

Appendix B—Tables

Table 1. Environmental Releases in the Area Around the Del Amo Site, Near Torrance, California

Zip Code and Year	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988
90502*	29,370	52,230	52,912	62,362	50,400	28,851	10,662	73,942	169,658	534,917	622,746	619,609	468,651
	Methanol (32%-48%), styrene (6%-10%), glycol (10%-46%), methyl isobutyl ketone (4%-7%), toluene (1.7%-3%), xylenes (2%-31%).		Xylenes (50%-60%), toluene (2%-25%), styrene (6%-23%), glycol (7%-53%), methyl isobutyl ketone (3%-13%).					1,1,1-TCA (47%), PCE (40%), BTEX (2%), styrene (3%), glycol (5%).	PCE (57%), 1,1,1-TCA (21%), methylene chloride (18%), styrene (2%), glycol (1%).	1,1,1-TCA (12%-50%), methylene chloride (12%-38%), PCE (22%-42%), MEK (6%-13%), BTEX (8%-13%), styrene (~2.5%), glycol (1%-5%), chromium (<1%), lead cpds (<1%); caustics (<1%): HF, H ₂ NO ₃ , NaOH, H ₂ SO ₄ .			
90501	159	277	171	13,746	14,989	19,119	45,075	100,724	136,384	93,875	164,681	97,217	51,091
	Similar to 1995 – 1997, but much less quantity and no 1,1,1-TCA.			1,1,1-TCA (1995 only, 62%), n-butyl alcohol (11%-24%), naphthalene (16%-24%), 1,2,4-trimethylbenzene (start in 1996, 13%-15%), and cumene (start in 1996, 23%-24%), lead (<1%), copper cpds (<1%).			1,1,1-TCA (26%-70%), xylenes (8%-54%), Freon 113 (1990 only, 14%), acetone (in 1992 and 1993, 9%-12%), copper cpds (2%-7%), lead, HCl, MEK (1991 only, 3%), barium (1991 and 1992 only), chloromethane (1991 and 1992 only, 12%), n-butyl alcohol (start in 1991, 2%-9%), naphthalene (start in 1994, 9%), chromium (in 1993 and 1994 only, 1%).			1,1,1-TCA (40%-60%), Freon 113 (10%-21%), acetone (7%-17%), glycol ethers (1%-8%), copper (1%-3%). Less than 1%: asbestos (1988 only), lead, caustics (HCl, H ₂ NO ₃ , H ₂ PO ₄ , H ₂ SO ₄). Add HCl in 1989 (23%), propylene (4%), and MEK (2%).			
90509†	1,118,079	1,920,952	1,166,936	971,137	1,042,806	794,645	748,192	717,326	604,559	659,316	450,966	528,635	409,297
	Ammonia (85%-90%). Less than 2%: propylene, BTEX, ethylene, naphthalene, MTBE, n-hexane, phenol, methane, metals (nickel and zinc compounds), HF.												

Source: Toxic Release Inventory (TRI) (31) Releases are presented in pounds of chemical released in that year.

* Douglas Aircraft Company's closure resulted in the large drop in emission release in 1991/1992.

† Mobil Oil Corporation Refinery is the major industry in this zip code.

1,1,1-TCA—1,1,1-trichloroethane; PCE—tetrachloroethylene; BTEX—benzene, toluene, ethylbenzene, xylenes; HCl—hydrochloric acid; MEK—methyl ethyl ketone; HF—hydrofluoric acid; MTBE—methyl tertbutyl ether; H₂NO₃—nitric acid; H₂PO₄—phosphoric acid; H₂SO₄—sulfuric acid; NaOH—sodium hydroxide.

Table 2. Evaluation of Exposure Pathways, Del Amo Site, Near Torrance, California

Location	Type of Exposure Pathway	Primary Contaminants of Concern	Exposure Pathway Elements					Time	Conclusion
			Source	Media	Point of Exposure	Route of Exposure	Potentially Exposed Population		
Developed Area of Site	Soil	Arsenic, cadmium, Aroclor1260, total PCBs, BaP and other carcinogenic PAHs, benzene, ethylbenzene	Del Amo, Montrose, and other activities	Soil	Soil	Incidental ingestion, skin contact	Long-term on-site worker, occasional worker, child at day care	From ~1970s until now, future	Not currently a public health hazard from site-related contaminants. Potential future hazard if soil becomes exposed. Testing needed when covered soil is exposed.
	Groundwater if used as drinking water	BTEX	Del Amo, Montrose, and several other facilities	Groundwater	Drinking water	Ingestion, inhalation, skin contact	Residents, workers, other users of water	Past, present, future	Eliminated for past and current exposure. Potential future exposure if not cleaned up.
	Indoor air	BTEX, TCE, Styrene, PCE	Del Amo site activities	Soil gas coming from contaminated soil and groundwater	Indoor air	Inhalation	Long-term on-site worker, occasional worker, child at daycare	From 1970s (when development occurred) until now, future	Future public health hazard for buildings located over LNAPL. Indoor air testing recommended.
Waste Pits	Exposure to waste-pit contamination before pits were capped	PAHs, BTEX, VOCs, SVOCs	Del Amo waste pits	Soil Waste-material	Soil Waste-material	Incidental ingestion, skin contact	Trespasser	Before cap was placed over the pits	Public health hazard in the past.
	Exposure to emissions from waste pits before pits were capped	BTEX	Del Amo waste pits	Emissions from waste	Air	Inhalation	Nearby resident, trespasser	Before cap was placed over the pits	Not a public health hazard.

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Location	Type of Exposure Pathway	Primary Contaminants of Concern	Exposure Pathway Elements					Time	Conclusion
			Source	Media	Point of Exposure	Route of Exposure	Potentially Exposed Population		
Waste Pits	Exposure to waste-pit contamination after cap was placed	PAHs, BTEX, VOCs, SVOCs	Del Amo waste pits	Soil Waste-material	Soil Waste-material	Incidental ingestion, skin contact	Trespasser	After cap was placed over the pits	Not a public health hazard as long as cap is maintained.
	Releases from treatment of soil gas captured from under waste-pit cap	(Yet to be determined)	Del Amo waste pits, soil gas treatment system	Soil gas	To be determined	Inhalation, skin contact	Nearby resident	Future	Evaluate when treatment is operational.
Neighborhood area south of site	Indoor air exposure	BTEX	Del Amo, Montrose and several other facilities	Soil gas coming from contaminated groundwater	Indoor air	Inhalation	Nearby residents	Past, present, future	Not a public health hazard.
	Soil exposure before the grading occurred	DDT, arsenic, cadmium	Fill from Montrose site and other facilities	Soil	Surface soil	Incidental ingestion, skin contact	Residents	Past	Eliminated; no chemicals related to Del Amo at levels of health concern.
	Soil exposure after the grading occurred	Arsenic, lead, copper, zinc, nickel in non-native material	Del Amo site	Soil and nonnative materials found in the soil	Surface soil	Incidental ingestion, skin contact	Trespassers, park workers, park users	Present, future	Eliminated; no chemicals related to Del Amo at levels of health concern in soil. Nonnative material should be removed from accessible surface.

Acronyms used in table: BTEX—benzene, toluene, ethylbenzene, xylenes; DDT—dichlorodiphenyltrichloroethane; PAHs—polycyclic aromatic hydrocarbons; PCBs—polychlorinated biphenyls; SVOCs—semi-volatile organic compounds; BaP—benzo(a)pyrene; PCE—tetrachloroethylene; TCE—trichloroethylene; VOCs—volatile organic compounds.

Table 3. Summary of Chemicals Detected in the Parcels and Exposure Areas of Potential Concern on the Del Amo Site, Near Torrance, California

Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#1 7351-31-17	NS	Very few samples composited with other parcels. Cadmium Chromium Manganese	NS	NS	-----	Not an area of manufacturing or storage
#2 7351-31-24 7351-31-25	Arsenic Cadmium DDT Arochlor PCBs PAHs	Cadmium DDT Arochlor PCBs PAHs	Toluene Xylenes 1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Ethylbenzene Isopropylbenzene Tetrachloroethylene	NS	Toluene Xylenes 1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Ethylbenzene Isopropylbenzene Tetrachloroethylene	
#3 7351-31-7 Sumitomo	NS	NS	3 samples on north end: Benzene Ethylbenzene Toluene	Benzene Methylene chloride Tetrachloroethylene Trichloroethylene 1,1-Dichloroethylene 1,1,1-Trichloroethane Cyclohexane Ethylbenzene Methyl ethyl ketone Styrene Toluene Xylenes	-----	Historically, tanks located in the area. Building is located on former tank area. Very little sampling.

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#4 7351-31-8	NS	Cadmium Cyclohexane Chromium (Total) Copper 2-Hexanone Manganese Nickel Vanadium	NS	NS	-----	Not an area of manufacturing or storage. No soil gas data. Some soil data.
#5 7351-33-17 WRC (Toyota-leases)	NS	NS	Benzene Toluene Dichlorobromomethane 2-Hexanone 1,2,3-Trimethylbenzene Methyl isobutyl ketone Xylenes Ethylbenzene Tetrachloroethylene Trichloroethylene	Benzene Methylene Chloride Tetrachloroethylene Trichloroethylene Toluene	-----	Manufacturing of butadiene during facility operation. Fair amount of data, but no metal analyses.
#6 7351-33-22 Hamilton Dutch Building	NS	NS	Benzene Toluene Ethylbenzene Xylenes	NS	Benzene Toluene Ethylbenzene Xylenes	Historical usage occurred in area. Non RI/FS sampling. Lots of soil gas sampling. Most samples analyzed for BTEX, very little other VOC analysis or high detection limits.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#7 7351-33-26	NS	NS	Benzene Cyclohexane	-----	Benzene Chloromethane Cyclohexane Freon 12 Freon 114	Storage tanks and pipelines on property when facility was in operation. LNAPL present in area. High detection limits for soil gas—bad data
#8 7351-33-27 Takechi USA, Inc.	NS	For VOCs only. No COCs	Benzene Cyclohexane 2-Hexanone	Benzene Tetrachloroethylene Toluene Styrene Xylenes Cyclohexane Methyl ethyl ketone 1,1-Dichloroethane 1,1-TCA Ethylbenzene	-----	Storage tanks and pipelines on property when facility was in operation. LNAPL present in area.
#9 7351-33B30 Currently Undeveloped	1 sample—a composite of 6 samples: Arsenic Cadmium Chromium Copper Manganese Vanadium Nickel DDT	NS	NS	NA	-----	Butadiene plant or fabrication plant were located in this area. Cooling towers also located in the area.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#10 7351-33-34 Currently Undeveloped	2 composite samples—from this parcel and two others: Arsenic Cadmium Chromium (Total) Copper Manganese Nickel Vanadium Zinc DDT Dieldrin	NS	Benzene Toluene Tetrachloroethylene	NA	Benzene Tetrachloroethylene Toluene	Pipelines cross the property.
#11 7351-33-37 Currently Undeveloped	2 composites—1 from this parcel and 2 others: Arsenic Cadmium Chromium Copper Manganese Nickel Vanadium Zinc Dieldrin DDT	NS	Benzene Tetrachloroethylene 1,2,4-Trimethylbenzene	NA	Benzene Tetrachloroethylene 1,2,4-Trimethylbenzene	Butadiene plant used to be located on parcel. Cooling towers located on parcel. High detection limits for BTEX in soil gas. Minimal other VOC analyses.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#12 7351-33-40 Currently Undeveloped	2 composite sample from this and other parcels: Arsenic Cadmium Chromium (Total) Copper Manganese Nickel Vanadium Zinc Dieldrin DDT	NS	2 Samples Benzene	NA	Benzene	Historical use of hazardous material. Pipelines crossed parcel. High detection limits for BTEX in soil gas.
#13 7351-33-900 Gas/Utility Right-of-Way	NS	NS	NS	NA	NA	Historically, a Department of Water and Power right- of-way. No facility activities in area.
#14 7351-34-39 Miller Fabrication	NS	NS	Benzene 4-Ethyl toluene Cyclohexane Xylenes Ethylbenzene Styrene Tetrachloroethylene	Benzene 1,1,1-Trichloroethane Ethylbenzene Methyl ethyl ketone Styrene Tetrachloroethylene Toluene Trichloroethylene Xylenes	-----	Historically, pipelines crossed property. High detection limits in soil gas.
#15 7351-34-41 Obie (Formerly F. Schaefer) Publications	NS	NS	Benzene Ethylbenzene Tetrachloroethylene Xylenes Toluene	Benzene Ethylbenzene Styrene Tetrachloroethylene Toluene Xylenes	-----	Historically, pipelines crossed property. Styrene finishing unit was located there.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#16 7351-34-43 Ace	NS	NS	Tetrachloroethylene 1,1,1-Trichloroethane Freon 11	1,1,1-Trichloroethane Benzene Chloroform Ethylbenzene Methyl ethyl ketone Styrene Tetrachloroethylene Toluene Xylenes	Tetrachloroethylene 1,1,1-Trichloroethane Freon 11	Historically, pipelines crossed parcel. Limited soil gas sampling.
#17 7351-34-45	NS	NS	Tetrachloroethylene 1,1,1-Trichloroethane 1,1-Dichloroethylene Freon 11 Acetone	NS	Tetrachloroethylene 1,1,1-Trichloroethane 1,1-Dichloroethylene Freon 11 Acetone	Historically, pipelines crossed the parcel. Limited soil gas sampling.
#18 7351-34-47 R. R. Donnelly Financial	NS	NS	Ethylbenzene Toluene Tetrachloroethylene Benzene 1,1,1-Trichloroethane	Benzene 1,1,1-Trichloroethane Cyclohexane Ethylbenzene Methyl ethyl ketone Methylene chloride Styrene Tetrachloroethylene Xylenes	-----	When facility was in operation, manufacturing activities like ethylbenzene production took place on the parcel. High detection limits for soil gas samples.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#19 7351-34-72	NS	1 single sample. 2 composites with other parcels: Cadmium Chromium (total) Copper Manganese Nickel Vanadium Zinc	Tetrachloroethylene	NS	Tetrachloroethylene	Historically, pipelines crossed parcel.
#20 7351-34-15 7351-34-50 7351-34-56 R. R. Donnelly & Sons	NS	Arsenic Manganese Cadmium Chromium (total) N-Nitroso- dipenylamine	Ethylbenzene Styrene 1,4-Dichlorobenzene 1,3,5-Trimethylbenzene Toluene Tetrachloroethylene 2-Hexanone 4-Ethyl toluene Chloroform Benzene 1,1,1-Trichloroethane Trichloroethylene 1,2,4-Trimethylbenzene	1,1,1-Trichloroethane Benzene Chlorobenzene Cyclohexane Ethylbenzene Methyl ethyl ketone Styrene Tetrachloroethylene Toluene Trichloroethylene Xylenes	Ethylbenzene Styrene 1,4-Dichlorobenzene 1,3,5-Trimethylbenzene Toluene Tetrachloroethylene 2-Hexanone 4-Ethyl toluene Chloroform Benzene 1,1,1-Trichloroethane Trichloroethylene 1,2,4-Trimethylbenzene	Benzene, toluene, and other tanks located in parcel. LNAPL present in area.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#21 7351-34-52 Toyota	NS	NS	Tetrachloroethylene Benzene 4-Ethyl toluene Trichloroethylene 1,2,4-Trimethylbenzene	1,1,1-Trichloroethane Benzene Cyclohexane Ethylbenzene Methyl ethyl ketone Methylene chloride Styrene Tetrachloroethylene Toluene Trichloroethylene Xylenes	Tetrachloroethylene Benzene 4-Ethyl toluene Trichloroethylene 1,2,4-Trimethylbenzene	When facility was in operation, manufacturing activities like ethylbenzene production took place on the parcel. High detection limits for soil gas sampling.
#22 7351-34-57 Coca Cola Building	NS	Limited sampling Benzene Ethylbenzene (no metals analysis)	Ethylbenzene Styrene 1,3,5-Trimethylbenzene Toluene Tetrachloroethylene Xylenes 2-Hexanone 4-Ethyl toluene Acetone Chloroform Benzene 1,1,1-Trichloroethane Trichloroethylene 1,2,4-Trimethylbenzene 1,2-Dichloroethane	Benzene (only analyzed for benzene, ethylbenzene, styrene, and toluene)	Ethylbenzene Styrene 1,3,5-Trimethylbenzene Toluene Tetrachloroethylene Xylenes 2-Hexanone 4-Ethyl toluene Acetone Chloroform Benzene 1,1,1-Trichloroethane Trichloroethylene 1,2,4-Trimethylbenzene 1,2-Dichloroethane	Several storage areas for styrene, benzene, ethylbenzene, and toluene located here.
#23 7351-34-58	NS	Limited sampling one boring - two depths No metals No COCs	Ethylbenzene 1,3,5-Trimethylbenzene Tetrachloroethylene 4-Ethyl toluene Benzene Trichloroethylene 1,2,4-Trimethylbenzene	NS	Ethylbenzene 1,3,5-Trimethylbenzene Tetrachloroethylene 4-Ethyl toluene Benzene Trichloroethylene 1,2,4-Trimethylbenzene	Storage tanks were located on this parcel.

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#24 7351-34-69 Tri-Lite	NS	Nickel Chromium (total) Vanadium Arsenic	Ethylbenzene Styrene Xylenes Toluene Cyclohexane Tetrachloroethylene sec-Butyl benzene 4-Ethyl toluene Benzene 1,1,1-Trichloroethane Freon 114 Isopropyl benzene	1,1,1-Trichloroethane Benzene Chloroform Cyclohexane Ethylbenzene Methyl ethyl ketone Methylene chloride Styrene Tetrachloroethylene Toluene Trichloroethylene Xylenes	Ethylbenzene Styrene Xylenes Toluene Cyclohexane Tetrachloroethylene sec-Butyl benzene 4-Ethyl toluene Benzene 1,1,1-Trichloroethane Freon 114 Isopropyl benzene	Historically, pipeline crossed property. Styrene finishing unit located there. Considerable soil sampling conducted outside RI/FS, primarily for VOCs.
#25 7351-34-70	2 composites shared with another parcel: Arsenic Chromium (total) Cadmium Manganese Nickel DDT Benzo(a)anthracene Phenanthrene	Arsenic Chromium (total) Cadmium Nickel Manganese DDT	No COCs	NA	NA	Storage area was located in eastern portion when facility was in operation. High detection limits for soil gas.
#26 7351-34-73	NS	NS	Limited—3 samples. Ethylbenzene Styrene Toluene Cyclohexane Xylenes Benzene	NS	Ethylbenzene Styrene Toluene Cyclohexane Xylenes Benzene	Not much activity or storage on the parcel when facility was in operation. High detection limits for soil gas.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#27 7351-34-901	2 composites shared with another parcel: Arsenic Cadmium Chromium (total) Manganese Nickel Vanadium DDT Phenanthrene Acenaphthylene Benzo(a)anthracene 2-Methylnaphthalene	Arsenic Cadmium Chromium (total) Manganese Nickel Vanadium	No COCs	NA	Benzene Ethylbenzene Toluene Xylenes	Historically and currently, a Department of Water & Power right of way.
#28 Pacific Gateway	NS	2 samples for VOCs, SVOCs. 2 composite samples with other parcels— for PCBs / pesticides, metals. Manganese Nickel Cadmium Chromium	Ethylbenzene Styrene 1,3,5-Trimethylbenzene Toluene Tetrachloroethylene Xylenes 4-Ethyl toluene Acetone Chloroform Benzene 1,1,1-Trichloroethane Freon 11 Freon 12 Trichloroethylene	NA	NA	A street. Pipelines crossed the property in the past.
#29 Magellan Drive	NS	NS	Ethylbenzene Toluene Tetrachloroethylene Benzene	NA	NA	A street. Pipelines cross the parcel.

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Area of Concern; Parcel Numbers; Current Building Name	Surface Soil	Sub-Surface Soil	Shallow Soil Gas	Indoor Air (Sampling)	Indoor Air (Model)	Comments Sample Adequacy Historical Uses
#31 7351-31-18	NS	Limited sampling Cadmium Manganese Chromium (total)	1,4-Dichlorobenzene 1,3,5-Trimethylbenzene Tetrachloroethylene 4-Ethyl toluene Freon 11 Freon 12 Trichloroethylene 1,2,4-Trimethylbenzene	NS	1,4-Dichlorobenzene 1,3,5-Trimethylbenzene Tetrachloroethylene 4-Ethyl toluene Freon 11 Freon 12 Trichloroethylene 1,2,4-Trimethylbenzene	Historically, a reactor building for synthetic rubber located on the parcel.
#31 7351-34-54	NS	Cadmium Manganese	No COCs	NS	----	Little activity on property. Pipeline crossed parts of property.
#32 7351-34-66 Nippon Express	1 Surface soil for SVOC, PCBs / pesticides No COCs/No EDB	NS	5 shallow soil gas samples. 4 without complete VOC analysis. Carbon tetrachloride Chloroform	Benzene Cyclohexane Ethylbenzene Methyl ethyl ketone Methylene chloride Styrene Toluene 1,1,1-Trichloroethane Xylenes	----	Eastern Research Company was located in this parcel.
#33 7351-31-20 LAX Business Center	NS	NS	2 shallow soil gas samples. Only 1 had complete VOC analysis. No COCs	Benzene Cyclohexane Ethylbenzene Methyl ethyl ketone Methylene chloride Styrene Tetrachloroethylene 1,1,1-Trichloroethane Xylenes	----	Laboratory and process building for synthetic rubber process located in this area.

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7351-31-800 7351-33-15 7351-33-20 7351-33-39 7351-34-21 7351-34-23 7351-34-24 7351-34-75 7351-34-64 7351-34-76 7351-34-67 7351-34-68	NS	NS	Tetrachloroethylene Freon113 1,1,1-Trichloroethane 1,1-Dichloroethylene Acetone Chloroform Dichlorobromomethane Freon 11 Ethylbenzene 1,3,5-Trimethylbenzene Toluene Cyclohexane 4-Ethyl toluene Benzene 1,2,4-Trimethylbenzene	NS	-----	Pipeline crossed these properties. Cooling towers were located in 7351-33-20 and 7351-33-39.
7351-34-65	NS	NS	5 shallow soil gas samples. 4 without complete VOC analysis. Freon 11 Freon 113	NS	-----	Some historical usage.
7351-33-9	NS	NS	12 shallow soil gas. 2 with complete VOC analysis. 1,3,5-Trimethylbenzene Tetrachloroethylene 4-Ethyl toluene Chloroform Benzene Acetonitrile Trichloroethylene 1,2,4-Trimethylbenzene	NS	-----	Unlined impoundments were located on this parcel.

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7351-33-24 7351-33-23	NS	NS	1,4-Dichlorobenzene 1,3,5-Trimethylbenzene 4-Ethyl toluene Chloroform Benzene Chloromethane Chloroethane Acetonitrile 1,2,4-Trimethylbenzene	NS	----	Wastewater treatment, oil skimmer, and other recovery operations occurred here.
7351-34-74	NS	NS	3 shallow. Only 1 with complete VOC analysis. 2-Hexanone 4-Ethyl toluene Benzene 1,1,1-Trichloroethane 1,2,4-Trimethylbenzene	NS	NS	Historical photos show some unidentifiable structure was located here.

Source: Draft baseline risk assessment report for the Del Amo site (30).

Acronyms used in table: DDT—dichlorodiphenyltrichloroethane; PAHs—polycyclic aromatic hydrocarbons; PCBs—polychlorinated biphenyls; VOCs—volatile organic compounds; NS—not sampled; COCs—chemicals of concern; NA—not applicable.

Table 4. Summary of Surface Soil* Data Collected from the Developed Portion of the Del Amo Site, Near Torrance, California All Units (ppm)

Chemical Type	Chemical	Surface Soil		Health Comparison Value‡ (Source) Average Background (Bkgd) Concentration for Metals
		No. Detects / No. Samples	Concentration Range (Average†)	
Metal	Arsenic	15/15	2.6-49 (10.7)	20 (Child Chronic EMEG) 0.5 (CREG) Bkgd=0.6-11 (3.5)
Metal	Barium	15/15	130-210	4,000 (Child RMEG) Bkgd=133-1,400 (509)
Metal	Cadmium	15/15	6.3-9.1 (6.9)	10 (Child EMEG) Bkgd=0.05-1.7 (0.36)
Metal	Chromium	15/15	18-290 (30.8)	80,000 (Child RMEG) Bkgd=23-1,579 (122)
Metal	Cobalt	15/15	6.8-12	500 (Child Intermediate EMEG) Bkgd=2.7-46.9 (14.9)
Metal	Copper	15/15	19-240 (60.9)	2,900 (Residential PRG) Bkgd=9.1-96.4 (28.7)
Metal	Manganese	15/15	310-620	3,000 (Child RMEG) Bkgd=253-1,687 (646)
Metal	Nickel	15/15	12-59	1,000 (Child RMEG) Bkgd=9-509 (57)
Metal	Lead	15/15	5.6-200 (36.5)	400 (Residential PRG) Bkgd=12.4-97.1 (23.9)
Metal	Vanadium	15/15	36-160	200 (Child Intermediate EMEG) Bkgd=39-288 (112)
Metal	Zinc	15/15	56-650	20,000 (Child Chronic EMEG) Bkgd=88-236 (149)

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Chemical Type	Chemical	Surface Soil		Health Comparison Value‡ (Source) Average Background (Bkgd) Concentration for Metals
		No. Detects / No. Samples	Concentration Range (Average†)	
Pesticide	4,4'-DDD	12/15	0.0043-2.7 (0.24)	30 (Child RMEG)
Pesticide	4,4'-DDE	12/15	0.0056-2.2 (0.27)	30 (Child RMEG)
Pesticide	4,4'-DDT	14/15	0.022-9.1 (1.4)	1.0 (CREG)
Pesticide	Aroclor 1260	3/15	0.25-6.8	0.22 (CREG)
Pesticide	Dieldrin	3/15	<2-0.01	3 (Child Chronic EMEG) 0.04 (CREG)
Pesticide	Total PCB=s	3/15	0.25-6.8 (0.84)	0.04 (CREG)
SVOC	2-Methylnaphthalene	0/15	<0.4	-
SVOC	Acenaphthene	1/15	<0.4-0.23	3,000 (Child RMEG)
SVOC	Acenaphthylene	1/15	<0.4-0.47	-
SVOC	Anthracene	1/15	<0.4-0.57	20,000 (Child RMEG)
SVOC	Benzo(a)anthracene	2/15	<0.4-0.31	0.01 (BAP-eq CREG)
SVOC	Benzo(a)pyrene	1/15	<0.4-0.43 (0.2)	0.1 (CREG)
SVOC	Benzo(b)fluoranthene	1/15	<0.4-0.87	0.01 (BAP-eq CREG)
SVOC	Benzoic acid	1/15	<2-9.3	200,000 (Child RMEG)
SVOC	Bis(2-ethylhexyl)phthalate	3/15	<0.3-0.77	35 (Residential PRG)
SVOC	Butylbenzylphthalate	2/15	<0.4-0.34	10,000 (Child RMEG)
SVOC	Chrysene	1/15	<0.4-1.1	10 (BAP-eq CREG)

Table 4. Summary of Surface Soil* Data Collected from the Developed Portion of the Del Amo Site, Near Torrance, California All Units (ppm)

Chemical Type	Chemical	Surface Soil		Health Comparison Value‡ (Source) Average Background (Bkgd) Concentration for Metals
		No. Detects / No. Samples	Concentration Range (Average†)	
SVOC	Di-n-butylphthalate	1/15	<0.4-8.3	6,100 (Residential PRG)
SVOC	Fluoranthene	3/15	<0.4-0.24	2,000 (Child RMEG)
SVOC	Fluorene	1/15	<0.4-0.24	2,000 (Child RMEG)
SVOC	N-Nitrosodiphenylamine	0/15	<0.4	100 (CREG)
SVOC	Naphthalene	0/15	<0.4	1,000 (Child RMEG)
SVOC	Phenanthrene	4/15	<0.2-1	-
SVOC	Pyrene	5/15	<0.2-0.21	2,000 (Child RMEG)
VOC	1,2,4-Trimethylbenzene	0/5	<0.005	52 (Residential PRG)
VOC	1,2-Dichlorobenzene	0/5	<0.4	5,000 (Child RMEG)
VOC	1,3,5-Trimethylbenzene	0/5	<0.005	21 (Residential PRG)
VOC	1,4-Dichlorobenzene	0/5	<0.4	20,000 (Child Intermediate EMEG)
VOC	2-Hexanone	0/5	<0.05	-
VOC	Acetone	0/5	<0.05	5,000 (Child RMEG)
VOC	Benzene	0/5	<0.05	10 (CREG)
VOC	Cyclohexane	0/1	<0.001	140 (Residential PRG)
VOC	Ethyl benzene	0/5	<0.005	5,000 (Child RMEG)
VOC	Methyl isobutyl ketone (MIBK)	0/5	<0.05	790 (Residential PRG)

Table 4. Summary of Surface Soil* Data Collected from the Developed Portion of the Del Amo Site, Near Torrance, California All Units (ppm)

Chemical Type	Chemical	Surface Soil		Health Comparison Value‡ (Source) Average Background (Bkgd) Concentration for Metals
		No. Detects / No. Samples	Concentration Range (Average†)	
VOC	Methylene chloride	0/5	<0.05	3,000 (Child Chronic EMEG) 90 (CREG)
VOC	Naphthalene	0/5	<0.4	1,000 (Child RMEG)
VOC	Styrene	0/5	<0.005	10,000 (Child RMEG)
VOC	Tetrachloroethene	1/5	<0.005-0.006	500 (Child RMEG) / 5.7 (Residential PRG)
VOC	Toluene	0/5	<0.005	10,000 (Child RMEG)
VOC	Xylenes (Total)	NA	NA	100,000 (Child RMEG)
VOC	m,p-Xylene	0/5	<0.01	30,000 (Child Intermediate EMEG)
VOC	n-Butylbenzene	1/5	<0.005-0.005	140 (Residential PRG)
VOC	n-Propylbenzene	0/5	<0.005	140 (Residential PRG)
VOC	o-Xylene	0/5	<0.005	-
VOC	p-Isopropyltoluene	0/5	<0.005	-
VOC	sec-Butylbenzene	0/5	<0.005	110 (Residential PRG)
VOC	tert-Butylbenzene	0/5	<0.05	130 (Residential PRG)

Source: Section 2, Pilot feasibility study, summary of RI/FS investigation and findings (5). Background metal concentrations were obtained from ABackground concentrations of trace and major elements in California soils@ (33).

* Surface soil = 0 – 6 inches below ground surface (bgs); † Average values given in parentheses for chemicals used in dose calculations, non-detects were assigned half the detection limit for calculation of average concentration values; ‡ Health comparison values: EMEG—Environmental Media Evaluation Guide; RMEG—Reference Dose Media Evaluation Guide; CREG—Cancer Risk Evaluation Guideline; PRG—preliminary remediation goal; BaP-eq—benzo(a)pyrene equivalent.

ppm—parts per million; VOC—volatile organic compound; SVOC—semi-volatile organic compound.

Table 5. Summary of the Health Evaluation from Exposure to Soil on the Developed Portion of the Del Amo Site, Near Torrance, California

Potentially Exposed Group	Type of Exposure	Noncancer	Cancer Health Effect
Long-term worker who digs in surface soil	Maximum Soil Concentration	None expected	4.0 in 100,000 Very low increased risk
	Average Soil Concentration	None expected	7.8 in 1 million No apparent increased risk
Occasional worker who digs into the subsurface soil	Maximum Soil Concentration	None expected	2.2 in 1 million No apparent increased risk
	Average Soil Concentration	None expected	4.4 in 10 million No apparent increased risk
Child attending daycare who plays on surface soil	Maximum Soil Concentration	Arsenic exposure-estimate exceeds health comparison value	-----
	Average Soil Concentration	None expected	-----

Source: Doses were calculated from the following information: maximum- and average-surface soil concentrations from Table 4 for certain chemicals. Equations for determination of dose are shown in U.S. Environmental Protection Agency (EPA) Risk Assessment Guidelines for Superfund. Long-term and occasional (short-term) worker weight: 70 kilograms (154 pounds). Child weight (13.5 kilograms or 30 pounds) was derived from the average of the 50th percentile of boys and girls ages 6 months to 5 years (EPA Exposure Factors Handbook) (47). The following were the duration assumed for exposure: 250 days per year for 25 years for the long-term worker; 14 days per year for 25 years for the short-term worker; and 250 days per year for 4.5 years for the child attending day-care. Incidental ingestion was assumed to be 100 milligrams soil per day for both worker populations and 200 milligrams per day for the child. The noncancer determination is based on a comparison of the estimated dose to the noncancer health comparison value for each chemical. For the long-term worker and child attending day-care, chronic health comparison values were used. For the short-term worker, acute or intermediate health comparison values were used, if available. If the estimated dose did not exceed the noncancer health comparison value, then the chemical was determined not to pose a health risk. Cancer risk is calculated by multiplying the estimated dose by the cancer slope factor derived by U.S. EPA or California Office of Environmental Health Hazard Assessment, and summing the risks from each carcinogen present in the soil. Noncancer health comparison values and cancer slope factors used in this evaluation are listed in Appendix F or here: copper—0.03 mg/kg/day (intermediate Minimal Risk Level) and 1,2,4-trimethylbenzene—0.05 mg/kg/day.

Table 6. Summary of Chemicals Detected Near the Del Amo Site and the Groundwater Units in Which Each Chemical Was Detected, Near Torrance, California

Compounds	Upper Bell-flower Aquitard	Middle Bell-flower B-sand Benzene Plume	Bell-flower C-sand		Gage Aquifer	Lynwood Aquifer
			Benzene Plume	Chloro-benzene Plume		
Acetone	X		X	X	X	
Total DDT*	X		X	X	X	
Total Hexachlorocyclohexanes	X		X	X		
sec-Butylbenzene		X				
Benzene	X	X	X	X	X	X
Carbon disulfide		X				
Carbon tetrachloride	X					
Chlorobenzene	X	X	X	X	X	X
Chloroform	X	X	X	X	X	
Dibromochloromethane		X				
1,2-Dichlorobenzene			X	X	X	
1,4-Dichlorobenzene			X	X	X	
1,1-Dichloroethane		X				
1,2-Dichloroethane	X	X	X	X	X	
1,1-Dichloroethylene		X				
cis 1,2-Dichloroethylene		X				
Ethylbenzene	X	X	X	X	X	
Methylene chloride	X	X				
Naphthalene		X				
Styrene		X				
Tetrachloroethylene	X	X	X	X	X	
Toluene	X	X	X	X	X	
Trichloroethylene	X	X	X	X		
1,2,4-Trimethylbenzene		X				
1,3,5-Trimethylbenzene		X				
Vinyl chloride		X				
Total Xylenes	X	X	X	X		
Arsenic		X				
Manganese		X				

Source: Groundwater remedial investigation report (final), Del Amo study area (3).

* DDT—dichlorodiphenyltrichloroethane

Table 7. California Department of Health Services Monitoring Frequency Guideline for Organic and Inorganic Chemicals in the West Basin Area, Del Amo Site, Near Torrance, California

Parameters To Be Sampled (Chemicals included in this analysis that are found in groundwater contamination near Del Amo and Montrose sites)	Monitoring Frequency
VOCs* that are regulated under Title 22 (Benzene, carbon tetrachloride, chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, cis-1,2-dichloroethylene, ethyl benzene, methylene chloride, styrene, tetrachloroethylene, toluene, trichloroethylene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, vinyl chloride, xylenes)	VOCs, annually if none detected; Quarterly, if detected, but less than MCLs†; or Monthly, if detections are greater than MCLs.
SVOCs‡ that are regulated under Title 22	SVOCs every 5 years, if none detected; Quarterly, if detected, but less than MCLs; or Monthly, if detections are greater than MCLs.
Organic chemicals that are unregulated but monitoring is required	Naphthalene- monitored as required by federal government, 1987-1999. 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene sec-Butylbenzene Hexachlorocyclohexanes
Inorganic chemicals that are regulated under Title 22 (arsenic, manganese)	Once every 3 years

* VOC—volatile organic compounds

† MCL—Maximum Contaminant Level

‡ SVOCs—semi-volatile organic compounds

Table 8. Summary of Chemicals Detected in Shallow Soil Gas—Data Collected on the Developed Portion of the Del Amo Site, Near Torrance, California (All Units ($\mu\text{g}/\text{m}^3$))

Chemical	No. of Samples	No. of Detects	Frequency of Detection (%)	Minimum Concentration Detected	Maximum Concentration Detected	Mean Concentration
1,1,1-Trichloroethane	613	91	15	9.3	7,104	528.4
1,1,2,2-Tetrachloroethane	75	2	3	7.6	22.7	7,576*
1,1-Dichloroethane	403	1	0	113.4	113.4	768.4*
1,1-Dichloroethylene	612	6	1	3.5	6,103	429.3
1,2,4-Trichlorobenzene	75	1	1	28.3	28.3	13,830*
1,2,4-Trimethylbenzene	75	35	47	1.7	83,570	4,916
1,2-Dibromoethane (EDB)	303	2	1	2,3910	37,370	7,684
1,2-Dichlorobenzene	75	3	4	7.2	270,600	7,666
1,3,5-Trimethylbenzene	75	17	23	1.0	137.6	3,662*
1,4-Dichlorobenzene	158	5	3	6.0	222,500	3,432
2-Hexanone	75	6	8	11.1	163.9	6,985*
4-Ethyl toluene	74	29	39	5.9	63,910	6,268
Acetone	75	36	48	3.6	546.5	7,191*
Acetonitrile	328	7	2	18.4	184.5	2,433*
Benzene	875	209	24	0.6	13,000,000	88,940
Carbon tetrachloride	75	1	1	62.4	62.4	3,935*
Carbon disulfide	75	3	4	1.6	17.1	9,397*
Chloroethane	303	1	0	8.2	8.2	3,078*
Chloroform	495	17	3	13.1	7,787	554

Table 8. Summary of Chemicals Detected in Shallow Soil Gas—Data Collected on the Developed Portion of the Del Amo Site, Near Torrance, California All Units ($\mu\text{g}/\text{m}^3$)

Chemical	No. of Samples	No. of Detects	Frequency of Detection (%)	Minimum Concentration Detected	Maximum Concentration Detected	Mean Concentration
Chloromethane	69	6	9	2.9	96.0	1,772*
Cyclohexane	669	58	9	12.4	11,360,000	58,840
Dichlorobromomethane	75	2	3	19.4	2,549,000	39,960
Ethanol	6	1	17	13.7	13.7	10,190*
Ethylbenzene	841	155	18	6.0	78,040,000	194,900
Freon 11	74	23	31	7.3	7,284	2,555
Freon 113	75	19	25	9.2	61,310	6,882
Freon 114	68	3	4	2.8	643.1	4,808*
Freon 12	56	7	13	1.7	1,930	4,170*
Heptane	6	3	50	1.8	4,508,000	949,400
Isopropanol	6	1	17	1.0	9,586	13,290
Methyl ethyl ketone (MEK)	479	13	3	7.0	144.5	897.8*
Methyl isobutyl ketone (MIBK)	75	2	3	12.3	110.4	5016*
Methylene chloride	571	3	1	5.6	6.6	583.7*
Styrene	841	67	8	6.0	8,082,000	11,300
Tetrachloroethylene	613	211	34	9.5	1,426,000	9,013
Tetrahydrofuran	6	0	0	N/A	N/A	15,950
Toluene	841	155	18	2.494	1,565,000	9,012
Trichloroethylene	612	67	11	18.22	2,872,000	9,159

Table 8. Summary of Chemicals Detected in Shallow Soil Gas—Data Collected on the Developed Portion of the Del Amo Site, Near Torrance, California All Units ($\mu\text{g}/\text{m}^3$)

Chemical	No. of Samples	No. of Detects	Frequency of Detection (%)	Minimum Concentration Detected	Maximum Concentration Detected	Mean Concentration
Xylenes (Total)	297	51	17	6.5	186,400	2,140
cis-1,2-Dichloroethylene	496	1	0	6.0	6.0	502.7*
m,p-Xylene	6410	31	8	0.8	1,042,000	7,421*
n-Hexane	6	2	33	32,430	59,920	15,410
o-Xylene	6	2	33	1.0	320,800	54,270

Source: Draft baseline risk assessment report for the Del Amo site (30). Soil gas samples (approximately 900) were collected in places around the site where VOCs were stored, transported, or disposed. This table presents the shallow soil gas samples collected from 1 to 15 feet below ground surface (bgs). In the risk assessment from which the numbers in this table were taken, the mean was calculated by halving the detection limit for the non-detects. For some chemicals, the mean was reported as higher than the maximum because the detection limits for the non-detects were high. Those chemicals for which the mean is higher than the maximum are noted by an asterisk next to the mean. The soil gas samples were typically analyzed for the BTEX compounds, to a lesser extent for the common chlorinated solvent VOCs, and to a small extent (approximately 70 of the 900 samples) the samples were analyzed for the entire suite of VOCs. At times, the detection limits for the soil gas samples were very high, resulting in non-detections where there may have been chemicals present.

$\mu\text{g}/\text{m}^3$ —milligrams per cubic meter

Table 9. Summary of Workplace Air Monitoring Study at the Del Amo Site, Near Torrance, California

Chemical	Indoor or Outdoor Air	No. of		Value (ppb)			Typical Concentrations Mean/Max (ppb)	Health Comparison Value (Source) (Values in ppb)
		Samples	Detections	Maximum	Minimum	Average		
Benzene	Indoor	121	116	38	0.38	3.75	13/97	0.03 (CREG) 4 (Intermediate MRL)
	Outdoor	39	35	5.2	0.185	1.76	7.1/25	
Chlorobenzene	Indoor	121	2	0.81	0.08	0.16	<0.23	13.5 (Ambient Air PRG)
	Outdoor	39	0	0.22	0.09	0.15	<0.23/0.11	
Chloroform	Indoor	121	3	0.8	0.08	0.16	1.4/12	20 (Chronic MRL) 50 (Intermediate MRL) 0.008 (CREG)
	Outdoor	39	1	0.25	0.09	0.16	0.47/75	
Cyclohexane	Indoor	121	55	60	0.4	3.03	NA	6,112 (Ambient Air PRG)
	Outdoor	39	14	5.5	0.45	1.55	NA	
1, 1-Dichloroethane	Indoor	121	1	0.63	0.08	0.16	NA	128 (Ambient Air PRG) 0.3 (Cal modified PRG)
	Outdoor	39	0	0.22	0.09	0.15	NA	
1,2-Dichloroethane	Indoor	121	0	0.24	0.08	0.15	<0.20/0.23	0.01 (CREG) 600 (Chronic MRL)
	Outdoor	39	0	0.22	0.09	0.15	NA	
1,1-Dichloroethylene	Indoor	121	1	0.61	0.08	0.16	<0.18	17.6 (Chronic REL) 0.005 (CREG) 20 (Chronic MRL)
	Outdoor	39	0	0.22	0.09	0.15	<0.18	
1,2-Dichloroethylene	Indoor	121	0	0.24	0.08	0.15	NA	200 (Intermediate MRL)
	Outdoor	39	0	0.22	0.09	0.15	NA	
1,2-Dibromoethane (EDB)	Indoor	121	0	0.23	0.18	0.21	NA	0.0065 (CREG)
	Outdoor	39	0	0.22	0.185	0.20	NA	
Ethylbenzene	Indoor	121	113	17	0.1	2.63	5.8/40	1,000 (Intermediate MRL)
	Outdoor	39	35	3.2	0.185	1.16	3.2/16	

Table 9. Summary of Workplace Air Monitoring Study at the Del Amo Site, Near Torrance, California

Chemical	Indoor or Outdoor Air	No. of		Value (ppb)			Typical Concentrations Mean/Max (ppb)	Health Comparison Value (Source) (Values in ppb)
		Samples	Detections	Maximum	Minimum	Average		
Methyl ethyl ketone	Indoor	121	86	230	0.5	16.25	NA	340 (RfC)
	Outdoor	39	24	13	0.18	2.87	NA	
Methylene chloride	Indoor	121	70	12	0.14	1.47	23.8/489	300 (Chronic & Intermediate MRL) 0.86 (CREG)
	Outdoor	39	13	2.5	0.135	0.49	NA	
Styrene	Indoor	121	94	15	0.095	1.42	2.9/23	60 (Chronic MRL)
	Outdoor	39	27	2.2	0.16	0.60	1.7/13	
Tetrachloroethylene	Indoor	121	86	11	0.16	1.28	6.8/53	40 (Chronic MRL) 0.49 (Ambient Air PRG)
	Outdoor	39	23	1.7	0.175	0.51	4.3/18	
Toluene	Indoor	121	121	85	0.59	12.41	NA	80 (Chronic MRL)
	Outdoor	39	37	14	07	5.41	NA	
1,1,1-Trichloroethane	Indoor	121	114	190	0.185	18.13	19/90	700 (Intermediate MRL)
	Outdoor	39	35	17	0.175	2.60	11/40	
Trichloroethylene	Indoor	121	32	10	0.08	0.48	1.2/15	100 (Intermediate MRL) 0.2 (Ambient Air PRG)
	Outdoor	39	4	1.3	0.09	0.21	0.22/1.6	
m,p-Xylene	Indoor	121	116	49	0.185	9.15	30/170	100 (Chronic MRL) 700 (Intermediate MRL)
	Outdoor	39	38	12	0.47	4.22	18/90	
o-Xylene	Indoor	121	109	14	0.17	3.08	12/68	Both values for total Xylene
	Outdoor	39	31	4	0.185	1.50	6.5/29	

Source: In 1994 and 1995, contractors for the responsible parties sampled the workplace air at twelve buildings in the developed portion of the site (5). Typical concentration data are from the Team Study and the Woodland Study (43, 44). These buildings were chosen because the building footprint is located over part of the former rubber plant VOC facility or the shallow soil gas samples collected within 25 feet of the building had indicated an Inhalation hazard to nearby indoor workers@ (4). The contractors conducted air sampling on three occasions, once in the fall, winter, and spring. Three to six primary samples were collected at each building per sampling event. The number and location of sample collection points was varied on the basis of building size, layout, worker distribution, the location of former plant site, VOC facilities, and a preliminary Acrack and crevice@ screening survey for total organic vapor using field instruments. At least one sample per building per event was collected to allow comparison of data with local ambient conditions. Eight-hour-time integrated air samples were collected coinciding with the normal work day. Abbreviations and acronyms used in table: NA—not available; CREG—Cancer Risk Evaluation Guide; MRL—Minimal Risk Level; PRG—Preliminary Remediation Goal; REL—Reference Exposure Limit; ppb—parts per billion; RfC—Reference Concentration.

Table 10. Summary of the Health Evaluation from Exposure to the Indoor Air on the Developed Portion of the Del Amo Site, Near Torrance, California

Potentially Exposed Group		Noncancer Health Effects	Cancer Health Effects
Tract 7351-34-57 (Building located over LNAPL)	Long-term worker	None of the estimated air concentrations exceed their health comparison values.	1.2 in 100,000 Very low increased risk
	Short-term worker		6.3 in 10 million No apparent increased risk
	Child in daycare	The estimated concentration of benzene in indoor air exceeds its health comparison value.	-----
Tract 7351-34-15 Tract 7351-34-50 Tract 7351-34-56 (Building located near LNAPL)	Long-term worker	None of the estimated air concentrations exceed their health comparison values.	1.4 in 1 million No apparent increased risk
	Short-term worker		7.9 in 100 million No apparent increased risk
	Child in daycare		-----
Tract 7351-31-18 (Building not near a groundwater source)	Long-term worker	None of the estimated air concentrations exceed their health comparison values.	1.4 in 1 billion No apparent increased risk
	Short-term worker		8.0 in 100 billion No apparent increased risk
	Child in daycare		-----

The non-aqueous phase liquid (NAPL) advance model, as recommended by Environmental Protection Agency (EPA), was used to estimate the amount and risk from soil gas that would move from the light non-aqueous phase liquid (LNAPL) (groundwater) into the soil gas and then into the structure on Tract 7351-34-57 (38, 39). The soil column was assumed to be composed of three stratum and soil characteristics as described in the risk assessment. The LNAPL concentration (1,826 parts per million [ppm] in soil), the length, width, and height of the LNAPL were taken from the HRS Scoring Package. Fifty percent of the building was assumed to be located over the LNAPL based on data in the Groundwater Remedial Investigation Report. The Johnson and Ettinger soil gas advance model, as recommended by EPA, was used to estimate the amount and risk from the soil contamination beneath the structure into the structures located on the three tracts (37, 41). The vadose zone soil was input as SCL. Buildings were assumed not to have basements. Building dimensions (length and width) were estimated from maps. Height of the buildings was assumed to be 300 centimeters. The maximum soil gas concentrations taken from building-perimeter sampling (for soil gas modeling samples should be taken within the zone of influence of the building) were used, the soil gas values came from samples collected 6-7 feet below ground surface (bgs). The maximum concentrations of chemicals in the near building soil gas samples were used in the model. For the building on Tract 7351-34-57, the following soil gas samples were used in the model SGL0283, SGL0284, SGL0287, SGL0294, SGL0594, and SGL0615. For the building on Tracts 7351-34-15, 50, 56, the following soil gas samples were used in the model SGL0002, SGL0005, SGL0008, SGL0353, SGL0356, and SGL0357. For the building on Tract 7351-31-18, two soil gas samples (SGL0271 and SGL0558) were used in the model. Equations for determination of dose are shown in EPA's Risk Assessment Guidelines for Superfund. Long-term and occasional (short-term) worker weight: 70 kilograms (154 pounds). Child weight (13.5 kilograms or 30 pounds) was derived from the average of the 50th percentile of boys and girls aged 6 months to 5 years from EPA's Exposure Factors Handbook (47). The following were assumed for exposure duration: 250 days per year for 25 years for the long-term worker; 14 days per year for 25 years for the short-term worker and 250 days per year for 4.5 years for the child attending daycare. Inhalation rate was assumed to be 20 meters cubed per day (m³/day) for the worker and the child's inhalation rate (7.2 m³/day) was derived from the average of children from 0.5 to 5 years from EPA's Exposure Factors Handbook (47). The noncancer determination is based on a comparison of the estimated dose to the noncancer health comparison value for each chemical. If the indoor air concentration did not exceed the noncancer health comparison value then that the chemical was determined not to pose a health risk. Cancer risk is calculated by multiplying the estimated indoor air concentration by the unit risk factor derived by EPA or the California Office of Environmental Health Hazard Assessment (OEHHA), and summing the risks from each carcinogen present in the soil gas/LNAPL (groundwater). For the long-term worker and child attending day-care chronic health comparison values were used. For the short-term worker, acute or intermediate health comparison values were used if available. Noncancer health comparison values and cancer slope factors used in this evaluation are listed in Appendix F or here: chloroform (OEHHA inhalation unit risk = 5.3 x 10⁻⁶ (micrograms per meter cubed)⁻¹ [µg/m³]⁻¹ and OEHHA chronic Reference Exposure Level = 300 Φg/m³); 1,1,1-trichloroethane (ATSDR intermediate Minimal Risk Level = 700 parts per billion [ppb]); 1,4-dichlorobenzene (EPA Reference Concentration [RfC] = 800 Φg/m³, Agency for Toxic Substances and Disease Registry (ATSDR) chronic Minimal Risk Level = 100 ppb and intermediate Minimal Risk Level = 200 ppb); acetone (EPA RfC = 13,000 Φg/m³); and 1,1,2,2-tetrachloroethane (ATSDR intermediate Minimal Risk Level = 400 ppb).

Table 11. Summary of Chemicals Detected in Two Surface Soil Composite Samples from the Waste-pit Area on the Del Amo Site, Near Torrance, California

Chemical Type	Chemical	Fill Soil Overlying		EPA Region IX Residential Soil PRG (ppm)	Health Comparison Value‡ (Source) Average Background (Bkgd) Concentration for Metals (ppm)
		Waste Pits (ppm)	Evaporation Ponds (ppm)		
SVOC	Acenaphthylene	0.81	0.78	NA	B
SVOC	2-Methylnaphthalene	0.63	0.7	NA	B
SVOC	Phenanthrene	0.58	0.43	NA	B
SVOC	Pyrene	0.4	0.48	100	2,000 (Child RMEG)
Pesticide	4,4'-DDD	0.12	0.12	1.9	30 (Child RMEG)
Pesticide	4,4'-DDE	0.14	0.067	1.3	30 (Child RMEG)
Pesticide	4,4'-DDT	1.5	0.2	1.3	1.0 (CREG)
Metal	Arsenic	9.2	7	0.38	20 (Child Chronic EMEG) 0.5 (CREG) Bkgd=0.6-11 (3.5)
Metal	Barium	170	170	5,300	4,000 (Child RMEG) Bkgd=133-1,400 (509)
Metal	Cadmium	6.2	6.7	9	10 (Child EMEG) Bkgd=0.05-1.7 (0.36)
Metal	Chromium	56	35	210	80,000 (Child RMEG) Bkgd=23-1,579 (122)
Metal	Cobalt	12	12	4,600	500 (Child Intermediate EMEG) Bkgd=2.7-46.9 (14.9)
Metal	Copper	32	25	2,800	2,900 (Residential PRG) Bkgd=9.1-96.4 (28.7)

Table 11. Summary of Chemicals Detected in Two Surface Soil Composite Samples from the Waste-pit Area on the Del Amo Site, Near Torrance, California

Chemical Type	Chemical	Fill Soil Overlying		EPA Region IX Residential Soil PRG (ppm)	Health Comparison Value‡ (Source) Average Background (Bkgd) Concentration for Metals (ppm)
		Waste Pits (ppm)	Evaporation Ponds (ppm)		
Metal	Lead	41	15	130	400 (Residential PRG) Bkgd=12.4-97.1 (23.9)
Metal	Manganese	640	640	3,200	3,000 (Child RMEG) Bkgd=253-1,687 (646)
Metal	Nickel	21	17	150	1,000 (Child RMEG) Bkgd=9-509 (57)
Metal	Vanadium	48	47	540	200 (Child Intermediate EMEG) Bkgd=39-288 (112)
Metal	Zinc	120	88	23,000	20,000 (Child Chronic EMEG) Bkgd=88-236 (149)

Source: As a part of the phase I remedial investigation, one composite sample was collected from the waste pits and one composite sample was collected from the evaporation ponds (23). Background soil data obtained from ABackground concentrations of trace and major elements in California soils@ (33). Specifically, three locations (SSL0017, SSL0018, and SSL0019) overlying the 2 series pits were sampled and combined into one composite sample and four locations (SSL0020, SSL0021, SSL0022, and SSL0023.) overlying the 1 series evaporation ponds were sampled and composited. The two samples were analyzed for SVOCs, pesticides/PCBs, metals, and cyanide.

Abbreviations and acronyms used in table: SVOC—semi-volatile organic compound; ppm—parts per million; RMEG—Reference Dose Media Evaluation Guide; CREG—Cancer Risk Evaluation Guide; EMEG—Environmental Media Evaluation Guide; DDT—dichlorodiphenyltrichloroethane; DDE—dichlorodiphenyldichloroethane; DDT—dichlorodiphenylchloroethane; PRG—Preliminary Remediation Goal; NA—not available.

Table 12. Summary of Ambient Air Contaminants Detected at the Waste-Pit Area and in Backyards on 204th Street, Del Amo Site, Near Torrance, California

Chemical	Level Measured in Air Near Waste Pits (ppb)	Level Measured in Air in Backyards (ppb)	SCAQMD=s Maximum Background Levels (ppb)	Health Comparison Levels (ppb)	References for Health Comparison Levels
1,1,1-Trichloroethane	6.52	2.23	5.40	700	i-EMEG/MRL
1,2,4-Trimethylbenzene	2.8	2.4	NA	NA	-----
1,2-Dichlorobenzene	2.6	ND	0.40	34.64	PRG
1,3,5-Trimethylbenzene	0.82	0.7	NA	NA	-----
1,4-Dichlorobenzene	0.93	ND	0.40	200	i-EMEG/MRL
Benzene	3.2	2.8	5.50	0.03	CREG
Ethylbenzene	1.4	1.4	1.43	300	i-EMEG/MRL
Isopropylbenzene	4.9	0.8	NA	1.91	PRG
m,p-Xylene	8.3	5.4	2.4	300/40	a-EMEG/MRL
Methylene chloride	12	104.1	2.6	0.86	CREG
n-Propylbenzene	0.55	ND	NA	NA	-----
o-Xylene	2.9	1.29	16.50	400	a-EMEG/MRL
p-Isopropyl toluene	0.93	0.8	NA	NA	-----
Styrene	1.9	0.7	1.10	235	RfC
Tetrachloroethylene	2.3	8.3	2.00	0.29	CREG
Toluene	10	0.05	9.4	106.15	RfC
Naphthalene	0.12	0.05	NA	2	c-EMEG/MRL

Table 12. Summary of Ambient Air Contaminants Detected at the Waste-Pit Area and in Backyards on 204th Street, Del Amo Site, Near Torrance, California

Chemical	Level Measured in Air Near Waste Pits (ppb)	Level Measured in Air in Backyards (ppb)	SCAQMD=s Maximum Background Levels (ppb)	Health Comparison Levels (ppb)	References for Health Comparison Levels
Acenaphthalene	0.002	0.000097	NA	34.9	-----
Acenaphthylene	0.006	0.00019	NA	NA	-----
Fluorene	0.002	0.00018	NA	22.1	PRG
Phenanthrene	0.002	0.00035	NA	NA	PRG
Anthracene	0.002	0.00014	NA	151	PRG
Fluoranthene	0.001	0.000033	NA	18.1	PRG
Pyrene	0.001	0.000031	NA	13.3	PRG

Source: Del Amo facility health consultation, potential health impacts due to the emissions from the waste pits (45).
 Abbreviations and acronyms used in table: ppb—parts per billion ; ND—not detected; NA—not available; PRG—EPA Preliminary Remediation Goals; RfC—EPA Reference Concentration; CREG—ATSDR Cancer Risk Evaluation Guide for 1×10^{-6} excess cancer risk; a-EMEG/MRL—ATSDR Environmental Media Evaluation Guide/acute Minimal Risk Level; c-EMEG/MRL—ATSDR Environmental Media Evaluation Guide/chronic Minimal Risk Level; i-EMEG/MRL—ATSDR Environmental Media Evaluation Guide/intermediate Minimal Risk Level; SCAQMD—South Coast Air Quality Management District.

Table 13. Summary of the Health Evaluation From Exposure to the Indoor Air in the Neighborhood South of the Del Amo Site, Near Torrance, California

Potentially exposed group	Noncancer	Cancer
Residents on the western side (near Normandie Avenue)	None expected None of the estimated indoor air levels exceed health comparison values	4 in 10 million No apparent increased cancer risk
Residents on the eastern side (near Vermont Avenue)	None expected None of the estimated indoor air levels exceed health comparison values	8 in 100 million No apparent increased cancer risk

The revised Johnson and Ettinger groundwater screening model as adopted by EPA was used to estimate indoor air exposures in residences located south of the Del Amo site situated over contaminated groundwater plumes (48). For the residents living on the western side (near Normandie Avenue), monitoring well data for SWL0049 was used. For the residents on the eastern side (near Vermont Avenue), monitoring well data for SWL0057 was used. These wells were chosen for modeling because they are wells that have measurable levels of contamination in them and the wells are located in the neighborhood. Data were obtained from the Groundwater Remedial Investigation Report (3). Default values were used for the soil characteristics. Depth to groundwater = 1,435 cm or 47 feet. Building dimensions (length and width) were estimated from maps. Height of the buildings was assumed to be 300 cm. Equations for determination of dose are shown in EPA's Risk Assessment Guidelines for Superfund. The noncancer determination is based on a comparison of the estimated indoor air concentration to the chronic noncancer health comparison value (Minimal Risk Level (MRL), Reference Concentration (RfC) or Reference Exposure Level (REL) for each chemical). If the indoor air concentration did not exceed the noncancer health comparison value than that the chemical was determined not to pose a health risk. Cancer risk is calculated by multiplying the estimated indoor air concentration by the unit risk factor derived by EPA or OEHHA, and summing the risks from each carcinogen present in the groundwater. The resident's weight was assumed to be 70 kilograms (154 pounds) and inhalation rate was assumed to be 20 m³/day. Noncancer health comparison values and cancer slope factors used in this evaluation are listed in Appendix F or here: chloroform (OEHHA inhalation unit risk = 5.3 x 10⁻⁶ (µg/m³)⁻¹ and OEHHA chronic REL = 300 Φg/m³); 1,4-dichlorobenzene (EPA RfC = 800 Φg/m³, ATSDR chronic Minimal Risk Level = 100 ppb); 1,2-dichloroethane (EPA inhalation risk = 2.6 x 10⁻⁵ (µg/m³)⁻¹ and ASTDR chronic Minimal Risk Level = 600 ppb); methylene chloride (EPA inhalation risk = 4.7 x 10⁻⁷ (µg/m³)⁻¹ and ATSDR chronic and intermediate Minimal Risk Level = 300 ppb); and naphthalene (OEHHA chronic REL = 9 Φg/m³ and ATSDR chronic MRL= 2 pp

Table 14. Summary of Surface and Near Surface Soil Data From the Neighborhood South of the Del Amo Site, Near Torrance, California

Year of Sampling	1983		1993	1995		Health Comparison Value (Source) Average Background (Bkgd) Concentration for Metals
Depth of Sample (bgs)	0-0.5 ft.	2-3 ft.	0-0.5ft.	0.5 ft.	2 ft.	
Number of Samples	9	9	21	66*	64†	
All VOCs	NA	NA	NA	<0.654-2.17	<0.144-1.85	-
Arsenic	4.5-19.4 (10.1)	8.16-12 (10.4)	2.5-14 (4.6)	3.23-9.37 (5.86)	3.39-3.8 (3.60)	20 (Child Chronic EMEG) 0.5 (CREG) Bkgd=0.6-11 (3.5)
Barium	71.2-169 (117)	137-219 (160)	110-450 (195)	56.2-253 (133)	17-460 (129)	4,000 (Child RMEG) Bkgd=133-1,400 (509)
Cadmium	0.91-6.67 (2.1)	1.22-2.12 (1.6)	1.5-29 (8.5)	0.85-30.2 (4.89)	0.15-881 (164)	10 (Child EMEG) Bkgd=0.05-1.7 (0.36)
Chromium	8.83-51.4 (20.9)	16.8-47.7 (24.7)	22-210 (52)	15.7-24.6 (9.15)		80,000 (Child RMEG) Bkgd=23-1,579 (122)
Cobalt	6.19-19.7 (9.6)	8.42-10.7 (9.6)	8.9-16 (12)	0.74-24.6 (9.15)	2.93-156 (18.1)	500 (Child Intermediate EMEG) Bkgd=2.7-46.9 (14.9)
Copper	11.0-24.6 (19)	14.9-23.3 (17.7)	26-1,600 (141)	2.48-459 (95.5)	20.7-156 (68.6)	2,900 (Residential PRG) Bkgd=9.1-96.4 (28.7)
Lead	20.7-88.1 (37.4)	13-28.2 (19.4)	54-450 (150)	9.5-2,280 (183)	6.0-392 (104)	400 (Residential PRG) Bkgd=12.4-97.1 (23.9)
Nickel	5.08-24.0 (12.8)	10.4-23.0 (13.7)	15-570 (92)	12.4-585 (160)	15.2-345 (102)	1,000 (Child RMEG) Bkgd=9-509 (57)
Vanadium	NA	NA	33-71 (50)	23.8-137 (38.7)	6.3-84 (38)	200 (Child Intermediate EMEG) Bkgd=39-288 (112)
Zinc	38.4-135 (75.6)	41.4-58.1 (48.0)	140-1,600 (335)	69.3-1100 (266)	15.8-497 (138)	20,000 (Child Chronic EMEG) Bkgd=88-236 (149)
All SVOCs	<5	<5	<0.2 (except for the ones indicated below	<1.46	<0.763	---

Table 14. Summary of Surface and Near Surface Soil Data From the Neighborhood South of the Del Amo Site, Near Torrance, California

Year of Sampling	1983		1993	1995		Health Comparison Value (Source) Average Background (Bkgd) Concentration for Metals
Depth of Sample (bgs)	0-0.5 ft.	2-3 ft.	0-0.5ft.	0.5 ft.	2 ft.	
Number of Samples	9	9	21	66*	64†	
Butylbenzylphthalate	<5	<5	0.30; 0.20; 0.21	NA	NA	10,000 (Child RMEG)
Bis(2-ethylhexyl)phthalate	<5	<5	0.35; 0.71; 0.61; 1.4	NA	NA	35 (Residential PRG)
Benzo(a)anthracene	<5	<5	0.24	NA	NA	0.01 (BAP-eq CREG)
Benzo(a)pyrene	<5	<5	0.2	NA	NA	0.1 (CREG)
Benzo(b)fluoranthene	<5	<5	0.28	NA	NA	0.01 (BAP-eq CREG)
Chrysene	<5	<5	0.37	NA	NA	10 (BAP-eq CREG)
Dimethylphthalate	<5	<5	0.25	NA	NA	100,000 (Residential PRG)
Phenanthrene	<5	<5	0.47; 0.22	NA	NA	---
Phenol	<5	<5	0.78; 0.31	NA	NA	30,000 (Child RMEG)
Di-n-butylphthalate	<5	<5	0.20	NA	NA	6,100 (Residential PRG)
Fluoranthene	<5	<5	0.27	NA	NA	2,000 (Child RMEG)
Di-n-octylphthalate	<5	<5	<5	NA	NA	1,200 (Residential PRG)
DDT (total)	0.035-1.7 (0.420)	0.003-0.218 (0.039)	1.04-111 (11.83)	<2.02-147 (3.49)	<0.219-70.5 (1.52)	30 (Child RMEG) 2 (CREG)

Source: Data obtained from a number of sources (6-10). Sampling data and background concentrations presented as ranges followed by the average in parentheses. Background soil data obtained from "Background concentrations of trace and major elements in California soils" (33). *There were 66 samples analyzed for DDT and not for the full suite of contaminants. For instance, only 30 surface (0.5 ft) samples were analyzed for most metals, five for VOCs, four for SVOCs, Pesticides/PCBs, and Herbicides. Only three samples were analyzed for arsenic and selenium. † There were 64 samples analyzed for DDT and not for the full suite of contaminants. For instance, only 15 samples were analyzed for most metals, three for VOCs, two for SVOCs, Pesticides/PCBs, and Herbicides. Only two samples were analyzed for arsenic and selenium. Abbreviations and acronyms used in table: ft.—feet; bgs—below ground surface; EMEG—Environmental Media Evaluation Guide; CREG—Cancer Risk Evaluation Guide; RMEG—Reference Dose Evaluation Guide; PRG—Preliminary Remediation Guide; NA— not analyzed; VOCs—volatile organic compounds; BaP-eq—benzo(a)pyrene equivalent; SVOCs—semi-volatile organic compounds; DDT—dichlorodiphenyltrichloroethane.

Table 15. Post-Grading Soil Tests in Proposed Neighborhood Park South of the Del Amo Site, Near Torrance, California

Chemical	Concentration of Chemical (ppm) in Each Sample										Health Comparison Value (Source) Average Background (Bkgd) Concentration for Metals
	SS-31D	SS-35D	SS-30D	SS-16D	SS-21D	SS-29D	SS-18D	SS-17D	SS-5	SS-6	
Arsenic	3.5	4.8	4.1	5.8	4.7	4.2	6.4	5.4	5.1	5.1	20 (Child Chronic EMEG) 0.5 (CREG) Bkgd=0.6-11 (3.5)
Barium	130	170	230	190	170	130	130	200	160	170	4,000 (Child RMEG) Bkgd=133-1,400 (509)
Cadmium	ND	ND	ND	ND	ND	0.56	1.2	ND	ND	0.62	10 (Child EMEG) Bkgd=0.05-1.7 (0.36)
Chromium	20	22	25	33	27	19	57	26	25	31	80,000 (Child RMEG) Bkgd=23-1,579 (122)
Cobalt	8.4	11	11	12	13	9.1	11	11	12	12	500 (Child Intermediate EMEG) Bkgd=2.7-46.9 (14.9)
Copper	23	36	28	39	27	26	130	29	30	40	2,900 (Residential PRG) Bkgd=9.1-96.4 (28.7)
Lead	22	39	15	26	15	120	44	28	14	29	400 (Residential PRG) Bkgd=12.4-97.1 (23.9)
Nickel	17	20	20	39	21	18	76	21	24	39	1,000 (Child RMEG) Bkgd=9-509 (57)
Vanadium	39	44	52	55	51	35	53	50	50	50	200 (Child Intermediate EMEG) Bkgd=39-288 (112)
Zinc	99	190	76	88	74	160	110	120	78	110	20,000 (Child Chronic EMEG) Bkgd=88-236 (149)

Source: Environmental mitigation closure report, neighborhood park project (25). Background soil data obtained from ABackground concentrations of trace and major elements in California soils@ (33).

Abbreviations and acronyms used in the table: ppm—parts per million; EMEG—Environmental Media Evaluation Guide; CREG—Cancer Risk Evaluation Guide; RMEG—Reference Dose Media Evaluation Guide; PRG—Preliminary Remediation Goal.