TABLE 3-7

SAMPLES FROM PIT D WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
P-D	Radian B-10	ARSENIC	8.8	3	500	50	100
P-D	Radian B-10	BERYLLIUM	0.49	3	75	7.5	NA

Source: ESE (1997a)

TABLE 3-8							
SAMPLES FROM PIT E WITH CONCENTRATIONS EXCEEDING THE PRGs							
Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
P-E	Radian B-8	ARSENIC	7.6	20	500	50	100
P-E	Radian B-8	BERYLLIUM	0.43	3	75	7.5	NA
P-E	Radian B-8	BERYLLIUM	0.56	15	75	7.5	NA
Source: ESE (1997a)							

TABLE 3-9

SAMPLES FROM PIT F WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
P-F	WCC B-7	BENZENE	3.5	C0-37	NA	NA	10
P-F	WCC B-7	ETHYLBENZENE	670	C0-37	NA	NA	NA
P-F	WCC B-7	ETHYLBENZENE	260	C0-37	NA	NA	NA
P-F	WCC B-7	STYRENE	720	C0-37	NA	NA	NA
P-F	WCC B-7	1,1'-BIPHENYL	1200	C0-37	NA	NA	NA
P-F	WCC B-7	ANTHRACENE	180	C0-37	NA	NA	NA
P-F	Radian Pit F	BIS(2-ETHYLHEXYL) PHTHALATE	200	0	NA	NA	NA
P-F	EMA-SD	ARSENIC	1.2	0	500	50	100
P-F	WCC B-6	ARSENIC	0.9	C0-58	500	50	100
P-F	WCC B-6	ARSENIC	1.1	C0-58	500	50	100
P-F	WCC B-7	ARSENIC	7.9	C0-37	500	50	100
P-F	WCC B-7	ARSENIC	1	C0-37	500	50	100
P-F	WCC B-6	BERYLLIUM	1.5	C0-58	75	7.5	NA
P-F	WCC B-6	BERYLLIUM	0.75	C0-58	75	7.5	NA
P-F	WCC B-7	BERYLLIUM	99	C0-37	75	7.5	NA

Source: ESE (1997a)

TABLE 3-10							
SAMPLES FROM PIT G WITH CONCENTRATIONS EXCEEDING THE PRGs							
Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
P-G	Radian B-12	ARSENIC	18	3	500	50	100
P-G	Radian B-12	ARSENIC	12	5	500	50	100
P-G	Radian B-15 (MW-15)	ARSENIC	18	3	500	50	100
P-G	Radian B-15 (MW-15)	ARSENIC	27	3	500	50	100
P-G	Radian B-15 (MW-15)	ARSENIC	29	3	500	50	100
P-G	Radian B-15 (MW-15)	ARSENIC	5.7	3	500	50	100
P-G	Radian B-12	BERYLLIUM	0.73	3	75	7.5	NA
P-G	Radian B-12	BERYLLIUM	0.59	5	75	7.5	NA
P-G	Radian B-15 (MW-15)	BERYLLIUM	1.1	3	75	7.5	NA
P-G	Radian B-15 (MW-15)	BERYLLIUM	0.99	3	75	7.5	NA
P-G	Radian B-15 (MW-15)	BERYLLIUM	0.89	3	75	7.5	NA
P-G	Radian B-15 (MW-15)	BERYLLIUM	0.4	3	75	7.5	NA
Source: ESE (1997a)							

TABLE 3-11

SAMPLES FROM PIT H WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
P-H	II 67	BENZIDINE	99	15	NA	NA	NA
P-H	Radian B-1A	BENZO[a]PYRENE	1.2	4	NA	NA	NA
P-H	II 67	DIBENZ[a,h]ANTHRACENE	0.5	10	NA	NA	NA
P-H	Radian B-1A	ARSENIC	9.1	4	500	50	100
P-H	ESE97 CPT-1	ARSENIC	3.1	10	500	50	100
P-H	Radian B-1A	BERYLLIUM	0.46	4	75	7.5	NA
P-H	II 22	LEAD	320	0.5	1000	50	100

Source: ESE (1997a)

TABLE 3-12

WATER SAMPLES FROM THE PITS WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, µg/L	Depth, ft.
PW-F	WCC ACID PIT	BENZENE	0.6	0
PW-F	EMA AQ	ARSENIC	97	0
PW-F	WCC ACID PIT	ARSENIC	4	0
PW-F	EMA AQ	CADMIUM	24	0
PW-F	EMA AQ	LEAD	1300	0

Source: ESE (1997a)

Table 3-13
Summary Statistics for All Lagoons

Analyte (units mg/kg unless otherwise note	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
TPH							
OIL & GREASE, EPA 413.2	4	4	NA	NA	NA	689,000	808,455
TPH, EPA 3510/8015	10	10	NA	NA	NA	40,000	18,118
TRPH, EPA 418.1	18	18	NA	NA	NA	530,000	4.9E+12
VOCs							
(1,1-DIMETHYLBUTYL)BENZENE	1	1	NA	NA	NA	3.3	NA
(1,1-DIMETHYLPROPYL)BENZENE	1	1	NA	NA	NA	8.3	NA
(1-METHYLBUTYL)BENZENE	1	1	NA	NA	NA	8.1	NA
(1-PROPENYL)CYCLOHEXANE	2	2	NA	NA	NA	40	114
1,1,1-TRICHLOROETHANE	23	6	0	0	1200	240	66
1,1,2,2-TETRACHLOROETHANE	16	0	0	8	0.45	2.2 *	NA
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	3	3	0	0	5600	8.6	11
1,1,2-TRICHLOROETHANE	17	0	0	4	0.65	2.0 *	NA
1,1,4,6-TETRAMETHYLINDANE	1	1	NA	NA	NA	2.0	NA
1,1-DICHLOROETHANE	18	1	0	0	500	0.70	0.47
1,1-DICHLOROETHENE	18	1	1	13	0.037	8.9	41
1,1-DIMETHYLCYCLOBENTANE	1	1	NA	NA	NA	0.0010	NA
1,2,3,4-TETRAHYDRONAPHTHALENE	1	1	NA	NA	NA	12	NA
1,2,3,5-TETRAMETHYLBENZENE	2	2	NA	NA	NA	7.5	17
1,2-DICHLOROETHANE	23	6	6	9	0.25	65	118
1,2-DICHLOROETHENE (TOTAL)	8	1	0	0	35	1.2	87
1,2-DICHLOROPROPANE	17	0	0	9	0.31	2.0 *	NA
1,4-DIETHYLBENZENE	1	1	NA	NA	NA	2.6	NA
1,4-DIMETHYLCYCLOOCTANE	1	1	NA	NA	NA	14	NA
1-(1-METHYLETHENYL)-2-(1-METHYLETHYL)	1	1	NA	NA	NA	7.7	NA
1-(1-METHYLETHENYL)-4-PROPYLBENZENE	1	1	NA	NA	NA	3.4	NA
1-ETHENYL-3-ETHYLBENZENE	1	1	NA	NA	NA	21	NA
1-ETHYL-3,4-DIMETHYLBENZENE	1	1	NA	NA	NA	7.3	NA
1-ETHYL-3,5-DIMETHYLBENZENE	1	1	NA	NA	NA	10	NA
1-ETHYL-3-METHYLCYCLOPENTANE	1	1	NA	NA	NA	1.6	NA
1-ETHYL-4-(1-METHYLETHYL)BENZENE	1	1	NA	NA	NA	2.7	NA
1-METHYLETHYLBENZENE	1	1	NA	NA	NA	0.65	NA
1-METHYLETHYLCYCLOPENTANE	1	1	NA	NA	NA	4.2	NA
1-PHENYL-1-HEXANONE	1	1	NA	NA	NA	0.0010	NA
1-PROPENYLBENZENE	1	1	NA	NA	NA	4.4	NA
2,3-DIMETHYLBUTANONE	1	1	NA	NA	NA	0.22	NA
2-BUTANONE	13	1	0	0	7100	0.11	NA
2-CHLOROETHYLVINYL ETHER	17	0	NA	NA	NA	2.0 *	NA
2-CYCLOHEXYLDECANE	5	5	NA	NA	NA	8.1	6.9
2-ETHYL-4-METHYL-1-PENTANOL	1	1	NA	NA	NA	0.0010	NA
2-ETHYLHEXANOL	1	1	NA	NA	NA	3.2	NA
2-HEXANONE	12	0	NA	NA	NA	10 *	NA
2-METHYLDECAHYDRONAPHTHALENE	2	2	NA	NA	NA	16	21
2-PROPYL-1-HEPTANOL	2	2	NA	NA	NA	10	69
4-(2-BUTENYL)-1,2-DIMETHYLBENZENE	1	1	NA	NA	NA	1.8	NA
4-METHYL-2-PENTANONE	12	0	0	0	770	5.0 *	NA
6-ETHYL-1,2,3,4-TETRAHYDRONAPHTHALE	1	1	NA	NA	NA	4.1	NA
6-METHYL-1,1-HEPTANOL	1	1	NA	NA	NA	10	NA
6-METHYLHEPTANOL	6	6	NA	NA	NA	30	23
ACETONE	13	1	0	0	2100	0.21	NA
BENZENE	25	14	11	3	0.63	17	19
BROMODICHLOROMETHANE	17	0	0	4	0.63	2.0 *	NA
BROMOFORM	19	2	0	0	56	15	2.4
BROMOMETHANE	17	0	0	0	8.8	5.0 *	NA
CARBON DISULFIDE	12	0	0	0	7.5	5.0 *	NA
CARBON TETRACHLORIDE	17	0	0	11	0.23	5.0 *	NA
CHLOROBENZENE	22	0	0	0	65	2.0 *	NA
CHLORODIBROMOMETHANE	17	0	0	0	5.3	2.0 *	NA
CHLOROETHANE	17	0	0	0	1100	5.0 *	NA
CHLOROFORM	24	7	7	9	0.25	25.0	527
CHLOROMETHANE	17	0	0	5	1.2	5.0 *	NA
CIS-1,2-DICHLOROETHENE	12	0	0	0	31	2.0 *	NA
CIS-1,3-DICHLOROPROPENE	17	0	NA	NA	NA	2.0 *	NA
DECAHYDRONAPHTHALENE	2	2	NA	NA	NA	15	41
DIETHYLMETHYLBENZENE ISOMERS	2	2	NA	NA	NA	37	120
DIMETHYLINDANE ISOMERS	2	2	NA	NA	NA	25	25
DIMETHYLNAPHTHALENE	1	1	NA	NA	NA	300	NA

Summary Statistics for All Lagoons

Analyte (units mg/kg unless otherwise note	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
ETHYLBENZENE	26	19	0	0	230	20		162
ETHYLDIMETHYLBENZENE ISOMERS	3	3	NA	NA	NA	27		27
ETHYLDIMETHYLNAPHTHALENE ISOMERS	1	1	NA	NA	NA	25		NA
ETHYLMETHYLBENZENE ISOMERS	4	4	NA	NA	NA	32		26
HEXANEDIOIC ACID, DIOCTYL ESTER	1	1	NA	NA	NA	700		NA
ISOOCTANOL	3	3	NA	NA	NA	11		12
METHYLDECAHYDRONAPHTHALENE ISOME	1	1	NA	NA	NA	25		NA
METHYLENE CHLORIDE	24	7	4	3	7.6	110		173
METHYLINDANE ISOMERS	1	1	NA	NA	NA	17		NA
METHYLNAPHTHALENE ISOMERS	2	2	NA	NA	NA	210		736
METHYLPROPYLBENZENE ISOMERS	1	1	NA	NA	NA	12		NA
OCTAHYDROINDENE	7	7	NA	NA	NA	31		25
PROPYLBENZENE	6	6	NA	NA	NA	2.6		2.2
STYRENE	12	0	0	0	680	2.0	*	NA
TETRACHLOROETHENE	17	0	0	0	5.4	2.0	*	NA
TOLUENE	26	15	0	0	790	3.8		1.2
TRANS-1,2-DICHLOROETHENE	12	0	0	0	78	2.0	*	NA
TRANS-1,3-DICHLOROPROPENE	17	0	0	9	0.25	2.0	*	NA
TRICHLOROETHENE	17	0	0	0	3.2	2.0	*	NA
TRICHLOROFLUOROMETHANE	17	0	0	0	380	6.0	*	NA
TRIMETHYLBENZENE ISOMERS	9	9	NA	NA	NA	130		66
TRIMETHYLINDANE ISOMERS	1	1	NA	NA	NA	6.7		NA
TRIMETHYLPENTANE ISOMERS	6	6	NA	NA	NA	71		64
VINYL ACETATE	12	0	0	0	780	5.0	*	NA
VINYL CHLORIDE	17	0	0	17	0.016	5.0	*	NA
XYLENES (TOTAL)	26	19	0	0	320	13		3
SVOCs								
1,2,4-TRICHLOROBENZENE	16	0	0	0	570	100	*	NA
1,2,4-TRIMETHYLBENZENE	1	1	NA	NA	NA	64		NA
1,2-DICHLOROBENZENE	26	0	0	0	700	100	*	NA
1,3-DICHLOROBENZENE	26	0	0	0	500	100	*	NA
1,4-DICHLOROBENZENE	26	0	0	13	3.6	100	*	NA
2,4,5-TRICHLOROPHENOL	16	0	0	0	6500	100	*	NA
2,4,6-TRICHLOROPHENOL	17	1	0	2	40	0.16		0.52
2,4-DICHLOROPHENOL	17	1	0	0	200	0.59		0.55
2,4-DIMETHYLPHENOL	16	0	0	0	1300	100.0	*	NA
2,4-DINITROPHENOL	16	0	0	2	130	500	*	NA
2,4-DINITROTOLUENE	16	0	NA	NA	NA	1000	*	NA
2,6-DINITROTOLUENE	16	0	0	13	0.65	100	*	NA
2-CHLORONAPHTHALENE	16	0	0	0	110	100	*	NA
2-CHLOROPHENOL	16	0	0	2	91	100	*	NA
2-METHYLNAPHTHALENE	17	11	NA	NA	NA	75		30
2-METHYLPHENOL	16	0	0	0	3300	100	*	NA
2-NITROANILINE	16	0	0	13	3.9	100	*	NA
2-NITROPHENOL	16	0	NA	NA	NA	100	*	NA
3,3'-DICHLOROBENZIDINE	16	0	0	15	0.99	500	*	NA
3-NITROANILINE	16	0	NA	NA	NA	100	*	NA
4,6-DINITRO-2-METHYLPHENOL	16	0	NA	NA	NA	500	*	NA
4-BROMOPHENYL PHENYL ETHER	16	0	NA	NA	NA	100	*	NA
4-CHLORO-3-METHYLPHENOL	16	0	NA	NA	NA	100	*	NA
4-CHLOROANILINE	16	0	0	0	260	10	*	NA
4-CHLOROPHENYL PHENYL ETHER	16	0	NA	NA	NA	100	*	NA
4-METHYLPHENOL	16	0	0	0	330	100	*	NA
4-NITROANILINE	16	0	NA	NA	NA	100	*	NA
4-NITROPHENOL	16	0	NA	NA	NA	100	*	NA
ACENAPHTHENE	16	0	0	0	110	100	*	NA
ACENAPHTHYLENE	16	0	NA	NA	NA	100	*	NA
ANILINE	16	0	0	2	19	100	*	NA
ANTHRACENE	17	2	0	6	5.7	3.2		4270
AZOBENZENE	7	0	0	7	4	7.5	*	NA
BENZIDINE	16	1	1	15	0.0019	260		489
BENZOIC ACID	16	0	0	0	100000	1000	*	NA
BENZO[A]PYRENE	16	1	1	15	0.061	0.066		NA
BENZO[B]FLUORANTHENE	16	1	0	13	0.61	0.11		NA
BENZO[G,H,I]PERYLENE	16	0	NA	NA	NA	500	*	NA
BENZO[K]FLUORANTHENE	16	1	0	13	6.1	0.14		NA
BENZYL ALCOHOL	16	0	0	0	20000	100	*	NA
BENZYL BUTYL PHTHALATE	16	0	0	0	930	500	*	NA

Summary Statistics for All Lagoons

Analyte (units mg/kg unless otherwise note	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
BENZ[A]ANTHRACENE	16	1	0	13	0.61	0.082		NA
BIS(2-CHLOROETHOXY)METHANE	16	0	NA	NA	NA	100	*	NA
BIS(2-CHLOROETHYL) ETHER	16	0	0	16	0.043	100	*	NA
BIS(2-CHLOROISOPROPYL) ETHER	16	0	0	13	2.6	100	*	NA
BIS(2-ETHYLHEXYL) PHTHALATE	17	1	1	6	32	460		283
CHRYSENE	16	3	1	8	6.1	11		4.7
DI-N-BUTYL PHTHALATE	16	0	NA	NA	NA	500	*	NA
DI-N-OCTYL PHTHALATE	16	0	0	0	1300	500	*	NA
DIBENZOFURAN	16	0	0	0	140	100	*	NA
DIBENZ[A,H]ANTHRACENE	16	0	0	15	0.061	100	*	NA
DIETHYL PHTHALATE	16	0	0	0	52000	100	*	NA
DIMETHYL PHTHALATE	16	0	0	0	100000	100	*	NA
FLUORANTHENE	16	2	0	0	2600	0.63		0.74
FLUORENE	16	1	0	2	90	8.90		3.9
HEXACHLOROBENZENE	16	0	0	15	0.28	100	*	NA
HEXACHLOROBUTADIENE	16	0	0	6	5.7	100	*	NA
HEXACHLOROCYCLOPENTADIENE	16	0	0	0	450	200	*	NA
HEXACHLOROETHANE	16	0	0	2	32	100	*	NA
INDENO[1,2,3-CD]PYRENE	16	0	0	15	0.61	500	*	NA
ISOPHORONE	16	0	0	0	470	100	*	NA
N-NITROSO-DI-N-PROPYLAMINE	16	0	0	16	0.083	100	*	NA
N-NITROSODIPHENYLAMINE	16	0	0	2	91	100	*	NA
NAPHTHALENE	26	13	0	0	240	32		9.2
NITROBENZENE	16	0	0	9	16	100	*	NA
PENTACHLOROPHENOL	16	0	0	13	2.6	200	*	NA
PHENANTHRENE	17	5	NA	NA	NA	25		10
PHENOL	16	0	0	0	39000	100	*	NA
PYRENE	17	4	0	0	100	15		7.1
PESTICIDES								
4,4'-DDD	10	0	0	2	1.9	5.0	*	NA
4,4'-DDE	12	0	0	5	1.3	5.0	*	NA
4,4'-DDT	11	0	0	5	1.3	5.0	*	NA
ALDRIN	11	0	0	10	0.026	2.5	*	NA
ALPHA-BHC	11	0	0	8	0.071	2.5	*	NA
ALPHA-CHLORDANE	6	0	NA	NA	NA	25	*	NA
BETA-BHC	11	0	0	6	0.25	2.5	*	NA
CHLORDANE	5	0	0	2	0.34	0.50	*	NA
DELTA-BHC	11	0	NA	NA	NA	2.5	*	NA
DIELDRIN	11	0	0	10	0.028	5.0	*	NA
ENDOSULFAN I	11	0	0	0	390	2.5	*	NA
ENDOSULFAN II	11	0	NA	NA	NA	5.0	*	NA
ENDOSULFAN SULFATE	11	0	NA	NA	NA	5.0	*	NA
ENDRIN	11	0	0	0	20	5.0	*	NA
ENDRIN ALDEHYDE	5	0	NA	NA	NA	0.75	*	NA
ENDRIN KETONE	6	0	NA	NA	NA	5.0	*	NA
GAMMA-BHC (LINDANE)	11	0	0	6	0.34	2.5	*	NA
GAMMA-CHLORDANE	6	0	NA	NA	NA	25	*	NA
HEPTACHLOR	11	0	0	8	0.099	2.5	*	NA
HEPTACHLOR EPOXIDE	11	0	0	10	0.049	2.5	*	NA
METHOXYCHLOR	11	0	0	0	330	25	*	NA
TOXAPHENE	11	0	0	10	0.4	50	*	NA
PCBs								
PCB-1016	24	6	6	17	0.066	3.0		1.6
PCB-1221	17	0	0	16	0.066	25	*	NA
PCB-1232	17	0	0	16	0.066	25	*	NA
PCB-1242	18	1	1	16	0.066	4.2		4.0
PCB-1248	22	5	5	16	0.066	10		5.4
PCB-1254	24	8	8	16	0.066	13		4.6
PCB-1260	23	6	6	16	0.066	3.3		1.9
METALS								
ANTIMONY	35	2	0	0	31	2.7		2.6
ARSENIC	39	26	26	13	0.38	100		127
BARIUM	39	38	0	0	5300	890		321
BERYLLIUM	35	13	7	0	0.14	0.60		0.16
CADMIUM	41	29	7	0	9	78.0		39
CHROMIUM, TOTAL	41	40	0	0	210	200.0		87

Summary Statistics for All Lagoons

Analyte (units mg/kg unless otherwise note	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
CHROMIUM, VI	8	0	0	0	0.2	0.050 *	NA
COBALT	20	18	0	0	4600	6.40	4.3
COPPER	37	36	0	0	2800	92	35
LEAD	41	38	23	0	130	1400	3059
MERCURY	34	24	0	0	23	1.6	0.91
MOLYBDENUM	20	14	0	0	380	8.3	3.0
NICKEL	37	36	0	0	160	100	46
SELENIUM	39	5	0	0	380	0.70	0.26
SILVER	39	3	0	0	380	7.6	0.40
THALLIUM	34	0	0	0	5.4	5.1 *	NA
VANADIUM	24	21	0	0	540	61	35
ZINC	37	36	0	0	23000	1600	364
OTHER							
CYANIDE	4	0	0	0	1300	0.10 *	NA
IGNITABILITY (F)	2	NA	NA	NA	NA	140	326
SULFUR DIOXIDE	3	3	NA	NA	NA	11	14
pH (standard units)	11	NA	NA	NA	NA	9.7	NA

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997).

TABLE 3-14

SAMPLES FROM LAGOON 1 WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
L-1	OWR 1	1,2-DICHLOROETHANE	55	4.5	NA	NA	10
L-1	OWR 2	1,2-DICHLOROETHANE	6.2	4.5	NA	NA	10
L-1	Radian LS1	BENZENE	1.3	0	NA	NA	10
L-1	OWR 1	BENZENE	1.8	4.5	NA	NA	10
L-1	OWR 2	BENZENE	4.4	4.5	NA	NA	10
L-1	ESE L1-1	BENZENE	2.6	4	NA	NA	10
L-1	OWR 1	CHLOROFORM	17	4.5	NA	NA	120
L-1	OWR 2	CHLOROFORM	18	4.5	NA	NA	120
L-1	OWR 1	METHYLENE CHLORIDE	110	4.5	NA	NA	NA
L-1	ESE L1-1	CHRYSENE	11	4	NA	NA	NA
L-1	OWR 1	PCB-1016	2.3	4.5	50	50	NA
L-1	OWR 2	PCB-1016	3	4.5	50	50	NA
L-1	OWR 1	PCB-1248	9.4	4.5	50	50	NA
L-1	OWR 2	PCB-1248	10	4.5	50	50	NA
L-1	OWR 1	PCB-1254	5.5	4.5	50	50	NA
L-1	OWR 2	PCB-1254	6.1	4.5	50	50	NA
L-1	OWR 1	PCB-1260	3.1	4.5	50	50	NA
L-1	OWR 2	PCB-1260	3.3	4.5	50	50	NA
L-1	OWR 2	ARSENIC	16	4.5	500	50	100
L-1	ESE L1-1	ARSENIC	44	4	500	50	100
L-1	ESE L1-2	ARSENIC	3.4	5	500	50	100
L-1	II 34	ARSENIC	21	0	500	50	100
L-1	Radian LS1	ARSENIC	20	0	500	50	100
L-1	Radian LS1	BERYLLIUM	0.15	0	75	7.5	NA
L-1	OWR 1	BERYLLIUM	0.33	4.5	75	7.5	NA
L-1	ESE L1-1	CADMIUM	78	4	100	10	20
L-1	II 35	CADMIUM	17	0	100	10	20
L-1	OWR 2	LEAD	140	4.5	1000	50	100
L-1	ESE L1-1	LEAD	280	4	1000	50	100
L-1	II 35	LEAD	830	0	1000	50	100

Source: ESE (1997a)

TABLE 3-16

SAMPLES FROM LAGOON 2 WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
L-2	OWR 3	1,1-DICHLOROETHENE	8.9	4.5	NA	NA	14
L-2	OWR 3	1,2-DICHLOROETHANE	9	4.5	NA	NA	10
L-2	OWR 4	1,2-DICHLOROETHANE	6.1	4.5	NA	NA	10
L-2	OWR 3	BENZENE	5.2	4.5	NA	NA	10
L-2	OWR 4	BENZENE	2.9	4.5	NA	NA	10
L-2	II 33	BENZENE	3	0	NA	NA	10
L-2	OWR 3	CHLOROFORM	24	4.5	NA	NA	120
L-2	OWR 4	CHLOROFORM	17	4.5	NA	NA	120
L-2	OWR 3	METHYLENE CHLORIDE	12	4.5	NA	NA	NA
L-2	OWR 3	PCB-1016	2.2	4.5	50	50	NA
L-2	OWR 4	PCB-1016	2.7	4.5	50	50	NA
L-2	OWR 3	PCB-1248	8.6	4.5	50	50	NA
L-2	OWR 4	PCB-1248	9.5	4.5	50	50	NA
L-2	Radian LS-2	PCB-1254	8.4	0	50	50	NA
L-2	OWR 3	PCB-1254	5.2	4.5	50	50	NA
L-2	OWR 4	PCB-1254	5.4	4.5	50	50	NA
L-2	OWR 3	PCB-1260	3.2	4.5	50	50	NA
L-2	OWR 4	PCB-1260	2.9	4.5	50	50	NA
L-2	Radian LS-2	ARSENIC	24	0	500	50	100
L-2	OWR 4	ARSENIC	2.5	4.5	500	50	100
L-2	ESE L2-2	ARSENIC	15	12	500	50	100
L-2	ESE L2-2	ARSENIC	38	4	500	50	100
L-2	OWR 3	BERYLLIUM	0.4	4.5	75	7.5	NA
L-2	OWR 4	BERYLLIUM	0.43	4.5	75	7.5	NA
L-2	ESE L2-2	CADMIUM	19	4	100	10	20
L-2	Radian LS-2	LEAD	180	0	1000	50	100
L-2	OWR 4	LEAD	160	4.5	1000	50	100
L-2	ESE L2-2	LEAD	140	12	1000	50	100
L-2	ESE L2-2	LEAD	170	4	1000	50	100
L-2	II 33	LEAD	230	0	1000	50	100

Source: ESE (1997a)

TABLE 3-16

SAMPLES FROM LAGOON 3 WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
L-3	OWR 5	1,2-DICHLOROETHANE	6.2	4.5	NA	NA	10
L-3	OWR 5	BENZENE	2.6	4.5	NA	NA	10
L-3	II 31	BENZENE	17	0	NA	NA	10
L-3	OWR 5	CHLOROFORM	17	4.5	NA	NA	120
L-3'	OWR 5	CHLOROFORM	17	4.5	NA	NA	120
L-3	II 24	BENZO[a]PYRENE	68	0	NA	NA	NA
L-3	OWR 5	PCB-1016	1.6	4.5	50	50	NA
L-3	OWR 5	PCB-1248	5.2	4.5	50	50	NA
L-3	Radian LS-3	PCB-1254	13	0	50	50	NA
L-3	OWR 5	PCB-1254	3.2	4.5	50	50	NA
L-3	OWR 5	PCB-1260	1.1	4.5	50	50	NA
L-3	Radian LS-3	ARSENIC	50	0	500	50	100
L-3	OWR 5	ARSENIC	1.4	4.5	500	50	100
L-3	ESE L3-2	ARSENIC	49	15	500	50	100
L-3	ESE L3-2	ARSENIC	52	15	500	50	100
L-3	II 31	ARSENIC	100	0	500	50	100
L-3	OWR 5	BERYLLIUM	0.32	4.5	75	7.5	NA
L-3	OWR 5	CADMIUM	11	4.5	100	10	20
L-3	II 31	CADMIUM	9.8	0	100	10	20
L-3	DOHS-770	LEAD	320	0	1000	50	100
L-3	Radian LS-3	LEAD	370	0	1000	50	100
L-3	OWR 5	LEAD	440	4.5	1000	50	100
L-3	ESE L3-2	LEAD	160	15	1000	50	100
L-3	II 31	LEAD	1400	0	1000	50	100

Source: ESE (1997a)

TABLE 3-17

SAMPLES FROM LAGOON 4 WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
L-4	OWR 6	BENZENE	1.6	4.5	NA	NA	10
L-4	II 30	BENZENE	0.73	0	NA	NA	10
L-4	OWR 6	CHLOROFORM	25	4.5	NA	NA	120
L-4	OWR 6	METHYLENE CHLORIDE	34	4.5	NA	NA	NA
L-4	OWR 6	PCB-1016	1.6	4.5	50	50	NA
L-4	OWR 6	PCB-1242	4.2	4.5	50	50	NA
L-4	OWR 6	PCB-1254	6.1	4.5	50	50	NA
L-4	OWR 6	PCB-1260	1.2	4.5	50	50	NA
L-4	Radian LS-4	ARSENIC	14	0	500	50	100
L-4	OWR 6	ARSENIC	20	4.5	500	50	100
L-4	SE B-2	ARSENIC	6	0-3	500	50	100
L-4	ESE L4-2	ARSENIC	42	12	500	50	100
L-4	ESE L4-2	ARSENIC	13	5	500	50	100
L-4	II 29	ARSENIC	67	0	500	50	100
L-4	WCC Lagoon 4	ARSENIC	2	0-77	500	50	100
L-4	SE B-2	BERYLLIUM	0.6	0-3	75	7.5	NA
L-4	WCC Lagoon 4	BERYLLIUM	0.2	0-77	75	7.5	NA
L-4	II 29	CADMIUM	23	0	100	10	20
L-4	II 30	CADMIUM	11	0	100	10	20
L-4	OWR 6	LEAD	380	4.5	1000	50	100
L-4	ESE L4-2	LEAD	280	12	1000	50	100
L-4	ESE L4-2	LEAD	1200	5	1000	50	100
L-4	ESE L4-2	LEAD	170	5	1000	50	100
L-4	II 29	LEAD	170	0	1000	50	100
L-4	II 30	LEAD	140	0	1000	50	100

Source: ESE (1997a)

TABLE 3-18

SAMPLES FROM LAGOON 5 WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
L-5	OWR 7	1,2-DICHLOROETHANE	10	4.5	NA	NA	10
L-5	OWR 7	CHLOROFORM	9.6	4.5	NA	NA	120
L-5	II 36	BENZIDINE	260	0	NA	NA	NA
L-5	OWR 7	BIS(2-ETHYLHEXYL) PHTHALATE	460	4.5	NA	NA	NA
L-5	Radian LS-5	ARSENIC	7.9	0	500	50	100
L-5	OWR 7	ARSENIC	26	4.5	500	50	100
L-5	II 36	ARSENIC	100	0	500	50	100
L-5	II37	ARSENIC	22	0	500	50	100
L-5	II38	ARSENIC	20	0	500	50	100
L-5	OWR 7	LEAD	790	4.5	1000	50	100
L-5	II 36	LEAD	870	0	1000	50	100
L-5	II37	LEAD	230	0	1000	50	100
L-5	II38	LEAD	200	0	1000	50	100

Source: ESE (1997a)

Table 3-19

Summary Statistics for Water Samples from the Lagoons

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
TPH								
OIL & GREASE	4	4	NA	NA	NA	19000		19205
PETROLEUM DISTILLATE - TRACE	1	1	NA	NA	NA	0.000050		NA
VOCs								
1,1,1,2-TETRACHLOROETHANE	3	0	NA	NA	NA	5.0	*	NA
1,1,1-TRICHLOROETHANE	3	1	0	0	790	7.5		9.6
1,1,2,2-TETRACHLOROETHANE	3	0	0	3	0.055	2.0	*	NA
1,1,2-TRICHLOROETHANE	3	0	0	3	0.2	2.0	*	NA
1,1-DICHLOROETHANE	3	0	0	0	810	2.0	*	NA
1,1-DICHLOROETHENE	3	0	0	3	0.046	5.0	*	NA
1,1-DICHLOROPROPENE	3	0	NA	NA	NA	2.0	*	NA
1,2,3-TRICHLOROBENZENE	3	0	NA	NA	NA	5.0	*	NA
1,2,3-TRICHLOROPROPANE	3	0	NA	NA	NA	10	*	NA
1,2,3-TRIMETHYLBENZENE	1	1	NA	NA	NA	0.30		NA
1,2,4-TRIMETHYLBENZENE	4	1	NA	NA	NA	0.20		NA
1,2-DIBROMO-3-CHLOROPROPANE	3	0	NA	NA	NA	5.0	*	NA
1,2-DIBROMOETHANE	3	0	NA	NA	NA	2.0	*	NA
1,2-DICHLOROETHANE	3	0	0	3	0.12	2.0	*	NA
1,2-DICHLOROPROPANE	3	0	0	3	0.16	2.0	*	NA
1,3,5-TRIMETHYLBENZENE	3	0	NA	NA	NA	2.0	*	NA
1,3-DICHLOROPROPANE	3	0	NA	NA	NA	2.0	*	NA
2,2-DICHLOROPROPANE	3	0	NA	NA	NA	2.0	*	NA
2-BUTANONE	3	0	0	0	1900	10	*	NA
2-CHLOROETHYLVINYL ETHER	3	0	NA	NA	NA	5.0	*	NA
2-CHLOROTOLUENE	3	0	NA	NA	NA	5.0	*	NA
2-ETHYHEXANOL	1	1	NA	NA	NA	0.30		NA
2-ETHYLHEXANOL	1	1	NA	NA	NA	30		NA
2-HEXANONE	3	0	NA	NA	NA	10	*	NA
4-CHLOROTOLUENE	3	0	NA	NA	NA	5.0	*	NA
4-METHYL-2-PENTANONE	3	0	0	0	160	10	*	NA
ACETONE	3	3	0	0	610	32		37
BENZENE	6	3	3	3	0.39	500		1760758
BROMOBENZENE	3	0	NA	NA	NA	5.0	*	NA
BROMOCHLOROMETHANE	3	0	NA	NA	NA	2.0	*	NA
BROMODICHLOROMETHANE	3	0	0	3	0.18	2.0	*	NA
BROMOFORM	3	0	0	0	8.5	2.0	*	NA
BROMOMETHANE	3	0	0	0	8.7	5.0	*	NA
CARBON DISULFIDE	3	0	0	0	21	5.0	*	NA
CARBON TETRACHLORIDE	3	0	0	3	0.17	5.0	*	NA
CHLOROBENZENE	3	0	0	0	39	2.0	*	NA
CHLOROETHANE	3	0	0	0	710	5.0	*	NA
CHLOROFORM	3	0	0	3	0.16	2.0	*	NA
CHLOROMETHANE	3	0	0	3	1.5	5.0	*	NA
CIS-1,2-DICHLOROETHENE	3	0	0	0	61	2.0	*	NA
CIS-1,3-DICHLOROPROPENE	3	0	NA	NA	NA	2.0	*	NA
DIBROMOCHLOROMETHANE	3	0	NA	NA	NA	2.0	*	NA
DIBROMOMETHANE	3	0	NA	NA	NA	2.0	*	NA
DICHLOROFLUOROMETHANE	3	0	NA	NA	NA	5.0	*	NA
DICHLOROMETHANE	1	1	NA	NA	NA	5.4		NA
ETHYLBENZENE	3	0	0	0	1300	2.0	*	NA
ISOPROPYLBENZENE	3	0	NA	NA	NA	2.0	*	NA
METHYLENE CHLORIDE	3	1	1	2	4.3	99		128
N-BUTYLBENZENE	3	0	NA	NA	NA	5.0	*	NA
N-PROPYLBENZENE	3	0	NA	NA	NA	2.0	*	NA
P-ISOPROPYLTOLUENE	3	0	NA	NA	NA	2.0	*	NA
SEC-BUTYLBENZENE	3	0	NA	NA	NA	5.0	*	NA
STYRENE	4	1	0	0	1600	0.30		NA
TERT-BUTYLBENZENE	3	0	NA	NA	NA	5.0	*	NA
TETRACHLOROETHENE	4	1	0	3	1.1	0.000050		NA
TOLUENE	3	0	0	0	720	2.0	*	NA
TRANS-1,2-DICHLOROETHENE	3	0	0	0	120	2.0	*	NA
TRANS-1,3-DICHLOROPROPENE	3	0	0	3	0.081	2.0	*	NA
TRICHLOROETHENE	3	0	0	3	1.6	2.0	*	NA
TRICHLOROFLUOROMETHANE	3	0	0	0	1300	5.0	*	NA
VINYL CHLORIDE	3	0	0	3	0.02	5.0	*	NA
XYLENES (TOTAL)	4	1	0	0	1400	0.60		NA

Summary Statistics for Water Samples from the Lagoons

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
SVOCs								
1,1'-BIPHENYL	1	1	0	0	300	0.80		NA
1,2,4-TRICHLOROBENZENE	3	0	0	0	190	5.0	*	NA
1,2-DICHLOROBENZENE	3	0	0	0	370	2.0	*	NA
1,3-DICHLOROBENZENE	3	0	0	0	180	2.0	*	NA
1,4-DICHLOROBENZENE	3	0	0	3	0.47	2.0	*	NA
1-ETHYL-2-METHYLBENZENE	1	1	NA	NA	NA	0.40		NA
HEXACHLOROBUTADIENE	3	0	0	3	0.86	5.0	*	NA
NAPHTHALENE	4	1	0	0	240	0.80		NA
PHENOL	1	1	0	0	22000	7.0		NA
METALS								
ANTIMONY	3	0	0	3	15	500	*	NA
ARSENIC	6	6	6	0	0.045	370		228
BARIUM	6	6	0	0	2600	100		105
BERYLLIUM	3	0	0	3	0.016	10	*	NA
CADMIUM	3	0	0	0	18	5.0	*	NA
CHROMIUM (TOTAL)	3	0	NA	NA	NA	5.0	*	NA
CHROMIUM (VI)	3	0	NA	NA	NA	25	*	NA
COBALT	4	1	0	0	2200	48		44
COPPER	6	3	0	0	1400	250		291
LEAD	4	4	3	0	4	69		17236
MERCURY	3	0	0	0	11	0.20	*	NA
MOLYBDENUM	3	0	0	0	180	100	*	NA
NICKEL	5	2	0	0	730	31		29
SELENIUM	3	0	0	0	180	10	*	NA
SILVER	3	0	0	0	180	50	*	NA
THALLIUM	3	0	0	3	2.6	500	*	NA
THORIUM	3	2	NA	NA	NA	360		451
TIN	3	3	NA	NA	NA	140		170
VANADIUM	3	0	0	0	260	50	*	NA
ZINC	6	6	0	0	11000	160		121
OTHER								
CYANIDE	1	1	0	0	730	35		NA
FLUORIDE	3	3	NA	NA	NA	6800		8370
IGNITABILITY (F)	2	NA	NA	NA	NA	140	*	NA
pH (standard units)	6	NA	NA	NA	NA	7.8		7.9

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997a).

TABLE 3-19a				
WATER SAMPLES FROM THE LAGOONS WITH CONCENTRATIONS EXCEEDING THE PRGs				
Area	Sample Location	Analyte	Result, µg/L	Depth, ft.
LW-2	WCC Lagoon 2	BENZENE	0.6	0
LW-4	WCC Lagoon 4	BENZENE	500	0
LW-5	WCC Lagoon 5	BENZENE	0.4	0
LW-1	ESE97 L1-1	METHYLENE CHLORIDE	99	0
LW-1	ESE97 L1-1	ARSENIC	69	0
LW-2	WCC Lagoon 2	ARSENIC	77	0
LW-4	ESE97 L4-1	ARSENIC	99	0
LW-4	WCC Lagoon 4	ARSENIC	31	0
LW-5	ESE97 L5-1	ARSENIC	370	0
LW-5	WCC Lagoon 5	ARSENIC	120	0
LW-1	ESE97 L1-1	LEAD	69	0
LW-4	ESE97 L4-1	LEAD	11	0
LW-5	ESE97 L5-1	LEAD	21	0
Source: ESE (1997a)				

Table 3-20. Hydrocarbon Distribution of Lagoon and Pit "F" Samples - ESE Investigation

			Hydrocarbon Type and Distribution Percentage*													
Sample No.	Sample Date	TEPH (mg/kg)	C8-C9	C10-C11	C12-C13	C14-C15	C16-C17	C18-C19	C20-C21	C22-C23	C24-C25	C26-C27	C28-C29	C30-C31	C32-C35	C36-C40
L1-1-4'	1/25/96	40,000	1.5	4.8	11	13	12	11	9.2	9.7	5.7	4.8	4.8	4.5	5.7	2.6
L1-2-5'	1/25/96	7,800	1.6	3.0	6.0	7.8	8.2	8.4	8.2	11	7.2	6.8	7.5	7.4	10	7.0
L2-2-4'	1/25/96	20,000	1.1	2.6	6.2	8.9	10	11	10	11	7.0	6.2	6.5	6.1	8.3	5.5
L3-2-5'	1/25/96	4,100	1.5	3.0	6.5	8.2	9.0	9.0	8.3	11	7.1	6.6	7.5	7.3	10	5.8
L4-2-5'	1/26/96	4,700	5	3.5	8.6	7.3	8	9.6	6.8	5.9	6.0	6.1	4.9	8.5	10	10
L4-2-5' DUP	1/26/96	5,000	4.8	3.8	9.2	7.8	8.5	10	7.0	6.0	6.1	6.0	4.8	8.2	9.5	8.3
L5-2-5'	1/26/96	17,000	1.6	3.0	5.7	7.3	8.0	7.9	7.4	10	6.9	6.7	8.0	8.1	12	8.2
F-ESE1#	1/26/96	520,000	4.0	1.6	1.0	9.0	22	17	14	12	6.0	4.8	2.2	2.0	2.7	2.0

Gasoline

Diesel

Waste Oils

Notes:

US EPA - U.S. Environmental Protection Agency

TEPH - total extractable petroleum hydrocarbons (Analyzed using EPA Method 8015)

* - Carbon range area percentage - percentage of hydrocarbons being within specified carbon range

\# - Styrene Pit Sample

Source: ESE (1997a)

Table 3-21
Summary Statistics for the Former Lagoons

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
TPH								
OIL & GREASE, EPA 413.2	15	15	NA	NA	NA	128000		3.67E+05
TPH, EPA 3510/8015	39	27	NA	NA	NA	18000		3.54E+05
TRPH, EPA 418.1	96	72	NA	NA	NA	20000		2.12E+05
VOCs								
1,1,1-TRICHLOROETHANE	25	0	0	0	1200	0.6	*	NA
1,1,2,2-TETRACHLOROETHANE	25	0	0	7	0.45	1.2	*	NA
1,1,2-TRICHLOROETHANE	25	0	0	0	0.65	0.6	*	NA
1,1-DICHLOROETHANE	18	0	0	0	500	0.5	*	NA
1,1-DICHLOROETHENE	32	0	0	8	0.037	0.6	*	NA
1,2,3,4-TETRAHYDRO-1,1,6-TRIMETHYLNAPHTHALENE	1	1	NA	NA	NA	0.13		NA
1,2,4,5-TETRAMETHYLBENZENE	1	1	NA	NA	NA	13		NA
1,2-DICHLOROETHANE	25	0	0	7	0.25	0.6	*	NA
1,2-DICHLOROETHENE (TOTAL)	14	0	0	0	35	0.6	*	NA
1,2-DICHLOROPROPANE	25	0	0	7	0.31	0.6	*	NA
1-ETHYL-3,5-DIMETHYLBENZENE	2	2	NA	NA	NA	25		9.11E+01
1-ETHYL-3-METHYLBENZENE	1	1	NA	NA	NA	0.09		NA
2,4-DIMETHYLHEXANE	1	1	NA	NA	NA	0.03		NA
2-BUTANONE	19	6	0	0	7100	5.2		1.71E+02
2-CHLOROETHYLVINYL ETHER	18	0	NA	NA	NA	0.5	*	NA
2-HEXANONE	18	0	NA	NA	NA	1.2	*	NA
4-METHYL-2-PENTANONE	18	0	0	0	770	1.2	*	NA
ACETONE	19	6	0	0	2100	0.05		2.78E-02
BENZENE	27	9	3	0	0.63	2		8.36E+00
BROMODICHLOROMETHANE	25	0	0	0	0.63	0.6	*	NA
BROMOFORM	25	0	0	0	56	0.6	*	NA
BROMOMETHANE	25	0	0	0	6.8	1.2	*	NA
CARBON DISULFIDE	18	0	0	0	7.5	1	*	NA
CARBON TETRACHLORIDE	25	0	0	7	0.23	0.6	*	NA
CHLOROBENZENE	31	2	0	0	65	6.6		1.60E+00
CHLORODIBROMOMETHANE	25	0	0	0	5.3	0.6	*	NA
CHLOROETHANE	25	0	0	0	1100	1.2	*	NA
CHLOROFORM	25	0	0	7	0.25	0.6	*	NA
CHLOROMETHANE	25	0	0	0	1.2	1.2	*	NA
CIS-1,2-DICHLOROETHENE	11	0	0	0	31	0.5	*	NA
CIS-1,2-DICHLOROPROPENE	7	0	NA	NA	NA	0.1	*	NA
CIS-1,3-DICHLOROPROPENE	18	0	NA	NA	NA	0.6	*	NA
ETHYLBENZENE	29	14	0	0	230	6.2		7.59E+02
METHYLENE CHLORIDE	25	3	0	0	7.8	0.061		4.46E-02
METHYLNAPHTHALENE ISOMERS	1	1	NA	NA	NA	0.02		NA
OCTAHYDROINDENE	3	3	NA	NA	NA	27		3.81E+01
STYRENE	18	0	0	0	680	1	*	NA
TETRACHLOROETHENE	25	0	0	0	5.4	0.6	*	NA
TOLUENE	31	25	0	0	790	5.2		1.38E+01
TRANS-1,2-DICHLOROETHENE	11	0	0	0	78	0.5	*	NA
TRANS-1,3-DICHLOROPROPENE	25	0	0	7	0.25	0.6	*	NA
TRICHLOROETHENE	25	0	0	0	3.2	0.6	*	NA
TRICHLOROFLUOROMETHANE	18	0	0	0	380	2.5	*	NA
TRIMETHYLBENZENE ISOMERS	2	2	NA	NA	NA	69		1.83E+02
VINYL ACETATE	18	0	0	0	780	1.2	*	NA
VINYL CHLORIDE	25	0	0	14	0.016	6.5	*	NA
XYLENES (TOTAL)	30	21	0	0	320	40.006		1.13E+04
SVOCs								
1,2,4-TRICHLOROBENZENE	26	0	0	0	570	10	*	NA
1,2,4-TRIMETHYLBENZENE	2	2	NA	NA	NA	80		2.92E+02
1,2-DICHLOROBENZENE	39	0	0	0	700	10	*	NA
1,3-DICHLOROBENZENE	39	0	0	0	500	10	*	NA
1,4-DICHLOROBENZENE	39	0	0	6	3.6	10	*	NA
1-METHYLNAPHTHALENE	2	2	NA	NA	NA	65		2.24E+02
2,4,5-TRICHLOROPHENOL	26	0	0	0	6500	50	*	NA
2,4,6-TRICHLOROPHENOL	26	0	0	0	40	10	*	NA
2,4-DICHLOROPHENOL	26	0	0	0	200	10	*	NA
2,4-DIMETHYLPHENOL	26	1	0	0	1300	39		9.15E+00

Table 3-21
Summary Statistics for the Former Lagoons

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
2,4-DINITROPHENOL	26	0	0	0	130	50	*	NA
2,4-DINITROTOLUENE	26	0	NA	NA	NA	10	*	NA
2,6-DINITROTOLUENE	26	0	0	16	0.65	10	*	NA
2-CHLORONAPHTHALENE	26	0	0	0	110	10	*	NA
2-CHLOROPHENOL	26	0	0	0	91	10	*	NA
2-METHYLNAPHTHALENE	30	14	NA	NA	NA	100		3.24E+02
2-METHYLPHENOL	26	0	0	0	3300	10	*	NA
2-NITROANILINE	26	0	0	13	3.9	50	*	NA
2-NITROPHENOL	26	0	NA	NA	NA	10	*	NA
3,3'-DICHLOROBENZIDINE	26	1	0	17	0.99	0.082		NA
3-NITROANILINE	26	0	NA	NA	NA	50	*	NA
4,6-DINITRO-2-METHYLPHENOL	26	0	NA	NA	NA	50	*	NA
4-BROMOPHENYL PHENYL ETHER	26	0	NA	NA	NA	10	*	NA
4-CHLORO-3-METHYLPHENOL	26	0	NA	NA	NA	10	*	NA
4-CHLOROANILINE	26	0	0	0	260	10	*	NA
4-CHLOROPHENYL PHENYL ETHER	26	0	NA	NA	NA	10	*	NA
4-METHYLPHENOL	26	0	0	0	330	10	*	NA
4-NITROANILINE	26	0	NA	NA	NA	50	*	NA
4-NITROPHENOL	26	0	NA	NA	NA	50	*	NA
ACENAPHTHENE	26	2	0	0	110	0.64		3.16E-01
ACENAPHTHYLENE	26	0	NA	NA	NA	10	*	NA
ANILINE	19	0	0	0	19	10	*	NA
ANTHRACENE	27	1	0	1	5.7	2.4		1.60E+00
BENZIDINE	19	0	0	19	0.0019	250	*	NA
BENZOIC ACID	26	1	0	0	100000	0.16		NA
BENZO[A]PYRENE	26	0	0	23	0.061	10	*	NA
BENZO[B]FLUORANTHENE	26	0	0	16	0.61	10	*	NA
BENZO[G,H,I]PERYLENE	26	0	NA	NA	NA	10	*	NA
BENZO[K]FLUORANTHENE	26	0	0	1	6.1	10	*	NA
BENZYL ALCOHOL	26	0	0	0	20000	10	*	NA
BENZYL BUTYL PHTHALATE	26	0	0	0	930	10	*	NA
BENZ[A]ANTHRACENE	26	3	0	14	0.61	0.11		7.50E-02
BIS(2-CHLOROETHOXY)METHANE	26	0	NA	NA	NA	10	*	NA
BIS(2-CHLOROETHYL) ETHER	26	0	0	26	0.043	10	*	NA
BIS(2-CHLOROISOPROPYL) ETHER	26	0	0	6	2.5	10	*	NA
BIS(2-ETHYLHEXYL) PHTHALATE	26	7	0	1	32	1.6		5.16E-01
CHRYSENE	26	5	0	1	6.1	0.74		3.37E-01
DI-N-BUTYL PHTHALATE	27	7	NA	NA	NA	3.7		1.06E+00
DI-N-OCTYL PHTHALATE	26	0	0	0	1300	10	*	NA
DIBENZOFURAN	26	1	0	0	140	0.54		3.18E-01
DIBENZ[A,H]ANTHRACENE	26	0	0	23	0.061	10	*	NA
DIETHYL PHTHALATE	26	0	0	0	52000	10	*	NA
DIMETHYL PHTHALATE	26	0	0	0	100000	10	*	NA
FLUORANTHENE	27	4	0	0	2600	3.2		1.41E+00
FLUORENE	26	4	0	0	90	2.5		1.56E+00
HEXACHLOROBENZENE	26	0	0	18	0.28	10	*	NA
HEXACHLOROBUTADIENE	26	0	0	1	5.7	10	*	NA
HEXACHLOROCYCLOPENTADIENE	26	0	0	0	450	10	*	NA
HEXACHLOROETHANE	26	0	0	0	32	10	*	NA
INDENO[1,2,3-CD]PYRENE	26	0	0	16	0.61	10	*	NA
ISOPHORONE	26	0	0	0	470	10	*	NA
N-NITROSO-DI-N-PROPYLAMINE	26	0	0	23	0.063	10	*	NA
N-NITROSODIPHENYLAMINE	26	1	0	0	91	0.68		3.57E-01
NAPHTHALENE	40	21	0	0	240	24		2.74E+01
NITROBENZENE	26	0	0	0	18	10	*	NA
PENTACHLOROPHENOL	26	0	0	16	2.5	50	*	NA
PHENANTHRENE	33	16	NA	NA	NA	12		1.66E+01
PHENOL	26	2	0	0	39000	0.098		8.74E-02
PYRENE	27	5	0	0	100	3		1.31E+00
PESTICIDES								
4,4'-DDD	22	0	0	2	1.9	2	*	NA
4,4'-DDE	22	0	0	0	1.3	1	*	NA
4,4'-DDT	22	0	0	2	1.3	2	*	NA
ALDRIN	22	0	0	15	0.026	1	*	NA
ALPHA-BHC	22	0	0	10	0.071	1	*	NA

Table 3-21
Summary Statistics for the Former Lagoons

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
ALPHA-CHLORDANE	8	0	NA	NA	NA	2.8	*	NA
BETA-BHC	22	3	0	3	0.25	0.075		3.64E-02
CHLORDANE	14	0	0	4	0.34	2	*	NA
DELTA-BHC	22	0	NA	NA	NA	2	*	NA
DIELDRIN	22	0	0	17	0.028	1	*	NA
ENDOSULFAN I	22	0	0	0	390	2	*	NA
ENDOSULFAN II	22	0	NA	NA	NA	1	*	NA
ENDOSULFAN SULFATE	22	0	NA	NA	NA	10	*	NA
ENDRIN	22	0	0	0	20	2	*	NA
ENDRIN ALDEHYDE	14	0	NA	NA	NA	3	*	NA
ENDRIN KETONE	8	0	NA	NA	NA	0.57	*	NA
GAMMA-BHC (LINDANE)	22	0	0	2	0.34	1	*	NA
GAMMA-CHLORDANE	8	1	NA	NA	NA	0.017		NA
HEPTACHLOR	22	0	0	10	0.099	1	*	NA
HEPTACHLOR EPOXIDE	22	0	0	14	0.049	1	*	NA
METHOXYCHLOR	22	0	0	0	330	30	*	NA
TOXAPHENE	22	0	0	19	0.4	35	*	NA
PCBs								
PCB-1016	21	0	0	18	0.066	10	*	NA
PCB-1221	21	0	0	18	0.066	10	*	NA
PCB-1232	21	0	0	18	0.066	10	*	NA
PCB-1242	21	0	0	18	0.066	10	*	NA
PCB-1248	21	0	0	18	0.066	10	*	NA
PCB-1254	21	0	0	18	0.066	10	*	NA
PCB-1260	21	1	1	18	0.066	0.086		1.07E-01
METALS								
ANTIMONY	36	17	0	0	31	8.5		3.48E+00
ARSENIC	44	15	15	29	0.38	23		6.55E+00
BARIUM	44	44	0	0	5300	1800		4.79E+02
BERYLLIUM	36	20	19	0	0.14	1.4		5.38E-01
CADMIUM	42	10	0	0	9	2		9.12E-01
CHROMIUM, TOTAL	44	44	0	0	210	120		3.48E+01
CHROMIUM, VI	15	0	0	12	0.2	0.25	*	NA
COBALT	26	26	0	0	4600	18		8.26E+00
COPPER	36	36	0	0	2800	86		3.66E+01
LEAD	43	33	5	0	130	530		2.45E+02
MERCURY	33	15	0	0	23	0.31		1.18E-01
MOLYBDENUM	26	4	0	0	380	1.2		4.72E-01
NICKEL	36	36	0	0	150	140		3.42E+01
SELENIUM	44	12	0	0	380	28		1.72E+01
SILVER	42	0	0	0	380	5	*	NA
THALLIUM	34	3	3	0	5.4	72		1.29E+01
VANADIUM	35	35	0	0	540	75		4.01E+01
ZINC	36	36	0	0	23000	340		1.21E+02
OTHER								
CYANIDE	21	0	0	0	1300	0.1	*	NA
IGNITABILITY (F)	8	NA	NA	NA	NA	140		1.21E+02
pH (standard units)	17	NA	NA	NA	NA	10.2		NA

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997).

TABLE 3-22

SAMPLES FROM THE FORMER LAGOONS WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
F-2C	II 59	BENZENE	0.93	5	NA	NA	10
F-6E	Radian B-6	BENZENE	1.9	21	NA	NA	10
F-3F	II 44	BENZENE	2.0	20	NA	NA	10
F-4A	II 50	PCB-1260	0.088	5	50	50	NA
F-1B	WCC B-1	ARSENIC	4.2	C0-53	500	50	100
F-1B	WCC B-1	ARSENIC	4.4	C0-53	500	50	100
F-2A	Radian S-3	ARSENIC	23	0.25	500	50	100
F-2B	WCC B-8	ARSENIC	7	C0-58	500	50	100
F-2B	WCC B-8	ARSENIC	20	C0-58	500	50	100
F-3A	Radian S-2	ARSENIC	13	0.25	500	50	100
F-3A	WCC B-3	ARSENIC	18	C0-50	500	50	100
F-3A	WCC B-3	ARSENIC	2.7	C0-50	500	50	100
F-3F	Radian B-5	ARSENIC	8.9	14	500	50	100
F-4C	WCC B-5	ARSENIC	1.4	C0-45	500	50	100
F-4C	WCC B-5	ARSENIC	1.7	C0-45	500	50	100
F-5B	WCC B-4	ARSENIC	1.2	C0-48	500	50	100
F-5B	WCC B-4	ARSENIC	8.5	C0-48	500	50	100
F-5B	Radian S-1	ARSENIC	15	0.25	500	50	100
F-6A	Radian BH-1	ARSENIC	16	C5-10	500	50	100
F-1B	WCC B-1	BERYLLIUM	0.75	C0-53	75	7.5	NA
F-1B	WCC B-1	BERYLLIUM	0.85	C0-53	75	7.5	NA
F-2A	Radian S-3	BERYLLIUM	0.6	0.25	75	7.5	NA
F-2B	WCC B-8	BERYLLIUM	0.65	C0-58	75	7.5	NA
F-2B	WCC B-8	BERYLLIUM	1.2	C0-58	75	7.5	NA
F-3A	Radian S-2	BERYLLIUM	0.57	0.25	75	7.5	NA
F-3A	WCC B-3	BERYLLIUM	1.2	C0-50	75	7.5	NA
F-3A	WCC B-3	BERYLLIUM	0.85	C0-50	75	7.5	NA
F-3F	Radian B-5	BERYLLIUM	0.29	5	75	7.5	NA
F-3F	Radian B-5	BERYLLIUM	0.56	14	75	7.5	NA
F-4C	WCC B-5	BERYLLIUM	1.1	C0-45	75	7.5	NA
F-4C	WCC B-5	BERYLLIUM	1.4	C0-45	75	7.5	NA
F-5B	Radian S-1	BERYLLIUM	0.54	0.25	75	7.5	NA
F-5B	WCC B-4	BERYLLIUM	0.63	C0-48	75	7.5	NA
F-5B	WCC B-4	BERYLLIUM	0.85	C0-48	75	7.5	NA
F-6A	Radian BH-1	BERYLLIUM	0.97	C5-10	75	7.5	NA
F-6E	Radian B-6	BERYLLIUM	0.24	20	75	7.5	NA
F-6E	Radian B-6	BERYLLIUM	0.47	21	75	7.5	NA
F-6E	Radian B-6	BERYLLIUM	0.48	5	75	7.5	NA
F-2A	Radian S-3	LEAD	280	0.25	1000	50	100
F-3A	Radian S-2	LEAD	260	0.25	1000	50	100
F-4C	WCC B-5	LEAD	160	C0-45	1000	50	100
F-3F	Radian B-5	THALLIUM	8.7	30	700	70	NA
F-3F	Radian B-5	THALLIUM	29	5	700	70	NA
F-3F	Radian B-5	THALLIUM	72	14	700	70	NA

Source: ESE (1997a)

Table 3-23
Summary Statistics for the Perimeter Berms

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
TPH								
OIL & GREASE, EPA 413.2	1	1	NA	NA	NA	5000		NA
TPH, EPA 3510/8015	16	12	NA	NA	NA	48000		79,120,083
TRPH, EPA 418.1	60	36	NA	NA	NA	37000		1,647,295
VOCs								
1,1,1-TRICHLOROETHANE	27	0	0	0	1200	0.50	*	NA
1,1,2,2-TETRACHLOROETHANE	27	0	0	3	0.45	0.50	*	NA
1,1,2-TRICHLOROETHANE	27	0	0	0	0.65	0.50	*	NA
1,1-DICHLOROETHANE	27	0	0	0	500	0.50	*	NA
1,1-DICHLOROETHENE	27	0	0	5	0.037	0.50	*	NA
1,2-DICHLOROETHANE	27	0	0	3	0.25	0.50	*	NA
1,2-DICHLOROETHENE (TOTAL)	16	0	0	0	35	0.062	*	NA
1,2-DICHLOROPROPANE	27	0	0	3	0.31	0.50	*	NA
2-BUTANONE	12	5	0	0	7100	0.03		0.017
2-CHLOROETHYLVINYL ETHER	27	0	NA	NA	NA	1.2	*	NA
2-HEXANONE	11	0	NA	NA	NA	1.0	*	NA
4-METHYL-2-PENTANONE	11	0	0	0	770	1.0	*	NA
ACETONE	14	6	0	0	2100	0.10		0.066
BENZENE	26	5	2	0	0.63	1.3		0.57
BROMODICHLOROMETHANE	27	0	0	0	0.63	0.50	*	NA
BROMOFORM	27	0	0	0	56	1.2	*	NA
BROMOMETHANE	27	0	0	0	6.8	0.62	*	NA
CARBON DISULFIDE	11	0	0	1	7.5	11	*	NA
CARBON TETRACHLORIDE	27	0	0	4	0.23	0.50	*	NA
CHLOROBENZENE	42	0	0	0	65	0.50	*	NA
CHLORODIBROMOMETHANE	27	0	0	0	5.3	0.50	*	NA
CHLOROETHANE	27	0	0	0	1100	0.50	*	NA
CHLOROFORM	27	0	0	3	0.25	0.50	*	NA
CHLOROMETHANE	27	0	0	0	1.2	0.50	*	NA
CIS-1,2-DICHLOROETHENE	11	0	0	0	31	0.50	*	NA
CIS-1,2-DICHLOROPROPENE	16	0	NA	NA	NA	0.25	*	NA
CIS-1,3-DICHLOROPROPENE	11	0	NA	NA	NA	0.50	*	NA
ETHYLBENZENE	26	5	0	0	230	4.7		2.0
METHYLENE CHLORIDE	29	3	0	0	7.6	0.06		0.025
STYRENE	12	1	0	0	680	0.0016		NA
TETRACHLOROETHENE	27	0	0	0	5.4	0.50	*	NA
TOLUENE	26	18	0	0	790	3.0		17
TRANS-1,2-DICHLOROETHENE	11	0	0	0	78	0.50	*	NA
TRANS-1,3-DICHLOROPROPENE	27	0	0	3	0.25	0.50	*	NA
TRICHLOROETHENE	27	0	0	0	3.2	0.50	*	NA
TRICHLOROFLUOROMETHANE	28	4	0	0	380	0.057		0.016
VINYL ACETATE	11	0	0	0	780	1.0	*	NA
VINYL CHLORIDE	27	0	0	20	0.016	0.50	*	NA
XYLENES (TOTAL)	26	17	0	0	320	22		121
SVOCs								
1,2,4-TRICHLOROBENZENE	10	0	0	0	570	4.0	*	NA
1,2-DICHLOROBENZENE	41	1	0	0	700	0.15		0.14
1,3-DICHLOROBENZENE	41	0	0	0	500	10	*	NA
1,4-DICHLOROBENZENE	41	0	0	1	3.6	4.0	*	NA
2,4,5-TRICHLOROPHENOL	10	0	0	0	6500	20	*	NA
2,4,6-TRICHLOROPHENOL	10	0	0	0	40	4.0	*	NA
2,4-DICHLOROPHENOL	10	0	0	0	200	10	*	NA
2,4-DIMETHYLPHENOL	10	0	0	0	1300	4.0	*	NA
2,4-DINITROPHENOL	10	0	0	0	130	20	*	NA
2,4-DINITROTOLUENE	10	0	NA	NA	NA	5.0	*	NA
2,6-DINITROTOLUENE	10	0	0	3	0.65	4.0	*	NA
2-CHLORONAPHTHALENE	10	0	0	0	110	4.0	*	NA
2-CHLOROPHENOL	10	0	0	0	91	4.0	*	NA
2-METHYLNAPHTHALENE	10	3	NA	NA	NA	10		101
2-METHYLPHENOL	10	0	0	0	3300	4.0	*	NA
2-NITROANILINE	10	0	0	3	3.9	20	*	NA
2-NITROPHENOL	10	0	NA	NA	NA	4.0	*	NA

Summary Statistics for the Perimeter Berms

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
3,3'-DICHLOROBENZIDINE	10	0	0	7	0.99	10	*	NA
3-NITROANILINE	10	0	NA	NA	NA	20	*	NA
4,6-DINITRO-2-METHYLPHENOL	10	0	NA	NA	NA	20	*	NA
4-BROMOPHENYL PHENYL ETHER	10	0	NA	NA	NA	10	*	NA
4-CHLORO-3-METHYLPHENOL	10	0	NA	NA	NA	4.0	*	NA
4-CHLOROANILINE	10	0	0	0	260	4.0	*	NA
4-CHLOROPHENYL PHENYL ETHER	10	0	NA	NA	NA	4.0	*	NA
4-METHYLPHENOL	10	0	0	0	330	4.0	*	NA
4-NITROANILINE	10	0	NA	NA	NA	20	*	NA
4-NITROPHENOL	10	0	NA	NA	NA	20	*	NA
ACENAPHTHENE	10	0	0	0	110	4.0	*	NA
ACENAPHTHYLENE	10	0	NA	NA	NA	4.0	*	NA
ANILINE	10	0	0	0	19	4.0	*	NA
ANTHRACENE	10	0	0	0	57	4.0	*	NA
BENZIDINE	10	1	1	9	0.0019	17		19
BENZOIC ACID	10	0	0	0	100000	100	*	NA
BENZO[A]PYRENE	10	0	0	9	0.061	4.0	*	NA
BENZO[B]FLUORANTHENE	10	0	0	3	0.61	4.0	*	NA
BENZO[G,H,I]PERYLENE	10	0	NA	NA	NA	4.0	*	NA
BENZO[K]FLUORANTHENE	10	0	0	0	6.1	4.0	*	NA
BENZYL ALCOHOL	10	0	0	0	20000	4.0	*	NA
BENZYL BUTYL PHTHALATE	10	0	0	0	930	4.0	*	NA
BENZ[A]ANTHRACENE	10	0	0	3	0.61	20	*	NA
BIS(2-CHLOROETHOXY)METHANE	10	0	NA	NA	NA	4.0	*	NA
BIS(2-CHLOROETHYL) ETHER	10	0	0	10	0.043	4.0	*	NA
BIS(2-CHLOROISOPROPYL) ETHER	10	0	0	1	2.5	4.0	*	NA
BIS(2-ETHYLHEXYL) PHTHALATE	10	0	0	0	32	20	*	NA
CHRYSENE	10	0	0	0	6.1	4.0	*	NA
DI-N-BUTYL PHTHALATE	11	1	NA	NA	NA	0.21		NA
DI-N-OCTYL PHTHALATE	10	0	0	0	1300	4.0	*	NA
DIBENZOFURAN	10	0	0	0	140	4.0	*	NA
DIBENZ[A,H]ANTHRACENE	10	0	0	9	0.061	4.0	*	NA
DIETHYL PHTHALATE	10	0	0	0	52000	20	*	NA
DIMETHYL PHTHALATE	10	0	0	0	100000	4.0	*	NA
FLUORANTHENE	10	0	0	0	2600	4.0	*	NA
FLUORENE	11	1	0	0	90	0.10		0.29
HEXACHLOROBENZENE	10	0	0	5	0.28	4.0	*	NA
HEXACHLOROBUTADIENE	10	0	0	0	5.7	4.0	*	NA
HEXACHLOROCYCLOPENTADIENE	10	0	0	0	450	4.0	*	NA
HEXACHLOROETHANE	10	0	0	0	32	4.0	*	NA
INDENO[1,2,3-CD]PYRENE	10	0	0	5	0.61	4.0	*	NA
ISOPHORONE	10	0	0	0	470	4.0	*	NA
N-NITROSO-DI-N-PROPYLAMINE	10	0	0	9	0.063	4.0	*	NA
N-NITROSODIPHENYLAMINE	10	0	0	0	91	4.0	*	NA
NAPHTHALENE	11	4	0	0	240	4.1		11
NITROBENZENE	10	0	0	0	18	4.0	*	NA
PENTACHLOROPHENOL	10	0	0	3	2.5	20	*	NA
PHENANTHRENE	11	3	NA	NA	NA	2.3		4.4
PHENOL	10	0	0	0	39000	4.0	*	NA
PYRENE	10	1	0	0	100	1.0		0.94
PESTICIDES								
4,4'-DDD	22	1	0	3	1.9	0.011		NA
4,4'-DDE	22	3	0	3	1.3	0.017		0.020
4,4'-DDT	22	0	0	3	1.3	5.0	*	NA
ALDRIN	22	0	0	14	0.026	2.5	*	NA
ALPHA-BHC	22	0	0	7	0.071	2.5	*	NA
ALPHA-CHLORDANE	15	0	NA	NA	NA	1.1	*	NA
BETA-BHC	22	0	0	4	0.25	2.5	*	NA
CHLORDANE	7	0	0	5	0.34	5.0	*	NA
DELTA-BHC	22	1	NA	NA	NA	0.038		0.017
DIELDRIN	22	0	0	18	0.028	2.5	*	NA
ENDOSULFAN I	22	0	0	0	390	5.0	*	NA
ENDOSULFAN II	22	2	NA	NA	NA	0.011		0.033
ENDOSULFAN SULFATE	22	0	NA	NA	NA	25	*	NA
ENDRIN	22	0	0	0	20	5.0	*	NA
ENDRIN ALDEHYDE	7	0	NA	NA	NA	7.5	*	NA

Summary Statistics for the Perimeter Berms

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
ENDRIN KETONE	15	0	NA	NA	NA	0.21	*	NA
GAMMA-BHC (LINDANE)	22	1	0	4	0.34	0.065		0.024
GAMMA-CHLORDANE	15	0	NA	NA	NA	1.1	*	NA
HEPTACHLOR	22	0	0	7	0.099	2.5	*	NA
HEPTACHLOR EPOXIDE	22	0	0	9	0.049	2.5	*	NA
METHOXYCHLOR	22	0	0	0	330	75	*	NA
TOXAPHENE	22	0	0	15	0.4	88	*	NA
PCBs								
PCB-1016	22	0	0	21	0.066	25	*	NA
PCB-1221	22	0	0	21	0.066	25	*	NA
PCB-1232	22	0	0	21	0.066	25	*	NA
PCB-1242	22	0	0	21	0.066	25	*	NA
PCB-1248	22	0	0	21	0.066	25	*	NA
PCB-1254	22	0	0	21	0.066	25	*	NA
PCB-1260	22	1	1	20	0.066	0.091		0.27
METALS								
ANTIMONY	26	14	0	0	31	8.1		4.8
ARSENIC	31	13	13	15	0.38	20		8.1
BARIUM	31	29	0	0	5300	970		359
BERYLLIUM	26	16	15	0	0.14	0.91		0.44
CADMIUM	32	9	0	0	9	4.4		1.0
CHROMIUM, TOTAL	32	30	0	0	210	120		33
CHROMIUM, VI	10	0	0	4	0.2	0.25	*	NA
COBALT	26	24	0	0	4600	13		8.7
COPPER	27	25	0	0	2800	41		26
LEAD	34	21	5	0	130	1800		852
MERCURY	16	4	0	0	23	1.9		0.36
MOLYBDENUM	26	3	0	0	380	1.9		0.53
NICKEL	27	25	0	0	150	50		22
SELENIUM	31	0	0	0	380	7.4	*	NA
SILVER	31	0	0	0	380	0.69	*	NA
THALLIUM	26	3	3	0	5.4	100		7.7
VANADIUM	27	24	0	0	540	51		32
ZINC	27	25	0	0	23000	660		723
OTHER								
CYANIDE	6	0	0	0	1300	0.10	*	NA
pH (standard units)	3	NA	NA	NA	NA	11		NA

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997).

TABLE 3-24
SAMPLES FROM THE PERIMETER BERMS WITH CONCENTRATIONS EXCEEDING THE PRGs

Area	Sample Location	Analyte	Result, mg/kg	Depth, ft.	TTLC, mg/kg	10 X STLC, mg/kg	20 X TCLP, mg/kg
B-1B	II 51	BENZENE	1.3	14	NA	NA	10
B-1E	II 40	BENZENE	1.0	15	NA	NA	10
B-1B	II 51	BENZIDINE	17	14	NA	NA	NA
B-1G	Radian B-4 (MW-4)	PCB-1260	0.091	5	50	50	NA
B-1E	Radian B-14 (MW-14)	ARSENIC	5.4	25	500	50	100
B-1E	Radian B-14 (MW-14)	ARSENIC	7.3	2	500	50	100
B-1E	Radian B-14 (MW-14)	ARSENIC	8.2	15	500	50	100
B-1E	Radian B-14 (MW-14)	ARSENIC	11	16	500	50	100
B-1G	Radian B-4 (MW-4)	ARSENIC	4.7	15	500	50	100
B-1G	Radian B-4 (MW-4)	ARSENIC	6.1	20	500	50	100
B-1G	Radian B-4 (MW-4)	ARSENIC	7.3	5	500	50	100
B-5G	Radian B-13 (MW-13)	ARSENIC	4.4	5	500	50	100
B-7A	Radian BH-2	ARSENIC	11	C5-10	500	50	100
B-7A	II 26	ARSENIC	16	0	500	50	100
B-7D	Radian B-9 (MW-9)	ARSENIC	5.2	20	500	50	100
B-7D	Radian B-9 (MW-9)	ARSENIC	13	5	500	50	100
B-7D	Radian B-9 (MW-9)	ARSENIC	20	10	500	50	100
B-1E	Radian B-14 (MW-14)	BERYLLIUM	0.35	15	75	7.5	NA
B-1E	Radian B-14 (MW-14)	BERYLLIUM	0.37	16	75	7.5	NA
B-1E	Radian B-14 (MW-14)	BERYLLIUM	0.73	2	75	7.5	NA
B-1E	Radian B-14 (MW-14)	BERYLLIUM	0.74	25	75	7.5	NA
B-1G	Radian B-4 (MW-4)	BERYLLIUM	0.41	5	75	7.5	NA
B-1G	Radian B-4 (MW-4)	BERYLLIUM	0.51	20	75	7.5	NA
B-1G	Radian B-4 (MW-4)	BERYLLIUM	0.52	15	75	7.5	NA
B-5G	Radian B-13 (MW-13)	BERYLLIUM	0.16	15	75	7.5	NA
B-5G	Radian B-13 (MW-13)	BERYLLIUM	0.9	5	75	7.5	NA
B-7A	Radian BH-2	BERYLLIUM	0.56	C5-10	75	7.5	NA
B-7D	Radian B-9 (MW-9)	BERYLLIUM	0.2	15	75	7.5	NA
B-7D	Radian B-9 (MW-9)	BERYLLIUM	0.24	15	75	7.5	NA
B-7D	Radian B-9 (MW-9)	BERYLLIUM	0.42	20	75	7.5	NA
B-7D	Radian B-9 (MW-9)	BERYLLIUM	0.87	10	75	7.5	NA
B-7D	Radian B-9 (MW-9)	BERYLLIUM	0.91	5	75	7.5	NA
B-1C	II 3	LEAD	450	0.5	1000	50	100
B-1G	II 41	LEAD	220	5	1000	50	100
B-1G	Radian B-4 (MW-4)	LEAD	430	5	1000	50	100
B-1G	DOHS-767	LEAD	1800	0	1000	50	100
B-7A	II 26	LEAD	440	0	1000	50	100
S-2G	E&E, AW-3	LEAD	2560	15	1000	50	100
S-2G	E&E, AW-3	MERCURY	37	15	20	2.0	4.0
B-5G	Radian B-13 (MW-13)	THALLIUM	8.6	15	700	70	NA
B-5G	Radian B-13 (MW-13)	THALLIUM	27	15	700	70	NA
B-5G	Radian B-13 (MW-13)	THALLIUM	100	5	700	70	NA

Source: ESE (1997a).

Table 3-25
Summary Statistics for Background Samples

Analyte (units mg/kg unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
TPH							
TPH, EPA 3510/80	7	0	NA	NA	NA	5.0 *	NA
TRPH, EPA 418.1	1	1	NA	NA	NA	990	NA
METALS							
ANTIMONY	8	1	0	0	31	4.8	3.3
ARSENIC	8	8	8	0	0.38	12	6.8
BARIUM	8	8	0	0	5300	140	107
BERYLLIUM	8	1	1	0	0.14	0.63	0.26
CADMIUM	8	1	0	0	9	0.35	0.16
CHROMIUM, TOTAL	8	8	0	0	210	42	29
CHROMIUM, VI	7	0	0	7	0.2	0.25 *	NA
COBALT	8	8	0	0	4600	11	10
COPPER	8	8	0	0	2800	40	34
LEAD	8	7	0	0	130	9.4	8.0
MERCURY	7	4	0	0	23	0.082	0.046
MOLYBDENUM	8	0	0	0	360	0.69 *	NA
NICKEL	8	8	0	0	150	24	19
SELENIUM	8	0	0	0	380	6.5 *	NA
SILVER	8	0	0	0	380	0.61 *	NA
THALLIUM	8	0	0	0	5.4	5.0 *	NA
VANADIUM	8	8	0	0	540	49	46
ZINC	8	8	0	0	23000	79	74

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997a)

Table 3-26
Summary Statistics for Water Samples from Seeps

Analyte (units µg/L unless otherwise note	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
TPH							
OIL & GREASE	3	3	NA	NA	NA	11800	15125
VOCs							
1,1,1,2-TETRACHLOROETHANE	5	0	NA	NA	NA	5.0 *	NA
1,1,1-TRICHLOROETHANE	5	0	0	0	790	5.0 *	NA
1,1,2,2-TETRACHLOROETHANE	5	0	0	5	0.055	5.0 *	NA
1,1,2-TRICHLOROETHANE	5	0	0	5	0.2	5.0 *	NA
1,1-DICHLOROETHANE	5	0	0	0	810	5.0 *	NA
1,1-DICHLOROETHENE	5	0	0	5	0.046	5.0 *	NA
1,1-DICHLOROPROPENE	5	0	NA	NA	NA	5.0 *	NA
1,2,3-TRICHLOROBENZENE	5	0	NA	NA	NA	5.0 *	NA
1,2,3-TRICHLOROPROPANE	5	0	NA	NA	NA	5.0 *	NA
1,2,4-TRIMETHYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
1,2-DIBROMOETHANE	5	0	NA	NA	NA	5.0 *	NA
1,2-DICHLOROETHANE	5	0	0	5	0.12	5.0 *	NA
1,2-DICHLOROPROPANE	10	0	0	10	0.16	5.0 *	NA
1,3,5-TRIMETHYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
2,2-DICHLOROPROPANE	5	0	NA	NA	NA	5.0 *	NA
2-BUTANONE	5	0	0	0	1900	80 *	NA
2-CHLOROTOLUENE	5	0	NA	NA	NA	5.0 *	NA
2-HEXANONE	5	0	NA	NA	NA	80 *	NA
4-CHLOROTOLUENE	5	0	NA	NA	NA	5.0 *	NA
4-METHYL-2-PENTANONE	5	0	0	0	160	80 *	NA
ACETONE	5	0	0	0	610	80 *	NA
BENZENE	5	0	0	5	0.39	5.0 *	NA
BROMOBENZENE	5	0	NA	NA	NA	5.0 *	NA
BROMOCHLOROMETHANE	5	0	NA	NA	NA	5.0 *	NA
BROMODICHLOROMETHANE	5	0	0	5	0.18	5.0 *	NA
BROMOFORM	5	0	0	0	6.5	5.0 *	NA
CARBON TETRACHLORIDE	5	0	0	5	0.17	5.0 *	NA
CHLOROBENZENE	5	0	0	0	39	5.0 *	NA
CHLOROFORM	5	0	0	5	0.16	5.0 *	NA
CIS-1,2-DICHLOROETHENE	5	0	0	0	61	5.0 *	NA
DIBROMOCHLOROMETHANE	5	0	NA	NA	NA	5.0 *	NA
DIBROMOMETHANE	5	0	NA	NA	NA	5.0 *	NA
ETHYLBENZENE	6	1	0	0	1300	0.10	NA
ISOPROPYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
METHYLENE CHLORIDE	5	0	0	5	4.3	5.0 *	NA
N-BUTYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
N-PROPYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
P-ISOPROPYLTOLUENE	5	0	NA	NA	NA	5.0 *	NA
SEC-BUTYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
STYRENE	6	1	0	0	1600	0.10	NA
TERT-BUTYLBENZENE	5	0	NA	NA	NA	5.0 *	NA
TETRACHLOROETHENE	5	0	0	5	1.1	5.0 *	NA
TOLUENE	5	0	0	0	720	5.0 *	NA
TRANS-1,2-DICHLOROETHENE	5	0	0	0	120	5.0 *	NA
TRICHLOROETHENE	5	0	0	5	1.6	5.0 *	NA
XYLENES (TOTAL)	6	1	0	0	1400	0.10	NA
SVOCs							
1,2,4-TRICHLOROBENZENE	5	0	0	0	190	5.0 *	NA
1,2-DICHLOROBENZENE	5	0	0	0	370	5.0 *	NA
1,3-DICHLOROBENZENE	5	0	0	0	180	5.0 *	NA
1,4-DICHLOROBENZENE	5	0	0	5	0.47	5.0 *	NA
2,4-DIMETHYLPHENOL	1	1	0	0	730	0.000050	NA
4-HYDROXY-4-METHYL-2-PENTANONE	1	1	NA	NA	NA	47	NA
BIS(2-ETHYLHEXYL) PHTHALATE	1	1	0	0	4.8	0.000050	NA
DI-N-OCTYL PHTHALATE	1	1	0	0	730	0.000050	NA
HEXACHLOROBUTADIENE	5	0	0	5	0.86	5.0 *	NA
NAPHTHALENE	5	0	0	0	240	5.0 *	NA
PHENOL	2	2	0	0	22000	79	289
METALS							
ANTIMONY	1	1	1	0	15	35	NA
ARSENIC	3	3	3	0	0.045	270	352
BARIUM	3	3	0	0	2600	126	178

Summary Statistics for Water Samples from Seeps

Analyte (units µg/L unless otherwise note	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
CADMIUM	1	1	0	0	18	9.5	NA
CHROMIUM (TOTAL)	1	1	NA	NA	NA	88	NA
COBALT	1	1	0	0	2200	108	NA
COPPER	1	1	0	0	1400	47	NA
LEAD	1	1	1	0	4	7.0	NA
MERCURY	3	2	0	0	11	2.0	2.5
NICKEL	3	3	0	0	730	253	2.6E+11
SILVER	1	1	0	0	180	112	NA
THALLIUM	1	1	1	0	2.6	22	NA
THORIUM	2	0	NA	NA	NA	100 *	NA
TIN	2	2	NA	NA	NA	310	549
VANADIUM	1	1	0	0	260	22	NA
ZINC	3	3	0	0	11000	370	8.7E+10
OTHER							
FLUORIDE	1	1	NA	NA	NA	3600	NA
pH (standard units)	3	NA	NA	NA	NA	7.7	7.8

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997).

TABLE 3-27				
WATER SAMPLES FROM THE SEEPS WITH CONCENTRATIONS EXCEEDING THE PRGs				
Area	Sample Location	Analyte	Result, µg/L	Depth, ft.
S-5B	WCC S-6	ANTIMONY	35	0
S-1A	WCC S-1	ARSENIC	4	0
S-1D	WCC S-4	ARSENIC	4	0
S-5B	WCC S-6	ARSENIC	270	0
S-1D	WCC S-4	LEAD	7	0
S-1D	WCC S-4	THALLIUM	22	0
Source: ESE (1997a)				

Table 3-28
Summary Statistics for Soil Gas (ppbV)

Analyte (units ppbV unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	Maximum Concentration	Upper 95% Confidence Limit
VOCs				
1-OCTENE	1	1	5,820	NA
2,2,4-TRIMETHYLPENTANE	2	2	403,000	1.4E+06
2,2,5-TRIMETHYLHEXANE	1	1	823	NA
2,3,4-TRIMETHYLPENTANE	4	4	272,000	8.5E+11
2-BUTANONE	1	1	47	NA
3-METHYLHEPTANE	6	6	203,000	1.6E+09
3-METHYLHEXANE	1	1	1,900	NA
B-PINENE	2	2	246	514
C-2 VOC	3	3	12,000	14,895
C-3 VOC	3	3	157,000	240,505
C10+ ALKENE	2	2	27	66
C7 ALKANE	8	8	219,000	6.9E+08
C8 ALKANE	7	7	164,000	7.0E+09
C8 ALKENE	3	3	816	1,059
C9 ALKANE	3	3	201,000	9.5E+31
C9 ALKENE	5	5	12,300	600,772
ISOBUTANE	2	2	72,400	97,375
ISOHEPTANE + 2,3-DMP	4	4	144,000	4.6E+12
METHANE	11	11	5,880,000	8.6E+06
METHYLCYCLOHEXANE	8	8	314,000	2.8E+06
METHYLCYCLOPENTANE	2	2	250,000	913,228
N-BUTANE	2	2	116,000	155,853
N-DECANE	3	3	2,910	4,273
N-NONANE	2	2	6,130	8,256
N-OCTANE	2	2	9,400	33,349
N-PENTANE	1	1	37	NA
N-UNDECANE	1	1	22	NA
T-BUTYLBENZENE	1	1	2,560	NA
TNMHC (AS C6)	9	9	4,860,000	1.1E+09
TOLUENE	2	2	2,380	8,605
TPH	11	0	1,000 *	1,000
TRICHLOROFLUOROMETHANE	2	2	1,490	5,342
UNIDENTIFIED VOC	4	4	874	894
XYLENES (TOTAL)	1	1	5,530	NA

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.
Source: ESE (1997).

Table 3-29
Summary Statistics for Soil Gas (µg/L)

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
VOCs								
1,1,1,2-TETRACHLOROETHANE	11	0	0	11	0.00026	1.0	*	NA
1,1,1-TRICHLOROETHANE	11	0	0	0	1	1.0	*	NA
1,1,2,2-TETRACHLOROETHANE	11	0	0	11	3.3E-05	1.0	*	NA
1,1,2-TRICHLOROETHANE	11	0	0	11	0.00012	1.0	*	NA
1,1,2-TRICHLOROTRIFLUOROETHANE (F	11	0	NA	NA	NA	1.0	*	NA
1,1-DICHLOROETHANE	11	0	0	11	0.52	1.0	*	NA
1,1-DICHLOROETHENE	11	0	0	11	3.6E-05	1.0	*	NA
1,2-DICHLOROETHANE	11	0	0	11	7.4E-05	1.0	*	NA
BENZENE	11	0	0	11	0.00023	1.0	*	NA
CARBON TETRACHLORIDE	11	0	0	11	0.00013	1.0	*	NA
CHLOROETHANE	11	0	0	0	10	1.0	*	NA
CHLOROFORM	11	0	0	11	8.4E-06	1.0	*	NA
CIS-1,2-DICHLOROETHENE	11	0	0	11	0.037	1.0	*	NA
DICHLORODIFLUOROMETHANE	11	0	0	11	0.21	1.0	*	NA
DICHLOROMETHANE	11	0	NA	NA	NA	1.0	*	NA
ETHYLBENZENE	11	0	0	0	1.1	1.0	*	NA
TETRACHLOROETHENE	11	0	0	11	0.0033	1.0	*	NA
TOLUENE	11	0	0	11	0.4	1.0	*	NA
TRANS-1,2-DICHLOROETHENE	11	0	0	11	0.073	1.0	*	NA
TRICHLOROETHENE	11	0	0	11	0.0011	1.0	*	NA
TRICHLOROFLUOROMETHANE	11	0	0	11	0.73	1.0	*	NA
VINYL CHLORIDE	11	0	0	11	2.2E-06	1.0	*	NA
XYLENES (TOTAL)	11	0	0	11	0.73	1.0	*	NA

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997).

Table 3-30
Summary Statistics for Groundwater

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
TPH							
OIL & GREASE	3	3	NA	NA	NA	9600	12058
ORGANIC CARBON (TOTAL)	1	1	NA	NA	NA	73	NA
TPH, EPA 3510/8015	11	2	NA	NA	NA	2100	727
TRPH, EPA 418.1	24	1	NA	NA	NA	2200	NA
VOCs							
(1-METHYLETHENYL)BENZENE	2	2	NA	NA	NA	1100	3677
(1-METHYLETHYL)BENZENE	1	1	NA	NA	NA	30000	NA
(1-METHYLPROPYL)BENZENE	3	3	NA	NA	NA	5700	3.4E+31
1,1'-(1-METHYL-1,2-ETHENEDIYL)BISBENZENE	1	1	NA	NA	NA	2.8	NA
1,1'-ETHYLIDENEBISBENZENE	1	1	NA	NA	NA	6.8	NA
1,1'-METHYLENEBISBENZENE	2	2	NA	NA	NA	9.2	15
1,1,1,2-TETRACHLOROETHANE	19	0	NA	NA	NA	5.0 *	NA
1,1,1-TRICHLOROETHANE	36	1	0	0	790	230	3.1
1,1,2,2-TETRACHLOROETHANE	36	0	0	36	0.055	2.0 *	NA
1,1,2-TRICHLOROETHANE	36	0	0	22	0.2	2.0 *	NA
1,1-DICHLOROETHANE	51	1	0	0	810	0.11	0.056
1,1-DICHLOROETHENE	21	1	1	20	0.046	56	5.8
1,1-DICHLOROPROPENE	19	0	NA	NA	NA	2.0 *	NA
1,2,3-TRICHLOROBENZENE	19	0	NA	NA	NA	5.0 *	NA
1,2,3-TRICHLOROPROPANE	19	0	NA	NA	NA	10 *	NA
1,2,4-TRIMETHYLBENZENE	19	1	NA	NA	NA	2.4	1.2
1,2-DIBROMO-3-CHLOROPROPANE	19	0	NA	NA	NA	5.0 *	NA
1,2-DIBROMOETHANE	19	0	NA	NA	NA	2.0 *	NA
1,2-DICHLOROETHANE	36	0	0	22	0.12	2.0 *	NA
1,2-DICHLOROETHENE (TOTAL)	15	0	0	0	55	1.0 *	NA
1,2-DICHLOROPROPANE	36	0	0	22	0.16	2.0 *	NA
1,3,5-TRIMETHYLBENZENE	19	0	NA	NA	NA	2.0 *	NA
1,3-DICHLOROPROPANE	19	0	NA	NA	NA	2.0 *	NA
1,3-DIMETHYLBENZENE	1	1	NA	NA	NA	21	NA
1,4-DIETHYLBENZENE	3	3	NA	NA	NA	170000	2.4E+73
1-ETHENYL-3,5-DIMETHYLBENZENE	1	1	NA	NA	NA	4600	NA
1-ETHENYL-4-ETHYLBENZENE	2	2	NA	NA	NA	89	283
1-ETHYL-3,5-DIMETHYLBENZENE	3	3	NA	NA	NA	14	16
1-METHYLINDANE	1	1	NA	NA	NA	4.0	NA
1-PENTANOL	1	1	NA	NA	NA	6.9	NA
2,2-DICHLOROPROPANE	19	0	NA	NA	NA	2.0 *	NA
2-BUTANONE	21	0	0	0	1900	10 *	NA
2-CHLOROETHYLVINYL ETHER	36	0	NA	NA	NA	20 *	NA
2-CHLOROTOLUENE	19	0	NA	NA	NA	5.0 *	NA
2-HEXANONE	21	0	NA	NA	NA	10 *	NA
3-HEXEN-2-ONE	1	1	NA	NA	NA	27	NA
3-METHYL-2-BUTANONE	1	1	NA	NA	NA	22	NA
3-PENTANONE	1	1	NA	NA	NA	20	NA
4-CHLOROTOLUENE	19	0	NA	NA	NA	5.0 *	NA
4-METHYL-2-PENTANONE	21	0	0	0	180	10 *	NA
4-METHYL-3-PENTEN-2-ONE	1	1	NA	NA	NA	18	NA
4-METHYL-4-HYDROXY-2-PENTANONE	1	1	NA	NA	NA	170	NA
ACETONE	25	5	0	0	610	77	18
BENZENE	40	12	11	20	0.39	520	27
BROMOBENZENE	19	0	NA	NA	NA	5.0 *	NA
BROMOCHLOROMETHANE	19	0	NA	NA	NA	5.0 *	NA
BROMODICHLOROMETHANE	36	3	3	22	0.18	0.22	0.12
BROMOFORM	36	0	0	1	8.5	20 *	NA
BROMOMETHANE	36	0	0	1	8.7	10 *	NA
CARBON DISULFIDE	22	4	3	0	21	100	14
CARBON TETRACHLORIDE	36	0	0	36	0.17	5.0 *	NA
CHLOROBENZENE	49	0	0	0	39	5.0 *	NA
CHLORODIBROMOMETHANE	2	0	0	0	1	1.0 *	NA
CHLOROETHANE	36	0	0	0	710	5.0 *	NA
CHLOROFORM	36	6	6	22	0.16	9.4	3.1
CHLOROMETHANE	34	0	0	20	1.5	5.0 *	NA
CIS-1,2-DICHLOROETHENE	21	0	0	0	81	2.0 *	NA
CIS-1,3-DICHLOROPROPENE	37	1	NA	NA	NA	0.30	NA
DIBROMOCHLOROMETHANE	34	0	NA	NA	NA	2.0 *	NA
DIBROMOMETHANE	19	0	NA	NA	NA	2.0 *	NA
DICHLORODIFLUOROMETHANE	19	0	NA	NA	NA	5.0 *	NA
DIETHYLBENZENES	3	3	NA	NA	NA	17000	2.6E+54
ETHANOL	1	1	NA	NA	NA	5.6	NA
ETHYLBENZENE	40	12	4	0	1300	160000	39742
ETHYLMETHYLBENZENE	1	1	NA	NA	NA	23	NA
ETHYLMETHYLBENZENES	1	1	NA	NA	NA	4.5	NA

Summary Statistics for Groundwater

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
INDAN	2	2	NA	NA	NA	20	71
INDENE	2	2	NA	NA	NA	58	199
ISOPROPYLBENZENE	19	1	NA	NA	NA	110	17
METHYLENE CHLORIDE	36	5	2	21	4.3	54	12
N-BUTYLBENZENE	19	0	NA	NA	NA	5.0 *	NA
N-PROPYLBENZENE	19	0	NA	NA	NA	2.0 *	NA
OCTAHYDROINDENE	1	1	NA	NA	NA	3.8	NA
P-ISOPROPYLTOLUENE	19	0	NA	NA	NA	2.0 *	NA
PROPYLBENZENE	5	5	NA	NA	NA	6.7	5.7
SEC-BUTYLBENZENE	19	1	NA	NA	NA	10	3.6
STYRENE	29	8	1	0	1800	310000	14919
TERT-BUTYLBENZENE	19	0	NA	NA	NA	5.0 *	NA
TETRACHLOROETHENE	36	4	1	18	1.1	6.1	2.0
TETRAHYDROFURAN	1	1	NA	NA	NA	210	NA
TOLUENE	43	15	2	0	720	1200	48
TRANS-1,2-DICHLOROETHENE	21	0	0	0	120	2.0 *	NA
TRANS-1,3-DICHLOROPROPENE	36	0	0	36	0.081	4.0 *	NA
TRICHLOROETHENE	36	1	1	19	1.6	3.8	0.89
TRICHLOROFLUOROMETHANE	36	0	0	0	1300	5.0 *	NA
TRIMETHYLBENZENE ISOMERS	3	3	NA	NA	NA	6000	3.8E+38
VINYL ACETATE	2	0	0	0	410	2.0 *	NA
VINYL CHLORIDE	36	0	0	36	0.02	5.0 *	NA
XYLENES (TOTAL)	38	6	1	0	1400	14200	93
SVOCs							
1,1'-(1,2-ETHENEDIYL)BISBENZENE	1	1	NA	NA	NA	660000	NA
1,1'-BIPHENYL	5	5	3	0	300	410000	7.3E+21
1,2,4-TRICHLOROBENZENE	32	0	0	0	180	10 *	NA
1,2-DICHLOROBENZENE	61	1	0	0	370	0.10	NA
1,3-DICHLOROBENZENE	60	0	0	0	180	20 *	NA
1,4-DICHLOROBENZENE	60	0	0	34	0.47	10 *	NA
1-ETHYL-2-METHYLBENZENE	2	2	NA	NA	NA	130	449
1-METHYL-3-PROPYLBENZENE	1	1	NA	NA	NA	110	NA
1-METHYLETHENYLBENZENE	3	3	NA	NA	NA	300000	2.0E+68
1-METHYLETHYLBENZENE	1	1	NA	NA	NA	210	NA
1-METHYLNAPHTHALENE	1	1	NA	NA	NA	11000	NA
1-METHYLPROPYLBENZENE	1	1	NA	NA	NA	180	NA
1-PHENYLETHANONE	1	1	NA	NA	NA	87	NA
1-PROPENYLBENZENE	6	6	NA	NA	NA	160000	3.7E+11
2,3-DIHYDRO-1-METHYLINDANE	1	1	NA	NA	NA	15000	NA
2,3-DIHYDROINDENE	1	1	NA	NA	NA	4200	NA
2,4,5-TRICHLOROPHENOL	13	0	0	0	3700	20 *	NA
2,4,6-TRICHLOROPHENOL	13	0	0	11	6.1	20 *	NA
2,4-DICHLOROPHENOL	13	0	0	0	110	10 *	NA
2,4-DIMETHYLPHENOL	16	3	0	0	730	49	15
2,4-DINITROPHENOL	13	0	0	11	73	100 *	NA
2,4-DINITROTOLUENE	13	0	NA	NA	NA	10 *	NA
2,6-DINITROTOLUENE	13	0	0	13	0.099	10 *	NA
2-CHLORONAPHTHALENE	13	0	0	0	490	10 *	NA
2-CHLOROPHENOL	13	0	0	0	36	10 *	NA
2-ETHYL-1,1'-BIPHENYL	1	1	NA	NA	NA	230000	NA
2-METHYL-1,1'-BIPHENYL	1	1	NA	NA	NA	140000	NA
2-METHYLNAPHTHALENE	16	3	NA	NA	NA	4200	427
2-METHYLPHENOL	13	0	0	0	1800	10 *	NA
2-NITROANILINE	13	0	0	13	2.2	20 *	NA
2-NITROPHENOL	13	0	NA	NA	NA	10 *	NA
2-PHENYLNAPHTHALENE	1	1	NA	NA	NA	200000	NA
3,3'-DICHLOROBENZIDINE	13	0	0	13	0.15	40 *	NA
3-NITROANILINE	13	0	NA	NA	NA	20 *	NA
4,6-DINITRO-2-METHYLPHENOL	13	0	NA	NA	NA	40 *	NA
4-BROMOPHENYL PHENYL ETHER	13	0	NA	NA	NA	10 *	NA
4-CHLORO-3-METHYLPHENOL	13	0	NA	NA	NA	20 *	NA
4-CHLOROANILINE	13	0	0	0	150	10 *	NA
4-CHLOROPHENYL PHENYL ETHER	13	0	NA	NA	NA	10 *	NA
4-HYDROXY-4-METHYL-2-PENTANONE	5	5	NA	NA	NA	12000	2.0E+11
4-METHYLPHENOL	13	0	0	0	180	10 *	NA
4-NITROANILINE	13	0	NA	NA	NA	100 *	NA
4-NITROPHENOL	13	0	NA	NA	NA	100 *	NA
ACENAPHTHENE	14	1	1	0	370	5000	802
ACENAPHTHYLENE	13	0	NA	NA	NA	10 *	NA
ALPHA,ALPHA-DIMETHYLBENZENEMETHANOL	2	2	NA	NA	NA	360	1136
ANILINE	13	0	0	0	11	10 *	NA
ANTHRACENE	18	5	1	0	1800	130000	10256
AZOBENZENE	11	0	0	11	0.61	20 *	NA

Summary Statistics for Groundwater

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration		Upper 95% Confidence Limit
BENZIDINE	13	0	0	13	0.00029	100	*	NA
BENZOIC ACID	13	0	0	0	150000	100	*	NA
BENZO(A)PYRENE	13	0	0	13	0.0015	10	*	NA
BENZO(B)FLUORANTHENE	13	0	0	13	0.092	10	*	NA
BENZO(G,H,I)PERYLENE	13	0	NA	NA	NA	10	*	NA
BENZO(K)FLUORANTHENE	13	0	0	13	0.92	10	*	NA
BENZYL ALCOHOL	13	0	0	0	11000	20	*	NA
BENZYL BUTYL PHTHALATE	13	0	0	0	7300	20	*	NA
BENZ[A]ANTHRACENE	13	0	0	13	0.092	10	*	NA
BIS(2-CHLOROETHOXY)METHANE	13	0	NA	NA	NA	10	*	NA
BIS(2-CHLOROETHYL) ETHER	13	0	0	13	0.0096	10	*	NA
BIS(2-CHLOROISOPROPYL) ETHER	13	0	0	13	0.27	10	*	NA
BIS(2-ETHYLHEXYL) PHTHALATE	15	3	1	12	4.8	98		2.7E+09
CHRYSENE	13	0	0	11	9.2	10	*	NA
DI-N-BUTYL PHTHALATE	13	0	NA	NA	NA	20	*	NA
DI-N-OCTYL PHTHALATE	15	2	0	0	730	0.000050		0.000050
DIBENZOFURAN	13	0	0	0	24	10	*	NA
DIBENZ[A,H]ANTHRACENE	13	0	0	13	0.0092	20	*	NA
DIETHYL PHTHALATE	13	0	0	0	29000	10	*	NA
DIMETHYL PHTHALATE	13	0	0	0	370000	10	*	NA
FLUORANTHENE	13	0	0	0	1500	10	*	NA
FLUORENE	13	0	0	0	240	10	*	NA
HEXACHLOROBENZENE	13	0	0	13	0.042	10	*	NA
HEXACHLOROBUTADIENE	32	0	0	32	0.86	10	*	NA
HEXACHLOROCYCLOPENTADIENE	13	0	0	0	260	40	*	NA
HEXACHLOROETHANE	13	0	0	11	4.8	10	*	NA
INDENO[1,2,3-CD]PYRENE	13	0	0	13	0.092	20	*	NA
ISOPHORONE	13	0	0	0	71	10	*	NA
N-NITROSO-DI-N-PROPYLAMINE	13	0	0	13	0.0096	10	*	NA
N-NITROSODIPHENYLAMINE	13	0	0	0	14	10	*	NA
NAPHTHALENE	42	10	4	0	240	84000		927
NITROBENZENE	13	0	0	11	3.4	40	*	NA
PENTACHLOROPHENOL	13	1	1	12	0.56	4.2		10
PHENANTHRENE	18	5	NA	NA	NA	180000		47659
PHENOL	20	7	0	0	22000	600		47858833
PYRENE	13	0	0	0	180	10	*	NA
PESTICIDES								
4,4'-DDD	27	0	0	13	0.28	5.0	*	NA
4,4'-DDE	27	0	0	14	0.2	5.0	*	NA
4,4'-DDT	27	0	0	14	0.2	5.0	*	NA
ALDRIN	27	0	0	27	0.004	2.5	*	NA
ALPHA-BHC	27	0	0	27	0.011	2.5	*	NA
ALPHA-CHLORDANE	16	0	NA	NA	NA	25	*	NA
BETA-BHC	27	1	0	26	0.037	0.000050		NA
CHLORDANE	11	0	0	11	0.052	0.15	*	NA
DELTA-BHC	27	3	NA	NA	NA	0.10		0.11
DIELDRIN	27	0	0	27	0.0042	5.0	*	NA
ENDOSULFAN I	27	0	0	0	220	2.5	*	NA
ENDOSULFAN II	27	0	NA	NA	NA	5.0	*	NA
ENDOSULFAN SULFATE	27	0	NA	NA	NA	5.0	*	NA
ENDRIN	27	0	0	0	11	5.0	*	NA
ENDRIN ALDEHYDE	11	0	NA	NA	NA	0.25	*	NA
ENDRIN KETONE	16	0	NA	NA	NA	5.0	*	NA
GAMMA-BHC (LINDANE)	27	0	0	15	0.052	2.5	*	NA
GAMMA-CHLORDANE	16	0	NA	NA	NA	25	*	NA
HEPTACHLOR	27	0	0	27	0.015	2.5	*	NA
HEPTACHLOR EPOXIDE	27	0	0	27	0.0074	2.5	*	NA
METHOXYCHLOR	27	0	0	0	180	25	*	NA
TOXAPHENE	27	0	0	27	0.061	50	*	NA
PCBs								
PCB-1016	27	0	0	27	0.0087	25	*	NA
PCB-1221	27	0	0	27	0.0087	25	*	NA
PCB-1232	27	0	0	27	0.0087	25	*	NA
PCB-1242	27	0	0	27	0.0087	25	*	NA
PCB-1248	27	0	0	27	0.0087	25	*	NA
PCB-1254	27	0	0	27	0.0087	50	*	NA
PCB-1260	27	0	0	27	0.0087	50	*	NA
METALS								
ANTIMONY	37	24	23	13	15	100		55
ARSENIC	37	12	12	25	0.045	270		99
BARIUM	38	38	0	0	2600	230		137

Summary Statistics for Groundwater

Analyte (units µg/L unless otherwise noted)	No. of Samples Tested	No. of Samples with Detected Concentrations	No. of Samples with Detected Concentrations Greater than the PRG	No. of Samples with the Detection Limit Greater than the PRG	Preliminary Remediation Goal (PRG)	Maximum Concentration	Upper 95% Confidence Limit
BERYLLIUM	26	3	3	23	0.016	6.0	3.7
CADMIUM	27	7	1	1	18	29	7.2
CHROMIUM (TOTAL)	35	17	NA	NA	NA	91	27
CHROMIUM (VI)	12	0	NA	NA	NA	25 *	NA
COBALT	31	10	0	0	2200	132	37
COPPER	30	21	0	0	1400	190	57
LEAD	30	13	11	17	4	110	23
MERCURY	19	7	0	0	11	1.6	0.66
MOLYBDENUM	25	1	0	0	180	57	38
NICKEL	38	20	0	0	730	269	62
SELENIUM	27	5	0	0	180	147	38
SILVER	33	9	0	0	180	180	35
THALLIUM	29	10	10	19	2.9	140	70
THORIUM	2	1	NA	NA	NA	100	233
TIN	3	3	NA	NA	NA	220	306
VANADIUM	27	9	0	0	260	91	34
ZINC	38	29	0	0	11000	760	201
OTHER							
CYANIDE	4	2	0	0	730	90	84
FLUORIDE	2	2	NA	NA	NA	10200	28532
IGNITABILITY (F)	1	NA	NA	NA	NA	140 *	NA
pH (standard units)	3	NA	NA	NA	NA	9.5	10

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1997).

TABLE 3-31				
GROUNDWATER SAMPLES WITH CONCENTRATIONS EXCEEDING THE PRGs				
Area	Sample Location	Analyte	Result, µg/L	Depth, ft.
W-4A	II NMW-1	1,1-DICHLOROETHENE	56	N/A
W-1A	E & E AW-8	BENZENE	0.66	N/A
W-1A	E & E AW-8	BENZENE	2.5	N/A
W-2B	WCC B-8	BENZENE	7.8	N/A
W-4A	II NMW-1	BENZENE	10	N/A
W-4C	WCC B-5	BENZENE	3.9	N/A
W-5B	WCC B-4	BENZENE	2.6	N/A
W-5B	WCC B-4	BENZENE	4.8	N/A
W-5F	WCC B-7	BENZENE	2.2	N/A
W-5F	WCC B-7	BENZENE	160	N/A
W-5G	WCC B-6	BENZENE	520	N/A
W-5G	WCC B-6	BENZENE	14	N/A
W-1E	Radian B-14 (MW-14)	BROMODICHLOROMETHANE	0.22	N/A
W-7G	Radian B-15 (MW-15)	BROMODICHLOROMETHANE	0.22	N/A
W-7G	Radian B-15 (MW-15)	BROMODICHLOROMETHANE	0.22	N/A
W-1G	Radian B-4 (MW-4)	CARBON DISULFIDE	100	N/A
W-1G	Radian B-4 (MW-4)	CARBON DISULFIDE	29	N/A
W-7D	Radian B-9 (MW-9)	CARBON DISULFIDE	48	N/A
W-1E	Radian B-14 (MW-14)	CHLOROFORM	0.96	N/A
W-2B	WCC B-8	CHLOROFORM	9.4	N/A
W-2G	E&E AW-3	CHLOROFORM	3.8	0
W-7D	Radian B-9 (MW-9)	CHLOROFORM	6.5	N/A
W-7G	Radian B-15 (MW-15)	CHLOROFORM	0.96	N/A
W-7G	Radian B-15 (MW-15)	CHLOROFORM	0.96	N/A
W-2B	WCC B-8	ETHYLBENZENE	5600	N/A
W-5F	WCC B-7	ETHYLBENZENE	2100	N/A
W-5G	WCC B-6	ETHYLBENZENE	1300	N/A
W-5G	WCC B-6	ETHYLBENZENE	160000	N/A
W-2G	E&E AW-3	METHYLENE CHLORIDE	5.3	0
W-7A	E&E AW-4	METHYLENE CHLORIDE	54	0
W-5G	WCC B-6	STYRENE	310000	N/A
W-4A	II NMW-1	TETRACHLOROETHENE	6.1	N/A
W-5F	WCC B-7	TOLUENE	1200	N/A
W-5G	WCC B-6	TOLUENE	1100	N/A
W-4A	II NMW-1	TRICHLOROETHENE	3.8	N/A
W-7G	Radian B-15 (MW-15)	XYLENES (TOTAL)	0.44	N/A
W-5F	WCC B-7	1,1'-BIPHENYL	550	N/A
W-5G	WCC B-6	1,1'-BIPHENYL	410000	N/A
W-5G	WCC B-6	1,1'-BIPHENYL	3700	N/A
W-2B	WCC B-8	ACENAPHTHENE	5000	N/A
W-5G	WCC B-6	ANTHRACENE	130000	N/A
W-4A	II NMW-1	BIS(2-ETHYLHEXYL) PHTHALATE	98	N/A
W-2B	WCC B-8	NAPHTHALENE	3400	N/A
W-5F	WCC B-7	NAPHTHALENE	470	N/A
W-5G	WCC B-6	NAPHTHALENE	64000	N/A
W-5G	WCC B-6	NAPHTHALENE	22000	N/A
W-4A	II NMW-1	PENTACHLOROPHENOL	4.2	N/A
W-1A	Radian AW-8	ANTIMONY	84	N/A
W-1A	Radian AW-8	ANTIMONY	70	N/A
W-1A	E&E AW-8	ANTIMONY	35	9.25
W-1B	E&E AW-7	ANTIMONY	22	5
W-1C	E&E AW-6	ANTIMONY	25	5.5
W-1E	Radian B-14 (MW-14)	ANTIMONY	37	N/A
W-1G	Radian B-4 (MW-4)	ANTIMONY	48	N/A
W-2B	WCC B-8	ANTIMONY	20	N/A
W-2G	Radian AW-3	ANTIMONY	64	N/A

GROUNDWATER SAMPLES WITH CONCENTRATIONS EXCEEDING THE PRGs				
Area	Sample Location	Analyte	Result, µg/L	Depth, ft.
W-2G	E&E AW-3	ANTIMONY	40	0
W-4C	WCC B-5	ANTIMONY	100	N/A
W-5B	WCC B-4	ANTIMONY	65	N/A
W-5F	WCC B-7	ANTIMONY	73	N/A
W-5F	WCC B-7	ANTIMONY	19	N/A
W-5G	Radian B-13 (MW-13)	ANTIMONY	65	N/A
W-5G	Radian AW-1	ANTIMONY	57	N/A
W-5G	E&E AW-1	ANTIMONY	20	N/A
W-5G	E&E AW-1	ANTIMONY	50	N/A
W-5G	WCC B-6	ANTIMONY	34	N/A
W-7A	Radian AW-4	ANTIMONY	60	N/A
W-7A	E&E AW-4	ANTIMONY	50	0
W-7D	Radian B-9 (MW-9)	ANTIMONY	56	N/A
W-7G	Radian AW-2	ANTIMONY	68	N/A
W-1B	E&E AW-7	ARSENIC	270	5
W-1C	E&E AW-6	ARSENIC	270	5.5
W-2B	WCC B-8	ARSENIC	18	N/A
W-2G	E&E AW-3	ARSENIC	180	0
W-4C	WCC B-5	ARSENIC	270	N/A
W-5A	E&E AW-5	ARSENIC	13	0
W-5B	WCC B-4	ARSENIC	12	N/A
W-5F	WCC B-7	ARSENIC	32	N/A
W-5G	E&E AW-1	ARSENIC	180	N/A
W-5G	E&E AW-1	ARSENIC	270	N/A
W-5G	WCC B-6	ARSENIC	29	N/A
W-7A	E&E AW-4	ARSENIC	180	0
W-2G	Radian AW-3	BERYLLIUM	2	N/A
W-4C	WCC B-5	BERYLLIUM	6	N/A
W-5G	Radian AW-1	BERYLLIUM	2	N/A
W-7D	Radian B-9 (MW-9)	CADMIUM	29	N/A
W-0E	ESE97 CPT-3	LEAD	7	N/A
W-1A	ESE97 CPT-1	LEAD	8	N/A
W-2B	WCC B-8	LEAD	13	N/A
W-2G	E&E AW-3	LEAD	11	N/A
W-4A	II NMW-1	LEAD	9	N/A
W-5A	E&E AW-5	LEAD	6	N/A
W-5A	E&E AW-5	LEAD	110	0
W-5F	WCC B-7	LEAD	13	N/A
W-5G	WCC B-6	LEAD	29	N/A
W-7A	E&E AW-4	LEAD	21	N/A
W-7D	Radian B-9 (MW-9)	LEAD	9	N/A
W-1A	Radian AW-8	THALLIUM	120	N/A
W-1A	Radian AW-8	THALLIUM	91	N/A
W-2B	WCC B-8	THALLIUM	26	N/A
W-2G	Radian AW-3	THALLIUM	16	N/A
W-5A	E&E AW-5	THALLIUM	10	0
W-5B	WCC B-4	THALLIUM	63	N/A
W-5F	WCC B-7	THALLIUM	97	N/A
W-5G	Radian AW-1	THALLIUM	110	N/A
W-5G	WCC B-6	THALLIUM	36	N/A
W-7A	Radian AW-4	THALLIUM	140	N/A
Source: ESE (1997a)				

TABLE 4-1. SELECTED CHEMICALS OF POTENTIAL CONCERN IN SOIL AND PITS

CHEMICAL	*AVERAGE CONCENTRATION IN SOIL AND PITS /a/ (mg/kg)*	*MAXIMUM OR 95% UCL CONCENTRATION IN SOIL AND PITS /a/ (mg/kg)*
Petroleum Hydrocarbons		
TRPH	3.87E+03	3.70E+04
Volatile Organic Compounds		
Acetone	7.28E-01	1.77E+00
Benzene	1.32E-01	2.49E-01
Chlorobenzene	9.88E-02	6.94E-02
Ethylbenzene	5.23E-01	2.27E+00
Methylene chloride	4.45E-01	3.62E-01
Trichlorofluoromethane	4.83E-01	1.02E+00
Toluene	4.24E-01	1.78E+00
Semi-volatile Organic Compounds		
2,4-Dimethylphenol	1.30E+00	1.89E+00
2,-Methylnaphthalene	6.45E+00	2.32E+01
1-Methylnaphthalene	3.50E+01	6.50E+01
Benzidine	1.27E+01	3.44E+01
Di-N-butyl phthalate	2.38E+00	3.62E+00
Dibenzofuran	7.25E-01	1.64E-01
Endosulfan II	1.22E-01	7.83E-03
Fluoranthene	9.14E-01	1.94E+00
Naphthalene	2.77E+00	7.32E+00
Phenanthrene	4.95E+00	6.76E+00
Metals		
Arsenic	5.27E+00	1.03E+01
Barium	2.77E+02	3.23E+02
Cadmium	5.44E-01	6.05E-01
Copper	4.11E+01	4.82E+01
Lead	8.35E+01	1.11E+02
Mercury	5.93E-01	1.82E-01
Nickel	2.16E+01	2.53E-01
Thallium	4.72E+00	4.96E+00

Notes: /a/ See ESE Risk Assessment dated April 23, 1997 for details.
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter
NE = Not estimated

TABLE 4-2. SELECTED CHEMICALS OF POTENTIAL CONCERN IN LAGOONS AND PIT F

CHEMICAL	*AVERAGE CONCENTRATION DETECTED /a/ (mg/kg)*	*MAXIMUM OR 95% UCL CONCENTRATION DETECTED /a/ (mg/kg)*
Petroleum Hydrocarbons		
TRPH	1.48E+05	5.30E+05
TPH	1.13E+04	1.81E+04
Volatile Organic Compounds		
1,1,1-Trichloroethane	1.22E+01	6.63E+01
1,2-Dichloroethane	4.24E+00	5.50E+01
2,4-Dichlorophenol	8.12E+00	5.53E-01
2,4,6-trichlorophenol	8.60E+00	1.60E-01
Benzene	1.89E+00	1.70E+01
Methylene chloride	8.82E+00	1.10E+02
Styrene (from Pit F)	1.87E+02	7.20E+02
Semi-volatile Organic Compounds		
2-Methylnaphthalene	2.09E+01	3.01E+01
Benzidine	9.91E+01	2.60E+02
Fluoranthene	8.64E+00	6.30E-01
Naphthalene	1.03E+01	9.21E+00
Phenanthrene	1.20E+01	1.02E+01
Phenol (from Pit F)	3.34E+02	8.00E-01
Pyrene	1.03E+01	7.06E+00
Metals		
Antimony	2.76E+00	2.46E+00
Arsenic	2.02E+01	1.00E+02
Barium	2.67E+02	3.21E+02
Cadmium	5.47E+00	3.87E+01
Copper	2.96E+01	3.49E+01
Lead	2.49E+02	1.40E+03
Mercury	2.09E-01	9.07E-01
Silver	3.85E-01	3.99E-01
Vanadium	3.00E+01	3.47E+01
Zinc	2.74E+02	3.64E+02

Not /a/ See ESE Risk Assessment dated April 23, 1997 for details.
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter

TABLE 4-3. EXPOSURE POINT CONCENTRATION SUMMARY. AVERAGE EXPOSURE SCENARIO

Chemical	*Average Chemical Concentration in Lagoons and Pit F (mg/kg)*	*Average Chemical Concentration in Soil and Pits (mg/kg)*	*Average On-Site VOC Concentration (mg/m^3)*	*Average Off-Site VOC Concentration (mg/m^3)*	*Average Ambient Chemical Concentration Due to Dust Generation (mg/m^3)*
Volatile Organic Compounds					
1,1,1-Trichloroethane	1.22E+01	Not a COPC	4.37E-01	1.46E-01	NA
1,2-Dichloroethane	4.24E+00	Not a COPC	7.66E-02	2.55E-02	NA
2,4-Dichlorophenol	8.12E+00	Not a COPC	1.70E-04	5.66E-05	NA
2,4,6-Trichlorophenol	8.60E+00	Not a COPC	4.42E-05	1.47E-05	NA
Acetone	Not a COPC	7.28E-01	5.05E-08	5.05E-08	NA
Benzene	1.89E+00	1.32E-01	3.20E-02	1.07E-02	NA
Chlorobenzene	Not a COPC	9.88E-02	6.85E-09	6.85E-09	NA
Ethylbenzene	Not a COPC	5.23E-01	3.62E-08	3.62E-08	NA
Methylene chloride	8.82E+00	4.45E-01	7.98E-01	2.66E-01	NA
Trichlorofluoromethane	Not a COPC	4.83E-01	3.35E-08	3.35E-08	NA
Toluene	Not a COPC	4.24E-01	2.94E-08	2.94E-08	NA
Styrene (from Pit F)	1.87E+02	Not a COPC	7.73E-02	2.58E-02	NA
Semi-volatile Organic Compounds					
2,4-Dimethylphenol	Not a COPC	1.30E+00	NA	NA	9.01E-08
2,-Methylnaphthalene	2.09E+01	6.45E+00	NA	NA	4.47E-07
1-Methylnaphthalene	Not a COPC	3.50E+01	NA	NA	2.43E-06
Benzidine	9.91E+01	1.27E+01	NA	NA	8.80E-07
Di-N-butyl phthalate	Not a COPC	2.38E+00	NA	NA	1.65E-07
Dibenzofuran	Not a COPC	7.25E-01	NA	NA	5.02E-08
Endosulfan II	Not a COPC	1.22E-01	NA	NA	8.45E-09
Fluoranthene	8.64E+00	9.14E-01	NA	NA	6.33E-08
Naphthalene	1.03E+01	2.77E+00	NA	NA	1.92E-07
Phenanthrene	1.20E+01	4.95E+00	NA	NA	3.43E-07
Phenol	3.34E+02	Not a COPC	NA	NA	NA
Pyrene	1.03E+01	Not a COPC	NA	NA	NA

TABLE 4-3. (Continued)

Chemical	*Average Chemical Concentration in Lagoons (mg/kg)*	*Average Chemical Concentration in Soil and Pits (mg/kg)*	*Average On-Site VOC Concentration (mg/m^3)*	*Average Off-Site VOC Concentration (mg/m^3)*	*Average Ambient Chemical Concentration Due to Dust Generation (mg/m^3)*
Metals					
Antimony	2.76E+00	Not a COPC	NA	NA	NA
Arsenic	2.02E+01	5.27E+00	NA	NA	3.65E-07
Barium	2.67E+02	2.77E+02	NA	NA	1.92E-05
Cadmium	5.47E+00	5.44E-01	NA	NA	3.77E-08
Copper	2.96E+01	4.11E+01	NA	NA	2.85E-06
Lead	2.49E+02	8.35E+01	NA	NA	5.79E-06
Mercury	2.09E-01	5.93E-01	NA	NA	4.11E-08
Nickel	Not a COPC	2.16E+01	NA	NA	1.50E-06
Silver	3.85E-01	Not a COPC	NA	NA	NA
Thallium	Not a COPC	4.72E+00	NA	NA	3.27E-07
Vanadium	3.00E+01	Not a COPC	NA	NA	NA
Zinc	2.74E+02	Not a COPC	NA	NA	NA

VOC = Volatile organic compounds
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter

TABLE 4-4. EXPOSURE POINT CONCENTRATION SUMMARY. REASONABLE MAXIMUM EXPOSURE SCENARIO

Chemical	*RME Chemical Concentration in Lagoons and Pit F (mg/kg)*	*RME Chemical Concentration in Soil and Pits (mg/kg)*	*RME On-Site VOC Concentration (mg/m^3)*	*RME Off-Site VOC Concentration (mg/m^3)*	*RME Ambient Chemical Concentration Due to Dust Generation (mg/m^3)*
Volatile Organic Compounds					
1,1,1-Trichloroethane	6.63E+01	Not a COPC	6.63E-01	2.21E-01	NA
1,2-Dichloroethane	5.50E+01	Not a COPC	2.78E-01	9.25E-02	NA
2,4-Dichlorophenol	5.53E-01	Not a COPC	3.23E-06	1.08E-06	NA
2,4,6-Trichlorophenol	1.60E-01	Not a COPC	2.30E-07	7.65E-08	NA
Acetone	Not a COPC	1.77E+00	2.32E-07	2.32E-07	NA
Benzene	1.70E+01	2.49E-01	8.04E-02	2.68E-02	NA
Chlorobenzene	Not a COPC	6.94E-02	9.09E-09	9.09E-09	NA
Ethylbenzene	Not a COPC	2.27E+00	2.97E-07	2.97E-07	NA
Methylene chloride	1.10E+02	3.62E-01	2.78E+00	9.27E-01	NA
Trichlorofluoromethane	Not a COPC	1.02E+00	1.34E-07	1.34E-07	NA
Toluene	Not a COPC	1.78E+00	2.33E-07	2.33E-07	NA
Styrene (from Pit F)	7.20E+02	Not a COPC	1.86E-01	6.19E-02	NA
Semi-volatile Organic Compounds					
2,4-Dimethylphenol	Not a COPC	1.89E+00	NA	NA	2.48E-07
2,-Methylnaphthalene	3.01E+01	2.32E+01	NA	NA	3.04E-06
1-Methylnaphthalene	Not a COPC	6.50E+01	NA	NA	8.52E-06
Benzidine	2.60E+02	3.44E+01	NA	NA	4.51E-06
Di-N-butyl phthalate	Not a COPC	3.62E+00	NA	NA	4.74E-07
Dibenzofuran	Not a COPC	1.64E-01	NA	NA	2.15E-08
Endosulfan II	Not a COPC	7.83E-03	NA	NA	1.03E-09
Fluoranthene	6.30E-01	1.94E+00	NA	NA	2.54E-07
Naphthalene	9.21E+00	7.32E+00	NA	NA	9.59E-07
Phenanthrene	1.02E+01	6.76E+00	NA	NA	8.86E-07
Phenol	8.00E-01	Not a COPC	NA	NA	NA
Pyrene	7.06E+00	Not a COPC	NA	NA	NA

TABLE 4-4. (Continued)

Chemical	*RME Chemical Concentration in Lagoons (mg/kg)*	*RME Chemical Concentration in Soil and Pits (mg/kg)*	*RME On-Site VOC Concentration (mg/m^3)*	*RME Off-Site VOC Concentration (mg/m^3)*	*RME Ambient Chemical Concentration Due to Dust Generation (mg/m^3)*
Metals					
Antimony	2.46E+00	Not a COPC	NA	NA	NA
Arsenic	1.00E+02	1.03E+01	NA	NA	1.35E-06
Barium	3.21E+02	3.23E+02	NA	NA	4.23E-05
Cadmium	3.87E+01	6.05E-01	NA	NA	7.93E-08
Copper	3.49E+01	4.82E+01	NA	NA	6.31E-06
Lead	1.40E+03	1.11E+02	NA	NA	1.45E-05
Mercury	9.07E-01	1.82E-01	NA	NA	2.38E-08
Nickel	Not a COPC	2.53E-01	NA	NA	3.31E-08
Silver	3.99E-01	Not a COPC	NA	NA	NA
Thallium	Not a COPC	4.96E+00	NA	NA	6.50E-07
Vanadium	3.47E+01	Not a COPC	NA	NA	NA
Zinc	3.64E+02	Not a COPC	NA	NA	NA

VOC = Volatile organic compounds
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter

Table 5-1
Summary of Potential ARARs
Ascon Site, Huntington Beach, California

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
POTENTIAL CHEMICAL-SPECIFIC ARARs			
Clean Air Act (CAA) a. National Primary and Secondary Ambient Air Quality Standards (NAAQS)	40 CFR 50-80	The CAA regulates air emissions of substances that may harm public health. Air pollutants that may be of concern at the site during remedial activities are listed below, along with primary NAAQS standards: • PM_{10}(particulate matter, diameter 10 micrometer [μm] or less)annual - 50 micrograms per cubic meters ($\mu g/m^3$) 24-hour - 150 $\mu g/m^3$ • Pb (lead) quarterly average - 1.5 $\mu g/m^3$ Cleanup of the site is not likely to result in classification as a "major source" under the CAA unless emissions equal or exceed 100 tons per year (tpy) of the pollutants for which the area is designated non-attainment. State implementation plans contain the specific regulations, which govern the emission rates for such areas.	Potentially Applicable
b. National Emission Standards for Hazardous Air Pollutants (NESHAP)	42 USC 7401 *et seq.*	NESHAP is established on an industry- and process-specific basis and must provide "an ample margin of safety to protect public health." All major stationary and area sources that emit or have potential to emit 10 tpy of any single hazardous air pollutant (HAP), or a total of 25 tpy of a combination of HAPs must comply with emission standards for that industry and HAP. This site contains many chemicals of concern, which are listed as HAPs, however, it is very unlikely that the releases from the site will reach the 10 or 25 tpy threshold.	Potentially Applicable
Water Quality Control Plan Santa Ana River Basin, 1995 (Basin Plan)	Chapter 4, Water Quality Objectives, Basin Plan	Defines the water quality objectives for taste and odor, bacteria, toxic substances, chemical constituents, and radioactivity. Any concentration limits, cleanup levels, and/or treatment levels established for the Ascon landfill must comply with these objectives.	Potentially Applicable
Hazardous Waste Control Act (HWCA), as administered by the Department of Toxic Substances Control (DTSC)	22 CCR 66260 *et seq.*	The HWCA mandates the control of hazardous wastes from point of generation through accumulation, transportation, treatment, storage, and ultimate disposal.	Potentially Applicable

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
a. Criteria for Identifying Characteristics of Hazardous Wastes	22 CCR 66261.10 *et seq.*	Tests must be performed on chemicals to identify hazardous characteristics. If a chemical is either listed or tested and found hazardous, then remedial alternatives must comply with the hazardous waste management requirements.	Potentially Applicable
b. Categories of Hazardous Waste	22 CCR 66261.100 *et seq.*	In addition to listing the four RCRA hazardous waste characteristics (reactivity, corrosivity, ignitability, and the Toxicity Characteristics Leachate Procedure [TCLP]), the HWCA regulations have established two other criteria: Total Threshold Limit Concentration (TTLC) and Soluble Threshold Limit Concentration (STLC) for classifying hazardous waste. Bioassays assessing mammalian and aquatic toxicity of wastes are also used to determine whether a waste is hazardous under the HWCA. If a chemical is either listed or tested and found hazardous, then remedial alternatives must comply with the hazardous waste management requirements.	Potentially Applicable
Porter-Cologne Water Quality Control Act, as administered by the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (Water Board) - Santa Ana Region	23 CCR 2200 *et seq.* and	This Act mandates regulations pertaining to land disposal unit design and construction standards that minimize dangers to the waters of the State. Wastes are classified as hazardous, designated, non-hazardous, or inert, and are disposed of accordingly. Regulations regarding water quality protection standards are determined by the Water Board on a case-by-case basis.	Potentially Applicable
	California Water Code § 13000	Defines legislative intent to attain the highest water quality reasonable considering the demands on the resource. Provides the basis for selecting background as the cleanup goal. Applies to all ground water and soil remediation projects where ground water protection is an issue.	Potentially Applicable
a. SWRCB Resolution 88-63	SWRCB Res. 88-63	This resolution addresses site-specific conditions that should be considered in determining appropriate beneficial uses for ground water beneath the site. Ground water with solids concentrations exceeding 3,000 milligrams per liter (mg/l) and/or sustained yield less than 200 gallons per day should not be considered as a source of drinking water.	Potentially Applicable
b. SWRCB Resolution 68-16	SWRCB Res. 68-16	This resolution requires maintenance of existing water quality unless it is demonstrated that a change will benefit the people of the State, will not unreasonably affect present or potential uses, and will not result in water quality less than that prescribed by other state policies. Further, the resolution requires that any activity that discharges waste to high quality water be required to meet waste discharge requirements. This policy is applicable to identifying appropriate ground water quality criteria for ground water beneath the site.	Potentially Applicable

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
POTENTIAL LOCATION-SPECIFIC ARARs			
City of Huntington Beach Soil Clean-up Standard	City Specification 431-92	The City has established risk-based hydrocarbon clean-up goals for residential and commercial/industrial developments and methodologies for sampling, remediation, and reporting of sites with petroleum hydrocarbon problems. The residential goals are <500 ppm total petroleum hydrocarbons (TPH) and <1,000 ppm TPH for commercial and industrial properties. Additional clean-up goals have been established for aromatic and polynuclear aromatic hydrocarbons.	Potentially Relevant and Appropriate
Orange County Heath Care Agency - Public Health Division of Environmental Health	Orange County Code Article 2, Section 4-5-17; Orange County Solid Waste Local Enforcement Agency (LEA)	The Orange County code contains standards and requirements for ground water wells in order to protect ground water quality in the basin. A permit must be obtained from the County prior to the construction or abandonment of any well. The County also serves as the LEA, as authorized by the California Integrated Waste Management Board, overseeing the construction, operation, and closure for all landfills in the County. The LEA requires that a written work plan be submitted, reviewed, and approved prior to initiating any field work. Landfill closures must follow California requirements for Clean Closure.	Potentially Relevant and Appropriate
Resource Conservation and Recovery Act (RCRA)	42 USC 6901 *et seq.* 40 CFR 240-271	RCRA establishes standards for the generation, management, and disposal of solid and hazardous waste. RCRA has limited application as an ARAR for alternative remedial actions at the site. Original waste disposal at the site generally ceased prior to RCRA regulations becoming effective in 1980. However, solid wastes associated with petroleum refining are not exempt as RCRA hazardous waste and therefore activities on the site could potentially generate as hazardous waste. In addition, certain remedial actions may include generation and disposal of solid or hazardous waste subject to RCRA requirements.	Potentially Applicable
Clean Water Act (CWA)	33 USC 1251 *et seq.* 40 CFR 100-140, 400-470	The CWA regulates the discharge of nontoxic and toxic pollutants into surface water by specific and non-specific sources. The CWA also specifies water quality criteria, requirements for state water quality standards based on these criteria, and wetlands regulations.	Potentially Applicable
Endangered Species Act	16 USC 1531 *et seq.* 40 CFR 6.302 50 CFR 17, 200, 402	The Endangered Species Act protects listed species and their habitat in the area of the proposed remedial action. To the extent such species are present at the site, this requirement is potentially applicable	Potentially Applicable
Fish and Wildlife Coordination Act	16 USC 661 *et seq.* 33 CFR 320-330	This Act requires federal and state agencies to ensure that actions do not jeopardize the existence of wildlife and their habitat. Where any action by a federal or state agency impounds, diverts, or controls water bodies or streams, that agency must first consult with the U.S. Fish and Wildlife Service, the Department of the Interior, and the California Department of Fish and Game. To the extent such wildlife and habitat are present at the site, this requirement is potentially applicable.	Potentially Applicable

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
Coastal Zone Management Act	16 USC 1451 *et seq.*	This Act requires federal agencies conducting or supporting activities directly affecting the coastal zone to ensure that such activities are consistent with the state program. "Coastal zone" is defined as the "coastal waters ... and the adjacent shore lands (including the waters therein and thereunder) strongly influenced by each other and in proximity to the shorelines of several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. ... The zone extends inland from the shorelines only to the extent necessary to control shore lands, the uses of which have a direct and significant impact on the coastal water."	Potentially Applicable
POTENTIAL ACTION-SPECIFIC ARARs			
National Pollution Discharge Elimination System (NPDES) under the CWA	33 USC 1342 40 CFR 122-125	The CWA regulates the discharge of nontoxic and toxic pollutants into surface water by specific and non-specific sources. In order to meet this requirement, an NPDES permit meeting discharge requirements must be obtained. The general requirements of a permit include (1) development and implementation of a Storm Water Pollution and Prevention Plan; (2) elimination of non-storm water discharge to storm water conveyances; and (3) monitoring of the quality and quantity of storm water discharges. Certain remedial alternatives proposed for the site could potentially trigger storm water discharge, therefore, these requirements are potentially applicable.	Potentially Applicable
Water Quality Control Plan Santa Ana River Basin, 1995 (Basin Plan)	Chapter 3, Beneficial Uses	Defines beneficial uses for ground water beneath the Ascon landfill (Santa Ana Pressure Ground Water Subbasin) as: Municipal and Domestic Supply, Agricultural Supply, Industrial Supply, and Industrial Process Supply. Because ground water beneath the site is a potential drinking water source, selection of concentration, cleanup and treatment levels should be made accordingly. The Basin Plan does not recognize the fact that ground water quality beneath the facility has been compromised by salt water intrusion.	Potentially Applicable
Discharges of Waste to Land	23CCR Title 23, Chapter 15, Article 5	Specifies water quality monitoring and response programs for waste management units. Requires establishing concentration limits, monitoring points, and points of compliance for ground water, surface water, and soil. The capping alternative would be subject to these regulations.	Potentially Applicable
HWCA	22 CCR 66260 *et seq.*	The HWCA mandates the control of hazardous wastes from point of generation through accumulation, transportation, treatment, storage, and ultimate disposal.	Potentially Applicable
a. Standards for Generators of Hazardous Waste	22 CCR 66262.10 *et seq.*	This regulation is applicable to hazardous waste resulting from remedial actions that generate hazardous waste on-site.	Potentially Applicable

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
b. Closure and Post-closure Requirements	22 CCR 66264.110 *et seq.*	This regulation sets standards that minimize the need for further maintenance, and control, minimize, or eliminate post-closure escape of hazardous waste, leachate, contaminated rainfall, or waste decomposition products to the ground or surface water or the atmosphere. These standards are potentially relevant and appropriate to certain remedial actions to the extent that the closure and post-closure requirements relate to the design requirements for monitoring ground water, stabilizing sump material, and isolating the to prevent direct contact.	Potentially Relevant and Appropriate
c. Standards for Transporters of Hazardous Waste	22 CCR 66263.10 *et seq.*	This regulations stipulates that hazardous waste must be transported by a hauler registered by the state. To the extent that hazardous wastes are transported for the remedial actions, the requirements are potentially applicable.	Potentially Applicable
d. Hazardous Materials Release Response Plan and Inventory	H&S Code 25500 *et seq.* 19 CCR 2700 *et seq.*	Businesses that handle hazardous materials are required to establish a plan for emergency response to a release or threatened release of hazardous materials. This requirement is applicable to the site and the hazardous materials release response plan and inventory should be incorporated into the site Health and Safety Plan.	Potentially Applicable
Mulford-Carrell Air Resources Act as implemented by the South Coast Air Quality Management Districts (SCAQMD) and administered by the California Air Resources Board (CARB)	H&S Code 39000 *et seq.*	The CARB and local air pollution control districts develop control measures aimed at reducing emissions of identified pollutants. Although it sets no standards, this Act is potentially applicable.	Potentially Applicable
SCAQMD Rules and Regulations			
a. Permits (1) Permit to Construct	Rule 201	Remedial actions viewed as a "stationary source" by the SCAQMD will require a permit to construct prior to initiating the remedial action.	Potentially Applicable
(2) Permit to Operate	Rule 203	Remedial actions deemed a "stationary source" will require a permit to operate.	Potentially Applicable
b. Prohibitory Rules (1) Visible Emissions	Rule 401	This rule limits visible emission from any point source.	Potentially Applicable
(2) Nuisance	Rule 402	This rule prohibits the discharge of any material, including odorous compounds that may cause injury, annoyance to the public, property, or business, or may endanger human health, comfort, peace, or safety.	Potentially Applicable

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
(3) Fugitive Dust	Rule 403	This rule limits on-site activities so that the emissions of fugitive dust from the operation shall not be remain visible in the atmosphere beyond the property line of the emission source and the particulate concentration shall not be more than 100 $\mu g/m^3$, averaged over 5 hours, above 15 miles per hour. This rule also requires reasonable precaution to minimize fugitive dust and the prevention and cleanup of material accidentally deposited on paved streets.	Potentially Applicable
(4) Particulate Matter	Rule 404	This rule limits particulate emissions for given volumetric gas flow rates.	Potentially Applicable
(5) Solid Particulate Matter	Rule 405	This rule establishes allowable discharge rates for particulates.	Potentially Applicable
(6) Liquid and Gaseous Air Contaminants	Rule 407	This rule establishes allowable discharge rates for carbon monoxide and sulfur dioxide.	Potentially Applicable
(7) Circumvention	Rule 408	This rule prohibits the unauthorized reduction or concealment of an emission.	Potentially Applicable
(8) Fuel Combustion Contaminants	Rule 409	This rule limits the emissions of particulate matter from the exhaust of combustion source.	Potentially Applicable
(9) Sulfur Content of Gaseous, Liquid or Fossil Fuels	Rules 431.1, 431.2, and 431.3	These rules limit sulfur compounds from combustion of gaseous fuels.	Potentially Applicable
(10) Fuel Burning Equipment - Oxides of Nitrogen	Rule 474	This rule limits the concentration of oxides of nitrogen from non-mobile fuel burning equipment.	Potentially Applicable
c. Source Specific Standards			
(1) Excavation of Landfill sites	Rule 1150	Remedial actions requiring excavation must obtain approval of an Excavation Management Plan by the Executive Officer of the SCAQMD. The Plan must provide information regarding the quantity and characteristics of the material to be excavated and transported and shall identify mitigation measures including gas collection and disposal, baling, encapsulation, covering of the material, and chemical neutralizing.	Potentially Applicable
(2) Volatile Organic Compound (VOC) Emissions from Decontamination of Soil	Rule 1166	This rule limits the emissions of VOCs from contaminated soil.	Potentially Applicable

Type/Name of Potential ARAR	Citation	Description and Comments	Potentially Applicable or Relevant and Appropriate
d. New Source Review of Carcinogenic Air Contaminants	Rule 1401	This rule specifies limits for cancer risk and excess cancer cases from new stationary sources and modifications to existing stationary sources that emit carcinogenic air contaminants. This rule establishes allowable emission impacts for all such stationary sources requiring new permits. Best Available Control Technology for Toxics (T-BACT) will be required for any system where a lifetime maximum individual cancer risk of 10^{-6} or greater is estimated to occur.	Potentially Applicable
California Safe Drinking Water and Toxic Enforcement Act of 1986	H&S Code 25249.5 *et seq.* 22 CCR 12000 *et seq.*	This rule regulates discharges and exposures of chemicals known to the State of California to be carcinogenic or reproductive toxins. Warnings are required to be provided to individuals exposed to "significant risks."	Potentially Applicable
California Occupational Safe and Health Act (OSHA)	Labor Code Section 6300 *et seq.* 8 CCR 330 *et seq.*	This regulation establishes the requirements for worker safety. All employees working at a Superfund or hazardous waste facility must have adequate 40-hour OSHA training in hazardous materials management.	Potentially Applicable

TABLE 5-2
Summary of To-Be-Considered Criteria
Ascon Site, Huntington Beach, California

Name of To-Be-Considered Criterion	Citation	Description and Comments
State Water Resources Control Board (SWRCB) Resolution 92-49	SWRCB Res. 92-49	The SWRCB's Policies and Procedures for Investigation and Cleanup and Abatement under Section 13304 of the Water Code, Resolution 92-49, establishes those conditions under which a Water Board or a local agency supervising cleanup "may establish containment zones (areas of ground water where water quality objectives cannot be reasonably achieved). In such cases, the Regional Water Quality Control Board (RWQCB) must require implementation of environmental mitigation measures to offset implementation measures to offset significant adverse impacts from leaving pollutants in the ground water." Furthermore, Resolution 92-49 requires that actions for cleanup and abatement "conform to the provisions of Resolution 68-16 of the SWRCB, and the Water Quality Control Plans of the SWRCB and the Water Boards, provided that under no circumstances shall these provisions be interpreted to require cleanup and abatement which achieves water quality conditions that are better than background conditions."
Hazardous Waste Control Act (HWCA), as administered by the Department of Toxic Substances Control (DTSC)	22 CCR 66260 *et seq.*	The HWCA mandates the control of hazardous wastes from point of generation through accumulation, transportation, treatment, storage, and ultimate disposal.
a. General Facility Standards	22 CCR 66264.1 *et seq.*	Facilities located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of hazardous wastes by a 100-year flood. Because there are no permanent hazardous waste treatment, storage, or disposal facilities proposed in the alternative remedial actions, this requirement will be a to-be-considered criterion to the extent that release during flooding can be minimized. In addition, the DTSC has promulgated regulations permitting the use of a corrective action management unit (CAMU) to manage remediation waste at permitted facilities. CAMUs will be used to manage remediation wastes identified as hazardous, if necessary.
b. Use and Management of Containers	22 CCR 66264.170 *et seq.*	Tank systems must meet the appropriate design standards and provide for adequate containment and detection/monitoring of leaks, inspections, and proper closure procedures.
c. Requirements for Design and Operation of Landfills	22 CCR 66264.300 *et seq.*	General design requirements for constructing/closing a landfill are similar to requirements for construction/closing a surface impoundment. These closure and post-closure requirements may be a to-be-considered criterion to the extent that they provide protective guidance regarding placement of wastes at the site and minimization of release of chemicals of concern present in sump materials.
Air Toxic "Hot Spot" Act, as implemented by the South Coast Air Quality Management Districts and administered by the California Air Resources Board	H&S Code 44300 *et seq.* 17 CCR 93300 *et seq.*	This regulation requires operators of specified facilities to prepare and submit inventory emissions plans and reports. This may be a to-be-considered criterion dependent on air emissions data, and volume of emissions generated during remediation.

Table 6-1
Proposed Risk-Based Soil Cleanup Levels for VOCs, SVOCs, and Metals

Chemical	Cleanup Levels for Noncarcinogens (mg/kg)	Cleanup Levels for Carcinogens (mg/kg)	Risk-Based Cleanup Levels (mg/kg)
Volatile Organic Compounds			
1,1,1-Trichloroethane	1.85E+03		**1.62E+03 (sat)**
1,1,2-Trichloro-1,2,2-trifluoroethane	1.23E+05		**2.90E+03 (sat)**
1,1-Dichloroethane	2.88E+03	3.96E+01	**3.96E+01**
1,1-Dichloroethylene	1.39E+02	5.96E-01	**5.96E-01**
1,2-Dichloroethane	8.75E+01	1.96E-01	**1.96E-01**
1,2-Dichloroethylene (total)	2.29E+02		**2.29E+02**
2,4,6-Trichlorophenol	NA	1.09E+01	**1.09E+01**
2,4-Dichlorophenol	1.96E+02		**1.96E+02**
2-Butanone	2.31E+04		**2.31E+04**
Acetone	4.34E+03		**4.34E+03**
Benzene	4.43E+01	2.58E+00	**2.58E+00**
Bromoform	1.30E+03	9.63E+01	**9.63E+01**
Carbon disulfide	4.50E+01		**4.50E+01**
Chlorobenzene	4.12E+02		**4.12E+02**
Chloroform	2.52E+02	1.13E+01	**1.13E+01**
Ethylbenzene	5.23E+03		**6.30E+02 (sat)**
Methylene chloride	3.46E+03	3.70E+01	**3.70E+01**
Styrene	1.09E+04		**2.43E+03 (sat)**
Toluene	4.68E+03		**1.01E+03 (sat)**
Trichlorofluoromethane	2.91E+03		**2.05E+03 (sat)**
Xylene (total)	4.04E+04		**4.99E+02 (sat)**
Semivolatile Organic Compounds			
1,2-Dichlorobenzene	4.14E+03		**4.14E+03**
1-Methylnaphthalene	2.61E+03		**2.61E+03**
2,4-Dimethylphenol	1.30E+03		**1.30E+03**
2-Methylnaphthalene	2.61E+03		**2.61E+03**
3,3-Dichlorobenzidine	NA	6.34E-01	**6.34E-01**
4,4'-DDD	NA	3.17E+00	**3.17E+00**
4,4'-DDE	NA	2.24E+00	**2.24E+00**
Acenaphthene	3.64E+03		**3.64E+03**
Anthracene	1.94E+04		**1.94E+04**
Benz[a]anthracene	NA	6.34E-01	**6.34E-01**
Benzidine	1.96E+02	1.52E-03	**1.52E-03**
Benzo[a]pyrene	NA	6.34E-02	**6.34E-02**
Benzo[b]fluoranthene	NA	6.34E-01	**6.34E-01**
Benzo[k]fluoranthene	NA	6.34E-01	**6.34E-01**
Benzoic acid	2.61E+05		**2.61E+05**
BCH (alpha)	NA	1.21E-01	**1.21E-01**
BCH (beta)	NA	4.22E-01	**4.22E-01**

Table 6-1
Proposed Risk-Based Soil Cleanup Levels for VOCs, SVOCs, and Metals

Chemical	Cleanup Levels for Noncarcinogens (mg/kg)	Cleanup Levels for Carcinogens (mg/kg)	Risk-Based Cleanup Levels (mg/kg)
Semivolatile Organic Compounds (cont'd)			
BCH (gamma) Lindane	1.96E+01	6.91E-01	**6.91E-01**
Bis(2-ethylhexyl)phthalate	1.30E+03	5.43E+01	**5.43E+01**
Butyl benzyl phthalate	1.30E+04		**1.30E+04**
Chrysene	NA	6.33E+00	**6.33E+00**
Dibenz[ah]anthracene	NA	1.85E-01	**1.85E-01**
Dibenzofuran	2.58E+02		**2.58E+02**
Di-N-butyl phthalate	6.52E+03		**6.52E+03**
Endosulfan	3.91E+02		**3.91E+02**
Fluoranthene	2.61E+03		**2.61E+03**
Fluorene	2.57E+03		**2.57E+03**
gamma-Chlordane	3.91E+00	6.34E-01	**6.34E-01**
Naphthalene	2.27E+03		**2.27E+03**
N-Nitrosodiphenylamine	NA	8.45E+01	**8.45E+01**
Phenol	3.91E+04		**3.91E+04**
Polychlorinated biphenyls (PCBs)	NA	9.88E-02	**9.88E-02**
Pyrene	1.95E+03		**1.95E+03**
Metals			
Antimony	2.61E+01		**2.61E+01**
Arsenic	1.96E+01	6.34E-02	**6.34E-02**
Barium	4.56E+03		**4.56E+03**
Beryllium	3.26E+02	1.09E-01	**1.09E-01**
Cadmium	3.26E+01	5.07E-02	**5.07E-02**
Chromium (total)	NA	1.81E-02	**1.81E-02**
Cobalt	3.91E+03		**3.91E+03**
Copper	2.42E+03		**2.42E+03**
Lead	2.88E+02		**2.88E+02**
Mercury	6.52E+00		**6.52E+00**
Molybdenum	3.26E+02		**3.26E+02**
Nickel	1.30E+03	8.36E-01	**8.36E-01**
Selenium	3.26E+02		**3.26E+02**
Silver	3.26E+02		**3.26E+02**
Thallium	4.56E+00		**4.56E+00**
Vanadium	4.56E+02		**4.56E+02**
Zinc	1.96E+04		**1.96E+04**

Notes: If the RBCL was greater than the calculated soil saturation concentration (Table X-4), the target cleanup level was set to the soil saturation concentration (sat).

TABLE 6-2
City of Huntington Beach
Proposed Soil Cleanup Levels for
Petroleum Hydrocarbons (1)
Ascon Site, Huntington Beach, California

Petroleum Hydrocarbons	Clean-up Level (mg/kg)
TPH	500
TRPH	500

Notes:

(1) = City of Huntington Beach Proposed Soil Clean-up Standard, City Specification 431-92, residential land use
mg/kg = Milligrams per kilogram
TPH = Total petroleum hydrocarbons
TRPH = Total recoverable petroleum hydrocarbons

Notes Continued:

5) Pits A-H Volume Calculation: Measured surface area and multiplied by average depth of impact from Radian b concern migration.

6) A. Soil = Affected Soil by Constituents of Concern.

7) Current Lagoons 1-5 Volume Calculation: Measured surface area and multiplied by average depth of impact fro Lagoon was situated over Former Lagoon, and this additional thickness of impact under the Current Lagoon surf impact..

8) Construction Debris Volume Calculation: Reviewed all 112 boring logs from RI Report and found that concrete each log evidenced was 37.65% of total boring depth (average of 26.25 feet) or 9.88 feet (used 10' in calculation a density factor of 3,000 pounds/yd^3 (1.5 ton/yd^3), this equated to approximately 274,050 tons of estimated conc

9) Former Lagoon Area Volume Calculation: Measured surface area of Former Lagoon areas on 1957 Aerial Photo area from Planimeter value of 1,081,800 SF and multiplied by the average depth of impact based on 11 spread o surface soil, 2 feet of affected underlying soil was also added to the calculation.

10) Perimeter Berms Volume Calculation: Using the Radian estimated 15', 10' and 5' heights of the berms on the n distances. Affected soils were estimated based on a 20% impact ratio.

11) C. Soil -- Relatively Clean Soil.

12) Surface Water Volume Calculation: Maximum possible retained surface water in Current Lagoons 1-5 was calc rainfall amount of 2 feet.

13) Associated Impacted Soil Volume Calculation: Already included this volume estimated by adding 2 feet of unde the heavy organic nature of the waste.

14) Relatively Clean Surface Fill Volume Calculation: Clean surface cover estimated from a review of Radian borin include Current Lagoons or Pits A-H areas).

15) This total *in situ* waste volume can be compared to Radian's estimate of 691,000 yd^3 of total site wastes.

16) This total *ex situ* waste volume can be compared to Environ's estimate of 830,000 yd^3 of total site wastes

oring log descriptions (OVA Readings) and added 2 feet of underlying soil as being affected by constituents of

m PSI drilling mud identification, cross sectional analyses and down to native clay. In some instances, Current
face area was also added. Then 2 feet of affected soil underlying the lagoon waste was added to the volume of

/rubble was entered on approximately ½ of the boring logs (45.6%). The average occurrence of concrete/rubble on
). Multiplied 10' concrete/rubble depth over 45.6% of surface area (1,081,800 SF) and arrived at 182,700 yd^3, with
rete/rubble.

graph (subtracted surface area of Current Lagoons) and was within 1% of Radian Planimeter Value. Used surface
at borings and 4 test pits across the area. This thickness of impact was 16' and appeared below 6' of relatively clean

h, east and south site sides, respectively, with a 1:1 slope, the volume was calculated based on measured linear

lated by multiplying the surface area of Current Lagoons 1-5 and multiplying by Environ's estimated maximum

rlying soil to each area of impact, and there is no appreciable horizontal migration of site wastes estimated due to

g logs and cross-sections. Average fill cover was estimated at 6' over all non-visible Former Lagoon Areas (doesn't

Table 7-1
Identified General Response Actions, Remedial Technologies and Process Options
Ascon Site, Huntington Beach, California

General Response Action	Remedial Technology	Process Options
No Action	None	None
Limited Action	Physical Barriers	Berm & Fence Reconstruction
	Institutional Controls	Deed Restrictions
Containment *Primary Wastes*	Horizontal Barriers	Clay
		Monolithic Cap
		Geomembrane
		Multi-layer Cap
	Vertical Barriers	Containment Berm
		Slurry Wall
		Grout Curtain
Secondary Wastes	Not applicable with containment options. See *Ex Situ* Treatment	
Removal and *Ex situ* Treatment and/or Disposal or Recycling	Stabilization	Asphalt Recycling
		Cement Stabilization
Primary Wastes	Biological Treatment	Biopile
		Bioreactor
		Landfarming
	Thermal Treatment	Thermal Desorption
		Incineration
	Physical Separation	Soil Washing
	Soil Vapor Extraction	Soil Vapor Extraction
	Off-site Disposal/Recycling	Off-site Disposal/Recycling
	Solvent Extraction	Solvent Extraction

General Response Action	Remedial Technology	Process Options
Secondary Wastes	Wastewater Treatment	Wastewater Treatment
	Debris Crushing	Debris Crushing
	Off-site Disposal or Recycling	Off-site Disposal or Recycling
In situ Treatment *Primary Wastes*	Stabilization	Stabilization
	Biological Treatment	Bioremediation
	Immobilization	Vitrification
	Physical Separation	Soil Flushing
	Soil Vapor Extraction	Soil Vapor Extraction
Secondary Wastes	Not applicable with *in situ* options. See *Ex Situ* Treatment	

Notes:

Primary wastes consist of the majority of site wastes such as drilling muds, oil-impacted soil, and liquid hydrocarbons. Secondary wastes consist of specific materials requiring specialized handling such as styrene tar, waste water, and construction debris.

TABLE 7-2
Preliminary Screening of Process Options Based on Effectiveness and Implementability
Ascon Site, Huntington Beach, California

General Response Action	Remedial Technology	Process Options	Effectiveness	Implementability	Rejected or Retained?
No action	None	Not Applicable	Does not meat RAOs	Not acceptable to agencies	Retained; as required by NCP, but does not meet RAOs and does not reduce risk.
Limited Action	Physical Barriers	Berm & Fence Reconstruction	Effective in preventing direct exposure	Implementable; not acceptable to agencies	Rejected; does not meet RAOs and does not reduce risk.
	Institutional Controls	Deed Restrictions	Effective in preventing inappropriate future uses	Implementable; long-term compliance not assured	Rejected; does not meet RAOs and does not reduce risk.
Containment	Horizontal Barriers	Clay	Effective in preventing contact/dust exposure and minimizing infiltration	Implementable; subject to clay availability	Rejected; cracking of clay cap can occur.
		Monolithic Cap	Effective	Implementable	Retained
		Geomembrane	Effective in preventing contact/dust exposure and minimizing infiltration	Implementable	Retained
		Multi-layer Cap	Effective in preventing contact/dust exposure and minimizing infiltration	Implementable	Retained
	Vertical Barriers	Slurry Wall	Effective in conjunction with cap	Implementable	Retained
		Grout Curtain	Effective in conjunction with cap	Difficult to implement	Rejected
		Containment Berm	Effective in conjunction with cap	Implementable	Retained

TABLE 7 (continued)

Preliminary Screening of Process Options, Ascon Site, Huntington Beach, California

General Response Action	Remedial Technology	Process Options	Effectiveness	Implementability	Rejected or Retained?
Removal and *ex situ* treatment and/or disposal or recycling	Stabilization	Asphalt Recycling	Effective for immobilizing petroleum hydrocarbons	Implementable	Retained
Primary Wastes		Cement Stabilization	Effective for binding metals; can inhibit mobility of hydrocarbons	Implementable	Retained
	Biological Treatment	Biopile	Effective for hydrocarbons but not metals	Implementable	Rejected
		Bioreactor	Effective for hydrocarbons but not metals	Implementable	Rejected
		Landfarming	Effective for hydrocarbons but not metals	Implementable	Rejected
	Thermal Treatment	Thermal Desorption	Effective for hydrocarbons but not metals	Implementable	Rejected
		Incineration	Effective for hydrocarbons but not metals	Implementable	Rejected
	Physical Separation	Soil Washing	Effective for coarse-grained materials but not for fine-grained materials	Implementable	Rejected
	Vapor Extraction	Soil Vapor Extraction	Effective for VOCs but not metals or SVOCs	Implementable	Rejected
	Disposal/ Recycling		Effective	Implementable	Retained
	Solvent	Solvent	Effective	Implementable	Retained

TABLE 7 (continued)
Preliminary Screening of Process Options, Ascon Site, Huntington Beach, California

General Response Action	Remedial Technology	Process Options	Effectiveness	Implementability	Rejected or Retained?
	Extraction	Extraction			
Secondary Wastes	Wastewater Treatment	Wastewater Treatment	Effective	Implementable	Retained
	Debris Crushing	Debris Crushing	Effective	Implementable	Retained
	Off-site Disposal or recycling	Off-site Disposal or Recycling	Effective	Implementable; subject to land ban restrictions	Retained
***In situ* treatment**	Stabilization	Stabilization	Effective for binding metals; can inhibit mobility of hydrocarbons	Potentially implementable	Rejected; not a proven process for *in situ* applications.
	Biological Treatment	Bioremediation	Effective	Difficult to implement	Rejected
	Immobilization	Vitrification	Effective for immobilizing metals and organics	Difficult to implement	Rejected
	Physical Separation	Soil Flushing	Not effective; requires hydraulic control	Difficult to implement	Rejected
	Soil Vapor Extraction	Soil Vapor Extraction	Not effective for metals or SVOCs	Implementable	Rejected

Notes:

Primary wastes consist of the majority of site wastes such as drilling muds, oil-impacted soil, and liquid hydrocarbons. Secondary wastes consist of specific materials requiring specialized handling such as styrene tar, waste water, and construction debris.

Table 7-3
Summary of Treatability and Pilot Tests
Ascon Site, Huntington Beach, California

Test	Technology Tested	Media Tested	Date	Test Implementation Contractor	QA/QC and Documentation Contractor	Comments
Treatability Studies	*Ex situ* Asphalt Recycling and Soil/Muds Stabilization	Affected soils and drilling muds from Lagoons 1 through 5, former lagoons, pits, and perimeter berm	March-May 1998	ER	J&W	• Asphalt emulsion, crusted concrete, and additives were used. • Best mix design was 40% affected soil and semi-solid material, 58% aggregates/stabilizers, and 2% emulsion. • End product was asphalt stabilized base (ASB) and backfill material.
				Global	QST	• Proprietary chemical agents were used to stabilize mobile COCs. • End product was soil-like material that can be used for fill, landfill cap, and road subgrade.
	Ex situ Solvent Extraction	Liquid hydrocarbon waste from Lagoons 1 and 2	May 1998	ER & NW Tech	J&W	• The test was performed in the Houston facility of NW Tech. • A hot water biosurfactant/solvent wash was used to reduce viscosity (increase pumpability) and extract oil from Lagoon 2 tarry material.
Pilot Tests	Test No. 1 - Solvent Extraction and Emissions Testing	Liquid hydrocarbon waste from Lagoons 1 and 2	March 1999	Global & 3I Cleaning Services	J&W	• Excavation, waste handling, waste mixing, *ex situ* solvent extraction testing, and air monitoring/sampling procedures were evaluated. • *Ex situ* solvent extraction was used to extract oil, with possible salvage value, from the liquid hydrocarbon wastes.
	Test No. 2 – Stabilization Testing	Solids from Lagoons 3 and 4 and from a Former Lagoon Area	October 1999	Global	J&W	• Surface mixing was evaluated for stabilization of solid wastes. • Reusable end product was engineered backfill.

TAL 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dre ger Tubes[9] (ppm)
3/28/99	1746	Baseline Pre-Ops Air Monitoring (AM) Sta. #1 – 250' NW of E3	SZ	0	20.9	0	0	0	0.01	NA[10]
3/28/99	1748	Baseline AM Sta. #2 – 65' N of Barrier Between Lagoons 4 & 5	CRZ	0	20.9	0	0	0	0.10	NA
3/28/99	1750	Baseline AM Sta. #3 – NE Corner of Site	CRZ	0	20.8	0	0	0	0	NA
3/28/99	1745	Baseline AM Sta. #4 – 175' SE of Hamilton Entrance	SZ	0	20.7	0	0	0	0.01	NA
3/28/99	1752	Baseline AM Sta. #5 – 175' W of Lagoon 4	CRZ	0	20.8	0	0	0	0	NA
3/28/99	1754	Baseline AM Sta. #6 – Between Lagoons 3 & 4	EZ	0	20.9	0	0	0	0	NA
3/28/99	1755	Baseline AM Sta. #7 – S Boundary Between Lagoons 4 & 5	EZ	0	20.9	0	0	0	0	NA
3/28/99	1756	Baseline AM Sta. #8 – SE Corner of Lagoon 5	CRZ	0	20.9	0	0	0	0	NA
3/28/99	1813	Baseline AM Sta. #9 – 210' W of Lagoon 3	CRZ	0	20.8	0	0	0	0	NA
3/28/99	1753	Baseline AM Sta. #10 – 60' W of E2	EZ	0	20.7	0	0	0	0	NA
3/28/99	1811	Baseline AM Sta. # 11 – SW Corner of Lagoon 3	EZ	0	20.9	0	0	0	0	NA
3/28/99	1758	Baseline AM Sta. #12 – 150' E of SE Corner of Lagoon 3	CRZ	0	20.7	0	0	0	0	NA
3/28/99	1758	Baseline AM Sta. #13 – 275' W of E Magnolia Perimeter	CRZ	0	20.8	0	0	0	0	NA

Reference: J&W (1999a)

TABLE 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dr←ger Tubes[9] (ppm)
3/28/99	1757	Baseline AM Sta. #14 – 60' W of E Magnolia Perimeter	CRZ	0	20.7	0	0	0	0	NA
3/28/99	1807	Baseline AM Sta. #15 – 50' W of Extraction Equipment & 125' W of E1	CRZ	0	20.9	0	0	0	0	NA
3/28/99	1808	Baseline AM Sta. #16 – 100' E of E1 Between Lagoons 1 & 2	EZ	0	21.0	0	0	0	0	NA
3/28/99	1800	Baseline AM Sta. #17 – 100' E of SE Corner of Lagoon 2	CRZ	0	20.8	0	0	0	0	NA
3/28/99	1759	Baseline AM Sta. #18 – 325' E of Lagoon 2 & 275' W of Magnolia Perimeter	CRZ	0	20.9	0	0	0	0	NA
3/28/99	1806	Baseline AM Sta. #19 – SW Corner of Site	SZ	0	21.0	0	0	0	0	NA
3/28/99	1804	Baseline AM Sta. #20 – 125' S of SE Corner of Lagoon 1 & 25' N of Perimeter	CRZ	0	20.7	0	0	0	0	NA
3/28/99	1801	Baseline AM Sta. #21 – 350' E of SE Corner of Lagoon 1 & 150' N of S Perimeter	CRZ	0	20.8	0	0	0	0	NA
3/28/99	1802	Baseline AM Sta. #22 – 375' E of NE Corner of Lagoon 1 & 300' W of Magnolia Perimeter	CRZ	0	20.7	0	0	0	0	NA
3/28/99	1803	Baseline AM Sta. #23 – 500' W of SE Property Corner	CRZ	0	20.9	0	0	0	0	NA
3/28/99	1803	Baseline AM Sta. #24 – 250' W of SE Property Corner	CRZ	0	20.7	0	0	0	0	NA
3/28/99	1810-1825	Baseline AM Sta. #17 – 100' E of SE Corner of Lagoon 2 – Dr←ger Tubes	CRZ	NA	NA	NA	NA	NA	NA	ND[11]
3/29/99	1059	E3 – 40' NNE of S3 (1058 Begin E3)	CRZ	0.9	NA	NA	NA	NA	0.04	NA
3/29/99	1102	E3 – 40' NNE of S3	CRZ	0.5	NA	NA	NA	NA	0.08	NA
3/29/99	1105	E3 – 20' N of S3	CRZ	0.6	NA	NA	NA	NA	0.08	NA

Reference: J&W (1999a)

TABLE 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dre-ger Tubes[9] (ppm)
3/29/99	1107	E3 – 20' N of S3	CRZ	0.5	NA	NA	NA	NA	0.34	NA
3/29/99	1111	E3 – 20' N of S3	CRZ	0.5	NA	NA	NA	NA	0.23	NA
3/29/99	1116	E3 – 20' N of S3	CRZ	0.0	NA	NA	NA	NA	0.12	NA
3/29/99	1123	E3 – 20' N of S3 (12 yd^3-Strike of 2.0)	CRZ	0.7	NA	NA	NA	NA	0.06	NA
3/29/99	1125	E3 – 20' N of S3	CRZ	0.3	NA	NA	NA	NA	0.23	NA
3/29/99	1144	E3 – 20' N of S3 (20 yd^3 Stop Excavation)	CRZ	0.0	NA	NA	NA	NA	0.21	NA
3/29/99	1046	E3 – [Before Excavation – 10' Downwind from Laydown Area (LA)]	EZ	0.0	20.8	0	0	0	0.49	NA
3/29/99	1103	E3 – 10' Downwind from LA	EZ	0.0	20.8	0	0	0	0.0	NA
3/29/99	1105	E3 – 5' Downwind from LA	EZ	0.0	20.8	0	0	0	0.0	NA
3/29/99	1110	E3 – 10' Downwind from LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1111	E3 – 5' Downwind from LA	EZ	0.1	20.9	0	0	0	0.0	NA
3/29/99	1112	E3 – 3-5" Downwind from Waste Pile	EZ	3.0	20.9	0	0	0	0.0	NA
3/29/99	1115	E3 – 10' Downwind from LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1115	E3 – 5' Downwind from LA	EZ	0.2	20.9	0	0	0	0.0	NA
3/29/99	1115	E3 – 3-5" Downwind from Waste Pile	EZ	11.5	20.9	0	0	0	0.0	NA
3/29/99	1117	E3 – 10' Downwind from LA	EZ	0.3	21.0	0	0	0	0.0	NA
3/29/99	1117	E3 – 5' Downwind from LA	EZ	1.0	21.0	0	0	0	0.0	NA
3/29/99	1117	E3 – 3-5" Downwind from Waste Pile	EZ	7.5	21.0	0	0	0	0.0	NA
3/29/99	1120	E3 – 10' Downwind from LA	EZ	0.1	20.9	0	0	0	0.0	NA
3/29/99	1120	E3 – 5' Downwind from LA	EZ	0.2	20.9	0	0	0	0.0	NA
3/29/99	1120	E3 – 3-5" Downwind from Waste Pile	EZ	10.5	20.9	0	0	0	0.0	NA
3/29/99	1124	E3 – 10' Downwind from LA	EZ	0.1	20.9	0	0	0	0.0	NA
3/29/99	1124	E3 – 5' Downwind from LA	EZ	0.3	20.9	0	0	0	0.0	NA
3/29/99	1124	E3 – 3-5" Downwind from Waste Pile	EZ	11.1	20.9	0	0	0	0.0	NA
3/29/99	1130	E3 – 10' Downwind from LA	EZ	0.2	20.9	0	0	0	0.0	NA
3/29/99	1130	E3 – 5' Downwind from LA	EZ	2.0	20.9	0	0	0	0.0	NA
3/29/99	1130	E3 – 3-5" Downwind from Waste Pile (3 Sec)	EZ	29.0	20.9	0	0	0	0.0	NA
3/29/99	1144	E3 – 5' Downwind from LA	EZ	0.2	20.8	1	0	0	0.04	NA
3/29/99	1144	E3 – 3-5" Downwind from Waste Pile	EZ	9.2	20.8	1	0	0	0.04	NA
3/29/99	1046	E3 – Downwind NE of LA	CRZ	0.0	NA	NA	NA	NA	0.49	NA

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TAL _9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dr~ger Tubes[9] (ppm)
3/29/99	1102	E3 – Downwind NE of LA	CRZ	0.7	NA	NA	NA	NA	0.39	NA
3/29/99	1110	E3 – Downwind NE of LA	CRZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1116	E3 – Downwind NE of LA	CRZ	0.7	NA	NA	NA	NA	0.04	NA
3/29/99	1126	E3 – Downwind NE of LA	CRZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1037	Site Briefing Area	SZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1110	Parking Area	SZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1117	Parking Area	SZ	0.2	NA	NA	NA	NA	0.0	NA
3/29/99	1127	Field Viewing Area 3	CRZ	0.2	NA	NA	NA	NA	0.0	NA
3/29/99	1043	E3 – N of LA	CRZ	0.2	NA	NA	NA	NA	0.0	NA
3/29/99	1100	E3 – N of LA	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1105	E3 – N of LA	CRZ	0.2	NA	NA	NA	NA	0.0	NA
3/29/99	1137	E3 – Perimeter	CRZ	0.4	NA	NA	NA	NA	0.0	NA
3/29/99	1143	E3 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1150	E3 – Waste Pile Berm	EZ	0.2	NA	NA	NA	NA	0.0	NA
3/29/99	1156	E3 – Waste Pile Berm	EZ	0.8	NA	NA	NA	NA	0.0	NA
3/29/99	1159	E3 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1205	E3 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1207	E3 – Waste Pile Berm	EZ	0.6	NA	NA	NA	NA	0.0	NA
3/29/99	1211	E3 – Waste Pile Berm	EZ	0.4	NA	NA	NA	NA	0.0	NA
3/29/99	1212	E3 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1217	E3 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1220	E3 – Waste Pile Berm	EZ	0.4	NA	NA	NA	NA	0.0	NA
3/29/99	1225	E3 – Waste Pile Berm	EZ	0.4	NA	NA	NA	NA	0.0	NA
3/29/99	1230	E3 – Waste Pile Berm	EZ	0.4	NA	NA	NA	NA	0.0	NA
3/29/99	1232	E3 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1242	E3 – 20' NW of LA	CRZ	0.0	NA	NA	NA	NA	0.08	NA
3/29/99	1246	E3 – 20' NW of LA	CRZ	0.0	NA	NA	NA	NA	0.10	NA
3/29/99	1249	E3 – 3-6" Downwind from Waste Pile	EZ	3.8	NA	NA	NA	NA	0.08	NA
3/29/99	1253	E3 – 20' NW of LA	CRZ	0.0	NA	NA	NA	NA	0.08	NA
3/29/99	1255	E3 – 3-6" Downwind from Waste Pile	EZ	1.9	NA	NA	NA	NA	0.08	NA
3/29/99	1258	E3 – 20' NW of LA	CRZ	0.0	NA	NA	NA	NA	0.10	NA
3/29/99	1301	E3 – 20' NW of LA	CRZ	0.0	NA	NA	NA	NA	0.10	NA

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TAb__ 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
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3/29/99	1307	E3 – 20' NW of LA	CRZ	0.0	NA	NA	NA	NA	0.08	NA
3/29/99	1400-1545	E3 – Perimeter & Berm	CRZ/EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1545-1700	E3 – Perimeter & Berm (1630 - During Backfilling)	CRZ/EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1226	E2 – CRZ Perimeter – 30' N of LA (1225 Begin E2)	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1229	E2 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1235	E2 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1248	E2 – 6-12" Downwind from Waste Pile	EZ	0.0	NA	NA	NA	NA	0.2	ND – Benzene
3/29/99	1253	E2 – Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1235	E2 - 3-5" over Asphaltic Crust in LA	EZ	0.0	0	0	0	0	0.4	NA
3/29/99	1239	E2 – 3' bgs Drilling Mud in LA	EZ	1.0	0	0	0	0	0.4	NA
3/29/99	1243	E2 – 5' bgs Drilling Mud in LA	EZ	0.0	0	0	0	0	0.0	NA
3/29/99	1249	E2 – 7' bgs Drilling Mud in LA	EZ	2.9	0	0	0	0	0.0	NA
3/29/99	1256	E2 – 7-8' bgs Drilling Mud in LA	EZ	0.6	0	0	0	0	1.8	NA
3/29/99	1259	E2 – Directly Downwind of LA	EZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1304	E2 – Downwind of LA (Spike of 32.8 – 3 Sec)	EZ	13.8	NA	NA	NA	NA	0.02	NA
3/29/99	1307	E2 – Downwind of LA – Excavation Complete due to Cave-In of Walls	EZ	0.6	NA	NA	NA	NA	0.02	NA
3/29/99	1232	E2 – 40' NW of E2 LA	CRZ	0.1	NA	NA	NA	NA	0.12	NA
3/29/99	1235	E2 – 40' NW of E2 LA	CRZ	0.2	NA	NA	NA	NA	0.08	NA
3/29/99	1243	Excavation Process Air Monitoring (AM) Sta. #1 (E3/E2 Open) – 250' NW of E3	SZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1240	Excavation Process AM Sta. #2 – 65' N of Barrier Between Lagoons 4 & 5	CRZ	0.0	NA	NA	NA	NA	0.1	NA
3/29/99	1236	Excavation Process AM Sta. #3 – NE Corner of Site	CRZ	0.2	NA	NA	NA	NA	0.0	NA
3/29/99	1246	Excavation Process AM Sta. #4 – 175' SE of Hamilton Entrance	SZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1255	Excavation Process AM Sta. #5 – 175' W of Lagoon 4	CRZ	0.0	NA	NA	NA	NA	0.0	NA

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Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m³)	Dräger Tubes[9] (ppm)
3/29/99	1258	Excavation Process AM Sta. #6 – Between Lagoons 3 & 4	EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1300	Excavation Process AM Sta. #7 – S Boundary Between Lagoons 4 & 5	EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1302	Excavation Process AM Sta. #8 – SE Corner of Lagoon 5	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1250	Excavation Process AM Sta. #9 – 210' W of Lagoon 3	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1254	Excavation Process AM Sta. #10 – 60' W of E2	EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1259	Excavation Process AM Sta. #11 – SW Corner of Lagoon 3	EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1309	Excavation Process AM Sta. #12 – 150' E of SE Corner of Lagoon 3	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1307	Excavation Process AM Sta. #13 – 275' W of E Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1305	Excavation Process AM Sta. #14 – 60' W of E Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1329	Excavation Process AM Sta. #15 – 50' W of Extraction Equipment & 125' W of E1	CRZ	0.0	NA	NA	NA	NA	0.3	NA
3/29/99	1326	Excavation Process AM Sta. #16 – 100' E of E1 Between Lagoons 1 & 2	EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1324	Excavation Process AM Sta. #17 – 100' E of SE Corner of Lagoon 2	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1312	Excavation Process AM Sta. #18 – 325' E of Lagoon 2 & 275' W of Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1322	Excavation Process AM Sta. #19 – SW Corner of Site	SZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1320	Excavation Process AM Sta. #20 – 125' S of SE Corner of Lagoon 1 & 25' N of Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA

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TAb__ 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m³)	Dre-ger Tubes[9] (ppm)
3/29/99	1315	Excavation Process AM Sta. #21 – 350' E of SE Corner of Lagoon 1 & 150' N of S Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1317	Excavation Process AM Sta. #22 – 375' E of NE Corner of Lagoon 1 & 300' W of Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1318	Excavation Process AM Sta. #23 – 500' W of SE Property Corner	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1323	Excavation Process AM Sta. #24 – 250' W of SE Property Corner	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1455	E1 – 10' Downwind of LA (1455 Begin E1/SE Process)	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1455	E1 – 5' Downwind of LA	EZ	0.0	21.0	0	0	0	0.0	NA
3/29/99	1456	E1 – 3-5" Downwind of Waste Pile	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1504	E1 – 10' Downwind of LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1504	E1 – 5' Downwind of LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1504	E1 – 3-5" Downwind of Waste Pile	EZ	0.5	20.9	0	0	0	0.0	NA
3/29/99	1509	E1 – 10' Downwind of LA	EZ	0.0	21.0	0	0	0	0.0	NA
3/29/99	1509	E1 – 5' Downwind of LA	EZ	0.0	21.0	0	0	0	0.0	NA
3/29/99	1509	E1 – 3-5" Downwind of Waste Pile	EZ	0.5	21.0	0	0	0	0.0	NA
3/29/99	1515	E1 – 10' Downwind of LA	EZ	0.0	20.9	0	0	0	0.0	NA
~~3/29/99~~	~~1515~~	~~E1 – 5' Downwind of LA~~	~~EZ~~	~~0.0~~	~~20.9~~	~~0~~	~~0~~	~~0~~	~~0.0~~	~~NA~~
3/29/99	1515	E1 – 3-5" Downwind of Waste Pile	EZ	0.5	20.9	0	0	0	0.0	NA
3/29/99	1519	E1 – 10' Downwind of LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1519	E1 – 5' Downwind of LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1519	E1 – 3-5" Downwind of Waste Pile	EZ	1.0	20.9	0	0	0	0.0	NA
3/29/99	1523	E1 – 5' Downwind of LA	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1523	E1 – 3-5" Downwind of Waste Pile	EZ	0.0	20.9	0	0	0	0.0	NA
3/29/99	1455	E1 – Downwind of Solvent Extraction (SE) Sump	EZ	0.0	NA	NA	NA	NA	0.06	NA
3/29/99	1506	E1 – Downwind of SE Unit/Sump	EZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1510	E1 – Downwind of SE Unit/Sump	EZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1518	E1 – Downwind of SE Unit/Sump	EZ	0.0	NA	NA	NA	NA	0.06	NA

Reference: J&W (1999a)

TABLE 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dr<-ger Tubes[9] (ppm)
3/29/99	1522	E1 – Downwind of SE Unit/Sump	EZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1535	E1 – Baseline Granulated Activated Carbon (GAC) Inlet – Off	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1536	E1 – Baseline GAC Middle – Off	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1536	E1 – Baseline GAC Outlet – Off	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1540	E1 – GAC Unit – Inlet	EZ	460	NA	NA	NA	NA	NA	NA
3/29/99	1540	E1 – GAC Unit – Middle	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1540	E1 – GAC Unit – Outlet	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1606	E1 – GAC Unit - Inlet	EZ	620	NA	NA	NA	NA	NA	NA
3/29/99	1606	E1 – GAC Unit – Middle	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1606	E1 – GAC Unit – Outlet	EZ	0.0	NA	NA	NA	NA	NA	NA
3/29/99	1620	E1 – 20' Downwind During Backfilling	EZ	2.5	NA	NA	NA	NA	0.08	NA
3/29/99	1533	Solvent Extraction (SE) Process AM Sta. #1 (SE/E1 Open) – 250' NW of E3	SZ	0.0	NA	NA	NA	NA	0.06	NA
3/29/99	1536	SE Process AM Sta. #2 – 65' N of Barrier Between Lagoons 4 & 5	CRZ	0.0	NA	NA	NA	NA	0.18	NA
3/29/99	1539	SE Process AM Sta. #3 – NE Corner of Site	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1528	SE Process AM Sta. #4 – 175' SE of Hamilton Entrance	SZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1534	SE Process AM Sta. #5 – 175' W of Lagoon 4	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1522	SE Process AM Sta. #6 – Between Lagoons 3 & 4	EZ	0.0	NA	NA	NA	NA	0.06	NA
3/29/99	1515	SE Process AM Sta. #7 – S Boundary Between Lagoons 4 & 5	EZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1517	SE Process AM Sta. #8 – SE Corner of Lagoon 5	CRZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1519	SE Process AM Sta. #9 – 210' W of Lagoon 3	CRZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1523	SE Process AM Sta. #10 – 60' W of E2	EZ	0.0	NA	NA	NA	NA	0.0	NA

Reference: J&W (1999a)

TAL _ 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m³)	Dre_ger Tubes[9] (ppm)
3/29/99	1552	SE Process AM Sta. #11 – SW Corner of Lagoon 3	EZ	0.0	NA	NA	NA	NA	0.16	NA
3/29/99	1512	SE Process AM Sta. #12 – 150' E of SE Corner of Lagoon 3	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1511	SE Process AM Sta. #13 – 275' W of E Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1509	SE Process AM Sta. #14 – 60' W of E Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1600	SE Process AM Sta. #15 – 50' W of Extraction Equipment & 125' W of E1	CRZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1557	SE Process AM Sta. #16 – 100' E of E1 Between Lagoons 1 & 2	EZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1505	SE Process AM Sta. #17 – 100' E of SE Corner of Lagoon 2	CRZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1506	SE Process AM Sta. #18 – 325' E of Lagoon 2 & 275' W of Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1452	SE Process AM Sta. #19 – SW Corner of Site	SZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1455	SE Process AM Sta. #20 – 125' S of SE Corner of Lagoon 1 & 25' N of Perimeter	CRZ	0.0	NA	NA	NA	NA	0.04	NA
3/29/99	1500	SE Process AM Sta. #21 – 350' E of SE Corner of Lagoon 1 & 150' N of S Perimeter	CRZ	0.0	NA	NA	NA	NA	0.02	NA
3/29/99	1503	SE Process AM Sta. #22 – 375' E of NE Corner of Lagoon 1 & 300' W of Magnolia Perimeter	CRZ	0.0	NA	NA	NA	NA	0.0	NA
3/29/99	1457	SE Process AM Sta. #23 – 500' W of SE Property Corner	CRZ	0.0	NA	NA	NA	NA	0.06	NA
3/29/99	1501	SE Process AM Sta. #24 – 250' W of SE Property Corner	CRZ	0.0	NA	NA	NA	NA	0.02	NA
3/30/99	1530	Post Field Operations Air Monitoring (AM) Sta. #1 – 250' NW of E3	SZ	0.1	20.8	0	0	0	0.0	NA

Reference: J&W (1999a)

TABLE 9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dre-ger Tubes[9] (ppm)
3/30/99	1530	Post Ops AM Sta. #2 – 65' N of Barrier Between Lagoons 4 & 5	CRZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1532	Post Ops AM Sta. #3 – NE Corner of Site	CRZ	0.2	20.8	0	0	0	0.0	NA
3/30/99	1529	Post Ops AM Sta. #4 – 175' SE of Hamilton Entrance	SZ	0.2	20.9	0	0	0	0.0	NA
3/30/99	1529	Post Ops AM Sta. #5 – 175' W of Lagoon 4	CRZ	0.2	20.7	0	0	0	0.0	NA
3/30/99	1534	Post Ops AM Sta. #6 – Between Lagoons 3 & 4	EZ	0.0	20.8	0	0	0	0.0	NA
3/30/99	1535	Post Ops AM Sta. #7 – S Boundary Between Lagoons 4 & 5	EZ	0.0	20.7	0	0	0	0.0	NA
3/30/99	1536	Post Ops AM Sta. #8 – SE Corner of Lagoon 5	CRZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1558	Post Ops AM Sta. #9 – 210' W of Lagoon 3	CRZ	0.1	20.9	0	0	0	0.0	NA
3/30/99	1600	Post Ops AM Sta. #10 – 60' W of E2	EZ	0.0	20.8	0	0	0	0.0	NA
3/30/99	1558	Post Ops AM Sta. #11 – SW Corner of Lagoon 3	EZ	0.0	20.7	0	0	0	0.0	NA
3/30/99	1537	Post Ops AM Sta. #12 – 150' E of SE Corner of Lagoon 3	CRZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1537	Post Ops AM Sta. #13 – 275' W of E Magnolia Perimeter	CRZ	0.1	20.8	0	0	0	0.0	NA
3/30/99	1536	Post Ops AM Sta. #14 – 60' W of E Magnolia Perimeter	CRZ	0.1	20.9	0	0	0	0.0	NA
3/30/99	1553	Post Ops AM Sta. #15 – 50' W of Extraction Equipment & 125' W of E1	CRZ	0.2	20.8	0	0	0	0.0	NA
3/30/99	1555	Post Ops AM Sta. #16 – 100' E of E1 Between Lagoons 1 & 2	EZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1538	Post Ops AM Sta. #17 – 100' E of SE Corner of Lagoon 2	CRZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1540	Post Ops AM Sta. #18 – 325' E of Lagoon 2 & 275' W of Magnolia Perimeter	CRZ	0.1	20.8	0	0	0	0.0	NA

Reference: J&W (1999a)

TAL _9 - 1
Summary of Air Monitoring Results
Field Emissions Testing
Ascon Site, Huntington Beach, California

Date	Time	Sample Location / Station Number[1]	Work Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (%)	H_2S[7] (%)	Dust[8] (mg/m^3)	Dr<–ger Tubes[9] (ppm)
3/30/99	1552	Post Ops AM Sta. #19 – SW Corner of Site	SZ	0.0	21.0	0	0	0	0.0	NA
3/30/99	1550	Post Ops AM Sta. #20 – 125' S of SE Corner of Lagoon 1 & 25' N of Perimeter	CRZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1545	Post Ops AM Sta. #21 – 350' E of SE Corner of Lagoon 1 & 150' N of S Perimeter	CRZ	0.0	20.9	0	0	0	0.0	NA
3/30/99	1543	Post Ops AM Sta. #22 – 375' E of NE Corner of Lagoon 1 & 300' W of Magnolia Perimeter	CRZ	0.0	20.8	0	0	0	0.0	NA
3/30/99	1545	Post Ops AM Sta. #23 – 500' W of SE Property Corner	CRZ	0.0	20.7	0	0	0	0.0	NA
3/30/99	1547	Post Ops AM Sta. #24 – 250' W of SE Property Corner	CRZ	0.0	20.7	0	0	0	0.0	NA
3/30/99	1605-1615	Post Ops AM Sta. # 17 – Dr<–ger Tubes	CRZ	NA	NA	NA	NA	NA	NA	ND

Notes:

1. Air monitoring locations/stations are shown in Figure 4.
2. Work zones (i.e. – Exclusion Zone [EZ], Contamination Reduction Zone [CRZ] and Support Zone [SZ]) are depicted on Figure 4. Organic Contaminant Action Levels (ALs) were:
   EZ – 50 ppm, CRZ – 10 ppm and SZ – 1 ppm; and, Dust ALs were; EZ – 25 mg/m^3, CRZ – 5 mg/m^3 and SZ – 1.25 mg/m^3.
3. Organic vapor concentration as measured by Thermo Environmental Instruments® OVM Model 580B, expressed in parts per million (ppm).
4. Oxygen concentration as measured by Lumidor Safety Products® MicroMax Model MAX-4AP, expressed in percentage by volume in air.
5. Portion of Lower Explosive (flammable) Limit as measured by Lumidor Safety Products® MicroMax Model MAX-4AP, expressed in percentage by volume in air.
6. Carbon monoxide concentration as measured by Lumidor Safety Products® MicroMax Model MAX-4AP, expressed in percentage by volume in air.
7. Hydrogen sulfide concentration as measured by Lumidor Safety Products® MicroMax Model MAX-4AP, expressed in percentage by volume in air.
8. Dust concentration as measured by Monitoring Instruments for the Environment, Inc.® Aerosol Monitor Model PDM-3, expressed in milligrams per cubic meter.
9. Periodic Dr<–ger Tube measurements for speciated compounds (i.e. Benzene, Toluene, Ethylbenzene and 1,1,1 – Trichloroethane) never indicated any positive results.
10. NA – Not Applicable; parameter not analyzed.
12. ND – Parameter not detected above detection limits.

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Constituent	Regulatory Limits						
	Action Levels[2] [DTSC ALs (ppb)]	Exposure Levels[3] [ATSDR MRLs (ppb)]	JW-01 (03-29-99/1047-1301) [S5-Downwind, NE Corner of Site] <During E1 Excavation>	JW-02[1] (03-29-99 / 1045-1257) [S9-Downwind, NE Corner of Lagoon 4] <Offsite During E1 Excavation>	JW-02 Dup (03-29-99 / 1045-1257) [S8-Downwind, NE Corner of Lagoon 4] <Offsite During E1 Excavation>	JW-04 (03-29-99 / 1031-1250) [S4-Upwind, Western Site Perimeter] <During E1 Excavation>	(03- [S <Du
VOCs (ppb)[5]							
Chloromethane	--[4]	500	1.1	0.92	1.1	1.2	
Acetone	2.5×10^5	2.6×10^4	9.3	32	32	10	
Trichlorofluoromethane	3.12×10^5	-- (143.4)	0.33	0.34	0.35	0.31	
Methylene Chloride	3.1×10^4	400	3.8	1.3	1.4	ND[5]	
Carbon Disulfide	--	300	0.54	0.44	0.44	ND	
Trichlorotrifluoroethane	--	--(407.9)	0.11	0.11	0.11	0.12	
Methyl Tert-Butyl Ether	--	200	0.34	0.34	0.38	0.33	
2-Butanone	--	-- (339.0)	1.8	2.5	2.5	1.4	
1,2-Dichloroethane	500	200	7.7	2.4	2.3	ND	
Benzene	500	50	0.55	0.60	0.61	0.29	
Carbon Tetrachloride	--	200	ND	ND	ND	ND	
4-Methyl-2-Pentanone	--	-- (--)	0.35	1.2	1.2	0.18	
Toluene	3.7×10^4	3,000	3.7	15	15	2.3	
2-Hexanone	--	-- (--)	ND	ND	ND	ND	
Tetrachloroethene	--	200	0.24	0.36	0.38	ND	
Ethylbenzene	3.1×10^4	-- (252.9)	0.26	2.4	2.5	0.36	
Styrene	--	60	ND	0.51	0.53	ND	
Xylenes	--	1,000	1.21	20.3	20.2	2.96	
1,2-Dichlorobenzene	--	-- (35)	ND	1.1	1.1	ND	
SVOCs ($\mu g/m^3$)[6]			NA[7]		NA		
Bis (2-ethylhexyl) phalate	--	-- (0.48)		8.2		49	
Metals (mg/m^3)[8]			NA	ND	NA	ND	
Zinc	--	-- (0.0025)					
Mercury (mg/m^3)[9]	5.0 mg/m^3	5.0 mg/m^3	NA	ND	NA	0.030	
PM-10 ($\mu g/m^3$)[10]	126[11]	NA	NA	NA	NA	NA	

Reference: J&W (1999a)

[illegible] - 2
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PERIMETER Sample I.D.# (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>						
JW-08 (03-29-99 / 1220-1450) [Downwind, NE Corner of Site] <During E2 Excavation>	JW-10 (03-29-99 / 1443-1702) [96-Downwind, SE Corner of Site] <During E1 Excavation and Solvent Extraction Testing>	JW-11 (03-29-99 / 1447-1715) [87-Downwind, Eastern Perimeter] <During E1 Excavation and Solvent Extraction Testing>	JW-12 (03-29-99 / 1481-1720) [88-Downwind, SE Corner of Site] <During E1 Excavation and Solvent Extraction Testing>	JW-3 (03-29-99 / 1033-1748) [94-Upwind, Western Perimeter] <Duration of Site Activities>	JW-6 (03-29-99 / 1048-1729) [85-Downwind, NE Corner of Site] <Duration of Site Activities>	JW-7 (03-29-99 / 1106-1741) [86-Downwind, SE Corner of Site] <Duration of Site Activities>
				NA	NA	NA
1.0	1.0	1.0	1.1			
12	4.9	270	17			
0.32	0.32	0.11	0.34			
ND	0.61	ND	ND			
ND	1.0	ND	ND			
0.11	0.10	ND	0.11			
0.26	ND	0.33	ND			
1.2	0.85	2.3	1.6			
ND	2.0	ND	ND			
0.27	0.44	0.29	0.23			
[illegible]	ND	0.11	0.11			
[illegible]	0.19	0.95	0.78			
0.38	7.6	0.47	0.28			
ND	ND	0.41	ND			
ND	0.24	ND	ND			
ND	0.84	ND	ND			
ND	ND	ND	ND			
ND	5.3	0.65	0.26			
ND	0.27	ND	ND			
			NA	NA	NA	NA
6.4	15	50				
ND	ND		NA	NA	NA	NA
		0.0016				
ND	ND	ND	NA	NA	NA	NA
NA	NA	NA	NA	76 (Background)	60	55

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Constituent	Regulatory Limits		EXCI	
	Action Levels [DTSC ALs (ppb)][1]	Exposure Levels [PEL x 50 (ppb)][12]	JW-03 (03-29-99 / 1037-1242) [N1-30' NE of E3 and Laydown Area] <During E3 Excavation>	JW-09 (03-29-99 / 1217-1[illegible] [S2-30' NE of [illegible] and Laydown Area] <During E3 Excavation>
VOCs (ppb)[3]				
Chloromethane	--[4]	2.5×10^5	1.1	0.97
Acetone	1.0×10^6	3.75×10^7	7.9	9.5
Trichlorofluoromethane	1.0×10^6	5.5×10^7	0.33	0.34
Methylene Chloride	1.0×10^6	1.25×10^6	1.4	ND[5]
Carbon Disulfide	--	2.0×10^5	1.1	ND
Trichlorotrifluoroethane	--	5.0×10^7	0.11	0.11
Methyl Tert-Butyl Ether	--	-- (1.0×10^4)	0.36	0.27
2-Butanone	--	1.0×10^7	1.1	1.4
1,1,1-Trichloroethane	1.0×10^6	1.75×10^7	ND	ND
1,2-Dichloroethane	5.0×10^4	5.0×10^4	3.0	ND
Benzene	5.0×10^4	5.0×10^4	0.69	0.34
Carbon Tetrachloride	--	1.0×10^5	0.10	0.10
Trichloroethene	--	1.25×10^6	ND	ND
4-Methyl-2-Pentanone	--	1.25×10^6	0.19	ND
Toluene	1.0×10^6	2.5×10^6	6.2	0.67
Tetrachloroethene	--	1.25×10^6	0.48	ND
Ethylbenzene	1.0×10^6	5.0×10^6	0.94	0.41
Styrene	--	2.5×10^6	ND	ND
Xylenes	--	5.0×10^6	4.6	0.47
1,4-Dichlorobenzene	--	3.75×10^6	ND	ND
1,2-Dichlorobenzene	--	2.5×10^6	0.2	ND
SVOCs (µg/m³)[6]			ND	ND
Bis (2-ethylhexyl) phalate	--	2.5×10^5		
Metals (mg/m³)[8]			ND	
Zinc	0.5 mg/m³	0.5 mg/m³		0.0016
Mercury (mg/m³)[9]	5.0 mg/m³	5.0 mg/m³	0.022	ND
PM-10 (µg/m³)[10]	126[11]	N/A[13]	NA	NA

Notes:

1) Action Levels obtained from established CAL-EPA DTSC-approved Revised Final AFTWHASP Addendum Table 2 (March 22, 1999) va (PRGs) which are allowable ambient air lifetime exposure values (if no MRLs exist).
2) Location of JW-02 selected to represent the closest downwind off-site migration point.
3) VOCs - Volatile Organic Compounds collected by Summa Canisters and analyzed by EPA Test Method TO-14A/8260 and reported in par
4) -- No DTSC Action Level or ATSDR MRL exists for this constituent; but value is far less than USEPA Region IX Preliminary Remediatio
5) ND – Constituent not detected above Method Detection Limit.
6) SVOCs – Semi-Volatile Organic Compounds collected by Sensidyne (Gilian) Station Air Sampling Pumps and Polyurethane (PUF/XAD-2
7) NA – Parameter Not Analyzed for at this time.
8) Metals – Title 22 Compounds collected by Sensidyne (Gilian) Station Air Sampling Pumps and MCE Filter Cassettes and analyzed by NIO
9) Mercury Samples collected by Hopcalite Badges and analyzed by OSHA Test Method ID-140 and reported in mg/m³.
10) PM-10 – Respirable Particulate Matter Samples collected by R&P Partisol Model 2000 High Volume Air Samplers and analyzed by NIOS
11) Action Level for PM-10 equals Background Levels (76) plus 50 µg/m³.
12) Action Levels for the Exclusion Zone for 40-hour HAZWOPER Trained on-site personnel equals the lower value of "PEL x 50" or 1,000 p
13) N/A - Not Applicable.

Reference: J&W (1999a)

ble 9 - 2
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USION ZONE Sample I.D.# (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>				
00) E2 >	JW-13 (03-29-99 / 1441-1642) [SE Downwind 25' NE of Solvent Extraction Sump and 40' NE of Soil Laydown Area] <During EE Extraction and Solvent Extraction Drying>	JW-14 (03-29-99 / 1441-1642) [Field Duplicate Collected at JW-13]	JW-14 (03-29-99 / 1441-1642) [Laboratory Duplicate Collected at JW-13]	Internal Laboratory QA/QC Samples and Field Blanks
				ND
	1.2	1.0	1.0	
	1,800	12	12	
	0.16	0.28	0.30	
	1.2	1.0	1.1	
	ND	ND	ND	
	0.11	0.11	0.11	
	0.79	0.55	0.55	
	4.1	1.7	1.8	
	0.24	0.19	0.20	
	ND	ND	ND	
	0.51	0.52	0.48	
	ND	ND	ND	
	ND	0.19	0.19	
	3.1	ND	ND	
	17	5.8	5.8	
	ND	ND	ND	
	5.1	1.5	1.5	
	0.42	ND	ND	
	28	1.17	1.15	
	0.14	ND	ND	
	0.17	ND	ND	
			NA	ND
	6.3	4.3		
	ND	ND	NA	ND
	0.026	0.029	NA	0.082 µg
	NA	NA	NA	ND

lues. Exposure Levels (where appropriate) were obtained from the most conservative ATSDR Minimal Risk Levels (MRLs) where available or USEPA Region IX Preliminary Remediation Goals

ts per billion (ppb).
n Goal (concentration presented in parentheses when MRL is not available) which is an allowable ambient air lifetime exposure level.

) Cartridges and analyzed by EPA Test Method TO-13A/8270 and reported in micrograms per cubic meter (µg/m³).

SH Test Method 7300 and reported in milligrams per cubic meter (mg/m³).

H Test Method 0600 and reported in µg/m³.

ppm (typical filtering capacity of full-face respirator cartridges).

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Analytical Parameters Detected	JW-15 03/29/99 / 1629 E1-Sludge Influent from Solvent Extraction Sump	JW-16 03/29/99 / 1617 E1-Water Effluent from Solvent Extraction Process	E1-Oil Ef
Volatile Organic Compounds (ppb)[1]			
Acetone	ND[6]	93.7	
Benzene	ND	7.4	
N-Butylbenzene	ND	ND	
Ethylbenzene	680	9.1	
N-Propylbenzene	ND	ND	
Toluene	280	61.8	
1,2,4 – Trimethylbenzene	330	13.7	
1,3,5 – Trimethylbenzene	ND	ND	
Xylenes	ND	23	
Methyl Tert-Butyl Ether	ND	36.3	
Semi-Volatile Organic Compounds (ppm)[2]	ND	ND	
TPH-Gas (ppm)[3]	290	12,800	
TPH-Diesel (ppm)[4]	195,000	525,000	
Total RCRA Metals (ppm)[5]			
Antimony	ND	0.028	
Arsenic	15.5	0.403	
Barium	637	5.93	
Cadmium	1.45	0.012	
Chromium	22.3	0.412	
Copper	15.8	0.3	
Lead	107	1.36	
Mercury	ND	0.0025	
Nickel	36.4	0.351	
Silver	ND	ND	
Vanadium	13.7	0.324	
Zinc	216	2.56	
Hydrocarbon Fractionation (ppm)[7]	NA[9]	NA	
C19-C20			
C23-C24			
C29-C32			
C33-C36			
C37+			
Oil Characterization[8]	NA	NA	

Reference: J&W (1999a)

1[illegible]9 - 3
vent Extraction Results
nissions Testing
ington Beach, California

Sample ID# Sample Collection Date/Time Sample Location			
JW-17 03/29/99 / 1819 Effluent from Solvent Extraction Process	JW-18 03/29/99 / 1819 E1-Oil Effluent Duplicate from Solvent Extraction Process	JW-19 03/29/99 / 1635 E1-Sediment Effluent from Solvent Extraction Process	Blanks NA Laboratory Method Blanks
			ND
ND	ND	ND	
ND	ND	ND	
592	588	ND	
838	730	1,600	
306	274	ND	
2,670	2,110	4,300	
1,570	1,560	3,900	
470	446	1,200	
1,540	1,380	ND	
ND	ND	ND	
ND	ND	ND	ND
[illegible]429	416	770	ND
129,000	138,000	46,100	ND
			ND
ND	ND	ND	
17.8	15.6	21.0	
1,250	1,280	2,740	
1.57	1.69	2.23	
27.6	24.3	40.2	
22.4	19.9	58.3	
125	114	137	
ND	ND	0.77	
ND	ND	37.6	
ND	ND	0.36	
18.2	16.6	26.5	
234	207	202	
		NA	ND
38,000	45,300		
28,200	30,000		
26,800	25,800		
84,600	100,000		
5,260	ND		
		NA	NA

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Summary of Sol
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Ascon Site, Hunti

Analytical Parameters Detected	JW-15 03/29/99 / 1629 E1-Sludge Influent from Solvent Extraction Sump	JW-16 03/29/99 / 1617 E1-Water Effluent from Solvent Extraction Process	(E1-Oil Ex
Density			
API Gravity			
Total Solids			
Total Sulfur			
Flash Point			
BTU Content			
Viscosity			

Notes:

1) Volatile Organic Compounds (VOCs) measured by EPA Test Method 8260 and reported in micrograms
2) Semi-Volatile Organic Compounds (SVOCs) measured by EPA Test Method 8270 and reported in millig
3) TPH-Gas – Total Petroleum Hydrocarbons as measured by EPA Modified Test Method 8015 for gasolin
4) TPH-Diesel – Total Petroleum Hydrocarbons as measured by EPA Modified Test Method 8015 for diese
5) Total RCRA Metals as measured by EPA Test Method 6010/7000 series and reported in mg/kg or mg/L
6) ND – Parameter not detected above method detection limit.
7) Hydrocarbon Fractionation as measured by EPA Modified Test Method 8015 with Carbon Chain Delinea
8) Oil Characterization – Density measured by ASTM Test Method D-4292 reported in grams per millilit EPA Test Method 160.3 reported in % by weight; Total Sulfur measured by ASTM Test Method D-12 Test Method D-240 reported in British Thermal Units/Pound (BTU/lb); and, Viscosity measured by AS sample, and the viscosity is too high to measure (sample would not flow at 40° C) due to captured particu
9) NA – Parameter not analyzed for at this time.

Reference: J&W (1999a)

9 - 3
vent Extraction Results
nissions Testing
ngton Beach, California

Sample ID# Sample Collection Date/Time Sample Location			
JW-17 3/29/99 / 1819 Effluent from Solvent Extraction Process	JW-18 03/29/99 / 1819 E1-Oil Effluent Duplicate from Solvent Extraction Process	JW-19 03/29/99 / 1635 E1-Sediment Effluent from Solvent Extraction Process	Blanks NA Laboratory Method Blanks
0.979 g/ml	0.986 g/ml		
13	12		
37.6% by wt.	39.4% by wt.		
0.8% by wt.	0.5% by wt.		
>212°F	NA		
NA	>175 BTU/lb		
NA	ND		

per kilogram (μg/kg) or micrograms per liter (μg/L) as approximated by parts per billion (ppb).
grams per kilogram [mg/kg or parts per million (ppm)] or μg/L (or ppb).
e fraction and reported in mg/kg or mg/L (ppm).
action and reported in mg/kg or mg/L (ppm).
(ppm).

ation reported in mg/L (ppm).
er (g/ml); API Gravity measured by ASTM Test Method D-287M reported in degrees API; Total Solids measured by) reported in % by weight; Flash Point measured by EPA Test Method 1010 reported in °F; BTU measured by ASTM STM Test Method D-445 reported in centistokes. The BTU value is artificially low due to entrained water within the ulate matter.

TAB
Summary of Air
Stabilizati
Ascon Site, Hunting

Day	Date	Time	Sample Location / Station Number[1]	Work
1	10/19/99	0930-1105	Initial 24-Point Site Air Monitoring Round	SZ/CI
1	10/19/99	1027-1418	Initial Mix Area & Excavation of Lagoon 4	E
1	10/19/99	1330-1515	Mid-Day 24-Point Monitoring	SZ/CI
1	10/19/99	1700-1738	Final Daily 24-Point Monitoring	SZ/CI
1	10/19/99	1330-1415	Mid-Day Sound Monitoring	SZ/CI
1	10/19/99	1000-1703	Mixing Area Continuous Monitoring	E
1	10/19/99	0945-1635	Excavation / Stockpile Area Continuous Monitoring	E
2	10/20/99	0910-1010	First Daily 24-Point Monitoring	SZ/CR
2	10/20/99	1000	Excavation of Former Lagoon Area (FLA) Monitoring	E
2	10/20/99	1044-1355	Excavation of E3 & Stockpile Monitoring	E
2	10/20/99	1407-1717	Mixing Area Monitoring	E
2	10/20/99	1456-1545	Mixing Area Sound Monitoring	E
2	10/20/99	1456-1545	Perimeter Area Sound Monitoring	S
2	10/20/99	1300-1400	Mid-Day 24-Point Monitoring	SZ/CR
2	10/20/99	1545-1640	Final Daily 24-Point Monitoring	SZ/CR
3	10/21/99	0820-0929	First Daily 24-Point Monitoring	SZ/CR

Reference: J&W (1999a)

I[illegible] - 4
Monitoring Results
on Pilot Test
ton Beach, California

Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (ppm)	H_2S[7] (ppm)	Dust[8] (mg/m^3)	Sound[9] (dB)
RZ/EZ	0	NA[10]	NA	NA	NA	0	NA
Z	5-8 (1-3 sec)	21.0	0	0	0	NA	NA
RZ/EZ	0	NA	NA	NA	NA	0	NA
RZ/EZ	0	NA	NA	NA	NA	0	NA
RZ/EZ	NA	NA	NA	NA	NA	NA	51-92[11] Below ALs
Z	0-14 (2 sec)	NA	NA	NA	NA	0-7.06 (3 sec)	NA
Z	0-35 (3" over soil 10 sec)	20.9	0	0	0	0-1.9 (3 sec)	NA
RZ/EZ	0	NA	NA	NA	NA	0	NA
Z	0	21.0	0	NA	NA	NA	NA
Z	0-125 (3" over soil < 3 sec)	20.9-21.0	0	0-12	0	0-0.49	NA
Z	0.3-46.3 (3 sec)	20.9-21.0	0	0	0	0-5.17 (5 sec)	NA
Z	NA	NA	NA	NA	NA	NA	82.3 (Generator)
Z	NA	NA	NA	NA	NA	NA	52.0-62.3
Z/EZ	0	NA	NA	NA	NA	0	NA
Z/EZ	0	NA	NA	NA	NA	0	NA
Z/EZ	0-1 (1 sec)	NA	NA	NA	NA	0	NA

Day	Date	Time	Sample Location / Station Number[1]	Work
3	10/21/99	1035-1043	Periodic Perimeter Monitoring	S
3	10/21/99	1100-1106	Periodic Mixing Area & Stockpile Monitoring	E
3	10/21/99	0947-1113	Mixing Area & E3 Monitoring	E
3	10/21/99	1144-1410	Mixing Area & E2 Monitoring	E
3	10/21/99	1420-1437	Excavation of FLA Monitoring	E
3	10/21/99	1627-1720	Mix Area Monitoring	E
3	10/21/99	1548-1600	Stabilized Soil Laydown Area Monitoring	E
3	10/21/99	0820-1317	Perimeter Sound Monitoring	S
3	10/21/99	0820-1317	Equipment Areas Sound Monitoring	E
3	10/21/99	0820-1317	Traffic Sound Monitoring	S
3	10/21/99	1114-1345	Noticeable Odor Monitoring	E
3	10/21/99	1355-1444	Mid-Day 24-Point Monitoring	SZ/CI
3	10/21/99	1545-1639	Final Daily 24-Point Monitoring	SZ/CI
4	10/22/99	0740-0825	First Daily 24-Point Monitoring	SZ/CI
4	10/22/99	0900-1230	Operational Mixing Area & Stockpile Area Monitoring	E
4	10/22/99	1336-1435	Mid-Day 24-Point Monitoring	SZ/CI
4	10/22/99	1540-1600	Excavation Area Backfilling Monitoring	E

Reference: J&W (1999a)

LE 9 - 4
nitoring Results
on Pilot Test
ington Beach, California

Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (ppm)	H_2S[7] (ppm)	Dust[8] (mg/m^3)	Sound[9] (dB)
SZ	0-1.1 (<1 min)	NA	NA	NA	NA	NA	NA
SZ	1.0-6.0 (< 2 min)	NA	NA	NA	NA	NA	NA
SZ	0-4.9 (5 sec)	20.9	0-10 (5 sec)	0	0	0-0.1	NA
SZ	0-21.0 (3" & 3 sec)	20.9-21.0	0-2 (1 min)	0	0	0-1.66 (5 sec)	NA
SZ	0-0.3	20.9	0	0	0	0.1-5.56 (5 sec)	NA
SZ	0.3-7.2 (3 sec)	20.8-20.9	0	0	0	0.22-0.77 (3 sec)	NA
[illegible]	0	NA	NA	NA	NA	0.1-2.48 (5 sec)	NA
Z	NA	NA	NA	NA	NA	NA	48.7-55.7
Z	NA	NA	NA	NA	NA	NA	59.2-74.0
Z	NA	NA	NA	NA	NA	NA	58.2-67.4
Z	0-1.0 (1 sec)	NA	NA	NA	NA	0	NA
Z/EZ	0	NA	NA	NA	NA	0	NA
Z/EZ	0	NA	NA	NA	NA	0	NA
Z/EZ	0	NA	NA	NA	NA	NA	NA
Z	0	NA	NA	NA	NA	0-3.64 (10 sec)	NA
Z/EZ	0	NA	NA	NA	NA	0.04-0.22	NA
Z	0	NA	NA	NA	NA	0.08	NA

TAB
Summary of Air
Stabilizati
Ascon Site, Hunti

Day	Date	Time	Sample Location / Station Number[1]	Work
4	10/22/99	0823-1755	Mixing Area Continuous Monitoring	E
4	10/22/99	1624-1635	Excavation E1 Backfilling Monitoring	E
4	10/22/99	1610-1731	Final Project 24-Point Monitoring	SZ/C

Notes:

1. Air monitoring locations/stations are shown on Figure 4.
2. Work zones (i.e. – Exclusion Zone [EZ], Contamination Reduction Zone [CRZ] and EZ – 50 ppm for 1 min. or 100 ppm for 15 sec., CRZ – 10 ppm for 1 min. or 25 ppm mg/m^3, CRZ – 5 mg/m^3 and SZ – 1.25 mg/m^3.
3. Organic vapor concentration as measured by Thermo Environmental Instruments® O
4. Oxygen concentration as measured by Lumidor Safety Products® MicroMax Model
5. Portion of Lower Explosive (flammable) Limit as measured by Lumidor Safety Prod
6. Carbon monoxide concentration as measured by Lumidor Safety Products® MicroM
7. Hydrogen sulfide concentration as measured by Lumidor Safety Products® MicroMa
8. Dust concentration as measured by Monitoring Instruments for the Environment, Inc
9. Sound Levels as measured by Sper-Scientific Digital Sound Meter Model 840029, e
10. NA – Not Applicable; parameter not analyzed.
11. 92 dB sound measurement was collected 10 feet from Spreader / Mixer in EZ, and

Reference: J&W (1999a)

LE 9 - 4
Monitoring Results
ion Pilot Test
ngton Beach, California

Zone[2]	OVM[3] (ppm)	O_2[4] (%)	LEL[5] (%)	CO[6] (ppm)	H_2S[7] (ppm)	Dust[8] (mg/m^3)	Sound[9] (dB)
Z	0-28.0 (2 sec)	20.8-20.9	0-2	0	0	0.04-4.81 (5 sec)	NA
Z	0	NA	NA	NA	NA	0.17-0.66	NA
RZ/EZ	0-0.3 (1 sec)	NA	NA	NA	NA	0-0.5 (10 sec)	NA

Support Zone [SZ]) are depicted on Figure 4. Organic Contaminant Action Levels (ALs) were:
for 15 sec. and SZ – 1 ppm for 1 min; and sustained, Dust ALs for greater than 15 sec. were; EZ – 25

VM Model 580B, expressed in parts per million (ppm).
-4AP, expressed in percentage by volume in air.
ucts® MicroMax Model MAX-4AP, expressed in percentage of LEL.
ax Model MAX-4AP, expressed in parts per million volume.
x Model MAX-4AP, expressed in parts per million volume.
® Aerosol Monitor Model PDM-3, expressed in milligrams per cubic meter.
xpressed in decibels (dB).

all sound levels measured were below approved ALs.

Table 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Regulatory Limits[a]		PERIMETER SAMPLING					
			Sample ID (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>					
	Action Levels [DTSC ALs]	Exposure Levels [ATSDR MRLs]	JW-25 (10-19-99/1044-1650) [S2-Downwind, NE Corner of Site] <During Mix 1 Activities>	JW-29 (10-19-99/1135-1707) [S1-Upwind, Western Site Perimeter] <During Mix 1 Activities>	JW-31 (10-19-99/1130-1745) [S3-Downwind, SE Corner of Site] <During Mix 1 Activities>	JW-26 (10-19-99/1212-1922) [S2-Downwind, NE Portion of Site] <During Dry Activities>	JW-28 (10-19-99/1055-1830) [S1-Upwind, Western Site Perimeter] <During Dry Activities>	JW-30 (10-19-99/1123-1840) [S3-Downwind, SE Corner of Site] <During Dry Activities>
VOCs (ppbv)[1]	ppbv	ppbv	ppbv	ppbv	ppbv	NA	NA	NA
Chloromethane	25,000	500	0.33	ND	0.54			
Acetone	250,000	26,000	20	9.8	11			
Trichlorofluoromethane	275,000	– (130)	0.39	0.37	0.39			
Methylene Chloride	31,000	3,000	0.91	0.76	0.69			
Carbon Disulfide	3,000	– (234)	ND[c]	ND	ND			
Trichlorotrifluoroethane	312,000	– (4,046)	0.10	ND	ND			
Methyl Tert-Butyl Ether	–	2,000	4.4	3.7	3.4			
2-Butanone (MEK)	75,000	– (339)	3.6	1.6	2.2			
Chloroform	–	100	ND	ND	ND			
1,2-Dichloroethane	–	200	ND	ND	ND			
1,1,1-Trichloroethane	112,000	2,000	0.19	ND	ND			
Benzene	500	50	1.3	1.2	1.0			
Carbon Tetrachloride	–	200	ND	ND	ND			
Trichloroethene	–	2,000	ND	ND	ND			
4-Methyl-2-Pentanone (MBK)	–	– (20)	0.18	ND	ND			
Toluene	37,000	4,000	4.1	5.7	3.3			
2-Hexanone (MBK)	–	– (–)	0.36	ND	ND			
Tetrachloroethene	–	200	0.55	0.33	0.31			
Ethylbenzene	31,000	– (253)	0.54	1.3	0.42			
Styrene	–	– (258)	0.49	0.42	ND			
Xylenes	37,000	1,000	2.26	5.7	1.7			
1,4-Dichlorobenzene	–	800	0.11	ND	ND			
1,2-Dichlorobenzene	–	– (35)	ND	ND	ND			
SVOCs (µg/m³)[2]						NA	NA	NA
Bis (2-ethylhexyl) phthalate	–	– (0.48 µg/m³)	230	3.7	3.6			
Naphthalene	19,388 µg/m³	– (3.1 µg/m³)	ND	ND	ND			
Metals (mg/m³)[3]	–	–	ND	ND	ND	NA	NA	NA
PM-10 (µg/m³)[4]	347 µg/m³	–	NA[e]	NA	NA	159 µg/m³	97 µg/m³	89 µg/m³

Reference: J&W (1999a)

ENVIRON

Table 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Regulatory Limits[5]		PERIMETER SAMPLING						
			Sample ID (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>						
	Action Levels [DTSC AL4]	Exposure Levels [ATSDR MRLs]	JW-40 (10-20-99/0:44-1550) [S2-Downwind, NE Corner of Site] <During Mix 2 Activities>	JW-41 (10-20-99/0:46-1555) [S6-Downwind, NE Portion of Site] <During Mix 3 Activities>	JW-44 (10-20-99/0:37-1545) [S3-Downwind, SE Corner of Site] <During Mix 3 Activities>	JW-45 (10-20-99/0:40-1550) [S1-Upwind, Western Site Perimeter] <During Mix 3 Activities>	JW-37 (10-20-99/0:45-1555) [S6-Downwind, NE Portion of Site] <During Day's Activities>	JW-38 (10-20-99/0:48-1600) [S1-Upwind, Western Site Perimeter] <During Day's Activities>	JW-39 (10-20-99/0:51-1615) [S3-Downwind, SE Corner of Site] <During Day's Activities>
VOCs (ppbv)[1]	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	NA	NA	NA
Chloromethane	25,000	500	0.41	0.40	0.35	0.42			
Acetone	250,000	26,000	27	21	27	25			
Trichlorofluoromethane	275,000	-- (130)	0.42	0.42	0.42	0.46			
Methylene Chloride	31,000	3,000	1.5	1.5	1.5	1.9			
Carbon Disulfide	3,000	-- (234)	ND	ND	0.55	ND			
Trichlorotrifluoroethane	312,000	-- (4,046)	0.10	ND	0.10	ND			
Methyl Tert-Butyl Ether	--	2,000	9.6	9.7	9.0	12			
2-Butanone (MEK)	75,000	-- (339)	4.1	3.8	4.0	3.4			
Chloroform	--	100	ND	ND	ND	0.15			
1,2-Dichloroethane	--	200	ND	ND	ND	ND			
1,1,1-Trichloroethane	112,000	2,000	0.27	0.27	0.26	0.33			
Benzene	500	50	2.5	2.5	2.4	3.6			
Carbon Tetrachloride	--	200	ND	ND	ND	ND			
Trichloroethene	--	2,000	0.16	0.17	ND	0.28			
4-Methyl-2-Pentanone (MIBK)	--	-- (20)	0.22	ND	ND	0.19			
Toluene	37,000	4,000	7.7	7.7	7.8	11			
2-Hexanone (MBK)	--	-- (--)	ND	ND	ND	ND			
Tetrachloroethene	--	200	0.93	0.87	0.95	1.3			
Ethylbenzene	31,000	-- (253)	1.2	1.1	1.1	1.8			
Styrene	--	-- (258)	0.58	0.54	0.51	3.8			
Xylenes	37,000	1,000	5.2	4.8	4.5	7.5			
1,4-Dichlorobenzene	--	800	0.18	0.19	0.18	0.26			
1,2-Dichlorobenzene	--	-- (35)	ND	ND	ND	ND			
SVOCs (µg/m³)[2]			NA	NA	NA	NA	NA	NA	NA
Bis (2-ethylhexyl) phthalate	--	-- (0.48 µg/m³)							
Naphthalene	15,388 µg/m³	-- (3.1 µg/m³)							
Metals (mg/m³)[3]	--	--	NA	NA	NA	NA	NA	NA	NA
PM-10 (µg/m³)[4]	170 µg/m³	--	NA	NA	NA	NA	110 µg/m³	120 µg/m³	120 µg/m³

Reference: J&W (1999a)

ENVIRON

Table 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Regulatory Limits[2]		PERIMETER SAMPLING Sample ID (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>						
	Action Levels [DTSC ALs]	Exposure Levels [ATSDR MRLs]	JW-47 (10-21-99/0813-1417) [S2-Downwind, NE Corner of Site] <During Mix 4 Activities>	JW-49 (10-21-99/0910-1419) [S5-Downwind, NE Portion of Site] <During Mix 4 Activities>	JW-51 (10-21-99/0917-1425) [S1-Upwind, Western Site Perimeter] <During Mix 4 Activities>	JW-53 (10-21-99/0924-1428) [S3-Downwind, SE Corner of Site] <During Mix 4 Activities>	JW-55 (10-21-99/0812-1738) [S5-Downwind, NE Portion of Site] <During Day's Activities>	JW-56 (10-21-99/0817-1745) [S1-Upwind, Western Site Perimeter] <During Day's Activities>	JW-57 (10-21-99/0821-1750) [S3-Downwind, SE Corner of Site] <During Day's Activities>
VOCs (ppbv)[1]	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	NA	NA	NA
Chloromethane	25,000	500	0.50	0.46	0.42	0.50			
Acetone	250,000	26,000	36	26	26	23			
Trichlorofluoromethane	275,000	– (139)	0.42	0.42	0.40	0.40			
Methylene Chloride	31,000	3,000	3.6	2.6	2.4	2.6			
Carbon Disulfide	3,000	– (234)	ND	ND	ND	ND			
Trichlorotrifluoroethane	312,000	– (4,046)	0.11	0.10	0.11	0.11			
Methyl Tert-Butyl Ether	--	2,000	19	13	12	12			
2-Butanone (MEK)	75,000	– (339)	6.0	4.0	3.7	3.5			
Chloroform	–	100	0.31	0.19	0.17	0.18			
1,2-Dichloroethane	--	200	ND	ND	ND	ND			
1,1,1-Trichloroethane	112,000	2,000	0.70	0.46	0.42	0.44			
Benzene	500	50	5.4	3.7	3.4	3.3			
Carbon Tetrachloride	--	200	0.10	ND	ND	ND			
Trichloroethene	--	2,000	0.29	0.19	0.15	0.16			
4-Methyl-2-Pentanone (MIBK)	--	– (20)	0.39	0.25	0.24	0.20			
Toluene	37,000	4,000	20	14	12	12			
2-Hexanone (MBK)	–	– (–)	ND	ND	ND	ND			
Tetrachloroethene	--	200	1.7	1.3	1.3	1.2			
Ethylbenzene	31,000	– (253)	2.6	1.9	1.8	1.6			
Styrene	--	– (258)	4.7	2.8	2.2	2.2			
Xylenes	37,000	1,000	12.9	9.0	8.1	7.4			
1,4-Dichlorobenzene	--	800	0.50	0.36	0.30	0.30			
1,2-Dichlorobenzene	--	– (35)	ND	ND	ND	ND			
SVOCs (µg/m³)[1]			NA	NA	NA	NA	NA	NA	NA
Bis (2-ethylhexyl) phthalate	--	– (0.48 µg/m³)							
Naphthalene	19,388 µg/m³	– (3.1 µg/m³)							
Metals (µg/m³)[1]	--	--	NA	NA	NA	NA	NA	NA	NA
PM-10 (µg/m³)[1]	149 µg/m³	--	NA	NA	NA	NA	119 µg/m³	99 µg/m³	130 µg/m³

Table 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Regulatory Limits[5]		PERIMETER SAMPLING						
			Sample ID (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>						
	Action Levels [DTSC ALs]	Exposure Levels [ATSDR MRLs]	JW-57 (18-22-99/0757-1407) [S3-Downwind, NE Corner of Site] <During Mix 3&5 Activities>	JW-58 (18-22-99/0804-1405) [S6-Downwind, NE Portion of Site] <During Mix 3&5 Activities>	JW-61 (18-22-99/0815-1425) [P3-Upwind, Western Site Perimeter] <During Mix 3&5 Activities>	JW-42 (18-22-99/0835-1429) [S3-Downwind, NE Corner of Site] <During Mix 3&5 Activities>	JW-59 (18-22-99/0852-1704) [S6-Downwind, NE Portion of Site] <During Day's Activities>	JW-60 (18-22-99/0856-1726) [S3-Upwind, Western Site Perimeter] <During Day's Activities>	JW-63 (18-22-99/0824-1730) [S3-Downwind, NE Corner of Site] <During Day's Activities>
VOCs (ppbv)[1]	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	NA	NA	NA
Chloromethane	25,000	500	0.43	0.40	0.40	0.40			
Acetone	250,000	26,000	4.9	5.6	6.5	7.8			
Trichlorofluoromethane	275,000	– (150)	0.34	0.36	0.35	0.35			
Methylene Chloride	31,000	3,000	0.42	0.42	0.38	0.48			
Carbon Disulfide	3,000	– (234)	ND	ND	ND	1.1			
Trichlorotrifluoroethane	312,000	– (4,046)	ND	0.09	0.09	0.09			
Methyl Tert-Butyl Ether	–	2,000	1.7	1.9	1.7	3.9			
2-Butanone (MEK)	75,000	– (335)	1.4	2.1	1.1	1.6			
Chloroform	–	100	ND	ND	ND	ND			
1,2-Dichloroethane	–	200	ND	ND	ND	0.91			
1,1,1-Trichloroethane	112,000	2,000	ND	ND	ND	ND			
Benzene	500	50	0.60	0.62	0.58	0.74			
Carbon Tetrachloride	–	200	ND	0.10	ND	ND			
Trichloroethene	–	2,000	ND	ND	ND	ND			
4-Methyl-2-Pentanone (MIBK)	–	– (20)	ND	ND	ND	ND			
Toluene	37,000	4,000	1.3	1.5	1.4	9.7			
2-Hexanone (MBK)	–	– (–)	ND	ND	ND	ND			
Tetrachloroethene	–	200	0.13	0.10	ND	0.23			
Ethylbenzene	31,000	– (253)	0.22	0.26	0.34	1.1			
Styrene	–	– (258)	0.22	ND	ND	0.53			
Xylenes	37,000	1,000	0.91	1.21	1.37	5.9			
1,4-Dichlorobenzene	–	800	ND	ND	ND	ND			
1,2-Dichlorobenzene	–	– (35)	ND	ND	ND	0.26			
SVOCs (µg/m³)[2]			NA	NA	NA	NA	NA	NA	NA
Bis (2-ethylhexyl) phthalate	–	– (0.48 µg/m³)							
Naphthalene	19,388 µg/m³	– (3.1 µg/m³)							
Metals (mg/m³)[3]	–	–	NA	NA	NA	NA	NA	NA	NA
PM-10 (µg/m³)[4]	68 µg/m³	–	NA	NA	NA	NA	73 µg/m³	18 µg/m³	34 µg/m³

Reference: J&W (1999a)

Table 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Regulatory Limits[a]		EXCLUSION ZONE SAMPLING Sample ID (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>					
	CalEPA OSHA PEL	Protected Worker EZ Exposure Limit	JW-27 (10-19-99/1448-1644) [S4 Adjacent downwind of EI] <During Mix 1 Activities>	JW-32 (10-19-99/1347-1755) [S5 Adjacent downwind of Stockpile Area] <During Mix 1 Activities>	JW-33 (10-19-99/1205-1210) [S4 Adjacent downwind of Mixing Area] <During Mix 1 Activities>	JW-34 <Duplicate of JW-33 for VOCs analysis only>	JW-42 (10-20-99/0950-1551) [S4 Adjacent downwind of Mixing Area] <During Mix 2 Activities>	JW-43 (10-20-99/0905-1550) [S5 Adjacent downwind of Stockpile Area] <During Mix 2 Activities>
VOCs (ppbv)[1]	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Chloromethane	5,000	250,000	0.34	0.36	ND	1.6	ND	0.40
Acetone	750,000	1,000,000	20	15	11	15	27	30
Trichlorofluoromethane	1,100,000	1,000,000	0.38	0.39	0.38	0.73	0.41	0.41
Methylene Chloride	25,000	1,000,000	0.86	0.97	ND	ND	1.5	1.5
Carbon Disulfide	4,000	200,000	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane	1,000,000	1,000,000	0.10	0.10	ND	ND	ND	0.11
Methyl Tert-Butyl Ether	–	–	4.2	5.2	3.5	2.4	9.9	10
2-Butanone (MEK)	200,000	1,000,000	3.1	2.4	1.5	1.7	4.6	4.6
Chloroform	2,000	100,000	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	1,000	50,000	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	350,000	1,000,000	0.16	0.21	ND	ND	ND	0.27
Benzene	1,000	50,000	1.3	1.5	2.4	1.3	4.8	4.0
Carbon Tetrachloride	2,000	100,000	ND	0.11	ND	ND	ND	ND
Trichloroethene	25,000	1,000,000	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIBK)	25,000	1,000,000	ND	ND	ND	ND	ND	0.29
Toluene	50,000	1,000,000	4.1	5.4	5.0	4.1	10	9.3
2-Hexanone (MBK)	5,000	250,000	ND	ND	ND	ND	ND	ND
Tetrachloroethene	25,000	1,000,000	0.37	0.49	0.29	ND	0.98	1.0
Ethylbenzene	100,000	1,000,000	0.74	0.97	4.4	1.6	3.7	2.7
Styrene	50,000	1,000,000	0.44	0.59	ND	ND	1.6	1.2
Xylenes	100,000	1,000,000	2.67	3.27	9.3	5.2	10.5	8.3
1,4-Dichlorobenzene	75,000	1,000,000	ND	0.22	ND	ND	ND	0.20
1,2-Dichlorobenzene	50,000	1,000,000	ND	ND	ND	ND	ND	ND
SVOCs (µg/m³)[2]						NA	NA	NA
Bis (2-ethylhexyl) phthalate	–	–	5.5	5.1	ND			
Naphthalene	10,000	500,000	ND	ND	3.7			
Metals (mg/m³)[3]	–	–	ND	ND	ND	NA	NA	NA

Reference: J&W (1999a)

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Ta. 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Regulatory Limits[a]		EXCLUSION ZONE SAMPLING Sample ID (Sample Collection Date / Time) [Sample Location] <Air Sampling Event>				
	CalEPA OSHA PEL	Proposed Worker EZ Exposure Limit	JW-54 (10-21-99/0824-1430) [S5-Adjacent downwind of Stockpile Area] <During Mix 4 Activities>	JW-55 (10-21-99/0824-1431) [S4-Adjacent downwind of Mixing Area] <During Mix 4 Activities>	JW-64 (10-22-99/0847-1447) [S5-Adjacent downwind of Stockpile Area] <During Mix 3&5 Activities>	JW-65 (10-22-99/0847-1450) [S4-Adjacent downwind of Mixing Area] <During Mix 3&5 Activities>	FIELD BLANK
VOCs (ppbv)[1]	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	NA
Chloromethane	5,000	250,000	0.51	0.45	ND	0.37	
Acetone	750,000	1,000,000	36	23	13	11	
Trichlorofluoromethane	1,100,000	1,000,00036	0.42	0.40	0.34	0.35	
Methylene Chloride	25,000	1,000,000	3.4	2.2	ND	0.45	
Carbon Disulfide	4,000	200,000	0.41	ND	ND	ND	
Trichlorotrifluoroethane	1,000,000	1,000,000	0.12	0.11	ND	ND	
Methyl Tert-Butyl Ether	–	–	17	11	1.7	1.8	
2-Butanone (MEK)	200,000	1,000,000	5.6	3.6	2.6	2.4	
Chloroform	2,000	100,000	0.27	0.16	ND	ND	
1,2-Dichloroethane	1,000	50,000	ND	ND	ND	ND	
1,1,1-Trichloroethane	350,000	1,000,000	0.63	0.37	ND	ND	
Benzene	1,000	50,000	5.1	4.4	0.68	0.96	
Carbon Tetrachloride	2,000	100,000	ND	ND	ND	ND	
Trichloroethene	25,000	1,000,000	0.24	ND	ND	ND	
4-Methyl-2-Pentanone (MIBK)	25,000	1,000,000	0.40	0.21	ND	0.26	
Toluene	50,000	1,000,000	19	13	3.6	1.8	
2-Hexanone (MBK)	5,000	250,000	ND	ND	ND	ND	
Tetrachloroethene	25,000	1,000,000	1.7	1.1	ND	ND	
Ethylbenzene	100,000	1,000,000	2.7	3.4	1.0	1.0	
Styrene	50,000	1,000,000	3.6	2.7	ND	0.28	
Xylenes	100,000	1,000,000	12.1	10.8	4.8	2.85	
1,4-Dichlorobenzene	75,000	1,000,000	0.44	0.29	ND	ND	
1,2-Dichlorobenzene	50,000	1,000,000	ND	ND	ND	ND	
SVOCs (µg/m³)[1]			NA	NA	NA	NA	ND
Bis (2-ethylhexyl) phthalate	–	–					
Naphthalene	10,000	500,000					
Metals (mg/m³)[1]	–	–	NA	NA	NA	NA	ND
PM-10 (mg/m³)[1]	–	–	NA	NA	NA	NA	ND

Reference: J&W (1999a)

Table 9 - 5
Summary of Air Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Notes:

1) *Concentration of Volatile Organic Compounds (VOCs) as measured by USEPA Test Method TO-14A, expressed in parts per billion volume (ppbv); samples were collected utilizing Summa Canisters and 6-hour collection period.*
2) *Concentration of Semi-Volatile Organic Compound (SVOCs) as measured by USEPA Modified Test Method TO-13, expressed in micrograms per cubic meter ($\mu g/m^3$); samples were collected utilizing Sensidyne (Gilian) Station Air Sampling Pumps and Polyurethane Foam (PUF/XAD-2) Cartridges and a 6-hour collection period.*
3) *Concentration of CA Title 22 Metals (Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Nickel, Silver, Thallium, Vanadium and Zinc) as measured by NIOSH Test Method 7300 and for Mercury by OSHA Test Method ID-140, expressed in milligrams per cubic meter (mg/m^3); samples were collected utilizing Sensidyne (Gilian) Station Air Sampling Pumps with MCE Filter Cassettes and passive Hopcalite Badges (Mercury) over a 6-hour collection period.*
4) *Concentration of Respirable Particulate Matter smaller than 10 microns as measured by NIOSH Test Method 0500, expressed in $\mu g/m^3$; samples were collected utilizing R&P Partisol Model 2000 High Volume Air Samplers and PTFE Filters over an 8-hour collection period daily.*
5) *Established and negotiated regulatory limits as promulgated in CalEPA-approved Final ASPTWHASP Addendum Table 2 (dated September 17, 1999). For perimeter sampling: Action Levels (ALs) for individual constituents were established as 0.25 x CalEPA OSHA STELs (and conservative field-based AL of 1 ppm); Exposure Levels were established as U.S. ASTDR Minimal Risk Levels (MRLs) by acute inhalation (USEPA Region IX Preliminary Remediation Goals (PRGs) presented in parentheses as alternative where no MRL established); and, Action Level for respirable dust established by SCAQMD Rule 403 – Fugitive Dusts as measured daily upwind concentration plus 50 $\mu g/m^3$, as per permit conditions. For Exclusion Zone sampling, exposure levels of concern are: CalEPA OSHA PELs, which are 8-hour time-weighted average concentrations of airborne contaminants for unprotected HAZWOPER-trained personnel; and, exposure limits for HAZWOPER-trained employees with Level C Personnel Protective Equipment (PPE) are the lower value of 50 x PEL and 1,000 ppmv (or 1,000,000 ppbv, which is the typical filtering capacity of respirator cartridges utilized).*
6) *ND – Not detected above analytical method detection limit.*
7) *NA – Not Analyzed.*

-- *Not established.*

Table 9 - 6
Summary of Soil Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Sample ID (Sample Collection Date) Sample Description				
	JW-20 (10-18-99) Waste Stockpile Staging Area Pre-Project Composite	JW-74 (10-23-99) Waste Stockpile Staging Area Post-Project Composite	JW-75 (10-23-99) Duplicate of JW-74	JW-21 (10-18-99) Mixing Area Pre-Project Composite	JW-73 (10-23-99) Mixing Area Post-Project Composite
TPH-G[1] (mg/kg)	ND[3]	1.7	1.6	ND	3.1
TPH CC ID[2] (mg/kg)	C7-18:ND C19-20: 47 C21-22: 30 C23-24: 36 C25-28: 62 C29-32: 105 C33-36: 147 ***C7-36: 427***	C7-12:ND C13-14: 22 C15-16: 51 C17-18: 58 C19-20: 60 C21-22: 51 C23-24: 61 C25-28: 103 C29-32: 251 C33-36: 231 ***C7-36: 888***	C7-12:ND C13-14: 16 C15-16: 25 C17-18: 49 C19-20: 53 C21-22: 50 C23-24: 69 C25-28: 95 C29-32: 266 C33-36: 249 ***C7-36: 872***	C7-18:ND C19-20: 142 C21-22: 120 C23-24: 121 C25-28: 138 C29-32: 280 C33-36: 230 ***C7-36: 1,031***	C7-12:ND C13-14: 38 C15-16: 75 C17-18: 75 C19-20: 64 C21-22: 48 C23-24: 51 C25-28: 48 C29-32: 208 C33-36: 27 ***C7-36: 634***

Constituent	Sample ID (Sample Collection Date) [Sample Description]				
	JW-22 (10-18-99) Product Stockpile Staging Area Pre-Project Composite (N portion)	JW-72 (10-23-99) Product Stockpile Staging Area Post-Project Composite (N portion)	JW-23 (10-18-99) Product Stockpile Staging Area Pre-Project Composite (S portion)	JW-24 (10-18-99) Duplicate of JW-23	JW-71 (10-23-99) Product Stockpile Staging Area Post-Project Composite (S portion)
TPH-G[1] (mg/kg)	ND	ND	ND	ND	ND
TPH CC ID[2] (mg/kg)	C7-18:ND C19-20: 27 C21-22: 41 C23-24: 123 C25-28: 119 C29-32: 313 C33-36: 311 ***C7-36: 934***	C7-16:ND C17-18: 14 C19-20: 47 C21-22: 58 C23-24: 63 C25-28: 121 C29-32: 287 C33-36: 258 ***C7-36: 84***	C7-16:ND C17-18: 34 C19-20: 76 C21-22: 116 C23-24: 55 C25-28: 179 C29-32: 240 C33-36: 211 ***C7-36: 911***	C7-16:ND C17-18: 30 C19-20: 36 C21-22: 34 C23-24: 38 C25-28: 45 C29-32: 94 C33-36: 74 ***C7-36: 251***	C7-20:ND C21-22: 58 C23-24: 42 C25-28: ND C29-32: 398 C33-36: 157 ***C7-36: 655***

Table 9 - 6
Summary of Soil Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Sample ID (Sample Collection Date) Sample Description					Data Quality Objectives[11]
	JW-35 (10-19-99) Lagoon #4 Material [Base for Mix 1]	JW-36 (10-19-99) Mix 1 End Product	JW-46 (10-20-99) Lagoon #4 Material + FLA Mud + Site Soils [Base for Mix 2&4]	JW-47 (10-20-99) Mix 2 End Product	JW-56 (10-21-99) Mix 4 End Product	
TPH-G[1] (mg/kg)	3,000	NA[10]	2,600	NA	NA	N/A[12]
TPH CC ID[2] (mg/kg)	C7-8:ND[9] C9-10: 172 C11-12: 864 C13-14: 2,970 C15-16: 2,600 C17-18: 2,760 C19-20: 3,190 C21-22: 1,920 C23-24: 2,020 C25-28: 2,040 C29-32: 4,020 C33-36: 1,530 ***C7-36: 24,086***	NA	C7-10:ND C11-12: 493 C13-14: 1,250 C15-16: 2,180 C17-18: 1,970 C19-20: 1,480 C21-22: 1,150 C23-24: 472 C25-28: 680 C29-32: 4,070 C33-36: 1,570 ***C7-36: 15,315***	NA	NA	N/A
TCLP TPH-G[3] (:g/l)	1,160	1,070	1,190	1,540	1,250	< 1,000,000
TCLP TPH CC ID[4] (:g/l)	C7-16:ND C17-18: 1,870 C19-20: 1,560 C21-28: ND C29-32: 2,680 C33-36: ND **C7-36: 6,110**	ND	ND	ND	ND	N/A
TCLP VOCs[5] (:g/l)	Acetone-1,400[B]	ND	Acetone-1,600[B]	ND	ND	≤ ALs / ELs
TCLP SVOCs[6] (:g/l)	ND	ND	ND	ND	ND	≤ ALs / ELs
TCLP Metals[7] (:g/l)	Ba - 2,610	Ba - 833	Ba - 1,830	Ba - 565	Ba - 527	≤ ALs / ELs
Physical Testing[8] Moisture Content (MC - %)	MC - 51.2		MC - 44.8			--
Optimum Moisture Content (OMC - %)		OMC - 17.3		OMC - 15.0	OMC - 16.4	OMC: 12-30 %
Maximum Dry Density (MDD - pcf)		MDD - 92		MDD - 98	MDD - 96	MDD: 85-120 pcf
Expansion Index (EI)		EI - 0		EI - 3	EI - 5	--
Marshall Stability (MS - lbs)	MS - 925	MS - 1,273	MS - 650	MS - 1,083	MS - 1,221	MS: >750 lbs
Unconfined Compressive Strength (UCS - psi)		UCS - 154		UCS - 143	UCS - 137	UCS: >35 psi
Shear Strength (SS - psi)		SS - 77		SS - 71.5	SS - 68.4	--

Reference: J&W (1999a)

Table 9 - 6
Summary of Soil Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Constituent	Sample ID (Sample Collection Date) Sample Description				Data Quality Objectives[11]
	JW-66 (10-22-99) Lagoon #3 Material + FLA Mud + Site Soil [Base for Mix 3&5]	JW-68 (10-22-99) Mix 3 End Product	JW-69 (10-22-99) Mix 5 End Product	JW-70 (10-22-99) Duplicate of JW-69	
TPH-G[1] (mg/kg)	2,100	NA	NA	NA	N/A[12]
TPH CC ID[2] (mg/kg)	C7-10:ND C11-12: 605 C13-14: 1,600 C15-16: 2,700 C17-18: 3,220 C19-20: 3,260 C21-22: 1,660 C23-24:1,830 C25-28: 2,230 C29-32: 5,720 C33-36: 2,600 ***C7-36: 25,425***	NA	NA	NA	N/A
TCLP TPH-G[3] (:g/l)	718	758	649	1,240	< 1,000,000
TCLP TPH CC ID[4] (:g/l)	ND	ND	ND	ND	N/A
TCLP VOCs[5] (:g/l)	Acetone-1,700[B]	ND	ND	ND	≤ ALs / ELs
TCLP SVOCs[6](:g/l)	ND	ND	ND	ND	≤ ALs / ELs
TCLP Metals[7] (:g/l)	Ba - 2,330	Ba – 924	Ba - 854	Ba - 879	≤ ALs / ELs
Physical Testing[8]					
Moisture Content (MC - %)	MC - 57.9				--
Optimum Moisture Content (OMC - %)		OMC - 19.0	OMC - 16.4	OMC - 20.0	OMC: 12-30 %
Maximum Dry Density (MDD - pcf)		MDD - 93	MDD - 90	MDD - 91	MDD: 85-120 pcf
Expansion Index (EI)		EI - 0	EI - 0	EI - 6	--
Marshall Stability (MS - lbs)	MS - 900	MS - 1,233	MS - 1,270	MS - 1,270	MS: >750 lbs
Unconfined Compressive Strength *(UCS - psi)*		UCS - 119	UCS - 113	UCS - 121	UCS: >35 psi
Shear Strength (SS - psi)		SS - 59.4	SS - 56.5	SS - 60.4	--

Table 9 - 6
Summary of Soil Sampling Results
Stabilization Pilot Testing
Ascon Site, Huntington Beach, California

Notes:

1) Concentration of Total Petroleum Hydrocarbons - Gas Fraction (TPH-G) as measured by USEPA Modified Test Method 8015, expressed in milligrams per kilogram.
2) TPH - Carbon Chain Fractionation Identification (TPH CC ID) as measured by USEPA Modified Test Method 8015, expressed in milligrams per kilogram.
3) ND – Not detected above analytical method detection limit.
4) Concentration of Total Petroleum Hydrocarbons - Gas Fraction (TPH-G) as measured by USEPA Modified Test Method 8015, expressed in milligrams per kilogram (mg/kg).
5) TPH - Carbon Chain Fractionation Identification (TPH CC ID) as measured by USEPA Modified Test Method 8015, expressed in mg/kg.
6) Concentration of Toxicity Characteristic Leaching Procedure Total Petroleum Hydrocarbons - Gas Fraction (TCLP TPH-G) as measured by USEPA Modified Test Method 8015, expressed in micrograms per liter (:g/l).
7) Toxicity Characteristic Leaching Procedure TPH Carbon Chain Fractionation Identification (TCLP TPH CC ID) as measured by USEPA Modified Test Method 1311/8015, expressed in :g/l.
8) Concentration of Toxicity Characteristic Leaching Procedure Volatile Organic Compounds as measured by USEPA Test Method 1311/8260, expressed in :g/l.
9) Concentration of Toxicity Characteristic Leaching Procedure Semi-Volatile Organic Compounds as measured by USEPA Test Method 1311/8270, expressed in :g/l.
10) Concentration of Toxicity Characteristic Leaching Procedure RCRA 8 Metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver) as measured by USEPA Test Method 1311/6010B/7471A, expressed in :g/l.
11) Physical Testing Results were produced by performance of the following laboratory tests:
    - MC = Moisture Content as measured by USEPA Test Method 160.3, expressed in percent (%) water.
    - OMC = Optimum Moisture Content as determined by ASTM Method D1557, expressed in percent (%) water.
    - MDD = Maximum Dry Density as determined by ASTM Method D1557, expressed in pounds per cubic foot (pcf).
    - EI = Expansion Index (unitless) as determined by ASTM Method D4829.
    - MS = Marshall Stability as determined by ASTM D1559, expressed in pounds (lbs).
    - UCS = Peak Unconfined Compressive Strength as determined by ASTM D2166, expressed in pounds per square inch (psi); The laboratory reported UCS in kips (1,000 pounds) per square foot (ksf), and for ease of comparison to DQOs, J&W reports these data in standard form (psi).
    - Shear Strength as determined by ASTM D2166, expressed in psi.
12) ND - Not detected above analytical method detection limit.
13) NA - Not Analyzed.
14) (Preliminary) Data Quality Objectives established in ASPTWHASP for basis to evaluate the effectiveness of the Stabilization Pilot Test. The current DTSC-approved Ascon Action Levels (ALs) and Exposure Levels (ELs) are stipulated on Table 4.
12) Not Applicable.

B Acetone was detected in the laboratory's internal method blank.

Table 10-1
Additional Screening of Process Options Based on Relative Cost
Ascon Site, Huntington Beach, California

General Response Action	Remedial Technology	Process Options	Relative Cost	Comments
No Action	None	None	None	Retained; required for detailed analysis by NCP.
Containment	Horizontal Barriers	Monolithic Cap	Moderate	Retained
		Geomembrane	Moderate	Retained; provides high benefit/cost ratio.
		Multi-layer Cap	Moderate to High	Rejected; potentially more costly than single geomembrane.
	Vertical Barriers	Containment Berm	Moderate	Retained
		Slurry Wall	Moderate	Retained
Removal and *Ex situ* Treatment or Disposal/Recycling	Stabilization	Asphalt Recycling	Moderate to High	Rejected, potentially more costly than cement stabilization.
		Cement Stabilization	Moderate	Retained; requires treatability study.
Primary Wastes	Solvent Extraction	Solvent Extraction	Moderate	Retained; requires treatability study.
	Off-site Disposal or Recycling	Off-site Disposal or Recycling	High	Rejected
Secondary Wastes	Wastewater Treatment	Wastewater Treatment	Moderate	Retained
	Debris Crushing	Debris Crushing	Moderate	Retained
	Off-site Disposal or Recycling	Off-site Disposal or Recycling	High	Retained, to be used only for the styrene waste and relatively small volumes of other wastes.

Notes:

Primary wastes consist of the majority of site wastes such as drilling muds, oil-impacted soil, and liquid hydrocarbons. Secondary wastes consist of specific materials requiring specialized handling such as styrene tar, waste water, and construction debris.

Table 10-2
Summary of Detailed Evaluation Criteria
Ascon Site, Huntington Beach, California

Criteria		Remarks	
1.	Overall Protection of Human Health and the Environment	a.	Protection of public health
		b.	Protection of the environment
2.	Compliance with ARARs	a.	Compliance with chemical-specific, action-specific, and location-specific ARARs and other criteria, advisories, and guidance
3.	Long-Term Effectiveness and Performance	a.	Magnitude of residual risk
		b.	Adequacy and reliability of controls
4.	Reduction of Toxicity, Mobility, and Volume Through Treatment	a.	Treatment process used and materials treated
		b.	Amount of hazardous substances destroyed or treated
		c.	Expected reductions in toxicity, mobility, and volume
		d.	Degree to which treatment is irreversible
		e.	Amount of residuals remaining after treatment
5.	Short-Term Effectiveness	a.	How fast remedial action objectives are achieved
		b.	Protection of residents during remedial actions
		c.	Protection of workers during remedial actions
		d.	Protection of the environment during remedial actions
6.	Implementability	a.	Availability of goods and services
		b.	Success of technology at similar sites
		c.	Ease of undertaking additional remedial actions
		d.	Ability to monitor effectiveness of remedy
		e.	Ability to obtain approval from agencies
		f.	Availability of off-site treatment, storage, and disposal (TSD) services and capacities
7.	Cost	a.	Capital costs
		b.	O&M costs
		c.	Present worth costs
8.	State Acceptance	a.	DTSC acceptance of preferred remedy for the site
9.	Community Acceptance	a.	Community acceptance of preferred remedy for the site

Table 10-3
Detailed Evaluation of Alternative 1 (No Action)
Ascon Site, Huntington Beach, California

DESCRIPTION OF ALTERNATIVE: Alternative 1 consists of no further action at the site. Hence, no remedial activities will be undertaken, and the site will be left in its current condition. No monitoring will be conducted and no institutional controls will be put in place to control the future use of the site.

1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

1a) Protection of public health: Risks to on-site workers, trespassers, off-site residents, and hypothetical future residents would remain.

1b) Protection of the environment: Waste at the site and liquid in the lagoons and Pit F will continue to leach into the underlying aquifer.

2) COMPLIANCE WITH ARARS

2a) Compliance with chemical-specific, action-specific, and location-specific ARARs and other criteria, advisories, and guidance: Currently, there are no specific chemical quality standards for soils promulgated through federal or state regulations. As such, compliance with ARARs is not applicable for affected soils, drilling muds, and other waste at the site. The site will continue to pose risks to human health for on-site workers, trespassers, off-site residents, and hypothetical future on-site residents. Many of the COCs at the site will not biodegrade and the principal loss of mass will be only through volatilization. The site will continue to impact ground water.

3) LONG-TERM EFFECTIVENESS AND PERMANENCE

3a) Magnitude of residual risk: No change.

3b) Adequacy and reliability of controls: The Ascon site is located within an area that is designated as having high susceptibility to liquefaction-related ground failure during significant seismic events. If soil liquefaction occurs as a result of seismic activity, slope failure of the existing perimeter berm, and disintegration of the underlying clay layer, could occur allowing the release of waste material to the surrounding areas and deeper into the subsurface.

4) REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT

4a) Processes used: N/A

4b) Amount of material destroyed or treated: None

4c) **Degree in expected reduction of toxicity, mobility, and volume:** None
4d) **Degree to which process is irreversible:** N/A
4e) **Amount of residuals remaining:** N/A

5) **SHORT-TERM EFFECTIVENESS**

5a) **How fast RAOs are achieved:** N/A
5b) **Protection of workers during remedial actions:** No actions taken.
5c) **Protection of residents during remedial actions:** No actions taken.
5d) **Protection of the environment during remedial actions:** No action taken.

6) **IMPLEMENTABILITY**

6a) **Availability of goods and services:** N/A
6b) **Success of technology at similar sites:** N/A
6c) **Ease of undertaking additional remedial action, if necessary:** N/A
6d) **Ability to monitor effectiveness of remedy:** N/A
6e) **Ability to obtain approval from agencies:** Unlikely
6g) **Availability of off-site TSD services and capacities:** N/A

7) **COST**

7a) **Present worth capital costs:** $0
7b) **Present worth O&M costs:** $0
7c) **Total present worth costs:** $0

CONCLUSIONS

The no action alternative would not provide any reduction in risks to on-site workers, trespassers, off-site residents, and hypothetical future on-site residents and would not meet the site RAOs. Because the alternative does not meet the threshold criteria of overall protection of human health and the environment, it was dropped from further consideration.

Table 10-4
Detailed Evaluation of Alternative 2 (Containment)
Ascon Site, Huntington Beach, California

DESCRIPTION OF ALTERNATIVE: Alternative 2 consists of removal of old drums, tires, pipe, vegetation, and piles of wood that are scattered throughout the site; removal of the liquids and very low-strength sediments (sludges) from the lagoons; *ex situ* treatment of the removed liquids by solvent extraction; *ex situ* treatment of the excavated soil and drilling muds by on-site cement stabilization; removal and off-site disposal of Pit F materials; containment of the site by construction of a circumferential slurry wall and a cap system; construction of a new perimeter berm; and performing long-term ground water and other monitoring programs.

1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

1a) Protection of public health: Risks to on-site workers, trespassers, and off-site residents would be eliminated.

1b) Protection of the environment: Because of continuing contact of portions of the on-site waste with the ground water, some leaching of the contaminants into the underlying aquifer will occur.

2) COMPLIANCE WITH ARARS

2a) Compliance with chemical-specific, action-specific, and location-specific ARARs and other criteria, advisories, and guidance: Currently, there are no chemical cleanup standards for soils promulgated through federal or state regulations. However, the SCAQMD, RWQCB, Water Board, City of Huntington Beach, and IWMB requirements or guidelines for air, soil, ground water, and engineering requirements (e.g., landfill cap requirements by Waste Board and Water Board) may apply. The site will continue to impact ground water although at a reduced rate because of minimized surface water infiltration.

3) LONG-TERM EFFECTIVENESS AND PERMANENCE

3a) Magnitude of residual risk: Will reduce residual risk.

3b) Adequacy and reliability of controls: Because of proximity of the site to the Newport-Inglewood Fault Zone, which was the source of the destructive 1933 Long Beach earthquake of magnitude 6.3, and because a magnitude 7 earthquake with subsurface faulting can occur at this fault and cause liquefaction and estimated surface displacements of as much as 6 feet, the integrity of the cap and slurry wall could be compromised in during such seismic events.

4) REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT

- **4a) Processes used:** On-site treatment of lagoon liquids by solvent extraction, on-site cement stabilization of lagoon sludges, off-site disposal of Pit F materials, capping, and slurry wall construction
- **4b) Amount of material destroyed or treated:** Estimated at 2.8 million gallons of surface water; 40,200 cy of liquid hydrocarbon waste; 46,900 cy of low strength materials (sludges); and 1,700 cy of Pit F materials
- **4c) Degree in expected reduction of toxicity, mobility, and volume:** Contaminant mobility will be reduced because of reduced infiltration.
- **4d) Degree to which process is irreversible:** N/A
- **4e) Amount of residuals remaining:** Only a minor amount of reduction of residual contaminants expected to occur through natural biodegradation.

5) SHORT-TERM EFFECTIVENESS

- **5a) How fast RAOs are achieved:** Expected to be approximately 2 years.
- **5b) Protection of workers during remedial actions:** Anticipated to be acceptable.
- **5c) Protection of residents during remedial actions:** Anticipated to be acceptable.
- **5d) Protection of the environment during remedial actions:** Anticipated to be acceptable.

6) IMPLEMENTABILITY

- **6a) Availability of goods and services:** Available
- **6b) Success of technology at similar sites:** Generally successful
- **6c) Ease of undertaking additional remedial action, if necessary:** N/A
- **6d Ability to monitor effectiveness of remedy:** Effectiveness of the remedy can be monitored by monitoring of air, vadose zone, ground water, and cap integrity based on procedures to be defined in the O&M Plan.
- **6e) Ability to obtain approval from agencies:** Moderate likelihood
- **6g) Availability of off-site treatment, storage, and disposal services and capacities:** Generally, not applicable; available for Pit F materials and miscellaneous debris.

7) COST

7a)	**Present worth capital costs:**	$24.0 million, including 15 percent contingency
7b)	**Present worth O&M costs:**	$2.7 million
7c)	**Total present worth costs:**	$26.7 million

CONCLUSIONS

The containment alternative meets the primary RAOs for the site. However, this alternative does not meet the secondary RAO of providing for the development of the Ascon site as anticipated by the site's current residential zoning, and it only meets a few of the nine NCP criteria.

Table 10-5
Detailed Evaluation of Alternative 3 (Source Removal)
Ascon Site, Huntington Beach, California

DESCRIPTION OF ALTERNATIVE: Alternative 3 consists of removal and off-site disposal of the old drums, tires, pipe, vegetation, and piles of wood that are scattered throughout the site; excavation of the construction debris and segregation into concrete and other debris; removing surface water from the five existing lagoons; removing the liquid hydrocarbon wastes from Lagoons 1 and 2; removing the tarry styrene wastes from Pit F; and excavating the affected soils and drilling muds from the current lagoons, former lagoons, pits, and the perimeter berm. The concrete debris will be crushed and used for backfill on-site; the non-concrete debris will be transported to a municipal landfill. The surface water will be discharged into Huntington Beach Flood Control Channel after running it through an on-site wastewater treatment system. The removed liquid hydrocarbon waste from Lagoons 1 and 2 will be treated using a solvent extraction process; the extracted oils from solvent extraction treatment will be concentrated and transported off-site. The excavated soils and drilling muds will be segregated and treated by on-site stabilization. The stabilized materials will be transported off-site for use as road base material and other similar uses (prior to initiation of construction activities, a project site will be confirmed as accepting the stabilized materials). The remediated site will be regraded by using on-site clean excavated material and imported soil. The ground water is considered not to require immediate remediation, and is planned for re-evaluation in the near future, as agreed with the DTSC. For this alternative, ENVIRON assumed that up to five years of ground water monitoring may be required.

1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

1a) **Protection of public health:** Risks to on-site workers, trespassers, and off-site residents would be eliminated.

1b) **Protection of the environment:** Source removal will eliminate future leaching of contaminants.

2) COMPLIANCE WITH ARARS

Compliance with chemical-specific, action-specific, and location-specific ARARs and other criteria, advisories, and guidance: Currently, there are no chemical cleanup standards for soils promulgated through federal or state regulations. However, the SCAQMD, RWQCB, and the City of Huntington Beach requirements for air, soil, and ground water may apply. Futures site impact to ground water will be eliminated.

3) LONG-TERM EFFECTIVENESS AND PERMANENCE

3a) **Magnitude of residual risk:** Will eliminate residual risk from affected soil.

3b) **Adequacy and reliability of controls:** Adequate and reliable.

4) REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT

- **4a) Processes used:** on-site cement stabilization.
- **4b) Amount of material destroyed or treated:** Estimated at 2.8 million gallons of surface water; 524,900 *ex situ* cy of drilling muds; 88,000 *ex situ* cy of affected soils; and 1,700 *ex situ* cy of Pit F materials.
- **4c) Degree in expected reduction of toxicity, mobility, and volume:** Substantial reduction.
- **4d Degree to which process is irreversible:** Except possibly some small reversal for cement stabilization, the processes used are irreversible.
- **4e) Amount of residuals remaining:** It is expected that only contaminants with concentrations below soil action levels may remain.

5) SHORT-TERM EFFECTIVENESS

- **5a) How fast RAOs are achieved:** Expected to be approximately 2 years.
- **5b) Protection of workers during remedial actions:** Anticipated to be acceptable.
- **5c) Protection of residents during remedial actions:** Anticipated to be acceptable.
- **5d) Protection of the environment during remedial actions:** Anticipated to be acceptable.

6) IMPLEMENTABILITY

- **6a) Availability of goods and services:** Available
- **6b) Success of technology at similar sites:** Generally successful
- **6c) Ease of undertaking additional remedial action, if necessary:** Relatively easy
- **6d) Ability to monitor effectiveness of remedy:** Through confirmation sampling, which will be conducted during and after source removal.
- **6e) Ability to obtain approval from agencies:** High likelihood
- **6g) Availability of off-site treatment, storage, and disposal services and capacities:** Available

7) COST

7a)	**Present worth capital costs:**	$31.3 million, including 15 percent contingency
7b)	**Present worth O&M costs:**	$ 0.2 million
7c)	**Total present worth costs:**	$31.5 million

CONCLUSIONS

The source removal alternative meets the primary RAOs for the site, meets the secondary RAO of providing for the development of the Ascon site as anticipated by the site's current residential zoning, and meets most of the NCP criteria. In rating the NCP criteria, high ranking was given to all

NCP criteria except for short-term effectiveness because of air emissions during alternative implementation, which can be generally monitored and mitigated, and cost, which is estimated to be approximately 18 percent greater than the cost of implementing the containment alternative. State and community acceptance is anticipated to be the highest for this alternative as compared to the other two alternatives.

Table 10-6: Order of Magnitude Cost Estimate for Alternatives 2 and 3
Ascon site, Huntington Beach, California

Item	Item Description	Cost Basis		Alternative 2 (Containment)		Alternative 3 (Source Removal)	
		Unit	Unit Cost ($)	Quantity	Cost ($)	Quantity	Cost ($)
1	Site Preparation (Utility Connections, Clearing, Grubbing, and Drum/Debris Removal) and Mobilization		Lump Sum		400,000		400,000
2	Excavating/Processing/Stockpiling Construction Debris	tons	6.50	274,000	1,781,000	274,000	1,781,000
3	Crushing/Stockpiling Concrete Debris	tons	4.50	219,300	987,000	219,300	987,000
4	Disposal of Non-Concrete Debris at Municipal Landfill	tons	11.00	54,700	602,000	54,700	602,000
5	Pumping/On-site Treatment of Rain Water	gallons	Lump Sum	2,800,000	750,000	2,800,000	750,000
6	Solvent Extraction of Liquid Hydrocarbon Waste	*in situ* cy	20.00	40,200	804,000	40,200	804,000
7	Excavating/Processing/Stockpiling On-site Berm and Clean Soil	*in situ* cy	5.00	29,300	147,000	181,000	905,000
8	Site Dewatering		Lump Sum		50,000		100,000
9	Excavating/Processing/Stockpiling Drilling Muds	*in situ* cy	5.00	46,900	235,000	524,900	2,625,000
10	Excavating/Processing/Stockpiling Affected Soils	*in situ* cy	5.00	37,000	185,000	88,000	440,000
11	Stabilizing Excavated Drilling Muds and Affected Soils	*ex situ* cy	10.00	100,700	1,007,000	735,500	7,355,000
12	Off-site Disposal/Recycling of Stablized Materials	*ex situ* cy	4.00	N/A	N/A	823,800	3,295,000
13	Backfilling Excavations with On-site Material & Regrading	*ex situ* cy	2.50	399,300	998,000	363,200	908,000
14	Importing Soil for Backfilling	*ex situ* cy	5.00	N/A	N/A	220,000	1,100,000
15	Backfilling with Imported Soil and Compacting	*ex situ* cy	2.00	N/A	N/A	220,000	440,000
16	Geotechnical Engineering Oversight and Testing During Backfilling	*ex situ* cy	Lump Sum		800,000		200,000
17	Pit F Emissions Containment (using Sprung Instant Structure)		Lump Sum		120,000		120,000
18	Pit F Excavation Emissions Control		Lump Sum		60,000		60,000
19	Excavating/Roll-off Box Loading/Transporting Styrene Waste	*in situ* cy	180.00	1,500	270,000	1,500	270,000
20	Disposing of Styrene Waste in Class I Landfill in Kettleman Hills	*in situ* cy	200.00	1,500	300,000	1,500	300,000
21	Constructing Slurry Wall	See Table 10-7 for details.			1,040,000		
22	Constructing Cap, CDF Trenches, and Surface Drainage	See Table 10-7 for details.			7,366,000		
23	Constructing New Perimeter Berm	See Table 10-7 for details.			444,000		
24	Site Cleaning and Demobilization		Lump Sum		50,000		50,000
25	**Construction Subtotal**				**18,396,000**		**23,492,000**
26	Work Plan (SAP, Air Monitoring Plan, Dust/Odor Control Plan, SWPPP) Preparation and Permitting		Lump Sum		60,000		80,000
27	Oversight (Including Air Monitoring, Dust/Odor Control, Documentation and QA)		% of Item 25	6%	1,104,000	8%	1,879,000
28	SAP Implementation (Including Laboratory Analyses)		% of Item 25	3%	552,000	5%	1,175,000
29	Engineering Consulting		% of Item 25	3%	552,000	2%	470,000
30	**Oversight Subtotal**				**2,268,000**		**3,604,000**
31	Abandoning/Reconstructing Ground Water Monitoring Wells				100,000		50,000
32	Restoring Perimeter Fencing and Adjacent Streets				100,000		50,000
33	**Miscellaneous Subtotal**				**200,000**		**100,000**
34	**Contingency (15% of Construction, Oversight & Misc. Costs)**				**3,130,000**		**4,079,000**
35	**Present Worth of O&M Costs (Tables 10-8 and 10-9)**				**2,711,000**		**226,000**
36	**Total Cost of Alternative**				**26,705,000**		**31,501,000**

Table 10-6 Notes:

The note numbers below correspond to the item numbers in Table 10-6. The estimated unit rates or lump sum costs are based on rates obtained by ENVIRON from prospective contractors, ENVIRON's experience, and/or ENVIRON's professional judgement. cy = cubic yard. The quantities were rounded to the nearest 100 and the calculated costs were rounded to the nearest $1,000.

1. The lump sum cost of $400,000 was estimated based on a range of $300,000 to $500,000.
2. The volume estimate of 274,000 tons was taken from Table 6-B of Section 6.4.3.
3. The weight estimate of 219,300 tons was taken from Table 6-B. The unit cost includes steam cleaning the surface of concrete prior to crushing.
4. The weight estimate of 54,700 tons was taken from Table 6-B.
5. The volume estimate of 2.8 million gallons was taken from Section 6.4.3.
6. The volume estimate of 40,200 cy was taken from Table 6-B. The unit cost of $20 per cy was obtained from 3i.
7. The volume estimate of 29,300 cy for Alternative 2 is the total perimeter berm volume, which was taken from Table 6-3. The volume estimate of 181,000 cy for Alternative 3, which is the sum of the total berm and the clean soil volumes, was taken from Table 6-B.
8. Site dewatering was assumed to be required for portions of the site.
9. The volume estimate of 46,900 cy for Alternative 2 includes (1) 10,800 cy, which is 20% of the volume estimate for Lagoons 1 and 2 drilling muds (from Table 6-3) that was assumed to be low strength materials, and (2) 36,100 cy of waste, which will need to be excavated from under Magnolia Street and Hamilton Avenue that are slated for widening in the future. The volume estimate of 524,900 cy for Alternative 3 was taken from Table 6-B.
10. The volume estimate of 88,000 cy for Alternative 3 was taken from Table 6-B.
11. The volume estimate of 100,700 for Alternative 2 was obtained by adding 20% to the corresponding volume under Item 9 to account for expansion upon excavation ("the fluff factor"). The volumes estimate of 735,500 cy for Alternative 3 was obtained by adding 20% to the corresponding volume under Item 9 to account for the fluff factor. The unit cost of $10 per cy was obtained from Global.
12. The volume estimate of 823,800 cy for Alternative 3 was calculated by accounting for the volume of cement that will be added using the 12% cement ratio for Mix 1 of Table 9-A of Section 9.3.1. For Alternative 2, the stabilized materials will be used as backfill at the site to create a foundation layer for the cap. It was assumed that for Alternative 3, the stabilized materials would be transported to off-site, with an estimated volume of 112,800 cy, construction sites within 30 miles of the Ascon site at a nominal cost of $4/cy (mostly for loading and transportation).

13. The volume estimate of 399,200 cy for Alternative 2 was calculated by adding the volumes of crushed concrete (146,200 cy), the stabilized materials from Item 12 (112,800 cy), the perimeter berm soil increased by 20% to account for the fluff factor (35,200 cy), soil excavated during construction of the slurry wall (10,500 cy) plus regrading of 3 feet of clean surface soil (94,600 cy). The volume estimate of 363,200 cy for Alternative 3 was calculated by adding the volumes of crushed concrete (146,200 cy) and the clean soil (217,000 cy, including the clean berm soil, obtained from Table 6-B).
14. The volume estimate of 220,000 cy was obtained based on the assumption that approximately 3 feet of imported fill will be needed across the site. The assumed unit cost of $5 per cy is expected to vary based on the availability of import soil at the time of project construction.
15. The assumed unit cost is for backfilling and soil compaction.
16. The lump sum costs for Alternatives 2 and 3 were estimated based on the assumed volumes and cost estimates obtained from geotechnical firms.
17. The lump sum cost is for the installation of a temporary containment structure (Sprung Instant Structure) over Pit F during the excavation and loading of styrene waste.
18. The lump sum cost is for installing and operating the containment system (applying negative air pressure during the operations, and installing and operating activated carbon air handling units to manage air emissions).
19. The volume estimate of 1,500 cy was taken from Table 6-B. The unit cost was obtained from 3i.
20. The volume estimate of 1,500 cy was taken from Table 6-B. The unit cost was obtained from Waste Management, the owner and operator of the Class I Landfill in Kettleman Hills, California.
21. See Item 1 of Table 10-7 notes.
22. See Items 2 through 8 of Table 10-7 notes.
23. See Item 9 of Table 10-7 notes.
24. The lump sum cost of $50,000 was estimated based on a cost range of $35,000 to $75,000.
25. Construction subtotal was calculated for each of Alternatives 2 and 3 by adding the corresponding costs for Items 1 through 24
26. The lump sum cost of $60,000 for Alternative 2 was estimated based on a cost range of $50,000 to $75,000. The lump sum cost of $80,000 for Alternative 3 was estimated based on a cost range of $60,000 to $100,000.
27. The oversight cost for Alternative 2 was assumed to be 6% of the construction subtotal cost. The corresponding cost for Alternative 3 was assumed to be 8% of the construction subtotal cost.
28. The SAP implementation cost for Alternative 2 was assumed to be 3% of the construction subtotal cost. The corresponding cost for Alternative 3 was assumed to be 5% of the construction subtotal cost.
29. The engineering cost for Alternative 2 was assumed to be 3% of the construction subtotal cost. The corresponding cost for Alternative 3 was assumed to be 2% of the construction subtotal cost.
30. Oversight subtotal was calculated for each of Alternatives 2 and 3 by adding the corresponding costs for Items 26 through 29.

31. This estimate includes the cost of abandoning the existing ground water monitoring wells and constructing new wells. Twelve new wells were assumed to be required for Alternatives 2, and six new wells were assumed to be required for Alternative 3.
32. For Alternative 2, a perimeter fence will be erected and Magnolia Street and Hamilton Avenue will be restored adjacent to the site. For Alternative 3, Magnolia Street and Hamilton Avenue will be restored adjacent to the site.
33. Miscellaneous subtotal was calculated for each of Alternatives 2 and 3 by adding the corresponding costs for Items 31 and 32.
34. Contingency for each of Alternatives 2 and 3 was calculated as 15% of the total of construction, oversight, and miscellaneous subtotals.
35. Present worth of O&M costs for Alternatives 2 and 3 was obtained from Tables 10-8 and 10-9, respectively.
36. Total cost of each of Alternatives 2 and 3 was calculated by adding the corresponding subtotals for Items 25, 30, 33, 34, and 35.

Table 10-7: Order of Magnitude Partial Cost Estimate Details for Alternative 2
Ascon site, Huntington Beach, California

Item	Item Description	Cost Basis		Alternative 2 (Containment)		
		Unit	Unit Cost ($)	Quantity	Cost ($)	Subtotal ($)
1	Constructing Slurry Wall	sq ft	20.00	52,000	1,040,000	
	Subtotal for Constructing Slurry Wall					**1,040,000**
2	Constructing CDF Trenches	linear ft	25.00	11,700	293,000	
3	Constructing Foundation Layer	tons	5.00	244,000	1,220,000	
4	Constructing Gas Collection Layer	tons	11.00	117,000	1,287,000	
5	Constructing Synthetic Liner	sq ft	0.80	2,000,000	1,600,000	
6	Constructing Cap Drainage Layer	tons	10.00	117,000	1,170,000	
7	Importing/Placing Topsoil	tons	11.00	146,000	1,606,000	
8	Hydroseeding	acres	38.00	5,000	190,000	
	Subtotal for Constructing Cap, CDF Trenches, and Surface Drainage					**7,366,000**
9	Constructing New Perimeter Berm	*ex situ* cy	12.00	37,000	444,000	
	Subtotal for New Perimeter Berm					**444,000**

Table 10-7 Notes:

The note numbers below correspond to the item numbers in Table 10-7. The estimated unit rates or lump sum costs are based on rates obtained by ENVIRON from prospective contractors, ENVIRON's experience, and/or ENVIRON's professional judgement. cy = cubic yard; sf = square foot. The quantities were rounded to the nearest 100 and the calculated costs were rounded to the nearest $1,000.

1. Assume the slurry trench is 2 feet wide, 10 feet deep, and constructed along the entire perimeter of the site. The unit cost was obtained from ENV America and assumes providing for pilot testing and constructing a cap on top of the slurry trench.
2. Assume 8 lines of 1,300-foot-long underdrain collection (CDF) trenches are required across the site. Also assume 1 line of CDF trench is required to connect the 8 lines, for a total CDF trench length of 11,700 linear feet at a unit cost of $25 per linear foot.
3. Assume volume of imported soil for the 2-foot-thick foundation layer below the synthetic liner is 132,000 cy. Assume an additional 10 percent imported soil will be required to provide soil for thicker areas of the foundation layer (to maintain the minimum 3 percent slope and provide larger areas of uniform grades to simplify construction). Allowing for 20 percent volume decrease, assume the imported soil will weigh 244,000 tons. Assume $5/ton for imported soil, backfilling, and compaction.
4. Assume a 1-foot-thick sand layer with perforated PVC pipes will be placed below the synthetic liner. Assume a sand volume of 73,000 cy with a weight of 117,000 tons, including 10 percent volume decrease. Assume a unit cost of $11/ton for importing, placing, and compacting the sand layer, including allowance for installing the PVC pipes.
5. Assume 12% additional synthetic liner (a composite of 60-mil VFPE geomembrane overlain by a GCL) is required to provide for overlap and wastage during liner installation. The total liner required is approximately 2,000,000 sf. The unit cost of 60-mil VLDPE liner over a 30-mil backing GCL is assumed to be $0.35/sf. Installation cost is assumed to be $0.45/sf
6. Assume the amount of imported soil for the 1-foot-thick sand drainage layer above the synthetic liner is 73,000 cy or 117,000 tons, including 10 percent volume decrease. Assume $10/ton for importing sand, backfilling, and compaction.
7. Assume the amount of imported topsoil for the vegetation layer is 20,000 cy (for 2 feet thickness) or 26,000 tons on slopes, and 78,000 cy (for 1.5 feet thickness) or 101,000 tons on non-slope areas. The latter was reduced from 109,000 tons to 100,000 tons because no vegetative layer is required under the perimeter berm. Assuming 10 percent volume decrease, the required amounts of topsoil are 30,000 tons for slopes and 116,000 tons for non-slope areas. Assume $11/ton for importing topsoil, backfilling, and compaction.
8. Assume the area of the vegetative layer for hydroseeding is 38 acres at a unit cost of $5,000/acre.
9. Assume 15,000 cy of soil will be required to construct the new perimeter berm at a cost of $12/cy.

Table 10-8
Order of Magnitude O&M Cost Estimate for Alternative 2
Ascon Site, Huntington Beach, California

Item	Item Description	o. of Year	Annual Cost ($)	Present Worth of Future Cost ($)
1	CDF Monitoring	30	5,000	109,597
2	CDF Liquid Recycling/Disposal	15	60,000	751,773
3	Ground Water Monitoring (First 2 years)	2	60,000	113,197
4	Ground Water Monitoring (Next 28 years)	28	30,000	662,581
5	O&M of Vegetation, Drainage, Fill Gas, Etc.	30	15,000	328,790
6	Irrigation and Lighting	30	20,000	438,386
7	Consulting Engineering and Reporting	30	14,000	306,870
8	**TOTAL (Present Worth)**			**2,711,000**

Notes: Assumed a 3% annual escalation rate and a 5% annual interest rate.

Table 10-9
Preliminary O&M Cost Estimate for Alternative 3 (Source Removal)
Ascon Site, Huntington Beach, California

F:\HD\ASCO

Item	Item Description	No. of Years	Annual Cost ($)	Present Worth of Future Cost ($)
1	Ground Water Monitoring (First 2 years)	2	60,000	113,197
2	Ground Water Monitoring (Next 3 years)	3	30,000	80,919
3	Consulting Engineering and Reporting (First 2 year	2	10,000	18,866
4	Consulting Engineering and Reporting (Next 3 yea	3	5,000	13,487
	TOTAL (Present Worth)			**226,000**

Notes: Assumed a 3% annual escalation rate and a 5% annual interest rate.

Table 10-10
Comparative Evaluation of the No Action, Containment, and Source Removal Alternatives
Ascon Site, Huntington Beach, California

NCP Criterion	Alternative's Ranking		
	Alternative 1 (No Action)	Alternative 2 (Containment)	Alternative 3 (Source Removal)
Overall protection of human health and the environment	Very Low	Medium	High
Compliance with ARARs	Very Low	High	High
Long-term effectiveness and permanence	N/A	Medium	High
Reduction of toxicity, mobility, and volume through treatment	N/A	Low	High
Short-term effectiveness	Very Low	Medium	Medium
Implementability	Very High	High	High
Cost	Very Low+	Medium+	Medium+
State acceptance	Very Low	Medium	High
Community acceptance	Very Low	Low to Medium	High

Notes:

"+" = High rankings are desirable except for cost where a low ranking is desirable.
"N/A" = Not applicable.

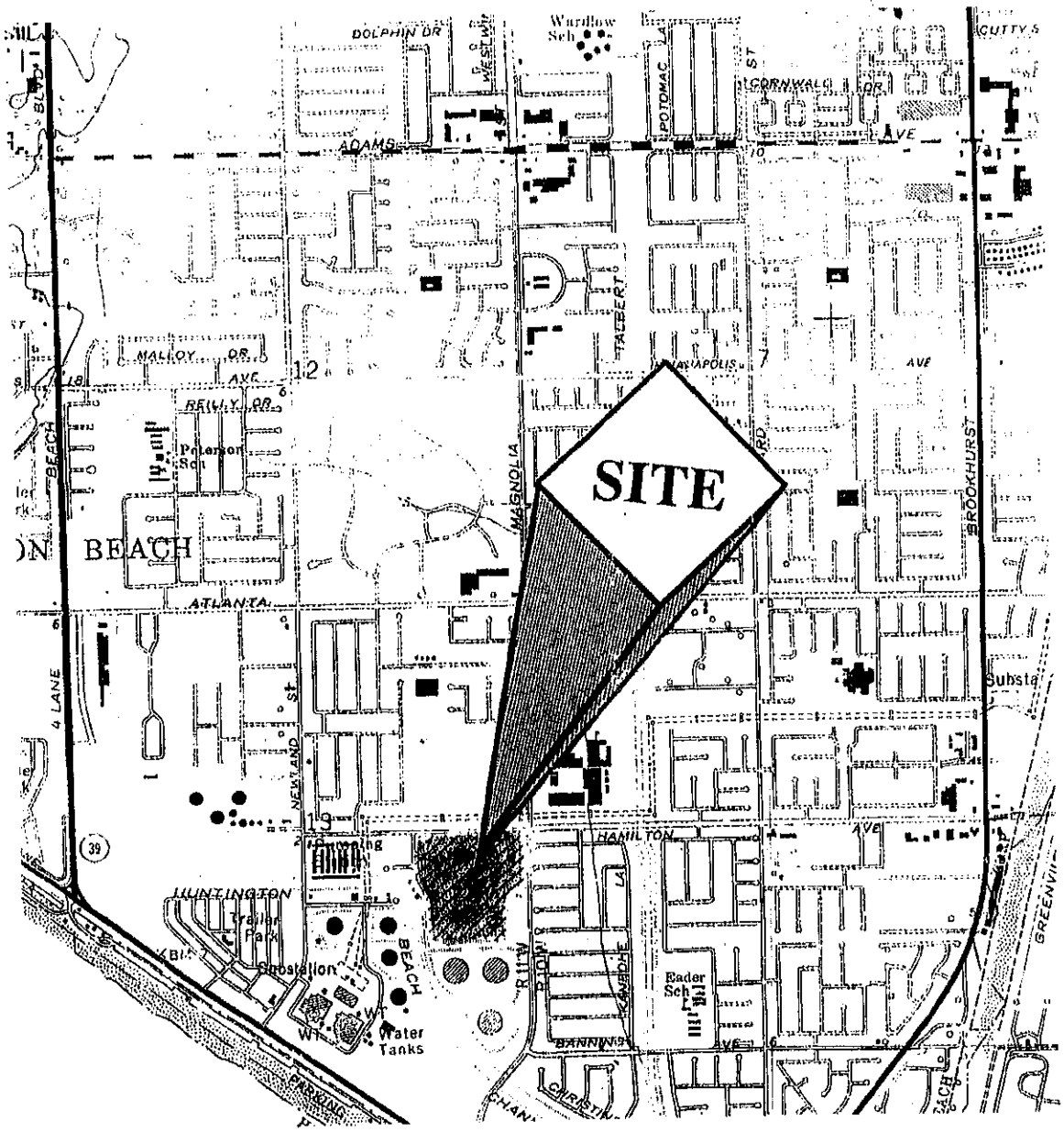
Table 11-1
Preliminary Project Implementation Schedule
Ascon Site, Huntington Beach, California

Activity	Year 1[1]				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Work Plan Preparation/Approval; Contracting																
Permitting																
Site Preparation and Full Mobilization																
Surface Water Removal/Treatment																
Liquid Hydrocarbon Removal/Solvent Extraction																
Drilling Muds & Affected Soils Excavation/Stockpiling/Stabilization																
Backfilling/Regrading																
Installing Ground Water Monitoring Wells																
Semi-Annual Ground Water Monitoring																
Site Closure/Restoration																
Closure Report Preparation/Approval																

Notes:

1. Year = Project Year (12 months).
   Q1 = First 3 months (quarter) of any Project Year; Q2 = Second 3 months; etc.
2. Ground water monitoring is proposed for five years, i.e., through Year 8.

FIGURES



FROM: U.S. GEOLOGICAL SURVEY, 1981
QUADRANGLE: Newport Beach
COUNTY: Orange
SERIES: 7.5-minute (topographic)

N

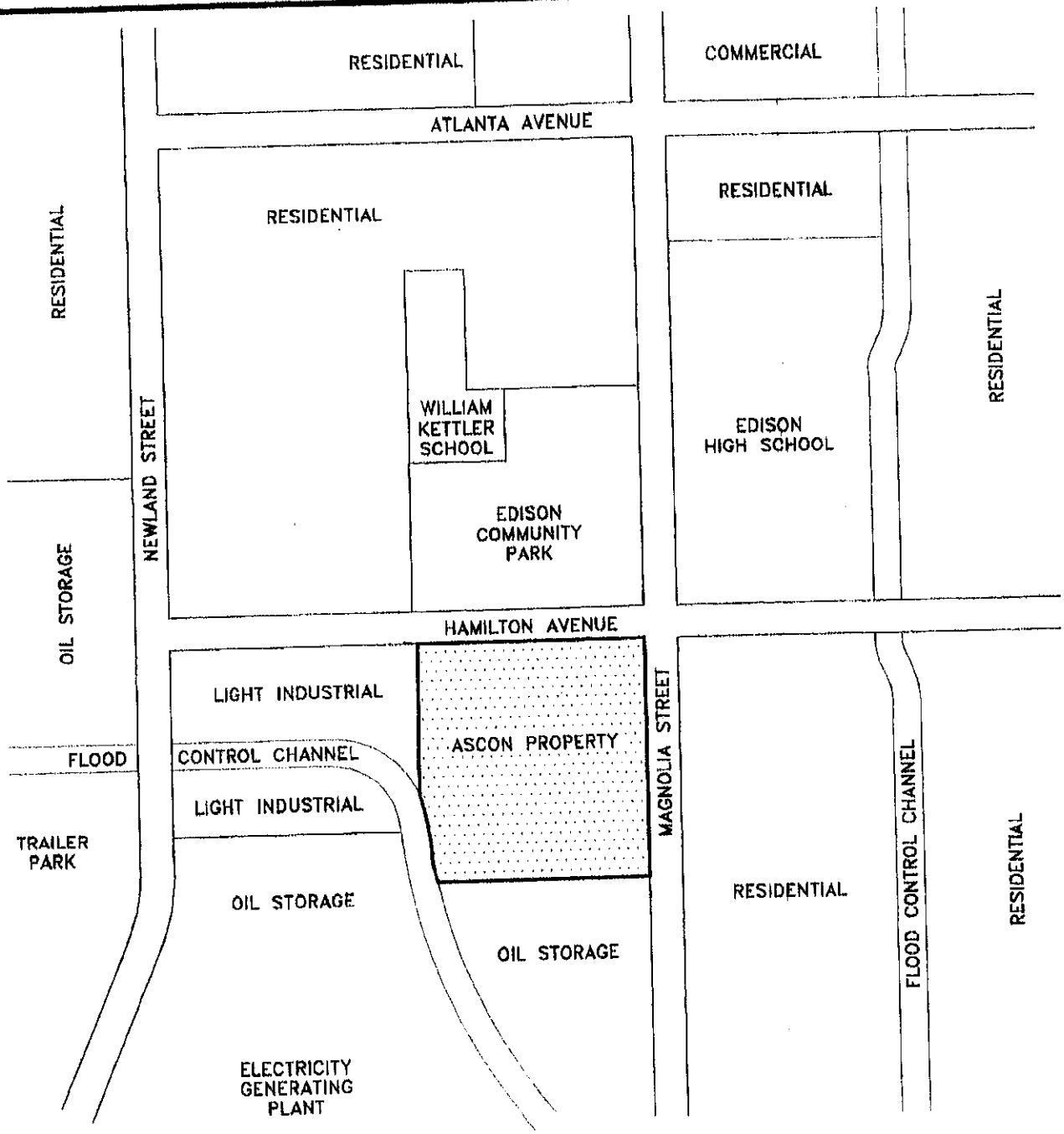
0 2,000 Feet
SCALE

ESE
A CILCORP COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA.

LOCATION MAP

DATE	PROJECT NUMBER	FIGURE
04/97	81-96192	1-1
DRAWING NUMBER		SIZE
G:\DWGS\CHARTS\SITELOCM		8.5 x 11
DRAWN BY	APPROVED BY	REVISION
RJM		



N

NOT TO SCALE

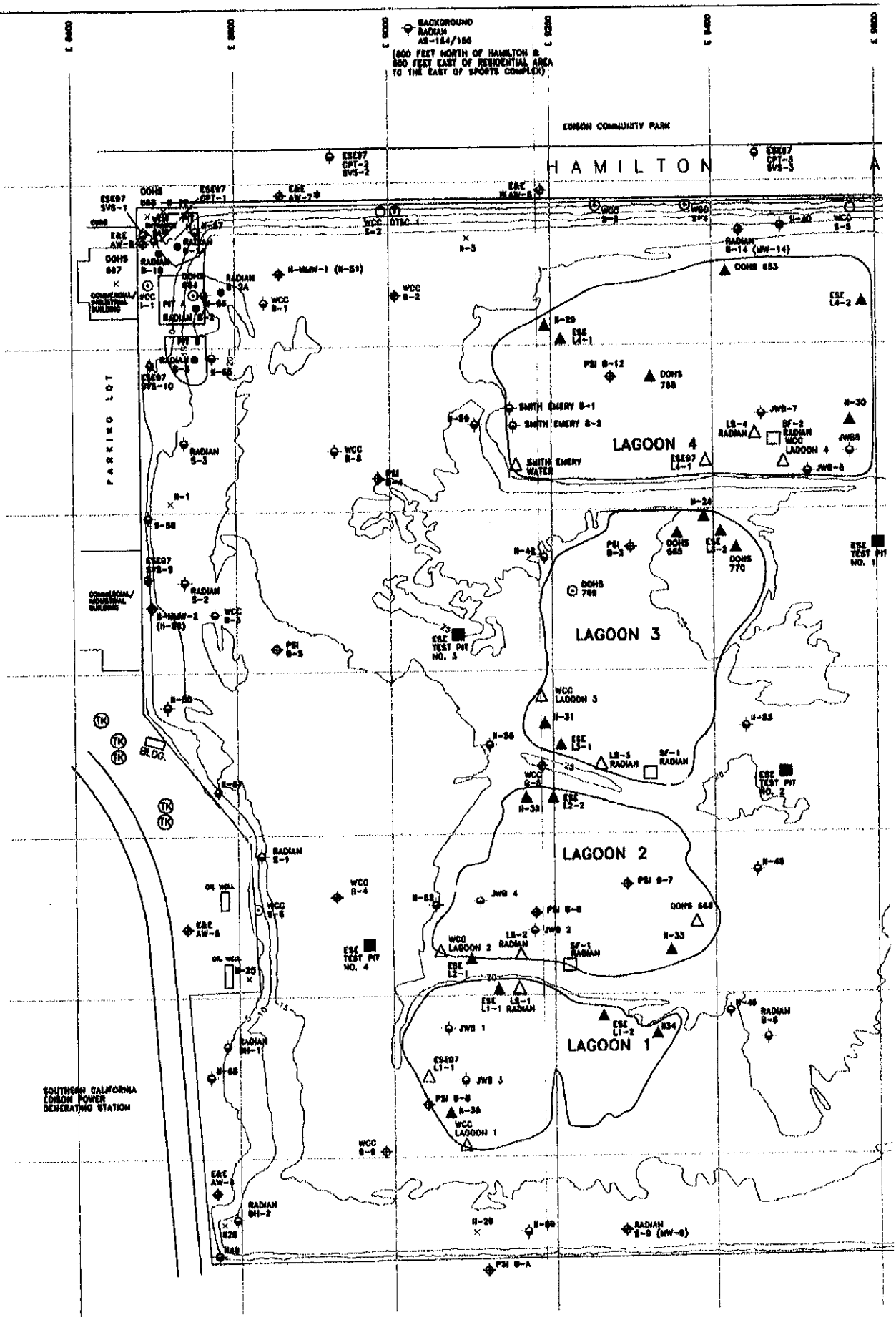
NOTE: LAND USE DESCRIPTIONS ARE BASED ON VISUAL OBSERVATION AND SHOULD NOT BE CONSIDERED ANY OF HUNTINGTON BEACH GENERAL PLAN–LAND USE DESIGNATIONS

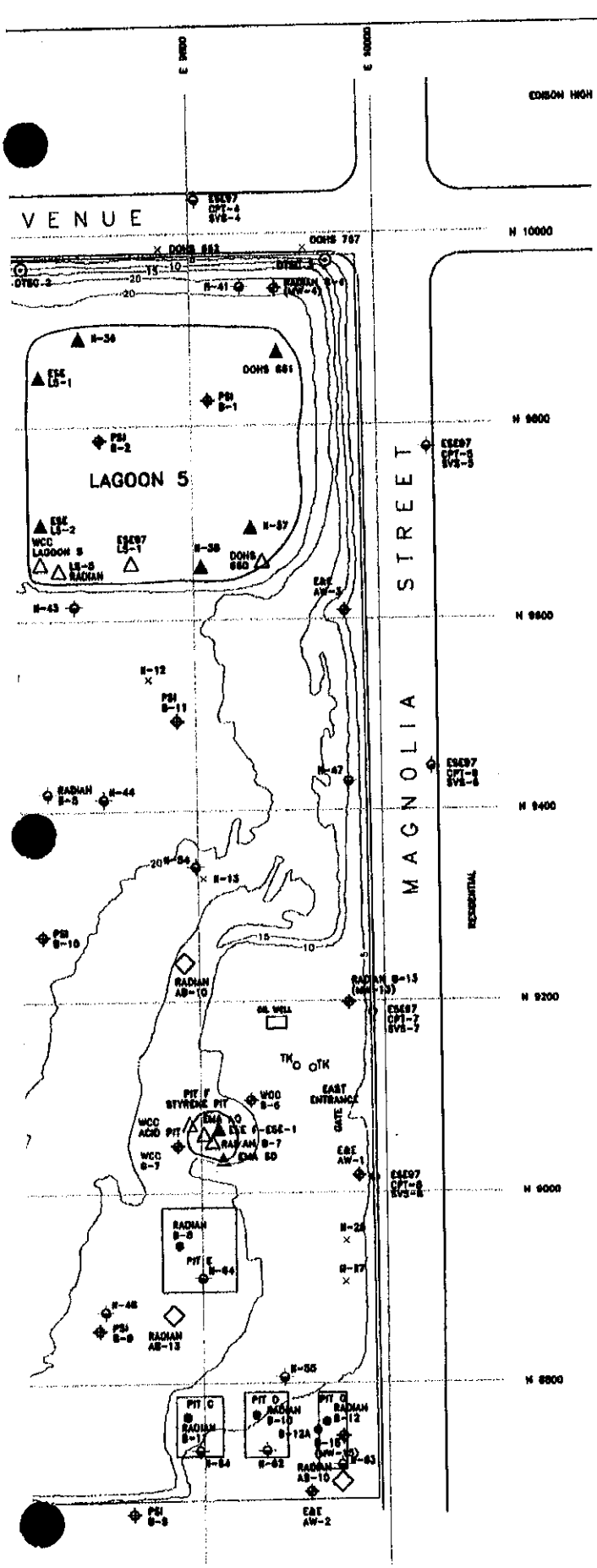
ESE
A CH2M HILL COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA

VICINITY MAP

DATE 03/97	PROJECT NUMBER 81-98192	FIGURE 1-2
DRAWING NUMBER OTHERS\44100102		SIZE 8.5 x 11
DRAWN BY RJM	APPROVED BY	REVISION


BACKGROUND
RADIAN
AS-154/156
(800 FEET NORTH OF HAMILTON & 600 FEET EAST OF RESIDENTIAL AREA TO THE EAST OF SPORTS COMPLEX)
EDISON COMMUNITY PARK
HAMILTON
PARKING LOT
LAGOON 4
LAGOON 3
LAGOON 2
LAGOON 1
ESE TEST PIT NO. 1
ESE TEST PIT NO. 2
ESE TEST PIT NO. 3
ESE TEST PIT NO. 4
SMITH EMERY WATER
SMITH EMERY B-1
SMITH EMERY B-2
WCC LAGOON 1
WCC LAGOON 2
WCC LAGOON 3
WCC LAGOON 4
BLDG.
OIL WELL
SOUTHERN CALIFORNIA EDISON POWER GENERATING STATION



EXPLANATION

- FENCE
- PROPERTY BOUNDARY
- 20 — TOPOGRAPHIC CONTOUR (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- × SOIL SAMPLE
- GROUNDWATER MONITORING WELL
- BORING WITHOUT CHEMICAL ANALYSIS
- BORING WITH CHEMICAL ANALYSIS
- CPT-8 CONE PENETROMETER
- SVS-6 SOIL VAPOR SAMPLE
- PIT BORING
- SURFACE SEEP SAMPLE
- SURFACE SEEP (NOT SAMPLE)
- LIQUID WASTE SAMPLE
- LAGOON OR PIT SEDIMENT SAMPLE
- SURFACE FLUX MEASUREMENT
- SOLID MATERIAL TEST PIT (NO CHEMICAL ANALYSIS)
- DOWN HOLE FLUX/SOIL GAS
- BOUNDARY OF WASTE LAGOON
- BOUNDARY OF WASTE PIT
- ESTIMATED BOUNDARY OF BURIED WASTE PIT
- N9000/E9000 LOCAL SURVEY REFERENCE GRID
- GRID REFERENCE
- TK TANK LOCATION

* WELL AW-6 AND AW-7 MAY HAVE BEEN PAVED OVER DURING WIDENING OF HAMILTON AVENUE.

PREVIOUS STUDIES

PSI – PSI ENGINEERING – 1986
SMITH-EMERY – 1979
DOHS – DEPARTMENT OF HEALTH SERVICES – 1980, 1981
OCEMA (EMA) – ORANGE COUNTY ENVIRONMENTAL MANAGEMENT AGENCY – 1981
WCC – WOODWARD CLYDE CONSULTANTS – 1983
ESE – ECOLOGY & ENVIRONMENT – 1983

JWS – J.W. BARRINGTON / TRUESDAIL LABORATORIES – 1985

RADIAN – RADIAN CORPORATION – 1988
N – ISCO INDUSTRIES/ITARA ENGINEERS. – 1982
DTSC – DEPARTMENT OF TOXIC SUBSTANCES CONTROL – 1983
ESE – ENVIRONMENTAL SCIENCE AND ENGINEERING, INC. – 1996
ESE97 – ENVIRONMENTAL SCIENCE AND ENGINEERING, INC. – 1997

N

0 80 FEET
SCALE

MODIFIED FROM RADIAN, 1988

ESE

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA.

SITE MAP SHOWING BORING AND SAMPLING LOCATIONS

DATE 08/97	PROJECT NUMBER 81-86192		FIGURE 1 of 3
DRAWING NUMBER 81X000301			SIZE 17 x 11
DRAWN BY RJH		APPROVED BY	REVISION 1

SECTIONAL DISTRICT MAP 13-6-11

CITY OF HUNTINGTON BEACH

ORANGE COUNTY, CALIFORNIA

NOTE: ALL DIMENSIONS ARE IN FEET. ANY ZONE ADJOINING ANY RIGHT OF WAY IS INTENDED TO EXTEND TO THE CENTER OF SUCH RIGHT OF WAY.

SCALE 0 1000 IN FEET

ADOPTED MARCH 7, 1960

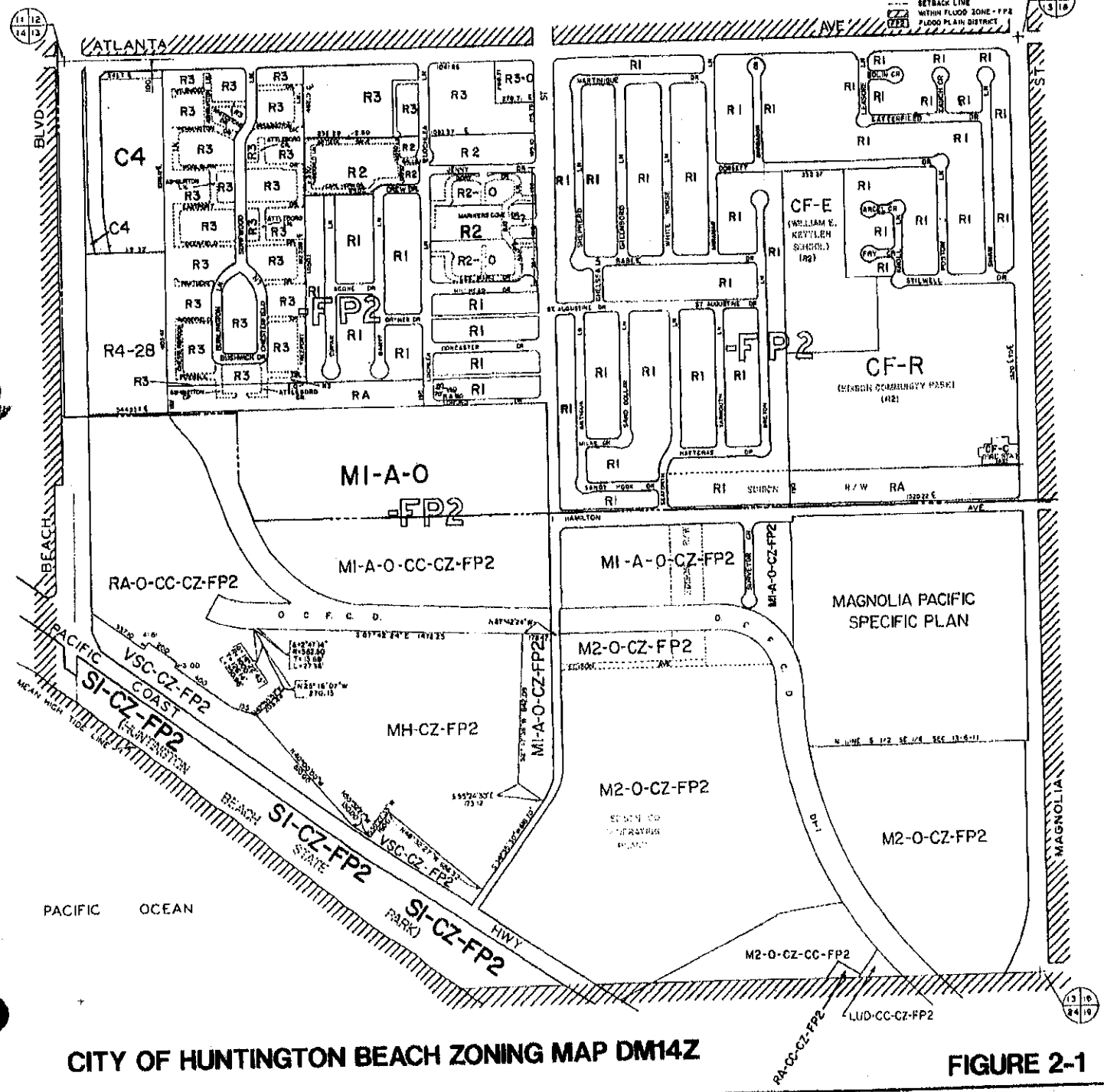
CITY COUNCIL ORDINANCE NO. 754

AMENDED	ZONE CASE	ORD. NO.
10-19-60	129	784
3-6-61	131	821
5-7-62	237	900
6-18-62	253	908
8-5-63	340	992
10-7-63	360	1007
1-20-64	390	1031
2-17-64	404	1037
3-2-64	402	1041
5-4-64	416	1055
6-15-64	445	1062
8-19-64	464	1079
8-1-66	66-33	1234
4-17-67	66-67	1317
8-19-67	66-66	1330
7-1-68	68-17	1426
9-3-68	68-26	1440
1-6-69	68-43	1464
6-16-71	71-13	1664
3-20-71	PP71-3	1732
6-6-72	72-11	1748
12-19-77	77-3"C"	2252
12-10-78	78-23	2336
4-7-80	80-2	2425
7-6-82	80-4	2555
8-17-82	82-3	2557
11-1-82	82-9	2591
7-2-84	84-7	2706

AMENDED	ZONE CASE	ORD. NO.
10-24-88	FLOOD ZONE	2604
1-23-90	87-14	2990
4-2-90	87-14A	3078
11-16-92	88-10	3033
	91-8	3177

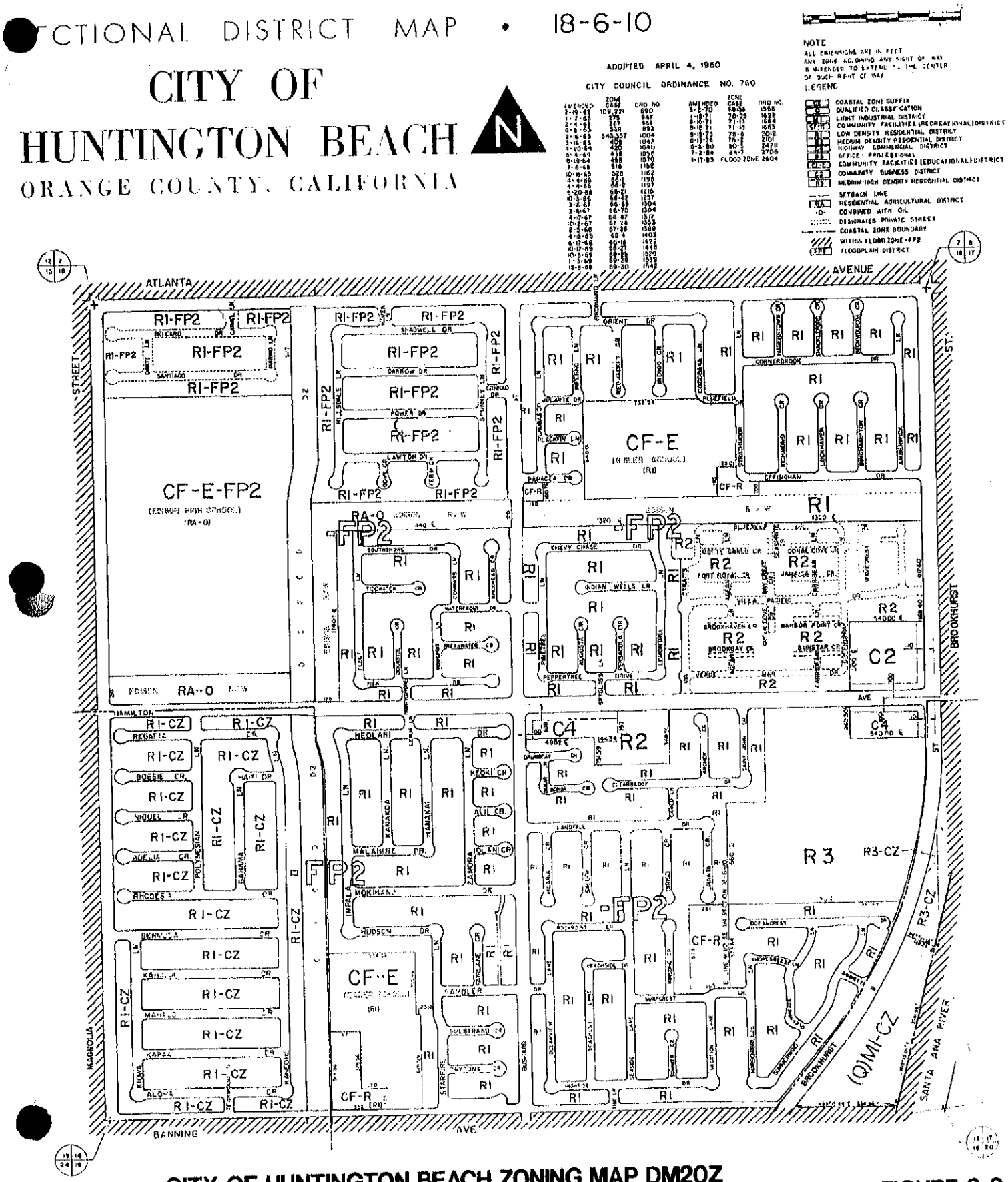
LEGEND

- VSC VISITOR SERVING COMMERCIAL
- RI LOW DENSITY RESIDENTIAL DISTRICT
- R3 MEDIUM DENSITY RESIDENTIAL DISTRICT
- RA RESIDENTIAL AGRICULTURAL DISTRICT
- MP INDUSTRIAL DISTRICT
- MI LIGHT INDUSTRIAL DISTRICT
- MI-A RESTRICTED MANUFACTURING DISTRICT
- R4 HIGH DENSITY RESIDENTIAL DISTRICT
- R2 MEDIUM-HIGH DENSITY RESIDENTIAL DISTRICT
- C4 HIGHWAY COMMERCIAL DISTRICT
- MH MOBILEHOME DISTRICT
- -O COMBINED WITH OIL PRODUCTION
- CF-C COMMUNITY FACILITIES (CIVIC) DISTRICT
- CF-R COMMUNITY FACILITIES (RECREATIONAL) DISTRICT
- LUD LIMITED USE DISTRICT
- SI SHORELINE DISTRICT
- CZ COASTAL ZONE SUFFIX
- COASTAL ZONE BOUNDARY
- DESIGNATES PRIVATE STREETS
- SETBACK LINE
- FP2 WITHIN FLOOD ZONE - FP2
- FP2 FLOOD PLAIN DISTRICT



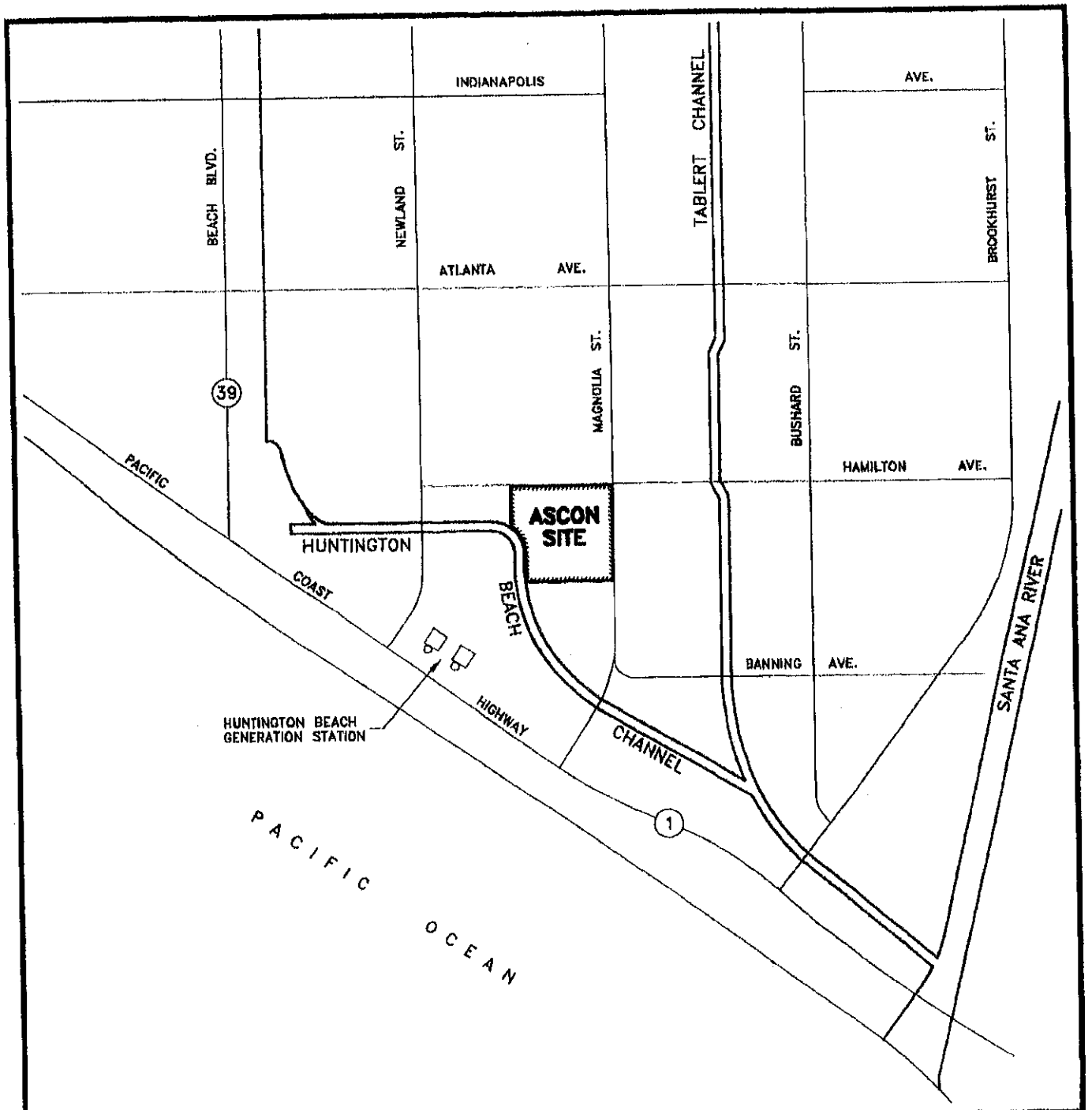
CITY OF HUNTINGTON BEACH ZONING MAP DM14Z

FIGURE 2-1



CITY OF HUNTINGTON BEACH ZONING MAP DM20Z

FIGURE 2-2



N

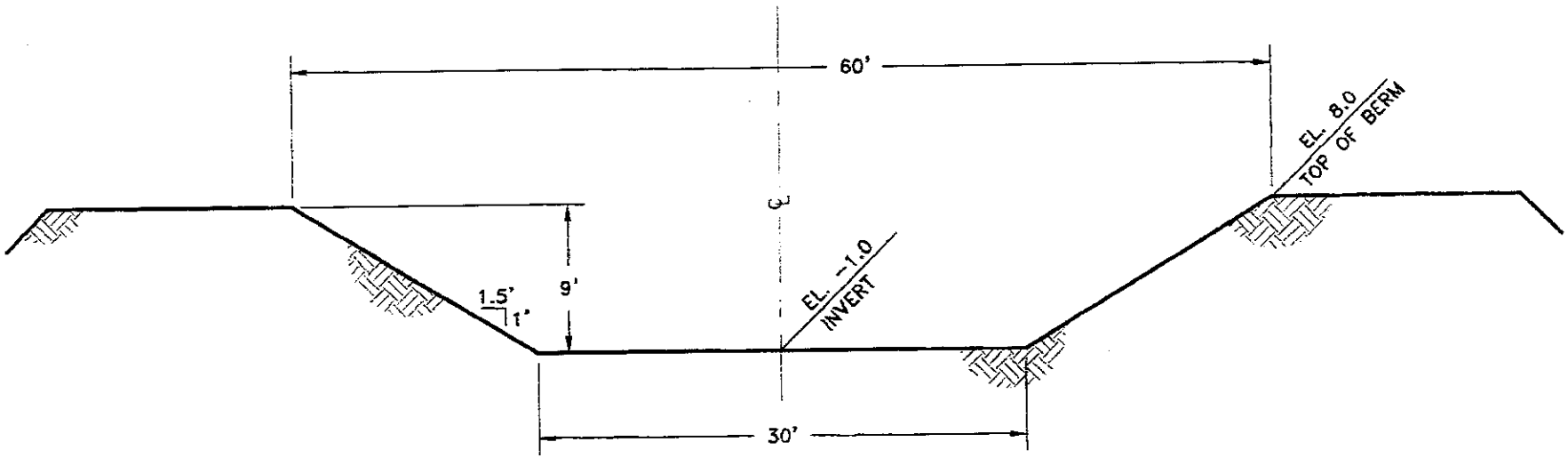
1" = 2000'±

ESE
A CH2MHILL COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA.

FLOOD CONTROL CHANNEL VICINITY MAP

DATE	PROJECT NUMBER	FIGURE
03/97	81-96192	2-3
DRAWING NUMBER		SIZE
41300338		8.5 x 11
DRAWN BY	APPROVED BY	REVISION
RJM		



0 10 FEET
SCALE

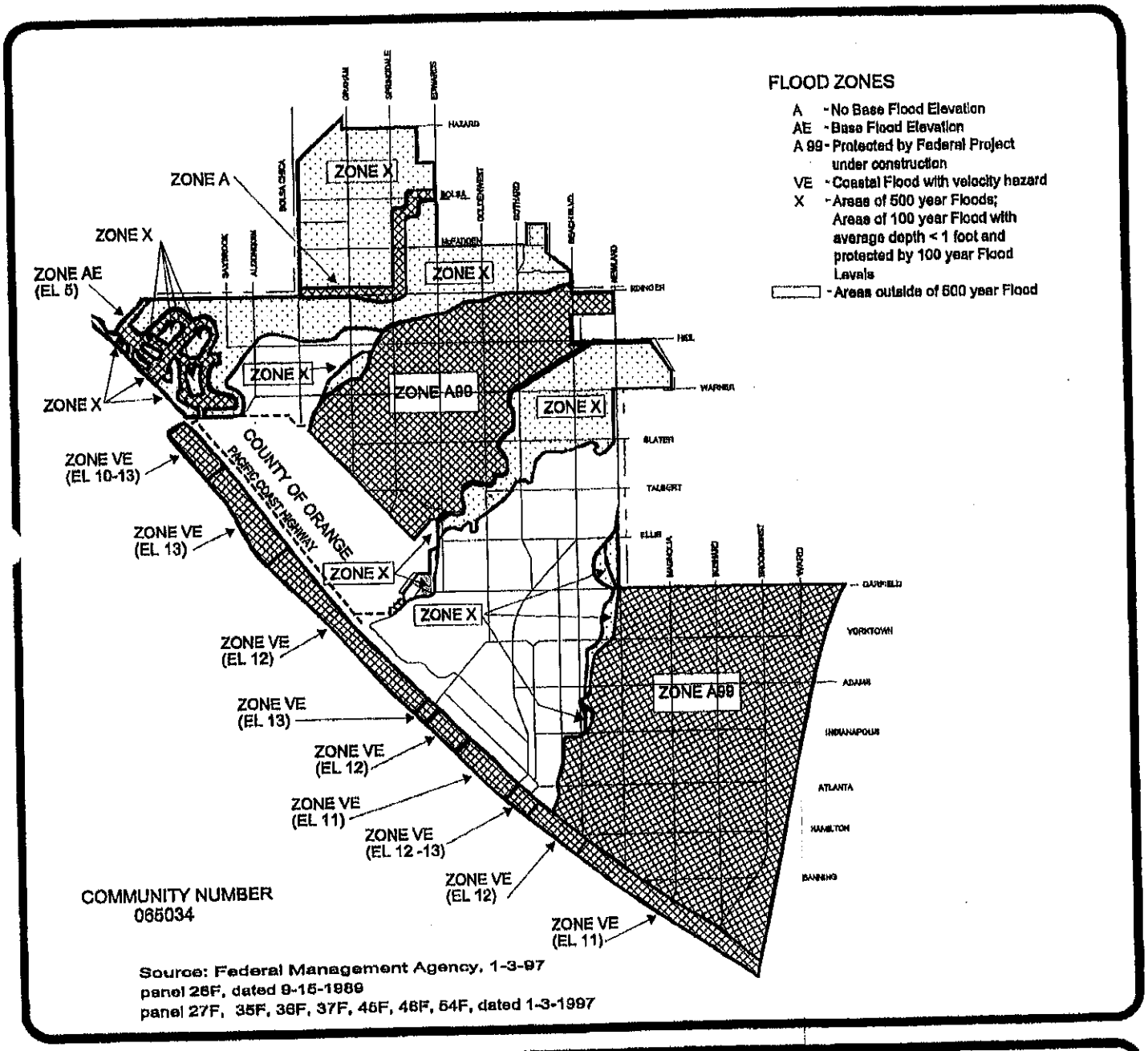
ESE
A CH2M HILL COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNGTINGTON BEACH, CA.

TYPICAL CHANNEL CROSS SECTION

DATE 03/97	PROJECT NUMBER 81/96192	FIGURE 2-4
DRAWING NUMBER 4130D339		SIZE 11 X 8.5
DRAWN BY RJM	APPROVED BY	REVISION

CITY OF HUNTINGTON BEACH



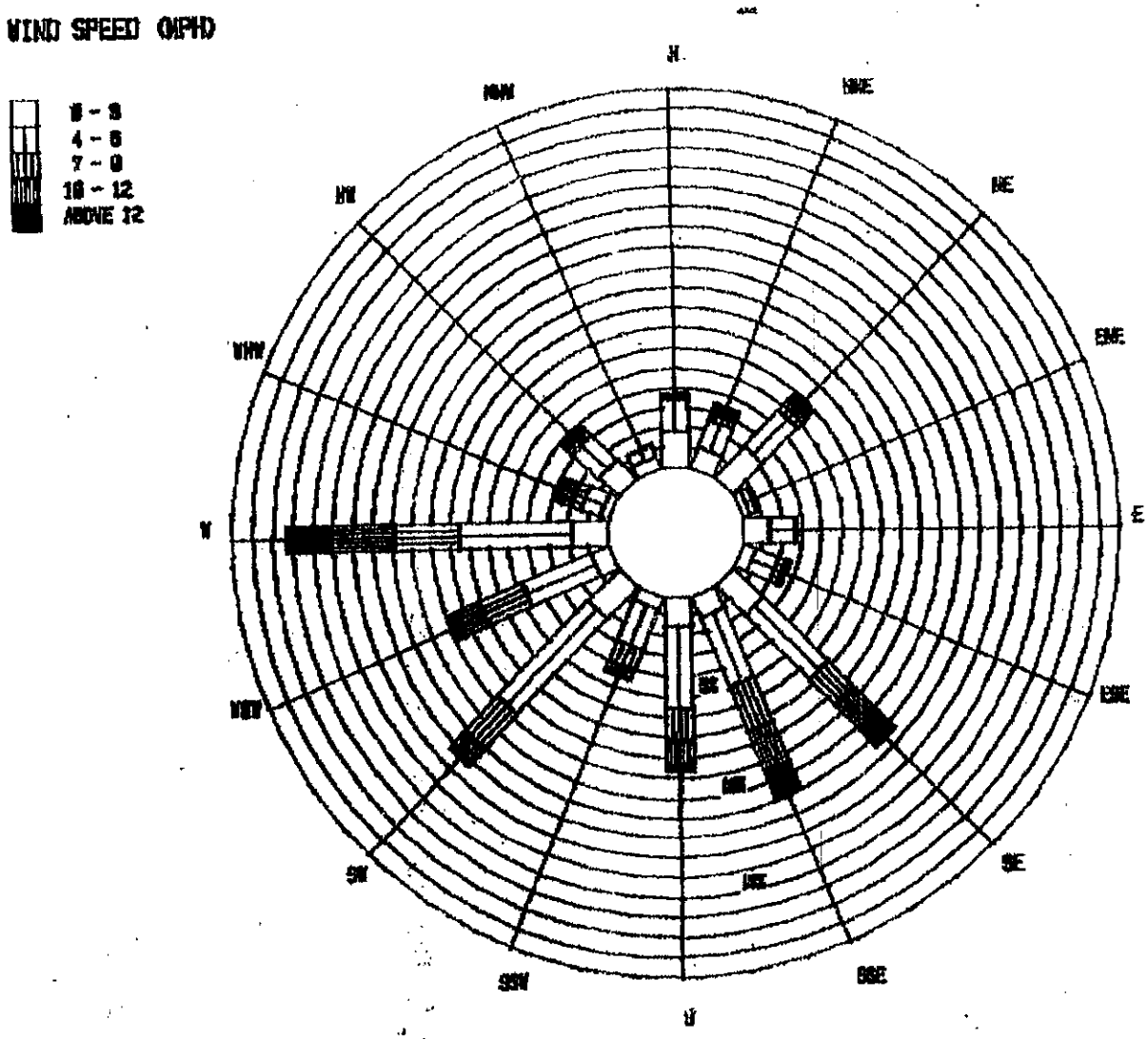
Source: Federal Management Agency, 1-3-97
panel 26F, dated 9-15-1989
panel 27F, 35F, 36F, 37F, 45F, 46F, 54F, dated 1-3-1997

FLOOD HAZARD AREAS 100 & 500 YEAR FLOOD

(STAGNER)

C:\DCAD\CITY\FLDMAP.DC2

FIGURE 2-5



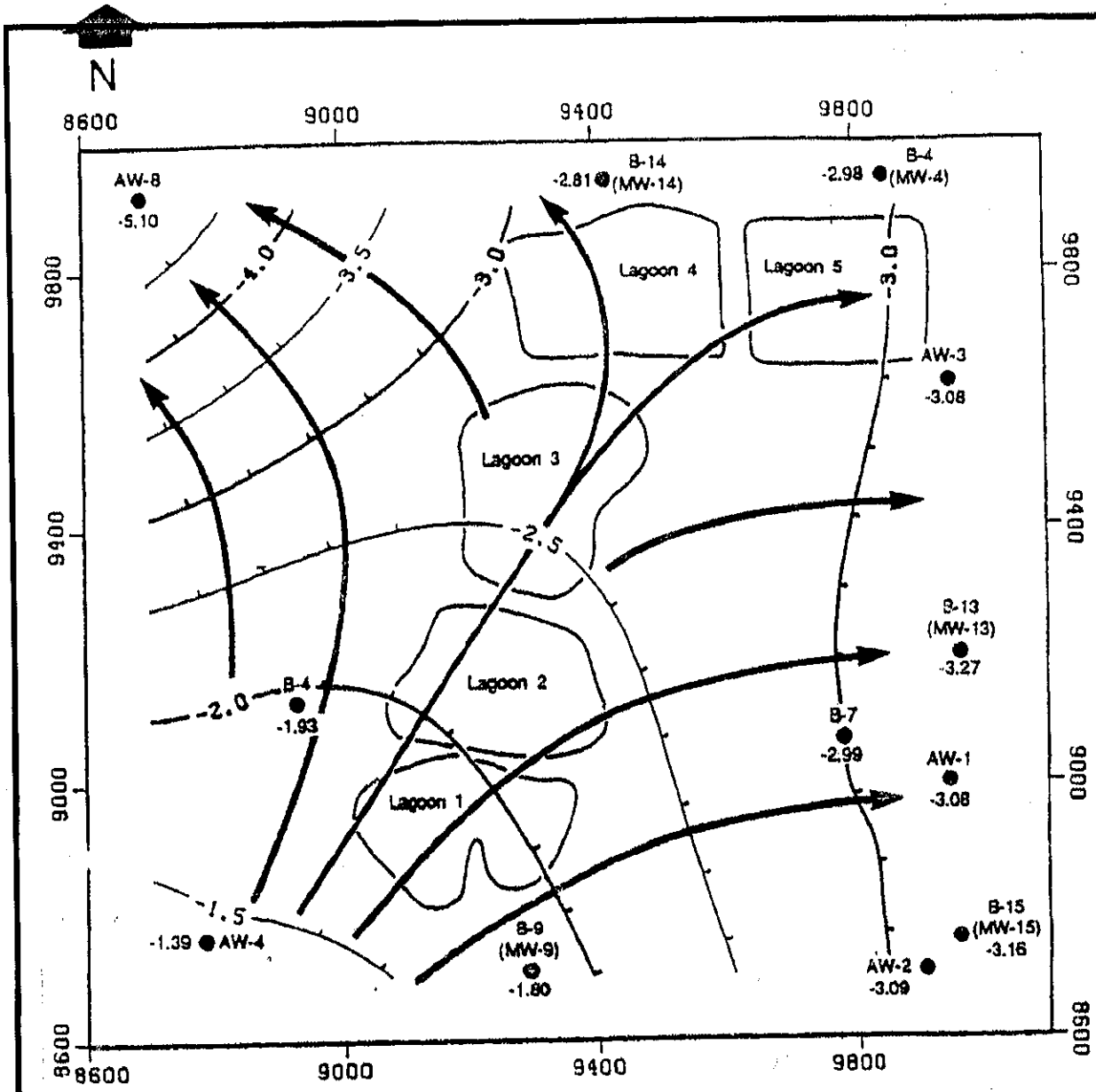
SOURCE: SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ESE
A GILBARCO COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA

WIND ROSE (1956–1975)

DATE	PROJECT NUMBER	FIGURE
04/97	81-98192	2-6
DRAWING NUMBER 41300341		SIZE 8.5 x 11
DRAWN BY	APPROVED BY	REVISION



LEGEND:

GROUND-WATER SURFACE ELEVATION CONTOURS

PRINCIPAL GROUND-WATER FLOW DIRECTIONS

B-14 -2.81 MONITORING WELL LOCATIONS AND WATER ELEVATION

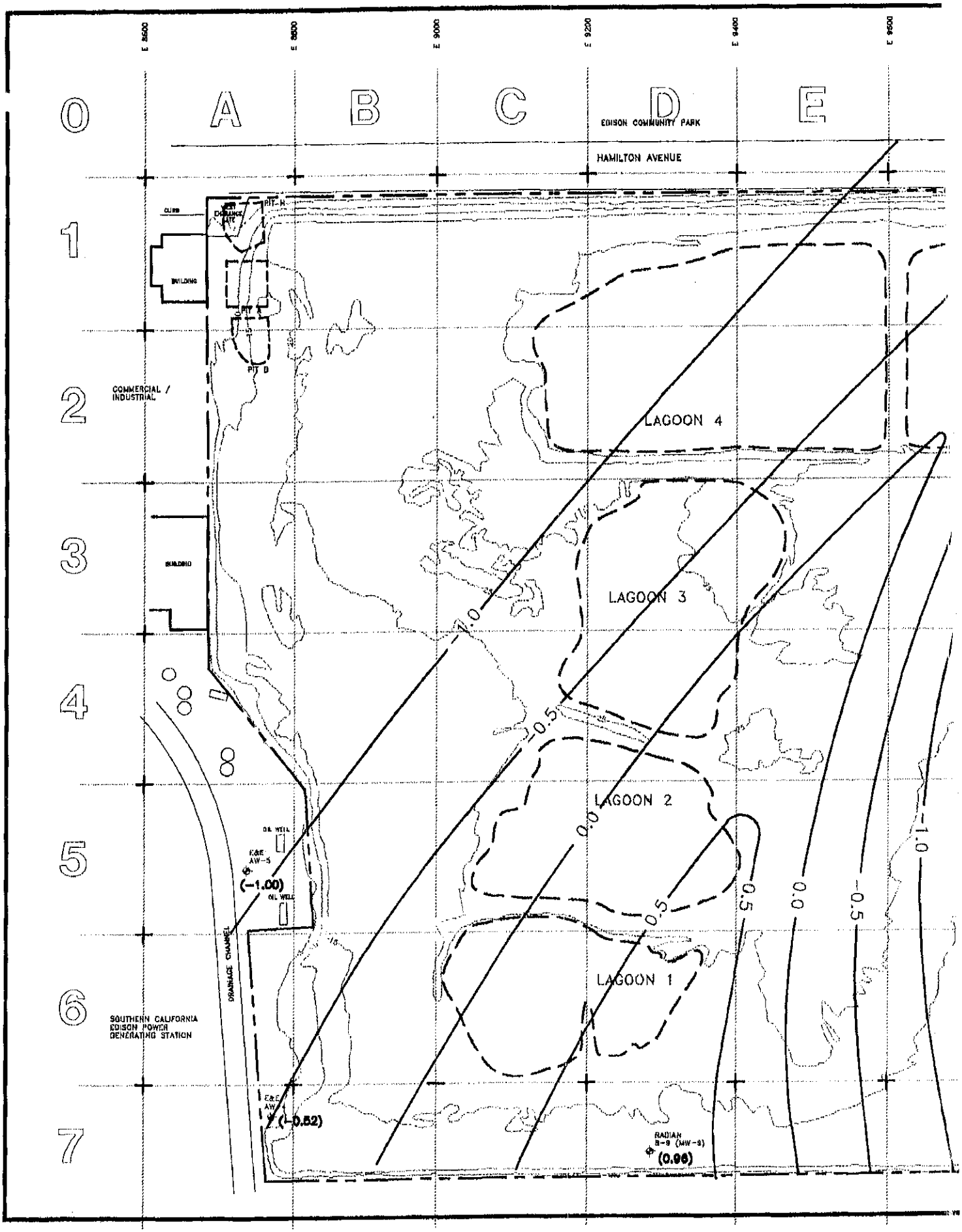
0 200 400
Scale in Feet

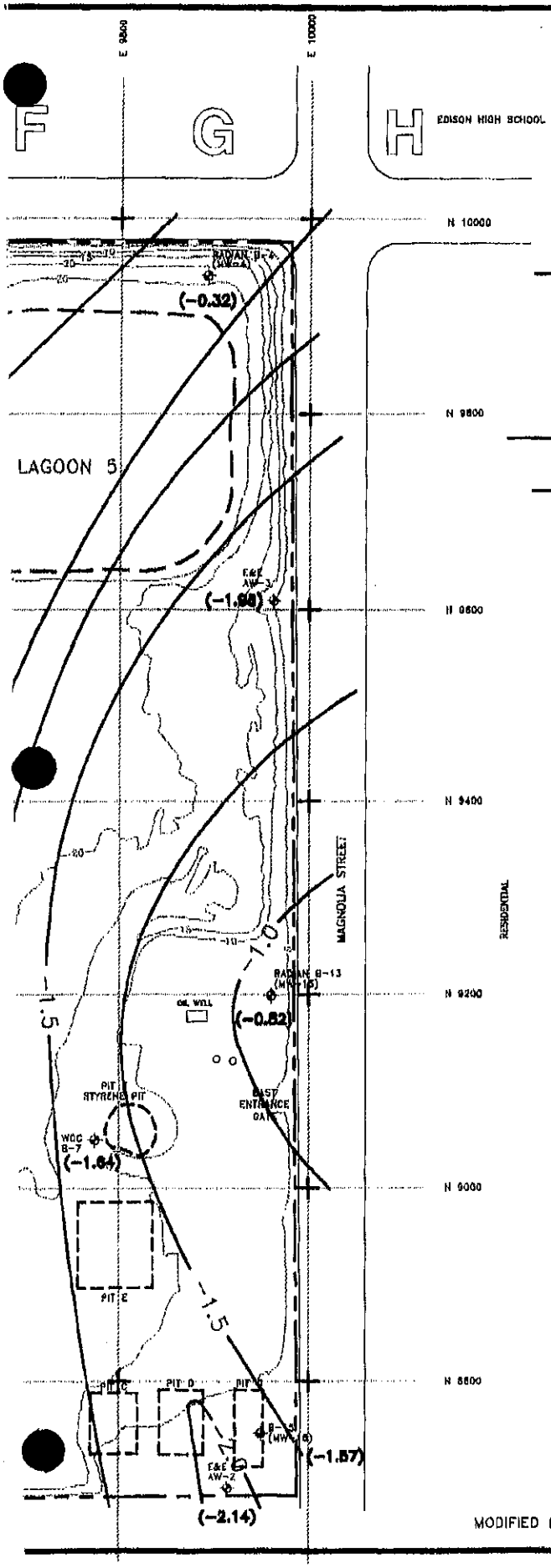
BSE
A GILCORP COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA.

GROUNDWATER SURFACE AND FLOW DIRECTIONS (SEPTEMBER 22, 1988)

DATE	PROJECT NUMBER	FIGURE
04/97	81-97192	2-7
DRAWING NUMBER		SIZE
41300342		8.5 x 11
DRAWN BY	APPROVED BY	REVISION


E 8500
E 8800
E 9000
E 9200
E 9400
E 9600
0
A
B
C
D
E
EDISON COMMUNITY PARK
HAMILTON AVENUE
1
2
3
4
5
6
7
CURB
DRAINAGE PIT
PIT H
BUILDING
PIT A
PIT D
COMMERCIAL / INDUSTRIAL
LAGOON 4
LAGOON 3
LAGOON 2
LAGOON 1
1.0
0.5
0.0
-0.5
-1.0
OIL WELL
E&E AW-5
(-1.00)
OIL WELL
DRAINAGE CHANNEL
SOUTHERN CALIFORNIA EDISON POWER GENERATING STATION
E&E AW-1
(-0.52)
RADIAN B-9 (MW-9)
(0.96)



MODIFIED FROM RADIAN, 1988

EXPLANATION

- PROPERTY BOUNDARY
- 20 — TOPOGRAHIC CONTOUR (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- GROUNDWATER MONITORING WELL
- (-0.82) — ELEVATION OF GROUNDWATER SURFACE IN FEET RELATIVE TO MEAN SEA LEVEL (MSL)
- -1.0 — LINE OF APPROXIMATELY EQUAL ELEVATION OF WATER SURFACE IN FEET RELATIVE TO MSL
- ESTIMATED BOUNDARY OF WASTE LAGOON
- ESTIMATED BOUNDARY OF WASTE PIT
- N9000/E9000 — LOCAL SURVEY REFERENCE GRID
- 7B — GRID REFERENCE

PREVIOUS STUDIES

PSI – PSI ENGINEERING – 1986
SMITH–EMERY – 1979
DOHS – DEPARTMENT OF HEALTH SERVICES – 1980, 81
OCEMA (EMA) – ORANGE COUNTY ENVIRONMENTAL MANAGEMENT AGENCY – 1981
WCC – WOODWARD CLYDE CONSULTANTS – 1983
E&E – ECOLOGY & ENVIRONMENT – 1983
[illegible] – OIL WELL [illegible] – [illegible]
JWB – J.W. BARRINGTON / TRUESDAIL LABORATORIES – 1986
[illegible] – [illegible] – [illegible]
RADIAN – RADIAN CORPORATION – 1988
II – ISCO INDUSTRIES/ITARA ENGINEERS, 1992, 1997
ESE – ENVIRONMENTAL SCEINCE AND ENGINEERING, INC. 1996
ESE97 – ENVIRONMENTAL SCIENCE AND ENGINEERING, INC. 1997

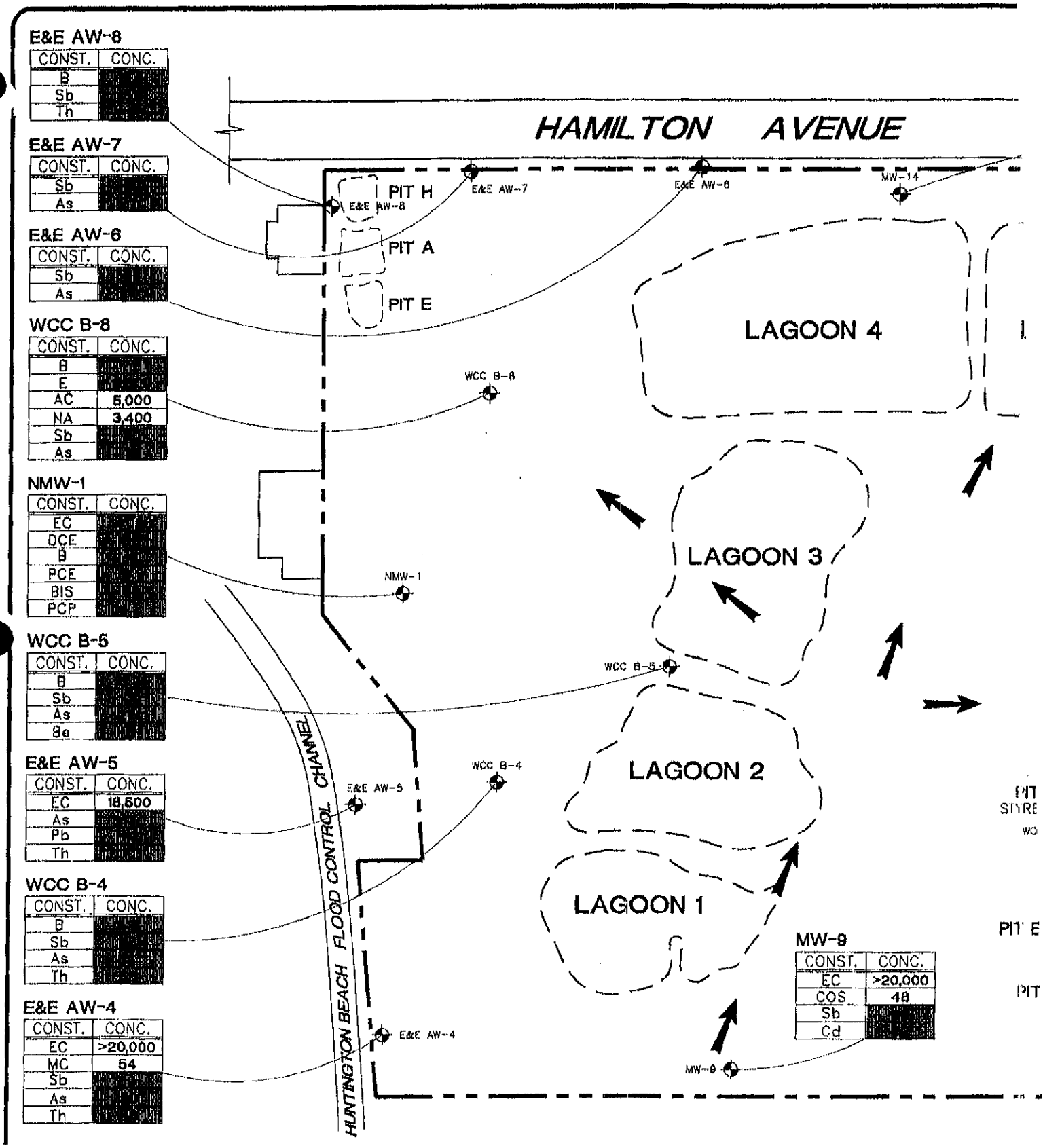
0 — 160 FEET
SCALE

ESE
A CH2M HILL COMPANY

ASCON PROPERTY
21641 MAGNOLIA STREET
HUNTINGTON BEACH, CA

GROUNDWATER ELEVATION MAP
MARCH 12, 1997

DATE	PROJECT NUMBER	FIGURE
03/97	81-96192	2-8
DRAWING NUMBER		SIZE
41300302		17 x 11
DRAWN BY	APPROVED BY	REVISION
RJM		



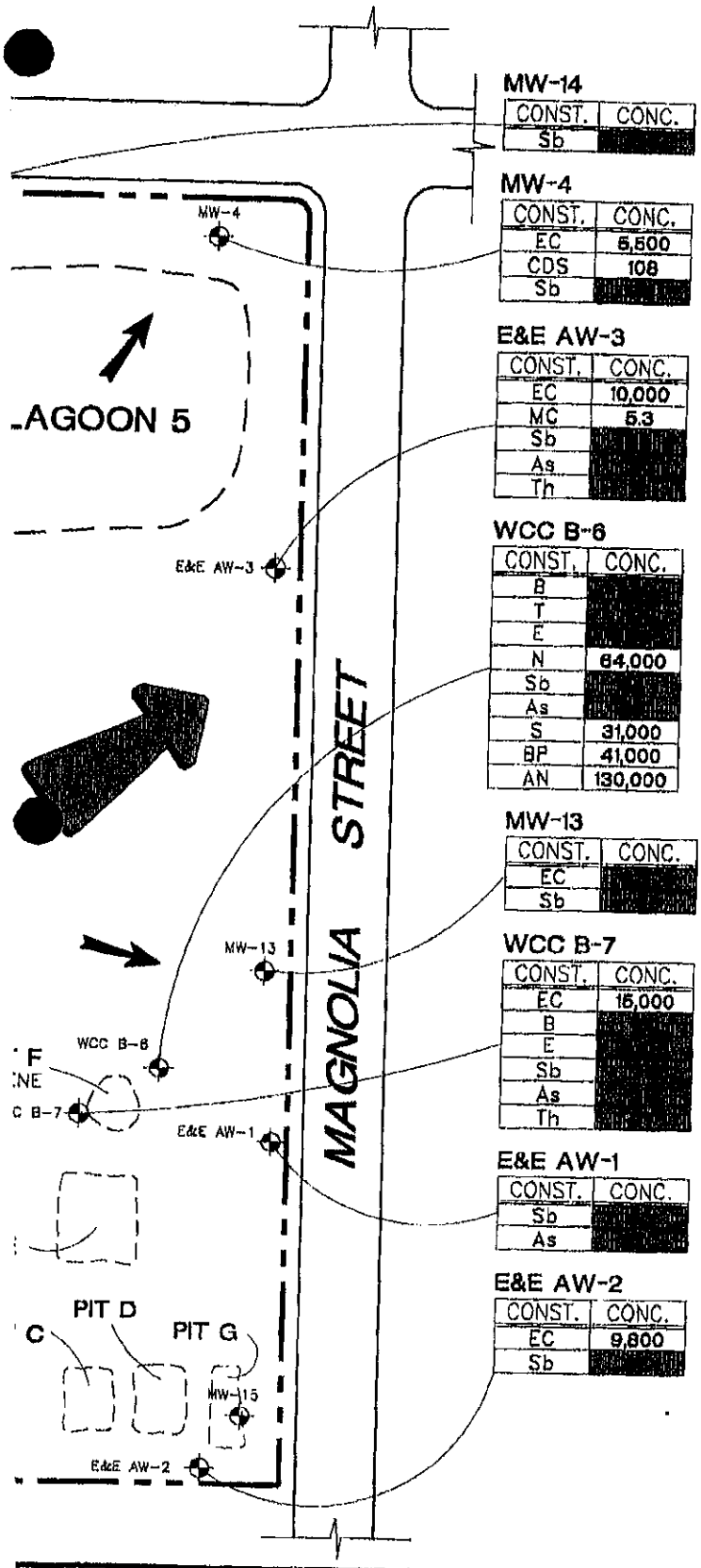
ENVIRON

Ground Water Flow Directions and Hist

DRAFTED BY: JJC | DATE: 11/17/97

Huati

FILE: 045914A\5914AF02



LEGEND

- PROPERTY BOUNDARY
- GROUND WATER MONITORING WELL
- ESTIMATED BOUNDARY OF WASTE LAGOON OR PIT
- GROUND WATER CONCENTRATION EXCEEDS MCL
- ESTIMATED GROUND WATER FLOW DIRECTION IN TALBERT AQUIFER (OCWD, MARCH, 1997)
- ESTIMATED GROUND WATER FLOW DIRECTION IN SEMI-PERCHED AQUIFER (ESE, MARCH, 1997)

CONSTITUENT ABBREVIATIONS

AC = Acenaphthene
AN = Anthracene
As = Arsenic
B = Benzene
BIS = Bis(2-ethylhexly)phthalate
BP = 1,1'-biphenyl
CDS = Carbon disulfide
DCE = 1,1-dichloroethene
E = Ethylbenzene
EC = Electrical conductivity (in umhos/cm)
MC = Methylene chloride
PCP = Pentachlorophenol
Sb = Antimony
T = Toluene
Th = Thallium

NOTES:
1. Detections of contaminants that exceeded the PRGs but were less than MCLs are not shown.
2. Concentrations are in micrograms per liter ($\mu g/l$).

Reference: ESE, 1997 and Radian, 1988

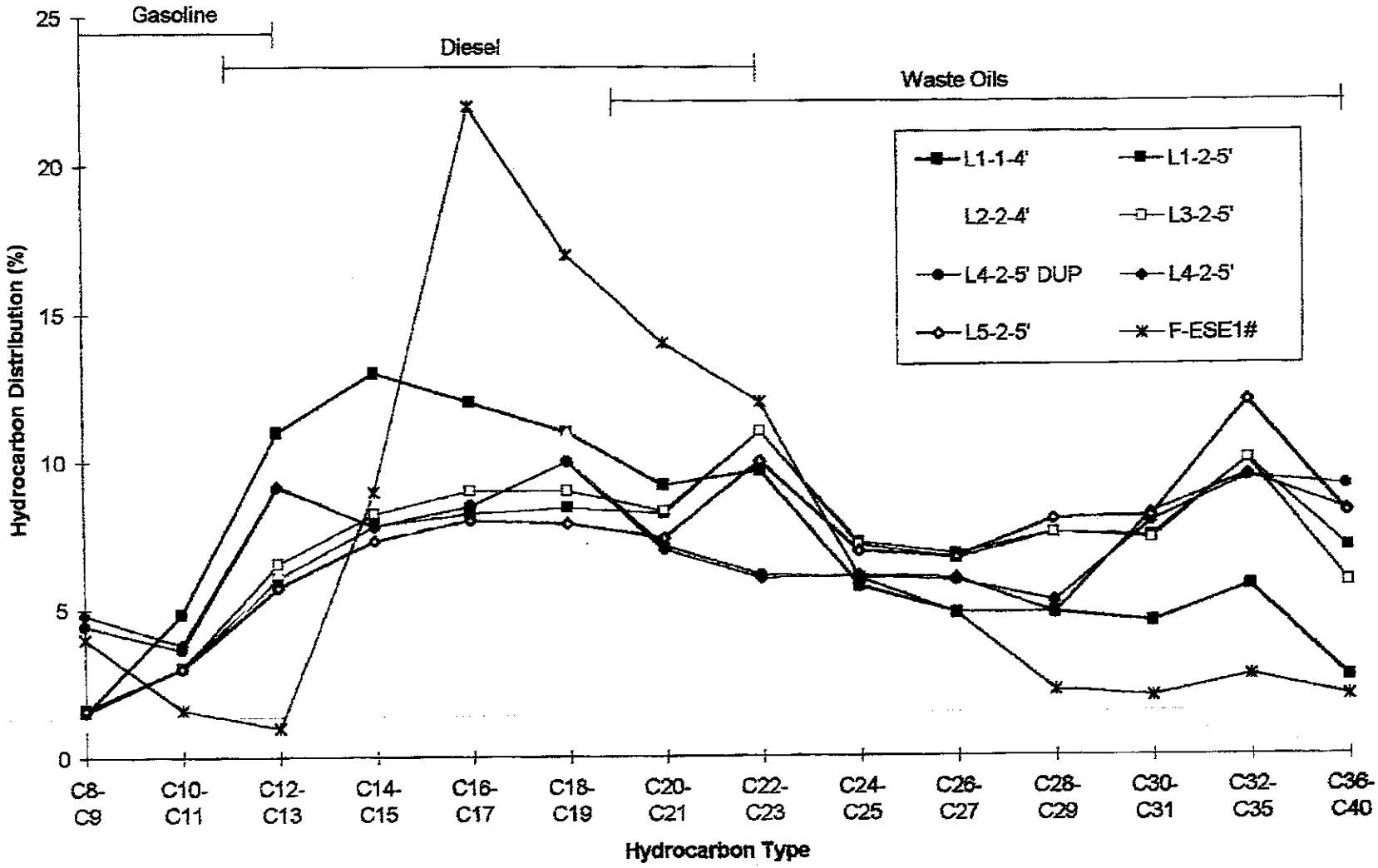
MAP NOT TO SCALE

tical Ground Water Contaminant Distribution

Ascon Landfill
igton Beach, California

PROJECT NO.: 04-5914A

Figure 2-9



ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

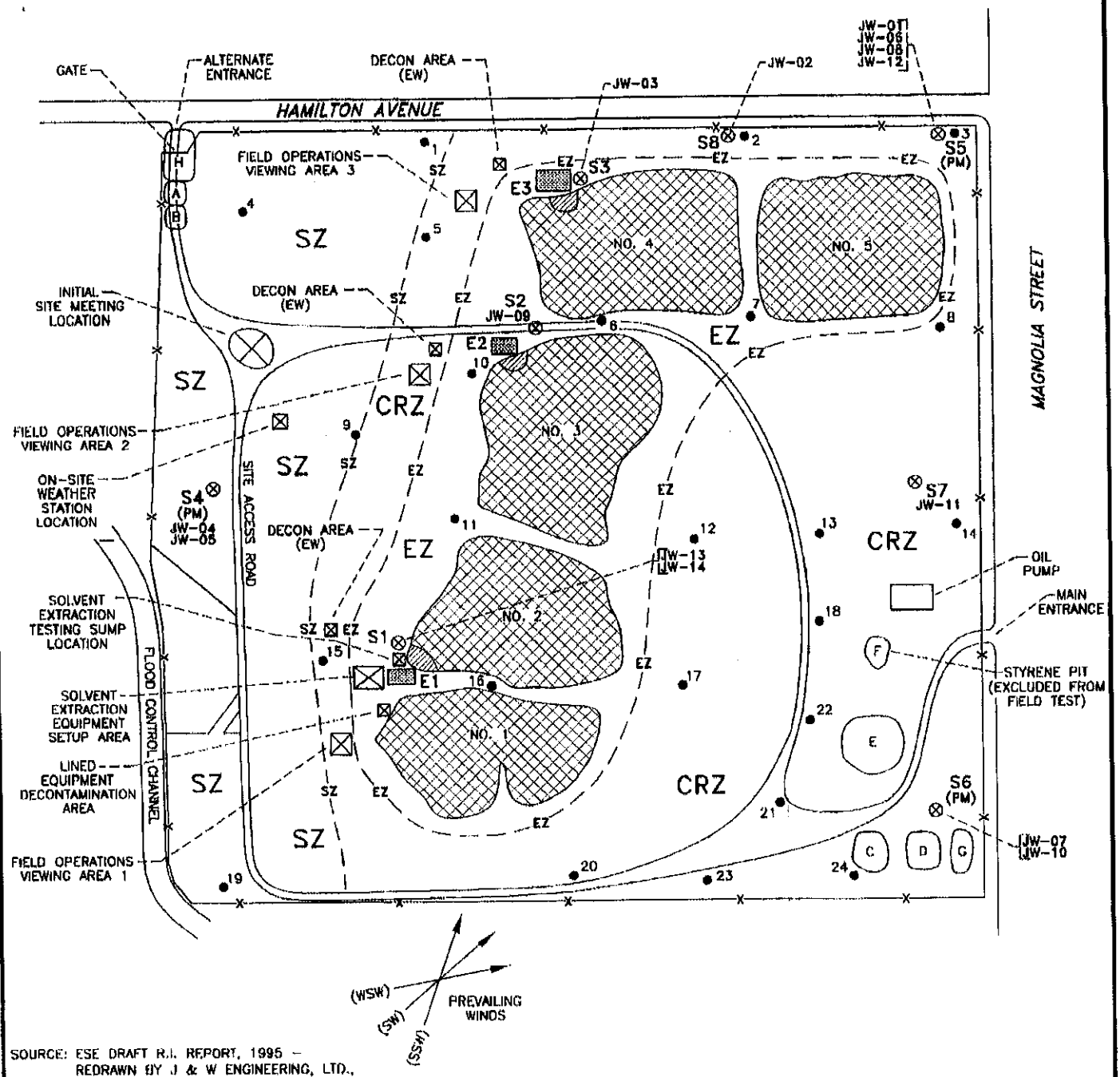
A GILCORP COMPANY

HYDROCARBON DISTRIBUTION FOR LAGOONS 1 THROUGH 5 AND PIT F SAMPLES

FIGURE 3-1

DWG# 41300316

FILE:023-008



SOURCE: ESE DRAFT R.I. REPORT, 1995 – REDRAWN BY J & W ENGINEERING, LTD., OCTOBER 12, 1998.

LEGEND

(F)	WASTE PIT LOCATIONS
	LAGOONS
-X—X-	FENCE
SZ	SUPPORT ZONE
CRZ	CONTAMINATION REDUCTION ZONE
EZ	EXCLUSION ZONE
PM	PARTICULATE MATTER (PM_{10}) SAMPLING LOCATION
	LINED SOILS LAYDOWN AREAS (E1–E3)
	EXCAVATION AREAS (E1–E3)
⊗	AIR SAMPLING POINT (S1–S8)
JW-01 TO 14	AIR SAMPLE ID
•	AIR MONITORING LOCATION (24)
⊠	SITE SETUP AREAS
EW	EMERGENCY EYEWASH STATION & PERSONNEL DECON AREA

FIELD ACTIVITY AND SAMPLE LOCATION MAP

ASCON FIELD EMISSIONS TESTING PILOT PROJECT
FORMER ASCON LANDFILL PROPERTY
21641 Magnolia Street
Huntington Beach, Orange County, California

Prepared for: CALIFORNIA/NEVADA DEVELOPMENTS, L.L.C.

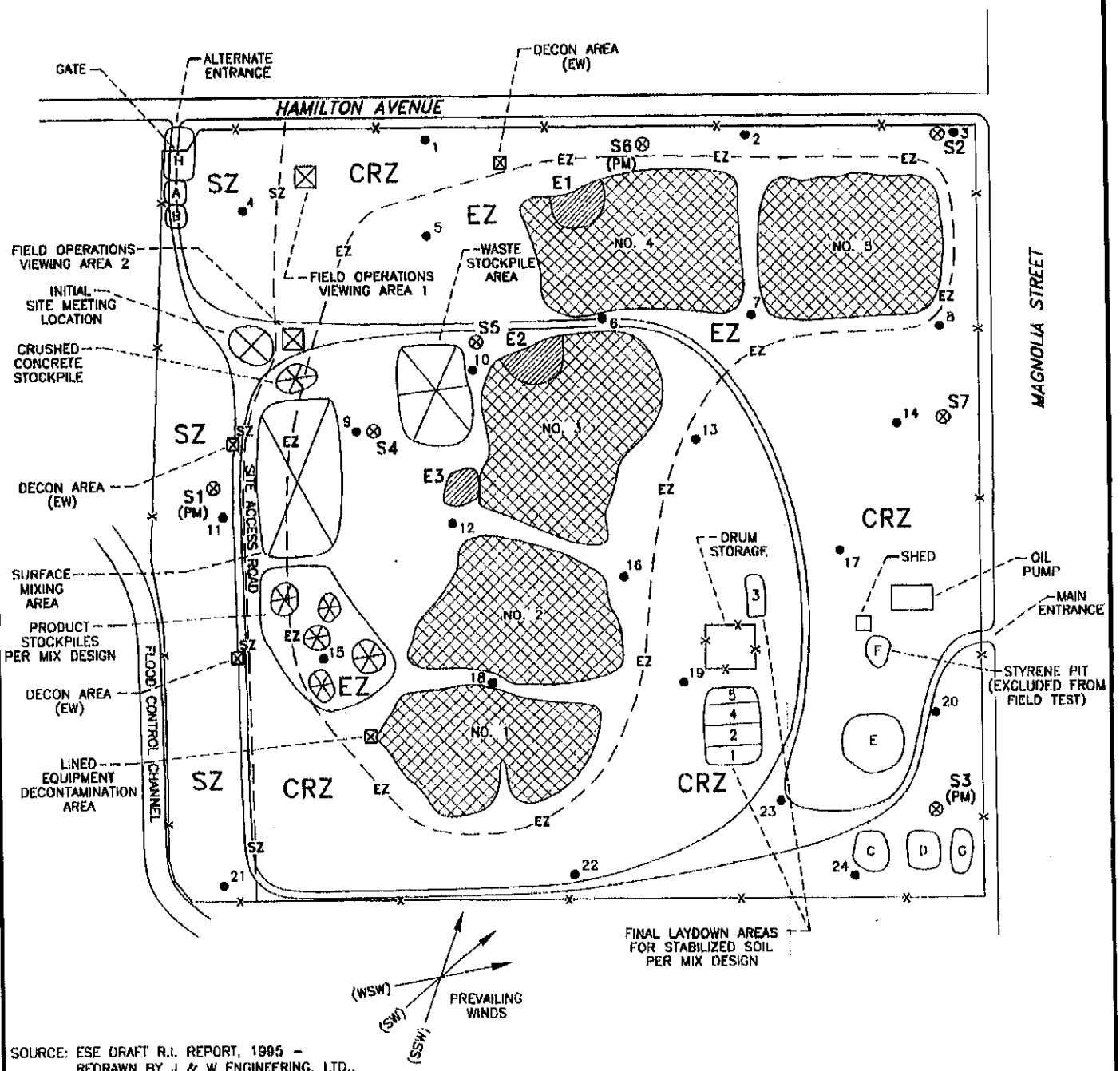
PROJECT MGR.:	NEJ
DRAWN BY:	LH
DATE:	2-01-2000
PROJECT NO:	023-008

0 125 250
SCALE IN FEET (APPROXIMATE)

J & W Engineering, Ltd. — Superior Client Service & Environmental Responsibility — DeSoto, Texas

Fig. 9-1

FILE:023-008



SOURCE: ESE DRAFT R.I. REPORT, 1995 – REDRAWN BY J & W ENGINEERING, LTD., OCTOBER 12, 1998.

LEGEND

- (F) WASTE PIT LOCATIONS
- LAGOONS
- FENCE
- SZ SUPPORT ZONE
- CRZ CONTAMINATION REDUCTION ZONE
- EZ EXCLUSION ZONE
- PM PARTICULATE MATTER (PM_{10}) SAMPLING LOCATION
- WASTE/PRODUCT STOCKPILE
- EXCAVATION AREAS (E1–E3)
- AIR SAMPLING POINT (S1–S7)
- AIR MONITORING LOCATION (24)
- SITE SETUP AREAS
- EW EMERGENCY EYEWASH STATION & PERSONNEL DECON AREA

FIELD ACTIVITY AND SAMPLE LOCATION MAP

ASCON STABILIZATION PILOT TESTING PROJECT
FORMER ASCON LANDFILL PROPERTY
21641 Magnolia Street
Huntington Beach, Orange County, California

Prepared for: CALIFORNIA/NEVADA DEVELOPMENTS, L.L.C.

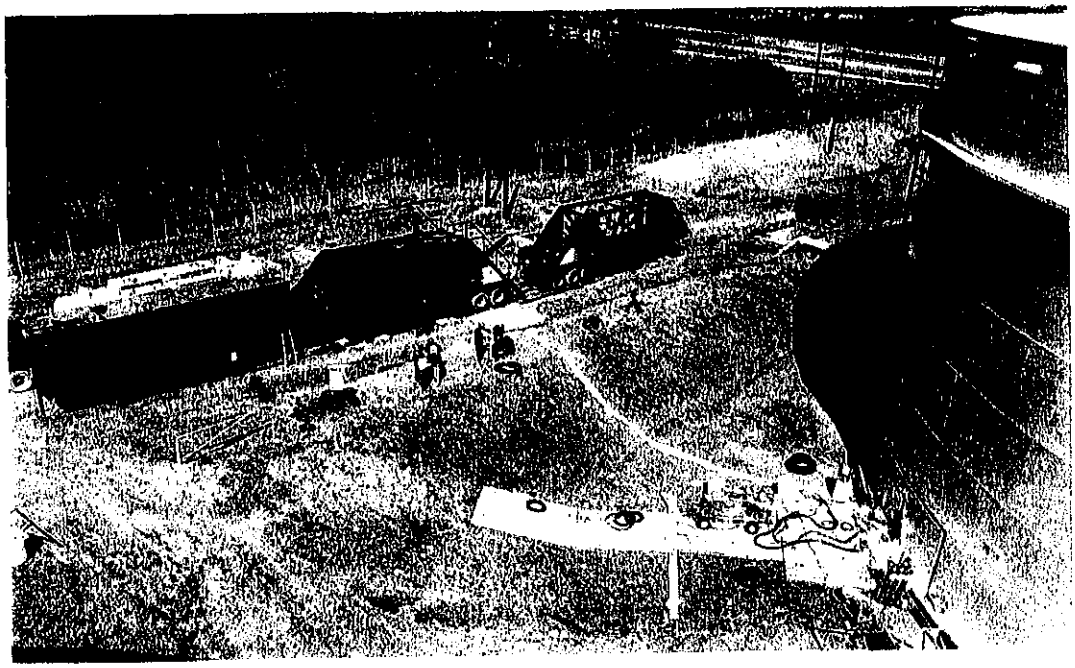
PROJECT MGR.:	NEJ
DRAWN BY:	LH
DATE:	2-01-2000
PROJECT NO:	023-008

0 125 250
SCALE IN FEET (APPROXIMATE)

J & W Engineering, Ltd. — Superior Client Service & Environmental Responsibility — DeSoto, Texas

Fig. 9-2

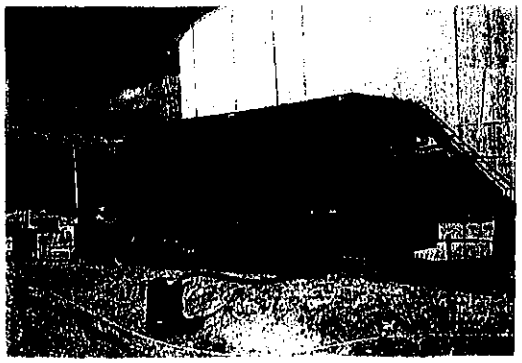
3i Automated Tank and Lagoon Cleaning Systems



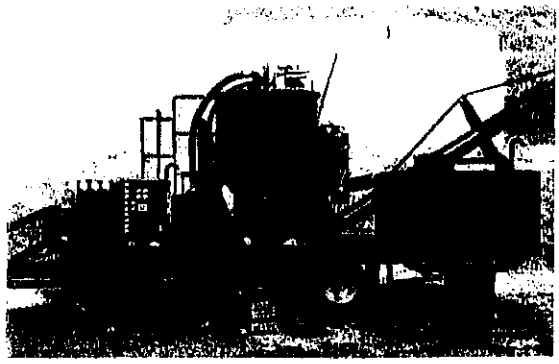
Industrial Innovations, Inc. has been building state of the art, automated Tank and Lagoon Cleaning Systems since the 1970s. These systems are comprised of a main power module, the **SUPERMACS**, a sludge jetting or extraction device such as the **ROBOTIC TANK CANNON** or **SLUDGE BUG**, and a centrifugal solids separation and concentration module such as the **PHASER 450, PHASER 600 or PHASEMASTER**.

Each modular component of a 3i system has been designed and sized to match every other component. The sizing and capacity of all the components of a 3i system makes each and every set up totally integrated. 3i Tank and Lagoon Cleaning Systems are engineered to deliver a safe and clean operation at a very high and reliable production level. The diagrams on the inside of this brochure describe various applications of 3i systems. These drawings depict what components and operators are required to perform each task. The diagrams shown within, together with the individual component photos shown on the rear cover, illustrate the leadership 3i has achieved in the world of totally integrated, automated tank and lagoon cleaning systems.

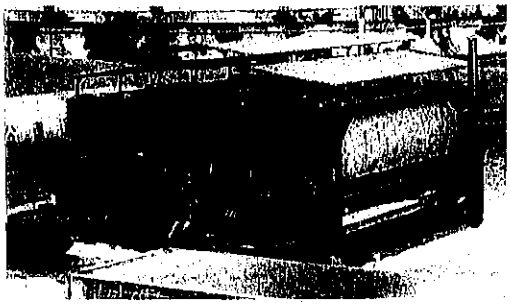
Components



Supermacs



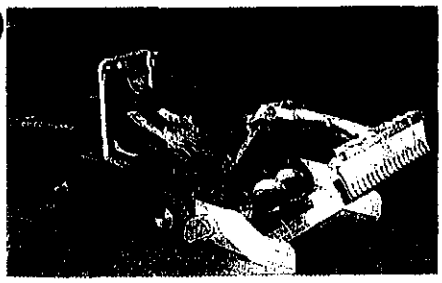
Phaser 450



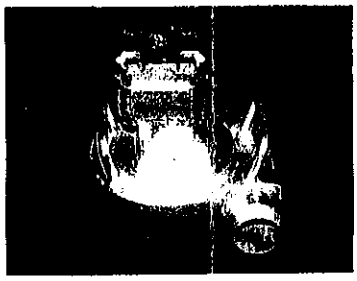
Phasemaster

Phaser 600

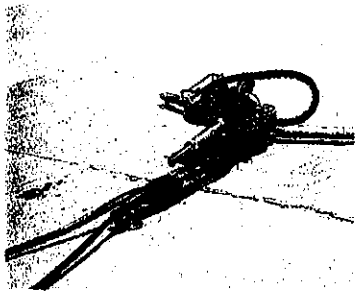
Robotic Tank Cannon
Remote Control Console



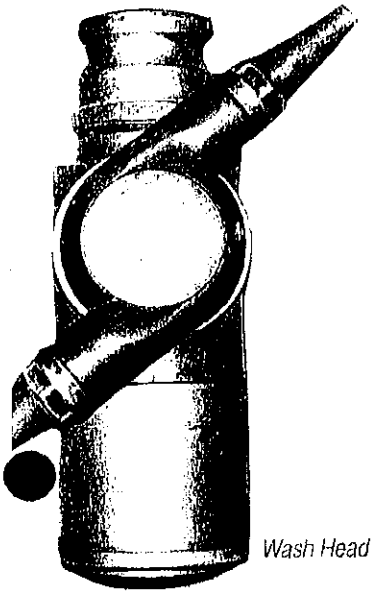
Sludge Bug (Sludge Extraction Device)



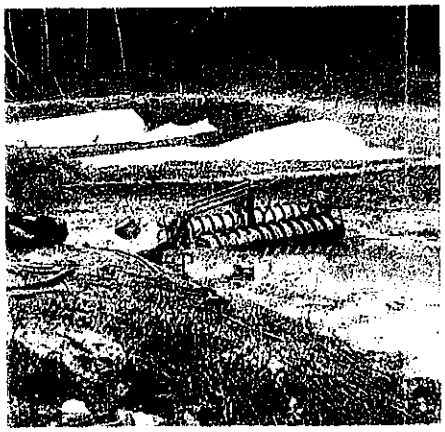
Trash Pump(Tank Cleaning)



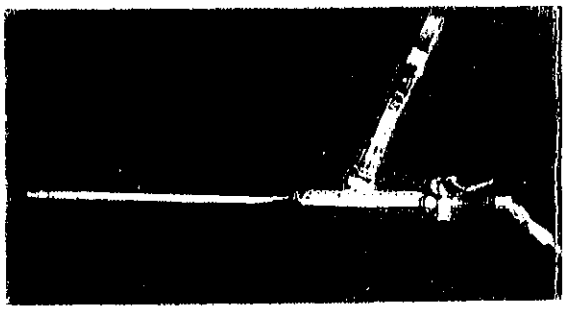
Robotic Tank Cannon (Tank Washing)



Wash Head



Pond Skipper (Sludge Pond)

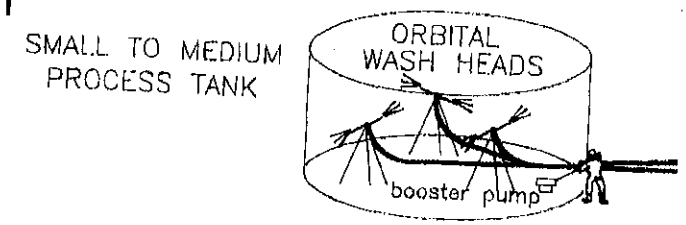


Hand Gun

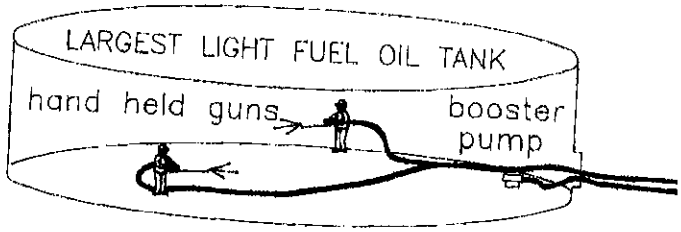
Figure 11-1
Components of the 3i Automated Tank and Lagoon Cleaning Systems

APPLICATIONS

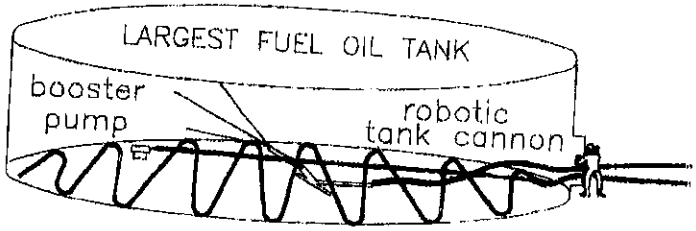
1. SMALL TANK AND PROCESS VESSEL WASHING
(30 METER OR 100 FT. MAX DIAMETER)
   a) SMALL AMOUNT OF RESIDUAL -- RECOVERABLE OIL
   b) LIGHT OR HEAVY PRODUCTS
   c) 3 MAN CREW
   d) ORBITAL WASHHEADS ON TRIPODS JETTING
   e) BOOSTER PUMP SLURRY RETURN
   f) No.2 DIESEL CUTTER STOCK @ AMBIENT TEMPERATURE OR 180° WATER WITH NaOH



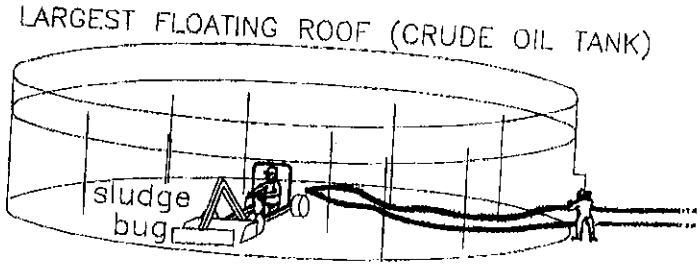
2. SMALL AND LARGE TANK DETAILING
(300 FT. OR 100 METER DIAMETER)
   a) LIGHT PRODUCTS OR DETAILING FOLLOWING HEAVY SLUDGE REMOVAL
   b) SMALL AMOUNT OF RESIDUAL – RECOVERABLE OIL
   c) 4 MAN CREW
   d) HAND HELD GUN JETTING
   e) BOOSTER PUMP SLURRY RETURN
   f) 130°F WATER WITH NaOH



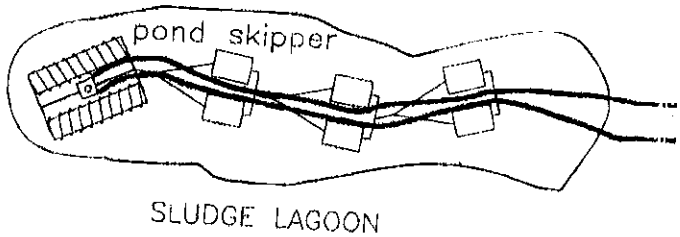
3. LARGE TO VERY LARGE TANK DESLUDGING
(300 FT. OR 100 METER DIAMETER WITH COILS)
   a) HEAVY FUEL OIL OR CRUDE OIL
   b) VERY LARGE AMOUNTS OF SLUDGE -- RECOVERABLE OIL
   c) PURIFIED OIL, CONCENTRATED FINES CAKE (5 CUBIC METERS PER HOUR)
   d) 4 MAN CREW
   e) ROBOTIC TANK CANNON JETTING
   f) BOOSTER PUMP SLURRY RETURN
   g) COLD WEATHER OPERATION: 0°F (–18°C)



4. LARGE TO VERY LARGE FLOATING ROOF TANK DESLUDGING
(300 FT. OR 100 METER DIAMETER WITHOUT COILS)
   a) HEAVY CRUDE OIL SLUDGE MORE THAN 1 FOOT IN DEPTH
   b) UP TO 25% SOLIDS CONTENT
   c) PURIFIED OIL, CONCENTRATED FINES CAKE (10 CUBIC METERS PER HOUR)
   d) 5 MAN CREW
   e) SLUDGEBUG SLUDGE EXTRACTION, LIQUIFICATION, AND SLURRY RETURN
   f) COLD WEATHER OPERATION: 0°F (–18°C)



5. SLUDGE LAGOON EXTRACTION AND PHASE SEPARATION
(1 ACRE TO 100 ACRES)
   a) OILY TYPE HEAVY SLUDGES – LARGE SOLID CONTENT
   b) POND SKIPPER SLUDGE EXTRACTION, LIQUIFICATION, AND SLURRY RETURN
   c) 5 MAN CREW
   d) PURIFIED OIL AND CONCENTRATED FINES CAKE (10 CUBIC METERS PER HOUR)
   e) COOL WEATHER OPERATION: 32°F +



6. OIL TANKER DESLUDGING AND PURE OIL RECOVERY
(1 ACRE TO 100 ACRES)
   a) HEAVY FUEL OR CRUDE OIL SLUDGE
   b) HEAVY SOLIDS CONCENTRATION
   c) 7 MAN CREW
   d) HAND GUN JETTING
   e) BOOSTER PUMPS IN SERIES SLURRY RETURN
   f) PURIFIED OIL AND CONCENTRATED FINES CAKE (10 CUBIC METERS PER HOUR)

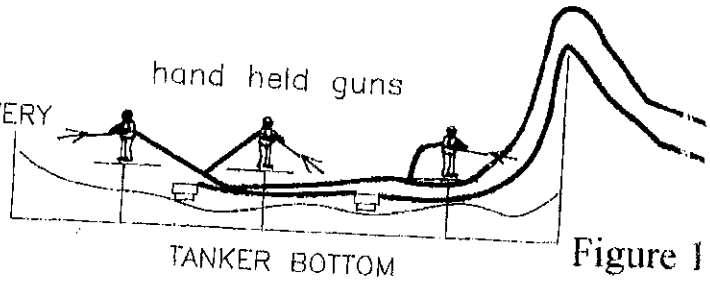
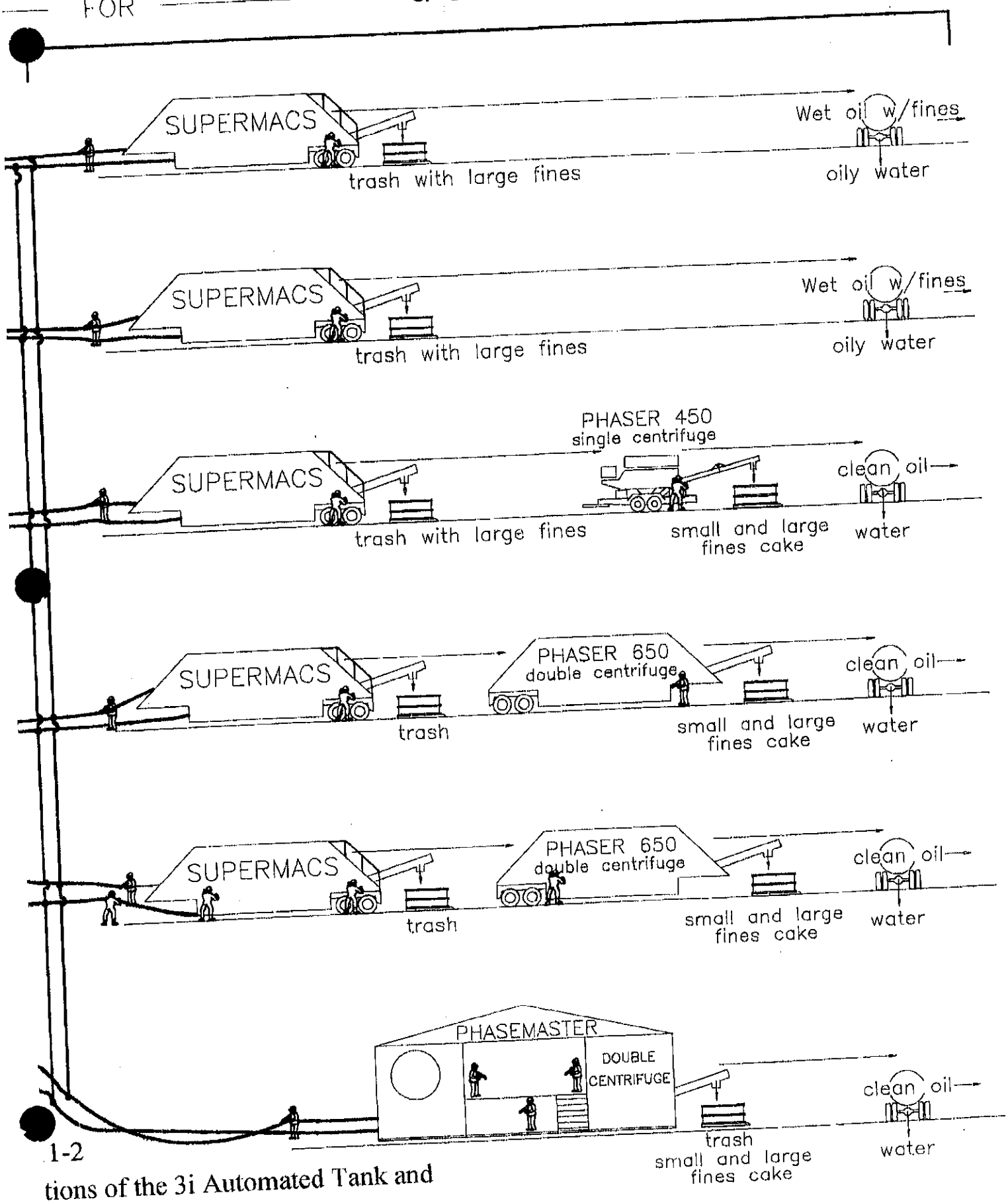


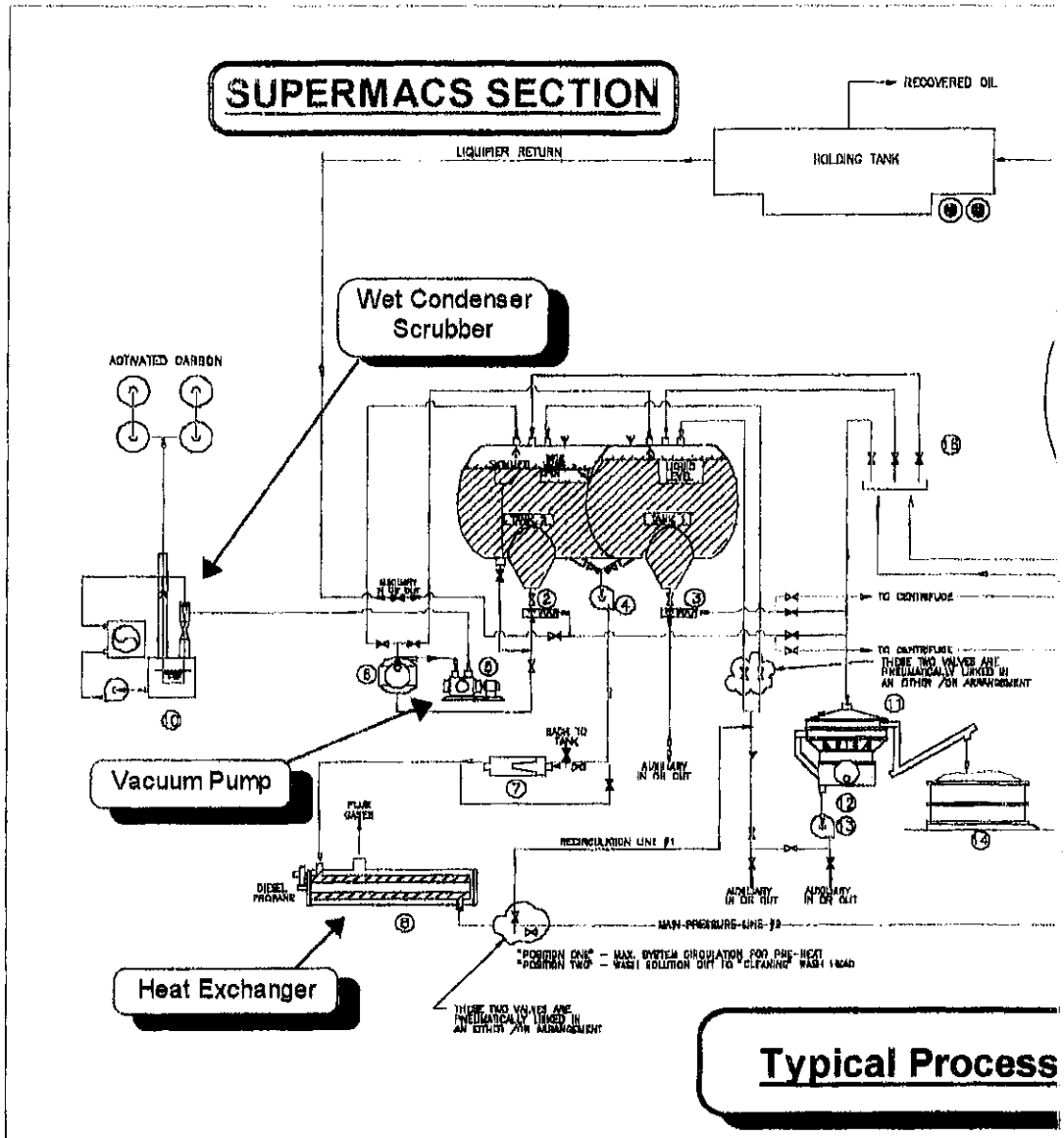
Figure 1
Applica
Lagoon

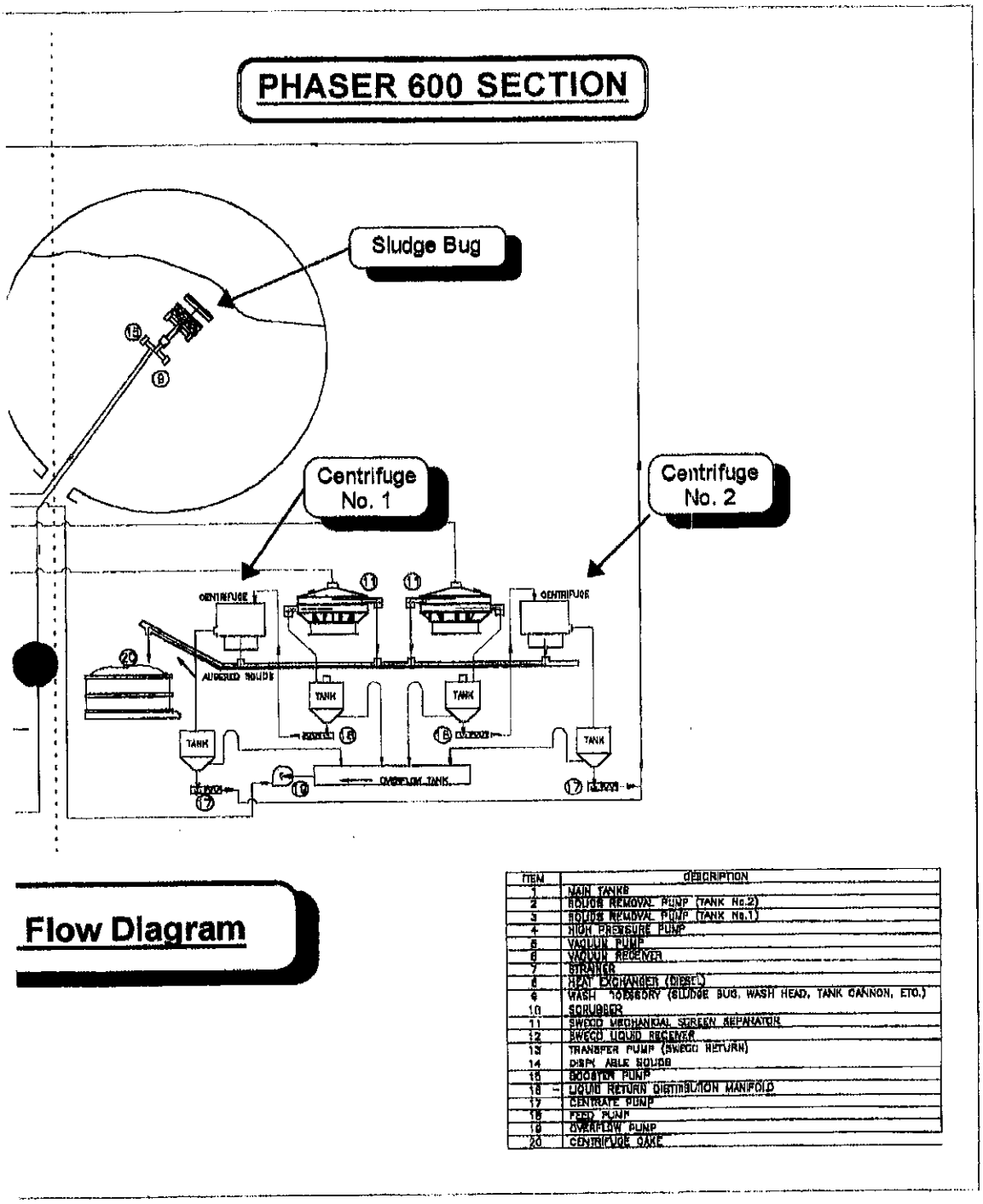
FOR **3i SYSTEMS**



1-2

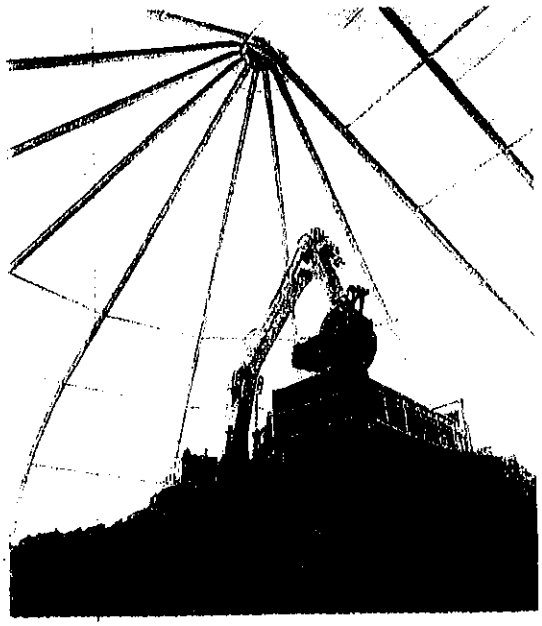
tions of the 3i Automated Tank and Cleaning Systems

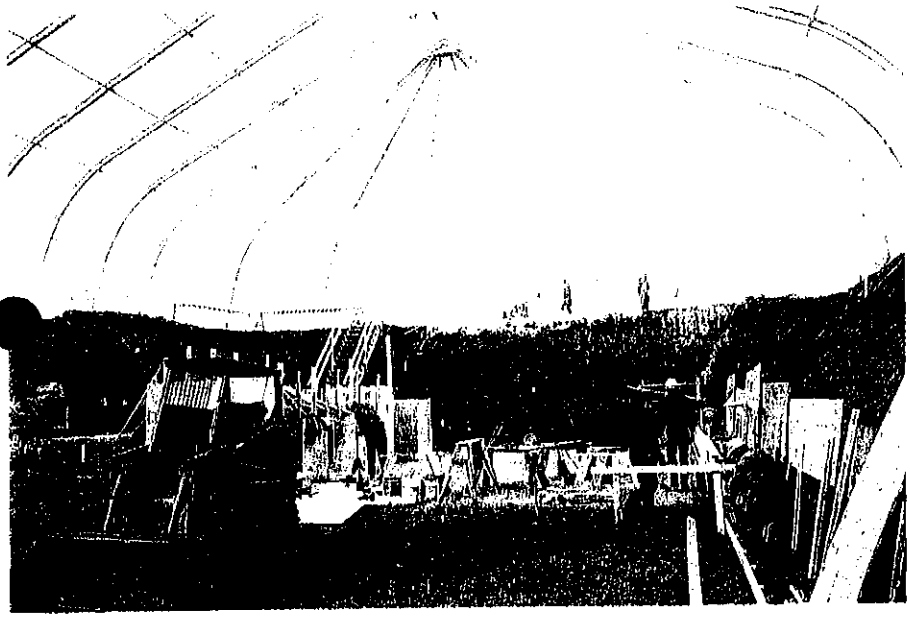

SUPERMACS SECTION
RECOVERED OIL
HOLDING TANK
LIQUIFIER RETURN
Wet Condenser Scrubber
ACTIVATED CARBON
Vacuum Pump
Heat Exchanger
Typical Process



ITEM	DESCRIPTION
1	MAIN TANKS
2	SOLIDS REMOVAL PUMP (TANK No.2)
3	SOLIDS REMOVAL PUMP (TANK No.1)
4	HIGH PRESSURE PUMP
5	VACUUM PUMP
6	VACUUM RECEIVER
7	STRAINER
8	HEAT EXCHANGER (DIESEL)
9	WASH ACCESSORY (SLUDGE BUG, WASH HEAD, TANK CANNON, ETC.)
10	SCRUBBER
11	SWECO MECHANICAL SCREEN SEPARATOR
12	SWECO LIQUID RECEIVER
13	TRANSFER PUMP (SWECO RETURN)
14	DISPOSABLE SOLIDS
15	BOOSTER PUMP
16	LIQUID RETURN DISTRIBUTION MANIFOLD
17	CENTRATE PUMP
18	FEED PUMP
19	OVERFLOW PUMP
20	CENTRIFUGE CAKE

Figure 11-3
Typical Process Flow Diagram for the 3i Automated Tank and Lagoon Cleaning System

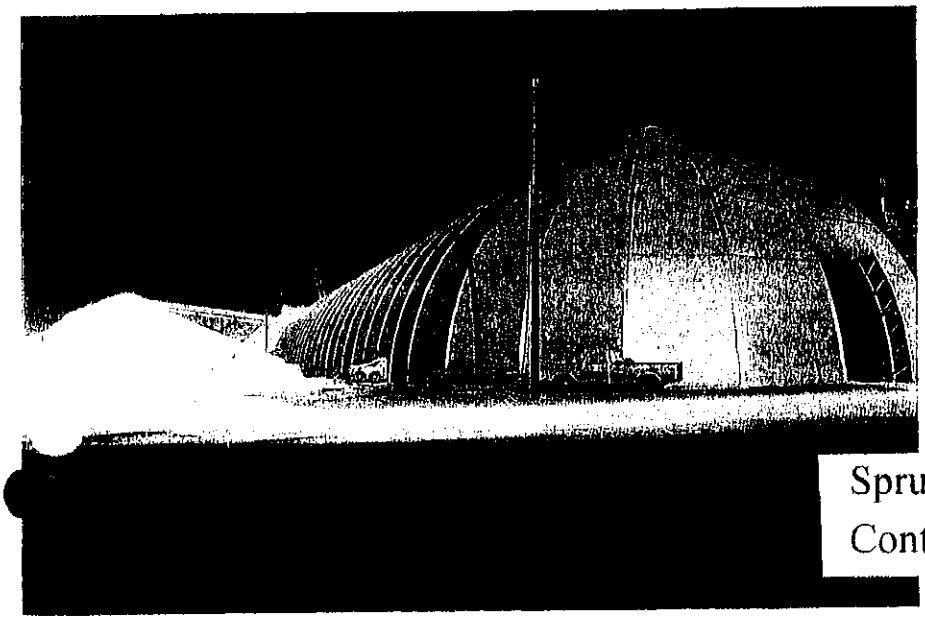




Past and Current Uses

- Transuranic Waste Treatment & Storage
- Radioactive Vault Storage
- Soil Remediation
- Asbestos Abatement
- Sludge Pond Covers
- Waste Remediation
- Earth & Clay Drying
- Environmental Protection
- Warehousing
- Vehicle Maintenance Shops
- Fabrication Shops

For Full details and specifications contact:



Sprung Instant Structures Inc.®
Instant Structures®
OFFICES IN:

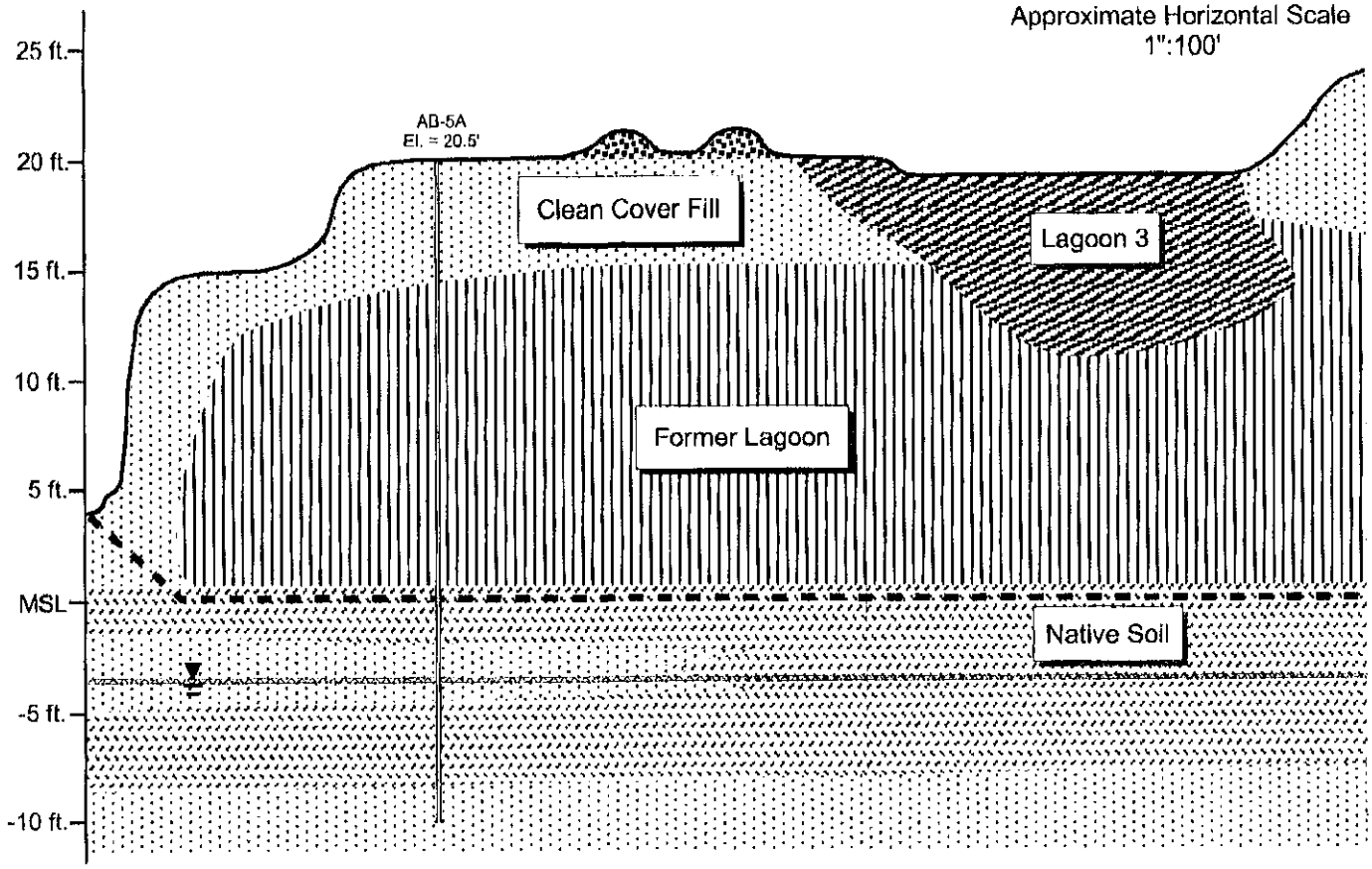
Figure 11-4

Sprung Instant Structure for Emissions Containment during Pit F Excavation

Internet: http://www.sprung.com
PATENTED WORLDWIDE

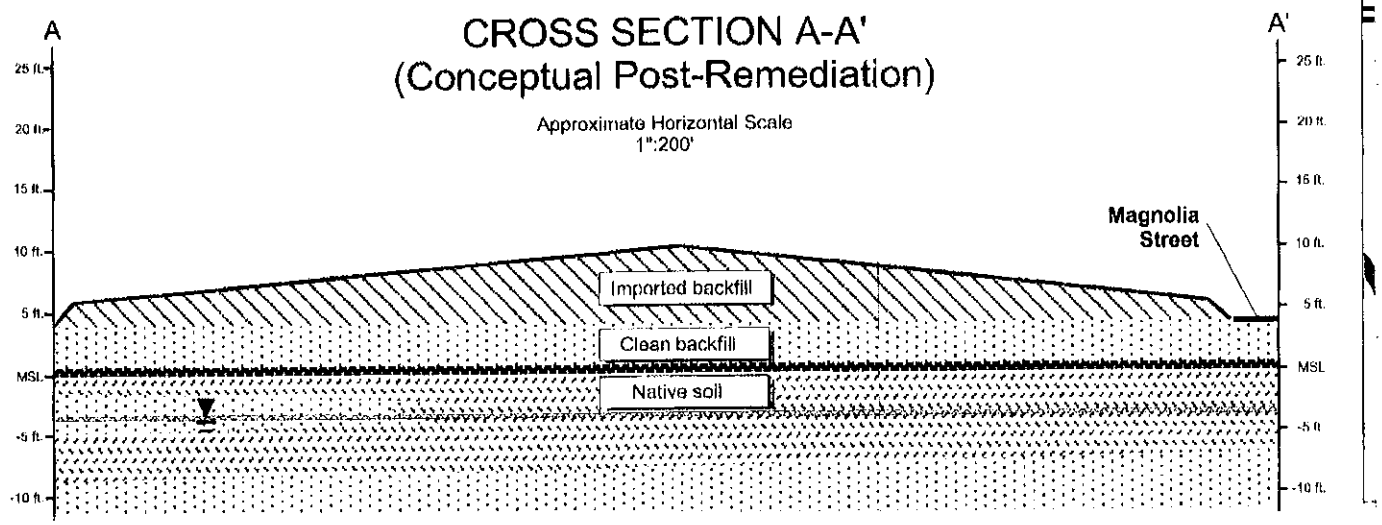
CROSS SECTION A
(Current)

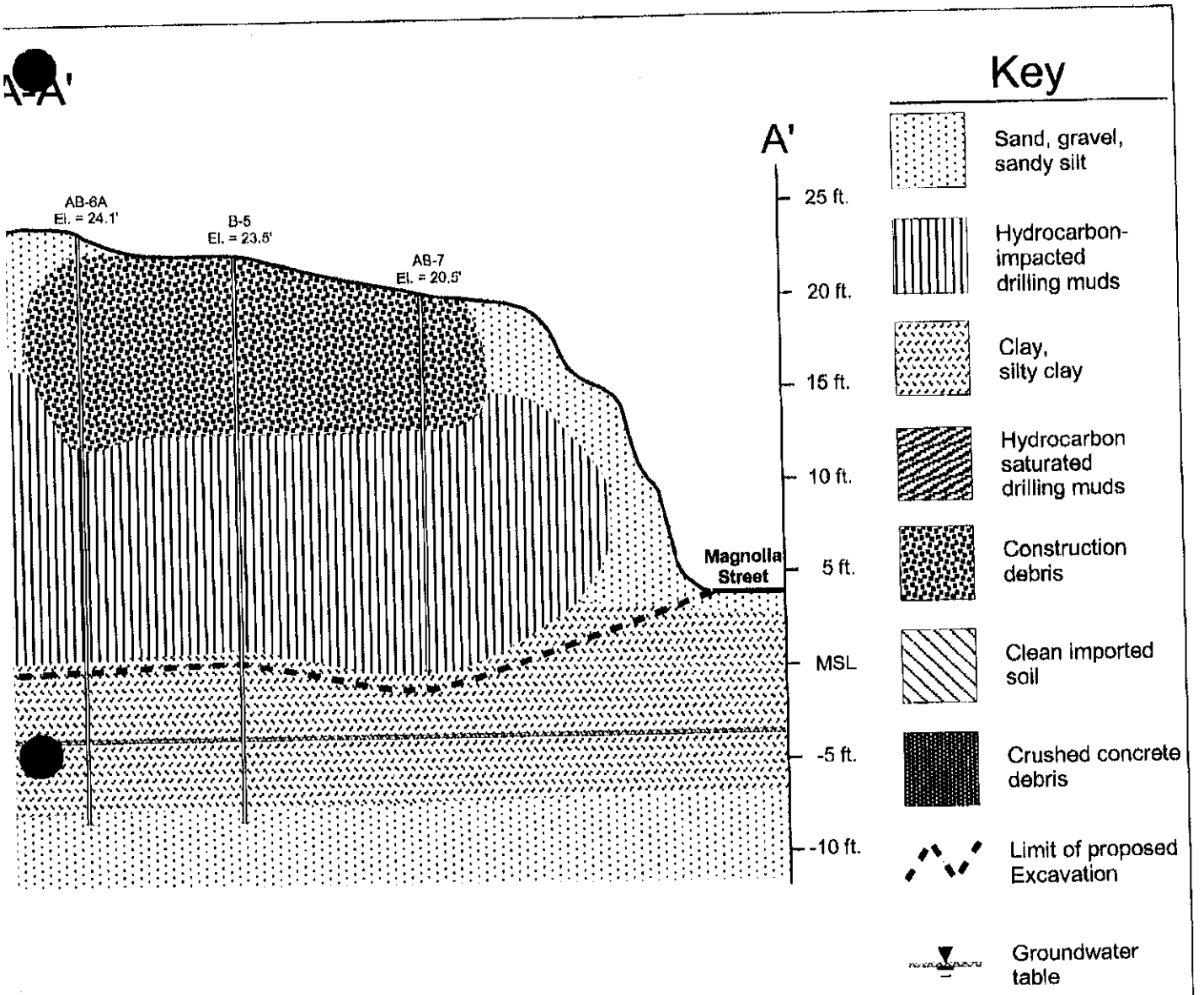
Approximate Horizontal Scale
1":100'

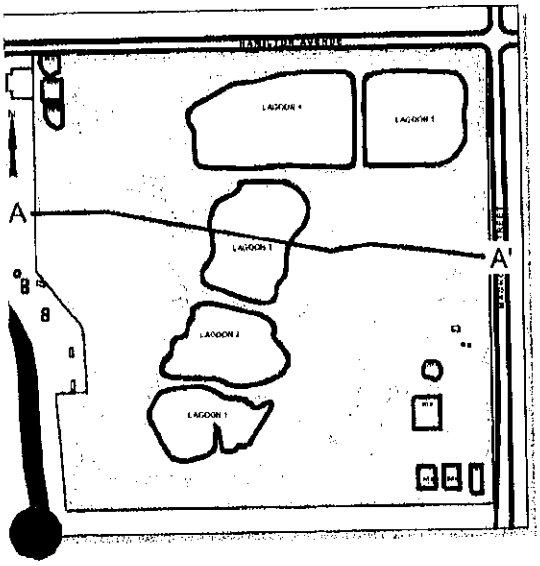


CROSS SECTION A-A'
(Conceptual Post-Remediation)

Approximate Horizontal Scale
1":200'







ENVIRON

Feasibility Study
ASCON Property
21641 Magnolia Street
Huntington Beach, California

Figure 11-5

Site Cross-Section

APPENDIX A

Ground Water Data Obtained from Orange County Water District

ORANGE COUNTY WATER DISTRICT
WATER QUALITY DEPARTMENT

10500 Ellis Avenue
Fountain Valley, CA 92728-8300
Telephone (714) 378-3200 FAX (714) 378-3373
Information Request Line (714) 378-3209

INFORMATION REQUEST TRANSMITTAL

TO: HOUSHANG DEZFULIAN
ENVIRON CORPORATION
ONE PARK PLAZA, SUITE 700
IRVINE, CA 92714

TRANSMITTAL DATE: 04/30/1997
REQUEST NUMBER: 2655
REQUEST DATE: 04/28/1997
PROCESSED BY: MP

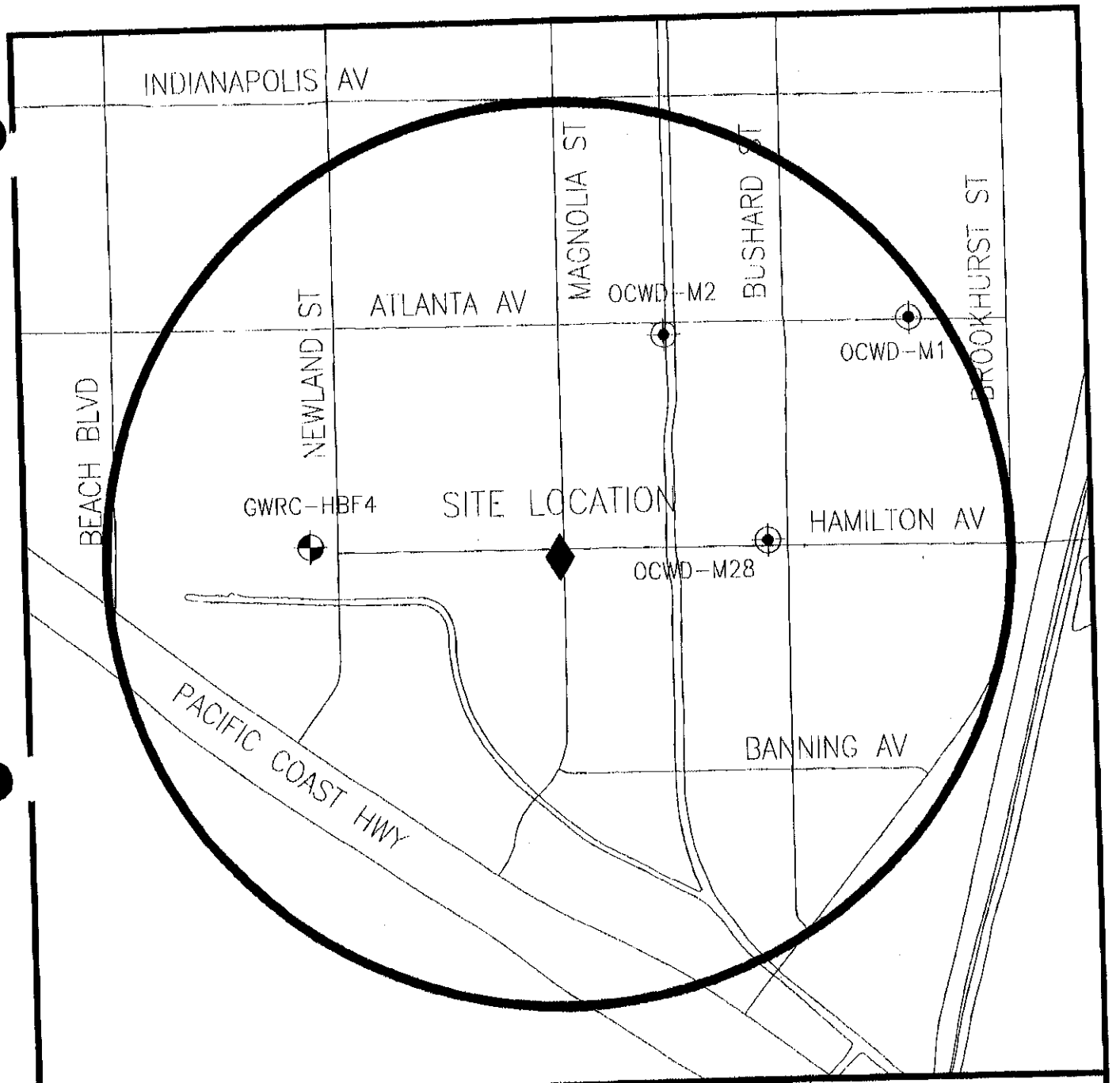
SITE INFORMATION

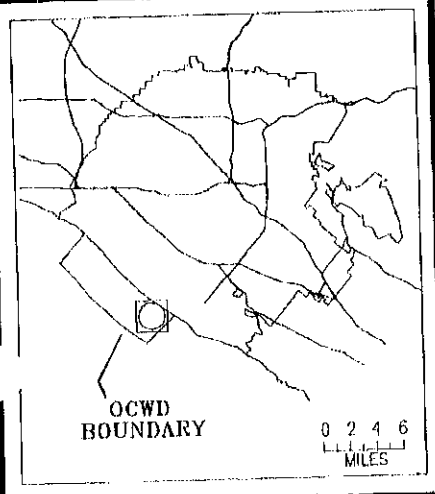
SITE NAME: ASCON PROPERTY

ADDRESS: 21641 MAGNOLIA ST.
CITY: HUNTINGTON BEACH
DESCRIPTION:
INTERSECTION: HAMILTON
THOMAS BROS. REF.: 1992/888-C2
SEARCH RADIUS (MILES): 1.0
SEARCH YEARS: 1996 - PRESENT

INFORMATION PROCESSED

# of Pages	*Description*
1	WELL LOCATION MAP
1	WATER LEVEL REPORT (WINDOWS)
1	GENERAL WELL INFO. REPORT
6	INORGANICS
8	VOLATILE ORGANICS





EXPLANATION

- PRODUCTION WELL
- SINGLE-POINT MONITORING WELL
- MULTI-POINT MONITORING WELL

0 2,000
SCALE IN FEET

N

INFORMATION REQUEST

Request ID: 2655
Request Date: 04/28/1997
Request Purpose:
Client: ENVIRON CORPORATION
Site Name:
Site Address: 21641 MAGNOLIA ST.
Site City: HUNTINGTON BEACH

SINCE 1933 ORANGE COUNTY WATER DISTRICT A TRADITION OF INNOVATION

FIGURE 1

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ORANGE COUNTY WATER DISTRICT
GENERAL WELL INFORMATION

Well Site Name	State Well No.	Well Type	Well Subtype	Well Use	Well Status	Bore Depth	Date Drilled	Thomas Bros. Ref.	Elev GS	Casing Seq #	Elev RP	Cased Depth	Perforations Top	Perforations Bottom
GWRC-HBF4	06S/11W-13F04	PRODUCT	SINGLE	INDUST	ACTIVE	200	04/19/1956	888-2B	4.00	1		200	164	184
OCWD-M1	06S/10W-07R01	MONITOR	SINGLE	TESTING	ACTIVE	123	11/01/1967	888-1E	5.34	1	4.19	115	75	110
OCWD-M2	06S/10W-18D02	MONITOR	SINGLE	TESTING	ACTIVE	162	09/01/1967	888-1D	10.98	1	10.51	155	85	150
OCWD-M28	06S/10W-18F00	MONITOR	SINGLE	TESTING	ACTIVE	161	07/01/1969	888-2D	5.77	1	5.37	155	80	145

ORANGE COUNTY WATER DISTRICT
WATER LEVEL REPORT

Date	Time	Time Period	Elev RP	Depth to Water	Elev WS	WL Status	Method Abbr.	Comments
Station Name: OCWD-M1/1 SWN: 06S/10W-07R01 Perfs: 75-110 Elev. GS: 5.34 Aquifer: TALBERT								
01/04/1996	12:00:00	MONTH	4.19	6.62	-2.43	STATIC	ELEC	
01/29/1996	09:00:00	MONTH	4.19	5.83	-1.64	STATIC	ELEC	
03/05/1996	13:40:00	MONTH	4.19	5.50	-1.31	STATIC	ELEC	
03/29/1996	10:30:00	MONTH	4.19	3.40	0.79	STATIC	ELEC	
05/01/1996	10:30:00	MONTH	4.19	3.31	0.88	STATIC	ELEC	
06/03/1996	09:00:00	MONTH	4.19	6.40	-2.21	STATIC	ELEC	
07/01/1996	09:15:00	MONTH	4.19	7.95	-3.76	STATIC	ELEC	
08/06/1996	09:30:00	MONTH	4.19	9.49	-5.30	STATIC	ELEC	
09/05/1996	08:30:00	MONTH	4.19	10.46	-6.27	STATIC	ELEC	
10/01/1996	09:30:00	MONTH	4.19	11.31	-7.12	STATIC	ELEC	
11/01/1996	10:00:00	MONTH	4.19	9.37	-5.18	STATIC	ELEC	
12/02/1996	09:40:00	MONTH	4.19	8.07	-3.88	STATIC	ELEC	
12/30/1996	09:00:00	MONTH	4.19	6.54	-2.35	STATIC	ELEC	
02/03/1997	10:00:00	MONTH	4.19	4.85	-0.66	STATIC	ELEC	
03/05/1997	08:00:00	MONTH	4.19	4.75	-0.56	STATIC	ELEC	
04/03/1997	09:45:00	MONTH	4.19	4.46	-0.27	STATIC	ELEC	
Station Name: OCWD-M2/1 SWN: 06S/10W-18D02 Perfs: 85-150 Elev. GS: 10.98 Aquifer: TALBERT								
01/04/1996	12:00:00	MONTH	10.51	11.44	-0.93	STATIC	ELEC	
01/26/1996	09:30:00	MONTH	10.51	10.91	-0.40	STATIC	ELEC	
03/04/1996	10:40:00	MONTH	10.51	9.81	0.70	STATIC	ELEC	
03/29/1996	12:15:00	MONTH	10.51	8.73	1.78	STATIC	ELEC	
05/01/1996	11:00:00	MONTH	10.51	8.65	1.86	STATIC	ELEC	
06/03/1996	09:40:00	MONTH	10.51	11.41	-0.90	STATIC	ELEC	
07/01/1996	10:00:00	MONTH	10.51	12.76	-2.25	STATIC	ELEC	
08/06/1996	09:00:00	MONTH	10.51	14.08	-3.57	STATIC	ELEC	
09/05/1996	09:00:00	MONTH	10.51	15.14	-4.63	STATIC	ELEC	
10/01/1996	09:15:00	MONTH	10.51	15.67	-5.16	STATIC	ELEC	
11/01/1996	09:40:00	MONTH	10.51	14.06	-3.55	STATIC	ELEC	
12/02/1996	09:20:00	MONTH	10.51	13.10	-2.59	STATIC	ELEC	
12/30/1996	08:50:00	MONTH	10.51	11.60	-1.09	STATIC	ELEC	
03/05/1997	08:15:00	MONTH	10.51	9.86	0.65	STATIC	ELEC	
04/03/1997	09:00:00	MONTH	10.51	9.57	0.94	STATIC	ELEC	
Station Name: OCWD-M28/1 SWN: 06S/10W-18F00 Perfs: 80-145 Elev. GS: 5.77 Aquifer: TALBERT								
01/05/1996	10:30:00	DAY	5.37	5.88	-0.52	STATIC	ELEC	
01/30/1996	09:00:00	MONTH	5.37	4.60	0.77	STATIC	ELEC	
03/04/1996	08:50:00	MONTH	5.37	4.41	0.96	STATIC	ELEC	
04/01/1996	10:00:00	MONTH	5.37	3.60	1.77	STATIC	ELEC	
05/02/1996	13:30:00	MONTH	5.37	3.94	1.43	STATIC	ELEC	
06/03/1996	10:50:00	MONTH	5.37	5.26	0.11	STATIC	ELEC	
07/01/1996	10:15:00	MONTH	5.37	6.23	-0.86	STATIC	ELEC	
08/06/1996	08:50:00	MONTH	5.37	7.25	-1.89	STATIC	ELEC	
09/03/1996	11:25:00	MONTH	5.37	7.81	-2.44	STATIC	ELEC	
10/01/1996	08:50:00	MONTH	5.37	8.36	-3.00	STATIC	ELEC	
11/01/1996	09:30:00	MONTH	5.37	7.38	-2.02	STATIC	ELEC	
12/02/1996	09:45:00	MONTH	5.37	6.00	-0.64	STATIC	ELEC	
12/30/1996	08:30:00	MONTH	5.37	5.50	-0.14	STATIC	ELEC	
02/03/1997	09:45:00	MONTH	5.37	4.21	1.16	STATIC	ELEC	
03/06/1997	09:00:00	MONTH	5.37	4.46	0.91	STATIC	ELEC	

All depths and elevations in feet.

Abbreviations:

Elev GS -- Elevation of Ground Surface
Elev RP -- Elevation of Reference Point
Elev WS -- Elevation of Water Surface
WL Status -- Water Level Status
Perfs -- Perforated Interval

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M1/1
Station Type: WELL CASING
Perf Interval (ft.): 75-110
Aquifer: TALBERT

State Well Number: 08S/10W-07R01
Well Owner: O.C. WATER DISTRICT
Well Name: M-1
City: HUNTINGTON BEACH

Sample Group ID: 96005662
Sample ID: 96008171
Sample Date/Time: 03/29/1996 10:30:00
Receive Date/Time: 03/29/1996 13:20:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER/KELLY RIOS
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9614432
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 11600
pH (UNITS): 7.4
TEMP (C): 21.2
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
TOTALX	Total Xylenes (m,p,&o)	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH3Cl	Chloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH3Br	Bromomethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
VNYLCL	Vinyl chloride	502.2		04/02/1996	ND	ug/L	.5	ug/L
ClETHA	Chloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH2Cl2	Methylene Chloride	502.2		04/02/1996	ND	ug/L	.5	ug/L
11DCE	1,1-Dichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
11DCA	1,1-Dichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHCl3	Chloroform	502.2		04/02/1996	ND	ug/L	.5	ug/L
CCl4	Carbon tetrachloride	502.2		04/02/1996	ND	ug/L	.5	ug/L
12DCP	1,2-Dichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
TCE	Trichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
112TCA	1,1,2-Trichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHBr2C	Dibromochloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
PCE	Tetrachloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CLBENZ	Chlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
12DCB	1,2-Dichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
13DCB	1,3-Dichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
14DCB	1,4-Dichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CCl3F	Trichlorofluoromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
t12DCE	trans-1,2 Dichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
12DCA	1,2-Dichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
111TCA	1,1,1-Trichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHBrCl	Bromodichloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
t13DCP	trans-1,3-Dichloropropene	502.2		04/02/1996	ND	ug/L	.5	ug/L
c13DCP	cis-1,3-Dichloropropene	502.2		04/02/1996	ND	ug/L	.5	ug/L
BENZ	Benzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHBr3	Bromoform	502.2		04/02/1996	ND	ug/L	.5	ug/L
1122PC	1,1,2,2-Tetrachloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
TOLU	Toluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
EtBENZ	Ethylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
Cl3F3E	Trichlorotrifluoroethane (Freon 113)	502.2		04/02/1996	ND	ug/L	.5	ug/L
2ClEVE	2-Chloroethylvinyl ether	502.2		04/02/1996	ND	ug/L	1	ug/L
MEK	Methyl Ethyl Ketone (MEK)	502.2		04/02/1996	ND	ug/L	5	ug/L
MIBK	Methyl Isobutyl Ketone (MIBK)	502.2		04/02/1996	ND	ug/L	5	ug/L
B2CLEE	bis (2-chloroethyl) ether	502.2		04/02/1996	ND	ug/L	5	ug/L
CCl2F2	Dichlorodifluoromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M1/1
Station Type: WELL CASING
Perf Interval (ft.): 75-110
Aquifer: TALBERT

State Well Number: 06S/10W-07R01
Well Owner: O.C. WATER DISTRICT
Well Name: M-1
City: HUNTINGTON BEACH

Sample Group ID: 96005662
Sample ID: 96008171
Sample Date/Time: 03/29/1996 10:30:00
Receive Date/Time: 03/29/1996 13:20:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER/KELLY RIOS
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9614432
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 11600
pH (UNITS): 7.4
TEMP (C): 21.2
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
22DCP	2,2-Dichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
c12DCE	cis-1,2-Dichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH2BrC	Bromochloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
11DCP	1,1-Dichloropropene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH2Br2	Dibromomethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
13DCP	1,3-Dichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
EDB	1,2-Dibromoethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
1112PC	1,1,1,2-Tetrachloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
o-XYL	o-Xylene	502.2		04/02/1996	ND	ug/L	.5	ug/L
STYR	Styrene	502.2		04/02/1996	ND	ug/L	.5	ug/L
ISPBNZ	Isopropylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
123TCP	1,2,3-Trichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
PRPBNZ	Propylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
BRBENZ	Bromobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
135TMB	1,3,5-Trimethylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
2CLTOL	2-Chlorotoluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
4CLTOL	4-Chlorotoluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
tBBENZ	tert-Butylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
124TMB	1,2,4-Trimethylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
sBBENZ	sec-Butylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
4IPTOL	4-Isopropyltoluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
nBBENZ	n-Butylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
DBCP	1,2-Dibromo-3-chloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
124TCB	1,2,4-Trichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
HCBut	Hexachlorobutadiene	502.2		04/02/1996	ND	ug/L	.5	ug/L
NAP	Naphthalene	502.2		04/02/1996	ND	ug/L	.5	ug/L
123TCB	1,2,3-Trichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
mp-XYL	m,p-Xylene	502.2		04/02/1996	ND	ug/L	.5	ug/L
TTHMs	Total THMs	502.2		04/02/1996	ND	ug/L	.5	ug/L
MTBE	Methyl tert-butyl ether	502.2		04/02/1996	ND	ug/L	5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M2/1
Station Type: WELL CASING
Perf Interval (ft.): 85-150
Aquifer: TALBERT

State Well Number: 06S/10W-18D02
Well Owner: O.C. WATER DISTRICT
Well Name: M-2
City: HUNTINGTON BEACH

Sample Group ID: 96005663
Sample ID: 96006173
Sample Date/Time: 03/29/1996 12:15:00
Receive Date/Time: 03/29/1996 13:20:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER/SCOTT HALL
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9614435
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 12800
pH (UNITS): 7.3
TEMP (C): 21.8
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
TOTALX	Total Xylenes (m,p,&o)	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH3Cl	Chloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH3Br	Bromomethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
VNYLCL	Vinyl chloride	502.2		04/02/1996	ND	ug/L	.5	ug/L
ClETHA	Chloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH2Cl2	Methylene Chloride	502.2		04/02/1996	ND	ug/L	.5	ug/L
11DCE	1,1-Dichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
11DCA	1,1-Dichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHCl3	Chloroform	502.2		04/02/1996	ND	ug/L	.5	ug/L
CCl4	Carbon tetrachloride	502.2		04/02/1996	ND	ug/L	.5	ug/L
12DCP	1,2-Dichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
TCE	Trichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
112TCA	1,1,2-Trichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHBr2C	Dibromochloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
PCE	Tetrachloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CLBENZ	Chlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
12DCB	1,2-Dichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
13DCB	1,3-Dichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
14DCB	1,4-Dichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CCl3F	Trichlorofluoromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
t12DCE	trans-1,2 Dichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
12DCA	1,2-Dichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
111TCA	1,1,1-Trichloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHBrCl	Bromodichloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
t13DCP	trans-1,3-Dichloropropene	502.2		04/02/1996	ND	ug/L	.5	ug/L
c13DCP	cis-1,3-Dichloropropene	502.2		04/02/1996	ND	ug/L	.5	ug/L
BENZ	Benzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CHBr3	Bromoform	502.2		04/02/1996	ND	ug/L	.5	ug/L
1122PC	1,1,2,2-Tetrachloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
TOLU	Toluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
EtBENZ	Ethylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
Cl3F3E	Trichlorotrifluoroethane (Freon 113)	502.2		04/02/1996	ND	ug/L	.5	ug/L
2ClEVE	2-Chloroethylvinyl ether	502.2		04/02/1996	ND	ug/L	1	ug/L
MEK	Methyl Ethyl Ketone (MEK)	502.2		04/02/1996	ND	ug/L	5	ug/L
MIBK	Methyl Isobutyl Ketone (MIBK)	502.2		04/02/1996	ND	ug/L	5	ug/L
B2CLEE	bis (2-chloroethyl) ether	502.2		04/02/1996	ND	ug/L	5	ug/L
CCl2F2	Dichlorodifluoromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M2/1
Station Type: WELL CASING
Perf Interval (ft.): 85-150
Aquifer: TALBERT

State Well Number: 06S/10W-18D02
Well Owner: O.C. WATER DISTRICT
Well Name: M-2
City: HUNTINGTON BEACH

Sample Group ID: 96005663
Sample ID: 96008173
Sample Date/Time: 03/29/1996 12:15:00
Receive Date/Time: 03/29/1996 13:20:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER/SCOTT HALL
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9614435
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 12800
pH (UNITS): 7.3
TEMP (C): 21.8
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
22DCP	2,2-Dichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
c12DCE	cis-1,2-Dichloroethene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH2BrC	Bromochloromethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
11DCP	1,1-Dichloropropene	502.2		04/02/1996	ND	ug/L	.5	ug/L
CH2Br2	Dibromomethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
13DCP	1,3-Dichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
EDB	1,2-Dibromoethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
1112PC	1,1,1,2-Tetrachloroethane	502.2		04/02/1996	ND	ug/L	.5	ug/L
o-XYL	o-Xylene	502.2		04/02/1996	ND	ug/L	.5	ug/L
STYR	Styrene	502.2		04/02/1996	ND	ug/L	.5	ug/L
ISPBNZ	Isopropylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
123TCP	1,2,3-Trichloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
PRPBNZ	Propylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
BRBENZ	Bromobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
135TMB	1,3,5-Trimethylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
2CLTOL	2-Chlorotoluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
4CLTOL	4-Chlorotoluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
tBBENZ	tert-Butylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
124TMB	1,2,4-Trimethylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
sBBENZ	sec-Butylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
4IPTOL	4-Isopropyltoluene	502.2		04/02/1996	ND	ug/L	.5	ug/L
nBBENZ	n-Butylbenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
DBCP	1,2-Dibromo-3-chloropropane	502.2		04/02/1996	ND	ug/L	.5	ug/L
124TCB	1,2,4-Trichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
HCIBut	Hexachlorobutadiene	502.2		04/02/1996	ND	ug/L	.5	ug/L
NAP	Naphthalene	502.2		04/02/1996	ND	ug/L	.5	ug/L
123TCB	1,2,3-Trichlorobenzene	502.2		04/02/1996	ND	ug/L	.5	ug/L
mp-XYL	m,p-Xylene	502.2		04/02/1996	ND	ug/L	.5	ug/L
TTHMs	Total THMs	502.2		04/02/1996	ND	ug/L	.5	ug/L
MTBE	Methyl tert-butyl ether	502.2		04/02/1996	ND	ug/L	5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M28/1
Station Type: WELL CASING
Perf Interval (ft.): 80-145
Aquifer: TALBERT

State Well Number: 06S/10W-18F00
Well Owner: O.C. WATER DISTRICT
Well Name: M-28
City: HUNTINGTON BEACH

Sample Group ID: 96008300
Sample ID: 96012055
Sample Date/Time: 05/16/1996 09:30:00
Receive Date/Time: 05/16/1996 13:15:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9617311
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 15100
pH (UNITS): 7.2
TEMP (C): 20.0
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
TOTALX	Total Xylenes (m,p,&o)	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH3Cl	Chloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH3Br	Bromomethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
VNYLCL	Vinyl chloride	502.2		05/21/1996	ND	ug/L	.5	ug/L
ClETHA	Chloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH2Cl2	Methylene Chloride	502.2		05/21/1996	ND	ug/L	.5	ug/L
11DCE	1,1-Dichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
11DCA	1,1-Dichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHCl3	Chloroform	502.2		05/21/1996	ND	ug/L	.5	ug/L
CCl4	Carbon tetrachloride	502.2		05/21/1996	ND	ug/L	.5	ug/L
12DCP	1,2-Dichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
TCE	Trichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
112TCA	1,1,2-Trichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHBr2C	Dibromochloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
PCE	Tetrachloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CLBENZ	Chlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
12DCB	1,2-Dichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
13DCB	1,3-Dichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
14DCB	1,4-Dichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CCl3F	Trichlorofluoromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
t12DCE	trans-1,2 Dichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
12DCA	1,2-Dichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
111TCA	1,1,1-Trichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHBrCl	Bromodichloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
t13DCP	trans-1,3-Dichloropropene	502.2		05/21/1996	ND	ug/L	.5	ug/L
c13DCP	cis-1,3-Dichloropropene	502.2		05/21/1996	ND	ug/L	.5	ug/L
BENZ	Benzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHBr3	Bromoform	502.2		05/21/1996	ND	ug/L	.5	ug/L
1122PC	1,1,2,2-Tetrachloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
TOLU	Toluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
EtBENZ	Ethylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
Cl3F3E	Trichlorotrifluoroethane (Freon 113)	502.2		05/21/1996	ND	ug/L	.5	ug/L
2ClEVE	2-Chloroethylvinyl ether	502.2		05/21/1996	ND	ug/L	1	ug/L
MEK	Methyl Ethyl Ketone (MEK)	502.2		05/21/1996	ND	ug/L	5	ug/L
MIBK	Methyl Isobutyl Ketone (MIBK)	502.2		05/21/1996	ND	ug/L	5	ug/L
B2CLEE	bis (2-chloroethyl) ether	502.2		05/21/1996	ND	ug/L	5	ug/L
CCl2F2	Dichlorodifluoromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M28/1
Station Type: WELL CASING
Perf Interval (ft.): 80-145
Aquifer: TALBERT

State Well Number: 06S/10W-18F00
Well Owner: O.C. WATER DISTRICT
Well Name: M-28
City: HUNTINGTON BEACH

Sample Group ID: 96008300
Sample ID: 96012055
Sample Date/Time: 05/16/1996 09:30:00
Receive Date/Time: 05/16/1996 13:15:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9617311
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 15100
pH (UNITS): 7.2
TEMP (C): 20.0
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
22DCP	2,2-Dichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
c12DCE	cis-1,2-Dichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH2BrC	Bromochloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
11DCP	1,1-Dichloropropene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH2Br2	Dibromomethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
13DCP	1,3-Dichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
EDB	1,2-Dibromoethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
1112PC	1,1,1,2-Tetrachloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
o-XYL	o-Xylene	502.2		05/21/1996	ND	ug/L	.5	ug/L
STYR	Styrene	502.2		05/21/1996	ND	ug/L	.5	ug/L
ISPBNZ	Isopropylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
123TCP	1,2,3-Trichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
PRPBNZ	Propylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
BRBENZ	Bromobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
135TMB	1,3,5-Trimethylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
2CLTOL	2-Chlorotoluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
4CLTOL	4-Chlorotoluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
tBBENZ	tert-Butylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
124TMB	1,2,4-Trimethylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
sBBENZ	sec-Butylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
4IPTOL	4-Isopropyltoluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
nBBENZ	n-Butylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
DBCP	1,2-Dibromo-3-chloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
124TCB	1,2,4-Trichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
HCIBut	Hexachlorobutadiene	502.2		05/21/1996	ND	ug/L	.5	ug/L
NAP	Naphthalene	502.2		05/21/1996	ND	ug/L	.5	ug/L
123TCB	1,2,3-Trichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
mp-XYL	m,p-Xylene	502.2		05/21/1996	ND	ug/L	.5	ug/L
TTHMs	Total THMs	502.2		05/21/1996	ND	ug/L	.5	ug/L
MTBE	Methyl tert-butyl ether	502.2		05/21/1996	ND	ug/L	5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M28/1
Station Type: WELL CASING
Perf Interval (ft.): 80-145
Aquifer: TALBERT

State Well Number: 06S/10W-18F00
Well Owner: O.C. WATER DISTRICT
Well Name: M-28
City: HUNTINGTON BEACH

Sample Group ID: 96008300
Sample ID: 96012056
Sample Date/Time: 05/16/1996 09:30:00
Receive Date/Time: 05/16/1996 13:15:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9617311D
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 15100
pH (UNITS): 7.2
TEMP (C): 20.0
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
TOTALX	Total Xylenes (m,p,&o)	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH3Cl	Chloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH3Br	Bromomethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
VNYLCL	Vinyl chloride	502.2		05/21/1996	ND	ug/L	.5	ug/L
ClETHA	Chloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH2Cl2	Methylene Chloride	502.2		05/21/1996	ND	ug/L	.5	ug/L
11DCE	1,1-Dichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
11DCA	1,1-Dichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHCl3	Chloroform	502.2		05/21/1996	ND	ug/L	.5	ug/L
CCl4	Carbon tetrachloride	502.2		05/21/1996	ND	ug/L	.5	ug/L
12DCP	1,2-Dichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
TCE	Trichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
112TCA	1,1,2-Trichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHBr2C	Dibromochloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
PCE	Tetrachloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CLBENZ	Chlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
12DCB	1,2-Dichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
13DCB	1,3-Dichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
14DCB	1,4-Dichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CCl3F	Trichlorofluoromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
t12DCE	trans-1,2 Dichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
12DCA	1,2-Dichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
111TCA	1,1,1-Trichloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHBrCl	Bromodichloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
t13DCP	trans-1,3-Dichloropropene	502.2		05/21/1996	ND	ug/L	.5	ug/L
c13DCP	cis-1,3-Dichloropropene	502.2		05/21/1996	ND	ug/L	.5	ug/L
BENZ	Benzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CHBr3	Bromoform	502.2		05/21/1996	ND	ug/L	.5	ug/L
1122PC	1,1,2,2-Tetrachloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
TOLU	Toluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
EtBENZ	Ethylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
Cl3F3E	Trichlorotrifluoroethane (Freon 113)	502.2		05/21/1996	ND	ug/L	.5	ug/L
2ClEVE	2-Chloroethylvinyl ether	502.2		05/21/1996	ND	ug/L	1	ug/L
MEK	Methyl Ethyl Ketone (MEK)	502.2		05/21/1996	ND	ug/L	5	ug/L
MIBK	Methyl Isobutyl Ketone (MIBK)	502.2		05/21/1996	ND	ug/L	5	ug/L
B2CLEE	bis (2-chloroethyl) ether	502.2		05/21/1996	ND	ug/L	5	ug/L
CCl2F2	Dichlorodifluoromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M28/1
Station Type: WELL CASING
Perf Interval (ft.): 80-145
Aquifer: TALBERT

State Well Number: 06S/10W-18F00
Well Owner: O.C. WATER DISTRICT
Well Name: M-28
City: HUNTINGTON BEACH

Sample Group ID: 96008300
Sample ID: 96012056
Sample Date/Time: 05/16/1996 09:30:00
Receive Date/Time: 05/16/1996 13:15:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9617311D
Laboratory: OCWD
Analysis Requested: 502

FIELD PARAMETERS:
EC (umhos/cm): 15100
pH (UNITS): 7.2
TEMP (C): 20.0
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
22DCP	2,2-Dichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
c12DCE	cis-1,2-Dichloroethene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH2BrC	Bromochloromethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
11DCP	1,1-Dichloropropene	502.2		05/21/1996	ND	ug/L	.5	ug/L
CH2Br2	Dibromomethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
13DCP	1,3-Dichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
EDB	1,2-Dibromoethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
1112PC	1,1,1,2-Tetrachloroethane	502.2		05/21/1996	ND	ug/L	.5	ug/L
o-XYL	o-Xylene	502.2		05/21/1996	ND	ug/L	.5	ug/L
STYR	Styrene	502.2		05/21/1996	ND	ug/L	.5	ug/L
ISPBNZ	Isopropylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
123TCP	1,2,3-Trichloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
PRPBNZ	Propylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
BRBENZ	Bromobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
135TMB	1,3,5-Trimethylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
2CLTOL	2-Chlorotoluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
4CLTOL	4-Chlorotoluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
tBBENZ	tert-Butylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
124TMB	1,2,4-Trimethylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
sBBENZ	sec-Butylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
4IPTOL	4-Isopropyltoluene	502.2		05/21/1996	ND	ug/L	.5	ug/L
nBBENZ	n-Butylbenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
DBCP	1,2-Dibromo-3-chloropropane	502.2		05/21/1996	ND	ug/L	.5	ug/L
124TCB	1,2,4-Trichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
HCIBut	Hexachlorobutadiene	502.2		05/21/1996	ND	ug/L	.5	ug/L
NAP	Naphthalene	502.2		05/21/1996	ND	ug/L	.5	ug/L
123TCB	1,2,3-Trichlorobenzene	502.2		05/21/1996	ND	ug/L	.5	ug/L
mp-XYL	m,p-Xylene	502.2		05/21/1996	ND	ug/L	.5	ug/L
TTHMs	Total THMs	502.2		05/21/1996	ND	ug/L	.5	ug/L
MTBE	Methyl tert-butyl ether	502.2		05/21/1996	ND	ug/L	5	ug/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M1/1
Station Type: WELL CASING
Perf Interval (ft.): 75-110
Aquifer: TALBERT

State Well Number: 06S/10W-07R01
Well Owner: O.C. WATER DISTRICT
Well Name: M-1
City: HUNTINGTON BEACH

Sample Group ID: 96005662
Sample ID: 96008591
Sample Date/Time: 03/29/1996 10:30:00
Receive Date/Time: 03/29/1996 13:20:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER/KELLY RIOS
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9614431
Laboratory: OCWD
Analysis Requested: Q23SG

FIELD PARAMETERS:
EC (umhos/cm): 11600
pH (UNITS): 7.4
TEMP (C): 21.2
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
EC	Electrical Conductivity	2510B		04/04/1996	11200	um/cm	1	um/cm
Cl	Chloride	X1-300.0		04/01/1996	3680	mg/L	.5	mg/L
TOC	Total Organic Carbon (Unfiltered)	5310DH		04/01/1996	4.19	mg/L	.05	mg/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M1/1
Station Type: WELL CASING
Perf Interval (ft.): 75-110
Aquifer: TALBERT

State Well Number: 06S/10W-07R01
Well Owner: O.C. WATER DISTRICT
Well Name: M-1
City: HUNTINGTON BEACH

Sample Group ID: 97000623
Sample ID: 97000947
Sample Date/Time: 12/31/1996 14:00:00
Receive Date/Time: 12/31/1996 14:40:00
Sampling Method: AIRLIFT
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9628382
Laboratory: OCWD
Analysis Requested: Q23SG

FIELD PARAMETERS:
EC (umhos/cm): NA
pH (UNITS): NA
TEMP (C): NA
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
EC	Electrical Conductivity	2510B		01/09/1997	10300	um/cm	1	um/cm
Cl	Chloride	X1-300.0		01/07/1997	3660	mg/L	.5	mg/L
TOC	Total Organic Carbon (Unfiltered)	5310DH		01/07/1997	3.55	mg/L	.05	mg/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M2/1
Station Type: WELL CASING
Perf Interval (ft.): 85-150
Aquifer: TALBERT

State Well Number: 06S/10W-18D02
Well Owner: O.C. WATER DISTRICT
Well Name: M-2
City: HUNTINGTON BEACH

Sample Group ID: 96005663
Sample ID: 96008592
Sample Date/Time: 03/29/1996 12:15:00
Receive Date/Time: 03/29/1996 13:20:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER/SCOTT HALL
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9614434
Laboratory: OCWD
Analysis Requested: Q23SG

FIELD PARAMETERS:
EC (umhos/cm): 12800
pH (UNITS): 7.3
TEMP (C): 21.8
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
EC	Electrical Conductivity	2510B		04/04/1996	12200	um/cm	1	um/cm
Cl	Chloride	X1-300.0		04/01/1996	4010	mg/L	.5	mg/L
TOC	Total Organic Carbon (Unfiltered)	5310DH		04/01/1996	5.63	mg/L	.05	mg/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M2/1
Station Type: WELL CASING
Perf Interval (ft.): 85-150
Aquifer: TALBERT

State Well Number: 06S/10W-18D02
Well Owner: O.C. WATER DISTRICT
Well Name: M-2
City: HUNTINGTON BEACH

Sample Group ID: 96020117
Sample ID: 96028195
Sample Date/Time: 10/29/1996 10:00:00
Receive Date/Time: 10/29/1996 15:00:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9626048
Laboratory: OCWD
Analysis Requested: Q23SG

FIELD PARAMETERS:
EC (umhos/cm): 1090
pH (UNITS): 7.4
TEMP (C): 20.8
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter		Analysis	Dates		Results		Detect Limits	
Abbr	Name	Method	Extract	Analysis	Value	Units	Value	Units
Reported Values								
EC	Electrical Conductivity	2510B		10/31/1996	12400	um/cm	1	um/cm
Cl	Chloride	X1-300.0		10/29/1996	4230	mg/L	.5	mg/L
TOC	Total Organic Carbon (Unfiltered)	5310DH		10/29/1996	5.64	mg/L	.05	mg/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M28/1
Station Type: WELL CASING
Perf Interval (ft.): 80-145
Aquifer: TALBERT

State Well Number: 06S/10W-18F00
Well Owner: O.C. WATER DISTRICT
Well Name: M-28
City: HUNTINGTON BEACH

Sample Group ID: 96008300
Sample ID: 96012833
Sample Date/Time: 05/16/1996 09:30:00
Receive Date/Time: 05/16/1996 13:15:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9617310
Laboratory: OCWD
Analysis Requested: Q23SG

FIELD PARAMETERS:
EC (umhos/cm): 15100
pH (UNITS): 7.2
TEMP (C): 20.0
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
EC	Electrical Conductivity	2510B		05/21/1996	15200	um/cm	1	um/cm
Cl	Chloride	X1-300.0		05/21/1996	5310	mg/L	.5	mg/L
TOC	Total Organic Carbon (Unfiltered)	5310DH		05/23/1996	3.38	mg/L	.05	mg/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

ORANGE COUNTY WATER DISTRICT
SAMPLE RESULTS

Station Name: OCWD-M28/1
Station Type: WELL CASING
Perf Interval (ft.): 80-145
Aquifer: TALBERT

State Well Number: 06S/10W-18F00
Well Owner: O.C. WATER DISTRICT
Well Name: M-28
City: HUNTINGTON BEACH

Sample Group ID: 96020601
Sample ID: 96028902
Sample Date/Time: 11/06/1996 09:30:00
Receive Date/Time: 11/06/1996 13:35:00
Sampling Method: SUBMERSIBLE PUMP
Sampling Agency: O.C. WATER DISTRICT
Sampled By: JIM CAVER
Monitoring Program: Talbert Barrier Q23 Monitoring
Comments:

Lab Sample No.: OCWD9626345
Laboratory: OCWD
Analysis Requested: Q23SG

FIELD PARAMETERS:
EC (umhos/cm): NA
pH (UNITS): NA
TEMP (C): NA
D.O. (mg/L): NA
D.O. TEMP (C): NA

Parameter Abbr	Parameter Name	Analysis Method	Dates Extract	Dates Analysis	Results Value	Results Units	Detect Limits Value	Detect Limits Units
Reported Values								
EC	Electrical Conductivity	2510B		11/06/1996	15100	um/cm	1	um/cm
Cl	Chloride	X1-300.0		11/07/1996	5410	mg/L	.5	mg/L
TOC	Total Organic Carbon (Unfiltered)	5310DH		11/06/1996	6.58	mg/L	.05	mg/L

NA : Not Analyzed
ND : Not Detected
TR : Trace

APPENDIX B

Risk-Based Cleanup Level Development

APPENDIX B

Risk-Based Cleanup Level Development

RISK-BASED CLEANUP LEVEL DEVELOPMENT

Results of the baseline risk assessment (Environmental Science & Engineering [ESE], 1996) indicated that the Ascon site, under current conditions, represents a potential health risk to current off-site residents and workers. Waste pits and lagoons at the site represent a continuous source of chemicals that can migrate to on- and off-site receptors through the air or groundwater. The health hazards posed by the site are not limited to chemical exposure. The physical and geotechnical properties of the site represent a threat to current and future occupants of the site. Under these conditions, development of the Ascon site for residential use can only proceed if 1) the waste pits and lagoons are removed or stabilized to a point where the potential risks to human health are eliminated or reduced to acceptable levels, and 2) the physical and geotechnical properties of the site are improved sufficiently to accommodate buildings and structures necessary for human habitation.

In anticipation of site remediation activities, risk-based cleanup levels (RBCLs) were developed for the Ascon site. RBCL are media-specific (soil, water, or air) concentrations that are believed to be protective of human health and the environment. RBCLs developed for the Ascon site express both a contaminant concentration and an exposure route, rather than contaminant concentrations alone, because protectiveness may be achieved by reducing exposure by means other than contaminant removal (such as capping an area, limiting access, or by waste stabilization).

RBCLs for groundwater were not developed at this time. The vertical and lateral extent of impacted groundwater has not been well defined at the Ascon site (see ESE's 1996 report for details on the groundwater investigations conducted at the site). RBCLs for groundwater will be developed at a future stage once the waste oil lagoons at the site have been removed or remediated.

The development of soil RBCLs required the following data:

- the chemicals of potential concern (COPC) at the site
- potentially exposed population(s) and exposure route(s) based on the most probable future land use
- an acceptable daily exposure level for each noncarcinogenic COPC, and an acceptable incremental cancer risk for carcinogens

The COPCs identified at the site are presented in Table C-1. The COPCs selected here include all the chemicals identified in soil, lagoons, and pits at the Ascon site (see Tables 1, 2, and 3 of the Baseline Risk Assessment; ESE, 1996). The potentially exposed populations are assumed to be adult and child residents living in a house to be constructed at the site. The potential exposure pathways include inhalation of volatile

chemicals in air; inhalation of dust particles; and oral and dermal contact with chemically-impacted dust and soil.

RBCLs for the Ascon site were developed using applicable U.S. Environmental Protection Agency (USEPA; 1991), Department of Toxic Substances Control (DTSC; 1992), and American Society for Testing and Materials (ASTM; 1995) methodology and development criteria. The following sections describe in detail development of RBCLs for the Ascon site.

VOLATILIZATION FACTORS AND SOIL SATURATION CONCENTRATIONS

In the risk assessment, the major source of volatile chemicals was found to be the waste lagoons. In the future, once the lagoon source has been removed or remediated, the only source of chemicals to the air will be any residual chemicals in soil. Chemicals in soil can become airborne if they are volatile or by attaching to microscopic soil particles that can become suspended in air.

Since one of the major exposure pathways expected to occur in the future is inhalation of airborne chemicals, it was essential to establish a relationship between soil chemical concentrations and an ambient chemical concentration. Only then could a "safe" soil chemical concentration be derived from a "safe" air chemical concentration. The relationship between soil chemical concentrations and ambient chemical concentrations can be estimated through volatilization factors.

The potential volatilization of chemicals from soil is dependent on the physical properties of each chemical and on the chemical and physical properties of soil. The following equation was used to estimate volatilization factors for volatile chemicals (ASTM, 1995):

$$VFss = \frac{2 \bullet W \bullet ps \bullet CF}{Uair \bullet h} \times \sqrt{\frac{Deff \bullet H'}{\pi \bullet [Ows + (ks \bullet ps) + (H' \bullet Oas)] \bullet t}}$$

Where:

VFss	=	Volatilization factor for superficial soil, kg/m^3
W	=	Width of source area parallel to wind direction, cm
ps	=	Soil bulk density, g/cm^3
CF	=	Conversion factor, 1,000 ($cm^3 \bullet kg/m^3 \bullet g$)
Uair	=	Wind speed, cm/sec
h	=	Ambient air mixing zone height, cm
Deff	=	Effective diffusion coefficient in soil, cm^2/sec
H'	=	Henry's Law constant, unitless
π	=	Pi, 3.1416
Ows	=	Volumetric water content in vadose zone soil, unitless

Ks = soil-water partition coefficient, cm3/g
t = Average time for vapor flux, seconds

The effective diffusion coefficient (Deff) was in turn obtained by using the following equation (ASTM, 1995):

$$Deff = \frac{Dair \bullet Oas^{3.33}}{Ot^2} + \frac{Dw \bullet Ows^{3.33}}{H' \bullet Ot^2}$$

Where:

Dair = Chemical diffusion coefficient in air, cm^2/sec
Dw = Chemical diffusion coefficient in water, cm^2/sec
Ot = Total soil porosity, unitless

The following equation was used to obtain the soil-water partition coefficient (ks) (ASTM, 1995):

$$ks = Koc \bullet foc$$

Where:

Koc = Chemical organic carbon partition coefficient, gm^3/g
Foc = Soil organic carbon content, g/g

The input parameters used to estimate volatilization factors are presented in Table C-2. The volatilization factors for superficial soil (VFss) were applied only to volatile chemicals. That is, chemicals having a Henry's Law constant greater than 10^{-5} ($atm.m^3/mol$) and a molecular weight of less than 200 g/mole. Semivolatile organic compounds and metals are not volatile at ambient temperatures, but can become airborne when adsorbed to dust particles. Thus, the volatilization factor for particles (VFp) was obtained by using the following equation (ASTM, 1995):

$$VFp = \frac{Pe \bullet W \bullet CF}{Uair \bullet h}$$

Where:

VFp = Volatilization factor for particulates, kg/m^3
Pe = Particulate emission rate, $g/cm^2 \bullet sec$

All others as previously defined.

The physical properties of the soil after site remediation are unknown. Therefore, default soil parameters that describe a silty soil were selected (Freeze and Cherry, 1979; Table C-2). Chemical parameters such as diffusion coefficients, Henry's Law constant, organic carbon partition coefficients were obtained in the scientific literature and are listed in Table C-3.

It is anticipated that most of the property surface in the future will be occupied by buildings, paved surfaces, and landscaping. The exposed soil surface available to wind erosion and vapor generation will be minimal. Therefore, the width of source area parallel to wind direction was assumed to be equal to one-fifth the distance covered by the property line along Magnolia Street (256 feet; 7,800 cm).

Default parameters such as particulate emission rate, ambient mixing height, and average time for vapor flux (Table C-2) were obtained from the ASTM (1995) guidance document. The estimated volatilization factors for volatile chemicals are presented in Table C-3. The estimated volatilization factor for particles is presented in Table C-2. The volatilization factors were used in Sections II and III to estimate RBCLs.

It should be noted that the volatilization factors developed above are only applicable when the volatile chemical concentration in soil is at or below its soil saturation concentration. The saturation concentration is the soil chemical concentration at which the adsorptive limits of the soil particles and the solubility limits of the available soil moisture have been reached. In other words, free-phase product can be anticipated at concentrations above the soil saturation concentration. The soil saturation concentration was estimated by using the following equation (USEPA, 1996):

$$sat = \frac{S}{ps} \bullet [(Ks \bullet ps) + Ows + (H' \bullet Oas)]$$

Where:

sat	=	Soil saturation concentration, mg/kg
S	=	Chemical solubility in water, mg/L

All other as previously defined.

It is known that chemicals with low toxicity potential will have an estimated RBCL that exceeds its soil saturation concentration. Therefore, for chemicals whose RBCL exceeds the soil saturation concentration, the soil saturation concentration will be selected as the target soil cleanup concentration.

II DEVELOPMENT OF RBCLs FOR NONCARCINOGENS

RBCLs for noncarcinogens are set by choosing an acceptable hazard quotient for each exposure pathway and then solving for a chemical concentration in the environmental

$$HQ = \frac{ADD}{RfD}$$

media that meets the chosen hazard quotient. The equation that defines the relationship between soil chemical concentrations, exposure and hazard quotients is:

Where:

$$ADD = EPC \bullet Pathway\ \ Specific\ \ EFn$$

Where:

HQ	=	Hazard quotient, unitless
ADD	=	Average daily dose, mg/kg/day
RfD	=	Reference dose, mg/kg/day
EPC	=	Exposure point concentration, mg/m^3 for air and mg/kg for soil
EFn	=	Exposure factor for noncarcinogens, m^3/kg•day for inhalation and kg/kg•day for oral and dermal

The HQ for the combined exposure through the inhalation, oral and dermal routes is given by:

$$HQ = \frac{Csoil \bullet VF \bullet IhIFn}{RfDi} + \frac{Csoil \bullet OIFn}{RfDo} + \frac{Csoil \bullet DIFn}{RfDo}$$

Where:

Csoil	=	Soil chemical concentration, mg/kg
VF	=	Chemical and site-specific volatilization factor, kg/m^3
IhIFn	=	Inhalation intake factor for noncarcinogens, m^3/kg•day
OIFn	=	Oral intake factor for noncarcinogens, kg/kg•day
DIFn	=	Dermal intake factor for noncarcinogens, kg/kg•day
RfDi	=	Reference dose for inhalation exposure, mg/kg/day
RfDo	=	Reference dose for oral exposure, mg/kg/day

All others as previously defined.

To obtain a soil chemical concentration that would satisfy a target hazard quotient (THQ), the above equation was solved for soil chemical concentration (Csoil) as follows:

$$Csoil = \frac{THQ}{\left(\frac{VF \bullet IhIFn}{RfDi} + \frac{[OIFn + DIFn]}{RfDo}\right)}$$

THQ	=	Target hazard quotient, unitless

All other as previously defined.

The target hazard quotient (THQ) chosen was 1.0 (DTSC, 1994a). Chemical-specific reference doses were obtained from the U.S. Environmental Protection Agency (USEPA; 1995, 1996a, and 1997) and are listed in Table C-5. Inhalation, oral, and dermal intake factors for hypothetical future on-site adult (Table C-6) and child residents (Table C-7) were taken from exposure parameters used to define the reasonable maximum exposure (RME) scenario in the baseline risk assessment (ESE, 1996). For a detailed derivation of exposure factors for the Ascon site, see Section 5.0 of ESE's 1996 report.

Estimated target on-site soil chemical concentrations for noncarcinogens for adult and child receptors are presented in Tables C-8 and C-9, respectively.

A review of the target soil cleanup levels derived for noncarcinogens shows that the lowest target soil concentrations are those estimated to protect children. Since the adoption of the lowest target soil concentration is protective of all receptors through all pathways of exposure, the target soil concentrations derived for children will be adopted as RBCLs for noncarcinogenic chemicals (Table C-10).

III DEVELOPMENT OF RBCLs FOR CARCINOGENS

RBCLs for carcinogenic chemicals were calculated by setting the target risk at a DTSC acceptable level and then solving for the concentration variable using receptor- and pathway-specific exposure factors.

The following equation defines the relationship between chemical exposure and cancer risk:

$$Risk = (LADD) \bullet SF$$

Where:

$$LADD = EPC \bullet Pathway\ Specific\ EFc$$

Risk	=	Upper bound incremental lifetime carcinogenic risk, unitless
LADD	=	Lifetime averaged daily dose, mg/kg/day
EPC	=	Exposure point concentration, mg/kg for soil and mg/m^3 for air
EFc	=	Intake factor for carcinogens, m^3/kg•day for inhalation and kg/kg•day for oral and dermal
SF	=	Cancer slope factor, 1/(mg/kg/day)

The incremental cancer risk for the combined exposure through the inhalation, oral and dermal routes is given by:

Risk = (Csoil • VF • IhIFc • SFi) + (Csoil • OIFc • SFo) + (Csoil • DIFc • SFo)

Where:

Csoil	=	Chemical concentration in soil, mg/kg
IhIFc	=	Inhalation intake factor for carcinogens, m^3/kg•day
OIFc	=	Oral intake factor for carcinogens, kg/kg•day
DIFc	=	Dermal intake factor for carcinogens, kg/kg•day
SFi	=	Chemical slope factor for inhalation exposure, 1/(mg/kg•day)
SFo	=	Chemical slope factor for oral exposure, 1/(mg/kg•day)

To obtain a soil chemical concentration that would satisfy a target cancer risk (TCR), the above equation was solved for soil chemical concentration (Csoil) as follows:

$$Csoil = \frac{TCR}{(VF \bullet IhIFc \bullet SFi) + (SFo \bullet [OIFc + DIFc])}$$

The TCR was set at the DTSC acceptable lifetime cancer risk of one in a million (1.0E-6).

Chemical-specific slope factors were taken from Table C-5. Inhalation, oral, and dermal intake factors for hypothetical future on-site adult and child residents were taken from Tables C-6 and C-7, respectively.

The estimated target on-site soil chemical concentrations for carcinogenic chemicals estimated to protect future adult and child receptor are presented in Tables C-11 and C-12, respectively.

As expected from the results obtained in the derivation of target soil concentrations for noncarcinogens, the lowest target soil concentrations were those estimated to protect children. Thus, the concentrations derived for children will be adopted as RBCLs for carcinogenic chemicals (Table C-13).

The final step in the derivation of RBCLs was the selection of cleanup levels for the protection of noncarcinogenic and carcinogenic effects. For chemicals having target cleanup levels for the protection of carcinogenic and noncarcinogenic effects, the lower of the two values was selected as the RBCL (Table C-14). For all other chemicals not known to be carcinogenic, the RBCL adopted was the cleanup level estimated to protect from noncarcinogenic effects (Table C-14). In addition, for chemicals whose RACL was greater than the calculated soil saturation concentration (Table C-4), the target soil cleanup level was set to the soil saturation concentration (sat; Table C-14)

IV CLEANUP LEVELS FOR LEAD

The RBCL development criteria described in the previous sections do not apply to inorganic lead. RfDs and SFs are not applicable because of incomplete knowledge of the complex physiological dynamics of lead in the body. Alternative methods have been developed to calculate RBCL for inorganic lead. These methods are based on establishing an acceptable target blood-lead level instead of an acceptable risk level. The target blood-lead level approach is considered appropriate because lead toxicity effects are typically only observed above certain blood-lead levels.

The most serious effects associated with elevated blood-lead levels are neurotoxic effects. For adults, such effects typically do not occur until blood-lead levels exceed 50 micrograms per deciliter (μg/dl). However, other observable effects of elevated blood-lead levels occur at levels as low as 15 to 30 μg/dl (elevation of the enzyme erythrocyte protoporphyrin). Increased blood pressure has also been suggested to be due to blood-lead levels as low as 7 to 10 μg/dl in white males aged 40 to 59. Neurological impairment (e.g., effects on IQ) have been seen in children at similar blood-lead levels.

The DTSC has indicated that a blood-lead level of 10 μg/dl should cause no adverse health effects in at least 50 percent of the population. Furthermore, the agency considers it appropriate to set RBCLs for this chemical that are protective of up to 99 percent of the population. Therefore, RBCLs for lead were set so that the maximum blood-lead concentration would not exceed 10 μg/dl in 99 percent of the child population.

RBCLs for lead were calculated using the LEADSPREAD model (DTSC, 1996). All input parameters and results are presented in Table C-15. The estimated RBCLs for lead are presented in Tables C-10 and C-14.

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Table C-1
Chemicals Detected in Soil, Pits, and Lagoons at the Ascon Site

LFR 4643.00

Chemical	Environmental Media Where Chemical Was Detected		
	Soil	Pits	Lagoons
Volatile Organic Compounds			
1,1,1-Trichloroethane			x
1,1,2-Trichloro-1,2,2-trifluoroethane			x
1,1-Dichloroethane			x
1,1-Dichloroethene			x
1,2-Dichloroethane			x
1,2-Dichloroethene (total)			x
2,4,6-Trichlorophenol			x
2,4-Dichlorophenol			x
2-Butanone	x	x	x
2-Hexanone	x		
Acetone	x	x	x
Benzene	x	x	x
Bromoform			x
Carbon disulfide		x	
Chlorobenzene	x		
Chloroform			x
Ethylbenzene	x	x	x
Methylene chloride	x		x
Styrene	x	x	
Toluene	x	x	x
Trichlorofluoromethane	x		
Xylenes (total)	x		x
Semivolatile Organic Compounds			
1,2-Dichlorobenzene	x		
1-Methylnaphthalene	x		
2-Methylnaphthalene	x	x	x
2,4-Dimethylphenol	x		
3,3'-Dichlorobenzidine	x		
4,4'-DDD	x		
4,4'-DDE	x		
Acenaphthene	x		x
Anthracene	x	x	
Benz[a]anthracene	x		x
Benzidine	x		x
Benzo[a]pyrene	x		x
Benzo[b]fluoranthene			x
Benzo[k]fluoranthene			x
Benzoic acid	x		
Benzyl butyl phthalate	x		
beta-BHC	x		
delta-BHC	x		

Table C-1
Chemicals Detected in Soil, Pits, and Lagoons at the Ascon Site

LFR 4643.00

Chemical	Environmental Media Where Chemical Was Detected		
	Soil	Pits	Lagoons
Semivolatile Organic Compounds (cont'd)			
gamma-BHC	x		
Bis (2-ethylhexyl) phthalate	x	x	x
Chrysene	x		x
Di-N-butyl phthalate	x		
Dibenz[a,h]anthracene	x		
Dibezofuran	x		
Endosulfan II	x		
Fluoranthene	x	x	x
Fluorene	x		x
gamma-Chlordane	x		
N-Nitrosodiphenylamine	x		
Naphthalene	x	x	x
PCB-1016			x
PCB-1242			x
PCB-1248			x
PCB-1254			x
PCB-1260	x		
Phenanthrene	x	x	x
Phenol	x	x	
Pyrene	x		x
Metals			
Antimony	x	x	x
Arsenic	x	x	x
Barium	x	x	x
Berylium	x	x	x
Cadmium	x	x	x
Chromium (total)	x	x	x
Cobalt	x		x
Copper	x	x	x
Lead	x	x	x
Mercury	x	x	x
Molybdenum	x		x
Nickel	x	x	x
Selenium	x	x	x
Silver	x		x
Thallium	x		
Vanadium	x	x	x
Zinc	x	x	x

a/ Data taken from Tables 1, 2 and 3 of ESE's (1997) Risk Assessment.
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter
NE = Not estimated

Table C-2
Parameters Used to Estimate Volatilization Factors
LFR 4643.00

Parameter Symbol	Parameter Definition	Units	Values	Source / Comments
VFss	Volatilization factor for superficial soils	kg/m^3	Estimated	See text for equation
VFp	Volatilization factor for particulates	kg/m^3	8.03E-12	See text for equation
W	Width of source area parallel to wind direction	cm	7,800	Site specific
Uair	Wind speed	cm/sec	335	SCAQMD, 1994
h	Ambient air mixing zone height	cm	200	Default
Deff	Effective Diffusion Coefficient in soil	cm^2/sec	Estimated	
H'	Henry's Law Constant	Unitless	Chemical specific	Scientific Literature
Pi	Pi	Unitless	3.1416	
ks	Soil water partition coefficient	cm^3/g	Estimated	
Koc	Organic carbon partition	cm^3/g	Chemical specific	
foc	Soil organic carbon content	g/g	0.01	Default
ps	Soil bulk density	g/cm^3	1.80	Default, silty soils
Ows	Volumetric water content in vadose zone soil	cm^3/cm^3	0.15	Default, silty soils
Ot	Total soil porosity	cm^3/cm^3	0.35	Default, silty soils
Oas	Volumetric air content in vadose zone soil	unitless	0.08	Estimated
t	Average time for vapor flux	seconds	7.88E+08	Equivalent to 25 years
Pe	Particulate emission rate	g/cm^2.sec	6.90E-14	ASTM, 1995
Dair	Diffusion coefficient in air	cm^2/sec	Chemical specific	Scientific Literature
Dw	Diffusion coefficient in water	cm^2/sec	Chemical specific	Scientific Literature

Table C-3
Chemical Parameters and Estimated Volatilization Factors for Volatile Factors
LFR 4643.00

Chemicals	Henry's Law Constant (unitless)	Diffusion Coefficient in Air (cm^2/sec)	Diffusion Coefficient in Water (cm^2/sec)	Koc (ml/g)	Effective Diffusion Coeficient (cm^2/sec)	Volatilization Factor (kg/m^3)
Volatile Organic Compounds						
1,1,1-Trichloroethane	7.05E-01	7.80E-02	8.80E-06	1.10E+02	1.42E-04	5.70E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	2.14E+01	2.88E-02	8.07E-06	1.60E+02	5.23E-05	1.29E-04
1,1-Dichloroethane	2.30E-01	7.42E-02	1.05E-05	3.16E+01	1.35E-04	5.47E-05
1,1-Dichloroethylene	1.07E+00	9.00E-02	1.04E-05	5.89E+01	1.64E-04	9.79E-05
1,2-Dichloroethane	4.01E-02	1.04E-01	9.90E-06	1.74E+01	1.93E-04	3.43E-05
1,2-Dichloroethylene (total)	2.69E-01	7.91E-02	1.13E-05	5.90E+01	1.44E-04	4.73E-05
2,4,6-Trichlorophenol						
2,4-Dichlorophenol						
2-Butanone	1.12E-03	8.95E-02	9.80E-06	4.50E+00	2.91E-04	1.00E-05
Acetone	1.59E-03	1.24E-01	1.14E-05	5.75E-01	3.31E-04	1.53E-05
Benzene	2.28E-01	8.80E-02	9.80E-06	5.89E+01	1.60E-04	4.60E-05
Bromoform						
Carbon disulfide	1.24E+00	1.04E-01	1.00E-05	4.57E+01	1.89E-04	1.25E-04
Chlorobenzene	1.52E-01	7.30E-02	8.70E-06	2.19E+02	1.33E-04	1.87E-05
Chloroform	1.50E-01	1.04E-01	1.00E-05	3.98E+01	1.90E-04	4.80E-05
Ethylbenzene	3.23E-01	7.50E-02	7.80E-06	3.63E+02	1.37E-04	2.16E-05
Methylene chloride	8.98E-02	1.01E-01	1.17E-05	1.17E+01	1.85E-04	5.67E-05
Styrene	1.13E-01	7.10E-02	8.00E-06	7.76E+02	1.30E-04	8.59E-06
Toluene	2.72E-01	8.70E-02	8.60E-06	1.82E+02	1.58E-04	2.98E-05
Trichlorofluoromethane	3.98E+00	8.70E-02	1.30E-05	1.60E+02	1.58E-04	1.15E-04
Xylene (total)	2.17E-01	7.00E-03	8.40E-06	2.40E+02	1.33E-05	6.76E-06
Semivolatile Organic Compounds						
1,2-Dichlorobenzene	7.91E-02	1.30E-01	7.90E-06	1.15E+03	2.37E-04	8.00E-06
1-Methylnaphthalene						
2,4-Dimethylphenol						
2-Methylnaphthalene						
3,3-Dichlorobenzidine						
4,4'-DDD						
4,4'-DDE						
Acenaphthene	4.92E-02	6.39E-02	7.69E-06	4.60E+03	1.18E-04	2.23E-06
Anthracene	1.39E-03	5.81E-02	7.74E-06	1.26E+04	1.88E-04	2.85E-07
Benz[a]anthracene						
Benzidine						
Benzo[a]pyrene						
Benzo[b]fluoranthene						
Benzo[k]fluoranthene						
Benzoic acid						
BCH (alpha)						
BCH (beta)						
BCH (gamma) Lindane						
Bis(2-ethylhexyl)phthalate						
Butyl benzyl phthalate						

Table C-3
Chemical Parameters and Estimated Volatilization Factors for Volatile Factors
LFR 4643.00

Chemicals	Henry's Law Constant (unitless)	Diffusion Coefficient in Air (cm^2/sec)	Diffusion Coefficient in Water (cm^2/sec)	Koc (ml/g)	Effective Diffusion Coeficient (cm^2/sec)	Volatilization Factor (kg/m^3)
Semivolatile Organic Compounds (cont'd)						
Chrysene	4.31E-05	4.60E-02	6.21E-06	2.00E+05	0.00E+00	0.00E+00
Dibenz[ah]anthracene						
Dibenzofuran	5.33E-04	6.01E-02	1.00E-05	7.76E+03	0.00E+00	0.00E+00
Di-N-butyl phthalate						
Endosulfan						
Fluoranthene	3.16E-03	6.08E-02	7.88E-06	7.90E+03	0.00E+00	0.00E+00
Fluorene						
gamma-Chlordane	5.21E-02	6.86E-02	7.50E-06	1.29E+03	0.00E+00	0.00E+00
Naphthalene						
N-Nitrosodiphenylamine						
Phenol						
Polychlorinated biphenyls (PCBs)	4.10E-04	2.72E-02	7.24E-06	1.23E+05	0.00E+00	0.00E+00
Pyrene						

Table C-4
Chemical Parameters and Estimated Soil Saturation Concentration Limits

LFR 4643.00

Chemicals	Henry's Law Constant (unitless)	Koc (ml/g)	ks (ml/g)	Solubility (mg/L-water)	Soil Saturation Concentration (mg/kg)
Volatile Organic Compounds					
1,1,1-Trichloroethane	7.05E-01	1.10E+02	1.10E+00	1.33E+03	1.62E+03
1,1,2-Trichloro-1,2,2-trifluoroethane	2.14E+01	1.60E+02	1.60E+00	1.10E+03	2.90E+03
1,1-Dichloroethane	2.30E-01	3.16E+01	3.16E-01	5.06E+03	2.07E+03
1,1-Dichloroethylene	1.07E+00	5.89E+01	5.89E-01	2.25E+03	1.62E+03
1,2-Dichloroethane	4.01E-02	1.74E+01	1.74E-01	8.52E+03	2.21E+03
1,2-Dichloroethylene (total)	2.69E-01	5.90E+01	5.90E-01	6.30E+03	4.32E+03
2,4,6-Trichlorophenol	3.19E-04	3.81E+02	3.81E+00	8.00E+02	3.11E+03
2,4-Dichlorophenol	1.30E-04	1.47E+02	1.47E+00	4.50E+03	6.99E+03
2-Butanone	1.12E-03	4.50E+00	4.50E-02	2.68E+05	3.44E+04
Acetone	1.59E-03	5.75E-01	5.75E-03	1.00E+06	8.92E+04
Benzene	2.28E-01	5.89E+01	5.89E-01	1.75E+03	1.19E+03
Bromoform	2.19E-02	8.71E+01	8.71E-01	3.10E+03	2.96E+03
Carbon disulfide	1.24E+00	4.57E+01	4.57E-01	1.19E+03	7.09E+02
Chlorobenzene	1.52E-01	2.19E+02	2.19E+00	4.72E+02	1.08E+03
Chloroform	1.50E-01	3.98E+01	3.98E-01	7.92E+03	3.86E+03
Ethylbenzene	3.23E-01	3.63E+02	3.63E+00	1.69E+02	6.30E+02
Methylene chloride	8.98E-02	1.17E+01	1.17E-01	1.30E+04	2.66E+03
Styrene	1.13E-01	7.76E+02	7.76E+00	3.10E+02	2.43E+03
Toluene	2.72E-01	1.82E+02	1.82E+00	5.26E+02	1.01E+03
Trichlorofluoromethane	3.98E+00	1.60E+02	1.60E+00	1.10E+03	2.05E+03
Xylene (total)	2.17E-01	2.40E+02	2.40E+00	2.00E+02	4.99E+02

Table C-5
Toxicological Parameters
LFR 4643.00

Chemicals	Toxicity Parameters							
	Slope Factor Oral 1/(mg/kg.day)		Reference Dose Oral (mg/kg.day)		Slope Factor Inhalation 1/(mg/kg.day)		Reference Dose Inhalation (mg/kg.day)	
Volatile Organic Compounds								
1,1,1-Trichloroethane	NA		3.50E-02	n	NA		2.86E-01	r
1,1,2-Trichloro-1,2,2-trifluoroethane	NA		3.00E+01	i	NA		8.57E+00	h
1,1-Dichloroethane	5.70E-03	c	1.00E-01	h	5.70E-03	c	1.43E-01	h
1,1-Dichloroethylene	6.00E-01	i	9.00E-03	i	1.75E-01	i	9.00E-03	r
1,2-Dichloroethane	3.60E+00	c	2.86E-03	r	2.50E-01	c	2.86E-03	n
1,2-Dichloroethylene (total)	NA		9.00E-03	h	NA		9.00E-03	r
2,4,6-Trichlorophenol	7.00E-02	c	NA		7.00E-02	c	NA	
2,4-Dichlorophenol	NA		3.00E-03	i	NA		3.00E-03	r
2-Butanone	NA		6.00E-01	i	NA		2.86E-01	i
Acetone	NA		1.00E-01	i	NA		1.00E-01	r
Benzene	1.00E-01	c	1.71E-03	r	1.00E-01	c	1.71E-03	n
Bromoform	7.90E-03	i	2.00E-02	i	3.85E-03	i	2.00E-02	r
Carbon disulfide	NA		1.00E-01	i	NA		2.86E-03	h
Chlorobenzene	NA		2.00E-02	i	NA		5.71E-03	h
Chloroform	3.10E-02	c	1.00E-02	i	1.90E-02	c	1.00E-02	r
Ethylbenzene	NA		1.00E-01	i	NA		2.90E-01	i
Methylene chloride	1.40E-02	c	6.00E-02	i	3.50E-03	c	8.57E-01	h
Styrene	NA		2.00E-01	i	NA		2.90E-01	i
Toluene	NA		2.00E-01	i	NA		1.10E-01	h
Trichlorofluoromethane	NA		3.00E-01	i	NA		2.00E-01	h
Xylene (total)	NA		2.00E+00	i	NA		2.00E-01	r
Semivolatile Organic Compounds								
1,2-Dichlorobenzene	NA		9.00E-02	i	NA		5.71E-02	h
1-Methylnaphthalene	NA		4.00E-02	rn	NA		4.00E-02	rn
2,4-Dimethylphenol	NA		2.00E-02	i	NA		2.00E-02	r
2-Methylnaphthalene	NA		4.00E-02	rn	NA		4.00E-02	rn
3,3-Dichlorobenzidine	1.20E+00	c	NA		1.20E+00	c	NA	
4,4'-DDD	2.40E-01	c	NA		2.40E-01	c	NA	
4,4'-DDE	3.40E-01	c	NA		3.40E-01	c	NA	
Acenaphthene	NA		6.00E-02	i	NA		6.00E-02	r
Anthracene	NA		3.00E-01	i	NA		3.00E-01	r
Benz[a]anthracene	1.20E+00	c	NA		3.90E-01	c	NA	
Benzidine	5.00E+02	c	3.00E-03	i	5.00E+02	c	3.00E-03	r
Benzo[a]pyrene	1.20E+01	c	NA		3.90E+00	c	NA	
Benzo[b]fluoranthene	1.20E+00	c	NA		3.90E-01	c	NA	
Benzo[k]fluoranthene	1.20E+00	c	NA		3.90E-01	c	NA	
Benzoic acid			4.00E+00	i	NA		4.00E+00	i
BCH (alpha)	6.30E+00	i	NA		6.30E+00	i	NA	
BCH (beta)	1.80E+00	i	NA		1.80E+00	i	NA	

Table C-5
Toxicological Parameters
LFR 4643.00

Chemicals	Toxicity Parameters							
	Slope Factor Oral 1/(mg/kg.day)		Reference Dose Oral (mg/kg.day)		Slope Factor Inhalation 1/(mg/kg.day)		Reference Dose Inhalation (mg/kg.day)	
Semivolatile Organic Compounds (cont'd)								
BCH (gamma) Lindane	1.00E+00	c	3.00E-04	i	1.10E+00	c	3.00E-04	r
Bis(2-ethylhexyl)phthalate	1.40E-02	i	2.00E-02	i	1.40E-02	r	2.20E-02	r
Butyl benzyl phthalate	NA		2.00E-01	i	NA		2.00E-01	r
Chrysene	1.20E-01	c	NA		3.90E-02	c	NA	
Dibenz[ah]anthracene	4.10E+00	c	NA		4.10E+00	c	NA	
Dibenzofuran	NA		4.00E-03	n	NA		4.00E-03	r
Di-N-butyl phthalate	NA		1.00E-01	i	NA		1.00E-01	r
Endosulfan	NA		6.00E-03	i	NA		6.00E-03	r
Fluoranthene	NA		4.00E-02	i	NA		4.00E-02	r
Fluorene	NA		4.00E-02	i	NA		4.00E-02	r
gamma-Chlordane	1.20E+00	c	6.00E-05	i	1.20E+00	c	6.00E-05	r
Naphthalene	NA		4.00E-02	n	NA		4.00E-02	r
N-Nitrosodiphenylamine	9.00E-03	c	NA		9.00E-03	c	NA	
Phenol	NA		6.00E-01	i	NA		6.00E-01	r
Polychlorinated biphenyls (PCBs)	7.70E+00	c	NA		7.70E+00	c	NA	
Pyrene	NA		3.00E-02	i	NA		3.00E-02	r
Metals								
Antimony	NA		4.00E-04	i	NA		4.00E-04	r
Arsenic	1.20E+01	r	3.00E-04	i	1.20E+01	c	3.00E-04	r
Barium	NA		7.00E-02	i	NA		1.43E-04	h
Beryllium	7.00E+00	c	5.00E-03	i	7.00E+00	c	5.00E-03	r
Cadmium	1.50E+01	r	5.00E-04	i	1.50E+01	c	5.00E-04	r
Chromium (total)	4.20E+01	r	NA		4.20E+01	i	NA	
Cobalt	NA		6.00E-02	n	NA		2.86E-04	n
Copper	NA		3.71E-02	h	NA		3.71E-02	r
Lead	NA		NA		NA		NA	
Mercury	NA		1.00E-04	i	NA		8.57E-05	i
Molybdenum	NA		5.00E-03	h	NA		5.00E-03	r
Nickel	9.10E-01	r	2.00E-02	i	9.10E-01	c	2.00E-02	r
Selenium	NA		5.00E-03	i	NA		5.00E-03	r
Silver	NA		5.00E-03	i	NA		5.00E-03	r
Thallium	NA		7.00E-05	h	NA		7.00E-05	r
Vanadium	NA		7.00E-03	h	NA		7.00E-03	r
Zinc	NA		3.00E-01	i	NA		3.00E-01	r

Notes:

c = Data obtained from Cal-EPA, 1994
h = Data obtained from USEPA, 1995
i = Data obtained from USEPA, 1997
n = Data obtained from USEPA, 1996
r = Values extrapolated from oral or inhalation values
rn = Values extrapolated from naphthalene values.

Ta. C-6

Intake Parameters Used to Estimate Daily Exposure for On-Site Adult Residents

LFR 4643.00

Parameter Symbol	Parameter Definition	Units	Value	Source/Comments
Inhalation Exposure Parameters				
IhR	Inhalation rate	m^3/hour	0.83	Cal-EPA, 1992
ET	Exposure time	hours/day	16	Default
EF	Exposure frequency	days/year	350	Default
ED	Exposure duration	years	24	Cal-EPA, 1992
BW	Body weight	kg	70	USEPA, 1989
ATc	Averaging time, carcinogens	days	25,550	USEPA, 1989
ATn	Averaging time, noncarcinogens	days	8,760	USEPA, 1989
IhIFc	Inhalation Intake factor, carcinogens	m^3/kg.day	6.24E-02	See footnote for formula
IhIFn	Inhalation Intake factor, noncarcinogens	m^3/kg.day	1.82E-01	See footnote for formula
Oral Intake Parameters				
IR	Dust ingestion rate	mg/day	100	Cal-EPA, 1992
CF	Conversion factor	kg/mg	1.00E-06	
OIFc	Oral Intake factor, carcinogens	kg/kg/day	4.70E-07	See footnote for formula
OIFn	Oral Intake factor, noncarcinogens	kg/kg/day	1.37E-06	See footnote for formula
Dermal Exposure Parameters				
DSA	Dermal surface area exposed	cm^2/day	5,800	Cal-EPA, 1992
AF	Dermal adherence factor	mg/cm^2	0.2	USEPA, 1996
DAF	Dermal absorption factor	unitless	0.1	Chemical specific
CF	Conversion factor	kg/mg	1.00E-06	
DIFc	Dermal Intake factor, carcinogens	kg/kg/day	5.45E-07	See footnote for formula
DIFn	Dermal Intake factor, noncarcinogens	kg/kg/day	1.59E-06	See footnote for formula

Notes:

IhIFc = (IhR * ET * EF * ED) / (BW * ATc)

OIFc = (IR * EF * ED * CF) / (BW * ATc)

DIFc = (DSA * DAF * EF * ED * DAF * CF) / (BW * ATc)

IhIFn = (IhR * ET * EF * ED) / (BW * ATn)

OIFn = (IR * EF * ED * CF) / (BW * ATn)

DIFn = (DSA * DAF * EF * ED * DAF * CF) / (BW * ATn)

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Table C-7

Intake Parameters Used to Estimate Daily Exposure for Future On-Site Child Residents

LFR 4643.00

Parameter Symbol	Parameter Definition	Units	Value	Source/Comments
Inhalation Exposure Parameters				
IhR	Inhalation rate	m^3/hour	0.417	Cal-EPA, 1992
ET	Exposure time	hours/day	19	Default
EF	Exposure frequency	days/year	350	Default
ED	Exposure duration	years	6	Cal-EPA, 1992
BW	Body weight	kg	15	Cal-EPA, 1992
ATc	Averaging time, carcinogens	days	25,550	USEPA, 1989
ATn	Averaging time, noncarcinogens	days	2,190	USEPA, 1989
IhIFc	Inhalation Intake factor, carcinogens	m^3/kg.day	4.34E-02	See footnote for formula
IhIFn	Inhalation Intake factor, noncarcinogens	m^3/kg.day	5.06E-01	See footnote for formula
Oral Intake Parameters				
IR	Dust ingestion rate	mg/day	200	Cal-EPA, 1992
CF	Conversion factor	kg/mg	1.00E-06	
OIFc	Oral Intake factor, carcinogens	kg/kg/day	1.10E-06	See footnote for formula
OIFn	Oral Intake factor, noncarcinogens	kg/kg/day	1.28E-05	See footnote for formula
Dermal Exposure Parameters				
DSA	Dermal surface area exposed	cm^2/day	2,000	Cal-EPA, 1992
AF	Dermal adherence factor	mg/cm^2	0.2	USEPA, 1996
DAF	Dermal absorption factor	unitless	0.1	Chemical specific
CF	Conversion factor	kg/mg	1.00E-06	
DIFc	Dermal Intake factor, carcinogens	kg/kg/day	2.19E-07	See footnote for formula
DIFn	Dermal Intake factor, noncarcinogens	kg/kg/day	2.56E-06	See footnote for formula

Notes:

IhIFc = (IhR * ET * EF * ED) / (BW * ATc)
OIFc = (IR * EF * ED * CF) / (BW * ATc)
DIFc = (DSA * DAF * EF * ED * DAF * CF) / (BW * A

IhIFn = (IhR * ET * EF * ED) / (BW * ATn)
OIFn = (IR * EF * ED * CF) / (BW * ATn)
DIFn = (DSA * DAF * EF * ED * DAF * CF) / (BW * ATn)

Table C-8
Target On-Site Soil Chemical Concentrations for the Protection of Future Adult Residents. Noncarcinogens
LFR 4643.00

Chemical	Oral Reference Dose (mg/kg.day)	Inhalation Reference Dose (mg/kg.day)	Volatilization Factor (Kg/m^3)	Target On-Site Soil Chemical Concentration (mg/kg)
TARGET HAZARD INDEX = 1.0				
Inhalation Intake factor (m^3/kg.day) 1.82E-01				
Oral Intake Factor (kg/kg.day) 1.37E-06				
Dermal Intake Factor (kg/kg.day) 1.59E-06				
Volatile Organic Compounds				
1,1,1-Trichloroethane	3.50E-02	2.86E-01	5.70E-05	8.28E+03
1,1,2-Trichloro-1,2,2-trifluoroethane	3.00E+01	8.57E+00	1.29E-04	3.52E+05
1,1-Dichloroethane	1.00E-01	1.43E-01	5.47E-05	1.01E+04
1,1-Dichloroethylene	9.00E-03	9.00E-03	9.79E-05	4.33E+02
1,2-Dichloroethane	2.86E-03	2.86E-03	3.43E-05	3.11E+02
1,2-Dichloroethylene (total)	9.00E-03	9.00E-03	4.73E-05	7.79E+02
2,4,6-Trichlorophenol	NA	NA	8.03E-12	NA
2,4-Dichlorophenol	3.00E-03	3.00E-03	8.03E-12	1.01E+03
2-Butanone	6.00E-01	2.86E-01	1.00E-05	8.84E+04
Acetone	1.00E-01	1.00E-01	1.53E-05	1.74E+04
Benzene	1.71E-03	1.71E-03	4.60E-05	1.51E+02
Bromoform	2.00E-02	2.00E-02	8.03E-12	6.76E+03
Carbon disulfide	1.00E-01	2.86E-03	1.25E-04	1.26E+02
Chlorobenzene	2.00E-02	5.71E-03	1.87E-05	1.34E+03
Chloroform	1.00E-02	1.00E-02	4.80E-05	8.56E+02
Ethylbenzene	1.00E-01	2.90E-01	2.16E-05	2.32E+04
Methylene chloride	6.00E-02	8.57E-01	5.67E-05	1.63E+04
Styrene	2.00E-01	2.90E-01	8.59E-06	4.95E+04
Toluene	2.00E-01	1.10E-01	2.98E-05	1.56E+04
Trichlorofluoromethane	3.00E-01	2.00E-01	1.15E-04	8.71E+03
Xylene (total)	2.00E+00	2.00E-01	6.76E-06	1.31E+05
Semivolatile Organic Compounds				
1,2-Dichlorobenzene	9.00E-02	5.71E-02	8.00E-06	1.71E+04
1-Methylnaphthalene	4.00E-02	4.00E-02	8.03E-12	1.35E+04
2,4-Dimethylphenol	2.00E-02	2.00E-02	8.03E-12	6.76E+03
2-Methylnaphthalene	4.00E-02	4.00E-02	8.03E-12	1.35E+04
3,3-Dichlorobenzidine	NA	NA	8.03E-12	NA
4,4'-DDD	NA	NA	8.03E-12	NA
4,4'-DDE	NA	NA	8.03E-12	NA
Acenaphthene	6.00E-02	6.00E-02	2.23E-06	1.78E+04
Anthracene	3.00E-01	3.00E-01	2.85E-07	9.96E+04
Benz[a]anthracene	NA	NA	8.03E-12	NA
Benzidine	3.00E-03	3.00E-03	8.03E-12	1.01E+03
Benzo[a]pyrene	NA	NA	8.03E-12	NA
Benzo[b]fluoranthene	NA	NA	8.03E-12	NA

Table C-8
Target On-Site Soil Chemical Concentrations for the Protection of Future Adult Residents. Noncarcinogens
LFR 4643.00

Chemical	Oral Reference Dose (mg/kg.day)	Inhalation Reference Dose (mg/kg.day)	Volatilization Factor (Kg/m^3)	Target On-Site Soil Chemical Concentration (mg/kg)
Semivolatile Organic Compounds (cont'd)				
Benzo[k]fluoranthene	NA	NA	8.03E-12	NA
Benzoic acid	4.00E+00	4.00E+00	8.03E-12	1.35E+06
BCH (alpha)	NA	NA	8.03E-12	NA
BCH (beta)	NA	NA	8.03E-12	NA
BCH (gamma) Lindane	3.00E-04	3.00E-04	8.03E-12	1.01E+02
Bis(2-ethylhexyl)phthalate	2.00E-02	2.20E-02	8.03E-12	6.76E+03
Butyl benzyl phthalate	2.00E-01	2.00E-01	8.03E-12	6.76E+04
Chrysene	NA	NA	4.33E-08	NA
Dibenz[ah]anthracene	NA	NA	8.03E-12	NA
Dibenzofuran	4.00E-03	4.00E-03	3.23E-07	1.33E+03
Di-N-butyl phthalate	1.00E-01	1.00E-01	8.03E-12	3.38E+04
Endosulfan	6.00E-03	6.00E-03	8.03E-12	2.03E+03
Fluoranthene	4.00E-02	4.00E-02	8.03E-12	1.35E+04
Fluorene	4.00E-02	4.00E-02	4.81E-07	1.31E+04
gamma-Chlordane	6.00E-05	6.00E-05	8.03E-12	2.03E+01
Naphthalene	4.00E-02	4.00E-02	4.48E-06	1.06E+04
N-Nitrosodiphenylamine	NA	NA	8.03E-12	NA
Phenol	6.00E-01	6.00E-01	8.03E-12	2.03E+05
Polychlorinated biphenyls (PCBs)	NA	NA	8.03E-12	NA
Pyrene	3.00E-02	3.00E-02	6.38E-08	1.01E+04
Metals				
Antimony	4.00E-04	4.00E-04	8.03E-12	1.35E+02
Arsenic	3.00E-04	3.00E-04	8.03E-12	1.01E+02
Barium	7.00E-02	1.43E-04	8.03E-12	2.37E+04
Beryllium	5.00E-03	5.00E-03	8.03E-12	1.69E+03
Cadmium	5.00E-04	5.00E-04	8.03E-12	1.69E+02
Chromium (total)	NA	NA	8.03E-12	NA
Cobalt	6.00E-02	2.86E-04	8.03E-12	2.03E+04
Copper	3.71E-02	3.71E-02	8.03E-12	1.26E+04
Lead	NA	NA	8.03E-12	NA
Mercury	1.00E-04	8.57E-05	8.03E-12	3.38E+01
Molybdenum	5.00E-03	5.00E-03	8.03E-12	1.69E+03
Nickel	2.00E-02	2.00E-02	8.03E-12	6.76E+03
Selenium	5.00E-03	5.00E-03	8.03E-12	1.69E+03
Silver	5.00E-03	5.00E-03	8.03E-12	1.69E+03
Thallium	7.00E-05	7.00E-05	8.03E-12	2.37E+01
Vanadium	7.00E-03	7.00E-03	8.03E-12	2.37E+03
Zinc	3.00E-01	3.00E-01	8.03E-12	1.01E+05

Table C-1
Comparison of Cap Design Options
Ascon Site, Huntington Beach, California

Cap Option Description	Estimated Cost per Unit Area of Landfill Surface ($/sq. yd.)	Advantages	Disadvantages
A. 1-foot-thick low permeability layer consisting of clay imported from off-site borrow source.	21 to 23	• Meets RCRA cap requirements. • Settlement of surface is relatively easy to repair.	• Requires securing off-site borrow area for importing clay. • Subject to cracking.
B. 1-foot-thick low permeability layer consisting of imported soil blended with 8 percent bentonite.	21 to 23	• Meets RCRA requirements. • Settlement of surface is relatively easy to repair.	• Quality control may be difficult. • If several soil types are used, bentonite-soil blends need to be redesigned. • Subject to cracking.
C. Monolithic 3- to 5-foot layer of compacted soil.	10 to 15	• Equivalent to RCRA requirements. • Additional protective cover over waste. • Settlement of surface is relatively easy to repair.	• Quality control is straightforward. • Substantial soil import required. • Price dependent on local soil sources. • Subject to cracking. • Unproven technology.
D. A 60-mil VFPE membrane topped with a 1-foot-thick drainage layer.	19 to 21	• Exceeds RCRA permeability requirements. • Eliminates importing of clay.	• Potential damage to liner due to settlement. • Maintenance of surface grades after settlement may require local excavation of membrane, membrane repair, and backfilling.
E. A composite of a 60-mil VFPE membrane over a GCL topped with a 1-foot-thick drainage layer.	20 to 22	• Exceeds RCRA permeability requirements. • Eliminates importing of clay. • The GCL provides a secondary barrier layer.	• Potential damage to liner due to settlement. • Maintenance of surface grades after settlement may require local excavation of membrane, membrane repair, and backfilling.

Note: All options include a 2-foot-thick foundation layer, a 1-foot-thick sand layer with gas collection pipes, and a 2-foot protective cover (1½-foot-thick vegetative cover soil overlain by 6-inch-thick top soil).

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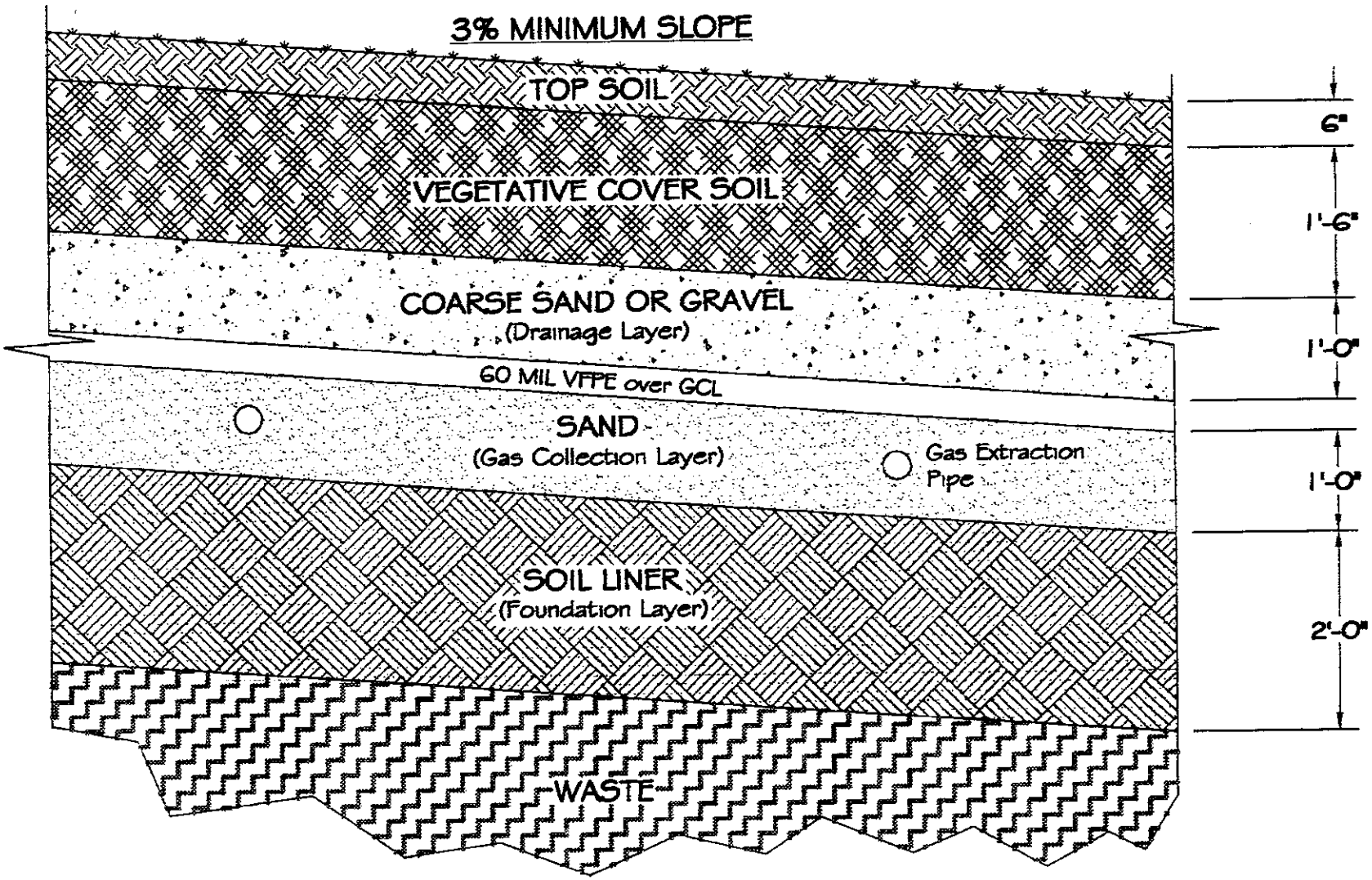

ENVIRON

Conceptual Cap Section

Figure C-1

Table C-9
Target On-Site Soil Chemical Concentrations for the Protection of Future Child Residents. Noncarcinogens
LFR 4643.00

Chemical		Oral Reference Dose (mg/kg.day)	Inhalation Reference Dose (mg/kg.day)	Volatilization Factor (Kg/m^3)	Target On-Site Soil Chemical Concentration (mg/kg)
TARGET HAZARD INDEX =	**1.0**				
Inhalation Intake factor (m^3/kg.day)	5.06E-01				
Oral Intake Factor (kg/kg.day)	1.28E-05				
Dermal Intake Factor (kg/kg.day)	2.56E-06				
Volatile Organic Compounds					
1,1,1-Trichloroethane		3.50E-02	2.86E-01	5.70E-05	1.85E+03
1,1,2-Trichloro-1,2,2-trifluoroethane		3.00E+01	8.57E+00	1.29E-04	1.23E+05
1,1-Dichloroethane		1.00E-01	1.43E-01	5.47E-05	2.88E+03
1,1-Dichloroethylene		9.00E-03	9.00E-03	9.79E-05	1.39E+02
1,2-Dichloroethane		2.86E-03	2.86E-03	3.43E-05	8.75E+01
1,2-Dichloroethylene (total)		9.00E-03	9.00E-03	4.73E-05	2.29E+02
2,4,6-Trichlorophenol		NA	NA	8.03E-12	NA
2,4-Dichlorophenol		3.00E-03	3.00E-03	8.03E-12	1.96E+02
2-Butanone		6.00E-01	2.86E-01	1.00E-05	2.31E+04
Acetone		1.00E-01	1.00E-01	1.53E-05	4.34E+03
Benzene		1.71E-03	1.71E-03	4.60E-05	4.43E+01
Bromoform		2.00E-02	2.00E-02	8.03E-12	1.30E+03
Carbon disulfide		1.00E-01	2.86E-03	1.25E-04	4.50E+01
Chlorobenzene		2.00E-02	5.71E-03	1.87E-05	4.12E+02
Chloroform		1.00E-02	1.00E-02	4.80E-05	2.52E+02
Ethylbenzene		1.00E-01	2.90E-01	2.16E-05	5.23E+03
Methylene chloride		6.00E-02	8.57E-01	5.67E-05	3.46E+03
Styrene		2.00E-01	2.90E-01	8.59E-06	1.09E+04
Toluene		2.00E-01	1.10E-01	2.98E-05	4.68E+03
Trichlorofluoromethane		3.00E-01	2.00E-01	1.15E-04	2.91E+03
Xylene (total)		2.00E+00	2.00E-01	6.76E-06	4.04E+04
Semivolatile Organic Compounds					
1,2-Dichlorobenzene		9.00E-02	5.71E-02	8.00E-06	4.14E+03
1-Methylnaphthalene		4.00E-02	4.00E-02	8.03E-12	2.61E+03
2,4-Dimethylphenol		2.00E-02	2.00E-02	8.03E-12	1.30E+03
2-Methylnaphthalene		4.00E-02	4.00E-02	8.03E-12	2.61E+03
3,3-Dichlorobenzidine		NA	NA	8.03E-12	NA
4,4'-DDD		NA	NA	8.03E-12	NA
4,4'-DDE		NA	NA	8.03E-12	NA
Acenaphthene		6.00E-02	6.00E-02	2.23E-06	3.64E+03
Anthracene		3.00E-01	3.00E-01	2.85E-07	1.94E+04
Benz[a]anthracene		NA	NA	8.03E-12	NA
Benzidine		3.00E-03	3.00E-03	8.03E-12	1.96E+02
Benzo[a]pyrene		NA	NA	8.03E-12	NA
Benzo[b]fluoranthene		NA	NA	8.03E-12	NA
Benzo[k]fluoranthene		NA	NA	8.03E-12	NA
Benzoic acid		4.00E+00	4.00E+00	8.03E-12	2.61E+05

Table C-9
Target On-Site Soil Chemical Concentrations for the Protection of Future Child Residents. Noncarcinogens
LFR 4643.00

Chemical	Oral Reference Dose (mg/kg.day)	Inhalation Reference Dose (mg/kg.day)	Volatilization Factor (Kg/m^3)	Target On-Site Soil Chemical Concentration (mg/kg)
Semivolatile Organic Compounds (cont'd)				
BCH (alpha)	NA	NA	8.03E-12	NA
BCH (beta)	NA	NA	8.03E-12	NA
BCH (gamma) Lindane	3.00E-04	3.00E-04	8.03E-12	1.96E+01
Bis(2-ethylhexyl)phthalate	2.00E-02	2.20E-02	8.03E-12	1.30E+03
Butyl benzyl phthalate	2.00E-01	2.00E-01	8.03E-12	1.30E+04
Chrysene	NA	NA	4.33E-08	NA
Dibenz[ah]anthracene	NA	NA	8.03E-12	NA
Dibenzofuran	4.00E-03	4.00E-03	3.23E-07	2.58E+02
Di-N-butyl phthalate	1.00E-01	1.00E-01	8.03E-12	6.52E+03
Endosulfan	6.00E-03	6.00E-03	8.03E-12	3.91E+02
Fluoranthene	4.00E-02	4.00E-02	8.03E-12	2.61E+03
Fluorene	4.00E-02	4.00E-02	4.81E-07	2.57E+03
gamma-Chlordane	6.00E-05	6.00E-05	8.03E-12	3.91E+00
Naphthalene	4.00E-02	4.00E-02	4.48E-06	2.27E+03
N-Nitrosodiphenylamine	NA	NA	8.03E-12	NA
Phenol	6.00E-01	6.00E-01	8.03E-12	3.91E+04
Polychlorinated biphenyls (PCBs)	NA	NA	8.03E-12	NA
Pyrene	3.00E-02	3.00E-02	6.38E-08	1.95E+03
Metals				
Antimony	4.00E-04	4.00E-04	8.03E-12	2.61E+01
Arsenic	3.00E-04	3.00E-04	8.03E-12	1.96E+01
Barium	7.00E-02	1.43E-04	8.03E-12	4.56E+03
Beryllium	5.00E-03	5.00E-03	8.03E-12	3.26E+02
Cadmium	5.00E-04	5.00E-04	8.03E-12	3.26E+01
Chromium (total)	NA	NA	8.03E-12	NA
Cobalt	6.00E-02	2.86E-04	8.03E-12	3.91E+03
Copper	3.71E-02	3.71E-02	8.03E-12	2.42E+03
Lead	NA	NA	8.03E-12	NA
Mercury	1.00E-04	8.57E-05	8.03E-12	6.52E+00
Molybdenum	5.00E-03	5.00E-03	8.03E-12	3.26E+02
Nickel	2.00E-02	2.00E-02	8.03E-12	1.30E+03
Selenium	5.00E-03	5.00E-03	8.03E-12	3.26E+02
Silver	5.00E-03	5.00E-03	8.03E-12	3.26E+02
Thallium	7.00E-05	7.00E-05	8.03E-12	4.56E+00
Vanadium	7.00E-03	7.00E-03	8.03E-12	4.56E+02
Zinc	3.00E-01	3.00E-01	8.03E-12	1.96E+04

Table C-10
Summary of Risk-Based Soil Cleanup Levels for Noncarcinogens
LFR 4643.00

Chemical	Adult On-Site Residents (mg/kg)	Child On-Site Residents (mg/kg)	Lowest Target Soil Concentration (mg/kg)
Volatile Organic Compounds			
1,1,1-Trichloroethane	8.28E+03	1.85E+03	1.85E+03
1,1,2-Trichloro-1,2,2-trifluoroethane	3.52E+05	1.23E+05	1.23E+05
1,1-Dichloroethane	1.01E+04	2.88E+03	2.88E+03
1,1-Dichloroethylene	4.33E+02	1.39E+02	1.39E+02
1,2-Dichloroethane	3.11E+02	8.75E+01	8.75E+01
1,2-Dichloroethylene (total)	7.79E+02	2.29E+02	2.29E+02
2,4,6-Trichlorophenol	NA	NA	NA
2,4-Dichlorophenol	1.01E+03	1.96E+02	1.96E+02
2-Butanone	8.84E+04	2.31E+04	2.31E+04
Acetone	1.74E+04	4.34E+03	4.34E+03
Benzene	1.51E+02	4.43E+01	4.43E+01
Bromoform	6.76E+03	1.30E+03	1.30E+03
Carbon disulfide	1.26E+02	4.50E+01	4.50E+01
Chlorobenzene	1.34E+03	4.12E+02	4.12E+02
Chloroform	8.56E+02	2.52E+02	2.52E+02
Ethylbenzene	2.32E+04	5.23E+03	5.23E+03
Methylene chloride	1.63E+04	3.46E+03	3.46E+03
Styrene	4.95E+04	1.09E+04	1.09E+04
Toluene	1.56E+04	4.68E+03	4.68E+03
Trichlorofluoromethane	8.71E+03	2.91E+03	2.91E+03
Xylene (total)	1.31E+05	4.04E+04	4.04E+04
Semivolatile Organic Compounds			
1,2-Dichlorobenzene	1.71E+04	4.14E+03	4.14E+03
1-Methylnaphthalene	1.35E+04	2.61E+03	2.61E+03
2,4-Dimethylphenol	6.76E+03	1.30E+03	1.30E+03
2-Methylnaphthalene	1.35E+04	2.61E+03	2.61E+03
3,3-Dichlorobenzidine	NA	NA	NA
4,4'-DDD	NA	NA	NA
4,4'-DDE	NA	NA	NA
Acenaphthene	1.78E+04	3.64E+03	3.64E+03
Anthracene	9.96E+04	1.94E+04	1.94E+04
Benz[a]anthracene	NA	NA	NA
Benzidine	1.01E+03	1.96E+02	1.96E+02
Benzo[a]pyrene	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA
Benzo[k]fluoranthene	NA	NA	NA
Benzoic acid	1.35E+06	2.61E+05	2.61E+05
BCH (alpha)	NA	NA	NA
BCH (beta)	NA	NA	NA
BCH (gamma) Lindane	1.01E+02	1.96E+01	1.96E+01

Table C-10
Summary of Risk-Based Soil Cleanup Levels for Noncarcinogens
LFR 4643.00

Chemical	Adult On-Site Residents (mg/kg)	Child On-Site Residents (mg/kg)	Lowest Target Soil Concentration (mg/kg)
Semivolatile Organic Compounds (cont'd)			
Bis(2-ethylhexyl)phthalate	6.76E+03	1.30E+03	1.30E+03
Butyl benzyl phthalate	6.76E+04	1.30E+04	1.30E+04
Chrysene	NA	NA	NA
Dibenz[ah]anthracene	NA	NA	NA
Dibenzofuran	1.33E+03	2.58E+02	2.58E+02
Di-N-butyl phthalate	3.38E+04	6.52E+03	6.52E+03
Endosulfan	2.03E+03	3.91E+02	3.91E+02
Fluoranthene	1.35E+04	2.61E+03	2.61E+03
Fluorene	1.31E+04	2.57E+03	2.57E+03
gamma-Chlordane	2.03E+01	3.91E+00	3.91E+00
Naphthalene	1.06E+04	2.27E+03	2.27E+03
N-Nitrosodiphenylamine	NA	NA	NA
Phenol	2.03E+05	3.91E+04	3.91E+04
Polychlorinated biphenyls (PCBs)	NA	NA	NA
Pyrene	1.01E+04	1.95E+03	1.95E+03
Metals			
Antimony	1.35E+02	2.61E+01	2.61E+01
Arsenic	1.01E+02	1.96E+01	1.96E+01
Barium	2.37E+04	4.56E+03	4.56E+03
Beryllium	1.69E+03	3.26E+02	3.26E+02
Cadmium	1.69E+02	3.26E+01	3.26E+01
Chromium (total)	NA	NA	NA
Cobalt	2.03E+04	3.91E+03	3.91E+03
Copper	1.26E+04	2.42E+03	2.42E+03
Lead*	2.88E+02	2.88E+02	2.88E+02
Mercury	3.38E+01	6.52E+00	6.52E+00
Molybdenum	1.69E+03	3.26E+02	3.26E+02
Nickel	6.76E+03	1.30E+03	1.30E+03
Selenium	1.69E+03	3.26E+02	3.26E+02
Silver	1.69E+03	3.26E+02	3.26E+02
Thallium	2.37E+01	4.56E+00	4.56E+00
Vanadium	2.37E+03	4.56E+02	4.56E+02
Zinc	1.01E+05	1.96E+04	1.96E+04

* See Attached Lead Risk Assessment Spreadsheet for development of lead cleanup levels.

Table C-11
Target On-Site Soil Chemical Concentrations fro the Protection of Future On-Site Adult Residents. Carcinogens
LFR 4643.00

Chemicals		Slope Factor Oral 1/(mg/kg.day)	Slope Factor Inhalation 1/(mg/kg.day)	Volatilization Factor (kg/m^3)	Target On-Site Soil Chemical Concentration (mg/kg)
TARGET CANCER RISK	**1.00E-06**				
Inhalation Intake factor (m^3/kg.day)	6.24E-02				
Oral Intake Factor (kg/kg.day)	4.70E-07				
Dermal Intake Factor (kg/kg.day)	5.45E-07				
Volatile Organic Compounds					
1,1-Dichloroethane		5.70E-03	5.70E-03	5.47E-05	3.96E+01
1,1-Dichloroethylene		6.00E-01	1.75E-01	9.79E-05	5.96E-01
1,2-Dichloroethane		3.60E+00	2.50E-01	3.43E-05	2.39E-01
2,4,6-Trichlorophenol		7.00E-02	7.00E-02	8.03E-12	1.41E+01
Benzene		1.00E-01	1.00E-01	4.60E-05	2.58E+00
Bromoform		7.90E-03	3.85E-03	8.03E-12	1.25E+02
Chloroform		3.10E-02	1.90E-02	4.80E-05	1.13E+01
Methylene chloride		1.40E-02	3.50E-03	5.67E-05	3.76E+01
Semivolatile Organic Compounds					
3,3-Dichlorobenzidine		1.20E+00	1.20E+00	8.03E-12	8.21E-01
4,4'-DDD		2.40E-01	2.40E-01	8.03E-12	4.11E+00
4,4'-DDE		3.40E-01	3.40E-01	8.03E-12	2.90E+00
Benz[a]anthracene		1.20E+00	3.90E-01	8.03E-12	8.21E-01
Benzidine		5.00E+02	5.00E+02	8.03E-12	1.97E-03
Benzo[a]pyrene		1.20E+01	3.90E+00	8.03E-12	8.21E-02
Benzo[b]fluoranthene		1.20E+00	3.90E-01	8.03E-12	8.21E-01
Benzo[k]fluoranthene		1.20E+00	3.90E-01	8.03E-12	8.21E-01
BCH (alpha)		6.30E+00	6.30E+00	8.03E-12	1.56E-01
BCH (beta)		1.80E+00	1.80E+00	8.03E-12	5.48E-01
BCH (gamma) Lindane		1.10E+00	1.10E+00	8.03E-12	8.96E-01
Bis(2-ethylhexyl)phthalate		1.40E-02	1.40E-02	8.03E-12	7.04E+01
Chrysene		1.20E-01	3.90E-02	4.33E-08	8.21E+00
Dibenz[ah]anthracene		4.10E+00	4.10E+00	8.03E-12	2.40E-01
gamma-Chlordane		1.20E+00	1.20E+00	8.03E-12	8.21E-01
N-Nitrosodiphenylamine		9.00E-03	9.00E-03	8.03E-12	1.10E+02
Polychlorinated biphenyls (PCBs)		7.70E+00	7.70E+00	8.03E-12	1.28E-01
Metals					
Arsenic		1.20E+01	1.20E+01	8.03E-12	8.21E-02
Beryllium		7.00E+00	7.00E+00	8.03E-12	1.41E-01
Cadmium		1.50E+01	1.50E+01	8.03E-12	6.57E-02
Chromium (total)		4.20E+01	4.20E+01	8.03E-12	2.35E-02
Nickel		9.10E-01	9.10E-01	8.03E-12	1.08E+00

Table C-12
Target On-Site Soil Chemical Concentrations for the Protection of Future On-Site Child Residents. Carcinogens

LFR 4643.00

Chemicals		Slope Factor Oral 1/(mg/kg.day)	Slope Factor Inhalation 1/(mg/kg.day)	Volatilization Factor (kg/m^3)	Target On-Site Soil Chemical Concentration (mg/kg)
TARGET CANCER RISK	**1.0E-06**				
Inhalation Intake factor (m^3/kg.day)	4.34E-02				
Oral Intake Factor (kg/kg.day)	1.10E-06				
Dermal Intake Factor (kg/kg.day)	2.19E-07				
Volatile Organic Compounds					
1,1-Dichloroethane		5.70E-03	5.70E-03	5.47E-05	4.75E+01
1,1-Dichloroethylene		6.00E-01	1.75E-01	9.79E-05	6.52E-01
1,2-Dichloroethane		3.60E+00	2.50E-01	3.43E-05	1.96E-01
2,4,6-Trichlorophenol		7.00E-02	7.00E-02	8.03E-12	1.09E+01
Benzene		1.00E-01	1.00E-01	4.60E-05	3.02E+00
Bromoform		7.90E-03	3.85E-03	8.03E-12	9.63E+01
Chloroform		3.10E-02	1.90E-02	4.80E-05	1.24E+01
Methylene chloride		1.40E-02	3.50E-03	5.67E-05	3.70E+01
Semi-volatile Organic Compounds					
3,3-Dichlorobenzidine		1.20E+00	1.20E+00	8.03E-12	6.34E-01
4,4'-DDD		2.40E-01	2.40E-01	8.03E-12	3.17E+00
4,4'-DDE		3.40E-01	3.40E-01	8.03E-12	2.24E+00
Benz[a]anthracene		1.20E+00	3.90E-01	8.03E-12	6.34E-01
Benzidine		5.00E+02	5.00E+02	8.03E-12	1.52E-03
Benzo[a]pyrene		1.20E+01	3.90E+00	8.03E-12	6.34E-02
Benzo[b]fluoranthene		1.20E+00	3.90E-01	8.03E-12	6.34E-01
Benzo[k]fluoranthene		1.20E+00	3.90E-01	8.03E-12	6.34E-01
BCH (alpha)		6.30E+00	6.30E+00	8.03E-12	1.21E-01
BCH (beta)		1.80E+00	1.80E+00	8.03E-12	4.22E-01
BCH (gamma) Lindane		1.10E+00	1.10E+00	8.03E-12	6.91E-01
Bis(2-ethylhexyl)phthalate		1.40E-02	1.40E-02	8.03E-12	5.43E+01
Chrysene		1.20E-01	3.90E-02	4.33E-08	6.33E+00
Dibenz[ah]anthracene		4.10E+00	4.10E+00	8.03E-12	1.85E-01
gamma-Chlordane		1.20E+00	1.20E+00	8.03E-12	6.34E-01
N-Nitrosodiphenylamine		9.00E-03	9.00E-03	8.03E-12	8.45E+01
Polychlorinated biphenyls (PCBs)		7.70E+00	7.70E+00	8.03E-12	9.88E-02
Metals					
Arsenic		1.20E+01	1.20E+01	8.03E-12	6.34E-02
Beryllium		7.00E+00	7.00E+00	8.03E-12	1.09E-01
Cadmium		1.50E+01	1.50E+01	8.03E-12	5.07E-02
Chromium (total)		4.20E+01	4.20E+01	8.03E-12	1.81E-02
Nickel		9.10E-01	9.10E-01	8.03E-12	8.36E-01

Table C-13
Summary of Risk-Based Soil Cleanup Levels for Carcinogens

LFR 4643.00

Chemical	Adult On-Site Residents (mg/kg)	Child On-Site Residents (mg/kg)	Lowest Target Soil Concentration (mg/kg)
Volatile Organic Compounds			
1,1-Dichloroethane	3.96E+01	4.75E+01	3.96E+01
1,1-Dichloroethylene	5.96E-01	6.52E-01	5.96E-01
1,2-Dichloroethane	2.39E-01	1.96E-01	1.96E-01
2,4,6-Trichlorophenol	1.41E+01	1.09E+01	1.09E+01
Benzene	2.58E+00	3.02E+00	2.58E+00
Bromoform	1.25E+02	9.63E+01	9.63E+01
Chloroform	1.13E+01	1.24E+01	1.13E+01
Methylene chloride	3.76E+01	3.70E+01	3.70E+01
Semivolatile Organic Compounds			
3,3-Dichlorobenzidine	8.21E-01	6.34E-01	6.34E-01
4,4'-DDD	4.11E+00	3.17E+00	3.17E+00
4,4'-DDE	2.90E+00	2.24E+00	2.24E+00
Benz[a]anthracene	8.21E-01	6.34E-01	6.34E-01
Benzidine	1.97E-03	1.52E-03	1.52E-03
Benzo[a]pyrene	8.21E-02	6.34E-02	6.34E-02
Benzo[b]fluoranthene	8.21E-01	6.34E-01	6.34E-01
Benzo[k]fluoranthene	8.21E-01	6.34E-01	6.34E-01
BCH (alpha)	1.56E-01	1.21E-01	1.21E-01
BCH (beta)	5.48E-01	4.22E-01	4.22E-01
BCH (gamma) Lindane	8.96E-01	6.91E-01	6.91E-01
Bis(2-ethylhexyl)phthalate	7.04E+01	5.43E+01	5.43E+01
Chrysene	8.21E+00	6.33E+00	6.33E+00
Dibenz[ah]anthracene	2.40E-01	1.85E-01	1.85E-01
gamma-Chlordane	8.21E-01	6.34E-01	6.34E-01
N-Nitrosodiphenylamine	1.10E+02	8.45E+01	8.45E+01
Polychlorinated biphenyls (PCBs)	1.28E-01	9.88E-02	9.88E-02
Metals			
Arsenic	8.21E-02	6.34E-02	6.34E-02
Beryllium	1.41E-01	1.09E-01	1.09E-01
Cadmium	6.57E-02	5.07E-02	5.07E-02
Chromium (total)	2.35E-02	1.81E-02	1.81E-02
Nickel	1.08E+00	8.36E-01	8.36E-01

Notes: mg/m^3
mg/kg/day = milligram per kilogram per day
NA = Not applicable or not available

Table C-14
Risk-Based Soil Cleanup Levels for the Ascon Site
LFR 4643.00

Chemical	Cleanup Levels for Noncarcinogens (mg/kg)	Cleanup Levels for Carcinogens (mg/kg)	Risk-Based Cleanup Levels (mg/kg)
Volatile Organic Compounds			
1,1,1-Trichloroethane	1.85E+03		**1.62E+03 (sat)**
1,1,2-Trichloro-1,2,2-trifluoroethane	1.23E+05		**2.90E+03 (sat)**
1,1-Dichloroethane	2.88E+03	3.96E+01	**3.96E+01**
1,1-Dichloroethylene	1.39E+02	5.96E-01	**5.96E-01**
1,2-Dichloroethane	8.75E+01	1.96E-01	**1.96E-01**
1,2-Dichloroethylene (total)	2.29E+02		**2.29E+02**
2,4,6-Trichlorophenol	NA	1.09E+01	**1.09E+01**
2,4-Dichlorophenol	1.96E+02		**1.96E+02**
2-Butanone	2.31E+04		**2.31E+04**
Acetone	4.34E+03		**4.34E+03**
Benzene	4.43E+01	2.58E+00	**2.58E+00**
Bromoform	1.30E+03	9.63E+01	**9.63E+01**
Carbon disulfide	4.50E+01		**4.50E+01**
Chlorobenzene	4.12E+02		**4.12E+02**
Chloroform	2.52E+02	1.13E+01	**1.13E+01**
Ethylbenzene	5.23E+03		**6.30E+02 (sat)**
Methylene chloride	3.46E+03	3.70E+01	**3.70E+01**
Styrene	1.09E+04		**2.43E+03 (sat)**
Toluene	4.68E+03		**1.01E+03 (sat)**
Trichlorofluoromethane	2.91E+03		**2.05E+03 (sat)**
Xylene (total)	4.04E+04		**4.99E+02 (sat)**
Semivolatile Organic Compounds			
1,2-Dichlorobenzene	4.14E+03		**4.14E+03**
1-Methylnaphthalene	2.61E+03		**2.61E+03**
2,4-Dimethylphenol	1.30E+03		**1.30E+03**
2-Methylnaphthalene	2.61E+03		**2.61E+03**
3,3-Dichlorobenzidine	NA	6.34E-01	**6.34E-01**
4,4'-DDD	NA	3.17E+00	**3.17E+00**
4,4'-DDE	NA	2.24E+00	**2.24E+00**
Acenaphthene	3.64E+03		**3.64E+03**
Anthracene	1.94E+04		**1.94E+04**
Benz[a]anthracene	NA	6.34E-01	**6.34E-01**
Benzidine	1.96E+02	1.52E-03	**1.52E-03**
Benzo[a]pyrene	NA	6.34E-02	**6.34E-02**
Benzo[b]fluoranthene	NA	6.34E-01	**6.34E-01**
Benzo[k]fluoranthene	NA	6.34E-01	**6.34E-01**
Benzoic acid	2.61E+05		**2.61E+05**
BCH (alpha)	NA	1.21E-01	**1.21E-01**
BCH (beta)	NA	4.22E-01	**4.22E-01**

Table C-14
Risk-Based Soil Cleanup Levels for the Ascon Site
LFR 4643.00

Chemical	Cleanup Levels for Noncarcinogens (mg/kg)	Cleanup Levels for Carcinogens (mg/kg)	Risk-Based Cleanup Levels (mg/kg)
Semivolatile Organic Compounds (cont'd)			
BCH (gamma) Lindane	1.96E+01	6.91E-01	**6.91E-01**
Bis(2-ethylhexyl)phthalate	1.30E+03	5.43E+01	**5.43E+01**
Butyl benzyl phthalate	1.30E+04		**1.30E+04**
Chrysene	NA	6.33E+00	**6.33E+00**
Dibenz[ah]anthracene	NA	1.85E-01	**1.85E-01**
Dibenzofuran	2.58E+02		**2.58E+02**
Di-N-butyl phthalate	6.52E+03		**6.52E+03**
Endosulfan	3.91E+02		**3.91E+02**
Fluoranthene	2.61E+03		**2.61E+03**
Fluorene	2.57E+03		**2.57E+03**
gamma-Chlordane	3.91E+00	6.34E-01	**6.34E-01**
Naphthalene	2.27E+03		**2.27E+03**
N-Nitrosodiphenylamine	NA	8.45E+01	**8.45E+01**
Phenol	3.91E+04		**3.91E+04**
Polychlorinated biphenyls (PCBs)	NA	9.88E-02	**9.88E-02**
Pyrene	1.95E+03		**1.95E+03**
Metals			
Antimony	2.61E+01		**2.61E+01**
Arsenic	1.96E+01	6.34E-02	**6.34E-02**
Barium	4.56E+03		**4.56E+03**
Beryllium	3.26E+02	1.09E-01	**1.09E-01**
Cadmium	3.26E+01	5.07E-02	**5.07E-02**
Chromium (total)	NA	1.81E-02	**1.81E-02**
Cobalt	3.91E+03		**3.91E+03**
Copper	2.42E+03		**2.42E+03**
Lead	2.88E+02		**2.88E+02**
Mercury	6.52E+00		**6.52E+00**
Molybdenum	3.26E+02		**3.26E+02**
Nickel	1.30E+03	8.36E-01	**8.36E-01**
Selenium	3.26E+02		**3.26E+02**
Silver	3.26E+02		**3.26E+02**
Thallium	4.56E+00		**4.56E+00**
Vanadium	4.56E+02		**4.56E+02**
Zinc	1.96E+04		**1.96E+04**

Notes: If the RBCL was greater than the calculated soil saturation concentration (Table X-4), the target cleanup level was set to the soil saturation concentration (sat).

Table C-15

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT							
MEDIUM	LEVEL		percentiles					PRG-99	PRG-95
LEAD IN AIR (ug/m^3)	0.1		50th	90th	95th	98th	99th	(ug/g)	(ug/g)
LEAD IN SOIL (ug/g)	288.0	BLOOD Pb, ADULT (ug/dl)	2.1	3.3	3.7	4.3	4.7	3531.6	5217.2
LEAD IN WATER (ug/l)	15	BLOOD Pb, CHILD (ug/dl)	4.4	6.9	7.9	9.1	10.0	288.0	581.8
PLANT UPTAKE? 1=YES 0=N	0	BLOOD Pb, PICA CHILD (ug/dl)	19.3	30.3	34.3	39.7	43.7	21.2	42.9
RESPIRABLE DUST (ug/m^3)	50	BLOOD Pb, INDUSTRIAL (ug/dl)	2.0	3.1	3.6	4.1	4.5	4361.5	6405.5

EXPOSURE PARAMETERS

	units	residential			industrial
		adults	children	children with pica	adults
General					
Days per week	days/wk	7	7	7	5
Dermal Contact					
Skin area	cm^2	3700	2800	2800	5800
Soil adherence	mg/cm^2	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	25
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m^3/day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.06	3%	0.06	3%	288 ug/g
SOIL INGESTION:	0.13	6%	0.09	5%	288 ug/g
INHALATION:	0.19	9%	0.13	7%	0.11 ug/m^3
WATER INGESTION:	0.84	40%	0.84	42%	15 ug/l
FOOD INGESTION:	0.88	42%	0.88	44%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.04	1%	0.04	0%	288 ug/g
SOIL INGESTION:	1.12	25%	16.02	83%	288 ug/g
INHALATION:	0.22	5%	0.22	1%	0.11 ug/m^3
WATER INGESTION:	0.96	22%	0.96	5%	15 ug/l
FOOD INGESTION:	2.08	47%	2.08	11%	10.0 ug Pb/kg diet

APPENDIX C

Conceptual Design for the Containment Alternative

APPENDIX C
CONCEPTUAL DESIGN FOR THE CONTAINMENT ALTERNATIVE
ASCON SITE, HUNTINGTON BEACH, CALIFORNIA

C.1 Introduction

The containment alternative is designed to minimize the mobility and transport of contaminants through air, water, and ingestion pathways. This alternative, with drainage and gas emissions controls, can isolate the waste at the Ascon site, diminishing the potential for direct human contact with the COCs. Surface water infiltration can be mitigated, thereby reducing the potential for mobilization of constituents in the contaminated soils above ground water. Stabilization of low strength drilling muds with cement will be required to increase their strength and consolidation characteristics.

The area identified for containment of the Ascon site would encompass the entire site less the area located within the right-of-ways of the lanes proposed to be added to Hamilton Avenue and Magnolia Street. The containment alternative is technically feasible but implementation requires the application of several technologies. Treatment of the liquid hydrocarbon waste in Lagoons 1 and 2 will be required to separate the waste into oil, water and solids which can be recycled or fed into other site processes. Excavation and off-site disposal of the tarry styrene waste from Pit F will be required. Low strength materials should be excavated from the upper portions of all lagoons and stabilized to create a "bridge" over the remaining lagoon materials. This "bridge" is necessary to provide a solid foundation upon which to construct the cap. Other site preparation activities will also be required.

The cap can be relatively easily constructed. Special precautions such as deed restrictions will have to be applied to future site uses to preclude impairing the integrity of the cap. A slurry wall may be required around the perimeter of the site to ensure long-term subsurface containment of the buried waste within of the limits of the landfill. The slurry wall will also reduce ground water migration off-site. The above-ground wastes will require a newly constructed containment berm for long-term perimeter containment. A gas collection system will be required beneath the cap.

For this alternative, permits from SCAQMD for excavation and other construction activities, and from the Water Board for issues related to storm water are required. A waste discharge requirement permit from the Water Board for on-site placement of treated soils may also be required. The cap components should undergo routine inspection and maintenance to maintain the effectiveness of the

containment features. Emissions mitigation measures are required during excavation and stabilization activities.

Various sections of California Code of Regulations (CCR) and the Code of Federal Regulations (CFR), e.g., Title 22 (22 CCR), Division 4.5, Chapters 14 and 15; and Title 40 of the CFR (40 CFR) - Subtitle D of RCRA, may regulate the activities related to closure and post-closure maintenance of the Ascon site in relation to the containment alternative. A proposed containment cap for the Ascon site is a RCRA Subtitle D or equivalent cap as defined in RCRA technical guidance document "Final Covers on Hazardous Waste Landfills and Surface Impoundments."

The minimum design requirements are summarized below:

- Foundation Layer: A 2-foot-thick layer typically consisting of soil, contaminated soil, incinerator ash or other waste materials, provided that such materials have appropriate engineering properties, should be placed on top of the waste. The foundation layer shall be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practices. At the Ascon site the foundation layer could consist of compacted surface soil for most of the site, and stabilized lagoon sludge for the lagoons.

- Low Permeability Layer: A minimum 1-foot thick soil cap containing no waste or leachate should be placed on top of the foundation layer and compacted to attain a hydraulic conductivity of $1x10^{-6}$ cm/sec or less, or equal to the hydraulic conductivity of any bottom liner or system or underlying natural geologic materials, whichever is less. If a "monolithic" cap is used, the permeability requirement may be reduced to $1x10^{-5}$ cm/sec but the minimum thickness may be increased to 3 to 5 feet.

- Vegetative Layer: A topsoil layer containing no waste or leachate should be placed on top of the soil cap with sufficient thickness to contain the rooting depth of vegetation on the cover, but not less than 1 foot in thickness.

- Cover Slope: In order to prevent ponding, the closed landfill should be graded and maintained to divert precipitation runoff away from the landfill, by providing a minimum slope of 3 percent or an effective system to direct surface drainage away from covered wastes. The grading and cover maintenance program should enable the closed landfill to resist erosion from the design 100-year, 24-hour storm.

C.2 Conceptual Containment Elements for the Ascon Site

Conceptually, the implementation of the containment alternative at the Ascon site would include the following main elements:

- Excavation of the liquid hydrocarbon waste in Lagoons 1 and 2 and remediation by on-site solvent extraction. The recovered oil can be transported to a refinery, recycler, or fuel blender. The recovered water can be treated to allow discharge or can be used as construction water. The recovered solids can be placed on-site and capped with the other wastes.

- Excavation of the tarry styrene waste from Pit F, and off-site disposal of the waste in a landfill (see the conceptual design described in Section 11.3.2).

- Excavation of the low strength materials from the upper portions of all lagoons and on-site cement stabilization of those materials for use as structural backfill. This backfill will be used to bridge over the weaker lagoon wastes left in place.

- Excavation of the existing perimeter berm and all wastes within the areas to be occupied by future street widening and by a new containment berm.

- Construction of a circumferential slurry trench cutoff wall to contain subsurface wastes and restrict ground water migration

- Construction of a new perimeter containment berm. The berm must be sufficiently high to contain all site wastes and connect to the cap.

- Grading the entire site and covering it with an engineered cap, including underdrains and a gas collection system.

Prior to backfilling the excavated lagoons with cement-stabilized materials, a 2-foot-thick layer of crushed concrete should be placed at the bottom of the excavations to initially bridge the soft underlying conditions and provide a stable foundation for placing the remaining backfill materials. This crushed concrete layer should be covered with 20-mil geotextile sheeting to prevent migration of fine particles from the overlying soil. Soil and/or cement-stabilized drilling muds should then be placed into the excavations and compacted. The entire site surface should be graded to the appropriate configuration for acceptance of the cap material.

The conceptual design for the containment alternative provides for the construction of a landfill gas control system. This system can consist of perforated polyvinyl chlorinated (PVC) pipes within a 1-foot-thick sand layer. The emitted gases will need to be monitored and, if required, collected and treated.

The containment alternative should also include gravel trenches constructed beneath the cap to collect any consolidation and drainage fluids (CDF) containing petroleum hydrocarbons that might be expressed from the underlying soils as they settle under the load of imported fill. If generated, fluids containing petroleum hydrocarbons will be removed from the CDF trenches and disposed off-site.

Ongoing monitoring of ground water, surface water, and the vadose zone will be performed to assess the migration of COCs. Remediation activities should be performed in accordance with applicable workplace health and safety requirements and an approved site Health and Safety Plan. Applicable environmental permits, such as air emission permits, storm water discharge permits, and waste discharge permits should be identified and obtained prior to the initiation of the cap construction activities.

C.3 Capping Alternatives Considered

The cap system can consist of compacted clay and/or geosynthetic liners. The American Society for Testing and Materials (ASTM) has defined "geosynthetic" in D4439 Terminology as follows:

> **Geosynthetic** - a planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

The following are commonly accepted definitions regarding geosynthetics (Koerner, 1994):

> **Geocomposite** - A manufactured material using geotextiles, geogrids, geonets, and/or geomembranes in laminated or composite form.
>
> **Geomembrane** - An essentially impermeable membrane used as a liquid or vapor barrier with foundation, soil, rock, earth, or any other geotechnical engineering-related material as an integral part of a human-made project, structure, or system.
>
> **Geosynthetic Clay Liner (GCL)** - A factory-manufactured hydraulic barrier consisting of a layer of bentonite clay or other very low permeability material supported by geotextiles

and/or geomembranes, and mechanically held together by needling, stitching, or chemical adhesives.

Geosynthetics - The generic term for all synthetic materials used in geotechnical engineering applications; it includes geotextiles, geogrids, geonets, geomembranes, and geocomposites.

Geotextile - Any permeable textile used with foundation, soil, rock, earth, or any other geotechnical engineering-related material as an integral part of a human-made project, structure, or system.

Liner - A layer of emplaced materials beneath a surface impoundment or landfill, which serves to restrict the escape of waste or its constituents from the impoundment or landfill.

Membrane - A continuous sheet of material, whether prefabricated as a flexible polymeric sheeting or sprayed or coated in the field, such as a sprayed-on asphalt.

Major considerations in the selection of a geomembrane for the cap system at the Ascon site are:

- The geotechnical conditions of the soil (i.e., strength and consolidation characteristics) are very heterogeneous and will present the potential for significant long-term differential subsidence.

- There will be about 12 monitoring wells that will penetrate the membrane and will require ongoing access.

ENVIRON evaluated the performance of the following commonly available geomembrane materials considered appropriate for capping waste disposal sites for preventing infiltration of surface water:

- High-density polyethylene (HDPE). This material has excellent chemical resistance and high strength, as well as good tear performance. It has a track record of about 17 years of installed systems. However, it has a relatively poor puncture/impact resistance and conformableness and/or tolerance to subsidence.

- Very flexible polyethylene (VFPE). This material is well suited for capping areas with high subsidence. It has very good puncture/impact resistance. However, its tear performance is not as good when compared to HDPE.

Both the HDPE and VFPE have good seaming ease and reliability. Unit cost is generally a little lower for VFPE than HDPE. Because of the expected high subsidence at the Ascon site, the VFPE was judged to be a better choice for the conceptual cap design. A 60-mil thickness of the VFPE was considered appropriate for preliminary design purposes.

Because one of the primary functions of the final cover system is to minimize percolation of precipitation through the cap system and into the underlying waste, ENVIRON evaluated two main categories of cover design, (1) a design identical to that prescribed in RCRA guidance; and (2) alternate designs that would be equivalent. Both of these design categories include a 2-foot-thick foundation layer and a 1-foot-thick sand layer with perforated pipes for landfill gas control, but differ in the design of the low permeability layer. The five options considered as part of these two design categories included the following:

Option A. Design prescribed in RCRA guidance with a 1-foot-thick low permeability layer consisting of clay imported from an off-site source and a 1½-foot-thick vegetative layer. The minimum thickness for the protective cover was selected as 1½ feet of a vegetative cover soil overlain with 6 inches of top soil to accommodate rooting depth of drought-tolerant perennial shrubs and grasses common to the region, and to minimize long-term maintenance costs for repairs of the low permeability layer due to shallow erosional rills.

Option B. A 1-foot-thick low permeability layer consisting of a blend of less expensive, higher permeability material blended with an appropriate percentage of bentonite, such that the final mixture will have a permeability of 1.0E-6 cm/sec or less. A 2-foot-thick protective cover will top this layer.

Option C. A 3 to 5 foot "monolithic cap" consisting of moderately low permeability soil with a permeability of 1.0E-5 cm/sec when compacted to 90% relative compaction.

Option D. Replace the low permeability clay layer in Option A with a VFPE geomembrane, 60 mil thick, topped by a 1-foot-thick drainage layer of coarse sand or gravel. Protective cover will be 2 feet thick.

Option E. Same as Option C except that the single membrane is replaced with a composite of 60 mil VFPE overlain by a GCL.

Table C-1 presents brief descriptions of each of these cap options, lists the advantages and disadvantages of each option, and provides estimated unit costs for each option. ENVIRON made a

comparison of estimated costs and the relative advantages and disadvantages of each cap option considered, and considered the results of Daniel and Koerner (1993) studies (see Section 7.5) and the added advantage of GCL acting as a secondary barrier. ENVIRON selected Option E as the most suitable conceptual design in terms of performance, maintenance, and cost effectiveness for the cap system at the Ascon site. While the monolithic cap is potentially less costly, its use and effectiveness are unproven. Since regulatory agency acceptance of a monolithic cap is uncertain, the proven cap design was used for this alternative.

The design considered for the geosynthetic portion of the cap for the Ascon site will consist of the following:

- A 60-mil VFPE geomembrane[26] which consists of a polyethylene resin designed specifically for flexible geomembrane applications. Its high uniaxial and multiaxial elongation characteristics make it very suitable for applications where differential or localized subgrade settlements are expected such as in the Ascon site's closure cap system.

- A GCL, which combines the high swelling and sealing characteristic of bentonite clay with the low permeability of a polyethylene geomembrane[27]. The textured backing will be 30 mils thick.

C.4 Preliminary Cap Design

The conceptual cap system for the Ascon site, as depicted on Figure C-1, consists of a minimum 2-foot-thick foundation layer, a 60-mil synthetic liner over a 30-mil backing GCL, a minimum 1-foot-thick coarse sand or gravel drainage layer, and a minimum 1½-foot-thick vegetative cover. The top surface should have a minimum slope of 3 percent to facilitate surface drainage. The 1½-foot thickness of the topsoil layer exceeds the minimum RCRA guidance requirement of 12 inches, but is better suited to accommodate the root penetration of the vegetation at the site. It is assumed that approximately 15 percent of the cap will have a slope of 3:1 (horizontal to vertical). It is also assumed that a 2-foot-thick vegetation layer will be placed on the slopes. The foundation layer may be thicker than the minimum requirement of 2 feet in certain areas of the site to maintain the minimum 3 percent slope and provide larger areas of uniform grades to simplify construction.

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26 Manufactured by GSE Lining Technology, Inc. Of Houston, Texas, a Gundle/SLT Environmental Inc. Company. Manufacturer's brand name is GSE Ultraflex, and UltraFrictionFlex (with single or double textured sides).

27 Manufactured by GSE Lining Technology under brand name GSE GundSeal (with smooth or textured surfaces).

Precipitation that percolates downward through the protective cover (top soil and vegetative layer) would flow laterally through the underlying drainage layer and over the impermeable synthetic barrier and into drainage channels, where the water would be collected and disposed as appropriate to a stabilization pond, as discussed in Section C.6. The side slopes would be at least 3:1 (horizontal to vertical) to ensure slope stability. It is anticipated that side slopes would be constructed along site perimeters as well as in the interior of the site.

At present, the site is partially covered with an interim cover that is sparsely vegetated with bushes, shrubs, and trees. This vegetation will need to be removed and transported off-site. The liquid hydrocarbons from Lagoons 1 and 2 should be treated by solvent extraction and transported off-site. The upper 5 feet of low-strength materials from the five lagoons should be excavated, stabilized with cement, and returned to the excavated areas. The site also contains concrete, which should be crushed on-site and used as backfill material in the bottom of the lagoon excavations. The tarry styrene waste from Pit F should be excavated and disposed off-site in a landfill, as described in Section 11.3.2.

Following removal of surface vegetation and backfilling of the excavated lagoons and Pit F, the site surface should be cut and filled, using the cut materials as much as possible, to generate relatively long/flat sections. The surface should then be moisture conditioned and rolled before placing the foundation material. The foundation material should be placed in lifts not exceeding 8 inches in compacted thickness, moisture conditioned to 0 to 5 percent above the optimum moisture content, and compacted to at least 90 percent of the maximum dry density (ATSM D1557).

The vegetative cover should provide protection against erosion of the landfill cover, have shallow roots, and survive the arid climate of the site with minimum irrigation and maintenance. The vegetative cover plants should be native to the region. As specified in RCRA guidance on cap design, the material for vegetative layer should contain no waste or leachate. Proper grading and compaction should be performed to minimize ponding and erosion. The vegetative layer should be placed in three lifts, with the lifts not exceeding a compacted thickness of 6 inches. The lower two lifts should be compacted to a minimum of 90 percent relative compaction (ASTM D1557). The upper lift should have a minimum relative compaction of 85 percent. Upon completion, the vegetative cover should be seeded with drought tolerant vegetation. The surface of the topsoil should be mulched to minimize seeding loss. Proper vegetative growth and maintenance are essential to minimize erosion of the topsoil layer.

C.5 Preliminary Slurry Wall Design

The trench for the slurry wall will be excavated to an impervious horizontal layer in order to prevent or reduce ground water flow beneath the wall. This circumferential trench will have an estimated total length of approximately 5,200 linear feet. Because of the presence of a low permeability (native clay and silty clay) layer under the site from depths of a few feet to about 8 feet below current street grade, a preliminary design depth of 10 feet below ground surface was assumed for the construction of the slurry wall at the site. Typical trench widths range from 2 to 5 feet (Evans, 1993); ENVIRON selected a preliminary thickness of 2 feet for the site. Based on ENVIRON's preliminary design, a soil-bentonite slurry consisting of 5 percent bentonite and 95 percent water by weight will be used.

Soil excavated from the slurry wall will have an estimated *in situ* volume of approximately 3,850 cy and an estimated *ex situ* volume of approximately 4,620 cy. The excavated soil will be used as backfill material on-site.

C.6 Surface Drainage Control System

A surface runoff management system will be required as part of the implementation of the containment alternative. To be consistent with RCRA cap design guidance, the design should address runoff for a 100-year, 24-hour storm event. Rainfall depth-duration-frequency data should be collected from nearby stations. Computer models, such as HEC-1 developed by the Corps of Engineers, can then be used to generate various storm scenarios. Because of the anticipated higher elevation of the cap relative to the adjacent land, run-on from adjacent areas is not expected.

Drainage channels should be constructed on the top surface of the cap and at the perimeter of the site to direct surface run-off to a holding pond. This pond can act as a stabilization pond, and the run-off could then be discharged to a drainage receptor.

C.7 Consolidation and Drainage Fluids Collection System

Consolidation and drainage fluids (CDF) are expected to be expelled from the oil-containing materials after the cap is placed at the site. The CDF is the fluid that is expressed from the soils in the vadose (unsaturated) zone, or expressed vertically upward from soils below the ground water. Horizontal underdrain collection trenches should be constructed under the cap to collect the CDF. As part of this conceptual design, CDF trenches can be constructed across the entire length of the site at a spacing of 150 to 200 feet. Another CDF trench can be constructed on the lower end of these trenches to collect all the CDF. Risers will need to be installed in the trenches and brought to the surface to provide for monitoring of the fluid level, and sampling and possible removal of the fluid.

C.8 Landfill Gas Control System

Landfill gas generated at the site will likely consist primarily of methane gas generated from anaerobic, chemical, and microbial decomposition of petroleum hydrocarbons within the oil-containing waste. The formation of methane due to the decomposition of petroleum hydrocarbons within many types of waste fills is well documented in the literature.

The need for a landfill gas system is largely dependent on the rate of gas generation. Regulation of gaseous emissions from inactive landfills is governed by SCAQMD Rule 1150.1, which requires the installation of a gas collection system that draws a sufficient amount of gas to prevent the average concentration of total organic compounds (TOCs) over a certain area on the surface from exceeding 500 ppmv. For the purposes of this conceptual design, ENVIRON included costs for a centrally located treatment facility constructed at the site to incinerate landfill gases. If necessary, hydrogen sulfide could be removed using technologies such as appropriate wet scrubbers.

C.9 New Perimeter Containment Berm

The berm that surrounds Ascon was constructed to contain the surface wastes as dumping activities took place in the 1940s, 1950s, and 1960s. Although the berm has generally fulfilled its purpose, it currently is in a state of significant disrepair. The soil in some areas of the berm is now saturated with lagoon liquids that have migrated laterally. Numerous rodent burrows have been observed at several locations along the berm. The top of the berm along Hamilton Avenue is exhibiting vertical cracking. Furthermore, the berm has experienced leakage problems and shallow slope failures during routine rainfall events.

It is believed that the existing berm surrounding the site is not constructed as an engineered containment structure. As part of our conceptual design, we assumed that the existing berm will need to be demolished and an engineered berm should be constructed around the entire perimeter of the site, taking into consideration proposed street widening. The berm will extend from current street grade to the top of the waste so as to connect with the cap. For the new berm, we assumed an average berm height of 13 feet [28], a crest width of 5 feet, an outer slope of 3:1, and an inner slope of 2:1. A detailed study will need to be performed to determine the exact configuration of the berm based on slope stability analyses and other factors including seismic loading. It is anticipated that the outer slope will have erosion protection consisting of stone riprap in combination with a geomembrane reinforcement material, or other appropriate embankment protection materials.

[28] The berm should be have a minimum of 2 feet of freeboard above the 100-year flood elevation.

C.10 Post-Closure Maintenance

After the closure construction of the site has been completed, the inspection, maintenance, and monitoring activities should be performed on a regular basis. These activities should continue for 30 years (except as noted) after the landfill closure pursuant to 22CCR, Division 4.5, Chapter 14, Article 7 or as long as wastes pose a threat to water quality pursuant to 23 CCR, Division 3, Chapter 15, Article 8. The post-closure activities are designed to maintain the long-term environmental control and monitoring systems and the integrity of the cap.

The following items should be inspected and maintained quarterly or semi-annually over the post-closure maintenance period:

- Landfill cover integrity including cracking, subsidence, plant growth, rodent burrows, and erosion
- Surface drainage control system
- Ground water monitoring wells
- Vadose zone monitoring
- Landfill gas control system
- CDF collection system
- Survey monuments
- Site security including fencing, gates, and signs

The specific O&M and monitoring activities required in connection with the above are summarized in the following paragraphs:

Landfill Cover Maintenance. This activity includes periodic visual inspection of the cover system by a qualified engineer or geologist for cracks, eroded areas, localized depressions, and damage from burrowing rodents. Maintenance consists of filling and compacting cracks and eroded areas according to the specifications of the constructed cover system. Integrity of the cover over the final slopes under both static and seismic conditions should be inspected. The ability of the slopes to prevent erosion and minimize soil erosion from disturbed areas on-site should be enhanced. Areas of

dead or dying vegetation should be visually identified. The cause of the die-off should be determined and mitigated as much as possible, and the areas of dead vegetation reseeded.

Surface Drainage Control System. This activity includes visual inspection of drainpipes and channel flowline for debris, other obstructions, and breaks and identification of areas where bank vegetation is overgrown or other conditions are impairing the functioning of the drainage channel. Maintenance could include cleaning channels and pipes, regrading and shaping channel flowlines and slopes, reseeding slopes, or replacing damaged culverts. Surface water monitoring will be required on a semi-annual or annual basis.

Ground Water Monitoring Wells. The on-site ground water monitoring wells will need to be properly abandoned prior to the construction of the cap and reinstalled during the construction. All wells will then need to be maintained in operational condition throughout the post-closure maintenance period. The wellheads will need to be inspected regularly and any damage repaired.

Vadose Zone Monitoring Lysimeters. Vadose zone monitoring lysimeters will be installed at locations to be approved by the DTSC. These lysimeters should be maintained in operation throughout the post-closure maintenance period.

Landfill Gas Control System. The gas from the horizontal, perforated pipes within the cap should be monitored. Gas around the site, both above and within the ground, will also need to be monitored. The air on and around the site should be monitored to check for air toxics injurious to people at the site or living around the site. It is anticipated that the monitoring will need to be performed initially on a quarterly basis and subsequently on a semi-annual basis.

CDF Collection System. On a semi-annual basis, the level of liquid in the CDF collection trenches will need to be measured, and liquid samples collected and analyzed. The oily liquid should be removed and disposed/recycled off-site, as required.

Survey Monuments. Permanent survey monuments should be installed at the site and protected to prevent disturbance or damage throughout the post-closure maintenance period. If these monuments become damaged or disturbed due to maintenance activity, they should be repaired or replaced and resurveyed according to the requirements of 23 CCR, Division 3, Chapter 15, Article 8, Section 2580(d). A topographic survey should also be conducted at the conclusion of closure activities and every five years after closure. Topographic maps of the top deck with a maximum contour interval of 2 feet will need to be produced from the survey. An isopach map should be produced to show the

change in elevation between each two successive surveys. This information should be used to monitor settlement and schedule repair to the final grade if warranted.

Site Security. After the completion of the construction, the site perimeter should be restored and secured by a chain-link fence. Gates should be installed at both Hamilton Avenue and Magnolia Street, as they currently are. Signs in accordance with the California Proposition 65 and other regulatory requirements should be posted at appropriate locations at the site. All these features should be maintained regularly.