APPENDIX H

FEASIBILITY STUDY ADDENDA

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FEASIBILITY STUDY ADDENDUM

This FS Addendum is intended to provide supplemental information to support US EPA's Proposed Plan, as requested by USEPA in their June 12, 2009 "Feasibility Study Addendum" memorandum (USEPA, 2009). The FS Addendum is divided into four parts, as follows:

1. Split Costs by Pathway (Appendix H1)
2. Plug-in Remedy Costs (Appendix H2)
3. ISCO Alternative 5A (Appendix H3)
4. Arsenic in Panhandle Area (Appendix H4)

APPENDIX H1

SPLIT COSTS BY PATHWAY

The preceding FS report presents the shallow soil remedial alternatives by parcel, with the alternatives for outdoor shallow soil (OS) and shallow soil under building (UB) combined. USEPA indicated in its FS Addendum memorandum, however, that the future Proposed Plan would present the OS and UB remedial alternatives separately to simplify the presentation to the public, and therefore requested that the associated cost estimates be similarly separated and presented in an FS Addendum. USEPA additionally requested that for specific EAPCs, certain contaminants should be removed from remediation consideration and that the cost estimates should be revised to reflect this. These requests are addressed below.

The affected EAPCs and alternatives are listed in the table below along with the actions taken in accordance with the USEPA requests.

EAPC NO.	ALTERNATIVE NO.	ACTION
2	3	Remove arsenic as contaminant to remediate
	4	Remove arsenic as contaminant to remediate
	5	Remove arsenic as contaminant to remediate
16	3	Split outdoor costs from under building costs
	4	Split outdoor costs from under building costs
	5	Split outdoor costs from under building costs
	6	Split outdoor costs from under building costs
23	3	Split outdoor costs from under building costs
	4	Split outdoor costs from under building costs
	5	Split outdoor costs from under building costs
	6	Split outdoor costs from under building costs
28	3	Remove VOC as contaminant to remediate
	4	Remove VOC as contaminant to remediate
	5	Remove VOC as contaminant to remediate
35	3	Remove VOC as contaminant to remediate
	4	Remove VOC as contaminant to remediate
	5	Remove VOC as contaminant to remediate
6	3	Split outdoor costs from under building costs
	4	Split outdoor costs from under building costs
	5	Split outdoor costs from under building costs
	6	Split outdoor costs from under building costs
11	3	Split outdoor costs from under building costs and remove arsenic as contaminant to remediate
	4	Split outdoor costs from under building costs and remove arsenic as contaminant to remediate
	5	Split outdoor costs from under building costs and remove arsenic as contaminant to remediate
	6	Split outdoor costs from under building costs and remove arsenic as contaminant to remediate

Table H1-1 summarizes the costs for the OS and UB alternatives along with the costs as originally presented in the FS. ICs and Monitoring are included with both the OS and UB alternatives for completeness. Attachment H1-1 presents the detailed split cost spreadsheets for each of the EAPCs and remedial alternatives listed above. These costs were derived by separating the individual line items of the original FS cost spreadsheet between OS and UB components.

For EAPCs 6, 11, 16 and 23, where there are common OS or UB technology components between two FS remedial alternatives, the costs for the common technology component are not the same. For example, SVE(UB) is common to Alternatives 5 and 6 in these EAPCs. Here, the SVE(UB) cost from Alternative 5 is lower than the SVE(UB) cost from Alternative 6. This occurs because in Alternative 5, SVE(OS) is combined with SVE(UB) resulting in expected cost-savings; whereas in Alternative 6, SVE(UB) is combined with Excavation with no anticipated cost-savings. For these EAPCs, the higher SVE(UB) cost from Alternative 6 is listed in Table H1-1 because it is more representative of a stand-alone SVE(UB) alternative. A similar situation occurs with the SVE(OS) component included in Alternatives 4 and 5. In this case, the cost for SVE(OS) from Alternative 4 is listed in Table H1-1, as it is more representative of a stand-alone SVE(OS) technology component.

Table H1-1

Summary of Costs split by Pathway (OS, UB) for select EAPCs

Ref: US EPA memorandum, "FS Addendum", dated 6/12/09

EAPC	Outdoor Soil (OS) Remedial Alternatives[1,2]	Cost	Under Building (UB) Remedial Alternatives[1,2]	Cost	Draft FS Appendix D Remedial Alternatives	Cost
2	Alt 2: ICs + Monitoring	$98,000			Alt 2: ICs + Monitoring	$98,000
	Alt 3: Cap(PAHs) + ICs + Monitoring[4]	$464,000			Alt 3: Cap (PAHs, As) + ICs + Monitoring	$652,000
	Alt 4: Exc(PAHs) + ICs + Monitoring[4]	$617,000			Alt 4: Cap (As) + Exc (PAHs) + ICs +Monitoring	$882,000
					Alt 5: Exc (PAHs, As) + ICs + Monitoring	$953,000
16	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000
	Alt 3: Cap(nonVOCs, VOCs) + ICs + Monitoring	$1,673,000	Alt 3: BEC(VOCs) + ICs + Monitoring[3]	$768,000	Alt 3: Cap (nonVOCs, VOCs) + HVAC/SSV (UB) + ICs + Monitoring	$1,913,000
	Alt 4: Cap(nonVOCs) + SVE/BV(VOCs) + ICs + Monitoring	$3,124,000	Alt 4: SVE/BV(VOCs) + ICs + Monitoring[3]	$2,792,000	Alt 4: Cap (nonVOCs) + SVE/BV (OS) + HVAC/SSV (UB) + ICs + Monitoring	$3,691,000
	Alt 5: Exc(nonVOCs, VOCs) + ICs + Monitoring	$5,338,000			Alt 5: Cap (nonVOCs) + SVE/BV (OS) + SVE/BV (UB) + ICs + Monitoring	$5,185,000
					Alt 6: Exc (nonVOCs, VOCs) + SVE/BV (UB) + ICs + Monitoring	$8,404,000
23	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000
	Alt 3: Cap(VOCs) + ICs + Monitoring	$2,244,000	Alt 3: BEC(VOCs) + ICs + Monitoring[3]	$1,498,000	Alt 3: Cap (VOCs) + HVAC/SSV (UB) + ICs + Monitoring	$3,374,000
	Alt 4: SVE/BV(VOCs) + ICs + Monitoring[3]	$3,689,000	Alt 4: SVE/BV(VOCs) + ICs + Monitoring[3]	$4,303,000	Alt 4: SVE/BV (OS) + HVAC/SSV (UB) + ICs + Monitoring	$5,063,000
	Alt 5: Exc(VOCs) + ICs + Monitoring	$9,148,000			Alt 5: SVE/BV (OS) + SVE/BV (UB) + ICs + Monitoring	$7,556,000
					Alt 6: Exc (VOCs) + SVE/BV (UB) + ICs + Monitoring	$13,979,000
28	Alt 2: ICs + Monitoring	$123,000			Alt 2: ICs + Monitoring	$123,000
	Alt 3: Cap(PAHs) + ICs + Monitoring[4]	$336,000			Alt 3: Cap (PAHs, VOCs) + ICs + Monitoring	$394,000
	Alt 4: Exc (PAHs) + ICs + Monitoring[4]	$378,000			Alt 4: Exc (PAHs) + SVE (VOCs) + ICs + Monitoring	$1,080,000
					Alt 5: Exc (PAHs, VOCs) + ICs + Monitoring	$676,000
35	Alt 2: ICs + Monitoring	$123,000			Alt 2: ICs + Monitoring	$123,000
	Alt 3: Cap(PAHs) + ICs + Monitoring[4]	$336,000			Alt 3: Cap (PAHs, VOCs) + ICs + Monitoring	$609,000
	Alt 4: Exc(PAHs) + ICs + Monitoring[4]	$385,000			Alt 4: Exc (PAHs) + SVE/BV (VOCs) + ICs + Monitoring	$1,286,000
					Alt 5: Exc (PAHs, VOCs) + ICs + Monitoring	$1,340,000
6	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000
	Alt 3: Cap(VOCs) + ICs + Monitoring	$1,727,000	Alt 3: BEC(VOCs) + ICs + Monitoring[3]	$748,000	Alt 3: Cap (VOCs) + HVAC/SSV (UB) + ICs + Monitoring	$2,279,000
	Alt 4: SVE/BV(VOCs) + ICs + Monitoring[3]	$2,725,000	Alt 4: SVE/BV(VOCs) + ICs + Monitoring[3]	$2,568,000	Alt 4: SVE/BV (OS) + HVAC/SSV (UB) + ICs + Monitoring	$3,358,000
	Alt 5: Exc(VOCs) + ICs + Monitoring	$6,108,000			Alt 5: SVE/VB (OS) + SVE/BV (UB) + ICs + Monitoring	$4,619,000
					Alt 6: Exc (VOCs) + SVE/BV (UB) + ICs + Monitoring	$9,073,000
11	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000	Alt 2: ICs + Monitoring	$123,000
	Alt 3: Cap(VOCs) + ICs + Monitoring[4]	$539,000	Alt 3: BEC(VOCs) + ICs + Monitoring[3]	$733,000	Alt 3: Cap (As, VOCs) + HVAC/SSV (UB) + ICs + Monitoring	$1,133,000
	Alt 4: SVE/BV (VOCs) + ICs + Monitoring[3,4]	$1,370,000	Alt 4: SVE/BV(VOCs) + ICs + Monitoring[3]	$1,783,000	Alt 4: Cap (As) + SVE/BV (OS) + HVAC/SSV (UB) + ICs + Monitoring	$2,005,000
	Alt 5: Exc(VOCs) + ICs + Monitoring[4]	$1,428,000			Alt 5: Cap (As) + SVE/BV (OS) + SVE/BV (UB) + ICs + Monitoring	$3,085,000
					Alt 6: Exc (As, VOCs) + SVE/BV (UB) + ICs + Monitoring	$3,945,000

NOTES

1. These cost estimates were derived by splitting costs from the surface pathway cost spreadsheets in Appendix D.
2. Detailed split cost spreadsheets for each EAPC are included in Attachment 1.
3. In these cases where two different costs of the same alternative were derived by the cost splitting process, the higher of the two costs is listed here.
4. Arsenic was removed as a COC for EAPCs 2 and 11, while VOCs were removed for EAPCs 28 and 35, per US EPA's "*FS addendum memo*", dated 6/12/09.

ATTACHMENT H1-1

DETAILED COST SHEETS

Note: The detailed cost sheets in this Attachment for each EAPC were derived from the original FS cost sheets (presented in Appendix D) with USEPA requested changes as described in Appendix H1. As a result of these revisions, some split alternatives have two cost sheets. Only the higher cost estimate for each split alternative is listed in Table H1-1. Therefore the cost sheets presented here do not directly correlate to the split alternatives laid out in Table H1-1.

EAPC 2

TABLE H1.1-1
EAPC 2 - REMEDIAL ALTERNATIVE 2 - ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 24,110	$ 24,110
				Direct Capital Total	**$ 24,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 24,000	$ 2,400
				Indirect Capital Subtotal	**$ 2,400**
				Total Direct + Indirect Capital Cost	**$ 26,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,775	$ 2,775
				ICs Annual Operation and Maintenance Subtotal	**$ 2,775**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 55,000**
				Contingency (20% of total project cost)	**$ 16,000**
				Total Capital and ICs O&M Cost	**$ 98,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3 and 4A.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.1-2
EAPC 2 - REMEDIAL ALTERNATIVE 3 - CAPPING (PAHs) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 20,000	$ 20,000
3	Site preparation	4,900	sf	$ 0.40	$ 2,000
4	Site Setup, Equipment Mobilization	4,900	sf	$ 0.75	$ 4,000
5	Slurry Seal over Existing Asphalt Pavement	4,900	sf	$ 5	$ 25,000
6	Parcel Cleanup/Demobilization	1	ls	$ 3,000	$ 3,000
7	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
8	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
9	Health and Safety, ODCs	1	ls	$ 5,000	$ 5,000
				Direct Capital Total	**$ 106,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 106,000	$ 16,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 106,000	$ 9,000
3	Construction Management	10%	of	$ 106,000	$ 11,000
	Indirect Capital Subtotal	33%			**$ 36,000**
				Total Direct + Indirect Capital Cost	**$ 142,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	Cap Maintenance and Repair	1	year	$ 9,000	$ 9,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 12,275**
				Present Worth of ICs + Cap (5%, 100 Years) O&M Costs	**$ 244,000**
				Contingency (20% of total project cost)	**$ 78,000**
				Total Capital and Cap + ICs O&M Cost	**$ 464,000**

NOTES/ASSUMPTIONS

1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. ICs include IC layers 1, 2, 3, 4A and 4B.

TABLE H1.1-3
EAPC 2 - REMEDIAL ALTERNATIVE 4 - EXCAVATION (PAHs) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 5,110	$ 5,110
2	Site Investigation/Delineation	1	ls	$ 35,000	$ 35,000
3	Site preparation/Geophysical Survey	4,900	sf	$ 0.80	$ 4,000
4	Site Setup, Equipment Mobilization/Demobilization	4,900	sf	$ 1.25	$ 7,000
5	Excavation and Stockpile (PAHs to <5 feet bgs)	907	yd3	$ 12	$ 11,000
6	Clean overburden excavation for slope stabilization	130	yd3	$ 12	$ 2,000
7	Truck Load-out	907	yd3	$ 2	$ 2,000
8	Backfill and Compaction	998	yd^3	$ 35	$ 35,000
9	Asphalt Pavement Restoration (PAHs area)	4,900	sf	$ 10	$ 49,000
10	Transportation and Off-Site Disposal	1,361	ton	$ 70	$ 96,000
11	Soil Confirmation Sampling and Analyses	18	samples	$ 500	$ 9,000
12	Air Monitoring/Sampling	5	days	$ 2,500	$ 13,000
13	Remediation Documentation/Reporting	1	ea	$ 30,000	$ 30,000
14	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 25,000	$ 25,000
				Direct Capital Total	**$ 323,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 323,000	$ 49,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 323,000	$ 26,000
3	Construction Management	10%	of	$ 323,000	$ 33,000
	Indirect Capital Subtotal	33%			**$ 108,000**
				Direct + Indirect Capital Total	**$ 431,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,175	$ 2,175
				ICs Annual Operation and Maintenance Subtotal	**$ 2,175**
				Present Worth of ICs (5%, 100 Years) O&M Costs	**$ 43,000**
				Contingency (30% of total project cost)	**$ 143,000**
				Total Capital and Cap + ICs O&M Cost	**$ 617,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. No shoring is needed.
3. Assume excavated soil is 50% Cal haz, 50% non haz sent to a permitted facility.
4. ICs include IC layers 1 and 2.

TABLE H1.1-4
EAPC 2 - REMEDIAL ALTERNATIVE 5 - EXCAVATION (PAHs) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 5,110	$ 5,110
2	Site Investigation/Delineation	1	ls	$ 35,000	$ 35,000
3	Site preparation/Geophysical Survey	4,900	sf	$ 0.80	$ 4,000
4	Site Setup, Equipment Mobilization/Demobilization	4,900	sf	$ 1.25	$ 7,000
5	Excavation and Stockpile (<5 feet bgs)	907	yd3	$ 12	$ 11,000
6	Clean overburden excavation for slope stabilization	130	yd3	$ 12	$ 2,000
7	Truck Load-out	907	yd3	$ 2	$ 2,000
8	Backfill and Compaction	998	yd^3	$ 35	$ 35,000
9	Asphalt Pavement Restoration	4,900	sf	$ 10	$ 49,000
10	Transportation and Off-Site Disposal	1,361	ton	$ 70	$ 96,000
11	Soil Confirmation Sampling and Analyses	18	samples	$ 500	$ 9,000
12	Air Monitoring/Sampling	5	days	$ 2,500	$ 13,000
13	Remediation Documentation/Reporting	1	ea	$ 30,000	$ 30,000
14	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 25,000	$ 25,000
				Direct Capital Total	**$ 323,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 323,000	$ 49,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 323,000	$ 26,000
3	Construction Management	10%	of	$ 323,000	$ 33,000
	Indirect Capital Subtotal	33%			**$ 108,000**
				Direct + Indirect Capital Total	**$ 431,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,175	$ 2,175
				ICs Annual Operation and Maintenance Subtotal	**$ 2,175**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 43,000**
				Contingency (30% of total project cost)	**$ 143,000**
				Total Capital and ICs O&M Costs	**$ 617,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. No shoring is needed.
3. Assume excavated soil is 50% Cal haz, 50% non haz sent to a permitted facility.
4. ICs include IC layers 1 and 2.

EAPC 16

TABLE H1.2-1
EAPC 16 - REMEDIAL ALTERNATIVE 2
ICs + MONITORING COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
				Direct Capital Total	**$ 34,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 34,000	$ 3,400
				Indirect Capital Subtotal	**$ 3,400**
				Total Direct + Indirect Capital Cost	**$ 37,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				Contingency (20% of total project cost)	**$ 20,000**
				Total Capital and ICs O&M Cost	**$ 123,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3, 4A and 5.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-2
EAPC 16 - REMEDIAL ALTERNATIVE 3 - CAPPING (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 31,100	$ 31,000
3	Site preparation	23,600	sf	$ 0.40	$ 9,000
4	Site Setup, Equipment Mobilization	23,600	sf	$ 0.75	$ 18,000
5	Slurry Seal over Existing Asphalt Pavement	23,600	sf	$ 5	$ 118,000
6	Parcel Cleanup/Demobilization	1	ls	$ 7,000	$ 7,000
7	Remedial Action Monitoring	5	day	$ 2,000	$ 10,000
8	Remediation Documentation/Reporting	1	ls	$ 14,000	$ 14,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,000	$ 7,000
				Direct Capital Total	**$ 258,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 258,000	$ 31,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 258,000	$ 16,000
3	Construction Management	8%	of	$ 258,000	$ 21,000
	Indirect Capital Subtotal	26%			**$ 68,000**
				Total Direct + Indirect Capital Cost	**$ 326,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	Cap Maintenance and Repair	1	year	$ 50,000	$ 50,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 53,775**
				Present Worth of Cap + ICs (5%, 100 Years) O&M Costs	**$ 1,068,000**
				Contingency (20% of total project cost)	**$ 279,000**
				Total Capital + O&M Cost	**$ 1,673,000**

NOTES/ASSUMPTIONS

1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
4. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-3
EAPC 16 - REMEDIAL ALTERNATIVE 3 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 18,300	$ 18,000
3	Site preparation	10,800	sf	$ 0.40	$ 4,000
4	Site Setup, Equipment Mobilization	10,800	sf	$ 0.75	$ 8,000
5	Subslab Venting System under building (installed)	10,800	sf	$ 5	$ 54,000
6	Install Vapor Monitoring Points inside building	27	ea	$ 500	$ 14,000
7	Parcel Cleanup/Demobilization	1	ls	$ 3,000	$ 3,000
8	Remedial Action Monitoring	7	day	$ 2,000	$ 14,000
9	Remediation Documentation/Reporting	1	ls	$ 6,000	$ 6,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 3,000	$ 3,000
				Direct Capital Total	**$ 168,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 168,000	$ 21,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 168,000	$ 11,000
3	Construction Management	8%	of	$ 168,000	$ 14,000
	Indirect Capital Subtotal	26%			**$ 46,000**
				Total Direct + Indirect Capital Cost	**$ 214,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
1	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 106,000**
				Total Capital and O&M Cost	**$ 634,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-4
EAPC 16 - REMEDIAL ALTERNATIVE 4 - Cap (non-VOCs) + SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 57,200	$ 57,200
3	Site preparation/Geophysical Survey	23,600	sf	$ 0.80	$ 19,000
4	Site Setup, Equipment Mobilization/Demobilization	23,600	sf	$ 1.25	$ 30,000
5	Slurry Seal over Existing Asphalt Pavement (non-VOCs)	6,400	sf	$ 5	$ 32,000
6	SVE Vertical Wells (V-SVE)	23	ea	$ 5,000	$ 115,000
7	Install Well Headworks/Vault	23	ea	$ 1,500	$ 34,500
8	Install Outdoor Vapor Monitoring Points	4	ea	$ 2,000	$ 8,000
9	Trenching, Piping, Backfill, Resurfacing	1,200	lf	$ 30	$ 36,000
10	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
11	Control and Instrumentation	1	ls	$ 6,000	$ 6,000
12	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 30,000	$ 30,000
13	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
14	SVE Emissions Treatment System (Thermal/Cat Ox), 250 cfm	1	ea	$ 70,000	$ 70,000
15	Scrubber for Thermal/Cat Ox Effluent	1	ea	$ 75,000	$ 75,000
16	Soil Confirmation Sampling and Analyses	28	samples	$ 750	$ 21,000
17	Air Monitoring/Sampling	8	days	$ 2,500	$ 20,000
18	Remediation Documentation/Reporting	1	ea	$ 20,000	$ 20,000
19	Site Closure, decommisioning, well abandonment	1	ls	$ 20,000	$ 20,000
20	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 753,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 753,000	$ 91,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 753,000	$ 46,000
3	Construction Management	8%	of	$ 753,000	$ 61,000
	Indirect Capital Total	26%			**$ 198,000**
				Direct + Indirect Capital Total	**$ 951,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 10,000	$ 120,000
3	Fuel	12	mths	$ 6,000	$ 72,000
4	Electricity	12	mths	$ 2,600	$ 31,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 2,000	$ 24,000
6	Scrubber Chemicals (NaOH/caustic, antiscaling agents)	12	mths	$ 2,000	$ 24,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 5,000	$ 60,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 8,000	$ 96,000
9	Waste/Scrubber Water Disposal	12	mths	$ 3,000	$ 36,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
11	Cap Maintenance and Repair	1	year	$ 11,000	$ 11,000
				SVE Annual Operation and Maintenance Subtotal	**$ 499,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,359,000**
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 14,775**
				Present Worth of Cap + ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 293,000**
				Contingency (20% of total project cost)	**$ 521,000**
				Total Capital and O&M Cost	**$ 3,124,000**

NOTES/ASSUMPTIONS
1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10
3. Cl-VOC SVE (OS) system: Uses 23 V-SVE wells, 5-15 feet bgs screens.
4. Cl-VOC SVE uses thermal oxidizer and scrubber to treat HCl vapors. Cl-VOC influent concentration assumed about 500 ppmv, 250 scfm PD blower.
5. Assume SVE operation for 3 years.
6. SVE O&M cost is higher for this alternative due to the labor intensive nature of scrubber operations.
7. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
8. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-5
EAPC 16 - REMEDIAL ALTERNATIVE 4 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 42,400	$ 42,000
3	Site preparation	10,800	sf	$ 0.80	$ 9,000
4	Site Setup, Equipment Mobilization	10,800	sf	$ 1.25	$ 14,000
5	Subslab Venting System under building (installed)	10,800	sf	$ 5	$ 54,000
6	Install Vapor Monitoring Points inside building	108	ea	$ 500	$ 54,000
7	Parcel Cleanup/Demobilization	1	ls	$ 7,000	$ 7,000
8	Remedial Action Monitoring	7	day	$ 2,000	$ 14,000
9	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 258,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 258,000	$ 31,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 258,000	$ 16,000
3	Construction Management	8%	of	$ 258,000	$ 21,000
	Indirect Capital Subtotal	26%			**$ 68,000**
				Total Direct + Indirect Capital Cost	**$ 326,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 128,000**
				Total Capital and SSV O&M Cost	**$ 768,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-6
EAPC 16 - REMEDIAL ALTERNATIVE 5 - Cap (non-VOCs) + SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 80,800	$ 80,800
3	Site preparation/Geophysical Survey	23,600	sf	$ 0.80	$ 19,000
4	Site Setup, Equipment Mobilization/Demobilization	23,600	sf	$ 1.25	$ 30,000
5	Slurry Seal over Existing Asphalt Pavement (non-VOCs)	6,400	sf	$ 5	$ 32,000
6	SVE Vertical Wells (V-SVE)	23	ea	$ 5,000	$ 115,000
7	Install Well Headworks/Vault	23	ea	$ 1,500	$ 34,500
8	Install Outdoor Vapor Monitoring Points	4	ea	$ 2,000	$ 8,000
9	Trenching, Piping, Backfill, Resurfacing	1,200	lf	$ 30	$ 36,000
10	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 41,000	$ 41,000
11	Control and Instrumentation	1	ls	$ 4,000	$ 4,000
12	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 30,000	$ 30,000
13	SVE System Installation and Startup	1	ea	$ 62,000	$ 62,000
14	SVE Emissions Treatment System (Thermal/Cat Ox), 250 cfm	1	ea	$ 41,000	$ 41,000
15	Scrubber for Thermal/Cat Ox Effluent	1	ea	$ 31,000	$ 31,000
16	Soil Confirmation Sampling and Analyses	44	samples	$ 1,200	$ 53,000
17	Air Monitoring/Sampling	10	days	$ 2,500	$ 25,000
18	Remediation Documentation/Reporting	1	ea	$ 20,000	$ 20,000
19	Site Closure, decommisioning, well abandonment	1	ls	$ 20,000	$ 20,000
20	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 741,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 741,000	$ 89,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 741,000	$ 45,000
3	Construction Management	8%	of	$ 741,000	$ 60,000
	Indirect Capital Total	26%			**$ 194,000**
				Direct + Indirect Capital Total	**$ 935,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 7,000	$ 84,000
3	Fuel	12	mths	$ 5,000	$ 60,000
4	Electricity	12	mths	$ 2,000	$ 24,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 2,000	$ 24,000
6	Scrubber Chemicals (NaOH/caustic, antiscaling agents)	12	mths	$ 2,000	$ 24,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 3,000	$ 36,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
9	Waste/Scrubber Water Disposal	12	mths	$ 2,000	$ 24,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
11	Cap Maintenance and Repair	1	year	$ 3,000	$ 3,000
				SVE Annual Operation and Maintenance Subtotal	**$ 360,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 981,000**
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 6,775**
				Present Worth of Cap + ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 134,000**
				Contingency (20% of total project cost)	**$ 410,000**
				Total Capital and O&M Cost	**$ 2,460,000**

NOTES/ASSUMPTIONS

1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. Cl-VOC SVE (OS) system: Uses 23 V-SVE wells, 5-15 feet bgs screens.
4. Cl-VOC SVE uses thermal oxidizer and scrubber to treat HCl vapors. Cl-VOC influent concentration assumed about 500 ppmv, 250 scfm PD blower.
5. Assume SVE operation for 3 years.
6. SVE O&M cost is higher for this alternative due to the labor intensive nature of scrubber operations.
7. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
8. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-7
EAPC 16 - REMEDIAL ALTERNATIVE 5 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 42,400	$ 43,000
3	Site preparation/Geophysical Survey	10,800	sf	$ 0.80	$ 9,000
4	Site Setup, Equipment Mobilization/Demobilization	10,800	sf	$ 1.25	$ 14,000
5	SVE Horizontal Wells (H-SVE)	5	ea	$ 25,000	$ 125,000
6	Install Well Headworks/Vault	5	ea	$ 1,500	$ 7,500
7	Trenching, Piping, Backfill, Resurfacing	300	lf	$ 30	$ 9,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 9,000	$ 9,000
9	Control and Instrumentation	1	ls	$ 4,000	$ 4,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 6,000	$ 6,000
11	SVE System Installation and Startup	1	ea	$ 13,000	$ 13,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 500 cfm	1	ea	$ 59,000	$ 59,000
13	Scrubber for Thermal/Cat Ox Effluent	1	ea	$ 44,000	$ 44,000
14	Soil Confirmation Sampling and Analyses	22	samples	$ 1,200	$ 26,400
15	Air Monitoring/Sampling	8	days	$ 2,500	$ 20,000
16	Remediation Documentation/Reporting	1	ea	$ 10,000	$ 10,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 419,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 419,000	$ 51,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 419,000	$ 26,000
3	Construction Management	8%	of	$ 419,000	$ 34,000
	Indirect Capital Total	26%			**$ 111,000**
				Direct + Indirect Capital Total	**$ 530,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 9,000	$ 108,000
3	Fuel	12	mths	$ 7,000	$ 84,000
4	Electricity	12	mths	$ 3,000	$ 36,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	Scrubber Chemicals (NaOH/caustic, antiscaling agents)	12	mths	$ 4,000	$ 48,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 4,000	$ 48,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 6,000	$ 72,000
9	Waste/Scrubber Water Disposal	12	mths	$ 4,000	$ 48,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,000	$ 12,000
				SVE Annual Operation and Maintenance Subtotal	**$ 468,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,275,000**
				ICs Annual Operation and Maintenance Subtotal	**$ 3,775**
				Present Worth of ICs (5%, 100 Years) O&M Costs	**$ 75,000**
				Contingency (20% of total project cost)	**$ 376,000**
				Total Capital and O&M Cost	**$ 2,256,000**

NOTES/ASSUMPTIONS
1. Cl-VOC SVE (UB) system: Uses 5 H-SVE wells, with average 100 feet screeens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Cl-VOC SVE uses thermal oxidizer and scrubber to treat HCl vapors. Cl-VOC influent concentration assumed about 500 ppmv, 500 scfm PD blower.
4. Assume SVE operation for 3 years.
5. SVE O&M cost is higher for this alternative due to the labor intensive nature of scrubber operations.
6. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
7. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-8
EAPC 16 - REMEDIAL ALTERNATIVE 6 - EXCAVATION (OS) +ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 104,400	$ 105,000
3	Site preparation/Geophysical Survey	23,600	sf	$ 0.80	$ 19,000
4	Site Setup, Equipment Mobilization/Demobilization	23,600	sf	$ 1.25	$ 30,000
5	Shoring design and installation	3,600	sf	$ 65	$ 234,000
6	Excavation and Stockpile (< 15 feet bgs)	13,100	yd3	$ 12	$ 157,000
7	Clean overburden excavation for slope stabilization	2,188	yd3	$ 12	$ 26,000
8	Truck Load-out	13,100	yd3	$ 2	$ 26,000
9	Backfill and Compaction	14,400	yd^3	$ 35	$ 504,000
10	Asphalt pavement restoration	23,600	sf	$ 10	$ 236,000
11	Transportation and Off-Site Disposal	19,650	ton	$ 100	$ 1,965,000
12	Soil Confirmation Sampling and Analyses	96	samples	$ 300	$ 39,000
13	Air Monitoring/Sampling	45	days	$ 2,500	$ 112,500
14	Remediation Documentation/Reporting	1	ea	$ 20,000	$ 20,000
15	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
16	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 3,533,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 3,533,000	$ 283,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 3,533,000	$ 177,000
3	Construction Management	6%	of	$ 3,533,000	$ 212,000
	Indirect Capital Total	19%			**$ 672,000**
				Direct + Indirect Capital Total	**$ 4,205,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 years)	**$ 65,000**
				Contingency (25% of total project cost)	**$ 1,068,000**
				Total Capital and O&M Cost	**$ 5,338,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. Assume 240 linear feet of soldier pile shoring is needed.
3. Assume excavated soil is 33% RCRA haz, 33% Cal haz, and 33% non haz sent to a permitted facility.
4. ICs include IC layers 1, 2, 3, 4A and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.2-9
EAPC 16 - REMEDIAL ALTERNATIVE 6 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 64,000	$ 64,000
3	Site preparation/Geophysical Survey	10,800	sf	$ 0.80	$ 9,000
4	Site Setup, Equipment Mobilization/Demobilization	10,800	sf	$ 1.25	$ 14,000
5	SVE Horizontal Wells (H-SVE)	5	ea	$ 25,000	$ 125,000
6	Install Well Headworks/Vault	5	ea	$ 1,500	$ 7,500
7	Trenching, Piping, Backfill, Resurfacing	300	lf	$ 30	$ 9,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
9	Control and Instrumentation	1	ls	$ 5,000	$ 5,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 6,000	$ 6,000
11	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 500 cfm	1	ea	$ 80,000	$ 80,000
13	Scrubber for Thermal/Cat Ox Effluent	1	ea	$ 85,000	$ 85,000
14	Soil Confirmation Sampling and Analyses	28	samples	$ 1,100	$ 41,000
15	Air Monitoring/Sampling	15	days	$ 2,500	$ 37,500
16	Remediation Documentation/Reporting	1	ea	$ 10,000	$ 10,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 613,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 613,000	$ 50,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 613,000	$ 31,000
3	Construction Management	6%	of	$ 613,000	$ 37,000
	Indirect Capital Total	19%			**$ 118,000**
				Direct + Indirect Capital Total	**$ 731,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 12,000	$ 144,000
3	Fuel	12	mths	$ 9,000	$ 108,000
4	Electricity	12	mths	$ 3,800	$ 46,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	Scrubber Chemicals (NaOH/caustic, antiscaling agents)	12	mths	$ 4,000	$ 48,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 5,000	$ 60,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 5,000	$ 60,000
9	Waste/Scrubber Water Disposal	12	mths	$ 4,000	$ 48,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				SVE Annual Operation and Maintenance Subtotal	**$ 562,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,531,000**
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs (5%, 100 Years) O&M Costs	**$ 65,000**
				Contingency (20% of total project cost)	**$ 465,000**
				Total Capital and O&M Cost	**$ 2,792,000**

NOTES/ASSUMPTIONS
1. Cl-VOC SVE (UB) system: Uses 5 H-SVE wells, with average 100 feet screeens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Cl-VOC SVE uses thermal oxidizer and scrubber to treat HCl vapors. Cl-VOC influent concentration assumed about 500 ppmv, 500 scfm PD blower.
4. Assume SVE operation for 3 years.
5. SVE O&M cost is higher for this alternative due to the labor intensive nature of scrubber operations.
6. ICs include IC layers 1, 2, 3, 4A, and 5.
7. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

EAPC 23

TABLE H1.3-1
EAPC 23 - REMEDIAL ALTERNATIVE 2
ICs + MONITORING COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
				Direct Capital Total	**$ 34,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 34,000	$ 3,400
				Indirect Capital Subtotal	**$ 3,400**
				Total Direct + Indirect Capital Cost	**$ 37,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				Contingency (20% of total project cost)	**$ 20,000**
				Total Capital and O&M Cost	**$ 123,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3, 4A and 5.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-2
EAPC 23 - REMEDIAL ALTERNATIVE 3 - CAPPING (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 49,300	$ 49,000
3	Site preparation	39,300	sf	$ 0.40	$ 16,000
4	Site Setup, Equipment Mobilization	39,300	sf	$ 0.75	$ 29,000
5	Slurry Seal over Existing Asphalt Pavement	39,300	sf	$ 5	$ 197,000
6	Parcel Cleanup/Demobilization	1	ls	$ 4,000	$ 4,000
7	Remedial Action Monitoring	8	day	$ 2,000	$ 16,000
8	Remediation Documentation/Reporting	1	ls	$ 8,000	$ 8,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 4,000	$ 4,000
				Direct Capital Total	**$ 367,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 367,000	$ 45,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 367,000	$ 23,000
3	Construction Management	8%	of	$ 367,000	$ 30,000
	Indirect Capital Subtotal	26%			**$ 98,000**
				Total Direct + Indirect Capital Cost	**$ 465,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	Cap Maintenance and Repair	1	year	$ 67,000	$ 67,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 70,775**
				Present Worth of Cap + ICs (5%, 100 Years) O&M Costs	**$ 1,405,000**
				Contingency (20% of total project cost)	**$ 374,000**
				Total Capital + O&M Cost	**$ 2,244,000**

NOTES/ASSUMPTIONS

1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. Site investigation cost is based on an assumed sampling density.
4. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-3
EAPC 23 - REMEDIAL ALTERNATIVE 3 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 72,250	$ 72,000
3	Site preparation	62,250	sf	$ 0.40	$ 25,000
4	Site Setup, Equipment Mobilization	62,250	sf	$ 0.75	$ 47,000
5	Subslab Venting System under building (installed)	62,250	sf	$ 5	$ 311,250
6	Install Vapor Monitoring Points inside building	125	ea	$ 500	$ 62,250
7	Parcel Cleanup/Demobilization	1	ls	$ 6,000	$ 6,000
8	Remedial Action Monitoring	7	day	$ 2,000	$ 14,000
9	Remediation Documentation/Reporting	1	ls	$ 12,000	$ 12,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 6,000	$ 6,000
				Direct Capital Total	**$ 600,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 600,000	$ 72,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 600,000	$ 36,000
3	Construction Management	8%	of	$ 600,000	$ 48,000
	Indirect Capital Subtotal	26%			**$ 156,000**
				Total Direct + Indirect Capital Cost	**$ 756,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
1	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 214,000**
				Total Capital and O&M Cost	**$ 1,284,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. Site investigation cost is based on an assumed sampling density.
6. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
7. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-4
EAPC 23 - REMEDIAL ALTERNATIVE 4 - SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 88,600	$ 89,000
3	Site preparation/Geophysical Survey	39,300	sf	$ 0.80	$ 31,000
4	Site Setup, Equipment Mobilization/Demobilization	39,300	sf	$ 1.25	$ 49,000
5	SVE Vertical Wells (V-SVE)	41	ea	$ 5,000	$ 205,000
6	Install Well Headworks/Vault	41	ea	$ 1,500	$ 61,500
7	Install Outdoor Vapor Monitoring Points	18	ea	$ 2,000	$ 36,000
8	Trenching, Piping, Backfill, Resurfacing	2,100	lf	$ 30	$ 63,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
10	Control and Instrumentation	1	ls	$ 7,000	$ 7,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 40,000	$ 40,000
12	SVE System Installation and Startup	1	ea	$ 60,000	$ 60,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 300 cfm	1	ea	$ 75,000	$ 75,000
14	SVE Emissions Treatment System, (GAC) Chlorinated VOCs 100 cfm	1	ea	$ 25,000	$ 25,000
15	Soil Confirmation Sampling and Analyses	72	samples	$ 1,200	$ 86,000
16	Air Monitoring/Sampling	15	days	$ 2,500	$ 37,500
17	Remediation Documentation/Reporting	1	ea	$ 12,000	$ 12,000
18	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 991,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 991,000	$ 119,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 991,000	$ 60,000
3	Construction Management	8%	of	$ 991,000	$ 80,000
	Indirect Capital Total	26%			**$ 259,000**
				Direct + Indirect Capital Total	**$ 1,250,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 8,000	$ 96,000
3	Fuel (Benzene SVE)	12	mths	$ 7,000	$ 84,000
4	Electricity (Chlor and Benzene SVE)	12	mths	$ 3,500	$ 42,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 3,200	$ 38,400
6	Carbon - Vapor Phase (chlor-SVE)	12	mths	$ 8,000	$ 96,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 8,000	$ 96,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 8,000	$ 96,000
9	Waste/Water Disposal	12	mths	$ 4,800	$ 57,600
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				ICs Annual Operation and Maintenance Subtotal	**$ 3,775**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 75,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 642,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,749,000**
				Contingency (20% of total project cost)	**$ 615,000**
				Total Capital and O&M Cost	**$ 3,689,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (OS) system: Uses 34 V-SVE wells, 5-15 feet bgs screens
2. Cl-VOC SVE (OS) system: Uses 7 V-SVE wells, 5-15 feet bgs screens
3. Benzene SVE uses thermal oxidizer, 300 scfm, positive displacement (PD) blower.
4. Cl-VOC SVE (OS) system: assume VPGAC (Cl-VOC conc. < 25 ppmv) with two 2000 lb vessels, 100 scfm PD blower
5. Assume 2 carbon changeout/month for VPGAC system with a total of 4000 lb/month at $2/lb.
6. Assume SVE operation for 3 years for both systems
7. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
8. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-5
EAPC 23 - REMEDIAL ALTERNATIVE 4 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 134,500	$ 135,000
3	Site preparation	62,250	sf	$ 0.80	$ 50,000
4	Site Setup, Equipment Mobilization	62,250	sf	$ 1.25	$ 78,000
5	Subslab Venting System under building (installed)	62,250	sf	$ 5	$ 311,250
6	Install Vapor Monitoring Points inside building	125	ea	$ 500	$ 63,000
7	Parcel Cleanup/Demobilization	1	ls	$ 6,000	$ 6,000
8	Remedial Action Monitoring	10	day	$ 2,000	$ 20,000
9	Remediation Documentation/Reporting	1	ls	$ 18,000	$ 18,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 740,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 740,000	$ 89,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 740,000	$ 45,000
3	Construction Management	8%	of	$ 740,000	$ 60,000
	Indirect Capital Subtotal	26%			**$ 194,000**
				Total Direct + Indirect Capital Cost	**$ 934,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 250,000**
				Total Capital and O&M Cost	**$ 1,498,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-6
EAPC 23 - REMEDIAL ALTERNATIVE 5 - SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 88,600	$ 89,000
3	Site preparation/Geophysical Survey	39,300	sf	$ 0.80	$ 31,000
4	Site Setup, Equipment Mobilization/Demobilization	39,300	sf	$ 1.25	$ 49,000
5	SVE Vertical Wells (V-SVE)	41	ea	$ 5,000	$ 205,000
6	Install Well Headworks/Vault	41	ea	$ 1,500	$ 61,500
7	Install Outdoor Vapor Monitoring Points	18	ea	$ 2,000	$ 36,000
8	Trenching, Piping, Backfill, Resurfacing	2,100	lf	$ 30	$ 63,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 37,000	$ 37,000
10	Control and Instrumentation	1	ls	$ 5,000	$ 5,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 37,000	$ 37,000
12	SVE System Installation and Startup	1	ea	$ 37,000	$ 37,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 2000 cfm	1	ea	$ 49,000	$ 49,000
14	SVE Emissions Treatment System, (GAC) Clorinated VOCs 100 cfm	1	ea	$ 25,000	$ 25,000
15	Soil Confirmation Sampling and Analyses	43	samples	$ 1,200	$ 51,600
16	Air Monitoring/Sampling	12	days	$ 2,500	$ 30,000
17	Remediation Documentation/Reporting	1	ea	$ 12,000	$ 12,000
18	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 872,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 872,000	$ 70,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 872,000	$ 44,000
3	Construction Management	6%	of	$ 872,000	$ 53,000
	Indirect Capital Total	19%			**$ 167,000**
				Direct + Indirect Capital Total	**$ 1,039,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 12,000	$ 144,000
3	Fuel (Benzene SVE)	12	mths	$ 8,000	$ 96,000
4	Electricity (Chlor and Benzene SVE)	12	mths	$ 4,000	$ 48,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 3,000	$ 36,000
6	Carbon - Vapor Phase (chlor-SVE)	12	mths	$ 8,000	$ 96,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 4,000	$ 48,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 6,000	$ 72,000
9	Waste/Water Disposal	12	mths	$ 4,000	$ 48,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 2,000	$ 24,000
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 612,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,667,000**
				Contingency (20% of total project cost)	**$ 554,000**
				Total Capital and O&M Cost	**$ 3,325,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (OS) system: Uses 34 V-SVE wells, 5-15 feet bgs screens.
2. Cl-VOC SVE (OS) system: Uses 7 V-SVE wells, 5-15 feet bgs screens
3. Benzene SVE uses thermal oxidizer, 2,000 scfm, positive displacement (PD) blower.
4. Cl-VOC SVE (OS) system: assume VPGAC (Cl-VOC conc. < 25 ppmv) with two 2,000 lb vessels, 100 scfm PD blower.
5. Assume SVE operation for 3 years for both systems.
6. Site investigation cost is based on an assumed sampling density.
7. ICs include IC layers 1, 2, 3, 4A and 5.
8. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-7
EAPC 23 - REMEDIAL ALTERNATIVE 5 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 134,500	$ 135,000
3	Site preparation/Geophysical Survey	62,250	sf	$ 0.80	$ 50,000
4	Site Setup, Equipment Mobilization/Demobilization	62,250	sf	$ 1.25	$ 78,000
5	SVE Horizontal Wells (H-SVE)	14	ea	$ 25,000	$ 350,000
6	Install Well Headworks/Vault	14	ea	$ 1,500	$ 21,000
7	Trenching, Piping, Backfill, Resurfacing	700	lf	$ 30	$ 21,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 13,000	$ 13,000
9	Control and Instrumentation	1	ls	$ 7,000	$ 7,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 13,000	$ 13,000
11	SVE System Installation and Startup	1	ea	$ 13,000	$ 13,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 2000 cfm	1	ea	$ 111,000	$ 111,000
13	Soil Confirmation Sampling and Analyses	67	samples	$ 1,200	$ 80,400
14	Air Monitoring/Sampling	18	days	$ 2,500	$ 45,000
15	Remediation Documentation/Reporting	1	ea	$ 18,000	$ 18,000
16	Site Closure, decommisioning, well abandonment	1	ls	$ 15,000	$ 15,000
17	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 1,020,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 1,020,000	$ 82,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 1,020,000	$ 51,000
3	Construction Management	6%	of	$ 1,020,000	$ 62,000
	Indirect Capital Total	19%			**$ 195,000**
				Direct + Indirect Capital Total	**$ 1,215,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 5,000	$ 60,000
3	Fuel	12	mths	$ 18,000	$ 216,000
4	Electricity	12	mths	$ 8,000	$ 96,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 5,000	$ 60,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 8,000	$ 96,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 10,000	$ 120,000
8	Waste/Water Disposal	12	mths	$ 2,000	$ 24,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 2,000	$ 24,000
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 696,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,896,000**
				Contingency (20% of total project cost)	**$ 635,000**
				Total Capital and O&M Cost	**$ 3,811,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (UB) system: Uses 14 H-SVE wells with average 100 feet screeens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Benzene SVE uses thermal oxidizer, 2,000 scfm, positive displacement (PD) blower.
4. Assume SVE operation for 3 years.
5. Site investigation cost is based on an assumed sampling density.
6. ICs include IC layers 1, 2, 3, 4A and 5.
7. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-8
EAPC 23 - REMEDIAL ALTERNATIVE 6 - EXCAVATION (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 127,900	$ 128,000
3	Site preparation/Geophysical Survey	39,300	sf	$ 0.80	$ 32,000
4	Site Setup, Equipment Mobilization/Demobilization	39,300	sf	$ 1.25	$ 50,000
5	Shoring design and installation	9,450	sf	$ 65	$ 614,000
6	Excavation and Stockpile (< 15 feet bgs)	21,900	yd3	$ 12	$ 263,000
7	Clean overburden excavation for slope stabilization	5,800	yd3	$ 12	$ 70,000
8	Truck Load-out	21,900	yd3	$ 2	$ 44,000
9	Backfill and Compaction	24,090	yd^3	$ 35	$ 843,000
10	Asphalt pavement restoration	39,300	sf	$ 10	$ 393,000
11	Transportation and Off-Site Disposal	32,900	ton	$ 100	$ 3,290,000
12	Soil Confirmation Sampling and Analyses	209	samples	$ 600	$ 125,400
13	Air Monitoring/Sampling	65	days	$ 2,500	$ 162,500
14	Remediation Documentation/Reporting	1	ea	$ 20,000	$ 20,000
15	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
16	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 6,094,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 6,094,000	$ 488,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 6,094,000	$ 305,000
3	Construction Management	6%	of	$ 6,094,000	$ 366,000
	Indirect Capital Total	19%			**$ 1,159,000**
				Direct + Indirect Capital Total	**$ 7,253,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 years)	**$ 65,000**
				Contingency (25% of total project cost)	**$ 1,830,000**
				Total Capital and O&M Cost	**$ 9,148,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. Assume 630 linear feet of soldier pile shoring is needed.
3. Assume excavated soil is 33% RCRA haz, 33% Cal haz, and 33% non haz sent to a permitted facility.
4. ICs include IC layers 1, 2, 3, 4A and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.3-9
EAPC 23 - REMEDIAL ALTERNATIVE 6 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 196,750	$ 197,000
3	Site preparation/Geophysical Survey	62,250	sf	$ 0.80	$ 50,000
4	Site Setup, Equipment Mobilization/Demobilization	62,250	sf	$ 1.25	$ 78,000
5	SVE Horizontal Wells (H-SVE)	14	ea	$ 25,000	$ 350,000
6	Install Well Headworks/Vault	14	ea	$ 1,500	$ 21,000
7	Trenching, Piping, Backfill, Resurfacing	700	lf	$ 30	$ 21,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
9	Control and Instrumentation	1	ls	$ 9,000	$ 9,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	900	lf	$ 10	$ 9,000
11	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 1,500 cfm	1	ea	$ 130,000	$ 130,000
13	Soil Confirmation Sampling and Analyses	72	samples	$ 600	$ 43,200
14	Air Monitoring/Sampling	30	days	$ 2,500	$ 75,000
15	Remediation Documentation/Reporting	1	ea	$ 10,000	$ 10,000
16	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
17	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 1,147,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 1,147,000	$ 92,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 1,147,000	$ 58,000
3	Construction Management	6%	of	$ 1,147,000	$ 69,000
	Indirect Capital Total	19%			**$ 219,000**
				Direct + Indirect Capital Total	**$ 1,366,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 10,000	$ 120,000
3	Fuel	12	mths	$ 21,000	$ 252,000
4	Electricity	12	mths	$ 7,900	$ 95,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 5,000	$ 60,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 6,000	$ 72,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 10,000	$ 120,000
8	Waste/Water Disposal	12	mths	$ 3,000	$ 36,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 791,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 2,155,000**
				Contingency (20% of total project cost)	**$ 717,000**
				Total Capital and O&M Cost	**$ 4,303,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (UB) system: Uses 14 H-SVE wells with average 100 feet screens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Benzene SVE uses thermal oxidizer, 1,500 scfm, positive displacement (PD) blower.
4. Assume SVE operation for 3 years.
5. ICs include IC layers 1, 2, 3, 4A and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

EAPC 28

TABLE H1.4-1
EAPC 28 - REMEDIAL ALTERNATIVE 2
ICs + MONITORING COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
				Direct Capital Total	**$ 34,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 34,000	$ 3,400
				Indirect Capital Subtotal	**$ 3,400**
				Total Direct + Indirect Capital Cost	**$ 37,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				Contingency (20% of total project cost)	**$ 20,000**
				Total Capital and ICs O&M Cost	**$ 123,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3, 4A and 5.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.4-2
EAPC 28 - REMEDIAL ALTERNATIVE 3 - CAPPING (B(a)P) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 13,000	$ 13,000
3	Site preparation	2,500	sf	$ 0.40	$ 1,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 0.75	$ 2,000
5	Slurry Seal over Existing Asphalt Pavement	2,500	sf	$ 5	$ 13,000
6	Parcel Cleanup/Demobilization	1	ls	$ 3,000	$ 3,000
7	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
8	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
9	Health and Safety, ODCs	1	ls	$ 5,000	$ 5,000
				Direct Capital Total	**$ 93,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 93,000	$ 14,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 93,000	$ 8,000
3	Construction Management	10%	of	$ 93,000	$ 10,000
	Indirect Capital Subtotal	33%			**$ 32,000**
				Total Direct + Indirect Capital Cost	**$ 125,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	Cap Maintenance and Repair	1	year	$ 4,000	$ 4,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 7,775**
				Present Worth of Cap + ICs (5%, 100 Years) O&M Costs	**$ 155,000**
				Contingency (20% of total project cost)	**$ 56,000**
				Total Capital and Cap + ICs O&M Cost	**$ 336,000**

NOTES/ASSUMPTIONS
1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. ICs include IC layers 1, 2, 3, 4A, 4B and 5.

TABLE H1.4-3
EAPC 28 - REMEDIAL ALTERNATIVE 4 - EXCAVATION (B(a)P) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 15,110	$ 15,110
2	Site Investigation/Delineation	1	ls	$ 21,000	$ 21,000
3	Site preparation/Geophysical Survey	2,500	sf	$ 0.80	$ 2,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 1.25	$ 4,000
5	Excavation and Stockpile (<5 feet bgs)	463	yd3	$ 12	$ 6,000
6	Clean overburden excavation for slope stabilization	93	yd3	$ 12	$ 1,000
7	Truck Load-out	463	yd3	$ 2	$ 1,000
8	Backfill and Compaction	509	yd^3	$ 35	$ 18,000
9	Asphalt pavement restoration	2,500	sf	$ 10	$ 25,000
10	Transportation and Off-Site Disposal	694	ton	$ 50	$ 35,000
11	Soil Confirmation Sampling and Analyses	25	samples	$ 800	$ 20,000
12	Air Monitoring/Sampling	3	days	$ 2,500	$ 8,000
13	Remediation Documentation/Reporting	1	ea	$ 15,000	$ 15,000
14	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 186,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 186,000	$ 28,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 186,000	$ 15,000
3	Construction Management	10%	of	$ 186,000	$ 19,000
	Indirect Capital Subtotal	33%			**$ 62,000**
				Direct + Indirect Capital Total	**$ 248,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,675	$ 2,675
				ICs Annual Operation and Maintenance Subtotal	**$ 2,675**
				Present Worth of ICs (5%, 100 years) O&M Costs	**$ 54,000**
				Contingency (25%) of total project cost	**$ 76,000**
				Total Capital and O&M Cost	**$ 378,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. No shoring is needed.
3. Assume excavated soil is 100% non haz sent to a permitted facility.
4. Assume 25% contingency for excavation.
5. ICs include IC layers 1, 2 and 5.

TABLE H1.4-4
EAPC 28 - REMEDIAL ALTERNATIVE 5 - EXCAVATION (B(a)P) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 15,110	$ 15,110
2	Site Investigation/Delineation	1	ls	$ 21,000	$ 21,000
3	Site preparation/Geophysical Survey	2,500	sf	$ 0.80	$ 2,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 1.25	$ 4,000
5	Excavation and Stockpile	463	yd3	$ 12	$ 6,000
6	Clean overburden excavation for slope stabilization	93	yd3	$ 12	$ 1,000
7	Truck Load-out	463	yd3	$ 2	$ 1,000
8	Backfill and Compaction	509	yd^3	$ 35	$ 18,000
9	Asphalt pavement restoration	2,500	sf	$ 10	$ 25,000
10	Transportation and Off-Site Disposal	694	ton	$ 50	$ 35,000
11	Soil Confirmation Sampling and Analyses	25	samples	$ 800	$ 20,000
12	Air Monitoring/Sampling	3	days	$ 2,500	$ 8,000
13	Excavation Documentation/Reporting	1	ea	$ 15,000	$ 15,000
14	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 186,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 186,000	$ 28,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 186,000	$ 15,000
3	Construction Management	10%	of	$ 186,000	$ 19,000
	Indirect Capital Subtotal	33%			**$ 62,000**
				Direct + Indirect Capital Total	**$ 248,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,675	$ 2,675
				ICs Annual Operation and Maintenance Subtotal	**$ 2,675**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 54,000**
				Contingency (25% of total project cost)	**$ 76,000**
				Total Capital and ICs O&M Costs	**$ 378,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. No shoring is needed.
3. Assume excavated soil is 100% non haz sent to a permitted facility.
4. Assume 25% contingency for excavation.
5. ICs include IC layers 1, 2 and 5.

EAPC 35

TABLE H1.5-1
EAPC 35 - REMEDIAL ALTERNATIVE 2
ICs + MONITORING COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
				Direct Capital Total	**$ 34,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 34,000	$ 3,400
				Indirect Capital Subtotal	**$ 3,400**
				Total Direct + Indirect Capital Cost	**$ 37,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				Contingency (20% of total project cost)	**$ 20,000**
				Total Capital and ICs O&M Cost	**$ 123,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3, 4A and 5.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.5-2
EAPC 35 - REMEDIAL ALTERNATIVE 3 - CAPPING (PAHs) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 13,000	$ 13,000
3	Site preparation	2,500	sf	$ 0.40	$ 1,000
4	Site Setup, Equipment Mobilization	2,500	sf	$ 0.75	$ 2,000
5	Slurry Seal over Existing Asphalt Pavement	2,500	sf	$ 5	$ 13,000
6	Parcel Cleanup/Demobilization	1	ls	$ 3,000	$ 3,000
7	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
8	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
9	Health and Safety, ODCs	1	ls	$ 5,000	$ 5,000
				Direct Capital Total	**$ 93,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 93,000	$ 14,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 93,000	$ 8,000
3	Construction Management	10%	of	$ 93,000	$ 10,000
	Indirect Capital Subtotal	33%			**$ 32,000**
				Total Direct + Indirect Capital Cost	**$ 125,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	Cap Maintenance and Repair	1	year	$ 4,000	$ 4,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 7,775**
				Present Worth of ICs + Cap (5%, 100 Years) O&M Costs	**$ 155,000**
				Contingency (20% of total project cost)	**$ 56,000**
				Total Capital and Cap + ICs O&M Cost	**$ 336,000**

NOTES/ASSUMPTIONS
1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. ICs include IC layers 1, 2, 3, 4A, 4B and 5.

TABLE H1.5-3
EAPC 35 - REMEDIAL ALTERNATIVE 4 - EXCAVATION (PAHs) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 15,110	$ 15,110
2	Site Investigation/Delineation	1	ls	$ 24,000	$ 24,000
3	Site preparation/Geophysical Survey	2,500	sf	$ 0.80	$ 2,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 1.25	$ 4,000
5	Excavation and Stockpile (<5 feet bgs)	463	yd3	$ 12	$ 6,000
6	Clean overburden excavation for slope stabilization	93	yd3	$ 12	$ 2,000
7	Truck Load-out	463	yd3	$ 2	$ 1,000
8	Backfill and Compaction	509	yd^3	$ 35	$ 18,000
9	Asphalt pavement restoration	2,500	sf	$ 10	$ 25,000
10	Transportation and Off-Site Disposal	694	ton	$ 50	$ 35,000
11	Soil Confirmation Sampling and Analyses	25	samples	$ 800	$ 20,000
12	Air Monitoring/Sampling	3	days	$ 2,500	$ 7,500
13	Remediation Documentation/Reporting	1	ea	$ 15,000	$ 15,000
14	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 190,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 190,000	$ 29,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 190,000	$ 16,000
3	Construction Management	10%	of	$ 190,000	$ 19,000
	Indirect Capital Subtotal	33%			**$ 64,000**
				Direct + Indirect Capital Total	**$ 254,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,675	$ 2,675
				ICs Annual Operation and Maintenance Subtotal	**$ 2,675**
				Present Worth of ICs (5%, 100 years) O&M Costs	**$ 54,000**
				Contingency (25%) of total project cost	**$ 77,000**
				Total Capital and O&M Cost	**$ 385,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. No shoring is needed.
3. Assume excavated soil is 100% non haz sent to a permitted facility.
4. Assume 25% contingency.
5. ICs include IC layers 1, 2 and 5.

TABLE H1.5-4
EAPC 35 - REMEDIAL ALTERNATIVE 5 - EXCAVATION (PAHs) + ICs + MONITORING
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 15,110	$ 15,110
2	Site Investigation/Delineation	1	ls	$ 24,000	$ 24,000
3	Site preparation/Geophysical Survey	2,500	sf	$ 0.80	$ 2,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 1.25	$ 4,000
5	Excavation and Stockpile (5 and 15 feet bgs)	463	yd3	$ 12	$ 6,000
6	Clean overburden excavation for slope stabilization	93	yd3	$ 12	$ 2,000
7	Truck Load-out	463	yd3	$ 2	$ 1,000
8	Backfill and Compaction	509	yd^3	$ 35	$ 18,000
9	Asphalt pavement restoration	2,500	sf	$ 10	$ 25,000
10	Transportation and Off-Site Disposal	694	ton	$ 50	$ 35,000
11	Soil Confirmation Sampling and Analyses	25	samples	$ 800	$ 20,000
12	Air Monitoring/Sampling	3	days	$ 2,500	$ 8,000
13	Excavation Documentation/Reporting	1	ea	$ 15,000	$ 15,000
14	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 190,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 190,000	$ 29,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 190,000	$ 16,000
3	Construction Management	10%	of	$ 190,000	$ 19,000
	Indirect Capital Subtotal	33%			**$ 64,000**
				Direct + Indirect Capital Total	**$ 254,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 2,675	$ 2,675
				ICs Annual Operation and Maintenance Subtotal	**$ 2,675**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 54,000**
				Contingency (25% of total project cost)	**$ 77,000**
				Total Capital and ICs O&M Costs	**$ 385,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. No shoring is needed.
3. Assume excavated soil is 100% non haz sent to a permitted facility.
4. Assume 25% contingency for excavation.
5. ICs include IC layers 1, 2 and 5.

EAPC 6

TABLE H1.6-1
EAPC 6 - REMEDIAL ALTERNATIVE 2
ICs + MONITORING COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
				Direct Capital Total	**$ 34,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 34,000	$ 3,400
				Indirect Capital Subtotal	**$ 3,400**
				Total Direct + Indirect Capital Cost	**$ 37,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				Contingency (20% of total project cost)	**$ 20,000**
				Total Capital and ICs O&M Cost	**$ 123,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3, 4A and 5.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-2
EAPC 6 - REMEDIAL ALTERNATIVE 3 - CAPPING (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 36,900	$ 37,000
3	Site preparation	29,400	sf	$ 0.40	$ 12,000
4	Site Setup, Equipment Mobilization	29,400	sf	$ 0.75	$ 22,000
5	Slurry Seal over Existing Asphalt Pavement	29,400	sf	$ 5	$ 147,000
6	Parcel Cleanup/Demobilization	1	ls	$ 6,000	$ 6,000
7	Remedial Action Monitoring	3	day	$ 2,000	$ 6,000
8	Remediation Documentation/Reporting	1	ls	$ 13,000	$ 13,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 6,000	$ 6,000
				Direct Capital Total	**$ 293,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 293,000	$ 36,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 293,000	$ 18,000
3	Construction Management	8%	of	$ 293,000	$ 24,000
	Indirect Capital Subtotal	26%			**$ 78,000**
				Total Direct + Indirect Capital Cost	**$ 371,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	Cap Maintenance and Repair	1	year	$ 50,000	$ 50,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 53,775**
				Present Worth of Cap + ICs (5%, 100 Years) O&M Costs	**$ 1,068,000**
				Contingency (20% of total project cost)	**$ 288,000**
				Total Capital + O&M Cost	**$ 1,727,000**

NOTES/ASSUMPTIONS

1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
4. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-3
EAPC 6 - REMEDIAL ALTERNATIVE 3 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 25,000	$ 25,000
3	Site preparation	17,500	sf	$ 0.40	$ 7,000
4	Site Setup, Equipment Mobilization	17,500	sf	$ 0.75	$ 13,000
5	Subslab Venting System under building (installed)	17,500	sf	$ 5	$ 87,500
6	Install Vapor Monitoring Points inside building	35	ea	$ 500	$ 17,500
7	Parcel Cleanup/Demobilization	1	ls	$ 4,000	$ 4,000
8	Remedial Action Monitoring	5	day	$ 2,000	$ 10,000
9	Remediation Documentation/Reporting	1	ls	$ 7,000	$ 7,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 4,000	$ 4,000
				Direct Capital Total	**$ 219,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 219,000	$ 27,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 219,000	$ 14,000
3	Construction Management	8%	of	$ 219,000	$ 18,000
	Indirect Capital Subtotal	26%			**$ 59,000**
				Total Direct + Indirect Capital Cost	**$ 278,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
1	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 118,000**
				Total Capital and O&M Cost	**$ 710,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-4
EAPC 6 - REMEDIAL ALTERNATIVE 4 - SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 108,200	$ 108,000
3	Site preparation/Geophysical Survey	29,400	sf	$ 0.80	$ 24,000
4	Site Setup, Equipment Mobilization/Demobilization	29,400	sf	$ 1.25	$ 37,000
5	SVE Vertical Wells (V-SVE)	35	ea	$ 5,000	$ 175,000
6	Install Well Headworks/Vault	35	ea	$ 1,500	$ 52,500
7	Install Outdoor Vapor Monitoring Points	10	ea	$ 2,000	$ 20,000
8	Trenching, Piping, Backfill, Resurfacing	2,500	lf	$ 30	$ 75,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
10	Control and Instrumentation	1	ls	$ 7,000	$ 7,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 40,000	$ 40,000
12	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 300 cfm	1	ea	$ 75,000	$ 75,000
14	Soil Confirmation Sampling and Analyses	40	samples	$ 800	$ 32,000
15	Air Monitoring/Sampling	15	days	$ 2,500	$ 37,500
16	Remediation Documentation/Reporting	1	ea	$ 19,000	$ 19,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 20,000	$ 20,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 16,000	$ 16,000
				Direct Capital Total	**$ 882,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 882,000	$ 106,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 882,000	$ 53,000
3	Construction Management	8%	of	$ 882,000	$ 71,000
	Indirect Capital Total	26%			**$ 230,000**
				Direct + Indirect Capital Total	**$ 1,112,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 5,000	$ 60,000
3	Fuel	12	mths	$ 7,000	$ 84,000
4	Electricity	12	mths	$ 2,200	$ 26,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 2,000	$ 24,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 5,000	$ 60,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 6,000	$ 72,000
8	Waste/Water Disposal	12	mths	$ 3,000	$ 36,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				ICs Annual Operation and Maintenance Subtotal	**$ 3,775**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 75,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 398,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,084,000**
				Contingency (20% of total project cost)	**$ 454,000**
				Total Capital and O&M Cost	**$ 2,725,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (OS) system: Uses 35 V-SVE wells, 5-15 feet bgs screens.
2. Benzene SVE uses thermal oxidizer, 300 scfm, positive displacement (PD) blower.
3. Assume SVE operation for 3 years.
4. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-5
EAPC 6 - REMEDIAL ALTERNATIVE 4 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 25,000	$ 25,000
3	Site preparation	17,500	sf	$ 0.80	$ 14,000
4	Site Setup, Equipment Mobilization	17,500	sf	$ 1.25	$ 22,000
5	Subslab Venting System under building (installed)	17,500	sf	$ 5	$ 87,500
6	Install Vapor Monitoring Points inside building	35	ea	$ 500	$ 17,500
7	Parcel Cleanup/Demobilization	1	ls	$ 4,000	$ 4,000
8	Remedial Action Monitoring	5	day	$ 2,000	$ 10,000
9	Remediation Documentation/Reporting	1	ls	$ 11,000	$ 11,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 9,000	$ 9,000
				Direct Capital Total	**$ 244,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 244,000	$ 30,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 244,000	$ 15,000
3	Construction Management	8%	of	$ 244,000	$ 20,000
	Indirect Capital Subtotal	26%			**$ 65,000**
				Total Direct + Indirect Capital Cost	**$ 309,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 125,000**
				Total Capital and O&M Cost	**$ 748,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-6
EAPC 6 - REMEDIAL ALTERNATIVE 5 - SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 108,200	$ 108,000
3	Site preparation/Geophysical Survey	29,400	sf	$ 0.80	$ 24,000
4	Site Setup, Equipment Mobilization/Demobilization	29,400	sf	$ 1.25	$ 37,000
5	SVE Vertical Wells (V-SVE)	35	ea	$ 5,000	$ 175,000
6	Install Well Headworks/Vault	35	ea	$ 1,500	$ 52,500
7	Install Outdoor Vapor Monitoring Points	12	ea	$ 2,000	$ 24,000
8	Trenching, Piping, Backfill, Resurfacing	2,500	lf	$ 30	$ 75,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 44,000	$ 44,000
10	Control and Instrumentation	1	ls	$ 5,000	$ 5,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 26,000	$ 26,000
12	SVE System Installation and Startup	1	ea	$ 44,000	$ 44,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 1000 cfm	1	ea	$ 55,000	$ 55,000
14	Soil Confirmation Sampling and Analyses	38	samples	$ 800	$ 30,400
15	Air Monitoring/Sampling	15	days	$ 2,500	$ 37,500
16	Remediation Documentation/Reporting	1	ea	$ 19,000	$ 19,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 11,000	$ 11,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 16,000	$ 16,000
				Direct Capital Total	**$ 818,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 818,000	$ 99,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 818,000	$ 50,000
3	Construction Management	8%	of	$ 818,000	$ 66,000
	Indirect Capital Total	26%			**$ 215,000**
				Direct + Indirect Capital Total	**$ 1,033,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 4,600	$ 55,200
3	Fuel	12	mths	$ 6,800	$ 81,600
4	Electricity	12	mths	$ 2,500	$ 30,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,400	$ 16,800
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 3,400	$ 40,800
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 6,000	$ 72,000
8	Waste/Water Disposal	12	mths	$ 2,100	$ 25,200
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,800	$ 21,600
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 343,200**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 935,000**
				Contingency (20% of total project cost)	**$ 407,000**
				Total Capital and O&M Cost	**$ 2,440,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (OS) system: Uses 35 V-SVE wells, 5-15 feet bgs screens.
2. Benzene SVE uses thermal oxidizer, 1000 scfm, positive displacement (PD) blower.
3. Assume SVE operation for 3 years.
4. Site investigation cost is based on an assumed sampling density.
5. ICs include IC layers 1, 2, 3, 4A and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-7
EAPC 6 - REMEDIAL ALTERNATIVE 5 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 62,500	$ 63,000
3	Site preparation/Geophysical Survey	17,500	sf	$ 0.80	$ 14,000
4	Site Setup, Equipment Mobilization/Demobilization	17,500	sf	$ 1.25	$ 22,000
5	SVE Horizontal Wells (H-SVE)	5	ea	$ 25,000	$ 125,000
6	Install Well Headworks/Vault	5	ea	$ 1,500	$ 7,500
7	Trenching, Piping, Backfill, Resurfacing	400	lf	$ 30	$ 12,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 6,000	$ 6,000
9	Control and Instrumentation	1	ls	$ 4,000	$ 4,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 4,000	$ 4,000
11	SVE System Installation and Startup	1	ea	$ 6,000	$ 6,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 1000 cfm	1	ea	$ 65,000	$ 65,000
13	Soil Confirmation Sampling and Analyses	22	samples	$ 800	$ 17,600
14	Air Monitoring/Sampling	9	days	$ 2,500	$ 22,500
15	Remediation Documentation/Reporting	1	ea	$ 11,000	$ 11,000
16	Site Closure, decommisioning, well abandonment	1	ls	$ 14,000	$ 14,000
17	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 9,000	$ 9,000
				Direct Capital Total	**$ 437,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 437,000	$ 53,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 437,000	$ 27,000
3	Construction Management	8%	of	$ 437,000	$ 35,000
	Indirect Capital Total	26%			**$ 115,000**
				Direct + Indirect Capital Total	**$ 552,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 5,400	$ 64,800
3	Fuel	12	mths	$ 8,200	$ 98,400
4	Electricity	12	mths	$ 3,000	$ 36,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,400	$ 16,800
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 4,100	$ 49,200
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
8	Waste/Water Disposal	12	mths	$ 2,400	$ 28,800
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 2,200	$ 26,400
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 368,400**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,004,000**
				Contingency (20% of total project cost)	**$ 324,000**
				Total Capital and O&M Cost	**$ 1,945,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (UB) system: Uses 5 H-SVE wells with average 125 feet screeens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Benzene SVE uses thermal oxidizer, 1000 scfm, positive displacement (PD) blower.
4. Assume SVE operation for 3 years.
5. Site investigation cost is based on an assumed sampling density.
6. ICs include IC layers 1, 2, 3, 4A and 5.
7. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.6-8
EAPC 6 - REMEDIAL ALTERNATIVE 6 - EXCAVATION (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 98,200	$ 98,000
3	Site preparation/Geophysical Survey	29,400	sf	$ 0.80	$ 24,000
4	Site Setup, Equipment Mobilization/Demobilization	29,400	sf	$ 1.25	$ 37,000
5	Shoring design and installation	2,250	sf	$ 65	$ 146,000
6	Excavation and Stockpile (< 15 feet bgs)	16,300	yd3	$ 12	$ 196,000
7	Clean overburden excavation for slope stabilization	900	yd3	$ 12	$ 11,000
8	Truck Load-out	16,300	yd3	$ 2	$ 33,000
9	Backfill and Compaction	17,930	yd^3	$ 35	$ 627,000
10	Asphalt pavement restoration	29,400	sf	$ 10	$ 294,000
11	Transportation and Off-Site Disposal	24,450	ton	$ 100	$ 2,445,000
12	Soil Confirmation Sampling and Analyses	78	samples	$ 350	$ 27,300
13	Air Monitoring/Sampling	31	days	$ 2,500	$ 77,500
14	Remediation Documentation/Reporting	1	ea	$ 19,000	$ 19,000
15	Site Closure, decommisioning	1	ls	$ 10,000	$ 10,000
16	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 16,000	$ 16,000
				Direct Capital Total	**$ 4,061,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 4,061,000	$ 325,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 4,061,000	$ 204,000
3	Construction Management	6%	of	$ 4,061,000	$ 244,000
	Indirect Capital Total	19%			**$ 773,000**
				Direct + Indirect Capital Total	**$ 4,834,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 years)	**$ 65,000**
				Contingency (25% of total project cost)	**$ 1,225,000**
				Total Capital and O&M Cost	**$ 6,108,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. Assume 150 linear feet of soldier pile shoring is needed.
3. Assume excavated soil is 33% RCRA haz, 33% Cal haz, and 33% non haz sent to a permitted facility.

TABLE H1.6-9
EAPC 6 - REMEDIAL ALTERNATIVE 6 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 62,500	$ 63,000
3	Site preparation/Geophysical Survey	17,500	sf	$ 0.80	$ 14,000
4	Site Setup, Equipment Mobilization/Demobilization	17,500	sf	$ 1.25	$ 22,000
5	SVE Horizontal Wells (H-SVE)	5	ea	$ 25,000	$ 125,000
6	Install Well Headworks/Vault	5	ea	$ 1,500	$ 8,000
7	Trenching, Piping, Backfill, Resurfacing	400	lf	$ 30	$ 12,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
9	Control and Instrumentation	1	ls	$ 7,000	$ 7,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 6,600	$ 7,000
11	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 750 cfm	1	ea	$ 100,000	$ 100,000
13	Soil Confirmation Sampling and Analyses	47	samples	$ 800	$ 37,600
14	Air Monitoring/Sampling	19	days	$ 2,500	$ 47,500
15	Remediation Documentation/Reporting	1	ea	$ 11,000	$ 11,000
16	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
17	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 9,000	$ 9,000
				Direct Capital Total	**$ 607,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 607,000	$ 49,000
2	Project Management, Agency Reporting and Coordination	5%	of	$ 607,000	$ 31,000
3	Construction Management	6%	of	$ 607,000	$ 37,000
	Indirect Capital Total	19%			**$ 117,000**
				Direct + Indirect Capital Total	**$ 724,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 6,000	$ 72,000
3	Fuel	12	mths	$ 12,000	$ 144,000
4	Electricity	12	mths	$ 4,300	$ 52,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 2,000	$ 24,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 4,000	$ 48,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 8,000	$ 96,000
8	Waste/Water Disposal	12	mths	$ 2,000	$ 24,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				SVE Annual Operation and Maintenance Subtotal	**$ 496,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 1,351,000**
				Contingency (20% of total project cost)	**$ 428,000**
				Total Capital and O&M Cost	**$ 2,568,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (UB) system: Uses 5 H-SVE wells with average 125 feet screens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Benzene SVE uses thermal oxidizer, 750 scfm, positive displacement (PD) blower.
4. Assume SVE operation for 3 years.
5. ICs include IC layers 1, 2, 3, 4A and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

EAPC 11

TABLE H1.7-1
EAPC 11 - REMEDIAL ALTERNATIVE 2
ICs + MONITORING COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
				Direct Capital Total	**$ 34,000**
Item No.	**Indirect Capital Costs**				
1	Project Management	10%	of	$ 34,000	$ 3,400
				Indirect Capital Subtotal	**$ 3,400**
				Total Direct + Indirect Capital Cost	**$ 37,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 65,000**
				Contingency (20% of total project cost)	**$ 20,000**
				Total Capital and ICs O&M Cost	**$ 123,000**

NOTES/ASSUMPTIONS
1. ICs include IC layers 1, 2, 3, 4A and 5.
2. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-2
EAPC 11 - REMEDIAL ALTERNATIVE 3 - CAPPING (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 16,500	$ 17,000
3	Site preparation	4,500	sf	$ 0.40	$ 2,000
4	Site Setup, Equipment Mobilization	4,500	sf	$ 0.75	$ 3,000
5	Slurry Seal over Existing Asphalt Pavement	4,500	sf	$ 5	$ 23,000
6	Parcel Cleanup/Demobilization	1	ls	$ 3,000	$ 3,000
7	Remedial Action Monitoring	5	day	$ 2,000	$ 10,000
8	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 3,000	$ 3,000
				Direct Capital Total	**$ 115,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 115,000	$ 18,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 115,000	$ 10,000
3	Construction Management	10%	of	$ 115,000	$ 12,000
	Indirect Capital Subtotal	33%			**$ 40,000**
				Total Direct + Indirect Capital Cost	**$ 155,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	Cap Maintenance and Repair	1	year	$ 11,000	$ 11,000
				Cap + ICs Annual Operation and Maintenance Subtotal	**$ 14,775**
				Present Worth of Cap + ICs (5%, 100 Years) O&M Costs	**$ 294,000**
				Contingency (20% of total project cost)	**$ 90,000**
				Total Capital + O&M Cost	**$ 539,000**

NOTES/ASSUMPTIONS

1. Site is already paved with asphalt over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
2. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
3. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
4. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-3
EAPC 11 - REMEDIAL ALTERNATIVE 3 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 27,500	$ 28,000
3	Site preparation	10,000	sf	$ 0.40	$ 4,000
4	Site Setup, Equipment Mobilization	10,000	sf	$ 0.75	$ 8,000
5	Subslab Venting System under building (installed)	10,000	sf	$ 5	$ 50,000
6	Install Vapor Monitoring Points inside building	100	ea	$ 500	$ 50,000
7	Parcel Cleanup/Demobilization	1	ls	$ 7,000	$ 7,000
8	Remedial Action Monitoring	7	day	$ 2,000	$ 14,000
9	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,000	$ 7,000
				Direct Capital Total	**$ 222,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 222,000	$ 34,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 222,000	$ 18,000
3	Construction Management	10%	of	$ 222,000	$ 23,000
	Indirect Capital Subtotal	33%			**$ 75,000**
				Total Direct + Indirect Capital Cost	**$ 297,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 122,000**
				Total Capital and SSV O&M Cost	**$ 733,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-4
EAPC 11 - REMEDIAL ALTERNATIVE 4 - SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 16,500	$ 16,500
3	Site preparation/Geophysical Survey	4,500	sf	$ 0.80	$ 4,000
4	Site Setup, Equipment Mobilization/Demobilization	4,500	sf	$ 1.25	$ 6,000
5	SVE Vertical Wells (V-SVE)	8	ea	$ 5,000	$ 40,000
6	Install Well Headworks/Vault	8	ea	$ 1,500	$ 12,000
7	Install Outdoor Vapor Monitoring Points	2	ea	$ 2,000	$ 4,000
8	Trenching, Piping, Backfill, Resurfacing	400	lf	$ 30	$ 12,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
10	Control and Instrumentation	1	ls	$ 4,000	$ 4,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 10,000	$ 10,000
12	SVE System Installation and Startup	1	ea	$ 30,000	$ 30,000
13	SVE Emissions Treatment System (Thermal/Cat Ox), 100 cfm	1	ea	$ 50,000	$ 50,000
14	Soil Confirmation Sampling and Analyses	15	samples	$ 750	$ 11,000
15	Air Monitoring/Sampling	6	days	$ 2,500	$ 15,000
16	Remediation Documentation/Reporting	1	ea	$ 15,000	$ 15,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 20,000	$ 20,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 13,000	$ 13,000
				Direct Capital Total	**$ 357,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 357,000	$ 43,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 357,000	$ 22,000
3	Construction Management	8%	of	$ 357,000	$ 29,000
	Indirect Capital Total	26%			**$ 94,000**
				Direct + Indirect Capital Total	**$ 451,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 4,000	$ 48,000
3	Fuel	12	mths	$ 3,000	$ 36,000
4	Electricity	12	mths	$ 1,300	$ 16,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 1,500	$ 18,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
8	Waste/Water Disposal	12	mths	$ 1,000	$ 12,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				SVE Annual Operation and Maintenance Subtotal	**$ 226,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 616,000**
				ICs Annual Operation and Maintenance Subtotal	**$ 3,775**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ 75,000**
				Contingency (20% of total project cost)	**$ 228,000**
				Total Capital and O&M Cost	**$ 1,370,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (OS) system: Uses 8 V-SVE wells, 5-15 feet bgs screens.
2. Benzene SVE uses thermal oxidizer, 100 scfm, positive displacement (PD) blower.
3. Assume SVE operation for 3 years.
4. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-5
EAPC 11 - REMEDIAL ALTERNATIVE 4 - HVAC MOD/SSV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 27,500	$ 28,000
3	Site preparation	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization	10,000	sf	$ 1.25	$ 13,000
5	Subslab Venting System under building (installed)	10,000	sf	$ 5	$ 50,000
6	Install Vapor Monitoring Points inside building	100	ea	$ 500	$ 50,000
7	Parcel Cleanup/Demobilization	1	ls	$ 7,000	$ 7,000
8	Remedial Action Monitoring	7	day	$ 2,000	$ 14,000
9	Remediation Documentation/Reporting	1	ls	$ 10,000	$ 10,000
10	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,000	$ 7,000
				Direct Capital Total	**$ 231,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 231,000	$ 28,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 231,000	$ 14,000
3	Construction Management	8%	of	$ 231,000	$ 19,000
	Indirect Capital Subtotal	26%			**$ 61,000**
				Total Direct + Indirect Capital Cost	**$ 292,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SSV periodic monitoring, operation, maintenance	1	year	$ 12,000	$ 12,000
				SSV + ICs Annual Operation and Maintenance Subtotal	**$ 15,775**
				Present Worth of SSV + ICs (5%, 100 Years) O&M Costs	**$ 314,000**
				Contingency (20% of total project cost)	**$ 121,000**
				Total Capital and SSV O&M Cost	**$ 727,000**

NOTES/ASSUMPTIONS
1. SSV assumed for this alternative instead of HVAC Mod.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-6
EAPC 11 - REMEDIAL ALTERNATIVE 5 - SVE/BV (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 16,500	$ 16,500
3	Site preparation/Geophysical Survey	4,500	sf	$ 0.80	$ 4,000
4	Site Setup, Equipment Mobilization/Demobilization	4,500	sf	$ 1.25	$ 6,000
5	SVE Vertical Wells (V-SVE)	8	ea	$ 5,000	$ 40,000
6	Install Well Headworks/Vault	8	ea	$ 1,500	$ 12,000
7	Install Outdoor Vapor Monitoring Points	2	ea	$ 2,000	$ 4,000
8	Trenching, Piping, Backfill, Resurfacing	400	lf	$ 30	$ 12,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 33,000	$ 33,000
10	Control and Instrumentation	1	ls	$ 2,000	$ 2,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 8,000	$ 8,000
12	SVE System Installation and Startup	1	ea	$ 33,000	$ 33,000
13	SVE Emissions Treatment System (Thermal/Cat Ox), 100 cfm	1	ea	$ 18,000	$ 18,000
14	Soil Confirmation Sampling and Analyses	15	samples	$ 750	$ 11,000
15	Air Monitoring/Sampling	6	days	$ 2,500	$ 15,000
16	Remediation Documentation/Reporting	1	ea	$ 20,000	$ 20,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 17,000	$ 17,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 17,000	$ 17,000
				Direct Capital Total	**$ 313,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 313,000	$ 38,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 313,000	$ 19,000
3	Construction Management	8%	of	$ 313,000	$ 26,000
	Indirect Capital Total	26%			**$ 83,000**
				Direct + Indirect Capital Total	**$ 396,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 4,000	$ 48,000
3	Fuel	12	mths	$ 2,000	$ 24,000
4	Electricity	12	mths	$ 1,000	$ 12,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 2,300	$ 27,600
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
8	Waste/Water Disposal	12	mths	$ 1,000	$ 12,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				SVE Annual Operation and Maintenance Subtotal	**$ 219,600**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 599,000**
				ICs Annual Operation and Maintenance Subtotal	**$ 3,775**
				Present Worth of ICs (5%, 100 Years) O&M Costs	**$ 75,000**
				Contingency (20% of total project cost)	**$ 214,000**
				Total Capital and O&M Cost	**$ 1,284,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (OS) system: Uses 8 V-SVE wells, 5-15 feet bgs screens.
2. Benzene SVE uses thermal oxidizer, 100 scfm, positive displacement (PD) blower.
3. Assume SVE operation for 3 years.
4. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-7
EAPC 11 - REMEDIAL ALTERNATIVE 5 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 44,110	$ 44,110
2	Site Investigation/Delineation	1	ls	$ 27,500	$ 28,000
3	Site preparation/Geophysical Survey	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization/Demobilization	10,000	sf	$ 1.25	$ 13,000
5	SVE Horizontal Wells (H-SVE)	4	ea	$ 25,000	$ 100,000
6	Install Well Headworks/Vault	4	ea	$ 1,500	$ 6,000
7	Trenching, Piping, Backfill, Resurfacing	300	lf	$ 30	$ 9,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 17,000	$ 17,000
9	Control and Instrumentation	1	ls	$ 4,000	$ 4,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 4,000	$ 4,000
11	SVE System Installation and Startup	1	ea	$ 17,000	$ 17,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 400 cfm	1	ea	$ 62,000	$ 62,000
13	Soil Confirmation Sampling and Analyses	15	samples	$ 800	$ 12,000
14	Air Monitoring/Sampling	6	days	$ 2,500	$ 15,000
15	Remediation Documentation/Reporting	1	ea	$ 10,000	$ 10,000
16	Site Closure, decommisioning, well abandonment	1	ls	$ 8,000	$ 8,000
17	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 8,000	$ 8,000
				Direct Capital Total	**$ 321,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 321,000	$ 39,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 321,000	$ 20,000
3	Construction Management	8%	of	$ 321,000	$ 26,000
	Indirect Capital Total	26%			**$ 85,000**
				Direct + Indirect Capital Total	**$ 406,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,775
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 2,000	$ 24,000
3	Fuel	12	mths	$ 7,000	$ 84,000
4	Electricity	12	mths	$ 2,500	$ 30,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 1,200	$ 14,400
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 2,000	$ 24,000
8	Waste/Water Disposal	12	mths	$ 500	$ 6,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,000	$ 12,000
				SVE Annual Operation and Maintenance Subtotal	**$ 206,400**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 563,000**
				ICs Annual Operation and Maintenance Subtotal	**$ 3,775**
				Present Worth of ICs (5%, 100 Years) O&M Costs	**$ 75,000**
				Contingency (20% of total project cost)	**$ 209,000**
				Total Capital and O&M Cost	**$ 1,253,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (UB) system: Uses 4 H-SVE wells with average 100 feet screeens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Benzene SVE uses thermal oxidizer, 400 scfm, positive displacement (PD) blower.
4. Assume SVE operation for 3 years.
5. ICs include IC layers 1, 2, 3, 4A, 4B and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-8
EAPC 11 - REMEDIAL ALTERNATIVE 6 - EXCAVATION (OS) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 65,000	$ 65,000
3	Site preparation/Geophysical Survey	4,500	sf	$ 0.80	$ 4,000
4	Site Setup, Equipment Mobilization/Demobilization	4,500	sf	$ 1.25	$ 6,000
5	Shoring design and installation	1,500	sf	$ 65	$ 98,000
6	Excavation and Stockpile (< 15 feet bgs)	2,500	yd3	$ 12	$ 30,000
7	Clean overburden excavation for slope stabilization	375	yd3	$ 12	$ 5,000
8	Truck Load-out	2,500	yd3	$ 2	$ 5,000
9	Backfill and Compaction	2,750	yd^3	$ 35	$ 96,000
10	Asphalt pavement restoration	4,500	sf	$ 10	$ 45,000
11	Transportation and Off-Site Disposal	3,750	ton	$ 100	$ 375,000
12	Soil Confirmation Sampling and Analyses	30	samples	$ 500	$ 15,000
13	Air Monitoring/Sampling	12	days	$ 2,500	$ 30,000
14	Remediation Documentation/Reporting	1	ea	$ 20,000	$ 20,000
15	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
16	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 15,000	$ 15,000
				Direct Capital Total	**$ 853,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 853,000	$ 103,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 853,000	$ 52,000
3	Construction Management	8%	of	$ 853,000	$ 69,000
	Indirect Capital Total	26%			**$ 224,000**
				Direct + Indirect Capital Total	**$ 1,077,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,275	$ 3,275
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 years)	**$ 65,000**
				Contingency (25% of total project cost)	**$ 286,000**
				Total Capital and O&M Cost	**$ 1,428,000**

NOTES/ASSUMPTIONS
1. Excavation assumes sidewall sloped 1:1 and areas needed for stockpile and load-out are available.
2. Assume 100 linear feet of soldier pile shoring is needed.
3. Assume excavated soil is 33% RCRA haz, 33% Cal haz, and 33% non haz sent to a permitted facility.
4. ICs include IC layers 1, 2, 3, 4A and 5.
5. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

TABLE H1.7-9
EAPC 11 - REMEDIAL ALTERNATIVE 6 - SVE/BV (UB) + ICs + MONITORING
COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ 34,110	$ 34,110
2	Site Investigation/Delineation	1	ls	$ 35,000	$ 35,000
3	Site preparation/Geophysical Survey	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization/Demobilization	10,000	sf	$ 1.25	$ 13,000
5	SVE Horizontal Wells (H-SVE)	4	ea	$ 25,000	$ 100,000
6	Install Well Headworks/Vault	4	ea	$ 1,500	$ 6,000
7	Trenching, Piping, Backfill, Resurfacing	300	lf	$ 30	$ 9,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 50,000	$ 50,000
9	Control and Instrumentation	1	ls	$ 5,000	$ 5,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 10,500	$ 10,500
11	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 400 cfm	1	ea	$ 80,000	$ 80,000
13	Soil Confirmation Sampling and Analyses	20	samples	$ 800	$ 16,000
14	Air Monitoring/Sampling	8	days	$ 2,500	$ 20,000
15	Remediation Documentation/Reporting	1	ea	$ 15,000	$ 15,000
16	Site Closure, decommisioning, well abandonment	1	ls	$ 10,000	$ 10,000
17	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 12,000	$ 12,000
				Direct Capital Total	**$ 474,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 474,000	$ 57,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 474,000	$ 29,000
3	Construction Management	8%	of	$ 474,000	$ 38,000
	Indirect Capital Total	26%			**$ 124,000**
				Direct + Indirect Capital Total	**$ 598,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ 3,775	$ 3,275
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 5,000	$ 60,000
3	Fuel	12	mths	$ 6,000	$ 72,000
4	Electricity	12	mths	$ 2,700	$ 32,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,500	$ 18,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 2,000	$ 24,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
8	Waste/Water Disposal	12	mths	$ 1,000	$ 12,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 3,000	$ 36,000
				SVE Annual Operation and Maintenance Subtotal	**$ 302,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 3 Years)	**$ 823,000**
				ICs Annual Operation and Maintenance Subtotal	**$ 3,275**
				Present Worth of ICs (5%, 100 Years) O&M Costs	**$ 65,000**
				Contingency (20% of total project cost)	**$ 297,000**
				Total Capital and O&M Cost	**$ 1,783,000**

NOTES/ASSUMPTIONS
1. Benzene SVE (UB) system: Uses 4 H-SVE wells with average 100 feet screeens installed @ 10 feet bgs.
2. Horizontal wells installed at a depth of 10 feet bgs using directional drilling.
3. Benzene SVE uses thermal oxidizer, 400 scfm, positive displacement (PD) blower.
4. Assume SVE operation for 3 years.
5. ICs include IC layers 1, 2, 3, 4A and 5.
6. ICs capital and O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.

APPENDIX H2

PLUG-IN REMEDY COSTS

APPENDIX H2

PLUG-IN REMEDY COSTS

The Permit Review Institutional Control (IC Layer 2) is intended to allow identification of any residual contamination at a parcel that might be encountered during soil excavation performed as part of future construction projects. Pursuant to direction by US EPA Headquarters, the Proposed Plan is required to describe and evaluate the remedial alternatives for these potential residual contamination areas. Cost estimates were therefore developed for applicable surface pathway remediation technologies to assist USEPA with this requirement. Since the size of remedial areas that would be addressed in the future are unknown, the cost estimates presented here are for hypothetical small, medium and large areas, as requested by USEPA in its FS Addendum memorandum dated June 12, 2009 (USEPA, 2009). These cost estimates were developed by first estimating unit costs for each technology ($/cubic yard [CY] or $/square foot [SF]) and then multiplying by the areal extent (SF) or volume (CY) of the assumed small, medium and large remedial areas.

Costs are presented in the attached tables for Capping, Excavation, Soil Vapor Extraction (SVE), Building Engineering Controls (BEC) and Institutional Control (IC) technologies including some technology variations as shown in the table below. For shallow soil excavation, three cost scenarios are included depending on factors such as depth, contaminant type, and soil disposal characteristics. For capping, two scenarios are included with either a new asphalt cap or slurry seal of an existing asphalt cap. For SVE, costs are presented for SVE in outdoor soil and SVE under building.

TECHNOLOGY	TECHNOLOGY VARIATION
Capping (asphalt)	New asphalt cap
	Slurry seal of existing asphalt cap
Excavation	Excavation, <5 feet bgs, nonVOC-impacted, nonhazardous soil for disposal
	Excavation, <15 feet bgs, VOC-impacted, nonhazardous soil for disposal
	Excavation, <15 feet bgs, VOC-impacted, RCRA and California hazardous soil for disposal
Soil Vapor Extraction	SVE (OS)
	SVE (UB)
Building Engineering Control	HVAC modification/Subslab Venting (SSV)
Institutional Controls	IC layers 1 and 2 are applied to all parcels while various combinations of IC layers 3, 4A, 4B and 5 are applied to parcels in Groups 3, 4 and 5. A technology modification in the future could require additional ICs for a specific parcel.

Table H2-1 summarizes the plug-in costs for the assumed small, medium and large areas for each of the technologies listed above except ICs. The ICs costs do not vary significantly with the size

of the remedial area. The total cost presented for each technology is a present worth cost (in 2009 dollars) based on the duration of the remedial technology. For excavation, soil volumes of 10 CY, 100 CY and 1,000 CY are assumed to represent small, medium and large areas. For SVE and BEC, larger soil volumes of 100 CY, 1,000 CY and 10,000 CY are assumed for these areas because these technologies are commonly applied to relatively larger areas. For Capping, soil areas of 100 SF, 1,000 SF and 10,000 SF are assumed to represent the small, medium and large areas. Table H2-2 presents ICs costs for the initial setup of ICs for all parcels at the site. Additional costs are shown in the bottom of the table if a need to add individual IC layers 3, 4A, 4B or 5 arises in the future. The cost for a selected alternative can be obtained by adding the cost of the soil remediation technology (Table H2-1) and the relevant ICs cost presented in Table H2-2.

Table H2-3 presents the unit costs ($/SF or $/CY) for each technology and backup cost spreadsheets are presented in Attachment H2-1. The specific assumptions used during preparation of the cost estimates for each technology are generally consistent with those used in the previous FS cost estimates (Appendix D). Notes are presented at the bottom of each table to provide further details about assumptions used to derive the cost estimates.

TABLE H2-1
PLUG-IN COSTS SUMMARY TABLE FOR SOIL REMEDIATION TECHNOLOGIES
SMALL, MEDIUM AND LARGE AREA SCENARIOS
Soil an NAPL FS
Del Amo Superfund Site

Area Scenarios	Unit Cost[1]		Impacted Soil Area	Impacted Soil Volume	Total PW[2] Cost
	$/sf	$/cy	sf	cy	$
Capping[3]					
New Asphalt Cap					
Small Area	$230	--	100	--	$23,000
Medium Area	$96	--	1000	--	$96,000
Large Area	$74	--	10000	--	$744,000
Slurry Seal					
Small Area	$200	--	100	--	$20,000
Medium Area	$86	--	1000	--	$86,400
Large Area	$63	--	10000	--	$632,000
Excavation[4]					
<5 feet bgs (non-VOC, non-Haz)					
Small Area	--	$2,268	--	10	$22,680
Medium Area	--	$907	--	100	$90,700
Large Area	--	$555	--	1000	$555,000
<15 feet bgs (VOC, non-Haz)					
Small Area	--	$2,700	--	10	$27,000
Medium Area	--	$858	--	100	$85,800
Large Area	--	$477	--	1000	$477,000
<15 feet bgs (VOC, 33% RCRA Haz / 33% CAL Haz / 33% Non Haz)					
Small Area	--	$3,276	--	10	$32,760
Medium Area	--	$1,322	--	100	$132,200
Large Area	--	$927	--	1000	$927,000
Soil Vapor Extraction (Outdoor Soil)[5]					
Small Area (GAC)	--	$384	--	100	$38,400
Medium Area (GAC)	--	$158	--	1000	$158,000
Medium Area (CatOx)	--	$169	--	1000	$169,000
Large Area (CatOx)	--	$82	--	10000	$820,000
Soil Vapor Extraction (Under Building)[6]					
Small Area (GAC)	--	$513	--	100	$51,300
Medium Area (GAC)	--	$201	--	1000	$201,060
Medium Area (CatOx)	--	$223	--	1000	$223,000
Large Area (CatOx)	--	$110	--	10000	$1,100,000
Building Engineering Control[7]					
Small Area	--	$145	--	100	$14,500
Medium Area	--	$65	--	1000	$65,000
Large Area	--	$31	--	10000	$310,000

Notes:

1. Capping uses unit cost in $/square foot while other technologies use unit cost in $/cubic yard.

2. Present worth cost includes 20% to 30% contingency depending on technology.

3. Capping considers two scenarios: 1) resurfacing with a slurry seal (liquid asphalt) over existing pavement, or 2) constructing new 4-inch thick asphalt cover. Capping present worth includes costs for long term maintenance indefinitely in the future (assume 100 years).

4. Excavation considers three scenarios: 1) Non-hazardous soil, impacted area < 5 feet bgs, 2) Non-hazardous soil, impacted area < 15 feet bgs, and 3) 33% RCRA hazardous, 33% California hazardous, and 33% Non hazardous soil, hazardous soil, impacted area <15 feet bgs.

5. SVE(OS) assumes operation for 2 years for all areas. Assume SVE emisions treatment system uses granular activated carbon (GAC) for small and medium areas, and Catalytic Oxidizer / Thermal for medium and large area.

6. SVE(UB) assumes use of horizontal wells that are converted to SSV and operated indefinitely (100 years).

7. Building Engineering Control (BEC) assumes SSV system operates indefinitely (100 years). Soil volume (cy) is based on 15 feet bgs depth.

TABLE H2-2
INSTITUTIONAL CONTROLS COSTS SUMMARY BY PARCEL GROUPS
Soil and NAPL FS
Del Amo Superfund Site

EAPC Groups IC Scenarios	IC Layers	ICs Implementation Cost[1]	Capital Cost[2]	Annual O&M Cost[1]	Total PW Costs[3]
Groups 3, 4 and 5 Parcels					
IC Layers					
Scenario 1	1,2,3,4A	$24,110	$26,000	$2,775	**$98,000**
Scenario 2	1,2,3,4A,5	$34,110	$37,000	$3,275	**$123,000**
Scenario 3	1,2,3,4A,4B	$34,110	$37,000	$3,275	**$123,000**
Scenario 4	1,2,3,4A,4B,5	$44,110	$48,000	$3,775	**$148,000**
Groups 1 and 2 Parcels					
IC Layers					
All Group 1 and 2 parcels	1,2	$5,110	$5,500	$2,175	**$58,000**
If additional IC Layers are added [4]					
Scenario 1	3	$4,000	$4,400	$100	**$8,000**
Scenario 2	4A	$15,000	$16,500	$500	**$32,000**
Scenario 3	4B	$10,000	$11,000	$500	**$25,000**
Scenario 4	5	$10,000	$11,000	$500	**$25,000**
Scenario 5	3,4A	$19,000	$21,000	$600	**$40,000**
Scenario 6	3,4A,5	$29,000	$32,000	$1,100	**$65,000**
Scenario 7	3,4A,4B	$29,000	$32,000	$1,100	**$65,000**
Scenario 8	3,4A,4B,5	$39,000	$43,000	$1,600	**$90,000**

Notes:

1. ICs implementation and annual O&M costs are estimated based on applicable IC layers per parcel as shown in Tables D3-1 and D3-2.
2. ICs Capital Costs includes implementation cost (direct capital) plus 10% for project management cost.
3. Present Worth cost assumes ICs are implemented for 100 years at a 5% discount rate and includes a 20% contingency.
4. Additional IC layers may be required for a parcel if a technology modiciation is deemed necessary depending on future site conditions.

TABLE H2-3
UNIT COSTS SUMMARY TABLE FOR SOIL REMEDIATION TECHNOLOGIES
SMALL, MEDIUM AND LARGE AREA SCENARIOS
Soli and NAPL FS
Del Amo Superfund Site

Area Scenarios	Dimensions (ft)		Impacted Area (sf)	Impacted Volume[1] (cy)	Total PW Costs[2]	Unit Costs	
	L	W			$	$/sf	$/cy
Capping[3]							
New Asphalt Cap							
Small Area	10	10	100	--	**$23,000**	**$230**	**--**
Medium Area	25	25	625	--	**$60,000**	**$96**	**--**
Large Area	50	50	2500	--	**$186,000**	**$74**	**--**
Slurry Seal							
Small Area	10	10	100	--	**$20,000**	**$200**	**--**
Medium Area	25	25	625	--	**$54,000**	**$86**	**--**
Large Area	50	50	2500	--	**$158,000**	**$63**	**--**
Excavation[4]							
<5 feet bgs (non-VOC, non-Haz)							
Small Area	10	10	100	19	**$42,000**	**$420**	**$2,268**
Medium Area	25	25	625	116	**$105,000**	**$168**	**$907**
Large Area	50	50	2500	463	**$257,000**	**$103**	**$555**
<15 feet bgs (VOC, non-Haz)							
Small Area	10	10	100	56	**$150,000**	**$1,500**	**$2,700**
Medium Area	25	25	625	347	**$298,000**	**$477**	**$858**
Large Area	50	50	2500	1,389	**$663,000**	**$265**	**$477**
<15 feet bgs (VOC, 33% RCRA Haz / 33% CAL Haz / 33% Non Haz)							
Small Area	10	10	100	56	**$182,000**	**$1,820**	**$3,276**
Medium Area	25	25	625	347	**$459,000**	**$734**	**$1,322**
Large Area	50	50	2500	1,389	**$1,287,000**	**$515**	**$927**
Soil Vapor Extraction (Outdoor Soil)[5]							
Small Area (GAC)	50	50	2500	1,389	**$534,000**	**$214**	**$384**
Medium Area (GAC)	100	100	10000	5,556	**$880,000**	**$88**	**$158**
Medium Area (CatOx)	100	100	10000	5,556	**$938,000**	**$94**	**$169**
Large Area (CatOx)	200	200	40000	22,222	**$1,825,000**	**$46**	**$82**
Soil Vapor Extraction (Under Building)[6]							
Small Area (GAC)	50	50	2500	1,389	**$712,000**	**$285**	**$513**
Medium Area (GAC)	100	100	10000	5,556	**$1,117,000**	**$112**	**$201**
Medium Area (CatOx)	100	100	10000	5,556	**$1,237,000**	**$124**	**$223**
Large Area (CatOx)	200	200	40000	22,222	**$2,436,000**	**$61**	**$110**
Building Engineering Control[7]							
Small Area	50	50	2500	1,389	**$202,000**	**$81**	**$145**
Medium Area	100	100	10000	5,556	**$362,000**	**$36**	**$65**
Large Area	200	200	40000	22,222	**$690,000**	**$17**	**$31**

Notes:

1. Assumes impacted soil depth of 15 feet bgs for capping to estimate unit cost per cubic yard. For excavation, two scenarios with a depth of 5 feet bgs (non-VOC) and 15 feet bgs (VOC) are considered.

2. Cost estimate backup cost sheets are included in Attachment H2. Present Worth cost includes 20% to 30% contingency depending on technology.

3. Capping considers two scenarios: 1) resurfacing with a slurry seal (liquid asphalt) over existing pavement, or 2) constructing new 4-inch thick asphalt cover.

4. Excavation considers three scenarios: 1) Non-hazardous soil, impacted area < 5 feet bgs, 2) Non-hazardous soil, impacted area < 15 feet bgs, and 3) 33% RCRA hazardous, 33% California hazardous, and 33% Non hazardous soil, hazardous soil, impacted area < 15 feet bgs.

5. SVE(OS) assumes operation for 2 years for all areas. Assume SVE emisions treatment system uses granular activated carbon (GAC) for small and medium areas, and Catalytic Oxidizer / Thermal for medium and large areas.

6. SVE(UB) assumes use of horizontal wells that are converted to SSV and operated indefinitely (100 years).

7. Building Engineering Control (BEC) assumes SSV system operates indefinitely (100 years).

ATTACHMENT H2-1

PLUG-IN COST ESTIMATES BACKUPS

CAPPING ALTERNATIVES
BACKUP ESTIMATES

TABLE H2.1-1
SUMMARY OF CAPPING SCENARIOS PLUG-IN COST ESTIMATES
Soil and NAPL FS
Del Amo Superfund Site

Scenario	Dimensions of Impacted Area (ft)		Cap Area	Soil Investigation		Total PW Cost	Unit Cost
	L	W	(ft)	$	% of Total	$	$/sf
	Cap (New asphalt)						
Small	10	10	100	$ 5,000	22	$ 23,000	$230
Medium	25	25	625	$ 8,500	14	$ 60,000	$96
Large	50	50	2500	$ 15,750	8	$ 186,000	$74
	Cap (New slurry seal, existing asphalt)						
Small	10	10	100	$ 5,000	25	$ 20,000	$200
Medium	25	25	625	$ 8,500	16	$ 54,000	$86
Large	50	50	2500	$ 15,750	10	$ 158,000	$63

TABLE H2.1-2
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (< 100 sf)
CAPPING (OS, New) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 5,000	$ 5,000
3	New 4" Thick Asphalt Pavement	100	sf	$ 12	$ 1,200
4	Mobilization/Demobilization	1	ls	$ 500	$ 500
5	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
6	Remediation Documentation/Reporting	1	ls	$ 1,000	$ 1,000
7	Health and Safety, ODCs	1	ls	$ 1,000	$ 1,000
				Direct Capital Total	**$ 11,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 11,000	$ 2,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 11,000	$ 1,000
3	Construction Management	10%	of	$ 11,000	$ 2,000
				Indirect Capital Subtotal	**$ 5,000**
				Total Direct + Indirect Capital Cost	**$ 16,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	Cap Maintenance and Repair	1	year	$ 170	$ 170
				Cap Annual Operation and Maintenance Subtotal	**$ 170**
				Present Worth of Cap (5%, 100 Years) O&M Costs	**$ 3,000**
				Contingency (20% of total project cost)	**$ 4,000**
				Total Capital and Cap O&M Cost	**$ 23,000**
				Unit cost ($/sf)	**$ 230**

NOTES/ASSUMPTIONS

1. Small size impacted outdoor area not to exceed 10' by 10' (100 sf).
2. Site investigation assumes 1 boring per every 100 sf not to exceed 2 borings, 3 samples/boring at 1, 5, and 10 ft bgs + 10% QC samples
3. Site not paved over impacted area. New 4" thick pavement assumed to be required to meet ARARs.
4. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
5. IC layers in place for EAPC also apply to the new area.

TABLE H2.1-3
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (< 100 sf)
CAPPING (OS, Slurry Seal) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 5,000	$ 5,000
3	Slurry Seal over Existing Asphalt Pavement	100	sf	$ 5	$ 500
4	Mobilization/Demobilization	1	ls	$ 500	$ 500
5	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
6	Remediation Documentation/Reporting	1	ls	$ 1,000	$ 1,000
7	Health and Safety, ODCs	1	ls	$ 1,000	$ 1,000
				Direct Capital Total	**$ 10,000**
	Indirect Capital Costs				
1	Engineering, Design, and Permitting	15%	of	$ 10,000	$ 2,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 10,000	$ 1,000
3	Construction Management	10%	of	$ 10,000	$ 1,000
				Indirect Capital Subtotal	**$ 4,000**
				Total Direct + Indirect Capital Cost	**$ 14,000**
	Operation and Maintenance Costs				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	Cap Maintenance and Repair	1	year	$ 170	$ 170
				Cap Annual Operation and Maintenance Subtotal	**$ 170**
				Present Worth of Cap (5%, 100 Years) O&M Costs	**$ 3,000**
				Contingency (20% of total project cost)	**$ 3,000**
				Total Capital and Cap O&M Cost	**$ 20,000**
				Unit cost ($/sf)	**$ 200**

NOTES/ASSUMPTIONS

1. Small size impacted outdoor area not to exceed 10' by 10' (100 sf).
2. Site investigation assumes 1 boring per every 100 sf not to exceed 2 borings, 3 samples/boring at 1, 5, and 10 ft bgs + 10% QC samples
3. Site paved over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
4. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
5. IC layers in place for EAPC also apply to the new area.

TABLE H2.1-4
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 625 sf)
CAPPING (OS, New) ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 8,500	$ 8,500
3	New 4" Thick Asphalt Pavement	625	sf	$ 12	$ 7,500
4	Mobilization/Demobilization	1	ls	$ 1,000	$ 1,000
5	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
6	Remediation Documentation/Reporting	1	ls	$ 1,500	$ 1,500
7	Health and Safety, ODCs	1	ls	$ 1,000	$ 1,000
				Direct Capital Total	**$ 22,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 22,000	$ 3,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 22,000	$ 2,000
3	Construction Management	8%	of	$ 22,000	$ 2,000
				Indirect Capital Subtotal	**$ 7,000**
				Total Direct + Indirect Capital Cost	**$ 29,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	Cap Maintenance and Repair	1	year	$ 1,060	$ 1,060
				Cap Annual Operation and Maintenance Subtotal	**$ 1,060**
				Present Worth of Cap (5%, 100 Years) O&M Costs	**$ 21,000**
				Contingency (20% of total project cost)	**$ 10,000**
				Total Capital and Cap O&M Cost	**$ 60,000**
				Unit cost ($/sf)	**$ 96**

NOTES/ASSUMPTIONS

1. Medium size impacted outdoor area not to exceed 25' by 25' (625 sf).
2. Site investigation assumes 1 boring per every 200 sf not to exceed 4 borings, 3 samples/boring at 1, 5, and 10 ft bgs + 10% QC samples
3. Site not paved over impacted area. New 4" thick pavement assumed to be required to meet ARARs.
4. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
5. IC layers in place for EAPC also apply to the new area.

TABLE H2.1-5
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 625 sf)
CAPPING (OS, Slurry Seal) ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 8,500	$ 8,500
3	Slurry Seal over Existing Asphalt Pavement	625	sf	$ 5	$ 3,100
4	Mobilization/Demobilization	1	ls	$ 1,000	$ 1,000
5	Remedial Action Monitoring	1	day	$ 2,000	$ 2,000
6	Remediation Documentation/Reporting	1	ls	$ 1,500	$ 1,500
7	Health and Safety, ODCs	1	ls	$ 1,000	$ 1,000
				Direct Capital Total	**$ 17,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 17,000	$ 3,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 17,000	$ 2,000
3	Construction Management	8%	of	$ 17,000	$ 2,000
				Indirect Capital Subtotal	**$ 7,000**
				Total Direct + Indirect Capital Cost	**$ 24,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	Cap Maintenance and Repair	1	year	$ 1,060	$ 1,060
				Cap Annual Operation and Maintenance Subtotal	**$ 1,060**
				Present Worth of Cap (5%, 100 Years) O&M Costs	**$ 21,000**
				Contingency (20% of total project cost)	**$ 9,000**
				Total Capital and Cap O&M Cost	**$ 54,000**
				Unit cost ($/sf)	**$ 86**

NOTES/ASSUMPTIONS

1. Medium size impacted outdoor area not to exceed 25' by 25' (625 sf).
2. Site investigation assumes 1 boring per every 200 sf not to exceed 4 borings, 3 samples/boring at 1, 5, and 10 ft bgs + 10% QC samples
3. Site paved over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
4. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
5. IC layers in place for EAPC also apply to the new area.

TABLE H2.1-6
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (<2,500 sf)
CAPPING (OS, New) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 15,750	$ 15,750
3	New 4" Thick Asphalt Pavement	2,500	sf	$ 12	$ 30,000
4	Mobilization/Demobilization	1	ls	$ 1,500	$ 1,500
5	Remedial Action Monitoring	2	day	$ 2,000	$ 4,000
6	Remediation Documentation/Reporting	1	ls	$ 2,000	$ 2,000
7	Health and Safety, ODCs	1	ls	$ 1,500	$ 1,500
				Direct Capital Total	**$ 55,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 55,000	$ 7,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 55,000	$ 4,000
3	Construction Management	8%	of	$ 55,000	$ 5,000
				Indirect Capital Subtotal	**$ 16,000**
				Total Direct + Indirect Capital Cost	**$ 71,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	Cap Maintenance and Repair	1	year	$ 4,250	$ 4,250
				Cap Annual Operation and Maintenance Subtotal	**$ 4,250**
				Present Worth of Cap (5%, 100 Years) O&M Costs	**$ 84,000**
				Contingency (20% of total project cost)	**$ 31,000**
				Total Capital and Cap O&M Cost	**$ 186,000**
				Unit cost ($/sf)	**$ 74**

NOTES/ASSUMPTIONS

1. Large size impacted outdoor area not to exceed 50' by 50' (2,500 sf).
2. Site investigation assumes 1 boring per every 300 sf not to exceed 8 borings, 3 samples/boring at 1, 5 and 10 ft bgs + 10% QC
3. Site not paved over impacted area. New 4" thick pavement assumed to be required to meet ARARs.
4. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
5. IC layers in place for EAPC also apply to the new area.

TABLE H2.1-7
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (<2,500 sf)
CAPPING (OS, Slurry Seal) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 15,750	$ 15,750
3	Slurry Seal over Existing Asphalt Pavement	2,500	sf	$ 5	$ 12,500
4	Mobilization/Demobilization	1	ls	$ 1,500	$ 1,500
5	Remedial Action Monitoring	2	day	$ 2,000	$ 4,000
6	Remediation Documentation/Reporting	1	ls	$ 2,000	$ 2,000
7	Health and Safety, ODCs	1	ls	$ 1,500	$ 1,500
				Direct Capital Total	**$ 37,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 37,000	$ 5,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 37,000	$ 3,000
3	Construction Management	8%	of	$ 37,000	$ 3,000
				Indirect Capital Subtotal	**$ 11,000**
				Total Direct + Indirect Capital Cost	**$ 48,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	Cap Maintenance and Repair	1	year	$ 4,250	$ 4,250
				Cap Annual Operation and Maintenance Subtotal	**$ 4,250**
				Present Worth of Cap (5%, 100 Years) O&M Costs	**$ 84,000**
				Contingency (20% of total project cost)	**$ 26,000**
				Total Capital and Cap O&M Cost	**$ 158,000**
				Unit cost ($/sf)	**$ 63**

NOTES/ASSUMPTIONS

1. Large size impacted outdoor area not to exceed 50' by 50' (2,500 sf).
2. Site investigation assumes 1 boring per every 300 sf not to exceed 8 borings, 3 samples/boring at 1, 5 and 10 ft bgs + 10% QC
3. Site paved over impacted area. Existing pavement with slurry seal treatment assumed to be adequate cap to meet ARARs.
4. Cap maintenance and repair assumes resurfacing with a slurry seal (liquid asphalt) every 10 years starting at year 5 and new 4-inch thick asphalt cover every 10 years starting at year 10.
5. IC layers in place for EAPC also apply to the new area.

EXCAVATION ALTERNATIVES
BACKUP ESTIMATES

TABLE H2.2-1
SUMMARY OF EXCAVATION SCENARIOS PLUG-IN COST ESTIMATES
Soil and NAPL FS
Del Amo Superfund Site

Dimensions of Impacted Area (ft)			Waste Disposal Scenario	Excv. Bottom Area	Excv. Wall Area	Over-burden Area	Impacted Volume	Over-burden Volume	Shoring Area	Waste Disposal	Soil Confirmation Samples	Asphalt Restoration Area			Soil Investigation		Total PW Cost (Standard)	Unit Cost (Standard)
L	W	D		(ft)	(sf)	(sf)	(cy)	(cy)	(sf)	(tons)		(sf)	$	% of Total	$	% of Total	$	$/cy
Non-Haz Shallow (< 5 ft bgs)																		
10	10	5	Non-Haz	100	50	300	19	28	0	28	7	400	$4,800	11.4	$ 5,000	11.9	$ 42,000	$2,268
25	25	5	Non-Haz	625	125	600	116	56	0	174	20	1225	$14,700	14.0	$ 11,500	11.0	$ 105,000	$907
50	50	5	Non-Haz	2500	250	1100	463	102	0	694	33	3600	$43,200	16.8	$ 19,500	7.6	$ 257,000	$555
Non-Haz Shallow (< 15 ft bgs)																		
10	10	15	Non-Haz	100	150	1500	56	313	150	83	9	1600	$19,200	12.8	$ 6,000	4.0	$ 150,000	$2,700
25	25	15	Non-Haz	625	375	2400	347	500	375	521	27	3025	$36,300	12.2	$ 17,250	5.8	$ 298,000	$858
50	50	15	Non-Haz	2500	750	3900	1,389	813	750	2,083	44	6400	$76,800	11.6	$ 25,000	3.8	$ 663,000	$477
RCRA-Haz (33%) / Cal-Haz (33%) / Non-Haz (33%) Shallow (< 15 ft bgs)																		
10	10	15	RCRA/Cal/Non Haz	100	150	1500	56	313	150	83	9	1600	$19,200	10.5	$ 6,000	3.3	$ 182,000	$3,276
25	25	15	RCRA/Cal/Non Haz	625	375	2400	347	500	375	521	27	3025	$36,300	7.9	$ 17,250	3.8	$ 459,000	$1,322
50	50	15	RCRA/Cal/Non Haz	2500	750	3900	1,389	813	750	2,083	44	6400	$76,800	6.0	$ 25,000	1.9	$ 1,287,000	$927

TABLE H2.2-2
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (10'x10'x5', 20cy)
EXCAVATION (OS, NON-HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 5,000	$ 5,000
3	Excavation and Stockpile	19	yd^3	$ 12	$ 300
4	Clean overburden excavation for slope stabilization	28	yd^3	$ 12	$ 400
5	Truck Load-out	19	yd^3	$ 2	$ 40
6	Backfill and Compaction	20	yd^3	$ 35	$ 713
7	Asphalt pavement restoration (impacted area + overburden area)	400	sf	$ 12	$ 4,800
8	Transportation and Off-Site Disposal	28	ton	$ 50	$ 2,000
9	Soil Confirmation Sampling and Analyses	7	samples	$ 500	$ 3,500
10	Air Monitoring/Sampling	1	day	$ 2,500	$ 2,500
11	Excavation Documentation/Reporting	1	ea	$ 2,000	$ 2,000
12	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 1,500	$ 1,500
				Direct Capital Total	**$ 23,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 23,000	$ 4,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 23,000	$ 2,000
3	Construction Management	10%	of	$ 23,000	$ 3,000
				Indirect Capital Subtotal	**$ 9,000**
				Total Direct + Indirect Capital Cost	**$ 32,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 10,000**
				Total Capital and ICs O&M Costs	**$ 42,000**
				Unit cost ($/cy)	**$ 2,268**

NOTES/ASSUMPTIONS

1. Small size impacted outdoor area not to exceed 10' by 10' (100 sf) to a depth of 5 ft bgs (approximately 20 cy).
2. Excavation assumes sidewall sloped 1:1. Areas needed for stockpile and load-out are available.
3. Excavation adjacent to building footprint assumes slot-trenching. No shoring is needed.
4. Assume excavated soil is 100% non hazardous for waste disposal purposes ($50/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-3
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (25'x25'x5', 120cy)
EXCAVATION (OS, NON-HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 11,500	$ 11,500
3	Excavation and Stockpile	116	yd^3	$ 12	$ 2,000
4	Clean overburden excavation for slope stabilization	56	yd^3	$ 12	$ 1,000
5	Truck Load-out	116	yd^3	$ 2	$ 230
6	Backfill and Compaction	127	yd^3	$ 35	$ 5,000
7	Asphalt pavement restoration (impacted area + overburden area)	1,225	sf	$ 12	$ 14,700
8	Transportation and Off-Site Disposal	174	ton	$ 50	$ 9,000
9	Soil Confirmation Sampling and Analyses	20	samples	$ 500	$ 10,000
10	Air Monitoring/Sampling	2	days	$ 2,500	$ 5,000
11	Excavation Documentation/Reporting	1	ea	$ 3,000	$ 3,000
12	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 2,000	$ 2,000
				Direct Capital Total	**$ 63,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 63,000	$ 8,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 63,000	$ 4,000
3	Construction Management	8%	of	$ 63,000	$ 6,000
				Indirect Capital Subtotal	**$ 18,000**
				Total Direct + Indirect Capital Cost	**$ 81,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 24,000**
				Total Capital and ICs O&M Costs	**$ 105,000**
				Unit cost ($/cy)	**$ 907**

NOTES/ASSUMPTIONS

1. Medium size impacted outdoor area not to exceed 25' by 25' (625 sf) to a depth of 5 ft bgs (approximately 120 cy).
2. Excavation assumes sidewall sloped 1:1. Areas needed for stockpile and load-out are available.
3. Excavation adjacent to building footprint assumes slot-trenching. No shoring is needed.
4. Assume excavated soil is 100% non hazardous for waste disposal purposes ($50/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-4
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (50'x50'x5', 460cy)
EXCAVATION (OS, NON-HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 19,500	$ 19,500
3	Excavation and Stockpile	463	yd^3	$ 12	$ 6,000
4	Clean overburden excavation for slope stabilization	102	yd^3	$ 12	$ 2,000
5	Truck Load-out	463	yd^3	$ 2	$ 930
6	Backfill and Compaction	509	yd^3	$ 35	$ 18,000
7	Asphalt pavement restoration (impacted area + overburden area)	3,600	sf	$ 12	$ 43,200
8	Transportation and Off-Site Disposal	694	ton	$ 50	$ 35,000
9	Soil Confirmation Sampling and Analyses	33	samples	$ 500	$ 17,000
10	Air Monitoring/Sampling	3	days	$ 2,500	$ 7,500
11	Excavation Documentation/Reporting	1	ea	$ 4,000	$ 4,000
12	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 2,500	$ 2,500
				Direct Capital Total	**$ 156,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 156,000	$ 19,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 156,000	$ 10,000
3	Construction Management	8%	of	$ 156,000	$ 13,000
				Indirect Capital Subtotal	**$ 42,000**
				Total Direct + Indirect Capital Cost	**$ 198,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 59,000**
				Total Capital and ICs O&M Costs	**$ 257,000**
				Unit cost ($/cy)	**$ 555**

NOTES/ASSUMPTIONS

1. Large size impacted outdoor area not to exceed 50' by 50' (2,500 sf) to a depth of 5 ft bgs (approximately 460 cy).
2. Excavation assumes sidewall sloped 1:1. Areas needed for stockpile and load-out are available.
3. Excavation adjacent to building footprint assumes slot-trenching. No shoring is needed.
4. Assume excavated soil is 100% non hazardous for waste disposal purposes ($50/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-5
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (10'x10'x15', 50cy)
EXCAVATION (OS, NON-HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 6,000	$ 6,000
3	Excavation and Stockpile	56	yd^3	$ 12	$ 1,000
4	Clean overburden excavation for slope stabilization	313	yd^3	$ 12	$ 4,000
5	Shoring design and installation	150	sf	$ 65	$ 35,000
6	Truck Load-out	56	yd^3	$ 2	$ -
7	Backfill and Compaction	61	yd^3	$ 35	$ 3,000
8	Asphalt pavement restoration (impacted area + overburden area)	1,600	sf	$ 12	$ 19,200
9	Transportation and Off-Site Disposal	83	ton	$ 50	$ 5,000
10	Soil Confirmation Sampling and Analyses	9	samples	$ 500	$ 5,000
11	Air Monitoring/Sampling	1	days	$ 2,500	$ 2,500
12	Excavation Documentation/Reporting	1	ea	$ 3,000	$ 3,000
13	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 2,000	$ 2,000
				Direct Capital Total	**$ 86,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 86,000	$ 13,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 86,000	$ 7,000
3	Construction Management	10%	of	$ 86,000	$ 9,000
				Indirect Capital Subtotal	**$ 29,000**
				Total Direct + Indirect Capital Cost	**$ 115,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 35,000**
				Total Capital and ICs O&M Costs	**$ 150,000**
				Unit cost ($/cy)	**$ 2,700**

NOTES/ASSUMPTIONS

1. Small size impacted outdoor area not to exceed 10' by 10' (100 sf) to a depth of 15 ft bgs (approximately 50 cy).
2. Sidewall sloped 1:1 for 3 sides of the excavation. Areas needed for waste load-out and overburden soil stockpile are available.
3. Sheet or soldier pile shoring assumed for 1 side of the excavation
4. Assume excavated soil is 100% non hazardous for waste disposal purposes ($50/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-6
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (25'x25'x15', 350cy)
EXCAVATION (OS, NON-HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 17,250	$ 17,250
3	Excavation and Stockpile	347	yd^3	$ 12	$ 5,000
4	Clean overburden excavation for slope stabilization	500	yd^3	$ 12	$ 6,000
5	Shoring design and installation	375	sf	$ 65	$ 49,000
6	Truck Load-out	347	yd^3	$ 2	$ 1,000
7	Backfill and Compaction	382	yd^3	$ 35	$ 14,000
8	Asphalt pavement restoration (impacted area + overburden area)	3,025	sf	$ 12	$ 36,300
9	Transportation and Off-Site Disposal	521	ton	$ 50	$ 27,000
10	Soil Confirmation Sampling and Analyses	27	samples	$ 500	$ 14,000
11	Air Monitoring/Sampling	2	days	$ 2,500	$ 5,000
12	Excavation Documentation/Reporting	1	ea	$ 4,000	$ 4,000
13	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 2,500	$ 2,500
				Direct Capital Total	**$ 181,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 181,000	$ 22,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 181,000	$ 11,000
3	Construction Management	8%	of	$ 181,000	$ 15,000
				Indirect Capital Subtotal	**$ 48,000**
				Total Direct + Indirect Capital Cost	**$ 229,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 69,000**
				Total Capital and ICs O&M Costs	**$ 298,000**
				Unit cost ($/cy)	**$ 858**

NOTES/ASSUMPTIONS

1. Medium size impacted outdoor area not to exceed 25' by 25' (625 sf) to a depth of 15 ft bgs (approximately 350 cy).
2. Sidewall sloped 1:1 for 3 sides of the excavation. Areas needed for waste load-out and overburden soil stockpile are available.
3. Sheet or soldier pile shoring assumed for 1 side of the excavation
4. Assume excavated soil is 100% non hazardous for waste disposal purposes ($50/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-7
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (50'x50'x15', 1400cy)
EXCAVATION (OS, NON-HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 25,000	$ 25,000
3	Excavation and Stockpile	1,389	yd^3	$ 12	$ 17,000
4	Clean overburden excavation for slope stabilization	813	yd^3	$ 12	$ 10,000
5	Shoring design and installation	750	sf	$ 65	$ 74,000
6	Truck Load-out	1,389	yd^3	$ 2	$ 3,000
7	Backfill and Compaction	1,528	yd^3	$ 35	$ 54,000
8	Asphalt pavement restoration (impacted area + overburden area)	6,400	sf	$ 12	$ 76,800
9	Transportation and Off-Site Disposal	2,083	ton	$ 50	$ 105,000
10	Soil Confirmation Sampling and Analyses	44	samples	$ 500	$ 22,000
11	Air Monitoring/Sampling	3	days	$ 2,500	$ 7,500
12	Excavation Documentation/Reporting	1	ea	$ 6,000	$ 6,000
13	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 3,000	$ 3,000
				Direct Capital Total	**$ 403,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 403,000	$ 49,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 403,000	$ 25,000
3	Construction Management	8%	of	$ 403,000	$ 33,000
				Indirect Capital Subtotal	**$ 107,000**
				Total Direct + Indirect Capital Cost	**$ 510,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 153,000**
				Total Capital and ICs O&M Costs	**$ 663,000**
				Unit cost ($/cy)	**$ 477**

NOTES/ASSUMPTIONS

1. Large size impacted outdoor area not to exceed 50' by 50' (2500 sf) to a depth of 15 ft bgs (approximately 1400 cy).
2. Sidewall sloped 1:1 for 3 sides of the excavation. Areas needed for waste load-out and overburden soil stockpile are available.
3. Sheet or soldier pile shoring assumed for 1 side of the excavation
4. Assume excavated soil is 100% non hazardous for waste disposal purposes ($50/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-8
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (10'x10'x15', 50cy)
EXCAVATION (OS, CAL-RCRA HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 6,000	$ 6,000
3	Excavation and Stockpile	56	yd^3	$ 12	$ 1,000
4	Clean overburden excavation for slope stabilization	313	yd^3	$ 12	$ 4,000
5	Shoring design and installation	150	sf	$ 65	$ 35,000
6	Truck Load-out	56	yd^3	$ 2	$ -
7	Backfill and Compaction	61	yd^3	$ 35	$ 3,000
8	Asphalt pavement restoration (impacted area + overburden area)	1,600	sf	$ 12	$ 19,200
9	Transportation and Off-Site Disposal	83	ton	$ 230	$ 20,000
10	Soil Confirmation Sampling and Analyses	9	samples	$ 500	$ 5,000
11	Air Monitoring/Sampling	2	days	$ 2,500	$ 5,000
12	Excavation Documentation/Reporting	1	ea	$ 4,000	$ 4,000
13	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 2,000	$ 2,000
				Direct Capital Total	**$ 104,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 104,000	$ 16,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 104,000	$ 9,000
3	Construction Management	10%	of	$ 104,000	$ 11,000
				Indirect Capital Subtotal	**$ 36,000**
				Total Direct + Indirect Capital Cost	**$ 140,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 42,000**
				Total Capital and ICs O&M Costs	**$ 182,000**
				Unit cost ($/cy)	**$ 3,276**

NOTES/ASSUMPTIONS

1. Small size impacted outdoor area not to exceed 10' by 10' (100 sf) to a depth of 15 ft bgs (approximately 50 cy).
2. Sidewall sloped 1:1 for 3 sides of the excavation. Areas needed for waste load-out and overburden soil stockpile are available.
3. Sheet or soldier pile shoring assumed for 1 side of the excavation
4. Assume excavated soil is 33% RCRA-hazardous, 33% Cal-hazardous, and 33% non-hazardous for waste disposal purposes ($230/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-9
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (25'x25'x15', 350cy)
EXCAVATION (OS, CAL-RCRA HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Description		Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 17,250	$ 17,250
3	Excavation and Stockpile	347	yd^3	$ 12	$ 5,000
4	Clean overburden excavation for slope stabilization	500	yd^3	$ 12	$ 6,000
5	Shoring design and installation	375	sf	$ 65	$ 49,000
6	Truck Load-out	347	yd^3	$ 2	$ 1,000
7	Backfill and Compaction	382	yd^3	$ 35	$ 14,000
8	Asphalt pavement restoration (impacted area + overburden area)	3,025	sf	$ 12	$ 36,300
9	Transportation and Off-Site Disposal	521	ton	$ 230	$ 120,000
10	Soil Confirmation Sampling and Analyses	27	samples	$ 500	$ 14,000
11	Air Monitoring/Sampling	3	days	$ 2,500	$ 7,500
12	Excavation Documentation/Reporting	1	ea	$ 6,000	$ 6,000
13	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 3,000	$ 3,000
				Direct Capital Total	**$ 279,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 279,000	$ 34,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 279,000	$ 17,000
3	Construction Management	8%	of	$ 279,000	$ 23,000
				Indirect Capital Subtotal	**$ 74,000**
				Total Direct + Indirect Capital Cost	**$ 353,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 106,000**
				Total Capital and ICs O&M Costs	**$ 459,000**
				Unit cost ($/cy)	**$ 1,322**

NOTES/ASSUMPTIONS

1. Medium size impacted outdoor area not to exceed 25' by 25' (625 sf) to a depth of 15 ft bgs (approximately 350 cy).
2. Sidewall sloped 1:1 for 3 sides of the excavation. Areas needed for waste load-out and overburden soil stockpile are available.
3. Sheet or soldier pile shoring assumed for 1 side of the excavation
4. Assume excavated soil is 33% RCRA-hazardous, 33% Cal-hazardous, and 33% non-hazardous for waste disposal purposes ($230/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

TABLE H2.2-10
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (50'x50'x15', 1400cy)
EXCAVATION (OS, CAL-RCRA HAZ) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 25,000	$ 25,000
3	Excavation and Stockpile	1,389	yd^3	$ 12	$ 17,000
4	Clean overburden excavation for slope stabilization	813	yd^3	$ 12	$ 10,000
5	Shoring design and installation	750	sf	$ 65	$ 74,000
6	Truck Load-out	1,389	yd^3	$ 2	$ 3,000
7	Backfill and Compaction	1,528	yd^3	$ 35	$ 54,000
8	Asphalt pavement restoration (impacted area + overburden area)	6,400	sf	$ 12	$ 76,800
9	Transportation and Off-Site Disposal	2,083	ton	$ 230	$ 480,000
10	Soil Confirmation Sampling and Analyses	44	samples	$ 500	$ 22,000
11	Air Monitoring/Sampling	4	days	$ 2,500	$ 10,000
12	Excavation Documentation/Reporting	1	ea	$ 8,000	$ 8,000
13	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 4,000	$ 4,000
				Direct Capital Total	**$ 784,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 784,000	$ 95,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 784,000	$ 48,000
3	Construction Management	8%	of	$ 784,000	$ 63,000
				Indirect Capital Subtotal	**$ 206,000**
				Total Direct + Indirect Capital Cost	**$ 990,000**
Item No.	**ICs Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
				ICs Annual Operation and Maintenance Subtotal	**$ -**
				Present Worth of ICs Operation and Maintenance Costs (5%, 100 Years)	**$ -**
				Contingency (30% of total project cost)	**$ 297,000**
				Total Capital and ICs O&M Costs	**$ 1,287,000**
				Unit cost ($/cy)	**$ 927**

NOTES/ASSUMPTIONS

1. Large size impacted outdoor area not to exceed 50' by 50' (2500 sf) to a depth of 15 ft bgs (approximately 1400 cy).
2. Sidewall sloped 1:1 for 3 sides of the excavation. Areas needed for waste load-out and overburden soil stockpile are available.
3. Sheet or soldier pile shoring assumed for 1 side of the excavation
4. Assume excavated soil is 33% RCRA-hazardous, 33% Cal-hazardous, and 33% non-hazardous for waste disposal purposes ($230/ton).
5. Assume 30% contingency for excavation.
6. IC layers in place for EAPC also apply to the new area.

SVE (OS) ALTERNATIVES
BACKUP ESTIMATES

TABLE H2.3-1
SUMMARY OF SVE(OS) SCENARIOS PLUG-IN COST ESTIMATES
Soil and NAPL FS
Del Amo Superfund Site

Scenario	Dimensions of Impacted Area (ft)			Impacted Area	Impacted Volume	Soil Investigation		V-SVE Wells*	Vapor Monitoring Points	Total SVE Well Screen Length	Estimated Flow Rate	Selected Blower Size	Soil Confirmation Samples	Total PW SVE Cost	Unit SVE Cost	Unit SVE Cost
	L	W	D	sf	cy	$	% of Total	#	#	ft	CFM	CFM	#	$	$/sf	$/cy
Small Area: SVE-GAC	50	50	15	2500	1,389	$ 11,500	2.2	4	3	40	20	100	20	$ 534,000	$214	$384
Med Area: SVE-GAC	100	100	15	10000	5,556	$ 19,500	2.2	9	4	90	45	100	33	$ 880,000	$88	$158
Med Area: SVE-Catox	100	100	15	10000	5,556	$ 19,500	2.1	9	4	90	45	100	33	$ 938,000	$94	$169
Large Area: SVE-Catox	200	200	15	40000	22,222	$ 31,000	1.7	36	8	360	180	300	53	$ 1,825,000	$46	$82

TABLE H2.3-2
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (< 2,500 sf)
SVE(OS,GAC) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 11,500	$ 11,500
3	Site preparation/Geophysical Survey	2,500	sf	$ 0.80	$ 2,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 1.25	$ 4,000
5	SVE Vertical Wells (V-SVE)	4	ea	$ 5,000	$ 20,000
6	Install Well Headworks/Vault	4	ea	$ 1,500	$ 6,000
7	Install Outdoor Vapor Monitoring Points	3	ea	$ 2,000	$ 6,000
8	Trenching, Piping, Backfill, Resurfacing	200	lf	$ 30	$ 6,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 20,000	$ 20,000
10	Control and Instrumentation	1	ls	$ 2,000	$ 2,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 5,000	$ 5,000
12	SVE System Installation and Startup	1	ea	$ 20,000	$ 20,000
13	SVE Treatment System (Blower Package) 100 cfm	1	ea	$ 25,000	$ 25,000
14	Carbon Adsorption Vessels - VPGAC (1,000 lbs)	2	ls	$ 3,000	$ 6,000
15	Soil Confirmation Sampling and Analyses	20	samples	$ 700	$ 14,000
16	Air Monitoring/Sampling	3	days	$ 2,500	$ 7,500
17	Remediation Documentation/Reporting	1	ea	$ 5,000	$ 5,000
18	Site Closure, decommisioning, well abandonment	1	ls	$ 7,000	$ 7,000
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 5,000	$ 5,000
				Direct Capital Total	**$ 172,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 172,000	$ 21,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 172,000	$ 11,000
3	Construction Management	8%	of	$ 172,000	$ 14,000
				Indirect Capital Total	**$ 46,000**
				Direct + Indirect Capital Total	**$ 218,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 1,000	$ 12,000
3	Fuel	12	mths	$ -	$ -
4	Electricity	12	mths	$ 1,300	$ 16,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	Carbon Changeouts - Vapor Phase GAC (2 x 1,000 lbs)	4	year	$ 4,000	$ 16,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 1,000	$ 12,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 3,000	$ 36,000
9	Waste/Water Disposal	12	mths	$ 500	$ 6,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,000	$ 12,000
				SVE Annual Operation and Maintenance Subtotal	**$ 122,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 227,000**
				Contingency (20% of total project cost)	**$ 89,000**
				Total Capital and O&M Cost	**$ 534,000**

Unit Cost ($/sf) **$214**
Unit Cost ($/cy) **$384**

NOTES/ASSUMPTIONS
1. SVE (OS) system uses 4 V-SVE wells, 5-15 feet bgs screens.
2. Assume SVE system operation for 2 years, 100 cfm blower + 2 1,000 lb VPGAC.
3. Assume ICs are in place at the EAPC where the impacted soil is discovered.

TABLE H2.3-3
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 10,000 sf)
SVE(OS, GAC) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 19,500	$ 19,500
3	Site preparation/Geophysical Survey	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization/Demobilization	10,000	sf	$ 1.25	$ 13,000
5	SVE Vertical Wells (V-SVE)	9	ea	$ 5,000	$ 45,000
6	Install Well Headworks/Vault	9	ea	$ 1,500	$ 13,500
7	Install Outdoor Vapor Monitoring Points	4	ea	$ 2,000	$ 8,000
8	Trenching, Piping, Backfill, Resurfacing	500	lf	$ 30	$ 15,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 30,000	$ 30,000
10	Control and Instrumentation	1	ls	$ 3,000	$ 3,000
11	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 10,000	$ 10,000
12	SVE System Installation and Startup	1	ea	$ 30,000	$ 30,000
13	SVE Treatment System (Blower + GAC) 100 cfm	1	ea	$ 25,000	$ 25,000
14	Carbon Adsorption Vessels - VPGAC (1,000 lbs)	4	ls	$ 3,000	$ 12,000
15	Soil Confirmation Sampling and Analyses	33	samples	$ 600	$ 19,800
16	Air Monitoring/Sampling	5	days	$ 2,500	$ 12,500
17	Remediation Documentation/Reporting	1	ea	$ 7,500	$ 7,500
18	Site Closure, decommisioning, well abandonment	1	ls	$ 13,000	$ 13,000
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,500	$ 7,500
				Direct Capital Total	**$ 292,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 292,000	$ 36,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 292,000	$ 18,000
3	Construction Management	8%	of	$ 292,000	$ 24,000
				Indirect Capital Total	**$ 78,000**
				Direct + Indirect Capital Total	**$ 370,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 2,000	$ 24,000
3	Fuel	12	mths	$ -	$ -
4	Electricity	12	mths	$ 1,300	$ 16,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 2,000	$ 24,000
6	Carbon Changeouts - Vapor Phase GAC (4 x 1,000 lbs)	4	year	$ 8,000	$ 32,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 2,000	$ 24,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
9	Waste/Water Disposal	12	mths	$ 750	$ 9,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,500	$ 18,000
				SVE Annual Operation and Maintenance Subtotal	**$ 195,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 363,000**
				Contingency (20% of total project cost)	**$ 147,000**
				Total Capital and O&M Cost	**$ 880,000**
				Unit Cost ($/sf)	**$88**
				Unit Cost ($/cy)	**$158**

NOTES/ASSUMPTIONS
1. SVE (OS) system uses 9 V-SVE wells, 5-15 feet bgs screens.
2. Assume SVE system operates for 2 years, 100 cfm blower + 4 1,000 lb VPGAC.
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

TABLE H2.3-4
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 10,000 sf)
SVE(OS, CAT-OX) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 19,500	$ 19,500
3	Site preparation/Geophysical Survey	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization/Demobilization	10,000	sf	$ 1.25	$ 13,000
5	SVE Vertical Wells (V-SVE)	9	ea	$ 5,000	$ 45,000
6	Install Well Headworks/Vault	9	ea	$ 1,500	$ 13,500
7	Install Outdoor Vapor Monitoring Points	4	ea	$ 2,000	$ 8,000
8	Trenching, Piping, Backfill, Resurfacing	500	lf	$ 30	$ 15,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 30,000	$ 30,000
10	Control and Instrumentation	1	ls	$ 4,000	$ 4,000
11	Misc VETS Equipment (fittings, valves, manifold, etc.)	1	ls	$ 10,000	$ 10,000
12	SVE System Installation and Startup	1	ea	$ 30,000	$ 30,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 100 cfm	1	ea	$ 50,000	$ 50,000
14	Soil Confirmation Sampling and Analyses	33	samples	$ 600	$ 20,000
15	Air Monitoring/Sampling	5	days	$ 2,500	$ 12,500
16	Remediation Documentation/Reporting	1	ea	$ 7,500	$ 7,500
17	Site Closure, decommisioning, well abandonment	1	ls	$ 13,000	$ 13,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,500	$ 7,500
				Direct Capital Total	**$ 307,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 307,000	$ 37,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 307,000	$ 19,000
3	Construction Management	8%	of	$ 307,000	$ 25,000
				Indirect Capital Total	**$ 81,000**
				Direct + Indirect Capital Total	**$ 388,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 2,000	$ 24,000
3	Fuel	12	mths	$ 2,000	$ 24,000
4	Electricity	12	mths	$ 2,200	$ 26,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 2,000	$ 24,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 2,000	$ 24,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,500	$ 54,000
8	Waste/Water Disposal	12	mths	$ 1,000	$ 12,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 2,000	$ 24,000
				SVE Annual Operation and Maintenance Subtotal	**$ 212,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 394,000**
				Contingency (20% of total project cost)	**$ 156,000**
				Total Capital and O&M Cost	**$ 938,000**
				Unit Cost ($/sf)	**$94**
				Unit Cost ($/cy)	**$169**

NOTES/ASSUMPTIONS

1. SVE (OS) system uses 9 V-SVE wells, 5-15 feet bgs screens.
2. Assume SVE system operates for 2 years, 100 cfm blower + Thermal/Cat Ox.
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

TABLE H2.3-5
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (< 40,000 sf)
SVE(OS, CAT-OX) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 31,000	$ 31,000
3	Site preparation/Geophysical Survey	40,000	sf	$ 0.80	$ 32,000
4	Site Setup, Equipment Mobilization/Demobilization	40,000	sf	$ 1.25	$ 50,000
5	SVE Vertical Wells (V-SVE)	36	ea	$ 5,000	$ 180,000
6	Install Well Headworks/Vault	36	ea	$ 1,500	$ 54,000
7	Install Outdoor Vapor Monitoring Points	8	ea	$ 2,000	$ 16,000
8	Trenching, Piping, Backfill, Resurfacing	3,600	lf	$ 30	$ 108,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 40,000	$ 40,000
10	Control and Instrumentation	1	ls	$ 6,000	$ 6,000
11	Misc VETS Equipment (fittings, valves, manifold, etc.)	1	ls	$ 20,000	$ 20,000
12	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 300 cfm	1	ea	$ 75,000	$ 75,000
14	Soil Confirmation Sampling and Analyses	53	samples	$ 600	$ 32,000
15	Air Monitoring/Sampling	10	days	$ 2,500	$ 25,000
16	Remediation Documentation/Reporting	1	ea	$ 10,000	$ 10,000
17	Site Closure, decommisioning, well abandonment	1	ls	$ 21,000	$ 21,000
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 760,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 760,000	$ 92,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 760,000	$ 46,000
3	Construction Management	8%	of	$ 760,000	$ 61,000
				Indirect Capital Total	**$ 199,000**
				Direct + Indirect Capital Total	**$ 959,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 4,000	$ 48,000
3	Fuel	12	mths	$ 4,000	$ 48,000
4	Electricity	12	mths	$ 2,200	$ 26,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 3,000	$ 36,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 4,000	$ 48,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 5,000	$ 60,000
8	Waste/Water Disposal	12	mths	$ 1,000	$ 12,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 2,000	$ 24,000
				SVE Annual Operation and Maintenance Subtotal	**$ 302,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 562,000**
				Contingency (20% of total project cost)	**$ 304,000**
				Total Capital and O&M Cost	**$ 1,825,000**
				Unit Cost ($/sf)	**$46**
				Unit Cost ($/cy)	**$82**

NOTES/ASSUMPTIONS

1. SVE (OS) system uses 25 V-SVE wells, 5-15 feet bgs screens.
2. Assume SVE system operates for 2 years, 300 cfm blower + Thermal/Cat Ox. …Call vendor for sizes and rates.
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

SVE (UB) ALTERNATIVES
BACKUP ESTIMATES

TABLE H2.4-1
SUMMARY OF SVE(UB) SCENARIOS PLUG-IN COST ESTIMATES
Soil and NAPL FS
Del Amo Superfund Site

Scenario	Dimensions of Impacted Area (ft)			Impacted Area	Impacted Volume	Soil Investigation		H-SVE Wells	Total SVE Well Screen Length	Estimated Flow Rate	Selected Blower Size	Soil Confirmation Samples	Total PW SVE Cost	Unit SVE Cost	Unit SVE Cost
	L	W	D	sf	cy	$	% of Total	#	ft	CFM	CFM	#	$	$/sf	$/cy
Small Area: SVE-GAC	50	50	15	2500	1,389	$ 12,000	1.7	2	100	50	100	20	$ 712,000	$285	$513
Med Area: SVE-GAC	100	100	15	10000	5,556	$ 20,500	1.8	3	300	150	200	33	$ 1,117,000	$112	$201
Med Area: SVE-Catox	100	100	15	10000	5,556	$ 20,500	1.7	3	300	150	200	33	$ 1,237,000	$124	$223
Large Area: SVE-Catox	200	200	15	40000	22,222	$ 34,500	1.4	6	1200	600	750	53	$ 2,436,000	$61	$110

TABLE H2.4-2
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (< 2,500 sf)
SVE(UB) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 12,000	$ 12,000
3	Site preparation/Geophysical Survey	2,500	sf	$ 0.80	$ 2,000
4	Site Setup, Equipment Mobilization/Demobilization	2,500	sf	$ 1.25	$ 4,000
5	SVE Horizontal Wells (H-SVE)	2	ea	$ 25,000	$ 50,000
6	Install Well Headworks/Vault	2	ea	$ 1,500	$ 3,000
7	Trenching, Piping, Backfill, Resurfacing	100	lf	$ 30	$ 3,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 20,000	$ 20,000
9	Control and Instrumentation	1	ls	$ 1,000	$ 1,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 5,000	$ 5,000
11	SVE System Installation and Startup	1	ea	$ 20,000	$ 20,000
12	SVE Treatment System (Blower Package) 100 cfm	1	ea	$ 25,000	$ 25,000
13	Carbon Adsorption Vessels - VPGAC (1,000 lbs)	2	ls	$ 4,000	$ 8,000
14	Soil Confirmation Sampling and Analyses	20	samples	$ 700	$ 14,000
15	Convert H-SVE to SSV after completion of SVE(UB) Treatment	1	ls	$ 4,500	$ 4,500
16	Air Monitoring/Sampling	3	days	$ 2,500	$ 7,500
17	Remediation Documentation/Reporting	1	ea	$ 5,000	$ 5,000
18	Site Closure, decommisioning, well abandonment	1	ls	$ 5,000	$ 5,000
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 5,000	$ 5,000
				Direct Capital Total	**$ 194,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 194,000	$ 24,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 194,000	$ 12,000
3	Construction Management	8%	of	$ 194,000	$ 16,000
				Indirect Capital Total	**$ 52,000**
				Direct + Indirect Capital Total	**$ 246,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 1,000	$ 12,000
3	Fuel	12	mths	$ -	$ -
4	Electricity	12	mths	$ 1,300	$ 16,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,000	$ 12,000
6	Carbon Changeouts - Vapor Phase GAC (2 x 1,000 lbs)	4	year	$ 4,000	$ 16,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 1,000	$ 12,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 3,000	$ 36,000
9	Waste/Water Disposal	12	mths	$ 500	$ 6,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,000	$ 12,000
11	Converted SSV periodic monitoring, operation, maintenance	12	mths	$ 500	$ 6,000
				SVE Annual Operation and Maintenance Subtotal	**$ 122,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 227,000**
				SSV Annual O&M Subtotal	**$ 6,000**
				Present Worth of SSV (5%, 100 Years)	**$ 120,000**
				Contingency (20% of total project cost)	**$ 119,000**
				Total Capital and O&M Cost	**$ 712,000**
				Unit Cost ($/sf)	**$285**
				Unit Cost ($/cy)	**$513**

NOTES/ASSUMPTIONS

1. SVE (UB) system uses 2 H-SVE wells with 50-foot screen installed @ 10 feet bgs using directional drilling.
2. Assume SVE (UB) operation for 2 years, 100 cfm blower + 2 1,000 lb VPGAC. After SVE(UB) treatment, assume system is converted to SSV (UB) and operated for 100 years
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

TABLE H2.4-3
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 10,000 sf)
SVE(UB,GAC) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 20,500	$ 20,500
3	Site preparation/Geophysical Survey	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization/Demobilization	10,000	sf	$ 1.25	$ 13,000
5	SVE Horizontal Wells (H-SVE)	3	ea	$ 25,000	$ 75,000
6	Install Well Headworks/Vault	3	ea	$ 1,500	$ 4,500
7	Trenching, Piping, Backfill, Resurfacing	200	lf	$ 30	$ 6,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 30,000	$ 30,000
9	Control and Instrumentation	1	ls	$ 3,000	$ 3,000
10	Misc VETS Equipment (fittings, valves, manifold, tanks, pumps etc.)	1	ls	$ 10,000	$ 10,000
11	SVE System Installation and Startup	1	ea	$ 30,000	$ 30,000
12	SVE Emissions Treatment System (Blower Package) 200 cfm	1	ea	$ 30,000	$ 30,000
13	Carbon Adsorption Vessels - VPGAC (1,000 lbs)	4	ls	$ 4,000	$ 16,000
14	Soil Confirmation Sampling and Analyses	33	samples	$ 625	$ 21,000
15	Convert H-SVE to SSV after completion of SVE(UB) Treatment	1	ls	$ 8,000	$ 8,000
16	Air Monitoring/Sampling	5	days	$ 2,500	$ 12,500
17	Remediation Documentation/Reporting	1	ea	$ 7,500	$ 7,500
18	Site Closure, decommisioning, well abandonment	1	ls	$ 8,500	$ 8,500
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,500	$ 7,500
				Direct Capital Total	**$ 311,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 311,000	$ 38,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 311,000	$ 19,000
3	Construction Management	8%	of	$ 311,000	$ 25,000
				Indirect Capital Total	**$ 82,000**
				Direct + Indirect Capital Total	**$ 393,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 2,000	$ 24,000
3	Fuel	12	mths	$ -	$ -
4	Electricity	12	mths	$ 1,700	$ 20,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,500	$ 18,000
6	Carbon Changeouts - Vapor Phase GAC (4 x 1,000 lbs)	4	year	$ 8,000	$ 32,000
7	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 2,000	$ 24,000
8	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
9	Waste/Water Disposal	12	mths	$ 750	$ 9,000
10	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,500	$ 18,000
11	SSV periodic monitoring, operation, maintenance, Reporting	12	mths	$ 750	$ 9,000
				SVE Annual Operation and Maintenance Subtotal	**$ 193,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 359,000**
				SSV Annual Operation and Maintenance Subtotal	**$ 9,000**
				Present Worth of SSV (5%, 100 Years) O&M Costs	**$ 179,000**
				Contingency (20% of total project cost)	**$ 186,000**
				Total Capital and O&M Cost	**$ 1,117,000**
				Unit Cost ($/sf)	**$112**
				Unit Cost ($/cy)	**$201**

NOTES/ASSUMPTIONS

1. SVE (UB) system uses 3 H-SVE wells with 100-foot screens installed @ 10 feet bgs using directional drilling.
2. Assume SVE(UB) system operates for 2 years, 200 cfm blower + 4 1,000 lb VPGAC. After SVE(UB) treatment is complete, assume system is converted to SSV (UB) and operated indefinetely (100 years).
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

TABLE H2.4-4
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 10,000 sf)
SVE(UB,CatOx) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 20,500	$ 20,500
3	Site preparation/Geophysical Survey	10,000	sf	$ 0.80	$ 8,000
4	Site Setup, Equipment Mobilization/Demobilization	10,000	sf	$ 1.25	$ 13,000
5	SVE Horizontal Wells (H-SVE)	3	ea	$ 25,000	$ 75,000
6	Install Well Headworks/Vault	3	ea	$ 1,500	$ 4,500
7	Trenching, Piping, Backfill, Resurfacing	200	lf	$ 30	$ 6,000
8	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 30,000	$ 30,000
9	Control and Instrumentation	1	ls	$ 5,000	$ 5,000
10	Misc VETS Equipment (fittings, valves, manifold, etc.)	1	ls	$ 10,000	$ 10,000
11	SVE System Installation and Startup	1	ea	$ 30,000	$ 30,000
12	SVE Emissions Treatment System (Thermal/Cat Ox) 200 cfm	1	ea	$ 65,000	$ 65,000
13	Soil Confirmation Sampling and Analyses	33	samples	$ 625	$ 21,000
14	Convert H-SVE to SSV after completion of SVE(UB) Treatment	1	ls	$ 8,000	$ 8,000
15	Air Monitoring/Sampling	5	days	$ 2,500	$ 12,500
16	Remediation Documentation/Reporting	1	ea	$ 7,500	$ 7,500
17	Site Closure, decommisioning, well abandonment	1	ls	$ 8,500	$ 8,500
18	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 7,500	$ 7,500
				Direct Capital Total	**$ 332,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 332,000	$ 40,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 332,000	$ 20,000
3	Construction Management	8%	of	$ 332,000	$ 27,000
				Indirect Capital Total	**$ 87,000**
				Direct + Indirect Capital Total	**$ 419,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 2,000	$ 24,000
3	Fuel	12	mths	$ 6,000	$ 72,000
4	Electricity	12	mths	$ 1,700	$ 20,000
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 1,500	$ 18,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 2,000	$ 24,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 4,000	$ 48,000
8	Waste/Water Disposal	12	mths	$ 750	$ 9,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 1,500	$ 18,000
10	SSV periodic monitoring, operation, maintenance, Reporting	12	mths	$ 750	$ 9,000
				SVE Annual Operation and Maintenance Subtotal	**$ 233,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 433,000**
				SSV Annual Operation and Maintenance Subtotal	**$ 9,000**
				Present Worth of SSV (5%, 100 Years) O&M Costs	**$ 179,000**
				Contingency (20% of total project cost)	**$ 206,000**
				Total Capital and O&M Cost	**$ 1,237,000**
				Unit Cost ($/sf)	**$124**
				Unit Cost ($/cy)	**$223**

NOTES/ASSUMPTIONS

1. SVE (UB) system uses 3 H-SVE wells with 100-foot screens installed @ 10 feet bgs using directional drilling.
2. Assume SVE(UB) system operates for 2 years, 200 cfm blower + Thermal / Catalytic Oxidizer. After SVE(UB) treatment is complete, assume system is converted to SSV (UB) and operated indefinetely (100 years).
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

TABLE H2.4-5
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (< 40,000 sf)
SVE(UB,CatOx) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 34,500	$ 34,500
3	Site preparation/Geophysical Survey	40,000	sf	$ 0.80	$ 32,000
4	Site Setup, Equipment Mobilization/Demobilization	40,000	sf	$ 1.25	$ 50,000
5	SVE Horizontal Wells (H-SVE)	6	ea	$ 50,000	$ 300,000
6	Install Well Headworks/Vault	6	ea	$ 1,500	$ 9,000
7	Install Outdoor Vapor Monitoring Points	8	ea	$ 2,000	$ 16,000
8	Trenching, Piping, Backfill, Resurfacing	600	lf	$ 30	$ 18,000
9	Equipment Pad/EnclosureFence/Gas, Electricity Hookup	1	ea	$ 40,000	$ 40,000
10	Control and Instrumentation	1	ls	$ 11,000	$ 11,000
11	Misc VETS Equipment (fittings, valves, manifold, etc.)	1	ls	$ 20,000	$ 20,000
12	SVE System Installation and Startup	1	ea	$ 50,000	$ 50,000
13	SVE Emissions Treatment System (Thermal/Cat Ox) 750 cfm	1	ea	$ 150,000	$ 150,000
14	Soil Confirmation Sampling and Analyses	53	samples	$ 600	$ 32,000
15	Convert H-SVE to SSV after completion of SVE(UB) Treatment	1	ls	$ 13,000	$ 13,000
16	Air Monitoring/Sampling	15	days	$ 2,500	$ 38,000
17	Remediation Documentation/Reporting	1	ea	$ 10,000	$ 10,000
18	Site Closure, decommisioning, well abandonment	1	ls	$ 15,000	$ 15,000
19	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 10,000	$ 10,000
				Direct Capital Total	**$ 849,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 849,000	$ 102,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 849,000	$ 51,000
3	Construction Management	8%	of	$ 849,000	$ 68,000
				Indirect Capital Total	**$ 221,000**
				Direct + Indirect Capital Total	**$ 1,070,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SVE periodic monitoring, operation, maintenance	12	mths	$ 5,000	$ 60,000
3	Fuel	12	mths	$ 8,000	$ 96,000
4	Electricity	12	mths	$ 4,300	$ 51,600
5	Maintenance (hardware, filters, gauges, blower, etc.)	12	mths	$ 3,000	$ 36,000
6	VETS Influent/Effluent Monitoring / Lab Costs	12	mths	$ 4,000	$ 48,000
7	Project Management/Consultant support/Quarterly Reports	12	mths	$ 5,000	$ 60,000
8	Waste/Water Disposal	12	mths	$ 1,000	$ 12,000
9	Misc: Equipment rentals / PID / FID / ODCs	12	mths	$ 2,000	$ 24,000
10	Converted SSV periodic monitoring, operation, maintenance	12	mths	$ 1,000	$ 12,000
				SVE Annual Operation and Maintenance Subtotal	**$ 387,600**
				SVE Present Worth of Operation and Maintenance Costs (5%, 2 Year)	**$ 721,000**
				SSV Annual O&M Subtotal	**$ 12,000**
				Present Worth of SSV (5%, 100 Years)	**$ 239,000**
				Contingency (20% of total project cost)	**$ 406,000**
				Total Capital and O&M Cost	**$ 2,436,000**
				Unit Cost ($/sf)	**$61**
				Unit Cost ($/cy)	**$110**

NOTES/ASSUMPTIONS

1. SVE (UB) system uses 5 H-SVE wells with 200-foot screens installed @ 10 feet bgs using directional drilling.
2. Assume SVE(UB) system operates for 2 years, 750 cfm blower + Thermal / Catalytic Oxidizer. After SVE(UB) treatment is complete, assume system is converted to SSV (UB) and operated indefinetely (100 years).
3. Assume ICs are in place at the EAPC where the impacted soil is discovered

SSV (UB) ALTERNATIVES
BACKUP ESTIMATES

TABLE H2.5-1
SUMMARY OF SSV(UB) SCENARIOS PLUG-IN COST ESTIMATES
Soil and NAPL FS
Del Amo Superfund Site

Scenarios	Dimensions of Impacted Area (ft)			Impacted Area	Impacted Volume	Soil Investigation		Vapor Monitoring Points	Total PW SSV Cost	Unit SSV Cost	
	L	W	D	sf	cy	$	% of Total	#	$	$/sf	$/cy
Small	50	50	15	2,500	1,389	$ 11,500	5.7	5	$ 202,000	$81	$145
Medium	100	100	15	10,000	5,556	$ 19,500	5.4	10	$ 362,000	$36	$65
Large	200	200	15	40,000	22,222	$ 31,000	4.5	16	$ 690,000	$17	$31

TABLE H2.5-2
EAPC REMEDIAL ALTERNATIVE - UNKNOWN SMALL AREA (< 2,500 sf)
SSV(UB) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 11,500	$ 11,500
3	Site preparation/Geophysical Survey	1	ls	$ 750	$ 750
4	Site Setup, Equipment Mobilization/Demobilization	1	ls	$ 1,000	$ 1,000
5	Subslab Venting System under building (installed)	2,500	sf	$ 5	$ 12,500
6	Install Vapor Monitoring Points inside building	5	ea	$ 500	$ 2,500
7	Remedial Action Monitoring	2	day	$ 2,000	$ 4,000
8	Remediation Documentation/Reporting	1	ls	$ 2,000	$ 2,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 1,000	$ 1,000
				Direct Capital Total	**$ 35,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 35,000	$ 6,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 35,000	$ 3,000
3	Construction Management	10%	of	$ 35,000	$ 4,000
				Indirect Capital Subtotal	**$ 13,000**
				Total Direct + Indirect Capital Cost	**$ 48,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SSV periodic monitoring, operation, maintenance, Reporting	1	year	$ 6,000	$ 6,000
				SSV Annual Operation and Maintenance Subtotal	**$ 6,000**
				Present Worth of ICs + SSV + Cap (5%, 100 Years) O&M Costs	**$ 120,000**
				Contingency (20% of total project cost)	**$ 34,000**
				Total Capital and O&M Cost	**$ 202,000**
				Unit Cost ($/sf)	**$81**
				Unit Cost ($/cy)	**$145**

NOTES/ASSUMPTIONS

1. SSV assumed for this alternative.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. Site investigation cost is based on an assumed sampling density.
8. ICs assumed to be in place at the EAPC where the impacted soil is discovered

TABLE H2.5-3
EAPC REMEDIAL ALTERNATIVE - UNKNOWN MEDIUM AREA (< 10,000 sf)
SSV(UB) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 19,500	$ 19,500
3	Site preparation/Geophysical Survey	1	ls	$ 1,000	$ 1,000
4	Site Setup, Equipment Mobilization/Demobilization	1	ls	$ 1,500	$ 2,000
5	Subslab Venting System under building (installed)	10,000	sf	$ 5	$ 50,000
6	Install Vapor Monitoring Points inside building	10	ea	$ 500	$ 5,000
7	Remedial Action Monitoring	4	day	$ 2,000	$ 8,000
8	Remediation Documentation/Reporting	1	ls	$ 3,000	$ 3,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 2,000	$ 2,000
				Direct Capital Total	**$ 91,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	15%	of	$ 91,000	$ 14,000
2	Project Management, Agency Reporting and Coordination	8%	of	$ 91,000	$ 8,000
3	Construction Management	10%	of	$ 91,000	$ 10,000
				Indirect Capital Subtotal	**$ 32,000**
				Total Direct + Indirect Capital Cost	**$ 123,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SSV periodic monitoring, operation, maintenance, Reporting	1	year	$ 9,000	$ 9,000
				SSV Annual Operation and Maintenance Subtotal	**$ 9,000**
				Present Worth of SSV (5%, 100 Years) O&M Costs	**$ 179,000**
				Contingency (20% of total project cost)	**$ 60,000**
				Total Capital and O&M Cost	**$ 362,000**
				Unit Cost ($/sf)	**$36**
				Unit Cost ($/cy)	**$65**

NOTES/ASSUMPTIONS

1. SSV assumed for this alternative.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. Site investigation cost is based on an assumed sampling density.
8. ICs assumed to be in place at the EAPC where the impacted soil is discovered

TABLE H2.5-4
EAPC REMEDIAL ALTERNATIVE - UNKNOWN LARGE AREA (< 40,000 sf)
SSV(UB) COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Item No.	**Direct Capital Costs**				
1	ICs Design, Documentation, Implementation	1	ls	$ -	$ -
2	Site Investigation/Delineation	1	ls	$ 31,000	$ 31,000
3	Site preparation/Geophysical Survey	1	ls	$ 1,500	$ 1,500
4	Site Setup, Equipment Mobilization/Demobilization	1	ls	$ 2,000	$ 2,000
5	Subslab Venting System under building (installed)	40,000	sf	$ 5	$ 200,000
6	Install Vapor Monitoring Points inside building	16	ea	$ 500	$ 8,000
7	Remedial Action Monitoring	8	day	$ 2,000	$ 16,000
8	Remediation Documentation/Reporting	1	ls	$ 4,000	$ 4,000
9	Health and Safety, Equipment Rentals, ODCs	1	ls	$ 3,000	$ 3,000
				Direct Capital Total	**$ 266,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	12%	of	$ 266,000	$ 32,000
2	Project Management, Agency Reporting and Coordination	6%	of	$ 266,000	$ 16,000
3	Construction Management	8%	of	$ 266,000	$ 22,000
				Indirect Capital Subtotal	**$ 70,000**
				Total Direct + Indirect Capital Cost	**$ 336,000**
Item No.	**Operation and Maintenance Costs**				
1	Institutional Controls, Inspections, Monitoring	1	year	$ -	$ -
2	SSV periodic monitoring, operation, maintenance, Reporting	1	year	$ 12,000	$ 12,000
				SSV Annual Operation and Maintenance Subtotal	**$ 12,000**
				Present Worth of ICs + SSV + Cap (5%, 100 Years) O&M Costs	**$ 239,000**
				Contingency (20% of total project cost)	**$ 115,000**
				Total Capital and O&M Cost	**$ 690,000**
				Unit Cost ($/sf)	**$17**
				Unit Cost ($/cy)	**$31**

NOTES/ASSUMPTIONS

1. SSV assumed for this alternative.
2. SSV assumes piping laid in trenches inside building.
3. SSV system includes fan and carbon adsorbers as vapor control system.
4. SSV O&M includes periodic monitoring of vapor control system.
5. Site investigation cost is based on an assumed sampling density.
8. ICs assumed to be in place at the EAPC where the impacted soil is discovered

APPENDIX H3

FINAL TECHNICAL MEMORANDUM
ISCO ALTERNATIVE 5A

APPENDIX H3

FINAL TECHNICAL MEMORANDUM
ALTERNATIVE 5A
GROUNDWATER CONTAMINATION SOURCE AREAS SA12, SA3, AND SA11
SOIL AND NAPL FEASIBILITY STUDY
DEL AMO SUPERFUND SITE
DECEMBER 21, 2009

1.0 INTRODUCTION

The evaluation of active remedial alternatives for non-aqueous phase liquid (NAPL) in groundwater contamination source areas SA12, SA3 and SA11 at the Del Amo Superfund site presented in the Final Feasibility Study (FS) report (dated September 11, 2009) made significant assumptions regarding remedial design parameters. The assumptions made in the FS were conservative and led to more intensive remedial alternative designs, and higher cost estimates. The uncertainty in these parameters results in uncertainty in the cost estimates and other 9-criteria ratings relating to effectiveness and implementability. The FS presented a brief qualitative discussion of the uncertainties and limitations resulting from these assumptions in Section 10.3.4.

Of the four active remedial alternatives evaluated for NAPL remediation in the FS (Alternatives 3 to 6), uncertainty is highest for Alternative (Alt) 5 (ISCO+SVE) due to potential variations in remedial design parameters such as well spacing, oxidant demand, injection dosage, duration of remediation, etc. Higher end estimates for oxidant demand are assumed in the FS, with four multi-depth injection points per well and closely spaced (15-foot spacing) injection wells operating for a 2-year period. This tech memo presents an evaluation of Alt 5A, an in-situ chemical oxidation (ISCO) alternative that is less intensive and operates over a longer duration while accomplishing the remedial action objective. If this alternative is proposed for implementation, a bench-scale study would be required for oxidant selection and to determine soil oxidant demand. An ISCO field pilot test would also be required to refine the relevant design parameters, such as well spacing, oxidant dosage, etc. No oxidants are being excluded at this time and the final oxidant selection would be made during remedial design if an ISCO alternative is selected.

Alt 5A is less aggressive than Alt 5 in that it relies on a lower oxidant injection rate while increasing the remediation duration. With the injection locations spaced further apart, active chemical oxidation would occur in the zone closest to the wells. Further away from the injection locations, the oxidants would be reduced to dissolved oxygen (DO), enhancing aerobic biodegradation. The periodic injections and extended duration of operation will enable ISCO and bioremediation to effectively reduce contaminant mass in the saturated zone while using soil vapor extraction (SVE) for the vadose zone. Alternative 5A is therefore described as "**ISCO + Bioremediation + SVE + ICs +**

Monitoring", abbreviated as "ISCO/Bio+SVE". Additional data would be collected during remedial design to evaluate the DO distribution in the subsurface and obtain estimates of contaminant degradation rates attributed to chemical oxidation and bioremediation.

A conceptual design, nine criteria evaluation ratings, and a cost estimate for Alt 5A at source areas SA12, SA3 and SA11 are presented below. Two variations on the injection approach for Alt 5A are discussed, including well-based injection (Alt 5A1) and direct-push injection (Alt 5A2). For the well-based injection approach, Fenton's oxidant (hydrogen peroxide + iron) is assumed for SA12 and SA3, while Peroxone (hydrogen peroxide + ozone) is assumed for SA11, just as in the FS. For the direct-push injection, Fenton's oxidant[1] is considered for all three source areas. The assumed areal extent of each source area is the same as that in the FS. The conceptual design for each source area is presented with an injection plan view figure and tables comparing the design parameters and 9-criteria evaluation ratings of Alt 5 versus Alt 5A1 and Alt 5A2.

2.0 SOURCE AREA 12

2.1 CONCEPTUAL DESIGN FOR ALTERNATIVE 5A

Table 1 compares the conceptual design parameters for Alt 5 with those for Alt 5A1 and Alt 5A2. The comparison is based on design parameters for Fenton's oxidation such as well spacing, oxidant dosage, injection frequency, remedial action duration and well construction. Figure 1 shows the conceptual design and well layout for Alt 5A1. The conceptual design for the modified ISCO assumes a 45 to 60-foot injection well spacing in a staggered array compared to 15-foot spacing in the FS. Similar staggered 45 to 60-foot spacing is assumed for the SVE wells enabling placement of the SVE well and the ISCO injection points in the same borehole. Figure 1 shows 12 combined ISCO/SVE wells to address the source area and the well construction details. While Alt 5 required 75 wells with 4 injection points per well (300 total injection points), this is reduced to 12 wells with 2 injection points per well (24 total injection points) for Alt 5A1. Alt 5A1 assumes semiannual oxidant injection cycles for a total oxidant dosage of 1,120,000 gallons of 12.5% hydrogen peroxide over eight years compared with a dosage of 1,120,000 gallons of 17.5% hydrogen peroxide over two years for Alt 5. Alt 5A1 also assumes that ISCO and SVE wells are connected by subsurface piping/tubing to the treatment compound and that only the treatment compound would be fenced.

Alt 5A2 is a direct-push approach that involves semiannual injection of Fenton's oxidant in temporary injection points rather than wells. Figure 2 shows this approach, with 7 to 12 staggered injection locations for each injection event. As shown in the figure, after eight cycles of oxidant injections in four years, the entire source area would have oxidant

[1] Fenton's oxidant assumes use of 12.5% hydrogen peroxide with iron. With the direct push injection approach, the Peroxone oxidant injection is not considered because adequate mass of ozone gas cannot be injected during the short term injection events envisaged with Alt 5A2. Peroxone is typically injected in longer durations with permanent injection wells.

injected at 75 locations, resulting in an effective spacing of about 15 feet. Total oxidant volume injected is 1,120,000 gallons of 12.5% hydrogen peroxide over four years (Table 1). Oxidant would be injected in sequential 5-foot intervals at each injection location to address the entire impacted zone. A 30-foot thick zone (40 to 70 feet bgs) is assumed for injection across the NAPL area in order to be consistent with the FS. However, specific injection intervals can be targeted at each injection location with the direct-push approach to address the NAPL zones identified by the Ultra-Violet Optical Screening Tool (UVOST). Another advantage of the direct-push approach is the flexibility in moving injection locations to target the more impacted or recalcitrant areas. Multiple injection locations would be injected simultaneously through the manifold in the truck-mounted injection rig during each semi-annual event. Some of the SVE wells inside the source area would be installed into the saturated zone to serve as groundwater monitoring wells to track progress of remediation. Overall, there would be more reliance on chemical oxidation with Alt 5A2 compared to Alt 5A1, and bioremediation would play a smaller role.

Compared to Alt 5, where the entire remediation area and treatment compound would be fenced, the property owner/tenant would have access to the treatment area with either Alt 5A option. The SVE blower is smaller (400 scfm) with a smaller number of wells. SVE is assumed to operate continuously for four years, just as with Alt 5. For Alt 5A1, SVE is additionally assumed to operate during semiannual injection events as a soil vapor control measure during years five to eight, if needed.

2.2 9-CRITERIA ANALYSIS COMPARISON

Table 2 presents a comparison of the 9-criteria ratings for Alt 5, Alt 5A1 and Alt 5A2. Additional discussion of the evaluation is presented below by criterion.

Threshold Criteria

Alt 5, Alt 5A1 and Alt 5A2 meet the threshold criteria requirements regarding **Overall Protection of Human Health and Environment** and **Compliance with ARARs.**

Balancing Criteria

Long Term Effectiveness (LTE) is rated 7 for both Alt 5 and Alt 5A2 and 6 for Alt 5A1. Alt 5A2 is anticipated to remove a similar amount of contaminant mass (see RTMV) over a longer period of time and thus the rating is unchanged while Alt 5A1 is rated lower because of the potential for lower mass removal associated with a greater reliance on biodegradation for source reduction.

Reduction of Toxicity, Mobility and Volume (RTMV) is rated 6 for both Alt 5 and Alt 5A2 and 5 for Alt 5A1. It is anticipated that approximately 40-50% of the contaminant mass in the source area will be removed under Alt 5 and Alt 5A2 and 30-40% under Alt 5A1. Mass removal will be accomplished by chemical oxidation over a period of approximately two years under Alt 5. Mass removal will be accomplished by both chemical oxidation and bioremediation under Alt 5A1 but primarily by chemical

oxidation under Alt 5 and Alt 5A2. The remedial duration will be approximately four years under Alt 5A2 and approximately eight years for Alt 5A1.

Short Term Effectiveness (STE) is rated 5 for Alt 5 and 6 for Alt 5A1 and Alt 5A2. Alt 5A1 and Alt 5A2 are rated higher because the lower oxidant dosage and lower rate of injection imply a lower potential for impact to facility workers, business operations, and the environment. With Alt 5A1, the total amount of drilling in the source area is also substantially lower; hence, volatile organic compound (VOC) emissions and potential exposures to facility workers during system installation are also reduced. The lower number of injection wells/points (12 wells/24 points) allows the wells to be connected by subsurface tubing which reduces the potential human exposures on or adjacent to the property. With Alt 5A2, direct push drilling has a lower potential for exposures to site contaminants than Alt 5 because drill cuttings are not generated. The total oxidant injection per event for Alt 5A2 is lower than Alt 5, which also reduces the potential for contaminant migration and impact to the environment.

Implementability is rated 5 for Alt 5A1 and Alt 5A2 compared to 3 for Alt 5. This higher rating for Alt 5A1 is because of the significantly lower density of wells (reduced from 75 injection wells/300 injection points to 12 injection wells/24 injection points), resulting in a significantly less complex installation, a shorter time frame for the drilling and system installation, and less impact to property owners and neighbors during installation and operation. With Alt 5A2, the direct push injection at a limited number (7 to 12 as shown on Figure 2) of locations per event would be less complex and would result in less impact to the property owners and neighbors. With a smaller fenced area and greater access to the remedial area, Alt 5A1 and Alt 5A2 are additionally anticipated to be more acceptable to the property owners/tenants.

Cost is rated 6 for Alt 5A1 and Alt 5A2 compared to 5 for Alt 5. This higher rating is due to an estimated reduction in the present worth cost estimate from $11,406,000 for Alt 5 to $8,230,000 for Alt 5A1 and $7,775,000 for Alt 5A2. The lower cost is a result of lower capital and O&M costs due to lower oxidant dosage, smaller number of wells, and a smaller SVE blower. Tables A1 and A2 in Attachment A present the cost estimate spreadsheets for Alts 5A1 and 5A2 respectively. These cost estimates include a 40% contingency. The cost rating scale used for the NAPL evaluation was presented in Appendix G of the FS document (URS, September 11, 2009).

3.0 SOURCE AREA 3

The evaluation for SA3 is similar to SA12 discussed above. Figure 3 shows the conceptual design for Alt 5A1 with the Fenton's oxidation injection/SVE well layout, while Figure 4 shows the direct-push injection locations and SVE well layout for Alt 5A2. Table 3 compares the conceptual design parameters for Alt 5 versus Alt 5A1 and Alt 5A2. The design elements such as well spacing, injection frequency, duration of remedy, etc. for Alt 5A1 and Alt 5A2 are similar to that for SA12. For Alt 5A1, a larger number of wells (28 combined SVE/ISCO wells) and a larger total oxidant injection

volume (2,880,000 gallons over eight years) are proposed for SA3 because the assumed size of this source area is larger. For Alt 5A2, 24 direct-push injection locations are assumed for each of the 8 semiannual events, for a total of 192 injection locations with the same oxidant volume of 2,880,000 gallons over four years. The well construction screen intervals and the injection depth intervals also vary due to a deeper water table and assumed deeper contamination at SA3.

Table 4 presents a comparison of the 9-criteria ratings for Alt 5, Alt 5A1 and Alt 5A2 at SA3. LTE and RTMV criteria for Alt 5A2 are rated the same as for Alt 5, while Alt 5A1 is rated lower. STE, Implementability and Cost are rated higher for Alt 5A1 and Alt 5A2 compared to Alt 5. The alternative cost decreased from $23,279,000 for Alt 5 to $14,749,000 for Alt 5A1 and $13,966,000 for Alt 5A2. Tables A3 and A4 in Attachment A present the SA3 cost estimate spreadsheets for Alt 5A1 and Alt 5A2 respectively.

4.0 SOURCE AREA 11

The evaluation for SA11 is similar to the source areas considered earlier except that SA11 uses Peroxone oxidation for Alt 5A1. Figure 5 shows the conceptual design with injection/SVE well layout for Alt 5A1, while Figure 6 shows the conceptual design with injection locations and SVE well layout for Alt 5A2. Table 5 compares the conceptual design parameters for Alt 5, Alt 5A1 and Alt 5A2. A total of 20 combined SVE/ISCO wells and about 160,000 lbs of ozone and 270,000 gallons of hydrogen peroxide are proposed for Alt 5A1. The oxidant injection is assumed to be continuous for four years, followed by semiannual oxidant injections between years five and eight. SVE operation is also continuous for four years, followed by semiannual operation during oxidant injection events. Alt 5A2 assumes Fenton's oxidation with 12.5% hydrogen peroxide as described earlier in Section 1. For Alt 5A2, about 15 to 23 injection locations are assumed per event as shown in Figure 6, for a total of 152 injection locations with an oxidant volume of 1,120,000 gallons over four years. The well construction screen intervals and the injection depth intervals are similar to that assumed for SA12.

Table 6 presents a comparison of the 9-criteria ratings for Alt 5, Alt 5A1 and Alt 5A2 at SA11. The LTE and RTMV criteria for Alt 5A2 are rated the same as for Alt 5, while Alt 5A1 is rated lower. STE, Implementability and Cost are rated higher for Alt 5A1 and Alt 5A2 compared to Alt 5. The alternative cost decreased from $15,377,000 for Alt 5 to $8,279,000 for Alt 5A1 and $8,433,000 for Alt 5A2. Tables A5 and A6 in Attachment A present the SA11 cost estimate spreadsheets for Alt 5A1 and Alt 5A2 respectively.

5.0 CONCLUSION

The above evaluation indicates that significant improvements in STE, Implementability and Cost can be achieved through modified ISCO/Bio alternatives (Alt 5A1 and 5A2) compared to the ISCO alternative presented in the FS (Alt 5). Between the two modified ISCO/Bio options discussed, Alt 5A2 has several advantages over Alt 5A1 such as: 1)

greater flexibility in selecting injection locations; 2) greater flexibility in targeting specific depth intervals; 3) greater ability to vary oxidant dosage and concentrations according to level of NAPL impact; 4) slightly greater mass removal due to a closer effective spacing of injection points and a greater reliance on chemical oxidation compared to bioremediation; and, 5) a smaller treatment compound without long term storage of oxidant chemicals onsite.

The conceptual design and costs presented for the alternatives in each source area use the same assumptions regarding vertical and horizontal extent of NAPL as in the FS. However, the ongoing NAPL investigation indicates that the assumed areal and vertical extent of NAPL at each source area may be different than what has been assumed. As a result, the actual alternative remedial costs can vary from those presented here.

TABLES

Table 1
Comparison of Conceptual Design Parameters for SA12
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	Design Parameter[1]	Alt 5	Alt 5A Modified ISCO/Bio	
			Alt 5A1	Alt 5A2
1	Injection approach	Injection through fixed wells	Injection through fixed wells	Direct-push temporary injection points
2	Injection Well spacing	15 feet	Staggered array 45-60 feet [2]	15 feet[3]
3	Number of Injection wells	75 wells, 4 injection points/well	12 wells, 2 injections points/well	75 total temporary injection locations, 7 to 12 injection locations per event
4	SVE well spacing	30 feet	Staggered array 45-60 feet [2]	Staggered array 45-60 feet [3]
5	Number of SVE wells	23 dual-completion wells	12 single-completion wells	12 single-completion wells
6	Duration/Remedial Timeframe	ISCO 2 years SVE 4 years	ISCO 8 years SVE 4 years (continuous), then periodic operation Years 5-8	ISCO 4 years SVE 4 years (continuous)
7	ISCO Injection cycles	Semiannual injections for 2 years Initial injection to all wells; subsequent injections alternate	Semiannual injections for 8 years to all ISCO wells	Semiannual injections for 4 years with 7 to 12 injection locations/event
8	Total Oxidant dosage (Fenton's) (H_2O_2, Iron, acids)	1,120,000 gallons (2 years) 7,500 gal/well/year [4] using 17.5% hydrogen peroxide	1,120,000 gallons (8 years) 11,667 gal/well/year Using 12.5% hydrogen peroxide [5]	1,120,000 gallons (4 years) 14,933 gallons/location/year Using 12.5% hydrogen peroxide
9	SVE well screen SVE Blower Size	SVE well, dual screen 15-30 ft; 30-40 ft 500 scfm	SVE well screen, single 15-35 ft 400 scfm	SVE well screen, single 15-35 ft 400 scfm
10	ISCO well screen	4 individual ISCO injection points each 5' long, at 45', 55', 65', 75' bgs	2 individual ISCO injection points each 10' long, 45'-55', 65'-75' bgs	Temporary well screens in six 5-foot intervals to address 30-foot depth of impacted zone, 40-70 feet bgs
11	Well type	Separate SVE and ISCO well locations	Combined SVE and ISCO wells in one borehole	Temporary ISCO injection points and permanent SVE wells
12	Well drilling	SVE wells use Hollow Stem Auger (HSA) drilling; ISCO wells use direct push drill rig.	Only HSA drilling for combined SVE + ISCO wells located in one borehole.	Direct push for ISCO and HSA for SVE wells
13	Well Connection Piping	SVE wells are connected by piping below grade but ISCO injection points are not due to the large number of injection points (300 points).	SVE piping and ISCO injection tubing connecting to 24 injection points are all below grade.	SVE piping below grade No piping or injection wells for ISCO

Table 1
Comparison of Conceptual Design Parameters for SA12
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	Design Parameter[1]	Alt 5	Alt 5A Modified ISCO/Bio	
			Alt 5A1	Alt 5A2
14	Fenced-off area and Access issues	Entire remedial area + treatment compound will be fenced off. Facility employees will not have access to the remedial area.	Only the ISCO+SVE treatment compound will be fenced off. Remedial area will not be fenced off and facility employees will have limited access to it.	Only the SVE treatment compound will be fenced off. ISCO tanks and rigs are mobilized to the site semiannually for 3 weeks/event.

NOTES

1. Figures 1 and 2 show the conceptual design and well layout for the Modified ISCO/Bio + SVE alternatives (Alt 5A1 and Alt 5A2).
2. The well layout for Alt 5A1 (Figure 1) uses a staggered array of wells at 45 to 60-foot spacing to minimize the number of wells to address the source area.
3. Alt 5A2 includes 7 to 12 injection locations in a staggered array spaced 45 to 60 feet apart for each injection event (Figure 2). Four years of semiannual injection events would result in an effective injection spacing of about 15 feet.
4. For Alt 5 in the FS, 7,500 gallons/well is an average injection volume per year. As described in the FS, actual injection volume is 5,000 gallons/well/injection event, with an initial injection event applied to all wells and four subsequent semiannual events alternately applied to one-half the wells each time.
5. Alt 5 in the FS was designed as an aggressive remedial option to be completed in 2 years using a higher (17.5%) hydrogen peroxide concentration, while the Alt 5A1 and 5A2 options were designed to be less aggressive using a lower (12.5%) hydrogen peroxide concentration.

Table 2
Comparison of 9-criteria evaluation ratings for SA12
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

	9-Criteria	Alt 5	Alt 5A Modified ISCO/Bio		Comment
			Alt 5A1	Alt 5A2	
1	Overall Protection of Human Health and Environment	Yes	Yes	Yes	Both alternatives satisfy this threshold criterion
2	Compliance with ARARs	Yes	Yes	Yes	Both alternatives satisfy this threshold criterion
3	Long Term Effectiveness (LTE)	7	6	7	The contaminant mass removal with Alt 5A1 is expected to be slightly lower than Alt 5; hence it is rated lower. Removal for Alt 5A2 is estimated to be about the same as Alt 5 and hence it is rated the same.
4	Reduction of Toxicity, Mobility and Volume (RTMV)	6 *40%-50%*	5 *30%-40%*	6 *40%-50%*	The contaminant mass removal with Alt 5A1 is expected to be slightly lower than Alt 5 and Alt 5A2 is expected to remove about the same as Alt 5.
5	Short Term Effectiveness (STE)	5	6	6	Alts 5A1 and 5A2 are rated higher for STE because of lower potential for impacts to human health and environment during installation and operation. Alt 5 has a significantly greater number of closely spaced wells (75 wells, 4 pts per well) and a higher total oxidant dosage.
6	Implementability	3	5	5	Alts 5A1 and 5A2 are rated higher for STE because of less complex and shorter timeframe for installation, lower impact to property owners and neighboring facilities during installation and operation.
7	Cost *Present Worth Cost*	5 *$11,406,000*	6 *$8,230,000*	6 *$7,775,000*	Alts 5A1 and 5A2 are rated higher for Cost because the present worth cost for the modified, less intensive ISCO/Bio is significantly lower. Cost includes a 40% contingency.

Table 3
Comparison of Conceptual Design Parameters for SA3
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	Design Parameter [1]	Alt 5	Alt 5A Modified ISCO/Bio	
			Alt 5A1	Alt 5A2
1	Injection Approach	Injection through fixed wells	Injection through fixed wells	Direct-push temporary injection points
2	Injection Well spacing	15 feet	45 feet [2]	15 feet[3]
3	Number of Injection wells	192 wells, 4 injection points/well	28 wells, 2 injections points/well	192 total temporary injection locations, 24 injection locations per event
4	SVE well spacing	30 feet	Staggered array 45-60 feet [2]	Staggered array 45-60 feet [3]
5	Number of SVE wells	192 dual-completion wells	28 single-completion wells	28 single-completion wells
6	Duration/Remedial Timeframe	ISCO 2 years SVE 4 years	ISCO 8 years SVE 4 years (continuous) then periodic operation Years 5-8	ISCO 4 years SVE 4 years (continuous)
7	ISCO Injection cycles	Semiannual injections (2 years) Initial injection to all wells; subsequent injections alternate	Semiannual injection (8 years) to all ISCO wells	Semiannual injection for 4 years with 24 injection locations per event
8	Total Oxidant dosage (Fenton's) (H_2O_2, Iron, acids)	2,880,000 gallons (2 years) 7,500 gal/well/year [4] Using 17.5% hydrogen peroxide	2,880,000 gallons (8 years) 12,857 gal/well/year Using 12.5% hydrogen peroxide[5]	2,880,000 gallons (4 years) 15,000 gal/location/year Using 12.5% hydrogen peroxide
9	SVE well screen SVE blower size	SVE well, dual screen 15-30 ft; 30-50 ft 1,500 scfm	SVE well screen, single 15-45 ft 750 scfm	SVE well screen, single 15-45 ft 750 scfm
10	ISCO well screen	ISCO 4 individual injection points each 5' long, at 55', 65', 75', 85' bgs	ISCO 2 individual injection points each 10' long, 55'-65', 75'-85' bgs	Temporary well screens in eight 5-foot intervals to address 40-foot depth of impacted zone, 50-90 feet bgs
11	Well type	Separate SVE and ISCO well locations	Combined SVE and ISCO wells in one borehole	Temporary ISCO injection points and permanent SVE wells
12	Well drilling	SVE wells use Hollow Stem Auger (HSA) drilling; ISCO wells use direct push drill rig	Only HSA drilling for combined SVE + ISCO wells located in one borehole	Direct push for ISCO and HSA for SVE wells
13	Well Connection Piping	SVE wells are connected by piping below grade but ISCO injection points are not due to the large number of injection points (768 points).	SVE piping and ISCO injection tubing connecting to 56 injection points are all below grade	SVE piping below grade No piping or injection wells for ISCO

Table 3
Comparison of Conceptual Design Parameters for SA3
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	Design Parameter [1]	Alt 5	Alt 5A Modified ISCO/Bio	
			Alt 5A1	Alt 5A2
14	Fenced-off area and Access issues	Remedial area + Treatment compound will be fenced off. Facility employees will not have access to the remedial area.	Only the Treatment compound will be fenced off. Remedial area will not be fenced off and facility employees will have limited access to it.	Only the SVE treatment compound will be fenced off. ISCO tanks and rigs are mobilized to the site semiannually for 5 weeks/event.

NOTES

1. Figures 3 and 4 show the conceptual design and well layout for the Modified ISCO/Bio + SVE alternative (Alt 5A1 and Alt 5A2).
2. The well layout for Alt 5A1 (Figure 3) uses a staggered array of wells at 45 to 60-foot spacing to minimize the number of wells to address the source area.
3. Alt 5A2 includes twenty four injection locations in a staggered array spaced 45 to 60 feet apart for each injection event (Figure 4). Four years of semiannual injection events would result in an effective injection spacing of about 15 feet.
4. For Alt 5 in the FS, 7,500 gallons/well is an average injection volume per year. As described in the FS, actual injection volume is 5,000 gallons/well/injection event, with an initial injection event applied to all wells and four subsequent semiannual events alternately applied to one-half the wells each time.
5. Alt 5 in the FS was designed as an aggressive remedial option to be completed in 2 years using a higher (17.5%) hydrogen peroxide concentration, while the Alt 5A1 and 5A2 options were designed to be less aggressive using a lower (12.5%) hydrogen peroxide concentration.

Table 4
Comparison of 9-criteria evaluation ratings for SA3
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	9-Criteria	Alt 5 in FS	Alt 5A Modified ISCO/Bio		Comment
			Alt 5A1	Alt 5A2	
1	Overall Protection of Human Health and Environment	Yes	Yes	Yes	Both alternatives satisfy this threshold criterion
2	Compliance with ARARs	Yes	Yes	Yes	Both alternatives satisfy this threshold criterion
3	Long Term Effectiveness (LTE)	7	6	7	The contaminant mass removal with Alt 5A1 is expected to be slightly lower than Alt 5; hence it is rated lower. Mass removal for Alt 5A2 is estimated to be about the same as Alt 5 and hence it is rated the same.
4	Reduction of Toxicity, Mobility and Volume (RTMV)	7 *50%-60%*	6 *40%-50%*	7 50%-60%	The contaminant mass removal with Alt 5A1 is expected to be slightly lower than Alt 5 and Alt 5A2 is expected to remove about the same as Alt 5.
5	Short Term Effectiveness (STE)	5	6	6	Alt 5A1 and 5A2 are rated higher for STE because of lower potential for impacts to human health and environment during installation and operation. Alt 5 has a significantly greater number of closely spaced wells (192 wells, 4 pts per well) and a higher total oxidant dosage.
6	Implementability	4	6	6	Alt 5A is rated higher for STE because of lower density of wells (192 wells/4 pts per well down to 28 wells/2 pts per well), less complex and shorter timeframe for installation, lower impact to property owners and neighboring facilities during installation and operation.
7	Cost *Present Worth Cost*	2 *$23,279,000*	4 *$14,749,000*	4 *$13,966,000*	Alts 5A1 and 5A2 are rated higher for Cost because the present worth cost for the modified, less intensive ISCO/Bio is significantly lower. Cost includes a 40% contingency.

Table 5
Comparison of Conceptual Design Parameters for SA11
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	Design Parameter [1]	Alt 5	Alt 5A Modified ISCO/Bio	
			Alt 5A1	Alt 5A2 [2]
1	Injection approach	Injection through fixed wells	Injection through fixed wells	Direct-push temporary injection points
2	Injection Well spacing	15 feet	45 feet[3]	15 feet[4]
3	Number of Injection wells Total number of injection points	151 wells, 4 injection points/well 604 injection points	20 wells, 2 injection points/well 40 injection points	152 total injection locations, 15 to 23 temporary injection locations/event
4	SVE well spacing	30 feet	45 feet[3]	Staggered array 45-60 feet [4]
5	Number of SVE wells	34 dual-completion wells	20 single-completion wells	20 single-completion wells
6	Duration/Remedial Timeframe	ISCO 2 years SVE 4 years	ISCO 8 years SVE 4 years (continuous), then periodic operations for Years 5 to 8	ISCO 4 years SVE 4 years (continuous)
7	ISCO Injection cycles	Semiannual injections for 2 years Initial injection to all wells; subsequent injections alternate	Continuous operation for 4 years Semiannual injections for Years 5 to 8	Semiannual injections for 4 years with 15 to 23 injection locations/event
8	Total Oxidant dosage (H_2O_2, O_3)	45,000 lbs ozone (2 years) 604,000 gal hydrogen peroxide Using 17.5% hydrogen peroxide	160,000 lbs ozone (8 years) [5] 270,000 gal hydrogen peroxide Using 12.5% hydrogen peroxide	1,120,000 gallons (4 years) 7,400 gallons/location/year Using 12.5% hydrogen peroxide
9	SVE well screen SVE blower size	SVE well, dual screen 15-30 ft; 30-40 ft 1,000 scfm	SVE well screen, single 15-35 ft 500 scfm	SVE well screen, single 15-35 ft 500 scfm
10	ISCO well screen	ISCO 4 individual injection points each 5' long, at 45', 55', 65', 75' bgs	ISCO 2 individual injection points each 10' long, 45'-55', 65'-75' bgs	Temporary well screens in six 5-foot intervals to address 30-foot depth of impacted zone, 40-70 feet bgs
11	Well type	Separate SVE and ISCO well locations	Combined SVE and ISCO wells in one borehole	Temporary ISCO injection points and permanent SVE wells
12	Well drilling	SVE wells use Hollow Stem Auger (HSA) drilling; ISCO wells use direct push drill rig.	Only HSA drilling for combined SVE + ISCO wells located in one borehole.	Direct push for ISCO and HSA for SVE wells
13	Well Connection Piping	SVE wells are connected by piping below grade but ISCO injection points are not due to the large number of injection points (604 points).	SVE piping and ISCO injection tubing connecting to 40 injection points are all below grade.	SVE piping below grade No piping or injection wells for ISCO

Table 5
Comparison of Conceptual Design Parameters for SA11
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	Design Parameter [1]	Alt 5	Alt 5A Modified ISCO/Bio	
			Alt 5A1	Alt 5A2 [2]
14	Fenced-off area and Access issues	Remedial area + Treatment compound will be fenced off. Facility employees will not have access to the remedial area.	Only the Treatment compound will be fenced off. Remedial area will not be fenced off and facility employees will have limited access to it.	Only the SVE treatment compound will be fenced off. ISCO tanks and rigs are mobilized to the site semiannually for 4 weeks/event.

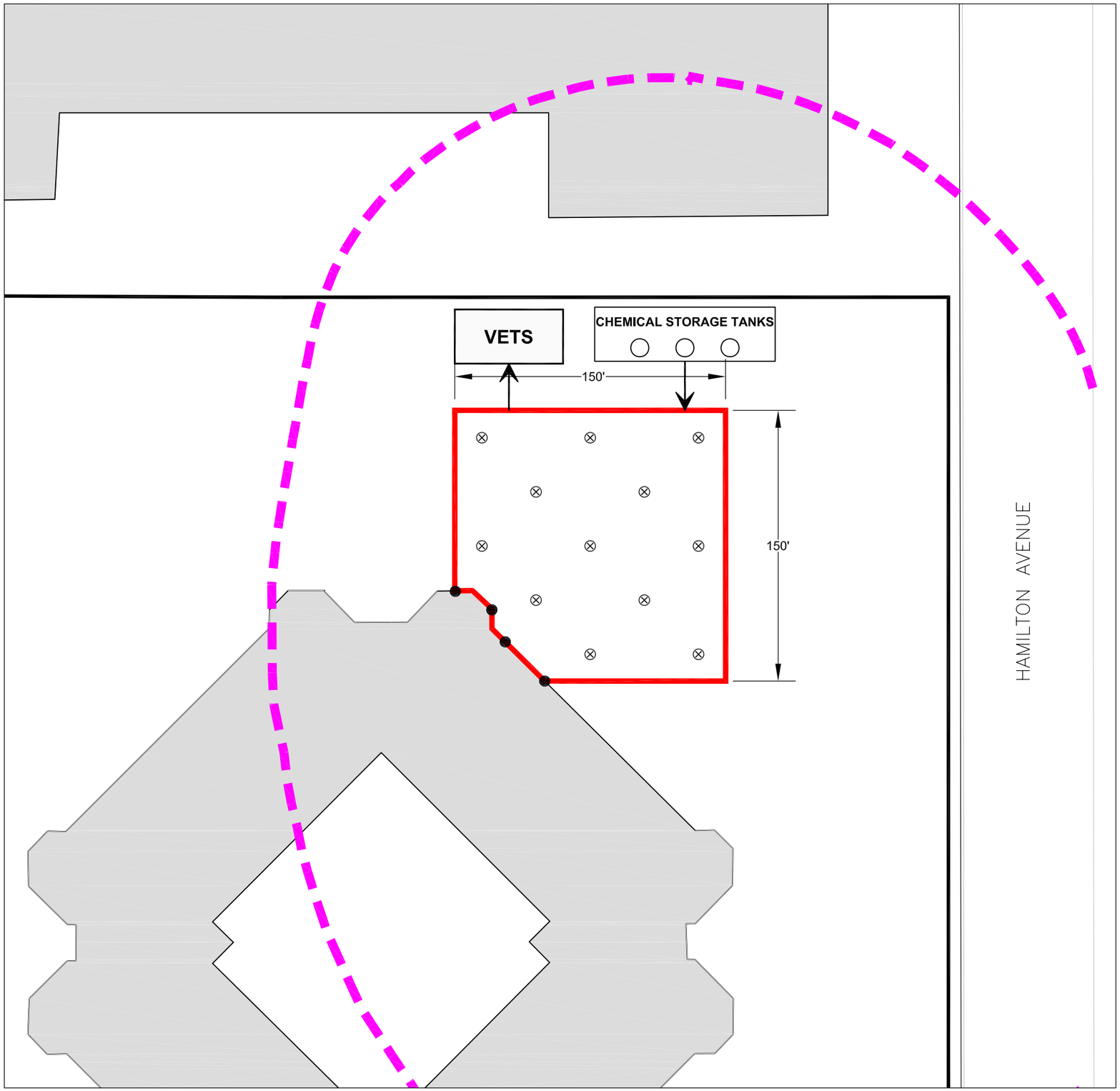
NOTES

1. Figures 5 and 6 show the conceptual design and well layout for the Modified ISCO/Bio + SVE alternatives (Alt 5A1 and Alt 5A2).
2. Alt 5A2 assumes Fenton's for direct push injection because Peroxone oxidant is typically used with fixed wells as in Alt 5A and 5A1.
3. The well layout for Alt 5A1 (Figure 5) use a staggered array of wells at 45 to 60-foot spacing to minimize the number of wells to address the source area.
4. Alt 5A2 includes 15 to 23 injection locations in a staggered array spaced 45 to 60 feet apart for each injection event (Figure 6). Four years of semiannual injection events would result in an effective injection spacing of about 15 feet.
5. For Peroxone ISCO design, the ideal ozone to hydrogen peroxide ratio would depend on site-specific pilot testing results. For the Alt 5 design that is an aggressive approach to complete remediation in 2 years, we assumed a greater proportion of hydrogen peroxide compared to ozone. This is a more cost effective approach for Alt 5 because ozone generators increase in cost significantly above a 100-pound per day (ppd) size. For Alt 5A1 that is designed to be less aggressive operating over an 8-year period, a greater reliance on ozone is feasible with the same 100 ppd ozone generator and hence the hydrogen peroxide dosage was decreased.

Table 6
Comparison of 9-criteria evaluation ratings for SA11
ISCO Alternatives 5, 5A1 and 5A2
Del Amo Soil and NAPL FS

No.	9-Criteria	Alt 5	Alt 5A Modified ISCO/Bio		Comment
			Alt 5A1	Alt 5A2	
1	Overall Protection of Human Health and Environment	Yes	Yes	Yes	Both alternatives satisfy this threshold criterion
2	Compliance with ARARs	Yes	Yes	Yes	Both alternatives satisfy this threshold criterion
3	Long Term Effectiveness (LTE)	7	6	7	The contaminant mass removal with Alt 5A1 is expected to be slightly lower than Alt 5; hence LTE is rated lower. Removal for Alt 5A2 is estimated to be about the same as Alt 5 and hence it is rated the same.
4	Reduction of Toxicity, Mobility and Volume (RTMV)	7 *50%-60%*	6 *40%-50%*	7 50%-60%	The contaminant mass removal with Alt 5A1 is expected to be slightly lower than Alt 5 and Alt 5A2 is expected to remove about the same as Alt 5.
5	Short Term Effectiveness (STE)	5	6	6	Alts 5A1 and 5A2 are rated higher for STE because of lower potential for impacts to human health and environment during installation and operation. Alt 5 has a significantly greater number of closely spaced wells (151 wells, 4 pts per well) and a higher total oxidant dosage.
6	Implementability	4	6	6	Alts 5A1 and 5A2 are rated higher for STE because of less complex and shorter timeframe for installation, lower impact to property owners and neighboring facilities during installation and operation.
7	Cost *Present Worth Cost*	4 *$15,377,000*	6 *$8,279,000*	6 *$8,433,000*	Alts 5A1 and 5A2 are rated higher for Cost because the present worth cost for the modified, less intensive ISCO/Bio is significantly lower. Cost includes a 40% contingency.

FIGURES



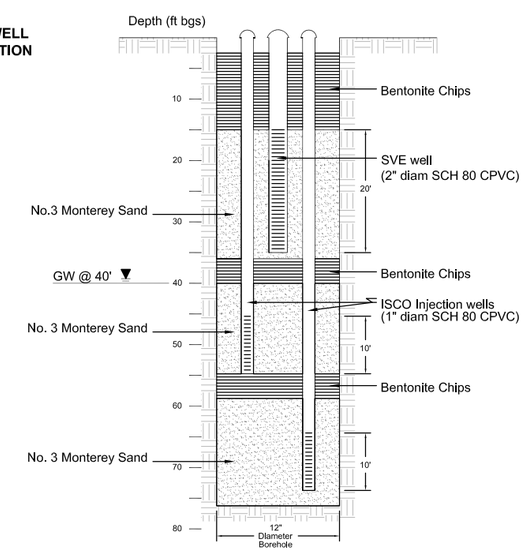
Legend

- Assumed extent of NAPL source area based on LNAPL accumulations or observed ROST NAPL signatures within one or more water table monitoring wells, temporary well points or borings.
- Area where LNAPL could potentially be present based on dissolved concentrations in groundwater (>5% of solubility)
- Parcel boundary
- Combined ISCO/SVE well (45- to 60-foot spacing)
- SVE sentry well (30-foot spacing)
- VETS — Vapor Extraction Treatment System

Notes:

(1) Temperature monitoring points are not shown on the figure. These points would typically be distributed throughout the source area at a 75-100 foot spacing.
(2) SVE radius of influence circles are not shown for each well due to the large number of closely spaced wells in the figure.

COMBINED ISCO/SVE WELL CONSTRUCTION DETAIL



N

0 60 120
Scale in Feet

FIGURE 1

Alternative 5A1
IN-SITU CHEMICAL OXIDATION, BIOREMEDIATION, SVE, ICS AND MONITORING
Parcel No. 7351-033-017

Source Area 12
Del Amo Soil + NAPL FS

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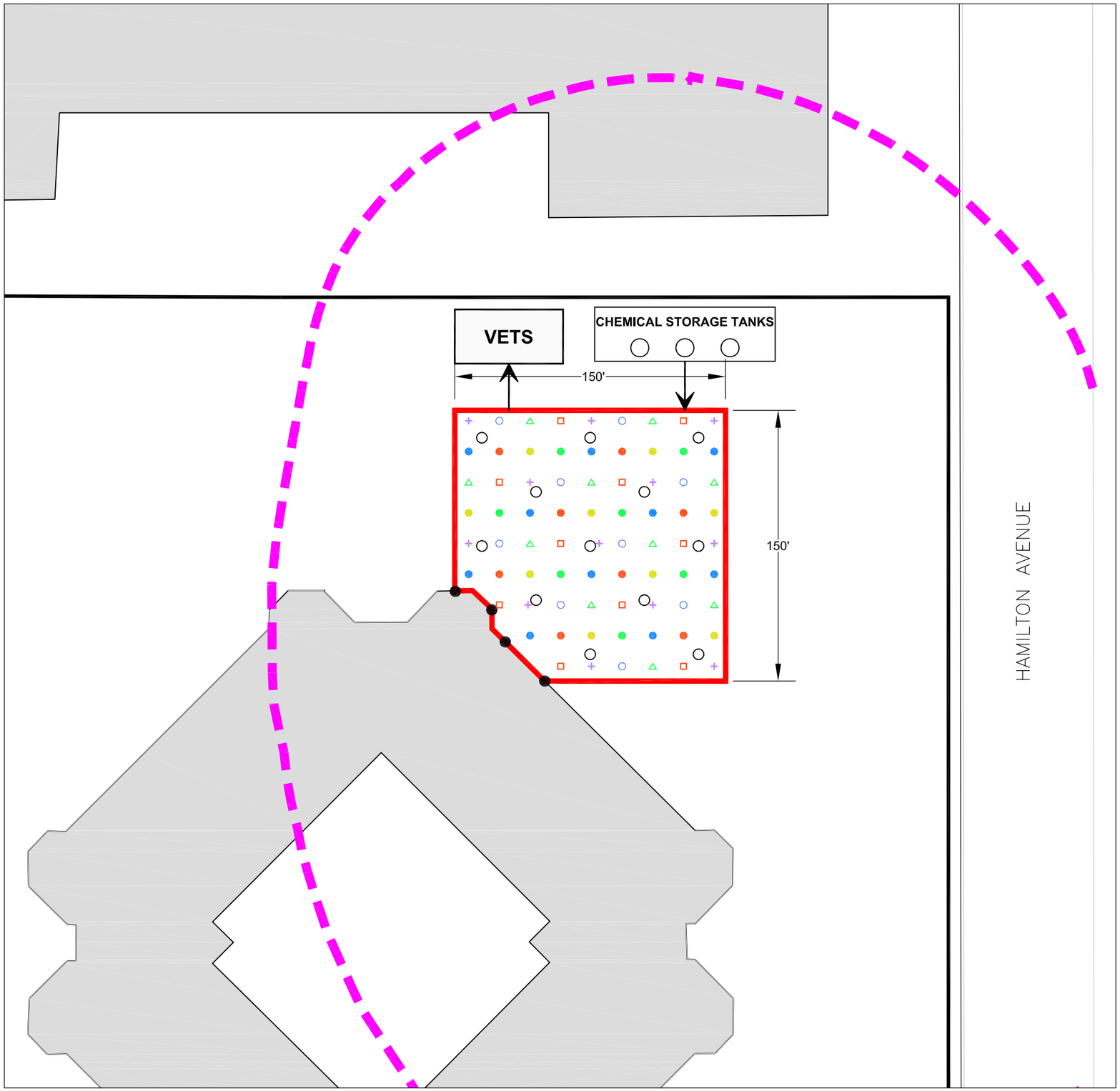


Legend

- Assumed extent of NAPL source area based on LNAPL accumulations or observed ROST NAPL signatures within one or more water table monitoring wells, temporary well points or borings.
- Area where LNAPL could potentially be present based on dissolved concentrations in groundwater (>5% of solubility)
- Parcel boundary
- SVE interior well (45- to 60-foot spacing)
- SVE sentry well
- VETS — Vapor Extraction Treatment System

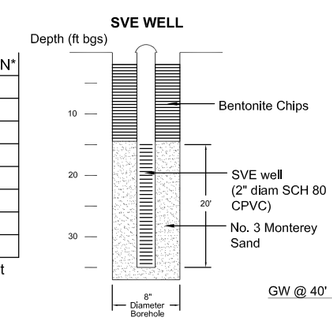
Note:

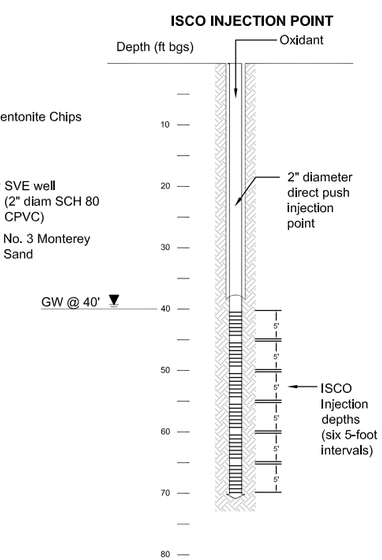
Temperature monitoring points are not shown on the figure. These points would typically be distributed throughout the source area at a 50-75 foot spacing.

SEMI-ANNUAL ISCO EVENTS INJECTION POINT CONFIGURATIONS

EVENT	YEAR	CONFIGURATION*
1	1	●
2	1	●
3	2	●
4	2	●
5	3	○
6	3	△
7	4	□
8	4	+

* 7 to 12 injection points per event





N

0 60 120

Scale in Feet

FIGURE 2

Alternative 5A2
IN-SITU CHEMICAL OXIDATION, SVE, ICS AND MONITORING
Parcel No. 7351-033-017

Source Area 12
Del Amo Soil + NAPL FS

URS

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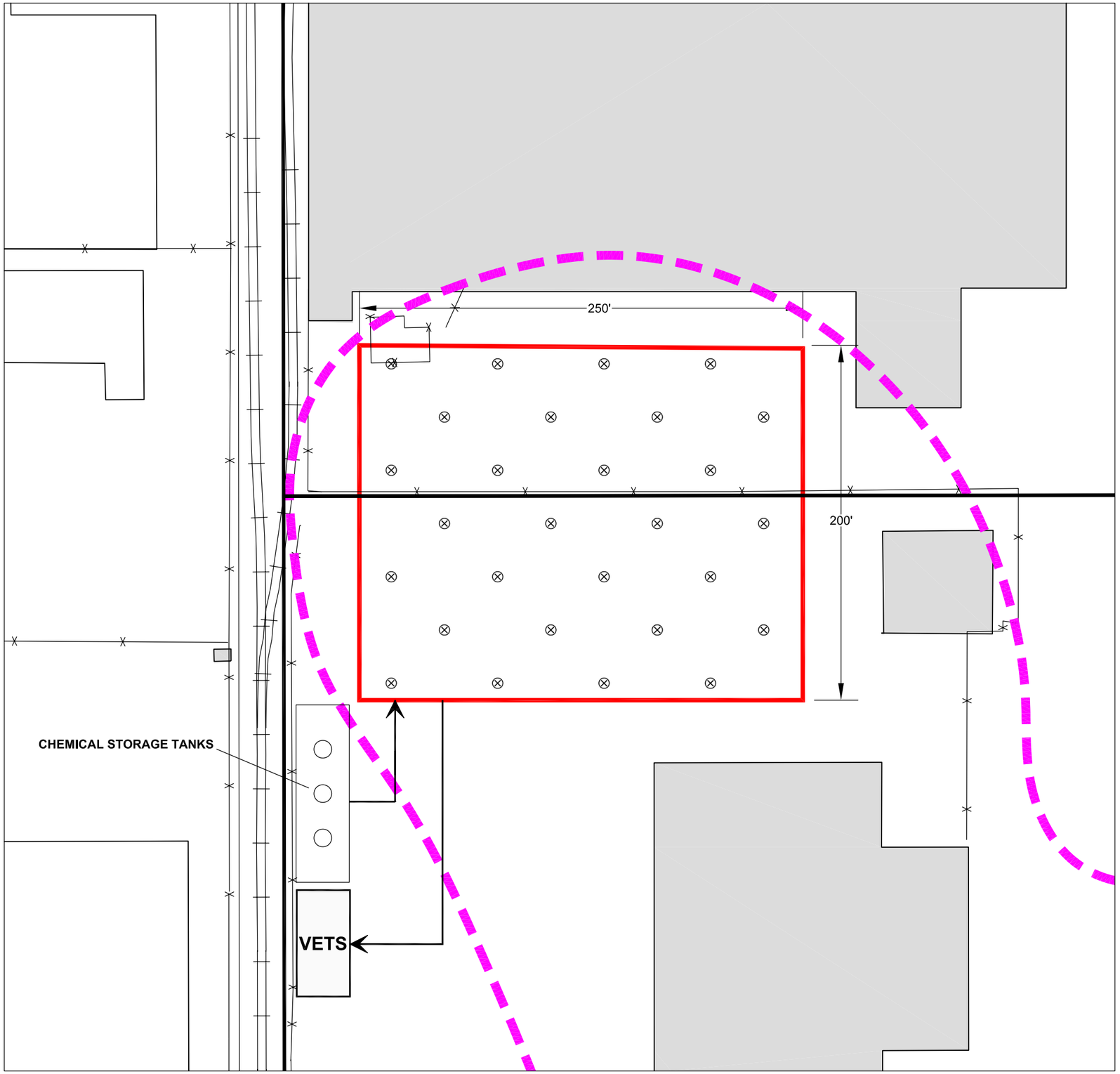


Legend

Assumed extent of NAPL source area based on:
1. *Visible LNAPL accumulations occur within one or more water table monitoring wells or temporary well points, or*
2. *Laboratory measurements of hydrocarbon saturation (Dean Stark testing)*

Area where LNAPL could potentially be present based on dissolved concentrations in groundwater (>5% of solubility)

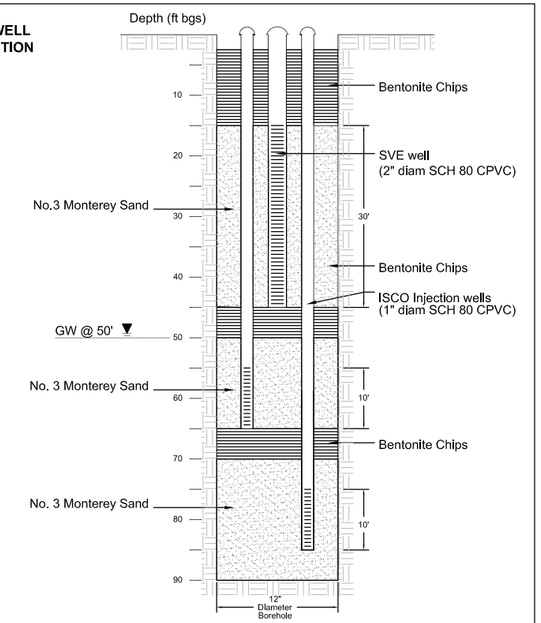
Parcel boundary

Combined ISCO/SVE well (45- to 60-foot spacing)

VETS — *Vapor Extraction Treatment System*

Notes:
(1) *Temperature monitoring points are not shown on the figure. These points would typically be distributed throughout the source area at a 75-100 foot spacing.*
(2) *SVE radius of influence circles are not shown for each well due to the large number of closely spaced wells in the figure.*

COMBINED ISCO/SVE WELL CONSTRUCTION DETAIL



N

0 60 120
Scale in Feet

FIGURE 3

Alternative 5A1
IN-SITU CHEMICAL OXIDATION, BIOREMEDIATION, SVE, ICS AND MONITORING
Parcels Nos. 7351-034-056 and 7351-034-057
Source Area 3
Del Amo Soil + NAPL FS

URS

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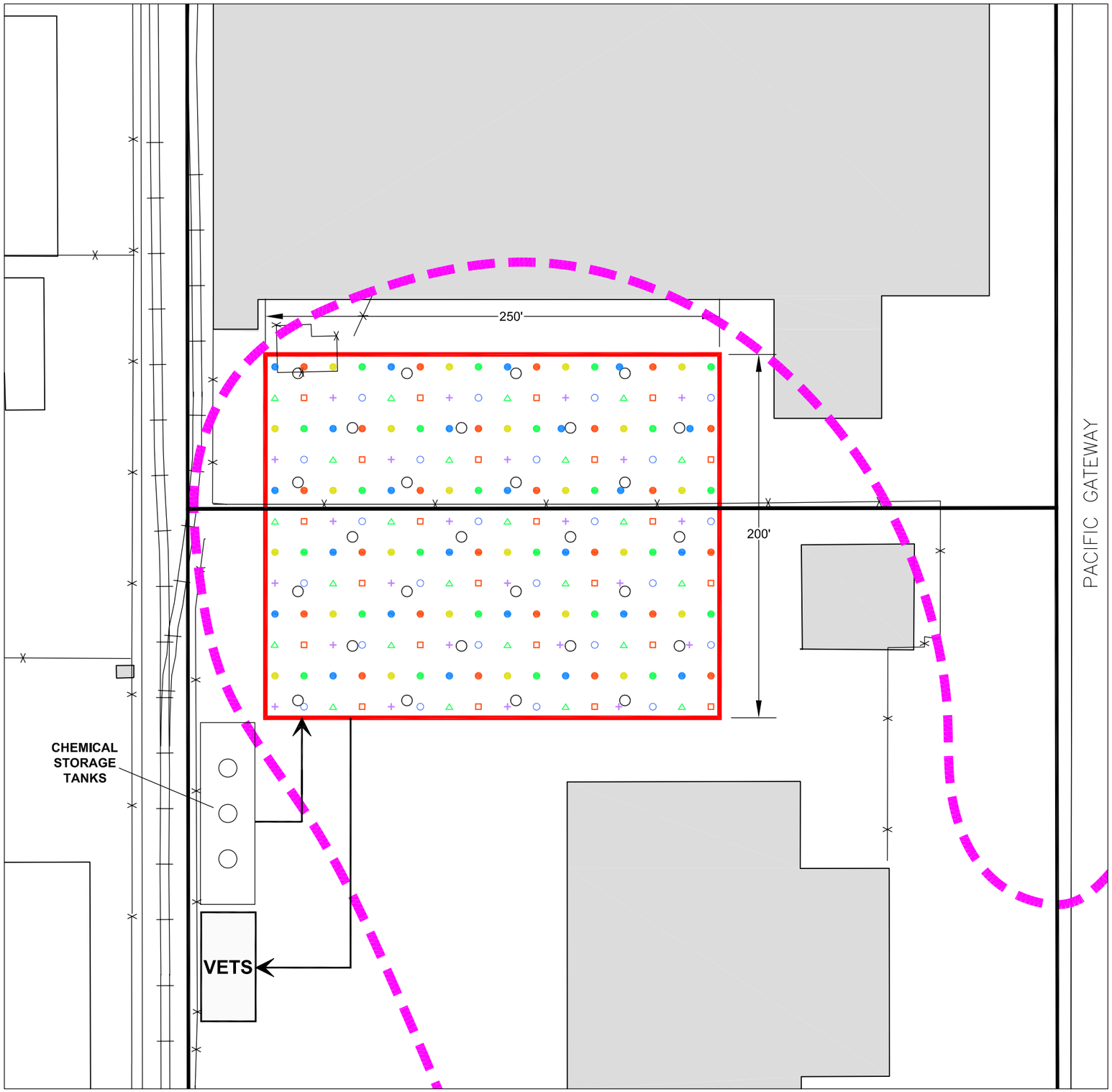


Legend

Assumed extent of NAPL source area based on:
1. Visible LNAPL accumulations occur within one or more water table monitoring wells or temporary well points, or
2. Laboratory measurements of hydrocarbon saturation (Dean Stark testing)

Area where LNAPL could potentially be present based on dissolved concentrations in groundwater (>5% of solubility)

Parcel boundary

SVE well (45- to 60-foot spacing)

VETS — Vapor Extraction Treatment System

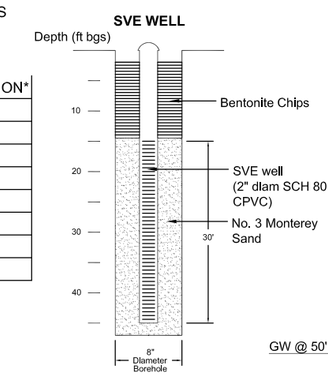
Note:

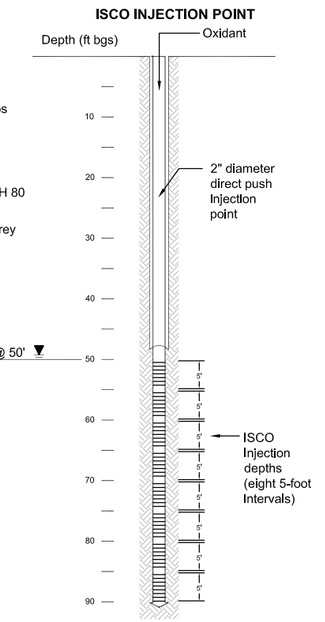
Temperature monitoring points are not shown on the figure. These points would typically be distributed throughout the source area at a 50-75 foot spacing.

SEMI-ANNUAL ISCO EVENTS INJECTION POINT CONFIGURATIONS

EVENT	YEAR	CONFIGURATION*
1	1	●
2	1	●
3	2	●
4	2	●
5	3	○
6	3	△
7	4	□
8	4	+

* 24 injection points per event





N

0 60 120
Scale in Feet

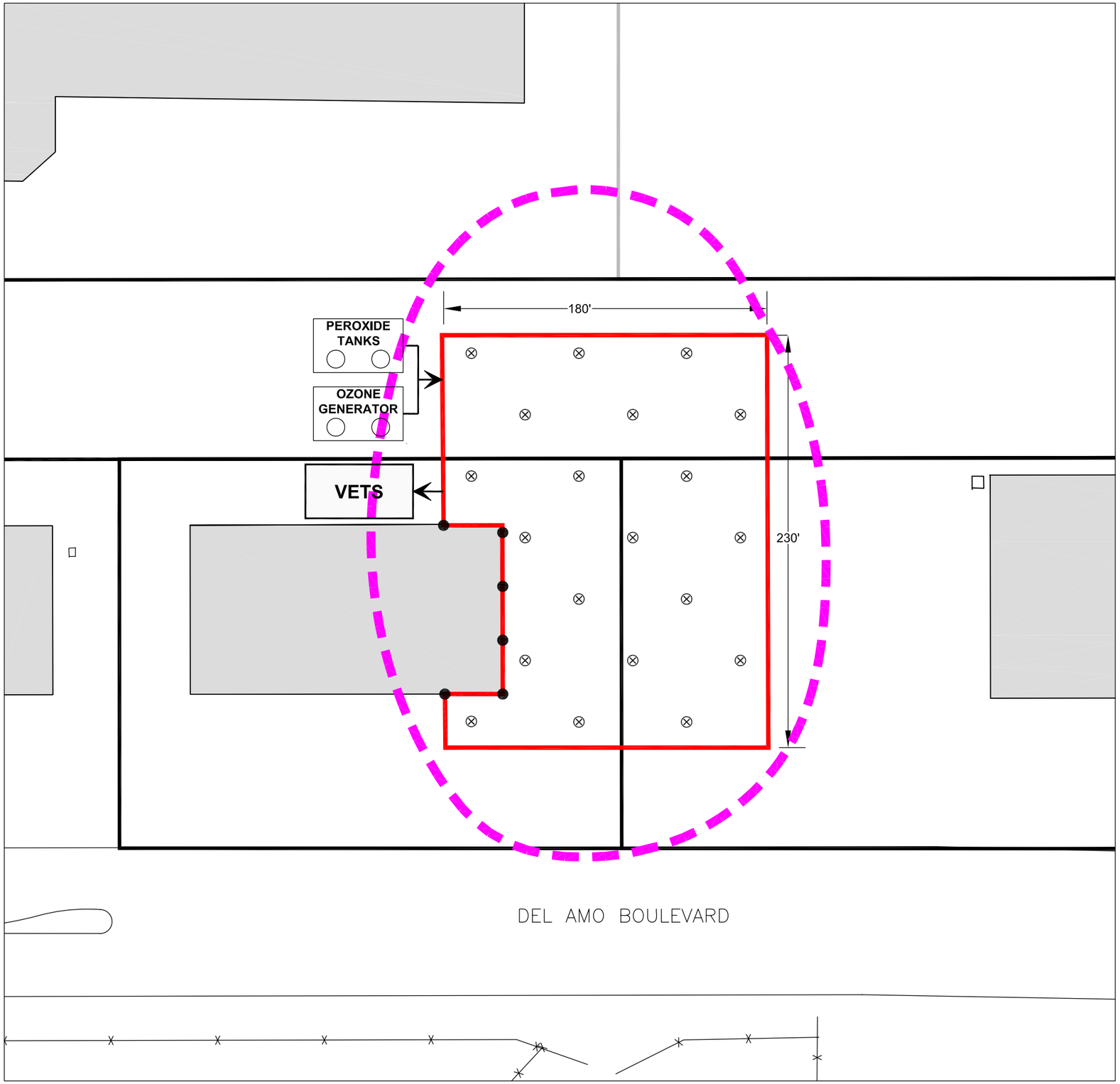
FIGURE 4

Alternative 5A2
IN-SITU CHEMICAL OXIDATION, SVE, ICS AND MONITORING
Parcels Nos. 7351-034-056 and 7351-034-057

URS

Source Area 3
Del Amo Soil + NAPL FS

T:\Del_Amo\2007\treatment_system\SA3 treatment system 10/21/09 (Santa Barbara Office)



Legend

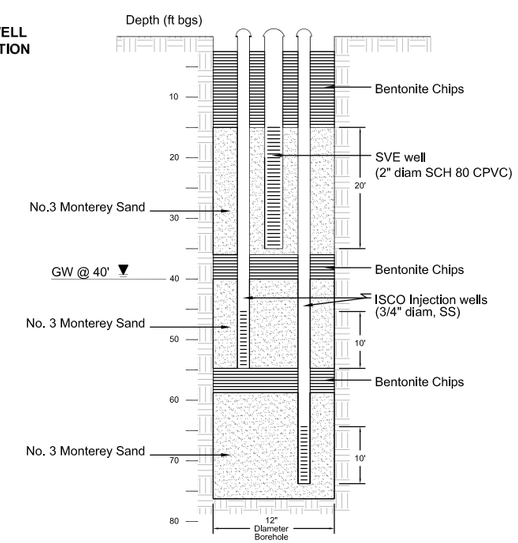
- Assumed extent of NAPL source area based on ROST signatures in CPT borings and hydrocarbon saturation data in soil boring core samples
- Area where LNAPL could potentially be present based on dissolved concentrations in groundwater (>5% of solubility)
- Parcel boundary
- Combined ISCO/SVE well (45- to 60-foot spacing)
- SVE sentry well (30-foot spacing)
- VETS — Vapor Extraction Treatment System

Notes:

(1) Temperature monitoring points are not shown on the figure. These points would typically be distributed throughout the source area at a 75-100 foot spacing.

(2) SVE radius of influence circles are not shown for each well due to the large number of closely spaced wells in the figure.

COMBINED ISCO/SVE WELL CONSTRUCTION DETAIL



N

0 60 120

Scale in Feet

FIGURE 5

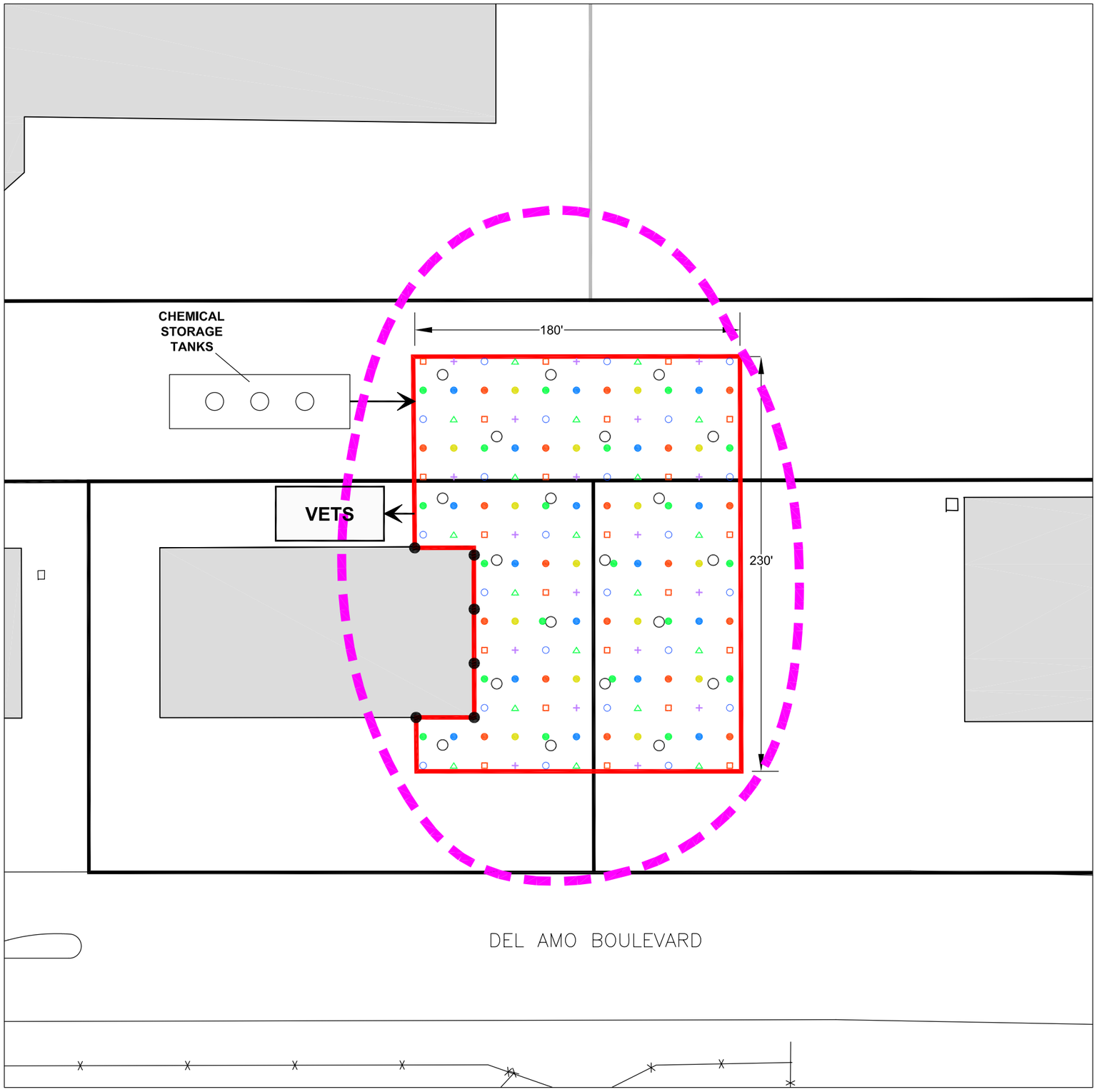
Alternative 5A1
IN-SITU CHEMICAL OXIDATION, BIOREMEDIATION, SVE, ICS AND MONITORING
Parcel Nos. 7351-033-022, -027 & -900

Source Area 11

Del Amo Soil + NAPL FS

URS

T:\Del_Amo\2007\treatment_system\figs_7-5_V4.dwg 10/29/09 (Santa Barbara Office)



Legend

- Assumed extent of NAPL source area based on ROST signatures in CPT borings and hydrocarbon saturation data in soil boring core samples
- Area where LNAPL could potentially be present based on dissolved concentrations in groundwater (>5% of solubility)
- Parcel boundary
- SVE interior well (45- to 60-foot spacing)
- SVE sentry well (30-foot spacing)
- VETS — Vapor Extraction Treatment System

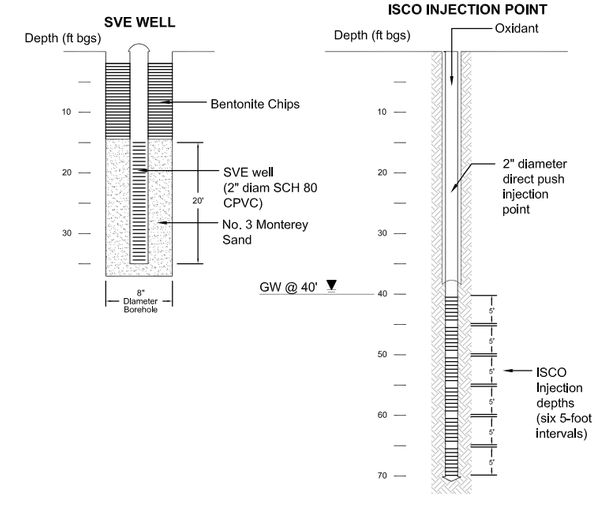
Note:

Temperature monitoring points are not shown on the figure. These points would typically be distributed throughout the source area at a 50-75 foot spacing.

SEMI-ANNUAL ISCO EVENTS INJECTION POINT CONFIGURATIONS

EVENT	YEAR	CONFIGURATION*
1	1	●
2	1	●
3	2	●
4	2	●
5	3	○
6	3	△
7	4	□
8	4	+

* 15 to 23 injection points per event



N

0 60 120
Scale in Feet

FIGURE 6

Alternative 5A2
IN-SITU CHEMICAL OXIDATION, SVE, ICS AND MONITORING
Parcel Nos. 7351-033-022, -027 & -900

URS

Source Area 11
Del Amo Soil + NAPL FS

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ATTACHMENT H3-1

TABLE A1
SOURCE AREA 12 - REMEDIAL ALTERNATIVE 5A1
ISCO/BIO + SVE COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	Site Investigation/Delineation	1	ls	$ 115,000	$ 115,000
2	Mobilization/Demobilization	22,500	sf	$ 1.5	$ 34,000
3	Electrical Service/Hookup/Utilities	1	ls	$ 30,000	$ 30,000
4	Site Preparation/Geophysical survey	22,500	sf	$ 0.8	$ 18,000
5	Combined SVE/ISCO wells	12	ea	$ 10,000	$ 120,000
6	Vapor Extraction Sentry Wells (outdoor)	4	ea	$ 6,000	$ 24,000
7	Temperature Monitoring Well Points (outdoor)	5	ea	$ 10,000	$ 50,000
8	Well Headworks/Vault for SVE/ISCO inj wells	21	ea	$ 3,000	$ 63,000
9	Treatment System Installation and Startup	1	ls	$ 75,000	$ 75,000
10	Misc. Treatment Sys Equipment: tanks, piping	1	ls	$ 25,000	$ 25,000
11	SVE Equipment : 400 CFM Blower+ThermOx	1	ls	$ 75,000	$ 75,000
12	Control and Instrumentation	1	ls	$ 13,000	$ 13,000
13	Trenching, Piping, Backfill and Resurfacing	700	lf	$ 50	$ 35,000
14	Equipment Pad/Enclosure/Fence	1	ea	$ 40,000	$ 40,000
15	Post Treatment Sampling + Analysis	9	each	$ 5,000	$ 45,000
				Direct Capital Total	**$ 762,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 762,000	$ 61,000
2	Project Management, Agency Reporting/Coordination	5%	of	$ 762,000	$ 39,000
3	Contruction Management	6%	of	$ 762,000	$ 46,000
				Indirect Capital Subtotal	**$ 146,000**
				Total Direct + Indirect Capital Cost	**$ 908,000**
Item No.	**Operation and Maintenance Cost**				
1	Fuel: Natural Gas	12	mths	$ 4,000	$ 48,000
2	Electricity/Utilities	12	mths	$ 2,200	$ 26,400
3	SVE System Operation and Monitoring Labor	12	units	$ 6,000	$ 72,000
4	SVE Maintenance Materials and Expenses	12	mths	$ 2,000	$ 24,000
5	ISCO Fentons Chemicals: H2O2, Iron soln, acids	12	wells	$ 17,500	$ 210,000
6	ISCO Vendor Labor+Equipment rental	2	events	$ 50,000	$ 100,000
7	ISCO Consultant Oversight, Monitoring	2	mths	$ 10,000	$ 20,000
8	SVE Vapor Treatment System Influent/Effluent Monitoring/Lab Costs	12	mths	$ 4,000	$ 48,000
9	ISCO Soil and Groundwater Monitoring/Sampling Analytical Lab Costs	1	rounds	$ 50,000	$ 50,000
10	Project Management/Consultant support/Reports	12	mths	$ 10,000	$ 120,000
11	Waste/Water Disposal	12	mths	$ 2,500	$ 30,000
12	H&S/Air Monitoring	1	ls	$ 8,000	$ 8,000
13	Miscellaneous: Equipment rentals, PID/FID, Transducers	12	mths	$ 4,500	$ 54,000
				SVE Annual Operation and Maintenance (Year 1-4) Subtotal	**$ 317,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 4 Years)	**$ 1,125,000**
				ISCO Annual Operation and Maintenance (Year 1-8) Subtotal	**$ 494,000**
				Present Worth of ISCO Operation and Maintenance Costs (5%, 8 Years)	**$ 3,193,000**
				SVE Annual Operation and Maintenance (Year 5-8) Subtotal	**$ 106,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, Year 5-8)	**$ 309,000**
				Present Worth of ICs + Monitoring (5%, 100 Years) Costs	**$ 481,000**
				Contingency (40% of ISCO)	**$ 2,214,000**
				Total Capital and O&M Cost Present Worth	**$ 8,230,000**

NOTES/ASSUMPTIONS
1. Assume 12 collocated SVE and ISCO injection wells at a 45- to 60-foot spacing and SVE wells screened 15-35 feet bgs.
2. ISCO injection wells have two 3/4"-SS injection points/well screened 45-55 ft and 65-75 ft bgs.
3. Vapor treatment system uses thermal oxidizer, 400 scfm, positive displacement (PD) blower.
4. Assume SVE operates for 4 years continuously and ISCO through semiannual injection events.
5. ISCO injection events continue semiannualy for years 5 to 8 and SVE is operated intermittently during ISCO events.
6. Assume acidified Fenton's process, injection of 11,667 gal of oxidant/well/year (12.5% H2O2, iron, acids) for a total of 1,120,000 gallons in 8 years.

TABLE A2
SOURCE AREA 12 - REMEDIAL ALTERNATIVE 5A2
ISCO/BIO + SVE COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	Site Investigation/Delineation	1	ls	$ 115,000	$ 115,000
2	Mobilization/Demobilization	22,500	sf	$ 1.5	$ 34,000
3	Electrical Service/Hookup/Utilities	1	ls	$ 30,000	$ 30,000
4	Site Preparation/Geophysical survey	22,500	sf	$ 0.8	$ 18,000
5	SVE Wells	12	ea	$ 5,500	$ 66,000
6	Vapor Extraction Sentry Wells (outdoor)	4	ea	$ 6,000	$ 24,000
7	Temperature Monitoring Well Points (outdoor)	5	ea	$ 10,000	$ 50,000
8	Well Headworks/Vault	21	ea	$ 3,000	$ 63,000
9	Treatment System Installation and Startup	1	ls	$ 75,000	$ 75,000
10	Misc. Treatment Sys Equipment: tanks, piping	1	ls	$ 25,000	$ 25,000
11	SVE Equipment : 400 CFM Blower+ThermOx	1	ls	$ 75,000	$ 75,000
12	Control and Instrumentation	1	ls	$ 13,000	$ 13,000
13	Trenching, Piping, Backfill and Resurfacing	700	lf	$ 50	$ 35,000
14	Equipment Pad/Enclosure/Fence	1	ea	$ 40,000	$ 40,000
15	Post Treatment Sampling + Analysis	9	each	$ 5,000	$ 45,000
				Direct Capital Total	**$ 708,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 708,000	$ 57,000
2	Project Management, Agency Reporting/Coordination	5%	of	$ 708,000	$ 36,000
3	Contruction Management	6%	of	$ 708,000	$ 43,000
				Indirect Capital Subtotal	**$ 136,000**
				Total Direct + Indirect Capital Cost	**$ 844,000**
Item No.	**Annual Operation and Maintenance Cost**				
1	Fuel: Natural Gas	12	mths	$ 4,000	$ 48,000
2	Electricity/Utilities	12	mths	$ 2,200	$ 26,400
3	SVE System Operation and Monitoring Labor	12	units	$ 6,000	$ 72,000
4	SVE Maintenance Materials and Expenses	12	mths	$ 2,000	$ 24,000
5	ISCO Fentons Chemicals: H2O2, Iron soln, acids	2	events	$ 210,000	$ 420,000
6	ISCO Direct-Push Injection Labor + Equipment Sub	2	events	$ 130,000	$ 260,000
7	ISCO Consultant Oversight, Monitoring	2	events	$ 35,000	$ 70,000
8	SVE Vapor Treatment System Influent/Effluent Monitoring/Lab Costs	12	mths	$ 4,000	$ 48,000
9	ISCO Soil and Groundwater Monitoring/Sampling Analytical Lab Costs	1	rounds	$ 50,000	$ 50,000
10	Project Management/Consultant support/Reports	12	mths	$ 10,000	$ 120,000
11	Waste/Water Disposal	12	mths	$ 2,500	$ 30,000
12	H&S/Air Monitoring	1	ls	$ 8,000	$ 8,000
13	Miscellaneous: Equipment rentals, PID/FID, Transducers	12	mths	$ 4,500	$ 54,000
				SVE Annual Operation and Maintenance Subtotal	**$ 317,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 4 Years)	**$ 1,125,000**
				ISCO Annual Operation and Maintenance Subtotal	**$ 914,000**
				Present Worth of ISCO Operation and Maintenance Costs (5%, 4 Years)	**$ 3,241,000**
				Present Worth of ICs + Monitoring (5%, 100 Years) Costs	**$ 481,000**
				Contingency (40% of ISCO)	**$ 2,084,000**
				Total Capital and O&M Cost Present Worth	**$ 7,775,000**

NOTES/ASSUMPTIONS

1. Assume 12 SVE wells at a 45- to 60-foot spacing and SVE wells screened 15-35 feet bgs.
2. Vapor treatment system uses thermal oxidizer, 400 scfm, positive displacement (PD) blower.
3. Assume SVE operates for 4 years continuously while ISCO is implemented through semiannual injection events for 4 years.
4. Assume a total of 75 direct push ISCO injection locations over a 4-year period, 18 to 19 locations/year divided into 2 semi-annual events. All injection locations driven to a depth of 70 feet bgs with six discrete 5-foot thick injection intervals between 40 and 70 ft bgs.
5. Assume acidified Fenton's inj with average 14,933 gal/inj loc of oxidant (12.5% H2O2, iron sol, acids) for a total of 1,120,000 gallons in 4 yrs.

TABLE A3
SOURCE AREA 3 - REMEDIAL ALTERNATIVE 5A1
ISCO/BIO + SVE COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	Site Investigation/Delineation	1	ls	$ 205,000	$ 205,000
2	Mobilization/Demobilization	50,000	sf	$ 1.5	$ 75,000
3	Electrical Service/Hookup	1	ls	$ 40,000	$ 40,000
4	Site Preparation/Geophysical survey	50,000	sf	$ 0.8	$ 40,000
5	Combined SVE/ISCO wells (outdoor)	28	ea	$ 11,000	$ 308,000
6	Vapor Extraction Sentry Wells (outdoor)	0	ea	$ 6,500	$ -
7	Temperature Monitoring Points/Wells (outdoor)	8	ea	$ 11,000	$ 88,000
8	Well Headworks/Vault for SVE/ISCO inj wells	36	ea	$ 3,000	$ 108,000
9	Treatment System Installation and Startup	1	ls	$ 125,000	$ 125,000
10	Misc. Treatment Sys Equipment: tanks, piping	1	ls	$ 40,000	$ 40,000
11	SVE Equipment : 750 CFM Blower+ThermOx	1	ls	$ 120,000	$ 120,000
12	Control and Instrumentation	1	ls	$ 21,000	$ 21,000
13	Trenching, Piping, Backfill and Resurfacing	1,800	lf	$ 50	$ 90,000
14	Equipment Pad/Enclosure/Fence	1	ea	$ 40,000	$ 40,000
15	Post Treatment Sampling + Analysis	20	boring	$ 5,000	$ 100,000
				Direct Capital Total	**$ 1,400,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 1,400,000	$ 112,000
2	Project Management, Agency Reporting/Coordination	5%	of	$ 1,400,000	$ 70,000
3	Contruction Management	6%	of	$ 1,400,000	$ 84,000
				Indirect Capital Subtotal	**$ 266,000**
				Total Direct + Indirect Capital Cost	**$ 1,666,000**
Item No.	**Operation and Maintenance Cost**				
1	Fuel: Natural Gas	12	mths	$ 8,000	$ 96,000
2	Electricity/Utilities	12	mths	$ 4,500	$ 54,000
3	SVE System Operation and Monitoring Labor	12	units	$ 9,000	$ 108,000
4	SVE Maintenance Materials and Expenses	12	mths	$ 3,000	$ 36,000
5	ISCO Fentons Chemicals: H2O2, Iron soln, Acids, Misc.	28	wells	$ 19,300	$ 540,400
6	ISCO Vendor Labor+Equipment rental	2	months	$ 100,000	$ 200,000
7	ISCO Consultant Oversight, O&M	3	mths	$ 10,000	$ 30,000
8	SVE Vapor Treatment System Influent/Effluent Monitoring/Lab Costs	12	mths	$ 5,000	$ 60,000
9	ISCO Soil and Groundwater Monitoring/Sampling Analytical Lab Costs	1	rounds	$ 70,000	$ 70,000
10	Project Management/Consultant support/Reports	12	mths	$ 12,000	$ 144,000
11	Waste Disposal	12	mths	$ 3,500	$ 42,000
12	H&S/Air Monitoring	1	ls	$ 8,000	$ 8,000
13	Miscellaneous: Equipment Rentals, PID/FID, Transducers	12	mths	$ 6,000	$ 72,000
				SVE Annual Operation and Maintenance Subtotal	**$ 472,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 4 Years)	**$ 1,674,000**
				ISCO Annual Operation and Maintenance Subtotal	**$ 989,000**
				Present Worth of ISCO Operation and Maintenance Costs (5%, 8 Years)	**$ 6,393,000**
				SVE Annual Operation and Maintenance (Year 5-8) Subtotal	**$ 157,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, Year 5-8)	**$ 458,000**
				Present Worth of ICs + Monitoring (5%, 100 Years) Costs	**$ 481,000**
				Contingency (40% of ISCO)	**$ 4,077,000**
				Total Capital and O&M Cost Present Worth	**$ 14,749,000**

NOTES/ASSUMPTIONS
1. Assume 28 collocated SVE and ISCO wells at 45- to 60-foot spacing and SVE wells screened 15- 45 feet bgs.
2. ISCO injection wells have two 3/4"-SS injection points/well screened 55-65 ft and 75-85 ft bgs.
3. Vapor treatment system uses thermal oxidizer, 750 scfm, positive displacement (PD) blower.
4. Assume SVE operates for 4 years continuously and ISCO through semiannual injection events.
5. ISCO injection events continue semiannualy for years 5 to 8 and SVE is operated intermittently during ISCO events.
6. Assume acidified Fenton's process, injection of 12,857 gal of oxidants/well/year (12.5% H2O2, iron, acids) for total of 2,880,000 gals in 8 years.

TABLE A4
SOURCE AREA 3 - REMEDIAL ALTERNATIVE 5A2
ISCO/BIO + SVE COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	Site Investigation/Delineation	1	ls	$ 205,000	$ 205,000
2	Mobilization/Demobilization	50,000	sf	$ 1.5	$ 75,000
3	Electrical Service/Hookup/Utilities	1	ls	$ 40,000	$ 40,000
4	Site Preparation/Geophysical survey	50,000	sf	$ 0.8	$ 40,000
5	SVE Wells	28	ea	$ 5,500	$ 154,000
6	Vapor Extraction Sentry Wells (outdoor)	0	ea	$ 6,000	$ -
7	Temperature Monitoring Well Points (outdoor)	8	ea	$ 10,000	$ 80,000
8	Well Headworks/Vault	36	ea	$ 3,000	$ 108,000
9	Treatment System Installation and Startup	1	ls	$ 125,000	$ 125,000
10	Misc. Treatment Sys Equipment: tanks, piping	1	ls	$ 40,000	$ 40,000
11	SVE Equipment : 750 CFM Blower+ThermOx	1	ls	$ 120,000	$ 120,000
12	Control and Instrumentation	1	ls	$ 21,000	$ 21,000
13	Trenching, Piping, Backfill and Resurfacing	1,800	lf	$ 50	$ 90,000
14	Equipment Pad/Enclosure/Fence	1	ea	$ 40,000	$ 40,000
15	Post Treatment Sampling + Analysis	20	each	$ 5,000	$ 100,000
				Direct Capital Total	**$ 1,238,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 1,238,000	$ 100,000
2	Project Management, Agency Reporting/Coordination	5%	of	$ 1,238,000	$ 62,000
3	Contruction Management	6%	of	$ 1,238,000	$ 75,000
				Indirect Capital Subtotal	**$ 237,000**
				Total Direct + Indirect Capital Cost	**$ 1,475,000**
Item No.	**Annual Operation and Maintenance Cost**				
1	Fuel: Natural Gas	12	mths	$ 8,000	$ 96,000
2	Electricity/Utilities	12	mths	$ 4,500	$ 54,000
3	SVE System Operation and Monitoring Labor	12	units	$ 8,000	$ 96,000
4	SVE Maintenance Materials and Expenses	12	mths	$ 3,000	$ 36,000
5	ISCO Fentons Chemicals: H2O2, Iron soln, acids	2	events	$ 540,000	$ 1,080,000
6	ISCO Direct-Push Injection Labor + Equipment Sub	2	events	$ 222,600	$ 445,200
7	ISCO Consultant Oversight, Monitoring	2	events	$ 60,000	$ 120,000
8	SVE Vapor Treatment System Influent/Effluent Monitoring/Lab Costs	12	mths	$ 5,000	$ 60,000
9	ISCO Soil and Groundwater Monitoring/Sampling Analytical Lab Costs	1	rounds	$ 70,000	$ 70,000
10	Project Management/Consultant support/Reports	12	mths	$ 10,000	$ 120,000
11	Waste/Water Disposal	12	mths	$ 3,500	$ 42,000
12	H&S/Air Monitoring	1	ls	$ 8,000	$ 8,000
13	Miscellaneous: Equipment rentals, PID/FID, Transducers	12	mths	$ 6,000	$ 72,000
				SVE Annual Operation and Maintenance Subtotal	**$ 448,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 4 Years)	**$ 1,589,000**
				ISCO Annual Operation and Maintenance Subtotal	**$ 1,852,000**
				Present Worth of ISCO Operation and Maintenance Costs (5%, 4 Years)	**$ 6,568,000**
				Present Worth of ICs + Monitoring (5%, 100 Years) Costs	**$ 481,000**
				Contingency (40% of ISCO)	**$ 3,853,000**
				Total Capital and O&M Cost Present Worth	**$ 13,966,000**

NOTES/ASSUMPTIONS

1. Assume 28 SVE wells at a 45- to 60-foot spacing and SVE wells screened 15-45 feet bgs.
2. Vapor treatment system uses thermal oxidizer, 750 scfm, positive displacement (PD) blower.
3. Assume SVE operates for 4 years continuously while ISCO is implemented through semiannual injection events for 4 years.
4. Assume a total of 192 direct push ISCO injection locs over a 4-year period, 48 locs/year divided into 2 semi-annual events of 24 locs each. All injection locs driven to a depth of 80 feet bgs with six discrete 5-foot thick injection intervals between 50 and 90 ft bgs.
5. Assume acidified Fenton's inj with average 15,000 gal/inj loc/yr of oxidant (12.5% H2O2, iron sol, acids) for a total of 2,880,000 gallons in 4 yrs.

TABLE A5
SOURCE AREA 11 - REMEDIAL ALTERNATIVE 5A1
ISCO/BIO + SVE COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	Site Investigation/Delineation	1	ls	$ 177,000	$ 177,000
2	Mobilization/Demobilization	41,400	sf	$ 1.5	$ 63,000
3	Electrical Service/Hookup	1	ls	$ 30,000	$ 30,000
4	Site Preparation/Geophysical survey	41,400	sf	$ 0.8	$ 34,000
5	Combined SVE/ISCO wells (outdoor)	20	ea	$ 10,000	$ 200,000
6	Vapor Extraction Sentry Wells (outdoor)	6	ea	$ 6,000	$ 36,000
7	Temperature Monitoring Points/Wells (outdoor)	7	ea	$ 10,000	$ 70,000
8	Well Headworks/Vault for SVE/ISCO inj wells	33	ea	$ 3,000	$ 99,000
9	Treatment System Installation and Startup	1	ls	$ 100,000	$ 100,000
10	Misc. Treatment Sys Equipment: tanks, piping	1	ls	$ 30,000	$ 30,000
11	SVE Equipment : 500 CFM Blower+ThermOx	1	ls	$ 90,000	$ 90,000
12	Ozone Generation (air supply, generator, and manifold system) and Peroxide Injection System	1	units	$ 325,000	$ 325,000
13	Control and Instrumentation (includes ozone / peroxide distribution manifold and controls)	1	ls	$ 58,000	$ 58,000
14	Trenching, Piping, Backfill and Resurfacing	1,300	lf	$ 50	$ 65,000
15	Equipment Pad/Enclosure/Fence	1	ea	$ 40,000	$ 40,000
16	Post Treatment Sampling + Analysis	16	boring	$ 5,000	$ 80,000
				Direct Capital Total	**$ 1,497,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 1,497,000	$ 120,000
2	Project Management, Agency Reporting/Coordination	5%	of	$ 1,497,000	$ 75,000
3	Contruction Management	6%	of	$ 1,497,000	$ 90,000
				Indirect Capital Subtotal	**$ 285,000**
				Total Direct + Indirect Capital Cost	**$ 1,782,000**
Item No.	**Operation and Maintenance Cost**				
1	Fuel: Natural Gas	12	mths	$ 5,000	$ 60,000
2	Electricity/Utilities	12	mths	$ 6,000	$ 72,000
3	SVE System Operation and Monitoring Labor	12	units	$ 8,000	$ 96,000
4	SVE Maintenance Materials and Expenses	12	mths	$ 3,000	$ 36,000
5	Chemicals: H2O2	20	wells	$ 2,500	$ 50,000
6	Ozone equipment-replacement parts, consumables	1	ls	$ 10,000	$ 10,000
7	ISCO Consultant Oversight, Injection Monitoring	12	mths	$ 9,000	$ 108,000
8	SVE Vapor Treatment System Influent/Effluent Monitoring/Lab Costs	12	mths	$ 6,000	$ 72,000
9	SVE / ISCO Soil and Groundwater Monitoring/Sampling Analytical Lab Costs	1	rounds	$ 60,000	$ 60,000
10	Project Management/Consultant support/Reports	12	mths	$ 12,000	$ 144,000
11	Waste Disposal	12	mths	$ 2,500	$ 30,000
12	H&S/Air Monitoring	1	ls	$ 8,000	$ 8,000
13	Miscellaneous: Equip rentals, PID/FID, Transducers	12	mths	$ 4,500	$ 54,000
				SVE Annual Operation and Maintenance Subtotal	**$ 454,000**
				Present Worth of SVE Operation and Maintenance Costs (5%, 4 Years)	**$ 1,610,000**
				ISCO Annual Operation and Maintenance Subtotal	**$ 347,000**
				Present Worth of ISCO Operation and Maintenance Costs (5%, 8 Years)	**$ 1,737,000**
				SVE Annual Operation and Maintenance (Year 5-8) Subtotal	**$ 151,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, Year 5-8)	**$ 441,000**
				Present Worth of ICs + Monitoring (5%, 100 Years) Costs	**$ 481,000**
				Contingency (40% of ISCO)	**$ 2,228,000**
				Total Capital and O&M Cost Present Worth	**$ 8,279,000**

NOTES/ASSUMPTIONS

1. Assume 20 collocated SVE and ISCO injection wells at 45- to 60-foot spacing and SVE wells screened 15-35 feet bgs.
2. ISCO injection wells have two 3/4"-SS injection points/well screened 45-55 and 65-75 ft bgs.
3. Vapor treatment system uses thermal oxidizer, 500 scfm, positive displacement (PD) blower.
4. Assume ISCO and SVE operates continuously for 4 years with injection cycling between ozone, oxygen/air and peroxide for each well.
5. Assume ISCO and SVE operate semiannually for Years 5 to 8 for 2 months per event.
6. Assume average injection of 1,000 lbs of ozone/well/year for a total ozone dosage of 160,000 lb for 20 wells in 8 years.
7. Assume average injection of 1680 gal/well/year of peroxide for a total dosage of 270,000 gal of 12.5% peroxide in 20 wells in 8 years.

TABLE A6
SOURCE AREA 11 - REMEDIAL ALTERNATIVE 5A2
ISCO/BIO + SVE COST ESTIMATE
Soil and NAPL FS
Del Amo Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
	Direct Capital Costs				
1	Site Investigation/Delineation	1	ls	$ 177,000	$ 177,000
2	Mobilization/Demobilization	41,400	sf	$ 1.5	$ 63,000
3	Electrical Service/Hookup/Utilities	1	ls	$ 30,000	$ 30,000
4	Site Preparation/Geophysical survey	41,400	sf	$ 0.8	$ 34,000
5	SVE Wells	20	ea	$ 5,500	$ 110,000
6	Vapor Extraction Sentry Wells (outdoor)	6	ea	$ 6,000	$ 36,000
7	Temperature Monitoring Well Points (outdoor)	7	ea	$ 10,000	$ 70,000
8	Well Headworks/Vault	33	ea	$ 3,000	$ 99,000
9	Treatment System Installation and Startup	1	ls	$ 100,000	$ 100,000
10	Misc. Treatment Sys Equipment: tanks, piping	1	ls	$ 30,000	$ 30,000
11	SVE Equipment : 500 CFM Blower+ThermOx	1	ls	$ 90,000	$ 90,000
12	Control and Instrumentation	1	ls	$ 16,000	$ 16,000
13	Trenching, Piping, Backfill and Resurfacing	1,300	lf	$ 50	$ 65,000
14	Equipment Pad/Enclosure/Fence	1	ea	$ 40,000	$ 40,000
15	Post Treatment Sampling + Analysis	16	each	$ 5,000	$ 80,000
				Direct Capital Total	**$ 1,040,000**
Item No.	**Indirect Capital Costs**				
1	Engineering, Design, and Permitting	8%	of	$ 1,040,000	$ 84,000
2	Project Management, Agency Reporting/Coordination	5%	of	$ 1,040,000	$ 52,000
3	Contruction Management	6%	of	$ 1,040,000	$ 63,000
				Indirect Capital Subtotal	**$ 199,000**
				Total Direct + Indirect Capital Cost	**$ 1,239,000**
Item No.	**Annual Operation and Maintenance Cost**				
1	Fuel: Natural Gas	12	mths	$ 5,000	$ 60,000
2	Electricity/Utilities	12	mths	$ 3,000	$ 36,000
3	SVE System Operation and Monitoring Labor	12	units	$ 8,000	$ 96,000
4	SVE Maintenance Materials and Expenses	12	mths	$ 3,000	$ 36,000
5	ISCO Fentons Chemicals: H2O2, Iron soln, acids	2	events	$ 210,000	$ 420,000
6	ISCO Direct-Push Injection Labor + Equipment Sub	2	events	$ 102,000	$ 204,000
7	ISCO Consultant Oversight, Monitoring	2	events	$ 27,500	$ 55,000
8	SVE Vapor Treatment System Influent/Effluent Monitoring/Lab Costs	12	mths	$ 6,000	$ 72,000
9	ISCO Soil and Groundwater Monitoring/Sampling Analytical Lab Costs	1	rounds	$ 60,000	$ 60,000
10	Project Management/Consultant support/Reports	12	mths	$ 10,000	$ 120,000
11	Waste/Water Disposal	12	mths	$ 2,500	$ 30,000
12	H&S/Air Monitoring	1	ls	$ 8,000	$ 8,000
13	Miscellaneous: Equipment rentals, PID/FID, Transducers	12	mths	$ 4,500	$ 54,000
				SVE Annual Operation and Maintenance Subtotal	**$ 396,000**
				SVE Present Worth of Operation and Maintenance Costs (5%, 4 Years)	**$ 1,405,000**
				ISCO Annual Operation and Maintenance Subtotal	**$ 856,000**
				Present Worth of ISCO Operation and Maintenance Costs (5%, 4 Years)	**$ 3,036,000**
				Present Worth of ICs + Monitoring (5%, 100 Years) Costs	**$ 481,000**
				Contingency (40% of ISCO)	**$ 2,272,000**
				Total Capital and O&M Cost Present Worth	**$ 8,433,000**

NOTES/ASSUMPTIONS

1. Assume 20 SVE wells at a 45- to 60-foot spacing and SVE wells screened 15-35 feet bgs.
2. Vapor treatment system uses thermal oxidizer, 500 scfm, positive displacement (PD) blower.
3. Assume SVE operates for 4 years continuously while ISCO is implemented through semiannual injection events for 4 years.
4. Assume a total of 152 direct push ISCO injection locs over a 4-year period, 38 locs/year divided into 2 semi-annual events'. All injection locs driven to a depth of 70 feet bgs with six discrete 5-foot thick injection intervals between 40 and 70 ft bgs.
5. Assume acidified Fenton's inj with average 7,400 gal/inj loc of oxidant (12.5% H2O2, iron sol, acids) for a total of 1,120,000 gallons in 4 yrs.

APPENDIX H4

ARSENIC IN PANHANDLE AREA

APPENDIX H4

ARSENIC IN PANHANDLE AREA

During the process of preparing this Feasibility Study Report, additional data became available that could affect remedial decisions in the southwest corner of the former plant property known as the Panhandle Area. The project team for the neighboring Montrose Superfund Site conducted additional shallow soil sampling activities in this area in 2005. The objective of their investigation was to characterize the migration of hazardous substances from the former Montrose plant property, located across the street from the southwest corner of the former Del Amo plant property.

The USEPA obtained and evaluated the 2005 draft data and the historic data from the Montrose project team as it relates to the former Del Amo Plant property. The USEPA found that there was no definitive evidence that arsenic emanated from the former Montrose Plant property, although it remains a possibility. However the evidence did indicate that DDT migrated from the former Montrose plant property onto the former Del Amo plant property. This information is documented in the attachments to this Appendix, which are listed below. The USEPA conclusions were discussed verbally in a conference call with DTSC and the Respondents on May 12, 2009.

ATTACHMENTS

H4-1 *"Technical Memorandum Re: Arsenic in Shallow Soil, Del Amo Superfund Site, Los Angeles, California,"* from John Dudley (URS) to Dante Rodriguez (USEPA), dated 1/14/09.

H4-2 *"Technical Memorandum, Assessment of Arsenic in Shallow Soil at the Montrose and Southwestern Del Amo Superfund Sites,"* from Randy Kellerman (CH2M Hill) to Dante Rodriguez (USEPA), dated March 3, 2009.

H4-3 *"Draft, Figure 17A, FSP Sample Locations, DDT Isoconcentrations in Soil 0-10' Below Ground Surface,"* by AECOM Earth Tech;
Table: *"Laboratory Analytical Results - Western Waste"* (13 pages);
Table: *"Laboratory Analytical Results" - LADWP (East Side of Normandie)* (6 pages).

ATTACHMENT H4-1

TECHNICAL MEMORANDUM

To: Dante Rodriguez
USEPA – Region 9
rodriguez.dante@epa.gov

From: John Dudley
URS Corporation
John_Dudley@URSCorp.com

Date: January 14, 2009

Re: Arsenic in Shallow Soil
Del Amo Superfund Site
Los Angeles, California

USEPA has indicated to the Del Amo Respondents that the agency's preferred remedial alternative for parcels 7351-034-070 and 7351-034-901 at the Del Amo site will likely include capping. The purpose of the cap(s) would be to reduce the risk associated with arsenic concentrations in shallow soil at these parcels.

Remedial investigation shallow soil data for arsenic is limited to a single composite sample composed of six discrete sampling locations over the area of concern (see Figure 1). Arsenic was detected at a concentration of 30 milligrams per kilogram (mg/kg) at 0.5 feet below ground surface in this sample, while the USEPA-determined background concentration for the Del Amo Waste Pit Area operable unit is 25 mg/kg. As indicated on Figure 1, this detected concentration is significantly higher than any of the arsenic concentrations at the numerous other shallow soil sampling locations within the Del Amo site.

Figure 1 also includes arsenic concentrations for shallow soil samples collected at the Montrose property, located to the northwest of the two parcels identified above. As indicated, arsenic concentrations for seven sampling locations in the eastern portion of the Montrose property are significantly elevated relative to the USEPA background level of 25 mg/kg, ranging from 79 to 98 mg/kg. This area of elevated concentrations is directly upwind from the two identified Del Amo parcels, as documented in the Soil and NAPL RI report (URS, 2007).

Based on the illustrated arsenic distribution, the prevailing wind direction, and the lack of any known current or former use of arsenic at the Del Amo site, the area of elevated arsenic at the two identified parcels is unlikely to originate from on site facilities or processes. Therefore, it is the Del Amo Respondents opinion that any response action associated with arsenic concentrations on these two parcels should not be the responsibility of the Del Amo Respondents.

T/Ladd/DelAmo/Francis/109-002

N

0 600 1200

Scale in Feet

Legend

5.5 — Shallow (<15 feet bgs) soil sampling location with arsenic concentration (mg/kg) that is less than 25 mg/kg (the EPA-determined background concentration for the Del Amo Waste Pit Area.

93 — Shallow (<15 feet bgs) soil sampling location with arsenic concentration (mg/kg) that exceeds 25 mg/kg (the EPA-determined background concentration for the Del Amo Waste Pit Area.

Composite sampling locations

Note: For shallow sampling locations with multiple arsenic results, the highest concentration is posted.

FIGURE 1

ARSENIC CONCENTRATIONS IN SHALLOW SOIL

Montrose and Del Amo Superfund Sites

URS

ATTACHMENT H4-2

Assessment of Arsenic in Shallow Soil at the Montrose and Southwestern Del Amo Superfund Sites

PREPARED FOR: Dante Rodriguez/USEPA Region IX

PREPARED BY: Randy Kellerman/CH2M HILL

COPIES: File

DATE: March 3, 2009

Pursuant to a technical communication memorandum from the U. S. Environmental Protection Agency (EPA) Task Order Project Officer (TOPO) dated February 17, 2009, CH2M HILL has reviewed arsenic concentrations in shallow soil associated with the Montrose Superfund Site (Montrose) and two parcels within the southwestern corner of the Del Amo Superfund Site (Del Amo). CH2M HILL evaluated whether the distribution of arsenic suggests that the arsenic detected at the Del Amo site originated at the Montrose site, as has been proposed by the Del Amo Respondents. This technical memorandum presents the results of CH2M HILL's evaluation.

Background

The Final Draft Feasibility Study Report for the Del Amo Superfund Site Operable Unit 2, dated August 4, 2008, indicates that arsenic in shallow soil in one area in the southwestern portion of the Del Amo site (i.e., the Del Amo Panhandle) exceeds the risk-based threshold level for arsenic. URS, on behalf of the Del Amo Respondents, submitted a technical memorandum to EPA (*Arsenic in Shallow Soil, Del Amo Superfund Site* dated January 14, 2009) suggesting that the arsenic concentrations exceeding the risk-based threshold level originated at the nearby Montrose Superfund Site and were transported to the Del Amo site via airborne migration, based on 1985 soil sample results that showed elevated arsenic in the eastern portion of the Montrose property. EPA requested that CH2M HILL review more recent arsenic data collected as part of the 2005 Montrose On- and Off-Property Assessment, and assess whether the arsenic distribution from 2005 indicates a connection between arsenic detected in the southwestern portion of the Del Amo site and arsenic on the Montrose property.

Discussion

Data used in this evaluation were obtained from the Montrose Superfund Site electronic database maintained by CH2M HILL on behalf of EPA. All available arsenic results used in the evaluation are shown on Figure 1. Figure 2 shows only the 2005 Montrose On- and Off-Property Assessment results. It should be noted that URS used the maximum result from 0-15 feet below ground surface (bgs) at each location in their analysis. To be consistent with the technical approach used by URS, the maximum result from 0-15 feet bgs was plotted at each location. However, presumably only the near-surface soil would be subject to airborne migration toward the Del Amo site (According to the May 18, 1998 Montrose Remedial

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Investigation Report the overall prevailing wind direction is from the west and northwest, although the evening and early morning bring lighter prevailing winds from the east and northeast). A check of results from the shallowest samples at each location indicates that at less than half of the locations the concentration detected closest to the surface was lower than the maximum used by URS and shown in Figures 1 and 2. With few exceptions (discussed below) the point-to-point difference is not significant and does not affect the outcome of the evaluation. Therefore, to remain consistent with URS the maximum concentration from 0-15 feet bgs was used for the 2005 data as well.

A background concentration of 25 milligrams per kilogram (mg/kg), referred to as the "USEPA-determined background concentration for the Del Amo Waste Pit Area operable unit" in the January 14, 2009 technical memorandum, was applied by URS to the 1985 arsenic data. Again, for consistency, this value was applied to the 2005 data as well. The "USEPA-determined background concentration" of 25 mg/kg is mentioned in the Record of Decision (ROD) for the Del Amo Waste Pits, which states in Section 2.5, "*Arsenic was detected at a concentration of 25 mg/kg, which exceeds arsenic's Preliminary Remediation Goal (PRG) of 2.4 mg/kg. This is consistent with background levels of arsenic in California soils, which typically have such elevated concentrations.*" The June 10, 1996 Focused Feasibility Study Report for the Del Amo Waste Pits (Focused FS) also refers to a 25 mg/kg background concentration for arsenic in soil. In Section 2.3.2, Page 2-23, the Focused FS states "Concentrations of arsenic in soil detected in these borings are below the 25 mg/kg concentration described by EPA as requiring no further action (EPA, 1993)." The EPA, 1993 reference is to a letter entitled *Proposed "Action Levels" for Backyard Sampling at the Del Amo site. Letter to Agency for Toxic Disease Registry, California Department of Health Services, and California Department of Toxic Substances Control from U.S. EPA Region IX. August 6.*

CH2M HILL examined the distribution of arsenic in shallow soil from samples collected by Montrose in 2005. Overall, the 2005 distribution of arsenic in shallow soil does not appear to support the theory that arsenic detected in the southwestern portion of the Del Amo site originated from Montrose (Figure 1; Figure 2). Although there are slightly elevated concentrations along the eastern site boundary, at the locations where previous arsenic concentrations were significantly elevated (above 75J mg/kg) in 1985 the 2005 concentrations are generally less than 10 mg/kg. In the 2005 event, maximum arsenic concentrations within the upper 15 feet exceeded 25 mg/kg in only four locations (Figure 2), none of which is in the eastern or southeastern portion of the Montrose property. One of these locations, with a maximum shallow concentration of 27 mg/kg is situated in the central portion of the site (At this location concentration of 27 mg/kg was detected in a sample from 10 feet bgs; the surficial sample contained arsenic at 19 mg/kg). Two of the locations are situated along the southern and southwestern boundary of the Montrose property, with concentrations of 28 and 30 mg/kg (The 28 mg/kg detection was from a sample collected from 10 feet bgs; the surficial sample contained arsenic at 11 mg/kg). The fourth location is along the railroad tracks on the western side of Normandie Avenue, almost directly across from the southwestern corner of the Del Amo site, with a concentration of 130 mg/kg.

The 130 mg/kg concentration is over four times higher than the next highest concentration in the 2005 data set, and thus appears to be somewhat of an outlier. Other nearby Montrose on- and off-property results seem to indicate that the arsenic at this location is unlikely to

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have originated from Montrose, because within the southeastern portion of the Montrose property and off-property to the south the maximum detections are less than 10 mg/kg (Figure 2).

Lastly, CH2M HILL reviewed the May 18, 1998 Montrose Remedial Investigation (RI) Report to learn more about the previous arsenic in soil data from 1985. Although not presented as such in URS's January 14, 2009 memorandum, every elevated detection from the 1985 on-property sampling event was qualified with a "J" flag, indicating that the laboratory could identify the compound but that the quantified result is estimated. In most cases a "J" flag is used when a compound is detected beneath the laboratory reporting limit, or when quality control parameters are not met. The reason for the "J" flag qualifier is not provided in the 1998 RI report. CH2M HILL also investigated the analytical method used in the 1985 sampling event, EPA Method 206.3. Although the potential exists for false positives for arsenic due to chemical interference using certain analytical methods (e.g., EPA Method 6010), it is not known whether interference with arsenic was a potential problem in the 1980s using EPA Method 206.3. The 2005 samples were analyzed for arsenic using EPA Method 6020, which is generally less subject to interferences for arsenic than EPA Method 6010. It is also important to note that according to the Montrose RI report the 1985 samples were most likely collected after the 1985 grading/soil rework activities performed by Montrose that are thought to have mixed shallow soil across the site. Samples collected prior to the grading activities were not analyzed for metals.

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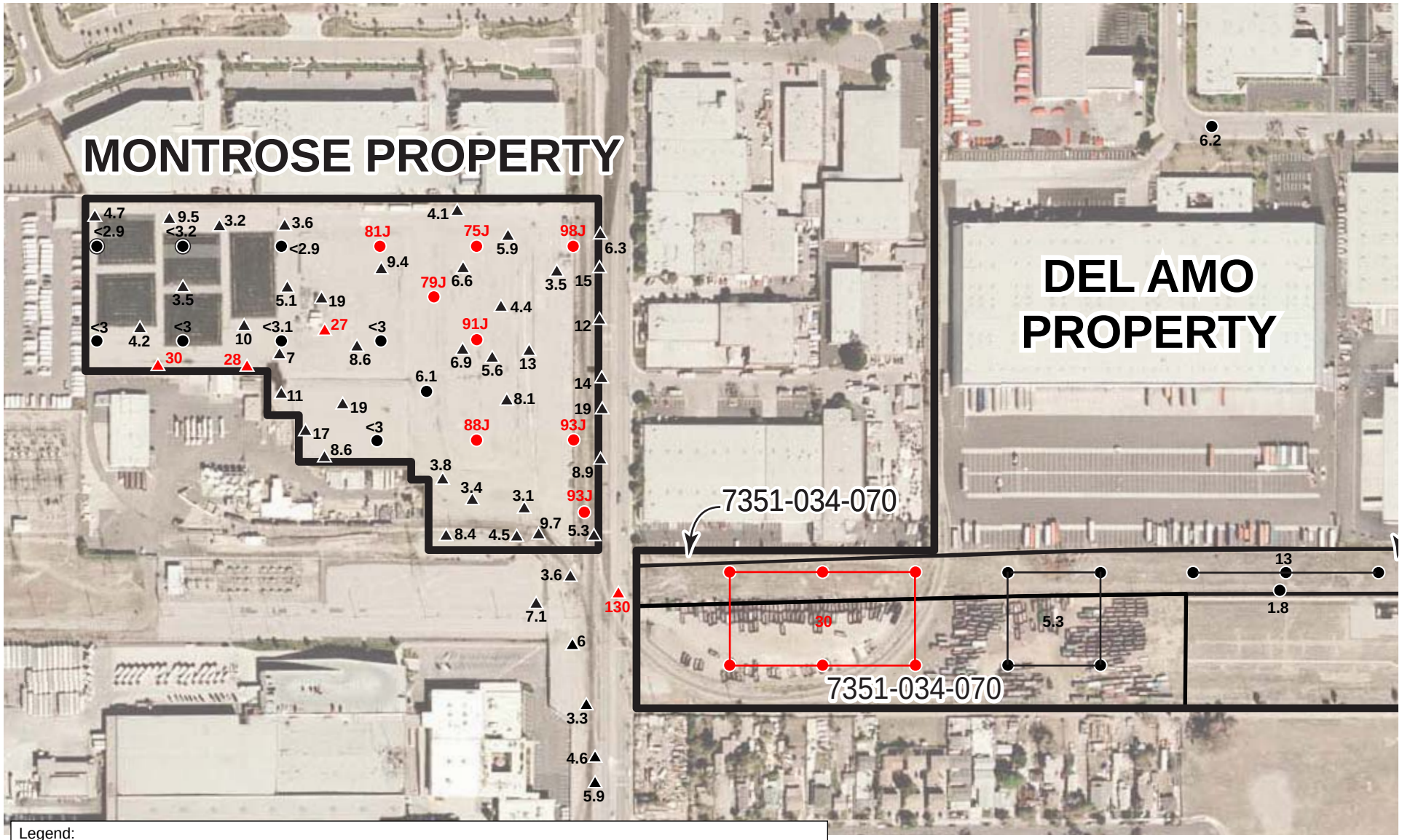


Legend:
- ● - Pre-2005 shallow (<15 ft bgs) soil sample result for arsenic, in milligrams per kilogram (mg/kg)
- ▲ - 2005 Montrose On- and Off-Property Assessment shallow (<15 ft bgs) soil sample result for arsenic, in mg/kg
- ● ▲ - Red indicates result is greater than 25 mg/kg

North

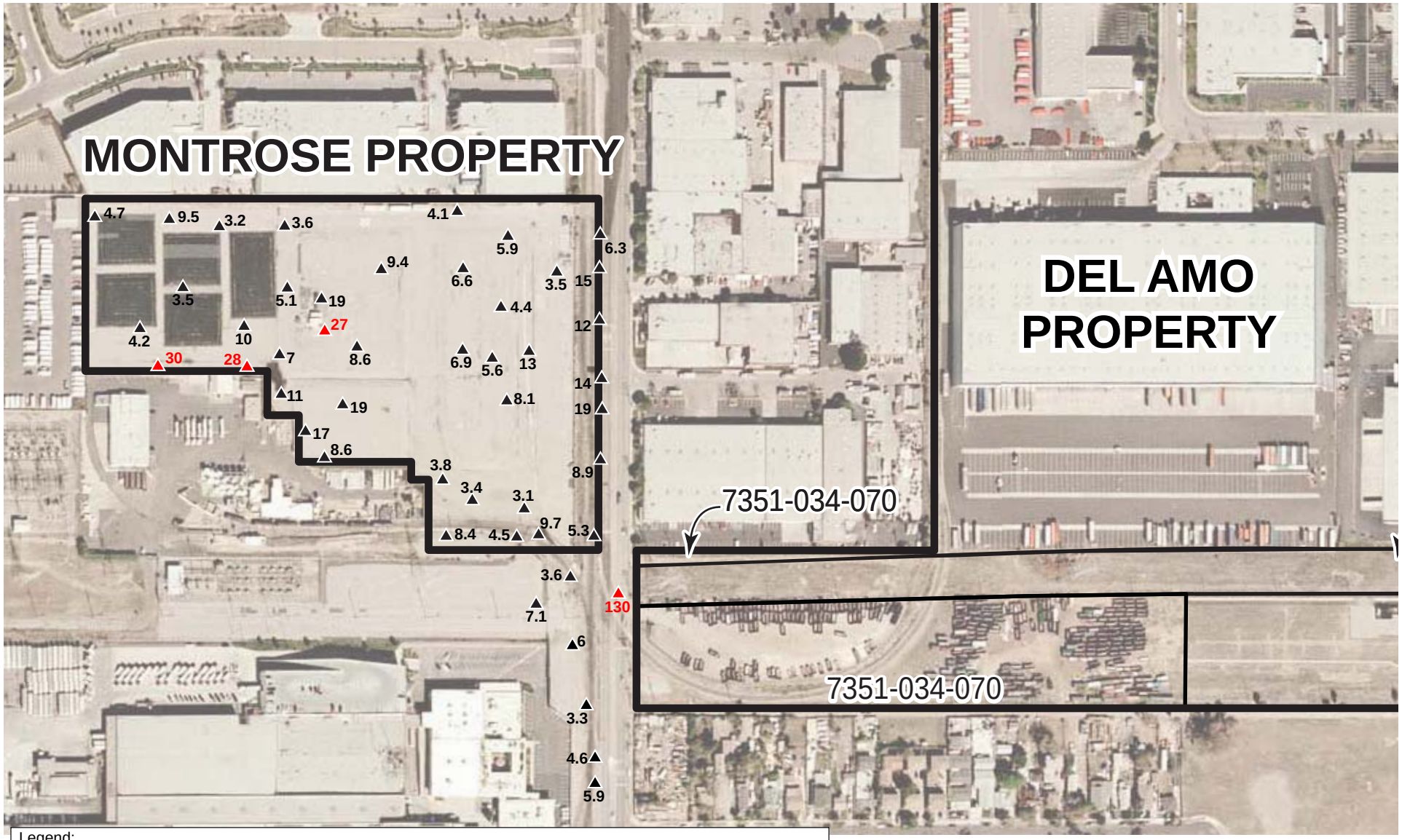
0 150 300
Approximate scale in feet

FIGURE 1
Arsenic Concentrations in Shallow Soil
Montrose and Del Amo Superfund Sites

Source: URS, Arsenic in Shallow Soil, Del Amo Superfund Site, January 14, 2009

ES022009011SCO385217.PR.01 DelAmo_figure.ai 2/09

CH2MHILL



Legend:
▲ - 2005 Montrose On- and Off-Property Assessment shallow (<15 ft bgs) soil sample result for arsenic, in mg/kg
▲ - Red indicates result is greater than 25 mg/kg

North

0 150 300
Approximate scale in feet

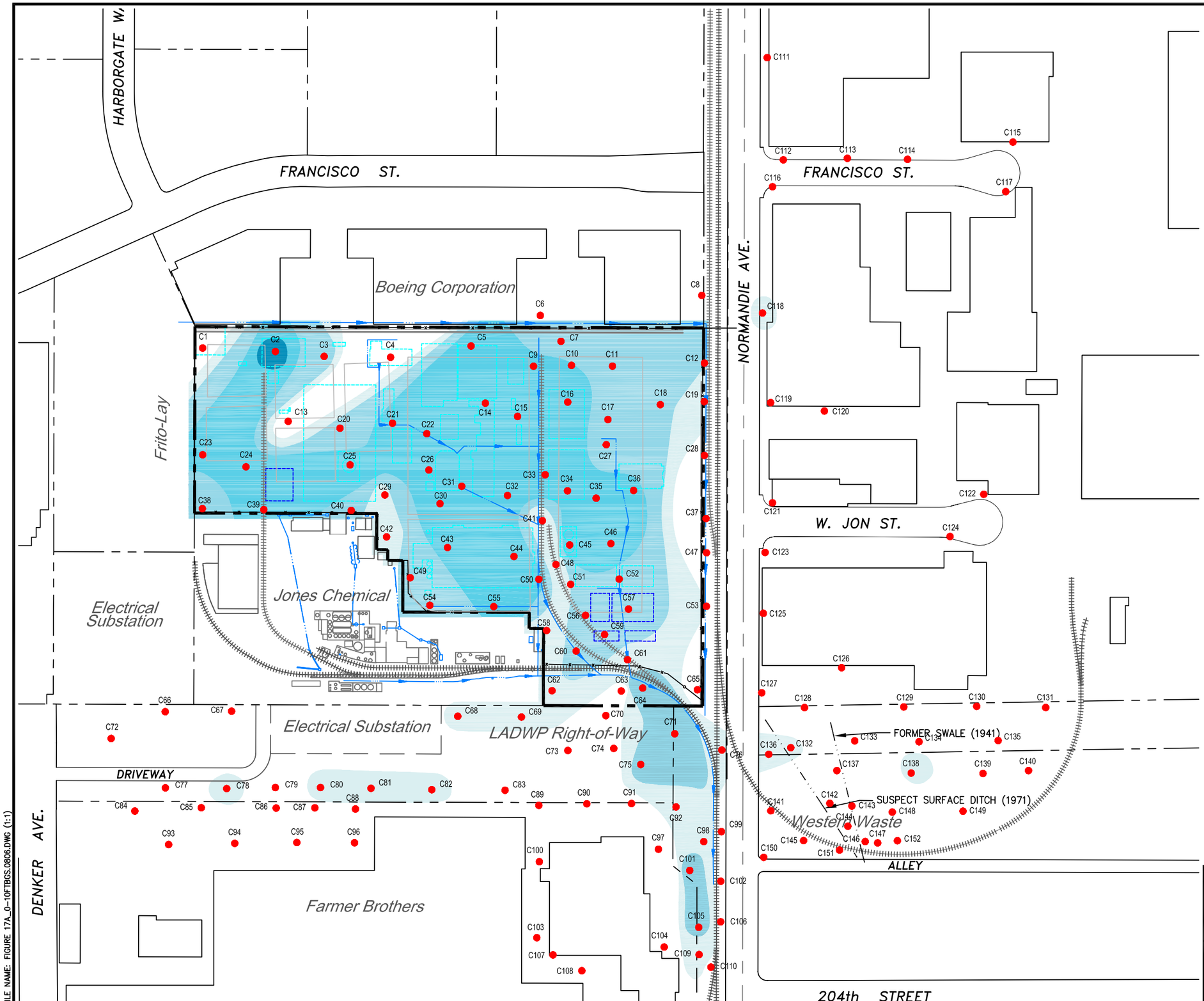
FIGURE 2
2005 Arsenic Concentrations in Shallow Soil
Montrose and Del Amo Superfund Sites

Source: URS, Arsenic in Shallow Soil, Del Amo Superfund Site, January 14, 2009

ES022009011SCO385217.PR.01 DelAmo_figure_2005.ai 2/09

CH2MHILL

ATTACHMENT H4-3



Legend:

- Location of Current Montrose Property Boundary
- Parcel Boundary / Right-of-Way
- Surveyed Fence Line
- Existing Railroad Tracks
- Former Railroad Tracks
- Existing Building
- Former Building (1981 Aerial Photo)
- Former Building (1962 Aerial Photo)
- Soil Cells/Raised Pads (2003 Imagery)
- Surface Drainage
- LADWP — Los Angeles Department of Water and Power
- C127 — 2005 FSP Soil Boring (Rework, Shallow & Deep)
- DDT Isoconcentration in Soil Contour Interval 10–100 mg/kg
- DDT Isoconcentration in Soil Contour Interval 100–1,000 mg/kg
- DDT Isoconcentration in Soil Contour Interval 1,000–10,000 mg/kg
- DDT Isoconcentration in Soil Contour Interval >10,000 mg/kg

DRAFT

References:

1. Parcel Boundary Information from Los Angeles, CA, Department of Public Works, On-line ArcInfo GIS data set, 2004. Montrose Chemical Corporation Boundary Survey conducted August 13, 2001 by Dulin-Boynton Land Surveyors.
2. Former Plant Site features based from historic Above Referenced Aerial Photos.

NORTH

0 100 200 FEET

SCALE: 1"= 200'

Montrose Chemical Corporation — Revised 08/09/06

FSP Sample Locations
DDT Isoconcentrations in Soil
0 - 10' Below Ground Surface

Date: 08-06	Montrose Superfund Site	Figure
Project No. 76465	EarthTech — A Tyco International Ltd. Company	17A

FILE NAME: FIGURE 17A_0-10FTBGS.0806.DWG (1:1)

LABORATORY ANALYTICAL RESULTS - LADWP (EAST SIDE OF NORMANDIE)

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C128		C128		C128		C128		C128		C128		C128		C129		C129	
	Sampling Date		07/29/2005 07:44		07/29/2005 07:44		07/29/2005 07:47		07/29/2005 07:52		07/29/2005 07:55		07/29/2005 07:55		07/29/2005 08:06		07/29/2005 08:28		07/29/2005 08:28	
	Sample Depth		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6		5.5 - 6		7.5 - 8		0 - 0.5		0 - 0.5	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C128-0.5		C128-0.5		C128-2		C128-4		C128-6		C128-6		C128-8		C129-0.5		C129-0.5	
	Lab Sample		IOG2071-02		IOG2071-02		IOG2071-03		IOG2071-04		IOG2071-05		IOG2071-05		IOG2071-06		IOG2071-07		IOG2071-07	
	PVC / Run		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1		PR / 2	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
alpha-BHC	SW8081A	mg/kg	**0.0084 J**		-		**0.0017 J**		<0.0050		<0.0050		-		<0.0050		**0.0011 J**		-	
beta-BHC	SW8081A	mg/kg	<0.025 C-1		-		<0.0050		<0.0050		<0.0050		-		<0.0050		**0.0027 J**		-	
delta-BHC	SW8081A	mg/kg	<0.050		-		<0.010		<0.010		<0.010		-		<0.010		<0.010		-	
gamma-BHC	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		**0.0012 J**		-	
chlordane	SW8081A	mg/kg	<0.25		-		<0.050		<0.050		<0.050		-		<0.050		<0.050		-	
2,4'-DDD	SW8081A	mg/kg	**0.011 J**		-		<0.0050		<0.0050		**0.0015 J**		-		<0.0050		**0.0022 J**		-	
2,4'-DDE	SW8081A	mg/kg	**0.0083 J**		-		<0.0050		<0.0050		<0.0050		-		<0.0050		**0.0025 J**		-	
2,4'-DDT	SW8081A	mg/kg	**0.066**		-		<0.0050		<0.0050 C-2j	**UJ**	<0.0050 C-2i	**UJ**	-		<0.0050 C-2j	**UJ**	**0.031 C-2i**	**J**	-	
4,4'-DDD	SW8081A	mg/kg	**0.042**		-		**0.0016 J**		<0.0050		**0.0035 J**		-		<0.0050		**0.0062**		-	
4,4'-DDE	SW8081A	mg/kg	**0.027**		-		**0.0024 J**		<0.0050		**0.0056**		-		<0.0050		**0.014**		-	
4,4'-DDT	SW8081A	mg/kg	-		**0.37 C-2f**	**J**	**0.0062 C-2f**	**J**	<0.0050 C-2d	**UJ**	-		**0.070**		<0.0050 C-2d	**UJ**	-		**0.19**	
dieldrin	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
alpha-endosulfan	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
beta-endosulfan	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
endosulfan sulfate	SW8081A	mg/kg	<0.050		-		<0.010		<0.010		<0.010		-		<0.010		<0.010		-	
endrin	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
endrin aldehyde	SW8081A	mg/kg	<0.025 C-1a		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
endrin ketone	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
heptachlor	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
heptachlor epoxide	SW8081A	mg/kg	<0.025		-		<0.0050		<0.0050		<0.0050		-		<0.0050		<0.0050		-	
methoxychlor	SW8081A	mg/kg	<0.025 C-2g	**UJ**	-		<0.0050 C-2i	**UJ**	<0.0050 C-2h	**UJ**	<0.0050 C-2e	**UJ**	-		<0.0050 C-2h	**UJ**	<0.0050 C-2e	**UJ**	-	
toxaphene	SW8081A	mg/kg	<1.0		-		<0.20		<0.20		<0.20		-		<0.20		<0.20		-	

LABORATORY ANALYTICAL RESULTS - LADWP (EAST SIDE OF NORMANDIE)

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C129		C129		C129		C130		C130		C130		C130		C131	
	Sampling Date		07/29/2005 08:34		07/29/2005 08:34		07/29/2005 08:37		07/29/2005 08:56		07/29/2005 08:56		07/29/2005 09:00		07/29/2005 09:07		07/29/2005 09:30	
	Sample Depth		1.5 - 2		1.5 - 2		3.5 - 4		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		0 - 0.5	
	Sample Type		N1		FR1		N1		N1		N1		N1		N1		N1	
	Field Sample		C129-2		C329-2		C129-4		C130-0.5		C130-0.5		C130-2		C130-4		C131-0.5	
	Lab Sample		IOG2071-08		IOG2071-09		IOG2071-10		IOG2071-11		IOG2071-11		IOG2071-12		IOG2071-13		IOG2071-14	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
beta-BHC	SW8081A	mg/kg	**0.0023 J**		**0.0017 J**		<0.0050		**0.0071 J**		-		<0.0050		<0.0050		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.010		<0.010		<0.010		<0.020		-		<0.010		<0.010		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
chlordane	SW8081A	mg/kg	<0.050		<0.050		<0.050		<0.10		-		<0.050		<0.050		<0.050	
2,4'-DDD	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		**0.0094 J**		-		<0.0050		<0.0050		<0.0050	
2,4'-DDE	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		**0.0079 J**		-		<0.0050		<0.0050		<0.0050	
2,4'-DDT	SW8081A	mg/kg	**0.0065 C-2i**	**J**	**0.0036 C-2i, J**	**J**	<0.0050		-		**0.15**		**0.0051 C-2i**	**J**	<0.0050 C-2j	**UJ**	<0.0050 C-2i	**UJ**
4,4'-DDD	SW8081A	mg/kg	**0.0022 J**		<0.0050		<0.0050		**0.042**		-		**0.0027 J**		<0.0050		<0.0050	
4,4'-DDE	SW8081A	mg/kg	**0.0042 J**		**0.0024 J**		<0.0050		**0.060**		-		**0.0056**		<0.0050		**0.0034 J**	
4,4'-DDT	SW8081A	mg/kg	**0.034 C-2b**	**J**	**0.015 C-2b**	**J**	<0.0050		-		**0.97**		**0.043 C-2b**	**J**	<0.0050 C-2d	**UJ**	<0.0050 C-2b	**UJ**
dieldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.010		<0.010		<0.010		<0.020		-		<0.010		<0.010		<0.010	
endrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
heptachlor	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.0050 C-2e	**UJ**	<0.0050 C-2e	**UJ**	<0.0050		<0.010 C-2e	**UJ**	-		<0.0050 C-2e	**UJ**	<0.0050 C-2h	**UJ**	<0.0050 C-2e	**UJ**
toxaphene	SW8081A	mg/kg	<0.20		<0.20		<0.20		<0.40		-		<0.20		<0.20		<0.20	

LABORATORY ANALYTICAL RESULTS - LADWP (EAST SIDE OF NORMANDIE)

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C131		C131		C131		C131		C132		C132		C132		C132	
	Sampling Date		07/29/2005 09:31		07/29/2005 09:40		07/29/2005 09:40		07/29/2005 09:40		08/01/2005 10:21		08/01/2005 10:21		08/01/2005 10:25		08/01/2005 10:25	
	Sample Depth		1.5 - 2		3.5 - 4		3.5 - 4		3.5 - 4		0 - 0.5		0 - 0.5		1.5 - 2		1.5 - 2	
	Sample Type		N1		N1		FR1		FR1		N1		N1		N1		N1	
	Field Sample		C131-2		C131-4		C331-4		C331-4		C132-0.5		C132-0.5		C132-2		C132-2	
	Lab Sample		IOG2071-15		IOG2071-16		IOG2071-17		IOG2071-17		IOH0040-02		IOH0040-02		IOH0040-03		IOH0040-03	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 2		PR / 1		PR / 2	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
alpha-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
beta-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
delta-BHC	SW8081A	mg/kg	<0.010		<0.010		<0.010		-		<0.15		-		<0.030		-	
gamma-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
chlordane	SW8081A	mg/kg	<0.050		<0.050		<0.050		-		<0.75		-		<0.15		-	
2,4'-DDD	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		**0.13**		-		**0.010 J**		-	
2,4'-DDE	SW8081A	mg/kg	<0.0050		<0.0050		**0.0024 J**		-		**0.10**		-		**0.0068 J**		-	
2,4'-DDT	SW8081A	mg/kg	<0.0050 C-2i	**UJ**	**0.0016 C-2i, J**	**J**	**0.0079 C-2i**	**J**	-		-		**0.96**		**0.047 C-2b**	**J**	-	
4,4'-DDD	SW8081A	mg/kg	<0.0050		<0.0050		**0.0059**		-		**0.61**		-		**0.039**		-	
4,4'-DDE	SW8081A	mg/kg	**0.0027 J**		**0.0058**		**0.025**		-		-		**2.1**		**0.11**		-	
4,4'-DDT	SW8081A	mg/kg	**0.0048 C-2b, J**	**J**	**0.013 C-2b**	**J**	-		**0.061**		-		**8.5**		-		**0.35**	
dieldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
beta-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
endosulfan sulfate	SW8081A	mg/kg	<0.010		<0.010		<0.010		-		<0.15		-		<0.030		-	
endrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
endrin aldehyde	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
endrin ketone	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
heptachlor	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.075		-		<0.015		-	
methoxychlor	SW8081A	mg/kg	<0.0050 C-2e	**UJ**	<0.0050 C-2e	**UJ**	<0.0050 C-2e	**UJ**	-		<0.075 C-2a	**UJ**	-		<0.015 C-2a	**UJ**	-	
toxaphene	SW8081A	mg/kg	<0.20		<0.20		<0.20		-		<3.0		-		<0.60		-	

LABORATORY ANALYTICAL RESULTS - LADWP (EAST SIDE OF NORMANDIE)

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C132		C132		C132		C132		C133		C133		C133		C133		C133	
	Sampling Date		08/01/2005 10:30		08/01/2005 10:35		08/01/2005 10:45		08/01/2005 10:45		08/01/2005 11:10		08/01/2005 11:10		08/01/2005 11:17		08/01/2005 11:21		08/01/2005 11:25	
	Sample Depth		3.5 - 4		5.5 - 6		7.5 - 8		7.5 - 8		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C132-4		C132-6		C132-8		C132-8		C133-0.5		C133-0.5		C133-2		C133-4		C133-6	
	Lab Sample		IOH0040-04		IOH0040-05		IOH0040-06		IOH0040-06		IOH0040-07		IOH0040-07		IOH0040-08		IOH0040-09		IOH0040-10	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.015		<0.010		<0.010		-		<0.010		-		<0.020		<0.010		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
chlordane	SW8081A	mg/kg	<0.075		<0.050		<0.050		-		<0.050		-		<0.10		<0.050		<0.050	
2,4'-DDD	SW8081A	mg/kg	<0.0075		<0.0050		**0.0031 J**		-		<0.0050		-		<0.010		<0.0050		<0.0050	
2,4'-DDE	SW8081A	mg/kg	<0.0075		<0.0050		**0.0031 J**		-		**0.0095 R-1**		-		<0.010		<0.0050		<0.0050	
2,4'-DDT	SW8081A	mg/kg	<0.0075		<0.0050		**0.029 C-2b**	**J**	-		**0.017 C-2b**	**J**	-		<0.010 C-2b	**UJ**	<0.0050		<0.0050 C-2b	**UJ**
4,4'-DDD	SW8081A	mg/kg	<0.0075		<0.0050		**0.017**		-		**0.0074**		-		<0.010		<0.0050		**0.0035 J**	
4,4'-DDE	SW8081A	mg/kg	**0.0039 J**		<0.0050		-		**0.057**		**0.056**		-		<0.010		<0.0050		**0.013**	
4,4'-DDT	SW8081A	mg/kg	**0.0061 J**		<0.0050		-		**0.23**		-		**0.23**		<0.010 C-2	**UJ**	<0.0050		**0.0083 C-2**	**J**
dieldrin	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.015		<0.010		<0.010		-		<0.010		-		<0.020		<0.010		<0.010	
endrin	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
heptachlor	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050		-		<0.0050		-		<0.010		<0.0050		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.0075		<0.0050		<0.0050 C-2a	**UJ**	-		<0.0050 C-2a	**UJ**	-		<0.010 C-2a	**UJ**	<0.0050		<0.0050 C-2a	**UJ**
toxaphene	SW8081A	mg/kg	<0.30		<0.20		<0.20		-		<0.20		-		<0.40		<0.20		<0.20	

LABORATORY ANALYTICAL RESULTS - LADWP (EAST SIDE OF NORMANDIE)

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C133		C133		C134		C134		C134		C134		C135		C135		C135	
	Sampling Date		08/01/2005 11:25		08/01/2005 11:32		07/29/2005 10:00		07/29/2005 10:00		07/29/2005 10:10		07/29/2005 10:15		07/29/2005 10:30		07/29/2005 10:30		07/29/2005 10:38	
	Sample Depth		5.5 - 6		7.5 - 8		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		0 - 0.5		0 - 0.5		1.5 - 2	
	Sample Type		FR1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C333-6		C133-8		C134-0.5		C134-0.5		C134-2		C134-4		C135-0.5		C135-0.5		C135-2	
	Lab Sample		IOH0040-11		IOH0040-12		IOG2071-18		IOG2071-18		IOG2071-19		IOG2071-20		IOG2071-21		IOG2071-21		IOG2071-22	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		**0.012 J**		-		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		**0.013 J**		-		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.010		<0.010		<0.020		-		<0.010		<0.010		**0.028 J**		-		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		**0.014 J**		-		<0.0050	
chlordane	SW8081A	mg/kg	<0.050		<0.050		<0.10		-		<0.050		<0.050		<0.37		-		<0.050	
2,4'-DDD	SW8081A	mg/kg	<0.0050		**0.0039 J**		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
2,4'-DDE	SW8081A	mg/kg	<0.0050		**0.0026 J**		<0.010		-		<0.0050		<0.0050		**0.10 R-1**		-		<0.0050	
2,4'-DDT	SW8081A	mg/kg	<0.0050		**0.0044 C-2b, J**	**J**	**0.038 C-2c**	**J**	-		<0.0050		<0.0050 C-2j	**UJ**	<0.037 C-2c	**UJ**	-		<0.0050	
4,4'-DDD	SW8081A	mg/kg	<0.0050		**0.0095**		**0.015**		-		<0.0050		<0.0050		<0.037		-		<0.0050	
4,4'-DDE	SW8081A	mg/kg	**0.0036 J**		**0.048**		**0.018**		-		<0.0050		<0.0050		**0.10 R-10**		-		<0.0050	
4,4'-DDT	SW8081A	mg/kg	<0.0050		**0.037 C-2**	**J**	-		**0.44**		<0.0050		<0.0050 C-2d	**UJ**	-		**0.77 C-2**	**J**	**0.0037 J**	
dieldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		**0.024 J**		-		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.010		<0.010		<0.020		-		<0.010		<0.010		<0.075		-		<0.010	
endrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.010 C-2j	**UJ**	-		<0.0050		<0.0050		<0.037 C-2j	**UJ**	-		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
heptachlor	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		-		<0.0050		<0.0050		<0.037		-		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.0050		<0.0050 C-2a	**UJ**	<0.010 C-2a	**UJ**	-		<0.0050		<0.0050 C-2h	**UJ**	<0.037 C-2a	**UJ**	-		<0.0050	
toxaphene	SW8081A	mg/kg	<0.20		<0.20		<0.40		-		<0.20		<0.20		<1.5 A-01		-		<0.20	

LABORATORY ANALYTICAL RESULTS - LADWP (EAST SIDE OF NORMANDIE)

	Base		MONTT		MONTT	
	Site		NONE		NONE	
	Point		C135		C135	
	Sampling Date		07/29/2005 10:46		07/29/2005 10:46	
	Sample Depth		3.5 - 4		3.5 - 4	
	Sample Type		N1		N1	
	Field Sample		C135-4		C135-4	
	Lab Sample		IOG2071-23		IOG2071-23	
	PVC / Run		PR / 1		PR / 2	
	Status		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		-	
alpha-BHC	SW8081A	mg/kg	<0.0050		-	
beta-BHC	SW8081A	mg/kg	<0.0050		-	
delta-BHC	SW8081A	mg/kg	<0.010		-	
gamma-BHC	SW8081A	mg/kg	<0.0050		-	
chlordane	SW8081A	mg/kg	<0.050		-	
2,4'-DDD	SW8081A	mg/kg	<0.0050		-	
2,4'-DDE	SW8081A	mg/kg	**0.0022 J**		-	
2,4'-DDT	SW8081A	mg/kg	**0.026 C-2c**	**J**	-	
4,4'-DDD	SW8081A	mg/kg	**0.0045 J**		-	
4,4'-DDE	SW8081A	mg/kg	**0.043**		-	
4,4'-DDT	SW8081A	mg/kg	-		**0.14 M2**	
dieldrin	SW8081A	mg/kg	<0.0050		-	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		-	
beta-endosulfan	SW8081A	mg/kg	<0.0050		-	
endosulfan sulfate	SW8081A	mg/kg	<0.010		-	
endrin	SW8081A	mg/kg	<0.0050 C-2j	**UJ**	-	
endrin aldehyde	SW8081A	mg/kg	<0.0050		-	
endrin ketone	SW8081A	mg/kg	<0.0050		-	
heptachlor	SW8081A	mg/kg	<0.0050		-	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		-	
methoxychlor	SW8081A	mg/kg	<0.0050 C-2a	**UJ**	-	
toxaphene	SW8081A	mg/kg	<0.20		-	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C136		C136		C136		C136		C136		C136		C136		C136		C137	
	Sampling Date		04/27/2005 07:57		04/27/2005 07:57		04/27/2005 08:30		04/27/2005 08:30		04/27/2005 08:42		04/27/2005 08:58		04/27/2005 09:26		04/27/2005 09:26		04/28/2005 11:20	
	Sample Depth		0 - 0.5		0 - 0.5		1.5 - 2		1.5 - 2		3.5 - 4		5.5 - 6		7.5 - 8		7.5 - 8		0 - 0.5	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C136-0.5		C136-0.5		C136-2		C136-2		C136-4		C136-6		C136-8		C136-8		C137-0.5	
	Lab Sample		IOD1956-02		IOD1956-02		IOD1956-03		IOD1956-03		IOD1956-04		IOD1956-05		IOD1956-06		IOD1956-06		IOD2060-13	
	PVC / Run		PR / 1		PR / 2		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
alpha-BHC	SW8081A	mg/kg	<0.30		-		**0.031 J**		-		<0.0050		<0.0050		<0.0050		-		<0.050	
beta-BHC	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
delta-BHC	SW8081A	mg/kg	<0.60		-		<0.20		-		<0.010		<0.010		<0.010		-		<0.10	
gamma-BHC	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
chlordane	SW8081A	mg/kg	<3.0		-		<1.0		-		<0.050		<0.050		<0.050		-		<0.50	
2,4'-DDD	SW8081A	mg/kg	**0.11 J**		-		**0.15**		-		<0.0050		<0.0050		<0.0050		-		**0.044 C-1c, J**	**J**
2,4'-DDE	SW8081A	mg/kg	**0.15 J**		-		**0.30**		-		<0.0050		<0.0050		<0.0050		-		**0.025 J**	
2,4'-DDT	SW8081A	mg/kg	**0.88 C-2d**	**J**	-		-		**2.1**		**0.0028 J**		**0.0041 J**		**0.0089 C-2d**	**J**	-		**0.13 C-2**	**U**
4,4'-DDD	SW8081A	mg/kg	**0.35 C-1a**	**J**	-		**0.37 C-1a**	**J**	-		<0.0050		**0.0024 J**		**0.0029 C-1a, J**	**J**	-		**0.28 C-1f**	**J**
4,4'-DDE	SW8081A	mg/kg	**3.5 R-1**		-		-		**5.8**		**0.0033 J**		**0.0045 J**		**0.024**		-		**0.040 J**	
4,4'-DDT	SW8081A	mg/kg	-		**10**		-		**19**		**0.016**		**0.014**		-		**0.081**		-	
dieldrin	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
alpha-endosulfan	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
beta-endosulfan	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
endosulfan sulfate	SW8081A	mg/kg	<0.60		-		<0.20		-		<0.010		<0.010		<0.010		-		<0.10 C-2o	**UJ**
endrin	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050 C-2l	**UJ**
endrin aldehyde	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050 C-2r	**UJ**
endrin ketone	SW8081A	mg/kg	<0.30 C-2i	**UJ**	-		<0.10 C-2i	**UJ**	-		<0.0050		<0.0050		<0.0050 C-2i	**UJ**	-		<0.050 C-2e	**UJ**
heptachlor	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050 C-2k	**UJ**
heptachlor epoxide	SW8081A	mg/kg	<0.30		-		<0.10		-		<0.0050		<0.0050		<0.0050		-		<0.050	
methoxychlor	SW8081A	mg/kg	<0.30 C-2f	**UJ**	-		<0.10 C-2f	**UJ**	-		<0.0050		<0.0050		<0.0050 C-2f	**UJ**	-		<0.050 C-2	**UJ**
toxaphene	SW8081A	mg/kg	<12		-		<4.0		-		<0.20		<0.20		<0.20		-		<2.0	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C137		C137		C137		C137		C137		C137		C138		C138	
	Sampling Date		04/28/2005 11:20		04/28/2005 11:21		04/28/2005 11:26		04/28/2005 11:34		04/28/2005 11:34		04/28/2005 11:37		04/28/2005 10:08		04/28/2005 10:08	
	Sample Depth		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6		5.5 - 6		7.5 - 8		0 - 0.5		0 - 0.5	
	Sample Type		N1		N1		N1		N1		FR1		N1		N1		N1	
	Field Sample		C137-0.5		C137-2		C137-4		C137-6		C337-6		C137-8		C138-0.5		C138-0.5	
	Lab Sample		IOD2060-13		IOD2060-14		IOD2060-15		IOD2060-16		IOD2060-17		IOD2060-18		IOD2060-10		IOD2060-10	
	PVC / Run		PR / 2		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1		PR / 2	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
alpha-BHC	SW8081A	mg/kg	-		**0.0049 J**	**J**	<0.050		<0.020		<0.050		<0.020		<1.0		-	
beta-BHC	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
delta-BHC	SW8081A	mg/kg	-		<0.020		<0.10 C-1b		<0.040		<0.10		<0.040		<2.1 C-1b		-	
gamma-BHC	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
chlordane	SW8081A	mg/kg	-		<0.10		<0.50		<0.20		<0.50		<0.20		<10		-	
2,4'-DDD	SW8081A	mg/kg	-		**0.0062 C-1c, J**	**U**	**0.12 R-10**		**0.024 C-1e, R-10**	**J**	**0.028 C-1c, J**	**J**	**0.0087 C-1e, J**	**U**	**0.62 J**		-	
2,4'-DDE	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		**0.042 R-10, J**	**J**	<0.020		**0.34 J**		-	
2,4'-DDT	SW8081A	mg/kg	-		<0.010 C-2	**UJ**	**0.044 C-2l, J**	**U**	**0.055 C-2h**	**U**	<0.050 C-2	**UJ**	**0.017 C-2h, J**	**U**	**4.0 C-2l**	**J**	-	
4,4'-DDD	SW8081A	mg/kg	-		**0.048 C-1f**	**U**	**0.50 C-1g**	**J**	**0.078 C-1i**	**J**	**0.11 C-1f, R-10**	**J**	**0.019 C-1i, J**	**U**	**2.1 C-1g**	**J**	-	
4,4'-DDE	SW8081A	mg/kg	-		<0.010		**0.16**		**0.13 R-1**	**J**	**0.11**	**J**	**0.053 R-1**	**J**	**2.1**		-	
4,4'-DDT	SW8081A	mg/kg	**0.98 C-2f**	**J**	**0.064 C-2**	**U**	**0.15 C-2f, R-10**	**U**	**0.19 C-2a**	**U**	**0.15 C-2**	**U**	**0.073 C-2a**	**U**	-		**27**	
dieldrin	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
alpha-endosulfan	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
beta-endosulfan	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
endosulfan sulfate	SW8081A	mg/kg	-		<0.020 C-2o	**UJ**	<0.10		<0.040		<0.10 C-2o	**UJ**	<0.040		<2.1		-	
endrin	SW8081A	mg/kg	-		<0.010 C-2l	**UJ**	<0.050		<0.020		<0.050 C-2l	**UJ**	<0.020		<1.0		-	
endrin aldehyde	SW8081A	mg/kg	-		<0.010 C-2r	**UJ**	<0.050		<0.020		<0.050 C-2r	**UJ**	<0.020		<1.0		-	
endrin ketone	SW8081A	mg/kg	-		<0.010 C-2e	**UJ**	<0.050		<0.020 C-2m	**UJ**	<0.050 C-2e	**UJ**	<0.020 C-2m	**UJ**	<1.0		-	
heptachlor	SW8081A	mg/kg	-		<0.010 C-2k	**UJ**	<0.050		<0.020		<0.050 C-2k	**UJ**	<0.020		<1.0		-	
heptachlor epoxide	SW8081A	mg/kg	-		<0.010		<0.050		<0.020		<0.050		<0.020		<1.0		-	
methoxychlor	SW8081A	mg/kg	-		<0.010 C-2	**UJ**	<0.050 C-2g	**UJ**	<0.020 C-2d	**UJ**	<0.050 C-2	**UJ**	<0.020 C-2d	**UJ**	<1.0 C-2g	**UJ**	-	
toxaphene	SW8081A	mg/kg	-		<0.40		<2.0		<0.80		<2.0		<0.79		<42		-	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C138		C138		C139		C139		C139		C139		C139	
	Sampling Date		04/28/2005 10:12		04/28/2005 10:14		04/28/2005 09:41		04/28/2005 09:41		04/28/2005 09:45		04/28/2005 09:57		04/28/2005 09:57	
	Sample Depth		1.5 - 2		3.5 - 4		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		3.5 - 4	
	Sample Type		N1		N1		N1		N1		N1		N1		FR1	
	Field Sample		C138-2		C138-4		C139-0.5		C139-0.5		C139-2		C139-4		C339-4	
	Lab Sample		IOD2060-11		IOD2060-12		IOD2060-06		IOD2060-06		IOD2060-07		IOD2060-08		IOD2060-09	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.015		<0.010		<0.030	**UJ**	-		<0.050		<0.0050		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.015		**0.0035 J**		**0.012 J**	**J**	-		<0.050		<0.0050		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.015		**0.0062 J**		**0.020 J**	**J**	-		<0.050		<0.0050		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.030		<0.020		**0.025 J**	**J**	-		<0.10		<0.010		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.015		<0.010		**0.017 J**	**J**	-		<0.050		<0.0050		<0.0050	
chlordane	SW8081A	mg/kg	<0.15		<0.10		<0.30	**UJ**	-		<0.50		<0.050		<0.050	
2,4'-DDD	SW8081A	mg/kg	<0.015 C-1c		**0.0023 J**	**U**	**0.10 C-1c, R-10**	**J**	-		<0.050 C-1c		**0.0012 J**	**U**	**0.0010 C-1d, J**	**U**
2,4'-DDE	SW8081A	mg/kg	<0.015		<0.010		**0.19 R-1**	**J**	-		<0.050		<0.0050 R		<0.0050	
2,4'-DDT	SW8081A	mg/kg	<0.015 C-2	**UJ**	**0.021**	**U**	**0.34 C-2, R-1**	**J**	-		**0.021 C-2, R-10, J**	**U**	**0.0039 R, J**	**U**	**0.0015 C-2h, J**	**U**
4,4'-DDD	SW8081A	mg/kg	**0.0090 C-1f, J**	**U**	**0.0083 C-1b, J**	**U**	**0.38 C-1f, R-1**	**J**	-		**0.068 C-1f, R-1**	**U**	**0.0015 C-1b, J**	**U**	**0.0025 C-1h, J**	**U**
4,4'-DDE	SW8081A	mg/kg	<0.015		**0.015**	**U**	<0.030	**UJ**	-		<0.050		**0.0022 J**	**U**	<0.0050	
4,4'-DDT	SW8081A	mg/kg	<0.015 C-2	**UJ**	**0.11 C-2j**	**U**	-		**0.89 C-2f**	**J**	**0.25 C-2, R-1**	**U**	**0.0083 C-2j**	**U**	**0.0059 C-2a**	**U**
dieldrin	SW8081A	mg/kg	<0.015		<0.010		<0.030	**UJ**	-		<0.050		<0.0050		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.015		<0.010		<0.030	**UJ**	-		<0.050		<0.0050		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.015		<0.010		<0.030	**UJ**	-		<0.050		<0.0050		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.030 C-2o	**UJ**	<0.020		<0.059 C-2o	**UJ**	-		<0.10 C-2o	**UJ**	<0.010		<0.010	
endrin	SW8081A	mg/kg	<0.015 C-2l	**UJ**	<0.010		<0.030 C-2l	**UJ**	-		<0.050 C-2l	**UJ**	<0.0050		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.015 C-2r	**UJ**	<0.010		<0.030 C-2r	**UJ**	-		<0.050 C-2r	**UJ**	<0.0050		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.015 C-2e	**UJ**	<0.010		<0.030 C-2e	**UJ**	-		<0.050 C-2e	**UJ**	<0.0050		<0.0050 C-2m	**UJ**
heptachlor	SW8081A	mg/kg	<0.015 C-2k	**UJ**	<0.010		<0.030 C-2k	**UJ**	-		<0.050 C-2k	**UJ**	<0.0050		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.015		<0.010		<0.030	**UJ**	-		<0.050		<0.0050		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.015 C-2	**UJ**	<0.010 C-2m	**UJ**	<0.030 C-2	**UJ**	-		<0.050 C-2	**UJ**	<0.0050 C-2m	**UJ**	<0.0050 C-2d	**UJ**
toxaphene	SW8081A	mg/kg	<0.60		<0.40		<1.2	**UJ**	-		<2.0		<0.20		<0.20	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C140		C140		C140		C140		C140		C141		C141		C141	
	Sampling Date		04/28/2005 08:19		04/28/2005 08:19		04/28/2005 09:26		04/28/2005 09:26		04/28/2005 09:30		04/26/2005 14:32		04/26/2005 14:35		04/26/2005 14:35	
	Sample Depth		0 - 0.5		0 - 0.5		1.5 - 2		1.5 - 2		3.5 - 4		0 - 0.5		1.5 - 2		1.5 - 2	
	Sample Type		N1		N1		N1		FR1		N1		N1		N1		N1	
	Field Sample		C140-0.5		C140-0.5		C140-2		C340-2		C140-4		C141-0.5		C141-2		C141-2	
	Lab Sample		IOD2060-02		IOD2060-02		IOD2060-03		IOD2060-04		IOD2060-05		IOD1871-11		IOD1871-12		IOD1871-12	
	PVC / Run		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1		PR / 2	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
alpha-BHC	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
beta-BHC	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
delta-BHC	SW8081A	mg/kg	<0.60 C-1b		-		<0.050		<0.050		<0.010		<0.030		<0.020		-	
gamma-BHC	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
chlordane	SW8081A	mg/kg	<3.0		-		<0.25		<0.25		<0.050		<0.15		<0.10		-	
2,4'-DDD	SW8081A	mg/kg	**0.13 J**		-		<0.025 C-1		**0.0057 C-1, J**	**U**	<0.0050		<0.015		<0.010		-	
2,4'-DDE	SW8081A	mg/kg	**0.16 J**		-		<0.025		<0.025		<0.0050		**0.0048 J**		**0.011**		-	
2,4'-DDT	SW8081A	mg/kg	**0.69 C-2l**	**J**	-		**0.018 C-2h, J**	**U**	**0.021 C-2h, J**	**U**	**0.0011 J**	**U**	**0.0089 C-2b, J**	**J**	**0.019 C-2b**	**J**	-	
4,4'-DDD	SW8081A	mg/kg	**0.40 C-1g**	**J**	-		**0.021 C-1a, J**	**U**	**0.040 C-1a**	**U**	<0.0050 C-1b		**0.024 C-1a**	**J**	**0.025 C-1a**	**J**	-	
4,4'-DDE	SW8081A	mg/kg	**0.66**		-		**0.025 R-1**		**0.029**		<0.0050		**0.036**		**0.091**		-	
4,4'-DDT	SW8081A	mg/kg	-		**1.4 C-2, R-10**	**J**	**0.20 C-2b**	**U**	**0.21 C-2b**	**U**	**0.0059 C-2j**	**U**	**0.061 C-2**	**J**	-		**0.23**	
dieldrin	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
alpha-endosulfan	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
beta-endosulfan	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
endosulfan sulfate	SW8081A	mg/kg	<0.60		-		<0.050 C-2p	**UJ**	<0.050 C-2p	**UJ**	<0.010		<0.030		<0.020		-	
endrin	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
endrin aldehyde	SW8081A	mg/kg	<0.30		-		<0.025 C-2p	**UJ**	<0.025 C-2p	**UJ**	<0.0050		<0.015		<0.010		-	
endrin ketone	SW8081A	mg/kg	<0.30		-		<0.025 C-2i	**UJ**	<0.025 C-2i	**UJ**	<0.0050		<0.015 C-2c	**UJ**	<0.010 C-2c	**UJ**	-	
heptachlor	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
heptachlor epoxide	SW8081A	mg/kg	<0.30		-		<0.025		<0.025		<0.0050		<0.015		<0.010		-	
methoxychlor	SW8081A	mg/kg	<0.30 C-2g	**UJ**	-		<0.025 C-2c	**UJ**	<0.025 C-2c	**UJ**	<0.0050 C-2m	**UJ**	<0.015 C-2a	**UJ**	<0.010 C-2a	**UJ**	-	
toxaphene	SW8081A	mg/kg	<12		-		<1.0		<1.0		<0.20		<0.60		<0.40		-	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C141		C141		C142		C142		C142		C142		C142	
	Sampling Date		04/26/2005 14:43		04/26/2005 14:46		04/29/2005 11:17		04/29/2005 11:17		04/29/2005 11:18		04/29/2005 11:22		04/29/2005 11:26	
	Sample Depth		3.5 - 4		5.5 - 6		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6	
	Sample Type		N1		N1		N1		FR1		N1		N1		N1	
	Field Sample		C141-4		C141-6		C142-0.5		C342-0.5		C142-2		C142-4		C142-6	
	Lab Sample		IOD1871-13		IOD1871-14		IOD2178-10		IOD2178-11		IOD2178-12		IOD2178-13		IOD2178-14	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
alpha-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.010 C-1a		<0.010 C-1a		<0.010 C-1a		<0.010 C-1a, RL-1		<0.010 C-1a	
beta-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
delta-BHC	SW8081A	mg/kg	<0.010 C-1		<0.010 C-1		<0.020 C-1		<0.020 C-1		<0.020 C-1		<0.020 C-1, RL-1		<0.020 C-1	
gamma-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
chlordane	SW8081A	mg/kg	<0.050		<0.050		<0.10		<0.10		<0.10		<0.10 RL-1		<0.10	
2,4'-DDD	SW8081A	mg/kg	<0.0050		<0.0050		**0.0059 C-1b, J**	**J**	**0.026 C-1b**	**J**	**0.0028 C-1b, J**	**J**	<0.010 C-1b, RL-1		**0.0061 C-1b, J**	**J**
2,4'-DDE	SW8081A	mg/kg	<0.0050		<0.0050		**0.0035 J**		**0.0061 J**		**0.0026 J**		**0.0023 J, RL-1**		<0.010	
2,4'-DDT	SW8081A	mg/kg	<0.0050		**0.0012 J**		**0.0057 C-2c, J**	**J**	**0.0094 C-2c, J**	**J**	**0.0079 C-2c, J**	**J**	<0.010 C-2c, RL-1	**UJ**	**0.0065 C-2c, J**	**J**
4,4'-DDD	SW8081A	mg/kg	<0.0050		<0.0050		**0.030 C-1d**	**J**	**0.11 C-1d**	**J**	**0.026 C-1d**	**J**	**0.0059 C-1d, J, RL-1**	**J**	**0.028 C-1d**	**J**
4,4'-DDE	SW8081A	mg/kg	<0.0050		**0.0027 J**		**0.022**		**0.040**		**0.0056 J**		<0.010 RL-1		<0.010	
4,4'-DDT	SW8081A	mg/kg	<0.0050		**0.0067**		**0.030 C-2**	**J**	**0.047 C-2**	**J**	**0.058 C-2**	**J**	<0.010 C-2, RL-1	**UJ**	**0.035 C-2**	**J**
dieldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
beta-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
endosulfan sulfate	SW8081A	mg/kg	<0.010		<0.010		<0.020 C-2h	**UJ**	<0.020 C-2h	**UJ**	<0.020 C-2h	**UJ**	<0.020 C-2h, RL-1	**UJ**	<0.020 C-2h	**UJ**
endrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
endrin aldehyde	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
endrin ketone	SW8081A	mg/kg	<0.0050		<0.0050		<0.010 C-2f	**UJ**	<0.010 C-2f	**UJ**	<0.010 C-2f	**UJ**	<0.010 C-2f, RL-1	**UJ**	<0.010 C-2f	**UJ**
heptachlor	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		<0.0050		<0.010		<0.010		<0.010		<0.010 RL-1		<0.010	
methoxychlor	SW8081A	mg/kg	<0.0050		<0.0050		<0.010 C-2a	**UJ**	<0.010 C-2a	**UJ**	<0.010 C-2a	**UJ**	<0.010 C-2a, RL-1	**UJ**	<0.010 C-2a	**UJ**
toxaphene	SW8081A	mg/kg	<0.20		<0.20		<0.40		<0.40		<0.40		<0.40 RL-1		<0.40	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C142		C143		C143		C143		C143		C143		C143		C143	
	Sampling Date		04/29/2005 11:28		04/29/2005 10:28		04/29/2005 10:28		04/29/2005 10:33		04/29/2005 10:36		04/29/2005 10:36		04/29/2005 10:38		04/29/2005 10:41	
	Sample Depth		7.5 - 8		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		3.5 - 4		5.5 - 6		7.5 - 8	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C142-8		C143-0.5		C143-0.5		C143-2		C143-4		C143-4		C143-6		C143-8	
	Lab Sample		IOD2178-15		IOD2178-05		IOD2178-05		IOD2178-06		IOD2178-07		IOD2178-07		IOD2178-08		IOD2178-09	
	PVC / Run		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
alpha-BHC	SW8081A	mg/kg	<0.010 RL-1, C-1a		<0.010 C-1a		-		<0.010 C-1a		<0.010 C-1a		-		<0.010 C-1a, RL-1		<0.010 C-1a	
beta-BHC	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
delta-BHC	SW8081A	mg/kg	<0.020 RL-1, C-1		<0.020 C-1		-		<0.020 C-1		<0.020 C-1		-		<0.020 C-1, RL-1		<0.020 C-1	
gamma-BHC	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
chlordane	SW8081A	mg/kg	<0.10 RL-1		<0.10		-		<0.10		<0.10		-		<0.10 RL-1		<0.10	
2,4'-DDD	SW8081A	mg/kg	**0.0038 RL-1, C-1b, J**	**J**	**0.030 C-1b**	**J**	-		<0.010 C-1b		<0.010 C-1b		-		<0.010 C-1b, RL-1		**0.0050 C-1b, J**	**J**
2,4'-DDE	SW8081A	mg/kg	<0.010 RL-1		**0.018**		-		<0.010		<0.010		-		<0.010 RL-1		**0.0061 J**	
2,4'-DDT	SW8081A	mg/kg	**0.0020 RL-1, C-2c, J**	**U**	**0.11 C-2c**	**J**	-		**0.0046 C-2c, J**	**J**	**0.039 C-2c**	**J**	-		<0.010 C-2c, RL-1	**UJ**	**0.012 C-2c**	**J**
4,4'-DDD	SW8081A	mg/kg	**0.0071 RL-1, C-1d, J**	**J**	-		**0.12 C-1d, J**	**J**	**0.0077 C-1d, J**	**J**	**0.031 C-1d**	**J**	-		<0.010 C-1d, RL-1		**0.016 C-1d**	**J**
4,4'-DDE	SW8081A	mg/kg	<0.010 RL-1		-		**0.23 J**		**0.0077 J**		**0.043**		-		<0.010 RL-1		**0.025**	
4,4'-DDT	SW8081A	mg/kg	<0.010 RL-1, C-2	**UJ**	-		**0.85 C-2**	**J**	**0.031 C-2**	**J**	-		**0.29 C-2**	**J**	<0.010 C-2, RL-1	**UJ**	**0.082 C-2**	**J**
dieldrin	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
alpha-endosulfan	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
beta-endosulfan	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
endosulfan sulfate	SW8081A	mg/kg	<0.020 RL-1, C-2h	**UJ**	<0.020 C-2h	**UJ**	-		<0.020 C-2h	**UJ**	<0.020 C-2h	**UJ**	-		<0.020 C-2h, RL-1	**UJ**	<0.020 C-2h	**UJ**
endrin	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
endrin aldehyde	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
endrin ketone	SW8081A	mg/kg	<0.010 RL-1, C-2f	**UJ**	<0.010 C-2f	**UJ**	-		<0.010 C-2f	**UJ**	<0.010 C-2f	**UJ**	-		<0.010 C-2f, RL-1	**UJ**	<0.010 C-2f	**UJ**
heptachlor	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
heptachlor epoxide	SW8081A	mg/kg	<0.010 RL-1		<0.010		-		<0.010		<0.010		-		<0.010 RL-1		<0.010	
methoxychlor	SW8081A	mg/kg	<0.010 RL-1, C-2a	**UJ**	<0.010 C-2a	**UJ**	-		<0.010 C-2a	**UJ**	<0.010 C-2a	**UJ**	-		<0.010 C-2a, RL-1	**UJ**	<0.010 C-2a	**UJ**
toxaphene	SW8081A	mg/kg	<0.40 RL-1		<0.40		-		<0.40		<0.40		-		<0.40 RL-1		<0.40	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C144		C144		C144		C144		C145		C145		C145		C145	
	Sampling Date		04/29/2005 07:46		04/29/2005 07:46		04/29/2005 07:53		04/29/2005 07:57		04/26/2005 11:38		04/26/2005 11:38		04/26/2005 11:42		04/26/2005 11:52	
	Sample Depth		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C144-0.5		C144-0.5		C144-2		C144-4		C145-0.5		C145-0.5		C145-2		C145-4	
	Lab Sample		IOD2178-02		IOD2178-02		IOD2178-03		IOD2178-04		IOD1871-06		IOD1871-06		IOD1871-07		IOD1871-08	
	PVC / Run		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.020		-		<0.010		<0.010		<0.010		-		<0.020 RL-1		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
chlordane	SW8081A	mg/kg	<0.10		-		<0.050		<0.050		<0.050		-		<0.10 RL-1		<0.050	
2,4'-DDD	SW8081A	mg/kg	**0.0042 C-1c, J**	**J**	-		<0.0050 C-1c		<0.0050 C-1c		<0.0050		-		<0.010 RL-1		<0.0050	
2,4'-DDE	SW8081A	mg/kg	**0.0030 J**		-		<0.0050		<0.0050		**0.0022 J**		-		<0.010 RL-1		<0.0050	
2,4'-DDT	SW8081A	mg/kg	**0.014 C-2e**	**J**	-		**0.0050 C-2e, R-10**	**J**	<0.0050 C-2e	**UJ**	**0.0080**		-		<0.010 C-2b, RL-1	**UJ**	**0.0022 J**	
4,4'-DDD	SW8081A	mg/kg	**0.075 C-1e**	**J**	-		**0.013 C-1e**	**J**	<0.0050 C-1e		**0.0028 J**		-		<0.010 C-1a, RL-1		<0.0050	
4,4'-DDE	SW8081A	mg/kg	**0.043**		-		**0.0049 J**		<0.0050		**0.027**		-		<0.010 RL-1		**0.0042 J**	
4,4'-DDT	SW8081A	mg/kg	-		**0.48**		**0.046 C-2b**	**J**	<0.0050 C-2b	**UJ**	-		**0.093**		<0.010 C-2, RL-1	**UJ**	**0.0090 C-2e**	**J**
dieldrin	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.020		-		<0.010		<0.010		<0.010		-		<0.020 RL-1		<0.010	
endrin	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.010 C-2g	**UJ**	-		<0.0050 C-2g	**UJ**	<0.0050 C-2g	**UJ**	<0.0050 C-2e	**UJ**	-		<0.010 C-2c, RL-1	**UJ**	<0.0050 C-2e	**UJ**
heptachlor	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.010		-		<0.0050		<0.0050		<0.0050		-		<0.010 RL-1		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.010 C-2d	**UJ**	-		<0.0050 C-2d	**UJ**	<0.0050 C-2d	**UJ**	<0.0050 C-2d	**UJ**	-		<0.010 C-2a, RL-1	**UJ**	<0.0050 C-2d	**UJ**
toxaphene	SW8081A	mg/kg	<0.40		-		<0.20		<0.20		<0.20		-		<0.40 RL-1		<0.20	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C145		C145		C146		C146		C146		C146		C146		C146		C146	
	Sampling Date		04/26/2005 11:52		04/26/2005 12:00		04/27/2005 10:00		04/27/2005 10:00		04/27/2005 10:15		04/27/2005 10:15		04/27/2005 10:30		04/27/2005 10:40		04/27/2005 11:08	
	Sample Depth		3.5 - 4		5.5 - 6		0 - 0.5		0 - 0.5		1.5 - 2		1.5 - 2		3.5 - 4		5.5 - 6		7.5 - 8	
	Sample Type		FR1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C345-4		C145-6		C146-0.5		C146-0.5		C146-2		C146-2		C146-4		C146-6		C146-8	
	Lab Sample		IOD1871-09		IOD1871-10		IOD1956-07		IOD1956-07		IOD1956-08		IOD1956-08		IOD1956-09		IOD1956-10		IOD1956-11	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.010		<0.010 C-1		<0.010		-		<0.010		-		<0.010		<0.010		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
chlordane	SW8081A	mg/kg	<0.050		<0.050		<0.050		-		<0.050		-		<0.050		<0.050		<0.050	
2,4'-DDD	SW8081A	mg/kg	<0.0050		**0.0014 J**		**0.0019 J**		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
2,4'-DDE	SW8081A	mg/kg	<0.0050		**0.0011 J**		**0.0028 J**		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
2,4'-DDT	SW8081A	mg/kg	**0.0015 J**		**0.0052**		**0.051 C-2d**	**J**	-		**0.010 C-2d, R-10**	**J**	-		**0.0019 J**		<0.0050		<0.0050	
4,4'-DDD	SW8081A	mg/kg	<0.0050		**0.0028 J**		**0.015 C-1a**	**J**	-		**0.012 C-1a**	**J**	-		<0.0050		<0.0050		<0.0050	
4,4'-DDE	SW8081A	mg/kg	**0.0044 J**		**0.0042 J**		**0.063**		-		**0.012**		-		**0.0025 J**		<0.0050		<0.0050	
4,4'-DDT	SW8081A	mg/kg	**0.0081 C-2e**	**J**	**0.054**		-		**0.66**		-		**0.37**		**0.036**		<0.0050		**0.0045 J**	
dieldrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.010		<0.010		<0.010		-		<0.010		-		<0.010		<0.010		<0.010	
endrin	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.0050 C-2e	**UJ**	<0.0050		<0.0050 C-2i	**UJ**	-		<0.0050 C-2i	**UJ**	-		<0.0050		<0.0050		<0.0050	
heptachlor	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		<0.0050		<0.0050		-		<0.0050		-		<0.0050		<0.0050		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.0050 C-2d	**UJ**	<0.0050		<0.0050 C-2f	**UJ**	-		<0.0050 C-2f	**UJ**	-		<0.0050		<0.0050		<0.0050	
toxaphene	SW8081A	mg/kg	<0.20		<0.20		<0.20		-		<0.20		-		<0.20		<0.20		<0.20	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C146		C147		C147		C147		C147		C147		C147		C147		C148	
	Sampling Date		04/27/2005 11:08		04/27/2005 11:25		04/27/2005 11:25		04/27/2005 11:32		04/27/2005 11:40		04/27/2005 11:50		04/27/2005 12:10		04/28/2005 14:38	
	Sample Depth		7.5 - 8		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6		7.5 - 8		0 - 0.5	
	Sample Type		FR1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C346-8		C147-0.5		C147-0.5		C147-2		C147-4		C147-6		C147-8		C148-0.5	
	Lab Sample		IOD1956-12		IOD1956-13		IOD1956-13		IOD1956-14		IOD1956-15		IOD1956-16		IOD1956-17		IOD2060-29	
	PVC / Run		PR / 1		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.010		<0.020		-		<0.010		<0.010		<0.010		<0.010		<0.010	
gamma-BHC	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
chlordane	SW8081A	mg/kg	<0.050		<0.10		-		<0.050		<0.050		<0.050		<0.050		<0.050	
2,4'-DDD	SW8081A	mg/kg	<0.0050		**0.0029 J**		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050 C-1	
2,4'-DDE	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
2,4'-DDT	SW8081A	mg/kg	<0.0050		**0.048 C-2d**	**J**	-		**0.0022 C-2d, J**	**J**	<0.0050		<0.0050		**0.0032 C-2d, J**	**J**	**0.0077 C-2h, R-10**	**U**
4,4'-DDD	SW8081A	mg/kg	<0.0050		**0.040 C-1a**	**J**	-		**0.0015 C-1a, J**	**J**	<0.0050		<0.0050		**0.0052 C-1a**	**J**	**0.0076 C-1a, R-10**	**U**
4,4'-DDE	SW8081A	mg/kg	<0.0050		**0.020**		-		**0.0025 J**		<0.0050		<0.0050		**0.015**		**0.030**	
4,4'-DDT	SW8081A	mg/kg	**0.0058**		-		**0.59**		**0.016 C-2d**	**J**	**0.0081**		<0.0050		**0.036 C-2d**	**J**	-	
dieldrin	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.010		<0.020		-		<0.010		<0.010		<0.010		<0.010		<0.010 C-2p	**UJ**
endrin	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050 C-2p	**UJ**
endrin ketone	SW8081A	mg/kg	<0.0050		<0.010 C-2i	**UJ**	-		<0.0050 C-2i	**UJ**	<0.0050		<0.0050		<0.0050 C-2i	**UJ**	<0.0050 C-2i	**UJ**
heptachlor	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		<0.010		-		<0.0050		<0.0050		<0.0050		<0.0050		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.0050		<0.010 C-2f	**UJ**	-		<0.0050 C-2f	**UJ**	<0.0050		<0.0050		<0.0050 C-2f	**UJ**	<0.0050 C-2c	**UJ**
toxaphene	SW8081A	mg/kg	<0.20		<0.40		-		<0.20		<0.20		<0.20		<0.20		<0.20	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C148		C148		C148		C148		C148		C148		C148		C148		C149	
	Sampling Date		04/28/2005 14:38		04/28/2005 14:40		04/28/2005 14:40		04/28/2005 14:40		04/28/2005 14:42		04/28/2005 14:42		04/28/2005 14:43		04/28/2005 14:46		04/28/2005 11:50	
	Sample Depth		0 - 0.5		1.5 - 2		1.5 - 2		1.5 - 2		3.5 - 4		3.5 - 4		5.5 - 6		7.5 - 8		0 - 0.5	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C148-0.5		C148-2		C148-2		C148-2		C148-4		C148-4		C148-6		C148-8		C149-0.5	
	Lab Sample		IOD2060-29		IOD2060-30		IOD2060-30		IOD2060-30		IOD2060-31		IOD2060-31		IOD2060-32		IOD2060-33		IOD2060-19	
	PVC / Run		PR / 2		PR / 1		PR / 2		PR / 3		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
alpha-BHC	SW8081A	mg/kg	-		<0.050 C-1a		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
beta-BHC	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
delta-BHC	SW8081A	mg/kg	-		<0.10 C-1		-		-		<0.050		-		<0.010		<0.010		<0.10	
gamma-BHC	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
chlordane	SW8081A	mg/kg	-		<0.50		-		-		<0.25		-		<0.050		<0.050		<0.50	
2,4'-DDD	SW8081A	mg/kg	-		**0.037 J**		-		-		**0.011 J**	**U**	-		<0.0050		<0.0050		**0.066 C-1e, R-10**	**J**
2,4'-DDE	SW8081A	mg/kg	-		**0.037 J**		-		-		<0.025		-		<0.0050		<0.0050		**0.049 J**	**J**
2,4'-DDT	SW8081A	mg/kg	-		-		**0.77 C-2q**	**J**	-		**0.088**	**U**	-		**0.0022 J**	**U**	<0.0050		**0.26 C-2h, R-10**	**J**
4,4'-DDD	SW8081A	mg/kg	-		**0.23**		-		-		**0.098 C-1b**	**J**	-		**0.0016 J**	**U**	<0.0050		**0.47 C-1i**	**J**
4,4'-DDE	SW8081A	mg/kg	-		**0.077**		-		-		<0.025		-		<0.0050		<0.0050		**0.12**	**J**
4,4'-DDT	SW8081A	mg/kg	**0.16**	**U**	-		-		**3.8**		-		**0.62**	**U**	**0.014 C-2t**	**U**	<0.0050 C-2t	**UJ**	-	
dieldrin	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
alpha-endosulfan	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
beta-endosulfan	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
endosulfan sulfate	SW8081A	mg/kg	-		<0.10		-		-		<0.050		-		<0.010		<0.010		<0.10	
endrin	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
endrin aldehyde	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
endrin ketone	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050 C-2t	**UJ**	<0.0050 C-2t	**UJ**	<0.050 C-2m	**UJ**
heptachlor	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
heptachlor epoxide	SW8081A	mg/kg	-		<0.050		-		-		<0.025		-		<0.0050		<0.0050		<0.050	
methoxychlor	SW8081A	mg/kg	-		<0.050 C-2n	**UJ**	-		-		<0.025 C-2m	**UJ**	-		<0.0050 C-2s	**UJ**	<0.0050 C-2s	**UJ**	<0.050 C-2d	**UJ**
toxaphene	SW8081A	mg/kg	-		<2.0		-		-		<1.0		-		<0.20		<0.20		<2.0	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C149		C149		C149		C150		C150		C150		C150		C150		C150		C150	
	Sampling Date		04/28/2005 11:50		04/28/2005 11:52		04/28/2005 11:54		04/26/2005 15:20		04/26/2005 15:20		04/26/2005 15:25		04/26/2005 15:25		04/26/2005 15:33		04/26/2005 15:33		04/26/2005 15:33	
	Sample Depth		0 - 0.5		1.5 - 2		3.5 - 4		0 - 0.5		0 - 0.5		1.5 - 2		1.5 - 2		3.5 - 4		3.5 - 4		3.5 - 4	
	Sample Type		N1		N1		N1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C149-0.5		C149-2		C149-4		C150-0.5		C150-0.5		C150-2		C150-2		C150-4		C150-4		C150-4	
	Lab Sample		IOD2060-19		IOD2060-20		IOD2060-21		IOD1871-15		IOD1871-15		IOD1871-16		IOD1871-16		IOD1871-17		IOD1871-17		IOD1871-17	
	PVC / Run		PR / 2		PR / 1		PR / 1		PR / 1		PR / 2		PR / 1		PR / 2		PR / 1		PR / 2		PR / 2	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
alpha-BHC	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
beta-BHC	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
delta-BHC	SW8081A	mg/kg	-		<0.010		<0.010 C-1b		<0.020 C-1		-		<0.020		-		<0.020		-			
gamma-BHC	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
chlordane	SW8081A	mg/kg	-		<0.050		<0.050		<0.10		-		<0.10		-		<0.10		-			
2,4'-DDD	SW8081A	mg/kg	-		<0.0050 C-1c		<0.0050		<0.010		-		<0.010		-		**0.0057 J**		-			
2,4'-DDE	SW8081A	mg/kg	-		<0.0050		<0.0050		**0.0038 J**		-		**0.0078 J**		-		**0.0073 J**		-			
2,4'-DDT	SW8081A	mg/kg	-		<0.0050 C-2	**UJ**	**0.0010 C-2l, J**	**U**	**0.029**		-		<0.010 C-2b	**UJ**	-		**0.039 C-2b**	**J**	-			
4,4'-DDD	SW8081A	mg/kg	-		**0.0026 C-1f, J**	**U**	<0.0050 C-1g		**0.0059 J**		-		**0.038 C-1a**	**J**	-		**0.067 C-1a**	**J**	-			
4,4'-DDE	SW8081A	mg/kg	-		<0.0050		<0.0050		**0.12**		-		-		**0.13**		-		**0.25**			
4,4'-DDT	SW8081A	mg/kg	**1.1 C-2f**	**J**	<0.0050 C-2	**UJ**	**0.0033 C-2f, J**	**U**	-		**0.47**		-		**0.45**		-		**0.57**			
dieldrin	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
alpha-endosulfan	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
beta-endosulfan	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
endosulfan sulfate	SW8081A	mg/kg	-		<0.010 C-2o	**UJ**	<0.010		<0.020		-		<0.020		-		<0.020		-			
endrin	SW8081A	mg/kg	-		<0.0050 C-2l	**UJ**	<0.0050		<0.010		-		<0.010		-		<0.010		-			
endrin aldehyde	SW8081A	mg/kg	-		<0.0050 C-2r	**UJ**	<0.0050		<0.010		-		<0.010		-		<0.010		-			
endrin ketone	SW8081A	mg/kg	-		<0.0050 C-2e	**UJ**	<0.0050		<0.010		-		<0.010 C-2c	**UJ**	-		<0.010 C-2c	**UJ**	-			
heptachlor	SW8081A	mg/kg	-		<0.0050 C-2k	**UJ**	<0.0050		<0.010		-		<0.010		-		<0.010		-			
heptachlor epoxide	SW8081A	mg/kg	-		<0.0050		<0.0050		<0.010		-		<0.010		-		<0.010		-			
methoxychlor	SW8081A	mg/kg	-		<0.0050 C-2	**UJ**	<0.0050 C-2g	**UJ**	<0.010		-		<0.010 C-2a	**UJ**	-		<0.010 C-2a	**UJ**	-			
toxaphene	SW8081A	mg/kg	-		<0.20		<0.20		<0.40		-		<0.40		-		<0.40		-			

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C150		C150		C151		C151		C151		C151		C151		C151		C151	
	Sampling Date		04/26/2005 15:40		04/26/2005 15:40		04/26/2005 10:48		04/26/2005 10:48		04/26/2005 10:48		04/26/2005 10:58		04/26/2005 11:08		04/26/2005 11:16		04/26/2005 11:16	
	Sample Depth		5.5 - 6		5.5 - 6		0 - 0.5		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6		5.5 - 6	
	Sample Type		N1		FR1		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C150-6		C350-6		C151-0.5		C151-0.5		C151-0.5		C151-2		C151-4		C151-6		C151-6	
	Lab Sample		IOD1871-18		IOD1871-19		IOD1871-02		IOD1871-02		IOD1871-02		IOD1871-03		IOD1871-04		IOD1871-05		IOD1871-05	
	PVC / Run		PR / 1		PR / 1		PR / 1		PR / 2		PR / 3		PR / 1		PR / 1		PR / 1		PR / 1	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
alpha-BHC	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
beta-BHC	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
delta-BHC	SW8081A	mg/kg	<0.020		<0.020		<0.010 C-1		-		-		<0.010 C-1		<0.020		<0.010 C-1		<0.010 C-1	
gamma-BHC	SW8081A	mg/kg	<0.010		<0.010		**0.0010 J**		-		-		<0.0050		<0.010		<0.0050		<0.0050	
chlordane	SW8081A	mg/kg	<0.10		<0.10		<0.050		-		-		<0.050		<0.10		<0.050		<0.050	
2,4'-DDD	SW8081A	mg/kg	**0.0032 J**		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
2,4'-DDE	SW8081A	mg/kg	<0.010		**0.0023 J**		**0.0091**		-		-		<0.0050		**0.0027 J**		<0.0050		<0.0050	
2,4'-DDT	SW8081A	mg/kg	**0.0060 C-2b, J**	**J**	<0.010 C-2b	**UJ**	**0.022**		-		-		**0.0024 J**		**0.0037 C-2b, J**	**J**	<0.0050		<0.0050	
4,4'-DDD	SW8081A	mg/kg	**0.021 C-1a**	**J**	**0.0050 C-1a, J**	**J**	**0.0018 J**		-		-		<0.0050		**0.0055 C-1a, J**	**J**	<0.0050		<0.0050	
4,4'-DDE	SW8081A	mg/kg	**0.040**		**0.062 M2**		-		**0.082**		-		**0.0061**		**0.023**		<0.0050		<0.0050	
4,4'-DDT	SW8081A	mg/kg	**0.068 C-2**	**J**	**0.13 C-2, M2**	**J**	-		-		**0.12 C-2e**	**J**	**0.023**		**0.042 C-2**	**J**	**0.0044 J**		**0.0044 J**	
dieldrin	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
alpha-endosulfan	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
beta-endosulfan	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
endosulfan sulfate	SW8081A	mg/kg	<0.020		<0.020		<0.010		-		-		<0.010		<0.020		<0.010		<0.010	
endrin	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
endrin aldehyde	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
endrin ketone	SW8081A	mg/kg	<0.010 C-2c	**UJ**	<0.010 C-2c	**UJ**	<0.0050		-		-		<0.0050		<0.010 C-2c	**UJ**	<0.0050		<0.0050	
heptachlor	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
heptachlor epoxide	SW8081A	mg/kg	<0.010		<0.010		<0.0050		-		-		<0.0050		<0.010		<0.0050		<0.0050	
methoxychlor	SW8081A	mg/kg	<0.010 C-2a	**UJ**	<0.010 C-2a	**UJ**	<0.0050		-		-		<0.0050		<0.010 C-2a	**UJ**	<0.0050		<0.0050	
toxaphene	SW8081A	mg/kg	<0.40		<0.40		<0.20		-		-		<0.20		<0.40		<0.20		<0.20	

LABORATORY ANALYTICAL RESULTS - WESTERN WASTE

	Base		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT		MONTT	
	Site		NONE		NONE		NONE		NONE		NONE		NONE		NONE	
	Point		C152		C152		C152		C152		C152		C152		C152	
	Sampling Date		04/27/2005 14:14		04/27/2005 14:14		04/27/2005 14:26		04/27/2005 14:49		04/27/2005 15:13		04/27/2005 16:01		04/27/2005 16:01	
	Sample Depth		0 - 0.5		0 - 0.5		1.5 - 2		3.5 - 4		5.5 - 6		7.5 - 8		7.5 - 8	
	Sample Type		N1		N1		N1		N1		N1		N1		N1	
	Field Sample		C152-0.5		C152-0.5		C152-2		C152-4		C152-6		C152-8		C152-8	
	Lab Sample		IOD1956-18		IOD1956-18		IOD1956-19		IOD1956-20		IOD1956-21		IOD1956-22		IOD1956-22	
	PVC / Run		PR / 1		PR / 2		PR / 1		PR / 1		PR / 1		PR / 1		PR / 2	
	Status		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*		*Validated*	
Analyte	Method	Unit	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA	Result (ND < MDL)	QA
aldrin	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
alpha-BHC	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
beta-BHC	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
delta-BHC	SW8081A	mg/kg	<0.010		-		<0.010		<0.010		<0.020		**0.0024 J**		-	
gamma-BHC	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
chlordane	SW8081A	mg/kg	<0.050		-		<0.050		<0.050		<0.10		<0.10		-	
2,4'-DDD	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		**0.0043 C-1b, J**	**J**	**0.0022 J**		-	
2,4'-DDE	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		**0.0086 J**		-	
2,4'-DDT	SW8081A	mg/kg	**0.0040 C-2d, J**	**J**	-		**0.0023 C-2d, J**	**J**	<0.0050		**0.0083 C-2g, J**	**J**	**0.015 C-2e**	**J**	-	
4,4'-DDD	SW8081A	mg/kg	**0.0096 C-1a**	**J**	-		**0.0061 C-1a**	**J**	<0.0050		**0.030 C-1c**	**J**	**0.016 C-1, R-1**	**J**	-	
4,4'-DDE	SW8081A	mg/kg	**0.0050**		-		**0.0037 J**		<0.0050		**0.012**		**0.021**		-	
4,4'-DDT	SW8081A	mg/kg	-		**0.063 C-2a**	**J**	**0.034 C-2d**	**J**	**0.0032 J**		**0.11 C-2a**	**J**	-		**0.14 C-2**	**J**
dieldrin	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
alpha-endosulfan	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
beta-endosulfan	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
endosulfan sulfate	SW8081A	mg/kg	<0.010		-		<0.010		<0.010		<0.020		<0.020		-	
endrin	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
endrin aldehyde	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
endrin ketone	SW8081A	mg/kg	<0.0050 C-2i	**UJ**	-		<0.0050 C-2i	**UJ**	<0.0050		<0.010 C-2h	**UJ**	<0.010 C-2j	**UJ**	-	
heptachlor	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
heptachlor epoxide	SW8081A	mg/kg	<0.0050		-		<0.0050		<0.0050		<0.010		<0.010		-	
methoxychlor	SW8081A	mg/kg	<0.0050 C-2f	**UJ**	-		<0.0050 C-2f	**UJ**	<0.0050		<0.010 C-2c	**UJ**	<0.010 C-2b	**UJ**	-	
toxaphene	SW8081A	mg/kg	<0.20		-		<0.20		<0.20		<0.40		<0.40		-	