TABLE 2

SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS, 1998 to PRESENT
BP BULK TERMINAL #33T
All Results Reported in Micrograms per Liter (µg/L)

Well No.	Sampling Date	LPH	TPHg	TPHd	B*	T*	E*	X*	MTBE*	Total Lead
MW-28 Cont'd	09/04/98	NP	Not Sampled							
	12/31/98	NP	Not Sampled							
	03/04/99	NP	Not Sampled							
	06/03/99	NP	Not Sampled							
	09/30/99	NP	Not Sampled							
	12/23/99	NP	Not Sampled							
	03/22/00	NP	Not Sampled							
	06/26/00	NP	Not Sampled							
	09/28/00	NP	Not Sampled							
	12/28/00	NP	<50	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
	03/28/01	NP	Not Sampled							
	06/28/01	NP	Not Sampled							
	09/27/01	NP	Not Sampled							
	12/27/01	NP	<500	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
	03/27/02	NP	Not Sampled							
	06/26/02	NP	Not Sampled							
	09/16/02	NP	Not Sampled							
	12/04/02	NP	<500	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
	11/14/03	NP	<500	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
	12/01/04	NP	Not Sampled (Construction In Well Vicinity)							
MW-29	03/06/98	NP	Not Sampled							
	06/05/98	0.01	Not Sampled							
	09/04/98	0.07	Not Sampled							
	12/31/98	NP	Not Sampled							
	03/04/99	NP	Not Sampled							
	06/03/99	NP	Not Sampled							
	09/30/99	NP	Not Sampled							
	12/23/99	NP	Not Sampled							
	03/22/00	NP	Not Sampled							
	06/26/00	NP	Not Sampled							
	09/28/00	NP	Not Sampled							
	12/28/00	NP	<50	--	<0.50	<0.50	<0.50	<1.5	29	--
	03/28/01	NP	Not Sampled							
	06/28/01	NP	Not Sampled							
	09/27/01	NP	Not Sampled							
	12/27/01	NP	<500	--	<0.50	<0.50	<0.50	<1.5	32	--
	03/27/02	NP	Not Sampled							
	06/26/02	NP	Not Sampled							
	09/16/02	NP	Not Sampled							
	12/04/02	NP	510	--	0.58	0.73	42	18	44	--
	11/14/03	NP	4,400	--	<1.2	<1.2	250	123	39	--
	12/01/04	NP	1,200	--	<2.0	<2.0	33	<6.0	85	--
MW-30	03/06/98	NP	Not Sampled							
	06/05/98	0.01	Not Sampled							
	09/04/98	NP	Not Sampled							
	12/31/98	0.10	Not Sampled							
	03/04/99	0.17	Not Sampled							

TABLE 2

SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS, 1998 to PRESENT
BP BULK TERMINAL #33T
All Results Reported in Micrograms per Liter (µg/L)

Well No.	Sampling Date	LPH	TPHg	TPHd	B*	T*	E*	X*	MTBE*	Total Lead
MW-30 Cont'd	06/03/99	0.52	Not Sampled							
	09/30/99	0.48	Not Sampled							
	12/23/99	0.56	Not Sampled							
	03/22/00	0.48	Not Sampled							
	06/26/00	0.24	Not Sampled							
	09/28/00	0.27	Not Sampled							
	12/28/00	0.33	Not Sampled							
	03/28/01	0.28	Not Sampled							
	06/28/01	0.28	Not Sampled							
	09/27/01	0.21	Not Sampled							
	12/27/01	Sheen	Not Sampled							
	03/27/02	0.34	Not Sampled							
	06/26/02	0.23	Not Sampled							
	09/16/02	0.15	Not Sampled							
	12/05/02	0.01	Not Sampled							
	11/14/03	NP	8,400	--	110	48	310	1,500	1,200	--
	12/01/04	NP	1,800	--	13	<12	68	350	130	--
MW-31	03/06/98	NP	Not Sampled							
	06/05/98	NP	Not Sampled							
	09/04/98	NP	Not Sampled							
	12/31/98	NP	Not Sampled							
	03/04/99	NP	Not Sampled							
	06/03/99	NP	Not Sampled							
	09/30/99	NP	Not Sampled							
	12/23/99	NP	Not Sampled							
	03/22/00	NP	Not Sampled							
	06/26/00	NP	Not Sampled							
	09/28/00	NP	Not Sampled							
	12/28/00	NP	<50	--	<2.5	<2.5	<2.5	<7.5	660	--
	03/28/01	NP	Not Sampled							
	06/28/01	NP	Not Sampled							
	09/27/01	NP	Not Sampled							
	12/27/01	NP	<500	--	<0.5	0.56	<0.50	<1.5	290	--
	03/27/02	NP	Not Sampled							
	06/26/02	NP	Not Sampled							
	09/16/02	NP	Not Sampled							
	12/05/02	NP	86,000	--	<200	31,000	2,800	15,000	<400	--
	11/14/03	NP	<500	--	<0.50	<0.50	<0.50	<1.5	120	--
	12/01/04	NP	<500	--	<0.50	<0.50	<0.50	<1.5	220	--
MW-32	09/16/02	0.30	Not Sampled							
	12/04/02	0.06	Not Sampled							
	11/14/03	0.03	160,000	--	<20	<20	<20	<60	<40	--
	12/01/04	NM	Not Sampled (Dry)							
MW-33	12/04/02	NP	5,800	--	260	630	240	1,300	39,000	--
	11/14/03	NP	3,800	--	120	250	200	940	40,000	--
	12/01/04	NP	14,000	--	120	74	910	4,600	440	--

TABLE 2

SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS, 1998 to PRESENT
BP BULK TERMINAL #33T
All Results Reported in Micrograms per Liter (µg/L)

Well No.	Sampling Date	LPH	TPHg	TPHd	B*	T*	E*	X*	MTBE*	Total Lead
MW-34	12/04/02	NP	2,200	--	6.4	<5.0	52	95	990	--
	11/14/03	NP	2,700	--	6.0	3.3	140	380	100	--
	12/01/04	NP	<2,500	--	<0.50	<0.50	1.0	6.5	9.4	--
MW-35	12/04/02	NP	<500	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
	11/14/03	NP	<500	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
	12/01/04	NP	<500	--	<0.50	<0.50	<0.50	<1.5	<1.0	--
MW-36	12/04/02	NP	<500	--	<0.50	<0.50	<0.50	<1.5	50	--
	11/14/03	NP	<500	--	<5.0	<5.0	<5.0	<15	850	--
	12/01/04	NP	<500	--	<5.0	<5.0	<5.0	<15	270	--
MW-37	12/04/02	NP	320	--	<20	<20	<20	<60	3,600	--
	11/14/03	NP	<500	--	<50	<50	<50	<150	9,700	--
	12/01/04	NP	830	--	130	<5.0	<5.0	<15	160	--

Notes:

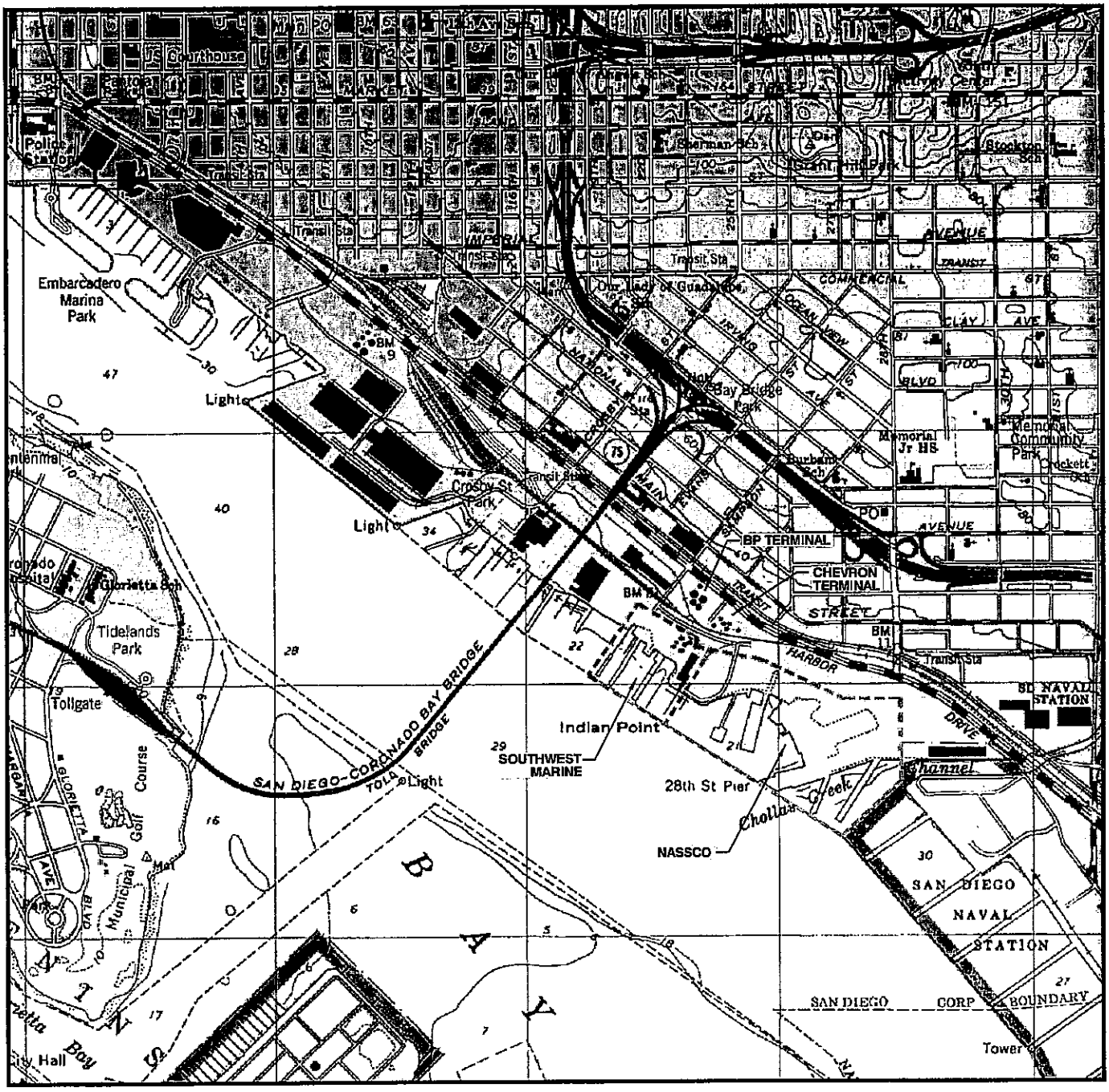
LPH	= Liquid-phase hydrocarbons (apparent thickness in feet)
TPHg	= Total petroleum hydrocarbons as gasoline (DHS Modified EPA Method 8015B)
TPHd	= Total petrolem hydrocarbons as diesel
B	= Benezene
T	= Toluene
E	= Ethylbenzene
X	= Xylenes
BTEX	= BTEX (EPA Method 8020)
MTBE	= Methyl-tert-butyl ether (EPA Method 8020, unless noted otherwise)
1	= MTBE analyzed by (EPA Method 8260)
NM	= Not measured (passive skimmer; in-situ LPH bubbler in well)
NS	= No samples collected
NP	= No product
PP	= Pre-purge sample
--	= Not analyzed
*	= Beginning 09/28/00, all BTEX and MTBE samples analyzed by EPA Method 8260B

TABLE 3

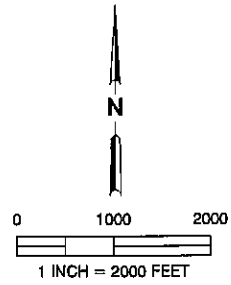
SUMMARY OF STORMWATERSAMPLE ANALYSIS 1997 THROUGH 2004
BP BULK TERMINAL #33T

		Analytes										
Sample Date	Sample ID	pH S.U.	TSS mg/L	SC uMHOS/cm	O&G mg/L	TOC mg/L	Benzene ug/L	Toluene ug/L	Ethyl-benzene ug/L	Xylenes, (Total) ug/L	TPHg mg/L	TPHd (C13-C22) mg/L
4/2/1997	Port A (Yard Outfall)	6.0*	140	250	NA	79	NA	NA	NA	NA	NA	NA
	Port B (Tank Farm)	6.0*	170	25000	NA	65	NA	NA	NA	NA	NA	NA
11/26/1997	Port A**	6.0*	33	520	NA	6	<0.5	<0.5	<0.5	<1.5	<500	NA
	Port B**	6.0*	21	540	NA	13	<0.5	<0.5	<0.5	<1.5	<500	NA
2/20/2003	Stormwater Grab Sample**	6.0*	<10	800	<6.2	10	<0.30	<0.30	<0.30	<0.60	<0.05	<0.50
2/23/2004	Tank Farm Discharge[1]	6.0*	<10	350	<4.7	4.2	<2.0	<2.0	<2.0	<4.0	NA	<0.50
10/21/2004	Sample 1**	NR	<10	560	<5.5	22	<0.30	<0.30	<0.30	<0.60	<0.05	<0.59
10/27/2004	Stormwater	NR	<10	15	21	4.8	pending	pending	pending	pending	pending	<0.50
Parameter Benchmark Value[2]		6.0-9.0	100	200 (50)	15	110 (30)	10	10,000	3,100			
California Toxics Rule Limit[3]							1.2/71	6,800/20,000	3,100/29,000			

mg/L = milligrams per liter ug/L = micrograms per liter
TSS = Total Suspended Solids (mg/L) (EPA Method 160.2)
SC = Specific Conductance (uMHOS/cm) (EPA Method 120.1)
O&G = Oil and Grease (mg/L) (EPA Method 1664)
TOC = Total Organic Carbon (mg/L) (EPA Method 415.1)
TPHg = Total Petroleum Hydrocarbons as gasoline by EPA Method 8015M/8021B (mg/L)
TPHd = Total Petroleum Hydrocarbons-diesel range by EPA Method 8015M (mg/L)
* pH was measured immediately following sample collection at the Terminal and was recorded on the Chain-of-Custody.
** Benzene, Toluene, Ethylbenzene and total Xylenes (BTEX) were analyzed by EPA Method 8020 or 8021B unless otherwise noted
NA = Not Analyzed NR = data not yet reported (due 7/1/05)
< = Result was below the Method reporting limit indicated
[1] BTEX analyzed by EPA Method 8260B on 2/23/2004
[2] Parameter Benchmark Values are from Federal Register, volume 65, No. 210, October 30, 2000. Values in parentheses are alternate RWQCB-San Diego benchmark values.
[3] California Toxics Rule (CTR) values are shown for two categories:
Inland Surface Waters, 30-day avg.Human Health, Drinking Water Sources (consumption of water and aquatic organisms)
Enclosed Bays & Estuaries, 30-day avg. Human Health, aquatic organism consumption only
CTR values are shown respectively for each category with values reported in ug/L



QUADRANGLE LOCATION



Reference: U.S.G.S., 1996, Point Loma, California Quadrangle Topographic 7.5' Series.

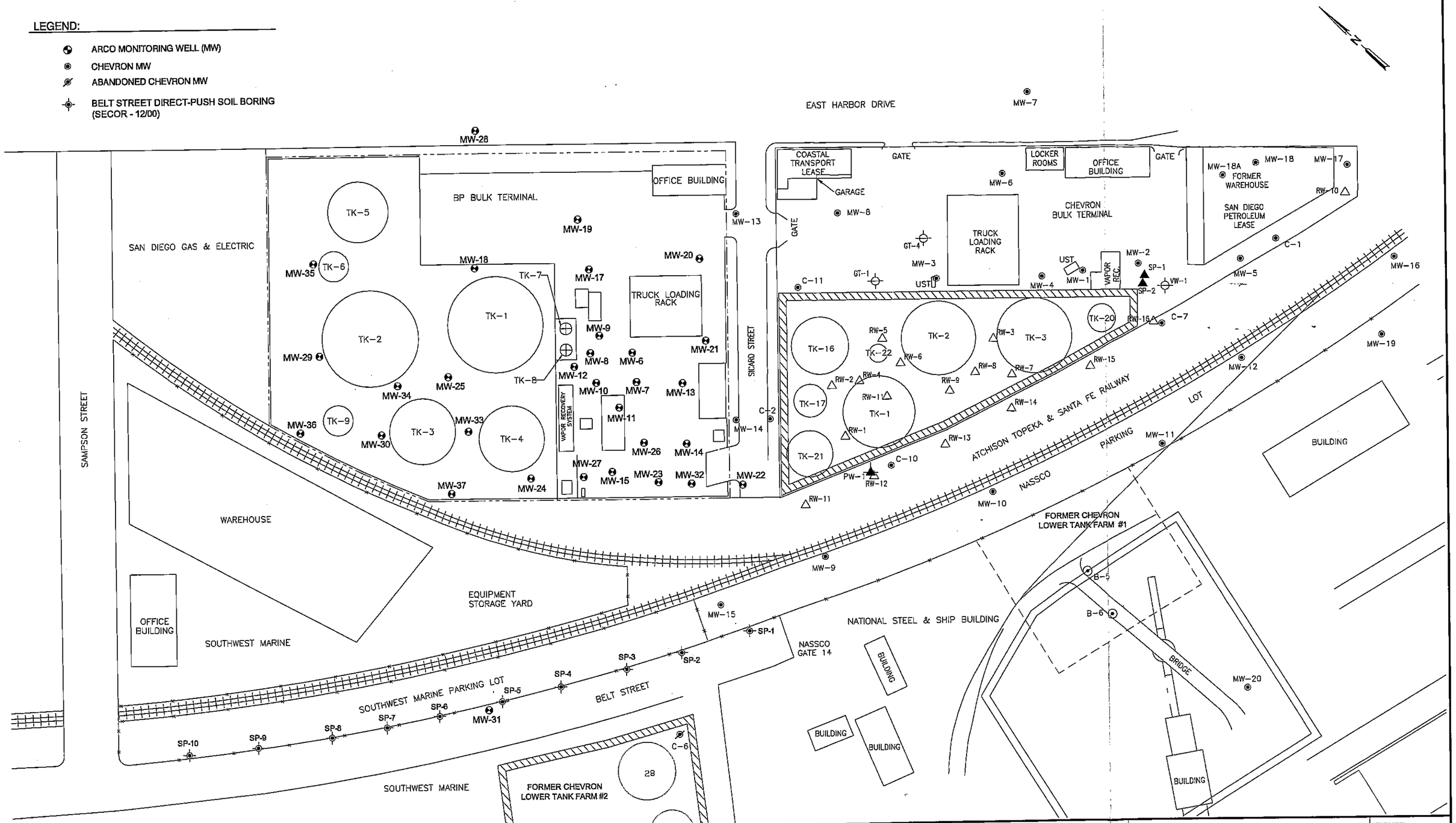
SECOR 2655 CAMINO DEL RIO NORTH, SUITE 302 SAN DIEGO, CALIFORNIA PHONE: (619) 296-6195/296-6199 (FAX)	FOR: BP TERMINAL 33T 2295 East Harbor Drive San Diego, California		SITE LOCATION MAP		FIGURE: 1
	JOB NUMBER: 08BP.0033T.05	DRAWN BY: RO	CHECKED BY: JH	APPROVED BY:	DATE: 3/25/05

FILEPATH: Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-USGS-JH.DWG MODIFIED BY ROCAMPO ON JUN 15, 2005 - 13:47

33T-USGS-JH

LEGEND:

- ARCO MONITORING WELL (MW)
- CHEVRON MW
- ABANDONED CHEVRON MW
- BELT STREET DIRECT-PUSH SOIL BORING (SECOR - 12/00)



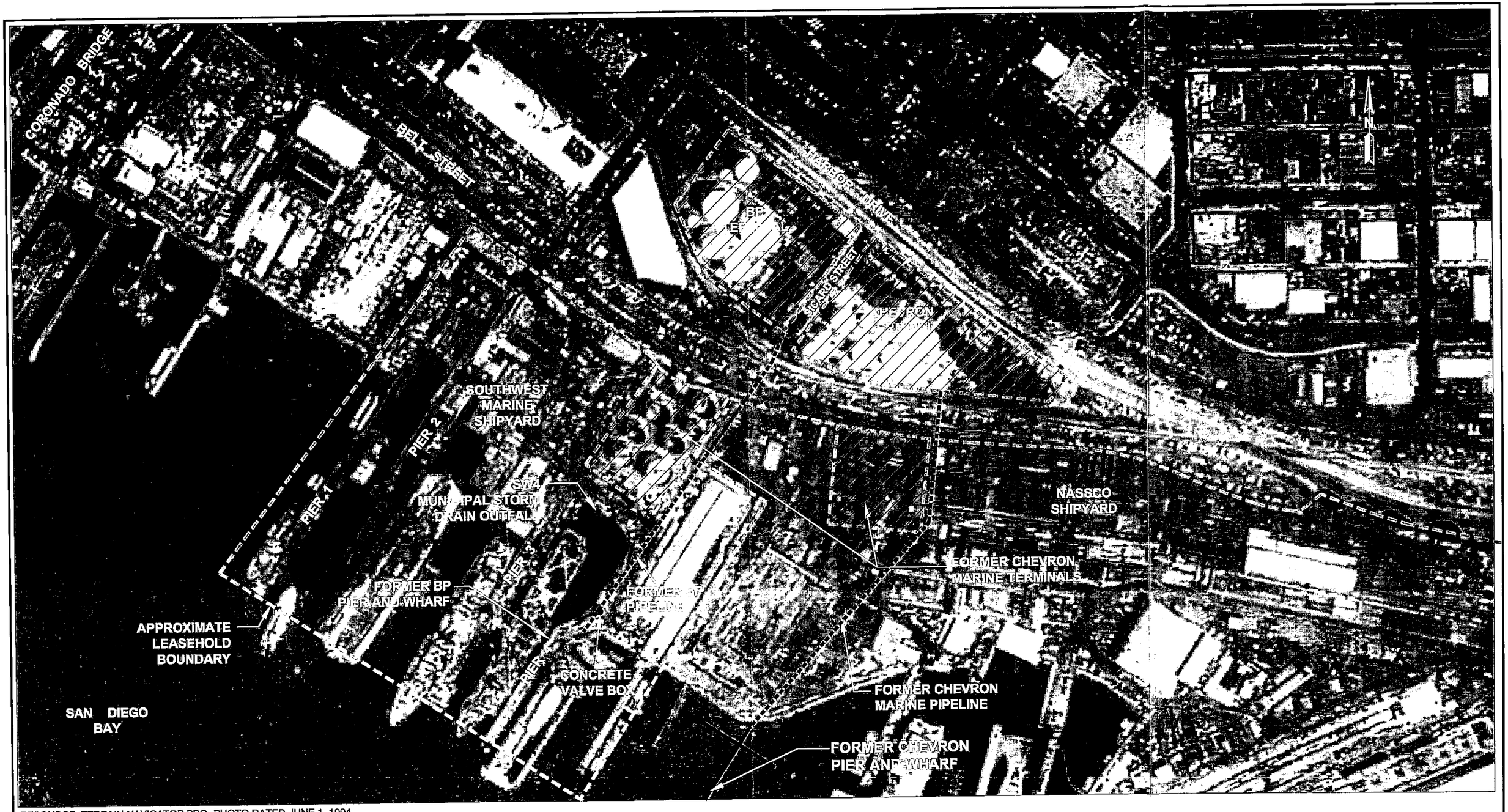
NOTE:
ARCO BULK TERMINAL SITE PLAN IS BASED ON GEOTRACKER WELLHEAD SURVEY PERFORMED BY SOUTHERN CALIFORNIA SURVEY ON OCTOBER 14, 2002

SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:			FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California		SITE PLAN	2
JOB NUMBER: 08BP.0033T.05	DRAWN BY: RO	CHECKED BY: JH	APPROVED BY:	DATE: 1/5/05

FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33TSPI-05.DWG|ROCAMPO|JUN 15, 2005 AT 13:18|LAYOUT: MODEL

33TSP1-05



RESOURCE: TERRAIN NAVIGATOR PRO, PHOTO DATED JUNE 1, 1994

LEGEND:

PROPERTY BOUNDARY

0 300 600

APPROXIMATE SCALE (FEET)

SECOR

2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:			FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California		SITE VICINITY MAP	3
JOB NUMBER: 08BP.0033T.05	DRAWN BY: LGH	CHECKED BY: JH	APPROVED BY:	DATE: 7/15/04

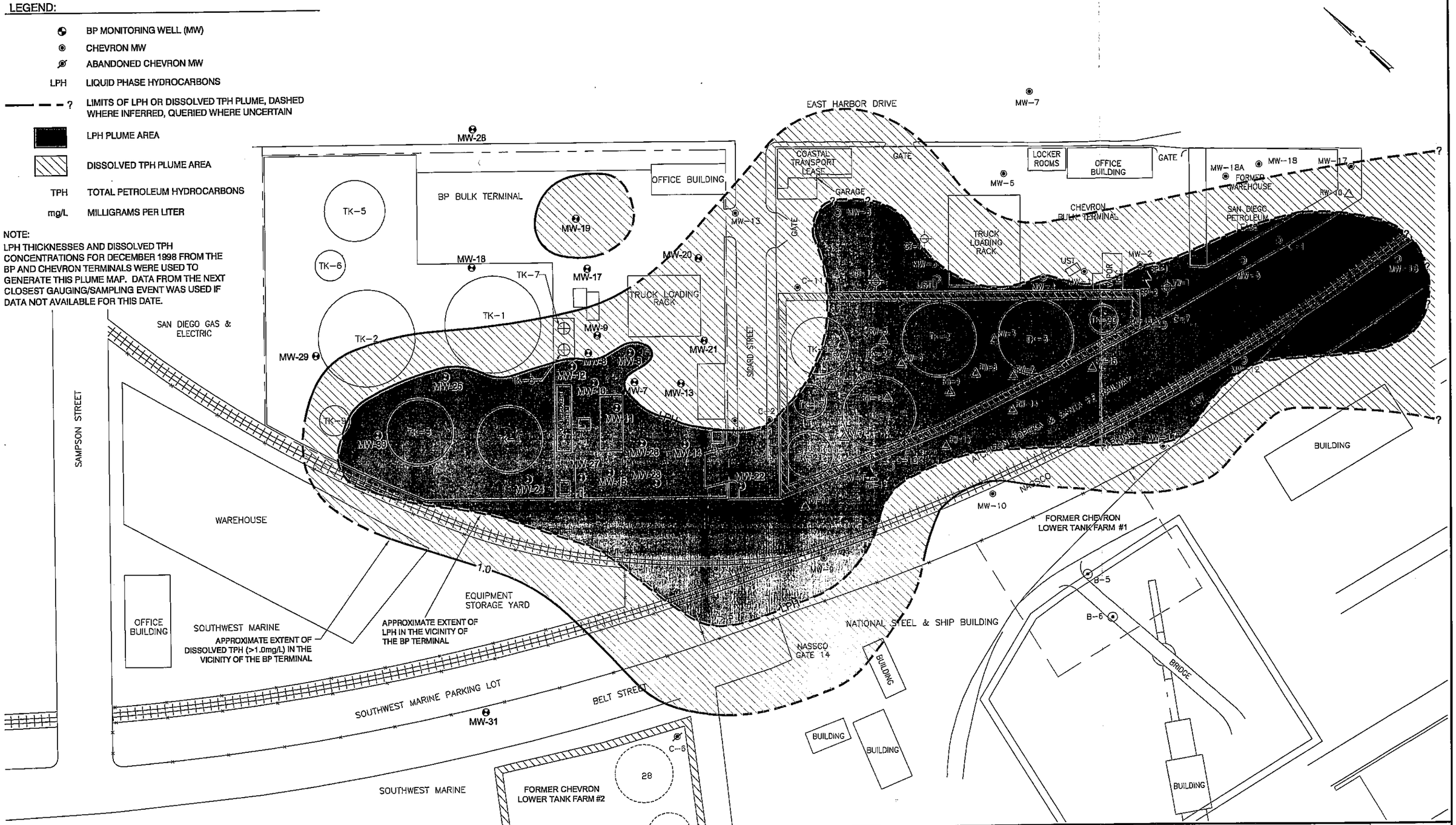
FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33TAERIAL-R.DWG|ROCAMPO|JUN 15, 2005 AT 13:33|LAYOUT: MODEL

33TAERIAL-R

LEGEND:

- BP MONITORING WELL (MW)
- CHEVRON MW
- ABANDONED CHEVRON MW
- LPH — LIQUID PHASE HYDROCARBONS
- LIMITS OF LPH OR DISSOLVED TPH PLUME, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN
- LPH PLUME AREA
- DISSOLVED TPH PLUME AREA
- TPH — TOTAL PETROLEUM HYDROCARBONS
- mg/L — MILLIGRAMS PER LITER

NOTE:
LPH THICKNESSES AND DISSOLVED TPH CONCENTRATIONS FOR DECEMBER 1998 FROM THE BP AND CHEVRON TERMINALS WERE USED TO GENERATE THIS PLUME MAP. DATA FROM THE NEXT CLOSEST GAUGING/SAMPLING EVENT WAS USED IF DATA NOT AVAILABLE FOR THIS DATE.



SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:			FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California		DECEMBER 1998 LPH/DISSOLVED TPH PLUME MAP	4
JOB NUMBER: 08BP.0033T.05	DRAWN BY: RQ	CHECKED BY: JH	APPROVED BY:	DATE: 6/6/05

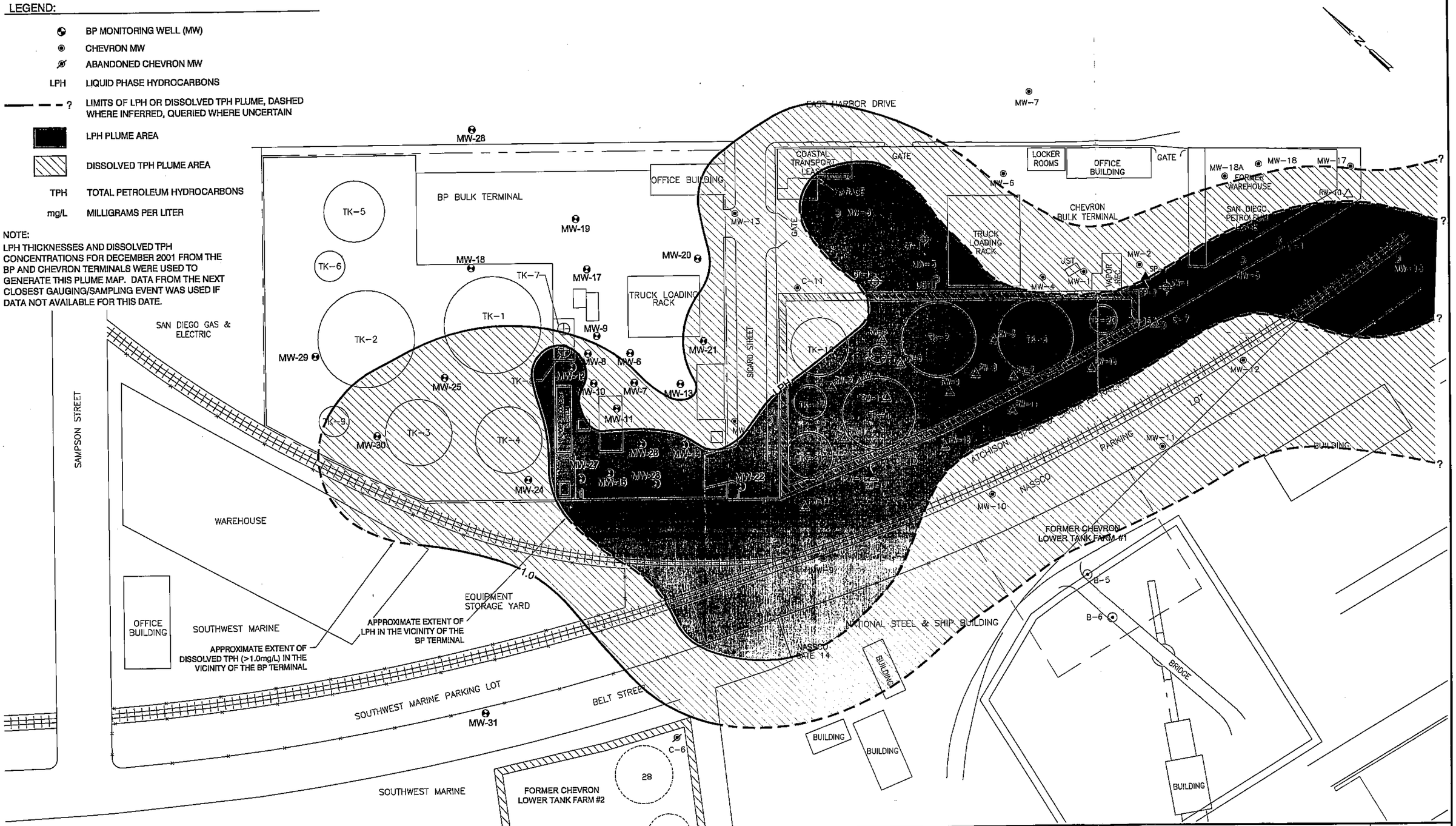
FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-TPH('98-'01-'04).DWG|ROCAMPO|JUN 15, 2005 AT 12:43|LAYOUT: MODEL

33T-TPH('98-'01-'04)

LEGEND:

- BP MONITORING WELL (MW)
- CHEVRON MW
- ABANDONED CHEVRON MW
- LPH — LIQUID PHASE HYDROCARBONS
- LIMITS OF LPH OR DISSOLVED TPH PLUME, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN
- LPH PLUME AREA
- DISSOLVED TPH PLUME AREA
- TPH — TOTAL PETROLEUM HYDROCARBONS
- mg/L — MILLIGRAMS PER LITER

NOTE:
LPH THICKNESSES AND DISSOLVED TPH CONCENTRATIONS FOR DECEMBER 2001 FROM THE BP AND CHEVRON TERMINALS WERE USED TO GENERATE THIS PLUME MAP. DATA FROM THE NEXT CLOSEST GAUGING/SAMPLING EVENT WAS USED IF DATA NOT AVAILABLE FOR THIS DATE.



SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:			FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California		DECEMBER 2001 LPH/DISSOLVED TPH PLUME MAP	5
JOB NUMBER: 08BP.0033T.05	DRAWN BY: RO	CHECKED BY: JH	APPROVED BY:	DATE: 6/6/05

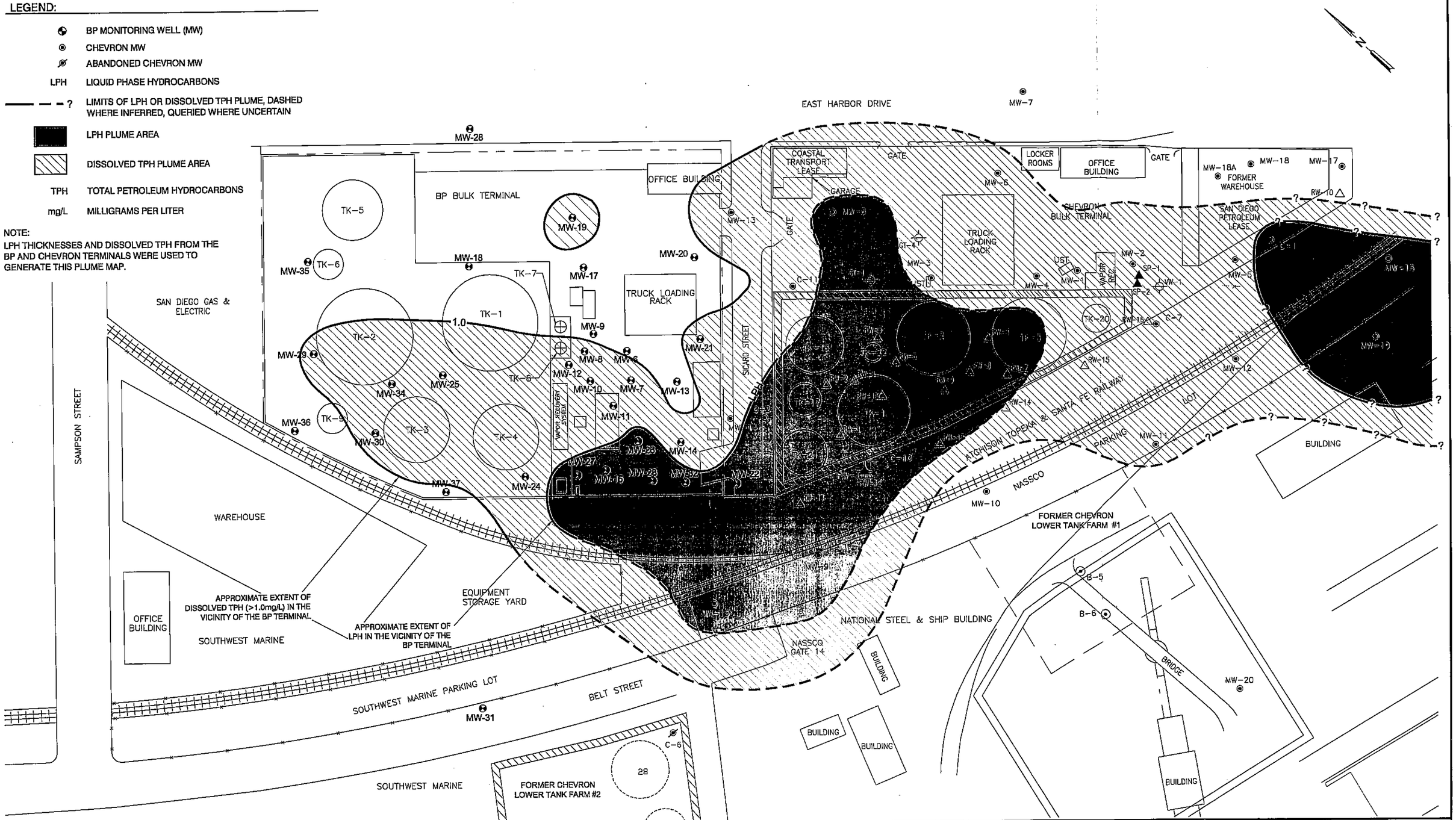
FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-TPH('98-'01-'04).DWG|ROCAMPO|JUN 15, 2005 AT 12:43|LAYOUT: MODEL

33T-TPH('98-'01-'04)

LEGEND:

- BP MONITORING WELL (MW)
- CHEVRON MW
- ABANDONED CHEVRON MW
- LPH — LIQUID PHASE HYDROCARBONS
- LIMITS OF LPH OR DISSOLVED TPH PLUME, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN
- LPH PLUME AREA
- DISSOLVED TPH PLUME AREA
- TPH — TOTAL PETROLEUM HYDROCARBONS
- mg/L — MILLIGRAMS PER LITER

NOTE:
LPH THICKNESSES AND DISSOLVED TPH FROM THE BP AND CHEVRON TERMINALS WERE USED TO GENERATE THIS PLUME MAP.



SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:		DECEMBER 2004 LPH/DISSOLVED TPH PLUME MAP		FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California				6
JOB NUMBER: 08BP.0033T.05	DRAWN BY: RO	CHECKED BY: JH	APPROVED BY:	DATE: 6/6/05

FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-TPH('98-'01-'04).DWG|ROCAMPO|JUN 15, 2005 AT 12:45|LAYOUT: MODEL

33T-TPH('98-'01-'04)

LEGEND:

.....	PROPERTY BOUNDARY	TPH	TOTAL PETROLEUM HYDROCARBONS
LPH	LIQUID PHASE HYDROCARBONS	mg/L	MILLIGRAMS PER LITER
——-------?	LIMITS OF LPH OR DISSOLVED TPH PLUME, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN		
■	LPH PLUME AREA		
▨	DISSOLVED TPH PLUME AREA		

NOTE:
LPH THICKNESSES AND DISSOLVED TPH CONCENTRATIONS FOR DECEMBER 1998 FROM THE BP AND CHEVRON TERMINALS WERE USED TO GENERATE THIS PLUME MAP. DATA FROM THE NEXT CLOSEST GAUGING/SAMPLING EVENT WAS USED IF DATA NOT AVAILABLE FOR THIS DATE.

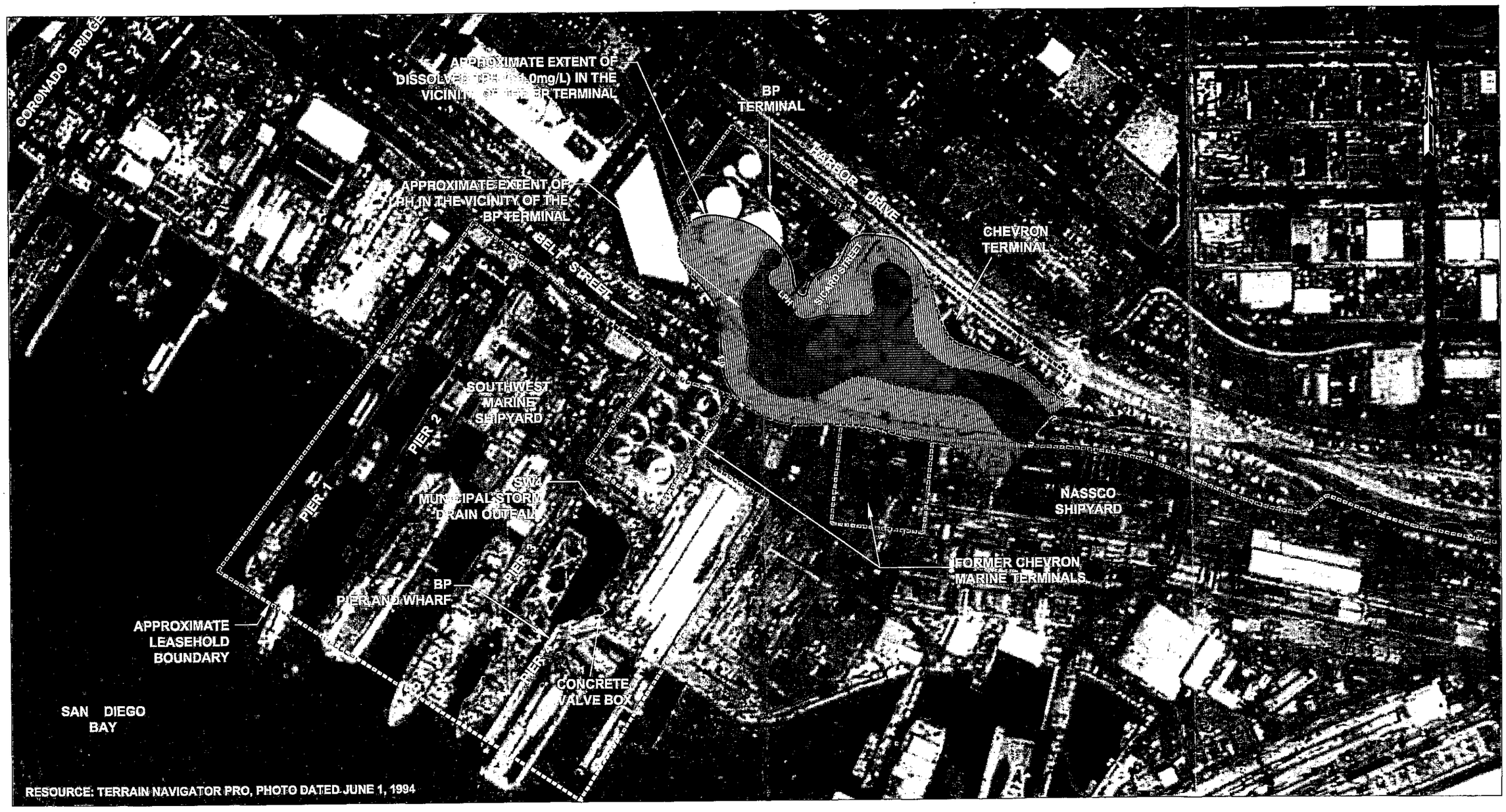
0 300 600
APPROXIMATE SCALE (FEET)

SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:			FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California	DECEMBER 1998 LPH/DISSOLVED TPH PLUME AERIAL PHOTO MAP		7
JOB NUMBER: 08BP.0033T.05	DRAWN BY: RO	CHECKED BY: JH	APPROVED BY:	DATE: 6/6/05

FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-TPH AERIAL ('98).DWG|ROCAMPO|JUN 15, 2005 AT 13:05|LAYOUT: MODEL

33T-TPH AERIAL (98)



LEGEND:

----------	PROPERTY BOUNDARY	TPH	TOTAL PETROLEUM HYDROCARBONS
LPH	LIQUID PHASE HYDROCARBONS	mg/L	MILLIGRAMS PER LITER
——-------?	LIMITS OF LPH OR DISSOLVED TPH PLUME, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN		
■	LPH PLUME AREA		
▨	DISSOLVED TPH PLUME AREA		

NOTE:
LPH THICKNESSES AND DISSOLVED TPH CONCENTRATIONS FOR DECEMBER 2001 FROM THE BP AND CHEVRON TERMINALS WERE USED TO GENERATE THIS PLUME MAP. DATA FROM THE NEXT CLOSEST GAUGING/SAMPLING EVENT WAS USED IF DATA NOT AVAILABLE FOR THIS DATE.

0 300 600
APPROXIMATE SCALE (FEET)

SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:
BP TERMINAL 33T
2295 East Harbor Drive
San Diego, California

DECEMBER 2001
LPH/DISSOLVED TPH PLUME
AERIAL PHOTO MAP

FIGURE: 8

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
08BP.0033T.05	RO	JH		6/6/05

FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-TPH AERIAL ('01).DWG|ROCAMPO|JUN 15, 2005 AT 12:56|LAYOUT: MODEL

33T-TPH AERIAL (01)

RESOURCE: TERRAIN NAVIGATOR PRO, PHOTO DATED JUNE 1, 1994

LEGEND:

- PROPERTY BOUNDARY
- LPH — LIQUID PHASE HYDROCARBONS
- LIMITS OF LPH OR DISSOLVED TPH PLUME, DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN
- LPH PLUME AREA
- DISSOLVED TPH PLUME AREA
- TPH — TOTAL PETROLEUM HYDROCARBONS
- mg/L — MILLIGRAMS PER LITER

NOTE:
LPH THICKNESSES AND DISSOLVED TPH CONCENTRATIONS FROM THE BP AND CHEVRON TERMINALS WERE USED TO GENERATE THIS PLUME MAP.

0 300 600
APPROXIMATE SCALE (FEET)

SECOR
2655 CAMINO DEL RIO NORTH, SUITE 302
SAN DIEGO, CALIFORNIA
PHONE: (619) 296-6195/296-6199 (FAX)

FOR:			FIGURE:
BP TERMINAL 33T 2295 East Harbor Drive San Diego, California	DECEMBER 2004 LPH/DISSOLVED TPH PLUME AERIAL PHOTO MAP		9
JOB NUMBER: 08BP.0033T.05	DRAWN BY: RO	CHECKED BY: JH	APPROVED BY:
DATE: 6/6/05			

FILEPATH:Q:\CADD-08\PROJECTS 2005\ARCO\33T-2K5\33T-TPH AERIAL ('04).DWG|ROCAMPO|JUN 15, 2005 AT 13:04|LAYOUT: MODEL

33T-TPH AERIAL (04)

APPENDIX A

RWQCB TENTATIVE CAO R9-2005-0126 (R9-2005-0126)

Technical Exhibits for BP West Coast Products LLC's Response to
Tentative Cleanup and Abatement Order R9-2005-0126
BP west Coast Products, LLC
BP San Diego Terminal (Facility 33T)
2295 East Harbor Drive
San Diego, CA 92113
08BP.0033T.05
June 15, 2005

TENTATIVE

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

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

- NATIONAL STEEL AND SHIPBUILDING COMPANY
- 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
- UNITED STATES NAVY

CONTAMINATED MARINE SEDIMENT IN SAN DIEGO BAY WITHIN AND ADJACENT TO SOUTHWEST MARINE, INC. AND NATIONAL STEEL AND SHIPBUILDING COMPANY LEASEHOLDS GENERALLY BETWEEN SAMPSON STREET EXTENSION AND MOUTH OF CHOLLAS CREEK

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

JURISDICTION

1. **WASTE DISCARGE**. Elevated levels of pollutants above San Diego Bay background conditions exist in the San Diego Bay bottom marine sediment within and adjacent to the National Steel and Shipbuilding Company (hereinafter "NASSCO") and Southwest Marine, Inc. (hereinafter "Southwest Marine) leaseholds (hereinafter collectively referred to as "Shipyard Sediment Site"), 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 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.

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. NASSCO has caused or permitted pollutants 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. NASSCO 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 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.

3. **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 at this site 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 has caused or permitted pollutants 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 into San Diego Bay in

violation of waste discharge requirements prescribed by the Regional Board. NASSCO 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 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 is referred to as "Discharger(s)" in this Cleanup and Abatement Order

4. **CITY OF SAN DIEGO**. The City of San Diego owns and operates a municipal separate storm water conveyance 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 Shipyard Sediment Site, 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) through its SW4 (located on the Southwest Marine leasehold) and SW9 (located on the NASSCO leasehold) MS4 conduit pipes as well as other MS4 conduit pipes which historically discharged directly into the Shipyard Sediment Site. The City of San Diego has also caused or permitted the discharge of these urban storm water pollutants through its MS4 to Chollas Creek resulting in the exceedance 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 studies indicate that during storm events, Chollas Creek discharges sediment plumes, containing urban storm water pollutants, up to 2 kilometers into San Diego Bay, including the Shipyard 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 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 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 has caused or permitted pollutants 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. 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

6. **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. Fuel products containing petroleum hydrocarbons and related constituents such as polynuclear aromatic hydrocarbons (PAHs) have been stored at 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. Accordingly Chevron is referred to as "Discharger(s)" in this Cleanup and Abatement Order.

7. **BP AS THE PARENT COMPANY AND SUCCESSOR TO ATLANTIC RICHFIELD COMPANY.** 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 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.

8. **SAN DIEGO GAS AND ELECTRIC, A SUBSIDIARY OF SEMPRA ENERGY COMPANY.** 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 has caused or permitted pollutants from its power plant operations, including chromium, iron, copper, total suspended solids, and petroleum hydrocarbons to San Diego Bay in violation of waste discharge requirements prescribed by the Regional Board. In addition, polychlorinated biphenyls (PCBs) are present in the location of the former waste holding ponds where it discharged or threatens to discharge to San Diego Bay at the location of the Shipyard Sediment Sites. Based on these considerations SDG&E is referred to as "Discharger(s)" in this Cleanup and Abatement Order.

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.

FACTUAL BACKGROUND

10. **CLEAN WATER ACT SECTION 303(d) LIST**. 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, mercury, polynuclear aromatic hydrocarbons (PAH), and polychlorinated biphenyls (PCB) 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 Sites occupy this shoreline.

11. **SEDIMENT QUALITY INVESTIGATION.** 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 report prepared by NASSCO's and 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.** 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 multiple lines of evidence approach to assess the potential risks to aquatic life beneficial uses from pollutants at the Shipyard Sediment Site. The approach focused on measuring exposure and adverse effects to the benthic macroinvertebrate community and to fish.

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 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 complementary evidence for the degree of pollution-induced degradation in the benthic community.

15. **BASELINE 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 used to define baseline conditions. The Regional Board selected a pool of reference stations in San Diego Bay to characterize the baseline condition (Baseline Pool). The pool of reference stations were sampled from three independent sediment quality investigations: (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 sediment investigation. 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 are shown below.

Reference Stations Used To Establish Baseline Sediment Quality Conditions

2001 Chollas/Paleta Reference Station Identification Number	2001 NASSCO/Southwest Marine 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 triad sampling stations at the Shipyard Sediment Site as having sediment pollutant levels "likely" to adversely affect the health of the benthic community. 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 baseline 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 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 the chemical concentrations in *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 HPAHs. These chemicals 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 the potential risks to the benthic community from 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 criterion continuous concentration, which is the highest concentration of a pollutant to which 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 fish to 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 lesions exhibited statistically significant elevations relative to reference conditions. However, a fifth lesion (i.e., abundant hemosiderin in liver) was considered important by the pathologist and was nearly statistically significant for the purposes of this study. 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		Southwest Marine		Reference Area
Lesion	Severity Scores	Inside	Outside	Inside	Outside	
Microscopic						
Liver						

		Prevalence of Lesions (percent)				
		NASSCO		Southwest Marine		Reference Area
Lesion	**Severity Scores**	**Inside**	**Outside**	**Inside**	**Outside**	
Abundant Lipofuscin	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
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
	3 – Severe	2	0	0	2	2

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

Of the five lesions identified as significantly elevated with respect to reference conditions, none has been identified in other scientific field studies as being associated with sediment pollutant exposure. Scientific literature describing lesions that are potential biomarkers of environmental stressors in fish does not attribute causation of liposuscin, hemosiderin, cholangitis/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 pollutant exposure at the Shipyard Sediment Site

20. **FISH BILE.** The Regional Board evaluated fish bile to determine the potential exposure of fish to PAH compounds within and adjacent to the Shipyard Sediment Site. PAH breakdown products 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, two exhibited statistically significant elevations relative to reference conditions in spotted sand bass collected immediately outside of the Shipyard Sediment Site. No bile breakdown products were significantly elevated relative to reference conditions in spotted sand bass collected inside of the Shipyard Sediment Site. 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.

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

		NASSCO		Southwest Marine	
	Reference Area	Inside	Outside	Inside	Outside
Naphthalene Metabolites (ug/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	89.5	--	--	--	--
Phenanthrene Metabolites (ug/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	14.6	--	--	--	--
Benzo[a]pyrene Metabolites (ug/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	2.8	--	--	--	--

Note: Boxed and shaded values indicate results significantly greater than reference values (i.e., site mean greater than reference using 95% upper confidence limit on the mean).

21. **INDICATOR SEDIMENT CHEMICAL.** The Regional Board evaluated the relationships between sediment chemicals and biological responses to identify indicator chemicals (i.e., chemicals of potential concern) that may be impacting aquatic life. 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 Shipyard study were all used to evaluate the potential of such relationships. Chemicals 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 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 Shipyard 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.** The Regional Board evaluated potential risks to aquatic-dependent wildlife from pollutants present in the sediments at the Shipyard 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 Shipyard 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.** The Tier I 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).[1] 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.

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 COMPREHENSIVE RISK ASSESSMENT.** The Tier II 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 Tier II baseline risk assessment was based on tissue measurements from prey items collected from four discrete

[1] 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.

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.

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%)

[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.

Assessment Unit	BTAG Low	Cumulative Risk			Primary Contaminant Drivers (% Contribution to cumulative risk)
		> 1	> Reference	Risk	
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	Brown Pelican	Yes	Yes	Yes	Mercury (55%) PCBs (19%)

Assessment Unit	NOAEL HQ	Cumulative Risk			Primary Contaminant Drivers (% Contribution to cumulative risk)
		> 1	> Reference	Risk	
Marine Leasehold	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.** 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.** The Tier I objectives were to determine whether or not Shipyard Sediment Site conditions pose a potential unacceptable risk to recreational and subsistence anglers, and to identify whether a comprehensive, site-specific risk assessment was warranted (i.e., Tier II). 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 nausta* 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, norganic 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 COMPREHENSIVE RISK ASSESSMENT.** The Tier II objective was to more conclusively determine whether Shipyard Sediment Site conditions posed an unacceptable human health risk. 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 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 ($1x10^{-6}$) 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)
		> 1x10^-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

[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 $1x10^{-6}$ 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 risk levels.

Assessment Unit		Cumulative Cancer Risk			Primary Contaminant Drivers (% contribution to cumulative risk)
		> 1x10^-6	> Reference	Cancer Risk	
	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%)

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 Leashold	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%)

Assessment Unit		Cumulative Non-Cancer Risk			Primary Contaminant Drivers (% contribution to cumulative risk)
		> 1	> Reference	Non-Cancer Risk	
Outside Southwest Marine Leashold	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 technologically[4] or economically[5] infeasible to do so.

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 as described in Finding 15. The background sediment chemistry levels at these reference stations are described below.

Background Sediment Chemistry Levels

Chemical	Units (dry weight)	Background Sediment Chemistry Levels (1)
Metals		
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

[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 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.

Chemical	Units (dry weight)	Background Sediment Chemistry Levels (1)
Silver	mg/kg	1.1
Zinc	mg/kg	192
Organics		
Dibutyltin	ug/kg	21
Monobutyltin	ug/kg	14
Tributyltin	ug/kg	22
Tetrabutyltin	ug/kg	(1.4)
HPAH (2)	ug/kg	673
PPPAH (3)	ug/kg	1,234
Benzo[a]pyrene	ug/kg	202
Total PCB Congeners (4)	ug/kg	84
Polychlorinated terphenyls	ug/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 Polynulear Aromatic Hydrocarbons
(4) PCB = Polychlorinated Biphenyls

32. **TECHNOLOGICAL FEASABILITY 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. Natural recovery was 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 also considered to be technologically infeasible 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 contaminated sediment.

33. **ECONOMIC FEASABILITY 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 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 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 background[6]. 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.

Summary Of Economic Feasibility Evaluation

Cleanup Alternatives	Approximate Dredge Volume (cu yd)	Approximate Total Cost
Natural Recovery	0	$900,000
Exponent LAET	75,000	$15,000,000
20x Background	252,060	$33,000,000
15x Background	295,460	$37,000,000
10x Background	502,450	$58,000,000
5x Background	885,580	$96,000,000
Background	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	Wildlife	Human Health	Aquatic Life	Wildlife	Human Health			
Natural Recovery	0	0	0	-4	-5	-5	0	0	0
Exponent LAET	-1	-1	-2	+2	+1	+1	-1	-1	+1
20x Background	-3	-1	-3	+3	+3	+3	-3	-3	+3
15x Background	-3	-1	-3	+3	+3	+3	-3	-3	+3
10x Background	-4	-1	-4	+3	+3	+4	-3	-3	+3
5x Background	-4	-2	-4	+4	+4	+5	-4	-4	+4
Background	-4	-2	-4	+4	+4	+5	-4	-4	+4

[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.

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.*** 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 Board.[8]. 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

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[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 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 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)

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, 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)
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	ug/kg	110
Benzo[a]pyrene	ug/kg	1,010
Total PCB Congeners (2)	ug/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 that cleanup footprint.
(2) PCB = polychlorinated biphenyl

STATUTORY AND REGULATORY FINDINGS

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 June 29, 2005. Detailed response to relevant comments has been incorporated into the final Technical Analysis of the Cleanup and Abatement Order adopted by this Order.

ORDER DIRECTIVES

IT IS HEREBY ORDERED that, pursuant to Sections and 13267 and 13304 of the California Water Code, National Steel and Shipbuilding Company; 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 actions[9] 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 (1)
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

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

Chemical	Units (dry weight)	Sediment Quality Levels (1)
Silver	mg/kg	1.5
Zinc	mg/kg	300
Organics		
Tributyltin	ug/kg	110
Benzo[a]pyrene	ug/kg	1,010
Total PCB Congeners (2)	ug/kg	420

(1) PCB = polychlorinated biphenyl

B. REMEDIAL ACTION PLAN AND IMPLEMENTATION

1. ***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

   d. *Short-Term Effectiveness Monitoring Activities.* A monitoring program as described in Directive D, 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.

2. ***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.

3. ***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 Shipyard Sediment Site.

4. ***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.

5. ***Monitoring and Evaluation.*** 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.

6. ***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) through sampling of the Shipyard Sediment Site. The monitoring period shall begin immediately after the completion of remedial action measures and be conducted at intervals proposed by the Discharger(s) and agreed to by the Regional Board. 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 Shipyard 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 March 1, 2006. 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 remedial action is completed. The monitoring activities shall include sampling for a period of not less than three 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:

a. *Monitoring Activities* – A detailed description of the post cleanup monitoring activities performed; and

b. *Interpretations and Conclusions.* Interpretations and conclusions regarding the potential presence and chemical characteristics of any newly deposited sediments 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 California 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 workplans, 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:

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 California 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 June 29,2005.

_____

John H. Robertus
Executive Officer

APPENDIX B
EXCERPTS FROM CHEVRON TERMINAL GROUNDWATER MONITORING REPORTS

Technical Exhibits for BP West Coast Products LLC's Response to Tentative Cleanup and Abatement Order R9-2005-0126
BP west Coast Products, LLC
BP San Diego Terminal (Facility 33T)
2295 East Harbor Drive
San Diego, CA 92113
08BP.0033T.05
June 15, 2005

Table 2
Historical Fluid Level Monitoring Data
Chevron Harbor Terminal 100-1252, 2351 East Harbor Drive, San Diego, California
LFR 002-10223-08

Well ID	Monitoring Date	Casing Elevation (feet-amsl)	Depth to Water (feet)	PSH Thickness (feet)	Groundwater Elevation (feet-amsl)	Comments
MW-1	07/31/89	22.01	20.73	0.00	1.28	
MW-1	10/30/89	22.01	20.58	0.00	1.43	
MW-1	03/12/90	22.01	19.13	0.00	2.88	
MW-1	06/22/90	22.01	18.79	0.00	3.22	
MW-1	09/27/90	22.01	20.24	0.00	1.77	
MW-1	01/22/91	22.01	20.55	0.00	1.46	
MW-1	05/30/91	22.01	21.14	0.00	0.87	
MW-1	08/16/91	22.01	20.52	0.00	1.49	
MW-1	12/02/91	22.01	NG	--	--	
MW-1	03/03/92	22.01	20.02	0.00	1.99	
MW-1	05/19/92	22.01	20.42	0.00	1.59	
MW-1	09/03/92	22.01	21.10	0.00	0.91	
MW-1	11/24/92	22.01	21.70	0.00	0.31	
MW-1	03/11/93	22.01	19.67	0.00	2.34	
MW-1	06/09/93	22.01	20.31	0.00	1.70	
MW-1	08/26/93	22.01	20.34	0.00	1.67	
MW-1	11/03/93	22.01	20.31	0.00	1.70	
MW-1	03/16/94	22.01	20.56	0.00	1.45	
MW-1	06/08/94	22.01	20.61	0.00	1.40	
MW-1	09/13/94	22.01	20.47	0.00	1.54	
MW-1	11/15/94	22.01	20.48	0.00	1.53	
MW-1	02/23/95	22.01	20.00	0.00	2.01	
MW-1	06/22/95	22.01	20.45	0.00	1.56	
MW-1	09/26/95	22.01	20.33	0.00	1.68	
MW-1	12/18/95	22.01	20.56	0.00	1.45	
MW-1	02/21/96	22.01	20.64	0.00	1.37	
MW-1	06/05/96	22.01	20.70	0.00	1.31	
MW-1	08/19/96	22.01	20.52	0.00	1.49	
MW-1	11/14/96	22.01	20.50	0.00	1.51	
MW-1	03/13/97	22.01	20.46	0.00	1.55	
MW-1	06/11/97	22.01	20.39	0.00	1.62	
MW-1	09/11/97	22.01	20.16	0.00	1.85	
MW-1	12/04/97	22.01	20.14	0.00	1.87	
MW-1	03/05/98	22.01	19.83	0.00	2.18	
MW-1	06/05/98	22.01	20.35	0.00	1.66	
MW-1	09/03/98	22.01	20.30	0.00	1.71	
MW-1	12/03/98	22.01	20.60	0.00	1.41	
MW-1	09/26/00	22.01	20.82	0.00	1.19	trace
MW-1	12/28/00	22.01	20.93	0.00	1.08	
MW-1	03/28/01	22.01	20.70	0.00	1.31	sheen
MW-1	06/28/01	22.01	20.82	0.00	1.19	trace
MW-1	09/27/01	22.01	20.61	0.00	1.40	
MW-1	12/27/01	22.01	NG	--	--	obstructed
MW-1	03/27/02	24.69	21.61	0.00	3.08	sheen
MW-1	06/26/02	24.69	22.03	0.02	2.68	
MW-1	09/25/02	24.69	NG	--	--	temporarily covered

Table 2
Historical Fluid Level Monitoring Data
Chevron Harbor Terminal 100-1252, 2351 East Harbor Drive, San Diego, California
LFR 002-10223-08

Well ID	Monitoring Date	Casing Elevation (feet-amsl)	Depth to Water (feet)	PSH Thickness (feet)	Groundwater Elevation (feet-amsl)	Comments
MW-1	12/04/02	24.69	20.82	0.00	3.87	
MW-1	02/05/03	24.69	20.82	0.00	3.87	
MW-1	06/04/03	24.69	21.03	0.02	3.68	
MW-1	09/03/03	24.69	20.62	0.00	4.07	
MW-1	12/03/03	24.69	20.52	0.00	4.17	
MW-1	03/03/04	24.69	20.37	0.01	4.33	
MW-1	06/02/04	24.69	21.50	0.05	3.23	
MW-1	09/01/04	24.38*	21.83	0.02	2.57	
MW-1	12/01/04	24.38*	20.49	0.00	3.89	
MW-1	03/02/05	24.38*	19.90	0.00	4.48	
MW-2	05/30/91	22.04	20.81	0.00	1.23	
MW-2	08/16/91	22.04	20.69	0.00	1.35	
MW-2	12/02/91	22.04	NG	--	--	
MW-2	03/03/92	22.04	20.22	0.00	1.82	
MW-2	05/19/92	22.04	20.45	0.00	1.59	
MW-2	09/03/92	22.04	20.57	0.00	1.47	
MW-2	11/24/92	22.04	20.53	0.00	1.51	
MW-2	03/11/93	22.04	19.13	0.00	2.91	
MW-2	06/09/93	22.04	20.47	0.00	1.57	
MW-2	08/26/93	22.04	22.53	0.00	-0.49	
MW-2	11/03/93	22.04	20.49	0.00	1.55	
MW-2	03/16/94	22.04	20.67	0.00	1.37	
MW-2	06/08/94	22.04	20.73	0.00	1.31	
MW-2	09/13/94	22.04	20.63	0.00	1.41	
MW-2	11/15/94	22.04	20.66	0.00	1.38	
MW-2	02/23/95	22.04	20.14	0.00	1.90	
MW-2	06/22/95	22.04	20.60	0.00	1.44	
MW-2	09/26/95	22.04	20.47	0.00	1.57	
MW-2	12/18/95	22.04	20.69	0.00	1.35	
MW-2	02/21/96	22.04	20.78	0.00	1.26	
MW-2	06/05/96	22.04	20.83	0.00	1.21	
MW-2	08/19/96	22.04	26.51	0.00	-4.47	
MW-2	11/14/96	22.04	20.59	0.00	1.45	
MW-2	03/13/97	22.04	NG	--	--	
MW-2	06/11/97	22.04	20.43	0.00	1.61	
MW-2	09/11/97	22.04	NG	--	--	
MW-2	12/04/97	22.04	NG	--	--	
MW-2	03/05/98	22.04	NG	--	--	
MW-2	06/05/98	22.04	NG	--	--	
MW-2	09/03/98	22.04	NG	--	--	
MW-2	12/03/98	22.04	NG	--	--	
MW-2	09/26/00	22.04	NG	--	--	
MW-2	12/28/00	22.04	NG	--	--	
MW-2	03/28/01	22.04	NG	--	--	
MW-2	06/28/01	22.04	NG	--	--	
MW-2	09/27/01	22.04	NG	--	--	