



California Regional Water Quality Control Board San Diego Region



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January 10, 2007

CERTIFIED MAIL:
7006 2760 0000 1615 6229

Mr. Andrew Fichthorn
Executive Vice President and General Manager
Sea World San Diego
500 Sea World Drive
San Diego, CA 92109-7904

In reply refer to:
SCR: 12-00083.01

Dear Mr. Fichthorn:

ADOPTION OF ADDENDUM NO. 1 TO ORDER NO. R9-2005-0091, NPDES NO. CA0107336; FOR THE DISCHARGE OF WASTE FROM SEAWORLD AERIAL FIREWORKS DISPLAYS TO SAN DIEGO MISSION BAY, SAN DIEGO

Enclosed is a copy of Addendum No. 1 to Order No. R9-2005-0091, which the Regional Board adopted on December 12, 2007. Addendum No. 1 to Order No. R9-2005-0091 established prohibitions and requirements for waste discharges associated with SeaWorld aerial fireworks displays conducted over Mission Bay in the city of San Diego.

Please note that the adoption date of December 12, 2007 is the date Addendum No. 1 went into effect.

Please review Addendum No. 1 to Order No. R9-2005-0091 to ensure that all required reports are received at the Regional Board office by the due dates indicated in the Order.

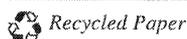
The heading portion of this letter includes a Regional Board code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

If you have any questions, please contact Michelle Mata at (858) 467-2981, or via email at mmata@waterboards.ca.gov.

Respectfully,

JOHN H. ROBERTUS
Executive Officer

California Environmental Protection Agency



Mr. Andrew Fichthorn
Executive Vice President and General Manager
Sea World San Diego

-2-

January 10, 2007

JHR:mpm:bdk:mm

Enclosure: Addendum No. 1 to Order No. R9-2005-0091, NPDES
No. CA 0107336

cc: Douglas Eberhardt, USEPA Region IX, 75 Hawthorne Street, San Francisco,
94105

Nancy Yoshikawa, USEPA Region IX (via email)

Kevin Carr, Sea World San Diego, 500 Sea World Drive, San Diego, 92109

California Coastal Commission, 7575 Metropolitan Drive, Suite 103, San Diego,
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Bruce Reznik, Executive Director, San Diego Coastkeeper, 2825 Dewey Road,
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California Environmental Protection Agency

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

**ADDENDUM NO. 1 TO
ORDER NO. R9-2005-0091, NPDES NO CA0107336
FOR THE DISCHARGE OF WASTE FROM
SEA WORLD AERIAL FIREWORKS DISPLAYS TO SAN DIEGO MISSION BAY
SAN DIEGO**

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

1. On November 19, 2004, Anheuser Busch Inc. submitted a report of waste discharge (RWD) for the renewal of an NPDES permit to discharge up to 9.36 million gallons per day of treated wastewater from SeaWorld San Diego. The discharge consists of wastewater from exhibit pools, intermittent flows during pool drainage and cleaning operations, runoff from landscape irrigation, and facility wash down water. Order No. R9-2005-0091 was adopted by this Regional Board on April 13, 2005 and does not include any requirements for the aerial fireworks displays.
2. On October 26, 2006, Brown and Caldwell submitted an incomplete report of waste discharge (RWD) on behalf of SeaWorld, San Diego for the discharge of waste to Mission Bay associated with their fireworks program. Additional information was requested on December 7, 2006 and received on January 19, 2007 to make the application complete.

Addendum No. 1 to Order No R9-2005-0091 specifically applies to the discharge of waste associated with the aerial fireworks displays. Addendum No. 1 to Order No. R9-2005-0091 does not include any changes of existing requirements of Order No. R9-2005-0091 for the discharge of treated wastewater.

3. The RWD indicates that nightly displays of fireworks occur during the summer months between April and September and other times during the year. Under the current Sea World Master Plan update, approved by the California Coastal Commission in 2001, Sea World may present up to 150 fireworks shows per year, with an anticipated average between 110 and 120 shows per year.

Mission Bay is unique due to the restricted circulation of waters within the bay, the shallow depth of the bay in the vicinity of the fireworks events, and because of the high frequency of fireworks events discharged by SeaWorld in that area.

The fireworks are launched from a barge located in the Pacific Passage Zone of Mission Bay, between Fiesta Island and the Sea World Shorelines. The average fireworks show lasts 5 to 6 minutes and dispenses approximately 250 shells (3-

inch and 4-inch); special events, such as the 4th of July and New Year's Eve, may dispense between 1,000 and 1,750 shells (mostly 3-inch and 4-inch and some larger). The average total weight of firework related material that are used in shows at SeaWorld is 129 kilograms (kg) and the annual July 4th show is 993 kg.

Sea World subcontracts the logistics of fireworks, operations, transportation, setup, ignition and cleanup and currently subcontracts that to Fireworks America, a licensed pyrotechnics company based in Lakeside, CA.

4. Typical fireworks constituents include aluminum, magnesium, strontium, barium, sodium, potassium, iron, copper, sulfate, nitrate and perchlorate. In addition, debris from unexploded shells as well as paper, cardboard, wires and fuses from exploded shells can also adversely impact the quality within Mission Bay. The area affected by these debris can vary depending on wind speed and direction, size of the shells, and other environmental and anthropogenic factors. These constituents have a potential to adversely impact and/or contribute to degradation of water and sediment quality within Mission Bay.
5. After each aerial fireworks display, crews conduct sweeps to gather floating debris from spent fireworks using handheld fishnets and a boom with a net off the bow. In addition, the fireworks barge is swept immediately after each show to prevent solid waste and debris from being swept into the water by the wind. Unexploded fireworks are disposed of by the fireworks subcontractor, who is currently Fireworks America. Fireworks debris deposited on Fiesta Island mainland is collected from the shorelines each morning following the aerial fireworks display. Solid waste typically consists of paper, paperboard or cardboard shells, and marginal amounts of wires and fuses.

Data for wet and dry debris retrieved by Sea World staff since 2002 was reviewed and it was determined that, on average, 11 pounds of fireworks related wet debris were collected each evening and 8 pounds of wet debris each morning.

6. Sea World conducted annual fireworks related monitoring of sediment and water quality parameters between 2001-2006. The final monitoring report prepared for Sea World, by Science Applications International Corporation, concluded that there were no significant spatial or temporal patterns in concentrations of key fireworks related metals in sea water or sediments in Mission Bay. It was also concluded that there is no indication of fireworks residue accumulation in the water or sediment of Mission Bay.
7. This action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21100 Et seq.) in accordance with

California Water Code Section 13389.

8. This Regional Board has notified the Discharger and all known interested parties of the intent to amend Order No. R9-2005-0091.
9. This Regional Board in a public meeting has heard and considered all comments pertaining to the proposed discharge from the Sea World fireworks displays to Mission Bay.

IT IS HEREBY ORDERED, that Order No. R9-2005-0091 is amended as follows:

The following shall be added to Section III Discharge Prohibitions:

- H. The discharge of waste from the aerial fireworks display shall not cause or contribute to the degradation of water or sediment quality in Mission Bay.
- I. The rate of deposition of inert solids and the characteristics of inert solids in Mission Bay sediments shall not be changed such that benthic communities are degraded.
- J. Fireworks aerial displays shall be in accordance with the following schedule and shall not exceed a maximum of 150 displays per calendar year:

Display Type	Approximate Show Length	Shell Average	Maximum Nights Per Year*
Typical	6 minutes	250 shells	129
Special	12 minutes	1000 shells	15
Major	20 minutes	1750 shells	6

*The maximum number of nights per year for a greater intensity display type may be transferred to a lesser intensity display type, provided that the total number of display nights does not exceed 150. Display intensity is defined by the approximate show length and average number of shells. Transferable display types are therefore limited to: 1) major to special; 2) special to typical; and 3) major to typical. Fireworks that reduce noise should be used.

The following shall be added to Attachment A-Definitions:

Fireworks Deposition Zone: The aerial extent of fireworks particles and/or debris created by a single fireworks display within the tidal influence of Mission Bay waters.

Degrade: Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and

animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected.

The following shall be added to Section IX of the Monitoring and Reporting Program:

F. Fireworks Related Water Quality, Sediment, and Benthic Monitoring

1. To determine the level of impact to the receiving water and underlying sediment, the monitoring program shall document conditions of the vicinity of the receiving water discharge points, at reference stations, and at areas beyond the immediate vicinity of the discharge points where discharge impacts might reasonably be expected.
2. The Discharger shall submit for review and approval a Monitoring Location Plan, for each sampling event, to monitor water and sediment chemistry, sediment toxicity, and benthic infauna. The Monitoring Location Plan shall be submitted to the Regional Board a minimum of 60 days prior to each sampling event, and approved by the Regional Board Executive Officer. The fireworks monitoring program shall begin no later than July 2008 and continue through March 2010.

The Monitoring Location Plan shall include, at a minimum, 10 randomly selected stations within the fireworks deposition zone and 2 reference stations. The 10 stations shall be reselected for each sampling event by SeaWorld using the methods set forth in USEPA's probability-based Environmental Monitoring and Assessment Program. The Monitoring Location Plan shall also include methods to be used and corresponding detection limits for all constituents.

3. Water quality analysis shall be conducted at all stations for the following constituents:

Table X. Water Quality Monitoring Requirements

Constituent	Units	Type of Sample	Frequency ¹
BIS (2-Ethylhexyl) Phthalate	µg/l	Grab	3 times a year
di-N Butylphthalate	µg/l	Grab	3 times a year
di-N Octylphthalate	µg/l	Grab	3 times a year
Diethylphthalate	µg/l	Grab	3 times a year
Dimethylphthalate	µg/l	Grab	3 times a year
Phenol	µg/l	Grab	3 times a year

Constituent	Units	Type of Sample	Frequency ¹
Naphthalene	µg/l	Grab	3 times a year
2,4-Dinitrotoluene	µg/l	Grab	3 times a year
2,6-DNT	µg/l	Grab	3 times a year
2,4,6-Trinitrotoluene	µg/l	Grab	3 times a year
Nitrobenzene	µg/l	Grab	3 times a year
Tetryl	µg/l	Grab	3 times a year
RDX	µg/l	Grab	3 times a year
Aluminum ²	µg/l	Grab	3 times a year
Antimony ²	µg/l	Grab	3 times a year
Arsenic ²	µg/l	Grab	3 times a year
Barium ²	µg/l	Grab	3 times a year
Beryllium ²	µg/l	Grab	3 times a year
Cadmium ²	µg/l	Grab	3 times a year
Chromium ²	µg/l	Grab	3 times a year
Cobalt ²	µg/l	Grab	3 times a year
Copper ²	µg/l	Grab	3 times a year
Iron ²	µg/l	Grab	3 times a year
Lead ²	µg/l	Grab	3 times a year
Manganese ²	µg/l	Grab	3 times a year
Mercury	µg/l	Grab	3 times a year
Molybdenum ²	µg/l	Grab	3 times a year
Nickel ²	µg/l	Grab	3 times a year
Potassium ²	µg/l	Grab	3 times a year
Selenium ²	µg/l	Grab	3 times a year
Silver ²	µg/l	Grab	3 times a year
Strontium ²	µg/l	Grab	3 times a year
Thallium ²	µg/l	Grab	3 times a year
Tin ²	µg/l	Grab	3 times a year
Titanium ²	µg/l	Grab	3 times a year
Vanadium ²	µg/l	Grab	3 times a year
Zinc ²	µg/l	Grab	3 times a year
Perchlorate	µg/l	Grab	3 times a year
Total Nitrogen	µg/l	Grab	3 times a year
Phosphorus	µg/l	Grab	3 times a year
Sulfate	µg/l	Grab	3 times a year

¹ Samples shall be collected and analyzed once during the period of January-March, once during the period of July-Labor Day and once within 24 hours after the Labor Day Aerial Fireworks. Water samples shall be collected within 24 hours of a fireworks event.

² All metals shall be reported as total and dissolved. Hardness as CaCO₃ shall also be analyzed.

4. **Sediment Characteristics.** Sediment samples for chemical analysis shall be collected from the top 2 centimeters of the grab. Samples shall be analyzed for the constituents listed in table below. Sediment chemistry ambient monitoring may be conducted using USEPA approved methods, or methods developed by NOAA's National Status and Trends for Marine Environmental Quality. For chemical analysis of sediment, samples shall be reported on a dry weight basis.

Table Y. Sediment Monitoring Requirements

Constituent	Units	Type of Sample	Frequency ¹
BIS (2-Ethylhexyl) Phthalate	µg/kg	Core	3 times a year
di-N Butylphthalate	µg/kg	Core	3 times a year
di-N Octylphthalate	µg/kg	Core	3 times a year
Diethylphthalate	µg/kg	Core	3 times a year
Dimethylphthalate	µg/kg	Core	3 times a year
Phenol	µg/kg	Core	3 times a year
Naphthalene	µg/kg	Core	3 times a year
2,4-Dinitrotoluene	µg/kg	Core	3 times a year
2,6-DNT	µg/kg	Core	3 times a year
2,4,6-Trinitrotoluene	µg/kg	Core	3 times a year
Nitrobenzene	µg/kg	Core	3 times a year
Tetryl	µg/kg	Core	3 times a year
RDX	µg/kg	Core	3 times a year
Aluminum ²	µg/kg	Core	3 times a year
Antimony ²	µg/kg	Core	3 times a year
Arsenic ²	µg/kg	Core	3 times a year
Barium ²	µg/kg	Core	3 times a year
Beryllium ²	µg/kg	Core	3 times a year
Cadmium ²	µg/kg	Core	3 times a year
Chromium ²	µg/kg	Core	3 times a year
Cobalt ²	µg/kg	Core	3 times a year
Copper ²	µg/kg	Core	3 times a year
Iron ²	µg/kg	Core	3 times a year
Lead ²	µg/kg	Core	3 times a year
Manganese ²	µg/kg	Core	3 times a year
Mercury	µg/kg	Core	3 times a year
Molybdenum ²	µg/kg	Core	3 times a year

Constituent	Units	Type of Sample	Frequency ¹
Nickel ²	µg/kg	Core	3 times a year
Potassium ²	µg/kg	Core	3 times a year
Selenium ²	µg/kg	Core	3 times a year
Silver ²	µg/kg	Core	3 times a year
Strontium ²	µg/kg	Core	3 times a year
Thallium ²	µg/kg	Core	3 times a year
Tin ²	µg/kg	Core	3 times a year
Titanium ²	µg/kg	Core	3 times a year
Vanadium ²	µg/kg	Core	3 times a year
Zinc ²	µg/kg	Core	3 times a year
Perchlorate	µg/kg	Core	3 times a year
Total Nitrogen	µg/kg	Core	3 times a year
Phosphorus	µg/kg	Core	3 times a year
Sulfate	µg/kg	Core	3 times a year

¹ Samples shall be collected and analyzed once during the period of January-March, once during the period of July-Labor Day and once within 24 hours after the Labor Day Aerial Fireworks Display.

² All metals shall be reported as total and dissolved. Hardness as CaCO₃ shall also be analyzed.

5. **Infauna.** For analysis of benthic infauna, two replicate samples of bottom sediment shall be collected and analyzed once during the period of January-March, once during the period of July-Labor Day and once within 24 hours after the Labor Day Aerial Fireworks display from the infauna monitoring locations. The benthic infaunal samples shall be collected using a 0.1-square meter modified Van Veen grab sampler. These grab samples shall be separated from those collected for sediment analyses. The samples shall be sieved using a 1.0 millimeter mesh screen. The benthic organisms retained on the sieve shall be fixed in 15 percent buffered formalin, and transferred to 70 percent alcohol within 2 to 7 days of storage. These organisms may be stained using Rose Bengal to facilitate sorting. Infaunal organisms, obtained during benthic monitoring shall be counted and identified to as low a taxon as possible.

- a. Number of species per 0.1-square meter
- b. Total number of species per station
- c. Total numerical abundance
- d. Benthic Response Index (BRI)
- e. Swartz's 75 percent dominance index
- f. Shannon-Weiner's diversity index

g. Pielou evenness (J)

In addition to the community parameters, an annual evaluation shall be performed that includes more detailed statistical comparisons including community, temporal, and spatial analyses. Methods may include, but are not limited to, various multivariate, such as cluster analysis, ordination, and regression. Additionally analyses shall also be conducted, as appropriate, to elucidate temporal and spatial trends in the data.

6. The following information shall also be recorded during each sampling event: wind direction and speed; weather (cloudy, rainy, etc); tidal conditions; any other noteworthy water condition.
7. An aerial 8 ½ x 11 map that clearly outlines the fireworks deposition zone shall be prepared by SeaWorld each year and approved by the Executive Officer.

This addendum becomes effective on the date of adoption by the Regional Board.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Addendum adopted by the California Regional Water Quality Control Board, San Diego Region, on December 12, 2007.



JOHN H. ROBERTUS
Executive Officer

12 December 2007
Date