

**Tentative Order No. R9-2009-0038
Amending
Order No. R9-2006-0065 (NPDES No. CA0109223)
Waste Discharge Requirements for
The Poseidon Resources Corporation
Carlsbad Desalination Project
Discharge to the Pacific Ocean Via
The Encina Power Station Discharge Channel**

COMMENTS

Submitted by:

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On behalf of Poseidon Resources Corporation (“Poseidon”), we appreciate the opportunity to submit public comment on Agenda Item No. 13 for the April 8, 2009 hearing at which the California Regional Water Quality Control Board (the “Regional Board”) will consider Poseidon’s Flow, Entrainment and Impingement Minimization Plan (the “Minimization Plan”). The Regional Board conditionally approved the Minimization Plan on April 9, 2008. On February 11, 2009, the Regional Board considered the Marine Life Mitigation Plan (the “MLMP”), an amendment to the Minimization Plan, but, at the request of staff, continued the matter to the present hearing on April 8, 2009. Over the past year, in response to public and agency input and the availability of greater scientific information, the Minimization Plan has gone through extensive revision, including the incorporation of the MLMP, in order to ensure that the potential intake and mortality from the proposed Carlsbad Desalination Project (“the Project” or “CDP”) will be minimized. The final Minimization Plan now before the Regional Board represents the product of thorough vetting in a months-long interagency process guided by scientific and public scrutiny.

This letter demonstrates that Poseidon has responded fully to the four outstanding items identified by staff at the February 11, 2009 hearing. It also demonstrates the Project’s compliance with California Water Code Section 13142.5(b).

I. EXECUTIVE SUMMARY

The principal issue driving the continued delay of the Minimization Plan approval (first provided staff on February 12, 2007) is staff’s concerns regarding Poseidon’s characterization of the potential for impingement at the future Project. (“Impingement” occurs when marine life, generally fish, get impinged on racks and bars that separate a seawater intake structure from the adjoining open water environment.) This issue took Poseidon by surprise since staff offered no specific comment on impingement from April 30, 2008, when Poseidon submitted a revised impingement estimate, replacing an earlier estimate containing a math error, until staff started asking for “flow-proportioned” calculations around the time of the February 11, 2009 hearing, a period which covered the interagency activity to develop the Marine Life Mitigation Plan (“MLMP”). The late-arrival of staff’s impingement concerns is underscored by the fact that the impingement data are from a staff-approved field study conducted in 2004-2005, and staff did not raise any similar concerns to our knowledge about these data during permitting proceedings in 2006 for the Encina Power Station and for Poseidon’s proposed Carlsbad Desalination Project (the “Project” or “CDP”).

Notwithstanding the lateness of the issue, Poseidon has undertaken tremendous effort in a very short period of time to address each and every one of staff’s many questions and comments. At staff’s request, Poseidon even agreed on March 18, 2009 to reimburse Dr. Pete Raimondi to provide staff with a third-party review of impingement. Poseidon is pleased that Dr. Raimondi commented favorably on the methods used by experts for Poseidon, as his April 1 reports states that:

“Generally I think this approach is a very interesting and potentially an appropriate method for comparison of impingement

losses (or any sort of loss) to gains in production provided by the creation or restoration of wetland habitats.”

Yet, unfortunately, Dr. Raimondi submitted his assessment a week late, hampering Poseidon’s ability to prepare a response, and quarrels with our experts’ application of their own methods, and concludes that Poseidon must provide many additional acres of mitigation wetlands to compensate for potential impingement losses at the CDP.

Poseidon respectfully disagrees with Dr. Raimondi, and urges the Board to approve the Minimization Plan with its robust mitigation commitment (up to 55.4 acres). The proposed mitigation is ample to offset impingement and entrainment associated with stand-alone operations, and very likely constitutes over-mitigation for potential loss and mortality at the proposed plant. This is so for many reasons, including the following principal points:

- The Proposed Wetlands Will Produce Fish in Amounts to Compensate Fully for Fish Lost to Potential Impingement – Dr. Raimondi has opined that juvenile and adult fish that will be present in the proposed wetlands cannot be used to compensate for fish lost at the CDP. This is nonsensical. Poseidon is committing to restore or construct a massive wetlands – up to 55.4 acres – with many benefits. These wetlands plainly have the capacity to compensate for fish lost to impingement, as well as larvae lost to entrainment. Larvae and fish of myriad species will live there. Absent the wetlands, they would not exist. Of course, Poseidon is entitled to receive mitigation credit for the many values furnished by these wetlands.
- No Double Counting – Dr. Raimondi bases his objection on the allegation that Poseidon’s experts are double counting the mitigation acreage for two purposes that he apparently believes are mutually exclusive – entrainment mitigation and impingement mitigation. Thus, he argues, Poseidon must build many acres of other wetlands to mitigate for impingement. This argument is undermined by the actual data, which show that the species that predominate impingement are largely different than the species that predominate entrainment. In addition, there will be ample fish production in the planned wetlands to replace the loss of fish that predominate impingement. Dr. Raimondi’s hypothesis simply does not match up with the facts.
- Impingement Should Not Be Considered a Major Driver of Mitigation, as Impingement Losses Likely Will Be Small – Our experts’ impingement assessment is based on assumed values that artificially inflate impingement. This may seem odd, but these values were produced at the request of Regional Board staff, based on unfounded fears that impingement would be higher than our experts had said it would be. The calculations in accordance with staff input are based on the somewhat fantastic assumption that events expected to occur only once every 25 or 35 years, occur annually, for an entire two-week period. Even with these unrealistic assumptions, the impingement estimate was still small, about 9 pounds per day, enough fish to feed 3 brown pelicans. Staff directed us to make calculations such as this, and then in the staff report suggest that we now agree that impingement is significant. We have never agreed to that point and, in fact, continue to believe that impingement will be *de minimis* at the Project. Nevertheless, Poseidon has agreed to offset hypothetical impingement even at the inflated value (9 pounds per day).

- Impingement Will Be Reduced Over That Observed at the EPS Because The CDP Will Operate at Lower Flows – Staff has resisted the long-established principle that reductions in flow result in reduced impingement. This common-sense notion long has been established at the EPS where the relationship between flow and impingement is “direct” and “significant.” An acknowledgement of this basic principle helps to demonstrate the *de minimis* nature of potential impingement, and supports a reasonable expectation of lower impingement when the EPS does not discharge enough water to meet the Project's feedstock needs.
- Poseidon Should Get Credit for Helping to Sustain the Ecosystem of Agua Hedionda Lagoon, Which Would Decline, Perhaps Dramatically, Without Continued Operation of the EPS Intakes – Although perhaps counterintuitive at first blush, the ecosystem of the Lagoon as it exists today did not exist prior to power plant operations that began in the 1950s. The ecosystem largely relies on the activities of humans, such as periodic dredging to keep water flowing to the intakes, and largely is a man-made system, providing an estuarine habitat and refuge that otherwise would be largely lower value mudflat. Thus, while no doubt the intakes entrain and impinge, much of the lost biomass might not exist without the intakes, and, most importantly, an entity with an economic incentive to keep Lagoon in a condition that allows effective intake operation.

Poseidon is confident, as should be the Board, that the Project will comply with California Water Code Section 13142.5(b), which requires the use of the best available site, design, technology and mitigation measures feasible to minimize the intake and mortality of marine life. The Minimization Plan assures that the Project will meet, and very likely exceed, these requirements in that:

- **Site:** By co-locating with the EPS, where it can use EPS discharge water to meet its source water needs, the Project will minimize the unnecessary intake of seawater as well as avoid the environmental costs associated with the construction of a new intake system. In fact, if the Project had been operating in 2008, 88.5% of its water supply needs would have been met by the EPS discharge.
- **Design:** The Project's primary Project design feature—i.e., direct connection of the desalination plant intake and discharge facilities to the discharge canal of the EPS—minimizes impingement and entrainment effects during co-located operations by avoiding unnecessary intake of seawater, and during stand-alone operations by reducing screen velocity and eliminating heat-related mortalities.
- **Technology:** The Project utilizes the best available technology measures feasible for its site-specific conditions through the installation of variable-frequency drives on the desalination plant's intake pumps.
- **Mitigation:** Although Project-related impingement and entrainment are expected to be minimal and will already be reduced by the site, design and technology elements, Poseidon has committed to mitigation under the terms of the MLMP to fully offset potential entrainment and impingement.

Final approval of the Minimization Plan is the last step in the Project's eight-year, multi-agency entitlement process and review. It will pave the way for Poseidon to finally break ground on the Project, so that it can provide much-needed water to the San Diego region's residents, as well as begin construction of the mitigation wetlands, which will provide substantial ecological benefit.

The Board also can be assured that Poseidon has addressed the four outstanding items identified by staff at the February 11, 2009 hearing on the MLMP:

- Chapter 6 of the Minimization Plan details the Regional Board authority under the MLMP.
- Chapter 6 also provides for the prioritization of mitigation sites within the boundaries of the Regional Board.
- Poseidon has laid out multiple approaches for estimating the Project's projected stand-alone impingement. These are described and analyzed in Attachments 5 and 9 to the Minimization Plan.
- In a February 26, 2009 submittal to the Regional Board, Poseidon provided regulatory documents from the City of Carlsbad, the California Coastal Commission, and the State Lands Commission to demonstrate the requirements imposed on the Project by these agencies.

In light of the above, and as further described below and in related submittals, Poseidon respectfully requests the Board's approval.

II. RELEVANT FACTUAL BACKGROUND

A. Relationship between the Project and the Lagoon

If approved, the Project will provide potable water to some 300,000 San Diego-area residents in this water-starved region.¹ The Project will be situated adjacent to the EPS on the Lagoon, which, in its present state, opens into the Pacific Ocean.

The Lagoon was named "Agua Hedionda," which means "stinking water," because when it was discovered by the Spanish, its mouth was closed to the Pacific Ocean and it was characterized by stagnant mudflats.² In 1954, the EPS was commissioned by San Diego Gas & Electric.³ To obtain a sufficient cooling water source for the new power plant, San Diego Gas & Electric dredged more than 3 million cubic yards of sediment from the Lagoon. This dredging

¹ See 2005 Urban Water Management Plans for the San Diego County Water Authority; Carlsbad Municipal Water District; Valley Center Municipal Water District; Rincon del Diablo Municipal Water District; Sweetwater Authority; Rainbow Municipal Water District; Vallecitos Water District; Santa Fe Irrigation District; Olivenhain Municipal Water District; and City of Oceanside.

² "Beach Receives Bounty of Dredging," *San Diego Union Tribune*, March 7, 2009

³ Agua Hedionda Land Use Plan, City of Carlsbad Local Coastal Program

created an open channel that enabled tidal flushing from the Pacific Ocean.⁴ Although natural storms and wave action constantly deposit sediment that would ultimately close the Lagoon's mouth, the EPS's operators have regularly maintained and dredged the Lagoon, thereby keeping the mouth open and preserving the cooling water source.⁵ In 1998-99, the entire Lagoon was dredged to an average depth of 8 to 11 feet, significantly increasing tidal flushing.⁶

Because of the stewardship of the power plant operators and others over the last half century, today the Lagoon is a 338-acre man-made coastal embayment teeming with marine life in a healthy marine ecosystem.⁷ Visitors no longer find "stinking water" and mudflats but instead a vibrant water body with a host of recreational and educational activities and resources, including the Hubbs-SeaWorld fish hatchery, the Carlsbad Aquafarm, the YMCA Camp and the Discovery Center.⁸ Historical records show that without consistent dredging, the Lagoon would decline from its current state back to its "mudflat" state.⁹ Dredging the Lagoon is a significant and expensive enterprise; in the event that the EPS were to cease operations, and if no industrial installation replaced it, the Lagoon could find itself without a steward. If this were to happen, the Lagoon would return to its natural condition, characterized by a far less rich ecosystem. In particular, marine life would be expected to substantially diminish from its present condition. Thus, the Lagoon in its present ecological state depends on the presence of an industrial operator.

In approving the Project, the Regional Board can assure continuation of the reciprocal relationship between the Lagoon and industrial operations. In fact, because the Project will require less water for desalination operations than the EPS requires for cooling purposes, the EPS is expected to discharge sufficient cooling water to meet the majority of the Project's source water needs.¹⁰ If EPS ceases to operate and the Project must operate in stand-alone mode by leasing the EPS's intake and discharge systems for its use, the Project will provide an industrial steward for the Lagoon that would otherwise not exist.

B. Evolution of the Minimization Plan

When the Regional Board issued a joint NPDES/WDR permit for the Project's discharge in 2006, it recognized that when the EPS is meeting the Project's feedstock needs, the Project will not meaningfully affect the intake and mortality of marine life at the intake system. The

⁴ Precise Development Plan and Desalination Plant Project (FEIR 03-05) (SCH#2004041081). Appendix E - Intakes Effects Assessment

⁵ "Beach Receives Bounty of Dredging," *San Diego Union Tribune*, March 7, 2009

⁶ SeaWorld/Busch Gardens Animal Information Database, San Diego Wetlands - Agua Hedionda Lagoon. Available at: http://www.shamutv.com/swc/wetlands/sd_county_wetlands/agua_hedionda_lagoon.htm

⁷ Carlsbad Desalination Project, Agua Hedionda Lagoon. Available at http://carlsbad-desal.com/agua_hedionda_lagoon.asp

⁸ City of Carlsbad Lagoon Overview – Agua Hedionda Lagoon. Available at: <http://www.carlsbadca.gov/parks/lagoonoverview.html>

⁹ "Beach Receives Bounty of Dredging," *San Diego Union Tribune*, March 7, 2009

¹⁰ Minimization Plan, p. 3-4. March 9, 2009

Regional Board noted that “when operating in conjunction with the power plant, the desalination plant intake would not increase the volume or the velocity of the power station cooling water intake, nor would it increase the number of organisms impinged by the Encina Power Station cooling water intake structure.”¹¹ Because “nearly 98 percent of the larvae entrained by the EPS are dead at the point of desalination intake[,] a *de minimis* of organisms remain viable which potentially would be lost due to the incremental entrainment effect of the CDP operation.”¹²

As such, the Regional Board required Poseidon to submit for its approval a Minimization Plan assessing “the feasibility of site-specific plans, procedures and practices to be implemented and/or mitigation measures to minimize the impacts to marine organisms when the CDP intake requirements exceed the volume of water being discharged by the EPS;”¹³ i.e., “a plan to minimize these impacts to marine organisms under conditions of operation in conjunction with the Encina Power Station”¹⁴ in which the Project requires more water than the EPS discharge to operate. If EPS were to cease operations and the Project were to operate in stand-alone mode, additional review pursuant to Water Code Section 13142.5(b) will be required.¹⁵

Poseidon submitted the first draft of its proposed Minimization Plan to the Regional Board on February 12, 2007. After public comment, Poseidon submitted a substantially revised second draft on June 29, 2007. In response to a letter from Regional Board staff on February 19, 2008, Poseidon again revised the Minimization Plan and resubmitted it on March 6, 2008. The March 6, 2008 version of the Minimization Plan was conditionally approved by the Regional Board on April 9, 2008. Final approval was conditioned upon Poseidon’s submittal of a mitigation plan as an amendment to the Plan.¹⁶

Consistent with the Board’s direction, Poseidon engaged in a months-long interagency process to develop a “specific mitigation alternative...to compensate [for] entrainment and impingement of marine organisms by operations at the CDP.”¹⁷ The end result of the

¹¹ Order No. R9-2006-0065, F-49, VII.B.4. *Intake Regulation*

¹² *Id.*

¹³ *Id.*, at 22, VI.C.2.e

¹⁴ Resolution No. R9-2008-0039.

¹⁵ *Id.*

¹⁶ Resolution No. R9-2008-0039 required Poseidon to address items in staff’s February 19, 2008 letter (many of the items had been mooted only by the March 6, 2008 version of the Plan), and the following additional concerns:

- a) identification of impacts from impingement and entrainment;
- b) adequate monitoring data to determine the impacts from impingement and entrainment;
- c) coordination among participating agencies for the amendment of the Plan as required by Section 13225 of the California Water Code;
- d) adequacy of mitigation; and
- e) commitment to fully implement the amendment to the Plan.

¹⁷ This process was explained in more detail in Poseidon’s January 26, 2009 comment letter.

interagency process was the development of the MLMP, which was approved by the Coastal Commission and the State Lands Commission and incorporated into Chapter 6 of the Minimization Plan. As explained in detail in Poseidon's January 26, 2009 comment letter, the MLMP provides for the construction or restoration of up to 55.4 acres of highly productive estuarine wetlands in the Southern California Bight.

Although Poseidon was required to develop the Minimization Plan only to address co-located operations, the MLMP, at the direction of the Coastal Commission, was developed to address mitigation for stand-alone operations.

III. POSEIDON HAS WORKED CLOSELY WITH STAFF ON THE FOUR ITEMS THAT STAFF IDENTIFIED AT THE FEBRUARY 11, 2009 HEARING

On February 11, 2009 the Regional Board considered the MLMP for the first time, continuing its review to the present hearing. Staff identified four additional issues it sought to resolve concerning the March 6, 2008 Minimization Plan before recommending that the Regional Board take final action on the Minimization Plan:

- (1) placing the Regional Board and its Executive Officer on equal footing, including funding, with Coastal Commission and its Executive Director, in the MLMP, while minimizing redundancies (e.g., only one Scientific Advisory Panel) details of dispute resolution process to be worked out);
- (2) reducing the number of [potential mitigation] sites to five, in consultation with the Coastal Commission, with the existing proviso that other sites within the Regional Board boundaries could be added;
- (3) Poseidon to provide the flow-proportioned calculations for its impacts due to impingement, to help support the Regional Board's determination that these impacts are *de minimis*; and
- (4) Poseidon to provide a consolidated set of all requirements imposed to date by the various agencies.

Subsequent to the February 11, 2009 hearing, Poseidon teleconferenced with staff and its counsel many times in an effort to address the identified issues. Staff agrees with Poseidon that all of these issues have been addressed.¹⁸

A. The Minimization Plan Places the Regional Board on Equal Footing with the Coastal Commission

In response to staff's request that the Minimization Plan clearly place the Regional Board on equal footing with the Coastal Commission, in Chapter 6 of the Minimization Plan, Poseidon clearly identified provisions of the MLMP that are enforceable by the Coastal Commission, then

¹⁸ Regional Board Staff Report: Review of Poseidon's Flow Entrainment and Impingement Minimization Plan Dated March 9, 2009, p. 6. March 27, 2009

indicated for each of them how they are also enforceable by the Regional Board if the Plan is approved.¹⁹ For instance, the Plan provides that the Regional Board will have the authority to approve the final mitigation site(s) and restoration plan for the site(s), and enforce compliance with the MLMP's strict performance criteria.²⁰

B. The Minimization Plan Prioritizes Mitigation Sites within the Regional Board's Boundaries

In response to staff's request to reduce the number of proposed mitigation site(s) from 11 to 5, Poseidon amended the Minimization Plan to provide as follows:

Sites located within the boundaries of the Regional Water Quality Control Board, San Diego Region, shall be considered priority sites. If Poseidon proposes one or more mitigation sites outside of these boundaries, it first shall demonstrate to the Board that the corresponding mitigation could not feasibly be implemented within the boundaries, such as when the criteria established in Section 3.0 of the MLMP [providing site criteria] are not satisfied.²¹

Therefore, "among the eleven candidate sites identified in the MLMP, Poseidon will consider the five sites within the Regional Board's boundaries as priority sites for selection."²²

C. Poseidon Provided Staff with Entitlement Documents from the City of Carlsbad, the Coastal Commission and the State Lands Commission to Establish the Requirements Imposed on the Project to Date by the Various Agencies

On February 26, 2009, staff counsel identified certain items that would satisfy staff's request that, "Poseidon [] provide a consolidated set of all requirements imposed to date by the various agencies." Poseidon responded by submitting six regulatory documents from the City of Carlsbad, the California Coastal Commission and the State Lands Commission:

1. City of Carlsbad Development Agreement (DA 05-01)
2. City of Carlsbad Redevelopment Permit (RP 05-12)
3. City of Carlsbad EIR Exhibit B, Mitigation Monitoring and Reporting Program
4. City of Carlsbad Precise Development Plan (PDP 00-02)

¹⁹ Minimization Plan, Section 6.6 (see chart). March 9, 2009

²⁰ *Id.*

²¹ *Id.*, Chapter 6, Section 6.4. *Site Selection*

²² Regional Board Staff Report: Review of Poseidon's Flow Entrainment and Impingement Minimization Plan Dated March 9, 2009, p. 5. March 27, 2009

5. State Lands Commission Lease Agreement (PRC 9727.1)
6. California Coastal Commission Condition Compliance for CDP No. E-06-013 — Special Condition 8.

All of these items were publicly available, and Poseidon already had submitted the key documents, including the Coastal Commission Condition Compliance and the State Lands Commission Lease Agreement, into the record by the time of the February 11, 2009 hearing.²³

D. The Minimization Plan Provides Various Flow-Adjusted Approaches to Estimating the Project's Projected Impingement

Staff's third request that Poseidon "provide the flow-proportioned calculations for Poseidon's impacts due to impingement, to help support the Board's determination that these impacts are *de minimis*," required the most extensive collaboration with staff. Since the February 11, 2009 hearing, Poseidon has had many communications with staff addressing specific questions and data requests, including multiple teleconferences.²⁴

1. Estimated Project-Related Impingement Is *De Minimis*

On April 30, 2008, Poseidon submitted a calculation indicating that the Project's stand-alone impingement would be approximately 1.57 kg per day,²⁵ a *de minimis* value. When operating in co-located mode, any impingement associated with the Project would naturally be even less. To provide context to the impingement estimate, 1.57 kg per day of fish is barely enough fish to sustain an adult pelican.²⁶

This impingement estimate was calculated by applying a linear regression analysis to EPS's 2004-05 impingement sampling data. Two outlier days were excluded from the calculation. Staff expressed concern that the linear regression analysis was insufficient to support a reliable estimate and requested the inclusion of the outlier data. Staff asked Poseidon to estimate the Project's impingement using flow-proportioned values.

The common-sense understanding that reduced flow volumes result in reduced impingement are underscored by staff's request for flow-proportioned values. Because the Project will withdraw less water than EPS's historical flows, the Project's operations will result in less impingement. In order to project the impingement that may eventually be associated with the Project's operations, therefore, it is necessary to discount EPS's impingement data by the Project's relatively lower flow volumes.

²³ Latham & Watkins LLP January 26, 2009 Comment Letter, Appendix A.

²⁴ Appendix A, Correspondence with Regional Board Staff and Counsel Since the February 11, 2009 San Diego Regional Water Quality Control Board Meeting.

²⁵ This value was initially incorrectly calculated in Poseidon's March 6, 2008 Minimization Plan as 0.96 kg per day.

²⁶ An adult pelican may eat up to 1.8 kg of fish per day. See San Diego Zoo Animal Bytes, Pelican. Available at: www.sandiegozoo.org/animalbytes/t-pelican.html

In Attachment 5 to the Minimization Plan, Poseidon describes the nature of the direct relationship between impingement and flow. Poseidon cites a number of authorities that support the well-established proposition that reducing flow reduces impingement. In addition to providing authority to reflect the general understanding that flow and impingement are directly related, Poseidon shows how the 2004-5005 impingement data also illustrate the phenomenon specifically.²⁷

It is important to note that the conclusions drawn from these recent data correspond with those reached by San Diego Gas & Electric (SDG&E) from the last impingement survey (conducted in 1979-1980). In a report that it submitted to the Regional Board in 1980 pursuant to Section 316(b) regulations, SDG&E found that "significant correlations between levels of impingement and the flow rates of cooling water in the conveyance channels, impingement increasing fairly directly with increasing flow rates, assuming equal numbers of fish were present during the various flows."²⁸ The results of this study support the conclusion that "in general, there was a direct relationship between increasing flow rates of cooling water and the impingement levels of fishes."²⁹ When the general authority in support of the proposition is combined with the specific observations at the EPS intake (both in 1979/1980 and 2004/2005), the resulting evidence indicates that that, because of its lower flow volumes, Poseidon's stand-alone operations will result in lower levels of impingement than those recorded in 2004/2005.

After describing the relationship between flow and impingement, Attachment 5 presents several different ways to account for this relationship in the impingement estimates. These approaches produce a range of possible impingement estimations of between 1.57 to 4.7 kg per day. Based on additional scientific analysis of the outlier events, which is detailed in Attachment 9 to the Minimization Plan, the estimate values toward the lower end of the range more reasonably anticipate the Project's operations. Because the estimations reflect expected stand-alone impingement, it is expected that Project-related impingement during the life of the EPS would be even less.

While the Minimization Plan provides for stand-alone impingement to be fully offset, Poseidon does not consider impingement within the estimated range to be material. Rather, it is minimal. Also, even though the impingement estimations were calculated for stand-alone operations, they do not take into account reductions in impingement that are likely to occur in this mode due to design and technology measures, as the impacts of such measures on the estimation, particularly at such low impingement values, are not easily quantified.³⁰

²⁷ The 2004/2005 impingement data reflect a statistically significant relationship between flow and impingement.

²⁸ San Diego Gas & Electric, Encina Power Plant Cooling Water Intake System Demonstration (1980), at 7-3.

²⁹ San Diego Gas & Electric, Encina Power Plant Cooling Water Intake System Demonstration (1980), at 7-139-140.

³⁰ Design and technology measures are discussed in more detail in Chapters 3 and 4, respectively, and in Attachment 10 of the Minimization Plan, and summarized in Section VI c., *infra*.

To be clear, Poseidon considers all of the various, reasonable impingement estimation approaches to result in impingement estimations that are *de minimis*; i.e., already minimal.³¹ This is true for both stand-alone operations and for co-located operations. Because impingement is already minimal, no additional mitigation measures need be taken to minimize it under Water Code Section 13142.5(b), an issue which is discussed more fully in Section IV, *infra*. Still, Poseidon has committed in the MLMP to 55.4 acres of mitigation wetlands, and is therefore over-mitigating for impingement.

IV. LEGAL STANDARD – WATER CODE SECTION 13142.5(B)

The purpose of the Minimization Plan is to assure that the Project will be in compliance with Water Code Section 13142.5(b),³² a section of California’s Porter-Cologne Water Quality Control Act regulating the intake system.³³ Section 13142.5(b) provides that:

For each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating or industrial processing, the best available site, design, technology and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life.

Thus, the Minimization Plan describes the best available site, design, technology and mitigation measures feasible for the Project, which will minimize the intake and mortality of all forms of marine life.

While EPS is operating, it is expected to supply the majority of the water needed to support desalination operations.³⁴ As explained in staff’s March 27, 2009 staff report, even though the Minimization Plan in many places discusses stand-alone operations, the Regional Board will reconsider whether the Project satisfies Section 13142.5(b) should EPS cease to operate. At this juncture, then, the Regional Board only need consider whether the Minimization Plan assures the Project will comply with Section 13142.5(b) when EPS provides insufficient water supply for the Project while operating in co-located mode.³⁵

³¹ In its report, staff states that “Poseidon no longer proposes that the Board consider these impacts *de minimis*.” This is not Poseidon’s position.

³² Order No. R9-2006-0065, F-49, VII.B.4. *Intake Regulation*.

³³ It is not disputed that the Project is not subject to Section 316(b) of the federal Clean Water Act, which is also administered by the Regional Board. *Id*.

³⁴ In 2008, EPS would have met the Project’s water intake needs 88% of the time. Minimization Plan, p. 3-2. March 9, 2009

³⁵ The Regional Board has already concluded that when EPS fully meets the Project’s water intake needs, any intake and mortality of marine life will be *de minimis*. Order No. R9-2006-0065, pp F-49-50.

V. **THE PROJECT WILL USE THE BEST AVAILABLE SITE, DESIGN, TECHNOLOGY, AND MITIGATION MEASURES FEASIBLE TO MINIMIZE THE INTAKE AND MORTALITY OF MARINE LIFE**

A. **Site**

As recognized in the 2006 NPDES/WDR permit granted to Poseidon for the Project, the Project site has been approved since 2006.³⁶ Co-locating the Project at the existing EPS site provides substantial environmental benefits relative to alternative sites because the EPS site would not require the construction of a new intake system. The primary benefits of this site are twofold. First, it prevents the environmental costs necessarily associated with new construction. Second, it provides the Project with source water that would otherwise be discharged into the Pacific Ocean; as a result, the Project only will result in the additional intake of seawater beyond what EPS would ordinarily require to the extent EPS's discharge flows are insufficient.

As explained in Chapter 2 of the Minimization Plan, there were only three possible sites within the City of Carlsbad: (1) the Encina Power Station; (2) the Encina Water Pollution Control Facility; and (3) the Maerkle Reservoir. The Encina Water Pollution Control Facility was rejected because it would only be able to accommodate a plant big enough to produce 10 MGD of water, which would be insufficient to meet user demands. Because of its lack of proximity to the intake system, this site would also require the construction of a 2-mile long water transport pipe. These factors, among others, made that site infeasible. The third site option, Maerkle Reservoir, was rejected for similar reasons and because the necessary construction changes would increase construction costs, and therefore water costs, to such a degree as to make the Project infeasible without any measurable environmental benefit. Staff agrees that the selected site is the best.³⁷

Project opponents have suggested that a site in Dana Point presents a preferable alternative site. Any site in Dana Point, however, is neither feasible nor available. While there has been some talk of locating a desalination plant at Dana Point, a variety of agencies in that area have already expressed interest in using the water from any such plant to meet local Orange County needs – and would likely reject the idea to export water to San Diego County. Moreover, there does not appear to be any infrastructure available to convey any such water generated in Dana Point to the Carlsbad area. Providing for any such infrastructure would complicate the Project greatly, and would require covering great distances, and passing through Camp Pendleton, owned by the federal government. Even if technically and politically feasible, which is very unlikely, any such conveyance would increase the cost of the water dramatically, potentially making the Project economically infeasible and the water unsalable. Entitlement proceedings for a Dana Point plant are incipient at best, and this potential source would not be

³⁶ See Order R9-2006-0065 (ordering Poseidon to generate “*site-specific* plans, procedures, and practices implemented and/or to be implemented to minimize the impacts to marine organisms[.]” (emphasis added). See also March 27, 2009 Poseidon Minimization Plan Regional Board Staff Report, p 7 (“The Regional Board...has already determined by implication that the site is the best available for purposes of CWC section 13142.5(b).”).

³⁷ Regional Board Staff Report: Review of Poseidon's Flow Entrainment and Impingement Minimization Plan Dated March 9, 2009, p. 7. March 27, 2009

available under the best of circumstances for many years, whereas Carlsbad and vicinity have an acute water need now.³⁸ Accordingly, a site in Dana Point is neither feasible nor available, and will not meet the objectives of the Project.

B. Design

Chapter 3 of the Minimization Plan describes the Project's many proposed design features that ensure the minimization of the intake and mortality of all forms of marine life.

The primary Project design feature is the direct connection of the desalination plant intake and discharge facilities to the discharge canal of the EPS, which was made possible through the site-selection process as outlined above. This direct connection to EPS facilities allows the use of the power plant cooling water as both source water for the Project and as blending water to reduce the salinity of the desalination plant concentrate prior to discharge to the ocean, resulting in only a *de minimis* increase in the impingement and entrainment of marine organisms over existing EPS operations.³⁹

The co-location of the Project on the EPS site will also result in the minimization of impingement and entrainment impacts when the EPS operation is temporarily or permanently discontinued, i.e. stand-alone operations. By co-locating the Project on the EPS site, the Project will result in significantly lower impingement and entrainment impacts during stand-alone operations than those caused by the EPS operations at the same intake flow, because the Project will employ different plant intake design and operations than the power plant.⁴⁰ These stand-alone Project design features include:

- Reduction in Inlet Screen Velocity. The Project's intake flow of 304 MGD will minimize the impingement and entrainment of marine organisms under stand-alone operations. At the design flow of 304 MGD, the bar rack screen velocity would be less than or equal to 0.5 fps, thereby creating flow conditions which the EPA has recognized would reduce impingement losses to a less than significant level.⁴¹
- Reduction in Fine Screen Velocity. By eliminating the need for Power Generation operational limitation during stand-alone operations, the Project will

³⁸ See 2005 Urban Water Management Plans for the San Diego County Water Authority; Carlsbad Municipal Water District; Valley Center Municipal Water District; Rincon del Diablo Municipal Water District; Sweetwater Authority; Rainbow Municipal Water District; Vallecitos Water District; Santa Fe Irrigation District; Olivenhain Municipal Water District; and City of Oceanside.

³⁹ Minimization Plan, Chapter 3, Section 3.3 *Use of EPS Discharge as Source Water for CDP*.

⁴⁰ *Id.*

⁴¹ See 66 Fed. Reg. 65274; see also 40 C.F.R. 125.84(b)(2), 125.84(c)(1) (stating that in the context of establishing the "best technology available" under Clean Water Act Section 316(b), the EPA determined – based on substantial scientific evidence – that a maximum intake velocity of 0.5 ft/s or less minimizes adverse environmental impacts associated with impingement mortality to acceptable levels.) (Previously submitted January 26, 2009, Latham & Watkins LLP Comments, Appendix A.)

experience greater flexibility in its choice of power plant intake pumps and screens, thereby reducing the through-screen velocity of the EPS's operational velocity. This significant reduction of the through-screen velocity would reduce the impingement of marine life on the vertical screens as well.

- Ambient Temperature Processing. When EPS is not generating electricity, the Project has been designed to operate using cold seawater from the power plant condensers to avoid the need to preheat the intake seawater. This design feature will eliminate those heat-related entrainment mortalities.
- Elimination of Heat Treatment. Stand-alone Project operations would not require heat treatment of the existing EPS intake and discharge facilities, eliminating the marine organism mortality associated with the current heat treatment events.⁴²

Project opponents have indicated that they favor desalination operations using a sub-surface intake system. Aside from the significantly increased environmental costs associated with building new sub-surface intakes rather than using the EPS's existing intake system,⁴³ sub-surface intakes are infeasible at the site. As explained in the Carlsbad EIR, the geology simply would not support sub-surface intakes.⁴⁴

C. Technology

As outlined in Chapter 4 of the Minimization Plan, the Project thoroughly analyzed a number of alternative seawater screening and intake technologies to determine the best available technology measures feasible for the Project's site-specific conditions in order to minimize the impingement and entrainment of marine organisms in the intake seawater. Because Water Code Section 13050 does not define the term "feasible," this assessment was based upon the definition of "feasible" set forth in the California Environmental Quality Act (CEQA) Guidelines,⁴⁵ which is generally consistent with the principles underlying the Porter-Cologne Water Quality Control Act.

⁴² Under current EPS operations, the power plant completes heat treatment of the intake facilities over 6 to 8 weeks, which results in 100% mortality of those marine organisms residing in the intake channels at that time. By removing the need for heat treatments, these significant mortalities will be eliminated. Minimization Plan, Chapter 3, Section 3.7 *Elimination of Heat Treatment Related Mortality*.

⁴³ Precise Development Plan and Desalination Plant Project (FEIR 03-05) (SCH#2004041081), Appendix C - Alternative Project Intake Source Water Collection Systems – Beach Wells, Infiltration Galleries and Seabed Filtration Systems.

⁴⁴ Wiedlin and Huntley, *Analysis of Alternative Subsurface Intake Structures, Proposed Desalination Plant, Carlsbad, California*. January 27, 2007

⁴⁵ "Feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors." CEQA Guidelines, Section 15364 (14 CCR 15364).

The following intake technology measure was found to be a feasible impingement, entrainment and flow reduction technology measure for the site-specific conditions of the CDP:

- Installation of Variable Frequency Drives (VFDs) on Desalination Plant Intake Pumps. The desalination plant intake pump station will be equipped with a VFD system to closely control the volume of the collected seawater. As water demand decreases during certain periods of the day and the year, the variable frequency drive system will automatically reduce the intake pump motor speed and decrease intake pump flow to the minimum level needed for water production. The installation of a VFD system at the intake pump station would reduce the total intake flow of the desalination plant compared to constant speed-design, resulting in the proportional decrease in entrainment associated with desalination plant operations. In addition, by reducing the intake pump flow below EPA approved velocities, the Project will further minimize impingement.⁴⁶

Taking into account economic, environmental and technological factors, the following technology alternatives were determined not to be capable of being accomplished in a successful manner within a reasonable period of time and thus, infeasible:

- Installation of Subsurface Intakes (e.g., beach wells, slant wells, infiltration galleries, etc.). The Project's hydrogeologic studies confirm that none of the alternative intakes evaluated are capable of delivering the 304 MGD of seawater needed for environmentally safe operation of the Project.⁴⁷ Furthermore, the quality of the water available from the subsurface intake would be untreatable due to an extremely high salinity level, excessive iron and high suspended solids.⁴⁸ Finally, extensive environmental damage would be associated with the implementation of such intakes.
- Construction of New Open Ocean Intake. The construction and operation of a new offshore intake in the vicinity of the Project site to serve the seawater supply needs of the Project would not result in significant reduction in dredging frequency, would cause permanent construction related impacts to the marine

⁴⁶ Minimization Plan, Chapter 4, Section 4.4.1 *Installation of Variable Frequency Drives on Desalination Plant Intake Pumps.*

⁴⁷ The maximum capacity that could be delivered using subsurface intakes is 28,000 GPM (40 MGD) from the installation of horizontal wells, which is substantially below the needed intake flow. Minimization Plan, Chapter 4, Section 4.2.1 *Desalination Plant Subsurface Intakes.*

⁴⁸ The total dissolved solids (TDS) concentration in the water was approximately 60,000 – 85,000 mg/L, nearly twice that of typical seawater (33,500 mg/L). Minimization Plan, Chapter 4, Section 4.2.1 *Desalination Plant Subsurface Intakes.* See also, Wiedlin and Huntley, *Analysis of Alternative Subsurface Intake Structures, Proposed Desalination Plant, Carlsbad, California.* January 27, 2007.

environment and would shift entrainment to a more sensitive area of the marine environment that would affect a greater diversity of species.⁴⁹

- Substantial Modification of Existing Power Plant Intake and Screening Facilities. Implementation of major physical or structural modifications to the existing EPS intake and screening facilities were found to be infeasible because they would interfere with, or interrupt power plant operations and would result in very limited impingement and entrainment benefits.⁵⁰
- Installation of VFDs on Existing Power Plant Intake Pumps. The installation of a VFD system on the existing EPS intake pumps would provide negligible benefits to marine life while significantly interfering with ongoing power plant operations.

Additionally, Poseidon has committed to the re-evaluation of these and any other available impingement and entrainment minimization technologies both through the State Lands Commission Lease Amendment and the MLMP. The Lease Amendment requires Poseidon to undertake an environmental review either when EPS permanently shuts down or August 2018, whichever is earlier.⁵¹ Based on this review, the State Lands Commission can then require compliance with any additional reasonable and appropriate technologies. The MLMP gives Poseidon the option of foregoing or reducing the Phase II portion of the wetlands restoration if Poseidon can demonstrate that additional entrainment technology measures at the intake structure obviate the need for more mitigation, thus providing significant incentive to Poseidon to continue to re-evaluate feasible technology measures.⁵²

Staff has observed that the previously submitted March 6, 2008 version of the Minimization Plan included a combination of intake, screening and treatment technologies that were found to be feasible impingement, entrainment and flow reduction technology measures and which are no longer included in the present version of the Minimization Plan. Chapter 4.4 and Attachment 10 of the Minimization Plan explain that subsequent to the submittal of the March 2008 version of the Minimization Plan, Poseidon, with the assistance of the Coastal Commission and the Commission's Scientific Advisory Panel, discovered that these technology measures would not be effective in returning viable organisms to the ocean, and would not result

⁴⁹ The Coastal Commission also found that alternative intakes that might avoid or minimize environmental impacts are infeasible or would cause greater environmental impacts. See Coastal Commission Recommended Revised Findings Coastal Development Permit for Poseidon Carlsbad Desalination Project, page 80 of 133; (Previously submitted January 26, 2009, Latham & Watkins LLP Comments, Appendix A.) Available at: <http://documents.coastal.ca.gov/reports/2008/8/W4a-8-2008.pdf>

⁵⁰ The Lease Amendment approved by the State Lands Commission to authorize the use of EPS facilities by the Project specifically prohibited the implementation of entrainment and impingement minimization measures that would interfere with, or interrupt ongoing power plant operations. State Lands Commission, Final Amendment of Lease PRC 8727.1, November 24, 2008 at Section 2. (Previously submitted January 26, 2009, Latham & Watkins LLP Comments, Appendix A.)

⁵¹ *Id.*

⁵² MLMP, Section 6.0.

in any minimization or reduction of entrainment. Furthermore, research demonstrates that the long-term survival of marine organisms once they have been returned to the ocean is uncertain.⁵³ Therefore, Poseidon determined these technological features would not be effective in the minimization or reduction of entrainment, and the decision was made to remove these technology measures from the Minimization Plan.

In Dr. Peter Raimondi's draft report dated March 23, 2009 he suggested that a fish return system, like the kind employed at the San Onofre Nuclear Generating Station (SONGS), may be feasible for the Project. It was beyond Dr. Raimondi's scope of work and expertise to discuss potential technology measures for the Project. In addition, a comparison of this Project to the San Onofre Nuclear Generating Station ("SONGS") is inapposite. SONGS is a nuclear generating station that pulls in several billion gallons seawater per day of – much more than the 304 MGD needed for the Project. Despite these obvious and significant differences between SONGS and the Project, Poseidon has, in response to Dr. Raimondi's suggestion, evaluated the feasibility of a fish return system. Such a system is infeasible.⁵⁴ It is, therefore, not a component of the Minimization Plan.

D. Mitigation

In its January 26, 2009 public comment letter to the Regional Board, Poseidon provided a detailed explanation of the MLMP's requirements.⁵⁵ To avoid redundancy, Poseidon will not reiterate the same points here. However, it is helpful to remember that the mitigation wetlands proposed under the MLMP will be significant – up to 55.4 acres with strict performance criteria enforced by multiple agencies. The wetlands will produce substantial ecological benefit within the Southern California Bight, and most likely within the boundaries of the Regional Board.

Contrary to staff's interpretation that, "Poseidon proposes to rely in large part on mitigation as a form of minimization, as allowed by the terms of the CWC section 13142.5(b),"⁵⁶ Poseidon's mitigation measures under the MLMP are being made *in addition to* measures taken under the site, design and technology elements to minimize intake and mortality of marine organisms by impingement and entrainment. In co-located mode, as explained in Section VI, *supra*, entrainment and impingement associated with the Project's operations already will be minimal. However, all entrainment and impingement associated with stand-alone operations – not just co-located operations – will be offset fully by the productivity of the mitigation site(s).

1. The Proposed Wetlands Will Fully Offset Potential Entrainment and Impingement

⁵³ Ferry-Graham, Dorin and Lin, *Understanding Entrainment at Coastal Power Plants: Informing a Program to Study Impacts and Their Reduction*, CEC-500-2007-120 at 36 (March 2008).

⁵⁴ Appendix B, Tab 1, J. Rauilli and J. Balletto, "Carlsbad Desalination Plant Fish Return Feasibility Analysis."

⁵⁵ The MLMP is incorporated as Part A of Chapter 6 of the Minimization Plan.

⁵⁶ Regional Board Staff Report: Review of Poseidon's Flow Entrainment and Impingement Minimization Plan Dated March 9, 2009, p.11. March 27, 2009.

The proposed wetlands will fully and simultaneously mitigate for any entrainment and impingement that may eventually be associated with the Project's operations.⁵⁷ Forty-nine acres of these wetlands were designed to mitigate for the larval entrainment of the three most commonly entrained lagoon species (i.e., gobies, blennies, and garibaldi) and 6.4 acres of these wetlands were designed to mitigate for larval entrainment of the five most commonly entrained open ocean species (i.e., white croaker, northern anchovy, California halibut, queenfish, and spotfin croaker). According to the Empirical Transport Model—which was used to calculate the habitat capable of offsetting the entrainment of these enumerated species—the proposed wetlands will have the capacity and capability to reproduce the larvae of those species lost to entrainment.

In addition to producing the larvae of the most commonly entrained species to offset entrainment, the proposed wetlands will sustain many other forms of life as well. These other life forms will include diverse assemblages of plants, birds, invertebrates, mammals, and other fish species. To the extent that the wetlands produce fish biomass from other species, this biomass is available to offset any impingement that may eventually result from the Project's co-located or stand-alone operations.

Evidence of fish productivity in similar habitats indicates that the proposed wetlands will produce enough biomass from other fish species to fully offset potential impingement. Therefore, by producing the larvae of the most commonly entrained species as well as the biomass of other fish species, the proposed wetlands will fully and simultaneously mitigate for any entrainment and impingement that may eventually be associated with the Project's co-located or stand-alone operations.⁵⁸

2. Project Opponents' Concerns as Expressed During February 11, 2009 Public Comments are Unwarranted

At the February 11, 2009 hearing, Mr. Ed Kimura spoke on behalf of the Sierra Club. Mr. Kimura expressed concern that the MLMP “fails to apply an ecosystem-based approach” and assumes the connectivity of larval populations over a large geographic area because it allows for the location of the mitigation site(s) within the Southern California Bight.⁵⁹ The MLMP requires Poseidon to develop a functioning wetland, which will naturally have the component parts of a complete ecosystem in order to be functional. The MLMP does not assume that the mitigation site(s) will be connected to the Agua Hedionda Lagoon, as Mr. Kimura, seems to suggest, nor

⁵⁷ For a complete discussion of this issue, see Appendix B, Tab 2, D. Mayer and C. Nordby, “Wetlands Mitigation Credit for Potential Impingement, as Well as for Potential Entrainment.”

⁵⁸ See, e.g., Dr. Noel Davis, Dr. Pete Raimondi, Rick York, and Joanna Reinhardt, *Huntington Beach Units 3&4 Entrainment and Impingement Study Results, Mitigation Options, Staff and Working Group Recommendations, and AES's Response and Objections to the Recommendation* (mitigation wetlands to offset entrainment impacts, no additional mitigation acreage for impingement impacts)

⁵⁹ Regional Board February 11, 2009 Hearing Transcript, at 134:25 – 136:10.

does it preclude it. Regardless, the mitigation site(s) need not be connected to Agua Hedionda to offset the impingement and entrainment associated with intake.⁶⁰

Mr. Jim Peugh spoke on behalf of the San Diego Audubon Society. While noting that the standards in the MLMP are “thoughtful, complex, and essential,” he complained that “it’s not a plan” because of uncertainties inherent to creation of a wetland system.⁶¹ Poseidon is, however, bound to deal with any uncertainties as they arise because of the MLMP’s strict performance criteria, which will be enforced by the Coastal Commission, the State Lands Commission, and if the Minimization Plan is approved, the Regional Board. The MLMP’s standards have been set high in order to ensure that the mitigation wetlands will in fact achieve their purpose.⁶²

VI. CONCLUSION

Poseidon respectfully urges the Regional Board to approve the Minimization Plan and MLMP incorporated therein. The Minimization Plan assures that the Project will comply with Water Code Section 13142.5(b) by using the best available site, design, technology and mitigation measures feasible to minimize the intake and mortality of marine life. The Regional Board’s approval will pave the way for Poseidon to begin construction on a project that will not only provide 50 MGD of potable water to San Diego-area residents – upon which they are depending – but will also provide for up to 55.4 acres of new wetlands in the region and a long-term steward for Agua Hedionda Lagoon.

⁶⁰ For a detailed response to Mr. Kimura’s comments, Supplemental Appendix B, Tab 2, J. Balletto “Response to Comments of Ed Kimura at February 11, 2009 Regional Board Hearing Regarding Poseidon’s Marine Life Mitigation Plan.”

⁶¹ Regional Board February 11, 2009 Hearing Transcript at 136:14 – 138:22.

⁶² For a detailed response to Mr. Peugh’s comments, please see Supplemental Appendix B, Tab 1, C. Nordby, “Response to Comments of Jim Peugh, San Diego Audubon Society, at February 11, 2009 Regional Board Hearing Regarding Poseidon’s Marine Life Mitigation Plan.”