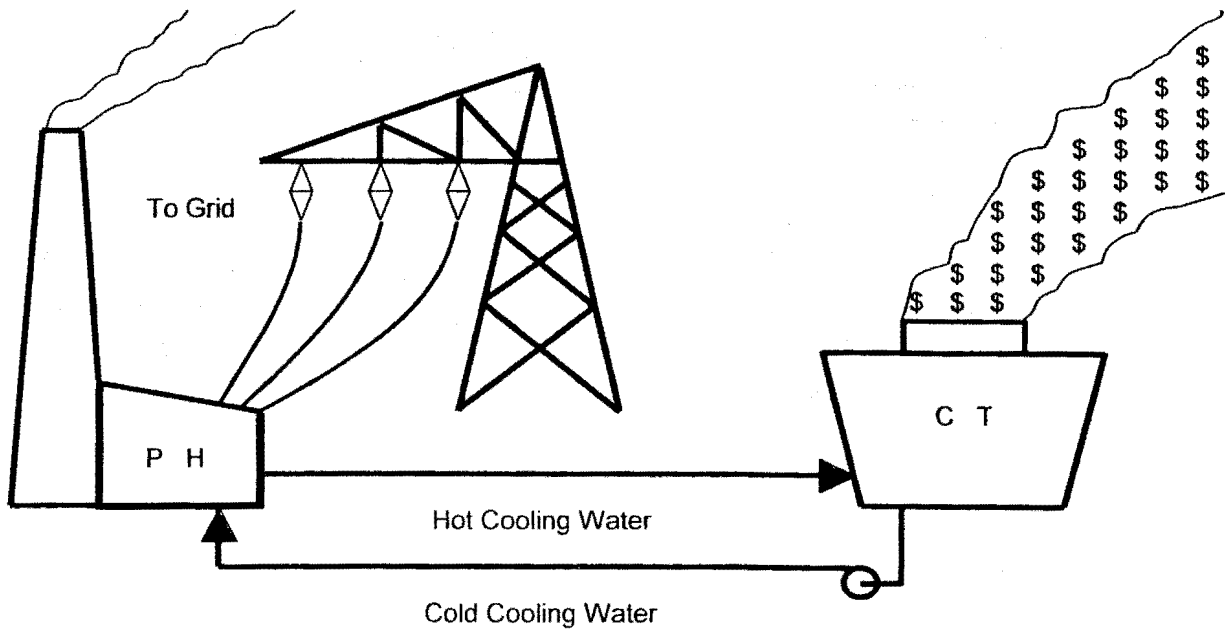


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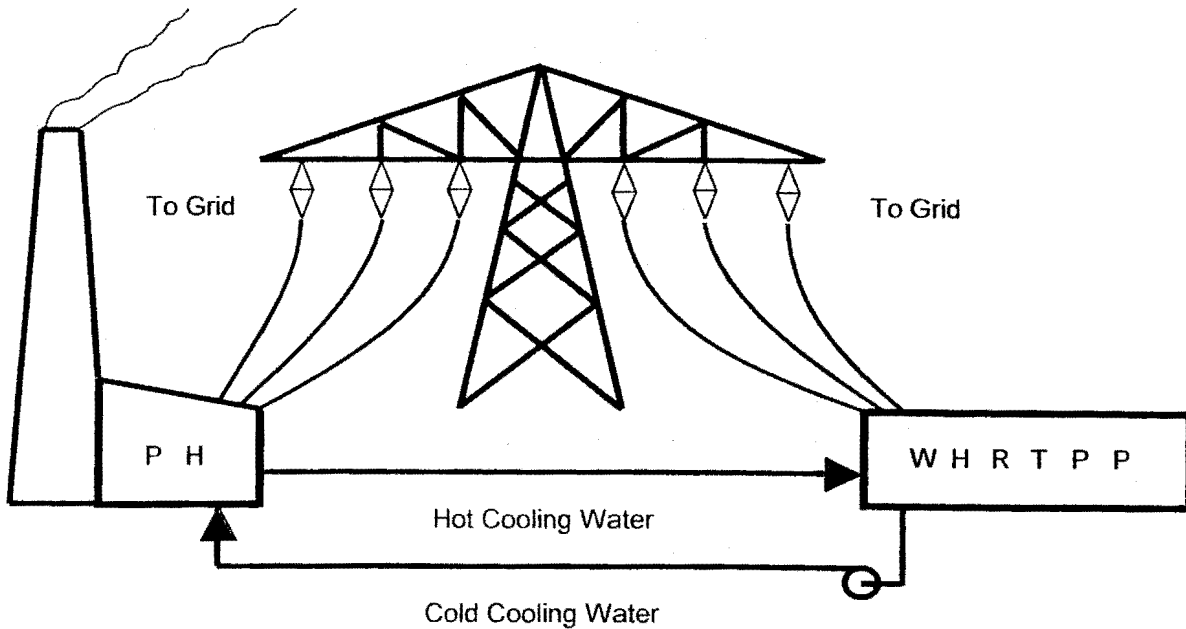
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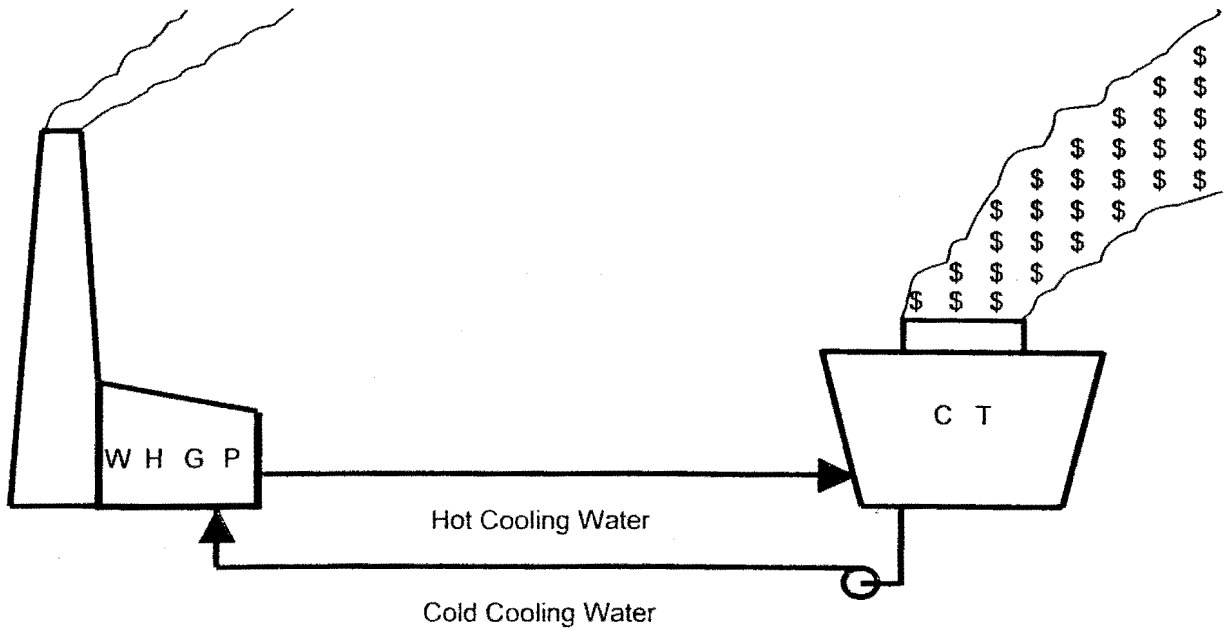
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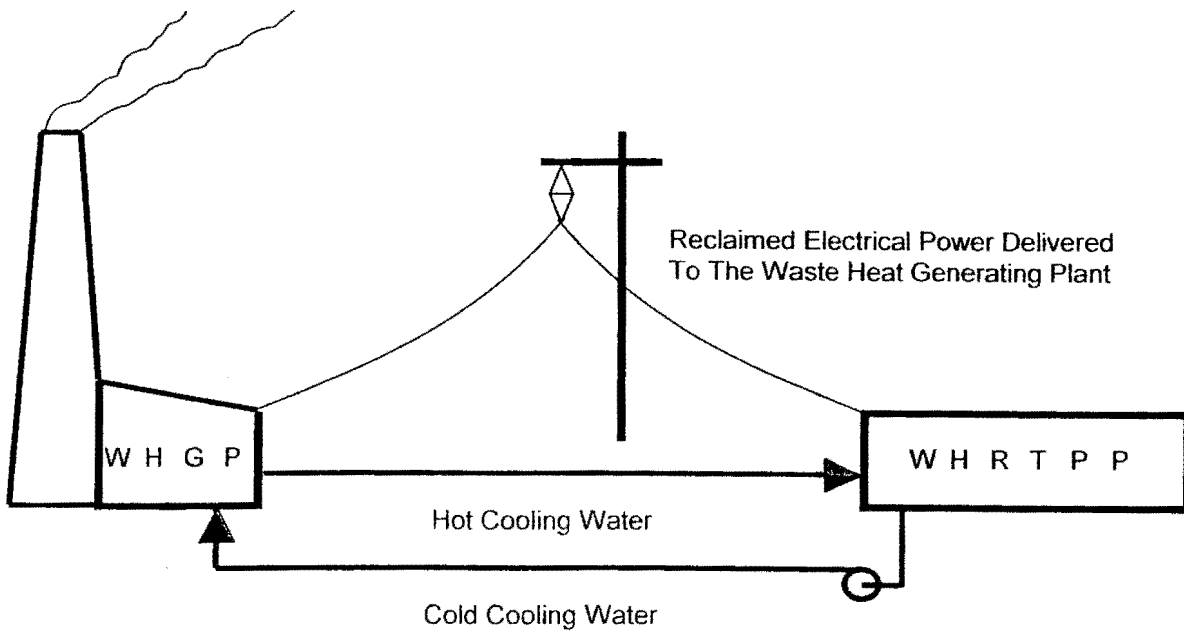
TYPICAL POWER PLANT WITHOUT WHRTP



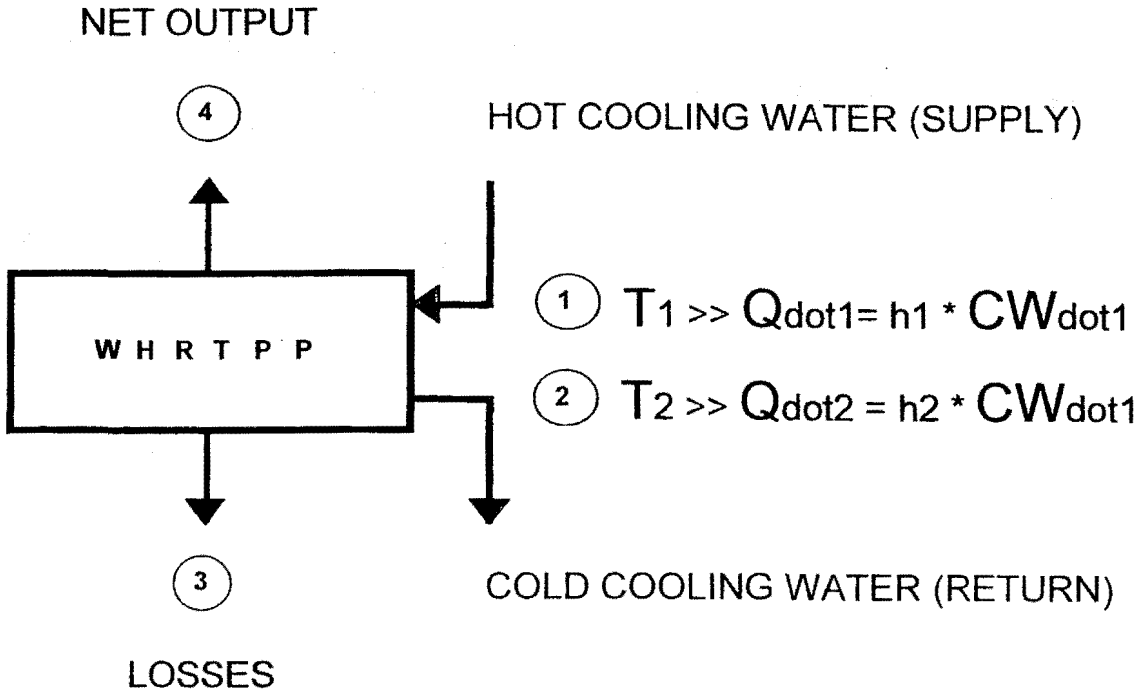
WHRTP EQUIPPED POWER PLANT



TYPICAL WASTE HEAT GENERATING PLANT WITHOUT WHRTPP



WASTE HEAT GENERATING PLANT EQUIPPED WITH WHRTPP



RF (Recycle Factor) = 1 - LF (Loss Factor); LF > 0

$$\textcircled{1} - \textcircled{2} = \textcircled{3} + \textcircled{4}$$

If: $\downarrow \textcircled{3} = LF \times (\textcircled{1} - \textcircled{2})$

Then: $\uparrow \textcircled{4} = RF \times (\textcircled{1} - \textcircled{2})$

And: $\uparrow \eta = \frac{\uparrow \textcircled{4}}{\textcircled{1} - \textcircled{2}}$



P.O. Box 164
Pismo Beach, CA 93448
805.773.3881
www.mothersforpeace.org

April 14, 2006

Paul D. Thayer, Executive Director
California State Lands Commission
100 Howe Street, Suite 100-South
Sacramento, CA 95825-8202

RE: Resolution by the California State Lands Commission Regarding Once Through Cooling in California Power Plants

Dear Mr. Thayer,

Thank you for this opportunity to comment on the staff proposal to develop policies that would eliminate once-through cooling from new and existing power plants in California. The San Luis Obispo Mothers for Peace have long been concerned with the health, safety, and environmental impacts of the operation of the Diablo Canyon Nuclear Power Plant. One of the many impacts of the operation of the plant is the enormous environmental damage caused by once-through cooling.

Mothers for Peace has been participating in the Regional Water Quality Control Board proceedings for many years now, and PG&E has still not been able to come to a resolution and obtain a new operating permit. The Diablo Canyon plant continues to operate without any mitigation for the enormous impacts of the once-through cooling operations. The California Department Fish and Game has recognized that the effects of Diablo Canyon Nuclear Power Plant's thermal discharge and entrainment "include loss and degradation of habitat, decreases in several species' diversity and density, and loss of entire species," and that "the effects continue to expand beyond Diablo Cove and are greater than predicted."

We urge the Lands Commission to approve this important resolution to protect our vulnerable coastline from the impacts of the once-through cooling at California Power Plants.

Sincerely,


Morgan Rafferty, Project Manager

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PAM SLATER-PRICE

SUPERVISOR, THIRD DISTRICT
SAN DIEGO COUNTY BOARD OF SUPERVISORS

April 17, 2006

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Torrey Pines

Steve Westly, Chair
California State Lands Commission
100 Howe Avenue, Ste. 100 South
Sacramento, CA 95825-8202

RE: Phasing out of Once-Through Cooling Systems for Coastal Power Plants

Dear Chair Westly,

I am writing to urge you to pass a resolution phasing out "once-through cooling." These outdated cooling systems unnecessarily destroy marine life and dramatically impact coastal economies that rely on healthy oceans. There are viable and readily available alternatives to once-through cooling currently in use at inland power plants, and coastal generators must transition to these technologies as soon as possible.

California's economy greatly relies on healthy coasts and oceans that support tourism, fishing communities, and other ocean related recreation and industry. It is well documented that once-through cooling unnecessarily destroys the marine life that supports vibrant coastal communities and the natural heritage we will leave for future generations. We must end once-through cooling now in order to stop the daily assault on our marine and estuarine environments and do everything in our power to restore the natural abundance that Californians once enjoyed.

Californians have historically supported heightened protection of our coast and ocean. We recently supported California's "Ocean Action Plan" which called for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands. Now is the time to put those promises into practice.

Please do everything in your power to phase out the use of once-through cooling as soon as possible.

Sincerely,

Supervisor Pam Slater-Price
Third District
SP/sk

County Administration Center • 1600 Pacific Highway, Room 335 • San Diego, CA 92101-2470

(619) 531-5533 • Toll Free (800) 852-7334

Email: pam.slater@sdcounty.ca.gov

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CONCERN/OPPOSITION

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April 11, 2006

Hon. Steve Westly, chair, and
Members of the State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

224 Airport Parkway, Suite 620
San Jose, California 95110
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Kaiser Permanente

Working Council Chair
LEON BEAUCHMAN
AT&T Inc.

Founded in 1977 by
DAVID PACKARD

Re: Resolution to Ban Once-Through Cooling for Coastal Power Plants after 2020

Dear Chairman Westly and Members of the Commission,

The Silicon Valley Leadership Group (SVLG), representing more than 200 of Silicon Valley's most respected employers and nearly 250,000 local jobs believes that the proposed unilateral decision by the State Lands Commission to ban leases or extensions to existing leases on power plants which employ once-through cooling would have massive long-term economic and power reliability implications for California.

Given the potential deleterious consequences such an action may have, we respectfully request that the Land's Commission postpone any decision on this matter until a thorough economic analysis on the impact on California's business, employment and investment climate. Additionally, we recommend that the Commission work in concert with representatives of power customers, the California Energy Commission, the California Independent Systems Operator, the California Public Utilities Commission and the Investor-owned Utilities to address this matter in a thorough, balanced and integrated manner.

Sincerely,

Justin D. Bradley
SVLG Energy Director

Cc: Jeff Byron, Byron Group
Nayem Sheikh, Cisco Systems

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COMMISSION-EO

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(619) 699-1900
Fax (619) 699-1905
www.sandag.org

March 10, 2006

File Number 3003000

Honorable Steve Westly, Chair,
and Members of the Commission
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Dear Chair Westly and Members of the Commission:

SUBJECT: State Lands Commission Resolution to Ban Once-Through Cooling
After 2020

The San Diego Association of Governments (SANDAG) respectfully requests that the California State Lands Commission consult with the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) prior to approving a resolution to ban once-through cooling power plants after 2020.

SANDAG understands that the State Lands Commission will be considering a resolution to ban leases or extensions to existing leases on such power plants at its April 14, 2006, meeting. While SANDAG has not taken a position in favor or opposition to the proposal, we would like the CEC and CPUC to be included in your decision-making process to ensure that the timeline will not negatively impact the region's energy supply and regional reliability.

The CEC and CPUC are respectively addressing the state's electricity supply and demand needs by developing the Integrated Energy Policy Report and regulating utility long-term procurement, respectively. In addition, SANDAG has adopted a Regional Energy Strategy which includes a goal of achieving 75 percent of summer peak demand electricity generation from in-county sources by 2020. SANDAG understands that approximately 40 percent of the state's current power generation comes from coastal power and could be impacted by this resolution, so we hope that the State Lands Commission will collaborate with the CEC and CPUC in making its determination.

Thank you for your consideration of these comments.

Sincerely,

MICKEY CAFAGNA
Chair, SANDAG Board of Directors

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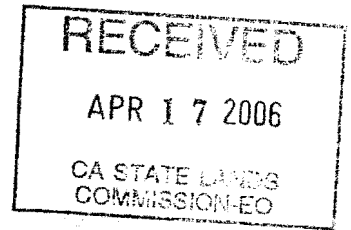
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Los Angeles
WATER and POWER ASSOCIATES, Inc.
A Non-Profit Corporation Dedicated to the Public Interest



April 14, 2006

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William G. Williams

Paul D. Thayer
Executive Officer
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Re: Comments on Once-Through Cooling Resolution – Proposed
April 12, 2006

Dear Mr. Thayer:

Water and Power Associates, Inc. (W&PA) is a non-profit, independent, private organization, incorporated in 1971, to inform and educate its members, public officials, and the general public on critical water and energy issues affecting the citizens of Los Angeles, Southern California, and the State of California.

Our organization is vitally interested in matters concerning the provision of the essential water and power resources needed to fuel the dynamic growth and vitality of our community and our State.

W&PA is opposed to the adoption of the proposed resolution dealing with once-through cooling because it fails to recognize the adverse impacts this rule will have on California's existing and new power plants and proposed water desalination facilities. Implementation of a categorical ban on once-through cooling would result in greatly increased costs for the customers of the power plants that could change cooling systems (one third) and forced shut down of two thirds of the plants which cannot convert. We do not believe it is appropriate for the State Lands Commission to attempt to limit the current options available to meet the needs of California's water and electric consumers. Those decisions must be made on a case-by-case basis by the regulatory agencies charged with that responsibility.

Sincerely,

Nancy I. Day
President

320 Cambridge Drive ~ Arcadia, California 91007

(626) 445-7376

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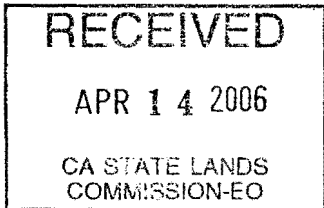


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BARBARA E. MOSCHOS, Secretary

RONALD F. DEATON, General Manager

April 12, 2006



Mr. Paul D. Thayer
Executive Officer
State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, Ca 95825

Subject: California State Lands Commission Proposed Once Through Ocean Cooling Resolution

Dear Mr. Thayer:

The California State Lands Commission (SLC) is considering adopting a draft resolution that would effectively ban new leases or the extension of existing leases on state lands after 2020 for existing and new once-through cooling (OTC) water intake structures. The City of Los Angeles acting by and through the Los Angeles Department of Water and Power (LADWP) has concerns with the SLC's broad-brush approach to addressing the nature of any potential impacts from operating OTC systems and its failure to allow the existing federal Phase II 316b Rule to be implemented prior to adopting a sweeping SLC policy such as that being proposed in the draft resolution.

The LADWP has three coastal generating facilities (Haynes, Harbor, and Scattergood) consisting of nine generating units that use once-through ocean cooling. These units comprise 37% of the City's electrical generating capacity. LADWP is in the process of implementing the Phase II 316b Rule that has been carefully designed to evaluate the impacts of OTC and provide environmental protections. The Rule has established very prescriptive performance standards, which must be met to ensure that impacts from OTC systems have been reduced or mitigated. The assessment of any potential for environmental impacts from OTC on marine life is site specific and the mitigation of those impacts is also site specific and technology specific. EPA, in the course of its 316b rulemaking efforts, recognized that impacts need to be evaluated on a localized, site-specific basis and that the assessment of the most feasible, environmentally protective and cost-effective control measures needs to be evaluated on a site-specific basis.

Water and Power Conservation ... a way of life

111 North Hope Street, Los Angeles, California 90012-2607 *000494* Mailing address: Box 51111, Los Angeles 90051-5700
Telephone: (213) 367-4211 Cable address: DEWAPOLA



Mr. Paul D. Thayer

Page 2

April 12, 2006

Although many studies have been performed over the last few decades, new studies are now in the initial stages to reassess the impact of the ocean cooled power plants and specifically LADWP facilities. It is important that the results of these studies are known in order to determine the most appropriate control measures. Upon completion of the studies, the best attainable retrofit equipment and/or operational changes for each individual site would be defined. Likewise, opportunities for offsite mitigation will also be determined, which may be the most effective means of environmental benefit.

In California, the State Water Resources Control Board (State Board) and the various Regional Water Quality Control Boards (Regional Board) have been delegated authority to implement the provisions of the Clean Water Act, which includes implementing the requirements of the Phase II 316b Rule, via the issuance of National Pollutant Discharge Elimination System (NPDES) Permits. LADWP believes that the proper implementation of any state or federal requirement as it pertains to the regulation of facilities with OTC systems is through the NPDES permit. Therefore, LADWP believes that the SLC should be involved in and express its OTC concerns to the State and Regional Boards in lieu of adopting the draft resolution.

Lastly, State Board Resolution 75-58 recognizes the value of our fresh water resources by encouraging the use of seawater for ocean power plant cooling. LADWP, as with other drinking water purveyors, is actively seeking ways to augment its limited water resources through sustainable water supply options, including desalinated ocean water. LADWP's evaluation of any proposed seawater desalination project will include a full evaluation of benefits and costs associated, including environmental, financial, reliability and water quality issues, through the appropriate CEQA and NEPA process. To this end, it may be economically advantageous and environmentally desirable for LADWP to consider the possibility of co-locating a desalination facility at one of its existing power generating facilities.

In conclusion, it is not anticipated that the benefits from eliminating OTC would justify the elimination of these valuable resources.

Consequently, we are recommending that:

- The environmental studies mandated by EPA's Phase II Rule continue on as planned to identify impacts and options of once-through ocean cooling.
- The State and Regional Boards exercise their Clean Water Act authority to review the 316b studies and modify the NPDES permits accordingly.

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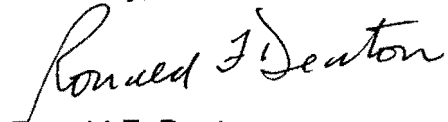
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Mr. Paul D. Thayer
Page 3
April 12, 2006

- The Resolution being considered by the California State Lands Commission not be adopted.

Thank you for considering these issues and the impact on the City of Los Angeles as well as on the Department of Water and Power. If you have additional concerns, please contact me.

Sincerely,



Ronald F. Deaton
General Manager

RSH:sa

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EPI-Center, 1013 Monterey Street, Suite 207 San Luis Obispo, CA 93401
 Phone: 805-781-9932 • Fax: 805-781-9384

San Luis Obispo COASTKEEPER®

April 17, 2006

State Lands Commission
 Steve Westly, State Controller, Commission Chair
 100 Howe Avenue, Suite 100-South
 Sacramento, CA 95825-8202

VIA FACSIMILE: 916-574-1810

Subject: Proposed Resolution Regarding Once-Through Cooling / Agenda Item V.71.

Chair Westly and Honorable Commission Members,

Today your Commission will consider a resolution regarding once-through cooling in California power plants (Agenda Item V.71) I am writing to urge you that, at a minimum, you adopt the resolution proposed by Staff to phase out once through cooling systems in our State. However, as a member of the California Coastkeeper Alliance, we are requesting your Commission to consider alternative language. The changes/edits we are recommending are provided for your consideration in the attached "stike-out" version of Staff's proposal.

Environment in the Public Interest the San Luis Obispo COASTKEEPER®, is a grassroots organization dedicated to ensuring that laws regulating water quality, watershed and land use planning, and environmental protection are enforced on the California Central Coast. As such, the SLO COASTKEEPER and our supporters are concerned that these outdated cooling systems unnecessarily destroy marine life and dramatically impact coastal economies that rely on healthy oceans. There are viable and readily available alternatives to once-through cooling currently in use at inland power plants, and coastal generators must transition to these technologies as soon as possible.



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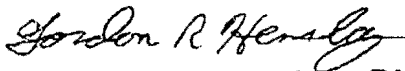
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California's economy greatly relies on healthy coasts and oceans that support tourism, fishing communities, and other ocean related recreation and industry. It is well documented that once-through cooling unnecessarily destroys the marine life that supports vibrant coastal communities and the natural heritage we will leave for future generations. We must end once-through cooling now in order to stop the daily assault on our marine and estuarine environments and do everything in our power to restore the natural abundance that Californians once enjoyed.

Californians have historically supported heightened protection of our coast and ocean. We recently supported California's "Ocean Action Plan" which called for an increase in the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands. Now is the time to put those promises into practice.

Please do everything in your power to phase out the use of once-through cooling as soon as possible.

Respectfully Submitted,



Gordon Hensley, San Luis Obispo COASTKEEPER*



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STATE OF CALIFORNIA

ARNOLD SCHWARZENEGGER, Governor

**CALIFORNIA STATE
LANDS COMMISSION**

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STEVE WESTLY, *Controller*
MICHAEL C. GENEST, *Director of Finance*



EXECUTIVE OFFICE
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

PAUL D. THAYER, *Executive Officer*
(916) 574-1800 Fax (916) 574-1810
California Relay Service TDD Phone 1-800-735-2929
Voice Phone 1-800-735-2922

PROPOSED - APRIL 13, 2006**RESOLUTION BY THE CALIFORNIA STATE LANDS COMMISSION REGARDING
ONCE-THROUGH COOLING IN CALIFORNIA POWER PLANTS**

WHEREAS, The California State Lands Commission (Commission) and legislative grantees of public trust lands are responsible for administering and protecting the public trust lands underlying the navigable waters of the state, which are held in trust for the people of California; and

WHEREAS, the public trust lands are vital to the recreational, economic and environmental values of California's coast and ocean; and

WHEREAS, the Commission has aggressively sought correction of adverse impacts on the biological productivity of its lands including, litigation over contamination off the Palos Verdes Peninsula and at Iron Mountain, the adoption of best management practices for marinas and litigation to restore flows to the Owens River; and

WHEREAS, California has twenty-one coastal power plants that use once-through cooling, the majority of which are located on bays and estuaries where sensitive fish nurseries and populations exist for many important species, including species important to the commercial and recreational fishing industries; and

WHEREAS, these power plants are authorized to withdraw and discharge approximately 16.7 billion gallons of ocean, bay and Delta water daily; and

WHEREAS, 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

WHEREAS, 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; and

WHEREAS, various studies have documented the harm caused by once-through cooling including one study that estimated that 2.2 million fish were annually ingested into eight southern California power plants during the late 1970s and another that estimated that 57 tons of fish were killed annually when all of the units of the San Onofre Nuclear Generating Station were operating; and

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WHEREAS, the public trust doctrine must be acknowledged and respected by the Commission in all of the Commission's work, thus, the least environmentally harmful technologies must be encouraged and supported by the Commission; and,

WHEREAS, once-through cooling systems adversely affect fish populations used for subsistence by low-income communities and communities of color thereby imposing an undue burden on these communities and

WHEREAS, regulations adopted under Section 316 (b) of the federal Clean Water Act recognize the adverse impacts of once-through cooling by effectively prohibiting new power plants from using such systems, and by requiring existing facilities to reduce impacts by up to 90-95%; and

WHEREAS, state law under the Porter-Cologne Water Quality Control Act requires the state to implement discharge controls that protect the beneficial uses of the waters and habitats affected by once-through cooling; and

WHEREAS, alternative cooling technologies and sources of cooling water, such as the use of recycled water, are readily available, as witnessed by their widespread use at inland power plants and many coastal plants nationwide; and

WHEREAS, 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, or phasing out, or mitigating to insignificance the impacts of once-through cooling; and

WHEREAS, members of the California Ocean Protection Council have called for consideration of a policy at its next meeting to discourage once-through cooling; and

WHEREAS, the California Energy Commission and the State Water Resources Control Board have the authority and jurisdiction over the design and operation of power plants and are conducting studies into alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water and cooling towers; and

WHEREAS, in its 2005 Integrated Energy and Policy Report, the California Energy Commission adopted a recommendation to work with other agencies to improve assessment of the ecological impacts of once-through cooling and to develop a better approach to the use of best-available retrofit technologies; and

WHEREAS, it is premature to approve new leases or extensions, amendments or modifications of existing leases to include co-located desalination facilities or other uses of once-through cooling water systems until first considering whether the desalination facility would adversely affect compliance by the power plant with requirements imposed to implement both the federal Clean Water Act Section 316(b) requirements and any additional requirements imposed by the State Water Resources Control Board and appropriate Regional Water Quality Control Board under state law and their delegated Clean Water Act authority; and

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WHEREAS, at many locations, there are alternative, feasible and available subsurface seawater intake technologies and practices for coastal desalination facilities that do not rely on surface seawater intakes used for once-through cooling; and

WHEREAS, 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; therefore, be it

RESOLVED, by the California State Lands Commission that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously develop and implement policies that eliminate the impacts of once-through cooling on the environment, from all new and existing power plants in California; and be it further

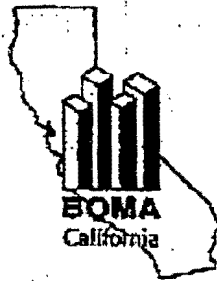
RESOLVED, that as of the date of this Resolution, the Commission shall not approve leases for new power facilities that include once-through cooling technologies; and be it further

RESOLVED, that the Commission shall not approve new leases for power facilities, or leases for re-powering existing facilities, or extensions or amendments of existing leases for existing power facilities, whose operations include once-through cooling, unless the power plant is in full compliance, or engaged in an agency-directed plan to achieve full compliance, with requirements imposed to implement both Clean Water Act Section 316(b) and California water quality law as determined by the State Water Resources Control Board, and with any additional requirements imposed by state and federal agencies for the purpose of minimizing the impacts of cooling systems on the environment, and be it further

RESOLVED, that the Commission shall include in any extended lease that includes once through cooling systems, a provision for noticing the intent of the Commission to consider re-opening the lease, if the State Water Resources Control Board or the California Energy Commission has decided, in a permitting proceeding for the leased facility, that an alternative, environmentally superior technology exists that can be feasibly installed, and that allows for continued stability of the electricity grid system, or if state or federal law or regulations otherwise require modification of the existing once-through cooling system; and, be it further

RESOLVED, that the Commission calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction; and be it further

RESOLVED, that the Commission's Executive Officer transmit copies of this resolution to the Chairs of the State Water Resources Control Board, the California Energy Commission, and the California Ocean Protection Council, all grantees, and all current lessees of public trust lands that utilize once-through cooling.



CELSOC
CONSULTING ENGINEERS AND
LAND SURVEYORS OF CALIFORNIA

CIPA
California Independent
Petroleum Association

California
Business
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Association

CALIFORNIA RETAILERS ASSOCIATION

April 13, 2006

Mr. Paul D. Thayer, Executive Officer
State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

Re: Comments on Proposed Resolution Regarding
Once Through Cooling in California Power Plants

Dear Mr. Thayer:

The undersigned organizations are writing to express our concern with the proposed resolution regarding once through cooling in California power plants. California's economy is dependent on a reliable, cost-effective, and uninterrupted supply of energy and water. The resolution, as proposed, could have major adverse impacts on the adequacy of electricity supplies and also hinder the operation of and development of new desalination facilities.

Currently, coastal power generation with once-through cooling represents 21 power plants and approximately 45% of in-state electricity generation. In addition, desalination technology is proving to be an increasingly viable means of addressing California's water supply shortfalls but relies on sharing existing ocean water intake and outfall from coastal power plants.

The resolution as proposed by the Lands Commission does not address the following critical issues:

- options for how existing coastal power plants can continue to operate;
- impacts on how the resolution affects the state's power generation capacity;
- effects on electricity rates to both businesses and consumers without coastal power plants;
- inefficiencies that would result from retrofits for alternative cooling and cause an increase in air emissions of NOx, PM 10 and CO2;
- consequences on desalination projects if desal plants are unable to co-locate with coastal power plants;

Already, California has an extensive regulatory, permitting, mitigation and enforcement process in place to oversee once through cooling systems through the State Water Resources Control Board, the Regional Water Quality Control Board, and the California Coastal Commission. Long-term plans by other state agencies would also be affected if this resolution is approved. The California Energy

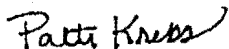
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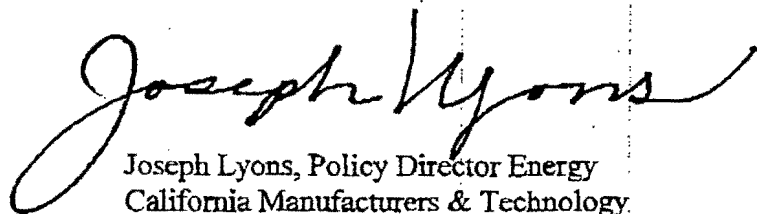
Commission just recently completed their Integrated Energy Policy Report to address the state's electricity supply and demand needs by developing the Integrated Energy Policy Report. The State Department of Water Resources, in their 2005 Framework for Action, cite increasing California's in-state water supply by applying ways to generate new supplies through desalination technologies.

For these reasons, we respectfully ask that any further discussions or planning to ban once through cooling on state lands be postponed until such time as other state agencies, including the California Energy Commission, the Public Utilities Commission, the California Environmental Protection Agency and the Department of Water Resources have been brought together to collaboratively consider important economic, energy, water supply and environmental policy issues that this action would impose on California businesses and consumers.

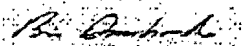
Thank you for your consideration of our comments.



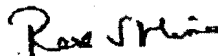
Patti Krebs, Executive Director
Industrial Environmental Association



Joseph Lyons, Policy Director Energy
California Manufacturers & Technology
Association



Bill Dombrowski
California Retailers Association



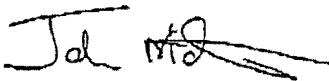
Rex Hime, President & CEO
California Business Properties Association



Sheryn Cockett, President
Building Owners & Managers Association
of California



Keith Dunn, Legislative Director
Consulting Engineers & Land
Surveyors of California



John Martini, CEO
California Independent Petroleum Association

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CA STATE LANDS
COMMISSION

April 13, 2006

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Barry Wallerstein
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Dean Wolbach
Mendocino Co AQMD

EXEC. DIRECTOR
Stewart J. Wilson
stew@capcoa.org

Mr. Steve Westly, Chair
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, California 95825-8202

SUBJECT: PROPOSED RESOLUTION REGARDING ONCE-THROUGH COOLING IN CALIFORNIA POWER PLANTS

Dear Chairman Westly:

The Board of Directors of the California Air Pollution Control Officers Association (CAPCOA) has become aware of the staff proposal recommending that the State Lands Commission no longer approve new leases, or extensions of existing leases, after 2020 in State tidelands for facilities associated with once-through cooling. The proposal, which is to be heard at your April 17 meeting in Sacramento, also calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction.

Impacts to Air Quality

CAPCOA discussed this proposal at meetings held in the last two weeks. CAPCOA is aware of and concerned about the reported impacts to marine life from use of once-through cooling at power plants, CAPCOA is very concerned about the potentially significant impacts to air quality that may arise from adoption of this proposal. Among these are possible closure of plants that could not retrofit with other cooling methods, which could result in increased air emissions at other plants; particulate emissions from cooling towers that replace once-through cooling systems, and increased emissions of NOx due to lower efficiency (perhaps 5% energy increase to go to cooling towers).

Environmental Review in Accord with CEQA

CAPCOA urges the State Lands Commission to undertake the environmental review needed to fully assess the air quality impacts that would likely follow adoption of the proposed resolution. A Program EIR could evaluate the statewide air quality impacts that would result from transitioning from once-through cooling to air or water-based cooling towers. In addition, other businesses such as desalination plants may use or be planning to use once-through cooling; the impacts on these operations should also be considered in the environmental review.

CAPCOA appreciates the opportunity to bring these concerns to the Commission and plans to send a representative to the April 17 hearing. If your Commission has any questions, please do not hesitate to contact me.

Yours truly,

Barbara A. Lee, President
California Air Pollution Control Officers Association

cc: Mr. Cruz Bustamente, Lieutenant Governor and Commission Member
Mr. Michael C. Genest, State Director of Finance and Commission Member

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 CA STATE LANDS
 COMMISSION-EO

11 April 2006

Commissioner Steve Westly
 State Lands Commission
 100 Howe Avenue, Suite 100 South
 Sacramento, CA 95825-8202

Dear Commissioner Westly:

Subject: Comments on the Draft Resolution Regarding Once-Through Cooling in California Power Plants

AES Southland L.L.C. (AES) appreciates the opportunity to comment on the proposed State Lands Commission resolution regarding once through cooling in California power plants (Proposed Resolution). The Proposed Resolution would establish a policy to not approve new leases or extensions of existing leases for facilities associated with once-through cooling after 2020.

AES owns and operates three coastal generating stations in Southern California. These facilities are capable of providing enough electricity to supply power to more than four million homes and businesses in California. The Huntington Beach Generating Station has used once-through cooling since the 1950s. This facility has operated under National Pollutant Discharge Elimination System (NPDES) permits that are administered and reviewed for re-issuance every five years by the Regional Water Quality Control Boards under authority delegated by the United States Environmental Protection Agency (USEPA).

The proposed resolution of the State Lands Commission could adversely affect over 21 power plants in California representing approximately 21,000 megawatts (MW) of generating capacity and over 45 percent of the State's power generation capability. The proposed State Lands Commission resolution presumes the outcome of ongoing comprehensive studies pertaining to the impacts of once-through cooling water and proposes a policy that would affect almost half of the State's generating capacity. However, the State Lands Commission does not have expertise either in regulating once-through cooling systems or in the operations and needs of the State's power generation and distribution systems. To avoid precipitous adverse impacts on the power generating capacity of the State, and thereby the State's economy, AES requests that the State Lands Commission reject the proposed resolution, and support the ongoing efforts of the State Water Resources Control Board and the Regional Water Quality Control Boards to provide the appropriate regulation of once-through cooling.

Our concerns regarding the Proposed Resolution are further described herein.

Regulation of Cooling Water Intake and Discharge

Through the Porter-Cologne Act the California legislature assigned the State Water Resources Control Board and the Regional Water Quality Control Boards responsibility for regulating operation of once-through cooling systems to protect the beneficial uses of the receiving waters in California, including protection and maintenance of aquatic life and its habitat. To implement Clean Water Act Section 316(a), which addresses discharges of cooling water, and Section 316(b), which addresses cooling water intake structures, these agencies have established plans and policies and administer programs to ensure compliance with these requirements.

In 2004 the USEPA published the Clean Water Act Section 316(b) Final Rule for the regulation of

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the intake structures for once-through cooling systems¹. Section 316(b) requires that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts. Facilities throughout California are in the process of collecting data and information on current levels of impingement and entrainment in conformance with the Section 316(b) Phase II Final Rule. The Section 316(b) Phase II Final Rule requires attainment of strict performance standards for reduction of impingement entrainment of aquatic life, either through implementation of control technologies or operational measures. Where control technologies and operational measures cannot achieve the necessary reductions, restoration measures will be required. By eliminating the operation of once-through cooling systems, the Proposed Resolution would presuppose the outcome of these studies and usurp the authorities and responsibilities assigned to the State Water Resources Control Board and the Regional Water Quality Control Boards assigned by the legislature.

There is No Need for the State Lands Commission to Adopt the Proposed Resolution

The Proposed Resolution states that the California Energy Commission and the State Water Resources Control Board have authority and jurisdiction over the design of power plants and that these agencies are conducting studies of alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water, and cooling towers. The Proposed Resolution would have the State Lands Commission usurp these authorities and jurisdictions assigned by the legislature and disrupt the orderly evaluation of once through cooling systems.

Significant Problems Associated with the Use of Once-Through Cooling Systems Have Not Been Identified

The State Lands Commission has provided no supporting data to demonstrate significant environmental impacts associated with once through cooling systems. The numbers cited in the proposed resolution are presented without context and do not demonstrate a significant environmental impact. For example, it is not possible to determine how small the mortality data cited is in relation to the total population. In contrast, there is substantial information to demonstrate that the impacts of once-through cooling are not significant. If there are problems with specific facilities such as those cited in the proposed resolution, they should be and are addressed by the appropriate agencies on an individual basis. Further, the State Lands Commission has produced no information, technical or otherwise as to why power generation facilities in California should be subject to standards that are much more stringent than in the rest of the United States.

USEPA Has Rejected Elimination of Once-Through Cooling Systems

For the Clean Water Act Section 316(b) Phase II Final Rule, USEPA spent a number of years evaluating the costs and benefits associated with once-through cooling water systems. This evaluation specifically considered the option of requiring the use of closed-cycle cooling and specifically considered the impacts in California. After review of all information they rejected use of closed-cycle cooling because the high costs were not justified by the benefits. In conjunction, USEPA has therefore, rejected the elimination of once-through cooling systems. After review of all information they rejected elimination of once-through cooling systems and replacement with closed-cycle cooling because the high costs were not justified by the benefits. To our knowledge,

¹ 40 CFR Parts 9, 122 et al., National Pollutant Discharge Elimination System – Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Final Rule, USEPA, Federal Register, July 9, 2004.



the State Lands Commission has not conducted a similarly rigorous study contradicting the findings of the USEPA studies.

Use of Ocean Water for Once-Through Cooling is Consistent with California Water Policy

The California Water Policy² regulates the use of inland surface waters for the use and disposal of inland surface waters for cooling. The policy also encourages the siting of power plants on the ocean to take advantage of the State's abundant seawater and to conserve the limited supplies of freshwater for other purposes. The California Ocean Plan and the Basin Plans explicitly recognize that use of ocean water for industrial cooling water is a compatible beneficial use.

The Proposed Resolution Will Have Significant Impacts on the State's Ability to Meet Its Growing Power Needs

With the expanding populations and economies of neighboring states, the availability of out-of-state power is declining. As experienced in the recurring power emergencies over the past several years and with projected increases in power demand within California, additional power generating capacity is needed, even assuming the continued operation of the power plants currently using once-through cooling systems. The cost of replacing imported power, constructing additional power plants to meet increasing power demands, and replacing obsolete power plants will be borne by the rate payers. Under the Proposed Resolution, these costs will be substantially exacerbated by the need to replace power plants using once-through cooling.

California is already promoting energy conservation and alternative sources of energy. In fact, California uses the least electrical power per capita of the 50 states.³ Although AES supports energy conservation, it is unreasonable to presume that sufficient additional conservation can be achieved to maintain adequate power supplies and to offset the elimination of the power plants using once-through cooling systems.

Some of the power plants that would be affected by the Proposed Resolution are critical to the stability of the electrical grid in California. For example, the AES-owned Huntington Beach Generating Station is the only electrical generating facility in Orange County. It is a FERC/CAISO "must run" facility, and has had that status for over a decade. The Proposed Resolution would eliminate the operation of this critical facility.

The Proposed Resolution, if adopted, will have a significant impact on the ongoing operational viability of the affected power plants. Recognizing the stated horizon for operation of the once through cooling systems, maintenance and improvements to continue operations at these facilities may not be financially justifiable. This condition will inevitably lead to lower power system reliability and, in some instances, premature retirement of these generating stations.

² Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling, State Water Resources Control Board Resolution No. 75-58, June 19, 1975.

³ WWW.ENERGY.CA.GOV/ELECTRICITY/USPERCAPITA/ELECTRICITY



No Justification for the Proposed Deadline Is Provided

The Proposed Resolution establishes a deadline of 2020 to eliminate the use of once-through cooling. This proposed deadline appears to be arbitrary and capricious as no information supporting the proposed deadline has been provided.

The Proposed Resolution Fails to Consider the Feasibility and Environmental Impacts of Alternatives

The Proposed Resolution suggests that elimination of once-through cooling systems can be achieved through conservation, conversion, construction of new facilities, or utilization of other sources and that these objectives would be achieved by establishing a deadline. However, no evidence has been provided to demonstrate that California's energy needs can be met under this deadline through implementation of these strategies. In fact, the evidence suggests that these strategies would not support attainment of California's energy needs through implementation of the proposed deadline.

There are significant limitations associated with existing power plant sites that may make it inappropriate to consider retrofitting existing power plants to use wet or dry cooling towers. These limitations include space, location in already congested areas that could affect visibility impairment, highway and airport safety issues, salt drift and corrosion problems, noise abatement problems and additional energy requirements. Visual and noise impacts are especially acute with dry cooling towers. Dry cooling towers also have significant parasitic energy requirements. Where treated wastewater or recycled water is not available for use in wet cooling towers, fresh water must be used. Wet cooling towers also generate considerable amounts of wastewater with high Total Dissolved Solids that must be disposed.

The Proposed Resolution fails to acknowledge that there may be significant environmental impacts associated with elimination of once-through cooling systems. For example, many of the power plants using once-through cooling systems are located in areas with high power demand, reducing the need for long distance transmission facilities.

The Economic Impacts of the Proposed Resolution Must Be Assessed and Considered

Power generating stations are essential components of California infrastructure, providing the energy necessary to support industry, agriculture, homes and other critical public infrastructure such as water and wastewater treatment plants, water supply pumps, traffic controls, community lighting, and other public health and safety systems. Maintenance of an adequate and reliable supply of power is critical to the economy and the health and safety of our citizens.

As noted in the introduction, the Proposed Resolution could require California to replace approximately 21,500 megawatts of generating capacity. However, the potential economic impact of the resolution is not addressed. The Southern California Public Power Authority (SCPPA), which is a public agency consortium, recently completed the 328 MW Magnolia Power Plant at a cost of \$300 million. This state of the art combined cycle power plant uses a wet cooling tower supplied with reclaimed water and a crystallizer for waste concentration prior to disposal. Using the cost of Magnolia Power Plant, it is projected that the replacement of the power generated by the power plants using once-through cooling would cost ratepayers of California approximately \$19.64 Billion. These costs to the ratepayers would be in addition to other power plant replacements, cost of additional facilities to meet the increasing demands of a growing population, and other facility costs. Clearly, the Proposed Resolution presents a significant potential economic impact to California. Prudent public policy warrants careful assessment and consideration of these prior to any action that may have such an economic impact.



Conclusion

The proposed resolution could adversely impact almost half of the electric power generating capacity in California. The potential for environmental benefits from elimination of once-through cooling systems are speculative and may not be significant. However, these impacts would result in significant costs to ratepayers, including elderly, disabled and economically disadvantaged, in addition to threatening the adequacy and reliability of the electric power system necessary for the operation of the economy and public health and safety systems. AES strongly urges the State Lands Commission to reject the Proposed Resolution. Regulation of once-through cooling systems in California must be consistent with the Clean Water Act Section 316(b) Phase II Final Rule and must be administered by the Regional Boards as designated by the State's legislature.

AES is committed to achieving compliance with the Clean Water Act Sections 316(a) and (b) at all three of its southern California generating stations. The State Lands Commission should support the Regional Boards and the USEPA by allowing the Clean Water Act Section 316(b) process to continue in an orderly manner. AES encourages the State Lands Commission to act responsibly and base a decision of this magnitude on sound science, not political rhetoric and environmental activism. We respectfully request that you either reject the Proposed Resolution or at the least consider each lease independently and without a set sunset clause. If you have any questions or would like to discuss these comments, please contact Steve Maghy at (562) 493-7384.

Sincerely,

Eric Pendergraft, President
AES Southland L.L.C.

- CC: Independent System Operator'
- California Energy Commission
- Public Utilities Commission
- Los Angeles Department of Water and Power
- Pacific Gas and Electric
- San Diego Gas and Electric
- Duke Energy
- Mirant

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 existing 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

ONCE-THROUGH COOLING & ENERGY

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 PM₁₀ 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 PM₁₀ 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 calculated 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 contracts 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 Maulbetsch 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/10⁶ 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 cooling system has generally been carried-out without requiring an extended unscheduled outage. The cost to retrofit 800 MW Palisades Nuclear (MI) 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 Technical 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 project 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 Beach 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/sitingcases/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.usainc.org/sanonofre.asp>]. The cooling 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 can 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.

ENDNOTES

^{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 PM₁₀ 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 PM₁₀. Diablo Canyon is located in San Luis Obispo County. The NO_x and PM₁₀ 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 PM₁₀.

^{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 Eftekhazadeh – 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.

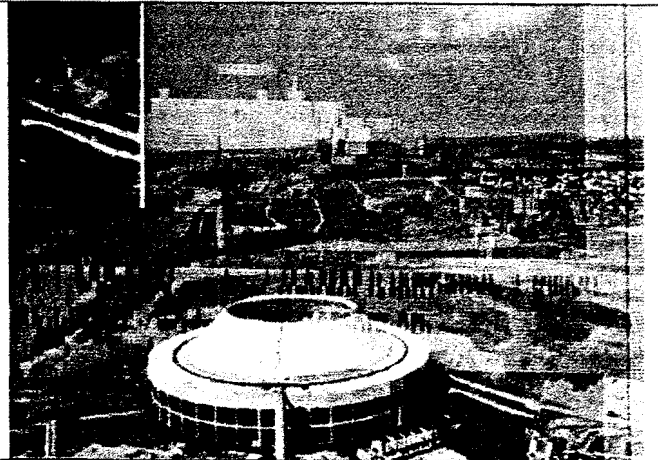
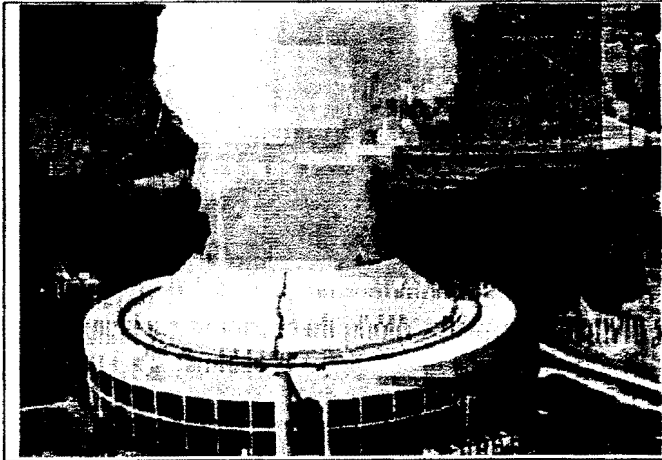
^{xxi} U.S. DOE, Final EIS - Imperial-Mexicali 230 kV Transmission Lines, December 2005. Table G-1, Power Plant Emissions, p. G-4.

^{xxii} Dr. Shahriar Eftekhazadeh – 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.

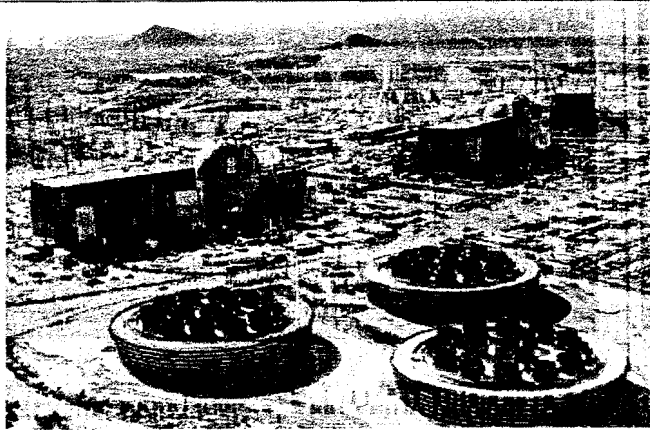
^{xxiii} EPA Region 1, MA0003654 - Brayton Point Station Final NPDES Document, July 22, 2002, Chapter 7, p. 7-128.
<http://www.epa.gov/boston/braytonpoint/>

^{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

<p>36-cell, space saving back-to-back inline conventional cooling tower. From: GEA Power Cooling Systems website</p>	<p>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.</p>
<p>Schematic of plume-abated cooling tower – dry (radiator) section above, conventional wet below. Source: P. Lindahl – Marley presentation, Dry Cooling Symposium, May 2002.</p>	<p>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.</p>
<p>Operational plume-abated tower, ~60 ft. tall – Selkirk 2 Cogen, 330 MW (NY) Source: P. Lindahl – Marley presentation, May 2002.</p>	<p>Operational plume-abated tower, ~50 ft. tall – Chicago O'Hare Airport Source: P. Lindahl – Marley presentation, May 2002.</p>

March 29, 2006

Mr. Paul D. Thayer, Executive Officer
California Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825-8202

VIA EMAIL (OTCres@slc.ca.gov) AND FACSIMILE (916.574.1810)

Subject: "Staff Proposed Resolution By The California State Lands Commission
Regarding Once Through Cooling in California Power Plants"

California American Water appreciates the opportunity to provide the State Lands Commission (SLC) with additional comments regarding the subject resolution noted above ("Proposed Resolution"). Given the limited time available and lack of SLC staff analysis regarding the Proposed Resolution, the following comments are not exhaustive, and California American Water reserves the right to raise additional issues upon further evaluation and review of any additional testimony, evidence or analysis developed by SLC Staff or others. For the record, California American Water strongly opposes the Proposed Resolution for the reasons noted below, and requests to be included in any public notice for all SLC actions relating to the Proposed Resolution, Once Through Cooling (OTC) and seawater desalination.

I Summary

For the reasons noted below, California American Water strongly opposes the Proposed Resolution and respectfully requests that either the Proposed Resolution be modified as shown in Attachment A or the decision delayed until SLC conducts a thorough review and consideration of available information, particularly with respect to the potential adverse environmental effects of the Proposed Resolution. We hereby incorporate by reference our testimony at the January hearing regarding this matter, as well as correspondence dated February 8, 2006 and our testimony at the February 28, 2006 "stakeholders meeting."

II California American Water's Suggested Wording for the Proposed Resolution

California American Water respectfully submits proposed revisions to the Proposed Resolution (see Attachment "A" – Proposed Revisions). These proposed revisions are consistent with the approach and conclusions of other State and Federal agencies that have devoted extensive research and public workshops to OTC. California American Water notes a disconnect in the Proposed Resolution between the first 13 "Whereas" clauses and the 14th clause, in which the language makes a quantum from "eliminating the impacts," "discourage" and "improve assessment" to "elimination of these [OTC] cooling systems." The former is consistent with public policy and actions by other agencies; the latter (total elimination of OTC regardless of specific circumstances) marks a major change in public policy and regulations that warrants more careful consideration and public review than the Proposed Resolution has received.

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If the intent of the Proposed Resolution is to identify a long-term policy goal while retaining flexibility to allow the SLC to consider OTC on a case-by-case basis, which is consistent with the policy and practices of other agencies, then the Proposed Resolution should be modified as noted in Attachment A to provide for such flexibility. If the intent of the Proposed Resolution is to establish new public policy affecting SLC future actions as presently worded, then the Proposed Resolution is subject to California Environmental Quality Act (CEQA) and warrants far more extensive analysis and consideration of impacts and alternatives. Furthermore, as noted below, California American Water believes the Proposed Resolution is subject to the CEQA and warrants full, formal public review and disclosure to allow informed decision-making (see Section III below).

III Inadequate Public Review and CEQA Compliance for Proposed Resolution

The Proposed Resolution, as worded, is not exempt from CEQA. The Proposed Resolution is discretionary in nature, is not a "planning or feasibility study" and does not appear to satisfy any other Statutory or Categorical Exemption categories. Class 7 and Class 8 exemptions are only applicable to actions taken in accordance with existing law and exclude activities where there is a "reasonable possibility that a project or activity may have a significant effect on the environment" (CEQA Guidelines §15300.2(c) and §15308).

The following is a citation from the well-documented "No Oil Inc" case of 1974:

"Second, since the preparation of an EIR is the key to environmental protection under CEQA, accomplishment of the high objectives of that act requires the preparation of an EIR whenever it can be fairly argued on the basis of substantial evidence that the project may have significant environmental impact. The superior court in the present case, however, ordered the city council to follow a far more restrictive test that limited use of an EIR to projects which may have an 'important' or 'momentous' effect of semi-permanent duration. The superior court's instruction, in addition, overlooked the importance of preparing an EIR in cases, such as the present action, in which the determination of a project's environmental effect turns upon the resolution of controverted issues of fact and forms the subject of intense public concern."¹

In addition to failure to comply with CEQA, SLC's public review process for considering this Proposed Resolution has been limited and inadequate to allow informed decision-making. The public notice of the SLC hearings on this matter did not comply with CEQA, the Proposed Resolution has not received adequate public review, the "stakeholders" consultation process was limited to one meeting without adequate opportunity for SLC staff analysis of testimony and to date, no staff analysis has been provided in response to the considerable testimony presented in opposition to the Proposed Resolution.

IV Inadequate Analysis to Support Proposed Resolution

The Proposed Resolution is not supported by adequate analysis in light of public testimony at the first hearing, the "stakeholders meeting" and recent comment letters to the SLC.

¹ http://ceres.ca.gov/ceqa/cases/1974/nooil_121074.html (retrieved March 24, 2006).

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Analysis gaps include, but are not limited to, the following with respect to the Proposed Resolution:

- 1) Conflict with existing local, State and Federal laws, programs and policies (see Section V below);
- 2) Potential significant impacts of the Proposed Resolution (see Section VI below);
- 3) Inadequate consideration of alternatives to OTC; and
- 4) Lack of response/analysis (to date) addressing substantial evidence and testimony raised by Opponents.

Other agencies' efforts to understand, regulate and develop alternatives to OTC have taken years, involved extensive detailed scientific analysis and public input, and have considered alternatives and economic impacts as part of the public policy decision process. These agencies have concluded, after extensive study, that OTC (as is the case with co-located seawater desalination) should be evaluated on a case-by-case basis. Testimony from the California Energy Commission (CEC) at the SLC OTC stakeholder meeting indicated that the CEC believes that there is simply not enough information to support a single comprehensive position on OTC.

V Proposed Resolution is in Direct Conflict with Numerous Local, State and Federal Laws, Policies and Programs

The following is a partial listing of how the Proposed Resolution conflicts with existing laws, policies and programs:

- State Lands Commission Policies. The Resolution appears to be in direct conflict with the SLC's Regulation 2802(b) and (f), as well as the SLC's adopted Public Trust Statement.
(http://www.slc.ca.gov/Policy%20Statements/Policy_Statements_Home.htm)
- California Coastal Commission policy paper indicating that co-located desalination plants should be evaluated on a case-by-case basis (and not arbitrarily blocked by this Resolution). (<http://www.coastal.ca.gov/energy/14a-3-2004-desalination.pdf>)
- The Cobey-Patar Saline Water Conversion Law (Ca. Water Code §12945 - §12947, which specifically provides State legislative directive for the development of seawater desalination.
- California Department of Water Resources State Water Plan (<http://www.waterplan.water.ca.gov/docs/cwpu2005/vol1/v1ch05.pdf>). The Resolution is in direct conflict with Recommendation 7, and with Volume II Chapter 6, Desalination.
- California Department of Water Resources State Water Desalination Task Force Final Report. The Resolution is in direct conflict with Findings and Recommendations 25-30.
- Metropolitan Water District's Integrated Resources Plan (<http://mwdh2o.org/mwdh2o/pages/yourwater/irp/integrated01.html>)

- San Diego County Water Authority's Urban Water Management Plan (<http://www.sdcwa.org/manage/UWMP.phtml>) and Regional Water Facilities Master Plan (<http://www.sdcwa.org/infra/masterplan.phtml>)
- Numerous County and local water district water supply planning programs and adopted Urban Water Management Plans.

The Proposed Resolution is in direct conflict with years of work by agencies with extensive expertise and experience with OTC to develop and implement regulations that address mitigation and alternatives for OTC. EPA has adopted "Phase II" rules for Clean Water Act §316(b) compliance. These Phase II rules apply to NPDES permits for large power plants using "once through cooling" (seawater intake), and require that power plants reduce their "impingement and entrainment" impacts to marine life.

"For example, impingement requirements call for the number of organisms pinned against parts of the intake structure to be reduced by 80 to 95 percent from uncontrolled levels. Entrainment requirements call for the number of aquatic organisms drawn into the cooling system to be reduced by 60 to 90 percent from uncontrolled levels. Large power plants have flexibility to comply and to ensure energy reliability. The rule provides several compliance alternatives, such as using existing technologies, selecting additional fish protection technologies (such as screens with fish return systems), and using restoration measures."

"This rule protects more than 200 million pounds of aquatic organisms annually from death or injury by cooling water intake structures. The impingement and entrainment reduction benefits range from \$73 million to \$83 million per year. These benefits are primarily from improvements to commercial and recreational fishing. There are likely to be other benefits, for example, more robust and productive aquatic ecosystems, although these are harder to quantify. EPA estimates that this rule affects about 550 facilities and costs about \$400 million per year."² The Regional Water Quality Control Board has been holding workshops regarding 316(b) implementation, which this Resolution would conflict with.³

VI Proposed Resolution May Result in Unintended Significant Impacts Not Evaluated by Staff

To date, we are not aware of any substantive analysis conducted by SLC regarding the potential adverse effects of the Proposed Resolution. Public testimony and comments to date have identified a variety of potentially significant impacts. Comments from Resolution supporters have generally been statements of opinion not substantiated by scientific data (see Section VIII below). Comments from the California Council for Environmental and Economic Balance (CCEEB) and others have identified potentially significant impacts regarding the implementation of OTC alternatives. In the limited time provided by SLC, we

² Environmental Protection Agency, <http://www.epa.gov/waterscience/316b/phase2final-fs.htm>.

³ <http://www.swrcb.ca.gov/npdes/cwa316.html> (retrieved March 24, 2006).

would like to address several potentially significant impacts that the adoption of the Proposed Resolution may cause:

- 1) Elimination of OTC may seriously delay seawater desalination projects currently in advanced planning and permitting stages. SLC should evaluate the potential effect of the Proposed Resolution on the seawater desalination projects currently in various stages of review and discuss potential impacts of these projects either being delayed due to redesign, or cancelled due to feasibility issues with non-OTC technology, as well as the potential impacts of non-OTC seawater desalination;
- 2) Converting co-located seawater desalination projects to non-OTC technologies (such as beach wells) may result in significant impacts to the environment not considered or evaluated by SLC (see Section VIII below); and
- 3) Elimination of OTC may result in significant impacts to the environment that have not been considered or evaluated in sufficient detail by SLC. In addition to comments raised by CCEEB and others, elimination of OTC, as suggested in the Proposed Resolution, would cause immediate and long-term changes in coastal circulation, both in the open ocean and particularly where OTC intakes are located at or near lagoons, bays, harbors or estuaries. Flow Science, Inc., a highly respected firm with unique expertise in hydrodynamic modeling and specific experience in OTC modeling at several locations, has prepared a brief technical memo that identifies potentially significant impacts associated with elimination of OTC (refer to Attachment B). Given the brief time allotted for review and response to the Proposed Resolution, this technical memo represents a preliminary review of potential adverse effects of eliminating OTC. Additional adverse effects and issues similarly not addressed by SLC to date include the long-term effects of sedimentation and environmental mitigation programs associated with the current/ongoing dredging and restoration/mitigation activities by the OTC plants.

VII Proposed Resolution May Seriously Delay or Preclude California American Water's Coastal Water Project

We previously commented on this issue in our February 8, 2006 letter to SLC. We would like to expand upon the points raised in that letter. As written, the Proposed Resolution would preclude the Coastal Water Project or "CWP" (www.coastalwaterproject.com). This Project represents over 25 years' effort by coastal Monterey County, State legislators, the CPUC, SWRCB and others to develop a long-term water supply solution. The Proposed Resolution would directly conflict with SWRCB Order 95-10 and the California Public Utilities Commission (CPUC) "Plan B" process that recommended seawater desalination as the solution (www.edaw.com/planb). The end product of this work, involving local citizens, public interest groups and various agency stakeholders, was the Coastal Water Project with its central element of a co-located seawater desalination plant at the Moss Landing Power Plant (MLPP). Since MLPP is an OTC facility, the Proposed Resolution would seriously delay and possibly preclude this critical water supply project. California American Water is well into engineering and pilot plant studies for the project, which relies upon the MLPP OTC system. A delay or elimination of the Coastal Water Project would also directly impact

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the Carmel River and its sensitive habitat and species, as California American Water would be forced to rely upon the Carmel Valley Aquifer for much of its water supply. The CWP evaluated non-OTC alternatives for seawater intake (beach wells), but even the non-OTC alternatives required use of the MLPP discharge due to infeasibility of brine injection. In addition, the CWP is an important project in terms of Environmental Justice because it provides a water supply source for northern Monterey County that is reliable and of high quality. Finally, as worded, the Proposed Resolution would preclude many non-OTC seawater desalination projects, which may have to rely upon an OTC discharge system for brine disposal (see Section VIII below).

VIII Brief Rebuttal to “Statements” Submitted by Proposed Resolution Proponents

We would like to provide a brief rebuttal to comments submitted by the Planning and Conservation League (PCL) and the California Coastal Commission (Coastal):

PCL Beach Well Fact Sheet

At the February 28, 2006 stakeholders meeting, PCL distributed a “Fact Sheet.” The title is misleading and inappropriate, as the “Fact Sheet” contains various talking points and opinion, but is not substantiated by any scientific data or actual studies.

- There is no support for the statement that OTC is not necessary for seawater desalination. Extensive alternatives analyses for the Coastal Water Project (www.coastalwaterproject.com), and 50 MGD facilities at Huntington Beach (<http://www.surfcity-hb.org/CityDepartments/planning/major/poseidon.cfm>) and Carlsbad (<http://www.ci.carlsbad.ca.us/pdfdoc.html?pid=439>) refute this assertion. The largest of planned seawater desalination projects are co-located adjacent to OTC plants, consistent with prior policy from Coastal and others.
- There is no supporting information for the statement that beach wells are feasible (see comment above). Beach well intakes MAY be feasible on a case-by-case basis (all of the large seawater projects are pursuing OTC-based systems), but brine injection is a complex issue and has more serious feasibility issues.
- There is no supporting information for the assertion that “much of California’s coastal geology is compatible with beach wells” (see comments above). Site-specific studies to date confirm that this is a site-specific engineering issue that cannot be blindly applied to all projects.
- Beach wells do not eliminate, but reduce the need for pretreatment.
- There is not a single beach well project in the U.S. that has demonstrated feasibility at the scale being contemplated for the larger seawater desalination plants in California. Again, even if the intakes were found to be feasible, the brine disposal would likely still require use of the OTC facilities, which is precluded by the Proposed Resolution as presently worded.

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- The examples cited for beach wells in California include a small facility in Marina that has experienced various maintenance issues in the past and is presently planned for replacement by a larger facility, and two facilities planned for but not yet through the design and permitting process.
- The final statement is completely misleading. While the actual wellhead of a beach well may be below ground, each wellhead or cluster would require surface fencing, security lighting and parking, all of which require a physical "footprint" on precious/scarce coastal land. In order to site the desalination plant away from the coast as suggested by PCL, the source water and brine disposal lines would necessarily be much longer, which would drive up the cost substantially.

IX Coastal Commission SLC Comment (letter dated March 13, 2006)

This comment letter repeats points raised by Coastal in comment letters on various co-located seawater desalination projects (see web links above for Huntington Beach and Carlsbad). Responses to Coastal comments for these projects should be reviewed by SLC staff to gain a more balanced perspective. This Coastal comment letter primarily states matters of opinion. California American Water is concerned that this letter appears to predispose Coastal staff against co-located seawater desalination, contrary to findings by the State Task Force and Coastal's own "white paper" on seawater desalination.

X Conclusion

California American Water appreciates the opportunity to comment on SLC's Proposed Resolution, and would again like to note our strong opposition to the Resolution as worded. Please do not hesitate to contact me if you have any questions regarding our comments, or would like additional information regarding the Coastal Water Project and other references noted in this letter.

Sincerely,



Paul G. Townsley, P.E.
President

cc: Members of the State Lands Commission

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**ATTACHMENT A
CALIFORNIA AMERICAN WATER PROPOSED REVISIONS**

**RESOLUTION BY THE CALIFORNIA STATE LANDS COMMISSION
REGARDING ONCE THROUGH COOLING IN CALIFORNIA POWER PLANTS**

WHEREAS, The California State Lands Commission and legislative grantees of public trust lands are responsible for the administering and protecting the public trust lands underlying the navigable waters of the state, which are held in trust for the people of California; and

WHEREAS, the public trust lands are vital to the recreational, economic and environmental values of California's coast and ocean; and

WHEREAS, the commission has aggressively sought correction of adverse impacts on the biological productivity of its lands including, litigation over contamination off the Palos Verdes Peninsula and at Iron Mountain, the adoption of best management practices for marinas and litigation to restore flows to the Owens River; and

WHEREAS, California has twenty-one coastal power plants which use once-through cooling, the majority of which are located on bays and estuaries where sensitive fish nurseries for many important species are located; and

WHEREAS, these power plants are authorized to withdraw and discharge approximately 16.7 billion gallons of ocean water daily; and

WHEREAS, once-through cooling harms the environment by killing large numbers of fish and other wildlife, larvae and eggs as they are drawn through fish screens and other parts of the power plant cooling system; and

WHEREAS, once through cooling also adversely affects the coastal environment by raising the temperature of adjacent water, killing and displacing wildlife and plant life; and

WHEREAS, various studies have documented the harm caused by once-through cooling including one study that estimated that 2.2 million fish were annually ingested into eight southern California power plants during the late 1970s and another that estimated that 57 tons of fish were killed annually when all of the units of the San Onofre Nuclear Generating Station were operating; and

WHEREAS, regulations adopted under Section 316 (b) of the federal Clean Water Act recognize the adverse impacts of once-through cooling by regulating power plants that use such systems; and

WHEREAS, 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 be better met by eliminating the impacts of once-through cooling; and

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WHEREAS, members of the California Ocean Protection Council have called for consideration of a policy at its next meeting to discourage once-through cooling; and

WHEREAS, the California Energy Commission and the State Water Resources Control Board have the authority and jurisdiction over the design of power plants and are conducting studies into alternatives to once-through cooling, such as air cooling, cooling with treated wastewater or recycled water and cooling towers; and

WHEREAS, in its 2005 Integrated Energy and Policy Report , the California Energy Commission adopted a recommendation to work with other agencies to improve assessment of the ecological impacts of once-through cooling and to develop a better approach to the use of best-available retrofit technologies; and

WHEREAS, the Commission recognizes that the coastal power plants currently utilizing once-through cooling make an important contribution to California's energy supply, but believes that the elimination of these cooling systems, through conservation, conversion, construction of new facilities, or utilization of other sources may be feasible at some locations and will be facilitated by establishing a deadline for this to occur; therefore, be it

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Resolved by the California State Lands Commission that it urges the California Energy Commission and the State Water Resources Control Board to expeditiously complete all necessary studies and develop policies that address once-through cooling at all new and existing power plants in California in light of EPA's 316(b) regulations; and be it further

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Resolved, that the Commission shall not approve new leases or extensions of existing leases for facilities associated with once-through cooling after 2020 except where alternatives to OTC are either environmentally undesirable or infeasible, and calls on public grantees of public trust lands to implement the same policy for facilities within their jurisdiction; and be it further

Resolved, that this Resolution is not intended to limit the California State Lands Commission or other agencies' discretionary review authority to consider co-located seawater desalination facilities proposing to utilize OTC intake or discharge systems, nor is it intended to preclude approval of use of such OTC systems subject to CEQA, applicable laws and regulations, and where alternatives to OTC facilities would either be environmentally undesirable or infeasible; and be it further

Resolved, that the Commission's Executive Officer transmit copies of this resolution to the Chairs of the State Water Resources Control Board, the California Energy Commission, and the California Ocean Protection Council, all grantees, and all current lessees of public trust lands that utilize once-through cooling.

ATTACHMENT B

Flow Science Incorporated

732 East Green St., Pasadena, CA 91101

(626) 304-1134 • FAX (626) 304-9427



Memorandum

To: Mr. Kevin Thomas
RBF Consulting

From: Imad A. Hannoun, Ph.D., P.E.
E. John List, Ph.D., P.E.

Date: March 27, 2006

Re: **Once Through Cooling** -- Technical Memorandum
Evaluation of Impacts on Circulation and Residence Time at
Moss Landing Power Plant and Encina Power Station

Project No: SLC Resolution, FSI 064032

This memorandum seeks to briefly touch upon the impacts of once through cooling (OTC) as it relates to changes in water quality, pollutant concentrations, residence times, and circulation patterns in confined estuaries and harbors where intakes for an OTC may be located. The discussion will use existing OTC power plant operations sited at Moss Landing Harbor and outer Agua Hedionda Lagoon as specific examples.

Many coastal power plants that use once through cooling have their water intakes located in a confined bay or estuary. The cooling water flow patterns for these power plants provide a significant source of water circulation within the bay or estuary. This circulation may affect water quality in the confined water body in two ways, which are described by the average residence time and the flushing time. The average residence time (t_{avg}) of a water body is computed by dividing the average volume by the average flow rate. Thus, the residence time increases as the average flow rate decreases. In reality, the actual residence time of the water body is better represented by a distribution curve since some of the water exits the basin in less than the average residence time and some of the water resides in the basin longer than the average residence time. Typically, a flushing time, t_{flush} , can be defined to represent the time it takes for water within a confined water body to "turnover." For example, the flushing time can be defined as the time it takes for 99 percent of the water that enters a basin at time $t = 0$ to exit the basin. In a basin with dead zones and limited mixing, t_{flush} is in the range of three to five times t_{avg} .

Moss Landing Power Plant (MLPP) is located adjacent to Moss Landing Harbor near Monterey, California. MLPP withdraws cooling water from within Moss Landing Harbor and discharges it to the Pacific Ocean. Moss Landing Harbor is hydraulically connected to Elkhorn Slough and the Pacific Ocean (via a dredged inlet) and receives freshwater inflows both from the Old Salinas River (predominantly agricultural return flows) and a small base flow and periodic storm water flows from Elkhorn Slough. The Encina Power Station (EPS) is situated adjacent to Agua Hedionda Lagoon, near San Diego, California. EPS withdraws cooling water from the outer basin of Agua Hedionda Lagoon and discharges to the Pacific Ocean. The outer basin is hydraulically connected to the Pacific Ocean and the middle basin, which in turn is connected to a large inner basin that receives periodic freshwater inflows from Agua Hedionda Creek.

Estimates of the average residence time and flushing time were computed for the source waters for these two power plant once through cooling systems. Details on the estimated source water volumes, tidal prisms, tidal exchange rates, freshwater inflows, and power plant flows for MLPP and EPS are summarized in Table 1. This table includes tidal exchange estimates based on both the mean diurnal tide range and the neap range (neap tide occurs twice every 29.5 days and is the minimum expected tide range). It also includes data on the average dry and rainy season freshwater inflows, and the average and maximum power plant intake flow rates.

Table 1. Basin Volumes, Tidal Prisms, and Flow Rates of MLPP and EPS Source Waters

Parameter		Elkhorn Slough (MLPP)	Moss Landing Harbor (MLPP)	Agua Hedionda Outer Lagoon (EPS)
Total Volume at mean sea level (m ³)		10,000,000 ^[1]	1,150,000 ^[1]	1,242,000 ^[2]
Tidal Prism (m ³)	mean diurnal range	5,550,000 ^[1]	515,000 ^[1]	297,000
	neap range	unknown	420,000	237,600
Tidal Exchange (m ³ /day)	mean diurnal range	11,100,000 ^[1]	1,030,000 ^[1]	594,000
	neap range	unknown	840,000	475,200
Surface Area (m ²)		unknown	460,000 ^[1]	270,000 ^[2]
Freshwater Inflow - Rainy Season (m ³ /day)		3,590,352 ^[3]	3,590,352 ^[3]	489,315 ^[4]
Freshwater Inflow - Dry Season (m ³ /day)		307,152 ^[5]	307,152 ^[5]	0

Parameter	Elkhorn Slough (MLPP)	Moss Landing Harbor (MLPP)	Agua Hedionda Outer Lagoon (EPS)
Maximum Power Plant Intake (m ³ /day)	4,631,040 ^[6]	4,631,040 ^[6]	3,009,402 ^[7]
Average Power Plant Intake (m ³ /day)	2,328,480 ^[6]	2,328,480 ^[6]	2,240,964 ^[7]
No Power Plant Intake (m ³ /day)	0	0	0

Based on the data presented in Table 1, average residence times were computed for Moss Landing Harbor, Elkhorn Slough, and the outer basin of Agua Hedionda Lagoon under various combinations of tidal exchange, freshwater inflow rates, and power plant intake flow rates. In all cases, it was assumed that the inlets connecting Moss Landing Harbor and Agua Hedionda Lagoon to the Pacific Ocean remained fully open. The resulting residence time estimates are presented in Table 2.

Table 2. Estimated Average Residence Times of MLPP and EPS Source Waters

Tide Range	Power Plant Operations	Elkhorn Slough (MLPP)		Moss Landing Harbor (MLPP)		Agua Hedionda Outer Lagoon (EPS)	
		Rainy Season (days)	Dry Season (days)	Rainy Season (days)	Dry Season (days)	Rainy Season (days)	Dry Season (days)
Mean Diurnal	Maximum	0.5	0.6	0.1	0.2	0.3	0.3
	Average	0.6	0.7	0.2	0.3	0.4	0.4
	None	0.7	0.9	0.2	0.9	1.1	2.1
Neap	Maximum	n/a	n/a	0.1	0.2	0.3	0.4
	Average	n/a	n/a	0.2	0.3	0.4	0.5
	None	n/a	n/a	0.3	1.0	1.3	2.6

This table shows that the average residence times without any power plant OTC flows (based on a mean diurnal tide range and dry season inflows) range from 0.9 days in both Moss Landing Harbor and Elkhorn Slough, up to 2.1 days in the Agua Hedionda Outer Lagoon. As noted above, the flushing times (i.e., maximum residence times) for these source waters are estimated to be on the order of three to five times the average residence times. This correlates to tidal flushing times on the order

of 2.7-4.5 days in Moss Landing Harbor and Elkhorn Slough and 6.3-10.5 days in the Agua Hedionda Outer Lagoon. Under extreme conditions of neap tide, with no power plant OTC flows and dry season inflows, the flushing times are on the order of 3-5 days for Moss Landing and 7.8-13 days for Agua Hedionda Outer Lagoon.

In comparison, the effect of operating the power plants at average OTC flows (based on a mean diurnal tide range and dry season inflows) is to decrease flushing times to 0.9-1.5 days in Moss Landing Harbor, 2.1-3.5 days in Elkhorn Slough, and 1.2-2 days in the Agua Hedionda Outer Lagoon. Operating the power plants at maximum OTC flows further decreases the flushing times. Therefore, the operation of the OTC pumps increases circulation and mixing in the source waters and results in faster flushing times. This may lead to several water quality benefits including a reduced likelihood of anoxia and algae growth, and associated stagnant water issues. Furthermore, lower residence times can lead to dramatically reduced contaminant concentrations in these areas, as will be discussed below.

The operation of the OTC pumps at MLPP and EPS can greatly increase the volume of water flowing from the ocean into their associated source waters above the volume resulting from tidal exchange alone. This increases the percentage of ocean water resident in the source waters and the potential for dilution of other inflows. Therefore, for contaminants that may be present in the freshwater inflows to either Moss Landing Harbor, Elkhorn Slough, or the Agua Hedionda Outer Lagoon (e.g., pesticides and pathogens from agricultural return flows or storm water runoff), the pumping from the OTC systems will substantially increase the dilution of these substances relative to the dilution that would be obtained due to tidal flushing only. Furthermore, by enhancing the flow of fresh oxygenated ocean water into the bay or lagoon the overall water quality is improved.

For example, the relationship between a contaminant concentration in the freshwater inflow to the average concentration in the source water (assuming complete and immediate mixing) is $C = C_o \times (Q_{\text{freshwater inflow}} / Q_{\text{total outflows}})$. Therefore, if a contaminant enters Moss Landing Harbor in a dry weather, agricultural return flow ($3.0 \times 10^5 \text{ m}^3/\text{day}$) it would be diluted 4:1 in the absence of any OTC pumping due to tidal exchange ($10^6 \text{ m}^3/\text{day}$). But, if the MLPP was operating at average OTC flows ($2.3 \times 10^6 \text{ m}^3/\text{day}$) then the dilution would be more than 12:1 because the intake pumps would be decreasing the average residence time and flushing time; under maximum OTC conditions ($4.6 \times 10^6 \text{ m}^3/\text{day}$) the dilution would increase to 19:1. Similarly, if a storm water contaminant entered the outer basin of Aqua Hedionda Lagoon in a wet weather flow ($4.9 \times 10^5 \text{ m}^3/\text{day}$) in the absence of any OTC flows then the dilution would be only about 2:1 due to the limited tidal exchange ($5.9 \times 10^5 \text{ m}^3/\text{day}$). But, if the EPS was operating at average OTC flows ($2.2 \times 10^6 \text{ m}^3/\text{day}$) then the dilution would be more than 7:1; under maximum OTC flows ($3.0 \times 10^6 \text{ m}^3/\text{day}$) the dilution would increase slightly to 8:1. Moreover, not only are any potential pollutants diluted, but they are directly removed from the basin and discharged to the open ocean through the cooling water outfall, where the dilution is even more rapid. This direct ocean discharge and dilution from the operation of the OTC results in lower concentrations of pollutants (e.g., pesticides and bacteria from storm water runoff) and a significant improvement in water quality within the bay or estuary.

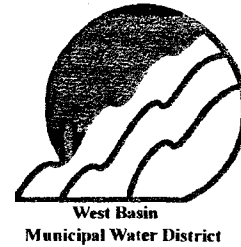


In addition to the impacts of the OTC pumping flows on flushing times and dilution, removal of the OTC flows from Moss Landing Harbor and Agua Hedionda Lagoon would reduce the average flow velocities in the confined source waters, which could lead to increased sedimentation and the need for either more frequent dredging or closing of the lagoon. Furthermore, any reduction in the tidal prism (and, hence to the tidal exchange rate) due to sedimentation would significantly increase residence times and flushing times.

In conclusion, the operation of OTC pumps at coastal power stations with confined source waters, such as a bay or estuary, is believed to increase circulation and reduce average residence times and flushing times. This may help prevent anoxia, algae growth, and other associated stagnant water issues. Moreover, the pumping of the OTC systems can effectively speed up the dilution and removal of pollutants that may enter the source water through freshwater inflows and storms.

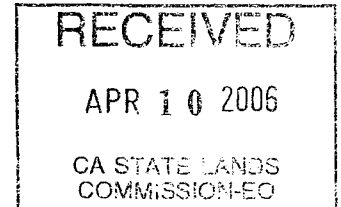
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- [1] Tenera Environmental Services. (1999). *Moss Landing Power Plant Modernization Project: 316(b) Resources Assessment*. Prepared for: Duke Energy, Moss Landing, CA.
- [2] E.A. Engineering, Science, and Technology. (July 1997). *Encina Power Plant Supplemental 316(a) Assessment Report*. Prepared for: San Diego Gas & Electric, San Diego, CA.
- [3] Caffrey, J. and Broenkow, W. (2002) "Chapter 4: Hydrography" in Caffrey, J., Brown, M., Tyler, W.B., and Silberstein, M. (eds). Changes in a California Estuary: A Profile of Elkhorn Slough. Elkhorn Slough Foundation: Moss Landing, CA, p. 29-42.
*** The freshwater flow rate is maximum listed for Carneros Creek.*
- [4] Malcolm Pirnie (2005). Preliminary Agua Hedionda Watershed Sanitary Survey. Prepared for: San Diego County Water Authority, San Diego, CA.
*** The freshwater flow rate is the maximum, sustained rate for Agua Hedionda Creek.*
- [5] Flow Science Incorporated (2005). Computational Fluid Dynamics Modeling for Moss Landing Power Plant. Prepared for: RBF Consulting, Inc., Monterrey, CA.
*** Agricultural return flow rate obtained from ELCOM calibration.*
- [6] Duke Energy (2001-2004). Discharger Self-Monitoring Reports. Prepared for: California Regional Water Quality Control Board, San Luis Obispo, CA.
- [7] Cabrillo Power I LLC (2000-2004). Discharger Self-Monitoring Reports. Prepared for: California Regional Water Quality Control Board, San Diego, CA.



April 6, 2006

Paul Thayer, Executive Officer
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95823



Dear Mr. Thayer:

Subject: Proposed Resolution On Once-Through-Cooling In California Power Plants

The undersigned water agencies appreciate the opportunity to comment on the proposed resolution regarding once-through-cooling in California power plants. Several southern California water agencies have included seawater desalination projects as part of their long-term, sustainable future water supply portfolio. One of the effective methods of seawater desalination is to co-locate desalination facilities at coastal power plants. The benefits include the possible use of onsite energy, the utilization of existing intake and outfall structures, the compatibility with industrial land use zoning, and compliance with established policy of the State of California, California Water Code 13550 and State Water Resources Control Board Resolution 75-58.

Seawater desalination is an integral, critical component of southern California's long-term resources development plan for the future water supplies of the next generation of Californians. It adds a superior water quality to our water system. It is a constant supply of drought proof water. It will offset future water shortages from imported supplies, and it enhances the opportunity for more reclamation because of its blending ability with the high salinity of local and imported sources.

We support the comment letter by the State Water Resources Control Board (SWRCB) which recommends the continuation of developing a statewide policy on once-through-cooling water. This process will incorporate the applicable requirements of the California Water Code Section 13142.5 and the recently promulgated federal regulations related to Section 316 (b) of the Clean Water Act. We concur with the SWRCB that the Commission should evaluate and compare the impacts of developing alternatives prior to adoption of the resolution on once-through-cooling.

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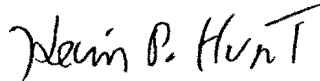
Mr. Paul Thayer
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April 6, 2006

Again, thank you for the opportunity to comment on the proposed resolution.

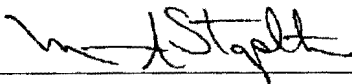
Sincerely,



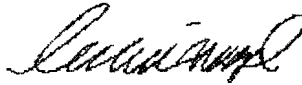
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cc: Tam M. Doduc, Chair, Gerald Secundy, Vice Chair, SWRCB
Mike Chrisman, Secretary for Resources, Council Chair, Brian Baird, Deputy,
California Ocean Protection Council
Jerry Jordan, Executive Director, California Municipal Utilities Association