



DEPARTMENT OF THE ARMY
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE
P.O. BOX 5008, BUILDING #4463 GIGLING ROAD
MONTEREY, CA 93944-5008

REPLY TO
ATTENTION OF:

MAY 13 2009

Fort Ord BRAC Office

U.S. Environmental Protection Agency
Superfund Federal Facilities Cleanup
ATTN: Lewis Mitani
75 Hawthorne Street, Mail Code SFD-8-3
San Francisco, CA 94105

Approval Memorandum
Proposed No Action
Site HA-92 – Old Demolition Training Area
Former Fort Ord, California

Dear Mr. Mitani:

This letter presents the approval memorandum for No Action (NoA) Site HA-92 – Old Demolition Training Area, also designated as MRS-3, Range 49, former Fort Ord, California. Copies of this letter have been sent to the United States Environmental Protection Agency (EPA), and departments of the California Environmental Protection Agency (Cal/EPA), including the Central Coast Regional Water Quality Control Board (RWQCB) and the Department of Toxic Substances Control (DTSC).

No further action for chemical contamination in soil is proposed for site HA-92. Site HA-92 meets the criteria specified in the approved *No Action Plug-In Record of Decision, Fort Ord, California* (NoA ROD) dated February 1995. The NoA ROD outlined a process and established necessary criteria for identifying and approving sites for NoA. NoA sites at Fort Ord are either Category 1 sites that are already in a protective state and pose no current or potential threat to human health or the environment, or Category 2 sites where CERCLA does not provide authority to take any remedial action. This approval memorandum provides a description of the site and completed investigations, and demonstrates the site's conformance with the NoA criteria for Category 1 sites established in the NoA ROD. This memo evaluates the risk of the chemicals present in soil, and does not address possible physical hazards related to munitions and explosives of concern (MEC). The MEC hazards are identified in the *Final Track 2 Munitions Response Remedial Investigation Feasibility Study, Parker Flats Munitions Response Area, Former Fort Ord, California*, August 2006.

CHARACTERIZATION REPORT SUMMARY

The Army has documented the results of the HA-92 characterization in the *Comprehensive Basewide Range Assessment Report Revision 1C* dated November 2006. The results of the characterization are summarized below.

Site HA-92 is located in Parker Flats, just north of the Impact Area (Figure 1). The site was used as a land mine, anti-armor course, and as a demolition area. MEC removal was

conducted in October 1998 at which time 167 items were removed including 81mm mortars, firing devices, and practice land mines. Additional site reconnaissance was conducted in August 2001. Military training features identified during this survey include: fighting positions, seven firing points, 14 locations of blank casings, one soil pit, two spent grenades (model and condition, not identified), three spent pyrotechnics, and one rifle grenade (model, condition not identified). Ten of the firing positions are in the northeast corner of the site. The two remaining firing positions are located in the northwest corner of the site. Two sets of blank small arms ammunition casings and two sets of sandbags are located along the southern border of this site. In Grid 107E several old ammo burn pits were found that contained vehicle parts and assorted trash. This location was selected for sampling to evaluate potential contamination related to trash burials and the burn pits.

Field Program

Soil samples were collected at 10 locations from the surface, and one and two feet below ground surface (bgs) in June 2002. Sample locations and concentrations of detected analytes are shown on Plate 2. Total petroleum hydrocarbons as gasoline, diesel and motor oil (TPHg, EPA (8260) TPHd and TPHmo, EPA (8015), antimony, copper, lead, semi-volatile organic compounds (SVOCs), EPA (8270C) and explosives EPA (8330) were analyzed for in all 10 locations.

Subsurface Conditions

In general, subsurface soil at HA-92 consists predominately of dark yellowish brown silty sand to a depth of 2.0 feet bgs (the maximum depth explored). Most of the sand was classified as loose, dry, and fine- to medium-grained. No groundwater was encountered during soil sampling procedures. Depth to groundwater at the site is approximately 250 feet bgs.

Analytical Results

A comparison of maximum detected chemical concentrations in soil at HA-92 with preliminary remediation goals (PRGs) is provided in Table 1. PRGs are chemical concentrations in soil expected to result in acceptable cancer risks (i.e., one-in-one-million) and noncancer health effects. The PRGs were developed as part of the No-Action ROD. Based on historical uses of the site as a land mine, anti-armor course, and demolition area and the identification of several old ammunition burn pits and drums, samples were analyzed for antimony, copper, and lead by EPA Method 6010B, TPH as gasoline (TPHg) TPHd, and TPHmo by EPA Method 8015, semi-volatile organic compounds (SVOCs) by EPA Method 8270C, and explosives by EPA Method 8330. Antimony was detected in 4 (2 surface and 2 subsurface) of the 22 samples collected with a maximum detected concentration of 0.27 milligrams per kilogram (mg/kg), which is two orders of magnitude lower than the PRG of 27 mg/kg. Copper and lead were detected above the reporting limit in all of the samples with maximum detected concentrations of 48 mg/kg and 17 mg/kg, respectively, which are also below their respective PRGs. The copper maximum concentration is nearly two orders of magnitude lower than the PRG of 2,500 mg/kg, and the lead maximum concentration is over one order of magnitude lower than the PRG of 240 mg/kg. The maximum concentration for these three metals was also compared to maximum background concentrations that were established for Fort Ord as part of the *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California* dated October 1995 and presented on Table 2. Antimony and lead were below

their maximum background concentrations of 8.2 mg/kg and 51.8 mg/kg, respectively. Copper was above the background concentration of 18.2 mg/kg. Di-n-butylphthalate, TPHd, and TPHmo were the only organic compounds detected at HA-92 at maximum concentrations of 0.075 mg/kg, 17 mg/kg, and 56 mg/kg, respectively, which are below their PRGs of 1,600 mg/kg, 500 mg/kg, and 500 mg/kg, respectively. Copper, di-n-butylphthalate, TPHd, and TPHmo were retained as site-related chemicals (SRCs). No explosive compounds were detected.

Screening Risk Evaluation

MACTEC conducted a screening risk evaluation (SRE) based on the site characterization data presented in Table 1. The SRE consisted of the following:

- Comparing concentrations of chemicals detected in soil at HA-92 with chemical-specific PRGs to evaluate the need for further action at the site;
- Evaluating potential impacts to groundwater; and
- Providing a qualitative discussion of ecological receptors.

The NoA ROD identified Category 1 sites as sites where the level of contamination is below the levels required for protection of human health (e.g., PRGs) and the environment. PRGs were developed specifically for Fort Ord and represent soil concentrations considered to result in estimated daily doses (1) associated with an estimated one-in-one-million probability that an exposed individual would develop cancer (i.e., 10^{-6} cancer risk) or (2) expected to be without appreciable risk of deleterious noncancer health effects (i.e., hazard quotient less than 1). The methodology and assumptions used to develop PRGs were presented in the *Draft Final Technical Memorandum, Preliminary Remediation Goals*, dated June 24, 1994. Following review of soil sample analytical results from HA-92, detected chemicals were divided into two categories: (1) chemicals that may be present as a result of Army activities at the site (i.e., site-related) and (2) chemicals considered to be naturally occurring and not related to Army activities (i.e., background). The same chemical can have both background- and site-related components where there are contributions from site activities as well as from natural occurrences. Copper, di-n-butylphthalate, TPH-diesel, and TPH-motor oil were the chemicals addressed as a site related chemical (SRCs) at HA-92. Copper was retained as a SRC because the maximum detected concentration was above the maximum measured background concentration. Background concentrations were not established for SVOCs and TPHs because they are automatically assumed to be site-related chemicals. Antimony and lead were considered to be present at concentrations representative of natural background and were therefore evaluated as background-related chemicals.

Comparison of Site Soil Data with PRGs

PRGs for chemicals detected in the soil at HA-92 were compared with site-specific data by calculating ratios of chemical concentrations to PRGs (Table 2). The chemical concentrations used in these ratios include:

- Maximum detected site concentration (MSC);

- Calculated component concentration representing the portion attributed to site activities (MSRC); and
- Calculated component concentration representing the portion attributed to background (MBC).

A chemical-specific ratio of 1 or less indicates that the maximum detected or calculated concentration is less than or equal to the PRG and, therefore, substantial health risks are not likely to be associated with that chemical. A ratio greater than 1 indicates that the concentration of the chemical exceeds the health-based PRG. To evaluate possible exposure to multiple chemicals, the effects of multiple chemicals were assumed to be additive and the ratios were added together to calculate a ratio sum (RS). A RS less than 1 indicates that substantial health risks are not likely to be associated with exposure to the multiple chemicals evaluated; an RS greater than 1 indicates further action may be necessary.

Table 2 is divided into a top panel for chemicals considered to be site-related and a bottom panel for chemicals considered to be background-related. For SRCs, the background component is assumed to be equivalent to the maximum background concentration (MBC) for that chemical as identified in the *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California, Volume II – Remedial Investigation, Basewide Background Soil Investigation, Final* dated October 1995. The site-related component (MSRC) is then calculated by subtracting this background component from the MSC. For SRCs, the total, background-related, and site-related concentrations were compared with the chemical-specific PRG using the ratios and RS calculations mentioned above. For background-related chemicals, the site-related component was considered to be 0, and the MSC has only a background component. As a result, for background-related chemicals, the MSC/PRG ratio is equivalent to the MBC/PRG ratio.

Site-Related Chemicals

The site-related components or SRCs evaluated at HA-92 were compared to PRGs (MSRC/PRG ratios, Table 2). The chemical-specific MSRCs for copper, di-n-butylphthalate, TPH-diesel, and TPH-motor oil evaluated at HA-92 are below the PRGs, as indicated by the MSRC/PRG ratios of less than 1.0 (Table 2, top panel). The site-related RS subtotal for the SRC is 0.16 (Table 2, top panel).

The site- and background-related components of SRCs were summed for use by risk managers (Table 2, top panel). The MSCs for chemicals evaluated at HA-92 are all less than the PRGs, as indicated by MSC/PRG ratios of less than 1.0 and the MSC/PRG RS subtotal for the SRCs of 0.17. This analysis indicates that health risks from possible exposure to the site-related components of the SRCs evaluated at HA-92 are acceptably low.

Background-Related Chemicals

The maximum detected concentrations of other metal at HA-92 were also compared with corresponding PRGs using background-related ratios (MSC/PRGs) and RS (Table 2, bottom panel). The measured concentrations of these metals, as well as the background component of the SRCs evaluated above, were considered to be naturally occurring and not related to discharge or other activities at the site. Accordingly, possible health effects of these metals were considered to be part of the risks inherent in day-to-day living in the region.

MSC/PRG ratios and RSs are presented herein to provide a context for risk management decisions at Fort Ord sites.

Potential Groundwater Impacts

The potential for TPHd at 500 mg/kg to impact groundwater was modeled using an EPA vadose zone leaching (VLEACH) and a groundwater mixing model as part of the *Draft Technical Memorandum: Approach to Evaluating Potential Groundwater Quality Impacts, Fort Ord, California* dated July 29, 1993. The results of modeling indicated that unknown TPHd at a concentration of 500 mg/kg in near surface soil is relatively immobile with negligible chemical mass reaching the uppermost aquifer. The concentrations of the three surrogates (dodecane, naphthalene, and chrysene) used to model TPHd were below detection limits for the chemicals. Based on the modeling results presented in the Technical Memorandum and described above, TPH detected at HA-92 at a maximum concentration of 56 mg/kg for TPHmo is unlikely to impact groundwater at this site. All TPH concentrations are also below the Monterey County Action Level of 100 mg/kg, which is considered protective of groundwater. Di-n-butylphthalate is also unlikely to impact groundwater at the concentrations seen at HA-92 (maximum of 0.075 mg/kg). The concentrations are well below the PRG of 1,600 mg/kg.

It is not anticipated that copper would impact groundwater based on the results of the *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California* dated October 1995 which indicates that leaching of metals to subsurface soil or groundwater at the former Fort Ord is not significant due to the depth of groundwater (generally greater than 80 feet) and soil conditions. Depth to groundwater at HA-92 is estimated at over 250 feet. Based on the results of the 1995 RI/FS and the depth to groundwater at HA-92, impacts to groundwater from metals at the site are not expected.

Ecological Receptors

A qualitative ecological SRE was conducted for lead at HA-92 using the findings from the *Basewide RI/FS Ecological Risk Assessment, Fort Ord, California* (BERA) dated October 1995 and the *Ecological Risk Assessment for Site 39 Ranges, Habitat Areas, Impact Area, Former Fort Ord, California* (ERA) dated October 31, 2007. The BERA and the ERA included a thorough evaluation of chemicals of potential ecological concern (COPECs) and the risks to ecological receptors associated with COPECs. Several chemicals were identified, sampled for in the RI, and evaluated as COPECs in the BERA (HLA, 1995). However, that evaluation indicated that the only chemicals which showed the potential for risk to ecological receptors were lead and the explosive compound cyclotetramethylene tetranitramine (HMX). TPH was found to be a risk driver for human health only. The other COPECs were evaluated but showed no or low potential for risks to ecological receptors. Antimony and copper were added as COPECs in the ERA since these chemicals are associated with small arms (as demonstrated by studies in the Basewide RI/FS) and have been shown to be risk drivers at other small arms sites (e.g., Site 3, the Beach Trainfire Ranges).

Since lead was the main risk driver in the ERA, threshold values for copper were not calculated in the ERA; therefore, copper concentrations were compared to EPA's ecological soil screening levels (Eco-SSL) for copper as published in *Ecological Screening Levels for Copper, Interim Final OSWER Directive 9285,7-68* dated February 2007,. The maximum

concentration for copper at 48 mg/kg was above the background concentration of 18.2 mg/kg and the avian Eco-SSL of 28 mg/kg, but below the mammalian Eco-SSL of 49 mg/kg. A 95 UCL for copper was calculated because the EPA's *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)* dated 1989 recommends using an estimate of the upper confidence limit (UCL) on the mean as an exposure point concentration (EPC) for prolonged exposures where it is appropriate to group data. The 95 percent UCL was calculated in this ecological SRE for copper using EPA's *ProUCL Version 4.0* dated 2007. The 95 UCL established for copper at HA-92 is 14.69 mg/kg (Table 3). The 95 UCL for copper at a concentration of 14.69 mg/kg was below the background concentration of 18.2 mg/kg, the avian Eco-SSL of 28 mg/kg, and the mammalian Eco-SSL of 49 mg/kg.

Although TPH was found to be a risk driver for human health only in the BERA, the TPH concentrations at HA-92 were also compared to the Monterey County Action Level of 100 mg/kg. The concentrations of diesel and motor oil were one order of magnitude to nine times lower than the action level. The chemical di-n-butylphthalate does not have an established ecological screening value established, but is over five magnitudes lower than the PRG of 1,600 mg/kg. Therefore, no additional action is needed to address ecological receptors at HA-92.

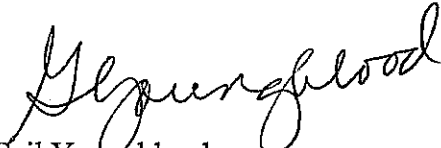
RECOMMENDED ACTION

On the basis of investigations completed and summarized above, no further action at HA-92 is recommended.

Please feel free to contact me at (831) 242-7918 with any questions you may have regarding the proposed No Action. Notification of the proposed No Action will be placed in a major local newspaper within 2 weeks of approval of this memorandum.

Your prompt attention to this proposed No Action approval Memorandum is sincerely appreciated

Sincerely,


Gail Youngblood
BRAC Environmental Coordinator

Enclosures:

Table 1	Soil Analytical Results for HA-92
Table 2	Comparison of Maximum Detected HA-92 Chemical Concentrations and Preliminary Remediation Goals
Table 3	General UCL Statistics for Full Data Sets for Copper at HA-92
Plate 1	Site Location Map
Plate 2	Investigation Results

Table 1. Soil Analytical Results for HA-92
 No Action Approval Memorandum
 Former Fort Ord

Sample Location	Sample Date	Sample Depth (feet bgs)	Antimony mg/kg		Copper mg/kg		Lead mg/kg		Di-n-butylphthalate mg/kg		TPH-Diesel mg/kg		TPH-Motor Oil mg/kg	
HA92SI0001	6/24/2002	0.08	ND(5)	U / A	24	/ A	6.7	/ A	ND(0.33)	U / A	ND(10)	U / A	ND(50)	U / A
HA92SI0002	6/24/2002	0.08	0.22	B / A	48	/ A	17	/ A	ND(0.34)	U / A	2.9	J / A	18	J / A
HA92SI0003	6/25/2002	0.08	0.27	B / A	6.6	/ A	5.7	/ A	0.053	J / A	1.1	J / A	5.2	J / A
HA92SI0004	6/25/2002	0.08	ND(5.1)	U / A	20	/ A	6.9	/ A	0.075	J / A	1.4	J / A	9	J / A
HA92SI0005	6/25/2002	0.08	ND(5)	U / A	5.6	/ A	6	/ A	ND(0.33)	U / A	ND(10)	U / A	2.4	J / A
Duplicate	6/25/2002	0.08	ND(5)	U / A	5.3	/ A	5.6	/ A	ND(0.33)	U / A	ND(10)	U / A	1.7	J / A
HA92SI0006	6/24/2002	0.08	ND(5)	U / A	0.65	B / A	1.1	/ A	ND(0.33)	U / A	ND(10)	U / A	ND(50)	U / A
Duplicate	6/24/2002	0.08	ND(5)	U / A	0.63	B / A	1.2	/ A	ND(0.33)	U / A	ND(10)	U / A	ND(50)	U / A
	6/24/2002	1.08	ND(5.1)	U / A	1.4	/ A	1.6	/ A	ND(0.34)	U / A	ND(10)	U / A	3.5	J / A
	6/24/2002	2.08	ND(5.2)	U / A	6.6	/ A	2.6	/ A	ND(0.34)	U / A	17	/ A	56	/ A
HA92SI0007	6/25/2002	0.08	ND(5.1)	U / A	3.9	/ A	11	/ A	ND(0.33)	U / A	1.2	J / A	7.3	J / A
	6/25/2002	1.08	ND(5.1)	U / A	0.47	B / A	1.6	/ A	ND(0.34)	U / A	ND(10)	U / A	ND(51)	U / A
	6/25/2002	2.08	ND(5.1)	U / A	0.51	B / A	1.5	/ A	ND(0.34)	U / A	ND(10)	U / A	ND(51)	U / A
HA92SI0008	6/24/2002	0.08	ND(5.1)	U / A	5.3	/ A	6.9	/ A	ND(0.33)	U / A	3.5	J / A	12	J / A
	6/24/2002	1.08	0.14	B / A	3.4	/ A	2.6	/ A	ND(0.34)	U / A	2	J / A	4.8	J / A
	6/24/2002	2.08	ND(5.2)	U / A	3.4	/ A	3	/ A	ND(0.34)	U / A	1.1	J / A	5.4	J / A
HA92SI0009	6/24/2002	0.08	ND(5)	U / A	0.86	B / A	1.6	/ A	ND(0.33)	U / A	ND(10)	U / A	ND(50)	U / A
	6/24/2002	1.08	0.14	B / A	0.81	B / A	1.4	/ A	ND(0.34)	U / A	ND(10)	U / A	ND(51)	U / A
	6/24/2002	2.08	ND(5.2)	U / A	0.71	B / A	1.2	/ A	ND(0.34)	U / A	ND(10)	U / A	ND(51)	U / A
HA92SI0010	6/25/2002	0.08	ND(5)	U / A	3.2	/ A	5	/ A	ND(0.33)	U / A	1.2	J / A	3.1	J / A
	6/25/2002	1.08	ND(5.1)	U / A	1.2	/ A	1.4	/ A	ND(0.34)	U / A	ND(10)	U / A	ND(51)	U / A
	6/25/2002	2.08	ND(5.1)	U / A	0.81	B / A	1.3	/ A	ND(0.34)	U / A	ND(10)	U / A	ND(51)	U / A
Preliminary Remediation Goals ^a			27		2,500		240		1,600		500		500	

Abbreviations:

feet bgs = Feet below ground surface.

mg/kg = Milligram per kilogram.

ND = Not detected.

B / A = Laboratory qualifier / validation qualifier.

Laboratory Qualifiers:

B = Estimated result; result is less than the reporting limit.

J = Result is detected below the reporting limit, but greater than the method detection limit.

U = Compound was analyzed for but not detected.

Validation Qualifiers:

A = Data were subjected to routine data validation.

 = Maximum detected concentration

a The Preliminary Remediation Goals (PRGs) are from the No Action Plug-In Record of Decision, Fort Ord, California (Army, 1995).

Table 2. Comparison of Maximum Detected HA-92 Soil Chemical Concentrations with Background Concentrations and Preliminary Remediation Goals
 No Action Approval Memorandum
 Former Fort Ord

Chemical	Maximum Detected Site Concentration (MSC) (mg/kg)	Maximum Background Concentration in Soil (MBC) ^a (mg/kg)	Maximum Site-Related Concentration (MSRC) ^b (mg/kg)	Preliminary Remediation Goal (PRG) ^c (mg/kg)	Chemical Total MSC/PRG ^d Ratio	Background-Related MBC/PRG ^{e,f} Ratio	Site-Related MSRC/PRG ^g Ratio
Site-Related Chemicals							
Copper	48	18.2	29.8	2,500	0.019	0.007	0.012
Di-n-butylphthalate	0.075	NA	NA	1,600	0.00005	NA	0.000
TPH-Diesel	17	NA	NA	500	0.034	NA	0.034
TPH-Motor Oil	56	NA	NA	500	0.112	NA	0.112
Ratio Sum Subtotal (site-related)					0.17	0.01	0.16
Background-Related Chemicals							
Antimony	0.27	8.2	NA	27	0.010	0.010	NA
Lead	17	51.8	NA	240	0.071	0.071	NA
Ratio Sum Subtotal (background-related)					0.08	0.08	NA
Ratio Sum Total (site- and background-related)					0.25	0.09	0.16

Abbreviations:

MSC = Maximum detected site concentration.
 mg/kg = Milligram per kilogram.
 MBC = Maximum background concentration in soil.
 MSRC = Maximum site-related concentration.
 PRG = Preliminary Remediation Goal.
 NA = Not applicable.

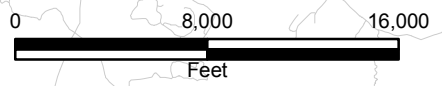
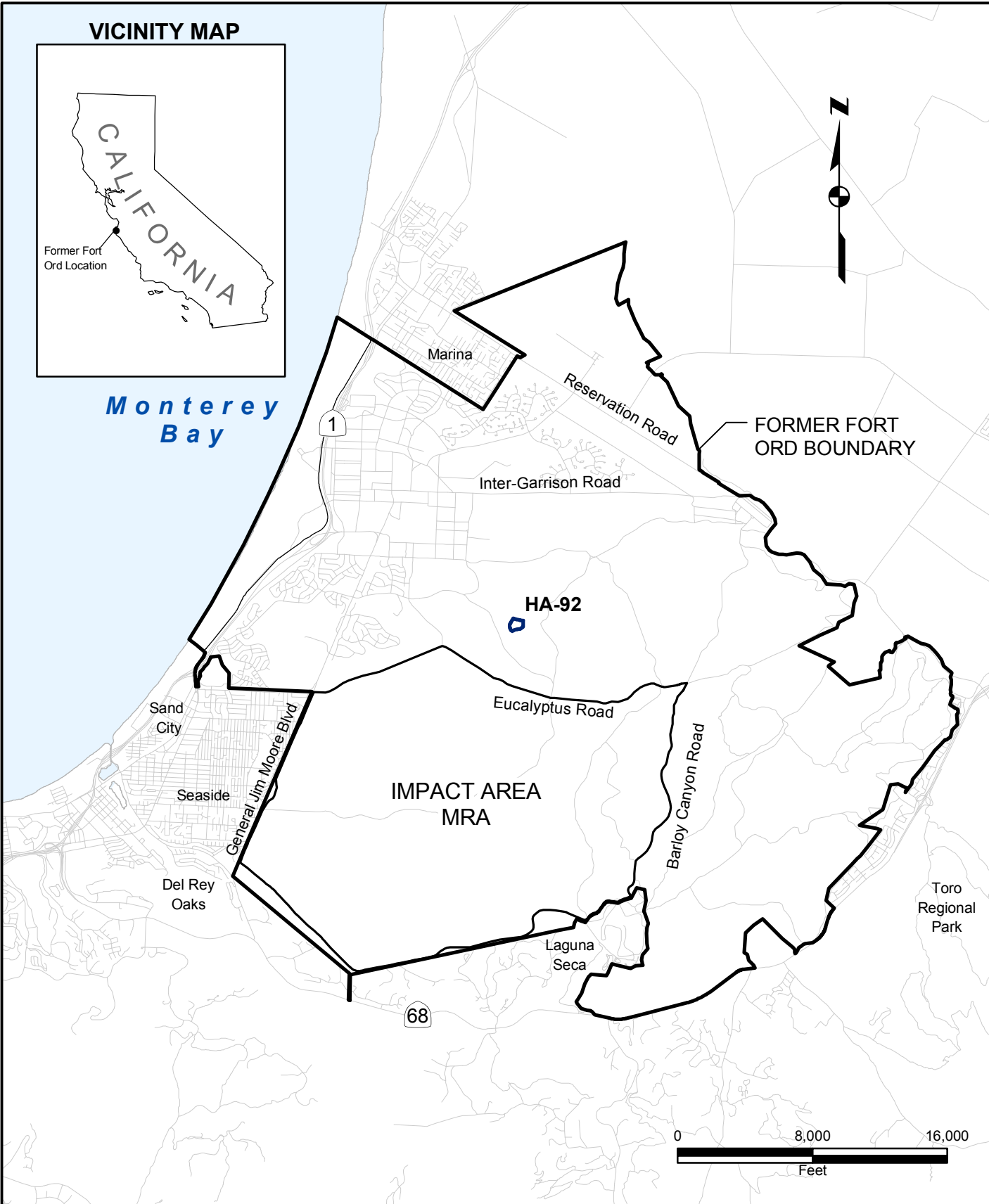
Footnotes:

- ^a Background concentrations in soil are from *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California, Volume II - Remedial Investigation, Basewide Background Soil Investigation, Final* (HLA, 1995).
^b MSRC = MSC - MBC
^c The Preliminary Remediation Goals (PRGs) are from the *No Action Plug-In Record of Decision, Fort Ord, California (Army, 1995)*.
^d Chemical Total = MSC ÷ PRG.
^e Background-Related = MBC ÷ PRG.
^f For background-related chemicals (antimony and copper) this value is the same as the chemical-related ratio because the site related component is assumed to be zero.
^g Site-Related = MSRC ÷ PRG.

VICINITY MAP



Monterey Bay

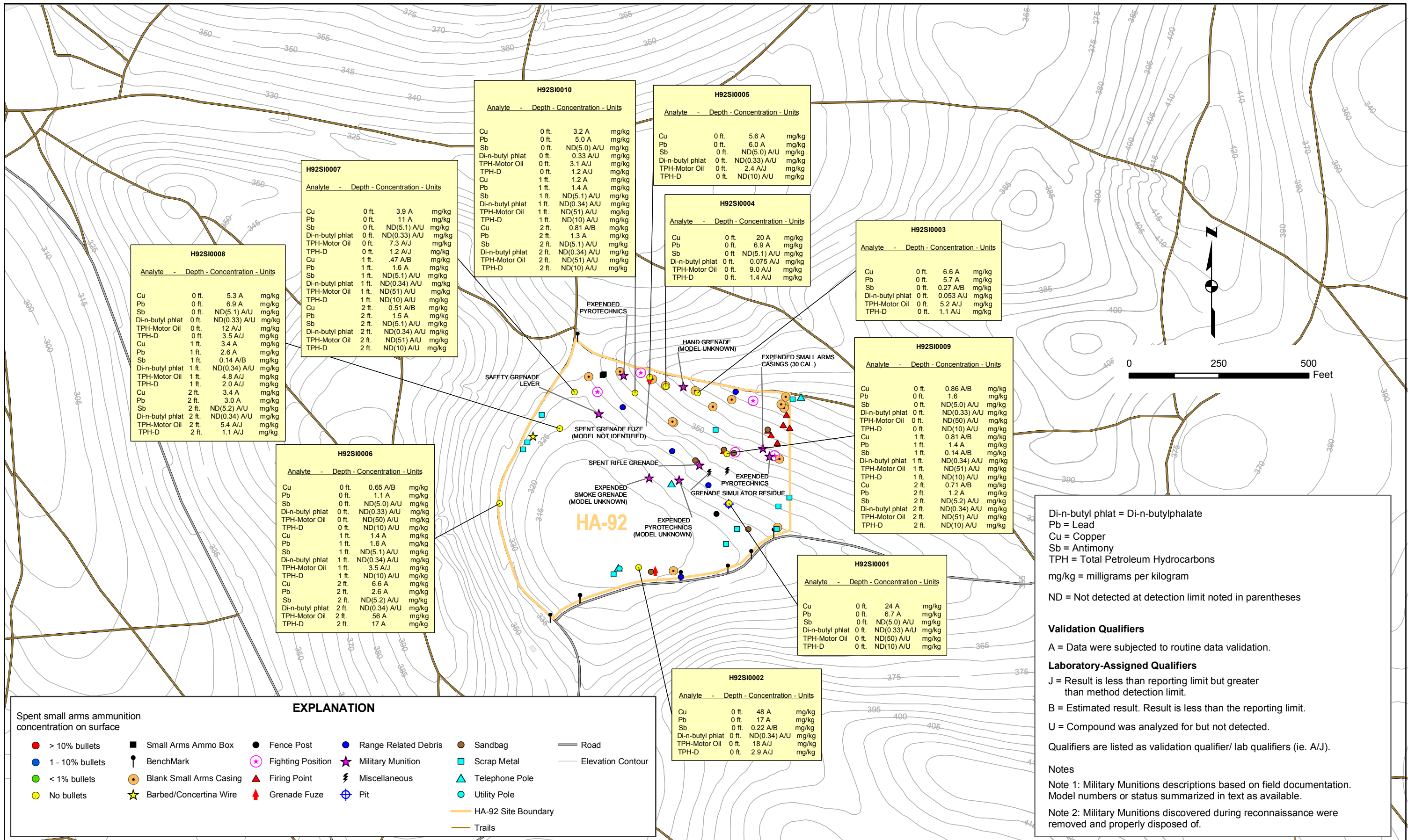


Site Location Map
Approval Memorandum
Site HA-92 - Old Demolition Training Area, Range 49
Former Fort Ord, California

PLATE
1

DRAWN TJH JOB NUMBER 4084075127 01 CHECKED CHECKED DATE APPROVED APPROVED DATE 2/2008

HA092-Plate1.mxd - 2/1/08



H92SI0008

Analyte	Depth	Concentration	Units
Cu	0 ft.	5.3 A	mg/kg
Pb	0 ft.	6.9 A	mg/kg
Sb	0 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.33) A/U	mg/kg
TPH-Motor Oil	0 ft.	12 A/J	mg/kg
TPH-D	0 ft.	3.5 A/J	mg/kg
Cu	1 ft.	3.4 A	mg/kg
Pb	1 ft.	2.6 A	mg/kg
Sb	1 ft.	0.14 A/B	mg/kg
Di-n-butyl phlat	1 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	1 ft.	4.8 A/J	mg/kg
TPH-D	1 ft.	2.0 A/J	mg/kg
Cu	2 ft.	3.4 A	mg/kg
Pb	2 ft.	3.0 A	mg/kg
Sb	2 ft.	ND(5.2) A/U	mg/kg
Di-n-butyl phlat	2 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	2 ft.	5.4 A/J	mg/kg
TPH-D	2 ft.	1.1 A/J	mg/kg

H92SI0007

Analyte	Depth	Concentration	Units
Cu	0 ft.	3.9 A	mg/kg
Pb	0 ft.	11 A	mg/kg
Sb	0 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.33) A/U	mg/kg
TPH-Motor Oil	0 ft.	7.3 A/J	mg/kg
TPH-D	0 ft.	1.2 A/J	mg/kg
Cu	1 ft.	.47 A/B	mg/kg
Pb	1 ft.	1.6 A	mg/kg
Sb	1 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	1 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	1 ft.	ND(51) A/U	mg/kg
TPH-D	1 ft.	ND(10) A/U	mg/kg
Cu	2 ft.	0.51 A/B	mg/kg
Pb	2 ft.	1.5 A	mg/kg
Sb	2 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	2 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	2 ft.	ND(51) A/U	mg/kg
TPH-D	2 ft.	ND(10) A/U	mg/kg

H92SI0010

Analyte	Depth	Concentration	Units
Cu	0 ft.	3.2 A	mg/kg
Pb	0 ft.	5.0 A	mg/kg
Sb	0 ft.	ND(5.0) A/U	mg/kg
Di-n-butyl phlat	0 ft.	0.33 A/U	mg/kg
TPH-Motor Oil	0 ft.	3.1 A/J	mg/kg
TPH-D	0 ft.	1.2 A/J	mg/kg
Cu	1 ft.	1.2 A	mg/kg
Pb	1 ft.	1.4 A	mg/kg
Sb	1 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	1 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	1 ft.	ND(51) A/U	mg/kg
TPH-D	1 ft.	ND(10) A/U	mg/kg
Cu	2 ft.	0.81 A/B	mg/kg
Pb	2 ft.	1.3 A	mg/kg
Sb	2 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	2 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	2 ft.	ND(51) A/U	mg/kg
TPH-D	2 ft.	ND(10) A/U	mg/kg

H92SI0005

Analyte	Depth	Concentration	Units
Cu	0 ft.	5.6 A	mg/kg
Pb	0 ft.	6.0 A	mg/kg
Sb	0 ft.	ND(5.0) A/U	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.33) A/U	mg/kg
TPH-Motor Oil	0 ft.	2.4 A/J	mg/kg
TPH-D	0 ft.	ND(10) A/U	mg/kg

H92SI0004

Analyte	Depth	Concentration	Units
Cu	0 ft.	20 A	mg/kg
Pb	0 ft.	6.9 A	mg/kg
Sb	0 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	0 ft.	0.075 A/J	mg/kg
TPH-Motor Oil	0 ft.	9.0 A/J	mg/kg
TPH-D	0 ft.	1.4 A/J	mg/kg

H92SI0003

Analyte	Depth	Concentration	Units
Cu	0 ft.	6.6 A	mg/kg
Pb	0 ft.	5.7 A	mg/kg
Sb	0 ft.	0.27 A/B	mg/kg
Di-n-butyl phlat	0 ft.	0.053 A/J	mg/kg
TPH-Motor Oil	0 ft.	5.2 A/J	mg/kg
TPH-D	0 ft.	1.1 A/J	mg/kg

H92SI0009

Analyte	Depth	Concentration	Units
Cu	0 ft.	0.86 A/B	mg/kg
Pb	0 ft.	1.6	mg/kg
Sb	0 ft.	ND(5.0) A/U	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.33) A/U	mg/kg
TPH-Motor Oil	0 ft.	ND(50) A/U	mg/kg
TPH-D	0 ft.	ND(10) A/U	mg/kg
Cu	1 ft.	0.81 A/B	mg/kg
Pb	1 ft.	1.4 A	mg/kg
Sb	1 ft.	0.14 A/B	mg/kg
Di-n-butyl phlat	1 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	1 ft.	ND(51) A/U	mg/kg
TPH-D	1 ft.	ND(10) A/U	mg/kg
Cu	2 ft.	0.71 A/B	mg/kg
Pb	2 ft.	1.2 A	mg/kg
Sb	2 ft.	ND(5.2) A/U	mg/kg
Di-n-butyl phlat	2 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	2 ft.	ND(51) A/U	mg/kg
TPH-D	2 ft.	ND(10) A/U	mg/kg

H92SI0006

Analyte	Depth	Concentration	Units
Cu	0 ft.	0.65 A/B	mg/kg
Pb	0 ft.	1.1 A	mg/kg
Sb	0 ft.	ND(5.0) A/U	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.33) A/U	mg/kg
TPH-Motor Oil	0 ft.	ND(50) A/U	mg/kg
TPH-D	0 ft.	ND(10) A/U	mg/kg
Cu	1 ft.	1.4 A	mg/kg
Pb	1 ft.	1.6 A	mg/kg
Sb	1 ft.	ND(5.1) A/U	mg/kg
Di-n-butyl phlat	1 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	1 ft.	3.5 A/J	mg/kg
TPH-D	1 ft.	ND(10) A/U	mg/kg
Cu	2 ft.	6.6 A	mg/kg
Pb	2 ft.	2.6 A	mg/kg
Sb	2 ft.	ND(5.2) A/U	mg/kg
Di-n-butyl phlat	2 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	2 ft.	56 A	mg/kg
TPH-D	2 ft.	17 A	mg/kg

H92SI0001

Analyte	Depth	Concentration	Units
Cu	0 ft.	24 A	mg/kg
Pb	0 ft.	6.7 A	mg/kg
Sb	0 ft.	ND(5.0) A/U	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.33) A/U	mg/kg
TPH-Motor Oil	0 ft.	18 A/J	mg/kg
TPH-D	0 ft.	ND(10) A/U	mg/kg

H92SI0002

Analyte	Depth	Concentration	Units
Cu	0 ft.	48 A	mg/kg
Pb	0 ft.	17 A	mg/kg
Sb	0 ft.	0.22 A/B	mg/kg
Di-n-butyl phlat	0 ft.	ND(0.34) A/U	mg/kg
TPH-Motor Oil	0 ft.	18 A/J	mg/kg
TPH-D	0 ft.	2.9 A/J	mg/kg

EXPLANATION

● > 10% bullets	■ Small Arms Ammo Box	● Fence Post	● Range Related Debris	● Sandbag	— Road
● 1 - 10% bullets	⬆ BenchMark	⊕ Fighting Position	★ Military Munition	■ Scrap Metal	— Elevation Contour
● < 1% bullets	● Blank Small Arms Casing	▲ Firing Point	⚡ Miscellaneous	▲ Telephone Pole	
● No bullets	★ Barbed/Concertina Wire	▲ Grenade Fuze	⊕ Pit	● Utility Pole	
				— HA-92 Site Boundary	
				— Trails	

Di-n-butyl phlat = Di-n-butylphalate
 Pb = Lead
 Cu = Copper
 Sb = Antimony
 TPH = Total Petroleum Hydrocarbons
 mg/kg = milligrams per kilogram
 ND = Not detected at detection limit noted in parentheses

Validation Qualifiers
 A = Data were subjected to routine data validation.

Laboratory-Assigned Qualifiers
 J = Result is less than reporting limit but greater than method detection limit.
 B = Estimated result. Result is less than the reporting limit.
 U = Compound was analyzed for but not detected.

Qualifiers are listed as validation qualifier/ lab qualifiers (ie. A/J).

Notes
 Note 1: Military Munitions descriptions based on field documentation. Model numbers or status summarized in text as available.
 Note 2: Military Munitions discovered during reconnaissance were removed and properly disposed of.

DRAWN: TJH	PROJECT NO: 4084075127 01
ENGINEER:	SCALE: AS SHOWN
CHECKED:	APPROVED:
DATE: 1/2008	DATE:



Approval Memorandum
 Site HA-92 - Old Demolition Training Area, Range 49
 Former Fort Ord, California

Investigation Results
 HA-92

HA092-Plate2.mxd - 2/28/08