

**PROPOSED RESOLUTION DELEGATING AUTHORITY TO
THE EXECUTIVE DIRECTOR TO APPROVE INTERIM
MITIGATION MEASURES UNDER THE ONCE-
THROUGH COOLING POLICY**

INFORMATION SHEET



Humpback Whale Breaching, Moss Landing

Photo: Shane Keena (California Ocean and Coastal Amateur Photography Contest, 2014 Judges' 1st Place Winner)

**State Water Resources Control Board
2015**

1. SUMMARY OF THE PROPOSED DELEGATION

This Information Sheet supports a proposed Resolution to delegate authority to the Executive Director of the State Water Resources Control Board (State Water Board) to approve, on a case-by-case basis, mitigation measures that owners or operators of Once-Through Cooling power plants shall undertake to comply with requirements for interim mitigation. On May 4, 2010, the State Water Board adopted the statewide [Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling](#) (Policy) to establish technology-based standards to implement the federal Clean Water Act Section 316(b) requirement that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact, and to otherwise reduce the harmful effects on marine and estuarine life that are associated with cooling water intake structures. Owners or operators of power plants are required to comply with one of two tracks that are defined in relation to the expected performance of closed-cycle wet cooling systems. The Policy applies to 13 existing power plants and is implemented through National Pollutant Discharge Elimination System (NPDES) permits.

The Policy requires owners or operators of existing power plants to implement measures to mitigate the interim impingement and entrainment impacts resulting from their cooling water intake structures. Per Section 2.C(3) of the Policy, interim mitigation is required beginning on October 1, 2015 and continues up to and until the owner or operator achieves final compliance. Three options for demonstrating compliance are presented in the Policy, and the majority of owners or operators have opted to provide funding to the Coastal Conservancy, which will work with the Ocean Protection Council, to fund appropriate mitigation projects. However, since all three options for compliance could include components that would vary by facility, mitigation efforts would need to be approved on an individual basis. Therefore, State Water Board staff proposes that authority be delegated to the Executive Director of the State Water Board to approve the mitigation measures on a case-by-case basis.

2. REGULATORY BACKGROUND

The State Water Board is designated as the state water pollution control agency for all purposes under the CWA. The State's Porter-Cologne Water Quality Control Act of 1969 authorizes the State Water Board to adopt statewide water quality control plans and policies, which are implemented through NPDES permits and waste discharge requirements. On May 4, 2010, the State Water Board adopted the Once-Through Cooling Policy under Resolution No. 2010-0020, establishing technology-based standards to implement the federal CWA Section 316(b) requirement that the location, design, construction, and capacity of cooling water intake structures reflect the BTA for minimizing adverse environmental impact, and to otherwise reduce the harmful effects on marine and estuarine life that are associated with cooling water intake structures. The Policy applies to 13 existing power plants, including nuclear plants. It originally affected 19 power plants, but six of these plants have ceased all once-through cooling operations since adoption of the Policy. The Policy is implemented through NPDES permits,

issued pursuant to Clean Water Act Section 402, which authorizes the point source discharge of pollutants to navigable waters. Section 3.A. of the Policy required the owner or operator of an affected fossil fuel power plant to submit an Implementation Plan to the State Water Board by April 1, 2011. The Implementation Plan must identify the selected compliance alternative, describe the general design, construction, or operational measures that will be undertaken to implement the alternative, and propose a realistic schedule that is as short as possible (including any requested changes to the default final compliance dates identified in the Policy) for implementing these measures.

Owners or operators of power plants are required to comply with one of two tracks that are defined in relation to the expected performance of closed-cycle wet cooling systems. Under Track 1, an owner or operator must reduce intake velocity to a level commensurate with that which can be attained by a closed-cycle wet cooling system, and a flow velocity of 0.5 feet per second. Under Track 2, conditioned upon a showing that Track 1 is not feasible, the owner or operator of an existing power plant must reduce impingement mortality and entrainment of marine life for the facility, on a unit-by-unit basis, to a comparable level to that which would be achieved under Track 1, using operational or structural controls, or both.

3. THE POLICY'S INTERIM MITIGATION REQUIREMENTS

Per Section 2.C(3) of the Policy, owners or operators must implement measures to mitigate the interim impingement and entrainment impacts resulting from the cooling water intake structure(s), commencing October 1, 2015 and continuing up to and until the owner or operator achieves final compliance, including implementation of Track 1 or 2 as described above. Each power plant has an established compliance deadline in the Policy as set forth in Section E, Table 1: Implementation Schedule. The Policy offers the following options for demonstrating compliance:

- A: Demonstrate compensation for the interim impingement and entrainment impacts through existing mitigation efforts (Section 2.C(3)(a)).
- B: Provide funding to the Coastal Conservancy for an appropriate mitigation project (Section 2.C(3)(b)). The Policy states that it is State Water Board's preference that funding be provided to the Coastal Conservancy, working with the Ocean Protection Council, for mitigation projects directed toward increases in marine life associated with the State's Marine Protected Areas in the geographic region of the facility.
- C: Develop and implement a mitigation project for the facility to compensate for interim impingement and compensation impacts (Section 2.C(3)(c)).

The majority of owners or operators have selected Option B to demonstrate compliance, but some have indicated they intend to comply using a combination of Options A and B. All three options are subject to the approval of the State Water Board.

To comply with Option B, owners or operators of once-through cooling power plants need to know the mitigation fee amount that must be paid. Section 2.C(3)(d) of the Policy requires that the habitat production forgone (HPF) method, or a comparable alternate method approved by

the State Water Board, shall be used to determine the habitat and area, based on replacement of the annual entrainment, for funding a mitigation project. To convert the HPF into a dollar amount, the State Water Board contracted with Moss Landing Marine Laboratory to establish an Expert Review Panel on minimizing and mitigating intake impacts from power plants and desalination facilities (ERP II¹). ERP II developed a scientifically defensible mitigation fee for power plant interim mitigation that would compensate for continued intake impacts due to impingement and entrainment. During a public meeting on March 1, 2012, the panel presented their recommendations, and the public asked questions and provided comments on the panel's draft report. The panel submitted the final report with their findings and recommendations on March 14, 2012. The mitigation fee calculation developed in ERP II comprises three components: an entrainment fee, an impingement fee, and a management and monitoring fee for implementation of the mitigation project. Calculations of the three amounts that together constitute the mitigation fee require input values that are unique to each facility.

The [ERP II final report](#) contains a discussion about the entrainment fee calculation by Dr. Peter Raimondi of the University of California, Santa Cruz. Dr. Raimondi used empirical transport models coupled with HPF, as required by the Policy, to determine the cost of creating or restoring habitat that replaces the production of marine organisms killed by entrainment. The key components for calculating the entrainment fee (cost per million gallons) are a facility's intake volume, the HPF (in acres), and a cost estimate for creating or restoring the HPF acreage. Originally, a half-life component also was included to account for degradation of the mitigation project over time, under the assumption that there would be no monitoring or maintenance of the project. However, as described below, the proposed mitigation fee calculation includes a cost for management and monitoring of the mitigation project. Therefore, the half-life component is not necessary in the entrainment fee calculation because the management and monitoring cost help ensure that the mitigation project will be successful and compensatory (Appendix 1).

The process for determining HPF-based cost estimates for entrainment for each power plant could be complex and expensive. Many facilities do not have entrainment studies, which would require both sampling efforts and modeling, and therefore do not have the data necessary to calculate HPF. Suitable entrainment studies could take at least a year to generate the data needed to estimate HPF. Additionally, when the cost of creating habitat equivalent to HPF was determined using existing examples of mitigation for power plant entrainment, the range of entrainment fees was relatively small. Therefore, ERP II concluded that applying an average cost estimate for entrainment (cost per million gallons) to all intakes is the simplest approach for entrainment mitigation. The average cost estimate is based on the costs of previous mitigation projects already calculated using the HPF for some power plants (ERP II final report, Appendix 1), and this average would need to be adjusted annually for inflation. Basically, the average cost estimate and a facility's intake volume would be used to determine the amount that owners or operators would need to pay on an annual basis to compensate for resources lost due to entrainment.

¹ This Expert Review Panel is referred to as ERP II because it was the second in a series of three Expert Review Panels established to address a number of scientific questions about the Once-Through Cooling Policy and amendments to the California Ocean Plan to address desalination activities.

As an example of calculating the entrainment fee, it could be estimated that the longevity of the mitigation project and the period of continued operation of the facility are both 30 years. Assuming that the mitigation project will not be initiated until 5 years after payment of the fee, the cost projection value is 5 years. Plugging these input values into ERP II's calculation yields an average cost estimate for entrainment of \$5.17 per million gallons (Appendix 2). Then, this average cost estimate for entrainment and a facility's annual intake volume would be multiplied to calculate the entrainment fee for the facility. Owners or operators would need to measure their intake volumes for each year of interim mitigation so that these values are available for use in their annual entrainment fee calculations.

Since impingement varies widely among power plants, ERP II determined that it would be inappropriate to apply a fixed impingement fee to all intakes. Instead, the panel advised determining the impingement fee on a case-by-case basis, using each plant's annual estimate of fish impingement together with the value for fishes estimated from catch totals and the average indirect economic value of the fisheries as determined in the ERP II final report (\$0.80 per pound). Consistent with the ERP II recommendation, the following equation could be used to calculate the impingement fee for each facility:

Impingement fee = \$0.80 per pound X average annual impingement of fishes (in pounds)

Appendix 2 of the ERP II final report is an example costing of impingement and entrainment losses at the Huntington Beach Generating Station. This facility had 2686 pounds as an average annual impingement of fishes from normal operations and heat treatments. Inserting this value into the above equation results in an impingement fee of \$2,148.80.

Finally, ERP II recommended management and monitoring fees on the typical range of 10-25% of the project's costs. Monitoring and assessment of the mitigation project are critical for guaranteeing that the project is truly compensating for the resources lost due to intakes. Therefore, it is critical to ensure that some fees are dedicated toward these activities.

Assuming a 20% management and monitoring fee and applying this to a facility with an annual intake volume of 500 million gallons per day and 3000 pounds of average annual impingement of fishes, the first annual payment for interim mitigation would be \$1,135,853.

Per the Policy, it is the State Water Board's preference that funding from interim mitigation is provided to the Coastal Conservancy, working with the Ocean Protection Council. State Water Board staff is working with the Coastal Conservancy and the Ocean Protection Council to determine how the mitigation fees will be received and how they will be applied toward increases in marine life associated with the State's Marine Protected Areas in the geographic regions of the facilities.

Since all mitigation options include components that would vary by facility, State Water Board staff proposes that authority be delegated to the Executive Director of the State Water Board to approve the mitigation measures on a case-by-case basis.

4. RATIONALE FOR THE PROPOSED DELGATION

All three options for demonstrating compliance with the Policy's interim mitigation requirements could include components that would vary by facility. As a result, mitigation efforts would need to be approved on an individual basis. Addressing approvals through individual amendments to the Policy would be onerous and would not result in significantly more protection for ocean resources. Instead, State Water Board staff proposes that the State Water Board delegate approval authority to the Executive Director, consistent with other delegations provided for in [Resolution 2012-0061](#).

5. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) CONSIDERATIONS

The proposed Resolution is limited to a delegation of approval authority. Delegation of approval authority for interim mitigation measures pursuant to the Policy does not constitute an action with the potential to directly or indirectly cause a physical change in the environment and is therefore not a project requiring review under CEQA. Nor does the proposed Resolution create a new rule or regulation that would trigger the need for environmental review under the California Code of Regulations Title 14, Section 15187.

6. REFERENCES

Foster, M. S., G. M. Cailliet, J. Callaway, P. Raimondi, and J. Steinbeck. 2012. Mitigation and fees for the intake of seawater by desalination and power plants. http://www.swrcb.ca.gov/water_issues/programs/ocean/desalination/docs/erp_intake052512.pdf

APPENDIX 1: Explanation of updates to entrainment fee calculation
(Entrainment fee calculation originally described in Appendix 1 of ERP II Final Report)

Dr. Peter Raimondi

Explanation of Fee calculation in fee based approach for entrainment.

The goal of model is to determine fee for use of water in once through systems (power-plants, desalinization) that is based on mitigation compensatory to entrainment impacts. We used five cases to provide the basis for compensatory mitigation. In each an empirical transport model (ETM) was used to estimate entrainment loss. The result of ETM was then used to calculate the area of production foregone (APF²), which represents the area of habitat that would be sufficient to produce resources equivalent to those lost due to entrainment. The APF for each case was then monetized by estimating the cost (per MG) for the restoration or creation of habitat. The mitigation type (wetland or rocky reef) was based on the species composition entrained, which were either wetland or rocky reef associated. The cost was adjusted using a cost escalator (adjustable) to account for the years lapsed between the original cost estimate and 2015. The APF for each project is, as noted, the area that if created would provide compensatory mitigation for the entrainment impact for entrainment. This model was originally designed for long term projects where mitigation impacts were likely to occur for decades. Given this, the longevity of the mitigation project was largely irrelevant to costing. However, for shorter term impacts, it is appropriate to incorporate the estimated life of the mitigation project so as to adjust the fee for the benefit provided by the mitigation post impact period. Hence, two additional terms are included (both adjustable): (1) estimated life of the mitigation project and (2) estimated period of continued operation of the power or desalinization plant. This yields a prorated cost for 2015. This is the total cost per MG based on the project continued period of operation. One more adjustment is possible, the cost projection year, which allows the initiation of fee to be delayed, but which also increases the cost based on the yearly cost escalator. The annual cost (assuming that the option of payment of total cost is not used) is then calculated for each project as well as the average annual cost per MG.

There is one key assumption to this model; it is that the restoration is compensatory. This means two things must occur. First the mitigation project must perform as designed. This means that the project must be monitored for biological performance. Second, the area of the mitigation project must not decrease or else the APF threshold would not be met. Therefore, the cost for monitoring, maintenance and potential remediation for non-performance must be incorporated into the fee. Depending on the projected mitigation project this would add 10-25% to the fee.

This assumption allowed the removal of the half-life term from the original model. The half-life term resulted from the following equation:

$$AYC = A_c \times L_p \times C_d$$

Where:

AYC = Acre years of credit

A_c = Acres created

² The terms APF and HPF are used interchangeably and refer to the area of habitat that would need to be created to compensate for resources lost to entrainment.

L_p = Lifespan of mitigation project

C_d = Coefficient of degradation of the mitigation project

Compensatory mitigation is intended to replace lost resources and creation or restoration of appropriate habitat equal to APF should fully compensate for those lost resources. Over the life of the a mitigation project, the total acres years of credit accrued will be the product of the acres created and lifespan of the mitigation project in years ($A_c \times L_p$). Given a finite lifespan and without the explicit requirement for monitoring, maintenance and potential remediation the mitigation project will degrade at some rate. For simplicity, we made the assumption that the rate of degradation (essentially a depreciation rate) would be linear. For example, if the lifespan of the project was 100 years, credit would start at 100% of the created acres and after 100 years it would be 0%. This leads to a coefficient of degradation (C_d) equal to .5. To complete the example, if we assume the acres created was 500, then AYC would be $500 \times 100 \times .5 = 25,000$ acre years of credit. Typically acres created = area of production foregone, hence 25,000 acre years of credit would compensate for a power or desalinization plant that operated for 50 years (500 acres (APF) \times 50 years of operation). For simplicity, we developed the term half-life to define the term ($L_p \times C_d$) because we set $C_d = 0.5$. Importantly, this calculation is only required to account for project degradation if there is no provision for monitoring, maintenance and remediation. In the new model we assume that monitoring, maintenance and remediation costs are part of the fee and as a result compensatory performance of the mitigation is assured the model term half-life can be removed.

APPENDIX 2: Entrainment fee calculation
Adapted from ERP II Final Report Appendix 1
Developed by Dr. Peter Raimondi

