

**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.

001985

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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

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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.

**ITEM 71**

**04-17-06**

**CALIFORNIA STATE LANDS COMMISSION**

**LETTERS OF SUPPORT/CONCERN**

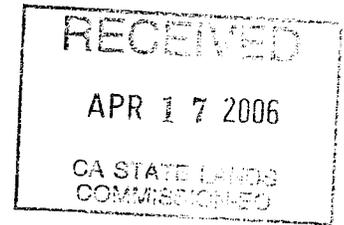
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April 14, 2006

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.

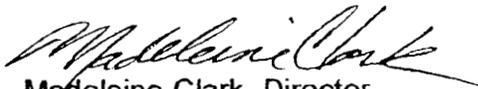
Dear Chair Jeffrey S. Young:

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.

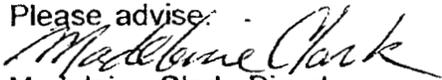
Notably, "The goal of the commission is to protect marine life by phasing out power plant systems that suck ocean water in for cooling purposes and then pump it back out to sea. Backed by environmental groups, the proposal could also alter the plans of five large desalination projects in the state which 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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(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, Haynes<sup>1</sup>, 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.

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<sup>1</sup> 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 portfolio<sup>2</sup>. 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.

<sup>2</sup> 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.

- 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 2005<sup>3</sup>, 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 prices<sup>4</sup>.

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 facilities<sup>5</sup> 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.

<sup>3</sup> Available at: [http://www.cpuc.ca.gov/static/water/desalinationreportdecember30\\_printed.pdf](http://www.cpuc.ca.gov/static/water/desalinationreportdecember30_printed.pdf)

<sup>4</sup> 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.

<sup>5</sup> 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

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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](http://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](mailto: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  
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Larry Miyamura  
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**In Memoriam:**  
Nathaniel S. Bingham  
Harold C. Christensen

## PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

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

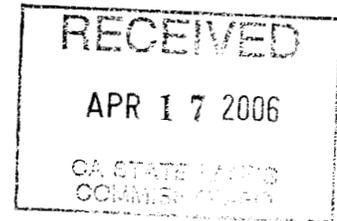
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11 April 2006

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.

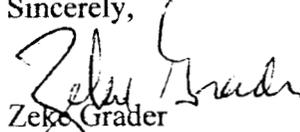
San Francisco Bay Delta aquatic life is also severely impacted by water withdrawals from the Sacramento and San Joaquin Rivers, the two primary sources of water to the Bay. The threatened Delta smelt, Coho and Chinook salmon, and striped bass young already fight against

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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~~ <sup>NOT</sup> 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. HART

Sandpiper Technical Services  
Attn: Mr. Timothy M. Kirby  
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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 27<sup>th</sup>, 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 black ink, appearing to read "Timothy M. Kirby". The signature is fluid and cursive.

Timothy M. Kirby  
Owner – Sandpiper Technical Services

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(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

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

(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.<sup>7</sup>** ..... F01K 7/34

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

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

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,950,949	A	*	4/1976	Martin et al.	60/641.8
4,372,126	A		2/1983	Sehald	
4,417,446	A		11/1983	Nakamoto	
4,907,410	A		3/1990	Chang	
5,087,175	A		2/1992	Raizman	
5,640,842	A		6/1997	Bronicki	

(Continued)

**OTHER PUBLICATIONS**

Carl D. Shields, *Boilers: Types, Characteristics, and Functions*—C 1961 (reissued 1982), ppg. 500–506, 508–510, & 524–526, ISBN 07–056801–4, McGraw–Hill, Inc. New York, NY.

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.

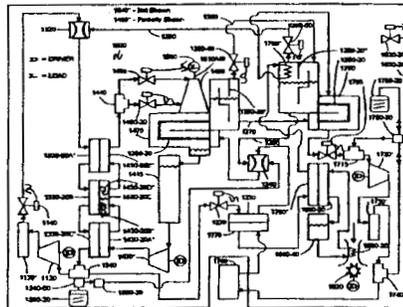
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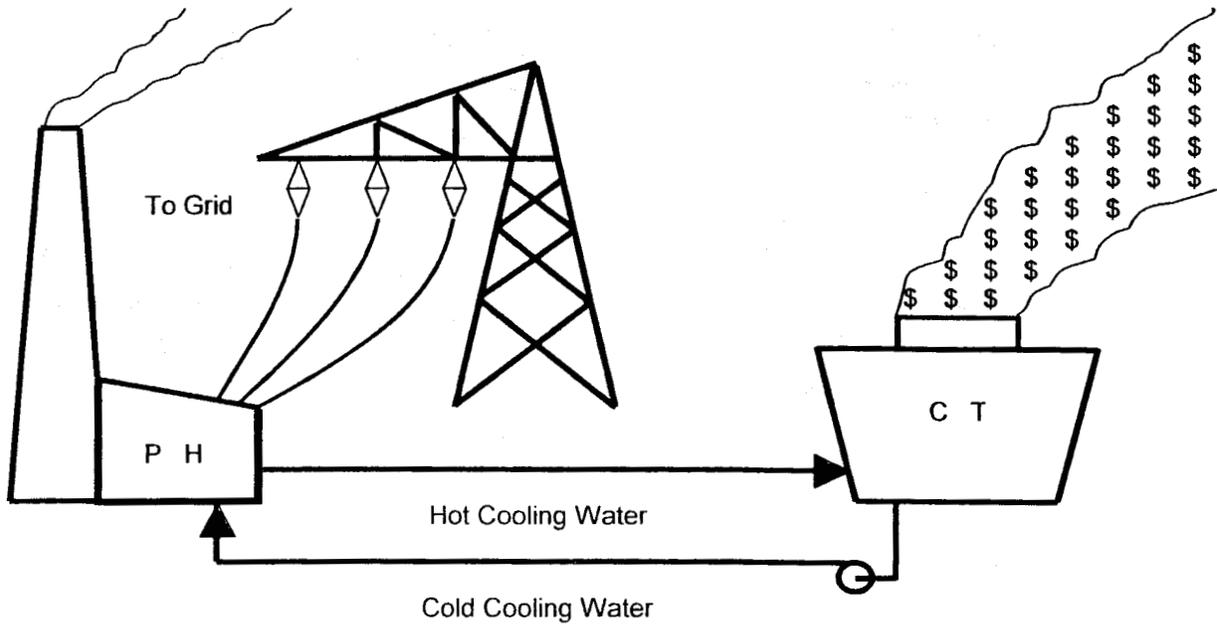
*Primary Examiner*—Hoang Nguyen

(57) **ABSTRACT**

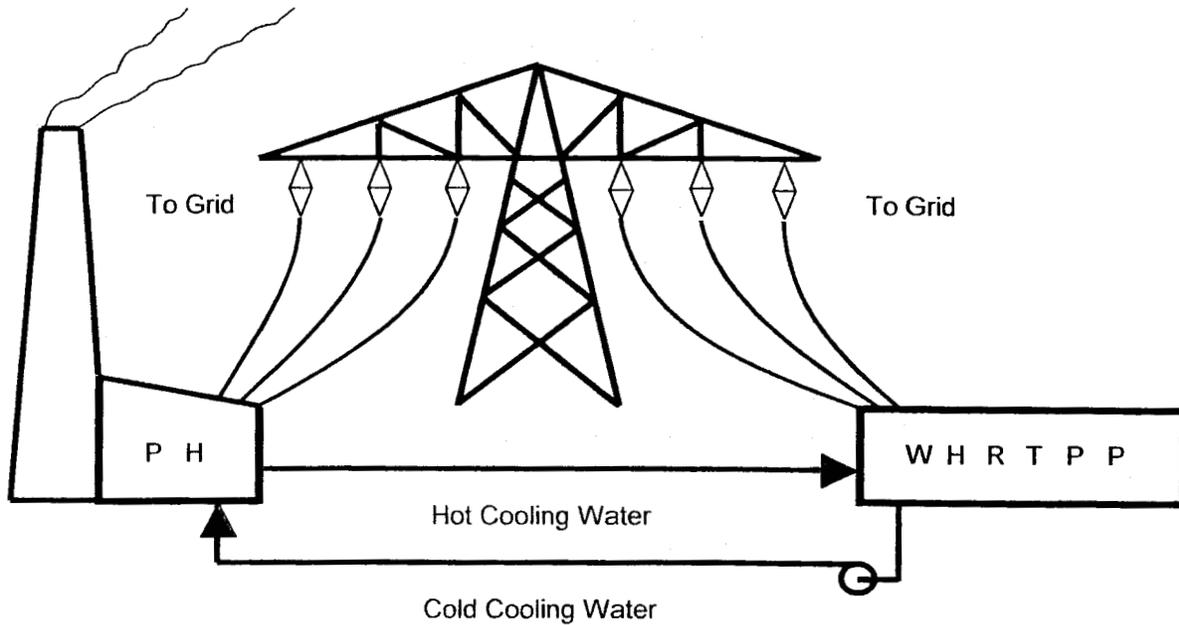
This invention, a waste heat recycling thermal power plant (1000), extracts heat from the environment, and concentrates this heat to produce a cfc super-ambient temperature heat source (1330) having an elevated temperature sufficient to supply a useable heat flow to an incorporated heat engine (e.g., 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.

24 Claims, 10 Drawing Sheets

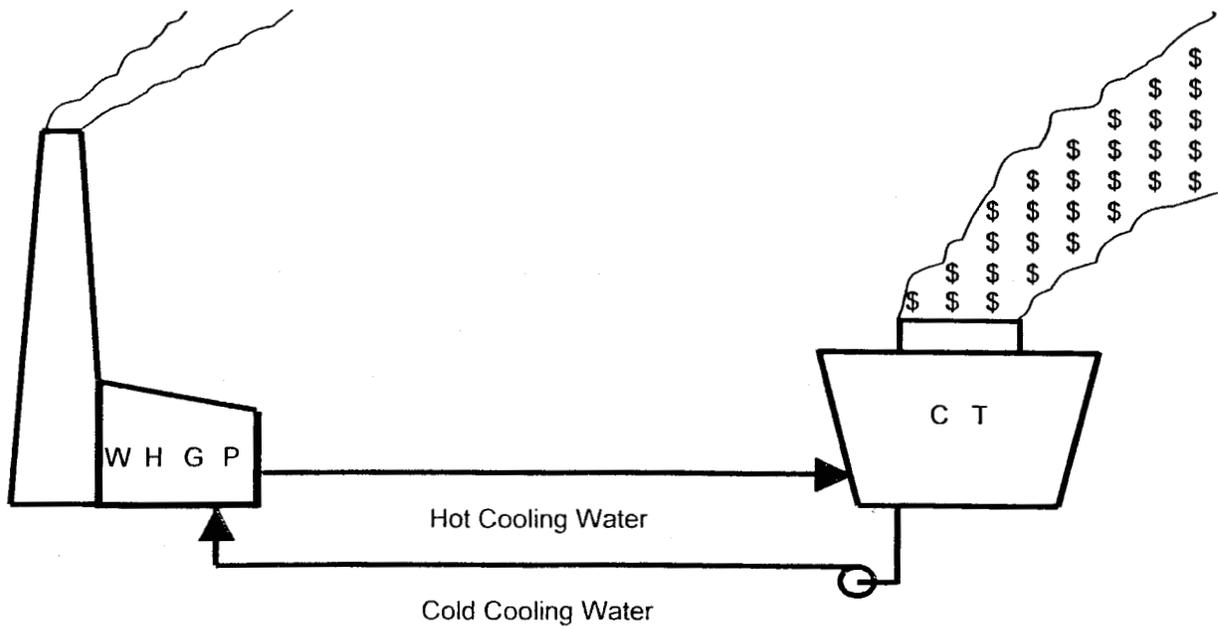




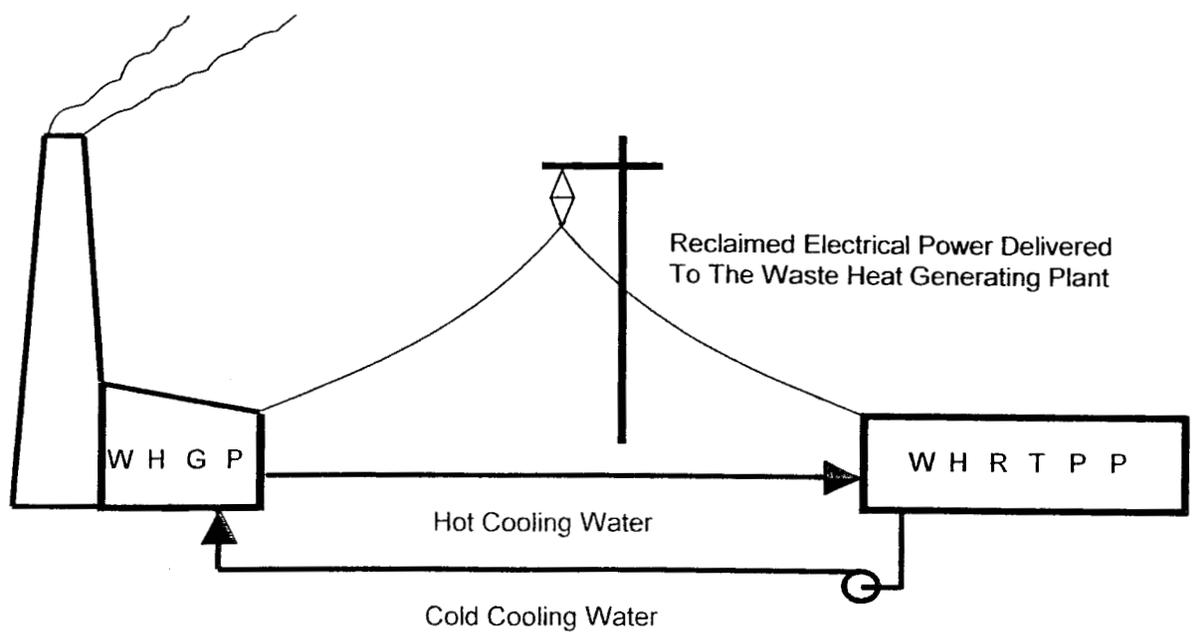
**TYPICAL POWER PLANT WITHOUT WHRTP**



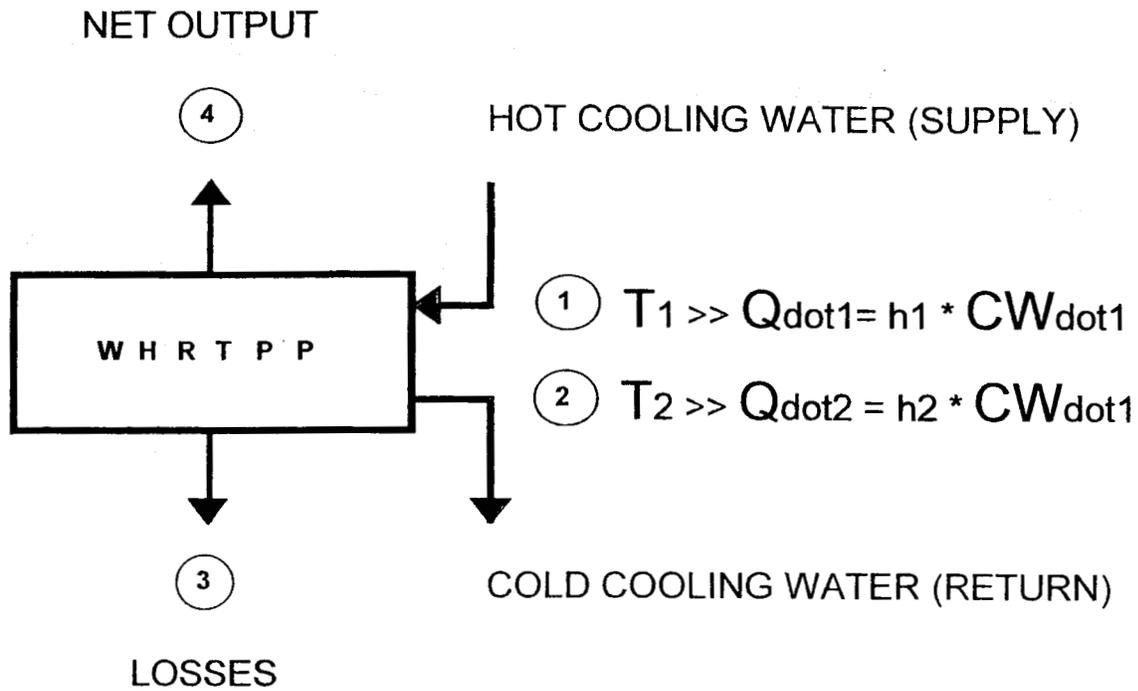
**WHRTP EQUIPPED POWER PLANT**



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