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Hawthorne Army Ammunition Plant, New Bomb
Open Burning/Open Detonation Grounds
EOD Surface Sweep - A Project Overview

Presented at the 22nd Annual
DOD Explosive Safety Seminar

by

C. David Douthat, P.E.
U.S. Army Corps of Engineers
Huntsville Division
Huntsville, AL

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I. Introduction

→ The U.S. Army Corps of Engineers, Huntsville Division recently completed a contract for an Explosive Ordnance Disposal (EOD) Surface Sweep of the Hawthorne Army Ammunition Plant (HWAAP), Nevada, New Bomb Open Burning/Open Detonation Grounds (OB/OD). This is the first EOD contract operation of this type ever undertaken by the Corps of Engineers.

↘ The scope of the contract required the location and rendering safe of approximately 5000 tons of ordnance fragments and 25,000 items of unexploded ordnance. This was a manual labor intensive operation under the direct supervision of civilian EOD qualified supervisors.

→ The completion of this project has demonstrated that what was once an exclusive military function can be done in a safe and effective manner by civilian forces.
↗

II. Background Information

Hawthorne Army Ammunition Plant is a government-owned/contractor-operated (GO/CO) facility located on 154,000 acres of Federal land south of Walker Lake in Mineral County, NV. Its mission includes loading, storing, maintaining and demilitarizing military munitions.

The New Bomb open burning/open detonation area is located 19 miles south of Hawthorne City limits on Nevada State Route 31. The area is within the Toiyabe National Forest and is leased to the Army by the U.S. Department of Agriculture. The actual leased area is approximately 800 acres.

The New Bomb Area is situated in a deep box canyon, which is a section of the Wassuck/Anchorite Hills. This area is where all open detonation of high explosive ordnance occurred.

As part of routine operations, DOD produces, stores, and uses large quantities of munitions and explosives. Each year, large quantities of these materials must be disposed of as waste. These wastes include out-of-date explosives and propellants, items in storage or manufacture which have failed quality assurance tests, out-of-date and obsolete munitions items, and any unsafe munitions items, components or explosives. Other related wastes also include materials which may have become contaminated by contact with these items. At present, OB/OD of explosive wastes are the most effective means of destroying many items, decontaminating large metal objects, and reducing most combustibles to a smaller volume. OB/OD is the most economical and in some cases, the only safe method currently available for the effective destruction, decontamination, and reduction of explosives and explosive wastes.

The OB/OD operations have been conducted at the New Bomb site since 1947. These grounds were operated by the Department of the Navy from 1947 to 1977 at which time ownership was transferred to the Department of the Army and the

grounds were continued for this use until the fall of 1984. Numerous types of ordnance, munition and explosive items were destroyed at this site during that time frame. Although disposal procedures were to prohibit kick-out of items that were destroyed by demolition, large quantities of fragments, intact unexploded ordnance and bulk explosives could be found throughout the site. This condition presented an undesirable environmental condition as well as a safety problem to the personnel operating the site and to the general public which had easy unauthorized access to the area.

III. Discussion

A competitively negotiated service contract was awarded to UXB International Inc., Washington, D.C. on 1 July 1985 to perform the EOD sweep. The qualifications of the contractor required that they have previous EOD work experience and that all management and supervisory personnel be Naval School, Explosive Ordnance Disposal, NAVSCOLEOD, Indianhead, Maryland trained and certified to perform all operations necessary under the contract.

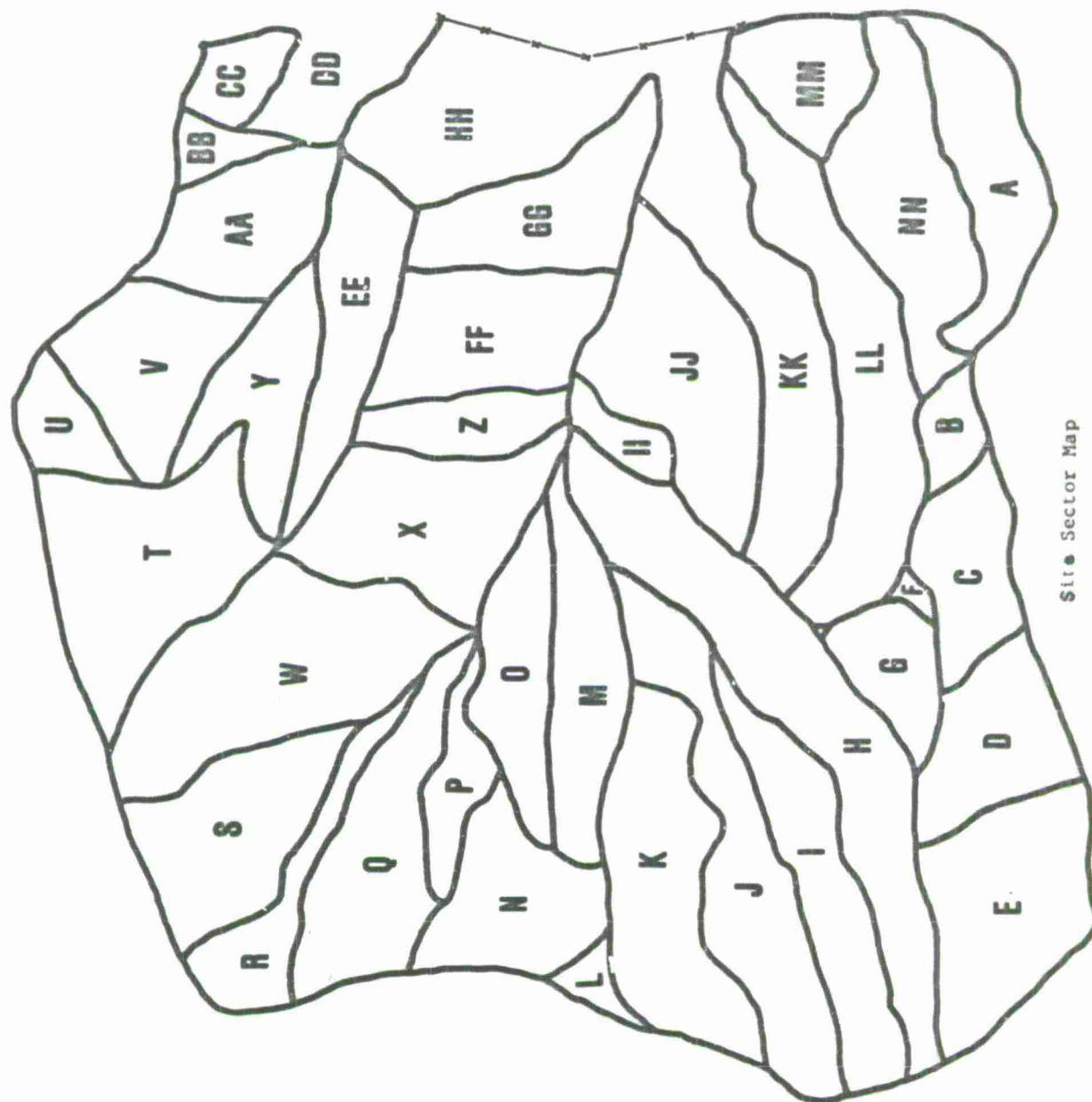
Prior to any ordnance operations on the site, the contractor was required to submit for approval Technical Plans, Management Plans, Safety Plans and SOP's to address all phases of the projected work. This was necessary to ensure the safety of all personnel during work activities and define management structure, responsibilities, work procedure, training, operating procedures, etc. during performance of the contract.

As a part of the preparation of the technical plans, the contractor was required to divide and mark the entire range into sectors and grids. This was required to measure the project progress and provided a basis for project completion payment. The methodology used in sector definition was to establish search/sweep sectors utilizing the natural or man-made boundaries (i.e., roads, fire lanes, mountain peaks and valleys). A total of forty (40) sectors were identified as shown on figure 1. In order to estimate the level of effort required to sweep each of the sectors preliminary surveys were performed to estimate the level of scrap metal contamination expressed in numbers of items per square feet of area.

In support of this project the contractor established facilities within the city of Hawthorne and at the site. The main office was located at Hawthorne and served as the recruitment center and Program Managers' office. The site field trailer served as the command post for the field work, first aid station, radio station and equipment station. Other equipment and materials required to support the project are shown in table 1.

Sweep Procedures

The initial EOD sweep of areas was conducted by EOD qualified personnel. This sweep located and marked the explosive material and identified those items that were to be destroyed in place. These sweeps were normally conducted on Saturdays or after the general labor force left the range. Those ordnance



Site Sector Map

Figure 1.

Table 1
Equipment Requirements

Facilities

Explosive Storage Magazines (2)
Maintenance Traylor (1)
Pallet Weighing Station (1)
Sani-Huts (6 to 10)

Equipment

IT-28 Forklift
Lift All Forklift
Rough Terrain Forklift
5 Ton Truck
10 Ton Truck
Jeeps (2)
Chevrolet Suburban (2)
Honda 4 Wheel Cycles (2)
Honda Trailers (2)
Portable Generators for Radio Transmitters
Water Tanks 1-300 gal., 1-1000 gal.
Fuel Support Tanks 500 gal. (2)
Radios
 Portable (AM) - 7
 Base Station (HF) - 1
 Portable Radios (HF) - 8
 Repeater Station (HF) - 1

Miscellaneous Equipment

Safety Glasses
Hard Hats
Rakes
Wheelbarrels
Fire Fighting Equipment
Picks (6)
Shovels (20)
Buckets (300)
Gloves (50 Doz.)
Safety Rope
First Aid Equipments
Water Coolers (16)

items that could be moved were placed in designated pallets for UXO and transported to the detonation pits for destruction. Those items to be destroyed in place were conspicuously marked for later destruction.

Follow-up sweeps were conducted by teams consisting of an EOD qualified team leader and laborers. These teams performed sweep operations using standard military EOD line abreast procedures. Spacing depended on the density of fragment, ground cover and terrain of the area. Any ordnance located during this follow-up sweep was flagged for later removal or destruction.

As a quality assurance measure, check sweeps were performed prior to government inspection. When the site supervisor was satisfied that the clearance was complete, governmental inspection was requested for sector sweep acceptance.

Sweep Effectiveness Probability (SEP)

The structure of the scope of work required the contractor to clean up all visible fragment greater than one inch in length in any direction and to locate and render safe all unexploded ordnance and explosive material. From this standpoint, the contractor was required to achieve a SEP of 100 for the entire range. This method was somewhat contrary to military ordnance sweep projects where a desirable SEP is established usually 80 to 90 and the area is swept until that SEP is accomplished at which time the area is considered clean.

Prior to this project completion it was decided to collect some data on sweep effectiveness from three different areas of approximately equal size but with varying terrain, ground cover and level of contamination. The three sectors were selected and were swept based on the following:

- Sweep 1: EOD sweep for potentially hazardous items. Time, personnel, item number, and item types were recorded.
- Sweep 2: Clearance sweep; search line with one EOD supervisor for every 10-15 laborers. Time, personnel, pounds of scrap, and EOD item number and types were recorded.
- Sweep 3: Check sweep; search line with one EOD supervisor for every 10-15 laborers. Time, personnel, pounds of scrap, and EOD item number and type were recorded.
- Sweep 4: Inspection sweep; the technical escort representative of the contract officer swept the lane with the site supervisor and one laborer. Pounds of scrap and EOD items and types, if any, were recorded.

Search Effectiveness Probability (SEP) was calculated as the ratio (%) of pounds of scrap collected on Sweep 2 to total pounds of scrap collected on all the sweeps. These SEPs ranged from 93.6 to 97.6. Separate SEPs were also calculated for potentially hazardous items using the ratio (%) of items collected on Sweep 1 to all hazardous items collected. These SEPs ranged from 20 to 83, but were not considered particularly meaningful since the searcher spacing interval was large (6 to 18 ft.) and the EOD searchers were confident that any UXO that was missed would be identified on subsequent sweeps. A comparison of this data with other sweep projects at Kahoolawe Island (Ref 1) and Cuddeback, CA (Ref 2) is shown in Figure 2.

SEARCH RATE VS. SEP

KAHOOLAWE, CUDEBACK, & HWAAP SURFACE

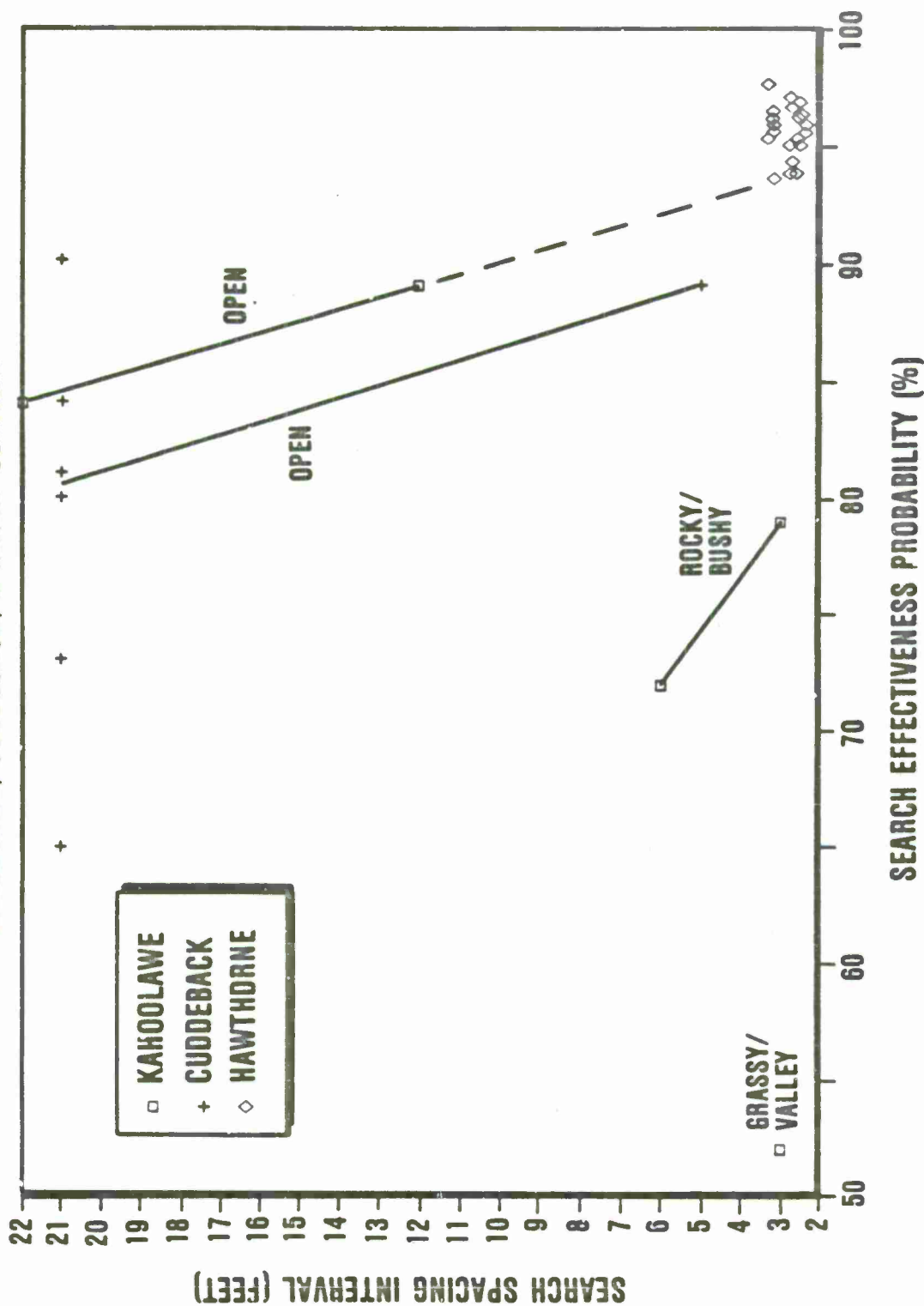


Figure 2.

Fragment and Ordnance
Sector Tally

SECTOR (# of Grids)	AREA (SQ. FEET)	SCRAP METAL (POUNDS)	BULK EXPLOSIVES (POUNDS)	DISPOSAL BY DETONATION (ITEMS)
A(14)	660000	8084	0	0
B(9)	150000	256	0	0
C(26)	650000	70520	0	2
D(23)	800000	134876	0	10
E(37)	1100000	269916	0	16
F(5)	22000	3095	0	0
G(25)	505000	77440	0	0
H(92)	1760000	1063546	0	25
I(70)	1070000	418363	0	1882
J(71)	1440000	754528	0	941
K(68)	1200000	439158	0	10
L(6)	85000	10273	0	0
M(93)	1100000	615773	0	6
N(23)	850000	440793	0	5
O(80)	800000	603852	0	5
P(30)	420000	366647	0	3
Q(42)	970000	390363	0	7
R(12)	370000	76462	0	3
S(18)	900000	269794	0	8
T(12)	1200000	219221	80	2087
U(1)	300000	0	0	0
V(20)	820000	27186	0	0
W(11)	1760000	732044	0	18
X(16)	1060000	396091	0	12
Y(13)	700000	35792	0	1
Z(7)	420000	86782	0	3
AA(7)	660000	5822	0	0
BB(3)	190000	0	0	0
CC(7)	250000	2394	0	0
DD(8)	700000	8526	0	0
EE(4)	760000	55562	0	1
FF(6)	950000	54377	0	2
GG(6)	820000	18136	0	0
HH(9)	1180000	447358	0	4381
II(2)	225000	74370	0	1
JJ(18)	1100000	260172	0	0
KK(25)	1388080	147380	0	5
LL(28)	1470000	51184	0	3
MM(6)	580000	4083	0	0
NN(14)	980000	8150	0	0
VARIOUS	0	0	7342	14991
SUBTOTAL	32365080	8748369	7422	24428
OPTION A	1524600	36179	0	0
OPTION B	5314320	0	0	207
TOTAL	39204000	8784548	7422	24635

* 4722 are Base Fuzes and are not counted as UXO

IV. Surface Sweep Data

The execution of the contract was completed in 228 days. This included mobilization, preliminary surveys, sweep time and demobilization. Personnel levels excluding management varied from 40 to 150 laborers per day. (Contract requirements limited no more than 15 laborers for each EOD supervisor.) Actual sector quantity amounts and ordnance types are shown in Figures 3 and 4. The average sweep rate for the project area was 0.05 acres/man-day which is slow compared to that at Cuddeback (Ref 2) of 0.58 acre per man day. This was to be expected since the contamination of HWAAP averaged over 12,000 lbs. per acre compared to that at Cuddeback of 2500 lbs. per acre. There were nearly 4000 pallets required to containerize the fragment. The final value of this contract was approximately \$2,500,000 for an average of \$3,125 per acre. This value is consistent with those costs identified in Ref 3.

V. Conclusion

The HWAAP New Bomb OB/OD Surface Sweep Project was successfully completed utilizing civilian forces operating under standard EOD military techniques. This project has demonstrated that where the need exists for ordnance cleanup, civilian forces are capable of performing the work. This capability will prove essential to the Department of Defense in the execution of the environmental restoration of present and formerly used ordnance sites.

UXO Quantity Tally

ITEMS	AMOUNT
AP Rounds	12
Base Fuzes	8674
Base Fuzes w/Dets	460
BD Fuze	1
Boosters (Various)	949
Booster Lead Ins	1
Burster Tubes	136
Cads	937
Detonators	35
Explosive Cartridges	227
FAH 30-53	1
Flare Ignitor	1
PMU 851B	1
HE Filled Rounds	2
Hedge Hog	1
Misc. Fuzes	419
Misc. Ordnance Items	811
M43A1 Blue Bomblets	2
M82 Bomb Nose	1
M83 Butterfly	1156
M100 Series Fuze	2
M103 Fuze (Nose)	4
M125A1 Booster	2
M344 PIBD Fuze	1
M904 Fuze	2
Mk 10 Army Device	1
Mk 44 Booster	27
Mk 230 Fuzes	58
Mortar Round	2
Nose Booster	4
Nose Det Fuzes	66
PD Fuze	5
Practice Depth Charges	3
Primers	134
Propellant Booster	1
Propellant Canisters	2
Propellant Cartridges	2
Special Fireworks	4
SQS.	1

Figure 4

UXO Quantity Table (cont'd)

ITEMS	AMOUNT
2.75 Rocket Fuze	1
2.75 Rocket Motors	1
2.75 Rocket Warhead	2
3" APHE Projectile	5
3" HE Projectile	285
3"50 HD Projectile	44
3.5 Fuzes (M404)	232
3.5 Rocket Motor	450
3.5 Rocket Motor & Fuze	79
3.5 Rocket W/H & Fuze	1
3.5 Rocket Warhead	16
3.75 Rocket Moror & Fuze	1
3.75 Rocket Warhead	220
5" HE Projectile	137
6" HE Projectile	217
8" HE Projectile	123
16" HE Projectile	1
20mm HE Round	126
221b. Frag Bomb	38
37mm HE Round	11
40mm HE Round	53
50mm HE Round	9
75mm Mortar	1
81mm Mortar	34
100lb. Bomb (old style)	23
106 Round	5

References

1. NAVEODTEHCEN Technical Report, TR-235, November 1980, "Study of Search Effectiveness of Surface Clearance Techniques on Kahoolawe Island."
2. Site Survey Plan, Cuddeback California, Air to Gunnery Range (AGGR), February 1986.
3. NAVEODTEHCEN Technical Report TR-275, January 1986, "Range Clearance Technology Assessment."

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