

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

**TENTATIVE 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 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, 2007 and received on January 19, 2007 to make the application complete.
2. 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.

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; special events, such as the 4<sup>th</sup> of July and New Year's Eve, may dispense between 1,000 and 1,750 shells. Sea World subcontracts the logistics of fireworks, operations, transportation, setup, ignition and cleanup to Fireworks America, a licensed pyrotechnics company based in Lakeside, CA.

3. Typical fireworks constituents include aluminum, magnesium, strontium, barium, sodium, potassium, iron, copper, sulfate, nitrate and perchlorate. These constituents have a potential to adversely impact and/or contribute to degradation of water and sediment quality within Mission Bay.

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.

4. After each aerial fireworks display, crews conduct sweeps to gather floating debris from spent fireworks using handheld fishnets. 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 Fireworks America. Fireworks debris deposited on Fiesta Island 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.

5. 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 critical 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.
6. 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.
7. This Regional Board has notified the Discharger and all known interested parties of the intent to amend Order No. R9-2005-0091.
8. 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 discharge of waste from the aerial fireworks display shall be free of settleable material or substances that may form sediments, which will degrade benthic communities or other aquatic life.
- J. Fireworks aerial displays shall be limited to the following dates: Easter through Labor Day and New Year's Eve of each year and shall not to exceed a maximum of 150 fireworks aerial displays per calendar year.

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.

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

F. Fireworks Related Water Quality and Benthic Monitoring

1. Beginning in April 2008, the Discharger shall implement a fireworks monitoring program that will continue until September 2010.
2. 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.
3. The following shall constitute the water quality monitoring locations:

Station Number	Location
RSW-001R	Area south of crown point shore and north of Vacation Isle shore <b>Reference Station</b>
RSW-001	Pacific Passage, 20 feet from the fireworks barge and in the direction of the fireworks deposition zone
RSW-002	Pacific Passage, center of the deposition zone as determined after each event
RSW-003	Pacific Passage, the outermost area of the fireworks deposition zone, at a point farthest away from the barge

4. 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 <sup>1</sup>
BIS (2-Ethylhexyl) Phthalate	mg/l	Grab	Semiannually
di-N Butylphthalate	mg/l	Grab	Semiannually
di-N Octylphthalate	mg/l	Grab	Semiannually
Diethylphthalate	mg/l	Grab	Semiannually

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

<sup>1</sup> Samples shall be collected and analyzed in January and July of each year. Semiannually means at least once during the months of January and July.

<sup>2</sup> All metals shall be reported as total and dissolved. Hardness as CaCO<sub>3</sub> shall also be analyzed.

5. **Sediment Characteristics.** The Discharger shall prepare a monitoring plan that identifies the locations of sediment monitoring. A minimum of 3 locations representative of the area of greatest potential impact and within the fireworks deposition zone shall be selected. All monitoring locations shall be approved by the Regional Board.

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.

Constituent	Units	Type of Sample	Frequency <sup>1</sup>
BIS (2-Ethylhexyl) Phthalate	mg/kg	Core	Semiannually
di-N Butylphthalate	mg/kg	Core	Semiannually
di-N Octylphthalate	mg/kg	Core	Semiannually
Diethylphthalate	mg/kg	Core	Semiannually
Dimethylphthalate	mg/kg	Core	Semiannually
Phenol	mg/kg	Core	Semiannually
Naphthalene	mg/kg	Core	Semiannually
2,4-Dinitrotoluene	mg/kg	Core	Semiannually
2,6-DNT	mg/kg	Core	Semiannually
2,4,6-Trinitrotoluene	mg/kg	Core	Semiannually
Nitrobenzene	mg/kg	Core	Semiannually
Tetryl	mg/kg	Core	Semiannually
RDX	mg/kg	Core	Semiannually
Aluminum <sup>2</sup>	mg/kg	Core	Semiannually
Antimony <sup>2</sup>	mg/kg	Core	Semiannually
Arsenic <sup>2</sup>	mg/kg	Core	Semiannually
Barium <sup>2</sup>	mg/kg	Core	Semiannually
Beryllium <sup>2</sup>	mg/kg	Core	Semiannually
Cadmium <sup>2</sup>	mg/kg	Core	Semiannually
Chromium <sup>2</sup>	mg/kg	Core	Semiannually
Cobalt <sup>2</sup>	mg/kg	Core	Semiannually
Copper <sup>2</sup>	mg/kg	Core	Semiannually
Iron <sup>2</sup>	mg/kg	Core	Semiannually
Lead <sup>2</sup>	mg/kg	Core	Semiannually

Manganese <sup>2</sup>	mg/kg	Core	Semiannually
Mercury	mg/kg	Core	Semiannually
Molybdenum <sup>2</sup>	mg/kg	Core	Semiannually
Constituent	Units	Type of Sample	Frequency <sup>1</sup>
Nickel <sup>2</sup>	mg/kg	Core	Semiannually
Potassium <sup>2</sup>	mg/kg	Core	Semiannually
Selenium <sup>2</sup>	mg/kg	Core	Semiannually
Silver <sup>2</sup>	mg/kg	Core	Semiannually
Strontium <sup>2</sup>	mg/kg	Core	Semiannually
Thallium <sup>2</sup>	mg/kg	Core	Semiannually
Tin <sup>2</sup>	mg/kg	Core	Semiannually
Titanium <sup>2</sup>	mg/kg	Core	Semiannually
Vanadium <sup>2</sup>	mg/kg	Core	Semiannually
Zinc <sup>2</sup>	mg/kg	Core	Semiannually
Perchlorate	mg/kg	Core	Semiannually
Total Nitrogen	mg/kg	Core	Semiannually
Phosphorus	mg/kg	Core	Semiannually
Sulfate	mg/kg	Core	Semiannually

<sup>1</sup> Samples shall be collected and analyzed in January and July of each year. Semiannually means at least once during the months of January and July.

<sup>2</sup> All metals shall be reported as total and dissolved. Hardness as CaCO<sub>3</sub> shall also be analyzed.

6. **Infauna.** The Discharger shall prepare a monitoring plan that identifies the locations of benthic infauna monitoring. A minimum of 3 locations representative of the area of greatest potential impact and within the fireworks deposition zone shall be selected. All monitoring locations shall be approved by the Regional Board.

For analysis of benthic infauna, two replicate samples of bottom sediment shall be collected and analyzed in January and July from a minimum of 3 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.

An additional array of 10 randomly selected stations shall be sampled and analyzed annually for sediment chemistry and benthic fauna. The same procedures must be followed as outlined in F.5 and F.6, with the exception of the number of samples collected at each station. Only one sample is required from each of the 10 randomly selected stations. The stations shall be reselected each year by USEPA using USEPA probability-based Environmental Monitoring and Assessment Program. The area shall extend throughout the Pacific Passage.

The random benthic sampling requirement may be suspended as part of a resource exchange agreement to allow for participation in the Southern California BRIGHT Regional Monitoring Surveys at the discretion of the Executive Officer. The benthic sampling may only be canceled for the year in which the BRIGHT Survey is conducted.

- 7. 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.
- 8. An aerial 8 ½ x 11 map that clearly outlines the fireworks deposition zone shall be prepared for each sampling event.

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.*

TENTATIVE  
JOHN H. ROBERTUS  
Executive Officer

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Date