

## CALIFORNIA ENERGY COMMISSION

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May 20, 2008

Tam Dodoc, Chairman  
State Water Resources Control Board  
1001 I Street, 24<sup>th</sup> Floor  
Sacramento, CA 85814

Attn: Jeanine Townsend, Clerk to the Board

Dear Chairman Dodoc:

The California Energy Commission (Energy Commission) submits the enclosed comments to the State Water Resources Control Board (SWRCB) concerning its *Scoping Document: Water Quality Control Policy on the Use of Coastal and Estuarine Waters For Power Plant Cooling (03/08)*. The preliminary draft policy would effectively phase out once-through cooling (OTC) for coastal power plants. The Energy Commission filed comments (9/25/06) on the June 2006 proposal from SWRCB to establish a statewide policy on Clean Water Act (CWA) 316 (b) regulations regarding the use of OTC in coastal power plants. As stated in those comments, one of the Energy Commission's core missions is to ensure a reliable supply of electricity for California that is affordable and that minimizes harm to the environment. Consistent with this mission, the Energy Commission supports the SWRCB's efforts to reduce the impacts of once-through cooling on marine and estuarine environments in California. We are pleased that certain broad elements of our earlier comments are now reflected in the new proposal issued by the SWRCB Staff.

While the SWRCB's preliminary draft policy focuses on refitting the existing power plants to reduce OTC impacts on the environment, the Energy Commission continues to examine this issue from the broader perspective of the long-term efficiency and reliability of the electrical system. In most cases, retiring and replacing, or repowering the existing OTC power plants would best serve this broader objective. The new power plants would likely not use OTC, and hence would comply with the SWRCB proposed policy. The Energy Commission first formally adopted a policy recommending that the aging power plants be retired or repowered in its *2005 Integrated Energy Policy Report (2005 IEPR)*. We reiterated this policy in the *2007 Integrated Energy Policy Report (2007 IEPR)*. We have recommended increased procurement of resources, including renewable and demand-side resources, to provide reliability as the aging plants are retired or repowered. We continue to support a large scale modernization of the state's fleet of aging power plants to address OTC and other environmental concerns in the electricity sector.

The Energy Commission supports the concept of a Statewide Task Force that would facilitate SWRCB review of individual power plant compliance plans. One of the principle challenges in implementing SWRCB policies on OTC is to ensure that we maintain the reliability of the electricity grid as these plants are retired, repowered or replaced. We encourage a "fleet management" approach whereby state agencies can work to ensure that sufficient replacement of generation and transmission upgrades are put in place to match timeframes for compliance with SWRCB policies and rules. We encourage SWRCB to work with state agencies in determining the appropriate scope and topics that the Statewide Task Force will be charged with addressing. The California Independent System Operator (CAISO) Stakeholder study examining *Mitigation of Reliance on Old Thermal Generation including Once-Through Cooling* is expected to provide the initial analytic basis for examining these tradeoffs between generation and transmission. That study, once scheduled for later 2008 and now slipping into 2009, will be an important input to the task force's recommendations.

We identify a number of specific issues with the details of the proposed policy, many connected with the issue of whether the policy ought to focus upon plants or units. We believe there is sufficient reason to differentiate between units within a plant, rather than requiring all units to follow the same compliance schedule.

Finally, the licensing and construction of the replacement infrastructure for the power plants that will retire will be a major challenge. The proposed policy touches nearly 30% of the entire generating capacity in the state. Many of the existing power plants are located in highly urbanized areas that will not welcome new power plants replacing old ones, even for the biological benefit that will ensue. Getting all agencies, both state and local, on the same page in permitting the replacement infrastructure is a necessary element of timely compliance with the SWRCB's schedule.

Please call me at (916) 654-5036, or the Energy Commission's Executive Director, Melissa Jones at (916) 654-4996, if you have questions about our comments.

Sincerely,



JACKALYNE PFANNENSTIEL  
Chairman

Enclosure

Cc:: CEC Commissioners  
CPUC Commissioners  
Mr. Yakout Mansour, CAISO CEO

**California Energy Commission Comments  
to State Water Resources Control Board Concerning Its Coastal Power Plant  
Cooling Preliminary Draft Policy and Related Scoping Document**

The California Energy Commission (Energy Commission) submits these comments to the State Water Resources Control Board (SWRCB) concerning its *Scoping Document: Water Quality Control Policy on the Use of Coastal and Estuarine Waters For Power Plant Cooling (03/08)*. The preliminary draft policy would effectively phase out once-through cooling (OTC) for coastal power plants. The Energy Commission filed comments (9/25/06) on the June 2006 proposal from SWRCB to establish a statewide policy on Clean Water Act (CWA) 316 (b) regulations regarding the use of OTC in coastal power plants.

As stated in those comments, one of the Energy Commission's core missions is to ensure a reliable supply of electricity for California that is affordable and that minimizes harm to the environment. Consistent with this mission, the Energy Commission supports the SWRCB's efforts to reduce the impacts of once-through cooling on marine and estuarine environments in California, and is pleased that certain broad elements of its earlier comments are now reflected in the new proposal issued by the SWRCB Staff.

The following comments are organized into four sections. Section I provides some background on Energy Commission policies concerning aging power plants, the use of water for power plant cooling, and on how the current SWRCB proposal appears to have evolved in response to comments on the June 2006 draft. Section II addresses specific concerns with the current preliminary draft policy. Specific changes are recommended. Section III discusses some issues with the Scoping Document and the supporting studies that the Ocean Protection Council has sponsored. In particular, we offer some concerns about the analysis of the reliability consequences of large numbers of power plant retirements in response to an aggressive coastal power plant cooling policy that would phase out OTC.

Section IV discusses major challenges that this policy will create for generators, transmission system owners, and the state's energy oversight entities – Energy Commission, California Public Utilities Commission (CPUC), and California Independent System Operator (CAISO). Energy Commission recommendations and suggestions for follow up are contained in each of Sections II – IV.

## **SECTION I – BACKGROUND AND PREVIOUS ENERGY COMMISSION COMMENTS ON THE JUNE 2006 SCOPING DOCUMENT**

In its September 25, 2006 comments on the SWRCB's Scoping Document released June 16, 2006, the Energy Commission stressed three broad themes. First, the majority of the OTC plants are also aging power plants that should be retired or repowered in order to achieve a more efficient and reliable generating fleet. Second, retiring or even repowering these facilities could create electricity system reliability problems if replacement generation capacity (or, in some cases, transmission system upgrades that would reduce capacity requirements or alter the location of these requirements) was not developed in a timely manner. Third, environmental improvements could be achieved either by directly reducing biological harm from the use of OTC in existing plants or by enforcing modern environmental regulations on new replacement capacity.

The Energy Commission's review of the March 22, 2008 Scoping Document concludes that the document and preliminary policy appear to be responsive to our earlier comments in each of these three areas. We offer comments on the March 2008 materials that address issues that have arisen or been refined since the initial draft policy from 2006.

### **A. Replacement of Aging Power Plants**

The Energy Commission has been examining the characteristics of the broad category of aging power plants since the early 2000s.<sup>1</sup> The Energy Commission first formally adopted a policy recommending that the aging power plants be retired or repowered in its *2005 Integrated Energy Policy Report (2005 IEPR)*. We reiterated this policy in the *2007 Integrated Energy Policy Report (2007 IEPR)*. As part of the input to the 2007 IEPR, Energy Commission staff conducted an initial analytic study of the tradeoffs between repowering and transmission system upgrades focusing attention on the question of the extent to which remote generation could substitute for some of the retired capacity.

The Energy Commission is participating in a CAISO-Stakeholder study called *Mitigation of Reliance on Old Thermal Generation including Once-Through Cooling*, which is examining the tradeoffs between power plant retirements and transmission upgrades. While the SWRCB's preliminary draft policy focuses on modifying the existing power plants to reduce OTC impacts on the environment, the Energy Commission continues to examine this issue from the broader perspective of actions needed to promote the long-

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<sup>1</sup> The fleet of aging power plants is highly similar to the fleet of OTC power plants, but there are differences. The two nuclear facilities are not considered aging, while the quite new Moss Landing Units 1 and 2 have OTC technology.

term efficiency and reliability of the electrical system. In most cases, repowering or replacing the existing OTC power plants would best serve this broader objective, while at the same time complying with the SWRCB proposed policy, because it is unlikely a new power plant would be permitted with OTC.

Even though the preliminary draft policy focuses on what the Energy Commission would call refitting to satisfy OTC concerns, we believe it would clearly support the Energy Commission's policy of retiring or repowering the subset of the aging power plants that use OTC with ocean water.<sup>2</sup> We understand that many of the owners of the aging OTC plants believe they cannot sustain the costs of refitting, and will either retire to avoid compliance costs or repower to simultaneously avoid the costs of refitting an old plant while developing a new facility that can compete in the wholesale market over the long term.<sup>3</sup>

## **B. Reliability Concerns**

In its earlier comments, the Energy Commission expressed concern that the compliance actions of the many power plants affected by the proposed rule might threaten reliability if compliance dates were unrealistic, or if "down time" during refitting or repowering was not coordinated across affected plants. A majority of the affected plants are in what the CAISO has designated as local reliability areas (LRA). In many LRAs there is barely a sufficient amount of capacity to assure stable grid operations during extreme summer peak conditions, so reductions in available capacity combined with power plant or transmission line forced outages could lead to localized load shedding to preserve overall system stability. Capacity reductions in these LRAs resulting from refitting, retiring, or repowering require development of additional capacity in the local reliability area. These local concerns link the actions of an OTC power plant with other power plants in the same LRA.

The March 2008 Scoping Document, and the extensive comments by SWRCB representatives at the May 13, 2008 Scoping meeting, makes clear that the SWRCB is now aware of this reliability concern. We understand that SWRCB has modified its proposed policy, especially with respect to the compliance dates for addressing the

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<sup>2</sup> In these comments, the Energy Commission uses the term refitting to mean modifications to specific physical systems of the power plant that do not involve replacing the prime mover. In contrast, we use the term repowering to mean changes that involve replacing the prime mover. Thus, modifying the water intake and plant pumping systems is a refitting, while replacing the steam boiler and generator with a combined cycle turbine and heat recovery steam generator/turbine would be a repowering of the plant.

<sup>3</sup> Most power plant owners echoed our understanding at the May 13, 2008 Scoping meeting.

OTC impacts, in an attempt to allow sufficient time for the electricity system to accommodate the proposed requirements. As noted at the May 13 meeting, virtually the entire electricity industry welcomes this recognition. The concept of a Statewide Task Force that would facilitate SWRCB review of individual power plant compliance plans is another sound development since the earlier draft policy.

### **C. Environmental Concerns and Evaluation of Scoping Document**

In its comments on the June 2006 draft policy, the Energy Commission expressed some concern that there were biological resource issues that the then proposed OTC rule did not address. Overall, the Energy Commission now believes that those issues are adequately addressed in the March 2008 draft policy document; and if the proposed strategies are implemented, they reduce the biological resource impacts of the coastal power plants.

#### **i) Endangered Species Affected by OTC**

The Energy Commission pointed out that there was a good discussion of impacts on endangered species in the impingement and entrainment portion of Part H of the June 2006 Scoping Report, but endangered species were not discussed in the related Power Plant Cooling Water Intake Provisions. This apparently was an oversight which has been corrected on page 17 of the March 2008 Scoping Document.

#### **ii) Cumulative Impact Analyses for Biological Harm**

The Energy Commission also pointed out in its 2006 comments that it is important to conduct cumulative impacts analyses and that the Energy Commission required the Huntington Beach power plant applicant to complete such an analysis, that included the OTC impacts from other power plants in the area. The 2008 Scoping Document (pp. 16 - 17) now has a brief but informative discussion of cumulative impacts specific to the Southern California Bight. It also indicates that a cumulative ecological study should be undertaken. The Energy Commission agrees with this suggestion.

#### **iii) Habitat Restoration**

The Energy Commission suggested that the SWRCB consider habitat restoration as a Best Technology Available compliance option. On Scoping Document pages 46 to 47, the Board staff now proposes mitigation recommendations such as large organism exclusion devices, reduction in entrainment by cooling water flow reductions when power is not generated, and habitat restoration for impingement and entrainment impacts. However, it is still unclear to what extent habitat restoration alone might be

considered a compliance option. We address this topic further in Section II E of these comments.

## **SECTION II - COMMENTS ON THE PRELIMINARY DRAFT REGULATION ITSELF**

In this section, the Energy Commission provides comments on the preliminary draft regulations included as Appendix A in the March 22, 2008 Scoping Document.

### **A. Date Certain Compliance**

The preliminary draft policy establishes different compliance target years for each of three categories of power plant based on a combination of generating technology and recent operating patterns. These target years range from 2015 to 2021. The lead times might appear to be sufficient to allow the plant owners, utilities, energy regulatory agencies, and any local permitting entities to coordinate their decision-making and to construct and begin operating replacement facilities, if necessary. However, it is unclear whether these necessary activities can actually occur within the stated timeframe for the majority of OTC plants for which January 1, 2015 is the proposed compliance date.

It is possible that delays in the permitting and construction of replacement power plants or transmission lines would threaten reliability of the entire electrical grid, or within selected LRAs, if power plants with 2015 compliance dates were required to shut down without adequate backup. Continuous close and accurate monitoring of the affected power plants, and any replacement infrastructure, will be needed to avoid or address any reliability concerns that may emerge. As SWRCB management representatives at the May 13 Scoping meeting observed, contingencies may arise that require changes to the rule itself or to the approved compliance schedules for specific plants.

**Recommendation: The Energy Commission is willing to participate in monitoring of power plant retirements, refitting, repowering and replacement activities, make appropriate assessments about reliability consequences, and report its findings and recommendations to the SWRCB. The SWRCB should be responsible for responding to the Energy Commission findings and recommendations.**

### **B. Role of the Statewide Task Force**

The preliminary draft policy would create a Statewide Task Force to prevent disruption in the State's electrical power supply. The membership includes not just the Energy Commission, CPUC and CAISO; it also includes the California Coastal Commission, California Air Resources Board, and California State Lands Commission. As proposed

in the March 2008 report, it would assist the SWRCB in reviewing implementation plans and schedules for each power plant. The scope of its role and the consequence of any recommendations it would forward to the SWRCB are unclear.

The Energy Commission expects that a major role of the task force would be associated with “fleet management” to ensure that power plant shut downs, (whether of a short term nature for refitting, an intermediate period for repowering, or permanently as a result of retirement) are balanced by new capacity and/or transmission upgrades to assure continued reliability of the electric grid. At the May 13 Scoping Meeting, numerous power plant owners advocated for a broader role for the Statewide Task Force, generally agreeing that these agencies could assist SWRCB staff in developing the policy itself, not just in implementing the final policy. At the May 13 Scoping Meeting, SWRCB representatives clarified the intent to draw upon the expertise of the energy agencies in developing the final policy as well as in its implementation.

**Recommendation: The Energy Commission supports the concept of an informal working group of the named agencies to help SWRCB staff to understand power plant and transmission system reliability issues, and to assist SWRCB in the development of a final policy that can achieve the environmental protection goals while being compatible with system reliability. The roles of the individual agencies, the responsibilities of the formal Statewide Task Force that would be constituted once the policy is adopted, and the general topics/issues that would likely be addressed should be specified in the policy.**

### **C. Plant Versus Unit as the Object of the Requirements**

The March 2008 Scoping Document and preliminary draft policy use the term “plant” as the object of compliance. Most of the plants consist of multiple power generation units. These units are of different ages and generating technologies. As a result, their economic values differ and their operating profiles are unique. The preliminary draft policy uses an annual capacity factor as the basis for discriminating between compliance in 2015 and 2018, and some plants have units with recent capacity factors above and below the 20% threshold. Huntington Beach is an example of a plant below the 20% threshold, but in year 2007 two of its units are above this threshold. Moreover, the two units used the most are not both new; rather, one is new and one is older. Are the two units below 20% required to satisfy the requirements of the policy by 2015, while the other two units are allowed to defer compliance until 2018? Or are all four units (collectively the plant) required to comply by 2015?

SWRCB may be interpreting the existence of common intake structures for multiple units as a rationale for treating all units within a plant in the same way. The near-term compliance requirements appear to require that cooling water flows be roughly correlated with plant electrical output. One of the ways that operators may implement this requirement is to modify water flow volumes within a common intake structure to match the number of units which are generating power. To the extent there are sensible engineering options for each unit, SWRCB should permit each unit of a plant to satisfy its requirements in individual ways.

It is essential that SWRCB clarify how the policy will be enforced. Appendix 1 provides data on the annual capacity factor by unit using the best and most recent data available to the Energy Commission. Since we believe data from years 2006 and 2007 are more likely to be indicative of unit operations going forward than older data, we have provided monthly data for those two years so that SWRCB can better understand the usage profiles of these generating facilities. These data reveal differences in operating profiles among units within plants.

**Recommendation: The preliminary draft rule should be revised to eliminate references to “plants” and substitute the term “unit.” To the extent that annual capacity factor continues to be an element of the final policy, the language of the rule should specify that all compliance activities would apply to individual power plant units, rather than to a plant as a whole. In cases where two or more power plant units share the same cooling water intake structure, and the near-term compliance changes do not result in a rough correlation between water usage with power generation output, it is reasonable to treat them as a single unit.**

#### **D. Length of History Used to Compute Annual Capacity Factor**

The preliminary draft policy distinguishes between plants on the basis of annual capacity factors establishing compliance dates with conversion to wet cooling (or the equivalent). Appendix 1 of these comments provides annual capacity factors by unit. These are similar to data included within the March 2008 Scoping Document. Both sets of capacity factor data generally show that the OTC power plants are operating at lower levels in recent years. We attribute this to two factors: (1) the addition of new, modern plants to the fleet, and (2) the inability of the older steam boilers to compete successfully in the wholesale energy market.<sup>4</sup>

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<sup>4</sup> Although these plants operate at lower levels in the energy market, in many cases their capacity is critical to meeting summer peak demand and in mitigating contingencies such as forced outages of other power plants or transmission lines.

While noting this facet of power plant operations, the preliminary draft policy does not specify the period used to compute such capacity factors even though this is a statistic of regulatory significance. As noted, these older plants, and the individual units, are operating less and less and thus have a recent and continuing downward pattern in their annual capacity factors. Appendix 1, Tables 2 and 3 provide monthly capacity factors by unit for 2006 and 2007 showing the seasonal pattern of operation for most units. The proposed regulations need to specify a precise period for which the annual capacity factors are computed. In addition, is the compliance date affected by operations during 2008, while the policy is being developed, or 2009 during which the power plant operator is developing its compliance plan, or fixed to a particular set of historic years? These alternative interpretations should illustrate that it is essential to create an unambiguous compliance date for each plant, and each unit within each plant.

**Recommendation: The Energy Commission does not believe that operating practices from the earlier time period are indicative of future behavior. To the extent that annual capacity factor continues to be used to distinguish among plants, the average of calendar years 2006 and 2007 should be used in determining the date for compliance with the substantive reductions in OTC.**

#### **E. OTC Mitigation through Energy Commission Licensing Decisions**

Moss Landing units 1 and 2 were permitted by the Energy Commission using OTC technology in 2002. Energy Commission licensing conditions established an offsite mitigation for the harm caused by OTC at the plant site. An extensive estuarine restoration project is being carried out as part of these licensing conditions. The March 2008 Scoping Document and the preliminary proposed policy do not recognize the extensive mitigation required by Energy Commission licensing requirements. The two options now addressed in section 2A of the preliminary proposed policy contemplate power plants that have not yet satisfied OTC mitigation requirements. The scope of these draft sections is not sufficiently broad to address plants that may have already satisfied legitimate, enforceable OTC mitigation. SWRCB staff appeared to agree that this issue was relevant to the proposed policy when the issue was raised in comments at the May 13, 2008 Scoping meeting.

**Recommendation: The Energy Commission believes that the licensing conditions established for Moss Landing 1 and 2, and other similarly situated power plants, should be considered as a form of alternative compliance. This requires a modification of section 2A of the preliminary draft policy to authorize a case by case consideration of whether power plant units have already implemented an OTC mitigation mechanism such that they satisfy the policy, or can do so in a more limited manner than other power generating units' plants.**

## **SECTION III - COMMENTS ON THE SCOPING DOCUMENT AND ASSOCIATED MATERIALS**

### **A. Scoping Document**

As noted in Section I of these comments, the approach SWRCB suggests in its March 2008 Scoping Document satisfies the water quality and biological concerns raised by the Energy Commission in its September 2006 comments on the CWA 316 (b) proposed regulations. However, the Energy Commission offers comments on the air quality analyses in the March 2008 scoping document to provide our perspective and recommendations for adjusting some of the assumptions.

Table 4 of the Scoping report does not include data from 2006 and 2007, which the Energy Commission believes is the most relevant to future operations. We recommend adding the data from these two years, which we provide in Attachment 1, Table 1 of these comments. SWRCB should update Table 2 to use these improved data. Further, the more specific monthly capacity factors for years 2006 and 2007 provide a better indication of the expected usage pattern of these units. Finally, the monthly usage patterns from 2006 and 2007 in Appendix 1, Tables 2 and 3, respectively, may provide a much better indication of the environmental harm from air emissions. Concentrating air emissions in the summer months is likely to be more harmful than if the emissions were released around the year in a uniform pattern. This is the general pattern for low annual capacity factor units.

The baseline air emissions data on page 11 appear to be inconsistent with data from Table 3 and Figure 2. We recommend adjustments to the air emission data in Table 7 to reflect the capacity factors for specific plants.

It is important to look at the types of power plants in the OTC power plant fleet. The data of Table 4 show that the nuclear units are highly utilized or base loaded. The combined cycle units appear to have intermediate capacity factors reflecting seasonal or load following patterns of operation. The steam boilers operate rarely and mostly as peakers or load following units. Much of the discussion in the Scoping Document addresses energy or megawatt hours. Energy Commission believes the document should include discussion of capacity or MW questions, in particular since the bulk of the fuel-fired air pollutant and GHG-emitting portion of the OTC units are used as peaking units.

The air emission assumptions for NO<sub>x</sub> in Table 7 appear to be high. All but two of the existing boilers in the coastal power plant fleet have selective catalytic reduction (SCR) to control NO<sub>x</sub>. We calculate approximately 17% c.f. for the boiler in the table, or about 470,000 MWh per year. This is much higher than the 9% c.f. for the fleet in 2005,

(calculated from data in Table 3 and Figure 2). At the most conservative emission factor of 0.05 lbs NO<sub>x</sub>/MWhr, we calculate the emissions at 11 tons per year. Some boilers are as high as 0.1 lbs NO<sub>x</sub>/MWh or about 22 tons NO<sub>x</sub> per year. However, at a more reasonable c.f. of 9%, the NO<sub>x</sub> numbers could be as low as 6 to 12 tons of NO<sub>x</sub> per year from a representative 300 MW boiler.

We note that Humboldt 1 and 2 boilers have very high NO<sub>x</sub> emission rates since they do not have SCR. The air basin, however, is in attainment of NO<sub>2</sub> and ozone, so the NO<sub>x</sub> emissions do not create adverse air impacts, and the air district has not required the operator to retrofit the boilers for NO<sub>x</sub> control.

Energy Commission has not reviewed the TOG, ROG, SO<sub>x</sub>, CO and PM calculations since all the units use natural gas and will continue to do so. Use of natural gas is considered the Best Available Control Technology (BACT) for reducing emissions of these pollutants from power plants. The resulting emissions are very low relative to other sources and the entire inventory in any one air basin.

Regarding the NO<sub>x</sub> calculations for the combined cycle hypothetical plant, all of the combined cycle units in Table 3 have SCR to control NO<sub>x</sub>. We suggest the NO<sub>x</sub> number shown in Table 7 is too high. We calculate that Table 7 assumes approximately 42% capacity factor for the combined cycle plant, or about 1,975,000 MWh per year. At the current combined cycle emission factor of 0.05 lbs NO<sub>x</sub>/MWhr, we calculate about 60 tons NO<sub>x</sub> per year, or about 72 tons per year at 51% capacity factor (per data in Table 3 and Figure 2).

In the discussion under Air Quality (p. 51), the report states that additional fuel will have to be consumed to make up for the reduction in capacity that accompanies a change to alternative cooling technologies the energy loss. Again, the primary role of these “peakers” is to provide capacity, or MWs, not energy, or GWh. Further, it is too speculative to assert that the owners of the boiler units would be required to make up any capacity lost at their boiler units from a shift to alternative cooling technologies. As described, the boilers would have a heat rate close to 10,000 Btu/MWh after retrofit with wet or dry cooling. This change in heat rate will affect where the unit is in the dispatch order. Units with a better heat rate could move ahead of the retrofit boiler units. The Energy Commission now has in its permitting process over 3,000 MW of peakers with heat rates less than 9,000 Btu/MWh. Were these to be built, the old boiler units might also produce less energy because they would be unable to compete with newer units. Many factors lead to performance changes through time.

Thus, it is misleading to assert that the retrofit boilers would be the preferred peaking generation resource, for initial dispatch or to make-up the “lost capacity” due to replacing OTC with the use of cooling towers. While the overall electricity system needs

such replacement capacity, it is not the responsibility of the current asset owners to replace that capacity.

On page 52 it is asserted that “[a]ccording to the USEPA, it is more likely that power plants that do not operate at full capacity on an annual basis will burn additional fuel to make up for their energy loss.” This is not substantiated, and may not apply to California and how the “peaking” boilers fit into the system. A reference and a more detailed discussion should be provided, since this assertion is critical to many of the conclusions in the report.

The NO<sub>x</sub> values in Tables 14 and 15 should be adjusted, using more representative emission factors for existing or new power plants. The MW, MWh generated, or hours operated associated with the data in the tables should be provided, so that it is clear what the numbers relate to.

In the discussion under Dry Cooling System (p. 57), it is unclear what is meant by “[d]ry cooling systems still use water to recirculate between the generator and the cooling system.” The generator is generally air or gas cooled. The steam turbine does exhaust to the air-cooled condenser with the condensate being recirculated to the boiler. This is the boiler feedwater, and with blowdown, there is a need for a stream of boiler feedwater makeup.

On page 77 in Table 18, footnote (e) incorrectly identifies Moss Landing Units 6 and 7 as simple cycle. They are steam boiler units.

## **B. Associated Reports**

Following release of the Scoping Document on March 22, 2008, the SWRCB issued a supplemental study undertaken by the Ocean Protection Council for the SWRCB entitled *Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California*. This study examines the costs and reliability consequences of various alternative scenarios of retirement of OTC power plants and of transmission system upgrades. This effort builds on previous studies conducted by the Energy Commission on aging power plants for the 2007 Integrated Energy Policy Report (IEPR) proceeding. In order to facilitate the Ocean Protection Council study, Energy Commission staff advised Ocean Protection Council’s contractor (Ventyx) about the interpretation of these earlier studies, but does not sponsor or endorse the results.

Because it used a more detailed transmission system analysis than the Energy Commission was able to use in its 2007 IEPR study, one might expect the Ventyx results to be more accurate. While the Ventyx reliability study made an attempt to discern a range of costs of compliance, it describes a range of cost impacts that include inexplicably low values. This may be a consequence of examining groups of power

plants rather than individual plants. The single recommendation in this report builds upon a frank self-assessment that more study was needed than resources and time permitted, thus it recommends more detailed study such as is now underway in the CAISO stakeholder process.

The definitive study of aging plant retirement, repowering and transmission line upgrades is now underway through the CAISO-organized stakeholder process, and will not be completed until late 2008, or perhaps later, if recent reports of delays are accurate. As discussed more fully in Section IV of these comments, the Energy Commission believes a full understanding of the tradeoffs between repowering current OTC power plant units, retiring them through transmission system upgrades, or developing replacement capacity at other locations cannot be achieved until this CAISO-organized stakeholder study has been completed and reviewed in detail.

**Recommendation: The Energy Commission recommends that the CAISO stakeholder study now scheduled for completion in 2009 should be relied upon for determining the costs and feasibility of various repowering, refitting or transmission system upgrades for each specific OTC power plant.**

#### **SECTION IV - COMMENTS ON ENERGY AND REGULATORY AGENCY CONSEQUENCES**

In this section, the Energy Commission describes challenges to the utilities, energy regulatory agencies, and CAISO in implementing the final rule adopted by the SWRCB. The comments in this section presume that something like the preliminary draft policy is adopted. Whether the detailed recommendations in Section II of these comments are accepted or not, the challenges described below will remain. We emphasize that these are challenges for which there are no easy solutions. Our recommendations involve processes to be pursued, rather than specific decisions that can be made now. The Statewide Task Force is an important element of the proposed policy, because it offers a vehicle to ensure that the agencies continue to coordinate.

##### **A. Challenges to Planning and Procurement of Replacement Infrastructure**

As noted on page 3 of these comments, the Energy Commission expects that many power plant units, representing a substantial amount of the capacity subject to the proposed policy, will be retired or repowered by their owners rather than comply with the requirements through refitting. Generally, these are aging power plants that are too old and inefficient to justify undertaking the refitting actions required in the rule. From the owner's perspective, adding costs to a plant that is marginally able to compete in energy

markets, or just “getting by” from capacity payments through resource adequacy contracts, could render the plant, or specific units at the plant, no longer sufficiently profitable to sustain continued operations.

Most of the power plant operators speaking at the May 13 Scoping meeting in Sacramento offered this same assessment. The Energy Commission’s current assumption is that a large number of new power plants (including repowers) and/or transmission line upgrades will be required as replacements for the retired plants/units. Some units may be able to survive even with refitting costs. Managing this transition from these older plants to new infrastructure requires substantial changes to the “business as usual” planning and procurement processes that exist today.

The Energy Commission uses the term “fleet management” to describe a complex process to determine whether an individual power plant should, from a purely economic perspective:

- (1) refit and thus be expected to be operational for years to come;
- (2) be repowered in place making use of existing transmission lines, substations, and switchyards;
- (3) be replaced by a new power plant at a nearby location that provides the same reliability services as the plant retired; or
- (4) be retired with no replacement at that location, as allowed by upgrading the transmission system to eliminate the need for an increment of local capacity and providing replacement capacity somewhere else.

This process does not simply examine each power plant by itself; instead, preliminary determinations for each power plant are examined in conjunction with all other power plants that interact with that power plant to satisfy local reliability needs in a given area, as well as aggregate system-wide supply/demand balance concerns. This result will essentially determine “need” for a specific set of refits, repowers, retirements and transmission line upgrades.

The term “fleet management” provides a greater sense of clarity about the choices that power plant owners will make than is actually available to the energy agencies and the CAISO. Only the owners of the facilities fully understand the costs to comply with a proposed rule or to develop new infrastructure. An analytic study may reach a particular conclusion about a generating plant repowering versus a transmission upgrade, but the owners are likely to understand these costs better than any study could achieve. In addition, an analytical result cannot, of course, substitute for the corporate decision-making of a large number of generating companies or even the transmission line component of the regulated utilities. Only these entities understand their other investment opportunities, the relative risks and rewards of these other options

compared to OTC plant or transmission line investments, capital or credit limitations, and other financial parameters. As these entities exercise their own corporate decision-making, some modifications to this list should be expected. These can be accommodated, but only by simultaneously reviewing interactions with other elements of the list affecting local and system reliability.

Once the appropriate planning studies have been conducted to make an analytic set of determinations, the hard work begins - coordinating the decisions of the power plant owner, the transmission owner, load serving entities that procure the electricity, and the state and local government agencies must be effectively accomplished. These entities must be involved in making compatible decisions about 1) “what” actions are needed and 2) “when” such actions must be carried out. Of course, such activities would not happen in isolation. Power plant owners are facing major challenges from the green house gas compliance mechanisms under development by ARB pursuant to the requirements of AB32. As the AB32 implementation process becomes more clear over time, the viability of refitting specific power plants, repowers at existing sites, or development of new power plants from the GHG perspective will affect the decisions the plant owners make from an OTC compliance perspective.

This coordinated work is the “fleet management” challenge, much of which is outside the scope of the SWRCB 316(b) rule or the NPDES permitting processes of the regional water quality control boards that will implement the policy. The SWRCB and regional boards must recognize this “fleet management” challenge in implementing any variant of the preliminary draft policy to achieve its desired goals under the realities of the currently fragmented structure and governance of the electricity industry.

**Recommendation: A “working group” composed of the same entities enumerated as participants in the Statewide Task Force should assist SWRCB staff in developing a final form of the policy. That policy should create a framework for individual power plant owners to propose implementation actions compatible with reliability requirements resulting from the CAISO study. Once the SWRCB adopts the final OTC policy, the formal Statewide Task Force should use the CAISO stakeholder results when reviewing the individual power plant implementation plans and in making its recommendations to the SWRCB.**

## **B. Procurement Authority**

By D.07-12-052, the CPUC authorized investor-owned utilities (IOUs) to procure generation resources sufficient to accommodate the Energy Commission’s aging power plant retirement/repowering policy. However, the CPUC did not direct the IOUs to undertake targeted procurement of generation resources that satisfy the LRA needs

now provided by potentially retired OTC power plants. Nor are publicly owned utilities necessarily adopting policies to address this procurement need.

In addition, procurement that enables competition between transmission system upgrades and power plant development was not contemplated in the CPUC proceeding, so no clear authority to run procurement processes that explicitly address such tradeoffs has been granted. Clearly, when compliance with the proposed rule is considered, there is a need to find the least cost infrastructure to assure local reliability, which is the function most OTC power plants now serve and, if not retired and replaced, can be expected to serve in the future. As our GHG implementation plans continue to develop, energy efficiency, demand response, and renewable generating technologies will also play increasingly strong roles.

The Energy Commission expects that the CPUC will have to ascertain how IOU procurement practices must change to allow this much more targeted procurement than has occurred in past IOU generation resource solicitations. The Energy Commission believes that the CPUC should review its procurement authorization decisions to determine what changes are needed to facilitate targeted procurement so that IOUs can be expected to act in the manner discussed above, pursuant to the final rule, and if not, determine how to address these deficiencies in the current 2008 LTPP rulemaking.

**Recommendation: Once compliance implementation gets underway, part of the monitoring activities we recommended in Section II.a of these comments should include an assessment of whether utilities are making adequate progress in their targeted procurement endeavors. If they are, then, contingent upon this replacement resource development (including repowering options), compliance of OTC power plants through retirement would be feasible.**

### **C. Licensing of Replacement Infrastructure**

The prospect of substantial retirement of existing OTC capacity means that a major power plant licensing challenge exists for the Energy Commission, and a major transmission line permitting challenge exists for the municipal utilities and the CPUC.<sup>5 6</sup>

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<sup>5</sup> Energy Commission licensing jurisdiction for power plant repowering of facilities not originally licensed by the Energy Commission is currently limited to those instances in which a net increase in capacity of 50MW or more is proposed by the applicant. This means that for many OTC power plants that local entities will be making key decisions affecting the viability of repower projects, and their reviews may not give weight to “need” considerations irrespective of the views of state energy agencies.

<sup>6</sup> Transmission line licensing can generally be accomplished by a municipal utility itself, and for the IOU transmission lines operated by the CAISO the licensing authority is the CPUC.

Because of the unique role played by existing power plants within the existing transmission system, their retirement will require either replacement generation or new transmission, or a combination of both. A large number of licensing applications will potentially be underway nearly simultaneously in several parts of the state, and especially in Southern California.

Based on the Energy Commission's permitting/licensing experiences, local opposition can be expected to challenge proposed replacement infrastructure in most cases. These challenges could cause delays beyond those normally expected for individual facilities. Normal project development, licensing, and construction lead times are already of direct concern for a 2015 compliance date for the majority of the capacity affected by the preliminary draft policy.

**Recommendation: The Energy Commission proposes that the SWRCB, other agencies, and possibly other entities assist in public outreach to communities potentially affected by proposed projects. For proposed facilities outside our jurisdiction, the Energy Commission could offer guidance to those regulatory entities that request the assistance.**

#### **D. Increasing Competition for Limited Water Supplies**

Eliminating or drastically reducing the use of ocean water for power plant cooling in California could significantly increase the competition for the State's limited water supply. Even low water use power generation technologies have some uses for water. SWRCB has a current policy, adopted by the Energy Commission for its licensing of new power plants, that limits the use of fresh water for power plant cooling. This policy will help to address this water competition challenge by continuing to encourage the development and use of alternative water sources and cooling technologies. Nevertheless, this challenge is expected to add incrementally to the difficulty of siting large thermal power plants in California. The Energy Commission will continue to pursue, through its research and development activities, alternative technologies to address these power plant cooling issues.

**Recommendation: The Energy Commission suggests that as power plants submit their compliance plans as part of the implementation of the SWRCB coastal and estuarine power plant water usage policy that the use of alternate water supplies be considered when wet cooling technologies are proposed.**

## **Appendix 1**

Data in the following tables was derived based on the following: nuclear energy data from FERC Form 1 1998-2002; 2003-2007 from EIA 960, because earlier years could not be downloaded due to website problems. Otherwise, CEMS data was used for energy.

Table 1 provides annual capacity factors for 1998 through 2007.

Table 2 provides monthly capacity factors for year 2006.

Table 3 provides monthly capacity factors for year 2007

**Table 1: Once-Through-Cooling Plants  
Annual Capacity Factors (per cent)**

Facility Name	Unit	In-service Year	MW	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07
<b>Alamitos</b>	1	1956	175	5	2	6	10	9	8	6	3	4	2
	2	1957	175	6	5	17	20	11	8	7	2	3	2
	3	1961	326	18	24	33	46	37	38	25	10	18	19
	4	1962	324	18	18	42	47	25	22	20	6	8	10
	5	1969	485	21	24	50	66	34	20	25	9	9	9
	6	1966	485	19	16	40	63	15	18	11	10	11	7
<b>Contra Costa</b>	6	1964	340	24	41	44	61	28	2	4	1	1	1
	7	1964	340	38	38	48	49	37	16	21	10	4	3
<b>Diablo Canyon</b>	1	1985	1103	89	86	88	94	85	99	75	86	102	92
	2	1986	1099						80	83	98	88	101
<b>El Segundo</b>	3	1964	335	14	28	27	23	34	23	9	12	11	9
	4	1965	335	20	28	41	55	43	19	8	10	9	9
<b>Encina (Carlsbad Energy Center Project)</b>	1	1954	107	3	6	26	35	14	11	17	14	4	6
	2	1956	104	4	14	28	38	18	15	23	17	10	5
	3	1958	110	16	25	42	45	18	20	38	19	11	8
	4	1973	300	27	42	44	57	33	34	44	31	18	8
	5	1978	330	23	48	39	41	34	38	42	20	19	12
<b>Harbor</b>	1	1994	227	27	15	47	30	30	24	16	15	10	9
<b>Haynes</b>	1	1962	200	20	27	54	19	24	33	33	24	13	29
	2	1963	200	18	26	44	51	31	24	33	20	25	22
	5	1966	318	0	18	35	38	16	36	12	18	10	4
	6	1967	318	11	18	12	13	20	11	13	3	5	17
	cc	2005	575	x	x	x	x	x	x	0	45	47	50

**Table 1: Once-Through-Cooling Plants  
Annual Capacity Factors (per cent)**

<b>Facility Name</b>	<b>Unit</b>	<b>In-service Year</b>	<b>MW</b>	<b>'98</b>	<b>'99</b>	<b>'00</b>	<b>'01</b>	<b>'02</b>	<b>'03</b>	<b>'04</b>	<b>'05</b>	<b>'06</b>	<b>'07</b>
<b>Huntington Beach</b>	1	1958	215	25	23	24	34	32	35	36	24	19	21
	2	1958	215	20	17	40	35	34	35	38	21	14	6
	3	2002	225	x	x	x	x	3	8	18	18	11	25
	4	2003	225	x	x	x	x	x	7	16	13	10	12
<b>Mandalay</b>	1	1959	218	16	35	66	52	24	14	15	7	8	9
	2	1959	218	15	31	65	53	27	18	20	11	10	15
<b>Morro Bay</b>	3	1962	300	32	44	70	67	18	5	8	6	7	11
	4	1963	300	36	46	69	56	36	5	4	6	5	8
<b>Moss Landing</b>	1	2002	540	x	x	x	x	23	50	43	44	57	68
	2	2002	540	x	x	x	x	20	46	53	46	57	71
	6	1967	702	45	39	50	56	35	9	6	4	6	6
	7	1968	702	38	33	79	77	26	11	12	4	11	10
<b>Ormond Beach</b>	1	1971	806	6	5	17	40	16	10	18	2	0	5
	2	1973	806	9	16	39	39	16	15	13	5	6	9
<b>Pittsburg</b>	5	1960	325	26	19	47	53	18	26	23	12	7	3
	6	1961	325	34	26	36	61	24	7	20	7	5	2
	7	1972	720	37	27	53	71	41	17	9	2	2	1
<b>Potrero</b>	3	1956	207	60	31	54	54	29	43	45	21	28	26
<b>Redondo Beach</b>	5	1954	179	6	5	8	10	5	8	2	1	2	1
	6	1957	175	3	2	17	23	3	2	1	1	2	2
	7	1967	493	21	9	40	62	21	11	16	6	6	6
	8	1967	493	25	18	23	62	21	8	10	3	5	4
<b>San Onofre</b>	2	1983	1127	89	84	92	77	91	98	82	90	68	84
	3	1984	1127						87	71	96	69	90

**Table 1: Once-Through-Cooling Plants  
Annual Capacity Factors (per cent)**

<b>Facility Name</b>	<b>Unit</b>	<b>In-service Year</b>	<b>MW</b>	<b>'98</b>	<b>'99</b>	<b>'00</b>	<b>'01</b>	<b>'02</b>	<b>'03</b>	<b>'04</b>	<b>'05</b>	<b>'06</b>	<b>'07</b>
<b>Scattergood</b>	1	1958	179	3	22	10	31	27	27	29	10	18	16
	2	1959	179	36	33	40	22	31	28	28	29	18	25
	3	1974	445	15	26	34	23	6	34	22	12	24	20
<b>South Bay</b>	1	1960	210	28	33	39	33	23	22	29	30	22	9
	2	1962	214	24	25	26	32	23	24	32	22	19	10
	3	1964	210	18	28	33	31	16	22	31	24	7	13
	4	1971	214	7	9	18	10	4	3	13	7	5	8

**Table 2: Once-Through-Cooling Plants  
2006 Monthly Capacity Factors (per cent)**

Facility Name	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Alamitos</b>	1	2.2	2.6	0.3	9.6	0.3	1.4	23.9	0.3	0.7	0.0	0.0	1.2
	2	0.0	0.0	3.0	1.3	0.0	3.4	25.1	0.0	0.5	0.0	0.0	0.4
	3	9.3	12.4	1.0	19.6	23.1	26.4	39.4	19.0	19.3	13.4	8.7	16.7
	4	0.1	0.7	3.2	7.7	4.7	22.1	33.6	7.7	8.4	0.0	4.0	3.3
	5	0.0	0.0	0.7	12.2	0.0	21.3	44.6	11.7	14.3	0.0	0.0	0.0
	6	0.0	0.0	0.0	9.7	22.6	20.6	46.8	16.8	10.2	0.0	0.0	0.0
<b>Contra Costa</b>	6	0.0	0.0	0.0	0.0	0.0	1.8	9.0	0.4	0.0	0.0	0.0	0.0
	7	0.0	0.0	0.0	0.0	3.0	6.4	20.3	7.9	7.9	0.0	0.0	0.0
<b>Diablo Canyon</b>	1	102.9	103.4	103.5	103.1	102.5	103.0	103.2	102.8	103.1	102.8	95.7	102.8
	2	98.4	98.9	99.0	51.9	11.1	103.6	103.8	103.1	103.2	103.0	103.1	81.3
<b>El Segundo</b>	3	10.8	0.0	12.3	19.6	17.3	24.8	23.1	11.2	10.6	0.0	5.1	0.0
	4	9.1	7.0	6.8	10.6	9.4	16.9	29.1	14.2	10.3	0.0	0.0	0.0
<b>Encina (Carlsbad Energy Center Project)</b>	1	15.2	4.0	0.4	4.9	0.0	4.0	16.9	0.7	3.8	0.0	0.0	0.0
	2	0.0	29.9	31.7	17.6	0.0	8.9	22.0	1.3	1.3	3.6	0.0	0.9
	3	0.0	27.3	38.0	23.2	0.0	9.5	23.9	7.8	0.7	7.4	0.0	0.9
	4	27.5	26.0	11.7	29.2	10.6	15.4	33.8	20.6	18.0	6.6	15.1	7.8
	5	24.3	30.9	35.2	0.0	4.1	17.5	36.5	13.0	9.1	13.6	25.7	18.0
<b>Harbor</b>	1	10.1	0.0	0.3	1.7	11.9	20.4	37.9	18.2	7.1	0.9	9.0	1.3
<b>Haynes</b>	1	19.8	29.3	31.1	0.0	0.0	23.1	34.7	0.0	0.0	0.0	0.0	20.9
	2	11.5	0.0	10.7	32.8	34.6	15.7	30.2	34.4	39.7	30.4	40.2	14.2
	5	0.0	0.0	3.8	32.3	0.0	0.0	21.9	46.4	18.8	0.0	0.0	0.0
	6	0.0	6.1	0.0	11.9	0.0	0.0	33.1	7.8	0.0	0.0	0.0	0.0

**Table 2: Once-Through-Cooling Plants  
2006 Monthly Capacity Factors (per cent)**

Facility Name	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	CC	28.5	37.5	37.9	15.3	55.8	64.0	71.0	60.6	69.6	66.2	12.9	47.7
<b>Huntington Beach</b>	1	21.2	15.5	20.0	13.5	11.9	29.8	37.5	27.6	29.5	6.0	0.0	16.4
	2	13.2	15.1	9.3	9.8	13.0	18.2	30.5	19.0	17.4	9.6	14.5	3.0
	3	4.8	0.0	1.1	31.0	1.6	18.9	47.2	7.1	3.7	0.0	6.4	8.3
	4	5.6	16.0	4.0	16.2	1.4	15.4	45.1	6.6	12.2	0.0	0.0	0.0
<b>Mandalay</b>	1	0.0	0.8	3.0	1.9	12.4	12.3	41.5	9.1	11.8	0.0	5.1	2.9
	2	0.0	0.0	0.0	0.0	11.1	11.0	42.5	14.0	23.4	0.0	6.0	7.4
<b>Morro Bay</b>	3	0.0	0.0	0.0	0.0	12.2	20.1	35.8	0.0	6.4	0.0	0.0	5.2
	4	0.4	0.0	0.0	0.0	10.0	9.9	33.7	0.7	10.3	0.0	0.0	0.0
<b>Moss Landing</b>	1	42.0	43.0	21.0	0.6	29.2	54.6	70.1	85.2	87.3	82.6	84.7	76.8
	2	31.3	44.7	29.6	18.7	17.3	52.6	75.9	84.8	83.8	88.3	76.3	78.2
	6	0.0	0.0	0.0	2.4	8.3	10.1	33.3	19.1	0.0	0.0	0.0	0.0
	7	0.0	0.0	0.0	1.9	31.6	18.8	37.7	21.6	12.1	0.0	0.0	3.4
<b>Ormond Beach</b>	1	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.3	0.0	0.0	0.0
	2	0.0	0.0	0.0	2.1	4.8	10.7	35.1	8.1	15.0	0.0	0.0	0.0
<b>Pittsburg</b>	5	0.0	5.3	5.5	22.0	0.0	5.0	23.1	0.0	0.0	5.9	22.0	1.2
	6	0.0	7.2	0.0	0.0	18.9	4.4	29.9	0.0	0.0	0.0	0.1	0.0
	7	0.0	0.0	0.0	0.0	0.0	7.4	10.7	0.0	0.0	0.0	0.0	0.0
<b>Potrero</b>	3	46.5	40.5	41.3	17.4	24.2	26.1	25.1	23.4	25.5	30.6	5.8	28.6
<b>Redondo Beach</b>	5	0.0	1.6	0.3	3.1	0.8	3.0	9.2	0.9	1.3	0.0	1.1	0.0
	6	0.0	1.6	1.3	3.5	0.0	1.0	10.7	0.7	0.4	0.0	0.1	0.2
	7	0.0	0.0	0.0	33.7	4.5	4.4	32.3	0.0	0.3	0.0	0.0	0.0
	8	0.0	0.0	0.0	0.0	3.3	20.8	30.4	3.8	4.2	0.0	0.0	0.0

**Table 2: Once-Through-Cooling Plants  
2006 Monthly Capacity Factors (per cent)**

<b>Facility Name</b>	<b>Unit</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>San Onofre</b>	2	6.3	-0.5	-1.8	17.5	97.8	99.1	98.6	99.3	99.4	99.6	99.8	100.0
	3	99.9	99.6	90.1	-0.9	67.5	99.5	98.8	99.6	99.5	48.0	-0.4	27.7
<b>Scattergood</b>	1	28.4	27.8	18.1	0.0	0.9	6.0	12.4	28.4	30.7	27.1	9.2	24.5
	2	0.0	3.8	21.6	32.7	34.3	39.0	34.0	12.6	0.0	0.0	31.4	4.3
	3	0.0	0.0	22.1	29.8	7.2	14.6	47.2	28.9	44.2	27.6	38.0	27.1
<b>South Bay</b>	1	35.8	38.8	43.5	5.5	3.5	21.9	20.6	18.7	15.8	22.9	8.6	23.2
	2	29.7	34.2	31.2	10.3	10.2	18.6	21.7	17.4	14.2	6.7	19.6	12.7
	3	2.1	0.0	22.1	26.5	1.2	0.0	12.8	4.4	6.3	3.8	0.5	5.0
	4	6.2	6.4	2.5	9.4	0.0	9.1	19.0	2.7	0.0	0.0	3.3	1.0

**Table 3: Once-Through-Cooling Plants  
2007 Monthly Capacity Factors (per cent)**

Facility Name	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Alamitos</b>	1	0.0	0.0	0.0	0.0	0.0	1.3	4.2	10.4	1.7	2.4	0.0	0.4
	2	0.0	0.0	0.0	0.0	0.0	0.8	7.2	11.9	3.5	2.7	0.0	0.0
	3	3.6	0.0	6.6	8.9	8.4	25.6	39.5	45.5	18.4	16.5	25.6	11.3
	4	0.0	7.0	0.9	0.0	0.0	7.2	29.2	29.7	15.2	8.7	2.8	9.5
	5	0.0	0.0	0.0	0.0	0.0	3.1	45.0	33.7	13.8	0.0	0.0	0.0
	6	0.0	0.0	0.0	0.0	0.0	5.8	10.6	40.4	12.7	9.3	0.0	0.0
<b>Contra Costa</b>	6	0.0	0.0	0.0	0.0	0.0	0.9	2.4	11.2	2.9	0.0	0.0	0.0
	7	0.0	0.0	0.0	0.0	1.7	1.6	4.8	24.9	5.3	0.0	0.0	0.0
<b>Diablo Canyon</b>	1	103.3	103.1	103.5	99.8	2.3	102.8	103.7	76.7	103.7	103.6	102.8	98.6
	2	103.4	103.0	102.9	96.3	101.9	102.6	102.5	100.9	102.1	102.0	100.9	93.2
<b>El Segundo</b>	3	3.6	0.0	1.1	0.0	0.5	13.9	24.1	32.9	17.9	12.4	5.4	0.1
	4	1.0	0.4	2.0	1.2	4.8	9.7	20.7	37.9	15.9	6.7	5.5	0.0
<b>Encina (Carlsbad Energy Center Project)</b>	1	0.2	0.4	0.0	1.5	3.7	0.0	1.7	6.3	5.3	16.2	20.6	16.6
	2	1.5	0.0	0.0	1.4	3.0	0.0	1.6	8.1	3.8	17.8	15.7	1.7
	3	0.0	1.4	0.0	1.6	2.7	0.0	3.4	10.7	11.6	20.7	21.2	20.4
	4	3.9	0.6	0.3	3.7	9.5	0.2	7.2	23.7	10.7	25.9	5.1	8.1
	5	5.0	2.5	0.0	0.0	8.2	10.5	11.6	19.8	6.7	26.6	18.5	28.4
<b>Harbor</b>	1	10.1	0.0	0.3	1.7	11.9	20.4	37.9	18.2	7.1	0.9	9.0	1.3
<b>Haynes</b>	1	31.9	36.2	22.2	36.0	29.6	35.9	16.3	44.2	38.7	14.2	30.1	14.1
	2	28.0	0.0	0.0	0.0	0.0	10.1	46.0	20.4	10.1	48.9	55.7	39.1
	5	0.0	0.0	0.0	0.0	0.0	1.5	32.3	6.1	6.9	0.0	0.0	0.0
	6	0.0	0.0	32.9	45.6	0.2	0.0	44.0	46.6	28.0	0.0	0.0	0.0

**Table 3: Once-Through-Cooling Plants  
2007 Monthly Capacity Factors (per cent)**

Facility Name	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	CC	28.2	23.3	0.0	5.3	75.5	79.3	78.7	76.5	80.2	65.9	32.3	51.9
<b>Huntington Beach</b>	1	12.7	10.1	9.0	11.8	21.3	22.5	31.7	35.5	26.5	37.4	8.8	17.2
	2	7.0	2.4	3.1	9.4	5.1	4.0	8.6	18.1	5.6	9.7	0.0	3.4
	3	0.0	0.0	18.0	12.1	17.5	28.8	35.1	52.1	29.0	41.1	34.1	32.8
	4	0.0	0.0	1.6	0.0	11.5	10.6	33.6	27.6	20.4	9.2	22.1	8.2
<b>Mandalay</b>	1	1.0	0.0	0.0	0.0	10.2	13.1	16.1	31.0	11.7	16.5	1.0	3.9
	2	2.0	0.0	2.2	1.6	21.0	23.6	35.8	34.0	14.7	25.5	2.6	11.0
<b>Morro Bay</b>	3	0.0	0.0	0.0	0.0	6.1	18.0	30.5	49.3	18.0	4.8	0.0	8.6
	4	0.0	0.0	0.0	0.0	4.8	12.0	20.9	41.3	11.1	4.9	0.0	0.0
<b>Moss Landing</b>	1	73.9	85.2	38.4	50.4	55.8	72.0	69.6	79.2	71.6	81.2	64.9	74.2
	2	74.2	86.1	35.1	63.6	45.7	74.9	77.9	83.7	81.1	78.4	77.2	79.2
	6	0.0	0.0	0.0	0.0	0.0	0.0	34.5	19.7	16.0	0.0	0.0	0.0
	7	0.0	0.0	0.0	0.0	0.0	27.7	39.5	25.3	21.0	0.0	0.0	9.8
<b>Ormond Beach</b>	1	0.0	0.0	0.0	1.6	0.0	3.3	22.1	17.7	7.2	5.6	1.6	0.0
	2	0.0	0.0	0.0	0.0	0.0	11.3	27.3	28.7	12.7	12.5	8.8	6.9
<b>Pittsburg</b>	5	0.0	0.0	0.0	0.0	0.0	0.0	3.3	22.0	5.1	0.0	0.0	0.0
	6	0.0	0.0	0.0	0.0	0.0	0.5	2.8	18.2	6.5	0.0	1.6	0.0
	7	0.0	0.0	0.0	0.0	0.0	0.0	1.9	4.2	2.8	0.0	0.0	0.0
<b>Potrero</b>	3	25.8	33.8	32.8	14.5	23.3	17.4	26.5	30.8	22.8	30.5	24.1	24.2
<b>Redondo Beach</b>	5	0.0	0.0	0.3	0.0	0.0	1.1	3.7	6.6	1.7	3.9	0.0	0.0
	6	0.0	0.0	0.3	0.0	0.0	2.7	2.7	5.9	0.9	5.5	0.0	0.0
	7	0.0	0.0	0.4	0.1	3.9	0.0	37.1	19.0	12.5	0.0	0.0	0.0
	8	0.0	0.0	0.0	0.0	0.0	6.4	10.3	24.2	10.7	0.0	0.0	0.0

**Table 3: Once-Through-Cooling Plants  
2007 Monthly Capacity Factors (per cent)**

Facility Name	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>San Onofre</b>	2	98.9	100.0	100.1	100.1	99.4	59.6	96.3	97.9	99.1	77.5	82.2	-0.7
	3	97.1	100.7	100.5	100.3	91.9	99.8	99.9	99.4	100.1	26.1	68.0	100.2
<b>Scattergood</b>	1	5.0	28.3	27.3	11.3	0.0	2.9	11.1	38.2	19.5	12.0	11.3	28.9
	2	31.5	1.7	0.0	23.6	30.6	36.0	38.5	13.7	29.2	42.5	47.3	4.8
	3	43.4	8.8	0.0	0.0	0.0	33.4	43.0	48.4	6.6	21.0	30.6	0.0
<b>South Bay</b>	1	5.2	2.8	1.3	0.0	3.6	0.9	4.0	13.7	5.3	27.0	33.1	15.7
	2	10.8	6.5	4.4	0.0	0.0	1.5	2.3	9.3	5.8	26.9	18.3	28.9
	3	1.5	0.0	0.7	0.0	6.0	11.6	26.6	25.0	20.9	11.8	17.0	34.5
	4	0.0	1.2	0.8	0.0	0.0	3.8	2.0	6.8	4.9	29.0	21.2	26.5