

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD**

**SAN DIEGO REGION**

9174 Sky Park Court, Suite 100  
(858) 467-2952 • Fax (858) 571-6972  
<http://www.waterboards.ca.gov/sandiego>

**RESOLUTION NO. R9-2008-0139  
AMENDING ORDER NO. R9-2005-0008  
NPDES NO. CA0107239  
WASTE DISCHARGE REQUIREMENTS  
UNIVERSITY OF CALIFORNIA SCRIPPS INSTITUTION OF OCEANOGRAPHY  
SAN DIEGO COUNTY**

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On February 9, 2005, this Regional Board adopted Order No. R9-2005-0008, Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for the University of California Scripps Institution of Oceanography (SIO), NPDES Permit No. CA0107239. Order No. R9-2005-0008 establishes waste discharge requirements for the discharge of up to 1.25 million gallons per day (MGD) of waste seawater to the Pacific Ocean. The wastewater from all outfalls discharges into the San Diego Marine Life Refuge Area of Special Biological Significance (ASBS), a portion of the Pacific Ocean located off the coast of La Jolla, CA.
2. On July 22, 2004, the State Water Resource Control Board (State Board) adopted Resolution No. 2004-0052, which adopted a Mitigated Negative Declaration for the conditional exception to the Californian Ocean Plan (Ocean Plan) prohibition against waste discharges to the San Diego Marine Life ASBS. The exception established requirements and conditions applicable to the discharges into the ASBS from the seawater system at SIO and from the municipal storm water collection system. The conditions in Resolution No. 2004-0052 are incorporated into Order No. R9-2005-0008.
3. Section 3.a of Resolution No. 2004-0052 establishes an advisory committee to define natural water quality based on the review of monitoring data. The advisory committee (ASBS Natural Water Quality Committee, NWQC), created by the Chief of the Division of Water Quality at the State Board, is composed of State and Regional Board staff, a representative from UCSD/SIO, and two scientist selected by the Regional Board staff from other academic organizations other than UCSD/SIO. The advisory committee advises the Regional Board on whether or not the natural water quality is being altered in the ASBS as a result of the UCSD/SIO discharges.
4. On February 1, 2008, SIO submitted a request for modification of Order No. R9-2005-0008, NPDES No. CA0107239. The modification request included a request to discontinue monitoring for certain constituents, increase the dilution factor, eliminate wet weather

bacteria, and exchange the benthic marine life survey for Bight '08 participation.

5. SIO conducted a reasonable potential analysis (RPA) using the Reasonable Potential Calculator Software (RPCalc, Version 2.0) and effluent monitoring data obtained between December 2004 and August 2006. The RPA calculations were based on the results from 39 discharge samples collected during wet and dry weather in 2004, 2005, and 2006. The RPA concluded that 65 constituents in the monitoring and reporting program do not have the potential to cause, or contribute to, an excursion above the Ocean Plan Table B water quality objectives.

The purpose of an RPA is to provide direction to the Regional Water Board in determining if a pollutant discharge causes, has the reasonable potential to cause, or contribute to an excursion above Table B water quality objectives in accordance with 40 CFR 122.44 (d)(1)(iii). Data obtained by SIO for the RPA was representative of various discharge conditions and effectively characterized the pollutant discharge from the facility. ~~Although the RPA concluded there is no effluent limits required for 65 constituents, the Ocean Plan requires periodic monitoring of Table B constituents. Monitoring of all constituents will continue to be required to ensure that the beneficial uses of the San Diego Marine Life Refuge ASBS are maintained.~~ **Under the Ocean Plan, an RPA analysis result of Endpoint 2 does not require effluent monitoring; however, the Regional Water Board may require occasional monitoring for the pollutant. As SIO's NPDES permit expires within 14 months, in February 2010, and the Endpoint 2 results of the RPA analysis suggest effluent limitations are not required for certain pollutants, the monitoring conducted by SIO over the last three years meets the requirements of the Ocean Plan. No further monitoring is contemplated in this permit cycle for constituents with a calculated RPA endpoint of 2.**

6. In accordance with Special Conditions C.4.h of Order No. R9-2005-0008, SIO conducted a dilution and dispersion study of effluent from the five permitted outfalls. The SEDXPORT hydrodynamic modeling system was used to numerically simulate dry weather and wet weather case scenarios. Modeling results indicate the minimum dilution factor inside the surf zone exceeds 15:1 more than 96 % of the time.

Based on the review of the dilution model and NWQC responses, the dilution factor will be increased from 2:1 to 7:1. The Regional Board finds that the minimum dilution factor, of 7:1, observed during the study, would be the most protective of the San Diego Marine Life Refuge ASBS. Effluent limits have been recalculated to reflect the change in dilution factor. The residual chlorine limitation has been revised to be consistent with Resolution 2004-0052.

7. Section C.4.j of Order No. R9-2005-0008 requires SIO to conduct three bacterial studies, within four-years of the adoption of the Order, to assess the impact, sources, and transport of bacteria during different conditions: once during dry weather, once during wet weather, and once when mammals are present in the Ring Tank. To date, SIO has completed the dry weather bacterial monitoring study. In general, bacteria levels were low.

Evaluation of the dry weather bacterial monitoring indicates that resources which were to be used for the additional bacterial monitoring studies would be better allocated towards other monitoring efforts that would further assess impacts to the ASBS as a result of the discharge. The NWQC has also reviewed the bacterial monitoring results and concluded the bacterial monitoring was not strongly correlated with the ASBS marine life beneficial use for the La Jolla area.

In addition, SIO conducts weekly bacterial monitoring within the surf-zone stations. Discharge monitoring found low values of enterococcus and fecal coliforms, with moderately low values of total coliform. Requirements for surf-zone monitoring will remain unchanged.

8. Section C.4.e of Order No. R9-2005-0008 requires SIO to submit a quantitative survey of benthic marine life within four and a half-years after adoption of the Order. SIO will be participating in the Southern California Bight 2008 Regional Monitoring Program for Areas of Special Biological Significance, which includes a benthic marine survey, and this participation shall satisfy the Requirement of Section C.4.e. The intent of regional monitoring activities is to maximize the efforts of all monitoring partners using a more cost-effective monitoring design and to best utilize the pooled scientific resources of the region. The deadline for submitting the results of the benthic marine life survey will be adjusted to correspond with the Southern California Bight 2008 Regional Monitoring Program Schedule.
9. According to Section 13263(e) of the California Water Code, the Regional Board may, upon application by any affected person, or on its own motion, review and revise waste discharge requirements.
10. The issuance of waste discharge requirements for this discharge is exempt from the requirement of preparation of environmental documents under the California Environmental Quality Act [Public Resources Code, Division 13, Chapter 3, Section 21000 et seq.] in accordance with Section 13389 of the California Water Code.
11. The Regional Board has notified all interested parties of its intent to modify Order No. R9-2005-0008.

12. The Regional Board in a public hearing on November 12, 2008 heard and considered all comments pertaining to the modification of Order No. R9-2005-0008.

~~13. Except as contradicted or superseded by the findings and directives set forth in this addendum (Addendum No. 1), all of the previous findings and directives of Order No. R9-2005-0008 remain in full force and effect.~~

**IT IS HEREBY ORDERED THAT:**

Waste Discharge Requirements Order No. R9-2005-0008 (NPDES No. CA0107239) is amended solely to modify the **findings, incorporate a new** initial dilution ratio, revise effluent limitations, revise benthic marine life survey requirements, remove intensive bacterial monitoring requirements, and revise monitoring requirements. Order No. R9-2005-0008 shall be amended as follows:

**Section C.1.a and C.1.b will be amended as follows:**

1. Numeric Effluent Limitations for Outfalls 001, 003, 004a and 004b

Effective upon adoption of this Addendum **Resolution No. R9-2008-0139**, the discharges of (1) waste seawater, and/or (2) storm water that co-mingles or mixes with the waste seawater discharges in outfall 001, and 003, and (3) the seawater system discharges from 004a or 004b in excess of the limitations listed in *Table 1. Table A Effluent Limitations*, *Table 2. Protection of Marine Aquatic Life Effluent Limitations for the Seawater System Discharges*, and *Table 3. Protection of Human Health-NonCarcinogens Effluent Limitations for Seawater System Discharges*, **and Table 4. Protection of Human Health-Carcinogens Effluent Limitations for Seawater System Discharges** are prohibited.

**Table 1.** Table A Effluent Limitations.

Constituent	Units	Monthly Average (30 day)	Weekly Average (7 day)	Maximum at any time
Oil & grease	mg/L	25	40	75
Suspended solids	mg/L	60	NA	120
Settleable solids	mL/L	1.0	1.5	3.0
Turbidity	NTU	75	100	225

Constituent	Units	Monthly Average (30 day)	Weekly Average (7 day)	Maximum at any time
pH	pH units	Within limits of 6.0 - 9.0 at all times.		

Note: mL/L = milliliters per liter      mg/L = milligrams per liter

**Table 2.** Protection of Marine Aquatic Life Effluent Limitations for Seawater System Discharges.

Constituent	Units	6-Month Median	Daily Maximum (Endnote 1)	Instantaneous Maximum (Endnote 3)
Arsenic	µg/L	18	90	234
Cadmium	µg/L	3	12	30
Chromium (hexavalent) <sup>1</sup>	µg/L	6	24	60
Copper	µg/L	<del>5</del> <b>10</b>	<del>32</del> <b>82</b>	<del>86</del> <b>226</b>
Lead	µg/L	6	24	60
Mercury	µg/L	0.239	0.959	2.399
Nickel	µg/L	15	60	150
Selenium	µg/L	45	180	450
Silver	µg/L	1.78	8.08	20.68
Zinc	µg/L	<del>44</del> <b>104</b>	<del>224</del> <b>584</b>	<del>584</del> <b>1544</b>
Cyanide <sup>2</sup>	µg/L	3	12	30

1- \_\_\_\_\_ The discharger may, at its option, meet this limitation as a total chromium limitation.

2- \_\_\_\_\_ If the discharger can demonstrate to the satisfaction of the Regional Board (subject to EPA approval) that an analytical method is available to reliably distinguish between strongly and weakly complexed cyanide, effluent limitations for cyanide may be met by the combined measurement of free cyanide, simple alkali metal cyanides, and weakly complexed organometallic cyanide complexes. In order for the analytical method to be acceptable, the recovery of free cyanide from metal complexes must be comparable to that achieved by Standard Methods 412 F, G, and H (Standard Methods for the Examination of Water and Wastewater, Joint Editorial Board, American Public Health Association, American Water Works Association, and Water Pollution Control Federation, most recent edition).

Constituent	Units	6-Month Median	Daily Maximum (Endnote 1)	Instantaneous Maximum (Endnote 3)
Total chlorine residual <sup>3</sup>	µg/L	<del>6</del> <b>16</b>	24 <b>64</b>	180 <b>480</b>
Ammonia (as N)	µg/L	1800	7200	18000
Acute toxicity (Endnote 4)	TUa	N/A	0.3	N/A
Chronic toxicity	TUc	N/A	3	N/A
Phenolic compounds- (non-chlorinated)	µg/L	90	360	900
Chlorinated phenolics	µg/L	3	12	30
Endosulfan <sup>4</sup>	µg/L	0.027	0.054	0.081
Endrin	µg/L	0.006	0.012	0.018
HCH <sup>5</sup>	µg/L	0.012	0.024	0.036
Radioactivity <sup>6</sup>	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subsection 4, Group 3, Article 1, Section 30253 of the California Code of Regulations.			

3 The effluent concentration and mass emission rate limitations for total chlorine residual are based on a continuous discharge of chlorine. Effluent concentration limitations for total chlorine residual, which are applicable to intermittent discharges not exceeding 2 hours, shall be determined through the use of the following equations:

$$\log C_o = -0.43 (\log x) + 1.8$$

$$C_e = C_o + D_m (C_o - C_s)$$

where:

C<sub>o</sub> = the concentration (in µg/L) to be met at the completion of initial dilution

x = the duration of uninterrupted chlorine discharge in minutes

C<sub>e</sub> = the effluent concentration limitation (in µg/L) to apply when chlorine is being intermittently discharged

D<sub>m</sub> = the minimum probable initial dilution

C<sub>s</sub> = the background seawater concentration = 0

4 ~~Endosulfan shall mean the sum of endosulfan alpha and beta and endosulfan sulfate.~~

5 ~~HCH shall mean the sum of the alpha, beta, gamma (lindane) and delta isomers of hexachlorocyclohexane.~~

6 The 1997 Ocean Plan refers to limits specified in Title 17, Division 5, Chapter 4, Group 3, Article 3, Section 32069 of the California Code of Regulations. The referenced section has since been repealed and the limitations set forth in this Order will be substituted. According to State Board staff, the change will be reflected in subsequent Ocean Plan revisions.

Note:  $\mu\text{g/L}$  = micrograms per liter

**Table 3.** Protection of Human Health-Carcinogens Effluent Limitations for Seawater System Discharges.

Constituent	Units	Monthly Average (30-day) (Endnote 2)
Acroleïn	$\mu\text{g/L}$	660
Antimony	$\mu\text{g/L}$	3600
Bis(2-chloroethoxy)-methane	$\mu\text{g/L}$	13.2
Bis(2-chloroisopropyl)-ether	$\mu\text{g/L}$	3600
Chlorobenzene	$\mu\text{g/L}$	1710
Chromium (III) <sup>4</sup>	$\mu\text{g/L}$	570,000
Di-n-butyl phthalate	$\mu\text{g/L}$	10,500
Dichlorobenzenes <sup>7</sup>	$\mu\text{g/L}$	15,300
Diethyl phthalate	$\mu\text{g/L}$	99,000
Dimethyl phthalate	$\mu\text{g/L}$	2,460,000
4,6-dinitro-2-methylphenol	$\mu\text{g/L}$	660
2,4-dinitrophenol	$\mu\text{g/L}$	12
Ethylbenzene	$\mu\text{g/L}$	12,300
Fluoranthene	$\mu\text{g/L}$	45
Hexachlorocyclopentadiene	$\mu\text{g/L}$	174
Nitrobenzene	$\mu\text{g/L}$	14.7
Thallium	$\mu\text{g/L}$	6
Toluene	$\mu\text{g/L}$	255,000
Tributyltin	$\mu\text{g/L}$	0.0042

7- \_\_\_\_\_ Dichlorobenzenes shall mean the sum of 1,2- and 1,3-dichlorobenzene.

Constituent	Units	Monthly Average (30-day) (Endnote 2)
1,1,1 trichloroethane	µg/L	1,620,000

**Table 4.** Protection of Human Health-Carcinogens Effluent Limitations for Seawater System Discharges.

Constituent	Units	Monthly Average (30-day)
Acrylonitrile	µg/L	0.3
Aldrin	µg/L	0.000066
Benzene	µg/L	17.7
Benzidine	µg/L	0.000207
Beryllium	µg/L	0.099
Bis(2-chloroethyl)-ether	µg/L	0.135
Bis(2-ethylhexyl)-phthalate	µg/L	10.5
Carbon tetrachloride	µg/L	2.7
Chlordane <sup>8</sup>	µg/L	0.000069
Chlorodibromomethane	µg/L	25.8
Chloroform	µg/L	390
DDT <sup>9</sup>	µg/L	0.00051 <b>0.00136</b>
1,4-dichlorobenzene	µg/L	54
3,3'-dichlorobenzidine	µg/L	0.0243
1,2-dichloroethane	µg/L	84
1,1-dichloroethylene	µg/L	2.7
Dichlorobromomethane	µg/L	18.6

8. Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane.

9. DDT shall mean the sum of 4,4'DDT, 2,4'DDT, 4,4'DDE, 2,4'DDE, 4,4'DDD, and 2,4'DDD.

Constituent	Units	Monthly Average (30-day)
Dichloromethane	µg/L	1350
1,3-dichloropropene	µg/L	26.7
Dieldrin	µg/L	0.00012
2,4-dinitrotoluene	µg/L	7.8
1,2-diphenylhydrazine	µg/L	0.48
Halomethanes <sup>10</sup>	µg/L	390
Heptachlor <sup>11</sup>	µg/L	0.00015
Heptachlor epoxide	µg/L	0.00006
Hexachlorobenzene	µg/L	0.00063
Hexachlorobutadiene	µg/L	42
Hexachloroethane	µg/L	7.5
Isophorone	µg/L	2190
N-nitrosodimethylamine	µg/L	21.9
N-nitrosodi-N-propylamine	µg/L	1.14
N-nitrosodiphenylamine	µg/L	7.5
PAHs <sup>12</sup>	µg/L	0.0264 <b>0.0704</b>
PCBs <sup>13</sup>	µg/L	0.000057

10 \_\_\_\_\_ Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide), chloromethane (methyl chloride), chlorodibromomethane, and dichlorobromomethane.

11 \_\_\_\_\_ Heptachlor shall mean the sum of heptachlor and heptachlor epoxide.

12 \_\_\_\_\_ PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene.

13 \_\_\_\_\_ PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254 and Aroclor 1260.

Constituent	Units	Monthly Average (30-day)
TCDD equivalents <sup>14</sup>	µg/L	0.0000000117 <b>0.0000000312</b>
1,1,2,2-tetrachloroethane	µg/L	6.9
Tetrachloroethylene	µg/L	6
Toxaphene	µg/L	0.00063
Trichloroethylene	µg/L	81
1,1,2-trichloroethane	µg/L	28.2
2,4,6-trichlorophenol	µg/L	0.87
Vinyl chloride	µg/L	108

14. \_\_\_\_\_ TCDD EQUIVALENTS shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below.

<u>Isomer Group</u>	<u>Toxicity Equivalence Factor</u>
2,3,7,8-tetra-CDD	1.0
2,3,7,8-penta-CDD	0.5
2,3,7,8-hexa-CDDs	0.1
2,3,7,8-hepta-CDD	0.01
octa-CDD	0.001
2,3,7,8-tetra-CDF	0.1
1,2,3,7,8-penta-CDF	0.05
2,3,4,7,8-penta-CDF	0.5
2,3,7,8-hexa-CDFs	0.1
2,3,7,8-hepta-CDFs	0.01
octa-CDF	0.001

**Section C.4.e will be amended as follows:**

~~Within four and a half years of the adoption of this Order, the discharger must submit a quantitative survey of benthic marine life. This Regional Board, in consultation with the State Board Division of Water Quality, must approve the survey design. (State Board Resolution No. 2004-0052, 3.k)~~

**A quantitative survey of benthic marine life shall be conducted during the life of this permit. The Regional Board, in consultation with the State Board Division of Water Quality, must approve the survey design. The discharger may participate in a Regional Monitoring program in lieu of an individual benthic marine life survey. The survey design for Regional Monitoring shall also be approved by the Regional Board, in consultation with the State Board Division of Water Quality.**

**The Discharger shall submit a monitoring report containing all available data by August 9, 2009. If all monitoring data is not available by the above referenced date, the Discharger shall include, in the monitoring report, and explanation for the missing data and time schedule for the anticipated date of completion. Data for the survey of benthic marine life shall be submitted no later than 6 months from the day the data becomes available.**

Section C.4.j has been deleted.

**The Monitoring and Reporting Program, Effluent Monitoring Requirements B.1. Table 2, Table 3, and Table 4 will be amended as follows:**

**Table 2. Monitoring Requirements for Protection of Marine Aquatic Life.**

Constituent	Units	Sample Type	Analysis Frequency	Reporting Frequency
Flow	mgd	continuous	daily	quarterly
Arsenic	µg/L	composite	2/year** <b><u>Once in 5 years</u></b>	Semi-annual **
Cadmium	µg/L	Composite	2/year** <b><u>Once in 5 years</u></b>	Semi-annual **

Constituent	Units	Sample Type	Analysis Frequency	Reporting Frequency
Chromium (hexavalent) <sup>15</sup>	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Copper, <b>Outfall 001, only</b>	µg/L	composite	monthly	quarterly
Copper, <del>other</del> <b>Outfalls 2,3,4a, and 4b</b>	µg/L	composite	2/year*	Semi-annual
Lead	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Mercury	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Nickel	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Selenium	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Silver	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Zinc	µg/L	composite	<u>2/year**</u> Once in 5 years	<u>Semi-annual</u> **
Cyanide <sup>16</sup>	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **

\* The 2/year monitoring frequency is May-September (dry weather) and October—April (wet weather). The sample taken during the October—April monitoring period must be taken during a storm water discharge. The sample from Outfall 004b shall be collected during the sand filter backwash discharge.

\*\* Data shall be submitted with the Report of Waste Discharge 180 days prior to this Orders expiration date.

15 The discharger may, at its option, meet this limitation as a total chromium limitation.

Constituent	Units	Sample Type	Analysis Frequency	Reporting Frequency
Total residual chlorine— <b>Outfall 003 only, when mammals are in the Ring Tank</b>	mg/L	grab	monthly	quarterly
Total chlorine residual <sup>17</sup> , <del>other</del> <b>Outfalls <u>2.3, 4a, and 4b</u></b>	µg/L	grab	2/year*	Semi-annual
Ammonia (as N)	µg/L	composite	2/year*	Semi-annual
Acute toxicity <sup>18</sup>	TUa	composite	2/year*	Semi-annual
Chronic toxicity <sup>19</sup>	TUc	composite	2/year*	Semi-annual
Phenolic compounds (non-chlorinated)	µg/L	composite	<del>2/year**</del> <b><u>Once in 5 years</u></b>	<del>Semi-annual</del> **
Chlorinated phenolics	µg/L	composite	<del>2/year**</del> <b><u>Once in 5 years</u></b>	<del>Semi-annual</del> **

16 If the discharger can demonstrate to the satisfaction of the Regional Board (subject to EPA approval) that an analytical method is available to reliably distinguish between strongly and weakly complexed cyanide, effluent limitations for cyanide may be met by the combined measurement of free cyanide, simple alkali metal cyanides, and weakly complexed organometallic cyanide complexes. In order for the analytical method to be acceptable, the recovery of free cyanide from metal complexes must be comparable to that achieved by Standard Methods 412 F, G, and H (Standard Methods for the Examination of Water and Wastewater, Joint Editorial Board, American Public Health Association, American Water Works Association, and Water Pollution Control Federation, most recent edition).

17 The effluent concentration and mass emission rate limitations for total chlorine residual are based on a continuous discharge of chlorine. Effluent concentration limitations for total chlorine residual, which are applicable to intermittent discharges not exceeding 2 hours, shall be determined through the use of the following equations:

$$\log C_o = -0.43 (\log x) + 1.8$$

$$C_e = C_o + D_m (C_o - C_s)$$

where:

$C_o$  = the concentration (in µg/L) to be met at the completion of initial dilution

$x$  = the duration of uninterrupted chlorine discharge in minutes

$C_e$  = the effluent concentration limitation (in µg/L) to apply when chlorine is being intermittently discharged

$D_m$  = the minimum probable initial dilution

$C_s$  = the background seawater concentration = 0

18 Acute toxicity monitoring shall comply with methods and species as specified in the 2001 Ocean Plan and Resolution No. 2004-0052.

19 Chronic toxicity monitoring shall comply with methods and species as specified in the 2001 Ocean Plan.

Constituent	Units	Sample Type	Analysis Frequency	Reporting Frequency
Endosulfan <sup>20</sup>	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Endrin	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
HCH <sup>21</sup>	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Radioactivity	composite		2/year*	Semi-annual

**Table 3.** Monitoring Requirements for Protection of Human Health-Noncarcinogens.

Constituent	Units	Sample Type	Analysis Frequency	Reporting Frequency
Acrolein	µg/L	grab	2/year** <u>Once in 5 years</u>	Semi-annual **
Antimony	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Bis(2-chloroethoxy) methane	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Bis(2-chloroisopropyl) ether	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Chlorobenzene	µg/L	grab	2/year** <u>Once in 5 years</u>	Semi-annual **
Chromium (III) <sup>4</sup>	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **
Di-n-butyl phthalate	µg/L	composite	2/year** <u>Once in 5 years</u>	Semi-annual **

20 Endosulfan shall mean the sum of endosulfan-alpha and -beta and endosulfan sulfate.

21 HCH shall mean the sum of the alpha, beta, gamma (lindane) and delta isomers of hexachlorocyclohexane.

Constituent	Units	Sample Type	Analysis Frequency	Reporting Frequency
Dichlorobenzenes <sup>22</sup>	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Diethyl phthalate	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Dimethyl phthalate	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
4,6-dinitro-2-methylphenol	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
2,4-dinitrophenol	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Ethylbenzene	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
Fluoranthene	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Hexachlorocyclopentadiene	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Nitrobenzene	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Thallium	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Toluene	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
Tributyltin	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
1,1,1-trichloroethane	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **

**Table 4.** Monitoring Requirements for Protection of Human Health-Carcinogens.

Constituent	Units	Sample Type	Sample Frequency	Reporting Frequency
Acrylonitrile	µg/L	grab	2/year*	Semi-annual
Aldrin	µg/L	composite	2/year*	Semi-annual
Benzene	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
Benzidine	µg/L	composite	2/year*	Semi-annual
Beryllium	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
Bis(2-chloroethyl) ether	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
Bis(2-ethylhexyl) phthalate	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
Carbon tetrachloride	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
Chlordane <sup>23</sup>	µg/L	composite	2/year*	Semi-annual
Chlorodibromomethane	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
Chloroform	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
DDT <sup>24</sup>	µg/L	composite	2/year**	Semi-annual
1,4-dichlorobenzene	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **
3,3'-dichlorobenzidine	µg/L	composite	2/year**	Semi-annual
1,2-dichloroethane	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	<del>Semi-annual</del> **

23 Chlordane shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane.

24 DDT shall mean the sum of 4,4'DDT, 2,4'DDT, 4,4'DDE, 2,4'DDE, 4,4'DDD, and 2,4'DDD.

Constituent	Units	Sample Type	Sample Frequency	Reporting Frequency
1,1-dichloroethylene	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
Dichlorobromomethane	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
Dichloromethane	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
1,3-dichloropropene	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
Dieldrin	µg/L	composite	2/year*	Semi-annual
2,4-dinitrotoluene	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
1,2-diphenylhydrazine	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Halomethanes <sup>25</sup>	µg/L	grab	2/year** <b>Once in 5 years</b>	Semi-annual **
Heptachlor <sup>26</sup>	µg/L	composite	2/year*	Semi-annual
Heptachlor epoxide	µg/L	composite	2/year*	Semi-annual
Hexachlorobenzene	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Hexachlorobutadiene	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Hexachloroethane	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **
Isophorone	µg/L	composite	2/year** <b>Once in 5 years</b>	Semi-annual **

25 Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide), chloromethane (methyl chloride), chlorodibromomethane, and dichlorobromomethane.

26 Heptachlor shall mean the sum of heptachlor and heptachlor epoxide.

Constituent	Units	Sample Type	Sample Frequency	Reporting Frequency
N-nitrosodimethylamine	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
N-nitrosodi-N-propylamine	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
N-nitrosodiphenylamine	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
PAHs <sup>27</sup>	µg/L	composite	2/year*	Semi-annual
PCBs <sup>28</sup>	µg/L	composite	2/year*	Semi-annual
TCDD equivalents <sup>29</sup>	µg/L	composite	2/year*	Semi-annual
1,1,2,2-tetrachloroethane	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **

27 PAHs (polynuclear aromatic hydrocarbons) shall mean the sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene.

28 PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

29 TCDD EQUIVALENTS shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below.

<u>Isomer Group</u>	<u>Toxicity Equivalence Factor</u>
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8 tetra CDF	0.1
1,2,3,7,8 penta CDF	0.05
2,3,4,7,8 penta CDF	0.5
2,3,7,8 hexa CDFs	0.1
2,3,7,8 hepta CDFs	0.01
octa CDF	0.001

Constituent	Units	Sample Type	Sample Frequency	Reporting Frequency
Tetrachloroethylene	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
Toxaphene	µg/L	composite	2/year*	Semi-annual
Trichloroethylene	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
1,1,2-trichloroethane	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
2,4,6-trichlorophenol	µg/L	composite	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **
Vinyl chloride	µg/L	grab	<del>2/year**</del> <b>Once in 5 years</b>	Semi-annual **

The following will be added to the Monitoring and Reporting Program Section C:

#### 4. Regional Monitoring

The Discharger shall participate and coordinate with state and local agencies and other Dischargers in the San Diego Region in development and implementation of a regional monitoring program (Bight Study) for the Pacific Ocean as directed by this Regional Water Board. The intent of the Bight Study is to maximize the efforts of all monitoring partners using a more cost-effective monitoring design and to best utilize the pooled resources of the region.

The Fact Sheet “Basis for Waste Discharge Requirements” will be amended as follows:

Pursuant to the 2001 Ocean Plan, the discharge of waste to an ASBS is prohibited unless the discharger applies for and receives an exception to the prohibition. The SIO seawater system and storm sewer system discharges are to an ASBS, and since SIO had never applied for or received an exception to discharge wastes to an ASBS, the State Board required SIO to apply for an exception to the Ocean Plan to continue the discharges to the ASBS.

In November 22, 2002, SIO applied to the State Board for an exception to the Ocean Plan to discharge to an ASBS. On July 22, 2004, the State Board adopted Resolution No.

2004-0052, which approved a Mitigated Negative Declaration for an exception for the discharges from the SIO seawater system and for the discharges of municipal storm water to the San Diego Marine Life ASBS.

The Initial Study is attached to this Order. The Initial Study contains detailed information regarding the history of the facility and the discharges from SIO. The reader is directed to the Initial Study for additional information.

~~The current NPDES permit allows an initial dilution factor of 2:1. This Order establishes effluent limitations for discharges of (1) seawater system discharges and (2) seawater system discharges mixed with storm water using the 2:1 initial dilution factor.~~

**This NPDES permit previously allowed an initial dilution factor of 2:1. On February 9, 2007, SIO submitted the results of a dilution study to this Regional Board. The dilution and dispersion of effluent from the five permitted outfalls at SIO into the ASBS were studied using the SEDXPORT hydrodynamic modeling system. The model is designed to numerically simulate dry weather and wet weather case scenarios. The dilution study incorporated historical data on water mass properties (salinity, temperature) tides and waves (water elevation, wave height and direction) that have been collected from Scripps pier since 1980.**

**The dilution and dispersion study results indicate dilution factors greater than 17:1 occur 95% of the time. The minimum dilution ratio observed was 7:1. Based on the SIO dilution study, this Order establishes effluent limitations for discharges of (1) seawater system discharges and (2) seawater system discharges mixed with storm water using the 7:1 initial dilution factor.**

~~The State Board Resolution requires SIO to conduct an initial dilution study. Once the initial dilution study is completed, this Regional Board will evaluate the study and determine if the dilution factor in this Order should be modified.~~

**The State Board Resolution required SIO to conduct an initial dilution study. Once the dilution study was completed, this Regional Board evaluated the study and determined it was appropriate to modify the dilution factor.**

The 2001 Ocean Plan equation for Table B effluent limitations is listed below:

$$C_e = C_o + D_m(C_o - C_s)$$

where:

$C_e$  = effluent concentration limit,  $\mu\text{g/L}$

$C_o$  = the concentration (water quality objective) to be met at the completion of initial dilution,  $\mu\text{g/L}$

$C_s$  = background seawater concentration,  $\mu\text{g/L}$

$D_m$  = minimum probable initial dilution expressed as parts seawater per part wastewater.

The 2001 Ocean Plan specifies the following background concentrations:

$A_s = 3 \mu\text{g/L}$

$C_u = 2 \mu\text{g/L}$

$H_g = 0.0005 \mu\text{g/L}$

$A_g = 0.16 \mu\text{g/L}$

$Z_n = 8 \mu\text{g/L}$

Other Table B constituents = 0  $\mu\text{g/L}$

~~An example calculation for acrolein using a dilution factor of 2:1 is provided below:~~

$$C_e = 220 + 2(220 - 0) \quad C_e = 660 \mu\text{g/L}$$

**An example calculation for DDT using a dilution factor of 7:1 is provided below:**

$$C_e = 0.00017 + 7(0.00017 - 0) \quad C_e = 0.00136 \mu\text{g/L}$$

~~An example calculation for Cu using a dilution factor of 2:1 is provided below:~~

$$C_e = 3 + 2(3 - 2); \quad C_e = 5 \mu\text{g/L}$$

**An example calculation for Cu using a dilution factor of 7:1 is provided below:**

$$C_e = 3 + 7(3 - 2); \quad C_e = 10 \mu\text{g/L}$$

This Order includes effluent limitations for the water quality objectives listed in *Table B. Water Quality Objectives* in the 2001 California Ocean Plan. The effluent limitations were **initially** calculated using a dilution factor of 2:1. **In November 2008 this Order was modified and the**

**dilution factor was increased to 7:1. Effluent limitations were recalculated to reflect the change in dilution factor.** The seawater system discharges and any storm water discharges mixed with seawater system discharges from Outfall 001, 003, 004a and 004b must comply numerical effluent limitations for the Table B Water Quality Objectives at the discharge point. Compliance with the numerical effluent limitations is required by this Order three years after its adoption. Outfall 001, 003, 004a and 004b must comply with effluent limitations in Table A of the Ocean Plan.

Because the numerical effluent limitations are not effective until three-years after the adoption of this Order, the discharger shall monitor Outfall 001, 003, 004a, and 004b twice quarterly for the first year. The twice quarterly monitoring will provide eight monitoring events in 12 months. This data may provide information for a reasonable potential analysis (**RPA**) for the respective discharges. After the first year of monitoring, the discharges shall be monitored twice annually.

**A RPA was conducted by SIO using the Reasonable Potential Calculator Software (RPcalc, Version 2.0). The RPA calculations were based on 39 discharge samples collected during wet and dry weather between December 2004 and August 2006. Based on the RPA conducted, monitoring for 65 constituents from Outfall 001, 003, 004a, and 004b have been reduced to once during the life of the permit. Monitoring for Table A Constituents will remain unchanged.**

The municipal storm water discharges from Outfall 002 must comply with narrative effluent limitations for the Table B Water Quality Objectives at the discharge point. The narrative effluent limitations require the discharger to evaluate and implement best management practices (BMP) as an iterative processes. The narrative effluent limitations are required for Outfall 002 because it discharges only municipal storm water.

Whenever the analyses of municipal storm water discharges from Outfall 002 exceeds the effluent limitations from the Ocean Plan the discharger shall review its Storm Water Management Plan/Program (SWMP) and modify the SWMP as necessary to reduce the concentrations of those constituents that exceed the effluent limitations. This Order also requires the discharge to sample and analyze the next storm water runoff event for the specific constituents that exceeded the effluent limitations, and compare to previous monitoring data and evaluate for best management practices (BMP) effectiveness and improvement. This Order also requires the discharge to document the review and the modifications to the SWMP, and to document the sampling analysis and comparison.

The conditions required by State Board Resolution No. 2004-0052 are listed below and are the basis for conditions in this Order.

1. The discharge must comply with all other applicable provisions, including water quality standards, of the Ocean Plan. Natural water quality conditions in the receiving water, seaward of the surf zone, must not be altered as a result of the discharge. The surf zone is defined as the area between the breaking waves and the shoreline at any one time. Natural water quality will be defined, based on a review of the monitoring data, by an advisory committee composed of State and Regional Board staff, a representative from UCSD/SIO, and two scientists selected by Regional Board staff from some academic organizations other than UCSD/SIO. At a minimum the advisory committee must meet annually to review the monitoring data and to advise the Regional Board whether or not natural water quality is being altered in the ASBS as a result of the UCSD/SIO discharges.
2. UCSD/SIO must minimize concentrations of chemical additives, including antibiotics, in the effluent. Formalin shall not be discharged to the ocean. The use of copper as a treatment additive in the open seawater system must be eliminated as soon as practicable; alternatively the discharge of copper additives must be eliminated as soon as practicable through the treatment of effluent prior to discharge. All additives to the seawater at the Birch Aquarium must be minimized to prevent the alteration of natural water quality conditions in the receiving water. In addition and at a minimum, UCSD/SIO must comply with effluent limits implementing Table B water quality objectives as required in Section III.C. of the Ocean Plan. Furthermore, UCSD/SIO must submit a report to the Regional Board within six months of permit re-issuance evaluating alternatives and associated costs, and the feasibility of such alternatives, to the current discharges to the ASBS. The report must include, but not be limited to, alternatives such as partial or complete diversion to sewer, alternative treatment techniques, pollutant minimization, and source control to eliminate the discharge of copper, and to reduce the discharge of other antibiotics and treatment additives. The report must also include a discussion of alternatives, associated costs and feasibility of moving the waste seawater outfalls to locations outside of the ASBS.
3. Effluent and receiving water analysis for copper must employ the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/ Mass Spectrometry).
4. A quarterly report of all chemical additives discharged via waste seawater must be submitted in the quarterly monitoring report to the Regional Board.
5. Flow measurements (using a flow metering device) for Outfall 001, and estimates for all other permitted outfalls, must be made and reported quarterly to the Regional Board.

6. By January 1, 2007, UCSD/SIO must eliminate all discharges of non-storm water urban runoff (i.e., any discharge of urban runoff to a storm drain that is not composed entirely of storm water), except those associated with emergency fire fighting.
7. UCSD/SIO must specifically address the prohibition of non-storm water urban runoff and the reduction of pollutants in storm water discharges draining to the ASBS in a revised Storm Water Management Plan/Program (SWMP). UCSD/SIO is required to submit its revised SWMP to the Regional Board within six months of permit issuance. The SWMP is subject to the approval of the Regional Board.
8. The revised SWMP must include a map of all entry points (known when the SWMP is prepared) for urban runoff entering the UCSD/SIO drainage system. The SWMP must also include a procedure for updating the map and plan when other entry points are discovered.
9. The revised SWMP must describe the measures by which non-storm water discharges will be eliminated and interim measures that will be employed to reduce non-storm water flows until the ultimate measures are implemented.
10. The revised SWMP must also address storm water discharges and how pollutants will be reduced in storm water runoff into the ASBS through the implementation of Best Management Practices (BMPs). The SWMP must describe the BMPs and include an implementation schedule. The implementation schedule must be designed to ensure an improvement in receiving water quality each year (over the permit cycle) due to either a reduction in storm water discharges (due to diversion) or reduction in pollutants (due to onsite treatment or other BMPs). The implementation schedule must be developed to ensure BMPs are implemented within one year of the permit issuance date.
11. Once every permit cycle, a quantitative survey of benthic marine life must be performed. The Regional Board, in consultation with the State Board Division of Water Quality, must approve the survey design. The results of the survey must be completed and submitted to the Regional Board within six months before the end of the permit cycle.
12. Once during the upcoming permit cycle, a bioaccumulation study using sand crabs (*Emerita analoga*) and mussels (*Mytilus californianus*) must be conducted to determine the concentrations of metals near field and far field (up and down coast, and offshore) in the ASBS. The Regional Board, in consultation with the Division of Water Quality, must approve the study design. The results of the survey must be

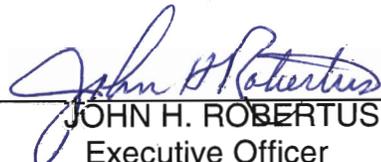
completed and submitted to the Regional Board at least six months prior to the end of the permit cycle (permit expiration). Based on the study results, the Regional Board, in consultation with the Division of Water Quality, may limit the bioaccumulation test organisms, required in subsequent permits, to only sand crabs or mussels.

13. The effluent from Outfall 001 must be sampled and analyzed monthly for copper concentrations. If after UCSD/SIO has demonstrated that copper as a treatment additive has been eliminated from the discharge into the ASBS, the Regional Board in consultation with the State Board Division of Water Quality may reduce the frequency of monitoring for copper in the effluent.
14. During the first year of the permit cycle, two samples must be collected from Outfall 001 (once during dry weather and once during wet weather) and analyzed for all Ocean Plan Table B constituents. During the first year of the permit cycle, two composite samples must also be collected (once during dry weather and once during wet weather) representing flows from Outfalls 002, 003, 004A, and 004B; these two composite samples must also be analyzed for all Ocean Plan Table B constituents. For wet weather samples from Outfall 001 and for the wet weather composite sample from Outfalls 002, 003, 004A, and 004B, the effluent samples must also be analyzed for Ocean Plan indicator bacteria. Based on these results, the Regional Board will determine the frequency of sampling (at a minimum, annually) and the constituents to be tested during the remainder of the permit cycle, except that chronic toxicity must be tested at least twice annually.
15. Twice annually, once during dry weather and once during wet weather, the receiving water and sediment in the vicinity of the UCSD/SIO pier must be sampled and analyzed for Ocean Plan Table B constituents. Receiving water must also be monitored for compliance with Ocean Plan bacterial water quality objectives. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed. All other Table B constituents must be analyzed during the first year. The Regional Board will determine the sample location(s) seaward of the surf zone. Based on the first year sample results, the Regional Board will determine specific constituents to be tested during the remainder of the permit cycle, except that copper and chronic toxicity for water must be tested twice annually, and copper and acute toxicity for sediment must be tested annually.
16. If the results of receiving water monitoring indicate that wet weather discharges that include storm water are causing or contributing to an alteration of natural water quality in the ASBS, UCSD/SIO is required to submit a report to the Regional Board

within 30 days. Those constituents in storm water that alter natural water quality must be identified in that report. The report must describe BMPs that are currently being implemented, BMPs that are planned for in the SWMP, and additional BMPs that may be added to the SWMP. The report shall include a new or modified implementation schedule. The Regional Board may require modifications to the report. Within 30 days following approval of the report by the Regional Board, UCSD/SIO must revise its SWMP to incorporate any new or modified BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring required. Implementation of non-structural BMPs must be within one year of the approval by the Regional Board of the revised SWMP. Structural BMPs must be implemented as soon as practicable. As long as UCSD/SIO has complied with the procedures described above and is implementing the revised SWMP, then UCSD/SIO does not have to repeat the same procedure for continuing or recurring exceedances of the same constituent.

17. A study must be performed to determine the initial dilution and fate of the discharge during storms (larger waves and lower salinity discharge) and non-storm periods (smaller waves and higher salinity discharge). The study may be empirical (e.g., a dye study) and/or using a model.
18. In addition to the bacterial monitoring requirements in the Ocean Plan, indicator bacteria and total residual chlorine must be tested once monthly in the effluent from Outfall 003, draining the marine mammal holding facility, when in use.
19. UCSD/SIO must develop and implement administrative and/or engineering controls that result in a negligible risk of the release of exotic species, including foreign pathogens (parasites, protozoa, bacteria, and viruses).

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, on November 12, 2008.

  
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JOHN H. ROBERTUS  
Executive Officer