

TENTATIVE

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN DIEGO REGION

REVISED TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2005-0126

NATIONAL STEEL AND SHIPBUILDING COMPANY

**BAE SYSTEMS SAN DIEGO SHIP REPAIR, INC.
(FORMERLY SOUTHWEST MARINE, INC.)**

CITY OF SAN DIEGO

**MARINE CONSTRUCTION AND DESIGN COMPANY
AND CAMPBELL INDUSTRIES, INC.**

~~CHEVRON, A SUBSIDIARY OF CHEVRON TEXACO~~

~~BP~~

**SAN DIEGO GAS AND ELECTRIC,
A SUBSIDIARY OF SEMPRA ENERGY COMPANY**

UNITED STATES NAVY

SHIPYARD SEDIMENT SITE

SAN DIEGO BAY

SAN DIEGO, CALIFORNIA

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

JURISDICTION

1. **WASTE DISCHARGE.** Elevated levels of pollutants above San Diego Bay background conditions exist in the San Diego Bay bottom marine sediment along the eastern shore of central San Diego Bay in an area extending approximately from the Sampson Street

Extension to the north and Chollas Creek to the south and from the within and adjacent to the National Steel and Shipbuilding Company Shipyard facility (hereinafter "NASSCO") and Southwest Marine, Inc hereinafter "Southwest Marine) the BAE Systems San Diego Ship Repair Facility (hereinafter "BAE Systems") shoreline out to the San Diego Bay main shipping channel to the west leaseholds. This area is (hereinafter collectively referred to as the "Shipyard Sediment Site"). NASSCO, BAE Systems San Diego Ship Repair, Inc., City of San Diego, Marine Construction and Design Company and Campbell Industries, Inc., Chevron, a subsidiary of ChevronTexaco, BP as the parent company and successor to Atlantic Richfield Company, San Diego Gas and Electric, a subsidiary of Sempra Energy Company, and the United States Navy have each caused or permitted the discharge of pollutants to the Shipyard Sediment Site resulting in the accumulation of pollutants in the marine sediment. The contaminated marine sediment concentrations of these pollutants causes or threatens to cause conditions of pollution, contamination, and nuisance in San Diego Bay that adversely affects three categories of beneficial uses aquatic life, aquatic-dependent wildlife, and human health and San Diego Bay beneficial uses. A map of the Shipyard Sediment Site region is provided in Attachment 1 to this Order.

PERSONS RESPONSIBLE

- 2. NATIONAL STEEL AND SHIPBUILDING COMPANY (NASSCO), A SUBSIDIARY OF GENERAL DYNAMICS COMPANY.** The National Steel and Shipbuilding Company, a subsidiary of General Dynamics Company (hereinafter NASSCO) owns and operates a full service ship construction, modification, repair, and maintenance facility on 126 acres of tidelands property leased from the San Diego Unified Port District (SDUPD) on the eastern waterfront of central San Diego Bay at 2798 Harbor Drive in San Diego. Shipyard operations have been conducted at this site by NASSCO over San Diego Bay waters or very close to the waterfront since 1945. Shipyard facilities operated by NASSCO over the years at the Site have included concrete platens used for steel fabrication, a graving dock, shipbuilding ways, and berths on piers or land to accommodate the berthing of ships. An assortment of waste is generated at the facility including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse. (hereinafter NASSCO) has (1) caused or permitted pollutants waste from its shipyard operations, including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc), butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated triphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH), to be discharged to San Diego Bay in violation of waste discharge requirements prescribed by the Regional Board.; and NASSCO also (2) discharged or deposited waste where it was discharged into San Diego Bay creating, or threatening to create, a condition of pollution or nuisance. These wastes contained metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH). these pollutants in the catch basins and collection sumps associated with the on-site storm water conveyance system (SWCS), inside the SWCS, and other locations where they were discharged into San Diego Bay. Metals, butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated triphenyls (PCTs), and polynuclear

aromatic hydrocarbons (PAHs) from NASSCO's shipyard operations have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay. Based on these considerations NASSCO is referred to as "Discharger(s)" in this Cleanup and Abatement Order.

NASSCO, a subsidiary of General Dynamics Company, owns and operates a full service ship construction, modification, repair, and maintenance facility on 126 acres of tidelands property leased from the San Diego Unified Port District (SDUPD) on the eastern waterfront of central San Diego Bay at 2798 Harbor Drive in San Diego. Shipyard operations have been conducted at this site by NASSCO over San Diego Bay waters or very close to the waterfront since 1945. Shipyard facilities operated by NASSCO over the years at the Site have included concrete platens used for steel fabrication, a graving dock, shipbuilding ways, and berths on piers or land to accommodate the berthing of ships. An assortment of waste is generated at the facility including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse.

- BAE SYSTEMS SAN DIEGO SHIP REPAIR, INC., FORMERLY SOUTHWEST MARINE, INC. (SOUTHWEST MARINE).** Southwest Marine owns and operates a ship repair, alteration, and overhaul facility on approximately 27 acres of tidelands property leased from the San Diego Unified Port District (SDUPD) on the eastern waterfront of central San Diego Bay at the foot of Sampson Street in San Diego. Southwest Marine has conducted shipyard operations over San Diego Bay waters or very close to the waterfront since 1979. Shipyard facilities operated by Southwest Marine over the years have included concrete platens used for steel fabrication, floating dry docks, and five piers. An assortment of waste is generated at the facility including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse. Southwest Marine BAE Systems San Diego Ship Repair, Inc. has (1) caused or permitted pollutants waste from its shipyard operations, including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated triphenyls terphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH), to be discharged into San Diego Bay in violation of waste discharge requirements prescribed by the Regional Board.; and NASSCO also (2) discharged or deposited waste where it was discharged into San Diego Bay creating, or threatening to create, a condition of pollution or nuisance. These wastes contained metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH).these pollutants in the catch basins and collection sumps associated with the on-site storm water conveyance system (SWCS), inside the SWCS, and other locations where they were discharged into San Diego Bay. Metals, butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated triphenyls (PCTs), and polynuclear aromatic hydrocarbons (PAHs) from Southwest Marine's shipyard operations have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality

~~objectives for toxic pollutants in San Diego Bay.~~ Based on these considerations ~~Southwest Marine BAE Systems San Diego Ship Repair, Inc.~~ is referred to as “Discharger(s)” in this Cleanup and Abatement Order.

From 1979 to the present, Southwest Marine, Inc. and its successor BAE Systems San Diego Ship Repair, Inc., hereinafter collectively referred to as BAE Systems, have owned and operated a ship repair, alteration, and overhaul facility on approximately 39.6 acres of tidelands property on the eastern waterfront of central San Diego Bay. The facility, currently referred to as BAE Systems San Diego Ship Repair, is located on land leased from the San Diego Unified Port District (SDUPD) at 2205 East Belt Street, foot of Sampson Street in San Diego, San Diego County, California. Shipyards facilities operated by BAE Systems over the years have included concrete platens used for steel fabrication, two floating dry docks, five piers, and two marine railways. An assortment of waste has been generated at the facility including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse.

4. **CITY OF SAN DIEGO.** The City of San Diego owns and operates a municipal separate storm ~~water conveyance~~ sewer system (MS4) through which it discharges pollutants commonly found in urban runoff to San Diego Bay subject to the terms and conditions of a NPDES Storm Water Permit. The City of San Diego has caused or permitted the discharge of urban storm water pollutants directly to San Diego Bay at the Shipyards Sediment Site, in violation of waste discharge requirements. The waste includes ~~ing~~ metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), total suspended solids, sediment (due to anthropogenic activities), petroleum products, and synthetic organics (pesticides, herbicides, and PCBs) through its SW4 (located on the ~~Southwest Marine BAE Systems~~ leasehold) and SW9 (located on the NASSCO leasehold) MS4 conduit pipes, as well as other MS4 conduit pipes which historically discharged directly into the Shipyards Sediment Site. The City of San Diego has also caused or permitted the discharge of these urban storm water pollutants in violation of waste discharge requirements, through its MS4 to Chollas Creek resulting in the exceedances of chronic and acute California Toxics Rule copper, lead, and zinc criteria for the protection of aquatic life, in violation of waste discharge requirements prescribed by the Regional Board. U.S. Navy's Studies indicate that during storm events, storm water plumes toxic to marine life and containing urban storm water pollutants, emanate from Chollas Creek discharges sediment plumes, containing urban storm water pollutants, up to 2 1.2 kilometers into San Diego Bay, including and contribute to pollutant levels at the Shipyards Sediment Site. The urban storm water pollutants in the on-site and off-site MS4 discharges have contributed to the accumulation of pollutants in the marine sediments at the Shipyards Sediment Site to levels, which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay. Based on these considerations the City of San Diego is referred to as “Discharger(s)” in this Cleanup and Abatement Order.

5. **MARINE CONSTRUCTION AND DESIGN COMPANY AND CAMPBELL INDUSTRIES, INC.** ~~Marine Construction and Design Company (MARCO) and Campbell Industries, Inc. (Campbell) are the parent companies to the operators of San Diego Marine Construction Corp (SDMC). SDMC operated a ship repair, alteration, and overhaul facility~~

~~on what is now the Southwest Marine leasehold at the foot of Sampson Street in San Diego from approximately the 1920s to 1979. Shipyard operations were conducted at this site by SDMC over San Diego Bay waters or very close to the waterfront. An assortment of waste was generated at the facility including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse. SDMC Marine Construction and Design Company and Campbell Industries, Inc. (hereinafter collectively referred to as "SDMC") has (1) caused or permitted pollutants from its shipyard operations, including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated triphenyls terphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH) to be discharged to San Diego Bay in violation of waste discharge requirements; and (2) discharged or deposited waste where it was discharged into San Diego Bay creating, or threatening to create, a condition of pollution or nuisance. These wastes contained metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH), prescribed by the Regional Board. SDMC also deposited these pollutants in the catch basins and collection sumps associated with the on-site storm water conveyance system (SWCS), inside the SWCS, and other locations where they were discharged into San Diego Bay. Metals, butyl tin species, polychlorinated biphenyls (PCBs), polychlorinated triphenyls (PCTs), and polynuclear aromatic hydrocarbons (PAHs) from SDMC's shipyard operations have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay. Based on these considerations, Marine Construction and Design Company and Campbell Industries, Inc. are referred to as "Discharger(s)" in this Cleanup and Abatement Order.~~

Between 1914 and 1979, San Diego Marine Construction Company and its successor San Diego Marine Construction Corporation, a wholly owned subsidiary of Campbell Industries, Inc., a wholly owned subsidiary of Marine Construction and Design Company (MARCO), collectively referred to as SDMC, operated a ship repair, alteration, and overhaul facility on what is now the BAE Systems leasehold at the foot of Sampson Street in San Diego. Shipyard operations were conducted at this site by SDMC over San Diego Bay waters or very close to the waterfront. An assortment of waste was generated at the facility including spent abrasive blast waste, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse.

- CHEVRON, A SUBSIDIARY OF CHEVRONTEXACO.** Chevron owns and operates the Chevron Terminal, a bulk fuel storage facility currently located at 2351 East Harbor Drive in the City of San Diego adjacent to the NASSCO and BAE Systems leaseholds. Fuel products containing petroleum hydrocarbons ~~and related constituents such as polynuclear aromatic hydrocarbons (PAHs)~~ have been stored at the Chevron Terminal since the early 1900s at both the currently operating 7 million gallon product capacity upper tank farm and the closed 5 million gallon capacity lower tank farm. ~~Storm water flows from Chevron Terminal enter a City of San Diego MS4 storm drain that terminates in San Diego Bay in the Shipyard Sediment Site approximately 300 feet south of the Sampson Street extension. Industry wide~~

~~operational practices, especially in the years prior to the State of California's passage of the Aboveground Petroleum Storage Act in 1990, often led to discharges from aboveground storage tank facilities such as the Chevron Terminal as a result of leaks and spills from tanks due to advanced age, defects in design or installation, human error, and equipment failure. Available records provide evidence of specific discharges of petroleum hydrocarbon pollutants from the Chevron Terminal facility to San Diego Bay at the Shipyard Sediment Site as a result of various spills and leaks in 1913, 1967 and 1973. Elevated concentrations of phase separated hydrocarbons (PSH) pollutants have also been found in soil and ground water at the upper and the former lower tank farm site. These pollutants may eventually migrate to San Diego Bay at the Shipyard Sediment Site via various preferential pathways. Chevron also discharges storm water runoff from Chevron Terminal to San Diego Bay at the Shipyard Sediment Site subject to the terms and conditions of the statewide Industrial NPDES Storm Water Permit. Monitoring reports submitted by Chevron during the years 1994 through 2004 indicate elevated levels of zinc; lead, cadmium, and copper are consistently present in the storm water discharge from the site. Based on these considerations Chevron caused or permitted the discharges of petroleum hydrocarbons, PAHs, zinc, lead, cadmium, and copper into San Diego Bay at the Shipyard Sediment Site, in violation of waste discharge requirements prescribed by the Regional Board. The discharges cited above have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay. Based on the information that the Regional Board has reviewed to date, there is insufficient evidence to find that discharges from the Chevron Terminal contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels, which create, or threaten to create, conditions of pollution or nuisance. Accordingly, Chevron is not referred to as "Discharger(s)" in this Cleanup and Abatement Order.~~

7. **BP AS THE PARENT COMPANY AND SUCCESSOR TO ATLANTIC RICHFIELD.** BP owns and operates the Atlantic Richfield Company (ARCO) Terminal, a bulk fuel storage facility with approximately 9 million gallons of capacity located at 2295 East Harbor Drive in the City of San Diego. Fuel products containing petroleum hydrocarbons and related constituents such as polynuclear aromatic hydrocarbons (PAHs) have been stored at ARCO Terminal since the early 1900s. ARCO owned and operated ancillary facilities include a wharf, fuel pier (currently ~~Southwest Marine~~ BAE Systems Pier 4), and a marine fueling station used for loading and unloading petroleum products and fueling from 1925 to 1978, and five pipelines connecting the terminal to the pier and wharf in use from 1925 to 1978. Storm water flows from ARCO Terminal enter a City of San Diego MS4 storm drain that terminates in San Diego Bay in the Shipyard Sediment Site approximately 300 feet south of the Sampson Street extension. ~~Industry-wide operational practices, especially in the years prior to the State of California's passage of the Aboveground Petroleum Storage Act in 1990, often led to discharges from aboveground storage tank facilities such as the ARCO Terminal due to leaks and spills from tanks due to advanced age, defects in design or installation, human error, and equipment failure. Similarly old fueling piers and pipelines were often the sources of releases and leaks due to the same factors. Available records provide evidence of specific discharges of petroleum hydrocarbon pollutants from the ARCO Terminal facility. Elevated concentrations of petroleum hydrocarbon pollutants have been found in soil and ground water at the ARCO Terminal. These pollutants may eventually migrate to San Diego Bay at the Shipyard Sediment Site via various preferential pathways. BP also discharges storm water runoff from ARCO Terminal to San Diego Bay at the Shipyard Sediment Site subject to the terms and conditions of the statewide Industrial NPDES Storm Water Permit. Monitoring reports submitted by BP during the years 2003, 2004, and 2005 indicate elevated levels of petroleum hydrocarbons (benzene, oil and grease) are present in the storm water discharge from the site. Prior to the early 1990s storm water was not analyzed prior to discharge. Based on these considerations BP caused or permitted the discharges of petroleum hydrocarbons into San Diego Bay at the Shipyard Sediment Site. The discharges cited above have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels, which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay. Accordingly Chevron is referred to as "Discharger(s)" in this Cleanup and Abatement Order. Based on the information that the Regional Board has reviewed to date, there is insufficient evidence to find that discharges from the ARCO Terminal contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels, which create, or threaten to create, conditions of pollution or nuisance. Accordingly, BP and ARCO are not referred to as "Discharger(s)" in this Cleanup and Abatement Order.~~

8. **SAN DIEGO GAS AND ELECTRIC, A SUBSIDIARY OF SEMPRA ENERGY.** ~~San Diego Gas and Electric, a subsidiary of Sempra Energy Company (hereinafter SDG&E) owned and operated the Silvergate Power Plant along the north side of the Southwest Marine leasehold from approximately 1943 to the 1990s. SDG&E utilized an easement to San Diego Bay along Southwest Marine's north property boundary for the intake and discharge of cooling water via concrete tunnels at flow rates ranging from 120 to 180 million gallons per day. SDG&E operations included discharging waste to holding ponds above the tunnels near the Shipyard Sediment Sites. SDG&E (1) has caused or permitted pollutants from its power plant operations, including metals (chromium, iron, copper, lead, nickel, and zinc), polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), total suspended solids, and petroleum hydrocarbons to be discharged to San Diego Bay in violation of waste discharge requirements prescribed by the Regional Board and (2) discharged waste or deposited waste where it would probably be discharged, including metals (chromium, copper, lead, nickel, and zinc), polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH-d and TPH-h), into San Diego Bay creating, or threatening to create, a condition of pollution or nuisance. Polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs) were discharged or deposited where it would be discharged to a City of San Diego storm drain system leading to San Diego Bay at the Shipyard Sediment Site creating or threatening to create a condition of pollution and nuisance. In addition, polychlorinated biphenyls (PCBs) residues are present in the location of the former waste holding ponds where it was discharged or deposited where it would be discharged threatens to discharge to San Diego Bay at the location of the Shipyard Sediment Sites, creating or threatening to create a condition of pollution and nuisance. Based on these considerations SDG&E is referred to as "Discharger(s)" in this Cleanup and Abatement Order.~~

San Diego Gas and Electric, a subsidiary of Sempra Energy Company (hereinafter SDG&E) owned and operated the Silver Gate Power Plant along the north side of the Southwest Marine BAE Systems leasehold from approximately 1943 to the 1990s. SDG&E utilized an easement to San Diego Bay along Southwest Marine's BAE Systems' north property boundary for the intake and discharge of cooling water via concrete tunnels at flow rates ranging from 120 to 180 million gallons per day. SDG&E operations included discharging waste to holding ponds above the tunnels near the Shipyard Sediment Sites.

9. **UNITED STATES NAVY.** ~~The US Navy is referred to as "Discharger(s)" in this Cleanup and Abatement Order based on the following considerations:~~
- a. ~~**US Navy Floating Dry Dock and Dockside Discharges.** Between the early 1950s through the early 1970s, the United States Navy (US Navy) owned and operated a floating dry dock (AFDL-37) located within the NASSCO leasehold that was used for naval vessel repair including solvent cleaning and degreasing of vessel parts and surfaces, abrasive blasting for paint removal and surface preparations, metal plating, and surface finishing and painting. The US Navy also used dockside space within the NASSCO leasehold for painting and scraping operations, which generate wastes that can be conveyed by water flows, become airborne (especially during dry blasting), or fall directly into receiving waters. Prevailing industry-wide shipyard operational practices in floating dry docks and adjacent work areas during the~~

1950s through the 1970s were not sufficient to adequately control or prevent pollutant discharges and often led to uncontrolled discharges of pollutants, including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc), butyltin species, polychlorinated biphenyls (PCBs)/ polychlorinated triphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH). The types of pollutants found in elevated concentrations at the Shipyard Sediment Site (metals, butyltin species, polychlorinated biphenyls (PCBs)/ polychlorinated triphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH)) are associated with the characteristics of the waste the US Navy operations generated at the NASSCO site. Based on these considerations the US Navy caused or permitted the discharges of these pollutants into the Shipyard Sediment Site. The discharges cited above have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay.

b. Naval Station San Diego Discharges. The US Navy also owns and operates a municipal separate storm water conveyance system (MS4) through which it discharges pollutants commonly found in urban runoff including metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc); total suspended solids, sediment (due to anthropogenic activities) petroleum products, and synthetic organics (pesticides, herbicides, and PCBs) to Chollas Creek from its Naval Station San Diego facility located at 32nd Street and Harbor Drive in the City of San Diego. The US Navy has caused or permitted the discharge of these urban storm water pollutants through its MS4 to Chollas Creek contributing to exceedances of chronic and acute California Toxics Rule copper, lead and zinc criteria for the protection of aquatic life. U.S. Navy studies indicate that, during storm events, Chollas Creek discharges sediment plumes containing urban runoff pollutants up to 2 kilometers into San Diego Bay over an area including the Shipyard Sediment Site. Based on these considerations the US Navy caused or permitted the discharge of urban runoff pollutants into the Shipyard Sediment Site from its Naval Station San Diego facility. The off-site MS4 discharges cited above have contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay.

The U.S. Navy owns and operates a municipal separate storm sewer system (MS4) at NAVSTA San Diego through which it has caused or permitted the discharge of pollutants commonly found in urban runoff to Chollas Creek and San Diego Bay, including excessive concentrations of copper, lead, and zinc in violation of waste discharge requirements. Technical reports by the U.S. Navy and others indicate that Chollas Creek outflows during storm events convey elevated sediment and urban runoff chemical pollutant loading and its associated toxicity up to 1.2 kilometers into San Diego Bay over an area including the Shipyard Sediment Site. The U.S. Navy has caused or permitted marine sediment and associated pollutants to be resuspended into the water column as a result of shear forces generated by the thrust of propellers during ship movements at NAVSTA San Diego. The resuspended sediment and pollutants can be transported by tidal currents and deposited in other parts of San Diego Bay, including the Shipyard Sediment Site. The discharges cited above have contributed to the accumulation of pollutants in marine sediment at the Shipyard

Sediment Site to levels, which cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay. Based on the preceding considerations, the U.S. Navy is referred to as “Discharger(s)” in this Cleanup and Abatement Order.

From the year 1921 to the present, the U.S. Navy has provided shore support and pier-side berthing services to U.S. Pacific fleet vessels at Naval Station San Diego (NAVSTA San Diego) located at 3445 Surface Navy Boulevard in the City of San Diego. NAVSTA San Diego currently occupies 1,029 acres of land and 326 water acres adjacent to San Diego Bay to the west, and Chollas Creek to the north near Pier 1. Between the years 1938 and 1956 the NAVSTA San Diego leasehold included a parcel of land, referred to as the 28th Street Shore Boat Landing Station, located at the south end of the present day NASSCO leasehold at the foot of 28th Street and including the 28th Street Pier. At this location, the U.S. Navy conducted operations similar in scope to a small boatyard including solvent cleaning and degreasing of vessel parts and surfaces, abrasive blasting and scraping for paint removal and surface preparations, metal plating, and surface finishing and painting. Prevailing industry-wide boatyard operational practices employed during the 1930s through the 1980s were often not sufficient to adequately control or prevent pollutant discharges and often led to excessive discharges of pollutants and accumulation of pollutants in marine sediment in San Diego Bay. The types of pollutants found in elevated concentrations at the Shipyard Sediment Site (metals, butyltin species, polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs), polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPH)) are associated with the characteristics of the waste the U.S. Navy operations generated at the 28th Street Shore Boat Landing Station site.

FACTUAL BACKGROUND

10. **CLEAN WATER ACT SECTION 303(d) LIST.** Approximately 55 acres of The San Diego Bay shoreline between Sampson and 28th Streets is listed on the Clean Water Act Section 303(d) list of water quality limited segments for elevated levels of copper, mercury, zinc, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in the marine sediment. These pollutants are impairing the aquatic life, aquatic-dependent wildlife, and human health beneficial uses designated for San Diego Bay. The Shipyard Sediment Sites occupy this shoreline. The Regional Board has determined that issuance of a cleanup and abatement order (in lieu of a Total Maximum Daily Load program) is the appropriate regulatory tool to use for correcting the impairment at the Shipyard Sediment Site.
11. **SEDIMENT QUALITY INVESTIGATION.** NASSCO and BAE Systems (formerly Southwest Marine) conducted a detailed sediment investigation at the Shipyard Sediment Site in San Diego Bay within and adjacent to the NASSCO and BAE Systems leaseholds. Two phases of fieldwork were conducted, Phase I in 2001 and Phase II in 2002. The results of the investigation are provided in the Exponent report *NASSCO and Southwest Marine Detailed Sediment Investigation, September 2003* (Shipyard Report). Unless otherwise explicitly stated, the Regional Board’s finding and conclusions in this Cleanup and

Abatement Order are based on the data and other technical information contained in the Shipyard Report ~~report~~ prepared by NASSCO's and BAE Systems' ~~Southwest Marine's~~ consultant, Exponent, entitled ~~NASSCO and Southwest Marine Detailed Sediment Investigation, September 2003.~~

AQUATIC LIFE BENEFICIAL USE IMPAIRMENT

12. **AQUATIC LIFE IMPAIRMENT.** Aquatic life beneficial uses designated for San Diego Bay are impaired due to the elevated levels of pollutants present in the marine sediment at the Shipyard Sediment Site. Aquatic life beneficial uses include: Estuarine Habitat (EST), Marine Habitat (MAR), and Migration of Aquatic Organisms (MIGR). This finding is based on the considerations described below in this *Impairment Of Aquatic Life Beneficial Uses* section of the Cleanup and Abatement Order.
13. **~~MULTIPLE LINES OF EVIDENCE~~ WEIGHT-OF-EVIDENCE APPROACH.** ~~There is no single method that measures the adverse effects of contaminated sediments at all times and to all organisms.~~ The Regional Board used a weight-of-evidence approach based upon multiple lines of evidence ~~approach to assess to evaluate~~ the potential risks to aquatic life beneficial uses from pollutants at the Shipyard Sediment Site. The approach focused on measuring and evaluating exposure and adverse effects to the benthic macroinvertebrate community and to fish using data from multiple lines of evidence and best professional judgment. Pollutant exposure and adverse effects to the benthic macroinvertebrate community were evaluated using sediment quality triad measurements, bioaccumulation analyses, and interstitial water (i.e., pore water) analyses. The Regional Board evaluated pollutant exposure and adverse effects to fish using fish histopathology analyses and analyses of polynuclear aromatic hydrocarbon (PAH) breakdown products in fish bile.
14. **SEDIMENT QUALITY TRIAD MEASURES.** The Regional Board used lines of evidence organized into a ~~the~~ sediment quality triad ~~approach~~ to evaluate potential risks to the benthic community from pollutants present in the Shipyard Sediment Site. The sediment quality triad provides a “weight-of-evidence” approach to sediment quality assessment by integrating synoptic measures of sediment chemistry, toxicity, and benthic community composition. All three measures provide a framework of complementary evidence for assessing the degree of ~~pollution~~ pollutant-induced degradation in the benthic community.
15. **BASELINE REFERENCE SEDIMENT QUALITY CONDITIONS.** ~~Implicit in evaluating if aquatic life impairments exist using the Sediment Quality Triad approach is the assumption that pollution in terms of sediment chemistry, toxicity, and benthic community structure is worse at the Shipyard Sediment Site than other areas in San Diego Bay. The Regional Board selected a pool of reference stations in San Diego Bay to characterize the baseline condition (Baseline Pool). The pool~~ Regional Board selected a group of reference stations were sampled from three independent sediment quality investigations to contrast pollution conditions at the Shipyard Sediment Site with conditions found in other relatively cleaner areas of San Diego Bay not affected by the Shipyard Sediment Site: (1) Southern California Bight 1998 Regional Monitoring Program (Bight 98), (2) 2001 Mouth of Chollas Creek and Mouth of Paleta Creek TMDL studies, and (3) 2001 NASSCO and Southwest

Marine (now BAE Systems) Detailed Sediment Investigation. Stations from these studies were selected to represent selected physical, chemical, and biological characteristics of San Diego Bay. Criteria for selecting acceptable reference stations included low levels of anthropogenic pollutant concentrations, locations remote from pollution sources, similar biological habitat to the Shipyard Sediment Site, sediment total organic carbon (TOC) and grain size profiles similar to the Shipyard Sediment Site, adequate sample size for statistical analysis, and sediment quality data comparability. The reference stations selected for the ~~Baseline Pool~~ Reference Sediment Quality Conditions are ~~identified~~ shown below.

Reference Stations Used To Establish Baseline Reference Sediment Quality Conditions

2001 Chollas/Paletta Reference Station Identification Number	2001 NASSCO/Southwest Marine <u>BAE Systems</u> Reference Station Identification Number	1998 Bight'98 Reference Station Identification Number
2231	2231	2235
2243	2243	2241
2433	2433	2242
2441	2441	2243
2238		2256
		2257
		2258
		2260
		2265

16. **SEDIMENT QUALITY TRIAD RESULTS.** ~~Based on the synoptic measures of sediment chemistry, toxicity, and benthic community composition at the Shipyard Sediment Site,~~ The Regional Board categorized 14 of 30 Sediment Quality Triad sampling stations at the Shipyard Sediment Site as having sediment pollutant levels “likely” to adversely affect the health of the benthic community. These results are based on the synoptic measures of sediment chemistry, toxicity, and benthic community structure at the Shipyard Sediment Site. ~~The results of this analysis are summarized in the table below.~~

Results of the Sediment Quality Triad Approach

Site	Station	Sediment Chemistry ⁽¹⁾	Toxicity ⁽²⁾	Benthic Community ⁽³⁾	Weight of Evidence Category ⁽⁴⁾
NASSCO	NA01	High	Low	Low	Possible
	NA03	High	Low	Low	Possible
	NA04	High	Low	Low	Possible
	NA05	High	Low	Low	Possible
	NA06	High	Low	Low	Possible
	NA07	High	Low	Low	Possible
	NA09	High	Moderate	Low	Likely
	NA11	High	Moderate	Low	Likely
	NA12	Moderate	Moderate	Low	Possible
	NA15	High	Low	Low	Possible
	NA16	High	Moderate	Low	Likely
	NA17	High	Low	Low	Possible
	NA19	High	Moderate	Low	Likely
	NA20	Moderate	Low	Moderate	Likely
NA22	High	Moderate	Moderate	Likely	
SWM	SW02	High	Low	Low	Possible
	SW03	High	Low	Low	Possible
	SW04	High	Low	Moderate	Likely
	SW08	High	Low	Low	Possible
	SW09	High	Low	Low	Possible
	SW11	High	Low	Low	Possible
	SW13	High	Moderate	Low	Likely
	SW15	High	Moderate	Low	Likely
	SW17	High	Moderate	Low	Likely
	SW18	High	Low	Low	Possible
	SW21	High	Low	Low	Possible
	SW22	High	Moderate	Low	Likely
	SW23	High	Moderate	Low	Likely
	SW25	High	Moderate	Low	Likely
SW27	High	Moderate	Low	Likely	

- (1) Relative likelihood that the chemicals present in the sediment are adversely impacting organisms living in or on the sediment based on the comparison to sediment quality guidelines (e.g. Effects Range Medium (ERM), Sediment Quality Guideline Quotients (SQGQ) and to the reference condition.
- (2) Relative likelihood of toxic effects based on the combined toxic response from three tests: amphipod survival, sea urchin fertilization, and bivalve development.
- (3) Relative likelihood of benthic community degradation based on four metrics: total abundance, total number of species, Shannon-Wiener Diversity Index, and the Benthic Response Index.
- (4) Relative likelihood that the health of the benthic community is adversely impacted based on the three lines of evidence: sediment chemistry, toxicity, and benthic community.

17. **BIOACCUMULATION.** The Regional Board evaluated initial laboratory bioaccumulation test data to ascertain the bioaccumulation potential of the sediment chemicals pollutants at the Shipyard Sediment Site. ~~The bioaccumulation tests involved the exposure of the clam *Macoma nasuta* to site sediments for 28 days using the protocols specified by ASTM. *Macoma nasuta* was selected as the test species for the initial bioaccumulation testing because it is native to the West Coast and actively ingests surface sediments (likely to be the most direct route of exposure to pollutants that accumulate in tissues).~~ Examination of laboratory test data on the chemical pollutant concentrations in tissue of the clam (*Macoma nasuta*) ~~tissue~~ relative to the pollutant concentrations in sediment indicates that bioaccumulation of chemical pollutants is occurring at the Shipyard Sediment Site. The data indicates for several chemical pollutants that concentrations in *Macoma nasuta* tissue increase in proportion to as chemical pollutant concentrations in sediment increase. Statistically significant relationships were found for arsenic, copper, lead, mercury, zinc, TBT, total PCBs, and high molecular weight polynuclear aromatic hydrocarbons (HPAHs). These chemicals pollutants have a bioaccumulation potential at the Shipyard Sediment Site and are therefore considered bioavailable to benthic organisms. No statistically significant relationships were found for cadmium, chromium, nickel, selenium, silver, or PCTs.
18. **PORE WATER.** The Regional Board evaluated the chemistry of pore water, the water occupying the spaces between sediment particles, at the Shipyard Sediment Site to determine compliance with California Toxics Rule (CTR) water quality criteria and the potential risks to the benthic community from chemical pollutants present in the sediment. ~~Pore water chemistry concentrations at the site were compared to water quality criteria established in the California Toxics Rule contained in 40 CFR 131.38.~~ Comparisons were made to the CTR saltwater quality criterion continuous concentration, which is the highest concentration of a pollutant to which marine aquatic life can be exposed for an extended period of time without deleterious effects. Of the 12 site stations sampled for pore water (SW02 was excluded due to the presence of some suspended material remaining after centrifugation), 12 stations exceeded the copper CTR value, 6 stations exceeded the lead CTR value, and 12 stations exceeded the total PCBs CTR value. Although the comparisons to the CTR criteria identified several pollutants for which measured pore water concentrations are above levels of concern, the measured pore water concentrations may be biased high due to the possible presence of very fine suspended or colloidal material in the pore water samples that could not be removed by centrifugation. ~~The pore water samples collected at the Shipyard Sediment Site were not filtered (in accordance with EPA guidance) and were reported as total concentrations, whereas the CTR values are filtered and are reported as dissolved fractions.~~

Comparison of Pore Water Concentrations at the Shipyard Sediment Site to CTR Water Quality Criteria

Station	Metals and PCBs (ug/L)								
	As	Cd	Cr (VI)	Cu	Pb	Ni	Se	Zn	PCBs (sum of homologs)
NA01	19	0.05	25	14	5.2	2.3	5.2	23	68
NA06	9.1	0.05	25	33	12	2.2	2.5	44	200
NA13	12	0.05	25	14	6.5	2.5	2.5	30	56
NA16	17	0.05	25	22	9	2.7	2.5	33	94
NA17	20	0.05	25	23	7	2.9	2.5	32	84
SW01	6.1	0.05	25	17	6.6	3	2.5	22	500
SW02 (outlier)	11	4.2	25	390	120	37	6.1	610	51,600
SW04	15	0.05	25	55	20	3.3	2.5	60	600
SW08	9.9	0.05	25	33	12	2	2.5	34	520
SW12	19	0.05	25	17	7.1	2.8	2.5	32	80
SW24	10	0.05	25	25	9.8	2.6	2.5	37	670
SW25	17	0.05	25	28	13	2.9	2.5	42	180
SW28	9	0.05	25	19	7.5	2.4	2.5	31	290

Note: Boxed and shaded values for Shipyard Sediment Site locations exceed CTR water quality criteria.

19. **FISH HISTOPATHOLOGY.** The Regional Board evaluated fish histopathology data to determine the potential exposure and associated adverse effects of on fish to from chemical pollutants present within and adjacent to the Shipyard Sediment Site. A total of 253 spotted sand bass were examined for various histopathological lesions. These spotted sand bass were collected from four discrete assessment units at the Shipyard Sediment Site and at a reference area located across San Diego Bay near Reference Station 2240. The fish histopathology data indicates a total of 70 types of histopathological lesions were found in the spotted sand bass. Of the 70 types of lesions found, ~~only four~~ five lesions exhibited statistically significant elevations relative to reference conditions. The five lesions are abundant lipofuscin in liver, abundant hemosiderin in liver, cholangitis/biliary hyperplasia (CBH) in liver, nephritis in kidney, and shiny gill foci. ~~However, a fifth~~ A sixth lesion (i.e., ~~abundant hemosiderin in liver~~ foci of cellular alteration in livers) was considered important ~~by the pathologist and was nearly statistically significant for the purposes of this study~~ even though no statistical differences were found because the existence of these lesions indicates a harmful effect strongly linked to PAH exposure. ~~The five lesions and their severity with respect to reference conditions are summarized below.~~

Summary of Microscopic and Macroscopic Lesions Significantly Elevated Relative to Reference Conditions

		Prevalence of Lesions (percent)				
		NASSCO		BAE Systems (formerly Southwest Marine)		Reference Area
Lesion	Severity Scores	Inside	Outside	Inside	Outside	
Microscopic						
Liver						
Abundant Lipofusein	0—None	74	92	75	88	96
	1—Mild	12	6	6	12	4
	2—Moderate	2	2	8	0	0
	3—Severe	12	0	12	0	0
Abundant Hemosiderin	0—None	98	78	98	80	94
	1—Mild	2	22	2	20	6
	2—Moderate	0	0	0	0	0
	3—Severe	0	0	0	0	0
Cholangitis /Biliary Hyperplasia	0—None	66	76	80	80	88
	1—Mild	28	24	14	20	12
	2—Moderate	6	0	6	0	0
	3—Severe	0	0	0	0	0
Foci of Cellular Alteration						
Eosinophilic Foci	NA	8	4	0	6	4
Basophilic Foci	NA	10	10	4	8	13
Clear Cell Foci	NA	10	2	6	4	2
Kidney						
Nephritis	0—None	48	66	76	66	75
	1—Mild	48	32	22	32	25
	2—Moderate	4	2	0	2	0
	3—Severe	0	0	2	0	0
Macroscopic						
Gill						
Shiny Gill Foci	0—None	12	10	0	0	10
	1—Mild	62	81	0	70	69
	2—Moderate	24	8	100	28	20

		Prevalence of Lesions (percent)				
		NASSCO		BAE Systems (formerly Southwest Marine)		Reference Area
Lesion	Severity Scores	Inside	Outside	Inside	Outside	
	3—Severe	2	0	0	2	2

Note: Boxed and shaded values indicate results significantly different relative to reference values.

Of the ~~five~~ six lesions identified as significantly elevated with respect to reference conditions, ~~none~~ two, CBH and foci of cellular alteration, ~~has~~ have been identified ~~in other scientific field studies~~ as being associated with sediment pollutant contaminant exposure. Scientific literature describing lesions that are potential biomarkers of environmental stressors in fish does not attribute causation of ~~liposusein~~ lipofuscin, hemosiderin, ~~eholangitis/biliary hyperplasia~~, nephritis, and shiny gill foci to pollution-related factors. It is plausible that the ~~five~~ lesions could have been caused by naturally occurring environmental factors such as infectious parasites. Based on these considerations the fish histopathology data does not indicate that the fish lesions observed in the data set can be conclusively attributed to contaminant exposure at the Shipyard Sediment Site.

20. **FISH BILE.** The Regional Board evaluated fish bile sampling results to determine the potential exposure of fish to polynuclear aromatic hydrocarbon (PAH) compounds within and adjacent to the Shipyard Sediment Site. The bile samples were analyzed for fluorescent aromatic compounds (FACs) and total proteins. Three groups of FACs were measured that correspond to metabolites (PAH breakdown products) from naphthalene, phenanthrene, and benzo[a]pyrene. Metabolites were detected in bile of spotted sand bass captured inside and outside of the Shipyard Sediment Site and within a reference area located across the bay from the shipyard sites near Reference Station 2240. ~~The bile breakdown products include naphthalene, phenanthrene, and benzo[a]pyrene. Of the three breakdown products,~~

Metabolites of two contaminants exhibited elevated levels statistically significant elevations relative to reference conditions in spotted sand bass collected immediately outside of the Shipyard Sediment Site when their mean concentrations were compared against reference data. No bile breakdown products metabolites were significantly elevated relative to reference conditions in spotted sand bass collected inside of the Shipyard Sediment Sites. ~~These results indicate that fish at the Shipyard Sediment Site are no more greatly exposed to PAH compounds than fish at the reference area in San Diego Bay.~~

The upper prediction limit (UPL) at the 95 percent confidence interval was also calculated for the metabolites of the reference area fish and compared to replicate fish bile samples from the four areas of the Shipyard Sediment Site (i.e., inside and outside of both NASSCO and BAE Systems leaseholds). The inside and outside areas of NASSCO had samples that exceeded the UPL. Inside NASSCO accounted for six of the 19 UPL exceedances. Two fish bile samples from inside NASSCO exceeded the UPL for naphthalene, phenanthrene, and

benzo[a]pyrene metabolites. From Outside NASSCO, 12 of the 13 UPL exceedances came from phenanthrene and benzo[a]pyrene metabolite samples.

For BAE Systems, all exceedances came from outside BAE Systems of which nine of 11 exceedances were for the benzo [a] pyrene metabolite samples. The remaining two exceedances were for the phenanthrene metabolite samples. No exceedances were found from inside BAE Systems; however, the PAH sediment chemistry data from inside BAE Systems showed the highest levels of sediment contamination.

The inconsistent relationship between the levels of FACs in fish and PAH contaminated sediment indicates that this data is inconclusive and the FAC concentrations observed in the fish cannot be exclusively attributed to contaminant exposure at the Shipyard Sediment Site. The variable nature of the sediment contamination found in bays and the mobility of the fish are confounding factors when attempting to correlate fish sampling results with sediment contamination.

Summary of Bile PAH Breakdown Products Significantly Elevated Relative to Reference Conditions

	Reference Area	NASSCO		BAE Systems	
		Inside	Outside	Inside	Outside
Naphthalene Metabolites (µg/mg protein)					
Mean	79	74.5	84.2	68.9	74
Standard Deviation	27.4	45.7	24.8	11.2	25.5
Minimum	58	26	64	55	49
Maximum	150	160	150	96	130
95% Upper Confidence Limit	131.7				
Phenanthrene Metabolites (µg/mg protein)					
Mean [†]	12.8	13.6	26.7	13.9	18.9
Standard Deviation	4.7	7.4	7.8	1.9	3.1
Minimum	7.1	5.7	20	11	14
Maximum	25	28	46	18	25
95% Upper Confidence Limit	21.9				
Benzo[a]pyrene Metabolites (µg/mg protein)					
Mean [†]	2.1	2.9	5.3	1.7	6.0
Standard Deviation	1.2	1.6	2.1	0.9	1.6
Minimum	0.7	0.5	2.7	0.7	2.8
Maximum	4.6	6	9.8	3.7	8.5
95% Upper Confidence Limit [†]	4.5				

~~**Note:** Boxed and shaded values for shipyard locations are significantly greater relative to reference values.~~

21. **INDICATOR SEDIMENT CHEMICALS.** The Regional Board evaluated the relationships between sediment chemicals pollutants and biological responses to identify indicator chemicals pollutants (i.e., chemicals of potential concern) that may be impacting aquatic life and would therefore be candidates for assignment of cleanup levels or remediation goals. A two-step process was conducted. The first step in the selection of indicator chemicals was to identify chemicals representative of the major classes of sediment pollutants: metals, butyltins, PCBs and PCTs, PAHs, and petroleum hydrocarbons. The second step was the evaluation of relationships between these chemicals and biological responses. Results of the three toxicity tests, benthic community assessment, and bioaccumulation testing conducted in Phase 1 of the Shipyards study were all used to evaluate the potential of such relationships. Chemicals pollutants were selected as indicator chemicals if they had any statistically significant relationship with amphipod mortality, echinoderm fertilization, bivalve development, total benthic macroinvertebrate abundance, total benthic macroinvertebrate richness, or tissue chemical concentrations in *Macoma nasuta*. Chemicals pollutants selected as indicator chemicals include arsenic, copper, lead, mercury, zinc, TBT, total PCB homologs, diesel range organics (DRO), and residual range organics (RRO).

AQUATIC-DEPENDENT WILDLIFE BENEFICIAL USES IMPAIRMENT

22. **AQUATIC-DEPENDENT WILDLIFE IMPAIRMENT.** Aquatic-dependent wildlife beneficial uses designated for San Diego Bay are impaired due to the elevated levels of pollutants present in the marine sediment at the Shipyards Sediment Sites. Aquatic-dependent wildlife beneficial uses include: Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), and Rare, Threatened, or Endangered Species (RARE). This finding is based on the considerations described below in the *Impairment of Aquatic-Dependent Wildlife Beneficial Uses* section of the Cleanup and Abatement Order.
23. **RISK ASSESSMENT APPROACH FOR AQUATIC-DEPENDENT WILDLIFE**. The Regional Board evaluated potential risks to aquatic-dependent wildlife from chemical pollutants present in the sediments at the Shipyards Sediment Site based on a two-tier approach. ~~This approach used an area use factor (AUF) of 1 and other conservative assumptions.~~ The Tier I screening level risk assessment was based on tissue data derived from the exposure of the clam *Macoma nasuta* to site sediments for 28 days using the protocols specified by American Society of Testing Material (ASTM). The Tier II comprehensive risk assessment was based on tissue data derived from resident fish and shellfish caught within and adjacent to the Shipyards Sediment Site. ~~The key receptors of concern considered in both tiers include:~~
- ~~a. Aquatic-Dependent Birds – California least tern (*Sterna antillarum brownie*), California brown pelican (*Pelecanus occidentalis californicus*), Surf scoter (*Melanitta perspicillata*), and Western grebe (*Aechmophorus occidentalis*);~~
 - ~~b. Marine Mammals – California sea lion (*Zalophus californianus*);~~

- c. ~~Marine Reptiles – East Pacific green turtle (*Chelonia mydas agassizii*); and~~
- d. ~~Submerged Aquatic Plants – Eelgrass (*Zostera marina*)~~

24. **TIER I SCREENING LEVEL RISK ASSESSMENT FOR AQUATIC-DEPENDENT WILDLIFE.** ~~The Tier I risk assessment objective was to determine whether or not Shipyard Sediment Site conditions pose a potential unacceptable risk to aquatic-dependent wildlife receptors of concern and to identify whether a comprehensive, site-specific risk assessment was warranted (i.e., Tier II baseline risk assessment).⁺ The receptors of concern selected for the assessment include: California least tern (*Sterna antillarum brownie*), California brown pelican (*Pelecanus occidentalis californicus*), Western grebe (*Aechmophorus occidentalis*), Surf scoter (*Melanitta perspicillata*), California sea lion (*Zalophus californianus*), and East Pacific green turtle (*Chelonia mydas agassizii*). Chemical pollutant concentrations measured in clam tissue derived from laboratory bioaccumulation tests were used to estimate chemical exposure to these receptors of concern. Based on the Tier I screening level risk assessment results, there is a potential risk to all receptors of concern ingesting prey caught at the Shipyard Sediment Site. The chemical pollutants in *Macoma* tissue posing a potential risk include arsenic, copper, lead, zinc, benzo[a]pyrene, and total PCBs. Potential risks were characterized by: (1) applying the hazard quotient (HQ) approach using *Macoma nasuta* tissue data from the bioaccumulation tests, and (2) comparing *Macoma nasuta* tissue concentrations from the shipyard sites to *Macoma nasuta* tissue concentrations from baseline conditions. Based on the Tier I results, the Regional Board identified six of nine Shipyard Sediment Site stations with *Macoma nasuta* tissue data as “likely” risks to the receptors of concern; thus requiring a Tier II risk assessment. The chemical pollutants of concern targeted for further study included arsenic, copper, lead, zinc, benzo[a]pyrene, and total PCBs.~~

⁺ ~~Potential risks were characterized by (1) applying the hazard quotient (HQ) approach using *Macoma nasuta* tissue data from the bioaccumulation tests, and (2) comparing *Macoma nasuta* tissue concentrations from the shipyard sites to *Macoma nasuta* tissue concentrations from baseline conditions.~~

Summary of Tier I Screening Level Risk Assessment Results

Station	Receptors "Likely" at Risk					Contaminants Posing "Likely" Risk to Receptors
	Brown Pelican	Least Tern	Sea Lion	Surf Scoter	Western Grebe	
NA06	X	X		X	X	Lead
SW04			X			Arsenic
	X	X		X	X	Copper, Lead
	X	X	X	X	X	Zinc
		X				Benzo[a]pyrene
SW08	X	X		X	X	Lead
		X				Zinc
		X				Benzo[a]pyrene, PCBs
SW13	X	X		X	X	Copper
		X				Zinc
	X	X				PCBs
SW21	X	X		X	X	Lead
		X				Zinc, Benzo[a]pyrene
	X	X				PCBs
SW28		X				Zinc, PCBs

Note: The East Pacific green turtle and eelgrass were not included in the analysis due to the lack of specific exposure parameters and toxicity reference values for these receptors of concern.

25. **TIER II BASELINE COMPREHENSIVE RISK ASSESSMENT FOR AQUATIC-DEPENDENT WILDLIFE.** The Tier II risk assessment objective was to more conclusively determine whether or not Shipyard Sediment Site conditions pose an unacceptable risk to aquatic-dependent wildlife receptors of concern. The receptors of concern selected for the assessment include: California least tern (*Sterna antillarum brownie*), California brown pelican (*Pelecanus occidentalis californicus*), Western grebe (*Aechmophorus occidentalis*), Surf scoter (*Melanitta perspicillata*), California sea lion (*Zalophus californianus*), and East Pacific green turtle (*Chelonia mydas agassizii*). To focus the risk assessment, prey items were collected within four assessment units at the Shipyard Sediment Site and from a reference area located across the bay from the site. Chemical concentrations measured in fish were used to estimate chemical exposure for the least tern, western grebe, brown pelican, and sea lion and chemical concentrations in benthic mussels and eelgrass were used to estimate chemical pollutant exposure for the surf scoter and green turtle, respectively. Based on the Tier II risk assessment results, ingestion of prey items caught within all four assessment units at the Shipyard Sediment Site poses a risk to all receptors of concern (excluding the sea lion). The chemical in prey tissue posing a risk include benzo[a]pyrene, total PCBs, copper, lead, mercury, and zinc. The Tier II-baseline risk assessment was based on tissue measurements from prey items collected from four discrete assessment units at the Shipyard Sediment Site and from a reference area located across San Diego Bay. The prey items collected from these areas included topsmelt (*Atherinops affinis*), anchovies (*Engraulis mordax*), spotted sand bass (*Paralabrax masculatofasciatus*), benthic mussels (*Musculista senhousi*), and eelgrass (*Zostera marina*). Although the Tier I screening level risk assessment identified only six chemicals as "likely" risks to receptors of concern, all

~~chemicals of potential concern were analyzed in the Tier II baseline risk assessment.² The Regional Board evaluated the Tier II risk assessment results and concluded that ingestion of the prey items caught within all four assessment units at the Shipyard Sediment Site poses a theoretical risk to all receptors of concern (excluding the East Pacific green turtle). The primary contaminants contributing to the cumulative cancer risk using the toxicity reference values (TRVs) developed by U.S. EPA Region 9 Biological Technical Assistance Group (BTAG) include lead, mercury, and selenium. Because BTAG TRVs were not available for benzo[a]pyrene and chromium, no-observed-adverse-effect level (NOAEL) TRVs were used as a substitute to determine the potential adverse effects from these chemicals of concern. Based on the risk results using the NOAEL TRVs, benzo[a]pyrene and chromium are also considered primary contaminants contributing to the cumulative cancer risk.~~

² Tier II risks were characterized by quantifying the cumulative risks at each of the four assessment units described above for each of the receptors of concern and then comparing those risks to the cumulative risks quantified for each of the receptors of concern at the reference area. An assessment unit was classified as a risk to a receptor of concern when the cumulative risk exceeded both the Hazard Quotient of 1 and reference risk levels.

Summary of Tier II Baseline Risk Assessment Results using the BTAG TRVs

Assessment Unit	BTAG Low	Cumulative Risk			Primary Contaminant Drivers (% Contribution to cumulative risk)
		>1	>Reference	Risk	
Inside NASSCO Leasehold	Brown Pelican	Yes	Yes	Yes	Lead (71%)
	Least Tern	Yes	Yes	Yes	Lead (81%)
	Sea Lion	Yes	Yes	Yes	Selenium (36%) Mercury (24%)
	Surf Scoter	Yes	Yes	Yes	Lead (91%)
	Western Grebe	Yes	Yes	Yes	Lead (89%)
Outside NASSCO Leasehold	Brown Pelican	Yes	Yes	Yes	Lead (74%)
	Least Tern	Yes	Yes	Yes	Lead (74%)
	Sea Lion	Yes	Yes	Yes	Selenium (35%) Mercury (24%)
	Western Grebe	Yes	Yes	Yes	Lead (85%)
Inside Southwest Marine Leasehold	Brown Pelican	Yes	Yes	Yes	Lead (74%)
	Least Tern	Yes	Yes	Yes	Lead (85%)
	Sea Lion	Yes	Yes	Yes	Selenium (42%) Mercury (17%)
	Surf Scoter	Yes	Yes	Yes	Lead (94%)
	Western Grebe	Yes	Yes	Yes	Lead (90%)
Outside Southwest Marine Leasehold	Brown Pelican	Yes	Yes	Yes	Lead (71%)
	Least Tern	Yes	Yes	Yes	Lead (78%)
	Sea Lion	Yes	Yes	Yes	Selenium (31%) Mercury (26%)
	Western Grebe	Yes	Yes	Yes	Lead (87%)

Note: The East Pacific green turtle was not included in the analysis due to the lack of specific exposure parameters and toxicity reference value.

Summary of Tier II Baseline Risk Assessment Results using the NOAEL TRVs (for benzo[a]pyrene and chromium)

Assessment Unit	NOAEL HQ	Cumulative Risk			Primary Contaminant Drivers (% Contribution to cumulative risk)
		>1	>Reference	Risk	
Inside NASSCO Leasehold	Brown Pelican	Yes	Yes	Yes	Mercury (49%) PCBs (23%)
	Least Tern	Yes	No	No	Not applicable
	Sea Lion	Yes	Yes	Yes	PCBs (49%) Arsenic (30%)
	Surf Scoter	Yes	Yes	Yes	BAP (32%) Chromium (21%)
	Western Grebe	Yes	Yes	Yes	Chromium (23%) Mercury (21%) PCBs (19%) BAP (17%)
Outside NASSCO Leasehold	Brown Pelican	Yes	Yes	Yes	Mercury (53%)
	Least Tern	Yes	No	No	Not applicable
	Sea Lion	No	No	No	Not applicable
	Western Grebe	No	No	No	Not applicable
Inside Southwest Marine Leasehold	Brown Pelican	Yes	Yes	Yes	Mercury (39%) PCBs (23%)
	Least Tern	Yes	Yes	Yes	PCBs (28%) BAP (22%) Mercury (18%)
	Sea Lion	Yes	Yes	Yes	PCBs (49%) Arsenic (31%)
	Surf Scoter	Yes	Yes	Yes	BAP (57%)
	Western Grebe	Yes	Yes	Yes	BAP (26%) PCBs (21%) Mercury (17%)
Outside Southwest Marine Leasehold	Brown Pelican	Yes	Yes	Yes	Mercury (55%) PCBs (19%)
	Least Tern	Yes	Yes	Yes	PCBs (27%) Mercury (24%) BAP (16%)
	Sea Lion	No	No	No	Not applicable
	Western Grebe	Yes	Yes	Yes	Mercury (23%) PCBs (22%) Chromium (17%)

Note: The East Pacific green turtle was not included in the analysis due to the lack of specific exposure parameters and toxicity reference value.

HUMAN HEALTH BENEFICIAL USES IMPAIRMENT

26. **HUMAN HEALTH IMPAIRMENT.** Human health beneficial uses designated for San Diego Bay are impaired due to the elevated levels of pollutants present in the marine sediment at the Shipyard Sediment Site. Human health beneficial uses include: Contact Water Recreation (REC-1), Non-contact Water Recreation (REC-2), Shellfish Harvesting (SHELL), and Commercial and Sport Fishing (COMM). This finding is based on the considerations described below in this *Impairment Of Human Health Beneficial Uses* section of the Cleanup and Abatement Order.
27. **RISK ASSESSMENT APPROACH FOR HUMAN HEALTH.** The Regional Board evaluated potential risks to human health from chemical pollutants present in the sediment at the Shipyard Sediment Site based on a two-tier approach. The Regional Board's assessment of potential human health risks from pollutants present in the Shipyard Sediment Site was based on a two-tier approach. This approach used a fractional intake (FI) of 1 and other conservative assumptions. The Tier I screening level risk assessment was based on tissue data derived from the exposure of the clam *Macoma nasuta* to site sediments for 28 days using American Society of Testing Material (ASTM) protocols. The Tier II comprehensive risk assessment was based on tissue data derived from resident fish and shellfish caught within and adjacent to the Shipyard Sediment Site. Two types of receptors (i.e., members of the population or individuals at risk) were evaluated:
- a. Recreational Anglers – Persons who eat the fish and/or shellfish they catch recreationally; and
 - b. Subsistence Anglers – Persons who fish for food, for economic and/or cultural reasons, and for whom the fish and/or shellfish caught is a major source of protein in their diet.
28. **TIER I SCREENING LEVEL RISK ASSESSMENT FOR HUMAN HEALTH.** The Tier I risk assessment objectives were to determine whether or not Shipyard Sediment Site conditions potentially pose an potential unacceptable risk to human health-recreational and subsistence anglers, and to identify if whether a comprehensive, site-specific risk assessment was warranted (i.e., Tier II baseline risk assessment). The receptors of concern identified for Tier I are recreational anglers and subsistence anglers. Recreational anglers represent those who eat the fish and/or shellfish they catch recreationally and subsistence anglers represent those who fish for food, for economic and/or cultural reasons, and for whom the fish and/or shellfish caught is a major source of protein in the diet. Chemical concentrations measured in *Macoma nasuta* tissue derived from laboratory bioaccumulation tests were used to estimate chemical exposure for these receptors of concern. Based on the Tier I screening level risk assessment results, there is a potential risk to recreational and subsistence anglers ingesting fish and shellfish caught at the Shipyard Sediment Site. The chemicals in *Macoma* tissue posing a potential risk include arsenic, BAP, PCBs, and TBT. Tier I was based on clam (*Macoma nasuta*) tissue concentrations derived from 28-day laboratory bioaccumulation tests. Potential risks were characterized by comparing *Macoma nasuta* tissue concentrations from nine Shipyard Sediment Site stations to:

- a. Tissue residue guidelines published by the California Office of Environmental Health Hazard, and
- b. The 95% upper prediction limits (UPL) calculated from the Baseline Pool *Macoma nasuta* tissue concentrations.

A Shipyard Sediment Site station was classified as a “possible” risk when one or more chemicals in the *Macoma nasuta* tissue exceeded both the TRGs and the 95% UPL thresholds. Based on the Tier I results, the Regional Board concluded that *Macoma nasuta* tissue data at eight of nine shipyard stations with *Macoma nasuta* tissue data were at levels that constituted a “possible” human health risk, subject to confirmation in a Tier II human health risk assessment study. The chemical pollutants of concern found to pose a “possible” cancer risk to both recreational and subsistence anglers include inorganic arsenic, benzo[a]pyrene, and total PCBs; tributyltin was determined to be a “possible” cancer risk to subsistence anglers only. PCBs were found to pose a “possible” non-cancer risk to both recreational and subsistence anglers; inorganic arsenic was found to pose a “possible” non-cancer risk to subsistence anglers.

Summary of Tier I Screening Level Risk Assessment Results for Recreational Anglers

Station	Contaminants Posing “Possible” Cancer Risk	Contaminants Posing “Possible” Non-Cancer Risk
NA06	PCBs, benzo[a]pyrene	PCBs
NA11	benzo[a]pyrene	None
NA20	benzo[a]pyrene	None
SW04	PCBs, benzo[a]pyrene, inorganic arsenic	PCBs
SW08	PCBs, benzo[a]pyrene	PCBs
SW13	PCBs, benzo[a]pyrene	PCBs
SW21	PCBs, benzo[a]pyrene	PCBs
SW28	PCBs, benzo[a]pyrene	PCBs

Summary of Tier I Screening Level Risk Assessment Results for Subsistence Anglers

Station	Contaminants Posing “Possible” Cancer Risk	Contaminants Posing “Possible” Non-Cancer Risk
NA06	PCBs, benzo[a]pyrene	PCBs
NA11	benzo[a]pyrene	None
NA20	benzo[a]pyrene	None
SW04	PCBs, tributyltin, benzo[a]pyrene, inorganic arsenic	PCBs, inorganic arsenic
SW08	PCBs, tributyltin, benzo[a]pyrene	PCBs
SW13	PCBs, benzo[a]pyrene	PCBs
SW21	PCBs, benzo[a]pyrene	PCBs
SW28	PCBs, benzo[a]pyrene	PCBs

29. TIER II BASELINE COMPREHENSIVE RISK ASSESSMENT FOR HUMAN HEALTH.

The Tier II risk assessment objective was to more conclusively determine whether Shipyard Sediment Site conditions pose unacceptable cancer and non-cancer health risks to recreational and subsistence anglers. Fish and shellfish were collected within four assessment units at the Shipyard Sediment Site and from two reference areas located across the bay from the Shipyard Site. Chemical concentrations measured in fish fillets and edible shellfish tissue were used to estimate chemical exposure for recreational anglers and chemical concentrations in fish whole bodies and shellfish whole bodies were used to estimate chemical exposure for subsistence anglers. Based on the Tier II risk assessment results, ingestion of fish and shellfish caught within all four assessment units at the Shipyard Sediment Site poses a theoretical increased cancer and noncancer risk to recreational and subsistence anglers. The chemicals posing cancer risks include inorganic arsenic and PCBs. The chemicals posing noncancer risks include cadmium, copper, mercury, and total PCBs.

The Tier II human health risk assessment was based on tissue measurements from fish and shellfish collected from four discrete assessment units within and adjacent to the shipyard leaseholds: inside NASSCO, outside NASSCO, inside Southwest Marine, and outside Southwest Marine. Additionally, fish and shellfish were collected from a reference area located across the bay from the Shipyard Sediment Site. The fish and shellfish included spotted sand bass (*Paralabrax masculatofasciatus*) and spiny lobsters (*Panulirus interruptus*), respectively. While the Tier I screening level risk assessment identified only four chemicals as “possible” risks to the recreational and subsistence anglers (inorganic arsenic, benzo[a]pyrene, tributyltin, and PCBs), all chemicals of potential concern were analyzed in the Tier II human health risk assessment.³ The Regional Board evaluated the

³ Tier II risks were characterized by quantifying the cumulative cancer risks and cumulative non-cancer hazard index at each of the four assessment units described above and then comparing those risks to the cumulative cancer risks and cumulative non-cancer hazard index quantified at the reference area. An assessment unit was classified as a cancer risk to recreational or subsistence anglers when the cumulative risk exceeded both the target risk level of 1×10^{-6} and reference risk levels. An assessment unit was classified as a non-cancer risk to recreational or subsistence anglers when the cumulative hazard index exceeded both the hazard index threshold of 1.0 and reference

Tier II risk assessment results and concluded that ingestion of spotted sand bass (whole body and fillet) and lobster (edible tissue only) caught within all four assessment units at the Shipyard Sediment Site poses a theoretical increased cancer risk, greater than one in a million (1×10^{-6}) and greater than reference, to both the recreational and subsistence anglers. The primary contaminants contributing to the cumulative cancer risk include inorganic arsenic, benzo[a]pyrene, and total PCBs. Ingestion of spotted sand bass (whole body and fillet) and lobster (whole body and edible tissue) caught within all four assessment units at the Shipyard Sediment Site poses theoretical non-cancer risk, greater than the hazard index threshold of 1.0 and reference risk levels, to both the recreational and subsistence anglers. The primary contaminants contributing to the cumulative non-cancer risk include copper, total mercury, and total PCBs.

Summary of Tier II Risk Assessment Results for Recreational and Subsistence Anglers (Cumulative Cancer Risk)

Assessment Unit		Cumulative Cancer Risk			Primary Contaminant Drivers (% contribution to cumulative risk)
		> 1×10^{-6}	> Reference	Cancer Risk	
Inside NASSCO Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (97%)
	Fillet Sand Bass	Yes	Yes	Yes	PCBs (38%) BAP (25%)
	Whole Body Lobster	Yes	No	No	Not applicable
	Edible Tissue Lobster	Yes	Yes	Yes	Inorganic arsenic (84%)
Outside NASSCO Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (88%)
	Fillet Sand Bass	Yes	Yes	Yes	PCBs (42%) BAP (22%)
Inside Southwest Marine Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (96%)
	Fillet Sand Bass	Yes	Yes	Yes	PCBs (84%)
	Whole Body Lobster	Yes	No	No	Not applicable
	Edible Tissue Lobster	Yes	Yes	Yes	Inorganic arsenic (63%) PCBs (20%)
Outside Southwest Marine Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (93%)
	Fillet Sand Bass	Yes	Yes	Yes	PCBs (62%) BAP (17%)

risk levels.

**Summary of Tier II Risk Assessment Results for Recreational and Subsistence Anglers
 (Cumulative Non-Cancer Risk)**

Assessment Unit		Cumulative Non-Cancer Risk			Primary Contaminant Drivers (% contribution to cumulative risk)
		>1	> Reference	Non-Cancer Risk	
Inside NASSCO Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (98%)
	Fillet Sand Bass	Yes	No	No	Not applicable
	Whole Body Lobster	Yes	Yes	Yes	PCBs (55%) Copper (26%)
	Edible Tissue Lobster	Yes	Yes	Yes	Total Mercury (75%)
Outside NASSCO Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (92%)
	Fillet Sand Bass	Yes	No	No	Not applicable
Inside Southwest Marine Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (97%)
	Fillet Sand Bass	Yes	Yes	Yes	PCBs (89%)
	Whole Body Lobster	Yes	Yes	Yes	PCBs (52%) Copper (27%)
	Edible Tissue Lobster	Yes	Yes	Yes	PCBs (64%) Total mercury (22%)
Outside Southwest Marine Leasehold	Whole Body Sand Bass	Yes	Yes	Yes	PCBs (96%)
	Fillet Sand Bass	Yes	Yes	Yes	PCBs (73%) Total mercury (25%)

CLEANUP TO BACKGROUND SEDIMENT QUALITY CONDITIONS

30. ~~**RESOLUTION 92-49.** The Regional Board must apply State Water Resources Control Board Resolution 92-49 (hereinafter Resolution 92-49), *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under California Water Code §13304* when setting cleanup levels for contaminated marine sediments if such sediments threaten beneficial uses of the waters of the state, and the contamination or pollution is the result of a discharge of waste. In applications dealing with cleanup of contaminated marine sediments Resolution 92-49 is interpreted to require cleanup to background sediment quality unless it is technologically⁴ or economically⁵ infeasible to do so.~~

⁴ Technological feasibility is determined by assessing available technologies, which have been shown to be effective in reducing the concentration of the pollutants of concern.

⁵ Economic feasibility is an objective balancing of the incremental benefit of attaining further reductions in the concentrations of constituents of concern as compared with the incremental cost of achieving those reductions. The evaluation of economic feasibility includes consideration of current, planned, or future land use, social, and

31. **BACKGROUND SEDIMENT QUALITY.** The Regional Board derived sediment chemistry levels for use in evaluating the feasibility of cleanup to background sediment quality conditions from the pool of San Diego Bay reference stations described in Finding 15. The background sediment chemistry levels at based on these reference stations are ~~described below.~~ as follows:

Background Sediment Chemistry Levels

Chemical	Units (dry weight)	Background Sediment Chemistry Levels ⁽¹⁾
<i>Metals</i>		
Arsenic	mg/kg	7.5
Cadmium	mg/kg	0.33
Chromium	mg/kg	57
Copper	mg/kg	121
Lead	mg/kg	53
Mercury	mg/kg	0.57
Nickel	mg/kg	15
Silver	mg/kg	1.1
Zinc	mg/kg	192
<i>Organics</i>		
Dibutyltin	µg/kg	21
Monobutyltin	µg/kg	14
Tributyltin	µg/kg	22
Tetrabutyltin	µg/kg	(1.4)
HPAH ⁽²⁾	µg/kg	673
PPPAH ⁽³⁾	µg/kg	1,234
Benzo[a]pyrene	µg/kg	202
Total PCB Congeners ⁽⁴⁾	µg/kg	84
Polychlorinated terphenyls	µg/kg	(142)

(1) Based on the 95 percent upper prediction limit calculated from a pool of reference stations in San Diego Bay. Parentheses () indicates non-detects accounted for more than or equal to half the values.

(2) HPAH = High Molecular Weight Polynuclear Aromatic Hydrocarbons

(3) PPPAH = Priority Pollutant Polynuclear Aromatic Hydrocarbons

(4) PCB = Polychlorinated Biphenyls

Note: A regression analysis of the grain size:metals relationship is used in establishing background sediment chemistry levels. The background metals concentration is based on the 95% UPL using 50% fine grain sediment. These values are conservative concentrations because the mean fine grain sediment at the Shipyard Investigation Site is 70% fine grain sediment. See Appendix for Section 15 of the Draft Technical Report for Tentative Cleanup and Abatement Order No. R9-2005-0126 for further details on the regression analysis.

economic impacts to the surrounding community including property owners other than the discharger. Economic feasibility does not refer to the dischargers' ability to finance cleanup. Availability of financial resources is considered in the establishment of reasonable compliance schedules.

32. **TECHNOLOGICAL FEASIBILITY CONSIDERATIONS.** It is technologically feasible to cleanup to background sediment quality levels at the Shipyard Sediment Site. The Regional Board considered three remedial technologies for the cleanup to background evaluation: (1) Natural Recovery, (2) Subaqueous Capping, and (3) Dredging. Based on current site use, nNatural recovery was is considered to be technologically infeasible due to sediment disturbance from normal shipyard activities (e.g., vessel propeller wash, ship traffic, dry dock movements, maintenance/navigational dredging, engine tests, construction, etc.). Subaqueous capping was is also considered to be technologically infeasible based on current site use because of the ever-larger ships being serviced at the shipyards, the associated navigational requirements, and the likelihood of cap disturbance resulting from normal shipyard activities (e.g., vessel propeller wash). Dredging, although difficult to implement because the Shipyard Sediment Site is currently a working shipyard, is considered to be technologically feasible. Dredging is a proven technology and it has been used not only in San Diego Bay but also throughout the United States for ~~remediating~~ remediation of contaminated sediment.

33. **ECONOMIC FEASIBILITY CONSIDERATIONS.** ~~It is economically infeasible to cleanup to background sediment quality levels at the Shipyard Sediment Site.~~ The Regional Board evaluated a number of criteria to determine tradeoffs in risks, costs, and benefits associated with cleanups ~~between the~~ to background sediment chemistry levels ~~defined above~~ and six alternative cleanup levels greater than background. The criteria included factors such as total cost, volume of sediments dredged, short- and long-term effects on beneficial uses (aquatic life, aquatic-dependent wildlife, and human health), effects on shipyards and associated economic activities, effects on local businesses and neighborhood quality of life, and effects on recreational, commercial, or industrial uses of aquatic resources. Based on these considerations, the Regional Board concludes ~~concluded~~ that it is not economically feasible to cleanup to the background sediment chemistry levels. ~~The overall benefit of conducting cleanup at background sediment quality is approximately equal to the overall benefit of achieving cleanup at levels 5 times greater than background⁶. Furthermore, the total cost to cleanup to background versus the total cost to cleanup to levels 5 times greater than background is significantly higher. There is an estimated \$26,000,000 difference in total costs between cleanup to background and cleanup to 5 times background.~~

⁶ ~~Many of the elevated chemical concentrations exist in the same area, cleaning up some chemicals to 5 times background will result in the reduction of the majority of chemicals to levels much lower than 5 times background as reflected in the table in Finding 37 Alternative Cleanup Levels.~~

Summary Of Economic Feasibility Evaluation

Cleanup Alternatives	Approximate Dredge Volume (cu yd)	Approximate Total Cost
<i>Natural Recovery</i>	0	\$900,000
<i>Exponent LAET</i>	75,000	\$15,000,000
<i>20x Background</i>	252,060	\$33,000,000
<i>15x Background</i>	295,460	\$37,000,000
<i>10x Background</i>	502,450	\$58,000,000
<i>5x Background</i>	885,580	\$96,000,000
<i>Background</i>	1,200,000	\$122,000,000

Summary Of Economic Feasibility Evaluation (continued)

Cleanup Alternatives	Short-Term Effects			Long-Term Effects			Effects on Shipyards & Economic Activities	Effects on Local Businesses & Neighborhoods	Effects on Aquatic Resources
	Aquatic Life	Wild life	Human Health	Aquatic Life	Wild life	Human Health			
<i>Natural Recovery</i>	0	0	0	-4	-5	-5	0	0	0
<i>Exponent LAET</i>	+1	+1	-2	+2	+1	+1	-1	-1	+1
<i>20x Background</i>	-3	+1	-3	+3	+3	+3	-3	-3	+3
<i>15x Background</i>	-3	+1	-3	+3	+3	+3	-3	-3	+3
<i>10x Background</i>	-4	+1	-4	+3	+3	+4	-3	-3	+3
<i>5x Background</i>	-4	-2	-4	+4	+4	+5	-4	-4	+4
<i>Background</i>	-4	-2	-4	+4	+4	+5	-4	-4	+4

Note: Scores are given on the basis of the degree of positive or negative effects relative to a neutral baseline condition (i.e., current condition at the Shipyard Sediment Site). Scores range from +5 (major improvement compared to current conditions) to -5 (major adverse effects compared to current conditions).

ALTERNATIVE SEDIMENT CLEANUP LEVELS

34. **ALTERNATIVE CLEANUP LEVELS.** The Regional Board has selected the alternative cleanup levels presented below for the Shipyard Sediment Site. In approving alternative cleanup levels less stringent than background the Regional Board has considered the factors contained in Resolution 92-49 and the California Code of Regulations, Title 23, section 2550.4, subdivision (d)⁷.

- a. ***Alternative Cleanup Levels are Appropriate.*** The Regional Board has determined that it is economically infeasible to cleanup to background sediment quality levels at the Shipyard Sediment Site. The overall benefit of remediating the site to the alternative cleanup levels is approximately equal to the overall benefit of cleaning up to background for considerably less cost. NASSCO and Southwest Marine's Sediment Investigation Report indicates that attainment of background sediment quality is not feasible because it would require removal of approximately 1,200,000 cubic yards of sediment at a cost of \$122,000,000. Removal of that much sediment would be extremely expensive; cause harm to beneficial uses from the large scale dredging (due to physical disturbance of habitat and re-suspension of pollutants into the water column); and cause substantial disruption of streets, businesses, and neighborhoods while producing little or no benefit to beneficial uses over that which could be attained from the alternative cleanup levels based on 5 times background.
- b. ***Alternative Cleanup Levels Are Consistent With Water Quality Control Plans And Policies.*** The alternative cleanup levels will not result in water quality less than prescribed in water quality control plans and policies adopted by the State Water Resources Control Board and the Regional Board⁸. The alternative sediment quality levels are well below levels expected to cause toxicity to aquatic life and will substantially reduce existing risks to aquatic dependent wildlife and human health.
- c. ***Alternative Cleanup Levels Are Consistent With The Maximum Benefit To The People Of The State.*** The level of water quality that will be attained upon implementation of the alternative cleanup levels at the Shipyard Sediment Site is consistent with the maximum benefit to the people of the state. The San Diego Bay shoreline between Sampson and 28th Streets is listed on the Clean Water Act 303(d) list for elevated levels of copper,

⁷ Resolution 92-49 provides that in approving any alternative cleanup levels less stringent than background sediment quality the Regional Board must consider the conditions described in California Code of Regulations, Title 23, section 2550.4. Resolution 92-49 further requires that any alternative cleanup levels shall (1) be consistent with maximum benefit to the people of the state; (2) not unreasonably affect present and anticipated beneficial use of such water; and (3) not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards.

⁸ Applicable numerical and narrative water quality objectives for San Diego Bay Waters include the Regional Board's Toxicity Objective, the California, California Toxics Rule Water Quality Criteria and the State Water Board Policy for Implementation of Toxics Standards (the SIP) which provides that mixing zones shall not result in "objectionable bottom deposits." This term is defined as "an accumulation of materials... on or near the bottom of a water body which creates conditions that adversely impact aquatic life, human health, beneficial uses, or aesthetics. These conditions include, but are not limited to, the accumulation of pollutants in the sediments (SIP at Appendix 4).

mercury, polynuclear aromatic hydrocarbons (PAH), and polychlorinated biphenyls (PCB) at the Shipyard Sediment Site. While it is impossible to determine the precise level of water quality that will be attained given the residual sediment pollutants constituents that will remain at the site, compliance with the alternative cleanup levels will markedly improve water quality conditions in the Shipyard Sediment Site and result in attainment of water quality standards at the site.

Alternative Sediment Cleanup Levels

Chemical	Units (dry weight)	Alternative Sediment Cleanup Levels ⁽¹⁾
<i>Metals</i>		
Arsenic	mg/kg	10
Cadmium	mg/kg	1.0
Chromium	mg/kg	81
Copper	mg/kg	200
Lead	mg/kg	90
Mercury	mg/kg	0.7
Nickel	mg/kg	20
Silver	mg/kg	1.5
Zinc	mg/kg	300
<i>Organics</i>		
Tributyltin	µg/kg	110
Benzo[a]pyrene	µg/kg	1,010
Total PCB Congeners ⁽²⁾	µg/kg	420

(1) Cleanup levels for tributyltin, benzo[a]pyrene, and total PCB congeners are based on 5 times background, constituents which, at 5 times background, determine the largest cleanup footprint. The other chemical concentrations are based on an evaluation of that cleanup footprint.

(2) PCB = polychlorinated biphenyl

35. **LEGAL AND REGULATORY AUTHORITY.** This Order is based on (1) section 13267 and Chapter 5, Enforcement, of the Porter-Cologne Water Quality Control Act (Division 7 of the Water Code, commencing with section 13000), commencing with section 13300; (2) applicable state and federal regulations; (3) all applicable provisions of statewide Water Quality Control Plans adopted by the State Water Resources Control Board and the *Water Quality Control Plan for the San Diego Basin* (Basin Plan) adopted by the Regional Board including beneficial uses, water quality objectives, and implementation plans; (4) State Water Board policies for water quality control, including State Water Board Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*) and Resolution No. 92-49 (*Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code section 13304*); and (5) relevant standards, criteria, and advisories adopted by other state and federal agencies.
36. **CEQA EXEMPTION.** This enforcement action is exempt from the provisions of the California Environmental Quality Act (CEQA) in accordance with section 15321 (Enforcement Actions by Regulatory Agencies), Chapter 3, Title 14 of the California Code of Regulations.
37. **PUBLIC NOTICE.** The Regional Board has notified all known interested persons and the public of its intent to adopt this Cleanup and Abatement Order and has provided them with an opportunity to submit written comments and recommendations.
38. **PUBLIC HEARING.** The Regional Board has considered all comments pertaining to this Cleanup and Abatement Order submitted to the Regional Board in writing, or by oral presentations at the public hearing held on [date(s) to be inserted] ~~June 29, 2005~~. Detailed responses to relevant comments ~~has~~ have been incorporated into the final Technical Report Analysis of for the Cleanup and Abatement Order adopted by this Order.

ORDER DIRECTIVES

IT IS HEREBY ORDERED that, pursuant to sections 13267 and 13304 of the Water Code, National Steel and Shipbuilding Company; BAE Systems San Diego Ship Repair Inc. (formerly Southwest Marine, Inc.); City of San Diego; Marine Construction and Design Company and Campbell Industries, Inc.; ~~Chevron, a subsidiary of ChevronTexaco; BP; San Diego Gas and Electric, a subsidiary of Sempra Energy Company; and the United States Navy (hereinafter Discharger(s)), shall comply with the following directives:~~

A. CLEANUP AND ABATE

1. The Discharger(s) shall take all corrective actions⁹ necessary to cleanup contaminated marine bay sediment at the Shipyard Sediment Site to attain the sediment quality levels specified below:

Chemical	Units (dry weight)	Sediment Quality Levels
Metals		
Arsenic	mg/kg	10
Cadmium	mg/kg	1.0
Chromium	mg/kg	81
Copper	mg/kg	200
Lead	mg/kg	90
Mercury	mg/kg	0.7
Nickel	mg/kg	20
Silver	mg/kg	1.5
Zinc	mg/kg	300
Organics		
Tributyltin	µg/kg	110
Benzo[a]pyrene	µg/kg	1,010
Total PCB Congeners ⁽¹⁾	µg/kg	420

(1) PCB = polychlorinated biphenyl

B. REMEDIAL ACTION PLAN AND IMPLEMENTATION

2. **Remedial Action Plan (RAP).** The Discharger(s) shall submit a Remedial Action Plan (RAP) to the Regional Board by [date based on 90 days after adoption to be inserted]. The RAP shall contain the following information:
 - a. *Implementation Activities.* A detailed description of all activities planned to implement the corrective actions necessary to comply with all the directives herein;
 - b. *Shipyard Sediment Site Map.* A map(s), using an appropriate modeling program, illustrating the horizontal and vertical distribution of pollutants within the remediation area defined by the sediment quality cleanup levels described in Directive A.1;
 - c. *Schedule.* A schedule detailing the sequence of events and time frame for each activity; and

⁹ Corrective Actions include the phases of cleanup and abatement described in Directives A through D of this Cleanup and Abatement order.

- d. *Short-Term Effectiveness Monitoring Activities.* A monitoring program as described in Directive C, Cleanup and Abatement Verification, to demonstrate the effectiveness of the RAP. The monitoring program shall be effective in determining compliance with the cleanup levels and in determining the success of the remedial action measures.
3. ***Remedial Action Plan (RAP) Implementation.*** In the interest of promoting prompt cleanup, the Discharger(s) may begin implementation of the RAP sixty (60) calendar days after submittal to the Regional Board, unless otherwise directed in writing by the Regional Board. Before beginning RAP implementation activities, the Discharger(s) shall:
 - a. Notify the Regional Board of its intention to begin cleanup; and
 - b. Comply with any conditions set by the Regional Board, including mitigation of adverse consequences from cleanup activities.
4. ***Remedial Action Zone.*** The Discharger(s) shall implement remedial action measures that ensure that marine sediment pollutants attain their respective cleanup levels at all monitoring points and throughout the Shipyards Sediment Site.
5. ***Implementation Schedule.*** Implementation of the RAP shall be completed on a schedule to be established by the Regional Board in a subsequent amendment to this Cleanup and Abatement Order.
6. ***Monitoring, Evaluation, and Reporting.*** The Discharger(s) shall monitor, evaluate, and report the results of implementation of the RAP on a schedule to be established by the Regional Board in a subsequent amendment to this Cleanup and Abatement Order.
7. ***Modify or Suspend Cleanup Activities.*** The Discharger(s) shall modify or suspend cleanup activities when directed to do so by the Regional Board.

C. CLEANUP AND ABATEMENT COMPLETION VERIFICATION

1. ***Cleanup and Abatement Completion Report.*** The Discharger(s) shall submit a final Cleanup and Abatement Completion Report verifying completion of the Remedial Action Plan (RAP) for the Shipyards Sediment Site. The report shall provide a demonstration, based on a sound technical analysis that marine sediment quality cleanup levels specified in Directive A.1. for all pollutants are attained at all monitoring points and throughout the Shipyards Sediment Site.

D. POST CLEANUP MONITORING

1. ***Post Cleanup Monitoring Plan.*** The Discharger(s) shall submit a Post Cleanup Monitoring Plan to the Regional Board by [Insert Date]. The Post Cleanup Monitoring

Plan shall be designed to confirm the short-term and long-term effectiveness of the cleanup. The Post Cleanup Monitoring Plan shall contain the following information:

- a. *Monitoring Activities.* A detailed description of monitoring and sampling activities designed to assess the site conditions, including the benthic community health, after the RAP is completed. The monitoring activities shall include sampling for a period of not less than five years; and
 - b. *Schedule.* A schedule detailing the sequence of events and time frame for each activity. The schedule shall also include the dates for submittal of the Post-Cleanup Monitoring annual progress reports and final report as detailed in Section D.2. below.
2. ***Post Cleanup Monitoring Report.*** The Discharger shall submit annual progress reports and a final Post Cleanup Monitoring Report, on a schedule to be established by the Regional Board in a subsequent amendment to this Cleanup and Abatement Order, containing the following information:
- c. *Monitoring Activities.* A detailed description of the post cleanup monitoring activities performed; and
 - d. *Interpretations and Conclusions.* Interpretations and conclusions regarding the potential presence and chemical characteristics of any newly deposited sediment within the cleanup areas, and interpretations and conclusions regarding the health and recovery of the benthic communities.

E. REGIONAL BOARD CONCURRENCE

1. ***Regional Board Concurrence.*** Upon concurrence with the findings of the Cleanup and Abatement Completion Report (Directive C.1) and the Post Cleanup Monitoring Report (Directive D.2) that remedial actions and monitoring are complete and that compliance with this Cleanup and Abatement Order is achieved, the Regional Board will inform the Discharger(s) and other interested persons in writing that no further remedial work is required at this time, based on available information. This written notice shall constitute Regional Board concurrence with the completed remedial actions.

F. PROVISIONS

1. **Cost Recovery.** The Discharger(s) shall reimburse the State of California for all reasonable costs actually incurred by the Regional Board to investigate, oversee, and monitor cleanup and abatement actions required by this Cleanup and Abatement Order, according to billing statements prepared from time to time by the State Water Resources Control Board. If the Discharger(s) is enrolled in a reimbursement program managed by the State Water Resources Control Board for the discharge addressed by this Cleanup and Abatement Order, reimbursement shall be made pursuant to the procedures established in that program.
2. **Waste Management.** The Discharger(s) shall properly manage, store, treat, and dispose of contaminated soils and ground water in accordance with applicable federal, state, and local laws and regulations. The storage, handling, treatment, or disposal of contaminated marine sediment and associated waste shall not create conditions of pollution, contamination or nuisance as defined in Water Code section 13050. The Discharger(s) shall, as required by the Regional Board, obtain, or apply for coverage under, waste discharge requirements or a conditional waiver of waste discharge requirements for the removal of waste from the immediate place of release and discharge of the waste to (a) land for treatment, storage, or disposal or (b) waters of the state.
3. **Request to Provide Information.** The Discharger(s) may present characterization data, preliminary interpretations and conclusions as they become available, rather than waiting until a final report is prepared. This type of on-going reporting can facilitate a consensus being reached between the Discharger(s) and the Regional Board and may result in overall reduction of the time necessary for regulatory approval.
4. **Waste Constituent Analysis.** Unless otherwise permitted by the Regional Board, all analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. Specific methods of analysis must be identified. If the Discharger(s) proposes to use methods or test procedures other than those included in the most current version of “*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*” (U.S. Environmental Protection Agency) or 40 CFR 136, “*Guidelines Establishing Test Procedures for the Analysis of Pollutants; Procedures for Detection and Quantification*“, the exact methodology must be submitted for review and must be approved by the Regional Board prior to use. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports submitted to the Regional Board.
5. **Duty to Operate and Maintain.** The Discharger(s) shall, at all times, properly operate and maintain all facilities and systems of treatment, control, storage, disposal and monitoring (and related appurtenances) which are installed or used by the Discharger(s) to achieve compliance with this Cleanup and Abatement Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities, which are installed by the Discharger(s) only when the operation is necessary to achieve compliance the conditions of this Cleanup and Abatement Order.

6. ***Duty to Use Registered Professionals.*** The Discharger(s) shall provide documentation that plans and reports required under this Cleanup and Abatement Order are prepared under the direction of appropriately qualified professionals. California Business and Professions Code sections 6735, 7835 and 7835.1 require that engineering and geologic evaluations and judgments be performed by or under the direction of registered professionals. A statement of qualifications and registration numbers of the responsible lead professionals shall be included in all plans and reports submitted by the Discharger(s). The lead professional shall sign and affix their registration stamp to the report, plan or document.
7. ***Corporate Signatory Requirements.*** All reports required under this Order shall be signed and certified by a responsible corporate officer(s) of the Discharger(s) described in paragraph 5.a. of this provision or by a duly authorized representative of that person as described in paragraph 5.b. of this provision.
 - a. ***Responsible Corporate Officer(s).*** For the purposes of this provision, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy - or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 - b. ***Duly Authorized Representative.*** A person is a duly authorized representative only if:
 - (1) The authorization is made in writing by a person described in paragraph (a) of this provision;
 - (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and
 - (3) The written authorization is submitted to the Regional Board.
 - c. ***Changes to Authorization.*** If an authorization under paragraph (b) of this provision is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this provision must be submitted to the Regional Board prior to or together with any reports or information to be signed by an authorized representative.

- d. **Certification Statement.** Any person signing a document under paragraph a. or b. of this provision shall make the following certification:

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

8. ***Duty to Submit Other Information.*** When the Discharger(s) becomes aware that it failed to submit any relevant facts in any report required under this Cleanup and Abatement Order, or submitted incorrect information in any such report, the Discharger(s) shall promptly submit such facts or information to the Regional Board.
9. ***Electronic and Paper Media Reporting Requirements.*** The Discharger(s) shall submit both electronic and paper copies of all reports required under this Cleanup and Abatement Order including work plans, technical reports, and monitoring reports.
10. ***Report Submittals.*** All monitoring and technical reports required under this Cleanup and Abatement Order shall be submitted to:

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

11. ***Identify Documents Using Code Number.*** In order to assist the Regional Board in the processing of correspondence and reports submitted in compliance with this Cleanup and Abatement Order, the Discharger(s) shall include the following code number in the header or subject line portion of all correspondence or reports submitted to the Regional Board:

For all correspondences: **Shipyards CAO: 03-0284.05**

For all reports: **Shipyards CAO: 03-0284.051**

G. NOTIFICATIONS

1. ***Enforcement Discretion.*** The Regional Board reserves its right to take any enforcement action authorized by law for violations of the terms and conditions of this Cleanup and Abatement Order.
2. ***Enforcement Notification.*** The Porter-Cologne Water Quality Control Act commencing with Chapter 5, Enforcement and Implementation, section 13308, provides that if there is

a threatened or continuing violation of a cleanup and abatement order, the Regional Board may issue a Time Schedule Order prescribing a civil penalty in an amount not to exceed \$10,000 per day for each day compliance is not achieved in accordance with that time schedule. Section 13350 provides that any person may be assessed administrative civil liability by the Regional Board for violating a cleanup and abatement order in an amount not to exceed \$5,000 for each day the violation occurs, or on a per gallon basis, not to exceed \$10 for each gallon of waste discharged. Alternatively the court may impose civil liability in an amount not to exceed \$15,000 for each day the violation occurs, or on a per gallon basis, not to exceed \$20 for each gallon of waste discharged. Section 13385 provides that any person may be assessed administrative civil liability by the Regional Board for violating a cleanup and abatement order for an activity subject to regulation under Division 7, Chapter 5.5 of the Water Code, in an amount not to exceed the sum of both of the following: (1) \$10,000 for each day in which the violation occurs; and (2) where there is a discharge, any portion of which is not susceptible to cleanup or is not cleaned up, and the volume discharged but not cleaned up exceeds 1,000 gallons, an additional liability not to exceed \$10 multiplied by the number of gallons by which the volume discharged but not cleaned up exceeds 1,000 gallons. Alternatively the civil liability may be imposed by the court in an amount not to exceed the sum of both of the following: (1) \$25,000 for each day in which the violation occurs; and (2) where there is a discharge, any portion of which is not susceptible to cleanup or is not cleaned up, and the volume discharged but not cleaned up exceeds 1,000 gallons, an additional liability not to exceed \$25 multiplied by the number of gallons by which the volume discharged but not cleaned up exceeds 1,000 gallons.

I, John H. Robertus, Executive Officer, do hereby certify the forgoing is a full, true, and correct copy of a Cleanup and Abatement Order issued on [Insert Date].

John H. Robertus
Executive Officer

Attachment 1. Map of Shipyard Sediment Site (Exponent, 2003)

