

**US Army  
Decommissioning Funding Plan  
Davy Crockett M101 Depleted Uranium  
Impact Areas  
License SUC-1593**

March 2015

## Introduction

The purpose of this document is to provide updated costs associated with the decommissioning of the Possession Only License Source Material License No. SUC-1593 (ML13259A062, 10OCT2013). Originally License No. SUC-1593 authorized the possession of up to 125 kg of Depleted Uranium (DU) at two US Army sites in Hawaii, Schofield Barracks and Pohakuloa Training Area. A condition of this license also required the US Army to seek license amendments to include other US Army sites containing DU related Davey Crockett M101 spotting Rounds.

As the US Army has increased its knowledge of US Army sites containing or suspected of containing DU related to Davy Crockett M101 spotting rounds, the US Army has sought to amend this license. Further in compliance with license conditions requiring:

*The licensee shall submit an updated site/installation specific decommissioning cost estimate and financial assurance instrument for each Army installation listed in License Condition 10 on a tri-annual basis, by December 31 of each year or, if applicable, in accordance with the requirements of 10 CFR 40.36(c)5,*

the US Army is updating the DFP to reflect changes in the number of sites and the amount of DU licensed. SUC-1593, as amended (Date), now authorizes the US Army to possess up to 5600 kg of DU located at multiple US Army training sites. These locations include the following:

- Schofield Barracks, HI (original license)
- Pohakuloa Training Area, HI (original license)
- Fort Benning, GA
- Fort Gordon, GA
- Fort Campbell, KY
- Fort Knox, KY
- Fort Carson, CO
- Fort Hood, TX
- Joint Base Lewis-McChord, WA
- Yakima Training Center, WA
- Fort Bragg, NC
- Fort Polk, LA
- Fort Sill, OK
- Fort Jackson, SC
- Fort Hunter Liggett, CA
- Fort Riley, KS

The US Army has submitted to the NRC a site specific Decommissioning Funding Plan (DFP) for the two sites in Hawaii (ML14057A363, 17JAN2014) and a draft generic cost estimates for sites that would likely be amended to the license (ML15041A790, 10JAN2015). Separately the US Army also provided detailed decommissioning cost estimates for Schofield Barracks (ML14057A365, 27FEB2014) and Pohakuloa Training Area (ML14057A366, 27FEB2014).

## Summary

### Facility Description (A.3.1.1)

#### 1.0 License number and type

- License number: SUC-1593
- License type: Possession Only Source Material License

#### 2.0 Specific quantities and types of materials authorized by the license (e.g., by specific isotope)

- Quantity: No more than 5600 kg
- Material type: Depleted Uranium ( $^{238}\text{U}$ ,  $^{235}\text{U}$  and  $^{234}\text{U}$ )

#### 3.0 General discussion of how licensed materials are used in the licensee's operations

- During the 1960's, Davy Crockett M101 Spotting Rounds containing DU were fired on US Army training ranges. The licensed material is residual DU remaining from this Atomic Energy Commission authorized firing. Remnants of these rounds reside on the surface and/or near subsurface of US Army training ranges in Radiation Controlled Areas (RCA).

#### 4.0 Description of facility buildings, rooms, and grounds, including the number and dimensions of areas (e.g., laboratories) that require decontamination;

- The location of the RCA's at M101 DU-affected Ranges have previously been provided to the NRC in the form of Archive Search Records (ASR)
- US Army training ranges are open areas with no habitable structures but may contain training materials, such as targets and associated supporting materials.
- Conventional unexploded ordnance (UXO) is present in the RCA's at all ranges. Because of the presence of UXO, ordnance and explosives safety staff support is required for activities within the RCAs (except where UXO has been cleared).

#### 5.0 Number and dimension of facility components (e.g., fume hoods, glove boxes, laboratory benches, ductwork) that requires decontamination;

- There are no habitable facilities within RCAs on US Army training ranges or laboratory operations that would require decontamination.

6.0 An estimate of the volume of contaminated material, including that in the subsurface containing residual radioactivity that will require remediation to meet the criteria for license termination

- The US Army estimated that 4068.1 m<sup>3</sup> of Davy Crockett rounds, fragments and contaminated soil will require disposal.
- The US Army estimates that an additional 154 m<sup>3</sup> of contaminated Personal Protective Equipment (PPE) and other items will require disposal.
- Thus the US Army estimates a total of 4222.1 m<sup>3</sup> of contaminated materials will require disposal.

7.0 Quantities of materials or waste accumulated prior to shipping or disposal (if applicable)

- Generally none or no more than a few M101 rounds (less than 1 Kg of DU)
- In accordance with license conditions, DU accumulates for waste shipping and disposal only when the US Army detects it by happenstance and retrieves it.
- The Department of Defense (DOD) Executive Agent for Low-Level Radioactive Waste (LLRW) disposal has primary responsibility for disposal of DOD LLRW. To support this, the Executive Agent conducts periodic waste removals from installations worldwide. If the Army collects any DU, the Army will secure and hold it for the next scheduled Executive Agent pick up. The Executive Agent will properly dispose of it in accordance with all applicable Federal and DOD regulations and with all disposal site conditions.

### **Estimated Decommissioning Costs (A.3.1.2)**

The following is a cost estimate for the costs of all phases of the decommissioning of Source Material License, License Number SUC-1593. Cost estimates are primarily based on analyses performed using RACER 11.2 <sup>TM</sup> <sup>1</sup> which draws primarily from the Unit Price Book (UPB) developed by the Tri-Services Cost Engineering Group.

The estimate is itemized by each of the major decommissioning tasks and activities, and distinguishes between labor and non-labor costs as described in NUREG-1757 Vol 3, sections A3.1.2.1 and A.3.1.2.2. This cost estimate also explicitly incorporates a contingency factor as discussed in NUREG-1757, section A.3.1.2.3.

#### **1.0 Labor Costs (A.3.1.2.1)**

- Planning and Preparation  
Cost assumptions are presented in Appendix A, tables A.3.1.2.1.a (labor hours) and A.3.1.2.1.g (labor cost schedule); and are assumed to be the same for each of the range training sites.
- Decontamination or dismantling of Radioactive Facility Components

---

<sup>1</sup> The Remedial Action Cost Engineering and Requirements (RACER<sup>TM</sup>) software is a Windows-based environmental remediation/corrective action cost-estimating system. RACER<sup>TM</sup> is commercial off-the-shelf software developed and maintained by AECOM.

Cost assumptions are presented in Appendix A, tables A.3.1.2.1.b (labor hours) and A.3.1.2.1.g (Labor cost schedule); and are assumed be the same for each of the range training sites.

- **Restoration of Contaminated Areas on Facility Grounds**  
Cost assumptions are presented in Appendix A, tables A.3.1.2.1.c (labor hours) and 3.1.2.1.g (Labor cost schedule); and are assumed be the same for each of the range training sites.
- **Final radiation Survey**  
Cost assumptions are presented in Appendix A, tables A3.1.2.1.d (labor hours) and A.3.1.2.1.g (labor cost schedule); for a 1 km<sup>2</sup> site and are assumed to scale linearly with the area for each of the range training sites.
- **Site Stabilization and Long-term Surveillance**  
Cost assumptions are presented in Appendix A, tables A.3.1.2.1.e (Labor) and A.3.1.2.1.g (Labor cost schedule); for a 1 km<sup>2</sup> site and are assumed to scale linearly with the area of each of the range training sites.

## 2.0 Non-Labor Costs (A.3.1.2.2)

- **Packing Materials**  
Cost assumptions are presented in Appendix A, Table A.3.1.2.2.a.1 and A.3.1.2.2.a.2. These costs are assumed to scale linearly to volume of DU contaminated material at each range training site.
- **Shipping Costs**  
Cost assumptions are presented in Appendix A, Table A.3.1.2.2.b. Unit costs have been evaluated separately for each range training site and linearly scaled to the volume of DU contaminated material at each range training site. Costs were derived from shipping cost schedules evaluated within RACER and transportation miles estimated from ZIP code to ZIP code road miles.
- **Waste Disposal Costs**  
Cost assumptions are presented in Appendix A, Table A.3.1.2.2.c. These costs are scaled to match the amount of material at each range training site.
- **Equipment and Supplies Costs**  
Cost assumptions are presented in Appendix A, Table A.3.1.2.2.d. These costs are assumed to be the same for each of the range training sites.
- **Laboratory Costs**  
Cost assumptions are presented in Appendix A, Table A.3.1.2.2.e. These costs are assumed to scale linearly to volume of DU contaminated material at each range training site.

### 3.0 Contingency Factor (A.3.1.2.3)

The US Army includes a 25 percent contingency factor consistent with the analysis and guidance contained in NUREG/CR-6477, which applies a 25 percent contingency factor to all estimated costs associated with decommissioning.

### 4.0 Total Cost

The total estimated cost, including contingency costs, to decommission the Possession Only License Source Material License No SUC-1593 at all sites is \$347.4 million.

This total estimated cost includes the decommissioning costs for Pohakuloa Training Area and Schofield Barracks previously submitted to the NRC (ML14057A365, ML14057A366) as well as the cost estimates for the remaining sites previously submitted to the NRC (ML15041A779, ML15041A790) and presented in Appendix A, Table A1 of this document.

### Key Assumptions (A.3.1.3)

The following key assumptions about site decommissioning have been made:

- This cost estimate **does not take credit for any salvage value** that the US Army might realize from the sale of potential assets (for example, recovered materials or decontaminated equipment) during or after decommissioning.
- This cost estimate represents the cost to the US Army if all decommissioning activities were performed by an independent contractor.
- This cost estimate assumes that during the decommissioning of individual sites, training operations would be suspended at decommissioning sites to ensure the safe and timely completion of decommissioning activities.
- Sites operated under License SUC-1593 reside within operational training areas and have currently existing institutional controls. These controls are in place to prevent unauthorized access to US Army training (live fire training, military equipment exercises and unexploded ordnance [UXO]). Institutional controls include security fences, signage (UXO, live fire and RCA), as well as monitored access control for training range entry. It is assumed that if license decommissioning with restrictions occurs, institutional controls will remain in place for safety related to US Army training activities, ensuring that annual dose to the average member of the critical group will not exceed 0.25 mSv (25 mrem).

- An average volume of contaminated soil and fragments requiring removal and remediation is estimated to be  $0.138 \text{ m}^3$  per Davy Crockett M101 spotting round. This estimate is based on the following assumptions.
  - The DU containing portion the Davy Crockett M101 spotting round is estimated to be 8.255cm in length and 2 cm in diameter.
  - High density and subsequent low spatial mobility of Davy Crockett M101 spotting DU fragments and DU weathered components results in material localization near the original impact sites.
  - As a conservative but lower bounding volume per Davy Crockett M101 spotting round, it is assumed that for intact, deformed or nearly intact Davy Crockett M101 spotting rounds, DU fragments and DU contaminated soil requiring remediation would be located within 10 cm of the original Davy Crockett round impact site. A cylindrical volume of  $0.011 \text{ m}^3$  of material is thus assumed as a lower bounding volume, based on a 22 cm diameter, 28.255 cm length cylinder.
  - As a conservative but upper bounding volume per Davy Crockett M101 spotting round, it is assumed that the Davy Crockett M101 spotting round is significantly fragmented and extensively oxidized from weathering and the DU fragments and DU contaminated soil requiring remediation would be located within 0.75 m of the original impact site. However, because the Davy Crockett M101 spotting round was not penetrator type munitions and was unlikely to have pierced the ground surface (to a significant degree) it is assumed that Davy Crockett M101 spotting round, fragments and contaminated soils generally lay within the top 15 cm of the surface. A cylindrical volume of  $0.265 \text{ m}^3$  is thus assumed as an upper bounding volume, based on a 1.5 m diameter, 15 cm height cylinder.
  - Experience at multiple Army training sites has shown that Davy Crockett M101 spotting rounds exist in a wide array of conditions ranging from intact with little degradation to highly fragmented and corroded, an average of the upper ( $0.265 \text{ m}^3$ ) and lower ( $0.011 \text{ m}^3$ ) volumes is assumed to be a reasonable estimate of the volume of DU fragments and soil requiring remediation for each Davy Crockett M101 spotting round. This volume is  $0.138 \text{ m}^3$ .
- As simplifying but conservative assumption, this cost estimate assumes that sites containing Davy Crockett M101 spotting rounds have been previously used as ranges for artillery, grenades, high explosive bombs, medium caliber munitions (20mm, 25mm, and 30mm), large caliber munitions (37mm and larger), mortars, and other small arms. This assumption requires the presence of unexploded ordnance (UXO) safety staff during site operations, which would not otherwise be required.
- As a simplifying but conservative assumption, this cost estimate assumes that sites containing Davy Crockett M101 spotting rounds have a vegetative cover that is predominantly heavy scrubs and small trees. This assumption results

in increased time (and labor) estimates for Davy Crockett M101 spotting round recovery.

### **Adjusting the Cost Estimate (A.3.2)**

The following is a description of the means the US Army will use to adjust the site-specific cost estimates and associated funding levels periodically over the life of the facilities.

The US Army will follow the regulatory guidance in NUREG-1757, Vol 3, Rev 1, sections A.3.2 and A.11. On a three year cycle or when the amount or types of materials substantially change the US Army will evaluate and adjust the decommissioning cost estimates to ensure costs accurately reflect changes in material inventory and possession limits; soil or groundwater contamination, facility modifications, remediation costs, and disposal costs. Additionally, the US Army will ensure financial assurance for revised decommissioning costs are updated to account for inflation, for other changes in the prices of goods and services, for changes in facility conditions or operations, and for changes in expected decommissioning procedures.

Currently the US Army has no plans to change facility conditions or operations at the RCAs' in a way that would require a license amendment.

### **Submitting the Required Documentation (A.3.3)**

In accordance with NRC financial assurance regulations (10CFR 30.35(e), 10CFR 40.36(d), 10 CFR 70.25 (e) and 10 CFR 72.3(b)), the US Army submits the following to the NRC.

- 1.0 A detailed site specific cost estimate for decommissioning (NUREG-1757 Vol 3, Rev 1, section A.3.1)

A detailed cost estimate is provided as Appendix A of this document.

- 2.0 A description of the means that will be used to adjust the site specific cost estimate and associated funding levels periodically over the life of the facility (NUREG-1757 Vol 3, Rev 1, section A.3.2);

The Army will continue to use updated versions of RACER <sup>TM</sup>

- 3.0 A certification of financial assurance by the license that financial assurance for decommissioning has been provided in the amount of the decommissioning cost estimate.

As a Federal Agency, the US Army will provide a Statement of Intent and proof of authority to commit funds. [WILL BE PROVIDED IN FINAL VERSION]



4.0 An originally signed duplicate of the financial instruments that provide financial assurance for decommissioning.

As a Federal Agency, the US Army will provide a Statement of Intent and proof of authority to commit funds. [WILL BE PROVIDED IN FINAL VERSION]

DRAFT

## Appendix A

Table A.1 Total Estimated Cost

GARRISON	(RANGE/TARGET ZONES/IMPACT AREAS)	ESTIMATED AREA (km <sup>2</sup> )	ESTIMATED COST	
Previously Submitted (estimate includes 25 percent contingency)				
Hawaii	Pohakuloa Training Area	8.9	\$66,864,608	
Hawaii	Schofield Barracks	3.7	\$42,470,781	
Generic (estimate includes 25 percent contingency)				
Generic 1 km2 area proportional cost		1.0	\$3,100,861	
Specific M101 DU Impact Areas [estimate includes 25 percent contingency]				
Training Area	Range Name	Area (km <sup>2</sup> )	Cost	Shipping and Disposal Costs
Fort Knox	Arms Knob	1.8	\$ 5,581,550	\$ 15,320,107
Fort Knox	O'Brein, Lawley and Garvin	1.9	\$ 5,891,636	
Joint Base Lewis-McChord	Fort Lewis 52, 53, OP8 and OP9	3.5	\$10,853,014	\$ 6,863,611
Joint Base Lewis-McChord	Yakima Training Center 14, 17, and 20	3.0	\$ 9,302,583	
Fort Riley	27A, 27B, and 29	2.0	\$ 6,201,722	\$ 695,444
Fort Riley	18A, B, and C and 27A and B	1.6	\$ 4,961,378	
Fort Polk	33 & 34A	2.0	\$ 6,201,722	\$ 10,168,271 \$ 36,903,550
Fort Benning	Hook	1.0	\$ 3,100,861	
Fort Benning	Patton	1.0	\$ 3,100,861	
Fort Benning	Buchanan	1.0	\$ 3,100,861	
Fort Benning	Coolidge	1.0	\$ 3,100,861	
Fort Benning	Brann	1.0	\$ 3,100,861	
Fort Benning	Z-4 (Lae Field)	1.0	\$ 3,100,861	
Fort Benning	K-18	1.0	\$ 3,100,861	
Fort Benning	K-15	1.0	\$ 3,100,861	
Fort Benning	Burma Hill	0.073	\$ 3,100,861	
Fort Campbell	OP2/OP3	1.0	\$ 3,100,861	
Fort Bragg	OP-5	1.0	\$ 3,100,861	
Fort Carson	141	1.0	\$ 3,100,861	
Fort Carson	Titus and Sergeants Roads	2.8	\$12,031,768	
Fort Carson	Battalion Field Training Area	1.0	\$ 3,100,861	
Fort Gordon	E	1.0	\$ 3,100,861	\$ 811,313
Fort Hood	[no name]	1.0	\$ 3,100,861	\$ 15,454,673
Fort Hunter Liggett	C8	1.0	\$ 3,100,861	\$ 797,475
Fort Hunter Liggett	B11	1.0	\$ 3,100,861	
Fort Hunter Liggett	B13	1.0	\$ 3,100,861	
Fort Jackson	[no name]	1.0	\$ 3,100,861	\$ 811,015
Fort Sill	FP 182/West	1.0	\$ 3,100,861	\$ 2,493,581
Subtotal			\$ 123,042,593	\$ 114,989,752
Total (without Hawaii sites)				\$238,032,345
Total				\$347,367,734

Table A.3.1.2 Estimated Decommission Costs (per km<sup>2</sup>)

Estimated Decommissioning Costs per km <sup>2</sup>	
Task/Component	Cost
Planning and Preparation (From Table A.3.1.2.1 (a))	\$ 221,229
Decontamination and/or Dismantling of Radioactive Facility Components (From Table A.3.1.2.1 (b))	\$ 159,900
Restoration of Contaminated Areas on Facility Grounds (From Table A.3.1.2.1(c) )	\$ -
Final Radiation Survey (From Table A.3.1.2.1 (d))	\$ 1,026,363
Site Stabilization and Long-Term Surveillance (From Table A.3.1.2.1(e))	\$ 36,505
Laboratory Costs (TOTAL from Table A.3.1.2.2(e))	\$ 701,190
Miscellaneous Costs (TOTAL from Table A.3.1.2.2 (f))	\$ 479,412
SUBTOTAL	\$ 2,480,689
25% Contingency	\$ 620,172
TOTAL	\$ 3,100,861

Table A.3.1.2.1 Total Labor Costs by Major Decommissioning Task (per km<sup>2</sup>)

Task	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Planning and Preparation	\$ 41,726	\$ 4,764	\$ 36,921	\$ 13,044	\$ 11,556	\$ 35,232	\$ 44,032	\$ 5,275	\$ 5,364	\$ 5,136	\$ 4,680	\$ 3,708	\$ 4,479	\$ 3,312	\$ 1000	\$ 1000	\$ -
Decontamination or Dismantling of Radioactive Facility Components	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 50,000	\$ 50,000	\$ 59,900
Restoration of Contaminated Areas on Facility Grounds	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Final Radiation Survey	\$ 32,304	\$ 5,955	\$ 47,640	\$ 43,480	\$ 6,420	\$ 9,909	\$ 23,382	\$ 5,275	\$ 3,576	\$ 5,136	\$ 31,980	\$ 44,496	\$ 53,748	\$ 79,488	\$ 306,000	\$ 306,000	\$ 21,564
Site Stabilization and Long-Term Surveillance	\$ 6,730	\$ 5,955	\$ 23,820	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 80,760	\$ 16,674	\$ 108,381	\$ 56,524	\$ 17,976	\$ 45,141	\$ 67,424	\$ 10,550	\$ 8,940	\$ 10,272	\$ 36,660	\$ 48,204	\$ 58,227	\$ 82,800	\$ 357,000	\$ 357,000	\$ 81,464

Table A.3.1.2.1 (a) Planning and Preparation (Work Days and per km<sup>2</sup>)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Preparation of Documentation for Regulatory Agencies	10	1	10	5	2				5								
Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36(g)(1), 40.42(g)(1), 70.38(g)(1), or 72.54(g).	10	1	10	1	5	20	20	2	2	1	2	1	1	1			
Development of Work Plans	10	2	10	6		10	10	2	2	1	4	1	1	1			
Procurement of Special Equipment					1	2	1			1							
Staff Training	1		1		1		1	1		1		1	1	1	1	1	
Characterization of Radiological Condition of the Facility (including sampling, soil and tailings analysis, or groundwater analysis, if applicable)																	
Other (specify)																	
TOTALS	31	4	31	12	9	32	32	5	9	4	6	3	3	3	1	1	0

**Table A.3.1.2.1 (b) Decontamination or Dismantling of Radioactive Facility Components (Work Days and per km<sup>2</sup>)**

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Glove Boxes																	
Fume Hoods																	
Lab Benches																	
Sinks																	
Drains																	
Floors																	
Walls																	
Ceilings																	
Ventilation/ Ductwork																	
Hot Cells																	
Equipment/ Materials																	
Soil Plots (field management in FSS)															50	50	100
Storage Tanks																	
Storage Areas																	
Radwaste Areas																	
Scrap Recovery Areas																	
Maintenance Shop																	
Equipment Decontamination Areas																	
Other (specify)																	
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	100

**Table A.3.1.2.1 (c) Restoration of Contaminated Areas on Facility Grounds (Work Days and per km<sup>2</sup>)**

Activity	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Backfill and Restore Site	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table A.3.1.2.1 (d) Final Radiation Survey (Work Days and per km<sup>2</sup>)**

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
First Pass Gamma Walkover															165	165	33
Re-survey of Decontaminated Areas															17	17	3
Sample Collection															124	124	0
Field Effort Oversight and Management	4	4	36	36	4	4	7	4	4	4	36	36	36	72			
Reporting	20	1	4	4	1	5	10	1	2		5						
TOTALS	24	5	40	40	5	9	17	5	6	4	41	36	36	72	306	306	36

**Table A.3.1.2.1 (e) Site Stabilization and Long-term Surveillance (Work Days and per km<sup>2</sup>)**

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Five year review	5	5	20														
TOTALS	5	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A.3.1.2.1 (f) Total Work Days by Labor Category (per km<sup>2</sup>)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Planning and Preparation (TOTALS from Table A.3.6)	31	4	31	12	9	32	32	5	9	4	6	3	3	3	1	1	0
Decontamination and/or Dismantling of Radioactive Facility Components (Sum of TOTALS from all copies of Table A.3.7)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	100
Restoration of Contaminated Areas on Facility Grounds (TOTALS from Table A.3.8)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Final Radiation Survey (TOTALS from Table A.3.9)	24	5	40	40	5	9	17	5	6	4	41	36	36	72	306	306	36
Site Stabilization and Long-Term Surveillance (TOTALS from Table A.3.10)	5	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A.3.1.2.1 (g) Worker Unit Cost Schedule (per km<sup>2</sup>)

Labor Cost Component	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Salary & Fringe (\$/year)	\$ 137,800	\$ 121,900	\$ 121,900	\$ 111,300	\$ 148,400	\$ 127,200	\$ 159,000	\$ 121,900	\$ 68,900	\$ 148,400	\$ 90,100	\$ 142,835	\$ 213,325	\$ 157,675	\$ 142,835	\$ 142,835	\$ 85,701
Overhead Rate (%)	154%	154%	154%	125%	125%	125%	125%	125%	125%	125%	125%	125%	82%	82%	82%	82%	82%
Total Cost Per Year	\$ 350,012	\$ 309,626	\$ 309,626	\$ 282,702	\$ 333,900	\$ 286,200	\$ 337,500	\$ 274,275	\$ 155,025	\$ 333,900	\$ 202,725	\$ 321,379	\$ 388,252	\$ 286,969	\$ 259,960	\$ 259,960	\$ 155,976
Total Cost Per Work Day*	\$ 1,346	\$ 1,191	\$ 1,191	\$ 1,087	\$ 1,284	\$ 1,101	\$ 1,376	\$ 1,055	\$ 596	\$ 1,284	\$ 780	\$ 1,236	\$ 1,493	\$ 1,104	\$ 1,000	\$ 1,000	\$ 599

Notes: \* Based on 260 work days per year (e.g., 260 days). Field personnel salary based on 60 hour work weeks.

Table A.3.1.2.2 Total Nonlabor Costs (per km<sup>2</sup>)

Category	Cost
Equipment/Supplies	\$ 174,000
Laboratory	\$ 661,500
Miscellaneous	\$ 993,457
<b>TOTAL</b>	<b>\$ 1,828,957</b>

Table A.3.1.2.2 Total Nonlabor Costs (Packaging, Shipping, and Disposal)

Category	Cost
Packaging Material	\$ 2,056,300
Shipping	\$ 1,249,864
Disposal	\$ 88,695,645
<b>TOTAL</b>	<b>\$ 92,001,809</b>

Table A.3.1.2.2.a.1 Packing Materials for Spotter Rounds, Fragments and Contaminated Soil

Packing Material Costs (Spotter rounds, fragments and contaminated soil)					
Location	Volume (m <sup>3</sup> )	Number of containers	Type of Container	Unit Cost of Container	Total Packaging Costs
Fort Benning	1338.6	6,693	55 gallon drum	\$ 100	\$ 669,300
Fort Bragg	581.3	2,906	55 gallon drum	\$ 100	\$ 290,600
Fort Campbell	94.0	470	55 gallon drum	\$ 100	\$ 47,000
Fort Carson	193.8	969	55 gallon drum	\$ 100	\$ 96,900
Fort Gordon	18.6	93	55 gallon drum	\$ 100	\$ 9,300
Fort Hood	557.2	2,786	55 gallon drum	\$ 100	\$ 278,600
Fort Hunter-Liggett	18.6	93	55 gallon drum	\$ 100	\$ 9,300
Fort Jackson	18.6	93	55 gallon drum	\$ 100	\$ 9,300
Fort Knox	549.9	2,730	55 gallon drum	\$ 100	\$ 273,000
Fort Polk	365.4	1,327	55 gallon drum	\$ 100	\$ 132,700
Fort Riley	14.5	72	55 gallon drum	\$ 100	\$ 7,200
Fort Sill	80.7	404	55 gallon drum	\$ 100	\$ 40,400
Joint Base Lewis McChord/Yakima Training Center	242.3	1,212	55 gallon drum	\$ 100	\$ 121,200
Hawaii (Schofield Barracks/Pohakula Training Area)	98.5	493	55 gallon drum	\$ 100	\$ 49,300
<b>Total</b>	<b>4068.1</b>	<b>20,341</b>			<b>\$ 2,034,100</b>
<b>Total (without Hawaii sites)</b>	<b>3969.6</b>	<b>19,848</b>			<b>\$ 1,984,800</b>

Table A.3.1.2.2.a.2 Packing Material for Personal Protective Equipment

Packing Material Costs (PPE)					
Location	Volume (m <sup>3</sup> )	Number of containers	Type of Container	Unit Cost of Container	Total Packaging Costs
Fort Benning	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Bragg	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Campbell	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Carson	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Gordon	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Hood	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Hunter-Liggett	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Jackson	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Knox	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Polk	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Riley	11	55	55 gallon drum	\$ 100	\$ 5,500
Fort Sill	11	55	55 gallon drum	\$ 100	\$ 5,500
Joint Base Lewis McChord/Yakima Training Center	11	55	55 gallon drum	\$ 100	\$ 5,500
Hawaii (Schofield Barracks/Pohakula Training Area	11	55	55 gallon drum	\$ 100	\$ 5,500
Total	154	770			\$ 77,000
Total (without Hawaii sites)	143	715			\$ 71,500

Table A.3.1.2.2.b Shipping Costs for Spotter Rounds, Fragments, Contaminated Soil and PPE

Shipping Costs (Spotting rounds, fragments, contaminated soil and PPE)					
Location	Number of containers	Number of Shipments	Distance (mi)	Unit cost (\$/shipment x mile)	Total Shipping Costs
Fort Benning	6,748	85	2,373	\$ 2.29	461,904.45
Fort Bragg	2,961	38	2,712		235,998.24
Fort Campbell	525	7	2,219		35,570.57
Fort Carson	1,024	13	1,348		40,129.96
Fort Gordon	148	2	2,549		11,674.42
Fort Hood	2,841	36	1,561		128,688.84
Fort Hunter-Liggett	148	2	132		604.56
Fort Jackson	148	2	2,497		11,436.26
Fort Knox	2,785	35	2,248		180,177.20
Fort Polk	1,382	18	1,931		79,595.82
Fort Riley	127	2	1,597		7,314.26
Fort Sill	459	6	1,473		20,239.02
Joint Base Lewis McChord/Yakima Training Center	1,267	16	997		36,530.08
Hawaii (Schofield Barracks/Pohakula Training Area	548				
Total					
Total (without Hawaii sites)					\$ 1,249,864



Table A.3.1.2.2 (c) Disposal Costs

Packing Material Costs (Spotter rounds, fragments and contaminated soil)				
Location	Volume (m <sup>3</sup> )	Unit Cost (\$/m <sup>3</sup> )	Surcharge	Disposal Costs
Fort Benning	1349.6	\$ 21,033	-	\$ 28,386,136
Fort Bragg	592.3	\$ 21,033	-	\$ 12,457,845
Fort Campbell	105.0	\$ 21,033	-	\$ 2,208,465
Fort Carson	204.8	\$ 21,033	-	\$ 4,307,558
Fort Gordon	29.6	\$ 21,033	-	\$ 622,576
Fort Hood	568.2	\$ 21,033	-	\$ 11,950,950
Fort Hunter-Liggett	29.6	\$ 21,033	-	\$ 622,576
Fort Jackson	29.6	\$ 21,033	-	\$ 622,576
Fort Knox	560.9	\$ 21,033	-	\$ 11,797,409
Fort Polk	376.4	\$ 21,033	-	\$ 7,916,821
Fort Riley	25.5	\$ 21,033	-	\$ 536,341
Fort Sill	91.7	\$ 21,033	-	\$ 1,928,726
Joint Base Lewis McChord/Yakima Training Center	253.3	\$ 21,033	-	\$ 5,327,659
Hawaii (Schofield Barracks/Pohakula Training Area)	109.5	\$ 21,033	-	\$ 2,303,113
Total	4326			\$ 90,988,758
Total (without Hawaii sites)	4212.6			\$ 88,695,645

Table A.3.1.2.2 (d) Equipment and Supplies (per km<sup>2</sup>)

Equipment/supply Costs (Excluding Containers)			
Equipment/Supplies	Quantity	Unit Cost	Total Equipment/Supply Cost
Monthly facility cost	2	\$ 5,000	\$ 10,000
Monthly instrument cost	2	\$ 45,000	\$ 90,000
Monthly consumable cost	2	\$ 15,000	\$ 30,000
Monthly vehicle cost	2	\$ 20,000	\$ 40,000
Monthly PPE cost	2	\$ 2,000	\$ 4,000
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
			\$ -
TOTAL			\$ 174,000

Table A.3.1.2.2 (e) Laboratory Costs (per km<sup>2</sup>)

Laboratory Costs	
Activity	Total Cost
Sampling	
Transport of samples	\$ 33,390
Testing and analysis	\$ 667,800
Other (specify)	
Total	\$ 701,190

Table A.3.1.2.2 (f) Miscellaneous Expenses (per km<sup>2</sup>)

Miscellaneous Expenses	
Cost Item	Total Cost
License Fees	\$ 50,000
Government Contact Acquisition	\$ 75,000
Taxes	
Air fare	\$ 25,000
Per diem	\$ 29,412
Contractor fee	\$ 300,000
Other (specify)	
Total	\$ 479,412