POSEIDON WATER

# *Appendix M*
# *Antidegradation Analysis*

*Renewal of NPDES CA0109223*
*Carlsbad Desalination Project*

# APPENDIX M

# COMPLIANCE WITH STATE AND FEDERAL ANTIDEGRADATION REGULATIONS

# CARLSBAD DESALINATION PROJECT

**August 2015**

# Executive Summary

In support of the Poseidon Resources (Channelside) LP Amended Report of Waste Discharge, this attachment assesses compliance of the proposed Carlsbad Desalination Project (CDP) discharge with:

- the State of California antidegradation policy set forth in State Water Resources Control Board (State Water Board) Resolution No. 68-16, and
- federal antidegradation regulations promulgated by the U.S. Environmental Protection Agency (EPA) within Title 40, Section 131.12 of the *Code of Federal Regulations* (40 CFR 131.12).

Antidegradation compliance is evaluated using guidance published by the State Water Board and EPA. A parameter-by-parameter approach is utilized to assess antidegradation compliance using the following three cases:

***Case 1***: CDP with the existing permitted operations of 50 million gallons per day (mgd) average annual potable water production capacity under co-located and temporary stand-alone conditions (all water quality parameters assessed).

***Case 2***: CDP with a 60 mgd production capacity under permanent stand-alone operating conditions (receiving water parameters except salinity and toxicity are assessed), and

***Case 3***: CDP with a 60 mgd production capacity under permanent stand-alone operating conditions (salinity and toxicity is assessed).

**Case 1 Conclusions.** In submitting this Amended Report of Waste Discharge, Poseidon does not propose any change in CDP co-located and temporary stand-alone operations addressed within Regional Water Board Order No. R9-2006-0065 (NPDES CA0109223). Under existing permitted operations, the CDP discharge would be comprised of 50 mgd (average annual flow) of reverse osmosis brine, 4 mgd of treated filtered backwash, and 200 mgd or more of cooling water from the Encina Power Station (EPS) or temporary flow diverted for CDP benefit (temporary stand-alone). Poseidon proposes to continue existing co-located and temporary stand-alone operations as set forth under Order No. R9-2006-0065 until the EPS once-through cooling water discharge is terminated (projected in 2017).

The Case 1 CDP discharge will not result in any change in permitted intake or discharge flows, no change in discharge mass emissions, no change in effluent concentrations, and no change in receiving water concentrations or toxicity. The Case 1 CDP discharge will result in continued

compliance with existing NPDES effluent limitations and performance goals, and continued compliance with applicable water quality standards.

Consistent with Antidegradation Finding II.K of Order No. R9-2006-0065, it is concluded that continuation of existing permitted CDP operations will not result in a lowering of water quality. As a result, is it concluded that existing permitted CDP operations (Case 1) will comply with antidegradation provisions of State Water Board Resolution No. 68-16 and 40 CFR 131.12.

**Case 2 Conclusions.** Poseidon proposes to operate CDP in permanent stand-alone mode when EPS is retired. In permanent stand-alone mode, the CDP discharge (239 mgd total) would be comprised of up to 60 mgd of reverse osmosis concentrate, 7 mgd of treated filter backwash (when backwash is discharged to the ocean), 1 mgd of return from intake screens, and 171 mgd of augmented (bypass) flow.

Under permanent stand-alone operations, total discharge flows (CDP process flow plus augmented flow) and total mass emissions would be less than existing permitted flows. Additionally, net mass emissions would be less than zero, as all constituents in the CDP intake (except for a small quantity that remains in the CDP product water) would be returned to the ocean. Virtually all Ocean Plan Table 1 receiving water constituents will be non-detectable within the discharge channel and within receiving water. No discernible changes in effluent concentrations, effluent mass emissions, or receiving water quality would occur for any Case 2 Ocean Plan constituent. The CDP discharge under permanent stand-alone operation would thus not result in any lowering of water quality for any Case 2 constituent, and the CDP discharge under Case 2 will be consistent with antidegradation provisions of State Water Board Resolution No. 68-16 and 40 CFR 131.12.

**Case 3 Conclusions.** As part of Case 3, antidegradation compliance of the 60 mgd CDP (permanent stand-alone conditions) is evaluated for salinity and toxicity. While overall discharge flows would be reduced compared to existing permitted operations, salinity concentrations in the CDP discharge under permanent stand-alone conditions would be increased from 40 parts per thousand (ppt) to 42 ppt (4.8 percent). Hydrodynamic modeling of the 60 CDP discharge demonstrates that discernible differences in receiving water salinity concentrations will occur within 200 meters (656 feet) of the discharge point (Brine Mixing Zone, or BMZ). The modeling also demonstrates that the discharge plume under permanent stand-alone conditions would be negatively buoyant, and salinity differences would be more discernible near the ocean bottom than in the water column. Consistent with the new 2015 Ocean Plan receiving water salinity standard, receiving water salinity concentrations will be maintained at 2 ppt above ambient or less at the BMZ boundary.

Changes in receiving water salinity will produce only minor (non-significant) effects, and will not create any discernible increase in acute or chronic toxicity near the edge of the BMZ or beyond the BMZ. The discharge will not adversely affect existing and projected beneficial uses outside the BMZ, and will comply with applicable California Ocean Plan standards for salinity

and toxicity. As a result of the limited nature of these receiving water salinity concentration changes, the 60 mgd permanent stand-alone CDP discharge appears to meet the threshold for a conclusion that no "lowering" of water quality occurs (as compared to the existing permitted discharge) as:

- the 60 mgd permanent stand-alone discharge would increases water column receiving water salinity at the edge of the BMZ by only approximately 0.1 to 0.2 ppt,
- more discernible increases in receiving salinity concentrations (on the order of 1 ppt) would be limited to the ocean bottom near the effluent discharge channel (well within the BMZ), and
- no discernible differences in receiving water acute or chronic toxicity would occur at or beyond the BMZ boundary.

If, however, the discernible increase in receiving water salinity concentration within the BMZ is deemed to represent a "lowering" of water quality, the 60 mgd CDP project in compliance with antidegradation provisions of State Water Board Resolution No. 68-16 and 40 CFR 131.12, as:

- the project is consistent with regional water plans and will produce approximately 12 percent of the total regional water demand,
- environmental impacts would be limited to a 15.5 acre BMZ and impacts have already been mitigated as part of implementing the existing permitted project,
- the project results in fewer environmental impact to aquatic habitat than the existing permitted discharge,
- no feasible alternatives are available that have lower impacts,
- the project provides significant economic benefits (in excess of $1 billion) in the form of water supply reliability benefits, water quality benefits, reduction in imported water reliance, increased employment, and economic stimulus benefits,
- the project will comply with applicable water quality standards and will not discernibly affect acute or chronic toxicity within or beyond the BMZ,
- existing and potential beneficial uses would be fully protected,
- the project is necessary to accommodate important economic and social development within the North County coastal area and San Diego County Water Authority service area, and
- the project is consistent with maximum benefit to the people of California.

# Attachment M
# Antidegradation Analysis

## Table of Contents

# List of Figures



# List of Tables

# List of Abbreviations

| | |
|---|---|
| BMZ | Brine Mixing Zone |
| CDP | Carlsbad Desalination Facility |
| CFR | *Code of Federal Regulations* |
| EIR | Environmental Impact Report |
| EPA | United States Environmental Protection Agency |
| EPS | Encina Power Station |
| ESP | San Diego County Water Authority Emergency Storage Program |
| LOEC | Lowest Observed Effects Concentration |
| m | meters |
| mgd | million gallons per day |
| mg/l | milligrams per liter |
| MWD | Metropolitan Water District of Southern California |
| NOEC | No Observed Effects Concentration |
| NPDES | National Pollutant Discharge Elimination System |
| Ocean Plan | *Water Quality Control Plan, Ocean Waters of California* |
| OPA | 2015 Ocean Plan Amendments |
| PEIR | Program Environmental Impact Report |
| Poseidon | Poseidon Resources (Channelside LP) |
| ppt | parts per thousand |
| Regional Water Board | Regional Water Quality Control Board, San Diego Region |
| RO | reverse osmosis |
| SED | Supplemental Environmental Document |
| SIG | seafloor infiltration gallery |
| SNMP | Salt and Nutrient Management Plan |
| State Water Board | California State Water Resources Control Board |
| TDS | total dissolved solids |
| TST | Test of Significant Toxicity |
| TUa | acute toxicity units |
| TUc | chronic toxicity units |
| µg/l | micrograms per liter |
| USBR | U.S. Bureau of Reclamation |
| UWMP | Urban Water Management Plan |
| Water Authority | San Diego County Water Authority |
| ZID | Zone of Initial Dilution |

# APPENDIX M

# ANTIDEGRADATION ANALYSIS

## OVERVIEW

**Objective.** Regional Water Quality Control Board (Regional Water Board) Order No. R9-2006-0065 (NPDES CA0109223) establishes requirements for the discharge of reverse osmosis (RO) concentrate and treated pretreatment backwash flows from the Carlsbad Desalination Project (CDP) into the Pacific Ocean via the Encina Power Station (EPS) effluent channel. In accordance with the requirements of the Order, Poseidon Resources (Channelside) LP (Poseidon) is submitting an Amended Report of Waste Discharge in application for renewal of NPDES CA0109223. In support of the Poseidon Amended Report of Waste Discharge, Appendix M assesses compliance of the proposed CDP discharge with state and federal antidegradation regulations. As part of this assessment, antidegradation compliance is evaluated for:

- existing CDP co-located and temporary stand-alone operations permitted within Order No. R9-2006-0065 (as amended), and
- proposed permanent temporary stand-alone operations proposed as part of this Report of Waste Discharge for reissuance and modification of NPDES CA0109223.

**State Antidegradation Policy and Implementation Guidance.** The State of California antidegradation policy is established in State Water Resources Control Board (State Water Board) Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California." (State Water Board, 1968) The state antidegradation policy (which predates the Clean Water Act and federal antidegradation regulations) requires that existing high quality water is to be maintained unless it is demonstrated that any change is:

- consistent with maximum benefit to the people of the state,
- will not unreasonably affect present and anticipated beneficial uses, and
- will not result in water quality less than that prescribed in the policies.

State Water Board guidance for implementing the state antidegradation policy is presented in "Antidegradation Policy Implementation for NPDES Permitting." (State Water Board, 1990) The State Water Board guidance provides that a complete antidegradation analysis is required if the proposed activity results in:

- a substantial increase in mass emissions of a pollutant, or
- mortality or significant growth or reproductive impairment of resident species.

The State Water Board guidance further directs Regional Water Boards to make an antidegradation finding and, if necessary, conduct an antidegradation analysis when reissuance or modification of a permit would allow a significant increase in the concentration or mass emissions of a pollutant. Complete antidegradation analyses are not required under the State guidance if a Regional Board determines that:

- a reduction in water quality will be spatially limited to the mixing zone, or
- the proposed actions will produce minor effects which will not result in a significant reduction of water quality.

Figure M-1 (below) presents State Water Board guidance[1] on the process to assess antidegradation compliance for projects (like the CDP) that do not involve discharges to Outstanding Natural Resource Waters.

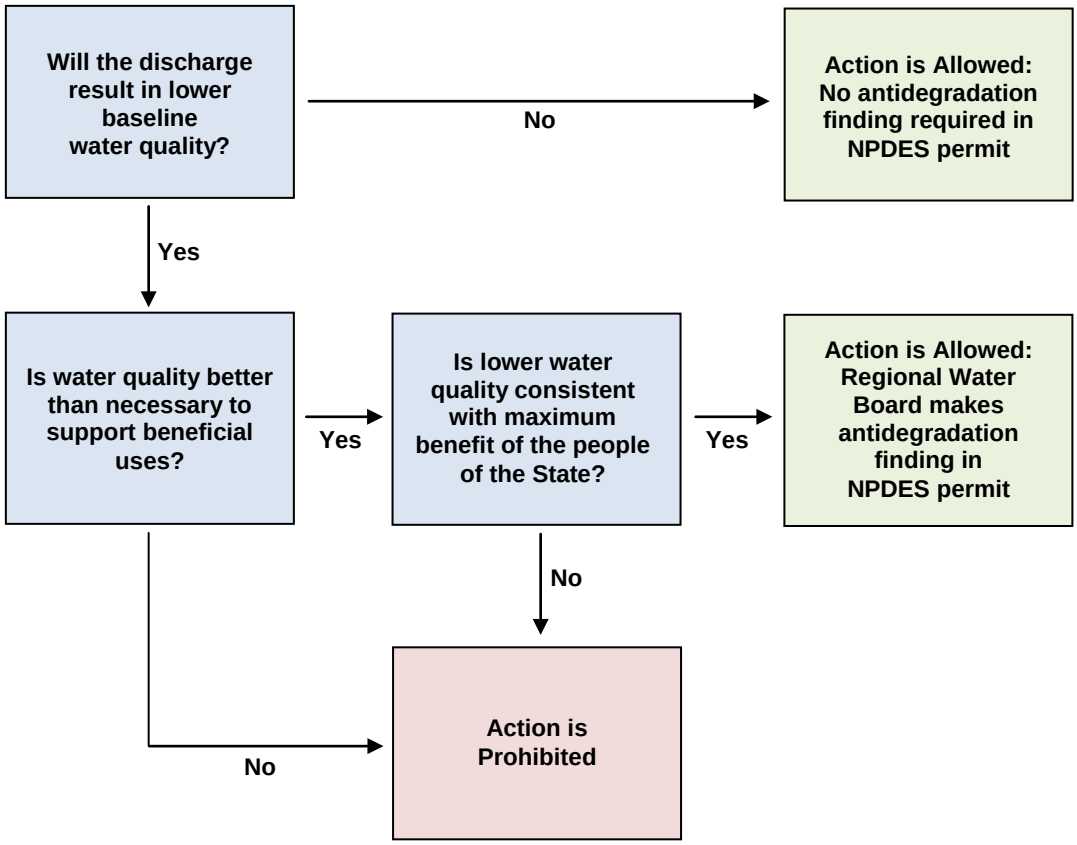



**Figure M-1**
**State Water Board Guidance: Assessing Compliance with Resolution No. 68-16[1]**

1 From Figure 1 of State Water Board (1990). Does not apply to discharges to waters designated as Outstanding Natural Resource Waters.

**Federal Antidegradation Regulations and Implementation Guidance.** Federal antidegradation regulations are established within Title 40, Section 131.12 of the *Code of Federal Regulations* (40 CFR 131.12).[2] For waters not designated as Outstanding Natural Resource Waters[3], the antidegradation regulations require states to implement standards and regulate dischargers so that:

Tier 1 Existing beneficial uses and the level of water quality necessary to protect the existing beneficial uses are maintained and protected.

Tier 2 Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation, that quality is maintained and protected unless the State finds that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

Figure M-2 (page M-4) presents EPA guidance[4] on the process to assess antidegradation compliance for projects that do not involve discharges to Outstanding Natural Resource Waters. The intent of Tier 2 protection is to maintain and protect high quality waters and not allow for any degradation below a *de minimus* level unless such a lowering in water quality is necessary to accommodate important economic or social development in the area in which the waters are located.[5] EPA does not provide states and tribes with specific guidance on how to define significance thresholds, but guidance provided by the EPA Office of Science and Technology[6] suggests that:

- the most appropriate way to define antidegradation significance thresholds is in terms of assimilative capacity, and
- a lowering of water quality by less than 10 percent of the available assimilative capacity represents minimal risk to receiving water and is fully consistent with the objectives and goals of the Clean Water Act.

In assessing Tier 2 compliance where the lessening of water quality exceeds a *de minimus* level, regulations of 40 CFR 131.12 require an analysis of practicable alternatives that would lessen degradation. Factors to be considered in assessing whether the lessening of water quality is necessary to accommodate important economic and social development include, in part: population, income, manufacturing employment, and tax bases.[5]

2 The 40 CFR 131.12 antidegradation provisions were amended by EPA on August 21, 2015. (EPA 2015a, EPA 2015b).

3 Tier III of the federal antidegradation regulations apply to discharges to Outstanding Natural Resource Waters (such as national and state parks or reserves). No such designated Outstanding Natural Resource Waters exist in the vicinity of the CDP discharge.

4 From EPA (1987).

5 Determination of whether the action is necessary to accommodate economic or social development is to be based on criteria defined by the State, per EPA (1987).

6 From EPA (2005).

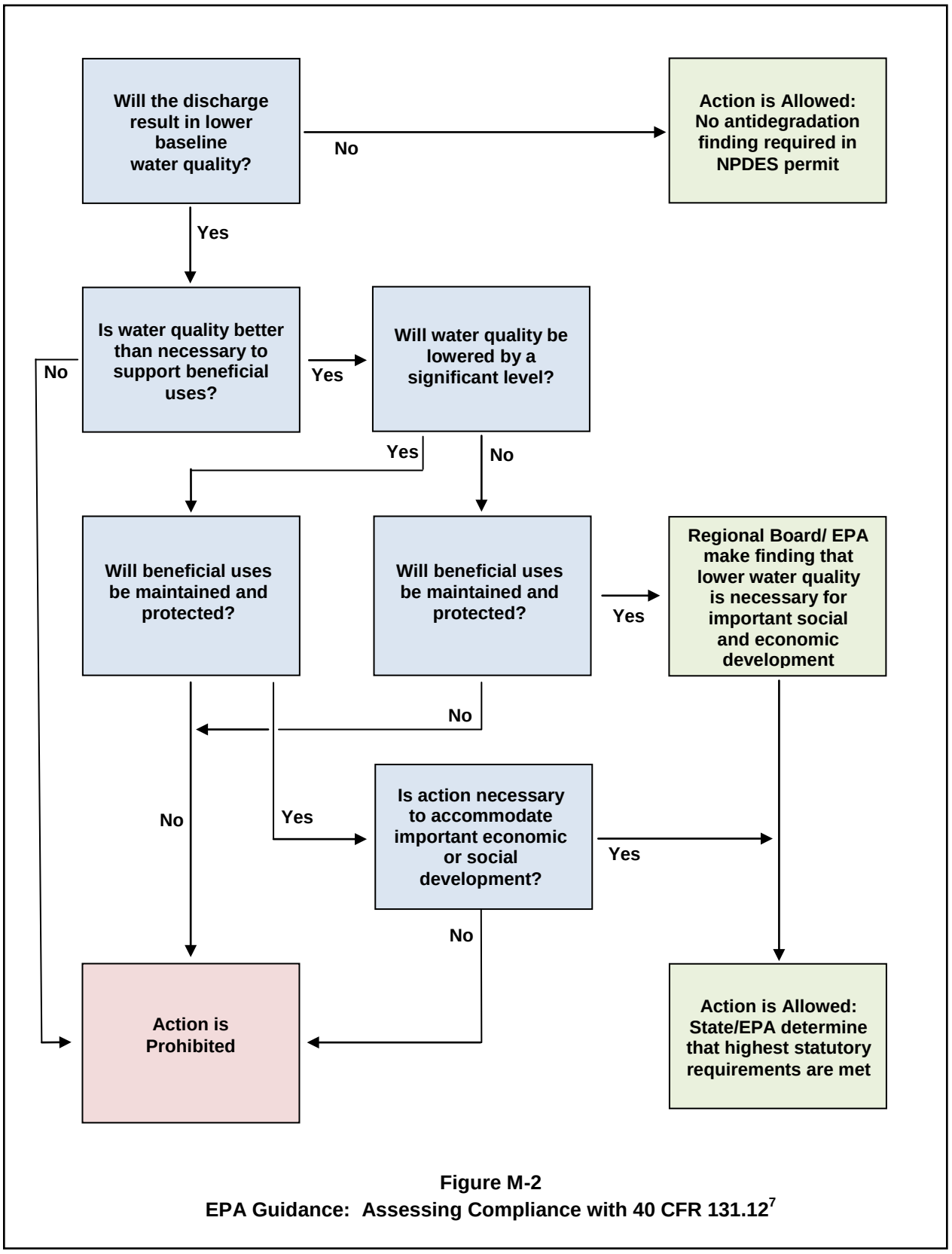



**Figure M-2**
**EPA Guidance: Assessing Compliance with 40 CFR 131.12[7]**

7 Adapted from Figure 1 of EPA (1987).

**Approach.** To facilitate evaluating CDP antidegradation compliance, the above State Water Board and EPA guidance is applied to (1) currently permitted CDP co-located and stand-alone operations and (2) permanent stand-alone operations proposed as part of this Amended Report of Waste Discharge. Table M-1 (below) summarizes the three-case water quality parameter approach utilized in evaluating antidegradation compliance for the range of CDP operating conditions.

**Table M-1**
**Antidegradation Analysis Approach - Evaluation Cases**

| Case | CDP Operating Conditions | Water Quality Parameters Assessed in Antidegradation Analysis |
|---|---|---|
| Case 1 | Existing permitted co-located and temporary stand-alone operating conditions[8] | All regulated constituents |
| Case 2 | Proposed permanent stand-alone operating conditions | Constituents for which Ocean Plan Table 1 concentration standards are established[9] |
| Case 3 | | Salinity, acute toxicity, chronic toxicity |

## CO-LOCATED AND TEMPORARY STAND-ALONE OPERATIONS

**Case 1: Existing Permitted Discharge.** Order No. R9-2006-0065 (as amended) establishes effluent and receiving water requirements for the CDP under:

- co-located operating conditions where flows from the Encina Power Station (EPS) are used as flow augmentation to dilute salinity concentrations in the CDP discharge to ensure compliance with applicable NPDES requirements, and
- temporary stand-alone operating conditions when EPS flows are augmented for the benefit of CDP in order to ensure compliance with applicable NPDES requirements.

Order No. R9-2006-0065 established effluent discharge standards and performance goals to implement applicable water quality standards in effect at the time the permit was adopted, including receiving water standards established within the *Water Quality Control Plan, Ocean Waters of California* (Ocean Plan).[10] Receiving water standards established within the 2005

8 As described and regulated within Order No. R9-2006-0065, as amended.

9 Includes all Ocean Plan Table 1 constituents except salinity, acute toxicity, and chronic toxicity.

10 At the time of adoption of Order No. R9-2006-0065, the 2005 version of the Ocean Plan was in effect. Receiving water standards for the protection of marine life and human health were established in Table B of the 2005 Ocean Plan. All Ocean Plan Table B standards established within the 2005 version of the Ocean Plan remain in effect. These standards are now presented within Table 1 of the 2012 and 2015 versions of the Ocean Plan. The 2015 version of the Ocean Plan has been approved by the State Water Board; approvals of the 2015 Ocean Plan amendments by the State of California Office of Administrative Law and EPA are pending.

version of the Ocean Plan for the protection of human health and marine aquatic habitat remain in effect in the current version of the Ocean Plan.[10]

To ensure compliance with Ocean Plan receiving water standards for acute and chronic toxicity, Order No. R9-2006-0065 established the following effluent quality salinity standards applicable at Monitoring Location M-002:[11,12]

- 44 parts per thousand (ppt) hourly average, and
- 40 ppt (daily average).

The 2015 Ocean Plan amendments[13] (hereinafter OPA) establish receiving water salinity limits that are applicable to all desalination facilities discharging brine into receiving waters. Under the OPA, receiving water salinity concentrations are not to exceed 2 ppt above ambient within a designated brine mixing zone (BMZ). The BMZ dimension is established at 100 meters (328 feet) from the discharge point, but the OPA provides that the Regional Water Board can establish a 200 meter (656 feet) BMZ for facilities that have received a Water Code 13142.5 determination, utilize flow augmentation with a surface intake, and are more than 80 percent constructed by the effective date of the OPA. CDP qualifies with these requirements for establishing a 200 meter BMZ. Equation 1 of the OPA establishes how effluent limits are to be determined to implement the receiving water salinity standard:

$$Ce = (2.0\,ppt + Cs) + Dm * 2.0\,ppt) \qquad Equation\ 1$$

Where: *Ce* = the effluent concentration limit required to implement the OPA 2 ppt above ambient receiving water salinity standard,

*Cs* = the natural background salinity, and

*Dm* = the minimum probable initial dilution expressed as parts of seawater per part brine discharge.

At a natural background salinity (*Cs*) of 33.5 ppt, it can be computed that an initial dilution (*Dm*) value of 2.25 is required to ensure that a 40 ppt effluent concentration standard (*Ce*) prevents receiving water salinity from exceeding 2 ppt above ambient at the edge of the BMZ. As demonstrated by Jenkins and Waysl (2005), minimum month initial dilution achieved within both 100 and 200 meters from the discharge point exceed this required 2.25 to 1 dilution ratio under Case 1 (existing permitted) conditions. As a result, the existing average daily 40 ppt effluent salinity concentration standard established at Monitoring Location M-002 within Order No. R9-2006-0065:

11 Effluent salinity standards (see Attachment F of Order No. R9-2006-0065) are based on salinity tolerance investigations, salinity toxicity investigations, and marine biology effects research conducted specific to the CDP discharge. The salinity standards established within Order No. R9-2006-0065 ensure compliance with Ocean Plan receiving water standards for acute and chronic toxicity.

12 Monitoring Location M-002 is located at the EPS final effluent pond that contains combined CDP and EPS discharge flows prior to discharge to the ocean via the EPS discharge channel.

13 Adopted by the State Water Board on May 15, 2015 (State Water Board, 2015). OPA approval by the State of California Office of Administrative Law and EPA is pending.

- implements the 2015 OPA receiving water salinity standard,
- is protective of receiving water quality and beneficial uses, and
- ensures that no lowering of water quality will occur under continued co-located or temporary stand-alone CDP operations (average CDP production rate of 50 mgd).

**Antidegradation Compliance Under Existing NPDES Permit.** Finding II.K of Order No. R9-2006-0065 acknowledges that the existing permitted CDP project is in compliance with State Water Board Resolution No. 68-16 and federal antidegradation regulations established within 40 CFR 131.12. In making this finding, the Regional Water Board concluded that:

> *… the discharge will not result in significant degradation of water quality. The discharge from CDP is not expected to affect the beneficial uses of the receiving water. As discussed in detail in the Fact Sheet (Attachment F), a discharge in compliance with this Order is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16.*[14]

As documented herein within this Amended Report of Waste Discharge, Poseidon does not propose any modifications to the flows, concentrations, mass emissions, or requirements regulated within Order No. R9-2006-0065. Existing CDP discharge flows, mass emissions, effluent quality, and receiving water quality would remain unchanged from that currently permitted under Order No. R9-2006-0065 for 50 mgd[15] co-located operations or temporary stand-alone operating conditions. Additionally, as documented above, the existing effluent salinity concentration limits established within Order No. R9-2006-0065 for co-located and temporary stand-alone operations are consistent with achieving compliance with the new 2015 OPA receiving water salinity standards.

As a final item, it should be noted that the CDP co-located or temporary stand-alone operations currently permitted under Order No. R9-2006-0065 will not result in any net mass emissions to the ocean, as virtually all intake seawater constituents will be returned to the ocean.[16] Further, proposed 50 mgd[15] CDP co-located and temporary stand-alone operations will result in:

- no changes in permitted CDP intake or discharge flows,
- no changes in permitted co-located and temporary stand-alone intake, treatment, or discharge facilities or operations,
- no changes in permitted CDP effluent concentrations, mass emissions, salinity concentrations, or effluent toxicity, and
- no changes in receiving water quality or benthic conditions.

14 See Finding II.K of Order No. R9-2006-0065.

15 Order No. R9-2006-0065 addresses an annual average CDP potable water production rate of 50 mgd (54 mgd maximum day flow).

16 Almost all of the mass of salinity and other constituents naturally found in the CDP intake water will be returned to the ocean, except for a small portion (1 percent or less) that will remain in the CDP product water.

**Case 1 Antidegradation Conclusions.** In accordance with Finding II.K of Order No. R9-2006-0065 and the fact that no changes in CDP operations are proposed under co-located and temporary stand-alone conditions, it is concluded that existing permitted CDP co-located and temporary stand-alone operations[15] will not result in a lowering (lessening) of effluent quality or receiving water quality. Consistent with State Water Board guidance (see Figure M-1) and EPA antidegradation guidance (see Figure M-2):

- Finding II.K of Order No. R9-2006-0065 remains valid for existing permitted[15] CDP co-located and temporary stand-alone operations, and
- continuation of existing permitted CDP operations will remain in compliance with State Water Board Resolution No. 68-16 and federal antidegradation provisions established within 40 CFR 131.12.

## PERMANENT STAND-ALONE OPERATIONS - TABLE 1 CONSITUENTS

**Case 2: Ocean Plan Table 1 Concentration Constituents.** Table 1 of the Ocean Plan establishes receiving water standards for the protection of marine aquatic habitat and for the protection of human health. Case 2 evaluates compliance of proposed CDP permanent stand-alone operating conditions with state and federal antidegradation requirements for all Ocean Plan Table 1 receiving water constituents except toxicity and salinity.

**Comparison of Currently Permitted and Proposed Discharges**. Table M-2 (page M-9) compares discharge flows between (1) currently permitted co-located and temporary stand-alone operating conditions and (2) proposed permanent stand-alone operations. As shown in Table M-2, total flows discharged through the discharge channel will decrease from 254 mgd to 239 mgd when permanent stand-alone operations are implemented. Under average flow conditions, the portion of this flow comprised of RO concentrate, however, will increase from 50 mgd to 60 mgd.

Table M-3 (page M-9) summarizes Ocean Plan Table 1 toxic inorganic constituents that are detected within the CDP discharge. Table M-4 (page M-10) summarizes Ocean Plan Table 1 toxic organic constituents that are detected within the CDP discharge. As shown in Tables M-3 and M-4, differences in concentrations of Ocean Plan Table 1 constituents between the currently regulated 50 mgd co-located and temporary stand-alone operations and the proposed 60 mgd permanent stand-alone operations are either non-discernible of *de minimus*.

As documented within this Amended Report of Waste Discharge, it is proposed that the existing 40 ppt average daily effluent pond salinity limit be retained for currently permitted co-located and stand-alone operations. An average effluent pond salinity limit of 42 ppt is proposed for permanent stand-alone operations. Thus, under permanent stand-alone operations, effluent pond salinity concentrations could be increased by approximately 4.8 percent.

**Table M-2**
**Summary of Discharge Flows**
**Existing Permitted Discharge and Proposed Permanent Stand-Alone Discharge[17]**

| Parameter | Currently Permitted Co-Located and Temporary Stand-Alone Operating Conditions | Proposed Permanent Stand-Alone Operating Conditions | Percent Increase(+) or Decrease (-) |
|---|---|---|---|
| Average RO brine flows | 50 mgd | 60 mgd | 16.7% |
| Treated Filter Backwash | 4 mgd | 7 mgd | 43% |
| Fish Return Flow | NA | 1 mgd | NA |
| Total flow discharged | 254 mgd | 239 mgd | -5.9% |

**Table M-3**
**Comparison of CDP Discharge Concentrations under 50 mgd and 60 mgd Discharge Scenarios**
**Ocean Plan Table 1 Toxic Inorganic Constituents[17]**

| Ocean Plan Table 1 Toxic Inorganic Constituent | Concentration (µg/l) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Reporting Limit (µg/l) | CDP Process Streams[18] | | Combined CDP Effluent Discharge: 50 mgd Production Co-Located and Temporary Stand-Alone Operations | | Combined CDP Effluent Discharge: 60 mgd Production Permanent Stand-Alone Operations | |
| | | Treated Backwash | RO Concentrate | Combined Filter Backwash and RO Concentrate[19] | Effluent Channel after Blending with EPS or Augmented Flow[20] | Combined Filter Backwash and RO Concentrate[21] | Effluent Channel after Blending with Augmented Flow[22] |
| Antimony | 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Arsenic | 2 | < 3[23] | < 3[23] | < 3[23] | < 3[23] | < 3[23] | < 3[23] |
| Cadmium | 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Chromium, total | 4 | < 4 | < 4 | < 4 | < 4 | < 4 | < 4 |
| Copper | 2 | < 2[24] | < 2[24] | < 2[24] | < 2[24] | < 2[24] | < 2[24] |
| Lead | 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Mercury | 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Nickel | 5 | 14 | 19 | 19 | < 5 | 18 | 5.2 |
| Selenium | 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 |
| Silver | 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Thallium | 2.5 | < 0.5[25] | < 2.5 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| Zinc | 10 | 11 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Cyanide | 50 | < 50 | < 50 | < 50 | < 50 | < 50 | < 50 |

17 CDP average flows, as presented within the NPDES application cover letter and on Page 2D-1 of EPA NPDES Form 2D.
18 From data presented in supplemental EPA Form 2D for Group B parameters (see pages 2D-3 and 2D-4).
19 Computed on the basis of 50 mgd average annual RO concentrate and 4 mgd treated filter backwash, under conditions in which clarified filter backwash is discharged to effluent channel.
20 Computed on the basis of diluting the CDP discharge flow into 200 mgd of EPS flow for a total average annual discharge of 254 mgd.
21 Computed on the basis of 60 mgd average annual RO concentrate and 7 mgd treated filter backwash, under conditions in which clarified filter backwash is discharged to effluent channel.
22 Computed on the basis of diluting the CDP discharge flow into 171 mgd of augmented flow for a total average annual discharge of 239 mgd.
23 Assumes ambient ocean water arsenic concentration of 3.0 µg/l per Table 3 of the Ocean Plan. CDP monitoring data (see Form 2D) shows actual ambient arsenic concentrations of less than 2 µg/l in the CDP intake flow.
24 Assumes ambient ocean water copper concentration of 2.0 µg/l per Table 3 of the Ocean Plan. CDP monitoring data (see Form 2D) shows actual ambient copper concentrations of less than 2 µg/l in the CDP intake flow.
25 Treated backwash thallium reporting limit was 0.5 µg/l.

**Table M-4**
**Comparison of CDP Discharge Concentrations under 50 mgd and 60 mgd Discharge Scenarios**
**Ocean Plan Table 1 Toxic Organic Constituents[17]**

| Ocean Plan Table 1 Toxic Organic Constituent | Concentration (µg/l) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Reporting Limit (µg/l) | CDP Process Streams[18] | | Combined CDP Effluent Discharge: 50 mgd Production Co-Located and Temporary Stand-Alone Operations | | Combined CDP Effluent Discharge: 60 mgd Production Permanent Stand-Alone Operations | |
| | | Treated Backwash | RO Concentrate | Combined Filter Backwash and RO Concentrate[19] | Effluent Channel after Blending with EPS or Augmented Flow[20] | Combined Filter Backwash and RO Concentrate[21] | Effluent Channel after Blending with Augmented Flow[22] |
| **Volatile Organic Compounds** | | | | | | | |
| Bromoform | 0.5 | ND | 1.4 | < 1.3 | ND | < 1.3 | ND |
| All other Table 1 volatile organic compounds | 5 | ND | ND | ND | ND | ND | ND |
| **Acid Extractable Compounds** | | | | | | | |
| Phenolic compounds (non-chlorinated) | 5 - 10[26] | ND | ND | ND | ND | ND | ND |
| Chlorinated phenolics | 5 - 10[26] | ND | ND | ND | ND | ND | ND |
| All other Table 1 acid extractable compounds | 5 - 10[26] | ND | ND | ND | ND | ND | ND |
| **Base/Neutral Compounds** | | | | | | | |
| All Table 1 base/neutral compounds | 5 | ND | ND | ND | ND | ND | ND |
| **Pesticides and PCBs** | | | | | | | |
| All Table 1 pesticides | 0.01 - 0.1[27] | ND | ND | ND | ND | ND | ND |
| PCBs | 0.1 | ND | ND | ND | ND | ND | ND |
| **Other Regulated Compounds** | | | | | | | |
| TCDD equivalents[28] | 0.001 | ND | ND | ND | ND | ND | ND |
| Tributyltin | 0.005 | ND | ND | ND | ND | ND | ND |

**Note: ND indicates "not detected at the referenced Reporting Limit**
**See bottom of page M-9 for footnotes 17 through 22**

As documented within this Amended Report of Waste Discharge (and within Poseidon's original 2005 Report of Waste Discharge), RO treatment processes are projected to remove approximately 99.6 percent of dissolved solids, which will be returned to the ocean in the form of RO concentrate. While the exact removal percentages for each individual constituent will vary, salinity can be used a surrogate parameter that is generally indicative of concentrating effects of any given constituent.[29] Using salinity as such a surrogate parameter, it may be

26 Reporting limits for individual acid extractable compounds ranged from 5 to 10 µg/l, except for 2,4-dinitrophenol, which had a reporting limit of 20 µg/l (See Form 2D).

27 Reporting limits for individual pesticide compounds ranged from 0.01 to 0.1 µg/l (see Form 2D).

28 Sum of chlorinated dibenzodioxins and dibenzofurans multiplied by their respective toxicity factors.

29 The RO process typically achieves higher removal percentages for dissolved ions and larger molecular weight molecules than low molecular weight compounds or electrostatically inert constituents. Removal percentages for salinity (e.g. predominantly comprised of dissolved ions such as sodium, chloride, sulfate, calcium, magnesium, potassium) may be used as surrogates indicative of general removal percentages for dissolved metal ions.

assumed that permanent stand-alone operations may result in increases in concentrations of toxic organic and inorganic constituents (prior to blending with augmented flows) of approximately 4.8 percent. As shown in Tables M-3 and M-4, nearly all Ocean Plan Table 1 constituents were below Reporting Limits. Additionally, none of the non-detected constituents were found to be detected-not quantifiable (DNQ), which would have occurred if the actual constituent concentrations were close to the respective Reporting Limits. As a result, it may be concluded that a 4.8 percent increase in the concentration of a non-detected constituent (under 60 mgd permanent stand-alone operations) would still render the constituent far below the Reporting Limit and the constituent would remain "non-detected".

**Case 2 Antidegradation Conclusions.** As shown in Tables M-3 and M-4, proposed permanent CDP stand-alone operations will result in continued compliance with all Case 2[30] Ocean Plan Table 1 receiving water standards within the effluent pond itself, not taking into account any subsequent initial dilution that occurs upon discharge to the ocean. As a result, compliance with Case 2 Ocean Plan Table 1 constituents will be achieved throughout the designated Brine Mixing Zone (BMZ) and Zone of Initial Dilution (ZID). Since Ocean Plan Table 1 standards apply outside the ZID boundary, CDP permanent stand-alone operations will comply with Case 2 Ocean Plan Table 1 standards with a significant margin of safety.

In summary, permanent CDP stand-alone operations will involve:

- an increase in average annual RO concentrate flows from 50 mgd to 60 mgd,
- a potential increase in clarified filter backwash discharge flows from 4 to 7 mgd (during times when the clarified backwash is discharged to the ocean instead of being recycled back to the CDP headworks),[31]
- a slight decrease in the total flow (CDP process flows plus all augmented flows) discharged to the ocean from the effluent channel, and
- an increase in the percent of the total discharge flow that is comprised of RO concentrate.

As noted, differences in concentrations of Case 2 Ocean Plan Table 1 constituents between the currently regulated 50 mgd co-located and temporary stand-alone operations and the proposed 60 mgd permanent stand-alone operations are either non-discernible of *de minimus*. Differences in mass emissions of Case 2 Ocean Plan Table 1 constituents will also be non-discernible or *de minimus.* Additionally, under proposed permanent CDP stand-alone operations:

30 As noted, Case 2 assesses compliance with all Ocean Plan Table 1 standards except toxicity and salinity. The Case 3 assessment evaluates compliance with Ocean Plan salinity, acute toxicity, and chronic toxicity standards.

31 As described within this Amended Report of Waste Discharge, filter backwash at the discretion of CDP operators may be recycled back to the CDP headworks. Total CDP intake and discharge flows would remain the same regardless of whether filter backwash is recycled to the headworks or discharged to the ocean, and salinity concentrations in the combined CDP effluent (augmented flow plus process flow) would remain the same.

- virtually all Case 2 Ocean Plan Table 1 constituents will remain non-detectable within the effluent discharge pond under proposed permanent stand-alone operations, and
- compliance will be achieved with all Case 1 Ocean Plan Table 1 receiving water standards within the effluent pond, ensuring compliance at the edge of the ZID.

In accordance with these determinations, it is concluded that 60 mgd CDP permanent stand-alone operations meet the conditions for a finding that no lowering of water quality for Case 2 constituents occurs either in the CDP discharge pond, in receiving waters within the BMZ or ZID, or in receiving waters outside the BMZ and ZID. Accordingly, for Case 2 constituents, proposed CDP permanent stand-alone operations are in compliance (see Figures M-1 and M-2) with State Water Board Resolution No. 68-16 and federal antidegradation provisions established within 40 CFR 131.12.

## PERMANENT STAND-ALONE OPERATIONS - SALINITY/TOXICITY

**Case 3: Salinity and Toxicity Standards**. Case 3 assesses antidegradation compliance of 60 mgd CDP permanent stand-alone operations with Ocean Plan standards for salinity, chronic toxicity, and acute toxicity.

As described on page M-6, the OPA adopted by the State Water Board in May 2015 established a requirement that discharges shall not exceed a daily maximum salinity concentration in excess of 2 ppt at the edge of the BMZ (unless the Regional Water Board approves a facility-specific alternative limit). This 2 ppt above ambient limit was implemented to ensure that desalination discharges do not result in acute or chronic toxicity impacts to marine organisms. In establishing this 2 ppt above ambient limit, the March 20, 2015 OPA Draft Substitute Environmental Documentation (SED) noted:

> *The Science Advisory Panel further recommended that the salinity objective should be based on the most conservative species. The reports by Phillips et al. (2012) and Roberts et al. (2012) provide the basis to develop a receiving water limitation for California's ocean waters. The Granite Canyon report showed that red abalone was most sensitive to elevated salinity, with an 119 LOEC at 35.6 ppt (1.6 ppt above background). Since salinity toxicity studies were not done for all organisms in the California marine environment, the 2 ppt limit may be overly conservative for some species, but not conservative enough for others. However, the majority of the studies on elevated salinity showed that effects were not seen below 2 to 3 ppt above natural salinity. (Roberts et al. 2012)*[32]

Table 1 of the Ocean Plan establishes acute and chronic toxicity standards to be implemented upon completion of initial dilution. These Ocean Plan acute and chronic toxicity standards are implemented in Order No. R9-2006-0065, including:

- a chronic toxicity effluent limitation (Monitoring Location M-001) of 16.5 TUc, and
- an acute toxicity performance goal (Monitoring Location M-001) of 0.765 TUa.

32 See page 118, State Water Board (May 2015).

**Salinity Effects.** Table M-5 (below) summarizes differences between the existing permitted 50 mgd co-located and temporary stand-alone operations and proposed 60 mgd permanent stand-alone operations. As shown in Table M-5, effluent pond salinity concentrations would be increased by 2 ppt (approximately 4.8 percent), but total discharge salinity mass emissions (CDP process flows plus augmented flow) would be reduced by approximately 2.4 percent. Additionally, net salinity mass emissions (the difference between intake salinity mass and discharged salinity mass) will be reduced under proposed 60 mgd permanent stand-alone conditions.

**Table M-5**
**Summary of Discharge Salinity**
**Existing Permitted Discharge and Proposed Permanent Stand-Alone Discharge**

| Parameter | Currently Permitted Co-Located and Temporary Stand-Alone Operating Conditions | Proposed Permanent Stand-Alone Operating Conditions | Percent Increase(+) or Decrease (-) |
|---|---|---|---|
| Effluent Pond Salinity | 40 ppt | 42 ppt | 4.8% |
| Salinity mass emissions discharged through effluent channel | 38,500 tons/day[33] | 37,600 tons/day[34] | -2.4% |
| Net salinity mass emissions (intake emissions minus effluent emissions) | - 19 tons/day[35] | -23 tons/day[36] | - 17% |

*Appropriateness of Effluent Concentration Limit*. The 42 ppt effluent pond salinity (see Table M-5 above) is consistent with implementing the OPA receiving water salinity standard of 2 ppt above ambient outside the BMZ. As shown in Equation 1 (page M-6), at a natural background salinity (*Cs*) of 33.5 ppt, it can be computed that an initial dilution (*Dm*) value of 3.25 is required to ensure that a 42 ppt effluent concentration standard (*Ce*) prevents receiving water salinity from exceeding 2 ppt above ambient at the edge of the BMZ.

As demonstrated by Jenkins and Waysl (2015) within Appendix C, the minimum month initial dilution achieved under 60 mgd permanent stand-alone conditions exceeds this 3.25:1 value. Jenkins and Waysl (2015) determined that worst case initial dilution occurs when receiving water salinity and temperature are highest at the same time that wind, waves, currents, and ocean water levels are minimal. Based on the 20.5-year-long hydrodynamic record, worst case month initial dilution conditions were identified as having occurred in August 1992. Within this worst

33 Computed on the basis of a total discharge flow (CDP process flow plus augmented flow) of 254 mgd (see Table M-1) and an effluent salinity concentration of 40 ppt.

34 Computed on the basis of a total discharge flow (CDP process flow plus augmented flow) of 239 mgd (see Table M-1) and an effluent salinity concentration of 42 ppt.

35 Computed on the basis of a 50 mgd potable water production rate and an average salinity concentration (prior to post-RO conditioning) of approximately 100 mg/l.

36 Computed on the basis of a 60 mgd potable water production rate and an average salinity concentration (prior to post-RO conditioning) of approximately 100 mg/l.

case month, Jenkins and Waysl (2015) determined that lowest initial dilutions along the BMZ boundary occurred at the ocean bottom downcoast from the discharge point. Minimum month initial dilution at this worst case point during August 1992 conditions was determined to be 10.4:1 - a factor of three higher than the 3.25:1 value required to demonstrate compliance with Ocean Plan salinity standards.[37] As a result, the proposed 42 ppt effluent concentration standard at Monitoring Location M-002:

- implements the 2015 OPA receiving water salinity standard for proposed 60 mgd CDP permanent stand-alone operations under minimum month initial dilution conditions, and
- is protective of receiving water quality and beneficial uses.

*Receiving Water Salinity.* To assess receiving water quality under proposed 60 mgd permanent stand-alone operations, Jenkins and Waysl (2015) utilized the same hydrodynamic model that had previously been utilized to assess the 50 mgd CDP discharge under co-located and temporary stand-alone operations. Jenkins and Waysl (2005, 2015) also applied the same 20.5-year history of hydrodynamic driving factors to both the 50 mgd and 60 mgd CDP discharge scenarios.[38]

Figure M-3 (page M-15) compares depth-averaged receiving water salinity concentrations under average conditions (50 percent probability) for the existing permitted 50 mgd CDP operations and the proposed 60 mgd permanent stand-alone conditions. As shown in Figure M-3, receiving water salinities in excess of 35 ppt are confined to within 100 meters (328 feet) of the discharge point for both operating scenarios. The 60 mgd permanent stand-alone scenario, however, results in receiving water concentrations beyond the BMZ that are 0.1 to 0.2 ppt above those projected to occur under the existing permitted 50 mgd discharge.[39]

Figure M-4 (page M-16) compares depth-averaged water column salinities for the 50 mgd and 60 mgd operating scenarios under 95 percentile (5 percent probability occurrence) conditions. As shown in Figure M-4, elevated salinities are constrained to the immediate area around the discharge channel for both discharge scenarios under 95$^{th}$ percentile conditions. The 60 mgd permanent stand-alone case, however, results in the 34 ppt receiving water contour extending beyond the 33.68 ppt contour applicable to the existing permitted 50 mgd discharge scenario. Thus, while elevated receiving water salinities are limited to the BMZ for both cases, the 60 mgd permanent stand-alone case under both average and 95$^{th}$ percentile cases results in discernible (but non-significant) increases in receiving water salinity beyond the BMZ compared to the existing permitted 50 mgd co-located and temporary stand-alone discharge.

37 Jenkins and Waysl (2015) determined that August 1992 conditions represented worst case monthly conditions during a 20.5 year period of hydrodynamic data. Superimposing the 60 mgd CDP permanent stand-alone discharge on these August 1992 conditions, Jenkins and Waysl (2015) determined that the minimum month initial dilution achieved at the downstream edge of the BMZ (200 meters from the discharge channel) on the ocean bottom (most critical initial dilution location) ranged from 9.1:1 to 17.3:1, and averaged 10.4:1. See Appendix C.

38 Appendix C presents the Jenkins and Waysl (2015) hydrodynamic modeling report.

39 It should be noted (see Appendix C) that natural variations in receiving water salinity of 2.0 ppt occur in the CDP area. As a result, while the 0.1 to 0.2 ppt increases due to the 60 mgd CDP discharge are discernible, the differences are in no way significant.

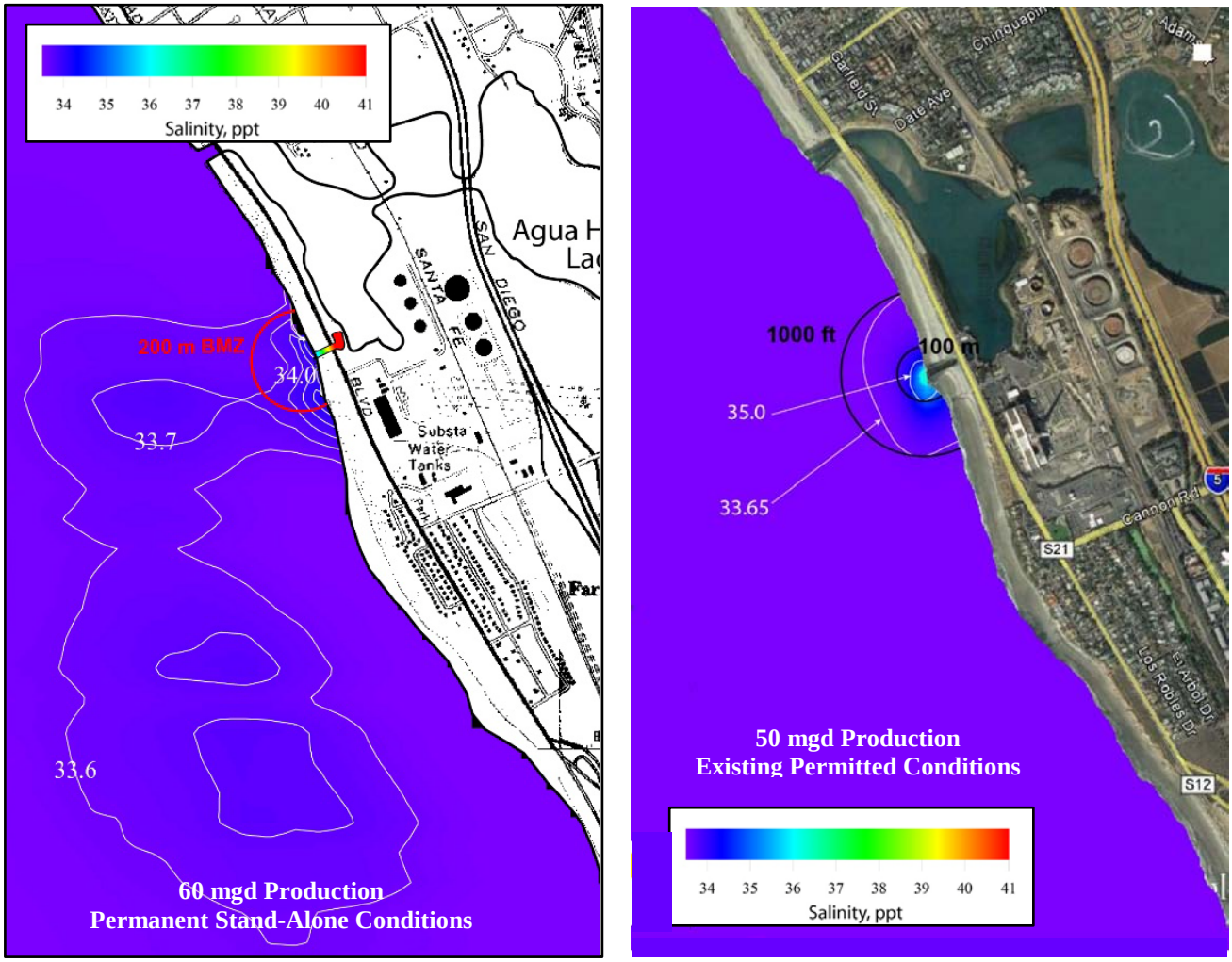



**Figure M-3 Depth-Averaged Water Column Salinity - Average Conditions**[40]

For the existing permitted 50 mgd average day CDP discharge, Jenkins and Waysl (2005) determined that worst case receiving water salinity concentrations of 36 ppt occurred at the ocean bottom near the end of the discharge channel under unheated discharge (temporary stand-alone conditions). Under these conditions, the discharge plume was negatively buoyant and the discharge plume tended to sink as it spread. As shown in Figure M-5 (page M-17), salinities at the ocean bottom at 200 meters from the discharge point are projected to be within 2 ppt of ambient at all times during the 20.5 year simulation period.

Similar to the 50 mgd discharge case assessed by Jenkins and Waysl (2005), Jenkins and Waysl (2015) determined that worst case salinity conditions on the ocean bottom occurred during rare times when summer El Niño events (significantly warmer than normal ocean water) coincided with times when the surf, wind, and currents were near zero.[41]

40 Existing permitted 50 mgd discharge case from Jenkins and Waysl (2005) under average (50 percent probability) conditions. Proposed CDP 60 mgd permanent stand-alone case under average (50 percent probability) conditions from Jenkins and Waysl (2015).

41 See pages 17-21 of Jenkins and Waysl (2015).

At the maximum 60 mgd plant capacity, Jenkins and Waysl (2015) determined that receiving water salinity concentrations at the edge of the BMZ would comply with the 2 ppt above ambient standard under virtually all combinations of wind, wave, current, temperature, and tide conditions. Figure M-6 (page M-17) summarizes projected compliance with the 2 ppt above ambient standards under the range of simulated hydrodynamic conditions. As shown in Figure M-6 (page M-17), Jenkins and Waysl (2015) determined that rare, coincidental occurrence of warm ocean temperatures, near-zero wind, near-zero waves, and near-zero ocean current (2 percent probability) could occur under short-term (6-hour to 24-hour) periods where receiving water salinity may temporarily exceed 2 ppt above ambient at depth at the BMZ boundary. Jenkins and Waysl (2015), however, determined that minimum initial dilution at the most critical point of the BMZ boundary (downcoast from the discharge point on the ocean bottom) during the worst case month on record was 10.4:1 - a value significantly higher than that required to ensure that an effluent pond salinity of 42 ppt does not result in exceedance of the Ocean Plan 2 ppt above ambient receiving water standard.[42]

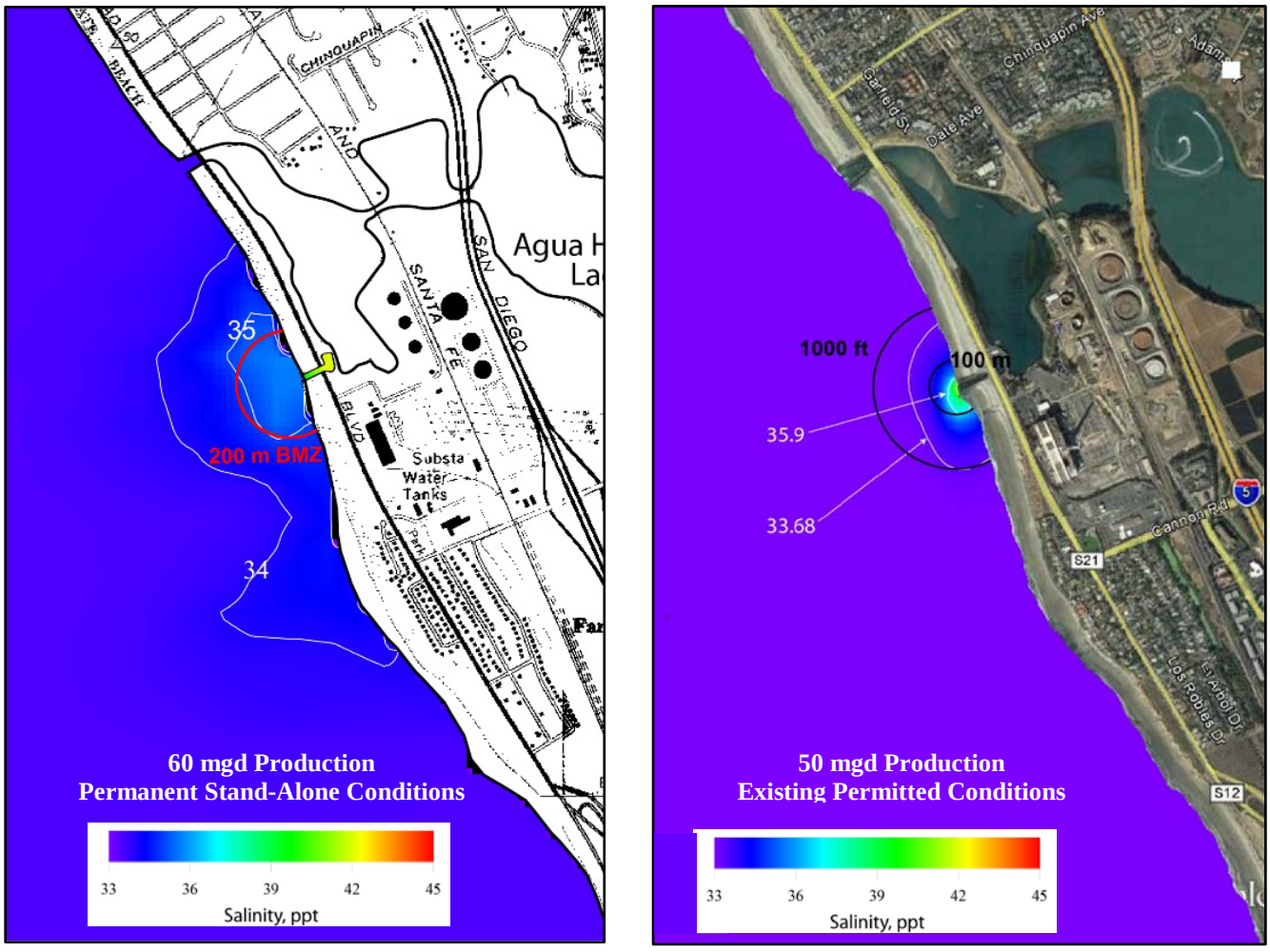
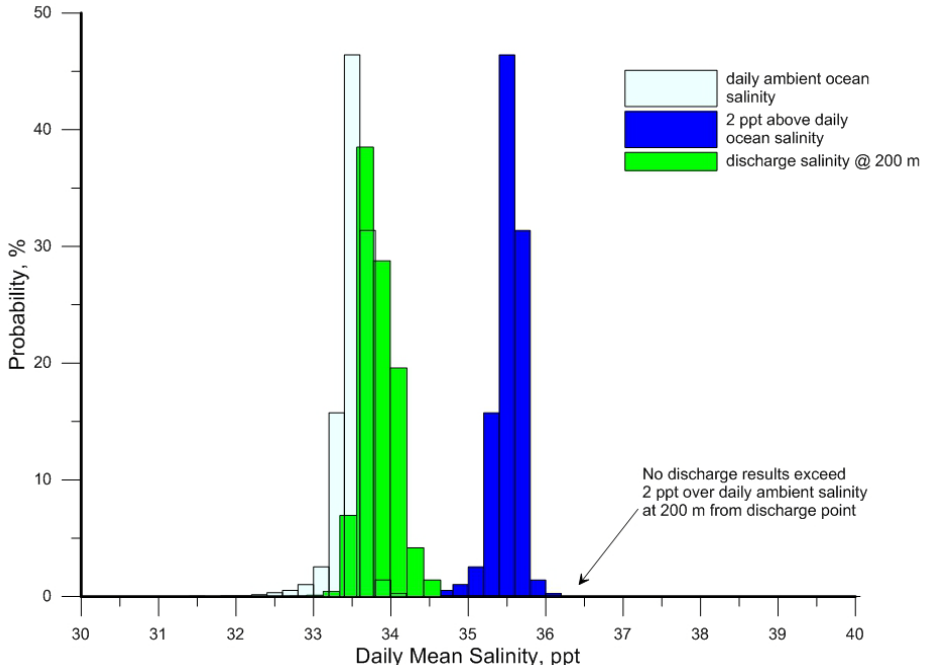



**Figure M-4 Depth-Averaged Water Column Salinity - 95th Percentile Conditions[43]**

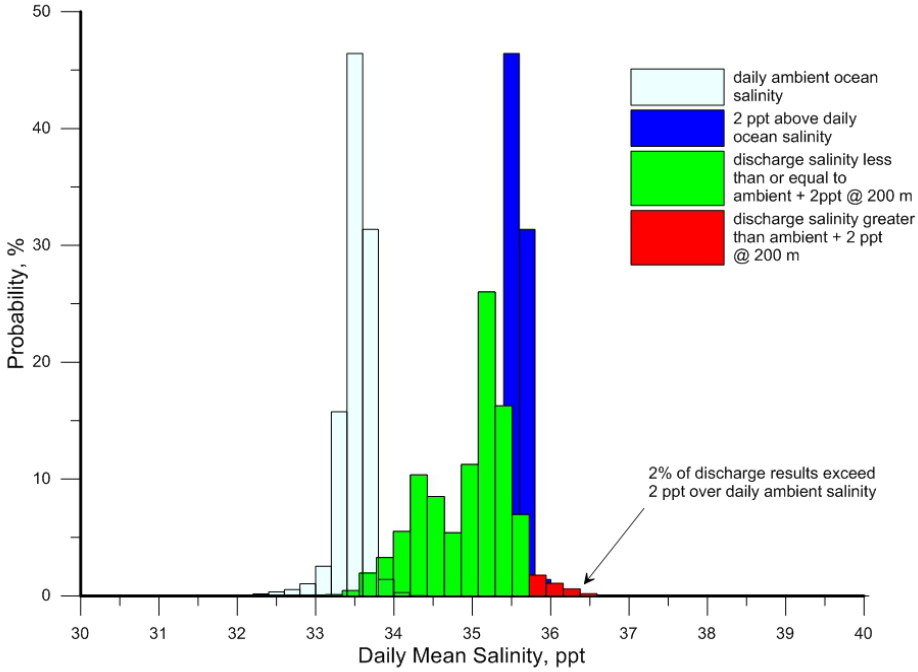
42 See Jenkins and Waysl (2015), presented herein as Appendix C.

43 Existing permitted 50 mgd discharge case from Jenkins and Waysl (2005) under 95 percentile conditions (5 percent probability) conditions. Proposed 60 mgd permanent stand-alone case under 95 percentile (5 percent probability) conditions from Jenkins (2015).




**Note:** The light blue histogram presents the probability distribution of ambient ocean water salinity. The dark blue histogram represents the 2 ppt above ambient limit (e.g. the light blue histogram offset by 2 ppt). The green histogram represents simulated receiving water salinity at the ocean bottom at the 200 meter BMZ boundary. As shown in the figure, receiving water salinities at the ocean bottom never exceeded 2 ppt above ambient in any of the 20.5 years of simulation for the existing permitted 50 mgd discharge scenario.

**Figure M-5 Probability Density Functions for Existing Permitted 50 mgd Discharge Ocean Bottom at Edge of 200-meter BMZ[44]**




**Note:** The light blue histogram presents the probability distribution of ambient ocean water salinity. The dark blue histogram represents the 2 ppt above ambient limit (e.g. the light blue histogram offset by 2 ppt). The green histogram represents simulated receiving water salinity concentrations at the ocean bottom at the 200 meter BMZ boundary that are less than or equal to 2 ppt above ambient. The red histogram depicts conditions under coincidental occurrence of warm ocean temperatures, near-zero wind, near-zero waves, and near-zero ocean current (2 percent probability) where receiving water salinity temporarily exceeds 2 ppt above ambient at depth at the BMZ boundary. Dilution provided under worst-case month conditions, however, exceeds the 3.25:1 initial dilution value within the BMZ required to ensure compliance with the Ocean Plan receiving water salinity standard of 2 ppt above ambient standard at the BMZ boundary.

**Figure M-6 Probability Density Functions for 60 mgd Permanent Stand-Alone Discharge Ocean Bottom at Edge of 200-meter BMZ[45]**

44 Additional clarification provided by Jenkins (2015) of modeling results originally presented by Jenkins and Waysl (2005).

45 From Jenkins and Waysl (2015), presented as Appendix C.

In summary, implementation of 60 mgd permanent stand-alone operations at CDP will result in discernible but non-significant increases in receiving water column salinity within and beyond the BMZ. More discernible increases in receiving water salinity are projected to occur at the ocean bottom nearest the discharge point.

Salinity concentrations within the BMZ at the ocean bottom under 60 mgd permanent stand-alone operations will be discernibly higher than receiving water salinity concentrations currently permitted CDP operations for the majority of anticipated hydrodynamic conditions. The CDP permanent stand-alone discharge, however, will comply with the OPA receiving water standard that salinity not exceed 2 ppt above ambient at the edge of the BMZ.[46]

**Acute Toxicity Effects.** Proposed CDP permanent stand-alone operations are not projected to result in any acute toxicity within or beyond the BMZ.

*2015 Acute Toxicity Threshold Studies.* Appendix G of this Amended Report of Waste Discharge presents the results of 96-hour static renewal tests that were conducted using topsmelt (*Atherinops affinis*) and mysid shrimp (*Americamysis bahia*). Tests conducted during February 2015 assessed acute toxicity effects of the species on salinity levels ranging from 38 ppt to 44 ppt. Tests conducted during March 2015 evaluated acute toxicity effects on the species in salinity concentrations ranging from 40 ppt to 44 ppt. As reported within Appendix G, the series of acute toxicity tests showed that:

> *There were no statistically significant effects observed for Pacific topsmelt survival at any of the salinity concentrations tested during both rounds of testing. A NOEC of 44 ppt and a LOEC of >44 ppt is reported for this species for both rounds of testing. During the first round of testing, survival of mysid shrimp in the highest test concentration (44 ppt) was 86.7 percent; this result was significantly decreased relative to the lab control according to the TST statistical approach but was not statistically significant using traditional statistics. The TST approach resulted in a NOEC of 42 and a LOEC of 44, while the traditional statistical approach resulted in a NOEC of 44 and a LOEC of >44. During the second round of testing, no statistically significant effects were observed for mysid shrimp survival at any of the salinity concentrations tested, resulting in a NOEC of 44 and a LOEC of >44.*

Table M-6 (page M-19) summarize the results of acute toxicity findings presented within Appendix G. Because effluent pond salinities will be maintained below 42 ppt, CDP permanent stand-alone operations will ensure that no acute toxicity effects occur in the discharge channel or within or beyond the BMZ as a result of the salinity of the 60 mgd CDP discharge under permanent stand-alone conditions.

46 As shown in Figure M-6 (page M-17), Jenkins and Waysl (2015) determined that rare, temporary coincidental occurrence of warm ocean temperatures, near-zero wind, near-zero waves, and near-zero ocean current (2 percent probability) could occur under short-term (6-hour to 24-hour) periods where receiving water salinity may exceed 2 ppt above ambient at depth at the BMZ boundary. Using a 20.5 year period of hydrodynamic data, Jenkins and Waysl (2015) determined that August 1992 conditions represented worst case month for initial dilution. Minimum month initial dilution at the most critical point of the BMZ boundary (downcoast from the discharge point on the ocean bottom) during this worst case month is computed at 10.4:1 - significantly higher than the 3.25:1 value required to ensure that an effluent pond salinity of 42 ppt does not result in exceedance of the Ocean Plan 2 ppt above ambient receiving water standard. Thus, while hydrodynamic modeling of the CDP discharge (see Figures 13, 15, and 16 of Appendix C) shows a small probability (up to 2 percent) that the 2 ppt above ambient standard may be exceeded under short-term periods, compliance with the Ocean Plan receiving water standard under minimum month conditions is assured.

**Table M-6**
**Summary of 2015 96-Hour Acute Toxicity Tests**[47]

| Species | Test Date | Test Description | No Observed Effect Level (NOEC) Salinity concentration (ppt) |
|---|---|---|---|
| Pacific topsmelt (*Atherinops affinis*) | February 5, 2015 | Steel Many-One Rank Sum Test | 44 |
| | | Test of Significant Toxicity (TST) | 42 |
| | March 3, 2015 | Steel Many-One Rank Sum Test | 44 |
| | | Test of Significant Toxicity (TST) | 44 |
| Mysid shrimp (*Americamysis bahia*) | February 10, 2015 | Steel Many-One Rank Sum Test | 44 |
| | | Test of Significant Toxicity (TST) | 44 |
| | March 5, 2015 | Steel Many-One Rank Sum Test | 44 |
| | | Test of Significant Toxicity (TST) | 44 |

*2007 Acute Toxicity Threshold Study.* Acute toxicity studies (Appendix G) conducted in 2015 conform results from earlier salinity-related acute toxicity effects evaluated by Poseidon in 2007. Special Provision C.2.c.1 of Order No. R9-2006-0065 required Poseidon to prepare and submit a study addressing salinity-related toxicity thresholds for short-term exposure. Poseidon completed the required salinity toxicity threshold study[48] in October 2007 in accordance with the provisions of Order No. R9-2006-0065. Results of the acute toxicity threshold study are presented in Table M-7 (page M-20). The 2007 threshold study concluded that:

- The daily average 40 ppt and maximum hourly 44 ppt salinity limitations established within Order No. R9-2006-0065 at Monitoring Location M-001 are conservative.
- The performance goal for acute toxicity of 0.765 TUa that is established in Order No. R9-2006-0065 is not exceeded until salinity reaches 48 ppt and is safely met at salinity of 46 ppt or less.
- No mortality effects are observed for a period of two hours at a salinity of 60 ppt.

**Chronic Toxicity Effects.** Proposed CDP permanent stand-alone operations are not projected to result in any chronic toxicity beyond the BMZ.

*2014-2015 Chronic Toxicity Threshold Studies.* Appendix H of this Amended Report of Waste Discharge presents the results of a suite of salinity tolerance bioassays and endpoints listed within the 2015 Ocean Plan amendments. To assess seasonal variability, chronic toxicity tests were performed at 2 - 5 month intervals during 2014-2015 on red abalone, purple urchin, sand dollar, topsmelt, and giant kelp

47 From Nautilus Environmental (2015b). See Appendix G.

48 From Poseidon Resources (2007), submitted in compliance with Special Provision C.2.c.1 of Order No. R9-2006-0065.

**Table M-7**
**Summary of 2007 Acute Toxicity Threshold Monitoring[50]**

| Salinity (ppt) | Pacific Topsmelt Acute Toxicity[49] (TUa) |
|---|---|
| 36 | 0.41 |
| 36 | 0.41 |
| 38 | 0.59 |
| 40 | 0.41 |
| 42 | 0.23 |
| 44 | 0.69 |
| 46 | 0.65 |
| 48 | **0.77** |
| 50 | **0.97** |
| 52 | **0.92** |
| 54 | **1.02** |
| 56 | **0.97** |
| 68 | **0.91** |
| 60 | **1.06** |

Values in **bold** font indicate exceedance of the 0.765 TUa acute toxicity Performance Goal of Order No. R9-2006-0065.

Table M-8 (page M-21) summarizes chronic toxicity threshold test results to date (October 2014 through July 2015). As shown in Table M-8, none of the tests resulted in No Observed Effect Concentrations (NOECs) of less than 36 ppt, and all but a few of the tests indicated no observed effects at salinity concentrations of 38.5 ppt. The Ocean Plan receiving water salinity standard of 2 ppt above ambient is thus fully protective of these species, and the interim chronic toxicity results (see Appendix H) provide evidence that a facility-specific salinity standards in excess of 2 ppt above ambient may also be fully protective of beneficial uses.

*Toxicity and Salinity Gradients*. In addition to the above tests that evaluated chronic toxicity in organisms exposed to constant salinity concentrations, tests were also performed to assess whether organisms passing through the salinity gradients of the BMZ would exhibit toxicity effects under projected salinity gradients. Appendix I evaluates chronic toxicity (development) for embryos of red abalone (*Haliotis rufescens*) and purple urchin (*Strongylocentrotus purpuratus*) under conditions in which the organisms are exposed to salinities that:

- that rapidly increase from 33.5 ppt to 40-44 ppt within one minute and remain at the high concentration for a few minutes,
- decrease over a period of 34-39 minutes[50] to 35.5 ppt, then
- decrease from 35.5 to 33.5 ppt over another 30 minutes.[51]

49 Acute toxicity conducted using topsmelt (*Atherinops affinis*). For reference, an acute toxicity of zero was recorded at a receiving water salinity of 33.5 ppt (average ambient).

50 This 30-40 minute salinity transition period is equivalent to projected travel time from the discharge point to the edge of the BMZ.

**Table M-8**
**Summary of 2014-2015 Chronic Toxicity Threshold Test Results**[52]

| Species | Test Endpoint | Start Date | No Observed Effect Concentration Salinity (ppt) |
|---|---|---|---|
| red abalone (*Haliotis rufeuscens*) | Development | December 12, 2014 | 36.0 |
| | Development | May 20, 2015 | 36.0 |
| purple urchin (*Strongylocentrotus purpuratus* | Development | October 30, 2014 | 36.5 |
| | Development | July 22, 2015 | 36.9 |
| sand dollar (*Dendraster excentricus*) | Development | October 30, 2014 | 38.5 |
| | Development | July 22, 2015 | 38.5 |
| purple urchin (*Strongylocentrotus purpuratus*) | Development | October 30, 2014 | 38.5 |
| | Development | July 22, 2015 | 38.5 |
| sand dollar (Dendraster *excentricus*) | Fertilization | October 30, 2014 | 38.5 |
| | Fertilization | July 22, 2015 | 38.5 |
| purple urchin (*Strongylocentrotus purpuratus*) | Fertilization | October 30, 2014 | 38.5 |
| | Fertilization | July 22, 2015 | 38.5 |
| giant kelp (*Macrocystis pyrifera*) | Germination | May 12, 2015 | 38.5 |
| | Growth | May 12, 2015 | 38.5 |
| topsmelt (*Atherinops affinis*) | Survival | May 5, 2015 | 38.5 |
| | Growth | May 5, 2015 | 38.5 |

As documented within Appendix I, none of the evaluated salinity gradient scenarios showed any statistically significant effects compared to control organisms. These tests demonstrate that no toxicity effects will occur on marine embryos within the augmented flows that are (1) blended into CDP process streams which results in an immediate increase in salinity, then (2) exposed to gradually decreasing salinity levels as the organisms proceed through the BMZ to ambient ocean waters. The tests also demonstrate no toxicity effects on any marine organisms that are exposed to the CDP discharge as they may pass through the BMZ.

*CDP Pilot Plant Chronic Toxicity Testing.* Results from the 2014-2015 chronic toxicity testing (see Appendix H) are consistent with the results of CDP pilot plant effluent performed during 2003. Table M-9 (page M-22) presents results of chronic toxicity tests performed during CDP pilot plant operations. Tests were performed on a combination of EPS cooling water and RO concentrate (representing co-located conditions) and on the RO concentrate blended with seawater at a 10:1 concentration (representing stand-alone operations). This 10:1 ratio,

51 This 30 minute salinity transition from 35.5 ppt to 33.5 ppt is equivalent to the projected travel time from the edge of the BMZ to where salinity concentrations are at ambient levels. From Nautilus Environmental (2015a). See Appendix I.

52 From Nautilus Environmental (2015c). See Appendix H. .

incidentally, is more conservative than the combined dilution that would be achieved under permanent stand-alone conditions as a result of flow augmentation blending and initial dilution.[53] As shown in Table M-9, all tests complied with the chronic toxicity effluent limit of 16.5 TUc (which implements the Ocean Plan receiving water toxicity limit of 1.0 TUc at the edge of the ZID). Data presented in Table M-9 demonstrate that:

- The daily average 40 ppt and maximum hourly 44 ppt salinity limitations established within Order No. R9-2006-0065 at Monitoring Location M-001 are conservative.
- The CDP discharge complies with the Order No. R9-2006-0065 chronic toxicity effluent limitation of 16.5 TUc under both co-located and stand-alone operating conditions by a wide margin.

**Table M-9**
**Summary of CDP Pilot Plant Chronic Toxicity Monitoring Results[54]**

| Species | Source of Sample | Test | Chronic Toxicity[1] (TUc) |
|---|---|---|---|
| Giant Kelp (*Macrocystis pyrifera*) | EPS cooling water and CDP pilot plant RO concentrate[55] | Germination | 1.0 |
| | | Growth | 1.0 |
| | CDP pilot plant concentrate[56] | Germination | 1.0 |
| | | Growth | 1.0 |
| Topsmelt (*Atherinops affinis*) | EPS cooling water and CDP pilot plant RO concentrate[55] | Survival | 1.0 |
| | | Growth | 1.0 |
| | CDP pilot plant concentrate[56] | Survival | 1.0 |
| | | Growth | 1.0 |
| Red Abalone (*Haliotis rufescens*) | EPS cooling water and CDP pilot plant RO concentrate[55] | Development | 1.0 |
| | CDP pilot plant concentrate[56] | Development | 2.0 |

**Important Social and Economic Development.** Adequate and viable water supplies are critical in supporting economic development within the San Diego Region, including

53 As shown in Table M-2 (page M-9), RO concentrate would be diluted by a factor of 3:1 by augmented flow (60 mgd into 178 mgd). Under minimum month conditions at the ocean bottom along the edge of the BMZ, Jenkins and Waysl (2015) demonstrate that the combined augmented flow would undergo a further mean dilution of 10.4:1, resulting in a total dilution factor of approximately 30:1 for the RO concentrate by the time the CDP discharge reaches the BMZ boundary. The 10:1 dilutions utilized in the CDP pilot plant testing are thus conservative compared to projected dilutions achieved under 60 mgd permanent stand-alone operating conditions.

54 Chronic toxicity tests for giant kelp and topsmelt performed on samples collected July 21, 23, and 25, 2003. Chronic toxicity tests for red abalone were performed on samples collected on August 6, 2003. (Results from Poseidon 2005 NPDES CDP Report of Waste Discharge.)

55 Sample comprised of 10 parts EPS cooling water effluent and 1 part concentrate from the CDP pilot plant to characterize co-located operations. This 10:1 blend is more conservative than the 15.5 to 1 initial dilution assigned within Order No. R9-2006-0065.

56 Samples comprised of RO concentrate from the CDP pilot plant, blended with deionized water to adjust the salinity of the blend to 36 ppt to represent approximately receiving water quality under stand-alone operations within the BMZ .

supporting industry, agriculture, and employment. The CDP represents important element of the comprehensive San Diego County Water Authority (Water Authority) program to support regional social and economic development (including environmental enhancement) through ensuring the viability and diversity of the region's water supplies. Economic benefits provided by the CDP include benefits related:

- improved water supply reliability,
- decreased reliance on imported water supplies,
- improved potable water quality, and
- other direct economic benefits.

*Improved Water Supply Reliability.* The CDP is an important element of the Water Authority's long-term strategy to improve the reliability of San Diego region water supplies. This regional strategy is based on:

- increasing regional water use efficiency,
- developing local water sources such as groundwater, surface water, recycled water, and seawater desalination, and
- securing independent transfers from the Colorado River.

The Water Authority has invested approximately $2 billion[57] during the past decade on large-scale water infrastructure projects designed to enhance water supply reliability and supply diversity.[58] Included among these costs are facilities for the Water Authority's Emergency Storage Program (ESP), which is directed toward being able to provide the region with 90 days of emergency supply (90,000 acre-feet of emergency storage) to ensure water supply reliability in the event of an interruption of imported water deliveries to the region.

Capital spending by the Water Authority on the ESP can be used as a rough estimate to indicate the value of supply that is available during an interruption of imported water deliveries. ESP capital costs translate to a unit value (not counting additional costs for treating stored water) of over $16,000 per acre-foot of reliable emergency supply. The additional 10 mgd of production capacity provided by the 60 mgd CDP under permanent stand-alone operations thus translates to approximately $180 million in value to the region's water users. Using this metric, the economic value of this water supply reliability for the full 60 mgd production capacity of the CDP would translate to approximately $1 billion.[59]

57 Includes the Water Authority's Emergency Storage Program, which is directed to maintaining regional water supply reliability in the event of a 90 day interruption of imported water availability. Excludes CDP costs, which is being constructed by Poseidon with private sector financing.

58 From Water Authority (2013).

59 Placing ESP facilities online will not detract from the reliability value of the CDP. The ESP is directed to provide approximately 90,000 acre-feet over a 90-day period, provided that sufficient imported supplies have been available to fill the storage capacity prior to the imported supply interruption. The CDP would annually produce 67,200 acre-feet at a production capacity of 60 mgd, independent of regional hydrologic conditions.

*Decreased Reliance on Imported Water Supplies.* Under proposed 60 mgd permanent stand-alone operations, the CDP will produce approximately 12 percent of the current Water Authority demand.[60] At this 60 mgd production rate, the CDP will represent approximately one-third of the total current local water supply developed within the Water Authority service area.

Implementation of the CDP will reduce reliance on imported supplies, which will result in (1) increased water supply reliability independent of the availability of imported supplies, and (2) reduced economic impacts associated with diverting and transporting imported supplies from the State Water Project and Colorado River to the San Diego Region. Social and economic values provided by decreasing reliance on imported supplies include:

- reduced need to expand the capacity of existing imported water infrastructure,
- reduced impacts on Bay Delta habitat, fisheries, and endangered species,
- reduced climate change risks to the Bay Delta ecosystem,
- reduced vulnerability to supply interruption from droughts, earthquakes or floods,
- reduced legal and environmental challenges to imported water supply availability, and
- increased certainty of water availability and increased certainty of water costs to local water supply agencies.

*Water Quality Benefits.* After final conditioning, CDP desalination supplies are projected to contain concentrations of total dissolved solids (TDS) on the order of 350 mg/l. TDS concentrations in the CDP supply are projected to be significantly lower than the imported supplies purveyed by the Water Authority, which typically contain TDS concentrations ranging from 450 to 650 mg/l, depending on hydrologic conditions and the blend of State Water Project and Colorado River supplies provided to the Region. Improved TDS concentrations in the CDP water supplies will provide significant benefit to a wide range of water users within the Water Authority service area, including:

- *Residential Benefits.* Increased life of plumbing facilities, increased life of residential appliances, and reduced use of bottled water and water softener products.
- *Agricultural Benefits.* Reduced water use, improved crop yields, and improved vegetation health.
- *Industrial.* Increased life of plumbing facilities, increased life of industrial equipment, and decreased water softening and/or water treatment costs.

60 Total water demand (excluding recycled water demand) within the Water Authority service area averaged approximately 550,000 acre-feet per year during the two year period 2013 and 2014. (Water Authority, 2015) A CDP production capacity of 60 mgd (67,200 acre-feet per year) translates to approximately 12 percent of the 2013-2014 supply. Due to water conservation, 2015 Water Authority demand is tracking below the 2013-2014 demand. As a result, the 60 mgd CDP production capacity translates to more than 12 percent using 2015 demand totals.

- *Utilities.* Increased life of treatment and distribution facilities for water and recycled water systems, decreased treatment needs for recycled water, and improved compliance with recycled water requirements.

The Metropolitan Water District of Southern California (MWD) and U.S. Bureau of Reclamation (USBR) developed an economic model to estimate benefits within each category of water use associated with improving salinity concentrations in public water supplies. Based on 1999 conditions, MWD and USBR (1999) estimated that reducing total dissolved solids concentrations by 100 mg/l in Southern California water supplies would yield annual savings on the order of $95 million. MWD is currently engaged in a detailed effort to update this model, but the MWD/USBR 1999 salinity impacts findings translate to an annual economic TDS-related benefit of approximately $11 million for replacing 60 mgd of 550 mg/l TDS imported supply with 60 mgd of 350 mg/l TDS desalination supply.[61] The additional 10 mgd provided under permanent stand-alone operations would translate to approximately $1.8 million per year in water quality-related benefits.

Reduced TDS concentrations in the CDP supply will also provide regional water and recycled water agencies with benefits related to improved compliance with:

- state and federal secondary drinking water standards for TDS,
- recycled water concentration standards imposed by the Regional Water Board,
- Basin Plan groundwater quality objectives, and
- salinity management provisions established within Regional Water Board-approved Salt and Nutrient Management Plans (SNMPs).

All San Diego Region SNMPs have concluded that salinity in imported water supplies are the dominant source of salt loads. Introducing high-quality CDP water into the regional water conveyance system will reduce total TDS loads to groundwater from landscape and agricultural irrigation sources (the largest salt loads in each basin).

Additionally, reduced TDS concentrations in the regional water supply will help recycled water agencies by improving the marketability of recycled water supplies to users with salt-sensitive landscaping or crops. Water quality improvements provided by the CDP supply could result in avoided recycled water demineralization costs, which depending on water quality and project size, translate to an annualized savings of more than $200 per acre-foot of demineralized supply.[62]

61 Computation based on approximately $45 per acre-foot of salinity-related costs per 100 mg/l of degradation (per MWD & USBR, 1999). Based on 80 percent increase in cost index between 1999 and 2015.

62 Based on recycled water demineralization costs presented by USBR (2009), updated to current (2015) dollars. Applies to recycled water supplies requiring demineralization or brackish groundwater supplies requiring demineralization.

Finally, reduced TDS concentrations in regional water supplies will help stormwater co-permittees in the effort to achieve compliance with Basin Plan surface water quality objectives, as TDS concentrations in low-flow or storm-related runoff may be reduced once low-TDS CDP supply is introduced into the regional water system. Even a small percentage savings to San Diego Region stormwater co-permittees would translate to large economic benefit, as regional co-permittees anticipate spending billions over the next 20 years to comply with NPDES stormwater requirements established by the Regional Water Board.[63]

*Other Economic Benefits.* Construction of the CDP has supported an estimated 2500 jobs, infusing approximately $350 million into the local economy. Under proposed permanent stand-alone operations, the project will support approximately 25 full-time employees and 175 indirect jobs, adding approximately $50 million in related annual spending throughout the region. The value of this $50 million annual infusion into the regional economy would be further enhanced through the economic multiplier effect.

In summary, the 60 mgd CDP under permanent stand-alone operations represents an important element of the San Diego Region water supply portfolio, and supports important social and economic development throughout the region - particularly within the City of Carlsbad and North County water agency service areas. Social and economic benefits of the CDP under permanent stand-alone operations include:

- improved water supply reliability benefits that result in a regional value of approximately $1 billion,
- decreased imported water reliance and decreased impacts on Bay Delta habitat and species,
- direct annual water quality benefits to San Diego region water users on the order of $8 million,
- indirect annual water quality benefits (e.g. recycled water compliance, enhanced SNMP compliance, enhanced stormwater compliance) that may total in the millions, and
- permanent employment that will annually add approximately $50 million to the local and regional economy and make efficient use of a $1 billion regional water treatment asset.

**Maximum Benefit to People of California.** State Water Board guidance[64] directs that the following factors be considered in assessing maximum benefit to the people of California:

- past, present and probable beneficial uses of the water,

63 See Southern California Water Committee (2014).

64 State Water Board (1987).

- economic and social costs of the proposed discharge compared to benefits,
- environmental aspects of the proposed discharge, and
- implementation of feasible alternative control measures which may reduce or mitigate negative impacts.

*Beneficial Uses.* Table M-10 (page M-28) summarizes beneficial uses in coastal waters. As shown in Table M-10, no beneficial uses would be discernibly affected by the CDP discharge under existing permitted conditions or proposed 60 mgd permanent stand-alone conditions.

The CDP discharge will also not have any discernible effect on waters within Agua Hedionda Lagoon. As documented within Jenkins and Waysl (2005, 2015) discharged waters would not be recirculated back into Agua Hedionda Lagoon to any discernible degree. Under worst case conditions, salinities in the lagoon of the inlet would be near ambient under both 50 mgd co-located and temporary stand-alone conditions and 60 mgd permanent stand-alone conditions.

As documented within Appendices A, B, D, and K, the CDP under permanent stand-alone operations will result in a significantly lower degree of intake entrainment and impingement effects than currently permitted co-located and temporary stand-alone conditions. Additionally, in accordance with 2015 OPA requirements, the CDP is designed using the best combination of site, design, technology, and mitigation to collectively minimize intake and mortality of all forms of marine life.

*Alternatives Control Measured Considered.* As summarized in Appendices A and B, a variety of alternatives and combinations of alternatives have been considered for intake facilities, discharge facilities, and mitigation. Intake alternatives considered (see Appendices A and B) included beach wells, slant wells, horizontal wells, offshore subsurface infiltration galleries, the existing EPS surface water intake, and a new surface water intake.[65] On the basis of an evaluation of site-specific applicability of subsurface intake technology supported by a comprehensive hydrogeological study of the subsurface conditions in the vicinity of the CDP, it was concluded that subsurface intakes were not feasible due to limited production capacity of the subsurface geological formation, poor water quality of collected source water, excessive cost, and environmental considerations.

65 These intake alternatives were extensively studied in the Regional Water Board's 2009 Water Code 13142.5(b) CDP determination (see Appendices O and P), in the CDP Final EIR (Appendix Q), and in the California Coastal Commission's Coastal Development Permit (see Appendix R).

**Table M-10**
**Protection of Beneficial Uses - Coastal Waters[66]**

| Symbol | Beneficial Use | Means by which CDP Discharge Protects Existing and Potential Beneficial Uses |
|---|---|---|
| IND | Industrial Service Supply | • No existing industrial intakes exist near the discharge point.<br>• CDP discharge will comply with all applicable water quality standards and will not affect the future potential use of coastal waters for industrial service supply. |
| NAV | Navigation | • The CDP discharge will have no effect on navigation. |
| REC1 | Water Contact Recreation | • The CDP discharge will not have a discernible effect on receiving water bacteriological compliance, and will not impede or impact swimming, surfing, or other water contact recreational uses.<br>• The CDP discharge will comply with all water quality standards for the protection of human health. |
| REC2 | Non-Contact Recreation | • The CDP discharge will have no discernible effect on boating, sail boarding, jet-skiing, fishing or other non-contact recreational uses.<br>• The CDP discharge will comply with all water quality standards for the protection of human health and marine organisms. |
| COMM | Commercial and Sport Fishing | • The CDP discharge will have no discernible effect on shore-based or boat-based fishing.<br>• The CDP discharge will comply with all water quality standards for the protection of human health and marine organisms. |
| BIOL | Preservation of Biological Habitats of Special Significance | • No Biological Habitats of Special Significance exist near the CDP discharge.<br>• The CDP discharge will comply with all applicable Ocean Plan standards for the protection of marine aquatic life. |
| WILD | Wildlife Habitat | • The CDP discharge will not have an effect on wildlife habitat, and will comply with all applicable Ocean Plan standards for the protection of marine aquatic life. |
| RARE | Rare and Endangered Species | • The CDP discharge will not discernibly affect wildlife or marine organisms, including rare and endangered species.<br>• The CDP discharge will comply with all applicable water quality standards for the protection of aquatic marine habitat. |
| MAR | Marine Habitat | • The CDP discharge will not have an effect on marine habitat outside the BMZ, and will comply with all applicable Ocean Plan standards for the protection of marine aquatic life. |
| MIGR | Migration of Aquatic Organisms | • The CDP discharge will have no discernible effect on migration; receiving water salinity values will approach ambient |
| SPWN | Spawning, Reproduction and/or Early Development | • The CDP discharge will not have an effect on fish spawning activities, and will comply with all applicable Ocean Plan standards for the protection of marine aquatic life. |
| SHELL | Shellfish Harvesting | • The CDP discharge will meet all applicable water quality standards for the protection of shellfish harvesting. |

66 The CDP discharge does not discernibly affect beneficial uses within Agua Hedionda Lagoon, as discharged waters would not be recirculated back into the lagoon to any discernible degree. As documented within Appendices A, B, D, and K, CDP under permanent stand-alone operations will result in a significantly lower degree of intake entrainment and impingement effects than currently permitted co-located and temporary stand-alone conditions. Additionally, the CDP in accordance with 2015 OPA requirements is designed using the best combination of site, design, and mitigation to collectively minimize intake and mortality of all forms of marine life.

Two additional intake alternatives that were evaluated (see Appendix B) included:

- a seafloor infiltration gallery (SIG) located in Agua Hedionda Lagoon coupled with an ocean outfall with a diffuser; and
- a lagoon-based SIG coupled with flow augmentation using the existing EPS intake and an outfall with a diffuser.

As documented within Appendix B, both of the SIG alternatives involved significant environmental impacts. On the basis of economic, environmental, social and technological factors (see Appendix B), neither of the two SIG alternatives were determined to be feasible.

Discharge alternatives considered (see Appendices A and B) included:

- surface discharge using the existing EPS discharge pond and discharge channel,
- discharging the RO concentrate into an existing municipal ocean outfall with a multiport diffuser, and
- constructing an ocean outfall/multiport diffuser at the CDP site.

As documented within Appendices A and B, discharging brine to the existing Encina, San Elijo, or Oceanside ocean outfalls was not feasible due to lack of outfall capacity, insufficient wastewater flows to dilute the brine, economic factors, and construction-related conveyance impacts. Constructing an outfall/multiport diffuser at the CDP site was not feasible due to shear stress mortality effects on organisms, environmental impacts to offshore rocky reef and kelp habitats, and economics.

As documented within Appendices A and B, the combination of screened surface intake, flow augmentation, and surface discharge through the existing onsite effluent pond and channel were concluded as (1) being technological and economically feasible, and (2) producing fewer impacts due to entrainment and intake than other feasible alternatives.

*Consistency with Regional Water Plans.* The proposed output from the 60 mgd CDP is consistent with the need for desalinated water identified in the following Water Authority regional water plans:

- 2003 *Regional Water Facilities Master Plan* (Master Plan) and associated Program Environmental Report (PEIR),
- 2010 Urban Water Management Plan (UWMP), and
- *Final 2013 Regional Water Facilities Optimization and Master Plan Update* (2013 Master Plan Update), along with the associated Supplemental PEIR.

The 2003 Master Plan and 2013 Master Plan Update identify phased implementation of seawater desalination as a future water supply (see Appendix W). The 2003 Master Plan PEIR describes the EPS desalination project as Phase I, with an initial capacity of 50 mgd. The 2003 PEIR also considered a Phase II, where:

> *…seawater desalination development would include expansion of seawater desalination capacity between 30 and 50 mgd, up to a total of 100 mgd, at the existing Seawater Desalination Plant at Encina, or construction of a new seawater desalination plant at a location other than the Encina Power Station by 2015.*

The 2003 PEIR also looked at a third phase, where seawater desalination development would include expansion of capacity between 50 and 70 mgd, up to a total of 150 mgd, again either at Encina or at another location by 2020.

The 2003 Master Plan and 2013 Master Plan Update emphasized the need for flexibility in adjusting the location, size and timing of water infrastructure in order to respond to changes in future demands. Accordingly, these plans provide that the Water Authority can adjust the implementation schedule for appropriate Master Plan elements (projects) consistent with future revisions in regional growth forecasts and/or the Water Authority UWMP updates. As such, a 60 mgd production rating for the CFP falls within the capacity ranges considered and analyzed as part of the 2003 Master Plan, 2010 URWM (currently being updated) and 2013 Master Plan Update.

Additionally, the 2010 UWMP identifies scenarios for responding to uncertainties in supplies and demands. One of the 2010 UWMP scenarios (Scenario 2) involves severe multi-year drought conditions where imported MWD supplies are limited. A potential supply gap of approximately 55,000 acre-feet in 2030 was identified, where alternative sources would be needed to help meet demands. This drought scenario is currently occurring, as California enters its fourth consecutive year of drought and MWD storage supplies have been significantly reduced. Additionally, given the potential for climate change and environmental restrictions to affect future imported water supply availability, the Water Authority plans emphasize the need to develop local supplies to mitigate this supply risk. Strategies for increasing local supply listed within the 2010 UWMP include increasing seawater desalination capacity within the San Diego Region. The re-rated 60 mgd CDP capacity would provide an increase in local supplies to help manage the current and future water supply shortages identified in the 2010 UWMP.

*Environmental Impacts of the Proposed Discharge.* As documented herein, proposed permanent stand-alone CDP operations will comply with all Ocean Plan standards for Case 3 constituents (salinity, chronic toxicity, and acute toxicity).

Monitoring conducted to date indicates that the CDP discharge will comply with applicable Ocean Plan acute and chronic toxicity standards under both existing permitted operations and

proposed permanent stand-alone operations. No discernible differences in receiving water toxicity are projected between (1) existing permitted 50 mgd co-located and temporary stand-alone conditions, and (2) proposed 60 mgd permanent stand-alone conditions.

Discernible differences in receiving water salinity within and beyond the BMZ are projected to occur between existing permitted 50 mgd co-located and temporary stand-alone operations and proposed 60 mgd permanent stand-alone conditions. These discernible differences in receiving water salinity, however, are:

- projected to be localized (limited to within and near the BMZ),
- not projected to result in significant differences in water quality (e.g. levels that would result in impact) within or outside the BMZ, and
- not projected to adversely affect existing or proposed beneficial uses.

The 200 meter (656 foot) BMZ would encompass an area of approximately 15.5 acres. The BMZ is well mixed by wave action and longshore currents, and the ocean bottom within the BMZ is predominantly sandy with scattered low rock outcrops. Sands within and beyond the surf zone are subject to seasonal stripping and replenishment. Abundance and biomass in the beach habitat can vary from sparse to abundant in summer to virtually non-existent in winter when cobble and gravel are the predominant sediment type.[67]

As documented within the CDP EIR, most of the organisms living in the BMZ also occur in areas of the Southern California Bight where salinity can be greater than projected to occur from the CDP discharge. Additionally, fish, plankton, and other pelagic organisms that encounter elevated salinities within the BMZ experience low exposure times on the order of several hours or less.[64]

As documented within Appendix A, assuming 100 percent mortality within the BMZ (a conservative approach), total marine mortality and mitigation requirements for the 60 mgd permanent stand-alone operations are less than those for the existing permitted 50 mgd co-located and temporary stand-alone CDP operations. As a result, no incremental additional impact occurs and previously approved mitigation is adequate to address effects associated with 60 mgd permanent stand-alone operations.

*Energy/Carbon Footprint.* Poseidon has developed a Climate Action Plan that calls for the plant to be net carbon neutral over 30 years by offsetting greenhouse gas emissions through the purchase of carbon offsets and energy recovery technology.

67 A description of the BMZ habitat conditions is presented within Section 4.3 of the CDP EIR (see Appendix Q).

*Conformance with San Diego Water Board Practical Vision*. CDP 60 mgd permanent stand-alone operations are consistent with the sustainable water supply mission established within the *San Diego Water Board Practical Vision* to "facilitate development of new and diverse sustainable water supplies in an environmentally responsible manner."[68] The agricultural reuse program also helps achieve the *San Diego Water Board Practical Vision* desired outcomes of (1) reducing dependence on imported water, and (2) increasing the use of recycled water while protecting water quality and beneficial uses.

**Attainment of Water Quality Standards/Beneficial Use Protection.** As documented within this Amended Report of Waste Discharge, the CDP discharge complies with effluent standards established within Order No. R9-2006-0065 for CDP co-located and temporary stand-alone operations. The existing permitted 50 mgd co-located and temporary stand-alone operations also will comply with receiving water salinity standards established within the 2015 OPA.

The 60 mgd CDP discharge will comply with Ocean Plan receiving water standards under permanent stand-alone operating conditions, including receiving water salinity standards established within the 2015 OPA. Further, in complying with Ocean Plan receiving water standards for the protection of human health and the protection of marine aquatic habitat, the CDP discharge will be fully protective of existing and potential beneficial uses under both existing permitted 50 mgd co-located and temporary stand-alone operations and proposed 60 mgd permanent stand-alone operations.

**Case 3 Antidegradation Conclusions.** In accordance with these determinations, it is concluded that the CDP permanent stand-alone discharge will result in discernible differences in receiving water column salinity and ocean bottom salinity within and immediately outside the BMZ, compared to the existing permitted CDP discharge. The 60 mgd CDP permanent stand-alone discharge, however, will not result in:

- significant differences in water column salinity and ocean bottom salinity, compared to the existing permitted CDP discharge,
- discernible differences in receiving water acute or chronic toxicity, compared to the existing permitted CDP discharge, and
- exceedance of Ocean Plan standards for salinity, acute toxicity, or chronic toxicity.

Additionally, areas where discernible differences in receiving water salinity would occur would be limited to the BMZ and immediately nearby waters. All in all, total differences between the existing permitted 50 mgd operating scenario and the proposed 60 mgd scenario are considerably less than the *de minimus* water quality differences addressed by Finding II.K of Order No. R9-

68 See Regional Water Board (2014).

2006-0065 for the existing permitted 50 mgd co-located and temporary stand-alone project.[69] For these reasons, no salinity assimilative capacity analyses are warranted, and state and federal thresholds for making a finding that water quality is not "lowered" would appear to be met.

In the event, however, that a determination is made that the projected differences in receiving water salinity concentrations represent a "lowering" of water quality (see Figures M-1 and M-2), proposed CDP stand-alone operations will conform to requirements of Resolution No. 68-16 and 40 CFR 131.12 on the basis of:

- no significant change in receiving water salinity is projected to occur,
- discernible changes in salinity are limited to the BMZ and nearby receiving waters,
- no discernible effect on receiving acute water toxicity will within or beyond the BMZ,
- no discernible effect on receiving water chronic toxicity will occur beyond the BMZ,
- continued compliance with water quality standards would be maintained,
- all beneficial uses will be fully supported and protected, and water quality effects will not unreasonably affect actual or potential beneficial uses,
- implementation of proposed CDP permanent stand-alone operations is necessary to accommodate important economic and social development within the Water Authority service area and City of Carlsbad, and
- implementation of the proposed CDP permanent stand-alone operations is consistent with maximum benefit to the people of the state.

Regardless of whether projected receiving water salinity changes are deemed to represent a "lowering" of water quality, substantial evidence exists (as summarized herein) to support a finding that permanent stand-alone CDP operations are consistent with provisions of State Water Board Resolution No. 68-16 and requirements of 40 CFR 131.12.

## CONCLUSIONS

Table M-11 (pages M-34 and M-35) summarizes antidegradation conclusions. Existing permitted CDP operations are concluded as resulting in no lowering of water quality. Antidegradation Finding II.K of Order No. R9-2006-0065 remains valid for the existing permitted CDP discharge, and the existing CDP discharge is concluded as being in compliance with antidegradation provisions of State Water Board Resolution No. 68-16 and 40 CFR 131.12.

69 Finding II.K of Order No. R9-2006-0065 addressed antidegradation compliance for the existing permitted 50 mgd CDP project under co-located and temporary stand-alone operating conditions. As noted on page M-7, the Regional Water Board in Finding No. II.K determined that the 50 mgd project (compared to "no project" conditions) would not result in significant degradation of water quality or affect the beneficial uses of the receiving water. Water quality differences between the proposed 60 mgd project and the existing permitted 50 mgd project are significantly lower than those between the 50 mgd project and "no project" conditions. As a result, the conclusions expressed in Finding II.K of Order No. R9-2006-0065 are also applicable to the proposed 60 mgd permanent stand-alone CDP project.

**Table M-11**
**Summary of Antidegradation Conclusions**

| CDP Operations | Water Quality Parameters Assessed | Basis for Conclusions | Antidegradation Conclusions |
|---|---|---|---|
| 50 mgd production rate under existing permitted co-located and temporary stand-alone operations | Case 1: All Ocean Plan receiving water constituents | • No change in permitted intake or discharge flows<br>• No net mass emissions[70]<br>• No change in total mass emissions[71]<br>• No change in effluent concentrations[72]<br>• No change in receiving water concentrations or toxicity<br>• Continued compliance with existing NPDES effluent limitations and performance goals[72]<br>• Continued compliance with applicable water quality standards | • No lowering of water quality<br>• Antidegradation Finding II.K of Order No. R9-2006-0065 remains valid for the existing permitted CDP discharge<br>• Existing permitted CDP discharge is in compliance with State Water Board Resolution No. 68-16<br>• Existing permitted discharge is in compliance with antidegradation provisions of 40 CFR 131.12 |
| 60 mgd production rate under proposed permanent stand-alone operations | Case 2: Ocean Plan receiving water constituents except salinity and toxicity | • No net mass emissions of any Case 2 constituent[70]<br>• Total discharge flows reduced compared to Case 1<br>• No change in total mass emissions for any Case 2 constituent[71]<br>• No discernible changes in effluent quality or receiving water quality for any Case 2 constituent[72] | • No lowering of water quality<br>• CDP 60 mgd permanent stand-alone discharge is in compliance with State Water Board Resolution No. 68-16 for all Case 2 constituents<br>• CDP 60 mgd permanent stand-alone discharge is in compliance with antidegradation provisions of 40 CFR 131.12 for all Case 2 constituents |
| 60 mgd production rate under proposed permanent stand-alone operations | Case 3: Salinity, Acute toxicity, chronic toxicity | • No net mass emissions of salinity[70]<br>• Total discharge flows reduced compared to Case 1<br>• Effluent salinity concentration will be increased by approximately 4.8 percent, but total mass emissions of salinity will be reduced by 17 percent[73]<br>• Receiving water depth-averaged salinity concentrations will be similar to existing permitted conditions[74]<br>• Discernible increase in ocean bottom salinity concentrations within the 15.5-acre BMZ will occur, but this increase will be on the order of a few tenths of a ppt except immediately near the discharge point<br>• The discharge will comply with Ocean Plan receiving water salinity and toxicity standards<br>• Salinity gradient toxicity tests demonstrate that no toxicity effects will occur for organisms moving through the BMZ[75]<br>• Salinity/toxicity threshold analyses (submitted herein) indicate that the Ocean Plan receiving water salinity standards are conservative in protecting marine life and that a facility specific receiving water standard may be appropriate[76]<br>• Environmental effects would be restricted to the BMZ[77] | • Salinity is a "threshold" pollutant (e.g. constituent believed to elicit an effect at a certain concentration)[78]<br>• Changes in receiving water salinity will produce only minor (non-significant) effects, and will not create any discernible increase in acute or chronic toxicity near the edge of the BMZ or beyond the BMZ<br>• The discharge will comply with applicable Ocean Plan standards for the protection of beneficial uses<br>• The limited increase in receiving salinity concentrations (compared to existing permitted conditions) within the BMZ and minimal to non-discernible increases at the edge of the BMZ appears to meet threshold for a conclusion of no "lowering" of water quality outside the BMZ |

70 Almost all of the mass of salinity and other constituents naturally found in the CDP intake water will be returned to the ocean, except for a small portion (1 percent or less) that will remain in the CDP product water.

71 Total mass emissions from CDP process flows plus augmented flows. Augmented flows may from either EPS under co-located operations or flows added for the benefit of CDP salinity compliance under temporary or permanent stand-alone operations.

72 Poseidon requests no changes in effluent limitations or performance goals for the Case 2 parameters currently regulated within Order No. R9-2006-0065, and no discernible changes in receiving water quality would occur for Case 2 parameters as part of the proposed project.

73 See Table M-5 on page M-13.

74 See Figures M-3 and M-4 on pages M-15 and M-16. Also see Appendix I.

75 See Appendix I.

76 See Appendices G and H.

77 As documented, salinity concentrations outside the BMZ will comply with Ocean Plan salinity standards (less than 2 ppt above ambient). Receiving water salinity concentrations outside the BMZ are rapidly reduced to a few tenths of a ppt above ambient, and are within the range of natural salinity variability that occurs in the vicinity.

78 The State Water Board (1987) directs Regional Water Boards to apply stricter scrutiny to non-threshold constituents (e.g. carcinogens, mutagens, etc.) in assessing small changes in water quality.

**Table M-11**
**Summary of Antidegradation Conclusions**

| CDP Operations | Water Quality Parameters Assessed | Basis for Conclusions | Antidegradation Conclusions |
|---|---|---|---|
| 60 mgd production rate under proposed permanent stand-alone operations | Case 3: Salinity, Acute toxicity, chronic toxicity | • The project is consistent with regional water supply plans and will meet approximately 12 percent of the regional water demand<br>• The project reduces imported water reliance and reduces the need for (and environmental effects of) future expansion of imported water facilities<br>• The project provides regional water reliability benefits on the order of $1 billion<br>• The project provides water quality benefits to water users estimated at approximately $8 million per year<br>• The project provides significant economic water quality benefits to recycled water users and stormwater co-permittees and helps ensure compliance with Basin Plan groundwater quality objectives[79]<br>• CDP operations will support 25 full-time and 175 support (indirect) jobs, and (not counting multiplier effects) will annually add approximately $50 million to the economy, not including the regional economic multiplier effect<br>• Alternatives to the proposed project are either not feasible or involve a greater level of impact than the proposed project[80]<br>• The project is net carbon neutral over next 30 years<br>• Beneficial uses are fully protected | *Conclusions applicable if a finding is made that a "lowering" of water quality occurs for Case 3 parameters:*<br>• The proposed project (60 mgd production rate under permanent stand-alone operations) is consistent with protecting existing and potential beneficial uses<br>• The project is necessary to accommodate important economic and social development within the North County coastal area and Water Authority service area<br>• The project is consistent with maximum benefit to the people of California<br>• The project is in compliance with State Water Board Resolution No. 68-16<br>• The project is in compliance with antidegradation provisions of 40 CFR 131.12 |

The proposed project (60 mgd production rate under permanent stand-alone operating conditions) is not projected to result in any discernible increase in effluent concentrations, mass emissions, or receiving water concentrations for Case 2 parameters. As a result, no lowering of water quality occurs under Case 2, and the CDP 60 mgd permanent stand-alone discharge is concluded as being in compliance with State Water Board Resolution No. 68-16 for all Case 2 constituents.

Depth-averaged water column salinity (a Case 3 constituent) under 60 mgd permanent stand-alone conditions will be similar to existing permitted CDP operations, but discernible salinity increases will occur at depth within the BMZ. The most discernible increases in salinity are projected to be occur at depth within the BMZ nearest the discharge channel. Outside the BMZ, receiving water salinity differences between the 50 mgd and 60 mgd operation scenarios are projected to be limited to a few tenths of a ppt or less.

79 By lowering potable water TDS concentrations, the project helps recycled water agencies achieve compliance recycled water effluent limits imposed by the Regional Water Board, and helps achieve salinity management goals established in Regional Water Board-approved Salt and Nutrient Management Plans (which document imported water as a key salt load within local basins), and helps stormwater co-permittees achieve compliance with Regional Water Board stormwater standards.

80 See Appendices A and B.

Proposed 60 mgd permanent stand-alone operations are not projected to result in any discernible acute or chronic toxicity outside the BMZ. Further toxicity monitoring (see Appendix I) indicates that organisms within the augmented flow will not exhibit toxic effects as they travel through the discharge channel and beyond the BMZ.

The limited increase in receiving salinity concentrations (compared to existing permitted conditions) within the BMZ and minimal to non-discernible increases at the edge of the BMZ appears to meet threshold for a conclusion of no "lowering" of water quality outside the BMZ. In the event, however, that the discernible difference in salinity concentration within the BMZ is deemed to represent a "lowering" of water quality, the proposed CDP project (60 mgd production rate under permanent stand-alone operations):

- is consistent with regional water supply plans,
- is fully protective of existing and potential beneficial uses,
- is necessary to accommodate important economic and social development within the North County coastal area and Water Authority service area,
- results in no greater net environmental impact than the existing permitted 50 mgd co-located and temporary stand-alone operations,
- provides significant economic value to the North County region and Water Authority service area, and is consistent with maximum benefit to the people of California,
- results in receiving water quality at least as good as applicable water quality standards,
- is in compliance with State Water Board Resolution No. 68-16, and
- is in compliance with antidegradation provisions of 40 CFR 131.12

## REFERENCES

Jenkins, Scott A. Carlsbad Supplemental Task Items (memorandum to Michael R. Welch. August 26, 2015.

Jenkins, Scott A, and Joseph Wasyl. *Hydrodynamic Dilution Analysis for the Carlsbad Desalination Project Operating at 60 Million Gallons per Day Production Rate* (See Appendix C). September 2015.

Jenkins, Scott A, and Joseph Wasyl. *Hydrodynamic Modeling of Dispersion and Dilution of Concentrated Seawater Produced by the Ocean Desalination Project at the Encina Power Plant*. March 2005.

Nautilus Environmental. *Poseidon Salinity Tolerance Study Interim Report- Chronic Toxicity Test Results October 2014 through July 2015* (see Appendix H). August 26, 2015. 2015c.

Nautilus Environmental. *Poseidon Acute Toxicity Tolerance Toxicity Test Results* (see Appendix G). July 29, 2015. 2015b.

Nautilus Environmental. *Poseidon Brine Dilution Pump Study, Final Toxicity Test Results* (see Appendix I. July 24, 2015. 2015a.

Regional Water Quality Control Board, San Diego Region (Regional Water Board). *San Diego Water Board Practical Vision.* 2014.

Regional Water Quality Control Board, San Diego Region (Regional Water Board). *Order No. R9-2006-0065, As Amended by Order Nos. R9-2009-0038 and Order No. R9-2010-0073, NPDES No. CA0109223, Waste Discharge Requirements for the Poseidon Resources (Channelside) LLC, Carlsbad Desalination Project Discharge to the Pacific Ocean via the Encina Power Station Discharge Channel.* Revised May 12, 2010.

Metropolitan Water District of Southern California (MWD) and U.S. Bureau of Reclamation (USBR). *Salinity Management Study*. June 1999.

Poseidon Resources. Salinity Related Toxicity Threshold for Short-Term Exposure (report submitted by Poseidon Resources to the Regional Water Board in compliance of Special Provision C.2.c.1 of Order No. R9-2006-0065). October 2, 2007.

San Diego County Water Authority (Water Authority). Monthly water use totals for the period January 2007 through July 2015. Located at www.sdcwa.org/water-use. 2015.

San Diego County Water Authority (Water Authority). *Final Supplemental Program Environmental Impact Report for the 2013 Regional Water Facilities Optimization and Master Plan Update and Climate Action Plan* (State Clearinghouse No. 20030021052. March 2014.

San Diego County Water Authority (Water Authority). *Regional Water Facilities Optimization and Master Plan Update*. 2013.

San Diego County Water Authority (Water Authority). *Regional Water Facilities Master Plan.* 2003.

San Diego County Water Authority (Water Authority). *Urban Water Management Plan*. 2010.

Southern California Water Committee. Third Annual Stormwater Workshop. Located at: www.socalwater.org/issues/stormwater. June 26, 2014.

State Water Resources Control Board (State Water Board). *Water Quality Control Plan, Ocean Waters of California* (Ocean Plan). Amended May 15, 2015.

State Water Resources Control Board (State Water Board). Administrative Procedures Update: Antidegradation Policy Implementation for NPDES Permitting. July 2, 1990.

State Water Resources Control Board (State Water Board). *Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters of California.* October 28, 1968.

U.S. Bureau of Reclamation. *Comparison of Advanced Treatment Methods for Partial Desalting of Tertiary Effluents*. September 2009.

U.S. Environmental Protection Agency (EPA). Water Quality Standards Regulatory Provisions. *Federal Register.* Vol. 80, No. 162. Promulgated on August 21, 2015. 2015a.

U.S. Environmental Protection Agency (EPA). Antidegradation Policy and Implementation Methods. Title 40, *Code of Federal Regulations,* Section 131.12. Revised on August 21, 2015. 2015b.

U.S. Environmental Protection Agency (EPA). *Water Quality Standards Handbook,* Chapter 4, Antidegradation. Updated 2014.

U.S. Environmental Protection Agency, Region 9 (EPA). Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12. June 3, 1987.