M60050.000174
MCAS EL TORO
SSIC #5090.3

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

TECHNICAL MEMORANDUM ENGINEERING COST ESTIMATE FOR SVE SYSTEM INSTALLATION SITE 24 MCAS EL TORO, CALIFORNIA

CTO-0162/0071
September 1998

Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

Signature: G. Patrick Brooks
G. Patrick Brooks, R.G., CTO Leader

Date: 9/22/98

TECHNICAL MEMORANDUM

This Technical Memorandum presents the cost estimate prepared to accompany the Draft Engineering Design Report (BNI 11 August 1998) for installation of a soil vapor extraction (SVE) system at Site 24, Marine Corps Air Station El Toro, Orange County, California. This Technical Memorandum was prepared in accordance with Contract Task Order-0162 issued under the Comprehensive Long-Term Environmental Action Navy (CLEAN) II Program, contract No. N68711-92-D-4670. The engineering cost estimate is summarized in Attachment A, Table 1 and details are presented in Table 2.

Major Assumptions and Basis of the Attached Capital Cost Estimate

- The cost estimate identifies the requirement for fund allocation necessary for the installation of the SVE system as described in the Draft Engineering Design Report (BNI 1998).
- Pricing is at the July 1998 level. It is based on published data such as Means Construction Cost Data, in-house cost file, recent similar projects, and budgetary phone quotes.
- Direct field costs reflect the engineering quantities and scope.
- Professional labor for project oversight is based on the assumed 12-month construction schedule.
- Remedial design of the SVE system is excluded.
- Indirect costs, which include temporary construction facilities, contractor's indirect costs, overhead, and profit were estimated at 45 percent of Total Direct Cost.
- Escalation is included at 2.5 percent as a separate line to allow for inflation from July 1998 to midpoint of construction, assumed to be April 1999.
- Contingency is assessed at 20 percent.
- Operation and maintenance of the SVE system is excluded from this estimate.

The Direct Portion of the Capital Cost Estimate is Divided Into the Following Sections

- Site preparation and setup.
- Installation of additional SVE wells: 26 shallow wells at 40 feet, 93 intermediate wells at 70 feet, and 93 deep wells at 100 feet; and sampling at all 233 wells including the existing 21 wells.
- Abandon all SVE wells (233 each) after completion of remedial action.
- Mechanical equipment including submersible condensate pumps for the permanent design, and portable SVE and treatment equipment for use during the SVE well field installation (6-month rental of pilot test equipment).
- Electrical power and control wiring for condensate pumps.

- To convey extracted SVE to the central treatment compound, installation of piping network included 1,890 linear feet (lf) of belowground trenched pipe, 4- to 8-inch-diameter; 7,315 lf of aboveground pipe at grade, 4- to 16-inch-diameter; 1,400 lf of aboveground overhead pipe, 8- to 12-inch-diameter in Buildings 296 and 297; 4,800 lf of aboveground 1-inch-diameter condensate pipe; 200 lf of 16-inch-diameter main header in existing steam trench; and miscellaneous piping and utility tie-ins.
- Miscellaneous concrete work includes 7 sump boxes, 58 aircraft-rated wellhead boxes/enclosures, and 49 highway-rated wellhead boxes/enclosures.
- Installation of 9,000 lf of guided boring piping, using FlowMole Drilling Services by UTILEX Corporation.
- Excavation, trenching, loading, and hauling soil to stockpile, backfilling and compacting.
- Off-site disposal of surplus soil, personal protective equipment, and decon rinsate.
- Site cleanup and site restoration.
- Soil gas sampling and analysis during installation of the new SVE wells.
- Professional labor for project oversight during construction.

Major Exclusions and Qualifications

- Treatment equipment in the treatment system compound will be procured and installed by others, and is excluded from this estimate.
- Mobilization and demobilization of personnel and equipment is assumed to be covered in subcontractor's unit pricing.
- The total estimated cost of approximately $10.9 million can potentially be reduced by approximately $1.4 million if the SVE piping is placed aboveground instead of being installed using directional drilling and in the overhead of Buildings 296 and 297. The majority of the savings results from completing the SVE wells abovegrade instead of belowgrade. Belowground well boxes rated for use by aircraft or motor vehicles are very expensive.

TABLE 1

Cost Estimate for Remedial Action at MCAS El Toro
Soil Vapor Extraction (CTO-162)
(For Final Review)

Description	COST
DIRECT COSTS:	
Site Preparation & Set-up (Allowance)	$60,000
Install Extraction Wells (212 ea)	$1,625,000
Abandon Extraction Wells (233 ea)	$230,000
Mechanical Equipment (7 pumps) and SVE Pilot Test Eq. (6mos.rental)	$59,000
Treatment Equipment (by others) **Excluded**	$0
Electrical (Power & Controls)	$150,000
Piping (incl. trenched, at grade & overhead ~15,600 lf, plus tie-ins,etc.)	$696,000
Guided Boring Piping (~9,000 lf)	$286,000
Concrete Work (Sumps (7), Well Head Encl.(58) & Boxes (49),etc.)	$1,153,000
Excavate, Load & Haul, Backfill from Off- Site, Disposal, Clean-up, etc.	$259,000
Sampling and Analysis	$64,000
Professional Labor (Project Oversight)	$1,536,000
Remedial Design **Excluded**	$0
Total Direct Cost	**$6,118,000**
INDIRECT COSTS:	
Contractor's Indirect, Overhead, Profit	$2,753,100
Total Indirect Cost	**$2,753,100**
OTHER COSTS:	
Escalation (July, 1998 to mid point of construction)	$221,800
Contingency (~20%)	$1,818,600
Total Other Costs	**$2,040,400**
CAPITAL COST (as of JULY, 1998) ~12 mo.constr.	**$10,911,500**
O & M COSTS (Expressed in Present Worth Dollars) :	
Excluded from this estimate for 2 years	$0
Total O & M Costs (as of JULY, 1998) Excluded	**$0**
TOTAL PRESENT VALUE (as of JULY,1998)	**$10,911,500**

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JON	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
1.	Mob. Personnel/Equip. Included w/individual S/C's	1	LT	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	S/T Mob.								$ -	$ -	$ -	$ -	$ -
2.	Site Prep. and Set-up, Allowance Includes Temporary Barricades	1	LS	$ 18,000.00	$ 6,000.00	$ 6,000.00	$ 30,000.00	$ 60,000.00	$ 18,000	$ 6,000	$ 6,000	$ 30,000	$ 60,000
	S/T Site Prep/Setup								$ 18,000	$ 6,000	$ 6,000	$ 30,000	$ 60,000
3.	Install Extraction Wells	232	EA	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ -	$ -	$ -	$ 1,160,000	$ 1,160,000
	Shallow Wells 26ea @ 40ft	1,040	LF	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Intermediate Wells 93ea @ 70ft	6,510	LF	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Deep Wells 93ea @ 100ft	9,300	LF	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Move and Set-up Between Holes	232	EA	$ -	$ -	$ -	$ 100.00	$ 100.00	$ -	$ -	$ -	$ 23,200	$ 23,200
	Drill w/HAS 8"OD 6 wells to 40ft	240	LF	$ -	$ -	$ -	$ 12.00	$ 12.00	$ -	$ -	$ -	$ 2,880	$ 2,880
	Continuous Sampling, 0-50ft	240	LF	$ -	$ -	$ -	$ 14.00	$ 14.00	$ -	$ -	$ -	$ 3,360	$ 3,360
	Drill w/HAS 8"OD 5 wells to 40ft	200	LF	$ -	$ -	$ -	$ 12.00	$ 12.00	$ -	$ -	$ -	$ 2,400	$ 2,400
	SPT/Split-spoon ring-lined @ 5ft	40	EA	$ -	$ -	$ -	$ 8.00	$ 8.00	$ -	$ -	$ -	$ 320	$ 320
	Drill w/HAS 10"OD 15wells to 100ft	1,500	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 16,500	$ 16,500
	Continuous Sampling, 51-100ft	1,500	LF	$ -	$ -	$ -	$ 16.00	$ 16.00	$ -	$ -	$ -	$ 24,000	$ 24,000
	Drill w/HAS 10"OD 35wells to 100ft	3,500	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 38,500	$ 38,500
	SPT/Split-spoon ring-lined @ 5ft	700	EA	$ -	$ -	$ -	$ 8.00	$ 8.00	$ -	$ -	$ -	$ 5,600	$ 5,600
	Drill w/HAS 12"OD 16wells to 70ft	1,120	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 12,320	$ 12,320
	Drill w/HAS 12"OD 20wells to 100ft	2,000	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 22,000	$ 22,000
	Continuous Sampling, 51-100ft	3,120	LF	$ -	$ -	$ -	$ 16.00	$ 16.00	$ -	$ -	$ -	$ 49,920	$ 49,920
	Drill w/HAS 12"OD 36wells to 70ft	2,520	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 27,720	$ 27,720
	Drill w/HAS 12"OD 23wells to 100ft	2,300	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 25,300	$ 25,300
	SPT/Split-spoon ring-lined @ 5ft	964	EA	$ -	$ -	$ -	$ 8.00	$ 8.00	$ -	$ -	$ -	$ 7,712	$ 7,712
	Stand-by Rig and Crew	30	HR	$ -	$ -	$ -	$ 110.00	$ 110.00	$ -	$ -	$ -	$ 3,300	$ 3,300
	Concrete Cutting, 12"tk, @6ft/hole	1,392	LF	$ -	$ -	$ -	$ 20.00	$ 20.00	$ -	$ -	$ -	$ 27,840	$ 27,840

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Mat'l	Total Cost S/C's	Total Direct
	PVC Riser Casing, 2-in ID Sch.40	5,730	LF	$ -	$ -	$ -	$ 5.00	$ 5.00	$ -	$ -	$ -	$ 28,650	$ 28,650
	PVC Riser Casing, 3-in ID Sch.40	4,320	LF	$ -	$ -	$ -	$ 7.00	$ 7.00	$ -	$ -	$ -	$ 30,240	$ 30,240
	PVC Riser Casing, 4-in ID Sch.40	170	LF	$ -	$ -	$ -	$ 8.00	$ 8.00	$ -	$ -	$ -	$ 1,360	$ 1,360
	PVC Riser Casing, 2-in ID Sch.80	270	LF	$ -	$ -	$ -	$ 7.00	$ 7.00	$ -	$ -	$ -	$ 1,890	$ 1,890
	PVC Screen, 2-in ID Sch.40 & 80	3,870	LF	$ -	$ -	$ -	$ 6.00	$ 6.00	$ -	$ -	$ -	$ 23,220	$ 23,220
	PVC Screen, 3-in ID Sch.40	2,340	LF	$ -	$ -	$ -	$ 9.00	$ 9.00	$ -	$ -	$ -	$ 21,060	$ 21,060
	PVC Screen, 4-in ID Sch.40	150	LF	$ -	$ -	$ -	$ 10.00	$ 10.00	$ -	$ -	$ -	$ 1,500	$ 1,500
	Decon.Personnel &Equip.@2hrs	464	HRS	$ -	$ -	$ -	$ 100.00	$ 100.00	$ -	$ -	$ -	$ 46,400	$ 46,400
	Construction of Temp.Decon.Pads	3	EA	$ -	$ -	$ -	$ 450.00	$ 450.00	$ -	$ -	$ -	$ 1,350	$ 1,350
	On-Site Waste Handling of IDW	25	HRS	$ -	$ -	$ -	$ 100.00	$ 100.00	$ -	$ -	$ -	$ 2,500	$ 2,500
	Pallets	20	EA	$ -	$ -	$ -	$ 20.00	$ 20.00	$ -	$ -	$ -	$ 400	$ 400
	Drums	50	EA	$ -	$ -	$ -	$ 30.00	$ 30.00	$ -	$ -	$ -	$ 1,500	$ 1,500
	Per-Diem	80	EA	$ -	$ -	$ -	$ 151.00	$ 151.00	$ -	$ -	$ -	$ 12,080	$ 12,080
	S/T Extraction Wells	**212**	EA						$ -	$ -	$ -	$ 1,625,022	$ 1,625,022
4.	Abandon Extraction Wells												
	Shallow Wells 26ea @ 40ft	1,040	LF	$ -	$ -	$ -	$ 9.00	$ 9.00	$ -	$ -	$ -	$ 9,360	$ 9,360
	Intermediate Wells 100ea @ 70ft	7,000	LF	$ -	$ -	$ -	$ 11.00	$ 11.00	$ -	$ -	$ -	$ 77,000	$ 77,000
	Deep Wells 107ea @ 100ft	10,700	LF	$ -	$ -	$ -	$ 13.00	$ 13.00	$ -	$ -	$ -	$ 139,100	$ 139,100
	Additional Misc., Allow.	1	LT	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ -	$ -	$ -	$ 5,000	$ 5,000
	S/T Abandon Extrtaction Wells	**233**	EA						$ -	$ -	$ -	$ 230,460	$ 230,460
5.	Treatment Equipment												
	Treatment Compound Procurred & Installed by Others	**Excl.**											
	Submersable Pumps:												
	Hanger Bldg.#296 (P-500,-501,-502 in Condensate Sump "G", "F", "E")	3	EA	$ -	$ -	$ -	$ 3,000.00	$ 3,000.00	$ -	$ -	$ -	$ 9,000	$ 9,000
	Hanger Bldg.#297 (P-503,-504,-505 in Condensate Sump "C", "B", "A")	3	EA	$ -	$ -	$ -	$ 3,000.00	$ 3,000.00	$ -	$ -	$ -	$ 9,000	$ 9,000
	Bldg.#671T1												

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	(P-506 in Condensate Pump "I")	1	EA	$ -	$ -	$ -	$ 3,000.00	$ 3,000.00	$ -	$ -	$ -	$ 3,000	$ 3,000
	SVE Pilot Test Equip. Rental: (Based on current pilot testing by Onion Enterprises)												
	SVE Unit, Rental	6	MO	$ -	$ -	$ -	$ 1,200.00	$ 1,200.00	$ -	$ -	$ -	$ 7,200	$ 7,200
	Maintenance	6	MO	$ -	$ -	$ -	$ 100.00	$ 100.00	$ -	$ -	$ -	$ 600	$ 600
	Carbon	6	MO	$ -	$ -	$ -	$ 1,650.00	$ 1,650.00	$ -	$ -	$ -	$ 9,900	$ 9,900
	Trailer 1	6	MO	$ -	$ -	$ -	$ 400.00	$ 400.00	$ -	$ -	$ -	$ 2,400	$ 2,400
	Trailer 2	6	MO	$ -	$ -	$ -	$ 300.00	$ 300.00	$ -	$ -	$ -	$ 1,800	$ 1,800
	Misc.	6	MO	$ -	$ -	$ -	$ 250.00	$ 250.00	$ -	$ -	$ -	$ 1,500	$ 1,500
	Trailer Generator,15Hp, Rental	6	MO	$ -	$ -	$ -	$ 2,500.00	$ 2,500.00	$ -	$ -	$ -	$ 15,000	$ 15,000
	S/T Treatment Equipment	1	LT						$ -	$ -	$ -	$ 59,400	$ 59,400
6.	Electrical (Power & Control)												
	Preliminary Allowance (Drawing 162-E01,-E02,-E03,-E04)	1	LT	$ -	$ -	$ -	$150,000	$ 150,000.00	$ -	$ -	$ -	$ 150,000	$ 150,000
	S/T Electrical	1	LT						$ -	$ -	$ -	$ 150,000	$ 150,000
7.	Misc.Piping incl.Utility Tie-ins												
	Flow Control Valves at Wellhead (4" PVC Ball Valves)	233	EA	$ -	$ -	$ 280.00	$ -	$ 280.00	$ -	$ -	$ 65,240	$ -	$ 65,240
	Piping Tie-ins at Sump Pumps	7	EA	$ -	$ -	$ -	$ 4,500.00	$ 4,500.00	$ -	$ -	$ -	$ 31,500	$ 31,500
	Additional Allowance	1	LT	$ -	$ -	$ -	$100,000	$ 100,000.00	$ -	$ -	$ -	$ 100,000	$ 100,000
	S/T Misc.Piping	1	LT						$ -	$ -	$ 65,240	$ 131,500	$ 196,740
8.	Misc. Concrete Work												
	Concrete Sump Boxes (Drawing 162-C03 & -M02) Poured-in-place, Detail 1/C-01	7	EA	$ -	$ -	$ -	$ 15,000.00	$ 15,000.00	$ -	$ -	$ -	$ 105,000	$ 105,000

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	Concrete Well Head Boxes												
	Rated for Aircraft Loading of 35.8k												
	(Drawing 162-C03 & -M02)												
	Poured-in-place, Detail 2/C-01												
	Single Depth Casing Enclosure	33	EA	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	5'-8"(L) x 4'-8"(W) x 4'-0"(D)												
	Saw Cut Concrete (up to 12"thk.)	792	LF	$ -	$ -	$ -	$ 60.00	$ 60.00	$ -	$ -	$ -	$ 47,520	$ 47,520
	Earthwork	231	CY	$ 10.50	$ 15.00	$ -	$ 6.00	$ 31.50	$ 2,426	$ 3,465	$ -	$ 1,386	$ 7,277
	Concrete @ ~ 1.70cy/ea	56	CY	$ -	$ -	$ -	$ 375.00	$ 375.00	$ -	$ -	$ -	$ 21,000	$ 21,000
	Embeds @ ~ 600#/ea	19,800	LBS	$ 1.00	$ 0.50	$ 1.50	$ -	$ 3.00	$ 19,800	$ 9,900	$ 29,700	$ -	$ 59,400
	Str.Steel @ ~ 1800#/ea	59,400	LBS	$ 0.50	$ 0.75	$ 1.75	$ -	$ 3.00	$ 29,700	$ 44,550	$ 103,950	$ -	$ 178,200
	Misc.Str.Steel @ ~ 300#/ea	9,900	LBS	$ 1.00	$ 0.75	$ 2.25	$ -	$ 4.00	$ 9,900	$ 7,425	$ 22,275	$ -	$ 39,600
	Dual Depth Casing Enclosure	21	EA	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	6'-1"(L) x 5'-10"(W) x 4'-0"(D)												
	Saw Cut Concrete (up to 12"thk.)	588	LF	$ -	$ -	$ -	$ 60.00	$ 60.00	$ -	$ -	$ -	$ 35,280	$ 35,280
	Earthwork	210	CY	$ 10.50	$ 15.00	$ -	$ 6.00	$ 31.50	$ 2,205	$ 3,150	$ -	$ 1,260	$ 6,615
	Concrete @ ~ 2.20cy/ea	46	CY	$ -	$ -	$ -	$ 375.00	$ 375.00	$ -	$ -	$ -	$ 17,250	$ 17,250
	Embeds @ ~ 700#/ea	14,700	LBS	$ 1.00	$ 0.50	$ 1.50	$ -	$ 3.00	$ 14,700	$ 7,350	$ 22,050	$ -	$ 44,100
	Str.Steel @ ~ 2400#/ea	50,400	LBS	$ 0.50	$ 0.75	$ 1.75	$ -	$ 3.00	$ 25,200	$ 37,800	$ 88,200	$ -	$ 151,200
	Misc.Str.Steel @ ~ 300#/ea	6,300	LBS	$ 1.00	$ 0.75	$ 2.25	$ -	$ 4.00	$ 6,300	$ 4,725	$ 14,175	$ -	$ 25,200
	Triple Depth Casing Enclosure	4	EA	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	6"-6"(L) x 6'-8"(W) x 4'-0"(D)												
	Saw Cut Concrete (up to 12"thk.)	120	LF	$ -	$ -	$ -	$ 60.00	$ 60.00	$ -	$ -	$ -	$ 7,200	$ 7,200
	Earthwork	48	CY	$ 10.50	$ 15.00	$ -	$ 6.00	$ 31.50	$ 504	$ 720	$ -	$ 288	$ 1,512
	Concrete @ ~ 2.50cy/ea	10	CY	$ -	$ -	$ -	$ 375.00	$ 375.00	$ -	$ -	$ -	$ 3,750	$ 3,750
	Embeds @ ~ 800#/ea	3,200	LBS	$ 1.00	$ 0.50	$ 1.50	$ -	$ 3.00	$ 3,200	$ 1,600	$ 4,800	$ -	$ 9,600
	Str.Steel @ ~ 2900#/ea	11,600	LBS	$ 0.50	$ 0.75	$ 1.75	$ -	$ 3.00	$ 5,800	$ 8,700	$ 20,300	$ -	$ 34,800
	Misc.Str.Steel @ ~ 300#/ea	1,200	LBS	$ 1.00	$ 0.75	$ 2.25	$ -	$ 4.00	$ 1,200	$ 900	$ 2,700	$ -	$ 4,800
		58	**EA**										
	Concrete Well Head Boxes												
	Rated for Highway Loading H-20												
	(Drawing 162-C03 & -M02)												
	Precast Vaults/Pull Boxes												
	Associated Concrete Products												

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	Single Depth Casing Enclosure 3'x5'x4'(D) Vault(Quikset No.4500) w/TL Hinged Cover	31	EA	$ 600.00	$ 800.00	$ 1,800.00	$ 1,200.00	$ 4,400.00	$ 18,600	$ 24,800	$ 55,800	$ 37,200	$ 136,400
	Dual Depth Casing Enclosure 4'x5'x4'(D) Vault(Quikset No.4500) w/TL Hinged Cover	15	EA	$ 800.00	$ 1,000.00	$ 2,300.00	$ 1,320.00	$ 5,420.00	$ 12,000	$ 15,000	$ 34,500	$ 19,800	$ 81,300
	Triple Depth Casing Enclosure 5'x5'x4'(D) Vault(Quikset No.4XXX) w/TL Hinged Cover	3	EA	$ 1,000.00	$ 1,500.00	$ 3,000.00	$ 1,440.00	$ 6,940.00	$ 3,000	$ 4,500	$ 9,000	$ 4,320	$ 20,820
		49	**EA**										
	Above Surface Well Head Compl.												
	for Single Depth Casing	37	EA	$ -	$ -	$ -	$ 1,000.00	$ 1,000.00	$ -	$ -	$ -	$ 37,000	$ 37,000
	for Dual Depth Casing	15	EA	$ -	$ -	$ -	$ 1,500.00	$ 1,500.00	$ -	$ -	$ -	$ 22,500	$ 22,500
	for Triple Depth Casing	3	EA	$ -	$ -	$ -	$ 2,000.00	$ 2,000.00	$ -	$ -	$ -	$ 6,000	$ 6,000
		55	**EA**										
	Additional Allowance	1	LT	$ -	$ -	$ -	$50,000	$ 50,000.00	$ -	$ -	$ -	$ 50,000	$ 50,000
	S/T Misc.Concrete Work	**1**	**LT**						$ 154,535	$ 174,585	$ 407,450	$ 416,754	$ 1,153,324
9.	Installation of Piping Network to convey extracted soil vapor to Central Treatment Area												
	Mob/Demob Equip	2	EA				$ 15,000.00	$ 15,000.00	$ -	$ -	$ -	$ 30,000	$ 30,000
	Below Ground Pipe (trenched):												
	PH.I (30%); 4"Dia.Sch.40 PVC	1,100	LF	$ 17.26	$ -	$ 6.05	$ -	$ 23.31	$ 18,981	$ -	$ 6,655	$ -	$ 25,636
	PH. II (70%); 4"Dia.Sch.40 PVC	300	LF	$ 17.26	$ -	$ 6.05	$ -	$ 23.31	$ 5,177	$ -	$ 1,815	$ -	$ 6,992
	6"Dia.SDR 11, HDPE	100	LF	$ 29.94	$ -	$ 10.60	$ -	$ 40.54	$ 2,994	$ -	$ 1,060	$ -	$ 4,054
	8"Dia.SDR 11, HDPE	390	LF	$ 36.54	$ -	$ 16.15	$ -	$ 52.69	$ 14,251	$ -	$ 6,299	$ -	$ 20,549
	10"Dia.Sch.40 PVC	-	LF	$ 43.14	$ -	$ 22.20	$ -	$ 65.34	$ -	$ -	$ -	$ -	$ -
	12"Dia.Sch.40 PVC	-	LF	$ 49.74	$ -	$ 29.25	$ -	$ 78.99	$ -	$ -	$ -	$ -	$ -
	14"Dia.Sch.40 PVC	-	LF	$ 63.95	$ -	$ 37.50	$ -	$ 101.45	$ -	$ -	$ -	$ -	$ -

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	Above Ground Pipe(at grade):												
	2"Dia.Sch.80 PVC	-	LF	$ 7.35	$ -	$ 3.20	$ -	$ 10.55	$ -	$ -	$ -	$ -	$ -
	PH.I (30%); 4"Dia.Sch.40 PVC	2,465	LF	$ 11.90	$ -	$ 6.05	$ -	$ 17.95	$ 29,334	$ -	$ 14,913	$ -	$ 44,247
	PH. II (70%); 4"Dia.Sch.40 PVC	1,250	LF	$ 11.90	$ -	$ 6.05	$ -	$ 17.95	$ 14,875	$ -	$ 7,563	$ -	$ 22,438
	6"Dia.Sch.40 PVC	1,475	LF	$ 20.65	$ -	$ 10.60	$ -	$ 31.25	$ 30,459	$ -	$ 15,635	$ -	$ 46,094
	8"Dia.Sch.40 PVC	571	LF	$ 25.20	$ -	$ 16.15	$ -	$ 41.35	$ 14,389	$ -	$ 9,222	$ -	$ 23,611
	10"Dia.Sch.40 PVC	321	LF	$ 29.75	$ -	$ 22.20	$ -	$ 51.95	$ 9,550	$ -	$ 7,126	$ -	$ 16,676
	12"Dia.Sch.40 PVC	746	LF	$ 34.30	$ -	$ 29.25	$ -	$ 63.55	$ 25,588	$ -	$ 21,821	$ -	$ 47,408
	14"Dia.Sch.40 PVC	-	LF	$ 44.10	$ -	$ 37.50	$ -	$ 81.60	$ -	$ -	$ -	$ -	$ -
	Main Header 16"Dia.Sch.40 PVC	487	LF	$ 35.00	$ -	$ 50.30	$ -	$ 85.30	$ 17,045	$ -	$ 24,496	$ -	$ 41,541
	Above Ground Pipe(overhead):												
	2"Dia.Sch.80 PVC	-	LF	$ 9.19	$ -	$ 4.00	$ -	$ 13.19	$ -	$ -	$ -	$ -	$ -
	PH.I (30%); 4"Dia.Sch.40 PVC	-	LF	$ 14.88	$ -	$ 7.56	$ -	$ 22.44	$ -	$ -	$ -	$ -	$ -
	PH. II (70%); 4"Dia.Sch.40 PVC	-	LF	$ 14.88	$ -	$ 7.56	$ -	$ 22.44	$ -	$ -	$ -	$ -	$ -
	6"Dia.Sch.40 PVC	-	LF	$ 25.81	$ -	$ 13.25	$ -	$ 39.06	$ -	$ -	$ -	$ -	$ -
	8"Dia.Sch.40 PVC	400	LF	$ 31.50	$ -	$ 20.19	$ -	$ 51.69	$ 12,600	$ -	$ 8,075	$ -	$ 20,675
	10"Dia.Sch.40 PVC	400	LF	$ 37.19	$ -	$ 27.75	$ -	$ 64.94	$ 14,875	$ -	$ 11,100	$ -	$ 25,975
	12"Dia.Sch.40 PVC	600	LF	$ 42.88	$ -	$ 36.56	$ -	$ 79.44	$ 25,725	$ -	$ 21,938	$ -	$ 47,663
	A/G Condensate Pipe:												
	(Hanger Walls & Ceilings)												
	1"Dia.Sch.80 PVC	4,800	LF	$ 8.09	$ -	$ 3.52	$ -	$ 11.61	$ 38,808	$ -	$ 16,896	$ -	$ 55,704
	U/G Header:												
	(in exist'g steam trench)												
	Main Header 16"Dia.Sch.40 PVC	200	LF	$ 50.75	$ -	$ 50.30	$ -	$ 101.05	$ 10,150	$ -	$ 10,060	$ -	$ 20,210
	S/T	**15,605**	**LF**						$ 284,799	$ -	$ 184,672	$ 30,000	$ 499,471
10.	Guided Boring Piping												
	FlowMole Drilling Services by												
	UTILX Corporation												
	Mob/Demob Equip	2	EA				$ 15,000.00	$ 15,000.00	$ -	$ -	$ -	$ 30,000	$ 30,000
	Directionally drill & install:												
	Ph.I (30%); 4"Dia.SDR 11, HDPE	3,425	LF	$ -	$ -	$ 4.50	$ 23.50	$ 28.00	$ -	$ -	$ 15,413	$ 80,488	$ 95,900
	Ph.II (70%); 4"Dia.SDR 11, HDPE	4,980	LF	$ -	$ -	$ 4.50	$ 23.50	$ 28.00	$ -	$ -	$ 22,410	$ 117,030	$ 139,440
	6"Dia.SDR 11, HDPE	579	LF	$ -	$ -	$ 6.50	$ 28.50	$ 35.00	$ -	$ -	$ 3,764	$ 16,502	$ 20,265
	8"Dia.SDR 11, HDPE	-	LF	$ -	$ -	$ 7.50	$ 32.50	$ 40.00	$ -	$ -	$ -	$ -	$ -
	10"Dia.SDR 11, HDPE	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	12"Dia.SDR 11, HDPE	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JON	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	14"Dia.SDR 11, HDPE	-	LF	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	S/T Guided Boring Piping	**8,984**	**LF**						$ -	$ -	$ 41,586	$ 244,019	$ 285,605
11.	Demolition												
	Remove/Load	950	CY	$ 8.00	$ 10.00	$ -	$ -	$ 18.00	$ 7,600	$ 9,500	$ -	$ -	$ 17,100
	S/T Demolition	**1**	**LT**						$ 7,600	$ 9,500	$ -	$ -	$ 17,100
12.	Excavation												
	Excavate Soil	**9,500**	CY	$ 2.00	$ 2.50	$ 0.50	$ -	$ 5.00	$ 19,000	$ 23,750	$ 4,750	$ -	$ 47,500
	S/T Excavation	**9,500**	**CY**						$ 19,000	$ 23,750	$ 4,750	$ -	$ 47,500
13.	Load and Haul to Stkpl-Soil												
	Load & haul to On-site Skpl	11,875	CY	$ -	$ -	$ -	$ 4.75	$ 4.75	$ -	$ -	$ -	$ 56,406	$ 56,406
	S/T Stockpile	**11,875**	**CY**						$ -	$ -	$ -	$ 56,406	$ 56,406
14	Backfill and Compact												
	Backfill	**4,375**	CY	$ 1.00	$ 3.00	$ -	$ -	$ 4.00	$ 4,375	$ 13,125	$ -	$ -	$ 17,500
	Import Fill/Sand - Purchase	1,400	CY			$ 7.15		$ 7.15	$ -	$ -	$ 10,010	$ -	$ 10,010
	Transp Import from Stkpl	2,975	CY	$ -	$ -	$ -	$ 3.50	$ 3.50	$ -	$ -	$ -	$ 10,413	$ 10,413
	Compaction Testing	1	LT	$ -	$ -	$ -	$ 1,800.00	$ 1,800.00	$ -	$ -	$ -	$ 1,800	$ 1,800
	S/T Backfill	**1**	**LT**						$ 4,375	$ 13,125	$ 10,010	$ 12,213	$ 39,723
15	Offsite Disposal												
	Equip Decon Rinsate	2,000	GAL	$ -	$ -	$ -	$ 0.50	$ 0.50	$ -	$ -	$ -	$ 1,000	$ 1,000
	Tank Rental - Liquid	12	MO	$ -	$ -	$ -	$ 600.00	$ 600.00	$ -	$ -	$ -	$ 7,200	$ 7,200
	Tank Drop charge	6	EA	$ -	$ -	$ -	$ 250.00	$ 250.00	$ -	$ -	$ -	$ 1,500	$ 1,500
	Haz Soil-Offsite Disposal	-	TNS	$ -	$ -	$ -	$ 125.00	$ 125.00	$ -	$ -	$ -	$ -	$ -
	Transport to Haz Disposal	-	LDS	$ -	$ -	$ -	$ 650.00	$ 650.00	$ -	$ -	$ -	$ -	$ -
	Class II Waste Disposal	**600**	TNS	$ -	$ -	$ -	$ 75.00	$ 75.00	$ -	$ -	$ -	$ 45,000	$ 45,000
	Class II Transport Waste	26	LDS	$ -	$ -	$ -	$ 300.00	$ 300.00	$ -	$ -	$ -	$ 7,826	$ 7,826
	PPE Disposal	20	Dru	$ -	$ -	$ -	$ 250.00	$ 250.00	$ -	$ -	$ -	$ 5,000	$ 5,000

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	Waste Profile - Soil	10	EA	$ -	$ -	$ -	$ 1,500.00	$ 1,500.00	$ -	$ -	$ -	$ 15,000	$ 15,000
	Trmt/Disp-Extracted Water, Excl.	-	Gal	$ 0.02	$ 0.15	$ 0.25	$ -	$ 0.42	$ -	$ -	$ -	$ -	$ -
	S/T Offsite Disposal	1	LT						$ -	$ -	$ -	$ 82,526	$ 82,526
16	**Site Cleanup (Allowance)**	1	LT	$ 5,000.00	$ 2,000.00	$ 500.00	$ -	$ 7,500.00	$ 5,000	$ 2,000	$ 500	$ -	$ 7,500
	S/T Site Cleanup	1	LT						$ 5,000	$ 2,000	$ 500	$ -	$ 7,500
17	**Demob** Included w/individual S/C's	1	LT	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	S/T Demobilization	1	LT						$ -	$ -	$ -	$ -	$ -
18	**Sampling**												
	Pull Samples	300	EA	$ 60.00	$ -	$ 10.00	$ -	$ 70.00	$ 18,000	$ -	$ 3,000	$ -	$ 21,000
	Analysis:												
	Soil Gas Samples, EPA 8021	300	EA	$ -	$ -	$ -	$ 52.00	$ 52.00	$ -	$ -	$ -	$ 15,600	$ 15,600
	Soil Gas Samples, EPA TO-14	15	EA	$ -	$ -	$ -	$ 225.00	$ 225.00	$ -	$ -	$ -	$ 3,375	$ 3,375
	Water Samples, EPA CLP	20	EA	$ -	$ -	$ -	$ 204.00	$ 204.00	$ -	$ -	$ -	$ 4,080	$ 4,080
	Sample Supplies	315	EA	$ -	$ -	$ -	$ 25.00	$ 25.00	$ -	$ -	$ -	$ 7,875	$ 7,875
	Sample Decon	335	EA	$ -	$ -	$ 4.00	$ -	$ 4.00	$ -	$ -	$ 1,340	$ -	$ 1,340
	Data Validation (Allow.) (10 hrs per 20 analysis)	168	HRS	$ 30.00	$ -	$ -	$ -	$ 30.00	$ 5,025	$ -	$ -	$ -	$ 5,025
	Geotechnical Analysis (Allow.)	1	LT	$ -	$ -	$ -	$ 5,000.00	$ 5,000.00	$ -	$ -	$ -	$ 5,000	$ 5,000
	Summary Report (Allow.)	30	HRS	$ 30.00	$ -	$ -	$ -	$ 30.00	$ 900	$ -	$ -	$ -	$ 900
	S/T Sampling & Analysis	1	LT						$ 23,925	$ -	$ 4,340	$ 35,930	$ 64,195
19	**Site Restoration** Allowance	1	LT	$ -	$ -	$ -	$ 8,000.00	$ 8,000.00	$ -	$ -	$ -	$ 8,000	$ 8,000
	S/T Site Restoration	1	LT						$ -	$ -	$ -	$ 8,000	$ 8,000

Table 2
Remedial Action at MCAS
El Toro, CA.
Soil Vapor Extraction
Cost Estimate
(FOR FINAL REVIEW)

Task Item	Activity	Qty	JOM	Unit Cost Labor	Unit Cost Equip.	Unit Cost Mat'l	Unit Cost S/C	Total Unit Cost	Total Cost Labor	Total Cost Equip	Total Cost Matl	Total Cost S/C's	Total Direct
	Total Direct Costs								$517,233	$228,960	$ 724,548	$3,112,230	$ 4,582,971