

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN FRANCISCO BAY REGION

R2-2005-0XXX

NPDES PERMIT NO. CA0038814

WASTE DISCHARGE REQUIREMENTS FOR:

MARIN MUNICIPAL WATER DISTRICT

DESALINATION PILOT PLANT

SAN RAFAEL

MARIN COUNTY

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**TENTATIVE ORDER
NPDES PERMIT NO. CA0038814**

WASTE DISCHARGE REQUIREMENTS FOR:

**MARIN MUNICIPAL WATER DISTRICT
DESALINATION PILOT PLANT
SAN RAFAEL, MARIN COUNTY**

FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (the Board) finds that:

1. *Discharger and Permit Application.* The Marin Municipal Water District (the Discharger) has applied to the Board for issuance of waste discharge requirements and a permit to discharge recombined reverse osmosis (R.O.) concentrate and permeate, and overflows¹ (consisting of bay water and pretreated bay water) from a temporary desalination plant (the Pilot Plant) to waters of the State and the United States under the National Pollutant Discharge Elimination System (NPDES).

Purpose

2. The Discharger will continuously operate the Pilot Plant for at least nine months but no longer than twelve months. This Pilot Plant will be used to evaluate the feasibility of producing drinking water from bay water using the reverse osmosis desalination process. The Pilot Plant will withdraw water from the bay, filter the bay water in one of three pretreatment systems, and then desalt the bay water using reverse osmosis. These processes produce three waste streams: reverse osmosis permeate (drinking water), reverse osmosis concentrate (brine), and overflows (consisting of bay water and pretreated bay water). After the Discharger evaluates the efficacy of the treatment processes to produce drinking water that meets both the Discharger's and regulatory standards, the reverse osmosis permeate and concentrate are recombined with minimal overflows from the pretreatment processes, and discharged (returned) to the bay. The sludge produced from the pretreatment processes is discharged to the local sanitary sewer. This Order regulates the discharge of bay water from the Pilot Plant.

Facility Description

3. *Service Area, Population, and Facility Location.* The Discharger is a public water supply and management agency that is responsible for providing drinking water to over 170,000 consumers in the eastern corridor of southern Marin County, and manages over 38,000 acres

¹ These flows include bay water removed but not used in the pretreatment and desalination process, and pretreated bay water not needed for the desalination process.

of watershed, which includes seven reservoirs. The Discharger, through the Pilot Plant, is studying the feasibility of operating a 15-MGD seawater R.O. desalination plant. The Pilot Plant is located at 2675 Francisco Boulevard East, San Rafael. The Pilot Plant will withdraw (intake), process, and discharge an average of 180,000 gallons per day of bay water.

Treatment Process Description

4. *Treatment Process.* The Discharger's treatment process consists of periodic chlorination, pretreatment, conventional filtration or submerged-membrane filtration, R.O.-membrane desalination, possible addition of sulfuric acid to maintain pH, and dechlorination. In addition, chemicals that do not include priority pollutants in its formulation may be added to prevent scaling and fouling of the R.O.-membrane. A process diagram for the Pilot Plant is included as Attachment A to this Order.

Intake and Discharge Description

5. *Intake Location.* Bay water (raw saltwater) will be obtained through a pipeline installed on the deck of the Marin Rod & Gun Club pier, which runs parallel to the effluent discharge pipeline, at latitude 37 degrees 56 minutes 46.11 seconds North and longitude 122 degrees 28 minutes 25.33 seconds West. A screened intake will be suspended from the end of the Marin Rod & Gun Club pier, and is designed to comply with California Fish & Game requirements.
6. *Effluent Discharge Location.* Sludge and filter backwash are discharged to the local sanitary sewer. The overflows from the pretreatment processes, and the R.O. concentrate and permeate are recombined (the effluent) and discharged back into San Pablo Bay. The effluent is discharged through a pipeline also installed on Marin Rod & Gun Club pier. The effluent discharges approximately 500 feet from shore and approximately one-foot below mean low level through a T-pipe attached to the end of the pipeline. A map showing the location of the Pilot Plant and the effluent discharge location is included as Attachment B to this Order. Because this is a new discharge, data are not available to characterize the effluent discharge.
7. The United States Environmental Protection Agency (the U.S. EPA) and the Board have classified this discharge as a minor discharge.

Storm Water Discharge

8. *Regulations.* Federal Regulations for storm water discharges were promulgated by the U.S. EPA on November 19, 1990. The regulations [40 CFR Parts 122, 123, and 124] require specific categories of industrial activity (industrial storm water) to obtain an NPDES permit and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to control pollutants in industrial storm water discharges.
9. *Exemption from Coverage under Statewide Storm Water General Permit.* The State Water Resources Control Board's (the State Board's) statewide NPDES permit for storm water discharges associated with industrial activities (NPDES General Permit CAS000001- the General Permit) was adopted on November 19, 1991, amended on September 17, 1992, and reissued on April 17, 1997. The Pilot Plant is not required to be covered under the General Permit, because desalination plants are not categorically required to obtain coverage.

10. *Site-Specific Storm Water Pollution Prevention Plan (SWPPP)*. This Order requires the Discharger to develop and implement a site-specific SWPPP for preventing, controlling, and reducing pollutant discharges in storm water to the maximum extent practicable as specified in Provision 4 of this Order.

Beneficial Uses

11. The Basin Plan identifies the following beneficial uses for San Pablo Bay:

- Commercial and Sport Fishing
- Estuarine Habitat
- Industrial Service Supply
- Fish Migration
- Navigation
- Preservation of Rare and Endangered Species
- Water Contact Recreation
- Non-contact Recreation
- Shell Fish Harvesting
- Fish Spawning
- Wildlife Habitat

Shallow Water Discharge Prohibition

12. Basin Plan Section 4, Table 4-1 prohibits the discharge of wastewater that contains pollutants of concern and that does not receive a minimum initial dilution of at least 10:1, or into any nontidal water, dead-end slough, similar confined waters, areas or any immediate tributaries thereof (the 10:1 discharge prohibition).
13. The 10:1 discharge prohibition provides an added degree of protection from the continuous effects of wastewater discharges that contain pollutants of concern (i.e., oxygen depleting pollutants, acutely toxic pollutants, etc.). However, the Board finds that the discharge regulated by this Order is not subject to the 10:1 prohibition because it is essentially recombined bay water that is not expected to contain pollutants of concern.

Reasonable Potential Analysis

14. NPDES permits include effluent limits for all pollutants, which have the reasonable potential to cause or contribute to an exceedence of an applicable water quality standard (that have reasonable potential). Because this is a new discharge, data are not available at this time for a Reasonable Potential Analysis (RPA) using procedures in Section 1.3 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (the State Implementation Policy, or SIP).
15. This Order contains monitoring requirements, and if concentrations of any of these constituents increase to the extent that they have reasonable potential or otherwise impact or threaten to impact water quality, the Discharger will be required to investigate the source of the increases and establish remedial measures.

Whole Effluent Acute Toxicity

16. To ensure the manipulation of bay water by the Discharger does not introduce toxicity, this Order includes effluent limitations for whole effluent acute toxicity. Compliance evaluation is based on static renewal bioassay techniques using the most sensitive marine test species, and performed according to the most current U.S. EPA approved method in 40 CFR 136, currently “Methods for Measuring the Acute Toxicity of Effluents and Receiving Water, 5th Edition.”

Optional Studies

17. To assess the permitability of a permanent desalination plant, the Provisions of this Order specify the following optional studies: Whole Effluent Toxicity Screening, Biological Resources Survey, Intake Water Credit Study, and Salinity Study. These studies are optional during this pilot study, however will be required as part of the NPDES permit application for a permanent desalination plant.

Requirements for Monitoring of Pollutants in Effluent and Receiving Water to Implement new Statewide Regulations and Policy

18. Board finds that the effluent and ambient background monitoring data are insufficient to determine reasonable potential and calculate numeric water quality-based effluent limitations (WQBELs) for the pollutants listed in the SIP.
19. On August 6, 2001, the Board sent a letter (hereinafter referred to as the Board’s August 6, 2001 Letter) to all permitted dischargers pursuant to Section 13267 of the California Water Code requiring submittal of effluent data on priority pollutants and other toxic pollutants.
20. Pursuant to the Board’s August 6, 2001 Letter attached to this Order (incorporated here by reference), the Discharger shall submit workplans and sampling results for characterizing the levels of selected pollutants in the brine as specified in Provision 2 of this Order.
21. The Self-Monitoring Program (SMP) attached to this Order (incorporated here by reference) requires effluent monitoring after the Pilot Plant’s return pump at any point along the discharge pipe (E-001-D) for conventional, non-conventional, toxic pollutants, and acute toxicity. The SMP requires monitoring twice monthly of Total Suspended Solids and Total Dissolved Solids in the brine as an effective and relatively inexpensive method to evaluate the filtration processes performance. The SMP also requires the Discharger to conduct sampling twice annually of the brine pursuant to the requirements of the Board’s August 6, 2001 Letter.

NPDES Permit, Notification and Public Hearing

22. *NPDES Permit.* This Order serves as an NPDES Permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code.
23. *CEQA.* On October 7, 2004, the Discharger filed a Notice of Exemption from the requirements of CEQA as this Pilot Plant project is an experimental testing activity that does

not result in a serious or major disturbance to an environmental resource. The CEQA Notice of Exemption is included as Attachment E to this Order.

24. *Notification.* The Discharger and interested agencies and persons have been notified of the Board's intent to issue requirements for the Pilot Plant's discharge and have been provided an opportunity to submit their written views and recommendations. Board staff prepared a Fact Sheet and Response to Comments, which are hereby incorporated by reference as part of this Order.
25. *Public Hearing.* The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code, regulations, and plans and policies adopted there under, and to the provisions of the Clean Water Act and regulations and guidelines adopted there under, that the Discharger shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The withdrawal of water from San Pablo Bay greater than 220,000 gallons per day or 150 gallons per minute, and greater than a velocity of 0.33 feet per second is prohibited unless it is pursuant to a specific request made by the Discharger and approved by the Executive Officer.
2. Discharge of sludge or filter backwash-water is prohibited.
3. Discharge at a location or in a manner different from that described in this Order is prohibited.

B. EFFLUENT LIMITS

The term "effluent" in the following limits means the recombined R.O. concentrate and permeate (drinking water) combined with the pretreatment-processes overflows.

Conventional Pollutants

1. The pH of the effluent discharge shall not exceed 8.5 nor be less than 6.0.
2. The effluent discharge shall not contain a chlorine residual concentration greater than 0.0 mg/L at any time.

Whole Effluent Acute Toxicity

3. Representative samples of the effluent shall meet the following limits for acute toxicity. Compliance with these limits shall be achieved in accordance with Provision 3 of this Order.
 - a. The survival of bioassay test organisms in 96-hour static renewal bioassays of undiluted effluent shall be:

- i. a 3-sample median value of not less than 90 percent survival, as defined in subsection b.i., below, and
 - ii. a single-sample maximum of not less than 70 percent survival, as defined in subsection b.ii., below. In the event that a bioassay test shows survival of less than 70 percent, the Discharger will be required to immediately cease discharge until the toxicity is eliminated.
- b. These acute toxicity limits are further defined as follows:
- i. If one of the past two or fewer samples shows less than 90 percent survival, then survival of less than 90 percent on the next sample represents a violation of the effluent limitation.
 - ii. Single-sample maximum: Any bioassay test showing survival of 70 percent or greater is not a violation of this limit. A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit.

C. RECEIVING WATER LIMITS

1. The discharge of the effluent shall not cause the following conditions to exist in waters of the State at any place:
 - a. Floating, suspended, or deposited macroscopic particulate matter or foam;
 - b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;
 - c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
 - d. Visible, floating, suspended, or deposited oil or other products of petroleum origin; or
 - e. Toxic or other deleterious substances to be present in concentrations or quantities that cause exceedence of the narrative toxicity objective contained in the Basin Plan.
2. The discharge shall not cause pH variation from normal ambient pH by more than 0.5 pH units.

D. PROVISIONS

1. Permit Compliance

The Discharger shall comply with all sections of this Order beginning on the effective date of this Order.

2. Effluent Characterization for Selected Constituents

The Discharger shall monitor and evaluate the discharge from Outfall E-001 for the constituents listed in Enclosure A of the Board's August 6, 2001 Letter (Attachment F).

Compliance with this requirement shall be achieved in accordance with the specifications stated in the Board's August 6, 2001 Letter under Effluent Monitoring for minor dischargers. A final report that presents all the data shall be submitted as part of the NPDES permit application for the permanent desalination plant.

3. Acute Toxicity Testing

The Discharger shall maintain compliance with acute toxicity requirements contained in this Order in accordance with the following:

- a. Compliance shall be based on 96-hour static renewal bioassays.
- b. The most sensitive species shall be determined from concurrent screenings, for at least three months, of two marine-species.
- c. Continuous testing
 - i. Continuous testing of both marine-species if toxicity is detected (<90% survival) in both species during the three month screening, or
 - ii. Continuous testing of the more sensitive of the two marine-species if no toxicity is detected.
- d. Bioassays shall be conducted in compliance with 40 CFR 136 methods, currently "Methods for Measuring The Acute Toxicity of Effluents and Receiving Water To Freshwater and Marine Organisms", 5th Edition (EPA-821-R-02-012), with exceptions that may be granted to the Discharger by the Executive Officer and the Environmental Laboratory Accreditation Program (ELAP).
- e. Representative samples of the effluent shall be obtained according to the frequency specified in the attached SMP and on days coincident with process of applications of the antiscalant, if applicable.

4. Storm Water Pollution Prevention Plan (SWPPP)

The Discharger shall submit and implement a SWPPP acceptable to the Executive Officer no later than 30 days after the effective date of this Order.

5. Self-Monitoring Program

The Discharger shall comply with the Self-Monitoring Program (Attachment C). The Self-Monitoring Program may be amended by the Executive Officer pursuant to U.S. EPA regulations 40 CFR 122.63.

6. Standard Provisions and Reporting Requirements

The Discharger shall comply with all applicable items (Items B.2, C, and D are not applicable) of the Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August 1993 (Attachment F), including any amendments thereto. Where provisions or reporting requirements specified in this Order are different from

equivalent or related provisions or reporting requirements given in the Standard Provisions, the specifications of this Order shall apply.

7. Optional Whole Effluent Toxicity Screening

If the Discharger intends to apply for a permit for a permanent desalination facility, the Discharger should perform Whole Effluent screening phase monitoring for acute and chronic toxicity during this pilot study. Screening phase monitoring data must be included in the NPDES Permit application for the discharges that are likely to occur from the permanent desalination plant. The monitoring must be performed as required in the Chronic Toxicity Screening Phase Requirement (incorporated here by reference). The Chronic Toxicity Monitoring Screening Phase Requirements, Critical Life Stage Toxicity Tests and definitions of terms used in the chronic toxicity monitoring are identified in the Enclosure of the SMP. For acute toxicity, the two most sensitive species shall be determined from concurrent screenings, for at least three months, of three marine-species: a fish, an invertebrate, and an aquatic plant.

8. Optional Biological Resources Survey

If the Discharger intends to apply for a permit for a permanent desalination facility, the Discharger should conduct biological surveys during this pilot study. The purpose of this survey is to determine the abundance and composition of the aquatic species (plants, invertebrates, and fishes) located within or migrating through the zone of the intake. This information can be used to evaluate how the intake design of the permanent desalination plant will impact biological resources (entrainment and impingement); and to evaluate technologies to minimize these impacts. The Discharger may develop a study work plan and time schedule to investigate and analyze the aquatic species in the receiving water (the Biological Resources Survey), acceptable to the Executive Officer. A final report documenting the findings from the Biological Resources Survey must be included in the NPDES Permit application for the permanent desalination plant. If the Discharger conducts the Biological Resources Survey during this pilot study, then the study work plan and time schedule must be submitted for approval by the Executive Officer within 90 days of startup of the Pilot Plant's operations.

9. Optional Intake Water Credit Study

If the Discharger intends to apply for a permit for a permanent desalination facility, the Discharger may conduct an intake water credit study during this pilot study. The results of the study may form the basis for intake credits in the NPDES permit issuance for the permanent desalination plant. The study must be sufficient to characterize the quality of the intake water, and must comprise of all priority pollutants for which intake credits will be sought. The study must be conducted for a duration of not less than six months, must address possible temporal fluctuations, and must be in accordance with appropriate methods such as those described in the Board's August 6, 2001 Letter.

10. Optional Salinity Study

If the Discharger intends to apply for a permit for a permanent desalination facility, the Discharger may conduct a salinity study during this pilot study. Salinity may be indirectly measured by conductivity. The purpose of this study is to predict the salinity range of the discharge (including the R.O. concentrate) from the permanent desalination plant, and to

evaluate if the salinity will impact biological resources, and evaluate mitigation of these impacts (e.g., discharge in combination with freshwater, such as wastewater treatment plant effluent).

11. NPDES Permit Effective Date

This Order shall serve as a National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the Clean Water Act or amendments thereto, and shall become effective on March 17, 2005, provided the U.S. EPA Regional Administrator has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

12. Order Expiration

This Order expires on March 31, 2006. The Executive Officer may extend this expiration date only if the Discharger makes a request justified on the need to collect additional data to resolve design or permitting issues for the permanent desalination plant.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 16, 2005.

BRUCE H. WOLFE
EXECUTIVE OFFICER

Attachments:

- A. Discharge Facility Treatment Process Diagram
- B. Discharge Facility Location Map
- C. Self-Monitoring Program, Part B
- D. Fact Sheet
- E. CEQA Notice of Exemption
- H. F. The following documents are part of this Permit, but are not physically attached due to volume. They are available on the internet at www.waterboards.ca.gov/sanfranciscobay/Download.htm
 - Self-Monitoring Program, Part A, adopted August 1993
 - Standard Provisions and Reporting Requirements, August 1993
 - August 6, 2001 Board Staff Letter: *Requirement for Priority Pollutant Monitoring in Receiving Water and Wastewater Discharges*

Attachment A.
Discharge Facility Treatment Process Diagram

Attachment B.
Discharge Facility Location Map

Attachment C.
Self-Monitoring Program, Part B

Attachment D.
Fact Sheet

Attachment E.
CEQA Notice of Exemption