

State Water Resources Control Board
Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling
Sarah Abramson - Expert Review Panel Draft Final Comments
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Expert Review Panel Questions:

1. *How will baseline be defined for*
 - a. *Track II?*

The calculation baseline determination should be consistent across all facilities in California and the State Board must be careful that any assumptions made in the calculation baseline determination result in an actual reduction in impingement and entrainment mortality.

This question raises the issue of whether flow should be used as a proxy for entrainment. If flow is used as a proxy for entrainment, the State Water Resources Control Board (State Water Board) should provide clear direction on how to calculate the flow reductions to truly reduce entrainment mortality. If flow is used as a proxy for entrainment, I recommend using the flow required to generate electricity (i.e. the “generational flow”) to determine the baseline for calculating and achieving flow reductions. Simply reducing flows based upon the permitted maximum flow will not actually achieve entrainment reductions at most once-through cooled plants in California, as most facilities do not operate at their permitted maximum flows. Instead, entrainment reduction should be based on the generational flow. Although intuitively one would think the actual flow at a facility would be equal to the generational flow, in many cases the actual flow is significantly greater than the generational flow. For example, generating Units 1 & 2 at El Segundo Generating Station ceased producing electricity in 2002; however the mean annual flow at Intake 001 (which draws in cooling water for Units 1 & 2) in 2003 and 2004 continued at or above the level prior to 2002.

At the once-through cooling workshop in Sacramento on July 31, 2006, State Water Board staff agreed to work with the California Energy Commission staff to gather information on generational flow at individual once-through cooled plants in California and compare it to the actual flow at each facility. This information has yet to be presented, but would greatly inform the decision on whether or not flow should be a proxy for entrainment.

A potential concern is that if the State Water board agrees to base entrainment reductions on actual flow instead of generational flow, then depending on how long it takes the policy to be adopted, facilities may be able to elevate their flow levels beyond the necessary amount for generation to augment the baseline (yet still remain within their permitted flow levels). This would make it easier for generators to comply with the policy without actually achieving true entrainment reductions (similar to problems with early efforts to reduce residential water use in the face of droughts – those overusing water when the baseline was set were “rewarded” while conservers punished).

Furthermore, if flow is used as a proxy for entrainment, the policy should be clear about the temporal scale used to calculate flow/entrainment reductions to avoid seasonal impacts. For example, in Southern California, peak larval abundance in coastal waters coincides directly with peak energy needs – during the summer. The policy should avoid a scenario allowing facilities to calculate flow reductions on an annual basis, or any other scenario that does not account for seasonal changes in entrainable marine life. If seasonal larval characteristics are not considered, facilities might reduce their intake flow (shutting down the pumps or reducing them to the minimum intake necessary) during the winter, and continue using high flow rates in the summer to comply with flow reductions. While such a practice may technically meet the flow reduction requirements if no further detail is provided, it would not adequately reduce the entrainment impacts in Southern California. The relative abundance of fish larvae and eggs is so great during the summer in Southern California that if operations were restricted to only the summer months, it would still account for the majority of year-long entrainment impacts.

The issue of already depleted source water should also be considered when determining the baseline. Many of these plants have been operating for decades, and have suffered continual impacts of entrainment and impingement. This is especially concerning at once-through cooled plants located on enclosed bays and harbors, for example Haynes Generating Station and Alamitos Generating Station on Alamitos Bay. It is estimated that these power plants take in the entire volume of Alamitos Bay every five days. The potentially depleted source water caused by ongoing impingement and entrainment should be addressed in the baseline determination. As such, I recommend consideration of a reference site approach in determining the calculation baseline to avoid establishing the baseline upon potentially depleted source waters surrounding each facility. Reference sites have historically been used in management to determine the extent of industrial impacts on marine and coastal resources. For example, the Hyperion Treatment and Joint Water Pollution Control Plants permits have historically and continue to require monitoring both within their zone of initial impact and at reference stations to determine the impacts of sewage discharge to benthic infauna, demersal fish, and macroinvertebrate community composition and species abundance.

b. Interim Restoration?

As stated in my response to question 1a, the issue of potentially depleted source water is of concern at once-through cooled power plants, especially for facilities located on enclosed bays or harbors. If interim restoration is required under the policy, these potentially depleted source waters should be taken into account, and a reference site approach should be employed to inform the baseline determination for interim restoration.

2. *Have current, statewide, and individual power plant impingement and entrainment impacts been correctly estimated?*

The impingement and entrainment impacts referenced in the Draft Scoping Document are based upon various Clean Water Act section 316(b) studies, which are not standardized or consistent across all studies and locations. These studies typically do not examine the impacts on all species of marine life entrained or impinged. For example, most of the studies focus solely on commercially important species or species that are entrained in high abundances, which typically includes fish larvae and select invertebrate larvae. Some entrainment studies include information on fish eggs, but most do not examine fish eggs on a species-specific basis. Phytoplankton and a comprehensive list of invertebrate species are rarely included in entrainment studies. To accurately reflect the ecosystem impacts of once-through cooling, studies should include a comprehensive list of species that provide a unique ecosystem function, serving as predators, prey, detritivores, and nutrient recyclers.

Furthermore, most of the studies referenced in the Draft Scoping Document do not consider indirect or cumulative impacts of entrainment and impingement. The California Energy Commission has also raised concerns about the cumulative impacts of once-through cooling and estimates in their 2005 staff report, *Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants*, that three facilities – Scattergood, Redondo Beach and El Segundo Generating Station - located within the same six-mile stretch of the Santa Monica Bay consume 13% of nearshore waters in the Bay every six weeks. Cumulative impacts must be understood to provide a complete assessment of the environmental effects of once-through cooling.

Although the Draft Scoping Document does not completely reflect the impacts of once-through cooling, it is well understood that the impacts are significant to our coastal and marine resources. The State Water Board should not allow any uncertainty regarding these impacts to delay the release of its policy on once-through cooling, and instead should act with precaution and issue the policy as soon as possible.

3. *Are the proposed interim controls effective and feasible to prevent mortality and reduce takes of wildlife?*

The State Water Board should clearly state how the proposed interim controls are enforceable in the policy. At present, it is unclear since they are interim measures and not measures that will help achieve policy compliance.

a. *Tetrapod exclusion screens?*

Although the proposal to require that large mesh screens (no greater than square 4") be installed at each offshore intake within a year may control against further negative impacts to marine mammals and other tetrapods, it will not likely control against continued impingement of commonly impinged organisms, for example, anchovies and other baitfish. Furthermore, maintenance of these structures

should also be required in the policy to ensure that they are effective, and do not become overly biofouled, thereby causing additional impingement. Additionally, information regarding the effectiveness of these structures in the marine environment should be provided in the Draft Scoping Document. It is critical that appropriate controls be implemented to minimize take or harassment of marine mammals.

b. Flow reduction?

What is the basis for the interim requirement that flows be reduced to less than 10% of the permitted daily flow rate if a power plant is not generating electricity for a period of two or more consecutive days? Although this proposal may control against entrainment mortality, it should not be allowed as a compliance strategy for Track II, as it is presented as an interim requirement. As stated in question 1, generational flow, not permitted flow should be the basis for calculating this reduction. Many coastal power plants in California operate at flow levels much lower than the permitted flow; therefore calculating flow reductions based upon permitted flow will not result in a true reduction in flow or entrainment. Furthermore, the policy should be clear on the temporal scale used to calculate these flow reductions to avoid seasonal entrainment impacts (see response to question 1).

c. Restoration?

Restoration projects should be the lowest priority, as they are an interim measure, not a requirement to comply with the draft policy. I recommend the State Water Board focus on policy compliance (planning/design, implementation, and monitoring) instead of restoration as an interim measure.

Further detail regarding the interim requirement for habitat restoration activities is necessary to provide a comprehensive response to this question. Moreover, there are some general questions that the State Water Board should consider before ordering restoration as an interim requirement. For example, what restoration activities are considered acceptable; and how does the State Water Board plan to develop proper mitigation measures that truly reflect the impacts caused by once-through cooling, which affect multiple species at multiple life stages? Historically, significant time and scientific deliberation has been invested in the design and execution of ecosystem level restoration projects with varied levels of success when employed. For example, over five years and hundreds of thousands of dollars were invested deliberating over how to replace the loss of fishing opportunity caused by contaminated sediments under the Montrose Settlements Restoration Program. Additionally, the restoration/mitigation deliberations for San Onofre Nuclear Generating Station and El Segundo Generating Station repowering project required significant time and funds. How does the State Water Board plan to streamline these processes and develop a restoration/mitigation plan that results in ecosystem-level benefits?

Furthermore, how will the State Water Board address the problem of maximizing restoration, but avoiding compromises to ecosystem integrity? For example, fish hatcheries are often used as

restoration/mitigation measures, but are a species-specific measure that without proper design can cause adverse environmental impacts such as habitat degradation or water quality impairments.

Another critical question is: what is the appropriate mitigation ratio for the impacts caused by once-through cooling? Again, answering this question is time and resource intensive. The California Coastal Commission spent years trying to identify an appropriate mitigation ratio for various damages, and this issue still comes up for debate before the Commission for some restoration/mitigation projects.

Additional questions that should be considered include: what is the appropriate time frame for these interim restoration/mitigation projects? Many restoration/mitigation projects require significant time to develop and implement. As interim requirements, how long are the power plant owners/operators responsible for the various restoration/mitigation projects? How will a value be accurately placed on the resources damaged? Often resources are undervalued when determining mitigation/restoration. Furthermore, how will a monetary value be placed on the ecosystem impacts caused by once-through cooling when impact studies are not comprehensive (see response to question 2)?

Clearly, restoration for ecosystem-level impacts is complex and many questions need to be addressed before the State Water Board moves forward with this interim measure.

4. *For Track I, are adverse impacts associated with the conversion to closed-cycle cooling adequately considered?*

The Expert Review Panel in its current configuration has limited expertise to address this question. I suggest the State Water Board consult engineering and air quality experts to better address this question, as well as the appropriate state agencies.

5. *For Track II, should the proposed policies require monitoring appropriate to determine actual percent reductions in mortality?*

Yes, monitoring is important to determine policy compliance. It is also important that monitoring be appropriately designed for individual compliance strategies.

6. *Should restoration projects be monitored to determine compliance?*

This question should be rephrased to state, "Should restoration projects be monitored to determine effectiveness?", as restoration is not a Track I or Track II compliance strategy within the Draft Scoping Document. Furthermore, restoration should not be allowed for compliance as it does not minimize the impacts of once-through cooling, required under Clean Water Act section 316(b). This argument was upheld in the Second Circuit U.S. Court of Appeals, which ruled that restoration measures may not be utilized as a compliance strategy with Clean Water Act section 316(b) (*Riverkeeper, Inc., et al. v. U.S. Environmental Protection Agency*, No. 04-6692-ag(L), 2nd Cir. Jan. 25, 2007). This element of the

Riverkeeper II decision stands, as it was not elected to be taken up by the Supreme Court in early April 2008. As an interim measure, restoration projects should be the lowest priority; instead the State Water Board should prioritize policy compliance (planning/design, implementation, and monitoring).

7. Should there be remediation if restoration does not comply?

This question should be rephrased to state, "Should there be remediation if restoration is not effective?". As stated in my response to question 6, restoration/mitigation should not be allowed as a compliance strategy with the state once-through cooling policy.