



April 9, 2015

Members, State Water Resources Control Board  
Attn: Ms. Jeanine Townsend, Clerk to the Board  
State Water Resources Control Board  
1001 "I" Street, 24<sup>th</sup> Floor  
Sacramento, CA 95814

VIA EMAIL: [commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

### **Comment Letter – Desalination Amendment to California Ocean Plan**

Dear Members of the Board:

Poseidon Water LLC ("Poseidon") appreciates the hard work that the Members and staff of the State Water Board have devoted to the process of developing a policy for regulating desalination facilities in California. The approach taken by State Board Members and staff over the past few years appears to have produced a reasonable set of guidelines to help Regional Water Boards make specific desalination permitting decisions.

As Governor Brown last week issued his fourth drought-related Executive Order in the past two years, we are reminded of the importance desalination must play in supplementing traditional sources of water supplies to our arid state. Indeed, one of the stated goals of the Desalination Amendment is to, "Support the use of ocean water as a reliable supplement to traditional water supplies while protecting beneficial uses." (*Draft Staff Report Including the Draft Substitute Environmental Documentation Amendment to the Water Quality Control Plan For Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-Substantive Changes*," Section 4.3 at p. 28 (March 20, 2015) (hereafter, "SED"). Poseidon supports this goal, and believes the draft Desalination Amendment go a long way to reaching that important balance.

Poseidon greatly appreciates State Water Board staff's efforts in addressing the hundreds of comments received on the July 3, 2014 draft Desalination Amendment, and for addressing many of the concerns we and the San Diego County Water Authority raised relative to continued permitting and operation of the nearly-completed Carlsbad Desalination Project ("CDP"). As you know, the entire San Diego region is counting on the CDP to provide roughly 50 million gallons per day of desperately-needed potable

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water beginning Fall of 2015, and it is our joint mission to ensure that the CDP can continue to be operated without extended interruption or substantial investment in additional capital facilities following the scheduled retirement of the Encina Power Station on December 31, 2017.

We believe that many changes proposed by staff in the March 20, 2015 draft Desalination Amendment will satisfactorily address several of the most important issues raised by Poseidon in its August 18, 2014 comment letter. These include:

- The addition of a provision in the proposed final amendment to account for previously approved mitigation projects for projects making a new Water Code Section 13142.5 (b) determination;
- Consideration of site-specific conditions and alternative approaches to compliance with desalination intakes and discharge requirements under Section 13142.5 (b) of the State Water Code;
- The inclusion of the CEQA definition of feasibility in keeping with the Carlsbad Project appellate court decision;

Poseidon continues to have concerns about the draft Desalination Amendment's approach for regulating brine discharges, and we have proposed language in Attachment A hereto that we believe will satisfactorily address those concerns, while still meeting the State (and Regional) Water Boards' obligation to protect beneficial resources of the state's ocean waters.

### **Brine Mixing Zone**

As currently drafted, the definitions for "Brine Mixing Zone" and "Natural Background Salinity" may render it impossible to demonstrate that alternative brine disposal methods, such as flow augmentation, provide a comparable level of protection to wastewater dilution and multipoint diffusers. The definition of "BRINE MIXING ZONE" (Desalination Amendment, Draft Final, March 20, 2015 at p. 20.) provides in part that, "The brine mixing zone shall not exceed 100 meters laterally from the points of discharge." By imposing an inflexible mixing zone limited to 100 meters, the proposed final amendment could have two, equally problematic consequences.

First, as indicated in the Table 1 below, a 100 meter mixing zone limitation could render flow augmentation, the discharge method utilized for the Carlsbad Desalination Project, infeasible due to what may be determined by the Regional Water Board to be an excessive amount of dilution water required to meet the receiving water salinity limitation.

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**Table 1**  
 Carlsbad Desalination Project  
 Brine Mixing Zone Size vs. Quantity of Dilution Water  
 Required to Achieve Receiving Water Salinity Limit

| ZID  |        |       |      | ZID w/ approximately 25% Safety Factor |        |       | Flow Augmentation | Pond Salinity |
|------|--------|-------|------|--|--------|-------|-------------------|---------------|
| Feet | Meters | Acres | ppt  | Feet                                   | Meters | Acres | MGD               | ppt           |
| 328  | 100    | 3.9   | 35.5 | 400                                    | 122    | 6.0   | 278               | 39            |
| 412  | 126    | 6.1   | 35.5 | 500                                    | 152    | 9.5   | 143               | 42            |
| 447  | 136    | 7.2   | 35.5 | 550                                    | 168    | 11.2  | 104               | 44            |
| 328  | 100    | 3.9   | 36.5 | 400                                    | 122    | 6.0   | 143               | 42            |

Second, even if relying on high volumes of dilution water were deemed acceptable, it may not necessarily result in the most environmentally beneficial discharge method for a given project. The question that Regional Boards (in consultation with State Water Board staff) should require project applicants to analyze is, what are the overall, comparative and holistic impacts of all technologies?

For example, a modest increase in the size of the brine mixing zone would significantly reduce the amount of dilution water required to meet the receiving water salinity limitation and could provide an environmentally preferable configuration. Turning to the table above, third row highlighted in yellow, if a Regional Board were to approve an increase in the size of the brine mixing zone from 100 meters to just 168 meters, it would result in the *reduction* of dilution water intake by more than 150% - potentially more protective to the near-range ecosystem than a strict adherence to the 100 meter brine mixing zone limit.

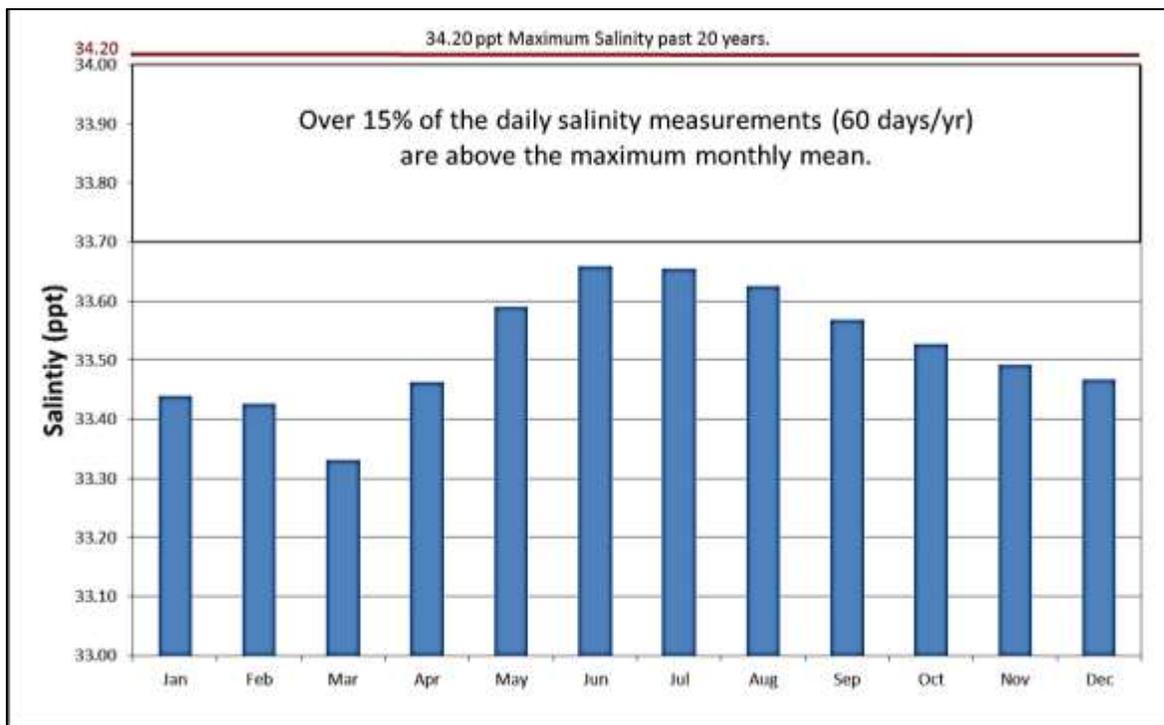
Poseidon strongly believes that the proposed final Desalination Amendment should include the flexibility to allow Regional Boards (in consultation with State Water Board staff) to approve modest increases in the 100 meter brine mixing zone, *provided that* a project applicant can successfully demonstrate that such an increase is environmentally superior on an overall basis, taking into account the totality of all site, design, technology, mitigation and impact minimization features of the proposed project.

**Definition of “Natural Background Salinity”**

The Desalination Amendment provides that brine discharges from desalination facilities shall not exceed 2.0 parts per thousand above the “NATURAL BACKGROUND SALINITY.” Natural background salinity is defined as the 20-year mean monthly salinity at the project location. The database that makes up the natural

background salinity for the Carlsbad Desalination Project shows a mean salinity of 33.5 ppt, a minimum salinity of 27.4 ppt, and a maximum salinity of 34.2 ppt over the last 20 years. The monthly mean, on the other hand, has a much narrower range from a low of 33.4 to a high of 33.7. Sixty-four percent of daily salinity measurements over the last 20 years are above the annual mean monthly salinity, as shown in Figure 1, 15 percent of the daily salinity measurements are above the maximum monthly mean. Under the proposed requirements, the Carlsbad facility would have to operate with less than a 2 ppt increase over the ambient salinity more than 60 days per year, which would severely impact plant reliability.

**Figure 1**  
 Carlsbad Desalination Project  
 Comparison of Maximum Daily Salinity to  
 Average Salinity by Month (1980-2012)



To address this problem, Poseidon requests the Desalination Amendment be revised to provide that the “natural background salinity” at a given location is defined as the 20-year mean monthly salinity at the project location unless the actual salinity measured at the facility intake absent any influence from the discharge is greater than the 20 year mean monthly salinity, in which case, the natural background salinity shall be the actual salinity measured at the intake absent any influence from the discharge.

Poseidon's August 18, 2014 comments on the July 3, 2014 draft Desalination Amendment included a similar request. However, that request did not include the requirement that the actual salinity measured at the intake be "absent any influence from the discharge." We have added this clarification in an effort to address staff's concern with the initial request as noted in staff's response to comment No. 15.17:

*"Using the actual salinity measured at an intake as the natural background salinity does not work for facilities with the intakes located nearby the discharges. In this scenario, the brine discharge could make the intake water saltier and saltier over time but the facility would not be in violation of the receiving water limitation for salinity even though natural background salinity is increasing over time."*

With the clarification that the actual salinity measured at the facility intake must be absent any influence from the discharge, we believe staff's concern has been addressed.

Poseidon is eager to support the proposed final Desalination Amendment if the definitions of "Brine Mixing Zone" and "Natural Background Salinity" are revised to accommodate the use of alternative brine disposal methods, outlined in Attachment A. Poseidon previously provided your staff with amendment language that would address these issues, and further believes that the proposed changes to these two definitions is consistent with the State Water Board's declared intent to provide flexible approaches to addressing the brine discharge issues as long as an applicant can demonstrate a comparable level of protection to beneficial uses.

### **Salinity Study Data Errors**

Lastly, we call your attention to two critical data errors in supporting scientific analyses that are being relied upon as the scientific basis for the receiving water salinity limitation of 2.0 parts per thousand (ppt). We understand that State Board staff has been in contact with the outside contractor lab to discuss these data errors after they were recently discovered.

Paragraph L.3.b. of the draft Desalination Amendment provides that the daily maximum receiving water limit for salinity shall not exceed 2.0 parts per thousand above natural background. According to the March 20 draft Desalination Amendment SED, it appears that this salinity limit was predicated on the hyper-salinity toxicity study performed by University of California, Davis, Department of Environmental Toxicology (Phillips *et al.* 2012). The Phillips, *et al.* study concluded that red abalone was one of the most developmentally sensitive species to brine, with a LOEC of 35.6 ppt. This value, in turn, was based on two definitive salinity tolerance tests performed for the State Water Board by the Marine Pollution Studies Laboratory - Granite Canyon, both of which were conducted on July 18, 2012 using adult abalone from two sources; one batch came from Monterey Bay and another from The Cultured Abalone in Goleta, California. The results

of these tests were submitted to the SWRCB as supporting the basis for the Desalination Amendment receiving water salinity limit of 35.5 ppt at 100 meters.

Recently, Nautilus Environmental reviewed the Granite Canyon study and the raw data made available. Nautilus Environmental discovered that the definitive test conducted with the abalone from The Cultured Abalone was invalid and should not be considered in the determination of the salinity results. Upon review of the data entry for the definitive test conducted with the abalone from Monterey Bay, Nautilus Environmental also discovered two data entry errors.

Based on the corrected Granite Canyon Laboratory values, the red abalone salinity test result show a LOEC of 36.7 ppt; 1.1 ppt higher than the LOEC value of 35.6 ppt originally reported. Therefore, receiving water salinity limit should be approximately 3 ppt above natural background.

It is our understanding that Nautilus Environmental has communicated the results of its review and analysis to Granite Canyon, and that Granite Canyon personnel were going to communicate this information to State Water Board staff. Although Poseidon's support for the proposed final Desalination Amendment will not be contingent on addressing this data integrity concern prior to adoption, we wanted to bring this information to the attention of the State Board Members, recommend that the issue, and its implications, are addressed prior to adoption of the proposed final Desalination Amendment.

We appreciate your consideration of our comments and your efforts to address many of our concerns in the proposal final amendment. We look forward to supporting the proposed final Desalination Amendment in May.

Sincerely,

A handwritten signature in black ink that reads "Peter MacLaggan". The signature is written in a cursive, flowing style.

Peter MacLaggan  
Senior Vice President

## Attachment A

### Poseidon Proposal for Modification of Definitions for “Brine Mixing Zone” and “Natural Background Salinity”

(1) Modify the definition of BRINE MIXING ZONE found at page 20; the underscore / strikeout text depicts the language contained in the March 20 draft; the **red text** is proposed new changes to that language:

“BRINE MIXING ZONE is the area where the salinity\* exceeds 2.0 parts per thousand above natural background salinity,\* or the concentration of salinity approved as part of an alternative receiving water limitation.\*—The brine mixing zone shall not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column unless otherwise authorized by the regional water board in accordance with this plan unless otherwise authorized by the regional board in accordance with this chapter L.”

(2) Add new sub-paragraph “d.” to Chapter III.L.3. at page 18, and then re-letter each subsequent sub-paragraph accordingly:

“d. An owner or operator proposing brine\* disposal technologies other than wastewater dilution and multiport diffusers,\* such as flow augmentation,\* may submit a proposal to the regional water boards for approval of an alternative brine mixing zone\*. An alternative brine mixing zone\* may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of intake and mortality of all forms of marine life\* as wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable. To determine whether a proposed facility-specific alternative brine mixing zone\* provides a comparable level of intake and mortality of all forms of marine life\*, the owner or operator must evaluate the individual and cumulative effects of the alternative brine mixing zone\* as an applicable element of the evaluation of the proposed alternative discharge method described in chapter III.L.2.d.(2)(c).”

(3) Add language to Chapter III.L.3.b.(2)(a) and (b) at page 16 as follows; underscore / strikeout text depicts the language contained in the March 20 draft; the **red text** is proposed new changes to that language:

“(a) The fixed distance referenced in the initial dilution\* definition shall be no more than 100 meters (328 feet), or an alternative brine mixing zone\* approved by the regional water board in accordance with chapter III.L.3.d.

(b) In addition, the owner or operator shall develop a dilution factor (Dm) based on the distance of 100 meters (328 feet) **(or the alternative brine mixing**

zone where applicable), or initial \*dilution,\*\_ whichever is smaller. The dilution factor (Dm) shall be developed within the brine mixing zone\* using applicable water quality models that have been approved by the regional water boards in consultation with State Water Board staff.

(4) Modify the definition of NATURAL BACKGROUND SALINITY found at page 21; the underscore / ~~strikeout text~~ depicts the language contained in the March 20 draft; the **red text** is proposed new changes to that language:

NATURAL BACKGROUND SALINITY is the salinity\* at a location that results from naturally occurring processes and is without apparent human influence. For purposes of determining natural background salinity, the mean monthly natural salinity shall be used. Mean monthly nNatural background salinity shall be determined by averaging 20 years of historical salinity\* data at a location in the proximity of the proposed discharge location unless the actual salinity measured at the facility intake, absent any influence from the discharge, is greater than the 20 year mean monthly natural salinity, in which case, the natural background salinity shall be the actual salinity measured at the intake absent any influence from the discharge and at the depth of the proposed discharge, when feasible.\* For historical data not recorded in parts per thousand, the regional water boards may accept converted data at their discretion. When historical data are not available, natural background salinity shall be determined by measuring salinity\* at depth of proposed discharge for three years, on a weekly basis prior to a desalination facility\* discharging brine,\* and the mean monthly natural averagesalinity\* shall be used to determine natural background salinity unless the actual salinity measured at the facility intake, absent any influence from the discharge, is greater than the 20 year mean monthly natural salinity, in which case, the natural background salinity shall be the actual salinity measured at the intake absent any influence from the discharge. Facilities shall establish a reference location with similar natural background salinity to be used for comparison in ongoing monitoring of brine\* discharges.