APPENDIX C

INTERIM ACTION REMEDIAL ALTERNATIVE COST ESTIMATES

APPENDIX C

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TABLES

RANGES 43-48

COST ESTIMATES
(TABLES C1-C8)

Table C1. Vegetation Clearance Cost Estimate
Prescribed Burning Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Planning, Tech Support, Meteorological Profiling, Set-Up	483	acres	$535	$258,405
Install Primary Fuelbreak	483	acres	$310	$149,730
Conduct Prescribed Burn	483	acres	$1,250	$603,750
Community Relations	483	acres	$360	$173,880
Residential Relocation	483	acres	$180	$86,940
Air Sampling & Monitoring	483	acres	$450	$217,350
Security	4	weeks	$15,000	$60,000
Subtotal Capital Costs				$1,550,055
Capital Cost Contingency	10%	of Capital Costs		$155,006
Total Capital Costs				**$1,705,061**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring	1	lump sum	$50,000	$50,000
Total Annual Costs				**$50,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January 2002				$208,346
Annual Cost Contingency	10%	of annual costs		$5,000
Total 5 Year O&M NPV Cost				**$213,346**
TOTAL ALTERNATIVE COST, 5 YEARS				**$1,918,406**
TOTAL COST PER ACRE (483 ACRES)				**$3,972**

DEFINITIONS

ENR = Engineering News Record
NPV = Net Present Value
O&M = Operations & Maintenance

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

Table C2. Vegetation Clearance Cost Estimate
Mechanical Clearance Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Mechanical Cutting & Chipping (2 passes/double cut method)	483	acres	$1,150	$555,450
Site Restoration	483	acres	$500	$241,500
Security	32	weeks	$15,000	$480,000
Subtotal Capital Costs				$1,276,950
Capital Cost Contingency	10%	of Capital Costs		$127,695
Total Capital Costs				**$1,404,645**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$50,000	$50,000
Total Annual Costs				**$50,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$208,346
Annual Cost Contingency	10%	of annual costs		$5,000
Total 5 Year O&M NPV Cost				**$213,346**
TOTAL ALTERNATIVE COST, 5 YEARS				**$1,617,991**
TOTAL COST PER ACRE (483 ACRES)				**$3,350**

DEFINITIONS
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ASSUMPTIONS
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Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Mechanical Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C3. Vegetation Clearance Cost Estimate
Manual Clearance Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Manual Cutting	483	acres	$2,400	$1,159,200
Hauling & Chipping	483	acres	$650	$313,950
Site Restoration	483	acres	$500	$241,500
Security	40	weeks	$15,000	$600,000
Subtotal Capital Costs				$2,314,650
Capital Cost Contingency	10%	of Capital Costs		$231,465
Total Capital Costs				**$2,546,115**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$50,000	$50,000
Total Annual Costs				**$50,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$208,346
Annual Cost Contingency	10%	of annual costs		$5,000
Total 5 Year O&M NPV Cost				**$213,346**
TOTAL ALTERNATIVE COST, 5 YEARS				**$2,759,461**
TOTAL COST PER ACRE (483 ACRES)				**$5,713**

DEFINITIONS

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NPV = Net Present Value
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ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Manual Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C4. OE Remedial Action Cost Estimate
No Action w/ Existing Site Security Measures Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
ANNUAL O&M COSTS [1]				
Existing Fence & Sign Maintenance/Repair	1	lump sum	$5,000	$5,000
Site Security Patrols	1	lump sum	$50,000	$50,000
Total Annual Costs				**$55,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$229,181
Annual Cost Contingency	10%	of annual costs		$5,500
Total 5 Year O&M NPV Cost				**$234,681**
TOTAL ALTERNATIVE COST, 5 YEARS				**$234,681**
TOTAL COST PER ACRE (483 ACRES)				**$486**

DEFINITIONS

EPA = U.S. Environmental Protection Agency
ENR = Engineering News Record
NPV = Net Present Value
O&M = Operations & Maintenance

ASSUMPTIONS

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Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

Table C5. OE Remedial Action Cost Estimate
Enhanced Site Security Measures Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Survey Perimeter/Site Preparation/Mobe/Demobe	1	lump sum	$10,000	$10,000
Install 10-ft. Chain Link w/Concertina Wire (2 crews)	19,108	feet	$40	$764,320
OE Escorts (2)	60	days	$1,400	$84,000
Post Warning Signs Every 100 ft.	200	signs	$10	$2,000
Post Large Warning Signs at Access Gates	5	signs	$200	$1,000
Erosion Control	1	lump sum	$8,000	$8,000
Security	45	days	$3,000	$135,000
Subtotal Capital Costs				$1,004,320
Capital Cost Contingency	10%	of Capital Costs		$100,432
Total Capital Costs				**$1,104,752**
ANNUAL O&M COSTS				
Fence & Sign Maintenance/Repair	1	lump sum	$5,000	$5,000
Site Security Patrols	52	weeks	$15,000	$780,000
Total Annual Costs				**$785,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$3,271,031
Annual Cost Contingency	10%	of annual costs		$78,500
Total 5 Year O&M NPV Cost				**$3,349,531**
TOTAL ALTERNATIVE COST, 5 YEARS				**$4,454,283**
TOTAL COST PER ACRE (483 ACRES)				**$9,222**

DEFINITIONS

EPA = U.S. Environmental Protection Agency
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NPV = Net Present Value
OE = Ordnance & Explosives
O&M = Operations & Maintenance

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

Table C6. OE Remedial Action Cost Estimate
Subsurface OE Removal Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE (1 FT. OE REMOVAL)	TOTAL (1 FT. OE REMOVAL) [1]	UNIT PRICE (4 FT. OE REMOVAL)	TOTAL (4 FT. OE REMOVAL) [1]
OE Survey	483	acres	$260	$125,508	$260	$125,508
OE Escort	483	acres	$87	$42,087	$87	$42,087
Followup Veg Clearance	483	acres	$3,560	$1,719,577	$3,560	$1,719,577
OE Escort - Followup Veg Clearance	483	acres	$697	$336,700	$697	$336,700
Visual Surface Sweep for Safety	417	acres	$3,346	$1,395,316	$3,346	$1,395,316
Visual Surface Sweep for Safety - Targets	66	acres	$16,730	$1,104,206	$16,730	$1,104,206
Digital Survey of Anomalies	483	acres	$2,111	$1,019,372	$2,111	$1,019,372
Reacquire Anomalies	483	acres	$2,345	$1,132,635	$2,814	$1,359,162
Excavate & Remove OE	417	acres	$3,486	$1,453,454	$3,802	$1,585,586
Excavate & Remove OE - Targets	66	acres	$4,647	$306,724	$5,228	$345,065
Quality Control	48	acres	$704	$33,769	$704	$33,769
Site Restoration - Followup Veg Clearance	48	acres	$1,017	$48,826	$1,017	$48,825
Site Restoration - OE Removal	483	acres	$1,564	$755,559	$1,739	$839,979
OE Residue Removal	483	acres	$155	$75,000	$155	$75,000
Total Field Costs [2]				$9,548,732		$10,030,150
Reporting	1	lump sum	$116,781	$116,781	$116,781	$116,781
Cost Subtotal				$9,665,513		$10,146,931
Cost Contingency	10%	of Cost Subtotal		$966,551		$1,014,693.14
Total Capital Costs				**$10,632,064**		**$11,161,625**
RANGE OF TOTAL ALTERNATIVE COSTS				**$10,632,064**	**to**	**$11,161,625**
RANGE OF TOTAL COSTS PER ACRE (483 ACRES)				**$22,013**	**to**	**$23,109**

DEFINITIONS
EPA = U.S. Environmental Protection Agency
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ASSUMPTIONS
These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Subsurface OE removal costs are assumed to fall within the range of estimated 1 ft. to 4 ft. OE removal costs based on recent Fort Ord specific data provided by Parsons, Inc
[2] Costs based on recent Fort Ord specific data provided by Parsons, Inc.

Table C7. OE Detonation Cost Estimate
Detonation With Engineering Controls Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detonation & Consolidation [1]	483	acres	$1,836	$886,667
Engineering Controls [2]	483	acres	$183	$88,452
Total Field Costs				$975,119
Cost Subtotal				$975,119
Cost Contingency	10%	of Cost Subtotal		$97,512
Total Capital Costs				**$1,072,631**
TOTAL ALTERNATIVE COST				**$1,072,631**
TOTAL COST PER ACRE (483 ACRES)				**$2,221**

DEFINITIONS

OE = Ordnance & Explosives

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] 1900 man-hrs for detonation with engineering controls during recent Ranges 43-48 surface OE removal x $70/hr = $133,000 (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = $443,333. Assume same density of OE in subsurface (multiply by 2) = $886,667.

[2] 2457 OE items located in recent Ranges 43-48 surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 8,190 OE items. Assume same density of OE in subsurface (multiply by 2) = 16,380 items. Assume $4.5/item for explosives and $0.90/item for sandbags, wood, pools = $5.4/item total. 16,380 OE items x $5.4 = $88,452

Table C8. OE Detonation Cost Estimate
Detonation Chamber and Detonation w/ Engineering Controls Alternative
Ranges 43-48
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detonation & Consolidation (95% OE Items) [1]	483	acres	$1,744	$842,334
Engineering Controls (95% of OE Items) [2]	483	acres	$183	$88,452
Detonation Chamber (5% of OE Items) [3]	483	acres	$219	$106,000
Total Field Costs [4]				$1,036,786
Cost Subtotal				$1,036,786
Cost Contingency	10%	of Cost Subtotal		$103,679
Total Capital Costs				**$1,140,465**
TOTAL ALTERNATIVE COST				**$1,140,465**
TOTAL COST PER ACRE (483 ACRES)				**$2,361**

DEFINITIONS

OE = Ordnance & Explosives

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.

Many design variables and necessary prefield activities have not been established.

Cost estimates will be refined after the field preparation/design is completed.

[1] 1900 man-hrs for detonation with engineering controls during recent Ranges 43-48 surface OE removal x $70/hr = $133,000 (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = $443,333. Assume same density of OE in subsurface (multiply by 2) = $886,667. Assume 95% of items detonated w/engr controls /5 % detonated in chamber. $886,667 x 0.95 = $842,334

[2] 2457 OE items located in recent Ranges 43-48 surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 8,190 OE items. Assume same density of OE in subsurface (multiply by 2) = 16,380 items. Assume $4.5/item for explosives and $0.90/item for sandbags, wood, pools = $5.4/item total. 16,380 OE items x $5.4 = $88,452

[3] 134 OE items eligible for transport to detonation chamber identified in recent Ranges 43-48 surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 447 OE items. Assume same density of OE in subsurface (multiply by 2) = 894 OE items. DeMill Donovan chamber cost estimate assumes 96 items can be processed per day = 9.3 days >assume 10 days @ $7150/day = $71,500. Assume 1 filter replaced/day @ $650 each ($6,500) + $8,000 equipment mobe + $20,000 travel = $106,000

[4] Because the Detonation Chamber is a stationary device, it cannot be moved over the 483 acres at Ranges 43-48. UXO items found must be transported to the chamber for detonation, which could be temporarily located at each of 5 access gates to the site. Based on recent Ranges 43-48-specific surface OE removal data, it is estimated that approximately 95% of UXO items that are anticipated to be found at Ranges 43-48 are too dangerous to be transported to the five temporary detonation chamber locations (data provided by Parsons, Inc.). Therefore, costs associated with detonation in the chamber are only for 5% of UXO items that may be found; the rest of the UXO items (95%) would be unsafe to move and would have to be detonated where they are found using engineering controls.

RANGE 30A

COST ESTIMATES
(TABLES C9-C16)

Table C9. Vegetation Clearance Cost Estimate
Prescribed Burning Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Planning, Tech Support, Meteorological Profiling, Set-Up	388	acres	$535	$207,580
Install Primary Fuelbreak	388	acres	$310	$120,280
Conduct Prescribed Burn	388	acres	$1,250	$485,000
Community Relations	388	acres	$360	$139,680
Residential Relocation	388	acres	$180	$69,840
Air Sampling & Monitoring	388	acres	$450	$174,600
Security	3	weeks	$15,000	$45,000
Subtotal Capital Costs				$1,241,980
Capital Cost Contingency	10%	of Capital Costs		$124,198
Total Capital Costs				**$1,366,178**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$35,000	$35,000
Total Annual Costs				**$35,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$145,842
Annual Cost Contingency	10%	of annual costs		$3,500
Total 5 Year O&M NPV Cost				**$149,342**
TOTAL ALTERNATIVE COST, 5 YEARS				**$1,515,520**
TOTAL COST PER ACRE (388 ACRES)				**$3,906**

DEFINITIONS

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ASSUMPTIONS

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Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Mechanical or Manual Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C10. Vegetation Clearance Cost Estimate
Mechanical Clearance Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Mechanical Cutting & Chipping (2 passes/double cut method)	388	acres	$1,150	$446,200
Site Restoration	388	acres	$500	$194,000
Security	23	weeks	$15,000	$345,000
Subtotal Capital Costs				$985,200
Capital Cost Contingency	10%	of Capital Costs		$98,520
Total Capital Costs				**$1,083,720**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$35,000	$35,000
Total Annual Costs				**$35,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$145,842
Annual Cost Contingency	10%	of annual costs		$3,500
Total 5 Year O&M NPV Cost				**$149,342**
TOTAL ALTERNATIVE COST, 5 YEARS				**$1,233,062**
TOTAL COST PER ACRE (388 ACRES)				**$3,178**

DEFINITIONS

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ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Mechanical Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Mechanical or Manual Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C11. Vegetation Clearance Cost Estimate
Manual Clearance Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Manual Cutting	388	acres	$2,400	$931,200
Hauling & Chipping	388	acres	$650	$252,200
Site Restoration	388	acres	$500	$194,000
Security	28	weeks	$15,000	$420,000
Subtotal Capital Costs				$1,797,400
Capital Cost Contingency	10%	of Capital Costs		$179,740
Total Capital Costs				**$1,977,140**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$35,000	$35,000
Total Annual Costs				**$35,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$145,842
Annual Cost Contingency	10%	of annual costs		$3,500
Total 5 Year O&M NPV Cost				**$149,342**
TOTAL ALTERNATIVE COST, 5 YEARS				**$2,126,482**
TOTAL COST PER ACRE (388 ACRES)				**$5,481**

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ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Manual Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C12. OE Remedial Action Cost Estimate
No Action w/ Existing Site Security Measures Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
ANNUAL O&M COSTS [1]				
Existing Fence & Sign Maintenance/Repair	1	lump sum	$3,500	$3,500
Site Security Patrols	1	lump sum	$35,000	$35,000
Total Annual Costs				**$38,500**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$160,426
Annual Cost Contingency	10%	of annual costs		$3,850
Total 5 Year O&M NPV Cost				**$164,276**
TOTAL ALTERNATIVE COST, 5 YEARS				**$164,276**
TOTAL COST PER ACRE (388 ACRES)				**$423**

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ASSUMPTIONS

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Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

Table C13. OE Remedial Action Cost Estimate
Enhanced Site Security Measures Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Survey Perimeter/Site Preparation/Mobe/Demobe	1	lump sum	$10,000	$10,000
Install 10-ft. Chain Link w/Concertina Wire (2 crews)	18,600	feet	$40	$744,000
OE Escorts (2)	35	days	$1,400	$49,000
Post Warning Signs Every 100 ft.	186	signs	$10	$1,860
Post Large Warning Signs at Access Gates	5	signs	$200	$1,000
Erosion Control	1	lump sum	$5,600	$5,600
Security	35	days	$3,000	$105,000
Subtotal Capital Costs				$916,460
Capital Cost Contingency	10%	of Capital Costs		$91,646
Total Capital Costs				**$1,008,106**
ANNUAL O&M COSTS [1]				
Fence & Sign Maintenance/Repair	1	lump sum	$3,500	$3,500
Site Security Patrols	52	weeks	$14,400	$748,800
Total Annual Costs				**$752,300**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$3,134,773
Annual Cost Contingency	10%	of annual costs		$75,230
Total 5 Year O&M NPV Cost				**$3,210,003**
TOTAL ALTERNATIVE COST, 5 YEARS				**$4,218,109**
TOTAL COST PER ACRE (388 ACRES)				**$10,871**

DEFINITIONS

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ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

Table C14. OE Remedial Action Cost Estimate
Subsurface OE Removal Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE (1 FT. OE REMOVAL)	TOTAL (1 FT. OE REMOVAL) [1]	UNIT PRICE (4 FT. OE REMOVAL)	TOTAL (4 FT. OE REMOVAL) [1]
OE Survey	388	acres	$260	$100,822	$260	$100,822
OE Escort	388	acres	$87	$33,809	$87	$33,809
Followup Veg Clearance	388	acres	$3,560	$1,381,358	$3,560	$1,381,358
OE Escort - Followup Veg Clearance	388	acres	$697	$270,475	$697	$270,475
Visual Surface Sweep for Safety	359	acres	$3,346	$1,201,243	$3,616	$1,298,279
Visual Surface Sweep for Safety - Targets	19	acres	$16,730	$317,878	$8,365	$158,939
Digital Survey of Anomalies	388	acres	$2,145	$832,230	$1,407	$545,916
Reacquire Anomalies	388	acres	$1,407	$545,916	$2,010	$779,880
Excavate & Remove OE	388	acres	$2,145	$832,230	$4,476	$1,736,766
Quality Control	39	acres	$704	$27,437	$704	$27,437
Site Restoration - Followup Veg Clearance	4	acres	$1,017	$4,069	$1,017	$4,069
Site Restoration - OE Removal	388	acres	$1,191	$462,200	$1,322	$512,852
OE Residue Removal	388	acres	$129	$50,000	$129	$50,000
Total Field Costs [2]				$6,059,666		$6,900,602
Reporting	1	lump sum	$116,781	$116,781	$116,781	$116,781
Cost Subtotal				$6,176,447		$7,017,383
Cost Contingency	10%	of Cost Subtotal		$617,645		$701,738.25
Total Capital Costs				**$6,794,092**		**$7,719,121**
RANGE OF TOTAL ALTERNATIVE COSTS				**$6,794,092**	**to**	**$7,719,121**
RANGE OF TOTAL COSTS PER ACRE (388 ACRES)				**$17,511**	**to**	**$19,895**

DEFINITIONS

EPA = U.S. Environmental Protection Agency
ENR = Engineering News Record
NPV = Net Present Value
OE = Ordnance & Explosives
O&M = Operations & Maintenance

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Subsurface OE removal costs are assumed to fall within the range of estimated 1 ft. to 4 ft. OE removal costs based on recent Fort Ord specific data provided by Parsons, Inc
[2] Costs based on recent Fort Ord specific data provided by Parsons, Inc.

Table C15. OE Detonation Cost Estimate
Detonation With Engineering Controls Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detonation & Consolidation [1]	388	acres	$267	$103,600
Engineering Controls [2]	388	acres	$23	$9,072
Total Field Costs				$112,672
Cost Subtotal				$112,672
Cost Contingency	10%	of Cost Subtotal		$11,267
Total Capital Costs				**$123,939**
TOTAL ALTERNATIVE COST				**$123,939**
TOTAL COST PER ACRE (388 ACRES)				**$319**

DEFINITIONS

OE = Ordnance & Explosives

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] 222 man-hrs for detonation with engineering controls during recent Ranges 30A surface OE removal x $70/hr = $15,540 (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = $51,800. Assume same density of OE in subsurface (multiply by 2) = $103,600.

[2] 252 OE items located in recent Range 30A surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 840 OE items. Assume same density of OE in subsurface (multiply by 2) = 1,680 items. Assume $4.5/item for explosives and $0.90/item for sandbags, wood, pools = $5.4/item total. 1,680 OE items x $5.4 = $9,072

Table C16. OE Detonation Cost Estimate
Detonation Chamber and Detonation w/ Engineering Controls Alternative
Range 30A
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detonation & Consolidation (90% of UXO Items) [1]	388	acres	$240	$93,240
Engineering Controls (90% of OE Items) [2]	388	acres	$21	$8,165
Detonation Chamber (10% of OE Items) [3]	388	acres	$58	$22,600
Total Field Costs [4]				$124,005
Cost Subtotal				$124,005
Cost Contingency	10%	of Cost Subtotal		$12,400
Total Capital Costs				**$136,405**
TOTAL ALTERNATIVE COST				**$136,405**
TOTAL COST PER ACRE (388 ACRES)				**$352**

DEFINITIONS
OE = Ordnance & Explosives

ASSUMPTIONS
These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] 222 man-hrs for detonation with engineering controls during recent Ranges 30A surface OE removal x $70/hr = $15,540 (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = $51,800. Assume same density of OE in subsurface (multiply by 2) = $103,600. Assume 90% of items detonated w/engr controls /10 % detonated in chamber. $103,600 x 0.90 = $93,240.

[2] 252 OE items located in recent Range 30A surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 840 OE items. Assume same density of OE in subsurface (multiply by 2) = 1,680 items. Assume $4.5/item for explosives and $0.90/item for sandbags, wood, pools = $5.4/item total. 1,680 OE items x $5.4 = $9,072. Assume 90% of items detonated w/engr controls /10 % detonated in chamber. $9,072 x 0.90 = $8,165.

[3] Assume 10% of 1,680 OE items can be detonated in chamber = 168 OE items. DeMill Donovan chamber cost estimate assumes 96 items can be processed per day = 1.75 days > assume 2 days @ $7150/day = $14,300. Assume 1 filter replaced/day @ $650 each ($1,300) + $2,000 equipment mobe + $5,000 travel = $22,600

[4] Because the Detonation Chamber is a stationary device, it cannot be moved over the 388 acres at Range 30A. UXO items found must be transported to the chamber for detonation, which could be temporarily located at each of 5 access gates to the site. It is estimated that approximately 90% of UXO items that are anticipated to be found at Range 30A are too dangerous to be transported to the five temporary detonation chamber locations. Therefore, costs associated with detonation in the chamber are only for 10% of UXO items that may be found; the rest of the UXO items (90%) would be unsafe to move and would have to be detonated where they are found using engineering controls.

SITE OE-16

COST ESTIMATES
(TABLES C17-C24)

Table C17. Vegetation Clearance Cost Estimate
Prescribed Burning Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Planning, Tech Support, Meteorological Profiling, Set-Up	80	acres	$535	$42,800
Install Primary Fuelbreak	80	acres	$310	$24,800
Conduct Prescribed Burn	80	acres	$1,250	$100,000
Community Relations	80	acres	$360	$28,800
Residential Relocation	80	acres	$180	$14,400
Air Sampling & Monitoring	80	acres	$450	$36,000
Security	1	week	$15,000	$15,000
Subtotal Capital Costs				$261,800
Capital Cost Contingency	10%	of Capital Costs		$26,180
Total Capital Costs				**$287,980**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$7,000	$7,000
Total Annual Costs				**$7,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$29,168
Annual Cost Contingency	10%	of annual costs		$700
Total 5 Year O&M NPV Cost				**$29,868**
TOTAL ALTERNATIVE COST, 5 YEARS				**$317,848**
TOTAL COST PER ACRE (80 ACRES)				**$3,973**

DEFINITIONS

ENR = Engineering News Record
HMP = Habitat Management Plan
NPV = Net Present Value
O&M = Operations & Maintenance

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Mechanical or Manual Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C18. Vegetation Clearance Cost Estimate
Mechanical Clearance Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study, Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Mechanical Cutting & Chipping (2 passes/double cut method)	80	acres	$1,150	$92,000
Site Restoration	80	acres	$500	$40,000
Security	5	weeks	$15,000	$75,000
Subtotal Capital Costs				$207,000
Capital Cost Contingency	10%	of Capital Costs		$20,700
Total Capital Costs				**$227,700**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$7,000	$7,000
Total Annual Costs				**$7,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$29,168
Annual Cost Contingency	10%	of annual costs		$700
Total 5 Year O&M NPV Cost				**$29,868**
TOTAL ALTERNATIVE COST, 5 YEARS				**$257,568**
TOTAL COST PER ACRE (80 ACRES)				**$3,220**

DEFINITIONS

ENR = Engineering News Record
HMP = Habitat Management Plan
NPV = Net Present Value
O&M = Operations & Maintenance

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Mechanical or Manual Methods than for Prescribed Burning, the only method approved for use in CMC habitat areas greater than 50 acres.

Table C19. Vegetation Clearance Cost Estimate
Manual Clearance Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Manual Cutting	80	acres	$2,400	$192,000
Hauling & Chipping	80	acres	$650	$52,000
Site Restoration	80	acres	$500	$40,000
Security	6	weeks	$15,000	$90,000
Subtotal Capital Costs				$374,000
Capital Cost Contingency	10%	of Capital Costs		$37,400
Total Capital Costs				**$411,400**
ANNUAL O&M COSTS				
HMP Species Recovery Monitoring [2]	1	lump sum	$7,000	$7,000
Total Annual Costs				**$7,000**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$29,168
Annual Cost Contingency	10%	of annual costs		$700
Total 5 Year O&M NPV Cost				**$29,868**
TOTAL ALTERNATIVE COST, 5 YEARS				**$441,268**
TOTAL COST PER ACRE (80 ACRES)				**$5,516**

DEFINITIONS

ENR = Engineering News Record
HMP = Habitat Management Plan
NPV = Net Present Value
O&M = Operations & Maintenance

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

[2] Actual HMP Species Recovery Monitoring O&M costs would be significantly higher for Manual or Mechanical Methods than for Prescribed Burning, the only vegetation clearance method approved under the HMP for CMC habitat greater than 50 acres.

Table C20. OE Remedial Action Cost Estimate
No Action w/ Existing Site Security Measures Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
ANNUAL O&M COSTS [1]				
Existing Fence & Sign Maintenance/Repair	1	lump sum	$750	$750
Site Security Patrols	1	lump sum	$7,500	$7,500
Total Annual Costs				**$8,250**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$34,377
Annual Cost Contingency	10%	of annual costs		$825
Total 5 Year O&M NPV Cost				**$35,202**
TOTAL ALTERNATIVE COST, 5 YEARS				**$35,202**
TOTAL COST PER ACRE (80 ACRES)				**$440**

DEFINITIONS

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ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

Table C21. OE Remedial Action Cost Estimate
Enhanced Site Security Measures Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [1]				
Survey Perimeter/Site Preparation/Mobe/Demobe	1	lump sum	$10,000	$10,000
Install 10-ft. Chain Link w/Concertina Wire (2 crews)	8,300	feet	$40	$332,000
OE Escorts (2)	7	days	$1,400	$9,800
Post Warning Signs Every 100 ft.	9	signs	$10	$90
Post Large Warning Signs at Access Gates	1	signs	$200	$200
Erosion Control	1	lump sum	$1,100	$1,100
Security	7	days	$3,000	$21,000
Subtotal Capital Costs				$374,190
Capital Cost Contingency	10%	of Capital Costs		$37,419
Total Capital Costs				**$411,609**
ANNUAL O&M COSTS				
Fence & Sign Maintenance/Repair	1	lump sum	$1,000	$1,000
Site Security Patrols	52	weeks	$6,450	$335,400
Total Annual Costs				**$336,400**
Assume 5 years of O&M				
Annual O&M NPV, 5 years, 6.4% ENR Cost Index for Construction, January, 2002				$1,401,752
Annual Cost Contingency	10%	of annual costs		$33,640
Total 5 Year O&M NPV Cost				**$1,435,392**
TOTAL ALTERNATIVE COST, 5 YEARS				**$1,847,001**
TOTAL COST PER ACRE (80 ACRES)				**$23,088**

DEFINITIONS

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ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Costs based on recent Fort Ord specific data provided by USACE and Parsons, Inc.

Table C22. OE Remedial Action Cost Estimate
Subsurface OE Removal Alternative
SIte OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE (1 FT. OE REMOVAL)	TOTAL PRICE (1 FT. OE REMOVAL)	UNIT PRICE (4 FT. OE REMOVAL)	TOTAL PRICE (4 FT. OE REMOVAL)
OE Survey	80	acres	$260	$20,788	$260	$20,788
OE Escort	80	acres	$87	$6,971	$87	$6,971
Followup Veg Clearance	80	acres	$3,560	$284,816	$3,560	$284,816
OE Escort - Followup Veg Clearance	80	acres	$697	$55,768	$697	$55,768
Visual Surface Sweep for Safety	69	acres	$4,061	$280,193	$4,061	$280,193
Digital Survey of Anomalies	80	acres	$1,407	$112,560	$1,407	$112,560
Reacquire Anomalies	80	acres	$1,126	$90,048	$1,173	$93,800
Excavate & Remove OE	69	acres	$2,021	$139,420	$1,940	$133,843
Quality Control	8	acres	$704	$5,628	$792	$6,332
Site Restoration - Followup Veg Clearance	8	acres	$1,144	$9,155	$1,144	$9,155
Security	80	acres	$250	$20,000	$260	$20,800
Site Restoration - OE Removal	80	acres	$660	$52,763	$686	$54,873
OE Residue Removal	80	acres	$188	$15,000	$188	$15,000
Total Field Costs [2]				$1,093,111		$1,094,900
Reporting	1	lump sum		$87,234		$87,234
Cost Subtotal				$1,180,345		$1,182,134
Cost Contingency	10%	of Cost Subtotal		$118,034		$118,213
Total Capital Costs				**$1,298,379**		**$1,300,347**
RANGE OF TOTAL ALTERNATIVE COSTS				**$1,298,379**	**to**	**$1,300,347**
RANGE OF TOTAL COSTS PER ACRE (80 ACRES)				**$16,230**	**to**	**$16,254**

DEFINITIONS
OE = Ordnance & Explosives

ASSUMPTIONS
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Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] Subsurface OE removal costs are assumed to fall within the range of estimated 1 ft. to 4 ft. OE removal costs based on recent Fort Ord specific data provided by Parsons, Inc

[2] Costs based on recent Fort Ord specific data provided by Parsons, Inc.

Table C23. OE Detonation Cost Estimate
Detonation With Engineering Controls Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detonation & Consolidation [1]	80	acres	$140	$11,200
Engineering Controls [2]	80	acres	$2	$184
Total Field Costs				$11,384
Cost Subtotal				$11,384
Cost Contingency	10%	of Cost Subtotal		$1,138
Total Capital Costs				**$12,522**
TOTAL ALTERNATIVE COST				**$12,522**
TOTAL COST PER ACRE (80 ACRES)				**$157**

DEFINITIONS

OE = Ordnance & Explosives

ASSUMPTIONS

These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] 24 man-hrs for detonation with engineering controls during recent Site OE-16 surface OE removal x $70/hr = $1,680 (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = $5,600. Assume same density of OE in subsurface (multiply by 2) = $11,200.

[2] 5 OE items located in recent Site OE-16 surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 17 OE items. Assume same density of OE in subsurface (multiply by 2) = 34 items. Assume $4.5/item for explosives and $0.90/item for sandbags, wood, pools = $5.4/item total. 34 OE items x $5.4 = $184

Table C24. OE Detonation Cost Estimate
Detonation Chamber and Detonation w/ Engineering Controls Alternative
Site OE-16
Interim Action OE Remedial Investigation/Feasibility Study,
Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detonation & Consolidation (90% of UXO Items) [1]	80	acres	$126	$10,080
Engineering Controls (90% of UXO Items) [2]	80	acres	$2	$166
Detonation Chamber (10% of UXO Items) [3]	80	acres	$185	$14,800
Total Field Costs [4]				$25,046
Cost Subtotal				$25,046
Cost Contingency	10%	of Cost Subtotal		$2,505
Total Capital Costs				**$27,551**
TOTAL ALTERNATIVE COST				**$27,551**
TOTAL COST PER ACRE (80 ACRES)				**$344**

DEFINITIONS
OE = Ordnance & Explosives

ASSUMPTIONS
These costs are for comparison purposes only, and have an accuracy of +50/-30%.
Many design variables and necessary prefield activities have not been established.
Cost estimates will be refined after the field preparation/design is completed.

[1] 24 man-hrs for detonation with engineering controls during recent Site OE-16 surface OE removal x $70/hr = $1,680 (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = $5,600. Assume same density of OE in subsurface (multiply by 2) = $11,200. Assume 90% of items detonated w/engr controls /10 % detonated in chamber. $11,200 x 0.90 = $10,080.

[2] 5 OE items located in recent Site OE-16 surface OE removal (data provided by Parsons, Inc.). Data for 30% of site, so for whole site divide by 0.3 = 17 OE items. Assume same density of OE in subsurface (multiply by 2) = 34 items. Assume $4.5/item for explosives and $0.90/item for sandbags, wood, pools = $5.4/item total. 34 OE items x $5.4 = $184. Assume 90% of items detonated w/engr controls /10 % detonated in chamber. $184 x 0.90 = $166.
[3] Assume 10% of 34 OE items can be detonated in chamber = 4 OE items. DeMill Donovan chamber cost estimate assumes 96 items can be processed per day > assume 1 day @ $7150/day = $7,150. Assume 1 filter replaced/day @ $650 each ($650) + $2,000 equipment mobe + $5,000 travel = $14,800

[4] Because the Detonation Chamber is a stationary device, it cannot be moved over the 80 acres at Site OE-16. UXO items found must be transported to the chamber for detonation, which could be temporarily located at each of 2 access gates to the site. It is estimated that approximately 90% of UXO items that are anticipated to be found at Site OE-16 are too dangerous to be transported to the two temporary detonation chamber locations. Therefore, costs associated with detonation in the chamber are only for 10% of UXO items that may be found; the rest of the UXO items (90%) would be unsafe to move and would have to be detonated where they are found using engineering controls.