POSEIDON RESOURCES



March 29, 2011

Mr. David Gibson
Executive Officer
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

**Subject:** **Submittal of Report of Waste Discharge**
**Renewal of NPDES CA0109233**
**Carlsbad Desalination Project**

Dear Mr. Gibson:

Attached in electronic format is a report of waste discharge submitted in application for renewal of Order No. R9-2006-0065 (NPDES CA0109233). Order No. R9-2006-0065 was adopted on August 16, 2006, and became effective on October 1, 2006.

Order No. R9-2006-0065, as amended by Order No. R9-2009-0038, establishes requirements for the discharge from the proposed Carlsbad Desalination Project (CDP). Order No. R9-2006-0065 expires on October 1, 2011, and Poseidon Resources is required to submit an application for renewal of the permit 180 days in advance of this expiration date. The attached report of waste discharge includes:

- EPA Form 1,
- EPA Form 2D,
- Supplemental figures and water quality tables,
- State of California Form 200,
- Regional Board Contributions Disclosure Statement, and
- A supplemental technical report that describes proposed seawater desalination facilities and operations, impingement and entrainment compliance, and compliance with applicable state and federal regulations and policies.

**No Proposed Changes in NPDES Requirements.** As described within Order No. R9-2006-0065, proposed CDP desalination facilities will be located adjacent to the Encina Power Station (EPS). The CDP will withdraw seawater from the EPS cooling water effluent channel. Concentrated seawater, and filter backwash water will be directed back into the EPS effluent channel for discharge to the Pacific Ocean.

Poseidon Resources
501 West Broadway, Suite 1500, San Diego, CA 92101-1234
619-595-7800 Fax 619-595-7999

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Poseidon Resources
501 West Broadway, Suite 2020, San Diego, CA 92101, USA
619-595-7802 Fax 619-595-7892

Poseidon seeks no changes in the effluent concentration limitations, discharge flow rates, or mass emission limits established in Order No. R9-2006-0065. Additionally, CDP facilities and operations described in the findings of Order No. R9-2006-0065 remain valid.

**Compliance with Special Provision VI.C.2.c(1).** Special Provision VI.C.2.c(1) of Order No. R9-2006-0065 required Poseidon to conduct a study that assessed salinity-related toxicity thresholds for short-term exposure. Poseidon completed the required toxicity threshold study and on October 2, 2007 submitted the study to the Regional Board. As documented within the attached Report of Waste Discharge, the study concluded that the salinity limitations established in Order No. R9-2006-0065 ensure by a significant margin that the CDP discharge will not cause any salinity-related toxicity in receiving waters.

**Compliance with Special Provision VI.C.2.e.** Special Provision VI.C.2.e of Order No. R9-2006-0065 required Poseidon to prepare and submit a Flow, Entrainment and Impingement Minimization Plan (Minimization Plan). Section 13142.5(b) of the California Water Code requires that industrial facilities using seawater for processing utilize the best available site, design, technology, and mitigation feasible to minimize intake and mortality of marine life. To ensure compliance with Water Code Section 13142.5(b) when CDP intake requirements exceed EPS discharge flows, the Minimization Plan:

- Assessed alternative sites, design features, and technology to minimize entrainment and impingement effects,
- Quantified potential impingement and entrainment effects, and
- Established a Marine Life Mitigation Plan (MLMP) to mitigate against potential impingement and entrainment effects.

Poseidon submitted an original version of the Minimization Plan to the Regional Board on February 12, 2007. After a comprehensive review and coordination process, Poseidon submitted a revised version of the Minimization Plan to the Regional Board on March 6, 2008. The Regional Board adopted Order No. R9-2008-0038 on April 9, 2008, which conditionally approved the Minimization Plan and required Poseidon to prepare an amendment to the Minimization Plan that included a proposal for mitigation developed through an interagency process.

Poseidon complied with this requirement through the development and submittal of a proposed MLMP which:

- Establishes mitigation requirements,

- Identifies alternative sites,
- Establishes minimum plan standards, and
- Sets forth an interagency process for site selection, monitoring, management, and remediation.

On August 6, 2008, the Coastal Commission approved the MLMP. On May 13, 2009, the Regional Board approved the amended Minimization Plan to include the MLMP.

Subsequent to the adoption of Order No. R9-2009-0038, Poseidon increased the quantity of acres to be restored under the MLMP to resolve a concern on the part of the Coastal Commission staff that the entire 55.4 acres of restoration contemplated under the MLMP was needed to fully offset projected entrainment losses for the source water drawn directly from Agua Hedionda Lagoon by the CDP, and therefore was not available for mitigation of projected impingement losses. Commission staff determined that an additional 11 acres would be required to fully offset the projected impingement losses associated with the stand-alone operation of the CDP. In light of Poseidon's voluntary commitment to provide additional 11 acres of habitat restoration to fully offset the projected impingement losses associated with stand-alone CDP operations, Poseidon is requesting the following modifications to the Minimization Plan and related permit conditions:

1. Increase the number of acres to be restored under the Marine Life Mitigation Plan from 55.4 to 66.4 acres (42.5 acres in Phase I and 23.5 acres in Phase II); and
2. Delete the Biological Performance Standard from the Minimization Plan mitigation monitoring requirements established in Order No. R9-2009-0038.

In accordance with the provisions of the MLMP, Poseidon on July 28, 2010 submitted a preliminary wetlands restoration plan to restore a 90 acre site in the Lower Otay River Floodplain. Poseidon's proposed mitigation site and restoration plan were approved by the California Coastal Commission on February 9, 2011. Regional Board approval of the proposed site and restoration plan occurred on March 9, 2011 with the adoption of Regional Board Resolution No. R9-2011-0028.

In accordance with the MLMP and site restoration plan, Poseidon will coordinate with the Coastal Commission, Regional Board, and other agencies in the development and implementation of a final wetlands restoration plan for the selected Otay River Valley Floodplain site.

Of note, on March 16, 2011, the Superior Court of California issued a tentative ruling upholding the San Diego Regional Water Quality Control Board's application of 13142.5(b) to the CDP. A copy of the tentative ruling is attached (Attachment A).

**Environmental Impact Report Addendum.** Subsequent to the adoption of Order No. R9-2006-0065, minor modifications to the CDP site design were addressed in a 2009 Environmental Impact Report (EIR) Addendum. The City of Carlsbad filed a Notice of Determination certifying the EIR addendum as complying with the California Environmental Quality Act (CEQA) on September 16, 2009. The minor modifications addressed in the EIR Addendum do not require any change in the facilities descriptions presented in Order No. R9-2006-0065 or the associated NPDES Fact Sheet.

**Submittal of Additional Information**. This report of waste discharge is being submitted electronically in accordance with Regional Water Board policies that encourage paperless submittal.

After our receipt of your review comments, we will (if requested) provide your office with updated copies of this report of waste discharge that incorporate any additional information or revisions requested by your staff.

Please contact me at (619) 595-7802 (email SMaloni@Poseidon1.com) if you have any questions.

Thank you for your assistance.

Sincerely,

Scott Maloni, Vice President - Development

**SUPERIOR COURT OF CALIFORNIA,**
**COUNTY OF SAN DIEGO**
**HALL OF JUSTICE**
**TENTATIVE RULINGS - March 16, 2011**

EVENT DATE: 03/17/2011 EVENT TIME: 10:00:00 AM DEPT.: C-68

JUDICIAL OFFICER:Judith F. Hayes

CASE NO.: 37-2010-00090436-CU-WM-CTL

CASE TITLE: SURFRIDER FOUNDATION VS. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN DIEGO REGION

CASE CATEGORY: Civil - Unlimited CASE TYPE: Writ of Mandate

EVENT TYPE: Hearing on Petition
CAUSAL DOCUMENT/DATE FILED: Motion - Other, 12/09/2010

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The Writ Petition of Petitioner Surfrider Foundation is DENIED. The Court finds Water Code section 13142.5(b) does not prohibit the implementation of restorative mitigation measures when considering a project's "best available site, design, technology, and mitigation measures feasible." Petitioner's interpretation of section 13142.5(b) is too restrictive and its literal application as suggested by petitioner is impractical under the circumstances presented here.

The plain language of the section 13142.5(b) provides that *mitigation measures*, together with the best available site, design and technology will be used for each new coastal industrial plant. The MLMP requirement that Poseidon create or restore up to 55.4 acres of estuarine wetlands is proper under section 13142.5 as a feasible mitigation measure. Respondent considered alternative designs, and technology and based on the objectives of the project, among other considerations, the best result was the implementation of restorative measures. (AR 31360-63, 31365-6, 31380, 31385)

The parties do not dispute the standard of review. While the Court finds there is no ambiguity in the statute, even in the unlikely event an ambiguity exists, the Court defers to the expertise of Respondent. (*Fukuda v. City of Angels* (1999) 20 Cal.4$^{th}$ 805, 817-818, *County of Los Angeles v. State Water* Resources Control Bd. (2006) 143 Cal.App.4$^{th}$ 985, 997, 1001; *Divers' Envtl. Conservation Organization v. State Water Resources Control Bd.* (2006) 145 Cal.App.4$^{th}$ 246, 252, and Evidence Code section 664)

In addition, the record demonstrates Respondent analyzed and discussed alternative mitigation measures as suggested by Petitioner. (See, AR 12598, 12601-603 [reduced intake velocity], AR 12619, 12621, 12629 [traveling screens for suitable fish removal procedures], AR 12598, 31361 [when EPS is temporarily shut-down], AR 12604 [additional measures].

The Court also finds the Federal Clean Water Act section 316(b) does not apply to desalination plants, as conceded by Petitioner previously (AR 1353), therefore, the analogy proposed by Petitioner is not applicable.

**Report of Waste Discharge**

# Poseidon Resources

# CARLSBAD DESALINATION PROJECT

***Submitted in Application for***
***Renewal of NPDES CA0109233***

***March 2011***

# Table of Contents

# List of Abbreviations

| | |
|---|---|
| BMP | best management practice |
| BOD | biochemical oxygen demand |
| CDP | Poseidon Resources Carlsbad Desalination Project |
| CEB | chemically enhanced backwash |
| CEQA | California Environmental Quality Act |
| COD | chemical oxygen demand |
| Commission | California Coastal Commission |
| EIR | Environmental Impact Report |
| EMT | empirical transport model |
| EPA | United States Environmental Protection Agency |
| EPS | Encina Power Station |
| ISO | California Independent Systems Operator |
| lb/day | pounds per day |
| ml/l | milliliters per liter |
| MLMP | Marine Life Mitigation Plan |
| mgd | million gallons per day |
| mg/l | milligrams per liter |
| ML | Minimum Level (sample detection reporting level) |
| NA | not applicable or not available |
| NPDES | National Pollutant Discharge Elimination System |
| NTU | Nephelometric Turbidity Units |
| ppt | parts per thousand |
| psi | pounds per square inch |
| Regional Board | California Regional Water Quality Control Board, San Diego Region |
| RO | reverse osmosis |
| RPA | Reasonable Potential Analysis |
| SM | *Standard Methods for the Examination of Water and Wastewater* |
| SUSMP | Standard Urban Stormwater Mitigation Plan |
| SWPPP | Storm Water Pollution Prevention Plan |
| SWRCB | State of California Water Resources Control Board |
| TOC | total organic carbon |
| TSS | total suspended solids |
| TUa | acute toxicity units |
| TUc | chronic toxicity units |
| µg/l | micrograms per liter |
| WQBEL | water quality based effluent limitation |

# *EPA Form 1*

***Renewal of NPDES CA0109233***
***Carlsbad Desalination Project***

Please print or type in the unshaded areas only.

Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

# GENERAL INFORMATION

*Consolidated Permits Program*

*(Read the "General Instructions" before starting.)*

I. EPA I.D. NUMBER

| S | | T/A | C |
|---|---|---|---|
| F | | | D |
| 1 | 2 — 13 | 14 | 15 |

| LABEL ITEMS | |
|---|---|
| I. | EPA I.D. NUMBER |
| III. | FACILITY NAME |
| V. | FACILITY MAILING ADDRESS |
| VI. | FACILITY LOCATION |

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

## II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

| SPECIFIC QUESTIONS | Mark "X" YES | NO | FORM ATTACHED | SPECIFIC QUESTIONS | Mark "X" YES | NO | FORM ATTACHED |
|---|---|---|---|---|---|---|---|
| A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A) | | X | | B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B) | | X | |
| | 16 | 17 | 18 | | 19 | 20 | 21 |
| C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C) | | X | | D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D) | X | | X |
| | 22 | 23 | 24 | | 25 | 26 | 27 |
| E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3) | | X | | F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4) | | X | |
| | 28 | 29 | 30 | | 31 | 32 | 33 |
| G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4) | | X | | H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4) | | X | |
| | 34 | 35 | 36 | | 37 | 38 | 39 |
| I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5) | | X | | J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5) | | X | |
| | 40 | 41 | 42 | | 43 | 44 | 45 |

## III. NAME OF FACILITY

1 | SKIP | Carlsbad Desalination Project

15 | 16 - 29 | 30 — 69

## IV. FACILITY CONTACT

| A. NAME & TITLE *(last, first, & title)* | B. PHONE *(area code & no.)* |
|---|---|
| 2 Scott Maloni, Vice President - Development | (619) 595-7802 |
| 15 — 16 — 45 | 46 — 48 — 49 — 51 — 52 — 55 |

## V. FACILTY MAILING ADDRESS

A. STREET OR P.O. BOX

3 | 501 W. Broadway, Suite 2020

15 — 16 — 45

| B. CITY OR TOWN | C. STATE | D. ZIP CODE |
|---|---|---|
| 4 San Diego | CA | 92101 |
| 15 — 16 — 40 | 41 — 42 | 47 — 51 |

## VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 | 4600 Carlsbad Boulevard

15 — 16 — 45

B. COUNTY NAME

San Diego

46 — 70

| C. CITY OR TOWN | D. STATE | E. ZIP CODE | F. COUNTY CODE *(if known)* |
|---|---|---|---|
| 6 Carlsbad | CA | 92008 | NA |
| 15 — 16 — 40 | 41 — 42 | 47 — 51 | 52 — 54 |

CONTINUED FROM THE FRONT

**VII. SIC CODES** *(4-digit, in order of priority)*

| A. FIRST | B. SECOND |
|---|---|
| 4941 *(specify)* Water Supply | *(specify)* |

| C. THIRD | D. FOURTH |
|---|---|
| *(specify)* | *(specify)* |

**VIII. OPERATOR INFORMATION**

A. NAME: Poseidon Resources (Channelside) LP

B. Is the name listed in Item VIII-A also the owner? ☑ YES ☐ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other," specify.)*

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

P *(specify)*

D. PHONE *(area code & no.)*: A (619) 595-7802

E. STREET OR P.O. BOX: 501 W. Broadway, Suite 2020

| F. CITY OR TOWN | G. STATE | H. ZIP CODE | IX. INDIAN LAND |
|---|---|---|---|
| San Diego | CA | 92101 | Is the facility located on Indian lands? ☐ YES ☑ NO |

**X. EXISTING ENVIRONMENTAL PERMITS**

| A. NPDES *(Discharges to Surface Water)* | D. PSD *(Air Emissions from Proposed Sources)* |
|---|---|
| 9 N CA0109223 | 9 P NA |

| B. UIC *(Underground Injection of Fluids)* | E. OTHER *(specify)* |
|---|---|
| 9 U NA | 9 NA *(specify)* |

| C. RCRA *(Hazardous Wastes)* | E. OTHER *(specify)* |
|---|---|
| 9 R NA | 9 *(specify)* |

**XI. MAP**

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

**XII. NATURE OF BUSINESS** *(provide a brief description)*

Poseidon Resources (Channelside) LP specializes in developing reverse osmosis seawater desalination faciliites. Poseidon Resources will be responsible for financing, constructing and operating the Carlsbad Desalination Project.

**XIII. CERTIFICATION** *(see instructions)*

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

| A. NAME & OFFICIAL TITLE *(type or print)* | B. SIGNATURE | C. DATE SIGNED |
|---|---|---|
| Peter M. MacLaggan<br>Senior Vice President - Development | Peter MacLaggan | 03/25/2011 |

COMMENTS FOR OFFICIAL USE ONLY

C

# *EPA Form 2D*

***Renewal of NPDES CA0109233***
***Carlsbad Desalination Project***

Form Approved. OMB No. 2040-0086. Approval expires 8-31-98.

Please print or type in the unshaded areas only

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)

Form 2D NPDES

# New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

## I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

| Outfall Number (*list*) | Latitude | | | Longitude | | | Receiving Water (*name*) |
|---|---|---|---|---|---|---|---|
| | Deg. | Min. | Sec. | Deg. | Min. | Sec. | |
| 001 | 33 | 8 | 17 | 117 | 20 | 22 | Pacific Ocean via Encina Power Staion effluent channel |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**II. Discharge Date** (When do you expect to begin discharging?)

Facilities to be constructed & operational in 2014

## III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

| Outfall Number | 1. Operations Contributing Flow (*List*) | 2. Average Flow *(Include Units)* | 3. Treatment *(Description or List codes from Table 2D-1)* |
|---|---|---|---|
| 001 | Concentrated seawater from reverse osmosis desalination | 50 mgd* | 4-B |
| 001 | Filter backwash from reverse osmosis desalination | 7 mgd** | 1-U***; 4-B |
| | | | |
| | | | |
| | | *50 mgd average monthly flow; 54 mgd peak flow | |
| | | ** Average monthly backwash flows will be 7 mgd if membrane filtration pretreatment is implemented. Average monthly backwash flows will be 4 mgd if granular media filtration pretreatment is implemented. | *** Clarification treatment would be provided if granular media filtration pretreatment is implemented. |
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B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Items III-A be intermittent or seasonal?

☐ YES (*complete the following table*) ☑ NO (*go to Section IV*)

| Outfall Number | 1. Frequency | | 2. Flow | | |
|---|---|---|---|---|---|
| | a. Days Per Week (*specify average*) | b. Months Per Year (*specify average*) | a. Maximum Daily Flow Rate (*in mgd*) | b. Maximum Total Volume (*specify with units*) | c. Duration (*in days*) |
| NA | NA | NA | NA | NA | NA |

**IV. Production**

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

| Year | A. Quantity Per Day | B. Units Of Measure | c. Operation, Product, Material, etc. *(specify)* |
|---|---|---|---|
| NA | NA | NA | Not applicable |
| | | | |
| | | | |

| CONTINUED FROM THE FRONT | EPA I.D. NUMBER (*copy from Item 1 of Form 1*) | Outfall Number |
|---|---|---|
| | | 001 |

**V. Effluent Characteristics**

A and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

**General Instructions** *(See table 2D-2 for Pollutants)*
Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

| 1. Pollutant | 2. Maximum Daily Value *(include units)* | 3. Average Daily Value *(include units)* | 4. Source *(see instructions)* |
|---|---|---|---|
| | | | |
| See attached tables | | | See attached tables |
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| CONTINUED FROM THE FRONT | EPA I.D. NUMBER (*copy from Item 1 of Form 1*) | |
|---|---|---|

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

| 1. Pollutant | 2. Reason for Discharge |
|---|---|
| See attached tables | See attached tables |

**VI. Engineering Report on Wastewater Treatment**

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☑ Report Available ☐ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

| Name | Location |
|---|---|
| Tampa Bay Seawater Desalination Plant (25 mgd operational) | 13041 Wyandotte Road<br>Hillsboro County<br>Gibsonton, FL 33534 |
| Poseidon Huntington Beach Desalination Facility (50 mgd proposed) | 21730 Newland Avenue<br>Orange County<br>Huntington Beach, CA 92647 |

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)

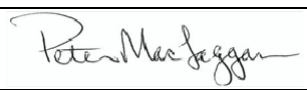
**VII. Other Information** *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

See attached technical information and reports

**VIII. CERTIFICATION**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

| A. Name and Official Title (*type or print*) | B. Phone No. |
|---|---|
| Peter M. MacLaggan, Senior Vice President - Development | (619) 595-7802 |
| C. Signature  | D. Date Signed 03/25/2011 |

# *EPA Form 2D*
# *Effluent Characteristics*

***Renewal of NPDES CA0109233***
***Carlsbad Desalination Project***

## Group A Parameters
## Granular Media Filtration Pretreatment Option
## General Physical/Chemical

| Group A Parameters[1] EPA Form 2D | Units | Analytical | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|---|
| | | | Treated Backwash Concentration[2] | RO Concentrate Concentration[2] | Maximum Concentration[3] | Maximum Day Mass Emission[3] (lbs/day) |
| Ammonia (as N) | mg/l | SM 4500 NH3 | < 0.1 | 0.12 | < 0.12 | < 60 |
| BOD (biochemical oxygen demand) | mg/l | SM 5210 B | < 10 | < 10 | < 10 | < 5000 |
| COD (chemical oxygen demand) | mg/l | EPA 410.4 | 76 | < 100 | < 98 | < 49,000 |
| Temperature (winter) | deg. C | --- | 21.7[4] | 21.7[4] | 21.7[4] | --- |
| Temperature (summer) | deg. C | --- | 24.7[4] | 24.7[4] | 24.7[4] | --- |
| TOC (total organic carbon) | mg/l | SM 5310 C | < 1.3 | 0.7 | < 0.8 | < 390 |
| TSS (Total suspended solids) | mg/l | EPA 160.2 | 33 | < 5 | < 8 | < 4000 |
| Oil and Grease | mg/l | EPA 1664 | < 5 | < 5 | < 5 | < 2500 |
| Surfactants | mg/l | SM 5540 C | 0.07 | 0.08 | 0.08 | < 40 |
| pH | pH Units | SM 4500 H B | 7.21 | 7.49 | 7.5 | --- |

1 Group A parameters, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day clarified filter backwash flow of 6.3 mgd.
4 Based on EPS cooling water effluent temperatures for November-April (winter) and May-October (summer).

## Group A Parameters
## Microscreen/Membrane Filtration Pretreatment Option
## General Physical/Chemical

| Group A Parameters[1] EPA Form 2D | Units | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|---|
| | | | Pretreatment Waste Concentration for Membrane Filtration Option[2] | RO Concentrate Concentration[2] | Maximum Concentration[3] | Maximum Day Mass Emission[3] (lbs/day) |
| Ammonia (as N) | mg/l | SM 4500 NH3 | 0.48 | 0.12 | < 0.18 | < 100 |
| BOD (biochemical oxygen demand) | mg/l | SM 5210 B | 20 | < 10 | < 12 | < 6300 |
| COD (chemical oxygen demand) | mg/l | EPA 410.4 | 91 | < 100 | < 99 | < 53,000 |
| Temperature (winter) | deg. C | --- | 21.7[4] | 21.7[4] | 21.7[4] | --- |
| Temperature (summer) | deg. C | --- | 24.7[4] | 24.7[4] | 24.7[4] | --- |
| TOC (total organic carbon) | mg/l | SM 5310 C | 22.8 | 0.7 | < 4 | < 2300 |
| TSS (Total suspended solids) | mg/l | EPA 160.2 | 48 | < 5 | < 12 | < 6500 |
| Oil and Grease | mg/l | EPA 1664 | < 3 | < 5 | < 5 | < 2500 |
| Surfactants | mg/l | SM 5540 C | Not Sampled | 0.08 | Not Available | Not Available |
| pH | pH Units | SM 4500 H B | 7.00 | 7.49 | 7.5 | --- |

1 Group A parameters, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.
4 Based on EPS cooling water effluent temperatures for November-April (winter) and May-October (summer).

## Group B Parameters
## Granular Media Filtration Pretreatment Option
## Mineral/Radioactivity/Physical/Metals

| Group B Parameters[1] EPA Form 2D | Units | Analytical | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|---|
| | | | Treated Filter Backwash Concentration[2] | RO Concentrate Concentration[2] | Maximum Concentration[3] | Maximum Day Mass Emission[3] (lbs/day) |
| Boron | mg/l | EPA 200.8 | 4.1 | 7.6 | 7.2 | 3.6 |
| Bromide | mg/l | EPA 300.0 | 65 | 120 | 114 | 57,500 |
| Chlorine residual, total | mg/l | --- | < 0.1 | < 0.1 | < 0.02[4] | < 10 |
| Color | Units | EPA 110.2 | 3.0 | 3.0 | 3.0 | --- |
| Coliforms, fecal[5] | #/100 ml | SM 9221 E | 20[5] | < 2[5] | < 4[5] | --- |
| Fluoride | mg/l | EPA 300.0 | < 0.5 | 2.1 | < 2 | < 970 |
| Nitrate (as N) | mg/l | EPA 300.0 | < 0.5 | < 0.5 | < 0.5 | < 250 |
| Oil and Grease | mg/l | EPA 1664 | < 5 | < 5 | < 5 | < 2500 |
| Phosphorus (as P) Total | mg/l | EPA 365.3 | 0.44 | < 0.05 | < 0.1 | < 50 |
| Radioactivity - gross alpha | pcuries/l | SM 7110C | 6.2 | 3.4 | 3.7 | --- |
| Radioactivity - gross beta | pcuries/l | EPA 900.0 | 175 | 765 | 700 | --- |
| Radioactivity - radium 226 | pcuries/l | EPA 903.0 | 0.192 | 0.128 | 0.13 | --- |
| Radioactivity - radium 228 | pcuries/l | Ra-05 | < 0.1 | 0.123 | < 0.12 | --- |
| Sulfate | mg/l | EPA 300.0 | 2600 | 5300 | 5000 | 2,520,000 |
| Sulfide | mg/l | SM 4500 S2 D | < 0.1 | < 0.1 | < 0.1 | < 50 |
| Sulfite | mg/l | SM 4500 SO3 | < 2 | < 2 | < 2 | < 1000 |
| Surfactants | mg/l | SM 5540 C | 0.07 | 0.08 | < 0.08 | < 41 |
| Aluminum | ug/l | EPA 200.8 | 850 | 24 | 110 | 55 |
| Barium | µg/l | EPA 200.8 | 8.4 | 15 | 14 | 7.2 |
| Cobalt | µg/l | EPA 200.8 | 1.6 | 2.8 | < 2.7 | < 1.3 |
| Iron | µg/l | EPA 200.7 | 8700 | < 40 | < 950 | < 480 |
| Magnesium | µg/l | EPA 200.7 | 1500 | 3100 | 2900 | 1450 |
| Manganese | µg/l | EPA 200.8 | 14 | 17 | 17 | 8.4 |
| Molybdenum | µg/l | EPA 200.8 | 12 | 28 | 26 | 13 |
| Tin | µg/l | EPA 200.8 | < 2.5 | < 2.5 | < 2.5 | < 1.3 |
| Titanium | µg/l | EPA 200.7 | < 10 | < 10 | < 10 | < 5 |

1 Group B parameters, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".

2 Data from February 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.

3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a max. day clarified filter backwash flow of 6.3 mgd.

4 Chlorine residual was not detected in the CDP pilot plant testing for the RO concentrate or pretreatment streams at a detection limit of 0.1 mg/l.

5 Coliform concentrations based on sample results from the February 2003 sampling of CDP pilot plant operations. The February 2003 sampling occurred during non-storm conditions, and is representative of dry weather operations. To characterize lagoon water quality during storm events, Poseidon Resources collected hourly wet-weather coliform samples during two storm events in December 2002 and one storm in January 2005. The wet weather sampling demonstrated that temporarily high coliform concentrations can exist in Agua Hedionda Lagoon during storm periods. CDP treatment facilities are designed to remove all coliform from the influent flow. For the granular media filtration scenario, much of the removed coliform will be concentrated in backwash water solids that are removed from the waste stream discharged back into the EPS channel. As a result, the total number (mass emissions) of coliform organisms in the CDP effluent discharged back into the EPS effluent channel are projected to be less than the total number of coliform organisms in the CDP influent under both normal (dry-weather) and storm conditions.

## Group B Parameters
## Microscreen/Membrane Filtration Pretreatment Option
## Mineral/Radioactivity/Physical/Metals

| Group B Parameters[1] EPA Form 2D | Units | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|---|
| | | | Pretreatment Waste Stream Concentration for Membrane Filtration Option[2] | RO Concentrate Concentration[2] | Maximum Concentration[3] | Maximum Day Mass Emission[3] (lbs/day) |
| Boron | mg/l | EPA 200.8 | Not Sampled | 7.6 | Not Available[4] | Not Available[4] |
| Bromide | mg/l | EPA 300.0 | Not Sampled | 120 | Not Available[4] | Not Available[4] |
| Chlorine residual, total | mg/l | --- | < 0.1 | < 0.1 | < 0.02[5] | < 10 |
| Color | Units | EPA 110.2 | Not Sampled | 3.0 | Not Available[4] | --- |
| Coliforms, fecal[6] | #/100 ml | SM 9221 E | 2[6] | < 2[6] | < 2[6] | --- |
| Fluoride | mg/l | EPA 300.0 | Not Sampled | 2.1 | Not Available[4] | Not Available[4] |
| Nitrate (as N) | mg/l | EPA 300.0 | Not Sampled | < 0.5 | Not Available[4] | Not Available[4] |
| Oil and Grease | mg/l | EPA 1664 | < 3 | < 5 | < 4.7 | < 2500 |
| Phosphorus (as P) Total | mg/l | EPA 365.3 | 0.73 | < 0.05 | < 0.7 | < 380 |
| Radioactivity - gross alpha | pcuries/l | SM 7110C | Not Sampled | 3.4 | Not Available[4] | --- |
| Radioactivity - gross beta | pcuries/l | EPA 900.0 | Not Sampled | 765 | Not Available[4] | --- |
| Radioactivity - radium 226 | pcuries/l | EPA 903.0 | Not Sampled | 0.128 | Not Available[4] | --- |
| Radioactivity - radium 228 | pcuries/l | Ra-05 | Not Sampled | 0.123 | Not Available[4] | --- |
| Sulfate | mg/l | EPA 300.0 | Not Sampled | 5300 | Not Available[4] | Not Available[4] |
| Sulfide | mg/l | SM 4500 S2 D | Not Sampled | < 0.1 | Not Available[4] | Not Available[4] |
| Sulfite | mg/l | SM 4500 SO3 | Not Sampled | < 2 | Not Available[4] | Not Available[4] |
| Surfactants | mg/l | SM 5540 C | Not Sampled | 0.08 | Not Available[4] | Not Available[4] |
| Aluminum | µg/l | EPA 200.8 | Not Sampled | 24 | Not Available[4] | Not Available[4] |
| Barium | µg/l | EPA 200.8 | Not Sampled | 15 | Not Available[4] | Not Available[4] |
| Cobalt | µg/l | EPA 200.8 | Not Sampled | 2.8 | Not Available[4] | Not Available[4] |
| Iron | µg/l | EPA 200.7 | Not Sampled | < 40 | Not Available[4] | Not Available[4] |
| Magnesium | µg/l | EPA 200.7 | Not Sampled | 3100 | Not Available[4] | Not Available[4] |
| Manganese | µg/l | EPA 200.8 | Not Sampled | 17 | Not Available[4] | Not Available[4] |
| Molybdenum | µg/l | EPA 200.8 | Not Sampled | 28 | Not Available[4] | Not Available[4] |
| Tin | µg/l | EPA 200.8 | Not Sampled | < 2.5 | Not Available[4] | Not Available[4] |
| Titanium | µg/l | EPA 200.7 | Not Sampled | < 10 | Not Available[4] | Not Available[4] |

1 Group B parameters, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".

2 Data from February 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.

3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.

4 Value cannot be computed, as the wastewater stream for the microscreen/membrane filtration pretreatment option was not sampled. See Table 3-13 on page 3-12 for concentration and mass emission values for the granular media filtration pretreatment option.

5 Chlorine residual was not detected in the CDP pilot plant RO concentrate or pretreatment streams at a detection limit of 0.1 mg/l.

6 Coliform concentrations based on sample results from the February 2003 sampling of CDP pilot plant operations. The February 2003 sampling occurred during non-storm conditions, and is representative of dry weather operations. To characterize lagoon water quality during storm events, Poseidon Resources collected hourly wet-weather coliform samples during two storm events in December 2002 and one storm in January 2005. The wet weather sampling demonstrated that temporarily high coliform concentrations can exist in Agua Hedionda Lagoon during storm periods. CDP treatment facilities are designed to remove all coliform from the influent flow. Because of coliform reduction achieved through treatment of the backwash water, the total number of coliform organisms (mass emissions) in the CDP effluent discharged back into the EPS effluent channel are projected to be less than the total number of coliform organisms in the CDP influent under both normal (dry-weather) and storm conditions.

## Group B1 and B2 Parameters
## Granular Media Filtration Pretreatment Option
## Toxic Metals/Cyanide and TCDD

| Group B1 & B2 Parameters[1] EPA Form 2D | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Treated Filter Backwash Concentration[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Antimony | EPA 200.8 | < 5 | < 5 | < 5.0 | < 2.5 |
| Arsenic | EPA 200.8 | 10 | < 2 | < 2.8 | < 1.4 |
| Beryllium | EPA 200.8 | < 0.3 | < 0.3 | < 0.3 | < 0.15 |
| Cadmium | EPA 200.8 | < 0.5 | < 0.5 | < 0.5 | < 0.25 |
| Chromium, total | EPA 200.8 | < 4 | < 4 | < 4 | < 2 |
| Copper | EPA 200.8 | < 2 | < 2 | < 2 | < 1 |
| Lead | EPA 200.8 | < 1 | < 1 | < 1 | < 0.5 |
| Mercury | EPA 245.1 | < 0.2 | < 0.2 | < 0.2 | < 0.1 |
| Nickel | EPA 200.8 | 14 | 19 | 19 | 9.3 |
| Selenium | EPA 200.8 Hy | < 0.4 | < 0.4 | < 0.4 | < 0.2 |
| Silver | EPA 200.8 | < 0.5 | < 0.5 | < 0.5 | < 0.25 |
| Thallium | EPA 200.8 | < 0.5 | < 2.5 | < 2.3 | < 1.2 |
| Zinc | EPA 200.8 | 11 | < 10 | < 10 | < 5 |
| Cyanide | SM 4500 CN E | < 50 | < 50 | < 50 | < 25 |
| 2,3,7,8-TCDD | --- | < 0.001 | < 0.001 | < 0.001 | < 0.0005 |

1 Group B1 parameters (toxic metals and cyanide) and Group B2 parameters (TCDD), as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".

2 Data from February 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.

3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day clarified filter backwash flow of 6.3 mgd.

## Group B1 and B2 Parameters
## Microscreen/Membrane Filtration Pretreatment Option
## Toxic Metals/Cyanide and TCDD

| Group B1 & B2 Parameters[1] EPA Form 2D | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Pretreatment Waste Stream Concentration for Membrane Filtration Option[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Antimony | EPA 200.8 | < 10 | < 5 | < 6 | < 3.1 |
| Arsenic | EPA 200.8 | 0.052 | < 2 | < 1.7 | < 0.9 |
| Beryllium | EPA 200.8 | < 0.0010 | < 0.3 | < 0.3 | < 0.2 |
| Cadmium | EPA 200.8 | < 0.005 | < 0.5 | < 0.5 | < 0.2 |
| Chromium, total | EPA 200.8 | 0.019 | < 4 | < 3.4 | < 1.8 |
| Copper | EPA 200.8 | 0.022 | < 2 | < 1.7 | < 0.9 |
| Lead | EPA 200.8 | < 0.005 | < 1 | < 0.9 | < 0.5 |
| Mercury | EPA 245.1 | < 0.20 | < 0.2 | < 0.2 | < 0.1 |
| Nickel | EPA 200.8 | < 0.02 | 19 | < 16 | < 8.6 |
| Selenium | EPA 200.8 Hy | < 50 | < 0.4 | < 8.5 | < 4.6 |
| Silver | EPA 200.8 | < 0.010 | < 0.5 | < 0.5 | < 0.2 |
| Thallium | EPA 200.8 | < 10 | < 2.5 | < 3.8 | < 2 |
| Zinc | EPA 200.8 | Not Sampled | < 10 | Not Available[4] | Not Available[4] |
| Cyanide | SM 4500 CN E | < 5 | < 50 | < 43 | < 23 |
| 2,3,7,8-TCDD | --- | Not Sampled | < 0.001 | Not Available[4] | Not Available[4] |

1 Group B1 Parameters (toxic metals and cyanide) and Group B2 parameters (TCDD), as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.
4 Value cannot be computed, as the wastewater stream for the microscreen/membrane filtration pretreatment option was not sampled.

## Group B3 Parameters – Volatile Organic Compounds
## Granular Media Filtration Pretreatment Option

| Group B3 Parameters[1] Volatile Organic Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Treated Filter Backwash Concentration[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| 2-Butanone | 524.2 | < 5 | < 5 | < 5 | < 2.5 |
| Bromoform | 524.2 | < 0.5 | 1.4 | < 1.3 | < 0.7 |
| All other Group B3 volatile compounds | 524.2 | Not Detected[4] | Not Detected[4] | Not Detected[4] | Not Applicable |

1 Group B3 volatile organic compounds, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day clarified filter backwash flow of 6.3 mgd.
4 All other Group 3 volatile organic compounds were not detected at a Method 524.2 detection limit of 5 µg/l.

## Group B3 Parameters – Volatile Organic Compounds
## Microscreen/Membrane Filtration Pretreatment Option

| Group B3 Parameters[1] Volatile Organic Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Pretreatment Waste Stream Concentration for Membrane Filtration Option[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| 2-Butanone | 524.2 | < 10 | < 5 | < 6 | < 3.1 |
| Bromoform | 524.2 | 58 | 1.4 | 11 | 5.7 |
| All other Group B3 volatile compounds | 524.2 | Not Detected[4] | Not Detected[4] | Not Detected[4] | Not Applicable |

1 Group B3 volatile organic compounds, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.
4 All other Group 3 volatile organic compounds were not detected at a Method 524.2 detection limit of 5 µg/l.

## Group B3 Parameters – Acid Extractable Compounds
## Granular Media Filtration Pretreatment Option

| Group B3 Parameters[1] Acid Extractable Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Treated Filter Backwash Concentration[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| 2-Chlorophenol | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 4-Chloro-3-methylphenol | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,4-Dichlorophenol | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,4-Dimethylphenol | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,4-Dinitrophenol | EPA 625 | < 20 | < 20 | < 20 | < 10 |
| 2-Methyl-4,6-dinitrophenol | EPA 625 | < 10 | < 10 | < 10 | < 5 |
| 2-Nitrophenol | EPA 625 | < 10 | < 10 | < 10 | < 5 |
| 4-Nitrophenol | EPA 625 | < 10 | < 10 | < 10 | < 5 |
| Pentachlorophenol | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Phenol | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,4,6-Trichlorophenol | EPA 625 | < 10 | < 10 | < 10 | < 5 |

1 Group B3 acid extractable compounds, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day clarified backwash flow of 6.3 mgd.

## Group B3 Parameters – Acid Extractable Compounds
## Microscreen/Membrane Filtration Pretreatment Option

| Group B3 Parameters[1] Acid Extractable Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Pretreatment Waste Stream Concentration for Membrane Filtration Option[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| 2-Chlorophenol | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 4-Chloro-3-methylphenol | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,4-Dichlorophenol | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,4-Dimethylphenol | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,4-Dinitrophenol | EPA 625 | < 20 | < 20 | < 20 | < 11 |
| 2-Methyl-4,6-dinitrophenol | EPA 625 | < 10 | < 10 | < 10 | < 5.4 |
| 2-Nitrophenol | EPA 625 | < 10 | < 10 | < 10 | < 5.4 |
| 4-Nitrophenol | EPA 625 | < 10 | < 10 | < 10 | < 5.4 |
| Pentachlorophenol | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Phenol | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,4,6-Trichlorophenol | EPA 625 | < 10 | < 10 | < 10 | < 5.4 |

1 Group B3 acid extractable compounds, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.

## Group B3 Parameters – Base Neutral Compounds
## Granular Media Filtration Pretreatment Option

| Group B3 Parameters[1] Base Neutral Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Treated Filter Backwash Concentration[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Acenaphthene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Acenaphthylene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Anthracene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Benzidine | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Benzo(a)anthracene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Benzo(a)pyrene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Benzo(b)fluoranthene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Benzo(g,h,i)perylene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Benzo(k)fluoranthene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Bis (2-chloroethoxy)methane | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Bis(2-chloroethyl)ether | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Bis(2-chloroisopropyl)ether | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Bis(2-ethylhexyl)phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 4-Bromophenyl phenyl ether | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Butylbenzyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2-Chloronaphthalene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 4-Chlorophenyl phenyl ether | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Chrysene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Dibenzo(a,h)anthracene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 1,2-Dichlorobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 1,3-Dichlorobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 1,4-Dichlorobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 3,3'-Dichlorobenzidine | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Diethyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Dimethyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Di-n-butyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,4-Dinitrotoluene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,6-Dinitrotoluene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Di-n-octyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 1,2-Diphenyl hydrazine | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Fluoranthene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Fluorene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Hexachlorobenzene | EPA 508 | < 0.5 | < 0.5 | < 0.5 | < 0.3 |
| Hexachlorobutadiene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Hexachlorocyclopentadiene | EPA 508 | < 1 | < 1 | < 1 | < 0.5 |
| Hexachloroethane | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Indeno(1,2,3-c)pyrene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Isophorone | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Naphthalene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Nitrobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| N-nitrosodi-n-propylamine | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| N-Nitrosodimethylamine | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| N-Nitrosodiphenylamine | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Phenanthrene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Pyrene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 1,2,4-Trichlorobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |

1 Group B3 base neutral compounds, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a max. day clarified filter backwash flow of 6.3 mgd.

## Group B3 Parameters – Base Neutral Compounds
## Microscreen/Membrane Filtration Pretreatment Option

| Group B3 Parameters[1] Base Neutral Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream: Microscreen/Membrane Filtration | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Waste Stream Concentration for Membrane Filtration Pretreatment[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Acenaphthene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Acenaphthylene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Anthracene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Benzidine | EPA 625 | < 50 | < 5 | < 12 | < 6.6 |
| Benzo(a)anthracene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Benzo(a)pyrene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Benzo(b)fluoranthene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Benzo(g,h,i)perylene | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| Benzo(k)fluoranthene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Bis (2-chloroethoxy)methane | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| Bis(2-chloroethyl)ether | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Bis(2-chloroisopropyl)ether | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| Bis(2-ethylhexyl)phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 4-Bromophenyl phenyl ether | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Butylbenzyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2-Chloronaphthalene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 4-Chlorophenyl phenyl ether | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Chrysene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Dibenzo(a,h)anthracene | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| 1,2-Dichlorobenzene | EPA 625 | < 0.5 | < 5 | < 4.3 | < 2.3 |
| 1,3-Dichlorobenzene | EPA 625 | < 0.5 | < 5 | < 4.3 | < 2.3 |
| 1,4-Dichlorobenzene | EPA 625 | < 0.5 | < 5 | < 4.3 | < 2.3 |
| 3,3'-Dichlorobenzidine | EPA 625 | < 50 | < 5 | < 12 | < 6.6 |
| Diethyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Dimethyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Di-n-butyl phthalate | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,4-Dinitrotoluene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,6-Dinitrotoluene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Di-n-octyl phthalate | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| 1,2-Diphenyl hydrazine | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Fluoranthene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Fluorene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Hexachlorobenzene | EPA 508 | < 5 | < 0.5 | < 1.2 | < 0.7 |
| Hexachlorobutadiene | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| Hexachlorocyclopentadiene | EPA 508 | < 10 | < 1 | < 2.5 | < 1.3 |
| Hexachloroethane | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Indeno(1,2,3-c)pyrene | EPA 625 | < 10 | < 5 | < 5.8 | < 3.1 |
| Isophorone | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Naphthalene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Nitrobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| N-nitrosodi-n-propylamine | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| N-Nitrosodimethylamine | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| N-Nitrosodiphenylamine | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Phenanthrene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Pyrene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 1,2,4-Trichlorobenzene | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |

1 Group B3 base neutral compounds, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.

## Group B3 Parameters – Chlorinated Pesticides
## Granular Media Filtration Pretreatment Option

| Group B3 Parameters[1] Chlorinated Pesticides EPA Form 2D | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Treated Filter Backwash Concentration[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Aldrin | EPA 508 | < 0.075 | < 0.075 | <0.075 | < 0.04 |
| BHC-alpha | EPA 508 | < 0.05 | < 0.05 | < 0.05 | < 0.03 |
| BHC-beta | EPA 508 | < 0.05 | < 0.05 | < 0.05 | < 0.03 |
| BHC-delta | EPA 508 | < 0.5 | < 0.5 | < 0.5 | < 0.25 |
| BHC-gamma (Lindane) | EPA 508 | < 0.2 | < 0.2 | < 0.2 | < 0.1 |
| Chlordane-alpha | EPA 508 | < 0.1 | < 0.1 | < 0.1 | < 0.05 |
| Chlordane-gamma | EPA 508 | < 0.1 | < 0.1 | < 0.1 | < 0.05 |
| 2,4'-DDD | EPA 508 | < 1 | < 1 | < 1 | < 0.05 |
| 2,4'-DDE | EPA 508 | < 1 | < 1 | < 1 | < 0.05 |
| 2,4'-DDT | EPA 508 | < 1 | < 1 | < 1 | < 0.05 |
| 4,4'-DDD | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| 4,4'-DDE | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| 4,4'-DDT | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Dieldrin | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Endosulfan I | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Endosulfan II | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Endosulfan sulfate | EPA 508 | < 0.05 | < 0.05 | < 0.05 | < 0.03 |
| Endrin | EPA 508 | < 0.1 | < 0.1 | < 0.1 | < 0.05 |
| Endrin aldehyde | EPA 508 | < 0.05 | < 0.05 | < 0.05 | < 0.03 |
| Heptachlor | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Heptachlor epoxide | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Polychlorinated biphenyls (PCBs) | EPA 508 | < 0.1 | < 0.1 | < 0.1 | < 0.05 |
| Toxaphene | EPA 508 | < 1 | < 1 | < 1 | < 0.5 |

1 Group B3 chlorinated pesticides, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day clarified filter backwash flow of 6.3 mgd.

## Group B3 Parameters – Chlorinated Pesticides
## Microscreen/Membrane Filtration Pretreatment Option

| Group B3 Parameters[1] Chlorinated Pesticides EPA Form 2D | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Pretreatment Waste Stream Concentration for Membrane Filtration Option[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Aldrin | EPA 508 | < 0.02 | < 0.075 | < 0.066 | < 0.004 |
| BHC-alpha | EPA 508 | < 0.02 | < 0.05 | < 0.045 | < 0.02 |
| BHC-beta | EPA 508 | < 0.02 | < 0.05 | < 0.045 | < 0.02 |
| BHC-delta | EPA 508 | < 0.02 | < 0.5 | < 0.42 | < 0.23 |
| BHC-gamma (Lindane) | EPA 508 | < 0.02 | < 0.2 | < 0.17 | < 0.09 |
| Chlordane-alpha | EPA 508 | < 0.01 | < 0.1 | < 0.085 | < 0.05 |
| Chlordane-gamma | EPA 508 | < 0.01 | < 0.1 | < 0.085 | < 0.05 |
| 2,4'-DDD | EPA 508 | < 0.02 | < 1 | < 0.84 | < 0.45 |
| 2,4'-DDE | EPA 508 | < 0.02 | < 1 | < 0.84 | < 0.45 |
| 2,4'-DDT | EPA 508 | < 0.02 | < 1 | < 0.84 | < 0.45 |
| 4,4'-DDD | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| 4,4'-DDE | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| 4,4'-DDT | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Dieldrin | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Endosulfan I | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Endosulfan II | EPA 508 | < 0.02 | < 0.01 | < 0.012 | < 0.01 |
| Endosulfan sulfate | EPA 508 | < 0.02 | < 0.05 | < 0.045 | < 0.02 |
| Endrin | EPA 508 | < 0.01 | < 0.1 | < 0.085 | < 0.05 |
| Endrin aldehyde | EPA 508 | < 0.02 | < 0.05 | < 0.045 | < 0.02 |
| Heptachlor | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Heptachlor epoxide | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Polychlorinated biphenyls (PCBs) | EPA 508 | < 0.1 | < 0.1 | < 0.1 | < 0.05 |
| Toxaphene | EPA 508 | < 0.5 | < 1 | < 0.9 | < 0.49 |

1 Group B3 chlorinated pesticides, as classified by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.

## Group B3 Parameters – Other Compounds
## Granular Media Filtration Pretreatment Option

| Group B1 & B2 Parameters[1] Other Hazardous Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Treated Filter Backwash Concentration[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Benzo(e)pyrene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Biphenyl hydrazine[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,6-Dimethylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Methoxychlor[5] | EPA 508 | < 10 | < 10 | < 10 | < 5 |
| 1-Methylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2-Methylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 1-Methylphenanthrene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| Mirex[5] | EPA 508 | < 0.02 | < 0.02 | < 0.02 | < 0.01 |
| Perylene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| 2,3,5-Trimethylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.5 |
| trans-Nonachlor[5] | EPA 508 | < 0.01 | < 0.01 | < 0.01 | < 0.05 |
| Tributyltin | --- | < 0.005 | < 0.005 | < 0.005 | < 0.003 |

1 Group B3 parameters classified as “other hazardous compounds” by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day clarified filter backwash flow of 6.3 mgd.
4 Base neutral compound not listed within the EPA Form 2D Group B3 base neutral compounds.
5 Pesticide not listed within the EPA Form 2D Group B3 pesticides.

## Group B3 Parameters – Other Compounds
## Microscreen/Membrane Filtration Pretreatment Option

| Group B3 Parameters[1] Other Hazardous Compounds EPA Form 2D | Analytical Method | CDP Wastewater Stream Microscreen/Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel | |
|---|---|---|---|---|---|
| | | Pretreatment Waste Stream Concentration for Membrane Filtration Option[2] (µg/l) | RO Concentrate Concentration[2] (µg/l) | Maximum Concentration[3] (µg/l) | Maximum Day Mass Emission[3] (lbs/day) |
| Benzo(e)pyrene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Biphenyl hydrazine[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,6-Dimethylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Methoxychlor[5] | EPA 508 | < 0.2 | < 10 | < 8.4 | < 4.5 |
| 1-Methylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2-Methylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 1-Methylphenanthrene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| Mirex[5] | EPA 508 | < 0.05 | < 0.02 | < 0.025 | < 0.013 |
| Perylene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| 2,3,5-Trimethylnaphthalene[4] | EPA 625 | < 5 | < 5 | < 5 | < 2.7 |
| trans-Nonachlor[5] | EPA 508 | < 0.02 | < 0.01 | < 0.012 | < 0.006 |
| Tributyltin | --- | < 0.005 | < 0.005 | < 0.005 | < 0.003 |

1 Group B3 parameters classified as “other hazardous compounds” by EPA NPDES Application Form 2D. A "<x" value indicates that the parameter was not detected at a Minimum Level (ML) concentration of "x".
2 Data from February 12, 2003 sampling of CDP pilot plant waste streams for treated filter backwash and RO concentrate.
3 Computed on the basis of a maximum day RO concentrate flow of 54 mgd and a maximum day waste stream of 10.5 mgd from microscreen/membrane filtration pretreatment facilities.
4 Base neutral compound not listed within the EPA Form 2D Group B3 base neutral compounds.
5 Pesticide not listed within the EPA Form 2D Group B3 pesticides.

# *EPA Form 2D*
# *Figures and Graphics*

***Renewal of NPDES CA0109233***
***Carlsbad Desalination Project***

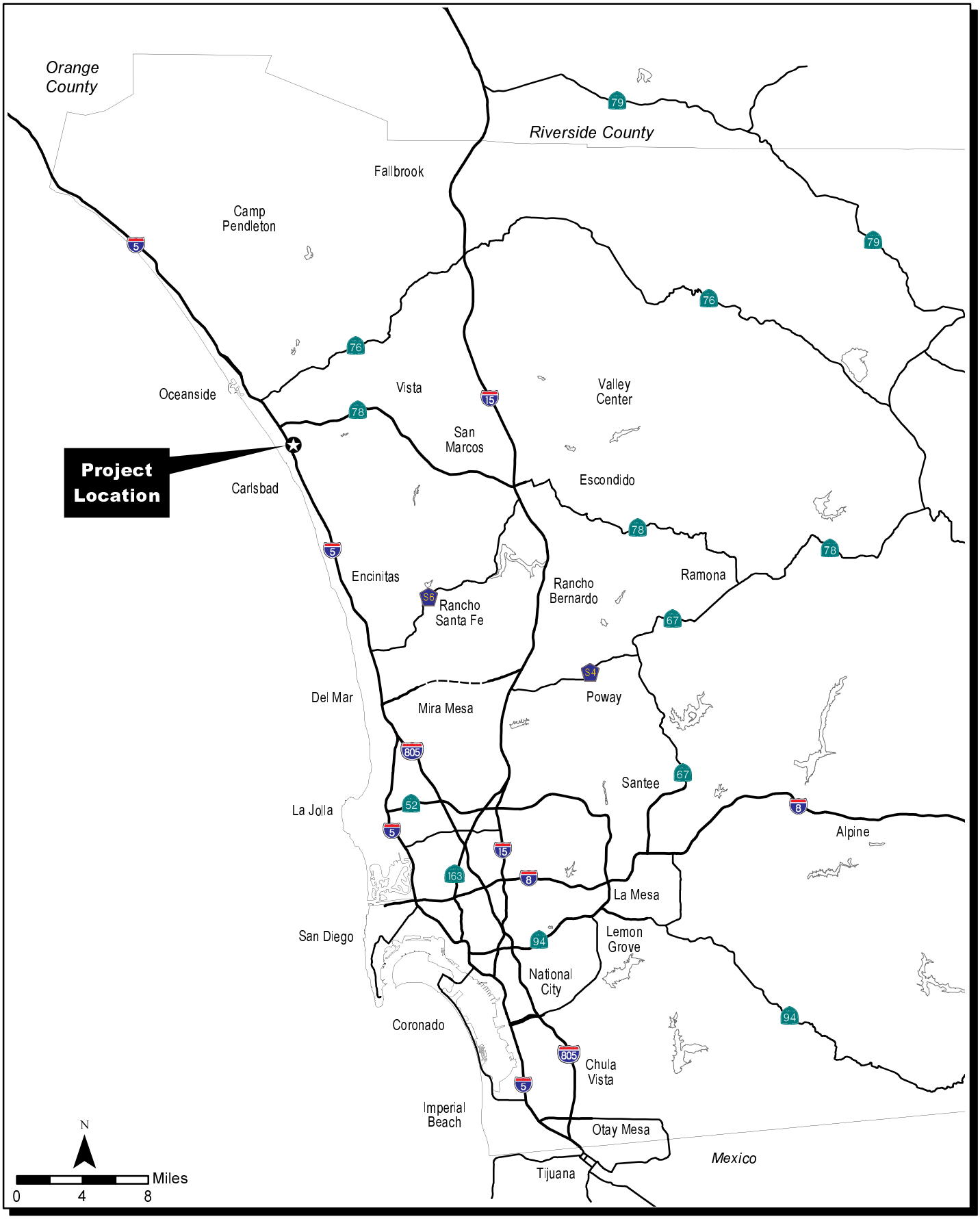



Figure 1 Project Location
Carlsbad Desalination Project

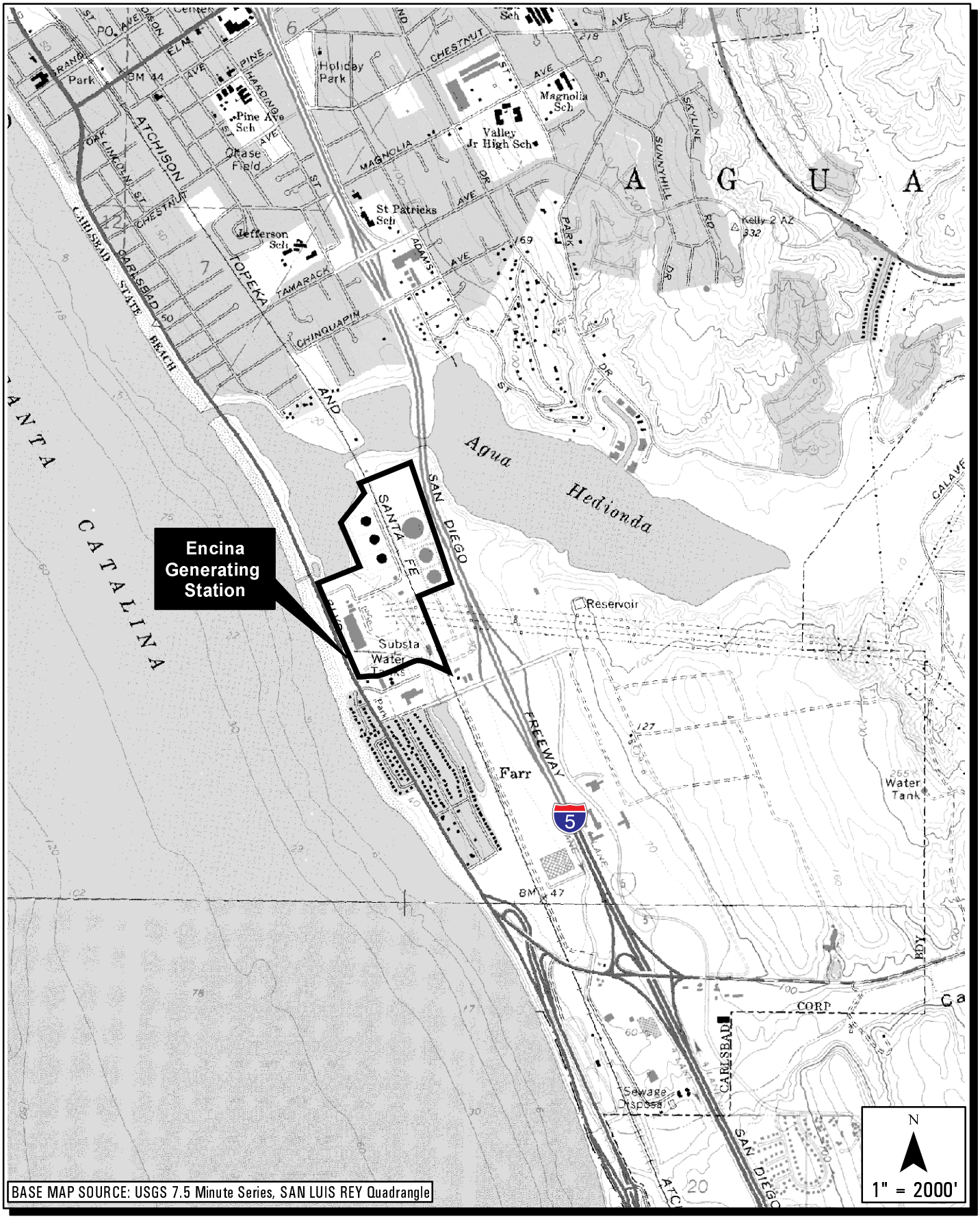



Figure 2 Site Location
Carlsbad Desalination Project


**Figure 3 Proposed Site Layout**
**Carlsbad Desalination Project**

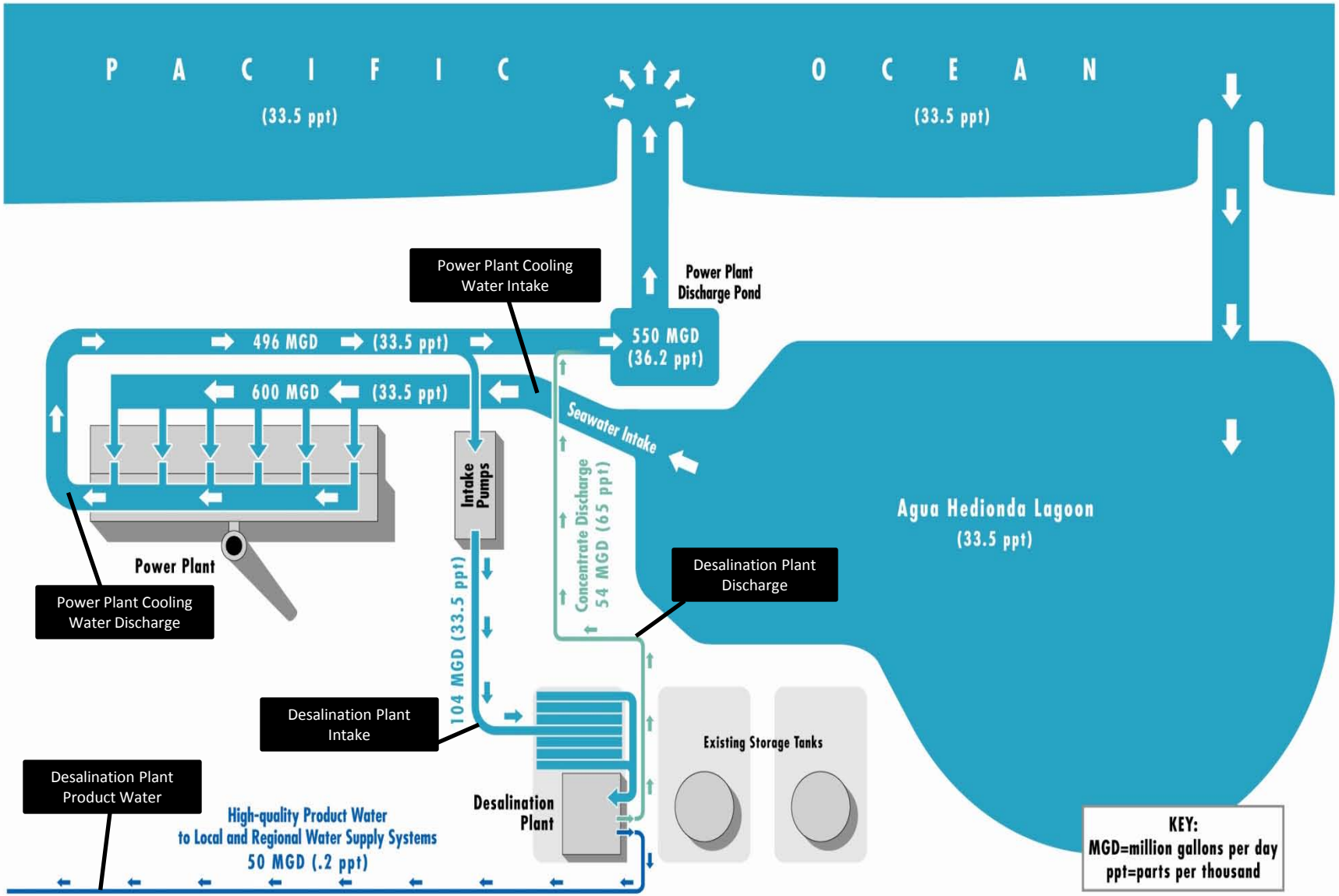



**Figure 4 Intake and Discharge Flow Schematic**
**Carlsbad Desalination Project**

# *State of California Form 200*

***Renewal of NPDES CA0109233***
***Carlsbad Desalination Project***

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

# APPLICATION/REPORT OF WASTE DISCHARGE
# GENERAL INFORMATION FORM FOR
# WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

## I. FACILITY INFORMATION

### A. Facility:

| | | | |
|---|---|---|---|
| **Name:** Carlsbad Desalination Project | | | |
| **Address:** 4600 Carlsbad Boulevard | | | |
| **City:** Carlsbad | **County:** San Diego | **State:** CA | **Zip Code:** 92008 |
| **Contact Person:** Scott Maloni; Vice President - Development | | **Telephone Number:** (619) 595-7802 | |

### B. Facility Owner:

| | | | |
|---|---|---|---|
| **Name:** Poseidon Resources (Channelside) LP | | | **Owner Type (Check One)** 1. ☐ Individual 2. ☑ Corporation |
| **Address:** 501 W. Broadway, Suite 2020 | | | 3. ☐ Governmental Agency 4. ☐ Partnership |
| **City:** San Diego | **State:** CA | **Zip Code:** 92101 | 5. ☐ Other: |
| **Contact Person:** Scott Maloni, Vice President - Development | | **Telephone Number:** (619) 595-7802 | **Federal Tax ID:** |

### C. Facility Operator (The agency or business, not the person):

| | | | |
|---|---|---|---|
| **Name:** Poseidon Resources (Channelside) LP | | | **Operator Type (Check One)** 1. ☐ Individual 2. ☑ Corporation |
| **Address:** 501 W. Broadway, Suite 2020 | | | 3. ☐ Governmental Agency 4. ☐ Partnership |
| **City:** San Diego | **State:** CA | **Zip Code:** 92101 | 5. ☐ Other: |
| **Contact Person:** Scott Maloni, Vice President - Development | | **Telephone Number:** (619) 595-7802 | |

### D. Owner of the Land:

| | | | |
|---|---|---|---|
| **Name:** Cabrillo Power I, LLC | | | **Owner Type (Check One)** 1. ☐ Individual 2. ☑ Corporation |
| **Address:** 5790 Fleet Street, Suite 200 | | | 3. ☐ Governmental Agency 4. ☐ Partnership |
| **City:** Carlsbad | **State:** CA | **Zip Code:** 92008 | 5. ☐ Other: |
| **Contact Person:** George Pianca, NRG West - Carlsbad Energy Center | | **Telephone Number:** (760) 707-6883 | |

### E. Address Where Legal Notice May Be Served:

| | | |
|---|---|---|
| **Address:** Same as Facility Owner | | |
| **City:** | **State:** | **Zip Code:** |
| **Contact Person:** | | **Telephone Number:** |

### F. Billing Address:

| | | |
|---|---|---|
| **Address:** Same as Facility Owner | | |
| **City:** | **State:** | **Zip Code:** |
| **Contact Person:** | | **Telephone Number:** |

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

# APPLICATION/REPORT OF WASTE DISCHARGE
# GENERAL INFORMATION FORM FOR
# WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

## II. TYPE OF DISCHARGE

**Check Type of Discharge(s) Described in this Application (A or B):**

☐ **A. WASTE DISCHARGE TO LAND** ☑ **B. WASTE DISCHARGE TO SURFACE WATER**

**Check all that apply:**

- ☐ Domestic/Municipal Wastewater Treatment and Disposal
- ☐ Cooling Water
- ☐ Mining
- ☐ Waste Pile
- ☐ Wastewater Reclamation
- ☐ Other, please describe: Concentrated seawater from seawater desalination process
- ☐ Animal Waste Solids
- ☐ Land Treatment Unit
- ☐ Dredge Material Disposal
- ☐ Surface Impoundment
- ☑ Industrial Process Wastewater
- ☐ Animal or Aquacultural Wastewater
- ☐ Biosolids/Residual
- ☐ Hazardous Waste (see instructions)
- ☐ Landfill (see instructions)
- ☑ Storm Water

## III. LOCATION OF THE FACILITY

**Describe the physical location of the facility.**

| 1. Assessor's Parcel Number(s) | | 2. Latitude | | 3. Longitude | |
|---|---|---|---|---|---|
| **Facility:** | 210-01-43 | **Facility:** | 33 08' 21" N | **Facility:** | 117 20' 06" |
| **Discharge Point:** | NA | **Discharge Point:** | 33 08' 17" N | **Discharge Point:** | 117 20' 22" |

## IV. REASON FOR FILING

- ☐ New Discharge or Facility
- ☐ Changes in Ownership/Operator (see instructions)
- ☐ Change in Design or Operation
- ☑ Waste Discharge Requirements Update or NPDES Permit Reissuance
- ☐ Change in Quantity/Type of Discharge
- ☐ Other: _____

## V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

**Name of Lead Agency:** City of Carlsbad

**Has a public agency determined that the proposed project is exempt from CEQA?** ☐ **Yes** ☑ **No**

**If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.**

**Basis for Exemption/Agency:** Not applicable

**Has a "Notice of Determination" been filed under CEQA?** ☑ **Yes** ☐ **No**

**If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.**

Expected CEQA Documents:

☑ **EIR** ☐ **Negative Declaration**

**Expected CEQA Completion Date:** Final EIR certified 6/13/06

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

# APPLICATION/REPORT OF WASTE DISCHARGE
# GENERAL INFORMATION FORM FOR
# WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

## VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

## VII. OTHER

**Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:**

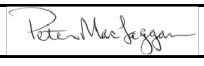
See attached maps, schematics, data tables, and technical studies

**You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.**

## VIII. CERTIFICATION

**"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."**

**Print Name:** Peter M. MacLaggan **Title:** Senior Vice President - Development

**Signature:**  **Date:** March 25, 2011

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# *Certification Statements*

***Renewal of NPDES CA0109233***
***Carlsbad Desalination Project***

# *CERTIFICATION SUPPLEMENT*
# *FOR*
# *NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM*
# *PERMIT APPLICATION*

Legal Name of Applicant: Poseidon Resources (Channelside) LP

Facility: Poseidon Resources
Carlsbad Desalination Project
NPDES CA0109233

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my Inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

| Peter M. MacLaggan | Senior Vice President - Development |
|---|---|
| Printed Name | Official Title |
|  | March 25, 2011 |
| Signature | Date Application Signed |

# *CONTRIBUTIONS DISCLOSURE STATEMENT*

I certify that the neither I nor Poseidon Resources (Channelside) LP have made any contributions amounting to $250 or more to any of the current Regional Board members within 12 months of the date of this application for use in a federal, state, or local election.

| | |
|---|---|
| Signature: |  |
| Name: | Peter M. MacLaggan |
| Title: | Senior Vice President - Development |
| Date: | March 25, 2011 |
| Organization: | Poseidon Resources (Channelside) LP<br>501 W. Broadway, Suite 2020<br>San Diego, CA 92101 |
| Telephone: | (619) 595-7802 |

# *Supplemental Technical Report*

## *Renewal of NPDES CA0109223*
## *Carlsbad Desalination Project*

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# *Section 1*
# *Introduction*

***Renewal of NPDES CA0109223***
***Carlsbad Desalination Project***

# *Section 1*
# *INTRODUCTION*

## 1.1 Purpose of Submittal

California Regional Water Quality Control Board, San Diego Region (Regional Board) Order No. R9-2006-0065 as amended by Order No. R9-2009-0038 (NPDES CA0109223) establishes requirements for the discharge from the proposed Poseidon Resources (Channelside) LP Carlsbad Desalination Project (CDP). Order No. R9-2006-0065 expires on October 1, 2011. This Report of Waste Discharge is submitted in application for renewal of NPDES CA0109223.

No changes in CDP facilities and operations are proposed as part of this NPDES renewal. Proposed CDP facilities and operations remain as described in Order No. R9-2006-0065.

## 1.2 Project Overview

**Project Location.** Poseidon Resources proposes to construct the CDP on a four-acre parcel within the site of the Encina Power Station (EPS). Poseidon has entered into a renewable 55-year lease with Cabrillo Power I LLC (the owner and operator of the EPS) for the CDP site. The EPS is located within the City of Carlsbad at 4600 Carlsbad Boulevard, adjacent to the southern edge of Agua Hedionda Lagoon along the Pacific Ocean. Figures 1 and 2 (see Figures and Graphics located after EPA Form 2D) present the location of the proposed CDP.

EPS generates up to 939 megawatts of electrical power using five steam generators and one gas turbine generator. The EPS steam generators are cooled by a once-through seawater flow system. EPS cooling water is discharged to the Pacific Ocean per requirements established in Regional Board Order No. R9-2006-0043 (NPDES CA0001350), *Waste Discharge Requirements for Cabrillo Power I LLC Encina Power Plant, San Diego County.*

**Intake Facilities.** Source waters for CDP desalination operations would be diverted from the EPS cooling water effluent channel. As described in Order No. R9-2006-0065, during times EPS is generating power, a portion of the EPS cooling water effluent would be diverted to CDP for seawater desalination treatment. A total intake flow of 304 million gallons per day (mgd) is required to operate the CDP at its nominal 50 mgd potable water production capacity. Of this 304 mgd flow, 107 mgd would be directed to CDP treatment facilities, and the remaining 197 mgd would be used as dilution water to comply with salinity requirements of Order No. R9-2006-0065.

During times EPS is not generating power or during times when EPS flows are insufficient to meet CDP intake needs, additional unheated EPS thru-flows would be used as a source of supply to the CDP. Order No. R9-2006-0065 established requirements to address impingement and entrainment impacts associated with Poseidon's use of such additional flows during temporary conditions when EPS flows are not sufficient to meet the CDP intake requirements. As documented within this Report of Waste Discharge, Poseidon has complied with these requirements, which has included:

- Order No. R9-2009-0038: the development and approval of a Flow, Entrainment and Impingement Minimization Plan (Minimization Plan) which includes a Marine Life Mitigation Plan (MLMP), and
- Order No. R9-2011-0028: Regional Board approval of a mitigation site (Otay River Floodplain) and preliminary restoration plan, as required under the Minimization Plan and MLMP.

**CDP Discharge Flows**. An average daily flow of 50 million gallons per day (mgd) of fresh potable water would be produced by the CDP seawater desalination facilities. Treatment processes at CDP would consist of pretreatment, reverse osmosis (RO) desalination, disinfection and product water stabilization. The first two of these processes would generate wastewater streams, including:

- filter backwash water from seawater desalination pretreatment processes, and
- concentrated seawater (average daily flows of 50 mgd) from the RO desalination process.

Virtually all dissolved solids and some of the suspended solids contained in the CDP intake water will be returned to the ocean, either via the RO concentrated seawater flow or by the pretreatment backwash discharge. As a result, seawater desalination operations at CDP will result in no discernible change in the mass of solids and salts discharged into the ocean. CDP seawater desalination operations, however, will result in wastewater flow volumes within the EPS effluent channel being reduced by approximately 50 mgd.

Table 1-1 summarizes allowable discharge flows regulated by Order No. R9-2006-0065. In requesting renewal of NPDES CA0109223, Poseidon proposes no changes in these flows.

**Table 1-1**
**Summary of Proposed CDP Flows Discharged Back into the EPS Cooling Water Stream**

| Flow Component | Option 1: Granular Media Filtration Pretreatment[1] | | Option 2: Membrane Filtration Pretreatment[2] | |
|---|---|---|---|---|
| | Daily Average Flow[3] (mgd) | Maximum Day Flow[4] (mgd) | Daily Average Flow[3] (mgd) | Maximum Day Flow[4] (mgd) |
| Potable Water Production Capacity | 50 | 54 | 50 | 54 |
| Wastewater Flow Component:<br>• Pretreatment Backwash Flows Discharged to the EPS Cooling Water Stream[5] | 4.0 | 6.3 | 7.0 | 10.5 |
| • RO Concentrate Flows Discharged to the EPS Cooling Water Stream[5] | 50 | 54 | 50 | 54 |
| • Total Flows Discharged Back into the EPS Cooling Water Stream[5] | 54 | 60.3 | 57 | 64.5 |

1 One of two pretreatment options would be implemented under proposed CDP seawater desalination operations. Under Option 1, pretreatment would consist of coagulant addition and granular media filtration. Backwash water from the granulated media filters would be clarified to remove settleable solids (including the coagulants), and clarified supernatant would be either returned to the EPS discharge channel or returned to the desalination plant inlet. See Chapter 2 for details of CDP treatment processes and wastewater flows.

2 Under Option 2, RO pretreatment would be provided through microscreening and membrane filtration. Solids in the seawater intake flows removed from the microscreens through backwashing would be discharged back into the EPS cooling water effluent stream. Solids removed from the membrane filters through backwashing would be clarified, and treated backwash water (approximately 50% of total backwash flow) would be directed to the desalination plant inlet. The remaining backwash flow would be returned to the EPS cooling water effluent stream. See Chapter 2 for details of CDP treatment processes and wastewater flows.

3 CDP would normally be operated at an average daily potable water production rate of 50 mgd. This 50 mgd potable water production rate can be achieved with one RO unit offline for membrane cleaning or maintenance.

4 Maximum CDP potable water production rate is 54 mgd with all RO units in service. This 54 mgd maximum day production rate cannot be sustained due to the need to periodically rotate RO units offline for membrane cleaning and maintenance.

5 CDP wastewater would be discharged back into the EPS cooling water effluent channel, and the blend of EPS cooling water and CDP wastewater would be discharged to the Pacific Ocean via the EPS effluent discharge channel.

As documented within Order No. R9-2006-0065, one of two potential RO pretreatment options would be implemented, and Poseidon has not yet determined which of these two pretreatment options is preferable. Wastewater flows from either of the two pretreatment processes being considered will have approximately the same water quality and salinity characteristics as the seawater influent (EPS cooling water effluent). As a result, the overall quality of the combined EPS/CDP discharge will not be discernibly affected by the decision as to which pretreatment option is implemented.

Concentrated seawater from the RO units would contain concentrations of salinity and dissolved ions that are approximately double the concentration of those in the seawater influent. As shown in Table 1-1 (page 1-3), average daily RO reject flows would be 50 mgd, regardless of which pretreatment process is selected for implementation.

Maximum day RO reject flows discharged back into the EPS effluent channel would be 54 mgd. This maximum flow would occur if all RO units were simultaneously in operation. Such a maximum day flow cannot be sustained because of the need to periodically rotate RO units offline for membrane cleaning and maintenance. As a result of this need for RO membrane cleaning and maintenance, CDP will normally be operated at an annual average water production rate of 50 mgd.

**Project Schedule.** On March 9, 2011, the Regional Board adopted Resolution No. R9-2011-0028, which approved Poseidon Resources preliminary wetlands restoration plan and mitigation site selection. The restoration plan and wetlands site would mitigate against entrainment and impingement impacts that may occur when EPS power generation flows are not sufficient to meet CDP intake needs.

Poseidon Resources has now obtained the key regulatory approvals required to move forward with project implementation. Preliminary construction of CDP was initiated in November 2009. Full-scale construction is currently scheduled to commence in 2011, and CDP seawater desalination facilities are scheduled for operation in 2014.

## 1.3 Requested Permit Modifications

As noted, no changes are proposed in the CDP facilities and operations described Order No. R9-2006-0065. Further, Poseidon seeks no changes in:

- the effluent limitations or mass emission limits established in Order No. R9-2006-0065, or
- monitoring provisions established in Order No. R9-2006-0065.

The only modification requested by Poseidon is related to the Minimization Plan mitigation requirements established in Order No. R9-2009-0038. In accordance with Poseidon's voluntary commitment to provide an additional 11 acres of habitat restoration to fully offset the projected impingement losses associated with stand-alone CDP operations, Poseidon requests the following permit modifications:

1. Increase the number of acres to be restored under the MLMP from 55.4 to 66.4 acres (42.5 acres in Phase I and 23.5 acres in Phase II); and
2. Delete the Biological Performance Standard from the Minimization Plan mitigation monitoring requirements established in Order No. R9-2009-0038.

## 1.4 Report Organization

Information presented in this Report of Waste Discharge supplements data presented by Poseidon in the attached EPA Form 1, EPA Form 2D, and State of California Form 200. To supplement these NPDES application forms, this report of waste discharge:

- describes EPS cooling water intake and discharge facilities, CDP seawater desalination treatment facilities, proposed CDP discharge flows, and the discharge quality (Section 2),
- addresses impingement and entrainment compliance with provisions of the California Water Code and reviews mitigation requirements established in Order No. R9-2006-0065 (NPDES CA0109223) and Order No. R9-2009-0038 (Section 3) and
- evaluates compliance of the proposed CDP discharge with applicable state and federal requirements (Section 4).

## 1.5 Report Preparation

This Report of Waste Discharge was prepared by Poseidon Resources (Channelside) LP under the direction of Peter M. MacLaggan, Senior Vice President - Development, and Scott Maloni, Vice President – Development. Technical assistance was provided by Michael R. Welch, Ph.D., P.E., Consulting Engineer.

Questions concerning this NPDES application should be directed to:

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Vice President - Development
Poseidon Resources (Channelside) LP
501 West Broadway, Suite 2020
San Diego, CA 92101
(619) 595-7802

# *Section 2*

# *Seawater Desalination Facilities and Operations*

*Renewal of NPDES CA0109223*
*Poseidon Carlsbad Desalination Project*

# *Section 2*
# *DESALINATION FACILITIES AND OPERATIONS*

## 2.1 Intake Flows

**EPS Intake Facilities.** As noted in Section 1, a portion of the cooling water effluent from the EPS will be diverted to the CDP for seawater desalination. EPS includes five steam generators that share a common once-through cooling water system that discharges to the Pacific Ocean per requirements established in Order No. R6-2006-0043 (NPDES CA0001350). The cooling water stream withdrawn from an intake located in Agua Hedionda Lagoon is typically comprised of seawater from the Pacific Ocean. During certain hydrologic and tidal conditions, however, fresh water from local storm runoff can comprise a portion of the Agua Hedionda Lagoon inflow.

Heated EPS cooling water flows to a discharge channel that feeds into a discharge pond that also receives several other smaller volume interplant wastewater streams. After passing through the discharge pond, the combined discharge flows by gravity to the Pacific Ocean via a surface channel. The temperature of the EPS cooling water is typically elevated by approximately 5.5º C (10º F) above the influent temperature.

**Permitted EPS Intake Flows.** Order No. R9-2006-0043 allows maximum EPS once-through cooling water flows of up to 857.3 mgd. While the Order also allows EPS to discharge approximately 6.2 mgd of additional flows (e.g. low volume waste, brine, seepage, stormwater, boiler blowdown, and metal cleaning wastes), non-contact once-through cooling water typically represents more than 99 percent of EPS discharge flow.

The CDP would involve the use only of EPS cooling water, as the CDP intake point is upstream from where the other EPS waste streams enter the EPS discharge channel. While a maximum cooling water flow of 857.3 is allowed under Order No. R9-2006-0043, the amount of required cooling water depends on the number of steam generation units in operation.

**Future EPS Intake Flows**. Recent EPS intake flows have generally been in excess of CDP intake requirements. While current plans indicate that EPS cooling water needs should typically provide sufficient flow for CDP desalination operations during the upcoming five year NPDES period, the following factors may influence future EPS intake flows:

- power marketing factors and California Independent Systems Operator (ISO) power generation needs,
- implementation of the State Water Resources Control Board (SWRCB) policy regarding once-through cooling water, and
- proposed modernization and modification of EPS power generating facilities.

*SRWCB Cooling Water Policy*. On May 4, 2010, the SWRCB adopted Resolution No. 2010-0020, which adopted a Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling. The Policy requires that by December 31, 2017, EPS achieve compliance with either:

Track 1: Reduce cooling water intake flow rates by 93 percent while ensuring that screen intake velocities not exceed 0.5 feet per second, or

Track 2: In the event Track 1 is not feasible, reduce that impingement mortality and entrainment to a comparable level that would be achieved under Track 1.

*Proposed EPS Modifications.* Carlsbad Energy Center LLC (a subsidiary of NGR Energy, Inc.) is proposing to retire existing EPS steam boiler Units 1, 2, and 3 and replace the units with a more efficient 558 megawatt combined-cycle generating facility configured using two units, each comprised of a natural gas-fueled combustion turbine and one steam turbine. The proposed Carlsbad Energy Center units would represent the first phase in replacing the EPS with a more efficient generating facility. Once-through cooling water would not be used as part of the modernized Carlsbad Energy Center power generation processes.

**CDP Operations Under EPS Shutdown.** In the event that EPS intake flows are temporarily insufficient to meet CDP desalination intake needs, Order Nos. R9-2006-0065 and R9-2009-0038:

- require Poseidon to comply with the terms of the approved Minimization Plan, and
- allow CDP use of the EPS intake structure to the benefit of the CDP.

**CDP Intake Facilities.** Per requirements established in Order No. R9-2006-0065, CDP would generate up to 50 mgd (average daily flow) of potable water through seawater desalination. Maximum day potable water production (with all RO units in service) would be 54 mgd.

Figure 3 (see Figures and Graphics section located after EPA Form 2D) presents a flow schematic showing how EPS cooling water would be diverted to CDP. CDP would divert EPS non-contact cooling water after the water has passed through the EPS steam condensers, but before other EPS waste streams (e.g. low volume and metal cleaning flows) are discharged into EPS effluent channel.

EPS cooling water effluent will be diverted via an intake structure that will be constructed adjacent to the power plant discharge channel. The intake structure will consist of a wet well and influent pumping station. The intake pump station will be equipped with a sodium hypochlorite feed system. Chlorine doses will be adjusted on an as-needed basis in accordance with intake seawater quality. Maximum dosages (approximately 1 to 5 mg/l) would occur during periods of red tide or algae blooms. The influent disinfection will help to control biological growth in downstream conveyance pipelines and treatment processes.

From the pumping station, EPS cooling water will be pumped through a 72-inch-diameter pipeline to the CDP water treatment facilities. CDP seawater desalination treatment processes will include:

- pretreatment to remove suspended particulates,
- RO treatment to remove salinity and dissolved constituents, and
- disinfection.

CDP pretreatment, RO, and disinfection processes will be housed within process building that also houses CDP administrative offices, a laboratory, and chemical storage facilities.

## 2.2 Pretreatment Processes

Pretreatment would be used to remove suspended particulates and to reduce solids loading and biological fouling of subsequent RO treatment facilities. Poseidon has conducted onsite pilot plant testing of two potential pretreatment process trains and will select one of the following two pretreatment options for implementation at CDP: (1) granular media filtration, or (2) microscreening/membrane filtration.

**Granular Media Filtration.** Under the granular media filtration option, ferric chloride (or ferric sulfate) and polymer would be added to the influent, and the influent would be directed to granular media filters, which would remove particulate matter larger than 50 microns (0.002 inch).

Ferric chloride (or ferric sulfate) dosages would depend on intake seawater characteristics, and would normally be 1 to 5 mg/l. During periods of red tide or algae blooms, however, coagulant dosages may be increased to 15 to 30 mg/l to enhance solids removal within the filters. Polymer dosages would range from 0 to 3 mg/L. Virtually all of the added coagulant (more than 99.9%) would be captured by the granular media filters. Solids captured within the filters would be periodically removed via backwashing with filtered seawater. Approximately 3 to 6 percent (average 4 percent) of the CDP seawater intake flow would be used for backwashing the granular media filters.

Spent backwash water will be directed to sedimentation basins (clarifiers), where approximately 99 percent of the backwashed solids (including the virtually all of the added coagulants) will be removed as waste sludge. Waste sludge would be dewatered using belt filter presses, and dewatered sludge would be hauled to a landfill.

Granular media filter backwash flows are projected at 4.0 mgd (average day) and 6.3 mgd (maximum day). Decanted backwash water (supernatant) from the clarifiers will have the same characteristics as the seawater influent. Depending on operational needs, the backwash supernatant will either be (1) recycled back into the CDP influent or (2) discharged to the EPS cooling water effluent channel.

**Microscreen/Membrane Filtration.** Microscreening/membrane filtration is the second potential pretreatment option that Poseidon may elect to implement at CDP. Under the microscreen/membrane filtration option, seawater would first undergo microscreening that would remove particulates larger than 120 microns (0.005 inch). The microscreening pretreatment option would eliminate the need for coagulant conditioning of the CDP influent.

The microscreen process would remove from 10 to 30 percent of the suspended solids within the seawater intake. Solids removed in the microscreens would be washed from the screens and discharged back into the EPS cooling water stream. The average daily microscreen backwash flow is projected at 2 mgd, while maximum day microscreen backwash flows are projected at 3 mgd.

After treatment by microscreening, water would be treated by a series of membrane filters to remove smaller particulates. Membrane filters would be cleaned through a backwash process. Membrane backwash water flows would represent approximately 10 to 15 percent of the source water intake flow. Membrane backwash water would be collected in backwash treatment tanks (concentrators). Supernatant from the concentrators (approximately one-half of the backwash flow) would be recycled back into the CDP pretreatment influent.

The remaining backwash flow will be discharged back into the EPS cooling water effluent stream for discharge to the ocean. No chemicals would be added as part of the microscreen/membrane filtration process. As a result, the backwash flow directed back into the EPS cooling water effluent stream will contain only solids originally in the seawater intake.

Average daily media filtration backwash flows discharged into the EPS effluent channel are projected at 5 mgd, while maximum day media filtration backwash flows are projected at 7 mgd. Combined microscreen/membrane filtration backwash flows directed into the EPS effluent channel would be 7 mgd (average daily flow), which includes 2 mgd from the microscreens and 5 mgd from the membrane filters. Maximum day combined microscreen/membrane filtration backwash flows would be 10.5 mgd, which includes 3 mgd from the microscreens and 7.5 mgd from the membrane filters.

Cleaning the membrane filters would generate two periodic wastewater sidestreams. Each of these sidestreams would be discharged to the sanitary sewer system for disposal. Sewer discharges of membrane backwash cleaning solutions are projected at 0.016 mgd. Chemically enhanced backwash (CEB) is the second sidestream that would be discharged to the sewer. CEB would involve intermittent daily cleaning of membranes with cleaning chemicals (chlorination and pH adjustment). CEB of the membranes will generate average daily waste flows of 0.11 mgd. Prior to discharge to the sanitary sewer system, the membrane cleaning and CEB flows will be collected in a separate tank and neutralized.

**Pretreated Water Storage.** Filtered seawater (regardless of the pretreatment option implemented) would flow into 3.4 million gallon filtered water storage tank located south of the RO building.

## 2.3 Reverse Osmosis Treatment

The RO system will be comprised of 14 first stage treatment trains, each with a 3.86 mgd potable water production capacity followed by a partial second stage for blending with first stage product water as necessary to achieve drinking water quality objectives. Each treatment train will consist of:

- influent transfer pumps and cartridge filters,
- high-pressure RO feed pumps,
- first stage RO membrane units,
- low-pressure RO feed pumps, and
- second stage RO membrane units.

A total of 12 treatment trains would normally be in operation at any given time (providing 50 mgd of potable water production capacity), with one train serving as auxiliary or undergoing cleaning/maintenance.

**Cartridge Filters.** Influent transfer pumps would convey filtered seawater from the filtered water storage tank through 20-micron cartridge filters for additional filtration. Cartridge filters would be replaced every six to eight weeks, and spent cartridge filters containing removed particulates would be hauled to a landfill.

**High-Pressure Reverse Osmosis Feed Pumps.** From the cartridge filters, the filtered seawater would flow into high-pressure RO feed pumps. The high-pressure feed pumps would lift the inflow to a pressure of 800 to 900 pounds per square inch required for operation of the RO salt/water membrane separation process.

**Reverse Osmosis Membranes.** High-pressure seawater will be directed into the first stage RO membrane units (14 trains in total) that consist of a pressure tubes housing spiral-wound semipermeable membranes. High-pressure in the RO influent forces a portion of the water through the semipermeable membranes, but virtually all ions and other dissolved constituents are retained behind the membranes and collected as reject flow. A portion of the first stage product water will be repressurized for processing by the second stage RO prior to blending with the balance of the first stage product water.

Table 2-1 (page 2-7) summarizes preliminary design criteria for the RO process. The combined first and second RO membrane units would achieve an estimated 99.6 percent removal of dissolved solids, and would recover approximately 50 percent of the influent flow. At this 50 percent recovery rate, half of the influent flow would be recovered as product water. Salinity from the seawater influent would be concentrated in the remaining half of the flow (RO concentrated seawater), which would be discharged back to the ocean via the EPS effluent channel along with backwash flows from the pretreatment process.

RO membrane performance will be monitored continuously by measuring feed seawater conductivity, product water conductivity, and pressure differential through the elements. RO membranes will be periodically cleaned to reduce fouling and increase membrane life. Membrane cleaning would be achieved by circulating a cleaning solution through the membranes for a specified period of time. After the cleaning process, the spent cleaning solution (which typically contains citric acid, sodium hydroxide, sodium tripolyphosphate, sodium dodecylbenzene, and sulfuric acid) is discharged to a 200,000 gallon washwater tank. The RO membranes are then flushed with RO permeate (flush water). The flush water from the “first flush” may contain dilute concentration of cleaning chemicals, while subsequent flush water is of low salinity and contains only trace quantities of chemicals. Flush water would also be discharged to the washwater tank.

Combined cleaning solution and flush water would be mixed and neutralized, and discharged to the sanitary sewer system. Average daily flows (predominantly flush water) associated with cleaning the RO membranes are 0.006 mgd. It is anticipated that one RO treatment train would be cleaned at a time (leaving 13 trains in operation for a 50 mgd potable water production capacity). The RO cleaning system, however, is designed to simultaneously handle cleaning of two RO trains.

**Table 2-1**
**Reverse Osmosis Design Criteria**

| Parameter | Preliminary Design Criteria[1] | |
|---|---|---|
| | First Stage | Second Stage |
| Number of treatment trains | 14- single pass | 1-four pass |
| Product water capacity of each train | 3.86 mgd | 10.2 |
| Membrane type | Spiral-wound TFC (thin film composite) | Spiral-wound TFC (thin film composite) |
| Number of pressure vessels per train | 170 – 225 | 450 |
| Pressure vessel size | 8-inch diameter pressure vessel | 8-inch diameter pressure vessel |
| Applied flux | 8 – 12 gallons per day per square foot | 8 – 12 gallons per day per square foot |
| Membrane replacement rate | 10 – 15 percent per year | 10 – 15 percent per year |
| Recovery rate | 50 percent | 98 percent |
| Nominal salt rejection | 99.6 percent | 99.6 percent |
| Applied pressure | 800 – 900 psi | 150-400 |
| Maximum pressure drop per element | 10 psi | 10 psi |

1 Nominal design criteria for RO treatment process. Actual RO performance will depend on the manufacturer selected for supplying the RO membranes and elements.

## 2.4 Potable Water Disinfection

Potable fresh water from the RO treatment system will be disinfected and conditioned prior to being pressurized for introduction in the product water distribution system. The disinfection/conditioning will be accomplished by chlorination followed by ammonia addition to form chloramines. The treated potable water flow will also be conditioned using lime and carbon dioxide to provide corrosion control for potable water distribution facilities. No wastewater streams will be generated by the disinfection and conditioning operation.

## 2.5 Solids Handling

As described in Section 2.2, one of two pretreatment options is being considered for RO pretreatment. No pretreatment solids handling facilities would be required at CDP if the membrane filtration pretreatment option is selected for implementation.

If Poseidon implements the media filtration pretreatment option, waste backwash solids will be generated by the filter backwash sedimentation basins (clarifiers). The filter backwash sedimentation basins would remove approximately 99 percent of the suspended solids within the filter backwash. Settled solids would be collected in the bottom of the sedimentation basins and directed to belt filter presses for dewatering. The belt filter presses would dewater solids to a solids concentration of at least 20 percent. Dewatered solids would be transported to a landfill for disposal.

## 2.6 Desalination Facility Staffing

The desalination facility will be operated by a professional staff of approximately 20 management, operations, maintenance, and administrative/support personnel. The facility will be staffed 24 hours per day, 365 days per year. The number of operators, required certification, and daily staffing requirements will be governed by the State of California Department of Public Health. It is anticipated that approximately five to seven personnel will be onsite during the weekday day shift, and a minimum of two personnel will be onsite during evenings, nights, and weekends.

## 2.7 Discharge Operations

**Discharge Facilities.** EPS discharges seawater to the Pacific Ocean via a discharge pond that empties into a channel that extends approximately 500 feet west of Carlsbad Boulevard. CDP discharge facilities will consist of a pipeline (up to 72-inch-diameter) that connects the desalination facility to the existing EPS discharge channel. The CDP discharge point will be located downstream of the CDP intake point to prevent recirculation of the concentrate back into the desalination facility. Figure 3 (see Figures and Graphics located after EPA Form 2D) presents the location of the CDP discharge pipe and EPS effluent channel. Figure 4 (see Figures and Graphics section) presents a schematic of the CDP and EPS discharge.

**Wastewater Flows.** As discussed in Section 2.2, wastewater process flows at CDP will depend on which of the two RO pretreatment options are implemented.

*RO Concentrated Seawater Flows.* As noted above, the 50 mgd potable water production rate would be achieved by operating 13 of the 14 RO treatment trains, with one train being in reserve or out of service for cleaning/maintenance. Under such normal operating conditions when 13

treatment trains are in operation, the CDP would generate an average daily RO concentrate flow of 50 mgd. During periods of peak water demand, the potential exists (during short-term periods) for all 14 RO treatment trains to be in production, yielding a maximum day potable water production flow rate of 54 mgd. Under these conditions, maximum day RO concentrate flows with all 14 RO units in operation would be 54 mgd. The 54 mgd maximum day potable water production rate cannot be sustained for long periods of time because of the need to periodically rotate RO units offline for cleaning.

*Pretreatment Flows: Granular Media Filtration.* Under the granular media filtration pretreatment option, CDP wastewater flows would depend on where clarified filter backwash flows are directed. Depending on CDP operating needs, clarified backwash flows may be directed back into the headworks, to the EPS effluent channel for disposal, or portions of the clarified backwash flow may be directed to both. Table 2-2 summarizes CDP process flows for the granular media filter backwash pretreatment option.

**Table 2-2**
**CDP Process Flows**
**Granulated Media Filtration Pretreatment Option**

| Flow Destination | Flow Stream | If Clarified Backwash is Discharged to the Ocean | | If Clarified Backwash is Returned to the CDP Intake | |
|---|---|---|---|---|---|
| | | Average Day Flow (mgd) | Maximum Day Flow (mgd) | Average Day Flow (mgd) | Maximum Day Flow (mgd) |
| CDP Intake | Seawater diversion from EPS cooling water stream | 104 | 114.4 | 100 | 108.1 |
| Regional Water Supply Systems | CDP product water (treated potable supply) | 50 | 54 | 4 | 6.3 |
| Sanitary Sewer System | Filter backwash settled solids | 0.016 | 0.016 | 104 | 114.3 |
| | RO membrane cleaning (cleaning solutions and flush water) | 0.006 | 0.072 | 50 | 54 |
| | Sewer Discharge Total | 0.022 | 0.088 | 0.016 | 0.016 |
| EPS Cooling Water Effluent Channel | Clarified supernatant from filter backwash clarifier | 4 | 6.3 | 0 | 0 |
| | RO concentrated seawater | 50 | 54 | 50 | 54 |
| | Ocean Discharge Total | 54 | 60.3 | 50 | 54 |

As noted in Section 2.2, some or all filter backwash water from the granular media filters may be directed back to the CDP influent channel. Table 2-3 (page 2-10) summarizes process flows when 100 percent of the granular media filter backwash is directed back into the CDP influent channel. Under this option, 100 mgd of EPS cooling water would be diverted to the CDP under average day conditions, and the wastewater discharge (average daily flow) to the EPS effluent channel would be comprised of 50 mgd of RO concentrate. During periods when all 14 RO treatment trains are in operation, maximum day EPS cooling water flows of up to 108.1 mgd would be diverted to the CDP, and 54 mgd of RO concentrated seawater would be discharged to the EPS effluent channel.

*Pretreatment Flows: Microscreen/Membrane Filtration.* Table 2-3 presents CDP process flows for the microscreen/membrane filtration pretreatment option. Under average day conditions, 102.1 mgd of EPS cooling water (average daily flow) would be diverted to the CDP, and the CDP discharge to the EPS effluent channel would be 57 mgd (comprised of 50 mgd RO concentrate, 2 mgd microscreen backwash, and 5 mgd backwash water from the membrane filters).

**Table 2-3**
**CDP Process Flows**
**Microscreen/Membrane Filtration Pretreatment Option**

| Flow Destination | Flow Stream | Average Day Flow (mgd) | Maximum Day Flow (mgd) |
|---|---|---|---|
| CDP Intake | Seawater diversion from EPS cooling water stream | 102.1 | 111.2 |
| | Clarified membrane filter backwash | 5.0 | 7.5 |
| | Total CDP Influent Flow | 107.1 | 118.7 |
| Regional Water Supply Systems | CDP product water (treated potable supply) | 50 | 54 |
| Sanitary Sewer System | Membrane filter cleaning solution and flush water | 0.016 | 0.016 |
| | Chemically enhanced backwash | 0.110 | 0.110 |
| | RO membrane cleaning (cleaning solutions and flush water) | 0.006 | 0.072 |
| | Total to Sanitary Sewer | 0.132 | 0.198 |
| EPS Cooling Water Effluent Channel | Microscreen backwash | 2 | 3 |
| | Subnatant from filter backwash clarifier | 5 | 7.5 |
| | RO concentrated seawater | 50 | 54 |
| | Ocean Discharge Total | 57 | 64.5 |

## 2.8 Projected Effluent Quality

Water quality projections for the desalination facility wastewater streams are based on data developed from an onsite 40,000 gpd pilot seawater desalination facility. The quality of effluent from the desalination effluent streams is presented in reference tables attached to EPA Form 2D.

**Salinity.** The salinity of the CDP effluent will be dependent on influent seawater salinity concentrations and the RO recovery rate. Concentrations of salinity in the EPS seawater intake vary slightly with season, current, and hydrologic conditions. As documented in Poseidon's 2005 Report of Waste Discharge, the mean seawater salinity during 1980-2000 was 33.5 parts per thousand (ppt). The maximum recorded salinity was 34.44 ppt, and the minimum recorded salinity was 31.26 ppt, both occurring during the 1999 El Niño. Seawater salinity at EPS can thus vary by more than 3 ppt (approximately 10 percent).

Table 2-4 presents estimated salinity concentrations in the CDP effluent streams at a mean influent seawater salinity of 33.5 ppt and a 50 percent RO recovery.

**Table 2-4**
**Projected Salinity of CDP Effluent Streams**

| Flow Condition | Pretreatment Option | Discharge | Projected Flow (mgd) | Effluent Salinity Concentration (ppt) |
|---|---|---|---|---|
| Average Daily CDP Flows | Granular Media Filtration | Filter backwash | 4[1] | 33.5[2] |
| | | RO concentrate | 50[1] | 67.0[4] |
| | Microscreen & Membrane Filtration | Microscreen/membrane filtration backwash | 7[3] | 33.5[2] |
| | | CDP RO Concentrate | 50[3] | 67.0[4] |
| Maximum Day CDP Flows | Granular Media Filtration | Filter backwash | 6.3[1] | 33.5[2] |
| | | RO concentrate | 54[1] | 67.0[4] |
| | Microscreen & Membrane Filtration | Microscreen/membrane filtration backwash | 10.5[3] | 33.5[2] |
| | | CDP RO Concentrate | 54[3] | 67.0[4] |

1 Flow values from Table 2-2 on page 2-9 for the granular media filtration pretreatment option.
2 Based on a mean seawater salinity of 35.5 ppt, as reported in the 2005 CDP NPDES application for the period 1980-2000.
3 Flow values from Table 2-3 on page 2-10 for the microscreen/membrane filtration pretreatment option.
4 Based on RO membranes achieving a 99.6 percent salt rejection and 50 percent recovery. See Table 2-1 on page 2-7.

As shown in Table 2-4, salinity in the CDP pretreatment streams are equivalent to the salinity in the CDP seawater influent. Salinity concentrations in the RO concentrated seawater are projected to be approximately double the concentration of the CDP seawater influent.

The salinity in the combined EPS/CDP discharge will depend on seawater salinity, the RO recovery rate, and EPS cooling water flows. Table 2-5 presents estimated "in the pipe" salinity levels (prior to initial dilution) for the combined CDP/EPS discharge. Salinity estimates are presented for the range of EPS cooling water flows that occurred during 1980-2000. As shown in Table 2-5, the projected "in the pipe" salinity of the combined EPS/CDP discharge is independent on the type of pretreatment provided at CDP. Highest salinities in the combined EPS/CDP effluent will occur during periods of lowest EPS influent flows. At an EPS cooling water flow of 304 mgd, salinity within the EPS effluent channel (prior to initial dilution) will be increased by approximately 22 percent.

**Table 2-5**
**Projected "In Pipe" Salinity of Combined CDP/EPS Discharge**

| CDP Potable Water Production Rate | Pretreatment Option | Projected Salinity of Combined EPS/CDP Discharge[1] (ppt) | | |
|---|---|---|---|---|
| | | EPS Influent Flow of 304 mgd[2] (Minimum Value) | EPS Influent Flow of 576 mgd[3] (Mean Value) | EPS Influent Flow of 857 mgd[4] (Max. Permitted) |
| 50 mgd (Average day) | Granular Media Filtration[5] | 40.1 | 36.7 | 35.6 |
| | Microscreen & Membrane Filtration[6] | 40.1 | 36.7 | 35.6 |
| 54 mgd (Maximum Day) | Granular Media Filtration[5] | 40.7 | 37.0 | 35.8 |
| | Microscreen & Membrane Filtration[6] | 40.7 | 37.0 | 35.8 |

1 Computed salinity levels are also based on a RO concentrate salinity of 67.0 ppt (double the mean influent seawater salinity). See Table 2-4 on page 2-11 for a summary of process flows and salinities for each CDP flow stream.
2 During 1980-2000, a daily average EPS cooling water flows exceeded 304 mgd more than 99 percent of the time.
3 Mean EPS cooling water flow for the period January 1980 through July 2000.
4 Maximum permitted EPS cooling water flow per requirements of Order No. R9-2006-0043.
5 See Table 2-2 on page 2-9 for flows for each process within the granular media filtration pretreatment option.
6 See Table 2-3 on page 2-10 for flows for each process within the microscreen/membrane filtration pretreatment option.

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**Toxic Inorganic Parameters.** As indicated, CDP operations would return concentrated seawater to the ocean, and would not result in the discernible increase in mass emissions of any toxic inorganic constituent. Table 2-6 summarizes CDP pilot plant discharge concentrations of toxic inorganic constituents for the granular media pretreatment option. As shown in the table, nickel was the only metal with a detectable concentration in the CDP pilot plant combined discharge (RO concentrate plus filter backwash) for the granular media filtration pretreatment option.

**Table 2-6**
**Summary of Toxic Inorganic Constituents[1]**
**Granular Media Filtration Pretreatment Option**

| Toxic Inorganic Constituent | Analytical Method | CDP Wastewater Stream Granular Media Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel Maximum Concentration (µg/l) |
|---|---|---|---|---|
| | | Treated Filter Backwash Concentration (µg/l) | RO Concentrate Concentration (µg/l) | |
| Antimony | EPA 200.8 | < 5 | < 5 | < 5.0 |
| Arsenic | EPA 200.8 | 10 | < 2 | < 2.8 |
| Beryllium | EPA 200.8 | < 0.3 | < 0.3 | < 0.3 |
| Cadmium | EPA 200.8 | < 0.5 | < 0.5 | < 0.5 |
| Chromium, total | EPA 200.8 | < 4 | < 4 | < 4 |
| Copper | EPA 200.8 | < 2 | < 2 | < 2 |
| Lead | EPA 200.8 | < 1 | < 1 | < 1 |
| Mercury | EPA 245.1 | < 0.2 | < 0.2 | < 0.2 |
| Nickel | EPA 200.8 | 14 | 19 | 19 |
| Selenium | EPA 200.8 Hy | < 0.4 | < 0.4 | < 0.4 |
| Silver | EPA 200.8 | < 0.5 | < 0.5 | < 0.5 |
| Thallium | EPA 200.8 | < 0.5 | < 2.5 | < 2.3 |
| Zinc | EPA 200.8 | 11 | < 10 | < 10 |
| Cyanide | SM 4500 CN E | < 50 | < 50 | < 50 |

Note: a "<ML" value indicates that the constituent was not detected at the referenced minimum level (ML).

1 Water quality results for seawater desalination waste streams developed from an onsite 40,000 gpd pilot seawater desalination facility, See attached water quality tables (located after EPA Form 2D) for complete monitoring results of toxic inorganic constituents within the desalination facility wastewater streams.

Table 2-7 summarizes CDP pilot plant discharge concentrations of toxic inorganic constituents for the granular media pretreatment option. As shown in Table 2-7, no detectable concentrations of toxic inorganic constituents were observed in the combined CDP pilot plant wastewater discharge for the microscreening/microfiltration pretreatment option.

**Table 2-7**
**Summary of Toxic Inorganic Constituents[1]**
**Microscreening/Membrane Filtration Pretreatment Option**

| Toxic Inorganic Constituent | Analytical Method | CDP Wastewater Stream Membrane Filtration Pretreatment | | Combined CDP Effluent Discharge into EPS Cooling Water Channel Maximum Concentration (µg/l) |
|---|---|---|---|---|
| | | Membrane Filtration Backwash Concentration (µg/l) | RO Concentrate Concentration (µg/l) | |
| Antimony | EPA 200.8 | < 10 | < 5 | < 6 |
| Arsenic | EPA 200.8 | 0.052 | < 2 | < 1.7 |
| Beryllium | EPA 200.8 | < 0.0010 | < 0.3 | < 0.3 |
| Cadmium | EPA 200.8 | < 0.005 | < 0.5 | < 0.5 |
| Chromium, total | EPA 200.8 | 0.019 | < 4 | < 3.4 |
| Copper | EPA 200.8 | 0.022 | < 2 | < 1.7 |
| Lead | EPA 200.8 | < 0.005 | < 1 | < 0.9 |
| Mercury | EPA 245.1 | < 0.20 | < 0.2 | < 0.2 |
| Nickel | EPA 200.8 | < 0.02 | 19 | < 16 |
| Selenium | EPA 200.8 Hy | < 50 | < 0.4 | < 8.5 |
| Silver | EPA 200.8 | < 0.010 | < 0.5 | < 0.5 |
| Thallium | EPA 200.8 | < 10 | < 2.5 | < 3.8 |
| Zinc | EPA 200.8 | Not Sampled | < 10 | Not Available[4] |
| Cyanide | SM 4500 CN E | < 5 | < 50 | < 43 |

Note: a "<ML" value indicates that the constituent was not detected at the referenced minimum level (ML).

1 Water quality results for seawater desalination waste streams developed from an onsite 40,000 gpd pilot seawater desalination facility, See attached water quality tables (located after EPA Form 2D) for complete monitoring results of toxic inorganic constituents within the desalination facility wastewater streams.

**Toxic Organic Parameters.** Table 2-8 summarizes CDP pilot plant concentrations of toxic organic constituents in the RO concentrated seawater and filter backwash discharge streams. As shown in the table, concentrations of toxic organic pollutants in the CDP pilot plant effluent were below detection limits for the granular media filtration pretreatment option. The compound 2-butanone was the only toxic organic constituent detected in the CDP pilot plant effluent for the microscreening/microfiltration pretreatment option.

**Table 2-8**
**Summary of Detected Toxic Organic Constituents[1]**
**CDP Pilot Desalination Plant**

| Category | Detected Compounds | Maximum Detected Concentration (µg/l) | | | |
|---|---|---|---|---|---|
| | | Pretreatment Option | | RO Concentrated Seawater | Combined CDP Discharge |
| | | Granular Media Filtration Backwash | Microscreening & Membrane Filtration Backwash | | |
| Volatile Organic Compounds | Bromoform | Not Detected | Not Detected | Not Detected | Not Detected |
| | 2-butanone | Not Detected | 58 | 1.4 | 11 |
| | All other volatile organic compounds[1] | None Detected | None Detected | None Detected | None Detected |
| Base Neutral Compounds | None Detected | None Detected | None Detected | None Detected | None Detected |
| Acid Extractable Compounds | None Detected | None Detected | None Detected | None Detected | None Detected |
| Chlorinated Pesticides & PCBs | None Detected | None Detected | None Detected | None Detected | None Detected |
| Other Toxic Organic Compounds | TCDD Equivalents | None Detected | None Detected | None Detected | None Detected |
| | Tributyl tin | Not Detected | Not Detected | Not Detected | Not Detected |

Note: a "<ML" value indicates that the constituent was not detected at the referenced minimum level (ML).

1 Water quality results for seawater desalination waste streams developed from an onsite 40,000 gpd pilot seawater desalination facility. See attached water quality tables (located after EPA Form 2D) for complete monitoring results of toxic organic constituents within the desalination facility wastewater streams.

# *Section 3*
# *Impingement and Entrainment*

***Renewal of NPDES CA0109223***
***Carlsbad Desalination Project***

# *Section 3*
# *IMPINGEMENT AND ENTRAINMENT*

## 3.1 Overview

**Co-Located Operations.** The CDP is planned to operate in conjunction with EPS. Under such co-located operations, CDP will use the EPS cooling water discharge at its desalination source water whenever the power plant flows are available. As noted in Section 2.1, historic EPS cooling water flows have normally been in excess of the 304 mgd required for CDP to produce 50 mgd of potable water.

When EPS flows are sufficient to support CDP intake needs, the CDP will not cause any additional intake or mortality of marine live above and beyond that associated with EPS operations. EPS impingement and entrainment requirements are established under Section 316(b) of the Clean Water Act. EPS compliance with the requirements of Section 316(b) is addressed in the EPS NPDES permit (Order No. R9-2006-0043, NPDES CA0001350).

**Co-Located Operations for CDP Benefit.** Order Nos. R9-2006-0065 and R9-2009-0038 conditionally allow CDP to operate under co-located conditions when CDP's intake requirements exceed EPS power generation flows. Such conditions may occur when:

- EPS is temporarily shut down, or
- EPS is operating, but its discharge flow is not sufficient to meet the CDP intake needs.

Under such "co-located operations for CDP benefit" conditions, EPS intake flows will be increased to support CDP seawater desalination operations. Such increased intake flows may cause impingement and entrainment impacts in excess of those associated with EPS operations.

Impingement and entrainment requirements for the CDP are established under Section 13142.5(b) of the *California Water Code*, which requires new industrial facilities using seawater for industrial processes to use the best available site, design, technology, and mitigation features to minimize the intake and mortality of marine life. To comply with the provisions of Section 13142.5(b) of the Water Code, Order No. R9-2006-0065 required the development of a "Flow, Entrainment, and Impingement Minimization Plan" (Minimization Plan).

After several revisions (which included the development of a Marine Life Mitigation Plan or MLMP), the Regional Board on March 27, 2009 adopted Order No. R9-2009-0038, which amended Order No. R9-2006-0065 to:

- approve Poseidon's Minimization Plan, with amendments requiring the development of Biological Performance Standards, a Productivity Monitoring Plan, and intake impingement sampling, and
- determine that provisions of Section 13142.5(b) of the *California Water Code* were satisfied, in that the CDP intake of seawater during prolonged (but not permanent) EPS shutdown represented the best available site, design, technology, and mitigation measures feasible to minimize the intake an mortality of all forms of marine life.

The MLMP establishes requirements for mitigating impacts caused by additional EPS intake flows under "co-located for CDP benefit" conditions. This mitigation includes the establishment and sustainment of wetlands habitat sites, along with productivity monitoring.

The Regional Board on March 11, 2011, adopted Resolution No. R9-2011-0028, which approved Poseidon's preliminary wetland restoration plan and wetland mitigation site, as set forth in the Minimization Plan and MLMP.

**Permanent or Long-Term EPS Shutdown.** Order Nos. R9-2006-0065 and R9-2009-0038 establish conditions under which EPS through-flows flows may be increased to meet CDP intake needs. Order No. R9-2009-0038 also establishes the following requirements that address permanent or long-term shutdown of EPS once-through cooling flows.

> *Permanent Shutdown of EPS.* Within 90 days after EPS operators provide written notice to the ISO of the intent to permanently shut down EPS once-through cooling generating facilities, Order Nos. R9-2006-0065 and R9-2009-0038 require Poseidon to submit a Report of Waste Discharge in application for authorization to operate the CDP in permanent stand-alone mode. Such a Report of Waste Discharge submittal would initiate additional review to determine whether the CDP complies with provisions of Section 13142.5 of the *California Water Code.*

*Long-Term Suspension of EPS Power Generation.* Within 45 days after EPS operators provide written notice to the ISO that power generation facilities will not be available for 180 consecutive days or more, Poseidon is required to submit a technical report to the Regional Board Executive Officer. The technical report is to evaluate whether any additional design or technology features are feasible and implementable to further reduce intake and mortality of marine life. If the technical report identifies additional design or technology measures that could be implemented, the Executive Officer may require Poseidon to implement such measures as soon as reasonably practicable for the duration of the EPS suspension of power generation operations.

## 3.2 Minimization Plan

The Minimization Plan addresses compliance with Section 13142.5(b) of the Water Code in the event that EPS intake flows are temporarily insufficient to meet CDP intake needs. The Minimization Plan:

1) evaluated the best available site, design and technology to minimize the intake and mortality of marine life,
2) estimated impingement and entrainment losses associated with stand-alone operation of EPS intake facilities to meet CDP intake needs, and
3) established a MLMP that:
    - identified required mitigation habitat needed to offset potential entrainment and impingement impacts, and
    - established site selection criteria, performance measures, and authority and coordination procedures that the Regional Board and California Coastal Commission will use in enforcing the provisions of the Minimization Plan and MLMP.

**Best Available Site.** The Minimization Plan identified the EPS as the best available site feasible for the CDP to minimize the intake and mortality of marine life under conditions of co-location operation for CDP benefit.

- Co-locating the CDP with EPS allows the CDP to use the existing EPS intake and discharge facilities. Using EPS's existing intake and discharge facilities allows the CDP to minimize the intake and mortality of marine life by reducing the amount of source water required to be withdrawn directly from AHL for desalination purposes by the amount of water discharged by EPS.
- The CDP's beneficial use of EPS's discharge water is a form of conservation of water resources through water recycling expressly encouraged by the State of California.

- The use of the existing intake and discharge facilities at the EPS site avoids construction of a major new intake system and discharge facilities.
- The Regional Board found that the proposed site for the CDP is the best site feasible available under co-location operation for the benefit of the CDP (Finding 25, Order No. R9-2009-0038).

**Best Available Design.** The Minimization Plan addresses identification of the best available design feasible to minimize the intake and mortality of marine life under co-location operation for CDP benefit. Features that will be incorporated in the desalination plant design to reduce impingement, entrainment and flow collection when the EPS is temporarily shut down include:

- EPS cooling water flows (when available) are used as a first source of CDP intake supply. In 2008, for example, EPS power plant flows would have comprised more than 88 percent of the CDP intake requirements.
- Operation of a modified EPS pump configuration to reduce both inlet and fine screen velocity. The CDP would utilize unheated seawater, which would eliminate entrainment mortality due to elevated temperatures.
- The Regional Board found that the proposed design for the CDP is the best available design feasible under co-location operation for the benefit of the CDP (Finding 30, Order No. R9-2009-0038).

**Best Available Technology.** The Minimization Plan addresses identification of the best available technology feasible to minimize the intake and mortality of marine life under co-location operation for CDP benefit. Features that will be incorporated in the desalination plant technology to reduce impingement, entrainment and flow collection when the EPS is temporarily shut down include:

- The CDP intake pump station design will incorporate variable frequency drives to reduce the total intake flow for the desalination facility to no more than that needed at any given time, thereby minimizing the entrainment of marine organisms.
- Under the conditions of co-location operations for CDP's benefit, the Regional Board found (Finding 39, Order No. R9-2009-0038):
    - Poseidon has little control over the intake structure and little flexibility in implementing different technologies;
    - Poseidon has identified the best technologies feasible to minimize the intake and mortality of marine life at this time; and
    - The proposed technology for the CDP is the best technology feasible under these circumstances.

**Best Available Mitigation.** The Minimization Plan describes mitigation measures associated with the CDP, incorporates the November 14, 2008 Marine Life Mitigation Plant (MLMP), and addresses identification of the best available mitigation feasible to minimize the intake and mortality of marine life under co-location operation for CDP benefit.

The MLMP sets forth a plan for mitigation and monitoring for impacts due to entrainment from the CDP as means of complying with Water Code section 13142.5(b):

- The MLMP was developed by Poseidon in consultation with multiple resources agencies including the Regional Board, and was approved by the California Coastal Commission (Commission) on August 6, 2008. The MLMP was subsequently approved by the Regional Board with the adoption on May 13, 2009 of Order No. R9-2009-0038. The MLMP approved under Order No. R9-2009-0038 specified the phased implementation of 55.4 acres of highly productive estuarine wetlands habitat as mitigation for any CDP-related impacts to marine life.

- The MLMP was originally written to fully compensate for entrainment impacts associated with stand-alone operation of the CDP. Poseidon is required to provide for the creation of a minimum of 37 acres Phase I and the balance of the acreage required (up to an additional 18.4 acres) in Phase II. Poseidon may propose to eliminate or reduce Phase II if it proposes alternative mitigation, such as new entrainment reduction technology or mitigation credits for dredging.

- Through the adoption of Order No. R9-2009-0038, the Regional Board augmented the MLMP to include a fish productivity requirement that must be achieved to compensate for the projected impingement based on the estimate of 4.7 kilograms per day. Using this estimate, the Regional Board added a "Biological Performance Standard" under section 5.4b. of the MLMP of 1,715.5 kilograms per year as the fish productivity requirement.

- Additionally, the Regional Board required Poseidon to sample and report on impingement during the first year of operation of the CDP according to an impingement monitoring program (IMP).

- With the incorporation of the MLMP (with the required modifications) in the Minimization Plan, the Regional Board found that the proposed mitigation is expected to fully offset projected entrainment and impingement losses for up to 304 mgd of source water drawn directly from Agua Hedionda Lagoon, and is the best available mitigation feasible for the CDP (Finding 50, Order No. R9-2009-0038).

Subsequent to the adoption of Order No. R9-2009-0038, Poseidon increased the quantity of acres to be restored under the MLMP to resolve a concern on the part of the Commission staff that the entire 55.4 acres of restoration contemplated under the MLMP was needed to fully offset projected entrainment losses for up to 304 mgd of source water drawn directly from Agua Hedionda Lagoon by the CDP. It was the Commission staff's view that this acreage was not available to offset any of the projected impingement losses. The Commission's staff determined that an additional 11 acres would be required to fully offset the projected impingement losses associated with the stand-alone operation of the CDP. In recognition of the staff opinion, Poseidon agreed to increase the number of acres to be restored under the MLMP to 66.4 acres (42.5 acres in Phase I and 23.5 acres in Phase II).

The Regional Board also expressed concerns about the adequacy of the mitigation acreage. The Biological Performance Standard was added to the MLMP to address these concerns. The stated purpose of the Biological Performance Standard was to provide a mechanism to "demonstrate that the mitigation wetlands required by the MLMP achieve the fish productivity requirement of 1,715.5 kilograms per year" ((Finding 47, Order No R9-2009-0038).

The verification of the fish biomass available to contribute toward the fish productivity requirement of 1,715.5 kilograms per year is established through an accounting method set forth in the Minimization Plan. Poseidon is required to conduct monitoring once per month for a 13 month measurement period beginning four years after completion of the construction of the wetlands. A recognized problem with this type of monitoring, however, is the high rate of mortality of fish that are captured as part of the monthly sampling. Poseidon's commitment to provide an additional 11 acres of wetlands restoration to fully offset the projected impingement losses effectively eliminates the need for the Biological Performance Standard. Consequently, Poseidon is requesting that the Regional Board consider the following permit modifications:

1. Increase the number of acres to be restored under the MLMP from 55.4 to 66.4 acres (42.5 acres in Phase I and 23.5 acres in Phase II); and
2. Delete the Biological Performance Standard from the Minimization Plan mitigation monitoring requirements established in Order No. R9-2009-0038.

**MLMP Implementation**. The MLMP establishes the California Coastal Commission and Regional Board as the agencies responsible for overseeing the implementation of the restoration plan, including:

- mitigation site selection,
- mitigation plan requirements,
- wetlands monitoring, management and remediation,
- administration,

- agency reimbursement, and
- annual review.

*Site Selection.* The MLMP identified eleven potential mitigation sites, and established criteria on which the sites are to be evaluated and final site or sites selected. The MLMP also specified that other appropriate sites may be considered.

Based on agency input, a total of 15 potential sites were evaluated for conformance with MLMP standards. Poseidon Resources identified the 90 acre Otay River Floodplain site as the best wetland mitigation site location. The Otay River Floodplain site was selected over the other alternative sites, in part, because:

- the site meets the MLMP criteria,
- the site provides a variety of habitat, including 50 percent mudflat, 30 percent low marsh, and 20 percent mid-high marsh, along with the potential for the creation of subtidal habitats,
- the site provides adequate acreage, and
- an existing conceptual restoration plan has already been developed for the site through a Programmatic Environmental Impact Statement completed by the U.S. Fish and Wildlife service in August 2006.

*Site Approval.* On February 9, 2011, the California Coastal Commission approved both the selection of the Otay River Floodplain site and Poseidon's preliminary site restoration plan. On March 9, 2011, the Regional Board adopted Order No. R9-2011-0028, which approved the selection of the Otay River site and Poseidon's wetland restoration plan for the site.

# *Section 4*
# *Compliance Issues*

***Renewal of NPDES CA0109223***
***Carlsbad Desalination Project***

# *Section 4*
# *COMPLIANCE ISSUES*

## 4.1 CEQA Compliance

Co-located and stand-alone operations of the CDP desalination facility were addressed in *Final Environmental Impact Report for the Seawater Desalination Project at Carlsbad*. The City of Carlsbad certified this Final Environmental Impact Report (EIR) as complying with provisions of the California Environmental Quality Act (CEQA) on June 13, 2006. (State Clearinghouse No. 2004041081)

Minor modifications to the CDP design were addressed in a 2009 EIR Addendum. The City of Carlsbad filed a Notice of Determination certifying the EIR addendum as complying with CEQA on September 16, 2009. This application for NPDES renewal does not involve any facilities or facility modifications outside of those evaluated in the Final EIR or the EIR Addendum.

CEQA evaluation of the Otay River Floodplain mitigation site was provided though a Programmatic EIR completed by the U.S. Fish and Wildlife service in August 2006.

## 4.2 Storm Runoff

CDP facilities will be constructed within a 6.3 acres of the existing EPS site. Prior to commencement of construction, Poseidon Resources filed a Notice of Intent with the State of California, State Water Resources Control Board (SWRCB). to obtain coverage under SWRCB *Water Quality Order No. 99-08-DWQ, NPDES General Permit for Storm Water Discharges Associated with Construction Activity*. In accordance with requirements of SWRCB Order No. 99-08-DWQ, Poseidon Resources prepared a Storm Water Pollution Prevention Plan (SWPPP) for the CDP dated October 15, 2009. The SWPPP conforms with the required elements of the General Permit No. CAS000002 issued by the SWRCB.

Additionally, Poseidon prepared a Standard Urban Stormwater Mitigation Program (SUSMP) Water Quality Technical Report dated September 11, 2009. This report describes Poseidon's commitment to installation and maintenance of structural and non-structural Best Management Practices (BMPs) to manage and control construction and post construction runoff from the project site so to minimize or eliminate the introduction of pollutants into the storm water system. Among other things, the SUSMP provides that when the CDP becomes operational, storm runoff from roof drains and other onsite CDP storm water collection facilities will be diverted to collection and storage facilities prior to discharge to the storm water system.

## 4.3 Compliance with Technology-Based Effluent Limitations

Table A of the Ocean Plan establishes technology-based effluent concentration standards for grease and oil, suspended solids, settleable solids, turbidity, and pH. The Table A standards apply to industrial discharges for which categorical standards have not been established pursuant to the Clean Water Act.

Table 4-1 compares projected effluent quality of the CDP desalination discharge with the Ocean Plan Table A standards. As shown in Table 4-1, the discharge is projected to comply with Ocean Plan Table A effluent concentration standards.

**Table 4-1**
**Projected Compliance with Ocean Plan Table A Standards**

| Constituent | Units | Projected Concentration of Desalination Plant Discharge[2] | Ocean Plan Table A Effluent Standard[1] | | |
|---|---|---|---|---|---|
| | | | 30-Day Average | 7-Day Average | Instant. Max. |
| Grease and oil | mg/l | < 5 | 25 | 40 | 75 |
| Total suspended solids (TSS) | mg/l | < 12[3] | NS | NS | 60[4] |
| Settleable solids | ml/l | < 1[5] | 1.0 | 1.5 | 3.0 |
| Turbidity | NTU | < 75[5] | 75 | 100 | 225 |
| pH | pH Units | 6 – 9[6] | NS | NS | 6< pH < 9[7] |

1 Effluent standard established in Table A of the Ocean Plan. NS indicates no standard is established.
2 Projected maximum concentration of the CDP discharge for the two pretreatment options. Average daily discharge concentrations are projected to be less than the maximum values.
3 The maximum daily CDP TSS concentration is projected at < 8 mg/l for the granular media filtration pretreatment option and < 12 mg/l for the microscreen/membrane filtration pretreatment option. (See Tables 3-12 and 3-13 on page 3-12).
4 Table A of the Ocean Plan specifies that, on a 30-day average basis, dischargers shall remove 75 percent of total suspended solids from the influent stream before discharging waters to the ocean, except that the effluent limitation shall not be lower than 60 mg/l.
5 Settleable solids and turbidity were not sampled as part of the pilot plant operations, but onsite treatment and solids handling facilities will be provided at the desalination facility site if necessary to ensure compliance with Ocean Plan Table A limits for settleable solids and turbidity.
6 The desalination facility effluent will be pH-adjusted to insure compliance with this limitation.
7 Table A of the Ocean Plan specifies that the effluent pH is to be maintained within 6.0 and 9.0 pH units at all times.

## 4.4 Compliance with Water Quality Based Effluent Limitations

Table B of the Ocean Plan establishes receiving water standards for toxic constituents for the protection of marine aquatic life and for the protection of human health. The Ocean Plan requires that the designated receiving water standards be achieved after the completion of initial dilution.

**Initial Dilution.** A minimum month initial dilution of 15.5 to 1 is currently designated within Order No. R9-2006-0065 for the CDP and EPS discharge through the EPS discharge channel. As documented by hydrodynamic modeling presented as part of Poseidon's 2005 Report of Waste Discharge, the CDP discharge into the EPS effluent channel is projected to result in initial dilution values that equal or exceed the assigned 15.5 to 1 dilution value.

**Water Quality Based Effluent Limitations (WQBELs).** On the basis of monitoring data developed through operation of the CDP pilot desalination facility, the Regional Board staff concluded within Order No. R9-2006-0065 that no reasonable potential exists for exceedance of any Ocean Plan Table B parameters for toxic inorganic constituents or toxic organic constituents. As a result, Order No. R9-2006-0065 establishes non-enforceable performance goals for all Table B parameters except chronic toxicity. To implement the Ocean Plan standard for chronic toxicity, Order No. R9-2006-0065 establishes a WQBEL chronic toxicity limit of 16.5 TUc.

**Chronic Toxicity Compliance.** As part of CDP pilot plant operations conducted during 2003, chronic toxicity tests were performed using three test species on the following two pilot plant effluent streams:

- combined EPS cooling water and CDP pilot plant RO concentrate, and
- CDP pilot plant RO concentrate, adjusted to a salinity of 36 ppt.

As part of the chronic toxicity tests, the EPS cooling water and CDP pilot plant RO concentrated seawater were blended at a 10 to 1 ratio. This test ratio is more conservative (higher salinity) than the 15.5 to 1 initial dilution allowed under Order No. R9-2006-0065.

Table 4-2 (page 4-4) presents results of chronic toxicity tests for the two sample sets. As shown in Table 4-2, all tests for the combined EPS cooling water and CDP RO concentrate recorded a chronic toxicity of 1.0 TUc.

Tests were also performed on the raw CDP pilot plant RO concentrate, with salinity adjusted to a 36 ppt level to represent typical long-term salinities beyond the edge of the Zone of Initial Dilution. As shown in Table 4-2, chronic toxicity values of 1.0 TUc occurred for giant kelp and topsmelt, while a chronic toxicity of 2.0 TUc was recorded for red abalone.

**Acute Toxicity Performance Goal.** Order No. R9-2006-0065 establishes an acute toxicity performance goal of 0.765 TUa. To ensure that no salinity-related acute toxicity effects occur, Special Provision C.2.c.1 of Order No. R9-2006-0065 required Poseidon to prepare and submit a study on salinity-related toxicity thresholds for short-term exposure.

**Table 4-2**
**CDP Pilot Plant Chronic Toxicity Monitoring Results**

| Species | Source of Sample | Test | Chronic Toxicity[1] (TUc) |
|---|---|---|---|
| Giant Kelp (*Macrocystis pyrifera*) | EPS cooling water and CDP pilot plant RO concentrate[2] | Germination | 1.0 |
| | | Growth | 1.0 |
| | CDP pilot plant concentrate[3] | Germination | 1.0 |
| | | Growth | 1.0 |
| Topsmelt (*Atherinops affinis*) | EPS cooling water and CDP pilot plant RO concentrate[2] | Survival | 1.0 |
| | | Growth | 1.0 |
| | CDP pilot plant concentrate[3] | Survival | 1.0 |
| | | Growth | 1.0 |
| Red Abalone (*Haliotis rufescens*) | EPS cooling water and CDP pilot plant RO concentrate[2] | Development | 1.0 |
| | CDP pilot plant concentrate[3] | Development | 2.0 |

1 Chronic toxicity tests for giant kelp and topsmelt performed by MEC Analytical on samples collected July 21, 23, and 25, 2003. Chronic toxicity tests for red abalone were performed by MEC Analytical on samples collected on August 6, 2003.
2 Sample comprised of 10 parts EPS cooling water effluent and 1 part concentrate from the CDP pilot plant. This 10:1 blend is more conservative than the 15.5 to 1 initial dilution assigned within Order No. R9-2006-0065.
3 Samples comprised of RO concentrate from the CDP pilot plant, blended with deionized water to adjust the salinity of the blend to 36 ppt. A salinity concentration of 36 ppt is representative of the EPS/CDP effluent salinity (prior to initial dilution) under typical CDP seawater desalination operations when EPS power generation is occurring.

Poseidon completed the required salinity toxicity threshold study in October 2007 in accordance with the provisions of Order No. R9-2006-0065. Results of the study, entitled "Salinity Related Threshold for Short-Term Exposure", are summarized in Table 4-3 (page 4-5). On the basis of the salinity threshold monitoring, the salinity threshold study concluded that:

- The daily average and maximum hourly salinity limitations of 40 ppt and 44 ppt that are established within Order No. R9-2006-0065 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.

- The average hourly salinity limitation of 44 ppt established within order No. R9-2006-0065 is very conservative. The test data indicates that no mortality effect is observed for a period of two hours at a salinity of 60 ppt.

**Table 4-3**
**CDP Pilot Plant Salinity-Acute Toxicity Threshold Monitoring[1]**

| Salinity (ppt) | Acute Toxicity (TUa) |
|---|---|
| Performance Goal[2] | 0.765[2] |
| 33.5[3] | 0 |
| 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 Performance Goal of Order No. R9-2006-0065.

1 From "Salinity Related Toxicity Threshold for Short-Term Exposure" (October 2, 2007), a report submitted by Poseidon Resources to the Regional Board in compliance of Special Provision C.2.c.1 of Order No. R9-2006-0065.
2 Acute toxicity performance goal established in Effluent Limitation and Performance Goal B.3 (Table 10) of Order No. R9-2006-0065.
3 Control sample, based on the mean seawater salinity of 35.5 ppt, as reported in the 2005 CDP NPDES application for the period 1980-2000.

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**Performance Goals for Toxic Constituents.** Order No. R9-2006-0065 establishes performance goals for all Ocean Plan Table B receiving water standards except chronic toxicity. As documented within Order No. R9-2006-0065, the Regional Board determined that no reasonable potential exists for the Poseidon discharge to exceed Ocean Plan Table B receiving water limits for these constituents. The reasonable potential analysis (RPA) findings of Order No. R9-2006-0065 remain valid.

**Bacteriological Standards.** Table 4-4 summarizes Ocean Plan bacteriological water quality standards applicable to waters in the vicinity of the CDP/EPS discharge. The desalination facility is projected to comply with the Ocean Plan bacteriological standards. While it is possible that natural storm-related noncompliance with Ocean Plan receiving water coliform standards may occur in waters offshore from the CDP, the power plant or desalination facility discharges will not contribute to receiving water coliform concentrations. Due to chlorination/dechlorination processes, the total number of coliform organisms (mass emissions) in the desalination plant effluent discharged back into the EPS discharge channel will likely be less than the total number of coliform organisms in the seawater intake.

**Table 4-4**
**Ocean Plan Bacteriological Standards**

| Parameter | Concentration Organisms (Most Probable Number) per 100 ml | |
|---|---|---|
| | Single Sample Maximum[1] | 30-Day Geometric Mean[1] |
| Total coliform | 10,000[2] | 1000 |
| Fecal coliform | 400 | 200 |
| Enterococcus | 104 | 35 |

1 Ocean Plan body-contact bacteriological limits apply to State-regulated receiving waters that are within 1000 feet of the shore, within the 30-foot depth contour, in designated kelp beds, or in other state-regulated ocean waters designated by Regional Boards as being subject to REC-1 (body contact recreation) use. The above receiving water standards do not apply within designated zones of initial dilution.

2 Single sample maximum for total coliform is 1000 organisms per 100 milliliters when the fecal coliform to total coliform ratio exceeds 0.1.

**Narrative Objectives for Physical/Chemical Characteristics.** Table 4-5 (page 4-7) summarizes Ocean Plan narrative objectives for physical and chemical characteristics. Table 4-5 also identifies the means by which the CDP discharge is projected to comply with the Ocean Plan narrative objectives.

**Habitat Protection.** The Ocean Plan does not establish any water quality objectives for salinity, but the Ocean Plan establishes a narrative prohibition against degrading marine communities, including vertebrate, invertebrate, and plant species. The Ocean Plan, in part, defines degradation as a significant difference in species diversity, population, or growth anomalies in demersal fish, benthic invertebrates, or attached algae.

**Table 4-5**
**Compliance with Ocean Plan Narrative Objectives for Physical and Chemical Characteristics**

| Category | Objective | Means of Compliance |
|---|---|---|
| Physical Characteristics: | Floating particulates shall not be visible | The effluent will not have visible floating particulates. |
| | Natural light shall not be significantly reduced outside the zone of initial dilution | The effluent will have a low turbidity. |
| Chemical Characteristics: | Dissolved oxygen shall not be depressed more than 10 percent from naturally occurring values | The combined CDP/EPS discharge will be high in dissolved oxygen, and will contain low concentrations of oxygen-demanding contaminants. |
| | The pH shall not be changed more than 0.2 units | The pH of desalination facility discharge will be approximately the same as the ambient waters. After initial dilution, no discernible change in receiving water pH is projected. |
| | Dissolved sulfide concentrations shall not be significantly increased. | The desalination facility effluent will contain low concentrations of suspended solids, settleable solids, and biodegradable material. As a result, the discharge is not projected to produce significant deposits of degradable biological material on the ocean floor. |

As documented herein, the CDP discharge complies with applicable water quality standards (including Ocean Plan Table B receiving water standards) designed to protect habitat and marine life. Salinity limits established within Order No. R9-2006-0065 also ensure (with a significant factor of safety) that the discharge does not result in acute or chronic toxicity effects.

Potential impacts of the CDP discharge on marine organisms and habitat were comprehensively addressed as part of the project EIR. Table 4-6 (page 4-8) summarizes these studies. As documented within the project EIR, these studies concluded that the CDP discharge was not projected to have a significant effect on marine life or marine habitat.

**Table 4-6**
**Summary of CDP Studies Assessing Marine Biology Impacts[1]**

| Category | Study | Preparer | Date |
|---|---|---|---|
| Marine Biology | *Marine Biological Considerations Related to the Reverse Osmosis Desalination Project at the Encina Power Plant, Carlsbad, CA.* | Jeffrey B. Graham, Ph.D. | 2004 |
| Hydrodynamic ```"Water Quality | *Hydrodynamic Modeling of Dispersion and Dilution of Concentrated Seawater Produced by the Ocean Desalination Project at the Encina Power Plant, Carlsbad, CA.* | Scott A. Jenkins, Ph.D. and Joseph Wasyl | 2001 |
| | *Hydrodynamic Modeling of Dispersion and Dilution of Concentrated Seawater Produced by the Ocean Desalination Project at the Encina Power Plant, Carlsbad, CA, Part II: Saline Anomalies Due to Theoretical Extreme Case Hydraulic Scenarios.* | Scott A. Jenkins, Ph.D. and Joseph Wasyl | 2005 |
| | *Note on Dilution of Ocean Outfall Discharges in the Source Water of the Poseidon Desalination Project at Encina Generating Station, Carlsbad, CA.* | Scott A. Jenkins, Ph.D. and Joseph Wasyl | 2005 |
| Toxicity and Salinity Tolerance | *Salinity Tolerance Investigations: A Supplemental Report for the Carlsbad CA Desalination Project.* | Steven D. Le Page | 2005 |
| | Toxicity testing of the concentrate discharge of the Carlsbad seawater desalination plant, Carlsbad, CA. | MEC Analytical, Inc. | 2003 |

1 Studies performed as part of assessments presented in the *Final Environmental Impact Report for Precise Development Plan and Desalination Plant (EIR 03-05-SCH#2004041081).* The City of Carlsbad certified the Final EIR as complying with the requirements of CEQA on June 13, 2006.

## 4.5 Antidegradation Compliance

Federal antidegradation regulations are established in Title 40, Section 131.12 of the *Code of Federal Regulations*. Tier I antidegradation regulations require that (1) existing beneficial uses be maintained and protected and (2) the level of water quality necessary to protect the beneficial uses be maintained and protected.

This application for renewal of NPDES requirements does not involve any increase in flow or mass emissions, and is consistent with implementing existing state and federal water quality standards. Further, the NPDES renewal would not result in the degradation of water quality necessary to protect beneficial uses. As a result, the proposed renewal of NPDES CA0109223 complies with Tier I antidegradation regulations.