DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser N45W/0012
04 Feb 2009

California Environmental Protection Agency
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Attention: Stephen Niou

Ladies and Gentlemen:

The enclosed is forwarded for your concurrence. Please forward your written concurrence by March 6, 2009.

If you have any questions, please contact Dr. Margaret Wallerstein at 562-626-7838.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

Enclosure: 1. Final Site Inspection Report, Naval Weapons Station Seal Beach Detachment Fallbrook, Munitions Response Program Site UXO5, Salvage Yard Burial Area, Fallbrook, California, dated February 4, 2009.

Copy to:
Naval Facilities Engineering Command
Southwest Division
Attention: Jacqueline Dunn
1220 Pacific Highway
San Diego CA 92132-5190

DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser N45W/0013
04 Feb 2009

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Ste. 100
San Diego, CA 92123-4353

Attention: Xueyuan (Helen) Yu, Ph.D.

Ladies and Gentlemen:

The enclosed is forwarded for your concurrence. Please forward your written concurrence by March 6, 2009.

If you have any questions, please contact Dr. Margaret Wallerstein at 562-626-7838.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
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800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser N45W/0014
04 Feb 2009

U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

Attention: Jonathan Snyder

Ladies and Gentlemen:

The enclosed is forwarded for your information only.

If you have any questions, please contact Dr. Margaret Wallerstein at 562-626-7838.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

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Naval Facilities Engineering Command Southwest
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

Contract No. N62473-06-D-2201
CTO No. 0014

FINAL

SITE INSPECTION REPORT

February 4, 2009

DCN: ECSD-2201-0014-0002

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
MUNITIONS RESPONSE PROGRAM SITE UXO5
SALVAGE YARD BURIAL AREA
FALLBROOK, CALIFORNIA

Naval Facilities Engineering Command Southwest
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

CONTRACT NO. N62473-06-D-2201
CTO NO. 0014

FINAL

SITE INSPECTION REPORT

February 4, 2009

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
MUNITIONS RESPONSE PROGRAM SITE UXO5
SALVAGE YARD BURIAL AREA
FALLBROOK, CALIFORNIA

DCN: ECSD-2201-0014-0002

Prepared by:

TETRA TECH EC, INC.

1230 Columbia Street, Suite 750
San Diego, California 92101-8536

Kent Weingardt, PE, PMP
Project Manager

EXECUTIVE SUMMARY

Naval Facilities Engineering Command Southwest contracted with Tetra Tech EC, Inc. under Remedial Action Contract IV No. N62473-06-D-2201, Contract Task Order No. 0014 to perform a site inspection (SI) for material potentially presenting an explosive hazard (MPPEH) at Munitions Response Program (MRP) Site UXO5, the Salvage Yard Burial Area, located at Naval Weapons Station Seal Beach Detachment Fallbrook, in Fallbrook, California. The SI was conducted in February and April 2007.

This SI Report summarizes the findings of the SI performed in February and April 2007. Observations, findings, and chemical data from the SI are included. A screening level ecological and human health risk assessment, as well as a revised Conceptual Site Model, to be used as the basis for recommendations for future actions is also included. The specific overall objective of the SI was to refine the boundaries or area(s) containing MPPEH and then reclassify these areas into one of three levels of munitions and explosives of concern (MEC) presence (known, suspected, and not suspected to contain MEC). Based on the SI approach, it was acknowledged that information gathered during this preliminary work may not be sufficient to fully classify the site into one of these levels. However, this remains the overall objective, and shortcomings are reported in this report along with recommendations for further actions to meet this objective.

The SI at MRP Site UXO5 included a geophysical survey of the entire site, an MPPEH surface sweep/survey, sampling for munitions constituents and *California Code of Regulations* Title 22 metals, and fence installation as an interim action.

Because of sensitive habitat and endangered species, biological avoidance and minimization measures were followed during all SI activities. Because the site provides habitat for Stephen's kangaroo rat, Least Bell's Vireo, and Coastal California gnatcatcher (all threatened or endangered), a qualified biologist, with expertise in species that dwell in the California coastal sage and chaparral ecoregion, surveyed the entire site for signs of inhabitance (nests and burrows). The biologist was on site, at a minimum, for the initiation of all phases of the SI field activities.

The geophysical survey did not indicate any broad contiguous buried disposal area at the site. However, the possibility of buried individual or small groupings of items cannot be eliminated. Several significant but isolated subsurface anomalies were identified, and further investigation is necessary to verify their nature.

Several munitions-related items were found throughout the site during the surface sweep. Some areas appeared to be more concentrated with munitions-related items but no distinct pattern was apparent. Also, the frequency of surface munitions appeared to taper off significantly outside the previously established site boundaries.

Sample results were compared with background concentrations, ecological soil screening levels, and Residential and Industrial Preliminary Remediation Goals. Based on the sample results, no explosive constituents are considered to be chemicals of potential concern (COPCs) for surface soils. Arsenic, lead, and vanadium should be considered COPCs with regards to human health from exposure to surface soils as they exceed threshold screening values. The following chemicals should be considered chemicals of potential ecological concern for ecological receptors' exposure to surface soils: antimony, cadmium, chromium, cobalt, copper, lead, mercury, selenium, vanadium, and zinc, as they exceed threshold screening values.

Characterization of MRP Site UXO5 has been advanced through the tasks performed for the SI. The results of the preliminary geophysical investigation performed as part of this SI did not indicate the presence of a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation. Several subsurface anomalies should be further investigated to determine if they are related to munitions disposal at the site and to determine the level of hazard that they might pose under potential future-use scenarios. Further risk assessment is also recommended to refine the list of COPCs based on site-specific future use and exposure scenarios. A remedial investigation/feasibility study is recommended to further characterize the site and determine any required response actions as appropriate. In the interim, the newly installed site fencing will limit human access to potential hazards at the site.

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APPENDICES

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ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
bgs	below ground surface
CAGN	California gnatcatcher
Cal/EPA	California Environmental Protection Agency
CCR	*California Code of Regulations*
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CSM	conceptual site model
CTO	contract task order
Detachment Fallbrook	Naval Weapons Station Seal Beach Detachment Fallbrook
DGPS	differential global positioning system
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESSL	ecological soil screening level
EZ	Exclusion Zone
FS	feasibility study
GPS	global positioning system
HE	high explosive
IRP	Installation Restoration Program
MC	munitions constituent
MCB	Marine Corps Base
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MK	mark
mm	millimeter
mmho/m	millimhos per meter
MP	Malcolm Pirnie, Inc.
MPPEH	material potentially presenting an explosive hazard
MRP	Munitions Response Program
NAD	Naval Ammunition Depot
NAVWPNSTA	Naval Weapons Station
PA	preliminary assessment

ABBREVIATIONS AND ACRONYMS
(Continued)

ppt	parts per thousand
PRG	Preliminary Remediation Goal
RDX	hexahydro-1,3,5-trinitro-1,3,5-trazine
RI	remedial investigation
SI	site inspection
SKR	Stephens' kangaroo rat
SLERA	screening level ecological risk assessment
SLHHRA	screening level human health risk assessment
SYBA	Salvage Yard Burial Area
TNT	2,4,6-trinitrotoluene
TtEC	Tetra Tech EC, Inc.
USFWS	U.S. Fish and Wildlife Service
USMC	U.S. Marine Corps
UXO	unexploded ordnance

1.0 INTRODUCTION

Naval Facilities Engineering Command Southwest contracted with Tetra Tech EC, Inc. (TtEC) to perform a site inspection (SI) for material potentially presenting an explosive hazard (MPPEH) at Munitions Response Program (MRP) Site UXO5, the Salvage Yard Burial Area (SYBA), located at Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment Fallbrook (Detachment Fallbrook), in Fallbrook, California (Figures 1-1 and 1-2). The SI was conducted in February and April 2007. The results are presented in this SI Report. This project was conducted under Remedial Action Contract IV No. N62473-06-D-2201, Contract Task Order (CTO) No. 0014.

1.1 PURPOSE AND SCOPE

The purpose of this SI Report is to summarize the findings of the SI performed in February and April 2007. Observations, findings, and chemical data from the SI are included. A screening level ecological and human health risk assessment, as well as a revised Conceptual Site Model (CSM), to be used as the basis for recommendations for future actions is also included. The specific overall objective of the SI was to refine the boundaries or area(s) containing MPPEH and then reclassify these areas into one of three levels of munitions and explosives of concern (MEC) presence (known, suspected, and not suspected to contain MEC). Based on the SI approach, it was acknowledged that information gathered during this preliminary work may not be sufficient to fully classify the site into one of these levels. However, this remains the overall objective, and shortcomings are reported in this report along with recommendations for further actions to meet this objective.

Throughout this document, specific terminology is used to describe the various types/categories of munitions-related materials and contaminants (MPPEH, MEC, munitions constituents [MC], etc). Please refer to Table 1-1 for a comprehensive definition of these terminologies.

A remedial investigation (RI)/feasibility study (FS) is recommended to further characterize the site and determine any required response actions as appropriate.

1.2 REPORT ORGANIZATION

This SI Report consists of seven major sections. Section 1.0, Introduction, provides the purpose, scope, and organization of this report. Section 2.0, Site Conditions and Background, describes the site location, physical setting, and site history, and reviews the regulatory status. Section 3.0, Summary of Site Inspection, gives a summary of previous investigations and describes the SI approach and execution. Section 4.0, Site Inspection Findings, provides observations of physical characteristics, vegetation and biological activity, interpretation of geophysical data, surface MPPEH findings, and results of soil sampling activities. Section 5.0, Munitions Hazards Assessment, describes the potential hazard sources at the site and provides human and ecological

exposure pathways analyses. The CSM and the site hazard assessment are also included in this section. Section 6.0, Conclusions and Recommendations, gives an overall summary and provides recommendations for further action, and Section 7.0, References, lists the documents relevant to and cited in this report. Appendices A, B, C, and D provide a photographic log, CSM, complete analytical data, and responses to comments on the draft version of this report, respectively.

2.0 SITE CONDITIONS AND BACKGROUND

MRP Site UXO5 is located in NAVWPNSTA Seal Beach Detachment Fallbrook, adjacent to the town of Fallbrook, California (see Figure 2-1). Detachment Fallbrook operates as an active munitions storage installation. Site location and background of the facility and site, as well as the site's current regulatory status, are described in this section.

2.1 SITE LOCATION

Detachment Fallbrook is located 53 miles north of San Diego in northern San Diego County, California, approximately 9 miles inland from the Pacific Coast. Detachment Fallbrook is bordered on the west by Marine Corps Base Camp Pendleton and is south of the Santa Margarita River. The detachment currently occupies 8,852 acres, but only 274 acres is developed. The remaining acreage is mostly open space due to the Explosives Safety Quantity Distance arcs encompassing the magazines.

Detachment Fallbrook lies between the Santa Margarita and San Onofre mountain ranges. The topography is mostly moderate south- and west-facing slopes, with rough broken ridges. It varies from gently rolling hills in the southern area to steeply rising hills to the north. Elevations range from 200 to 840 feet above mean sea level.

MRP Site UXO5, the SYBA, covers approximately 13 acres and is located in the northeast corner of Detachment Fallbrook, approximately 1,780 feet from the eastern boundary of the installation (Figure 1-2). MRP Site UXO5 is located just east of Building 307 and is bounded on the southwest and southeast sides by Sparrow Road (Figure 2-1).

2.2 PHYSICAL SETTING

2.2.1 Climate

The climate at Detachment Fallbrook is typical of the coastal southern California climate and is characterized by mild winters, cool summers, and infrequent rainfall. The annual average temperature in the Detachment Fallbrook vicinity is 75.7 degrees Fahrenheit (°F). Summer temperatures range from 66°F at night to 90°F during the day. Precipitation ranges from 13.7 to 17.1 inches per year. January is the wettest month and July is the driest, with a mean of 0.02 inches of precipitation. Summers at the Installation are punctuated by the Santa Ana (offshore) winds (Malcolm Pirnie, Inc. [MP], 2006, Weathercurrents, 2007).

2.2.2 Vegetation and Biological Setting

A good portion of the vegetation within MRP Site UXO5 burned in February 2002 as a result of the Gavilan fire that started near Gavilan Mountain southeast of De Luz Road (off Detachment

Fallbrook). In the subsequent years, vegetation growth has advanced through patterns typical of post-burn seral plant ecology. The vegetative communities associated with MRP Site UXO5 include California sagebrush (*Artemisa californica*), California buckwheat (*Eriogonum fasciculatum*), deer weed (*Lotus scoparius*), and a few individuals of white sage (*Salvia apiana*) along the southern extremes. When the site was inspected in 2004, over 98 percent of the vegetative material was less than 1 meter in height, and it was determined that it provided limited components of the Critical Habitat *Code of Federal Regulations* identified constituent elements (Knight, 2004). Since that time, it has been noted that the vegetation has grown, and special status species such as the California gnatcatcher (CAGN) have been observed using the area. The site is within designated Critical Habitat for the CAGN, and constituent elements exist on the site.

Species federally listed as endangered or threatened that could potentially occur at MRP Site UXO5 (based on their presence in similar areas in San Diego County and initial surveys conducted by the U.S. Fish and Wildlife Service [USFWS] on Detachment Fallbrook in March and April 1990) include the CAGN (*Polioptila californica californica*), Stephens' kangaroo rat (SKR) (*Dipodomys stephensi*), arroyo toad (*Bufo californicus*), Least Bell's Vireo (*Vireo bellii pusillus*), quino checkerspot butterfly (*Euphydryas editha quino*), and thread-leaved brodiaea (*Brodiaea filifolia*). Several unlisted, yet sensitive bird species are known to occur in this area of Detachment Fallbrook. They include the rufus-crowned sparrow (*Aimophila ruficeps*), grasshopper sparrow (*Ammodramus savannarum*), and protected raptors such as the Cooper's hawk (*Accipter cooperii*) and Golden Eagle (*Aquila chrysaetos*).

In 2004, the site was characterized as not containing sufficient constituent elements to constitute a use-area visited with any frequency (Knight, 2004) with reference to the CAGN. Navy natural resource biologists have conducted recent surveys for the presence of CAGN in the area; up until 2006, no sitings were documented on four separate occasions. A 2006 CAGN survey of the area showed multiple pairs in a 250-foot buffer area around, and in certain instances, inside the proposed project boundary area. During the SI work, multiple pairs were observed within the site by a qualified wildlife biologist (Art Davenport); however, specific nesting sites were not found.

During a four-day trapping session in May 2004, two SKRs were captured within the project site boundary. Also during that trapping session 18 non-listed Dulzura kangaroo rats were captured at the site. Because SKRs were captured at proportionally and absolutely low numbers, and because the two SKRs were observed to return to burrows outside of the site boundary, it was determined that the site was occupied by SKRs, but at "trace levels."

2.2.3 Geology and Hydrology

Detachment Fallbrook is in the Peninsular Ranges geomorphic province, which is characterized by a series of northwest-trending ranges and valleys. The geomorphic province is dominated by

the igneous and metamorphic rocks of the Peninsular Range batholith. The local topography is characterized by low hills and natural ravines.

Detachment Fallbrook land is part of two coastal watersheds: the Santa Margarita River and the San Luis Rey River. The Santa Margarita River, Fallbrook Creek, and Pilgrim Creek make up the three major surface water bodies within the detachment. The Santa Margarita River provides an important water supply by restoring groundwater aquifers used by local residents and the Marine Corps. Fallbrook Creek would naturally be an intermittent or ephemeral stream within the Santa Margarita watershed, but due to runoff from agricultural and urban irrigation, it is now a perennial stream. Pilgrim Creek is located on the northeast end of Oceanside, and its flow is augmented in the summer months by runoff from an upstream nursery's water supply.

There are no permanent surface water bodies within MRP Site UXO5. An intermittent stream drains into the Santa Margarita River on the northern boundary of the burial area, and a culvert that runs under Sparrow Road on the western side of the site feeds a drainage way that flows southwest.

2.2.4 Archaeological Resources

Detachment Fallbrook has an archaeological heritage ranging from the pre-historic Paleo-Indian period to the Mexican-American War. Approximately 4,900 acres of the detachment has been surveyed for archaeological purposes, and over 50 archaeological sites were found (MP, 2006).

Cultural resources near MRP Site UXO5 include six prehistoric sites, one milling site, and one 1930s cattle trough (MP, 2006).

2.3 SITE HISTORY

2.3.1 Facility Background

In February 1942, then Naval Ammunition Depot (NAD) Fallbrook was commissioned. The depot's mission was to receive, store, and guard large quantities of explosives and ammunition, and to distribute and deliver them as needed to other installations. The original facilities included 133 magazines, barracks, and administration and service buildings, 16 miles of railroad, and 115 miles of roads and trails (MP, 2006). After World War II, in 1947, NAD Fallbrook was put on caretaker status. This status ended with the onset of the Korean War in 1950. In 1953, the Marine Barracks at the depot became a separate command, which replaced the Marine Guard detachment from Marine Corps Base (MCB) Camp Pendleton that had provided station security since the original commissioning in 1942.

In 1958, NAD Fallbrook was designated an annex of the Naval Ammunition and Net Depot, Seal Beach. In the 1960s, Detachment Fallbrook's primary duty was to support the Pacific Marine Forces. It also stored, tested, and maintained several types of missiles (MP, 2006). On October 1,

1997, following the reorganization of munitions handling installations, the installation's name changed to Detachment Fallbrook and reported to the present NAVWPNSTA Seal Beach. Currently, the installation has 190 magazines storing pyrotechnics, high explosives, fuses, detonators, and small arms, among other weapons (MP, 2006). There are no active ranges within the detachment.

The only West Coast air-launched missile production facility is located at Detachment Fallbrook, where air-launched missiles such as the Phoenix, Sidewinder, Maverick, and high-speed anti-radiation missile are inspected, maintained, and recertified. The last remnants of the nation's napalm stockpile were stored at Detachment Fallbrook, and a state-of-the-art facility was built there to help eliminate these weapons. The last full napalm canister was destroyed in March 2001. Overall, the installation stores munitions with a monetary value of more than $2 billion.

Detachment Fallbrook is unique among naval weapons storage areas because it is located inland. Ammunition is transferred to and from ships by a process known as vertical replenishment, or VERTREP. In this operation, ammunition is taken by trucks from a magazine on Detachment Fallbrook to a helicopter pad located on the coast inside MCB Camp Pendleton. From there, a helicopter picks up the load and transfers it to the receiving ship waiting several miles off shore. In this manner, large vessels such as aircraft carriers and amphibious assault ships can be loaded without leaving their primary Southern California operating and training areas.

The MRP identified nine former ranges/sites at Detachment Fallbrook, six of which were identified as munitions sites through historical documents and interviews. The Preliminary Assessment (PA) (MP, 2006) evaluated these identified ranges and sites. Upon review of MRP Site UXO5, the SYBA, the PA recommended that an SI be performed with respect to MPPEH identified at the site.

2.3.2 Site Background

The SYBA was reported to be a burial area for munitions and dunnage (MP, 2006). From 1952 through 1960, the 2-acre area located northeast of Building 307 was used to dispose of inert materials (Knight, 2004). On historical maps, the area is labeled as a storage yard starting in the 1950s and ending in the late 1960s. Records indicate that expended cartridges, primers, live projectiles, and inert anti-tank projectiles were buried in the area (MP, 2006). In the mid-1960s, two pounds of five partially filled cans of smokeless powder were reportedly deposited at the site (Knight, 2004). In the late 1980s, an on-site survey was performed and revealed other materials in the disposal area, including electronic parts, inert missile parts, rubber missile shipping rings, missile test stands, practice shapes, electronic test equipment, empty powder cans, metal banding, and tires (Knight, 2004). In February 2002, a brush fire exposed buried munitions in the area (Knight, 2004). An Explosive Ordnance Disposal (EOD) report from that same month described separate incidents in which EOD technicians from MCB Camp Pendleton were called

to the site to handle suspected 20-millimeter (mm) and 40mm rounds and blasting caps found on the ground surface.

In 2004 and 2005, visual surveys were conducted at the site as part of the PA. The surveys consisted of walking the perimeter and several transects of the site. Munitions observed during the survey activities included a 25-pound bomb, a 3-pound pyrotechnic bomb, a Mark (MK) 76 practice bomb, a 2.36-inch anti-tank, high-explosive (HE) rocket, a 5-pound practice bomb, 20mm rounds, other projectiles, several smokeless powder cans and lids, and other munitions scrap (MP, 2006). Currently, MRP Site UXO5 is not in use. Prior to the SI, the area was not completely fenced.

2.4 REGULATORY STATUS

The SYBA was originally identified under the Installation Restoration Program (IRP) and given the designation IRP Site 33. No IRP investigations were undertaken, and the site is now being addressed under the MRP. The site is now identified as MRP Site UXO5.

The PA identified nine former ranges and sites at Detachment Fallbrook as potential MRP sites through reviewing historical information and personnel interviews. In 2006, the PA concluded six of the nine sites should be further investigated as MRP sites. Two visual surveys were performed at MRP Site UXO5 in 2004 and 2005. Several munitions were observed during these surveys (Figure 2-2). The PA concluded that an SI was recommended in reference to MPPEH at the site.

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3.0 SUMMARY OF SITE INSPECTION

3.1 SUMMARY OF PREVIOUS INVESTIGATIONS

Prior to the PA of Detachment Fallbrook, U.S. Marine Corps (USMC) EOD Technicians from the USMC EOD Detachment on Camp Pendleton responded on more than one occasion to locate and remove MEC in the form of 20mm and 40mm rounds and blasting caps, which provided credibility for the belief that the site contains MEC and MPPEH.

MRP Site UXO5 was included in the PA that was conducted in 2004 and 2005. Two data collection teams were used to conduct visual surveys of the site in September 2004 and March of 2005. The visual data were collected by walking the perimeter of the site and walking several transects. During the surveys, the following MPPEH items were encountered: a 25-pound bomb, a 3-pound practice bomb, a 5-pound practice bomb, an MK 76 practice bomb, a 2.36-inch anti-tank HE rocket, 20mm casings (and potentially rounds), a rifle grenade, 40mm casings, igniters, and other miscellaneous munitions debris (Figure 2-2).

3.2 SITE INSPECTION APPROACH AND EXECUTION

The SI activities included mobilization, biological avoidance and minimization procedures, a geophysical survey primarily geared toward identifying the burial area boundaries, a surface search of the entire site, the collection of soil samples, and the installation of a semi-permanent fence around the site boundaries.

3.2.1 Mobilization

Because the activities planned for the site were noninvasive and low-impact, the mobilization effort was nominal. Portable sanitation facilities were delivered, and the equipment that was used on a daily basis was stored in the cab of the project pickup truck. An inverter was used to power laptop computers, and a small printer that was used inside the truck cab on a folded seat. A broadband-access PC card was used for internet connectivity, and items that required the use of a fax were taken to a business in Fallbrook that had fax capability.

3.2.2 Biological Avoidance and Minimization

During the execution of the SI, the field crew followed the procedures for "Biological Constraints and Proposed Avoidance and Minimization Measures" outlined in the SI Work Plan (TtEC, 2007). Because the site provides habitat for SKR, Least Bell's Vireo, and CAGN (all threatened or endangered), a qualified biologist with expertise in species that dwell in the California coastal sage and chaparral ecoregion surveyed the entire site for signs of inhabitance (nests and burrows). The biologist was on site, at a minimum, for the initiation of all phases of the SI field activities.

The biologist provided a briefing to all site personnel on habitat avoidance and impact minimization. The procedures included being aware of ground conditions and avoiding stepping on any burrows, fire safety, and creating a buffer zone around any bird nests or visible SKR burrows. When the biologist returned to the site just prior to mowing the swath for the fence installation, he found no evidence of the endangered birds nesting or SKR burrows in the mowed path.

In an effort to reduce potential impacts to the CAGN, the fence line was selected to reduce impacts to mature or well-developed stands of coastal sage scrub to the maximum extent practicable. No nests of migratory birds were observed in the vicinity of the fence line.

3.2.3 Geophysical Survey

A geophysical survey of MRP Site UXO5 was conducted to determine the approximate boundaries of the site and to look for obvious burial sites.

3.2.3.1 Data Collection Approach

The west and southwest boundaries of MRP Site UXO5 were assumed to be the Building 307 parking lot and Sparrow Road. Transects 200 feet long were installed approximately parallel to the eastern border of the parking lot and were surveyed at a transect spacing of 50 feet. The survey routes were extended beyond the PA-identified boundaries to increase the confidence that the estimated edges of the undefined boundaries (north, east, and south) would be encompassed in the survey. The total length of the transects (in linear feet) was approximately 9,400 linear feet, which translated into approximately 47 transects.

3.2.3.2 Geophysical Instrumentation

To delineate the burial area boundaries, a Geonics EM31, MKII, ground conductivity meter was used to survey the site. Electromagnetic induction surveys detect contrasts in ground conductivity and metallic (ferrous and nonferrous) materials. Conductivity contrasts in the earth can be caused by natural phenomena, such as variations in lithology or moisture content, or man-made phenomena such as disturbed ground, buried metal, and in certain cases, contaminants in the soil and groundwater. The depth of investigation is related to the separation between the transmitter and receiver coils, the operational frequency, and the coil orientation(s). In general, the EM31, MKII used in the vertical dipole mode is sensitive to conductivity variations to maximum depths approaching 16.4 to 19.7 feet (5 to 6 meters). The EM31 samples a “volume” of soil below the coil. The EM31 is sensitive to conductivity variations from depths of 0 foot to a maximum of approximately 18 feet, with a maximum sensitivity at approximately 5 feet. The unit collected and stored digital data at a rate of approximately 5 times per second, which translates into a measurement every 6 to 10 inches along the ground surface at a walking pace of approximately 3 to 4 feet per second. Data were acquired over the area of interest along adjacent transects separated by approximately 10 feet. This spatial sample density is sufficient to detect

aggregates of larger metal items, as well as areas of nonmetallic waste disposal. Some areas were not surveyed due to thick vegetation, trees, and steep terrain. The area north and northeast of the compound is characterized by a dry stream bed that runs northwest-southeast that was very thick with trees, deadfall, thick bushes, and steep terrain. Much of the stream bed is impossible to survey without significant brush removal.

Positioning of the EM31, MKII, instrument was accomplished by using a high-resolution differential global positioning system (DGPS). The base station global positioning system (GPS) was erected over a survey control point established at the site. The rover GPS was mounted in the middle of the EM31, MKII, instrument to provide accurate (less than 4 inches [10 centimeters]) positions of the geophysical measurements.

At least once per day, the EM31, MKII, and position data were uploaded to a laptop computer at the site and backed up on storage media (i.e., compact disk). At the end of each day, the EM31, MKII, and position data were merged and processed with software developed by TtEC geophysicists. The processed data was uploaded to Geosoft® Oasis Montaj, and color-coded images of the sensor intensity were generated. These color-coded images were used to define areas representative of subsurface debris. Interpretation of the geophysical data is discussed in Section 4.3 along with details pertaining to the boundary of the areas surveyed.

The procedures and standards used to process and interpret the data are as follows:

- Raw Geonics EM31 data were downloaded to laptop, and Geonics Dat31 version 2.01 software was used to convert the file to ASCII format. Standards: none (straightforward data conversion).
- Raw Leica DGPS data were downloaded to laptop, and NovAtel Inc. GrafNav version 7.5 software was used to apply base station GPS corrections to rover GPS data, and export xy data file. Standards: Quality factor of 2 or better for each position and a standard deviation for each position of less than 0.05 meter.
- TtEC software was used to merge the EM31 data and GPS data and correct for instrument lag. Standards: Linear feature aligned to within 1 foot.
- XYZ data were imported to Geosoft Oasis Montaj version 6.4 software to grid, color contour, and map data. Standards: Sample distance mean less than 1 foot, noise less than 1 millimhos per meter (mmho/m) and less than 1 part per thousand (ppt) standard deviation, areal coverage gaps less than 15 feet (except for vegetation/obstacles), drift corrected to less than 1 mmho/m and less than 1 ppt, repeatability of electromagnetic readings less than 1 mmho/m and less than 1 ppt, and repeatability of position over known point less than 1 foot. Color scale sensitive for identification of anomalies greater than 4 mmho/m (conductivity) and 2 ppt (in phase).
- Interpretation was based on the Geosoft color-coded maps to identify anomalies. Anomaly amplitudes and footprints (areal extent and shape) were analyzed to ascertain the source of the anomaly. Standards: Anomalies greater than 4 mmho/m (conductivity)

or greater than 2 ppt (in phase) were identified and analyzed. Aboveground features (e.g., power lines, fences, stream bed, metal debris) were correlated to geophysical anomalies.

No deviations from standard procedures occurred during the data acquisition.

The DGPS base station was positioned directly over a surveyor's monument that had been installed just south of the parking lot of Building 307. Once the base station was in place, the coordinates of the monument generated by the DGPS were compared with the known coordinates to ensure that they were accurate within 10 centimeters. Similarly, the EM31 was taken to the area that had been established for the calibration of the instrument at the beginning of each work day, and the manufacturer's calibration procedures were used to ensure the instrument was functioning properly.

3.2.4 MPPEH Surface Sweep/Survey

A visual MPPEH surface sweep/survey of the site commenced after the geophysical survey. A 50-foot Exclusion Zone (EZ) was established prior to the commencement of the SI activities. The EZ was installed primarily for the portion of the site that bordered inhabited buildings (Building 307) or public traffic routes (Sparrow Road). When inhabitants of the building were in the parking lot, or vehicles were observed on Sparrow Road, work was ceased until there were no personnel within the EZ. As progress in the surface sweep moved farther to the east (away from the parking lot and the road), the EZ limits no longer encompassed Building 307 or Sparrow Road, allowing operations to continue unhindered. Prior to starting the surface search, the senior unexploded ordnance (UXO) technician ensured that all personnel who were not essential for the surface sweep were outside EZ boundaries.

The initial transect followed the contours of Sparrow Road. The UXO technicians formed a line abreast, perpendicular to the path of advance (Sparrow Road) spaced about 10 feet apart. The UXO technician positioned on the road boundary acted as the guide, and the remaining UXO technicians maintained the spacing from him and advanced across the search area, using Schonstedt metal detectors to provide an audible backup for the visual search. The UXO technician on the outside of the line marked the path of advance with surveyor's tape as the sweep line moved forward. When the perimeter of the site was reached, the sweep line shifted where the UXO guide was on the marked path, and the other UXO technicians were spaced appropriately. The sweep then resumed using the surveyor's tape as the new boundary. This process was repeated to ensure that the entire site was swept.

MPPEH items were not recovered during these efforts. When encountered, MPPEH items were visually identified, geo-referenced (with a DGPS), documented in the MPPEH log, photographed, and left undisturbed as found.

Surface sweep findings and interpretations are discussed in Section 4.4 of this report.

3.2.5 Munitions Constituents Sampling and Analysis

Soil samples were collected from 26 locations in accordance with the sampling strategy outlined in the SI Work Plan (TtEC, 2007). Figure 3-1 depicts the rationale for sample location selection based on the sampling strategy and results of geophysical survey and surface-sweep findings. Five of the selected sampling locations where there was strong evidence that MPPEH was present, both above and below ground surface, were field-screened for MC to ensure that soils with high content of explosives were not sent to a laboratory. The UXO technician escorting the sampling crew selected the suspect sites for field screening.

Soil samples were obtained from zero to 9 inches below ground surface (bgs) at each selected location. The soils collected from the zero to 9 inches bgs were homogenized at the laboratory into one discrete sample from each sampling point in accordance with the procedures outline in the Sampling and Analysis Plan (Appendix A of the SI Work Plan). The depth of 9 inches was selected to correspond with the depth at which magnetometers, with high confidence, can detect the smallest MEC item (a 20mm round). Soil samples were analyzed for MC (including perchlorate) and *California Code of Regulations* (CCR) Title 22 metals.

As described above, certain soil samples were tested for Group A explosives (2,4,6-trinitrotoluene [TNT]), Group B explosives (hexahydro-1,3,5-trinitro-1,3,5-trazine [RDX]), and compounds containing inorganic nitrates with the EXPRAY Explosives Detection/Identification Field Test Kit. The test kit was used strictly in accordance with the manufacturer's instructions, and all field tests were negative.

Soil sampling findings and interpretations are discussed in Section 4.5 of this report.

3.2.6 Interim Action (Fencing Installation)

The results of the geophysical survey and surface sweep were used to refine the boundaries of the MRP Site UXO5. Ultimately, the fence line boundary was determined based on SI findings as well as general site features. The fence line encompassed the vast majority of all surface findings and all significant subsurface anomalies. The DGPS was used to mark a lane where the fence would be installed. After the project biologist surveyed the proposed fence line, a track-mounted mower was used to cut a swath (5.5 feet wide) along the marked path. One UXO technician operated the mower, and another proceeded ahead of him to ensure that there was no MPPEH along the course.

When the mowing was complete, an 8-foot-tall chain-link fence was installed. Existing barbed wire fencing was used to form some of the fencing perimeter along the Building 307 and 365 parking lots. A new 20-foot double swing gate was installed along the Building 307 parking lot as access to the site. Proposed post locations were first surveyed by a UXO technician with a metal detector to ensure that no metal was present. The fence posts were then mechanically driven into the ground. UXO technicians escorted the fencing crew during the installation. When

the fence installation was complete, signs with warnings of unexploded munitions were installed along the outside of the fence. Figure 3-2 shows pictures of the installed signs.

4.0 SITE INSPECTION FINDINGS

This section details the findings of the SI at MRP Site UXO5.

4.1 SITE PHYSICAL CHARACTERISTICS OBSERVATIONS

The topography of MRP Site UXO5 is typical of Detachment Fallbrook with low hills and natural ravines. The highest point of the site is northwest of Building 365 immediately above the parking lot. The lowest point of the site is the bottom of the ravine north of the parking lot for Building 307, which is part of the Santa Margarita River watershed. Physical features of the site are shown in Figure 4-1. The site has a number of ravines, shallow trenches and small cliffs. Such site features and vegetation prevented the collection of geophysical data (white areas on Figure 4-1). Railroad track and concrete footers, perhaps from an old foundation, are also present in the southwestern section of the site.

The fence installed as an interim action is shown on Figure 4-1. The fence line boundary was determined based on SI findings as well as general site features and encompasses the vast majority of all surface findings and all significant subsurface anomalies.

4.2 VEGETATION AND BIOLOGICAL OBSERVATIONS

The site is predominantly vegetated with coastal sage scrub and mixed grasslands. Oak woodlands dominate the shaded ravine on the northern part of the site, and several large oak trees are found at random locations in the area. Poison oak was observed within the project site (Figure 4-1). The biologist surveyed and flagged six locations to caution personnel to avoid the areas during SI activities.

On January 22, 2007, the entire MRP Site UXO5 was surveyed by the wildlife biologist. A number of active kangaroo rat burrows were flagged. All of the flagged burrows were embedded in the coastal sage scrub, suggesting the burrows belong to the Dulzura kangaroo rat (*Dipodomys simulans*). No kangaroo rat burrows were found in the open space, where the SKR (*Dipodomys stephensi*) would be expected. No rats were observed during SI activities. Rats are primarily nocturnal, and trapping is necessary to absolutely verify the identification of the animals.

On January 22, 2007, two CAGNs (*Polioptila californica californica*) were heard immediately adjacent and north of the project site. The biologist concluded that based on the physical structure of the plant community on site, one to two pairs of the CAGN could be expected to use habitat within the project area. On February 7, 2007, a pair of CAGNs was observed within the project area. Although the pair likely uses a larger area than encompassed by the project area, they were initially located at the following GPS location: Zone 11; NAD 83; Easting 0475299, Northing 3693958, ± 3 meters. No nesting activity was observed. While on site on April 20,

2007, the pair of CAGNs was observed again in the southwestern corner of the project site. A buffer area was flagged to section off the suspected current nest site.

4.3 GEOPHYSICAL DATA INTERPRETATION

Color-coded contour maps for each component of the geophysical survey data gathered with the EM31 were generated following data processing. These maps are shown on Figures 4-2 and 4-3. The background for both maps is generally green, while positive conductivity responses range from yellow to pink, depending on the amplitude (see color-bar). Negative conductivity responses are blue. EM31 anomalies from metal can be either positive or negative, depending on the depth and quantity of metal.

There was scattered surface debris throughout the site, and these items may generate a response from the EM31 depending on the size of the piece of metal. These anomalies (blue and/or red) are localized and are not indicative of buried disposal masses in pits or trenches.

Figure 4-2 shows the terrain conductivity of the site, and Figure 4-3 shows the in-phase component. There are several areas where the conductivity is above background. These areas include an apparent disposal-like feature approximately 150 feet due south of Building 307 at the base of a concrete retaining wall. This anomaly was also characterized by several 40mm rounds on the ground surface. The in-phase response also shows a significant anomaly at this location.

There are two locations shown on Figure 4-2 with extreme positive (pink) responses. The area in the southwest side of the site, south of Building 307, is an unknown subsurface anomaly. In the northern side of the site, an area in the stream bed showed an intense positive response. Given the location in the stream bed, this response may indicate subsurface water or saturated soil. Water is highly conductive and would give such a response. However, given the prevailing dry weather during the survey, this seems unlikely. Further investigation may be required before these areas can be fully characterized.

There are three other locations where both the conductivity and in-phase data show potentially significant anomalies; however, due to the thick vegetation, the anomalies could not be fully mapped. These anomalies may be very limited in extent, or could extend out and be representative of disposal areas.

One location is in the ravine bed and is characterized by a negative (blue) response on both the conductivity and in-phase readings. At this location, there was a small sinkhole adjacent to the path the instrument operator followed across the stream bed in which metallic debris was observed. Because the vegetation was extremely thick at this location, the lateral extent of this debris could not be mapped and characterized.

A second anomaly is approximately 90 feet south of the first anomaly and is characterized by a negative response (blue) on the conductivity reading (Figure 4-2) and a positive response (pink) on the in-phase reading (Figure 4-3). This anomaly is adjacent to a large tree and undergrowth to the east that prohibited data collection. It is possible that this anomaly may extend further to the east.

The third anomaly is east along the stream bed and is characterized by negative responses (blue) on both the conductivity and in-phase readings. Similar to the other two anomalies, only one data acquisition line could be collected at this location, and the lateral extent of the anomaly could not be mapped.

Elevated conductivity readings at several other locations include the area immediately south of Building 307 and along the stream bed; however, the in-phase response (Figure 4-3) does not indicate anomalies at these locations. These conductivity anomalies are likely due to changes in the soil type or moisture content and are not representative of buried metal debris masses.

The linear anomaly that traverses that site from northwest to southeast is due to an overhead power line. The anomaly at the southeastern edge of the site is due to the intersection of two overhead power lines.

In conclusion, at least one potential disposal pit exists south of Building 307, and possibly two or three others (in or near the streambed) could not be fully characterized because of thick vegetation. Although numerous metallic items are scattered on the ground surface throughout the site, no other significant potential subsurface disposal areas appear to be mapped there. While the geophysical data from this preliminary survey are not indicative of any massive disposal or contiguous landfill-type disposal area, the data should be taken as a meaningful line of evidence rather than as conclusive evidence. Further investigation, including potentially intrusive investigation and further geophysical investigation, should be performed to provide additional lines of evidence.

4.4 SURFACE MPPEH FINDINGS

As shown on Figures 4-4 and 4-5, there were multiple findings of MPPEH throughout the site. All munitions-related debris is considered MPPEH until certified safe. Shell casings in multiple calibers were found in several locations, as were intact rounds (casing and projectile) that appeared to be inert. There were large concentrations in some areas, such as an area in Grid 49, where several 20mm casings were located, and the debris pit in Grid 39, which contained intact 40mm rounds in the pit and on the ground surface. In general, the smaller (20mm and 40mm) caliber casings (and projectiles) were located in the western portion of the site, while the larger casings (3″/50s) were found to the east. Two 40mm rounds were found in Grid 49 that were partially buried with only the bases of the casings visible. Their status (safe or hazardous) was unable to be determined. Several 2.25-inch rocket warheads (suspect inert ballistic ogives) were

found in the northern part of the site. All of the encountered MPPEH appeared to have been discarded or had become unearthed from pits by erosion.

The safety status of some items (fuzes, igniters, 40mm rounds) could not be determined because none of the items encountered were moved. Ample evidence of metal debris (and a possible nose fuze) lay in the bottom of the ravine bed to the north, but that area could not be mapped or swept because of the thick overgrowth. Some items were found on the hillside leading to the ravine in Grid 23. Remnants of an old access road to the ravine bottom were still visible and could have been used to transport debris for dumping. A map with representative photographs of the more likely MPPEH items found is provided as Figure 4-5.

4.5 SOIL SAMPLING AND ANALYSIS FINDINGS

A total of 29 soil samples were collected in April 2007 from 26 locations within MRP Site UXO5. Sampling locations are shown on Figure 4-6. The SI soil samples were collected from the surface and near-surface locations (i.e., to a maximum depth of 9 inches bgs). This sampling was conducted to supplement the findings of the visual surface survey for MPPEH and the geophysical survey performed in this area. The maximum soil sampling depth of 9 inches was selected to correspond to the depth at which a typical magnetometer can detect the smallest MEC item of interest, a 20mm round, with high confidence under site conditions. The collected soil samples were analyzed at Laucks Testing Laboratories, Inc., a qualified laboratory for MC, perchlorate, and CCR Title 22 metals. Table 4-1 presents a summary of the analytical results for each individual sample. The analytical data package from the laboratory is provided as Appendix C. Table 4-2 presents Title 22 metal background concentrations and the ranges of metal concentrations detected.

Figures 4-6 and 4-7 show metal concentrations that exceed screening levels and metal concentrations that exceed background concentrations, respectively.

Santa Margarita Basin background concentrations identified in the Camp Pendleton RI/FS (Jacobs, 1997) were used for comparison. Based on its proximity, the Santa Margarita Basin represents the most appropriate source of background data available. Because specific background data for the Fallbrook site are not available, this background comparison is presented for information only. Chemicals of potential concern (COPCs) are not eliminated based on this comparison at this stage.

Only one MC, 1,3,5-trinitrobenzene, was reported above its laboratory reporting limit of 0.20 milligram per kilogram (mg/kg). This compound was detected in 4 of the 26 sampled locations (indicating a frequency of detection of 15 percent) (Figure 4-8). The concentrations ranged from less than the laboratory reporting limit of 0.20 mg/kg to 0.62 mg/kg. Perchlorate was not detected in any of the samples at a concentration above its laboratory reporting limit of 10 micrograms per kilogram (μg/kg).

5.0 MUNITIONS HAZARDS ASSESSMENT

In accordance with the SI Work Plan (TtEC, 2007), soil sampling was conducted in the SYBA. Section 4.4.3 of the SI Work Plan specified that the analytical results obtained from this sampling be compared to the U.S. Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goals (PRGs) for both the Industrial and Residential default exposure scenarios. This comparison would be performed as part of a screening level human health risk assessment (SLHHRA). The SI Work Plan also specified that the analytical results be compared to the EPA ecological soil screening levels (ESSLs) for metals and risk-based criteria published by the Oak Ridge National Laboratory's Ecological Division and other groups for other compounds. These comparisons would be performed as part of a screening level ecological risk assessment (SLERA) for the SYBA. Section 2.3 of the SI Work Plan also required that the initial CSM for the SYBA developed for and included in the SI Work Plan be reconsidered in light of the data collected and refined, if necessary. The results of these assessments and evaluations are presented below.

5.1 HUMAN EXPOSURE PATHWAY ANALYSIS

A total of 29 soil samples were collected in April 2007 from 26 locations from MRP Site UXO5. The analytical results obtained from these samples were used in a SLHHRA. Table 4-1 presents a summary of the analytical results for each individual sample. Table 5-1 presents a summary of screening levels, background levels, and the maximum detected concentration of each compound reported site-wide. Only one MC, 1,3,5-trinitrobenzene, was reported above its laboratory reporting limit of 0.20 mg/kg. This compound was detected in 4 of the 26 sampled locations (indicating a frequency of detection of 15 percent). Perchlorate was not detected in any of the samples at a concentration above its reporting limit of 10 µg/kg. All 17 of the CCR Title 22 metals were detected at least once in site soils, with the exception of silver. The metals typically had a high frequency of detection, with the majority of the metals being detected in all of the SI samples.

The analytical results from each individual sample were compared to the EPA Region IX Industrial and Residential PRGs for soil, as presented in the Work Plan. PRGs were available for this comparison for all compounds detected. These risk-based PRG values also are presented in Table 4-1. The PRGs for both exposure scenarios consider possible contaminant intake by the receptors from soil as the result of potential incidental ingestion, dermal absorption (i.e., through the skin), and inhalation. The PRGs selected for the comparison are associated with an excess lifetime cancer risk of 1×10^{-6} risk or a hazard index relative to a noncarcinogenic health endpoint of 1. For arsenic and lead, risk-based PRG-like values also were available from the California Environmental Protection Agency (Cal/EPA). As these values were more stringent than the corresponding EPA Region IX PRGs for these constituents, the Cal/EPA values were used in the SLHHRA and are shown in Table 4-1.

Table 5-2 highlights the results of the comparisons, presenting only those instances where the sample result exceeded one or both of its corresponding PRGs. With regard to the risk-based screening levels for human health, arsenic, lead, and vanadium had one or more detected concentrations that exceeded their PRGs. All three of these metals were detected at least once at concentrations that exceed their corresponding residential-exposure scenario PRGs. In contrast, only arsenic was measured at a concentration that exceeded its relatively less stringent industrial-exposure scenario PRG. All of the analytical results for arsenic exceeded both its residential- and industrial-exposure scenario PRGs. The maximum detected arsenic concentration of 5.20 mg/kg is 87 times higher than the Cal/EPA Residential PRG and 20 times higher than the Cal/EPA Industrial PRG. Lead and vanadium concentrations in the soil exceeded their respective Residential PRGs in 3 percent and 45 percent of the 29 samples, respectively. The maximum detected concentrations of lead and vanadium in the soil samples were less than 2 times their respective Residential PRGs.

Those compounds with maximum detected concentrations exceeding human health-based PRGs were compared to background concentrations identified for soil in similar soil strata during an RI/FS conducted at nearby Camp Pendleton (Jacobs, 1997). The background values for the surface soil (zero to 5 feet depth) from the Santa Margarita Basin were used in the comparison, as this basin is the most representative of MRP Site UXO5. The results of this comparison were as follows.

Only 2 of the 29 exceedances of the arsenic human health-based PRGs shown in Table 5-2 (i.e., the maximum and next highest concentration detected at MRP Site UXO5, 5.2 mg/kg and 4.7 mg/kg, respectively) exceed the 95th percentile background concentration (4.61 mg/kg) from the Camp Pendleton study.

Only the maximum detected concentration of lead in soil (227 mg/kg) exceeds the 95th percentile background concentration (29.1 mg/kg) from the Camp Pendleton study. This lead measurement exceeded only the more stringent Residential PRG by less than a factor of 2. No samples exceeded the Industrial PRG for lead.

Only 16 of the 29 measurements of vanadium in soil exceeded the 95th percentile background concentration (69.4 mg/kg) from the Camp Pendleton study. Only 13 of these samples had vanadium concentrations that exceeded the more stringent Residential PRG by less than a factor of 2. No samples exceeded the Industrial PRG for vanadium.

5.2 ECOLOGICAL EXPOSURE PATHWAY ANALYSIS

5.2.1 Habitat Description and Wildlife Species Present

MRP Site UXO5 was used for the disposal of inert materials including electronic parts, inert missile parts, rubber missile shipping rings, missile test stands, practice shapes, electronic test equipment, empty powder cans, metal banding, and tires. The area has been subject to periodic

burns from both natural and human-induced fire sources (R. Knight personal communication to Ms. Karen Goebel, USFWS, June 1, 2004). Clearance of the dense brush as the result of sporadic fires has revealed the presence of partially buried munitions (e.g., buried 40mm rounds). Currently, the area is overgrown and provides habitat for wildlife.

Vegetative regrowth following burns has been typical for post-seral burn plant ecology in this area. Vegetation communities within the project area have been described as scrub-shrub dominated in nature. Vegetation species included California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), deer weed (*Lotus scoparius*) and scattered areas of white sage (*Salvia apiana*) (R. Knight personal communication to Ms. Karen Goebel, USFWS, June 1, 2004).

A detailed record of wildlife species that occupy the habitats of MRP Site UXO5 was not available. However, focused surveys of the site by the USFWS personnel did confirm the presence of two endangered species, the coastal CAGN (*Polioptila californica californica*) and the SKR (*Dipodomys stephensi*). The coastal CAGN has been observed at the site during more recent monitoring surveys. These more recent observations of this species suggested a transient use of the habitat present as no nesting activity was observed (Davenport, 2007). Given the presence of the CAGN, other nonendangered/threatened avian species are also likely to be present.

The SKR prefers scrub-shrub habitats with a mix of native and nonnative vegetation species present. The presence of this species was confirmed via trapping in May 2004 (R. Knight personal communication to Ms. Karen Goebel, USFWS, June 1, 2004). A nonendangered kangaroo rat species, the Dulzura kangaroo rat (*Dipodomys simulans*), also has been observed to be present (R. Knight personal communication to Ms. Karen Goebel, USFWS, June 1, 2004). Given the presence of these species, other more common mammalian species are also likely to be present.

5.2.2 Comparison of Sampling Results to Ecological Screening Values

The objective of this SLERA was to assess potential risk to ecological receptors from exposure to contaminants found in surface soils at MRP Site UXO5. Vegetation in the area is primarily coastal sage scrub with some mixed grasslands. Two special status species including the CAGN (*Polioptila californica californica*) and kangaroo rat (*Dipodomys* sp.) have been observed using the area.

This SLERA includes a comparison of maximum contaminant concentrations in soils collected at the site in April 2007 to ecological risk-based soil-screening levels to identify chemicals of potential ecological concern (COPEC). The ESSLs used in this comparison were compiled from the following multiple sources in accordance with the SI Work Plan:

- EPA ESSLs.
- Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones. 1997. *Preliminary Remediation Goals for Ecological Endpoints*. Oak Ridge National Laboratories, Oak Ridge, TN. ES/ER/TM-162/R2.
- Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic Munition Compounds: Environmental Effects and Screening Values. *Reviews of Environmental Contamination and Toxicology*. 161:1-156.
- Neuhauser, E.F., P.R. Durkin, M.R. Malecki, and M. Anatra. 1986. Comparative Toxicity of Ten Organic Chemicals to Four Earthworm Species. *Comparative Biochemistry and Physiology Part C*. 83(1):197-200. ECOTOX Database.
- Adema, D.M.M., and L. Henzen. 1989. A Comparison of Plant Toxicities of Some Industrial Chemicals in Soil Culture and Soilless Culture. *Ecotoxicology and Environmental Safety*. 18(2):219-229. ECOTOX Database.

The ESSLs are based on conservative exposure assessments that assume full-time exposure and 100 percent bioavailability to the ecological receptors. Specific screening levels, source references, default screening values, and laboratory detection limits were presented in the Sampling and Analysis Plan (Appendix A) of the SI Work Plan.

Table 4-1 also presents the ecological screening level comparison for the sampled surficial soils. The site-wide maximum detected concentrations of 10 of the metals (i.e., antimony, cadmium, chromium, cobalt, copper, lead, mercury, selenium, vanadium, and zinc) exceeded their corresponding ESSLs (Table 4-1). The remaining constituents either did not exceed their respective ESSL or were reported as being present at a concentration below their laboratory quantitation limit.

Those compounds with maximum detected concentrations exceeding the ESSLs also were compared to the same background levels identified for Camp Pendleton (Jacobs, 1997). The results of this comparison were as follows:

- All detections and indicated ESSL exceedances for antimony and selenium were less than the 95th percentile background concentrations calculated for these constituents in the Camp Pendleton study.
- The maximum concentrations of several other detected constituents were similar and/or consistent with the 95th percentile background concentration established for that constituent in the Camp Pendleton study:
  - Chromium (maximum of 49.6 mg/kg vs. 95th percentile background concentration of 33.0 mg/kg). Only four of the exceedances of the ESSL value of 26 mg/kg exceeded the Camp Pendleton 95th percentile background value.
  - Cobalt (maximum of 16.8 mg/kg vs. 95th percentile background concentration of 13.3 mg/kg). Only one of the exceedances of the ESSL value of 13 mg/kg exceeded the Camp Pendleton 95th percentile background value.

- Copper (maximum of 36.6 mg/kg vs. 95th percentile background concentration of 26.8 mg/kg). All six of the exceedances of the ESSL value of 28 mg/kg exceeded the Camp Pendleton 95th percentile background value.
- Mercury (maximum of 0.105 mg/kg vs. 95th percentile background concentration of 0.08 mg/kg). The single exceedance of the ESSL value of 0.00051 mg/kg exceeded the Camp Pendleton 95th percentile background value.

- Only 7 of the 29 concentrations of zinc in soil that exceeded the ESSL of 8.5 mg/kg also exceeded the Camp Pendleton 95th percentile background concentration (111 mg/kg). The maximum zinc concentration from the soil in the SYBA exceeded the background value by slightly more than a factor of 2.
- Only 16 of the 29 concentrations of vanadium in soil that exceeded the ESSL of 7.8 mg/kg also exceeded the Camp Pendleton 95th percentile background concentration (69.4 mg/kg). The maximum vanadium concentration from the soil in the SYBA exceeded the background value by roughly only a factor of 2.
- Only 4 of the 7 concentrations of lead in soil that exceeded the ESSL of 16 mg/kg also exceeded the Camp Pendleton 95th percentile background concentration (29.1 mg/kg). The maximum lead concentration from the soil in the SYBA exceeded the background value by less than a factor of 10.
- Only 6 of the 13 concentrations of cadmium in soil that exceeded the ESSL of 0.38 mg/kg also exceeded the Camp Pendleton 95th percentile background concentration (1.58 mg/kg). The maximum cadmium concentration from the soil in the SYBA exceeded the background value by somewhat less than a factor of 10.

5.3 CONCEPTUAL SITE MODEL

An initial CSM was developed for and included in the SI Work Plan. This CSM is presented in Appendix B. The soil sampling conducted as part of the SI revealed the presence of a broad range of metals and one MC. The lone detected MC, 1,3,5-trimethylbenzene, was detected at only 4 of the 26 locations and these locations were not grouped or seemingly spatially related. The presence of only one MC at detectable levels in the near surface soils would suggest that a significant source of MC is not present at or near the ground surface and that airborne deposition of MC residues in this area from sources outside this area has not occurred to any significant extent. The limiting of the sampling to the near surface (i.e., 0 to 9 inches bgs) does not, however, allow the possibility of the release of MC from buried wastes to the subsurface soil to be verified or checked. Similarly, the SI sampling data could not be used to test any hypotheses about exposure pathways involving potential leaching of constituents from the subsurface soil into groundwater.

The detection of a number of metals in the site soil is expected. The maximum detected concentrations of 10 of the metals exceeded their respective ecological risk-based screening values, and detected concentrations of 3 of the metals exceeded one or both of the human health risk-based screening levels. The screening level risk assessment highlighted the possibility that exposure to the metals in the soil over the long-term could be associated with adverse effects to

the target receptors identified. Based on the SI soil sampling, no refinement of the CSM presented in Appendix B is warranted. However, some exposure pathways and components shown on the CSM could not be either verified or refuted based on the SI sampling results.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents conclusions and recommendations based on information from the SI performed during the spring of 2007 at MRP Site UXO5, Detachment Fallbrook.

6.1 CONCLUSIONS

The purpose of the SI was to collect and evaluate data that would help determine further actions that would be required at MRP Site UXO5.

Results of the geophysical survey revealed the following findings:

- A full site geophysical survey was performed as part of this SI. The results did not appear to indicate any broad, contiguous, buried disposal area at the site. The preliminary conclusion from this survey is that the site does not appear to represent a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation during the RI/FS. This preliminary observation does not eliminate the possibility that individual items or small groupings of items may be buried at any location within the site.

- Several key subsurface anomalies were detected that indicate the potential for isolated buried masses or large items at the site. A distinctive anomaly exists due south of Building 307 beneath the former rail tracks within Grid 39 (Figure 3-1). This anomaly does not coincide with the exposed 40mm round disposal pit also located in that grid. Also, there are several anomalies located in or around the stream bed on the northern portion of the site. These anomalies may be associated with buried debris as evidenced by a sink-hole in Grid 14. It could not be verified if this buried debris was MEC-related, although one item in the sinkhole appears to be MEC. Much of the stream bed area could not be surveyed because of heavy vegetation.

Results of the surface sweep revealed the following findings:

- Many munitions-related items were found throughout the site on the surface. While some areas appear more concentrated with munitions-related items, there is no distinct pattern. In general, the smaller (20mm, 40mm) caliber casings (and projectiles) were located in the western portion of the site, while the larger casings (3″/50s) were found to the east. It appears that an old roadway leads to the stream bed that shows evidence of subsurface disposal, as scattered munitions-related items litter this roadway.
- The frequency of occurrence of surface munitions-related items appears to taper off significantly outside the site boundaries established in the PA (Figure 2-1) (survey and sweep were performed 100 feet to the east and north of the PA boundary, and a large area outside the boundary to the west of Sparrow Road).
- In general, the vast majority of the surface items appear to be inert MEC, but this could not be verified at the time of the survey. Several items (scattered throughout the

site) appear to be MPPEH and are indicated on Figure 4-5 with photographs and DGPS coordinates.

Sampling in the shallow soils at the surface revealed the following findings:

- One MC, 1,3,5-trinitrobenzene, was detected in 4 of the 29 samples. This constituent concentration did not exceed residential or industrial PRGs nor did it exceed ESSLs.
- Many metals were frequently detected in most of the samples acquired.
- Nine of the 17 Title 22 metals exceeded Camp Pendleton background concentrations.
- Arsenic, lead, and vanadium exceeded residential PRGs and Camp Pendleton background levels.
- Arsenic was the only metal to exceed industrial PRGs.
- Ten of the 17 metals exceeded ESSLs. Eight of these metals also exceeded the Camp Pendleton background levels.

Based on this analysis, no MC would be considered a COPC for surface soils. Arsenic, lead, and vanadium should be considered COPCs for human health from exposure to surface soils as they exceed threshold screening values. Based on the maximum detected concentrations, the following chemicals should be considered COPECs for ecological receptors to surface soils as they exceed threshold screening values: antimony, cadmium, chromium, cobalt, copper, lead, mercury, selenium, vanadium, and zinc. It should be noted that antimony and selenium did not exceed background levels but are nonetheless retained as COPECs because Santa Margarita Basin (Camp Pendleton) background values were used (site-specific Fallbrook background levels are not currently available).

6.2 RECOMMENDATIONS

Through the tasks performed in this SI, characterization of the site has been advanced. The results of the preliminary geophysical investigation performed as part of this SI did not indicate the presence of a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation.

Several subsurface anomalies should be further investigated to determine if they are related to munitions disposal at the site and to determine the level of hazard that they might pose under potential future use scenarios. This would include further investigation along the stream bed to define the extent of disposal in this area and the potential hazards that might be posed from these items.

The sampling performed under this SI provided an indication of surface/shallow soil contaminants (Title 22 metals) and suggested no prospect of MC in surface soil. However, if other areas of significant surface MPPEH are found during subsequent investigations, the surrounding surface soils should be sampled for MC. Further work is necessary to investigate

potential subsurface contaminants primarily associated with significant subsurface anomalies. Also, further risk assessment should be performed based on a combination of surface and subsurface analyses to refine the COPC list based on site-specific future use and exposure scenarios.

The purpose of this SI was to collect and evaluate data that would help determine further actions required at MRP Site UXO5. As a result of this SI, an RI/FS is recommended to further characterize the site and determine any required response actions as appropriate. The presence and use of MRP Site UXO5 by protected species will require No Observable Adverse Effect Level criteria to be included in further ecological risk assessment that may be performed as part of the RI/FS.

In the interim, the newly installed site fencing will limit human access to potential hazards at the site. The fencing should be inspected and maintained periodically to ensure its effectiveness.

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7.0 REFERENCES

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TABLES

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TABLE 1-1

MPPEH Classification Guide and Definitions

Type of Material	What is it BEFORE it is inspected for explosives hazards[2]?		What is it AFTER it is inspected for explosive hazards...					
			and it presents explosive hazards?			and it does not present explosive hazards?		
	MPPEH	Other	MEC			MC[5]	Munitions Debris	Other
			UXO	DMM [3]	MC [4]			
Used military munition, on a range, fired	X		X				X	
Unused military munition, on a range, apparently discarded	X			X			X	
Used military munition, in a burial pit, on an operational range or on former ranges	X		X[6]				X	
Unused military munition, in a burial pit on an operational range or on former ranges	X			X[6]			X	
Explosives in the soil	X				X[7]	X		
Refrigerator, nails, soft drink cans, old fence wire, etc.		(8)	NA	NA	NA			(8)
Used cartridge cases, from a range, with live unused munitions possibly mixed in	X			X			(9)	
Target from a range (other than small arms range)	X		(10)	(10)	(10)			(11)
Remnants of munitions from an operational range or former range	X		X[12]	X[12]	X[12]		X[13]	
Kicked out military munition from a former open burn or open detonation ground	X			X[14]			X	
Residual MC in a melt kettle of a former (closed) explosive cast loading building	X		(15)	(15)	X[15]	X		X[16]
Residual MC in a floor drain pipe from an explosives-laden wash water drain of a former (closed) explosives cast loading facility.	X		(15)	(15)	X[15]			X[16]
Residual MC in cracks in floor slab (and in soil underneath floor cracks) in a former explosives manufacturing building	X		(15)	(15)	X[15]	X		X[16]
Small arms bullets or lead particulates in the soil from small arms use at a former small arms range used only for firing small arms ammunition		X[17]	NA[17]			X		

TABLE 1-1

MPPEH Classification Guide and Definitions

Notes:

DMM – discarded military munitions
DoD – Department of Defense
EOD – Explosive Ordnance Disposal
HMX – octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
MC – munitions constituents
MEC – munitions and explosives of concern
MPPEH – munitions presenting potential explosive hazards
NA – not applicable
QASAS – quality assurance/surveillance ammunition specialist
RDX - hexahydro-1,3,5-trinitro-1,3,5-trazine
TNT - 2,4,6-trinitrotoluene
UXO – unexploded ordnance

The examples in this table are not all inclusive. The numbers in the table refer to the following notes. It is important to read the notes, as they provide additional information of importance to understanding.

(1) DoD has been working to standardize terms related to military munitions. The majority of the terms addressed in this matrix apply to the military munitions response program. However, many also apply to other areas (e.g., operational ranges) outside that program.
(2) Before material that is considered MPPEH can be either transferred within or released from DoD, its explosives safety status must be determined (see definition--Documentation of the Explosives Safety Status of Material). The type material involved determines the type of inspection (e.g., visual examination, chemical analysis, X-ray) required. Personnel qualified to determine the status of the particular material being examined must perform required inspections. For example, EOD and UXO-qualified personnel may inspect UXO and DMM during a munitions response or during range clearance activities. A QASAS or certified Wage Grade ammunition operator may inspect steamed-out projectiles at a depot's steam-out operation. A laboratory technician may perform a chemical analysis of soil to determine the percent explosives in the soil.
(3) Munitions generally considered as DMM include buried munitions; un-recovered kick-outs from open detonations; munitions left behind or discarded accidentally during munitions-related activities; munitions intentionally disposed of without authorization during munitions-related activities. Munitions removed from storage for the purpose of disposal that are awaiting disposal are not DMM.
(4) This is MC that is both (a) an explosive; and (b) present in sufficient concentrations to present explosive hazards.
(5) This is MC that is either (a) not an explosive (e.g., lead, beryllium, and cadmium); or (b) an explosive not present in sufficient concentrations to present explosive hazards.
(6) Although military munitions in a burial pit will normally be DMM, some may be UXO. For explosives safety reasons, munitions in a burial pit should be approached as UXO until assessed by technically qualified personnel (e.g., EOD personnel, UXO-qualified personnel) and determined that they are not UXO or that they do not present explosive hazards similar to UXO.
(7) Explosive soil is typically found in sumps and settling lagoons for explosives-laden wastewater, and in and around drainage ditches and pipes that carry the wastewater to such sumps and lagoons.
(8) These items are cultural debris.
(9) After determination of their explosives safety status, used cartridge cases documented as safe would, after any demilitarization required to remove their military characteristics, be available for release from DoD. In additions to these DoD requirements, other regulatory criteria may apply.
(10) A target is a type of range-related debris. Although a target is not MEC, it may contain UXO, DMM, or MC. Prior to its release from DoD control, its explosives safety status must be documented.
(11) A target's explosives safety status must be documented and any demilitarization required to remove its military characteristics must be performed prior to its release from DoD control.

TABLE 1-1

MPPEH Classification Guide and Definitions

(12) UXO, DMM, or MC may be found on operational ranges and on former ranges (previously referred to as closed, transferring or transferred ranges). An inspection of the material will determine into which category this material falls. For example, if a projectile breaks apart on impact, one could find (a) a sheared-off fuze, which would be UXO or (b) explosive filler, which would be MC that broke away from the projectile's open body. If during an open detonation of an unserviceable munition that is conducted on an operational range, the donor charge detonates, but the munition being destroyed breaks up, but does not detonate, the remnants of the munition would be DMM or, if explosive residue (e.g., clumps of TNT), MC.

(13) After determination of its explosives safety status, scrap metal from used munitions on a range documented as safe would, after any demilitarization required to remove its military characteristics, be available for release from DoD control. In additions to these DoD requirements, other regulatory criteria may apply.

(14) Prudent safety practice is to consider kick-outs, which have experienced an unknown environment, to be equally dangerous and managed like UXO until technically qualified personnel assess and determine that they are not UXO or do not present explosive hazards similar to UXO.

(15) Of itself, such material (e.g., mettle kettle, drainpipes, floor slabs) do not present an explosive hazard and would not be classified as UXO, DMM or MC. However, residual MC (e.g., TNT, RDX, HMX) could remain in such material in high enough concentrations to present an explosive hazard.

(16) After determination of its explosives safety status, such material (e.g., mettle kettle, drainpipes, floor slabs) when documented as safe would be available for release from DoD control. In addition to this DoD requirement, other regulatory criteria may apply.

(17) At operational ranges or former ranges used exclusively for live fire of small arms ammunition, some unfired small arms ammunition may be found. Although this ammunition is considered DMM and would be MPPEH, it is not considered to present a significant explosive hazard.

Consolidated Military Munitions Response Program Definitions

Anomaly Avoidance. Techniques employed on property known or suspected to contain MEC, or CWM in OTM configurations to avoid contact with potential surface or subsurface explosive or CA hazards, to allow entry to the area for the performance of required operations.

Chain-of-Custody. The activities and procedures taken throughout the inspection, re-inspection and documentation process to maintain positive control of MPPEH to ensure the veracity of the process used to determine the status of material as to its explosive hazard. This includes all such activities from the time of collection through final disposition.

Chemical Agent (CA). CA means an agent that, through its chemical properties, produces lethal or other damaging effects on human beings, except that such term does not include riot control agents, chemical herbicides, smoke and other obscuration materials.

Chemical Agent (CA) Hazard. A condition where danger exists because CA is present in a concentration high enough to present potential unacceptable effects (e.g., death, injury, damage) to people, operational capability, or the environment.

Chemical Warfare Material (CWM). Items generally configured as a munition containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM includes V- and G-series nerve agents or H-series (mustard) and L-series (lewisite) blister agents in other-than-munition configurations; and certain industrial chemicals (e.g., hydrogen cyanide (AC), cyanogen chloride (CK), or carbonyl dichloride (called phosgene or CG)) configured as a military munition. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include: riot control devices; chemical herbicides; industrial chemicals (e.g., AC, CK, or CG) not configured as a munition; smoke and flame producing items; or soil, water, debris or other media contaminated with low concentrations of chemical warfare agents where no CA hazards exist.

Chemical Warfare Material (CWM) Response. Munitions responses and other responses to address the chemical safety; explosives safety, when applicable; human health; or environmental risks presented by CWM regardless of configuration. (See munitions response.)

Construction Support. Assistance provided by DoD, EOD or UXO-qualified personnel and/or by personnel trained and for operations involving CWM Qualified during intrusive construction activities on property known or suspected to contain MEC, or CWM in OTM configurations to ensure the safety of personnel or resources from any potential explosive or CA hazards.

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MPPEH Classification Guide and Definitions

Chemical Agent (CA) Safety. A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of a mishap involving chemical warfare material (CWM).

Cultural Debris. Debris found on operational ranges or munitions response sites, which may be removed to facilitate a range clearance or munitions response, that is not related to munitions or range operations. Such debris includes, but is not limited to: rebar, household items (refrigerators, washing machines, etc.), automobile parts and automobiles that were not associated with range targets, fence posts, fence wire, and magnetic rocks.

Defense Sites. Locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions. [10 USC 2710(e)(1)]

Discarded Military Munitions (DMM). Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. [10 USC 2710(e)(2)]

Disposal. End of life tasks or actions for residual materials resulting from demilitarization or disposition operations.

Disposition. The process of reusing, recycling, converting, redistributing, transferring, donating, selling, demilitarizing, treating, destroying, or fulfilling other life-cycle guidance, for DoD property.

Documentation of the Explosives Safety Status of Material. Documentation recording that material: (1) does not present an explosive hazard and is consequently safe for unrestricted transfer within or release from DoD control or (2) is MPPEH, with the stated known or suspected explosive hazards, and is consequently is only transferable or releasable to a qualified receiver. This documentation must be signed by a technically qualified individual with direct knowledge of: (1) the results of both the 100 percent inspection and 100 percent re-inspection, and (2) the chain-of-custody of the material originally classified as MPPEH. This certification is followed by a verification signed by a technically qualified individual who inspects the material on a sampling basis (sampling procedures are determined by DoD entity that is generating the MPPEH).

Environmental Regulators and Safety Officials. Include, but may not be limited to environmental regulators, environmental coordinators or hazardous material coordinators, law enforcement officers, and safety personnel of the U.S. Environmental Protection Agency (EPA), American Indians and Alaska Natives, other Federal Land Managers, and/or the States. When appropriate, public health officials of various agencies may also be involved.

Explosive Hazard. A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage) to people, property, operational capability, or the environment.

Explosive Ordnance Disposal (EOD). The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance and of other munitions that have become hazardous by damage or deterioration.

Explosive Ordnance Disposal (EOD) Personnel. Military personnel who have graduated from the Naval School, Explosive Ordnance Disposal; are assigned to a military unit with a Service-defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform Render Safe Procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices.

Explosive Ordnance Disposal (EOD) Unit. A military organization constituted by proper authority; manned with EOD personnel; outfitted with equipment required to perform EOD functions; and assigned an EOD mission.

Explosives or Munitions Emergency Response. All immediate response activities by an explosives and munitions emergency response specialist to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency, An explosives or munitions emergency response may include in-place render-safe procedures, treatment or destruction of the explosives or munitions, and/or transporting those items to another location to be rendered safe, treated, or destroyed. Any reasonable delay in the

TABLE 1-1

MPPEH Classification Guide and Definitions

completion of an explosives or munitions emergency response caused by a necessary, unforeseen, or uncontrollable circumstance will not terminate the explosives or munitions emergency. Explosives and munitions emergency responses can occur on either public or private lands and are not limited to responses at RCRA facilities. (Military Munitions Rule, 40 CFR 260.10)

Explosives Safety. A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions.

Interim Holding Facility (IHF). A temporary storage facility designed to hold recovered chemical warfare material (RCWM) pending transportation for off-site treatment or storage, or on-site treatment.

Land Use Controls (LUC). LUC are physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property to manage risks to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to real property, such as fences or signs.

Long-term Management (LTMgt). The period of site management (including maintenance, monitoring, record keeping, 5-year reviews, etc.) initiated after response (removal or remedial) objectives have been met (i.e., after Response Complete).

Material Potentially Presenting an Explosive Hazard (MPPEH). Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Military Munitions. Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the U.S. Coast Guard, the U.S. Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components of the above. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 USC 2011 et seq.) have been completed. (10 USC 101(e)(4)(A) through (C))

Minimum Separation Distance (MSD). MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

Mutual Agreement. A meeting of the minds on a specific subject, and a manifestation of intent or refrain from doing some parties specific act or acts. Inherent in any mutual agreement or collaborative process are the acknowledgment of each member's role in the process and their differing views of their authorities. The mutual agreement process will provide a means of resolving differences without denying the parties an opportunity to exercise their respective authorities should mutual agreement fail to be achieved.

Munitions and Explosives of Concern (MEC). This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 USC 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 USC 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC). Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710).

Munitions Debris. Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

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MPPEH Classification Guide and Definitions

Munition with the Greatest Fragmentation Distance (MGFD). The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

Munitions Response. Response actions, including investigation, removal actions and remedial actions to address the explosives human health, safety or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC).

Munitions Response Area (MRA). Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS). A discrete location within an MRA that is known to require a munitions response.

One Percent Lethality Distance. A distance calculated from a given CA MCE and meteorological conditions (temperature, wind speed, Pasquill factor) stability and established as the distance at which dosage from that MCE agent release would be 150 mg-min/m ^{3} for H and HD agents, 75 mg-min/m^3 for HT agent, 150 mg-min/m^3 for Lewisite, 10 mg-min/m^3 for GB agent, 4.3 mg-min/m for VX vapor, and 0.1 mg-min/m^3 for inhalation and deposition of liquid VX.

On-call Construction Support. Support provided, on an as needed basis, by DoD, EOD or UXO-qualified personnel and/or by trained for personnel and qualified operations involving CWM during intrusive construction activities on property known or suspected to contain MEC or CWM in OTM configurations, where the probability of encountering such has been determined to be low. This support can respond from off-site when called, or be on-site and available to provide required construction support.

On-site Construction Support. Dedicated support provided by DoD, EOD or UXO-qualified personnel and/or by trained and for personnel qualified operations involving CWM during intrusive construction activities on property known or suspected to contain MEC, or CWM in OTM configurations, where the probability of encountering such has been determined to be moderate to high.

On-call UXO Construction Support. Support provided, on an as needed basis, by DoD, EOD or UXO-qualified personnel during intrusive construction. Personnel activities on property known or suspected to contain UXO or other munitions that have experienced abnormal environments where the probability of encountering such has been determined to be low. This support can respond from off site when called, or be on site and available to provide required construction support.

On-site UXO Construction Support. Dedicated support provided by DoD, EOD or UXO-qualified personnel during construction activities unknown Property or suspected to contain UXO or other munitions that have experienced abnormal environments where the probability of encountering such has been determined to be moderate to high.

On-the-Surface. A situation in which UXO, DMM or CWM are: (A) entirely or partially exposed above the ground surface (i.e., the top of the soil layer); or (B) entirely or partially exposed above the surface of a water body (e.g., because of tidal activity).

Open Burn (OB). An open-air combustion process by which excess, unserviceable, or obsolete munitions are destroyed to eliminate their inherent explosive hazards.

Open Detonation (OD). An open-air process used for the treatment of excess, unserviceable or obsolete munitions whereby an explosive donor charge initiates the munitions being treated.

Operational Range. A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities; or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. [10 USC 101(e)(3)(A) and (B)]. Also includes “military range,” “active range,” and “inactive range” as those terms are defined in 40 CFR 266,201. (See reference (f)).

Primary Explosives. Primary explosives are highly sensitive compounds that are typically used in detonators and primers. A reaction is easily triggered by heat, spark, impact or friction. Examples of primary explosives are lead azide and mercury fulminate.

Public Access Exclusion Distance (PAED). The PAED is defined as longest distance of the hazardous fragment distance, IBD for overpressure, or the One Percent Lethality Distance. For siting purposes, the PAED is analogous to the IBD for explosives; therefore, personnel not directly associated with the chemical operations are not to be allowed within the PAED.

TABLE 1-1

MPPEH Classification Guide and Definitions

Qualified Receiver. Entities that have personnel who are, or individuals who are, trained and experienced in the identification and safe handling of used and unused military munitions, and any known or potential explosive hazards that may be associated with the MPPEH they receive; and are licensed and permitted or otherwise qualified to receive, manage, and process MPPEH.

Range. A designated land or water area that is set aside, managed, and used for range activities of the DoD. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. [10 USC 101(e)(1)(A) and (B)]

Range activities. Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. [10 USC 101(e)(2)(A) and (B)]

Range Clearance. The recovery, collection, and on-range destruction of used military munitions (e.g., UXO), munitions debris, and other range-related debris (e.g., targets) on operational ranges to maintain or enhance operational safety or to sustain the continued use of the range for its intended purpose. The term "range clearance" does not include the on-range disposal or burial of military munition and munitions constituents, when the burial is not a result of normal use.

Range-Related Debris. Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g., targets).

Render Safe Procedures (RSP). The portion of EOD procedures that involves the application of special disposal methods or tools to interrupt the functions or separate the essential components of UXO to prevent an unacceptable detonation.

Secondary Explosives. Secondary explosives are generally less sensitive to initiation than primary explosives and are typically used in booster and main charge applications. A severe shock is usually required to trigger a reaction. Examples are TNT, cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX or cyclorrite), HMX, and tetryl.

Small Arms Ammunition. Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.

Team Separation Distance (TSD). The distance that munitions response teams must be separated from each other during munitions response activities involving intrusive operations.

Technical Escort Unit (TEU). A DoD organization manned with specially trained personnel that provide verification, sampling, detection, mitigation, render safe, decontamination, packaging, escort and remediation of chemical, biological and industrial devices or hazardous material.

Technology-aided Surface Removal. A removal of UXO, DMM or CWM on the surface (i.e., the top of the soil layer) only, in which the detection is process primarily performed visually, but is augmented by technology aids (e.g., hand-held magnetometers or metal detectors) because vegetation, the weathering of UXO, DMM or CWM, or other factors make visual detection difficult.

Time Critical Removal Action (TCRA). Removal actions where, based on the site evaluation, a determination is made that a removal is appropriate, and that less than 6 months exists before on-site removal activity must begin. (40 CFR 300.5)

Unexploded Ordnance (UXO). Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause. [10 USC 101(e)(5)(A) through (C)].

UXO Avoidance. Techniques employed on property known or suspected to contain UXO or other munitions that have experienced abnormal environments, to avoid contact with potential explosive or CA hazards, to allow entry to the area for the performance of required operations.

UXO technicians. Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO technician I, UXO technician II, and UXO technician III.

TABLE 1-1

MPPEH Classification Guide and Definitions

UXO-Qualified Personnel. Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO technician II, UXO technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

Venting. Exposing any internal cavities of MPPEH, to include training or practice munitions (e.g., concrete bombs), using DDESB- or DoD Component-approved procedures, to confirm that an explosive hazard is not present.

TABLE 4-1

SITE INSPECTION SAMPLE RESULTS SUMMARY

Sample Location					SIS-001	SIS-002	SIS-003	SIS-004	SIS-005	SIS-006	SIS-007	SIS-008	SIS-009	SIS-010	SIS-010 (FD)	SIS-011	SIS-012	SIS-013
Sample Date					4/11/2007	4/11/2007	4/11/2007	4/12/2007	4/12/2007	4/12/2007	4/11/2007	4/11/2007	4/12/2007	4/12/2007	4/12/2007	4/12/2007	4/12/2007	4/12/2007
Sample Depth (inches below ground surface)					0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"
Sampling Number					14-001	14-002	14-003	14-004	14-005	14-006	14-007	14-008	14-009	14-010	14-029	14-011	14-012	14-013
Analyte	**Unit**	**Residential PRGs[1]**	**Industrial PRGs[1]**	**ESSLs**														
Metals																		
Antimony	mg/kg	31	410	0.29 [2]	0.022 U	0.022 U	0.021 U	0.022 U	0.052 J	0.023 U	0.022 U	0.023 U	0.048 J	0.023 U	0.023 U	0.022 U	0.023 U	0.023 U
Arsenic	mg/kg	0.062 [4]	0.25	18 [2]	0.96	1.0	1.3	1.5	0.91	1.1	1.5	1.1	0.69	0.90	0.82	1.6	2.7	5.2
Barium	mg/kg	5400	67,000	330 [2]	156	130	119	102	113	95.6	103	151	81.9 J	102	103	84.5 J	93.3	118
Beryllium	mg/kg	150	1,900	36 [2]	0.061 J	0.19 J	0.054 J	0.16 J	0.05 J	0.27 J	0.044 U	0.046 U	0.15 J	0.14 J	0.19 J	0.17 J	0.16 J	0.14 J
Cadmium	mg/kg	37	450	0.38 [2]	13.0	0.20 J	4.5	0.24 J	0.81	0.21 J	1.9	1.7	0.18 J	0.19 J	0.17 J	0.28 J	0.39 J	0.25 J
Chromium	mg/kg	210 [5]	450	26 [2]	18.6	25.1	25.7	29.8	23.1	49.6	38.0	27.4	17.2	21.7	20.8	20.5	21.4	25.9
Cobalt	mg/kg	900	1,900	13 [2]	7.8	12.4	12.2	11.8	12.7	12.4	10.2	16.8	9.5	12.0	11.4	9.9	10.8	13.0
Copper	mg/kg	3,100	41,000	28 [2]	14.1	19.6	20.4	23.0	24.2	23.5	21.3	18.8	13.5	21.2	20.0	31.0	28.9	24.7
Lead	mg/kg	150 [4]	800	16 [2]	4.5	6.4	19.4	5.8	11.0	7.4	227	19.1	7.0	8.3	8.0	13.7	12.3	6.6
Mercury	mg/kg	23	310	0.00051 [3]	0.104 U	0.104 U	0.103 U	0.105	0.104 U	0.104 U	0.102 U	0.105 U	0.111 U	0.105 U	0.102 U	0.103 U	0.102 U	0.102 U
Molybdenum	mg/kg	390	5,100	2 [3]	0.15 J	0.087 J	0.24 J	0.17 J	0.23 J	0.28 J	0.27 J	0.18 J	0.19 J	0.21 J	0.18 J	0.42 J	0.75	0.53
Nickel	mg/kg	1,600	20,000	30 [3]	5.0	7.3	6.8	7.2	6.7	6.7	4.5	7.9	5.2	6.5	6.4	6.2	6.3	7.2
Selenium	mg/kg	390	5,300	0.21 [3]	0.075 U	0.077 U	0.073 U	0.075 U	0.074 U	0.078 U	0.077 U	0.079 U	0.086 U	0.079 U	0.078 U	0.077 U	0.078 U	0.079 U
Silver	mg/kg	390	5,100	2 [3]	0.036 U	0.037 U	0.036 U	0.035 U	0.037 U	0.036 U	0.035 U	0.036 U	0.038 U	0.037 U	0.037 U	0.036 U	0.036 U	0.035 U
Thallium	mg/kg	5.2	67	1 [3]	0.13 J	0.17 J	0.24 J	0.17 J	0.22 J	0.1 J	0.20 J	0.22 J	0.17 J	0.22 J	0.20 J	0.16 J	0.16 J	0.19 J
Vanadium	mg/kg	78	1,000	7.8 [3]	59.4	91.8	82.8	92.8	75.5	143	57.1	88.0	56.0	70.8	70.1	57.3	63.3	84.8
Zinc	mg/kg	23,000	100,000	8.5 [3]	42.8	29.3	70.8	30.5	56.9	26.4	95.5	65.9	25.5	45.3	54.1	211	281	96.0
Explosives/Perchlorate																		
HMX	mg/kg	3,100	31,000	50 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
RDX	mg/kg	4.4	16	15 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3,5-Trinitrobenzene	mg/kg	1,800	18,000	1.38 [6]	0.20 U	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.33	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.21
Nitrobenzene	mg/kg	20	100	226 [7]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Tetryl (Methyl-2,4,6-trinitrophyenylnitramine)	mg/kg	610	6,200	25 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
TNT	mg/kg	16	57	30 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Amino-2,6-dinitrotoluene	mg/kg	0.2 [8]	0.20	80 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Amino-4,6-dinitrotoluene	mg/kg	0.2 [8]	0.20	80 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,6-Dinitrotoluene	mg/kg	61	620	3.2 [9]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4-Dinitrotoluene	mg/kg	120	1,200	3.2 [9]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Nitrotoluene	mg/kg	0.88	2.2	N/A	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Nitrotoluene	mg/kg	12	30	N/A	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
3-Nitrotoluene	mg/kg	730	1,000	N/A	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dinitrobenzene	mg/kg	6.1	62	0.41 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Perchlorate	mg/kg [10]	7.8	100	10 [9]	0.01 U	0.01 U	0.0098 U	0.01 U	0.01 U	0.01 U	0.0094 U	0.01 U	0.011 U	0.01 U	0.01 U	0.0098 U	0.0099 U	0.01 U

TABLE 4-1

SITE INSPECTION SAMPLE RESULTS SUMMARY

Notes:

[1] Reference: EPA Region IX PRG Table, October 2004, http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf.

[2] Reference: EPA ESSL, http://www.epa.gov/ecotox/ecossl.

[3] Reference: Efroymson, R.A., G.W. Suter II, B.E. Sample and D.S. Jones. 1997. Preliminary Remediation Goals for Ecological Endpoints. Oak Ridge National Laboratories, Oak Ridge, TN ES/ER/TM-162/R2.

[4] The value listed is the California-EPA value that is the more stringent of the values listed in the 2004 PRG table.

[5] Listed value is for total chromium.

[6] Reference: Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno and F.B. Daniel. 1999. Nitroaromatic Munition Compounds: Environmental Effects and Screening Values. *Rev. Environ. Contam. Toxicol.* 161:1-156.

[7] Reference: Neuhauser, E.F., P.R. Durkin, M.R. Malecki, and M. Anatra. 1986. Comparative Toxicity of Ten Organic Chemicals to Four Earthworm Species. *Comp. Biochem. Physiol. C.* 83(1):197-200. ECOTOX Database.

[8] No PRG value was available for this compounds, so the laboratory's analytical method quantitation limit was used.

[9] Reference: Adema, D.M.M., and L. Henzen. 1989. A Comparison of Plant Toxicities of Some Industrial Chemicals in Soil Culture and Soilless Culture. *Ecotoxicol. Environ. Saf.* (18(2):219-229. ECOTOX Database.

[10] The units in the Final Sampling and Analysis Plan (TtEC, 2007) for perchlorate in Table A.7-1 were reported incorrectly as µg/kg. The correct units are presented in this table as mg/kg.

Abbreviations and Acronyms:

EPA - US Environmental Protection Agency
ESSL - ecological soil screening level
FD - field duplicate
HMX - octahydro-1,2,5,7-tetranitro-1,3,5,7-tetrazocine
J - estimated value
mg/kg - milligrams per kilogram
N/A - not applicable
NC - not calculable
PRG - Preliminary Remediation Goal
RDX - hexahydro-1,3,5-trinitro-1,3,5-trazine
TNT - 2,4,6-Trinitrotoluene
U - not detected

Highlighted values exceed ESSLs
Highlighted values exceed Residential PRGs
Highlighted values exceed Industrial PRGs

TABLE 4-1

SITE INSPECTION SAMPLE RESULTS SUMMARY

Sample Location					SIS-014	SIS-015	SIS-016	SIS-017	SIS-018	SIS-019	SIS-020	SIS-020 (FD)	SIS-021	SIS-022	SIS-023	SIS-024	SIS-025	SIS-026	SIS-026 (FD)
Sample Date					4/12/2007	4/12/2007	4/12/2007	4/12/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007	4/11/2007
Sample Depth (inches below ground surface)					0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"	0 - 9"
Sampling Number					14-014	14-015	14-016	14-017	14-018	14-019	14-020	14-027	14-021	14-022	14-023	14-024	14-025	14-026	14-028
Analyte	**Unit**	**Residential PRGs[1]**	**Industrial PRGs[1]**	**ESSLs**															
Metals																			
Antimony	mg/kg	31	410	0.29 [2]	0.024 U	0.12 J	0.022 U	0.021 U	0.052 J	0.068 J	0.33 J	0.15 J	0.09 J	0.049 J	0.022 U	0.023 U	0.020 U	0.019 U	0.022 U
Arsenic	mg/kg	0.062 [4]	0.25	18 [2]	0.94	0.84	0.84	0.86	1.0	1.3	1.9	1.9	4.2	4.7	0.90	1.0	4.4	1.0	1.1
Barium	mg/kg	5400	67,000	330 [2]	136	102	127	60.5 J	93.8	172	84.1	115	61.3	56.5	120	151	73.6	114	147
Beryllium	mg/kg	150	1,900	36 [2]	0.083 J	0.10 J	0.097 J	0.17 J	0.046 U	0.045 U	0.044 U	0.046 U	0.13 J	0.072 J	0.041 U	0.047 U	0.21 J	0.062 J	0.10 J
Cadmium	mg/kg	37	450	0.38 [2]	0.28 J	0.20 J	0.2 J	0.13 J	0.54	0.5	3.5	2.7	1.2	0.63	0.14 J	0.17 J	0.81	0.13 J	0.16 J
Chromium	mg/kg	210 [5]	450	26 [2]	28.2	19.1	24.3	14.1	14.8	13	12.4	14.4	7.8	9.9	29.0	32.9	6.8	36.4	39.7
Cobalt	mg/kg	900	1,900	13 [2]	13.0	11.0	12.0	7.8	9.1	12.3	6.7	8.9	6.3	5.8	11.8	13.3	7.0	10.9	12.6
Copper	mg/kg	3,100	41,000	28 [2]	36.6	22.7	24.8	12.4	20.5	21.6	23.3	35.6	22.9	22.7	18.7	25.8	7.4	30.7	36.2
Lead	mg/kg	150 [4]	800	16 [2]	8.3	9.9	7.8	5.4	16.4	12.7	35.3	40.1	30.2	12.0	8.4	7.3	6.1	4.5	5.0
Mercury	mg/kg	23	310	0.00051 [3]	0.105 U	0.106 U	0.102 U	0.101 U	0.102 U	0.102 U	0.102 U	0.102 U	0.101 U	0.102 U	0.102 U	0.103 U	0.102 U	0.103 U	0.102 U
Molybdenum	mg/kg	390	5,100	2 [3]	0.14 J	0.23 J	0.19 J	0.098 J	0.25 J	0.25 J	0.5	0.43	0.49	1.4	0.27 J	0.20 J	0.34 J	0.19 J	0.20 J
Nickel	mg/kg	1,600	20,000	30 [3]	9.4	6.3	7.0	3.3 J	4.6	5	3.9	5.1	2.5 J	2.3 J	6.2	7.8	2.5 J	7.9	9.5
Selenium	mg/kg	390	5,300	0.21 [3]	0.082 U	0.082 U	0.14 J	0.11 J	0.063 U	0.067 U	0.072 U	0.076 J	0.36 J	0.15 J	0.075 U	0.079 U	0.23 J	0.066 U	0.077 U
Silver	mg/kg	390	5,100	2 [3]	0.037 U	0.034 U	0.036 U	0.035 U	0.036 U	0.036 U	0.035 U	0.036 U	0.036 U	0.035 U	0.032 U	0.037 U	0.036 U	0.036 U	0.036 U
Thallium	mg/kg	5.2	67	1 [3]	0.22 J	0.17 J	0.21 J	0.10 J	0.27 J	0.25 J	0.23 J	0.25 J	0.34 J	0.26 J	0.22 J	0.22 J	0.42	0.11 J	0.15 J
Vanadium	mg/kg	78	1,000	7.8 [3]	84.4	56.2	84.5	101	46.8	60.8	32.6	45.0	28.6	35.3	89.7	91.1	38	98.6	108
Zinc	mg/kg	23,000	100,000	8.5 [3]	64.3	130	43.9	30.2	84.7	65.3	150	212	124	171	31.0	33.4	50.6	27.4	32.4
Explosives/Perchlorate																			
HMX	mg/kg	3,100	31,000	50 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
RDX	mg/kg	4.4	16	15 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3,5-Trinitrobenzene	mg/kg	1,800	18,000	1.38 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.62	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nitrobenzene	mg/kg	20	100	226 [7]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Tetryl (Methyl-2,4,6-trinitrophyenylnitramine)	mg/kg	610	6,200	25 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
TNT	mg/kg	16	57	30 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Amino-2,6-dinitrotoluene	mg/kg	0.2 [8]	0.20	80 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Amino-4,6-dinitrotoluene	mg/kg	0.2 [8]	0.20	80 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,6-Dinitrotoluene	mg/kg	61	620	3.2 [9]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4-Dinitrotoluene	mg/kg	120	1,200	3.2 [9]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Nitrotoluene	mg/kg	0.88	2.2	N/A	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Nitrotoluene	mg/kg	12	30	N/A	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
3-Nitrotoluene	mg/kg	730	1,000	N/A	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dinitrobenzene	mg/kg	6.1	62	0.41 [6]	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Perchlorate	mg/kg [10]	7.8	100	10 [9]	0.01 U	0.01 U	0.0098 U	0.0092 U	0.01 U	0.01 U	0.01 U	0.0099 U	0.0096 U	0.01 U	0.0095 U	0.0099 U	0.0098 U	0.0098 U	0.01 U

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TABLE 4-2

METAL CONCENTRATIONS DETECTED AT MRP SITE UXO5

Analyte	Background Concentration[a] (mg/kg)	Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)
Antimony	8.76	ND	0.33
Arsenic	4.61	0.69	5.2
Barium	262	56.5	172
Beryllium	1.52	ND	0.27
Cadmium	1.58	0.13	13
Chromium	33.0	6.8	49.6
Cobalt	13.3	5.8	16.8
Copper	26.8	7.4	36.6
Lead	29.1	4.5	227
Mercury	0.08	ND	0.105
Molybdenum	7.36	0.087	1.4
Nickel	22.5	4.5	9.5
Selenium	0.78	ND	0.36
Silver	1.36	ND	ND
Thallium	1.35	0.10	0.42
Vanadium	69.4	28.6	143
Zinc	111	25.5	281

Notes:

[a] Reference: Jacobs, 1997. The source of the background values is the Santa Margarita watershed.

Abbreviations and Acronyms:

mg/kg – milligrams per kilogram
ND – not detected above the laboratory reporting limit

TABLE 5-1

SITE INSPECTION SAMPLE RESULTS COMPARISON

Analyte	Unit	Residential PRGs[1]	Industrial PRGs[1]	ESSLs	Background Concentrations[10]	Maximum Detection	Max Above Residential PRG?	Max Above Industrial PRG?	Max Above Screening Level?	Max Above Background?
Metals										
Antimony	mg/kg	31	410	0.29 [2]	8.76	0.33	No	No	Yes	No
Arsenic	mg/kg	0.062 [4]	0.25	18 [2]	4.61	5.2	Yes	Yes	No	Yes
Barium	mg/kg	5400	67,000	330 [2]	262	172	No	No	No	No
Beryllium	mg/kg	150	1,900	36 [2]	1.52	0.27	No	No	No	No
Cadmium	mg/kg	37	450	0.38 [2]	1.58	13	No	No	Yes	Yes
Chromium	mg/kg	210 [5]	450	26 [2]	33	49.6	No	No	Yes	Yes
Cobalt	mg/kg	900	1,900	13 [2]	13.3	16.8	No	No	Yes	Yes
Copper	mg/kg	3,100	41,000	28 [2]	27	36.6	No	No	Yes	Yes
Lead	mg/kg	150 [4]	800	16 [2]	29.1	227	Yes	No	Yes	Yes
Mercury	mg/kg	23	310	0.00051 [3]	0.08	0.105	No	No	Yes	Yes
Molybdenum	mg/kg	390	5,100	2 [3]	7.36	1.4	No	No	No	No
Nickel	mg/kg	1,600	20,000	30 [3]	22.5	9.5	No	No	No	No
Selenium	mg/kg	390	5,300	0.21 [3]	0.78	0.36	No	No	Yes	No
Silver	mg/kg	390	5,100	2 [3]	1.36	ND	N/A	N/A	N/A	N/A
Thallium	mg/kg	5.2	67	1 [3]	1.35	0.42	No	No	No	No
Vanadium	mg/kg	78	1,000	7.8 [3]	69.4	143	Yes	No	Yes	Yes
Zinc	mg/kg	23,000	100,000	8.5 [3]	111	281	No	No	Yes	Yes
Explosives/Perchlorate										
HMX	mg/kg	3,100	31,000	50 [6]	N/A	ND		N/A	N/A	N/A
RDX	mg/kg	4.4	16	15 [6]	N/A	ND	N/A	N/A	N/A	N/A
1,3,5-Trinitrobenzene	mg/kg	1,800	18,000	1.38 [6]	N/A	0.62	No	No	No	N/A
Nitrobenzene	mg/kg	20	100	226 [7]	N/A	ND	N/A	N/A	N/A	N/A
Tetryl (Methyl-2,4,6-trinitrophyenylnitramine)	mg/kg	610	6,200	25 [6]	N/A	ND	N/A	N/A	N/A	N/A
TNT	mg/kg	16	57	30 [6]	N/A	ND	N/A	N/A	N/A	N/A
4-Amino-2,6-dinitrotoluene	mg/kg	0.2 [8]	0.20	80 [6]	N/A	ND	N/A	N/A	N/A	N/A
2-Amino-4,6-dinitrotoluene	mg/kg	0.2 [8]	0.20	80 [6]	N/A	ND	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	mg/kg	61	620	3.2 [9]	N/A	ND	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	mg/kg	120	1,200	3.2 [9]	N/A	ND	N/A	N/A	N/A	N/A
2-Nitrotoluene	mg/kg	0.88	2.2	N/A	N/A	ND	N/A	N/A	N/A	N/A
4-Nitrotoluene	mg/kg	12	30	N/A	N/A	ND	N/A	N/A	N/A	N/A
3-Nitrotoluene	mg/kg	730	1,000	N/A	N/A	ND	N/A	N/A	N/A	N/A
1,3-Dinitrobenzene	mg/kg	6.1	62	0.41 [6]	N/A	ND	N/A	N/A	N/A	N/A
Perchlorate	mg/kg	7.8	100	10 [9]	N/A	ND	N/A	N/A	N/A	N/A

Notes:

[1] Reference: EPA Region IX PRG Table, October 2004, http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf.
[2] Reference: EPA ESSL, http://www.epa.gov/ecotox/ecossl.
[3] Reference: Efroymson, R.A., G.W. Suter II, B.E. Sample and D.S. Jones. 1997. Preliminary Remediation Goals for Ecological Endpoints. Oak Ridge National Laboratories, Oak Ridge, TN ES/ER/TM-162/R2.
[4] The value listed is the California EPA value that is more stringent of the values listed in the 2004 PRG table.
[5] Listed value is for total chromium.
[6] Reference: Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic Munition Compounds: Environmental Effects and Screening Values. *Rev. Environ. Contam. Toxicol.* 161:1-156.
[7] Reference: Neuhauser, E.F., P.R. Durkin, M.R. Malecki, and M. Anatra. 1986. Comparative Toxicity of Ten Organic Chemicals to Four Earthworm Species. *Comp. Biochem. Physiol.* C. 83(1):197-200. ECOTOX Database.
[8] No PRG value was available for this compounds, so the laboratory's analytical method quantitation limit was used.
[9] Reference: Adema, D.M.M. and L. Henzen. 1989. A Comparison of Plant Toxicities of Some Industrial Chemicals in Soil Culture and Soilless Culture. *Ecotoxicol. Environ. Saf.* (18(2):219-229. ECOTOX Database.
[10] Background concentrations are from Remedial Investigation/Feasibility Study for Group D Sites, Marine Corps Base, Camp Pendleton, CA, July 16, 1997 (Jacobs, 1997)

Abbreviations and Acronyms:

EPA - U.S. Environmental Protection Agency
ESSL - ecological soil screening level
HMX - octahydro-1,2,5,7-tetranitro-1,3,5,7-tetrazocine
mg/kg - milligrams per kilogram
N/A - not applicable
ND - not detected
PRG - Preliminary Remediation Goal
RDX - hexahydro-1,3,5-trinitro-1,3,5-trazine
TNT - 2,4,6-Trinitrotoluene

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TABLE 5-2

SAMPLE LOCATIONS AND RESULTS ASSOCIATED WITH EXCEEDANCES OF ONE OR MORE RISK-BASED SCREENING VALUES

Compound	Risk-Based Screening Value that was Exceeded	Risk-Based Screening Value (mg/kg)	Detected Concentration (mg/kg)	Sample Location
Antimony	ESSL [2]	0.29	0.33	SIS-014
Arsenic [4]	Residential PRG, Industrial PRG [1]	0.062, 0.25	0.69	SIS-009
			0.82	SIS-010
			0.84	SIS-015
			0.84	SIS-016
			0.86	SIS-017
			0.90	SIS-010
			0.90	SIS-023
			0.91	SIS-005
			0.94	SIS-014
			0.96	SIS-001
			1.0	SIS-002
			1.0	SIS-018
			1.0	SIS-024
			1.0	SIS-026
			1.1	SIS-006
			1.1	SIS-008
			1.1	SIS-026
			1.3	SIS-003
			1.3	SIS-019
			1.5	SIS-004
			1.5	SIS-007
			1.6	SIS-011
			1.9	SIS-020
			1.9	SIS-020
			2.7	SIS-012
			4.2	SIS-021
			4.4	SIS-025
			4.7	SIS-022
			5.2	SIS-013

TABLE 5-2

SAMPLE LOCATIONS AND RESULTS ASSOCIATED WITH EXCEEDANCES OF ONE OR MORE RISK-BASED SCREENING VALUES

Compound	Risk-Based Screening Value that was Exceeded	Risk-Based Screening Value (mg/kg)	Detected Concentration (mg/kg)	Sample Location
Cadmium	ESSL [2]	0.38	0.39	SIS-012
			0.50	SIS-019
			0.54	SIS-018
			0.63	SIS-022
			0.81	SIS-005
			0.81	SIS-025
			1.2	SIS-021
			1.7	SIS-008
			1.9	SIS-007
			2.7	SIS-020
			3.5	SIS-020
			4.5	SIS-003
			13.0	SIS-001
Chromium [5]	ESSL [2]	26	27.4	SIS-008
			28.3	SIS-014
			29.0	SIS-023
			29.8	SIS-004
			32.9	SIS-024
			36.4	SIS-026
			38.0	SIS-007
			39.7	SIS-026
			49.6	SIS-006
Cobalt	ESSL [2]	13	13.0	SIS-013
			13.3	SIS-024
			16.8	SIS-008
Copper	ESSL [2]	28	28.9	SIS-012
			30.7	SIS-026
			31.0	SIS-011
			35.6	SIS-020
			36.2	SIS-026
			36.6	SIS-014
Lead [4]	ESSL [2]	16	16.4	SIS-018
			19.1	SIS-008
			19.4	SIS-003
			30.2	SIS-021
			35.3	SIS-020
			40.1	SIS-020
	Residential PRG [1]	150	227	SIS-007

TABLE 5-2

SAMPLE LOCATIONS AND RESULTS ASSOCIATED WITH EXCEEDANCES OF ONE OR MORE RISK-BASED SCREENING VALUES

Compound	Risk-Based Screening Value that was Exceeded	Risk-Based Screening Value (mg/kg)	Detected Concentration (mg/kg)	Sample Location
Mercury	ESSL [3]	0.00051	0.105	SIS-004
Selenium	ESSL [3]	0.21	0.23	SIS-025
			0.36	SIS-021
Vanadium	ESSL [3]	7.8	28.6	SIS-021
			32.6	SIS-020
			35.3	SIS-022
			38.0	SIS-025
			45.0	SIS-020
			46.8	SIS-018
			56.0	SIS-009
			56.2	SIS-015
			57.1	SIS-007
			57.3	SIS-011
			59.4	SIS-001
			60.8	SIS-019
			63.3	SIS-012
			70.1	SIS-010
			70.8	SIS-010
			75.5	SIS-005
	Residential PRG [1]	78	82.8	SIS-003
			84.4	SIS-014
			84.5	SIS-016
			84.8	SIS-013
			88.0	SIS-008
			89.7	SIS-023
			91.1	SIS-024
			91.8	SIS-002
			92.8	SIS-004
			98.6	SIS-026
			101	SIS-017
			108	SIS-026
			143	SIS-006

TABLE 5-2

SAMPLE LOCATIONS AND RESULTS ASSOCIATED WITH EXCEEDANCES OF ONE OR MORE RISK-BASED SCREENING VALUES

Compound	Risk-Based Screening Value that was Exceeded	Risk-Based Screening Value (mg/kg)	Detected Concentration (mg/kg)	Sample Location
Zinc	ESSL [3]	8.5	25.5	SIS-009
			26.4	SIS-006
			27.4	SIS-026
			29.3	SIS-002
			30.2	SIS-017
			30.5	SIS-004
			31.0	SIS-023
			32.4	SIS-026
			33.4	SIS-024
			42.8	SIS-001
			43.9	SIS-016
			45.3	SIS-010
			50.6	SIS-025
			54.1	SIS-010
			56.9	SIS-005
			64.3	SIS-014
			65.3	SIS-019
			65.9	SIS-008
			70.8	SIS-003
			84.7	SIS-018
			95.5	SIS-007
			96.0	SIS-013
			124	SIS-021
			130	SIS-015
			150	SIS-020
			171	SIS-022
			211	SIS-011
			212	SIS-020
			281	SIS-012

Notes:

[1] Reference: EPA Region IX PRG Table, October 2004, http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf.

[2] Reference: EPA ESSL, http://www.epa.gov/ecotox/ecossl.

[3] Reference: Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones. 1997. *PRGs for Ecological Endpoints.* Oak Ridge National Laboratories, Oak Ridge, TN ES/ER/TM-162/R2.

[4] Listed value is the Cal-EPA value, which is the more stringent of the values listed in the 2004 PRG table.

[5] The value listed is the value for total chromium.

Abbreviations and Acronyms:

Cal/EPA – California. Environmental Protection Agency

EPA – U.S. Environmental Protection Agency

ESSL – ecological soil screening level

mg/kg – milligrams per kilogram

PRG – Preliminary Remediation Goal

SIS – site inspection sample

FIGURES

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LEGEND

- 76 — STATE HIGHWAY
- 15 — INTERSTATE HIGHWAY
- FALLBROOK INSTALLATION BOUNDARY
- WATER

5 0 5 10 Miles

Scale: 1" = 10 Miles

N

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

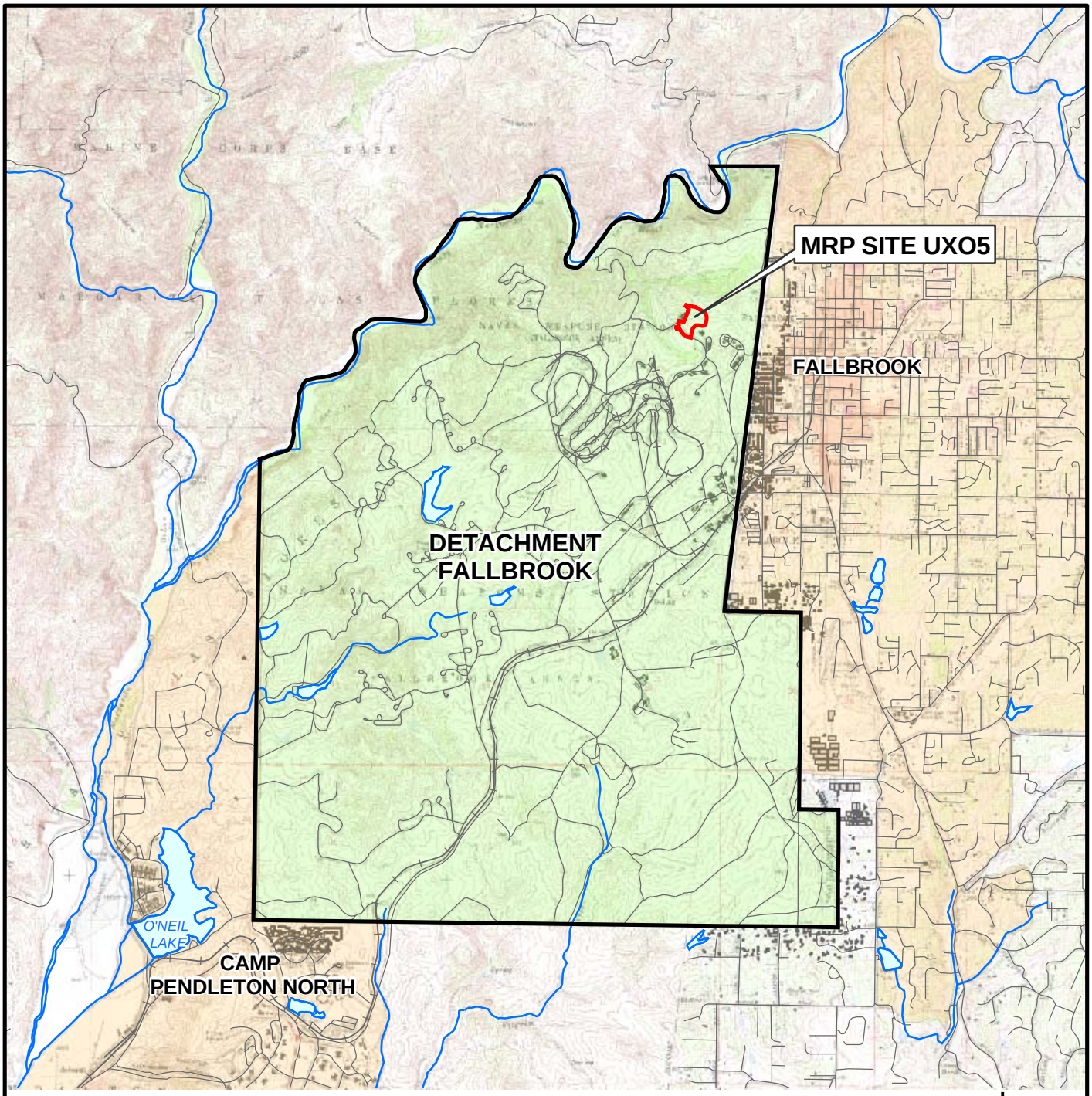
FIGURE 1-1

REGIONAL LOCATION MAP

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122R3889.mxd

TETRA TECH EC, INC



LEGEND

- ROAD
- STREAM
- RAILROAD
- MRP SITE UXO5
- FALLBROOK INSTALLMENT BOUNDARY
- BUILDING
- LAKE
- URBAN AREA

NOTES:

MRP - MUNITIONS RESPONSE PROGRAM

UXO - UNEXPLODED ORDNANCE

2,500 0 2,500 5,000 Feet

Scale: 1" = 5000'

N

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 1-2

DETACHMENT FALLBROOK LOCATION MAP

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122S3890.mxd

TETRA TECH EC, INC.

LEGEND

- ROAD/PAVED SURFACE
- STREAMS
- 725 TOPOGRAPHIC CONTOURS (FT ABOVE MSL)
- BUILDING
- MRP SITE UXO5 - SITE INSPECTION AREA AS DETAILED IN FINAL PRELIMINARY ASSESSMENT (MALCOLM PIRNIE, INC, 2006)

NOTES:

FT - FEET

MRP - MUNITIONS RESPONSE PROGRAM

MSL - MEAN SEA LEVEL

NAVWPNSTA - NAVAL WEAPONS STATION

UXO - UNEXPLODED ORDNANCE

100 0 100 200 Feet

Scale: 1" = 200'

N

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 2-1

MRP SITE UXO5 LOCATION MAP

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3891.mxd

TETRA TECH EC, INC.

LEGEND

- MEC SIGHTING
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING
- SUSPECT MEC PRESENCE
- KNOWN MEC PRESENCE
- MRP SITE UXO5

NOTES:

MEC - MUNITIONS AND EXPLOSIVES OF CONCERN

MK - MARK

MM - MILLIMETER

MRP - MUNITIONS RESPONSE PROGRAM

NAVWPNSTA - NAVAL WEAPONS STATION

UXO - UNEXPLODED ORDNANCE

MEC PRESENCE WAS DETERMINED IN PRELIMINARY ASSESSMENT REPORT (MALCOLM PIRNIE INC., 2006) THROUGH REVIEW OF HISTORICAL DOCUMENTATION, INTERVIEWS, AND VISUAL SURVEY.

100 0 100 200 Feet

Scale: 1" = 200'

N

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

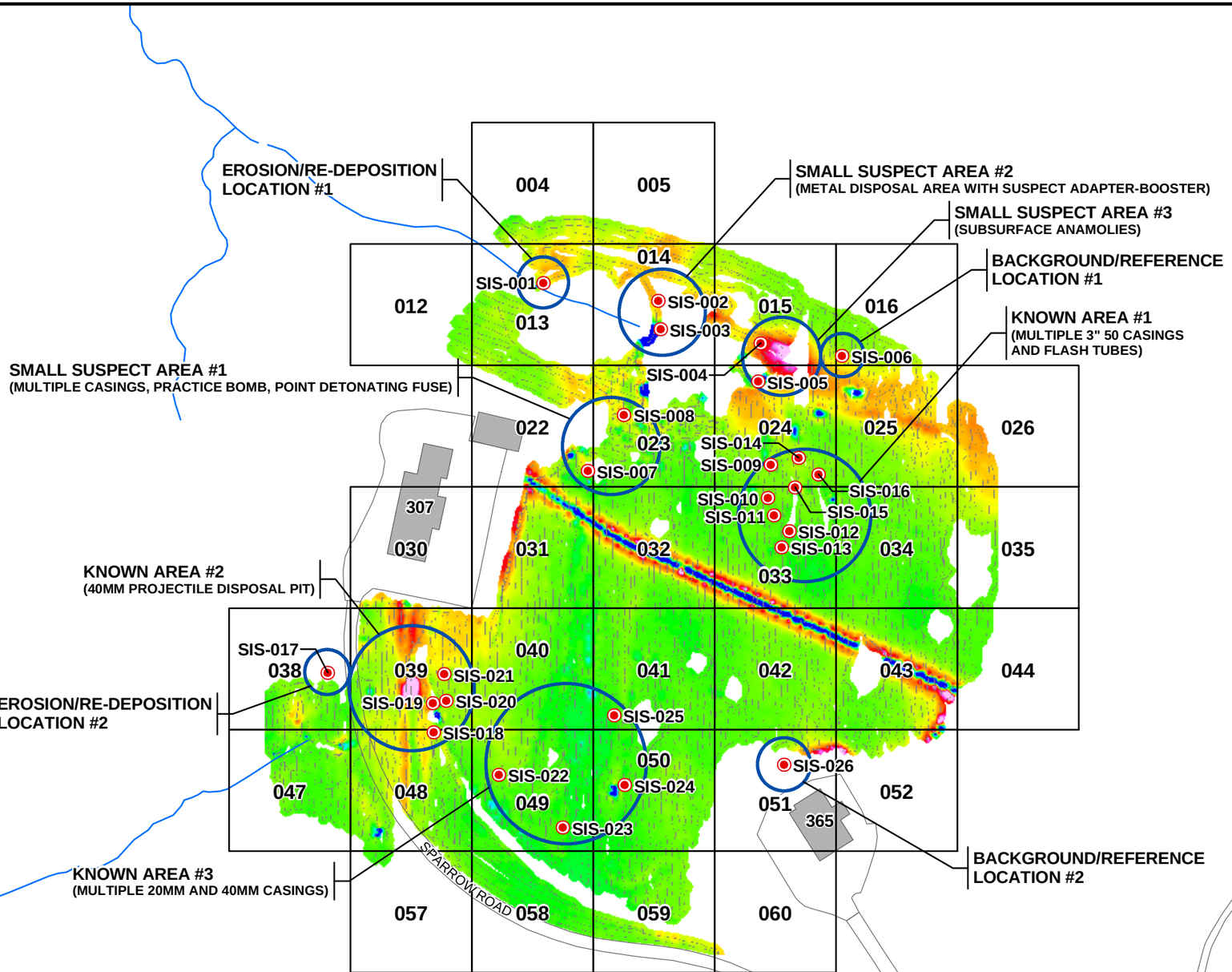
FIGURE 2-2

PRELIMINARY ASSESSMENT FINDINGS

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3892.mxd

TETRA TECH EC, INC.



LEGEND

- SIS-001 — SAMPLE LOCATION
- SAMPLE AREA
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING

100 0 100 200 Feet

Scale: 1" = 200'

NOTES:

MEC - MUNITIONS AND EXPLOSIVES OF CONCERN

MM - MILLIMETER

NAVWPNSTA - NAVAL WEAPONS STATION

SI - SITE INVESTIGATION

SIS - SITE INVESTIGATION SAMPLE

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 3-1

SAMPLING LOCATIONS AND STRATEGY

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3893.mxd

TETRA TECH EC, INC.

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 3-2

UXO DANGER SIGNS

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVISION: 0
AUTHOR: RKH
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122T3894.mxd

TETRA TECH EC, INC.

LEGEND

- POISON OAK (TOXICODENDRON DIVERSILOBUM)
- EXISTING BARBED WIRE FENCELINE
- NEW FENCELINE
- ROAD/PAVED SURFACE
- STREAMS
- HABITAT OF STEPHEN'S KANGAROO RAT (DIPODOMYS STEPHENSI)
- BUILDING

NOTES:

NAVWPNSTA - NAVAL WEAPONS STATION

FEATURES LISTED ON THIS MAP ARE ROUGH LOCATED AND SIZED BASED ON FIELD NOTES.

BASED ON DISCUSSIONS WITH PUBLIC WORKS DEPARTMENT AT DETACHMENT FALLBROOK, A BURIED WATER LINE (~10 FT BGS) TRAVERSES THE SITE BETWEEN BUILDING 307 AND THE HOUSING UNITS TO THE EAST.

Apparent Conductivity
mmho/m

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

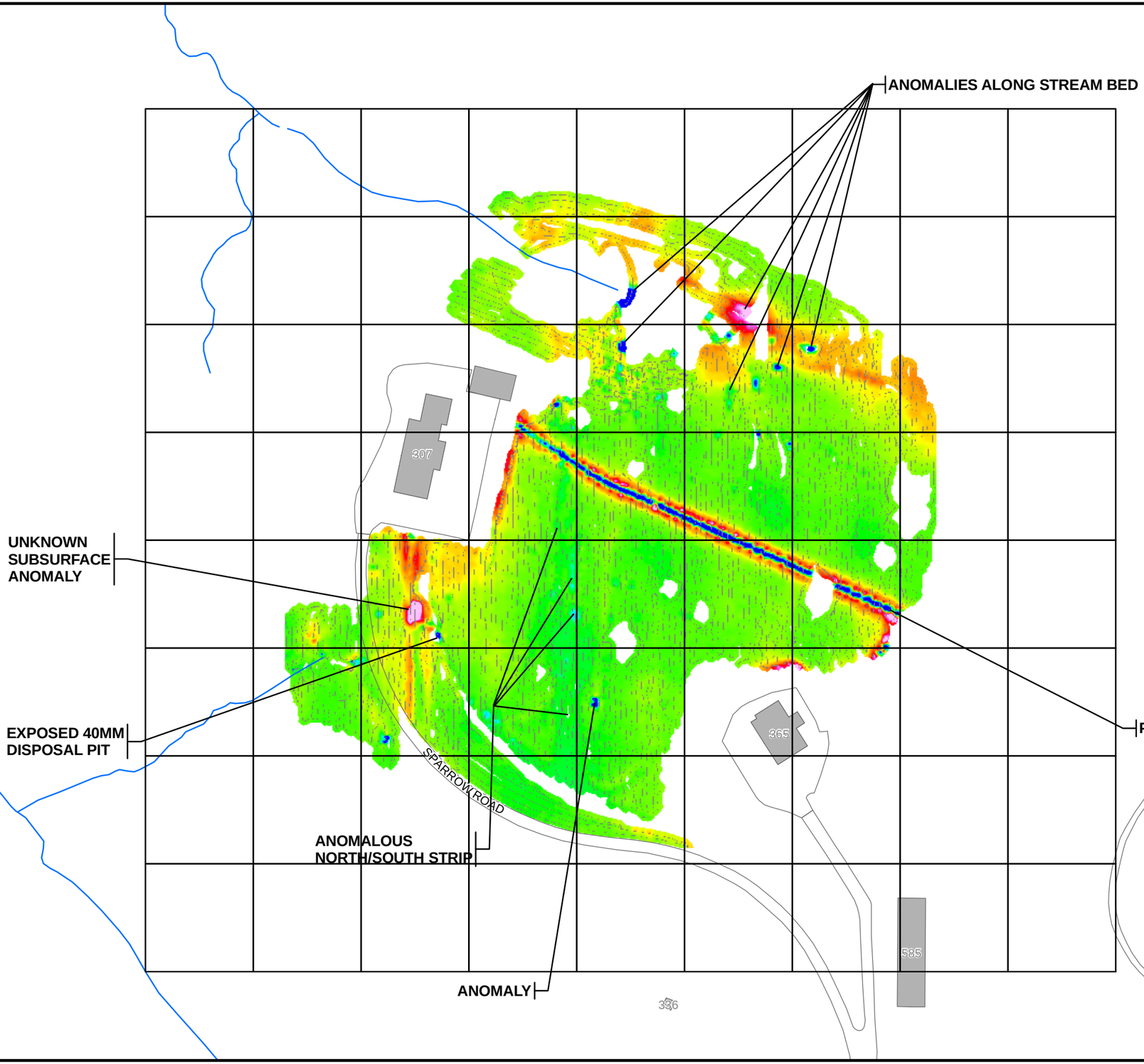
FIGURE 4-1

SITE FEATURES MAP

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3895.mxd

TETRA TECH EC, INC.



LEGEND

ROAD/PAVED SURFACE

STREAMS

BUILDING

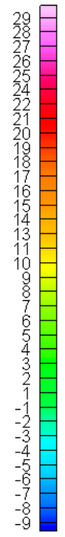
NOTES:

MM - MILLIMETER

mmho/m - MILLIMHOS PER METER

NAVWPNSTA - NAVAL WEAPONS STATION

THE CALL-OUT OF ANOMALIES ON THESE FIGURES ARE MEANT TO DRAW ATTENTIONS TO SOME SPECIFIC AREAS THAT APPEAR TO DEVIATE FROM BACKGROUND BASED ON GEOPHYSICAL DATA. THE CALL-OUTS ARE NOT MEANT TO BE A COMPREHENSIVE EVALUATION OF VARIABILITY OF GEOPHYSICAL RESPONSES AT THAT STATE.



Apparent Conductivity
mmho/m

100 0 100 200 Feet

Scale: 1" = 200'

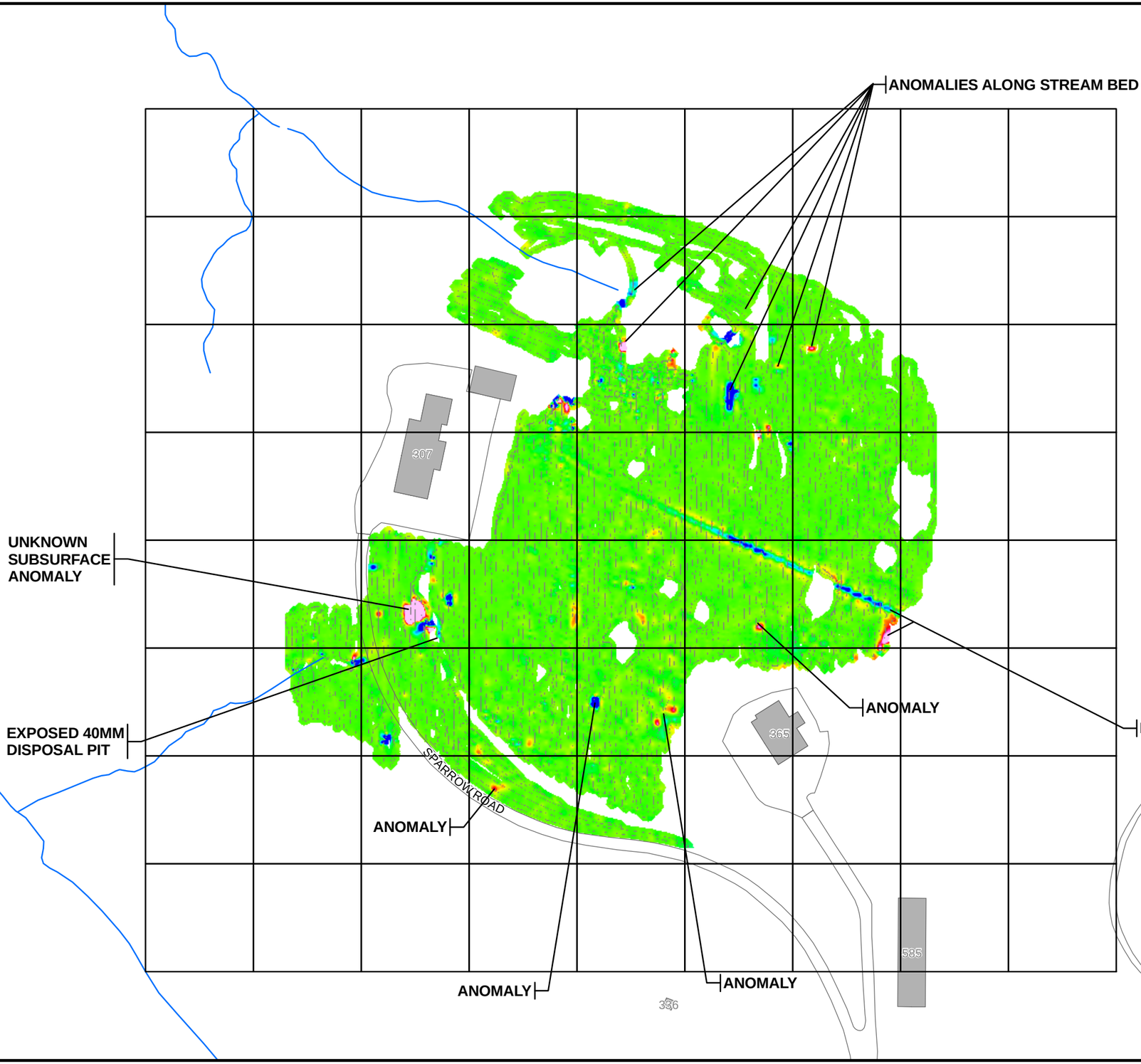
N

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT
FIGURE 4-2
GEOPHYSICAL SURVEY MAP
(APPARENT CONDUCTIVITY)
NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3896.mxd

TETRA TECH EC, INC.



LEGEND

ROAD/PAVED SURFACE

STREAMS

BUILDING

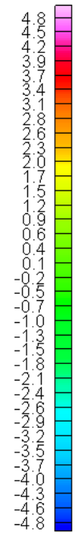
NOTES:

MM - MILLIMETER

NAVWPNSTA - NAVAL WEAPONS STATION

ppt - PARTS PER THOUSAND

THE CALL-OUT OF ANOMALIES ON THESE FIGURES ARE MEANT TO DRAW ATTENTIONS TO SOME SPECIFIC AREAS THAT APPEAR TO DEVIATE FROM BACKGROUND BASED ON GEOPHYSICAL DATA. THE CALL-OUTS ARE NOT MEANT TO BE A COMPREHENSIVE EVALUATION OF VARIABILITY OF GEOPHYSICAL RESPONSES AT THAT STATE.



Inphase Response
ppt

100 0 100 200 Feet

Scale: 1" = 200'

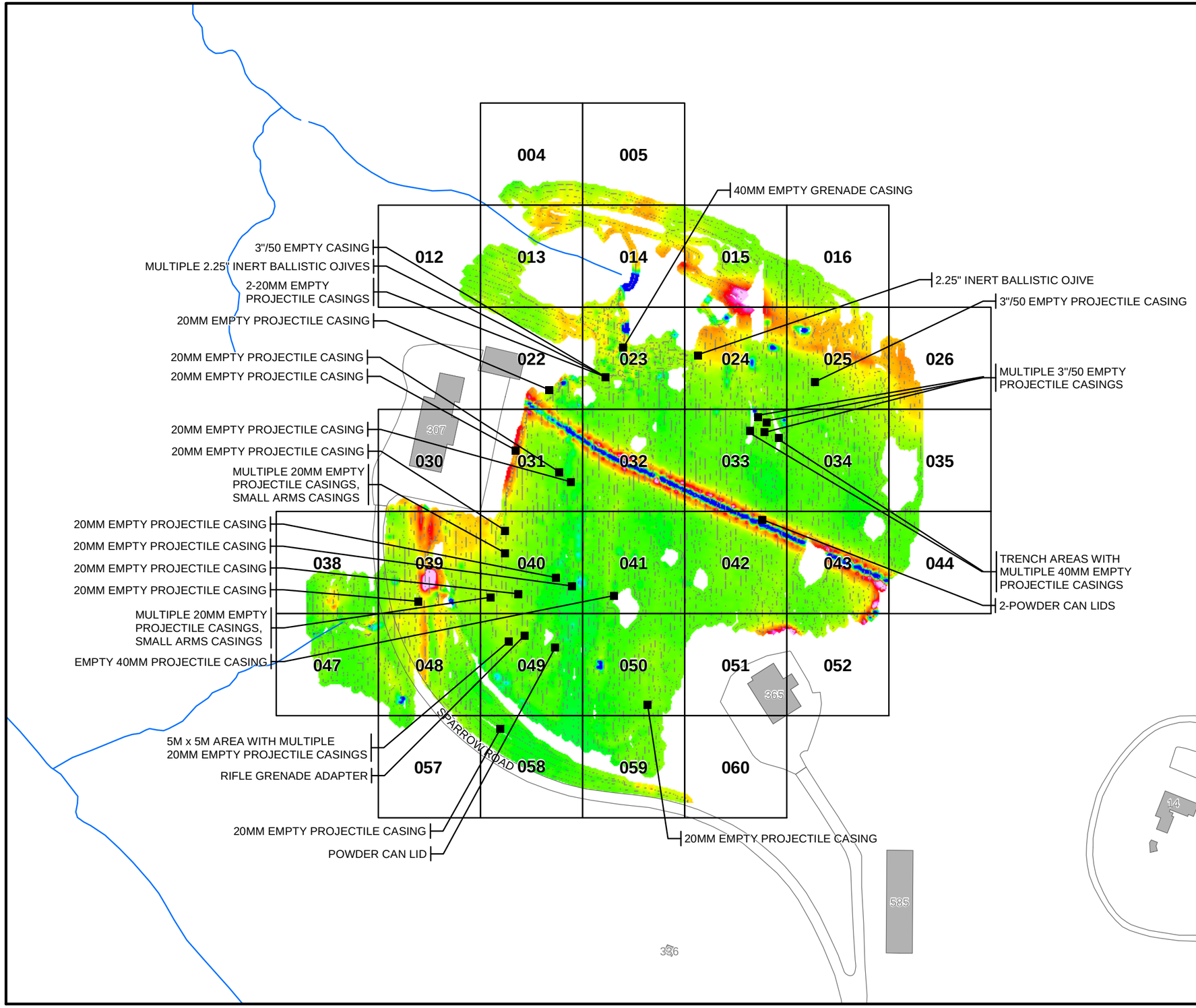
N

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT
FIGURE 4-3
GEOPHYSICAL SURVEY MAP
(INPHASE RESPONSE)
NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3897.mxd

TETRA TECH EC, INC.



LEGEND

- ESTIMATED MEC LOCATIONS
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING

NOTES:

M - METER

MEC - MUNITIONS AND EXPLOSIVES OF CONCERN

MM - MILLIMETER

mmho/m - MILLIMHOS PER METER

NAVWPNSTA - NAVAL WEAPONS STATION

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 4-4

SURFACE SWEEP FINDINGS MAP
(SUSPECT INERT)
NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3898.mxd

TETRA TECH EC, INC.

SUSPECT BASE FUSE IN SINK HOLE

POINT DETONATING FUSE

MK 106 PRACTICE BOMB

40MM ROUND (SUSPECT INERT)

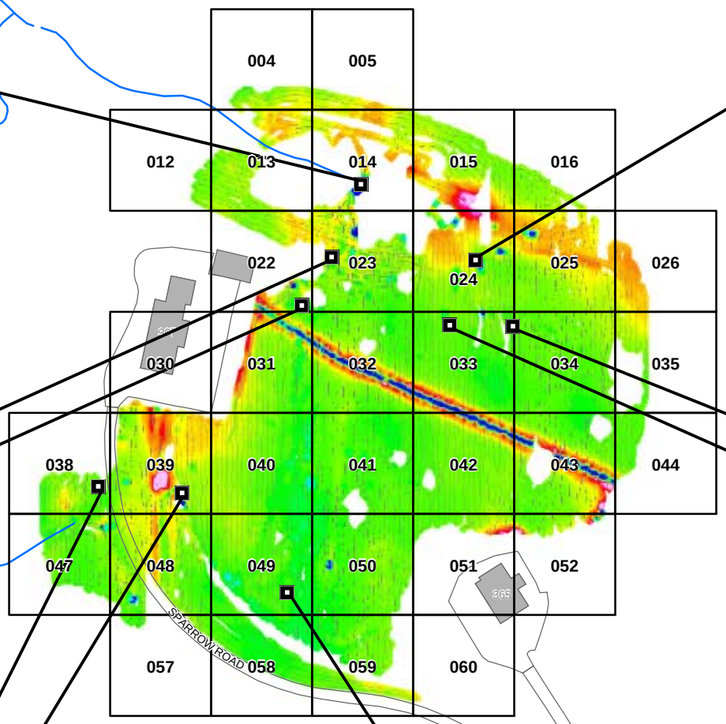
SUSPECT ADAPTER-BOOSTER

MULTIPLE 3"/50 CASINGS (SUSPECT INERT)

MULTIPLE FLASH TUBES

PIT WITH NUMEROUS 40MM ROUNDS

40MM ROUNDS



LEGEND

- MPPEH LOCATIONS (DGPS ACQUIRED DATA)
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING

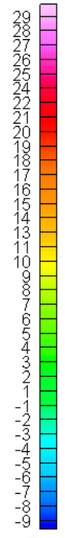
NOTES:

DGPS - DIFFERENTIAL GLOBAL POSITIONING SYSTEM

mmho/m - MILLIMHOS PER METER

MPPEH - MATERIAL POTENTIALLY PRESENTING AN EXPOSIVE HAZARD

NAVWPNSTA - NAVAL WEAPONS STATION



Apparent Conductivity
mmho/m

150 0 150 300
Feet

Scale: 1" = 300'

N

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

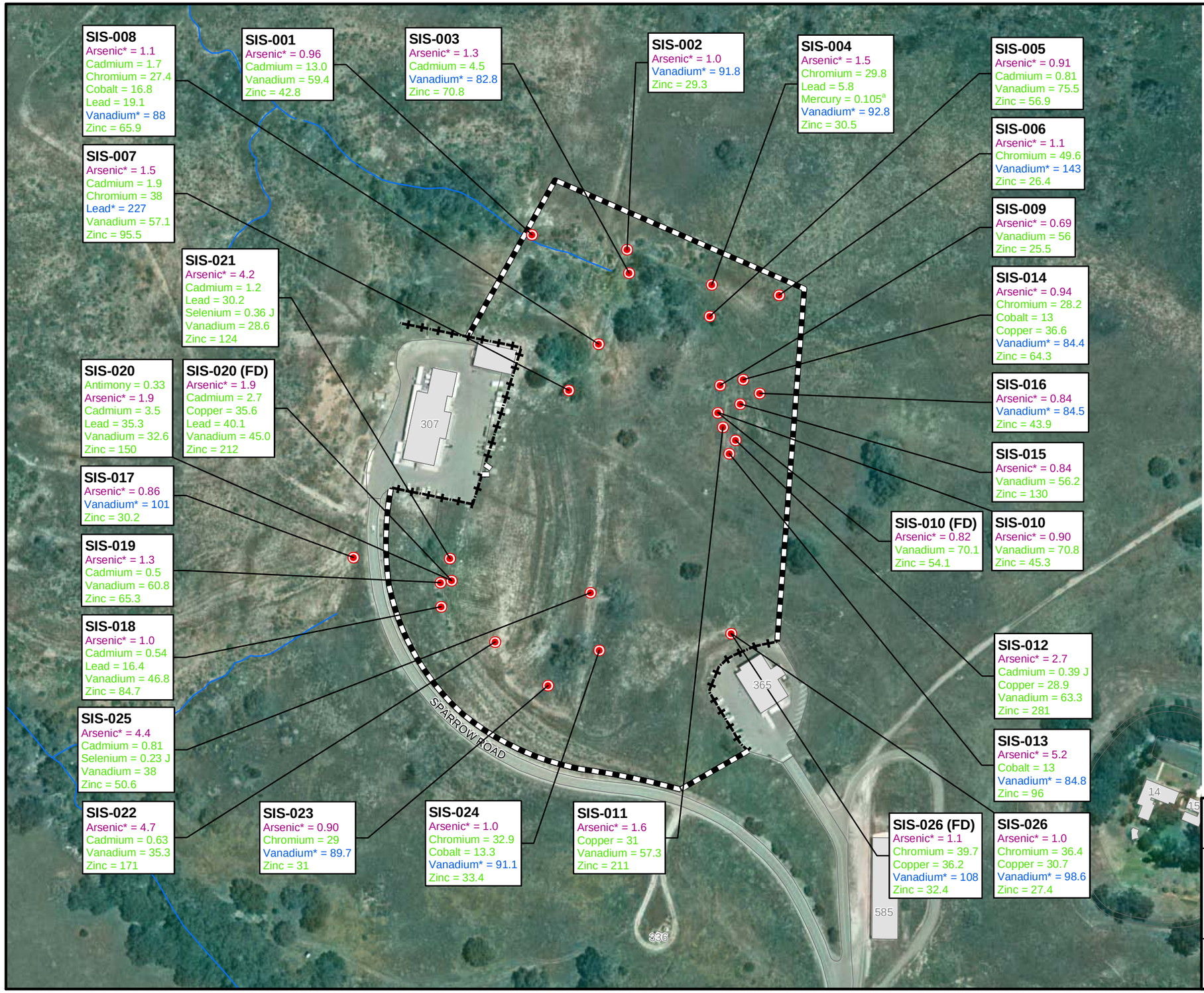
FIGURE 4-5

POTENTIAL MPPEH FINDINGS MAP
(EXPLOSIVE STATUS UNKNOWN)

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3899.mxd

TETRA TECH EC, INC.



LEGEND

- SITE INSPECTION SAMPLE
- EXISTING BARBED WIRE FENCELINE
- NEW FENCELINE
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING

METAL CONCENTRATION IN mg/kg

SAMPLE LOCATION → **SIS-001**
Arsenic = 0.96
Cadmium = 13.0
Vanadium = 59.4
Zinc = 42.8

NOTES:

[a] - THE DETECTION LIMIT FOR MERCURY IS GREATER THAN THE ESSL. THEREFORE, THE DETECTION LIMIT (1.0 mg/kg) IS THE SCREENING LEVEL

* - EXCEEDS MORE THAN ONE SCREENING LEVEL

EPA - US ENVIRONMENTAL PROTECTION AGENCY

ESSL - ECOLOGICAL SOIL SCREENING LEVEL

FD - FIELD DUPLICATE

J - ESTIMATED VALUE

mg/kg - MILLIGRAM PER KILOGRAM

NAVWPNSTA - NAVAL WEAPONS STATION

PRG - PRELIMINARY REMEDIATION GOAL

SIS - SITE INSPECTION SAMPLE

PURPLE TEXT - INDICATES ANALYTICAL RESULTS IN EXCEEDANCE OF THE 2004 EPA INDUSTRIAL PRGs.

BLUE TEXT - INDICATES ANALYTICAL RESULTS IN EXCEEDANCE OF THE 2004 EPA RESIDENTIAL PRGs.

GREEN TEXT - INDICATES ANALYTICAL RESULTS IN EXCEEDANCE OF THE EPA ESSLs.

100 0 100 200 Feet

Scale: 1" = 200'

N

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 4-6

SITE INSPECTION SAMPLING RESULTS -
METAL CONCENTRATIONS EXEEDING SCREENING LEVELS
NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN - ECSD-2201-0014-0002
FILE NUMBER: 090122L3900.mxd

TETRA TECH EC, INC.

LEGEND

- SITE INSPECTION SAMPLE
- EXISTING BARBED WIRE FENCELINE
- NEW FENCELINE
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING

SAMPLE LOCATION → **SIS-001** Cadmium = 13.0 (METAL CONCENTRATION IN mg/kg)

NOTES:

FD - FIELD DUPLICATE

mg/kg - MILLIGRAM PER KILOGRAM

NAVWPNSTA - NAVAL WEAPONS STATION

SIS - SITE INSPECTION SAMPLE

100 0 100 200 Feet

Scale: 1" = 200'

N

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 4-7

SITE INSPECTION SAMPLING RESULTS -
METAL CONCENTRATIONS EXCEEDING
BACKGROUND CONCENTRATIONS
NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3901.mxd

TETRA TECH EC, INC.

LEGEND

- SITE INSPECTION SAMPLE
- EXISTING BARBED WIRE FENCELINE
- NEW FENCELINE
- ROAD/PAVED SURFACE
- STREAMS
- BUILDING

SAMPLE LOCATION → **SIS-013** 1,3,5-TNB = 0.21

CONSTITUENT CONCENTRATION IN mg/kg

NOTES:

1,3,5-TNB - 1,3,5-TRINITROBENZENE

FD - FIELD DUPLICATE

J - ESTIMATED VALUE

mg/kg - MILLIGRAM PER KILOGRAM

NAVWPNSTA - NAVAL WEAPONS STATION

SIS - SITE INSPECTION SAMPLE

100 0 100 200 Feet

Scale: 1" = 200'

N

NAVAL FACILITIES ENGINEERING
COMMAND, SOUTHWEST
SAN DIEGO, CA

SITE INSPECTION REPORT

FIGURE 4-8

SITE INSPECTION SAMPLING RESULTS -
MUNITIONS CONSTITUENTS DETECTIONS

NAVWPNSTA SEAL BEACH
DETACHMENT FALLBROOK, CALIFORNIA

REVIEW: 0
AUTHOR: GFG
DCN: ECSD-2201-0014-0002
FILE NUMBER: 090122L3902.mxd

TETRA TECH EC, INC.

APPENDIX A

PHOTOGRAPH LOG

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Figure 1 - Mowing along western side of MRP Site UXO5

Figure 2 - Casings in Grid 40

Figure 3 - UXO Technician Clearing Location for Fence Post

Figure 4 - Installation of Fence Post

Figure 5 - Fence Installation

Figure 6 - Fence Installation

Figure 7 - Installed Fence

Figure 8 - Installed Fence

Figure 9 - Installed Fence

Figure 10 - Installed Fence, along Sparrow Road, looking South

Figure 11 - Installed Fence, along Sparrow Road, looking North

Figure 12 - Sampling at SIS-021

Figure 13 - SIS-022 with Flash Tubes in Background

Figure 14 - SIS-003, Sink hole

Figure 15 - Point of Detonating Fuse near SIS-008

Figure 16 - MK 106 Practice Bomb near SIS-007

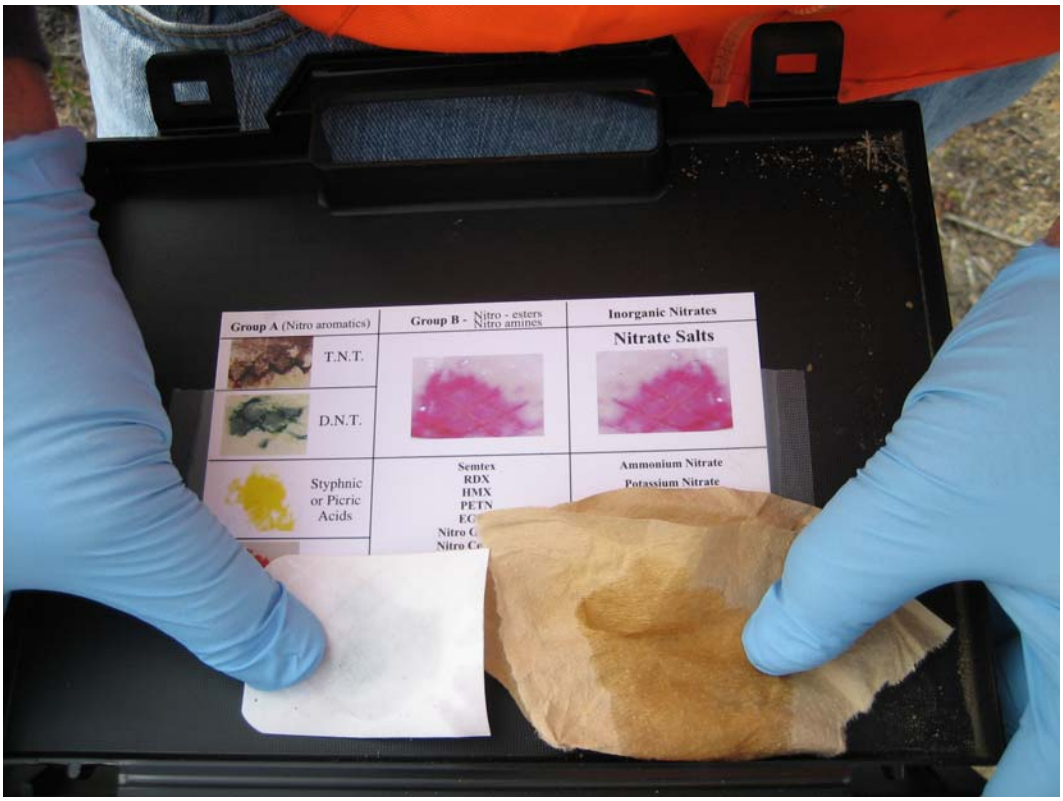

Figure 17 - EXPRAY Field Sampling Result (Negative), SIS-007

Figure 18 - Flashtubes adjacent to SIS-012

Figure 19 - Sampling at SIS-017

APPENDIX B

CONCEPTUAL SITE MODEL

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MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

FACILITY PROFILE	
Installation Name	Naval Weapons Station Seal Beach Detachment Fallbrook (Detachment Fallbrook)
Installation Location	Detachment Fallbrook is located immediately to the west of the City of Fallbrook, CA, which is located approximately 53 miles north of San Diego, CA.
Site Name	Munitions and Explosives of Concern (MEC) MRP Site UXO5 (also referred to as the Salvage Yard Burial Area [SYBA])
Site Location	MRP Site UXO5 is located in the northeastern corner of Detachment Fallbrook, approximately 900 feet from the western corner of the installation housing area. Figures 1-1 and 1-2 in the Site Inspection Work Plan show the location of Detachment Fallbrook within the State of California, and the location of MRP Site UXO5 relative to Detachment Fallbrook.
Site Ownership	U.S. Federal Government (Department of the Navy)
Installation Security	MRP Site UXO5 is located within the confines of Detachment Fallbrook, which is completely fenced and patrolled by a dedicated security force. Access onto the installation is very closely controlled. Once on the installation, access to MRP Site UXO5 is not restricted. The site is not completely fenced.
Physical Boundaries	MRP Site UXO5 is approximately 13 acres in size and is bordered by the following: To the North – Undeveloped land containing live oak woodlands and Coastal Sage Scrub grasslands To the East – Building 365, its parking area, and Coastal Sage Scrub grasslands To the South – Sparrow Road To the West – Building 307 and its parking area
Site Structures and Utilities	There are no buildings or man-made structures within MRP Site UXO5, other than a retaining wall located on the western side of the burial area. Building 307 is located west of the site, and Building 365 is located to the east. Buried water lines pass through the central portion of the burial area, sewer lines run through the southern portion of the site, and telephone lines run along the eastern portion of the former burial area. Additional buried utilities are located on the installation approximately 0.4 miles southwest of MRP Site UXO5.
Ordnance Area Type(s)	Burial area. The entire site was known to have been used as a burial area for over 10 years.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

FACILITY PROFILE	
Storage and Waste Disposal History	MRP Site UXO5, the former SYBA, was used as a disposal area for munitions, inert ordnance, munitions constituents (e.g., missile parts, electronics) and dunnage (the materials used in containers and the holds of ships to protect goods from moisture, contamination, and mechanical damage) from 1952 to approximately 1960. MRP Site UXO5 also was used as a disposal area and storage yard from the early 1950s to the late 1960s. Blasting caps, 20mm and 40mm rounds were found on the ground surface after a brush fire went through the area in 2002. Visual surveys conducted during a Preliminary Assessment of the site discovered practice bombs of varying sizes, a 2.36-inch rocket, a pyrotechnic bomb, and various artillery rounds. The site was never used as a target or impact area. The site is currently no longer actively used for disposal.
Physical Indications of a Potential Source Area	Eroded areas along the retaining wall on the western portion of the site appear to contain ordnance.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

PHYSICAL PROFILE	
Topography	Low hills and natural ravines are the dominant topographic features of the site. The highest point in MRP Site UXO5 is approximately 725 feet above mean sea level (MSL) in the south central portion of the site. The elevation of the remainder of the site varies from 700 feet to 725 feet above MSL.
Natural Barriers	None
Vegetation	Coastal Sage Scrub and non-native Mixed Grassland are the predominant vegetation types within MRP Site UXO5. Common species include coastal sagebrush, flat-topped buckwheat, laurel sumac, sage, goldenbush, and a variety of grasses. MRP Site UXO5 is covered by vegetation over essentially all of its area.
Extent of the Site	Building 307 and its parking lot are located on the western boundary of the site, and Sparrow Road delineates the southern border. Undeveloped grasslands, Coastal Sage Scrub, and live oak wood land are located on the northern site boundary, and Coastal Sage Scrub and Building 365 are east of the site. The boundaries of the site and the buildings adjacent to it are shown in Figure 2-1 in the Site Inspection Work Plan. The depth of the debris buried there is unknown**.**
Surface Water Features and Drainage Pathways	There are no permanent bodies of water within MRP Site UXO5. An intermittent, seasonal stream is located in the northern portion of the site. The stream drains to the Santa Margarita River, which forms the northern boundary of the site and has a watershed area of over 750 square miles. There are no wetlands on the site.
Surface and Subsurface Geology	Detachment Fallbrook is underlain by igneous and metamorphic rocks of the Peninsular Ranges physiomorphic province. Site-specific information about MRP Site UXO5 was not available.
Meteorological Data	The average annual temperature at Detachment Fallbrook is 63°F with summer temperatures ranging from 61°F to 90°F at night, and winter temperatures varying from 33°F at night to 67°F during the day. The climate is considered to be Dry Summer Subtropical, also known as Mediterranean. It is characterized by mild winters, cool summers, and infrequent rainfall. January is the wettest month of the year and July is the most arid. The average annual precipitation range is 13.7 to 17.1 inches. The installation experiences the Santa Ana winds in the summer.
Natural Processes Affecting Fate and Transport	Erosion of soil via water run-off and wind, and possible leaching.
Geophysical Data	None available.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

PHYSICAL PROFILE	
Hydrogeological Data	MRP Site UXO5 is located within *Deluze* Hydrologic area in the Santa Margarita watershed. There is no groundwater depth data available for the burial area. Groundwater flow in the northern portion of the site travels in a northwest direction in stream beds that eventually drain into the Santa Margarita River. Groundwater from the eastern and southern areas on the site flow west-southwest into a stream bed on the western side of Sparrow Road, which also drains into the Santa Margarita River.
Soil Boring or Well Log Information	The moderately drained soil is classified as a sandy loam of granitic origin.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

RELEASE PROFILE	
Munitions Types	Historical records of MRP Site UXO5 list expended cartridges, primers, live projectiles, and inert anti-tank projectiles as items buried in the SYBA. U.S. Marine Corps EOD personnel from MCB Camp Pendleton submitted an EOD incident report in 2002 for their response to 20mm and 40mm rounds found on the ground surface, as well as some blasting caps. The following types of MPPEH were encountered during a site characterization in 2004 and 2005: an MK 76; a 5-pound and a 25-pound practice bomb; a 3-pound pyrotechnic bomb; a 2.36-inch helium (HE) filled anti-tank rocket; 20mm rounds; other projectiles; several smokeless powder cans; and munitions scrap.
MEC Density	Indicated to vary across the burial area. Some portions of MRP Site UXO5 may not have any MEC.
Determination of Contaminant Movement from Source Areas	Ordnance items and related debris were buried or emplaced within the burial area. It has not been determined if MEC/MC has migrated to any locations (on or off site) from the point of their placement. Complete gun rounds were observed in an eroded area adjacent to the retaining wall, but none of them were observed down-gradient from that site.
Migration Routes and Mechanisms	Water runoff, soil erosion, and wind-entrained soil dust are all potential migration mechanisms for material potentially presenting an explosive hazard (MPPEH)/MEC/munitions constituents (MC). The leaching of buried MC through the soils to groundwater is another potential migration route. There is no current intrusive activity at the site that may cause or enhance migration, such as intrusive site maintenance, plowing, tilling, or regrading. Future remediation and/or maintenance activities within MRP Site UXO5 that involve excavation or construction create potential release mechanisms and/or migration routes. The ordnance items and debris associated with the site are generally small enough to be lifted and carried by an individual child or adult.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

RELEASE PROFILE	
Munitions Constituents and Media of Potential Concern	MC of concern associated with potential MEC include: • Explosives PBX, RDX and HMX (HE filled projectiles) • Titanium tetrachloride (25 pound bombs) • Smokeless powder (smokeless powder cans) • Explosives TNT and PETN (bazooka rounds) • Potassium perchlorate, powdered aluminum, black powder, smoke mixture, and lead (pyrotechnic bombs) • White phosphorus (pyrotechnic composition), lithium hydride, magnesium, RDX, lead styphnate, lead azide, barium, and strontium (pyrotechnics and blasting caps) • Lead, arsenic, copper, chromium, cadmium, nickel, and zinc (small arms rounds) These MC are primarily of potential concern relative to the site soils. Inter-media contaminant transfer is a possibility from the soil to the groundwater and from the soil into the ambient air via soil dust entrainment.
Impact of Chemical Mixtures and Co-located Waste	These constituents tend to be relatively stable in the soil, and tend to remain close to where they are released into the environment. A number of the constituents can be soluble in water, depending on the form in which they exist, and may leach into the groundwater. The solubility of many metals is influenced by the pH of the soil system. The organic compounds may degrade in the environment under certain conditions, which may be affected by sunlight, the presence of oxygen and nutrients, and moisture.
Locations and Delineation of Confirmed Releases	The locations of MPPEH recovered during the visual surveys noted earlier are annotated on Figure 4-2 in the project Work Plan.
Modeling Results	None available.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

LAND USE AND EXPOSURE PROFILE	
Current Land Use	MRP Site UXO5 is closed and is currently not in use. Livestock grazing on the site has been discontinued.
Future Land Use	Same as current use. No significant re-use or redevelopment is planned for the future due to the restrictions associated with the Explosive Safety Quantity Distance (ESQD) arcs (see below). Possibility for livestock grazing in the future as a means of fire control, if the risk is acceptable.
Zoning	ESQD arcs associated with on-installation explosives storage magazines located near MRP Site UXO5 restrict the amount and type of activities that can be performed at the site.
Demographics	Detachment Fallbrook employs 72 military, 191 civilian, and 102 contractor personnel. There are also 9 military, 126 civilians, and 90 contractor tenant personnel. Fallbrook, the nearest city to the installation, has a population of 29,100 (census year 2000), while San Diego County has a population of 2,933,462 (U.S. Census Bureau 2005 estimate).
Receptors Associated with Current and Future Land Use	People potentially exposed to ordnance or munitions constituents at MRP Site UXO5 include Navy personnel, Navy-authorized visitors (including contractors), and unauthorized visitors (trespassers). The leaching of MC through soils into the groundwater and the entrainment of contaminated soil as dust into open air are additional potential exposure pathway that could bring contaminants into contact with the general public.
Types of Current or Future Activities at the Facility	MRP Site UXO5 is currently not in use, and is not planned for any significant use in the future due to the ESQD arcs. Environmental and ecological surveys may be conducted on the site in the future. No mowing takes place on site; and the retaining wall on the western side of the site is not maintained. Repair to the underground utilities may occur in the future, if required. Fire prevention mitigation methods, including livestock grazing, may occur in the future, if the risk is acceptable.
Natural Resources	No information is available for the depth of groundwater beneath MRP Site UXO5; however, the depth of water in sampling wells near Buildings 230 and 232 on Ammunition Road ranged from 50 to 60 feet in 2003. There are no delineated wetlands or other unique natural features at MRP Site UXO5.
Cultural Resources	Cultural resources consisting of six prehistoric sites, a milling site, and one 1930s cattle trough are located on or near MRP Site UXO5. The information about the sites and their locations can be found in the Final Cultural Resources Inventory and Survey Report prepared by Mooney & Associates in May 2000. The information has not been released to the public to protect the integrity of the site.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

LAND USE AND EXPOSURE PROFILE	
Resource Utilization	No groundwater wells are located within MRP Site UXO5. Potable water for Detachment Fallbrook is purchased from the San Diego County Water Authority through water lines owned by the Fallbrook Utility District. No hiking trails or other features may preferentially draw individuals to the site where they may be exposed.
Sensitive Receptor Subpopulations	There are no on-installation schools, hospitals, or day care centers. A recreational facility is located 4,700 feet southeast of MRP Site UXO5. A small base-housing community is located 1,000 feet east southeast of MRP Site UXO5.

MRP SITE UXO5 CONCEPTUAL SITE MODEL INFORMATION PROFILES

ECOLOGICAL PROFILE	
Description of the Property and Habitat	MRP Site UXO5 is a 13-acre former burial area located in the northeastern portion of Detachment Fallbrook. The site is comprised of low hills and natural ravines and is predominantly vegetated with Coastal Sage Shrub, Mixed Grassland, and live oak woodlands that provide habitat for sensitive species that include the Stephens' kangaroo rat, the Coastal California gnatcatcher, and the Least Bell's vireo.
Primary Use of the Property and Degree of Disturbance	No current or future activities are planned at MRP Site UXO5. In the future, ecological and environmental surveys may be performed that may disturb portions of the local habitat. Possible future maintenance of the buried utilities also may disturb the local habitat in selected locations near the utilities. Otherwise, the site experiences relatively little disturbance.
Identification of Ecological Receptors in Relation to Habitat Type	Known or potentially present receptors include mammals (kangaroo rats, voles, deer, mice, ground squirrels, opossum, rabbits, and coyotes); amphibians (tree frogs); reptiles (orange-throated whiptails, rattlesnakes, horned lizards); and birds (burrowing owls, kites, quails, sparrows, kingbirds, and hawks). The river and its estuary support seven federal- or state-listed endangered species.
Federal Endangered Species	Stephen's kangaroo rat, Least Bell's Vireo, Arroyo toad, and quino checkerspot butterfly
Federal Threatened Species	Coastal California gnatcatcher and thread-leaved brodiaea
State Endangered Species	Least Bell's Vireo and thread-leaved brodiaea
State Threatened Species	Stephen's kangaroo rat
State Species of Special Concern	Coastal California gnatcatcher, golden eagle, Southern California Rufous-crowned sparrow, Cooper's hawk, and Arroyo toad
Migrating Species	No migrating species are known to use MRP Site UXO5.
Relationship of any MEC/MC Releases to Habitat Areas	MC that has been incorporated into the food web through uptake by vegetation and bioaccumulated in food and prey may come into contact with the terrestrial wildlife present at the site. There could be incidental ingestion of soil during digging, grooming, and foraging by mammalian and avian species. The potential also exists for a complete exposure pathway to the public by the leaching of MC into the groundwater system or by migration off site by out-flow and erosion during significant rain events. Surface runoff and groundwater may be communicating with the river and the aquatic habitats near the site. There could be incidental ingestion of soil during digging, grooming, and foraging by mammalian and avian species.

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APPENDIX C

ANALYTICAL DATA

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1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-005

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-001

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170705.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-006

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-002

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170706.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-004

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-003

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170707.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-014

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-004

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170708.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-016

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-005

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170712.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-013

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-006

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170713.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-012

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-007

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170714.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-015

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-008

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170715.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-009

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-009

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170716.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/17/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-010

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-010

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170718.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-029

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-011

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170719.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-011

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-012

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170720.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-017

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB02 Run Sequence: R017150

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB02-013

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170721.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/12/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-005

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-001

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 96.4

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.052	J	N	M	R017030
7440-38-2	Arsenic	0.91		*N	M	R017030
7440-39-3	Barium	113			P	R017115
7440-41-7	Beryllium	0.050	J		P	R017115
7440-43-9	Cadmium	0.81			M	R017030
7440-47-3	Chromium	23.1			P	R017115
7440-48-4	Cobalt	12.7			P	R017115
7440-50-8	Copper	24.2			P	R017115
7439-92-1	Lead	11.0			P	R017115
7439-97-6	Mercury	0.104	U		CV	R017075
7439-98-7	Molybdenum	0.23	J	*N	M	R017030
7440-02-0	Nickel	6.7			P	R017115
7782-49-2	Selenium	0.074	U		M	R017030
7440-22-4	Silver	0.037	U		P	R017115
7440-28-0	Thallium	0.22	J		M	R017030
7440-62-2	Vanadium	75.5			P	R017115
7440-66-6	Zinc	56.9			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Colorless Clarity After: Artifacts: No

Comment

SW-846
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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-009

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-009

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 90

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.048	J	N	M	R017030
7440-38-2	Arsenic	0.69		*N	M	R017030
7440-39-3	Barium	77.8			P	R017115
7440-41-7	Beryllium	0.15	J		P	R017115
7440-43-9	Cadmium	0.18	J		M	R017030
7440-47-3	Chromium	17.2			P	R017115
7440-48-4	Cobalt	9.5			P	R017115
7440-50-8	Copper	13.5			P	R017115
7439-92-1	Lead	5.5			P	R017115
7439-97-6	Mercury	0.111	U		CV	R017075
7439-98-7	Molybdenum	0.19	J	*N	M	R017030
7440-02-0	Nickel	5.2			P	R017115
7782-49-2	Selenium	0.086	U		M	R017030
7440-22-4	Silver	0.038	U		P	R017115
7440-28-0	Thallium	0.17	J		M	R017030
7440-62-2	Vanadium	53.1			P	R017115
7440-66-6	Zinc	23.6			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-004

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-003

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 96.5

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	1.5		*N	M	R017030
7440-39-3	Barium	102			P	R017115
7440-41-7	Beryllium	0.16	J		P	R017115
7440-43-9	Cadmium	0.24	J		M	R017030
7440-47-3	Chromium	29.8			P	R017115
7440-48-4	Cobalt	11.8			P	R017115
7440-50-8	Copper	23.0			P	R017115
7439-92-1	Lead	5.8			P	R017115
7439-97-6	Mercury	0.105			CV	R017075
7439-98-7	Molybdenum	0.17	J	*N	M	R017030
7440-02-0	Nickel	7.2			P	R017115
7782-49-2	Selenium	0.075	U		M	R017030
7440-22-4	Silver	0.035	U		P	R017115
7440-28-0	Thallium	0.17	J		M	R017030
7440-62-2	Vanadium	92.8			P	R017115
7440-66-6	Zinc	30.5			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-014

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-004

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 95.2

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.024	U	N	M	R017030
7440-38-2	Arsenic	0.94		*N	M	R017030
7440-39-3	Barium	136			P	R017115
7440-41-7	Beryllium	0.083	J		P	R017115
7440-43-9	Cadmium	0.28	J		M	R017030
7440-47-3	Chromium	28.2			P	R017115
7440-48-4	Cobalt	13.0			P	R017115
7440-50-8	Copper	36.6			P	R017115
7439-92-1	Lead	8.3			P	R017115
7439-97-6	Mercury	0.105	U		CV	R017075
7439-98-7	Molybdenum	0.14	J	*N	M	R017030
7440-02-0	Nickel	9.4			P	R017115
7782-49-2	Selenium	0.082	U		M	R017030
7440-22-4	Silver	0.037	U		P	R017115
7440-28-0	Thallium	0.22	J		M	R017030
7440-62-2	Vanadium	84.4			P	R017115
7440-66-6	Zinc	64.3			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-016

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-005

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 97.9

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	0.84		*N	M	R017030
7440-39-3	Barium	127			P	R017115
7440-41-7	Beryllium	0.097	J		P	R017115
7440-43-9	Cadmium	0.20	J		M	R017030
7440-47-3	Chromium	24.3			P	R017115
7440-48-4	Cobalt	12.0			P	R017115
7440-50-8	Copper	24.8			P	R017115
7439-92-1	Lead	7.8			P	R017115
7439-97-6	Mercury	0.102	U		CV	R017075
7439-98-7	Molybdenum	0.19	J	*N	M	R017030
7440-02-0	Nickel	7.0			P	R017115
7782-49-2	Selenium	0.14	J		M	R017030
7440-22-4	Silver	0.036	U		P	R017115
7440-28-0	Thallium	0.21	J		M	R017030
7440-62-2	Vanadium	84.5			P	R017115
7440-66-6	Zinc	43.9			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-013

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-006

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 97.6

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.023	U	N	M	R017030
7440-38-2	Arsenic	5.2		*N	M	R017030
7440-39-3	Barium	118			P	R017115
7440-41-7	Beryllium	0.14	J		P	R017115
7440-43-9	Cadmium	0.25	J		M	R017030
7440-47-3	Chromium	25.9			P	R017115
7440-48-4	Cobalt	13.0			P	R017115
7440-50-8	Copper	24.7			P	R017115
7439-92-1	Lead	6.6			P	R017115
7439-97-6	Mercury	0.102	U		CV	R017075
7439-98-7	Molybdenum	0.53		*N	M	R017030
7440-02-0	Nickel	7.2			P	R017115
7782-49-2	Selenium	0.079	U		M	R017030
7440-22-4	Silver	0.035	U		P	R017115
7440-28-0	Thallium	0.19	J		M	R017030
7440-62-2	Vanadium	84.8			P	R017115
7440-66-6	Zinc	96.0			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-012

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-007

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 98.2

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.023	U	N	M	R017030
7440-38-2	Arsenic	2.7		*N	M	R017030
7440-39-3	Barium	93.3			P	R017115
7440-41-7	Beryllium	0.16	J		P	R017115
7440-43-9	Cadmium	0.39	J		M	R017030
7440-47-3	Chromium	21.4			P	R017115
7440-48-4	Cobalt	10.8			P	R017115
7440-50-8	Copper	28.9			P	R017115
7439-92-1	Lead	12.3			P	R017115
7439-97-6	Mercury	0.102	U		CV	R017075
7439-98-7	Molybdenum	0.75		*N	M	R017030
7440-02-0	Nickel	6.3			P	R017115
7782-49-2	Selenium	0.078	U		M	R017030
7440-22-4	Silver	0.036	U		P	R017115
7440-28-0	Thallium	0.16	J		M	R017030
7440-62-2	Vanadium	63.3			P	R017115
7440-66-6	Zinc	281			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-015

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-008

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 94

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.12	J	N	M	R017030
7440-38-2	Arsenic	0.84		*N	M	R017030
7440-39-3	Barium	102			P	R017115
7440-41-7	Beryllium	0.10	J		P	R017115
7440-43-9	Cadmium	0.20	J		M	R017030
7440-47-3	Chromium	19.1			P	R017115
7440-48-4	Cobalt	11.0			P	R017115
7440-50-8	Copper	22.7			P	R017115
7439-92-1	Lead	9.9			P	R017115
7439-97-6	Mercury	0.106	U		CV	R017075
7439-98-7	Molybdenum	0.23	J	*N	M	R017030
7440-02-0	Nickel	6.3			P	R017115
7782-49-2	Selenium	0.082	U		M	R017030
7440-22-4	Silver	0.034	U		P	R017115
7440-28-0	Thallium	0.17	J		M	R017030
7440-62-2	Vanadium	56.2			P	R017115
7440-66-6	Zinc	130			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-009

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-009

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 90

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.048	J	N	M	R017030
7440-38-2	Arsenic	0.69		*N	M	R017030
7440-39-3	Barium	77.8			P	R017115
7440-41-7	Beryllium	0.15	J		P	R017115
7440-43-9	Cadmium	0.18	J		M	R017030
7440-47-3	Chromium	17.2			P	R017115
7440-48-4	Cobalt	9.5			P	R017115
7440-50-8	Copper	13.5			P	R017115
7439-92-1	Lead	7.0			P	R017115
7439-97-6	Mercury	0.111	U		CV	R017075
7439-98-7	Molybdenum	0.19	J	*N	M	R017030
7440-02-0	Nickel	5.2			P	R017115
7782-49-2	Selenium	0.086	U		M	R017030
7440-22-4	Silver	0.038	U		P	R017115
7440-28-0	Thallium	0.17	J		M	R017030
7440-62-2	Vanadium	56.0			P	R017115
7440-66-6	Zinc	25.5			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-010

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-010

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 95.1

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.023	U	N	M	R017030
7440-38-2	Arsenic	0.90		*N	M	R017030
7440-39-3	Barium	102			P	R017115
7440-41-7	Beryllium	0.14	J		P	R017115
7440-43-9	Cadmium	0.19	J		M	R017030
7440-47-3	Chromium	21.7			P	R017115
7440-48-4	Cobalt	12.0			P	R017115
7440-50-8	Copper	21.2			P	R017115
7439-92-1	Lead	8.3			P	R017115
7439-97-6	Mercury	0.105	U		CV	R017075
7439-98-7	Molybdenum	0.21	J	*N	M	R017030
7440-02-0	Nickel	6.5			P	R017115
7782-49-2	Selenium	0.079	U		M	R017030
7440-22-4	Silver	0.037	U		P	R017115
7440-28-0	Thallium	0.22	J		M	R017030
7440-62-2	Vanadium	70.8			P	R017115
7440-66-6	Zinc	45.3			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-029

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-011

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 97.8

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.023	U	N	M	R017030
7440-38-2	Arsenic	0.82		*N	M	R017030
7440-39-3	Barium	103			P	R017115
7440-41-7	Beryllium	0.19	J		P	R017115
7440-43-9	Cadmium	0.17	J		M	R017030
7440-47-3	Chromium	20.8			P	R017115
7440-48-4	Cobalt	11.4			P	R017115
7440-50-8	Copper	20.0			P	R017115
7439-92-1	Lead	8.0			P	R017115
7439-97-6	Mercury	0.102	U		CV	R017075
7439-98-7	Molybdenum	0.18	J	*N	M	R017030
7440-02-0	Nickel	6.4			P	R017115
7782-49-2	Selenium	0.078	U		M	R017030
7440-22-4	Silver	0.037	U		P	R017115
7440-28-0	Thallium	0.20	J		M	R017030
7440-62-2	Vanadium	70.1			P	R017115
7440-66-6	Zinc	54.1			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.

14-011

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-012

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 97.5

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	1.6		*N	M	R017030
7440-39-3	Barium	84.5	J		P	R017115
7440-41-7	Beryllium	0.17	J		P	R017115
7440-43-9	Cadmium	0.28	J		M	R017030
7440-47-3	Chromium	20.5			P	R017115
7440-48-4	Cobalt	9.9			P	R017115
7440-50-8	Copper	31.0			P	R017115
7439-92-1	Lead	13.7			P	R017115
7439-97-6	Mercury	0.103	U		CV	R017075
7439-98-7	Molybdenum	0.42	J	*N	M	R017030
7440-02-0	Nickel	6.2			P	R017115
7782-49-2	Selenium	0.077	U		M	R017030
7440-22-4	Silver	0.036	U		P	R017115
7440-28-0	Thallium	0.16	J		M	R017030
7440-62-2	Vanadium	57.3			P	R017115
7440-66-6	Zinc	211			P	R017115

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-017

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB02

Matrix (soil/water): Soil Lab Sample ID: DFB02-013

Level (low/med): LOW Date Received: 04/13/2007

% Solids: 99.1

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.021	U	N	M	R017030
7440-38-2	Arsenic	0.86		*N	M	R017030
7440-39-3	Barium	56.6			P	R017115
7440-41-7	Beryllium	0.17	J		P	R017115
7440-43-9	Cadmium	0.13	J		M	R017030
7440-47-3	Chromium	14.1			P	R017115
7440-48-4	Cobalt	7.8			P	R017115
7440-50-8	Copper	12.4			P	R017115
7439-92-1	Lead	5.4			P	R017115
7439-97-6	Mercury	0.101	U		CV	R017075
7439-98-7	Molybdenum	0.098	J	*N	M	R017030
7440-02-0	Nickel	3.3	J		P	R017115
7782-49-2	Selenium	0.11	J		M	R017030
7440-22-4	Silver	0.035	U		P	R017115
7440-28-0	Thallium	0.10	J		M	R017030
7440-62-2	Vanadium	101			P	R017115
7440-66-6	Zinc	30.2			P	R017115

Color Before: Brown Clarity Before: Texture: Coarse

Color After: Green Clarity After: Artifacts: No

Comment

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-005	**Date/Time Collected:**	04/12/2007 09:10
Lab Sample ID:	DFB02-001	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-006	**Date/Time Collected:**	04/12/2007 09:20
Lab Sample ID:	DFB02-002	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.6	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB02
Sample Number: 14-004
Date/Time Collected: 04/12/2007 09:30
Lab Sample ID: DFB02-003
Date/Time Received: 04/13/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB02

Sample Number: 14-014 **Date/Time Collected:** 04/12/2007 09:40

Lab Sample ID: DFB02-004 **Date/Time Received:** 04/13/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.6	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-016	**Date/Time Collected:**	04/12/2007 09:45
Lab Sample ID:	DFB02-005	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.8	U	9.8	5.3	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB02

Sample Number: 14-013 **Date/Time Collected:** 04/12/2007 09:55

Lab Sample ID: DFB02-006 **Date/Time Received:** 04/13/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB02

Sample Number: 14-012 **Date/Time Collected:** 04/12/2007 10:05

Lab Sample ID: DFB02-007 **Date/Time Received:** 04/13/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.9	U	9.9	5.3	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-015	**Date/Time Collected:**	04/12/2007 10:15
Lab Sample ID:	DFB02-008	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-009	**Date/Time Collected:**	04/12/2007 10:20
Lab Sample ID:	DFB02-009	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	11	U	11	5.8	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-010	**Date/Time Collected:**	04/12/2007 10:30
Lab Sample ID:	DFB02-010	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.6	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-029	**Date/Time Collected:**	04/12/2007 10:35
Lab Sample ID:	DFB02-011	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.5	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB02

Sample Number: 14-011 **Date/Time Collected:** 04/12/2007 10:40

Lab Sample ID: DFB02-012 **Date/Time Received:** 04/13/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.8	U	9.8	5.3	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB02		
Sample Number:	14-017	**Date/Time Collected:**	04/12/2007 11:25
Lab Sample ID:	DFB02-013	**Date/Time Received:**	04/13/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.2	U	9.2	5.0	04/26/2007	04/27/2007	R017182

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-021

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-001

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170725.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-020

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-002

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170726.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-027

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-003

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170727.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-019

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-004

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170728.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-018

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-005

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170734.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-022

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-006

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170735.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-023

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-007

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170736.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-024

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-008

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170737.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-025

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-009

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170738.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-026

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-010

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170740.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-028

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-011

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170741.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-001

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-012

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170742.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-002

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-013

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: O4170743.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-003

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-014

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170744.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-008

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-015

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170745.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

1

ORDNANCE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

14-007

Lab Name: Laucks Testing Laboratories, Contract: N/A

SDG No.: DFB01 Run Sequence: R017112

Matrix: (SOIL/WATER) Soil Lab Sample ID: DFB01-016

Sample wt/vol: 5.00 (g/mL) gm Lab File ID: 04170746.D

% Moisture: 0.0 Decanted: (Y/N) N Date Collected: 04/11/2007

Extraction: (Type) SONC Date Extracted: 04/16/2007

Concentrated Extract Volume: 20000.0(uL) Date Analyzed: 04/18/2007

Injection Volume: 50.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) mg/Kg	Q
2691-41-0	HMX (Octahydro-1,3,5,7-tetranitro-1	0.20	U
121-82-4	RDX (Hexahydro-1,3,5-trinitro-1,3,5	0.20	U
99-35-4	1,3,5-Trinitrobenzene	0.20	U
98-95-3	Nitrobenzene	0.20	U
479-45-8	Tetryl (Methyl-2,4,6-trinitrophyeny	0.20	U
118-96-7	2,4,6-Trinitrotoluene (TNT)	0.20	U
1946-51-0	4-Amino-2,6-dinitrotoluene	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	0.20	U
606-20-2	2,6-Dinitrotoluene	0.20	U
121-14-2	2,4-Dinitrotoluene	0.20	U
88-72-2	2-Nitrotoluene	0.20	U
99-99-0	4-Nitrotoluene	0.20	U
99-08-1	3-Nitrotoluene	0.20	U
99-65-0	1,3-Dinitrobenzene	0.20	U

Comments:

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-021

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-001

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.8

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.090	J	N	M	R017030
7440-38-2	Arsenic	4.2			M	R017030
7440-39-3	Barium	61.3			P	R016986
7440-41-7	Beryllium	0.092	J		P	R017214
7440-43-9	Cadmium	1.2		E	M	R017030
7440-47-3	Chromium	7.8		*N	P	R016986
7440-48-4	Cobalt	6.3			P	R016986
7440-50-8	Copper	22.9			P	R016986
7439-92-1	Lead	30.2		*	P	R016986
7439-97-6	Mercury	0.101	U		CV	R016881
7439-98-7	Molybdenum	0.49		N	M	R017030
7440-02-0	Nickel	2.5	J		P	R016986
7782-49-2	Selenium	0.36	J		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.34	J		M	R017030
7440-62-2	Vanadium	28.6			P	R016986
7440-66-6	Zinc	124		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Coarse

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-020

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-002

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 97.8

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.33	J	N	M	R017030
7440-38-2	Arsenic	1.9			M	R017030
7440-39-3	Barium	84.1			P	R016986
7440-41-7	Beryllium	0.044	U		P	R017214
7440-43-9	Cadmium	3.5		E	M	R017030
7440-47-3	Chromium	12.4		*N	P	R016986
7440-48-4	Cobalt	6.7			P	R016986
7440-50-8	Copper	23.3			P	R016986
7439-92-1	Lead	35.3		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.50		N	M	R017030
7440-02-0	Nickel	3.9			P	R016986
7782-49-2	Selenium	0.072	U		M	R017030
7440-22-4	Silver	0.035	U		P	R016986
7440-28-0	Thallium	0.23	J		M	R017030
7440-62-2	Vanadium	32.6			P	R016986
7440-66-6	Zinc	150		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-027

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-003

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.3

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.15	J	N	M	R017030
7440-38-2	Arsenic	1.9			M	R017030
7440-39-3	Barium	115			P	R016986
7440-41-7	Beryllium	0.046	U		P	R017214
7440-43-9	Cadmium	2.7		E	M	R017030
7440-47-3	Chromium	14.4		*N	P	R016986
7440-48-4	Cobalt	8.9			P	R016986
7440-50-8	Copper	35.6			P	R016986
7439-92-1	Lead	40.1		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.43		N	M	R017030
7440-02-0	Nickel	5.1			P	R016986
7782-49-2	Selenium	0.076	J		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.25	J		M	R017030
7440-62-2	Vanadium	45.0			P	R016986
7440-66-6	Zinc	212		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-019

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-004

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.2

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.068	J	N	M	R017030
7440-38-2	Arsenic	1.3			M	R017030
7440-39-3	Barium	172			P	R016986
7440-41-7	Beryllium	0.045	U		P	R017214
7440-43-9	Cadmium	0.50		E	M	R017030
7440-47-3	Chromium	13.0		*N	P	R016986
7440-48-4	Cobalt	12.3			P	R016986
7440-50-8	Copper	21.6			P	R016986
7439-92-1	Lead	12.7		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.25	J	N	M	R017030
7440-02-0	Nickel	5.0			P	R016986
7782-49-2	Selenium	0.067	U		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.25	J		M	R017030
7440-62-2	Vanadium	60.8			P	R016986
7440-66-6	Zinc	65.3		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-018

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-005

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.1

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.052	J	N	M	R017030
7440-38-2	Arsenic	1.0			M	R017030
7440-39-3	Barium	93.8			P	R016986
7440-41-7	Beryllium	0.046	U		P	R017214
7440-43-9	Cadmium	0.54		E	M	R017030
7440-47-3	Chromium	14.8		*N	P	R016986
7440-48-4	Cobalt	9.1			P	R016986
7440-50-8	Copper	20.5			P	R016986
7439-92-1	Lead	16.4		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.25	J	N	M	R017030
7440-02-0	Nickel	4.6			P	R016986
7782-49-2	Selenium	0.063	U		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.27	J		M	R017030
7440-62-2	Vanadium	46.8			P	R016986
7440-66-6	Zinc	84.7		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-022

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-006

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.3

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.049	J	N	M	R017030
7440-38-2	Arsenic	4.7			M	R017030
7440-39-3	Barium	56.5			P	R016986
7440-41-7	Beryllium	0.071	J		P	R017214
7440-43-9	Cadmium	0.63		E	M	R017030
7440-47-3	Chromium	9.9		*N	P	R016986
7440-48-4	Cobalt	5.8			P	R016986
7440-50-8	Copper	22.7			P	R016986
7439-92-1	Lead	12.0		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	1.4		N	M	R017030
7440-02-0	Nickel	2.3	J		P	R016986
7782-49-2	Selenium	0.15	J		M	R017030
7440-22-4	Silver	0.035	U		P	R016986
7440-28-0	Thallium	0.26	J		M	R017030
7440-62-2	Vanadium	35.3			P	R016986
7440-66-6	Zinc	171		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-023

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-007

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.5

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	0.90			M	R017030
7440-39-3	Barium	120			P	R016986
7440-41-7	Beryllium	0.041	U		P	R017214
7440-43-9	Cadmium	0.14	J	E	M	R017030
7440-47-3	Chromium	29.0		*N	P	R016986
7440-48-4	Cobalt	11.8			P	R016986
7440-50-8	Copper	18.7			P	R016986
7439-92-1	Lead	8.4		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.27	J	N	M	R017030
7440-02-0	Nickel	6.2			P	R016986
7782-49-2	Selenium	0.075	U		M	R017030
7440-22-4	Silver	0.032	U		P	R016986
7440-28-0	Thallium	0.22	J		M	R017030
7440-62-2	Vanadium	89.7			P	R016986
7440-66-6	Zinc	31.0		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-024

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-008

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 97.5

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.023	U	N	M	R017030
7440-38-2	Arsenic	1.0			M	R017030
7440-39-3	Barium	151			P	R016986
7440-41-7	Beryllium	0.047	U		P	R017214
7440-43-9	Cadmium	0.17	J	E	M	R017030
7440-47-3	Chromium	32.9		*N	P	R016986
7440-48-4	Cobalt	13.3			P	R016986
7440-50-8	Copper	25.8			P	R016986
7439-92-1	Lead	7.3		*	P	R016986
7439-97-6	Mercury	0.103	U		CV	R016881
7439-98-7	Molybdenum	0.20	J	N	M	R017030
7440-02-0	Nickel	7.8			P	R016986
7782-49-2	Selenium	0.079	U		M	R017030
7440-22-4	Silver	0.037	U		P	R016986
7440-28-0	Thallium	0.22	J		M	R017030
7440-62-2	Vanadium	91.1			P	R016986
7440-66-6	Zinc	33.4		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-025

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-009

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98.1

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.020	U	N	M	R017030
7440-38-2	Arsenic	4.4			M	R017030
7440-39-3	Barium	73.6			P	R016986
7440-41-7	Beryllium	0.17	J		P	R017214
7440-43-9	Cadmium	0.81		E	M	R017030
7440-47-3	Chromium	6.8		*N	P	R016986
7440-48-4	Cobalt	7.0			P	R016986
7440-50-8	Copper	7.4			P	R016986
7439-92-1	Lead	6.1		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.34	J	N	M	R017030
7440-02-0	Nickel	2.5	J		P	R016986
7782-49-2	Selenium	0.23	J		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.42			M	R017030
7440-62-2	Vanadium	38.0			P	R016986
7440-66-6	Zinc	50.6		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-026

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-010

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 97.2

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.019	U	N	M	R017030
7440-38-2	Arsenic	1.0			M	R017030
7440-39-3	Barium	114			P	R016986
7440-41-7	Beryllium	0.045	U		P	R017214
7440-43-9	Cadmium	0.13	J	E	M	R017030
7440-47-3	Chromium	36.4		*N	P	R016986
7440-48-4	Cobalt	10.9			P	R016986
7440-50-8	Copper	30.7			P	R016986
7439-92-1	Lead	4.5		*	P	R016986
7439-97-6	Mercury	0.103	U		CV	R016881
7439-98-7	Molybdenum	0.19	J	N	M	R017030
7440-02-0	Nickel	7.9			P	R016986
7782-49-2	Selenium	0.066	U		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.11	J		M	R017030
7440-62-2	Vanadium	98.6			P	R016986
7440-66-6	Zinc	27.4		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-028

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-011

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 97.9

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	1.1			M	R017030
7440-39-3	Barium	147			P	R016986
7440-41-7	Beryllium	0.11	J		P	R017214
7440-43-9	Cadmium	0.16	J	E	M	R017030
7440-47-3	Chromium	39.7		*N	P	R016986
7440-48-4	Cobalt	12.6			P	R016986
7440-50-8	Copper	36.2			P	R016986
7439-92-1	Lead	5.0		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.20	J	N	M	R017030
7440-02-0	Nickel	9.5			P	R016986
7782-49-2	Selenium	0.077	U		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.15	J		M	R017030
7440-62-2	Vanadium	108			P	R016986
7440-66-6	Zinc	32.4		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-001

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-012

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 96.4

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	0.96			M	R017030
7440-39-3	Barium	156			P	R016986
7440-41-7	Beryllium	0.059	J		P	R017214
7440-43-9	Cadmium	13.0		E	M	R017030
7440-47-3	Chromium	18.6		*N	P	R016986
7440-48-4	Cobalt	7.8			P	R016986
7440-50-8	Copper	14.1			P	R016986
7439-92-1	Lead	4.5		*	P	R016986
7439-97-6	Mercury	0.104	U		CV	R016881
7439-98-7	Molybdenum	0.15	J	N	M	R017030
7440-02-0	Nickel	5.0			P	R016986
7782-49-2	Selenium	0.075	U		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.13	J		M	R017030
7440-62-2	Vanadium	59.4			P	R016986
7440-66-6	Zinc	42.8		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-002

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-013

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 95.9

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	1.0			M	R017030
7440-39-3	Barium	130			P	R016986
7440-41-7	Beryllium	0.16	J		P	R017214
7440-43-9	Cadmium	0.20	J	E	M	R017030
7440-47-3	Chromium	25.1		*N	P	R016986
7440-48-4	Cobalt	12.4			P	R016986
7440-50-8	Copper	19.6			P	R016986
7439-92-1	Lead	6.4		*	P	R016986
7439-97-6	Mercury	0.104	U		CV	R016881
7439-98-7	Molybdenum	0.087	J	N	M	R017030
7440-02-0	Nickel	7.3			P	R016986
7782-49-2	Selenium	0.077	U		M	R017030
7440-22-4	Silver	0.037	U		P	R016986
7440-28-0	Thallium	0.17	J		M	R017030
7440-62-2	Vanadium	91.8			P	R016986
7440-66-6	Zinc	29.3		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-003

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-014

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 96.7

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.021	U	N	M	R017030
7440-38-2	Arsenic	1.3			M	R017030
7440-39-3	Barium	119			P	R016986
7440-41-7	Beryllium	0.091	J		P	R017214
7440-43-9	Cadmium	4.5		E	M	R017030
7440-47-3	Chromium	25.7		*N	P	R016986
7440-48-4	Cobalt	12.2			P	R016986
7440-50-8	Copper	20.4			P	R016986
7439-92-1	Lead	19.4		*	P	R016986
7439-97-6	Mercury	0.103	U		CV	R016881
7439-98-7	Molybdenum	0.24	J	N	M	R017030
7440-02-0	Nickel	6.8			P	R016986
7782-49-2	Selenium	0.073	U		M	R017030
7440-22-4	Silver	0.036	U		P	R016986
7440-28-0	Thallium	0.24	J		M	R017030
7440-62-2	Vanadium	82.8			P	R016986
7440-66-6	Zinc	70.8		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

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-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-008

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-015

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 95.6

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.023	U	N	M	R017030
7440-38-2	Arsenic	1.1			M	R017030
7440-39-3	Barium	151			P	R016986
7440-41-7	Beryllium	0.046	U		P	R017115
7440-43-9	Cadmium	1.7		E	M	R017030
7440-47-3	Chromium	27.4		*N	P	R017115
7440-48-4	Cobalt	16.8			P	R017115
7440-50-8	Copper	18.8			P	R017115
7439-92-1	Lead	19.1		*	P	R016986
7439-97-6	Mercury	0.105	U		CV	R016881
7439-98-7	Molybdenum	0.18	J	N	M	R017030
7440-02-0	Nickel	7.9			P	R017115
7782-49-2	Selenium	0.079	U		M	R017030
7440-22-4	Silver	0.036	U		P	R017115
7440-28-0	Thallium	0.22	J		M	R017030
7440-62-2	Vanadium	88.0			P	R016986
7440-66-6	Zinc	65.9		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

SW-846
-1-
INORGANIC ANALYSES DATA SHEET

SAMPLE NO.
14-007

Lab Name: Laucks Laboratories Contract:

Lab Code: LAUCKS SDG No.: DFB01

Matrix (soil/water): Soil Lab Sample ID: DFB01-016

Level (low/med): LOW Date Received: 04/12/2007

% Solids: 98

Concentration Units : mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	Run Seq.
7440-36-0	Antimony	0.022	U	N	M	R017030
7440-38-2	Arsenic	1.5			M	R017030
7440-39-3	Barium	103			P	R016986
7440-41-7	Beryllium	0.044	U		P	R017214
7440-43-9	Cadmium	1.9		E	M	R017030
7440-47-3	Chromium	38.0		*N	P	R016986
7440-48-4	Cobalt	10.2			P	R016986
7440-50-8	Copper	21.3			P	R016986
7439-92-1	Lead	227		*	P	R016986
7439-97-6	Mercury	0.102	U		CV	R016881
7439-98-7	Molybdenum	0.27	J	N	M	R017030
7440-02-0	Nickel	4.5			P	R016986
7782-49-2	Selenium	0.077	U		M	R017030
7440-22-4	Silver	0.035	U		P	R016986
7440-28-0	Thallium	0.20	J		M	R017030
7440-62-2	Vanadium	57.1			P	R016986
7440-66-6	Zinc	95.5		*N	P	R016986

Color Before: Brown Clarity Before: Texture: Medium

Color After: Green Clarity After: Artifacts: No

Comment

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-021
Date/Time Collected: 04/11/2007 12:55
Lab Sample ID: DFB01-001
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.6	U	9.6	5.2	04/26/2007	04/27/2007	R017182

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-020
Date/Time Collected: 04/11/2007 13:00
Lab Sample ID: DFB01-002
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/25/2007	04/26/2007	R017095

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Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-027
Date/Time Collected: 04/11/2007 13:05
Lab Sample ID: DFB01-003
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.9	U	9.9	5.3	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-019
Date/Time Collected: 04/11/2007 13:15
Lab Sample ID: DFB01-004
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.5	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-018
Date/Time Collected: 04/11/2007 13:25
Lab Sample ID: DFB01-005
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB01		
Sample Number:	14-022	**Date/Time Collected:**	04/11/2007 13:45
Lab Sample ID:	DFB01-006	**Date/Time Received:**	04/12/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.5	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB01

Sample Number: 14-023 **Date/Time Collected:** 04/11/2007 14:05

Lab Sample ID: DFB01-007 **Date/Time Received:** 04/12/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.5	U	9.5	5.1	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-024
Date/Time Collected: 04/11/2007 14:15
Lab Sample ID: DFB01-008
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.9	U	9.9	5.3	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB01

Sample Number: 14-025 **Date/Time Collected:** 04/11/2007 14:25

Lab Sample ID: DFB01-009 **Date/Time Received:** 04/12/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.8	U	9.8	5.3	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-026
Date/Time Collected: 04/11/2007 14:30
Lab Sample ID: DFB01-010
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.8	U	9.8	5.3	04/25/2007	04/26/2007	R017095

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Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-028
Date/Time Collected: 04/11/2007 14:35
Lab Sample ID: DFB01-011
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.5	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc.
Project: Detachment Fallbrook, CTO 14
SDG Number: DFB01
Sample Number: 14-001
Date/Time Collected: 04/11/2007 15:00
Lab Sample ID: DFB01-012
Date/Time Received: 04/12/2007 08:30
Method: E314.0
Unit: ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.6	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB01

Sample Number: 14-002 **Date/Time Collected:** 04/11/2007 15:10

Lab Sample ID: DFB01-013 **Date/Time Received:** 04/12/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.5	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB01		
Sample Number:	14-003	**Date/Time Collected:**	04/11/2007 15:15
Lab Sample ID:	DFB01-014	**Date/Time Received:**	04/12/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.8	U	9.8	5.3	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client:	Tetra Tech EC, Inc.	**Project:**	Detachment Fallbrook, CTO 14
SDG Number:	DFB01		
Sample Number:	14-008	**Date/Time Collected:**	04/11/2007 15:25
Lab Sample ID:	DFB01-015	**Date/Time Received:**	04/12/2007 08:30
Method:	E314.0	**Unit:**	ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	10	U	10	5.4	04/25/2007	04/26/2007	R017095

Laucks Testing Laboratories, Inc.

Final Results

Client: Tetra Tech EC, Inc. **Project:** Detachment Fallbrook, CTO 14

SDG Number: DFB01

Sample Number: 14-007 **Date/Time Collected:** 04/11/2007 15:30

Lab Sample ID: DFB01-016 **Date/Time Received:** 04/12/2007 08:30

Method: E314.0 **Unit:** ug/kg

Analyte	CAS	DF	Result	Q	PQL	MDL	Prepared	Analyzed	Run Seq.
Perchlorate	14797-73-0	1	9.4	U	9.4	5.1	04/25/2007	04/26/2007	R017095

APPENDIX D

RESPONSE TO AGENCY COMMENTS

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RESPONSE TO COMMENTS FOR
DRAFT SITE INSPECTION REPORT
NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK, MUNITIONS RESPONSE PROGRAM, SITE UXO5
SALVAGE YARD LANDFILL, FALLBROOK, CALIFORNIA
(DATED JANUARY 30, 2008)

Reviewed by Department of Toxic Substances Control, Daniel Cordero Jr.,
Office of Military Facilities, Southern California Branch
Comments Dated: April 15, 2008

GENERAL COMMENTS	RESPONSE
Comment 1. Executive Summary, last paragraph, second sentence states "the site does not appear to represent a contiguous landfill-type disposal facility and should not be addressed as such in future assessments". DTSC disagrees. The Site Inspection investigation that was performed could not confirm this statement. The Geophysical sweep has limitations on how far beneath the surface anomalies can be detected and no coring or trench work were done to confirm the statement. The site should continue to be viewed as a contiguous landfill until proven otherwise.	**Response 1.** It is agreed that the geophysical survey has depth limitations. The EM31, as used on this inspection, has a maximum sensitivity depth of approximately 18 feet. If there are disposal pits or trenches with an overburden of 15 to 20 feet, then the EM31 probably will not detect them, depending on the quantity and type of debris in the disposal pits/trenches. Such a depth of overburden is not likely the case as this would be extreme given the nature of disposal activities at this location. Therefore we feel that the conclusion as stated is reasonable. As described in the report, this does not rule out dispersed and random disposal throughout the site. We feel that this is an important distinction in understanding the nature and distribution of contamination at the site. That distinction being that the disposal practices appear to be more random and sporadic (as evidenced also by surface findings), with some areas of very concentrated debris, than as a contiguous landfill that would be indicative of mass disposal practices. We do not propose any change to the text.
Supplemental Comment 1, 09/25/08: Unless the Navy has definitively defined the depth of the overburden the statement that the site does not appear to represent a contiguous landfill-type disposal facility and should not be addressed as such in future assessments has not been proven. DTSC recommends that this issue be addressed during the RI/FS.	**Supplemental Response 1**. The last paragraph of the Executive Summary section will be revised to remove the second sentence and replace with the following: "The preliminary geophysical investigation performed as part of this SI did not appear to indicate the presence of a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation during the Remedial Investigation/Feasibility Study."

RESPONSE TO COMMENTS FOR DRAFT SITE INSPECTION REPORT NAVAL WEAPONS STATION SEAL BEACH DETACHMENT FALLBROOK, MUNITIONS RESPONSE PROGRAM, SITE UXO5 SALVAGE YARD LANDFILL, FALLBROOK, CALIFORNIA (DATED JANUARY 30, 2008)	
Reviewed by Department of Toxic Substances Control, Daniel Cordero Jr., Office of Military Facilities, Southern California Branch Comments Dated: April 15, 2008	
	The first bullet of section 6.1 CONCLUSIONS, will be changed to the following: "A full site geophysical survey was performed as part of this SI. The results did not appear to indicate any broad, contiguous, buried disposal area at the site. The preliminary conclusion from this survey is that the site does not appear to represent a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation during the RI/FS. This preliminary observation does not eliminate the possibility that individual items or small groupings of items may be buried at any location within the site."
Comment 2. Section 4.3, page 4-2, this section points out areas that two particular areas (the Northern and Southwestern portions) of UXO5 that appear to have hot spots (Pink and Dark Blue signatures) along with areas in the stream bed that could not be investigated due to vegetation are the primary areas to be concerned about. Figures 4-2 and 4-3 show a small pink area in the extreme east side of UXO5. There also appears to be a north to south strip in the middle of the UXO5 that appears to have a blue color. This could indicate anomalies at a depth the geophysical instrument could barely detect due to depth or size. DTSC recommends that other areas (such as those described) be investigated further.	**Response 2.** The anomaly commented on in the extreme east side of UXO 5 is described in the report as being in the southeast edge of the survey area and as being due to the intersection of two overhead power lines. Based on this evidence, the anomaly does not warrant further investigation. While we agree that the blue anomaly commented on in middle of UXO 5 is somewhat suspicious, it does not appear to signify an area of mass disposal (see comment response #1). More likely, this area is highlighted due to soil variations or dispersed debris disposal (not unlike the vast majority of the site) and does not warrant call-out as a distinct anomaly for further investigation, but should be looked at in the broader context of dispersed disposal throughout the site. We do not propose any change to the text.
Supplemental Comment 2, 09/25/08: For the anomaly on the extreme east side of UXO5, are the power lines below ground or above ground?	**Supplemental Response 2**. The power lines are above ground. The response from the power line can be seen on all geophysical maps as it extends across the entire site (long linear feature). The evidence that the

RESPONSE TO COMMENTS FOR DRAFT SITE INSPECTION REPORT NAVAL WEAPONS STATION SEAL BEACH DETACHMENT FALLBROOK, MUNITIONS RESPONSE PROGRAM, SITE UXO5 SALVAGE YARD LANDFILL, FALLBROOK, CALIFORNIA (DATED JANUARY 30, 2008)	
Reviewed by Department of Toxic Substances Control, Daniel Cordero Jr., Office of Military Facilities, Southern California Branch Comments Dated: April 15, 2008	
If they are above ground, please provide information that indicates that objects that far above the geophysical survey equipment will affect the results given. For the remainder of the Navy's response to DTSC comment, please see DTSC's reply to the Navy's RTC above.	power line can give this type of response is based on experiential observation. The amount of voltage running through the wires dictates the range of influence. Some of the high-tension lines with thousands of volts can influence the EM31 results from many hundreds of feet away. We do not have any type of formula for voltage vs. distance of influence on the EM31. The anomaly that appears isolated at the east edge of the survey area just south of where the power line intersects the edge of the survey area is the result of probably two causes. Guy wires for the pole supporting the power lines is one. Also, the power line takes a 90 degree turn here (to the south), towards building 365, and there are several wires that extend down from one of the power line poles. The power line may actually fork here (based on recollection), which is why there are guy wires.
Comment 3. Section 5.1, fourth paragraph, page 5-2 state that "compounds with maximum detected concentrations exceeding human health based PRGs were compared to background concentrations identified for soil in similar soil strata during a Remedial Investigation/Feasibility Study (RI/FS) conducted at nearby Camp Pendleton. The background values for the surface soil from Santa Margarita Basin were used in the comparison," DTSC did not agree to the use of these comparison criteria's. Therefore, any recommendations based on the use of either the Camp Pendleton or the Santa Margarita Basin comparison criteria are not accepted.	**Response 3.** Santa Margarita Basin background concentrations identified in the Camp Pendleton RI/FS (IT Corp 1997) were used for comparison. That RI/FS presented 4 background areas for soils 0-5 from ground surface: Las Flores Basin, Marin Terrace Deposits, Santa Margarita Basin, San Luis Rey Basin. The Santa Margarita Basin represented the most appropriate (due to proximity) source of background data available. Since DTSC did not agree with the use of these values, we will only include the comparison for discussion, but will not eliminate COCs based on this comparison (we will note this in Section 6.1 and revise the list of COPCs, COPECs accordingly). This change does not change the list of COPCs for human health. For COPECs we would add Antimony and Selenium to the list. See next

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	comment for the comprehensive list of COPCs and COPECs. As part of the Remedial Investigation to follow, the Navy will perform further background sampling at Detachment Fallbrook to support the overall selection of COCs for the site.
Supplemental Comment 3, 09/25/08: Navy RTC accepted.	**Supplemental Response 3**. No response required.
Comment 4. Section 6.1, page 6-2 state that "where enough data was available, an average concentration was calculated as a 95 percent upper confidence limit", DTSC did not agree to the use of the 95 percent upper confidence limit. Therefore, any recommendations to eliminate chemicals of potential concern based on the 95 percent upper confidence limit are not accepted.	**Response 4.** Comment acknowledged and the Navy agrees. Chemicals of potential concern will not be eliminated based on 95 percent upper confidence limits. We will revise the text accordingly. We will delete the 5th paragraph in Section 6.1, and we will remove the column in Table 4-1 that shows the calculated 95% confidence interval. Also, we will delete the last two sentences of the last paragraph of Section 6.1, thus adding the following chemicals to the list of COPECs: cobalt, copper, chromium, and zinc. Based on this change, the list of COPCs for human health did not change and the following COPCs remain: Arsenic, Lead, and Vanadium. The list of COPECs for ecological receptors is now (based on comments 4 and 5): Antimony, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Selenium, Vanadium, and Zinc.
Supplemental Comment 4, 09/25/08: Navy RTC accepted.	**Supplemental Response 4**. No response required.
Comment 5. Section 6.2, third paragraph, page 6-2, states that "the prospect of MC in surface soil has been eliminated", DTSC disagrees. Until shallow anomalies have been investigated and surrounding soils	**Response 5.** The overall objective of the SI was to refine boundaries or areas containing MPPEH and then reclassify these areas into one of three levels of MEC presence (known, suspected, and not suspected to contain

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tested can this statement be made.	MEC). The SI included geophysical survey, MPPEH surface sweep/survey and surface soil sampling. Soil sample locations were chosen based on random selection of points in areas known to contain MPPEH. Additional samples were collected in areas found to contain MPPEH during the survey of the site. Based on the sampling strategy and the sample results, the Navy feels that it is reasonable to conclude that there is no prospect of MC in the surface soil. No subsurface anomalies were investigated. Sampling was performed in accordance with the Work Plan and SAP primarily in areas that were known to contain MPPEH (either from past studies or from the visual surface investigation performed here), as well as in sedimentation/redeposition areas, and two areas that did not appear to have any evidence of MPPEH. Only 1,3,5-trinitrobenzene, was detected in 4 of the 29 samples at concentration below the PRGs and ESSLs. Based on this we eliminated the prospect of MC in surface soils. While it does not appear that MC is a risk driver for surface soils, further surface soil sampling will be conducted in the inaccessible areas (streambed) during the remedial investigation.
Supplemental Comment 5, 09/25/08: Due to the fact that some inaccessible areas were not sampled, the statement "the prospect of MC in surface soil has been eliminated" can not be supported. If MPPEH is found during the subsequent RI/FS in shallow sub-surface areas, additional surface sampling should be done.	**Supplemental Response 5**. It should be noted that all areas that were planned to be sampled (as outlined in the Site Inspection Work Plan) were indeed sampled. However, we understand that some inaccessible areas (for geophysical survey and surface sweep) may reveal the potential for additional contamination. The report will be modified to state that "these preliminary sampling results appear to indicate that there is no prospect of MC in the surface soil. However, if other areas of

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	significant surface MPPEH are found during subsequent investigations, the surrounding surface soil should be sampled for MC."
Comment 6. DTSC recommends UXO5 to be investigated in a RI/FS.	**Response 6.** Comment acknowledged and the Navy agrees. We will add this recommendation to advance the site to RI/FS in the Executive Summary and Conclusions section of this report.
Supplemental Comment 6, 09/25/08: Navy RTC accepted.	**Supplemental Response 6**. No response required.

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Reviewed by Department of Toxic Substances Control, James M. Polisini, Ph.D., Staff Toxicologist, HERD and J. Michael Eichelberger, Ph.D., Staff Toxicologist, HERD, Comments Dated: April 02, 2008	
GENERAL COMMENTS	**RESPONSE**
Comment 1. References are made to the UXO5 Work Plan for the Site Inspection (SI) work and screening for human health and ecological hazard. A work plan for the UXO5 Site risk assessment components was not previously furnished for HERD review. This memorandum contains recommendations for more detailed comparison to the proposed ambient concentrations from Camp Pendleton. Please included HERD in the review of any future risk assessment work plans for NAVWPNSTA Seal Beach Detachment Fallbrook.	**Response 1.** Comment acknowledged.
Comment 2. The soil sample collection and comparison of the maximum soil concentration to human health and ecological hazard screening concentrations presents a reasonable initial evaluation of potential releases and site-related risk and/or hazard. However, as recommended in the document, additional site characterization and evaluation is required for full site characterization.	**Response 2.** Comment acknowledged. "The purpose of the SI was to collect and evaluate data that would help determine further actions required at MRP Site UXO5. As a result of this SI, a Remedial Investigation (RI) will be conducted at the site." These two sentences will be added to the Conclusions and Recommendations section of the report as well as to the end of the Executive Summary.
SPECIFIC COMMENTS	**RESPONSE**
Comment 1. The stream bed was not surveyed due to thick vegetation (Section 3.2.3.2, page 3-3). This is a data gap which is acknowledged in the recommendations (Section 6.2, page 6-2). This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractor.	**Response 1.** Comment acknowledged.

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Comment 2. Soil samples were collected from the surface to 9 inches below ground surface (bgs) at each sample location (Section 3.2.5, page 3-4; Section 4.5, page 4-4). This soil depth corresponds to the depth at which magnetometers can detect the smallest Munitions and Explosives of Concern (MEC) item (a 20mm round). The description of historical waste disposal indicates "burial" of explosive waste (Section 2.3.2, page 2-4; MP, 2006). Potential presence of wastes buried deeper than 9 inches bgs remain a data gap which should be addressed in future investigations.	**Response 2.** Comment acknowledged. As stated in Section 6.2, Recommendations, of the Draft SI Report, "[t]he sampling performed under this SI provided an indication of surface/shallow soil contaminants (Title 22 metals) and eliminated the prospect of MC in surface soil. Further work is necessary to investigate potential subsurface contaminants primarily associated with significant subsurface anomalies. Also, further risk assessment should be performed based on a combination of surface and subsurface analyses to refine the COPC list based on site-specific future use and exposure scenarios."
Comment 3. Two Stephen's Kangaroo Rat (SKR) were trapped on the UXO5 Site in addition to 18 non-listed Dulzura Kangaroo Rats (Section 2.2.2, page 2-2). Two California gnatcatcher's (CAGN) (*Polioptila californica californica*) were heard in January, 2007 immediately adjacent and north of the project site, 2) a pair were observed in February, 2007 within the project boundary area, and 3) a pair was observed within the project boundary on April 20, 2007 (Section 4.2, page 4-1). The presence and use of the UXO5 site by these protected species will require No Observable Adverse Effect Level (NOAEL) criteria to be included in any Ecological Risk Assessment.	**Response 3.** Given that the Endangered Species Act protects the individual, it is typical and appropriate to use the NOAEL as a screening value for further Ecological Risk Assessment that may be performed as part of the RI/FS. The more important issue that will be faced with this situation is which NOAEL will be applied and from which study it will be derived to meet a media based concentration value. This will form the basis for any risk assessment work and the determination of lines of evidence to be used to assess risk to these species. NOAELs are not widely available for listed species; it is more likely that they would need to be developed based on surrogate avian species. This is an important planning note for future assessment at the site and can be noted in the conclusions section. We feel that based on the preliminary nature of the Site Inspection that the most appropriate available ecological soil screening levels were used to make a preliminary evaluation.

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Supplemental Comment 3, 08/25/08: Response to Specific Comment number 3: HERD agrees that No Observable Adverse Effect Level (NOAEL) Toxicity Reference Values (TRVs) for protected species should be developed based on surrogate species. HERD recommends the U.S. EPA Region 9 Biological Technical Assistance Group (BTAG) NOAELs be used where available for the Contaminants of Potential Ecological Concern (COPECs).	**Supplemental Response 3**. Comment acknowledged. No response required.
Comment 4. Three geophysical anomalies in both conductivity and in-phase readings remain unbounded (Section 4.3, page 4-2 and 4-3). This is a data gap in the surface soil characterization which should be addressed as part of the planned further characterization. These data gaps are acknowledged as part of the recommendations (Section 6.0).	**Response 4.** The geophysical anomalies do not represent a data gap in surface soil characterization – they represent potential subsurface hazards and related contamination that should be further investigated. As stated this is acknowledged in Section 6. We agree that the streambed represents a data gap for surface soil characterization (also acknowledged in Section 6 that this area requires further investigation). It does not appear that revision to the text is required.
Comment 5. Perchlorate was not detected in any of the surface soil samples at the reporting limit of 10 µg/kg (Section 4.5, page 4-4). This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractors.	**Response 5.** Comment acknowledged.
Comment 6. The background comparison for inorganic elements is made to the Santa Margarita Basin background data set (Jacobs, 1997) from the adjacent Marine Corps Base Camp (MCB) Pendleton (Section 5.1, page 5-2). This background data set appears reasonable based on the hydrology description provided (Section 2.2.2, page 2-3), but HERD would defer to the DTSC Geological Services Unit (GSU) should they have an opposing opinion.	**Response 6.** Comment acknowledged. Please refer to Response 3 to DTSC Comment 3.

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Supplemental Comment 6, 08/25/08: Response to Specific Comment number 6: The response refers to the response to DTSC comment number 3 which indicates, in part, that 'the Navy will perform further background sampling at Detachment Fallbrook'. Please forward a work plan prior to initiation of the background study for HERD review. The work plan should outline the number of proposed samples, proposed location and depth of samples, rationale for selection of sample locations, list of analytes for chemical analysis, method of chemical analysis, contract laboratory Reporting Limits and Method Quantitation Limit, and specific statistical methods with plan of analysis.	**Supplemental Response 6**. The Navy will involve HERD in the review of plans for any further sampling at the site that would be performed as part of the RI. The Sampling and Analysis Plan would address the specific items that are requested in this comment.
Comment 7. The area is reported as 'subject to periodic burns from both natural and human-induced fire sources' (Section 5.2, page 5-2). A more detailed description of the 'human-induced fire sources' should be supplied. If the 'human-induced fire sources' included burning of waste material future soils sample analyses should include Polycyclic Aromatic Hydrocarbons (PAHs) and potentially chlorinated dioxins and furans.	**Response 7.** There is no site history that states that burning of waste material was performed at this site, therefore investigation for PAHs is not warranted. The human-induced fire sources included controlled burns likely used for fire control.
Comment 8. Comparisons are provided for the UXO5 maximum soil concentrations to the 95th percentile of the Santa Margarita Basin (SMB) background (Section 5.2.2, page 5-4). The reasonable conclusion from this comparison is that the elements are less than background and therefore there has been no release where the maximum UXO5 soil concentrations are less than the 95th percentile. However, a clear conclusion is not possible where the maximum UXO5 soil concentrations exceed the 95th percentile SMB background. Non-	**Response 8.** Comment acknowledged. Please refer to Response 4 to DTSC Comment 4 (Mr. Cordero). As stated in that comment response, a comparison to the 95% percentile will be eliminated from this report. Therefore, the nonparametric statistical test will not be pursued at this time.

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parametric statistical tests should be applied to compare the SMB background data set to the UXO5 soil data for those elements where the maximum UXO5 soil concentration exceeds the 95th percentile SMB background.	
Supplemental Comment 8, 08/25/08: Response to Specific Comment number 8: This response requires elaboration. The point of the HERD comment was that the method used to compare UXO5 soil concentrations to an upper bound estimate of 'background' was flawed where the maximum UXO5 soil concentration exceeds a 95th percentile of Santa Margarita Basin (SMB) soils (Jacobs, 1997), which were used as a surrogate for UXO5 'background' concentrations. Use of a non-parametric statistical test remains a valid approach and is not tied to the use of a 95th percentile SMB value, particularly given the Navy proposal to collect UXO5-specific 'background' samples (Please see response to DTSC comment 3, outlined immediately above). Please revise the RTC to include reference to the proposed development of the UXO5-speicifc 'background' data set.	**Supplemental Response 8**. Comment acknowledged. A non-parametric statistical test could be used to compare data collected to that of a background data set that will be developed for future assessment at MRP UXO5 during the RI. A site-specific background data set will be developed in the next phase of the investigation.
Comment 9. CONCLUSIONS: Once the comments itemized above are addressed, the recommendations outlined for further characterization would appear appropriate given the past history and the results of the Site Inspection.	**Response 9.** Comment acknowledged.

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(DATED JANUARY 30, 2008)

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Xueyuan Yu, Ph.D., Water Resources Control Engineer, Northern San Diego Ground Water Unit,
Comments Dated: May 28,, 2008

GENERAL COMMENTS	RESPONSE
Comment 1. Vertical Extent: Data gaps exist, with respect to the vertical distribution of MPPEH and MC-impacted soil, at locations between 9 inch and 16.4 feet below ground surface (bgs), and deeper than 19.7 feet bgs. The Regional Board's rationale for this conclusion are as follows: According to the Report (Page 3-4), the maximum depth, at which the magnetometer can be reliably used to detect the smallest MPPEH item (i.e. a 20 mm round) with high confidence, is 9-inches bgs. The Report states on Page 3-2 that "…the vertical dipole mode (of the electromagnetic induction survey instrument EM31, MK11) is sensitive to conductivity variations at depths approaching 16.4 to 19.7 feet…" Additionally, based on the Regional Board staff understanding of the electromagnetic induction methods, one of the key features of the Terrain Conductivity Method used in the 2007 survey is that virtually all response from the ground is the quadrature phase component of the received signal. As a result, the in-phase signal that is particularly sensitive to ferrous and non-ferrous metal material might be too weak to give accurate representation of subsurface distribution of MPPEH. The vertical extent of MPPEH may not currently be reliably delineated, and the vertical extent of MC-impacted soil, as a result of MPPEH disposal is not adequately defined. Because of the existence of data gaps as discussed above, the 2007 investigation results are not sufficient to support the Report's conclusion (page 6-2) that "the site does not appear to represent a	**Response 1.** The rationale for a data gap as noted in the comment is likely based on misunderstanding of report text. The referenced statement (page 3-2) that the vertical dipole mode is sensitive to conductivity variations at depths approaching 16.4 to 19.7 feet refers to the "maximum" depth of sensitivity, and is not the depth range of sensitivity. The EM31 samples a "volume" of soil below the coil. The EM31 is sensitive to conductivity variations from 0 feet to a maximum depth of approximately 18 feet with a maximum sensitivity at a depth of approximately 5 feet. Performing another EM31 survey in the horizontal mode will not likely identify any large disposal pits or trenches that were not already identified from the survey using the vertical dipole orientation. Text will be modified to reflect the depth "range" for the EM31. In general, we agree that the vertical extent of MPPEH or MC at the site is unbounded. The vertical extent of contamination at the site will be addressed as part of the next phase of site investigation under the RI. In terms of the general conclusion that was reached and stated in the Site Inspection Report, regarding whether the site appears to represent a contiguous landfill, we refer you to the response to DTSC (Mr. Cordero) comment #1 above.

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contiguous landfill-type disposal facility and should not be addressed as such in future assessments." In future investigations, additional techniques, including and not be limited to other geophysical techniques (e.g., resistivity sounding and other types of electromagnetic induction methods) and soil borings in selected areas should be used to fill in the existing data gaps.	
Supplemental Comment 1, 08/22/08: Page 9, Response 1. Regarding the conclusion that "the site does not appear to represent a contiguous landfill-type disposal facility". Disagree.	**Supplemental Response 1.** Please see the response to Mr. Cordero's comment #1. The last paragraph of the Executive Summary section will be revised to remove the second sentence and replace with the following: "The preliminary geophysical investigation performed as part of this SI did not appear to indicate the presence of a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation during the Remedial Investigation/Feasibility Study." The first bullet of section 6.1 CONCLUSIONS, will be changed to the following: "A full site geophysical survey was performed as part of this SI. The results did not appear to indicate any broad, contiguous, buried disposal area at the site. The preliminary conclusion from this survey is that the site does not appear to represent a contiguous landfill-type disposal facility; however, this should be confirmed with further intrusive investigation during the RI/FS. This preliminary observation does not eliminate the possibility that individual items or small groupings of items may be buried at any location within the site."

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(a) What was the intercoil spacing of EM 31 used in the survey? Based on the information provided in the response, that the maximum sensitivity was achieved at 5 feet below grade (bgs), I assume that the intercoil spacing was 3.28 feet (1 m)?	(a) The intercoil spacing is 12 feet.
(b) It has generally been accepted that for vertical dipoles, all material below a depth of two intercoil spacings only contribute to about 25 percent of the total response. If the intercoil spacing used was 1 meter, then I assume the EM 31 is not so sensitive to the objects buried below 7 feet?	(b) The EM31 (with intercoil spacing of 12 feet) is sensitive to objects buried below 7 feet. It becomes less sensitive at depths approaching 15 to 18 feet.
(c) If that is the case, then as Mr. Cordero Jr. of DTSC pointed out in his comment, the blueish strip running in the north-south direction in the middle of UXO 5 might indicate a massive disposal area existing below 7 feet bgs, rather than the "disturbed" debris disposal.	(c) The EM31 is sensitive to objects below 7 feet. The anomaly (bluish strip) is relatively local (less than 10 feet wide - visible on only 1 acquisition line - and less than 50 feet long). This would indicate that a massive disposal area is unlikely within the depth of detection.
(d) Please provide more supporting information that the long strip as described above is due to soil variations.	(d) The comment response to Mr. Cordero Jr. of DTSC (#2) describes this anomaly as being suspicious and possibly due to dispersed debris disposal or soil variations. Based on its local character, and the fact that is perfectly lined up with the data acquisition line, it is unlikely the anomaly is due to massive disposal, and more likely due to localized disposal or local soil variations.
(e) Please also provide reference that the maximum sensitivity depth of the EM 31 used in the survey is 18 feet bgs.	(e) Reference: Geonics Limited EM31 Operating Manual, Section 5.2, Data Interpretation: Multi-Layered Earth. The generally accepted rule of thumb for EM detection is 1.5 times the intercoil spacing is the

	maximum reliable depth of detection, although this is dependent on the soil properties. This depth interval equates to approximately 70% of total contribution to the EM31 response. The material below 18 feet contributes the remaining 30%. (f) General response: Based on our geophysical expert's interpretation as described in the response above, a reasonable interpretation of this preliminary data is that the site does not appear to indicate a contiguous landfill within the site boundaries. We agree that this should not be seen as conclusive evidence, but as a meaningful line of evidence. Further investigation (during the RI), including potentially intrusive investigation and further geophysical investigation (with prove out), should be performed to confirm this preliminary interpretation, and provide additional lines of evidence. We will emphasize this in the Final SI.
(g) Additionally, please provide more background information about the historical site use: if this site was not used for massive disposal, why was it called (Salvage Yard) Landfill site?	(g) The Final Preliminary Assessment for Munitions Response Program, Naval Weapons Station Seal Beach Detachment Fallbrook (2006), was prepared to summarize the history of munitions use at former ranges and sites at Detachment Fallbrook (including MRP UXO5). In preparing the Work Plans for this project and the SI Report, we reviewed this document. The PA notes that based on historical records that the site is a burial area for munitions and dunnage. It is evident from our investigation that some munitions and dunnage have been buried at the site. The source of the name "Salvage Yard Landfill" came from an IRP

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	document, *Addendum to the PA* (Naval Energy and Environmental Support Activity, 1990). The following is excerpted from this document: "From 1952 until the early 1960s, an area of approximately two acres located northeast of Building 307 was used to dispose of inert materials. Approximately 10,000 cubic yards of material mostly metal was disposed at Site 33. From 1952 to 1955, an ammunition belting operation in Building 307 generated empty 20mm and 40mm ammunitions cans and excess ammunition clips were temporarily stored in the salvage yard adjacent to Building 307……the cans were smashed with a bulldozer, transported by dump truck to the landfill and buried. The ammunition clips were also disposed of at the landfill. Inspection of Site 33 during the on-site survey revealed other inert material in the disposal area…electronic parts, inert missile parts, rubber missile shipping rings, Bullpup missile test stands, practice shapes electronic test equipment, empty powder cans, metal banding, and tires. Reportedly, in 1966 or 1967 about two pounds of five partially-filled cans of smokeless powder was deposited in Site 33."
Comment 2. Lateral Extent: It is not clear whether the lateral extent of MPPEH disposal and MC-impacted soil, especially in the directions west, southwest, and south of the current site boundary (defined by the new fence line shown in Figure 4-1 of the referenced report is fully delineated. The text discussion on P3-2 of the Report states "The west and southwest boundaries of Site UXO5 were assumed to be the Building	**Response 2.** The presumed boundary for the site was determined in the Final Preliminary Assessment for the Munitions Response Program Naval Weapons Station Seal Beach Detachment Fallbrook (Malcolm Pirnie, Inc. 2006). The Site Inspection work performed here did include investigation beyond that boundary, specifically including geophysical survey, surface sweep, and sampling on the south of Sparrow Road. One 40 mm inert projectile was found in that area. Based on geophysical

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307 parking lot and Sparrow Road." The consultant should provide additional supporting information, possibly including aerial photos showing historical land use conditions to support their position.	results, the area does not appear to have significant anomalies for investigation nor did it have surface scrap (other than the one projectile). The area where building 307 is located (including the paved area) was not targeted for inspection under this project – it may not require future investigation based on future use scenarios) but could be further addressed based on findings from the RI.
Comment 3. Other Anomalies: In addition to the anomalies identified on pages 4-2 to 4-3 in the report, there are many other anomalies that may warrant further investigation including but not limited to: a) the long north south direction anomaly ("strip") located in the middle of the site, b) the anomaly located approximately 100 feet north of building 365, and c) The anomaly located about 300 feet southwest of building 365 and on the northern boundary of Sparrow Road. In each of these areas, both the terrain signal (Figure 4-2) and the in-phase signal (Figure 4-3) showed conductivities different than background.	**Response 3.** Our response here is similar to the response to DTSC (Mr. Cordero) comment #2. We agree that the "strip" running north/sough in the middle of UXO 5 is somewhat suspicious, however, it does not appear to signify an area of mass disposal (see comment response #1 response to Mr. Cordero). More likely, this area is highlighted due to soil variations or dispersed debris disposal (not unlike the vast majority of the site). It should be looked at in the broader context of dispersed disposal throughout the site – it will be noted on Figure 4-2 as an anomaly. There are a couple of anomalies in the area referred to in (b), mostly evident on Figure 4.3. We will note these on Figure 4.2 and 4.3. The area referred to in (c) does show a slight deviation from background and will be noted on Figure 4.2 as an anomaly, but similar to the area referenced in (a), this is likely the result of soil variations. We will also add a note to both Figure 4.2 and 4.2: "The call-out of anomalies on these figure are meant to draw attentions to some specific areas that appear to deviate from background based on geophysical data. The call-outs are not meant to be a comprehensive evaluation of

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	variability of geophysical responses at the site."
Comment 4. To assess the potential impact of MPPEH disposal on the quality of surface and ground water resources, the Regional Board requests the Navy report analytical results for the following water samples: a) collect representative surface water samples (from two stream beds, respectively located at the northwest and south of the site) and b) Collect representative ground water samples from the site. The water samples should be analyzed using appropriate methods for acceptable quantification of MCs and Title 22 Metals. At this time the potential impact of MPPEH disposal on the surface and ground water quality at the site has not been adequately assessed. The current Report does not provide adequate data to assess the local hydrology, including depth to ground water and ground water flow directions/gradients, etc. According to the Report (Page 6-1), the electromagnetic induction survey data appear to indicate the disposal of MPPEH wastes near stream beds. Additionally, it has been generally accepted that chemical and physical properties of many of the MCs [e.g. perchlorate and hexahydro-1,3,4-trinitro-1,3,5-triazene (RDX)], favor the leaching of these constituents from soil to impact ground water. The Regional Board concludes that the considerations described above warrant the requested further investigation of the quality of surface	**Response 4.** Comment acknowledged. Groundwater investigation was not identified as an objective of the SI. Groundwater may be investigated as part of the RI. The stream bed is normally dry and fills up after heavy rains. Therefore, there is no surface water. Soil samples were collected within the stream bed and drainage area, however, to investigate potential contaminant migration. The surface soil samples (both outside and within the stream beds/drainage areas) do not appear to warrant further investigation with regards to MC (they were all below detection limits except for a few hits for 1,3,5-trinitrobenzene in low concentrations not exceeding PRGs or ESSLs). We would recommend further groundwater investigation only after more subsurface soil sampling that would be conducted as part of the RI.

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water and ground water resources at the site.	
Supplemental Comment 4, 08/22/08: Page 11, Response 3 regarding surface water and ground water sampling, Don't agree. Please be advised that elevated metal concentrations, which is likely related to the disposal of munitions, have been found at this site, for example, a maximum arsenic concentration of 5.2 mg/kg has been reported, which is above the EPA Region 9 PRG for preventing leaching to GW (1 mg/kg, DAF 1).	**Supplemental Response 4.** There is no regularly occurring surface water at the site. The "stream bed" is dry except during and after rainfall events. It is unknown if the "stream bed" maintains water for any duration of time after rainfall events. Groundwater and surface water investigation were not an objective of this particular site investigation (Final Work Plan, TtEC, 2007), nor were any conclusions drawn with regard to water contamination. Potential contamination in the surface water and groundwater will be evaluated in the next phase of the investigation.
Comment 5. The Report (see page 3-3) states that "Quality control procedures for the geophysical data collection were followed in accordance with the Work Plan." The referenced Work Plan (dated April 6, 2007), did not include a detailed discussion of QC procedures with respect to the acquisition and processing of received signals. The Report should describe the procedures and standards employed to process and interpret the geophysical data. The should also provide a discussion regarding any potential problems, deviations with regards to the QC procedure, and limitations imposed upon interpretation of the results.	**Response 5.** Concur with comment that there were no QC procedures for data processing and interpretation discussed in the work plan. The procedures and standards used to process and interpret the data are as follows: (this information will be added to the report text) • Raw Geonics EM31 data were downloaded to laptop and Geonics Dat31 v 2.01 software was used to convert file to ASCII format. Standards: none (straightforward data conversion). • Raw Leica DGPS data were downloaded to laptop and NovAtel Inc GrafNav v7.5 software was used to apply base station GPS corrections to rover GPS data, and export xy data file. Standards: Quality factor (Q) of 2 or better for each position and a standard deviation for each position of less than 0.05 meters. • TtEC software was used to merge the EM31 data and GPS data

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	and correct for instrument lag. Standards: Linear feature aligned to within 1 foot. • XYZ data were imported to Geosoft Oasis Montaj v 6.4 software to grid, color contour, and map data. Standards: Sample distance mean < 1 foot, noise < 1 mmho/m and < 1 ppt standard deviation, areal coverage gaps <15 ft (except for vegetation/obstacles, drift corrected to < 1 mmho/m and < 1 ppt, repeatability of EM readings < 1 mmho/m and < 1 ppt, repeatability of position over know point < 1 foot. Color scale sensitive for identification of anomalies > 4 mmho/m (conductivity) and 2 ppt (in phase) • Interpretation was based on the Geosoft color coded maps to identify anomalies. Anomaly amplitudes and foot prints (areal extent and shape) were analyzed to ascertain the source of the anomaly. Standards: Anomalies > 4 mmho/m (conductivity) or > 2 ppt (in phase) were identified and analyzed. Above ground features (e.g., power lines, fences, stream bed, metal debris) were correlated to geophysical anomalies. No deviations from standard procedures occurred during the data acquisition. This will be added to text.
Supplemental Comment 5, 08/22/08: Page 12, Response to Comment 5 regarding the QA/QC procedures. Thanks for the information provided. Please also explain in detail how calibration was conducted.	**Supplemental Response 5**. The instrument is calibrated at the factory and is not calibrated at the site. However, the instrument did go through daily set up procedures and equipment functional checks. These procedures were performed at a location where the instrument response

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	did not vary when the coils are moved over the area (i.e., background area). The actual procedures are lengthy and not provided here, but can be found in the Geonics EM31 Operating Manual, Section 2.1.1 Initial Set-up Procedure, and Section 2.1.2 Equipment Functional Checks. In general, the procedures are for making sure the instrument is operating properly and the instrument settings are correct. These procedures include checks for range and phase settings, sensitivity, zero adjustment, battery level, etc.
(a) Additionally, please provide clarification for the below question related to the merging of EM31 data with GPS data: it seems that the location of the blue anomaly west of Building 365 that was already called out and labeled as "anomaly" on Figure 4-3 should be the location of a tree (Figure 4-8)? Shouldn't all tree areas be un-accessible to the geophysical survey and left as blank on survey result figures?	(a) We believe you are referencing the tree called out on Figure 4-1 that sits on the 4th grid line from the bottom and between the 5th and 6th grid line from the left on Figure 4-2. This tree is different from the blue anomaly called out on the bottom of Figure 4.2. Not all tree areas at the site were completely inaccessible. Some of the trees grow high and provide plenty of room for surveying around. Others have a lot of brush growing around them and were fairly inaccessible as noted on the drawings. If the colored survey charts show a color (not white) then the area was accessed.

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GENERAL COMMENTS	**RESPONSE**
Comment 1. Having limited experience with interpretation of geophysical data, I must defer to individuals with specific expertise in the subject to determine if results of the geophysical survey adequately support the conclusion that the site does not appear to represent a contiguous landfill-type disposal facility and should not be addressed as such in future assessments.	**Response 1.** It is agreed that the geophysical survey has depth limitations. The EM31, as used on this inspection, has a maximum sensitivity depth of approximately 18 feet. If there are disposal pits or trenches with an overburden of 15 to 20 feet, then the EM31 probably will not detect them, depending on the quantity and type of debris in the disposal pits/trenches. Such a depth of overburden is not likely the case as this would be extreme given the nature of disposal activities at this location. Therefore we feel that the conclusion as stated is reasonable. As described in the report, this does not rule out dispersed and random disposal throughout the site. We feel that this is an important distinction in understanding the nature and distribution of contamination at the site. That distinction being that the disposal practices appear to be more random and sporadic (as evidenced also by surface findings), with some areas of very concentrated debris, than as a contiguous landfill that would be indicative of mass disposal practices. We do not propose any change to the text.
Comment 2. It is agreed that subsurface anomalies identified as part of the geophysical survey should be investigated further. Of particular interest are those in, or around, the streambed on the north side of the site because: (1) it was not possible to delineate the size of the anomalies as part of the SI (nature and extent of material are still unknown), and (2) The stream when running is a potential conduit for off-site migration of contaminants.	**Response 2.** Comment noted.

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Comment 3. It is stated in Section 6.2 that sampling performed for the SI "provided an indication of surface/shallow soil contaminants (metals) and eliminated the prospect of munitions compounds in surface soil. Further work is necessary to investigate potential subsurface contaminants primarily associated with significant subsurface anomalies. Also, further risk assessment should be performed based on a combination of surface and subsurface analyses to refine the COPC list based on site-specific future use and exposure scenarios." I agree, with the some additional recommendations pertaining to details, as follows below:	**Response 3.** Comment noted.
Comment 4. a) It is assumed that burrowing animals will be considered among the ecological receptors for the potential future-use scenario. In areas where contaminants are being characterized, please extend the analysis to soils occurring at depths potentially reached by burrowers. The desired depth would be determined on a case-by-case basis, depending on the species at the site. A specific depth can be identified during the development of a sampling plan (if sampling is to be conducted), and with input from the Service. It is likely that the desired depth will be at least 1 to 2 meters.	**Response 4.** USFWS will be contacted when the field sampling plan is being prepared for the RI to determine depth intervals to be sampled.
Comment 5. b) To better enable full characterization of site risk, at least initially, it is recommended that background not be used as a criterion for selecting COPCs (EPA 2001). Background can be factored in for risk management purposes, once estimates of overall risk levels have been developed.	**Response 5.** Based on this comment we will include Antimony and Selenium as a COPEC. They were the only constituents that were eliminated from the list based on comparison to background. For a more extensive discussion of revision to the list of COPCs/COPECs see DTSC (Mr. Cordero) comments # 4 and # 5.

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Comment 6. c) It is agreed that munitions compounds can be ruled out as COPCs in the top 9 inches of soil. However, munitions compounds will need to be considered along with metals when moving to characterize contamination in subsurface soils.	**Response 6.** Agreed
Comment 7. d) In the "Ecological Profile" of Appendix B, please add text about incidental ingestion of soil during digging, grooming and foraging by mammalian and avian species. Incidental soil ingestion is represented in the first of the two diagrams provided.	**Response 7.** This will be discussed in "Relationship of any MEC/MC Releases to Habitat Areas."
Comment 8. e) Because federally listed species currently occur or may occur in the future on the site, my comments on the SI report were coordinated with an Endangered Species Biologist, Jonathan Snyder.	**Response 8.** Comment noted.