STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – DIVISION OF WATER QUALITY
AUGUST 4, 2015

ITEM (Clerk will assign #)

SUBJECT

CONSIDERATION OF PROPOSED DRAFT RESOLUTION DELEGATING AUTHORITY TO THE EXECUTIVE DIRECTOR TO APPROVE MEASURES THAT OWNERS OR OPERATORS OF ONCE-THROUGH COOLING FACILITIES SHALL UNDERTAKE TO COMPLY WITH INTERIM MITIGATION ON A CASE-BY-CASE BASIS.

DISCUSSION

This proposed draft Resolution would 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 (OTC) facilities 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 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. The Policy originally affected 19 power plants, but six of these plants have ceased all OTC operations since adoption of the Policy. 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.

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. 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 California Coastal Conservancy (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 California Coastal Conservancy, working with the California Ocean Protection Council (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, but some will comply using a combination of Options A and B. All three options are subject to the approval of the State Water Board. However, since all three options could include components that would vary by facility, mitigation efforts would need to be approved on an individual basis. Addressing approvals through individual amendments to the Policy would be onerous and 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.

Section 2.C(3)(d) of the Policy requires that the habitat production forgone (HPF) method shall be used to determine the area of habitat that needs to be created in order for a mitigation project to compensate for resources lost due to entrainment. For Options A and C, mitigation efforts must compensate for an area of habitat equivalent to what would be created or restored if mitigation funding had been provided instead.

To comply with Option B, owners or operators of OTC facilities need to know the mitigation fee amount that must be paid. To convert the HPF into a dollar amount, the State Water Board contracted with Moss Landing Marine Laboratory to establish an Expert Review Panel (ERP II[1]). 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. 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 will 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 essentially ensure that the mitigation project will be successful and compensatory.

The process for determining HPF-based cost estimates for entrainment for each facility 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. Currently, there is not enough time for owners or operators to complete

[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.

entrainment studies and to calculate their HPFs prior to the start of interim mitigation on October 1, 2015. 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.

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 1). 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. Consistent with the ERP II recommendation, the following equation could be used to calculate the impingement fee for each facility:

Impingement fee = $0.80 * average annual impingement of fishes (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 $1,362,870.

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.

POLICY ISSUE

Should the State Water Board delegate authority to the Executive Director to approve the measures that owners or operators of OTC facilities undertake to comply with interim mitigation on a case-by-case basis?

FISCAL IMPACT

No fiscal impact.

REGIONAL BOARD IMPACT

No Regional Board impact.

STAFF RECOMMENDATION

State Water Board staff recommends delegating authority to the Executive Director of the State Water Board to approve measures that owners or operators of OTC facilities undertake to comply with interim mitigation on a case-by-case basis.

State Water Board action on this item will assist the Water Boards in reaching 6 of the Strategic Plan Update: 2008-2012 to narrative of goal(s). In particular, approval of this item will assist in fulfilling Objective 6.2 to targeting consistency improvements in program delivery identified through past input, and solicit input to identify consistency issues as they arise.

Policy Review _____

Fiscal Review _____

Legal Review _____

Exec Review _____

APPENDIX 1: Entrainment fee calculation
Adapted from ERP II Final Report Appendix 1

					Annual Cost Escalator	3.00%		Estimated total cost per MG	$155.20	up front								
					Estimated Life of mitigation Project	30		Estimated total cost per MG	$5.17	First year of annual	additional years should be adjusted for inflation							
					continued operation	30												
					Cost projection (year)	5												
					Cost of assessment (%)	20.00%												
This model based on pay as you go - with cost escalator built in.																This is the up front cost		This is the first year of the annual cost
Facility	**Intake Volume (MGD)**	**APF (acres)**	**Mitigation Type**	**Cost estimate**	**cost per annual intake (MG)**	**Notes**	**Years between assessment and 2015**	**Cost escalator**	**total escalator**	**2015 cost per MG**	**estimated of mitigation project (years)**	**estimated period of continued operation**	**Prorated 2015 cost per MG**	**Cost projection year**		**Estimated cost at time of projection (per MG,)**		**Estimated annual cost at time of projection (per MG,)**
Moss Landing Combined cycle	360	840	wetland	$15,100,000	$115	based on max larval duration,	15	3.00%	$1.56	$179.04	30	30	**$179.04**	**5**		**207.55**		**$6.92**
Morro Bay	371	760	wetland	$13,661,905	$101	based on max larval duration,	14	3.00%	$1.51	$152.60	30	30	**$152.60**	**5**		**176.91**		**$5.90**
Poseidon	304	37	wetland	$11,100,000	$100	based on max larval duration,	6	3.00%	$1.19	$119.45	30	30	**$119.45**	**5**		**138.47**		**$4.62**
Huntington Beach	126.5	66	wetland	$4,927,560	$107	based on max larval duration,	6	3.00%	$1.19	$127.43	30	30	**$127.43**	**5**		**147.73**		**$4.92**
Diablo	2670	543	Rocky reef	$67,875,000	$70	based on125K per acre	9	3.00%	$1.30	$90.87	30	30	**$90.87**	**5**		**105.35**		**$3.51**
						Average		**3.00%**					**$133.88**			**155.20**		**5.17**