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TECHNICAL REPORT

TO: John H. Robertus
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SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

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DATE: April 4, 2008

SUBJECT: Review of Carlsbad Seawater Desalination Plant Flow, Entrainment, and Impingement Minimization Plan, Poseidon Resources Corporation, dated March 6, 2008

Executive Summary

On March 7, 2008, Poseidon submitted a revised version of the subject Plan, and written responses to the Regional Board's comments from a letter dated February 19, 2008. The revised Plan includes an assessment of impacts from impingement and entrainment of marine organisms, and a process for the selection of a specific mitigation alternative. The Central Watershed Unit (CWU) has reviewed the subject plan, focusing on the validity of the assessment of impacts, and suitability of the mitigation process proposed, and alternatives reviewed. In summary, the CWU staff conclude that adoption of the Plan, as currently drafted, would be premature for the following reasons:

1. The proposed plan does not describe a process for agency approval of the calculations and variables used to assess impacts from impingement and entrainment.
2. The proposed mitigation process does not clearly identify the method for the final selection and agency concurrence of the preferred mitigation alternative.
3. There is insufficient sampling data to accurately determine the impacts of impingement and entrainment.
4. The proposed process seems to favor a pre-determined outcome (i.e. mitigation in San Dieguito Lagoon). Other mitigation alternatives (e.g. kelp bed enhancement and artificial reef construction) should be considered and evaluated equally as viable mitigation possibilities.

California Environmental Protection Agency

I. Assessment of Impacts

A. Sampling Data

Impacts to marine resources attributable to the Carlsbad Desalination Plant (CDP) are described in Chapter 5 of the Plan. Impact calculations are based on results from a one-year sampling program of impingement and entrainment at the Encina Power Station (EPS). This sampling set is likely to be skewed because it does not account for annual variability and the data were collected during a year that was atypical with regards to rainfall.

It is important that ecological impacts are correctly determined because the Empirical Transport Model (used to estimate larval mortality rates) and calculation of Acres Production Foregone (used to establish the mitigation requirement) directly rely on the sampling results. If impacts are underestimated due to sampling during an atypically wet year, then subsequent modeling and calculations will lead to underestimated mortality and mitigation requirements.

B. Calculations

The Acres of Production Foregone (APF) is an estimate used by Poseidon to calculate the amount of acreage that would compensate for the entrainment loss of fish larvae (and other planktonic organisms) due to operation of the CDP. Its derivation is discussed in Chapter 6 of the Plan. However, the data used to derive this calculation are preliminary, and lack statistical power. Further justification for the values selected to calculate the Acres Production Foregone (APF) is warranted, and, after proper validation of these inputs, the APF should be recalculated. The Plan currently estimates that the restoration area needed to fully mitigate the CDP contribution to entrainment is 36.8 acres.

II. Assessment of Mitigation Process

Poseidon's Plan describes a process to follow for evaluating mitigation alternatives that will compensate for impacts to beneficial uses of Agua Hedionda Lagoon from entrainment and impingement of marine organisms by operations at the CDP. Poseidon's proposed process contains a schedule of actions to identify the appropriate type and amount of mitigation. One of these actions is to convene a meeting with the relevant resource and regulatory agencies, prior to finalizing their specific mitigation alternative. The proposed process is unclear as to how additional alternatives (not currently listed in the Plan) will be considered or what the agency approval mechanism would be for the final selection of the specific mitigation alternative. The Plan does state that if Alternatives 2 through 8 are deemed infeasible, Poseidon will proceed with implementation of Alternative 1 (i.e. Offsite Mitigation Program – San Dieguito Lagoon), described below.

III. Assessment of Proposed Mitigation

The main objective of the mitigation will be to implement one or more activities that will preserve, restore and enhance existing wetlands, lagoons or other high-productivity near-shore coastal areas located in the vicinity of Agua Hedionda and/or elsewhere in San Diego County.

A. Types of Mitigation Alternatives

Poseidon's proposed Plan states that types of activities that may be included in their final specific mitigation alternative include:

1. Wetland Restoration.
2. Coastal Lagoon Restoration.
3. Restoration of Historic Sediment Elevation to Promote Reestablishment of Eelgrass Beds.
4. Marine Fish Hatchery Stocking Program.
5. Artificial Reef Development.
6. Kelp Bed Enhancement.

Each of these activities has the *potential* to compensate for the direct loss of fish, larvae, and eggs.

B. Habitat Restoration Goals:

Poseidon's proposed habitat restoration plan goals are:

1. Creation or restoration of coastal habitat.
2. Development of a technically feasible project.
3. Stakeholder acceptance for selected project.
4. Ability to measure performance.

These goals are typical of plans developed to mitigate impacts to beneficial uses of surface waters resources.

C. Alternatives:

Poseidon has identified eight alternatives to be considered and further evaluated for selection in their final preferred specific mitigation alternative. These alternatives include:

1. San Dieguito Lagoon Coastal Habitat Restoration.
This mitigation would be out-of-watershed and includes the restoration of 37-acres of tidal prism and salt water marsh in San Dieguito Lagoon. This restoration would be good for San Dieguito Lagoon, but would provide very limited compensation for impacts to fish, larvae, and eggs in Aqua Hedionda Lagoon – which is located 12-miles north of San Dieguito Lagoon.

2. City of Oceanside Loma Alta Lagoon Restoration.
This mitigation would be out-of-watershed and Poseidon did not provide the Regional Board with any details on this alternative. This restoration potentially could create positive effects on Loma Alta Lagoon located approximately 5 miles north of Aqua Hedionda Lagoon. The project would provide very limited compensation for impacts to fish, larvae, and eggs in Aqua Hedionda Lagoon.
3. Agua Hedionda Lagoon – Land Acquisition for Expansion of an Ecological Reserve.
This mitigation alternative includes the “acquisition and preservation of land near the Agua Hedionda Lagoon’s Ecological Reserve to serve as coastal habitat for wildlife and migratory birds.” This mitigation alternative would benefit the waterfowl population, but potentially reduce the amount of fish and larvae due to increased waterfowl predation.
4. Agua Hedionda Lagoon – Eradication of Invasive Plants and Restoration of Native Vegetation. The mitigation alternative proposes to “remove exotic, invasive (terrestrial) plant species and replace these species with appropriate native plants to restore the protective function (surface water quality cleansing) of the lagoon watershed vegetation.” Removing exotic, invasive plant species from a watershed is always desirable. However, it is unclear that the increased amount of biomass in the Lagoon from slightly improved water quality would adequately compensate for the biomass loss from impingement and entrainment by operations at the CDP.
5. Carlsbad Aquafarm at Agua Hedionda Lagoon – Abalone Stock Enhancement.
This mitigation alternative proposes to “create a stock of 100,000 abalone at the Carlsbad Aquafarm located in the Agua Hedionda Lagoon and the use the stock to replenish the population of abalone near the intake to the lagoon and project discharge area.” With respect to improving the near shore ecosystem, abalones are known to consume algae on rocks and reefs, potentially creating habitat opportunities for less competitive species. Juvenile, attached abalones are also a food source for octopus, Cabazon, and Ling cod. This mitigation would directly benefit the abalone population but do nothing to mitigate for the hundreds of other species that suffer mortality from operations at the CDP.
6. Buena Vista Lagoon Ecological Reserve – Completion of Restoration/Enhancement Plan Environmental Analysis.
This mitigation would be out-of-watershed and Poseidon did not provide the Regional Board with any details on this mitigation alternative. Completion of an Analysis would have limited compensation for impacts to fish, larvae, and eggs in

Aqua Hedionda Lagoon – which is located approximately 5-miles south of Buena Vista Lagoon.

7. Frazee State Beach – Coastal Bluff Habitat Restoration.
Poseidon did not provide any details on this alternative.

8. Additional Agua Hedionda Lagoon Restoration Opportunities. Poseidon's Plan indicates they investigated additional mitigation alternatives, but reportedly did not find any opportunities. Based on this conclusion, Poseidon appears to favor Mitigation Alternative No.1 – the San Dieguito Lagoon Coastal Habitat Restoration. This is unfortunate because the alternatives that are best suited to directly mitigate impacted ecological functions are normally located within the same area (watershed). In addition, the proposed mitigation ratio is lower than that normally accepted for out-of-watershed mitigation projects.

Additional alternatives (e.g. artificial reef development, kelp bed enhancement, marine fish hatchery stocking, or reestablishment of eelgrass in Agua Hedionda Lagoon) that have been found suitable and viable for mitigation of similar impacts elsewhere, do not appear to be included for consideration in the current version of the Plan. The CWU staff conclude that Poseidon should include these additional alternatives for evaluation as part of their proposed process for the selection of a specific mitigation alternative.