Base Realignment and Closure
Program Management Office West
33000 Nixie Way, Building 50
San Diego, California 92147

CONTRACT NO. N62473-12-D-2006
CTO NO. 0011

DRAFT

ACTION MEMORANDUM
INSTALLATION RESTORATION PROGRAM SITE 1
VADOSE ZONE SOILS

November 2016

DCN: UMAC-2006-0011-0009

FORMER MARINE CORPS AIR STATION
EL TORO, CALIFORNIA

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DCN: UMAC-2006-0011-0009

Site Status:	**On the National Priorities List**
Category of Removal:	**Time-Critical Removal Action**
CERCLIS Site ID:	**CA6170023208**
Date:	**October 18, 2016**

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APPENDICES

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ABBREVIATIONS AND ACRONYMS

§	section
µg/kg	micrograms per kilogram
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	*Code of Federal Regulations*
CSM	conceptual site model
DGM	digital geophysical mapping
DON	Department of the Navy
DTSC	California Department of Toxic Substances Control
EOD	explosive ordnance disposal
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigation
FFA	Federal Facilities Agreement
FS	feasibility study
HA	hazard assessment
HI	hazard index
HQ	hazard quotient
IC	institutional controls
IRP	Installation Restoration Program
MCAS	Marine Corps Air Station
MD	munitions debris
MDAS	material documented as safe
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MEC HA	MEC hazard assessment
mm	millimeter
MPPEH	material potentially presenting an explosive hazard

ABBREVIATIONS AND ACRONYMS
(Continued)

NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OCFCD	Orange County Flood Control District
PRG	preliminary remediation goal
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SVOC	semivolatile organic compound
TCRA	time-critical removal action
TIC	The Irvine Company
TPH	total petroleum hydrocarbons
TtEC	Tetra Tech EC, Inc.
USC	*United States Code*
VOC	volatile organic compound

1. PURPOSE

The purpose of this Action Memorandum is to document the decision of the Department of the Navy (DON) to implement a time-critical removal action (TCRA) at the Installation Restoration Program (IRP) Site 1 (Figure 1-1).

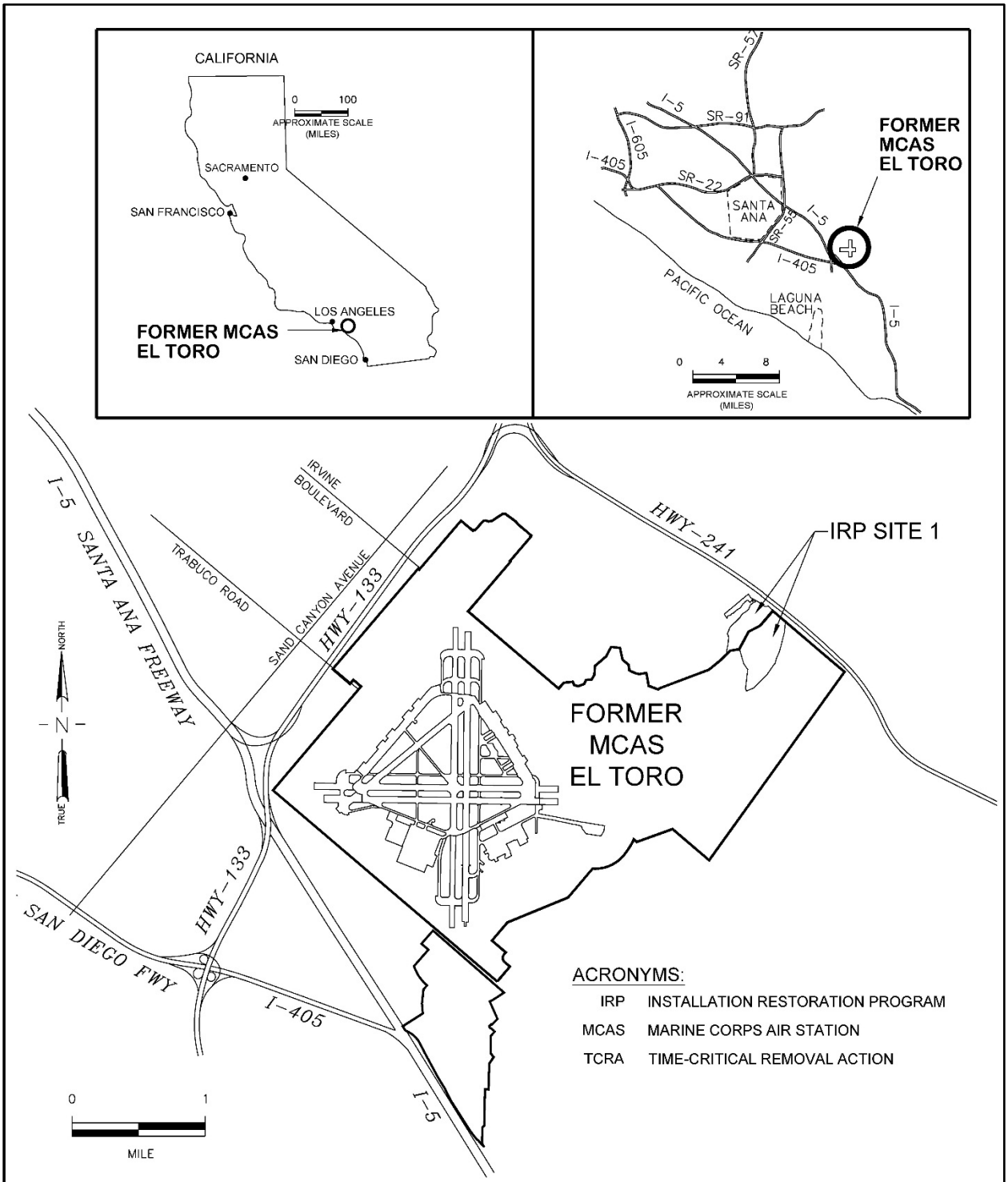
Installation Restoration Program (IRP) Site 1 includes two distinct areas: an on-Station Area, the Explosive Ordnance Disposal (EOD) Training Range (DON Property), and the off-Station Area, referred to as the Adjacent Property (private/public property, never owned by the DON) (Figure 1-2). The Former Marine Corps Air Station (MCAS) El Toro has been assigned Environmental Protection Agency (EPA) Identification (ID) Number CA6170023208. The Adjacent Property is located immediately to the northwest of the EOD Training Range and portions are owned by The Irvine Company (TIC) and the Orange County Flood Control District (OCFCD). The Adjacent Property was impacted by kick-outs from range activities performed on the EOD Training Range. A "kick-out" is a munition that was not fully consumed in a range operation and was ejected by the explosive force of the donor charge or larger munitions contained in the range activity.

This Action Memorandum addresses the selected actions for both the naphthalene-impacted soil at the EOD Training Range and the soil impacted with material potentially presenting an explosive hazard ([MPPEH]; of which munitions and explosives of concern [MEC] is a subset) at the Adjacent Property.

The DON, under the authority established by Executive Order 12580 (as amended), is investigating and cleaning up IRP Site 1 pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 ([SARA]; Title 42 United States Code [USC] Section [§] 9601, et seq.), and as provided in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Title 40 *Code of Federal Regulations* (CFR), Part 300.

IRP Site 1 is under the regulatory oversight of the EPA, California Department of Toxic Substances Control (DTSC) and the California Regional Water Quality Control Board (RWQCB) Santa Ana Region. The DON provides the funding for site cleanups on behalf of the Marine Corps. A Federal Facility Agreement (FFA) for former MCAS El Toro was signed in 1990 and documents how the Navy and Marine Corps intend to meet and implement the CERCLA requirements in partnership with the EPA, DTSC, and the RWQCB.

In February 1990, Former MCAS El Toro was listed on the EPA National Priorities List (NPL). On November 19, 2013, EPA indicated its intent to complete a direct final delisting of approximately 1,900 of the 4,712 acres of Former MCAS El Toro (the delisting did not include IRP Sites with ongoing actions including IRP Site 1). The partial delisting became effective on January 21, 2014.



	PREPARED BY: TETRA TECH EC, INC. DESIGNED BY: D. GEHRETT	TITLE: ACTION MEMORANDUM: IRP SITE 1 PROJECT LOCATION MAP	A REVISION
		PROJECT: MCAS EL TORO IRP SITE 1	PROJECT NO.: 106-45490011
		LOCATION: EL TORO, CALIFORNIA	DATE: 08/03/2016
			FIGURE: FIGURE 1-1

DRAFT

Area C

Area B

Area A

Agua Chinon Wash Retarding Basin

State Highway 241

Adjacent Property

Perimeter Fence

EOD Training Range Buffer Zone

NORTHERN EOD TRAINING RANGE

Agua Chinon Wash Retarding Dam

EOD Training Range

SOUTHERN EOD TRAINING RANGE

Approximate location of Naphthalene-Impacted Soil

Legend

IRP Site 1:
- IRP Site 1
- EOD Training Range
- Agua Chinon Wash Retarding Basin

Adjacent Property:
- Area A
- Area B
- Area C
- Former MCAS El Toro Base Boundary
- EOD Training Range Perimeter Fence
- EOD Training Range Boundaries
- Approximate location of Naphthalene-Impacted Soil

DRAFT

1 INCH = 500 FEET (SCALE AT 17" X 11")

SCALE IN FEET

0 500 1,000

NAD 1983 STATEPLANE CALIFORNIA VI FIPS 0406 FEET

NOTES:
1) Imagery from the USDA National Agriculture Imagery Program (NAIP), 1-m resolution, 2014, via the ArcGIS Image Server.

ACRONYMS:
EOD = Explosive Ordnance Disposal
IRP = Installation Restoration Program
MCAS = Marine Corps Air Station

PREPARED BY:
TETRA TECH EC, INC.
DESIGNED BY: J.DAHODA

TITLE:
ACTION MEMORANDUM: IRP SITE 1
SITE MAP

A REVISION

PROJECT: MCAS EL TORO IRP SITE 1
PROJECT NO.: 106-45490011
LOCATION: EL TORO, CALIFORNIA
DATE: 10/17/2016
FIGURE: **Figure 1-2**

(\\tts1535fs1) P:\NAVFAC - Naval Facilities Engineering Command\NAVFAC SW RAC 8\Former MCAS-El Toro CA\GIS\MXD\Draft\Action_Memorandum\Fig1-2_IRP-Site1_ActionMemo_SiteMap.mxd 2016/10/17 jeff.dahoda

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The TCRA will include the excavation and off-site disposal of approximately 110 cubic yards of naphthalene-impacted soil at the EOD Training Range and the removal of MPPEH from the Adjacent Property. The TCRA includes the following removal action technical approaches:

1) EOD Training Range Naphthalene-Impacted Soil: The approximate 15-foot by 20-foot area of naphthalene-impacted soil within the Northern EOD Training Range will be excavated and transported for off-site disposal.

2) The Adjacent Property (Excluding the Agua Chinon Retarding Basin): In the Adjacent Property, a grid system will be established and the soil will be excavated and screened for MPPEH to a depth of 12 inches below ground surface (bgs). After the excavation, a digital geophysical mapping (DGM) survey will be conducted and the data processed to create a target dig list. The target list will be used to perform intrusive investigations to complete the subsurface clearance of MPPEH. All individual targets will be investigated to depth. All recovered MEC items will be demilitarized and the explosives hazards eliminated. Remnants will be inspected and the material documented as safe (MDAS) will be recycled as scrap or disposed of appropriately.

3) The Agua Chinon Retarding Basin: A DGM survey will be performed in this area. The DGM data will be processed and a target dig list will be created and used to perform a subsurface clearance of MPPEH. Individual targets will be investigated to depth. Intrusive work will not be performed under any existing active roadways, stormwater control features (rip rap, etc.), or active existing structures (e.g., the dam and associated structures).

The objective for the naphthalene-impacted soil at the EOD Training Range is to reduce the site risk associated with the naphthalene by excavating the contaminated soil and disposing it off-site. The EOD Training Range removal action includes excavation, confirmation sampling, transport and disposal off-site, backfill, MEC disposal (discovered during excavation of the naphthalene-impacted soil) using donor explosives, and off-site disposal of MDAS and other metallic debris.

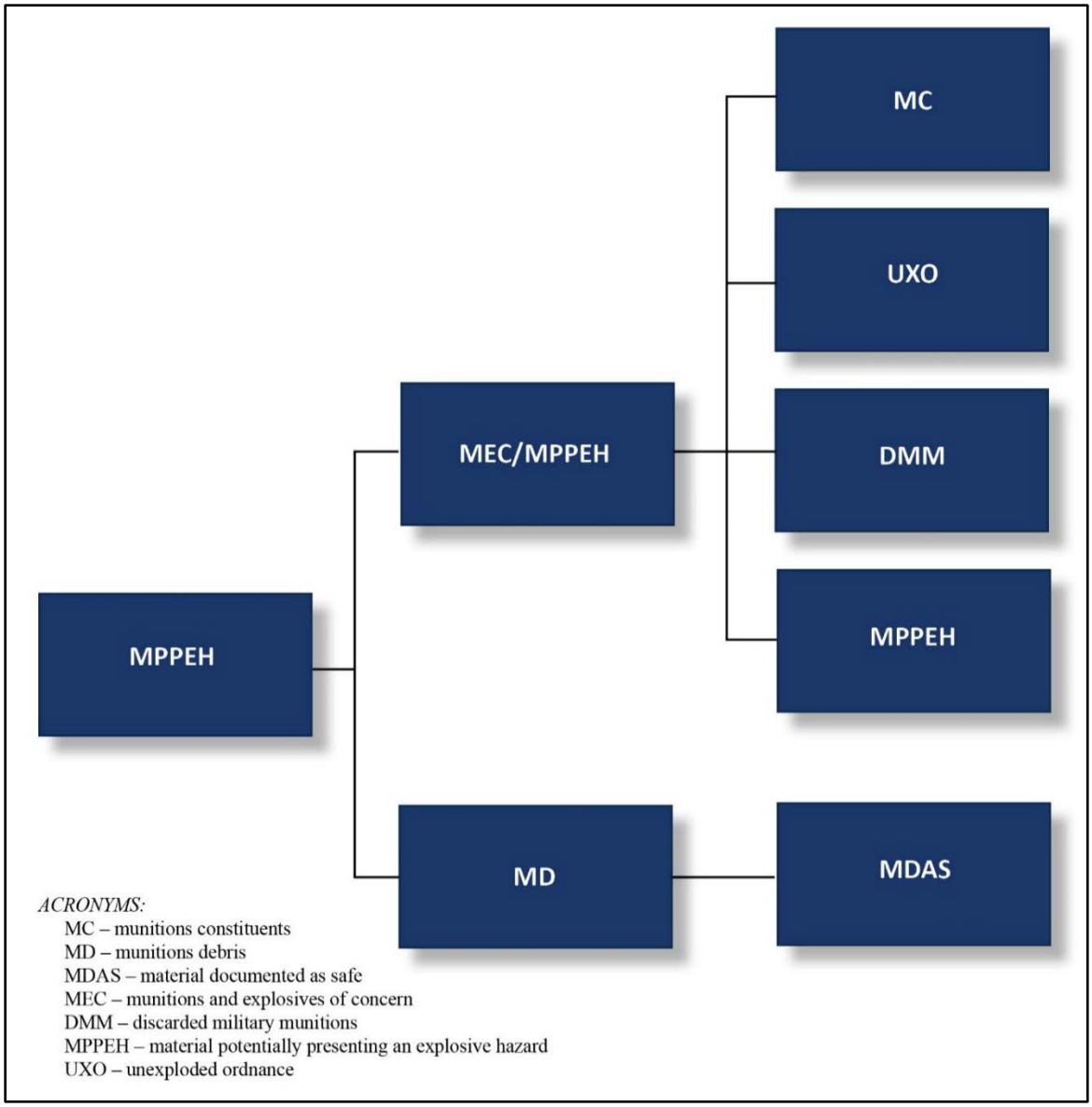
The objective for the Adjacent Property is to perform a removal action consistent with the residential reuse protocols to reduce the potential for exposure to MPPEH that would result in unacceptable hazards to future receptors. The Adjacent Property removal action includes excavation of near surface soil, mechanical screening of the soil to 12 inches bgs for MPPEH, geophysical surveys, individual intrusive investigation to remove anomalies, MEC disposal using donor explosives, and off-site disposal of MDAS and other metallic debris. The TCRA will be the final action for MEC-impacted soil at the Adjacent Property and as such, 5-year reviews will not be required. Only UXO-qualified personnel will determine the final disposition of MPPEH.

In this Action Memorandum, MPPEH refers to material potentially presenting an explosive hazard that has either 1) not been evaluated by UXO-qualified personnel for final determination or 2) has been inspected but a full inspection is not possible to clearly determine the explosive safety status. MEC refers to unexploded ordnance (UXO) or discarded military munitions (DMM). Munitions debris (MD) is ordnance-related material that has been initially inspected and determined not to

contain explosives or explosives residue. Munitions documented as safe (MDAS) is MD that has undergone a dual, independent inspection by two qualified and authorized UXO personnel and it has been determined that no explosives or residues are present. The relationship of the different classifications for munitions is shown on Figure 1-3.

During the previous 2010 TCRA (AECOM 2011), items were identified as material documented as an explosive hazard (MDEH). MDEH will be used where applicable in discussions of the previous TCRA. Tetra Tech EC, Inc. (TtEC) does not intend on turning over any MEC or MPPEH (unable to determine explosive safety status) to non-DoD or DoD agencies during the project field work; therefore, the term MDEH will not be used in this Action Memorandum.

Figure 1-3. Munitions Classifications



2. SITE CONDITIONS AND BACKGROUND

This section presents the description, location, and background information for IRP Site 1.

2.1 SITE DESCRIPTION

MCAS El Toro was closed in July 1999 as a part of the Base Realignment and Closure (BRAC) Act. Most of the property has been transferred or leased by the DON to a private owner. The DON currently owns the 74 acres of the former MCAS El Toro that are associated with the EOD Training Range (Figure 1-2).

Historically, land use around former MCAS El Toro has been largely agricultural. However, land to the south, southeast, and southwest has been developed over the past 10 to 15 years for commercial, light-industrial, and residential use. Currently, expanding commercial areas adjoin the former MCAS El Toro and additional residential areas are being constructed to the northwest and west. Adjacent land to the northeast and northwest is currently used for agriculture.

The Adjacent Property areas A and C (Figure 1-2) are owned by TIC. Area B and the Agua Chinon Retarding Basin is owned by OCFCD. The Agua Chinon Retarding Basin and Debris Dam was constructed in 1998 to provide flood control to the valley below. The Agua Chinon Wash and Debris Dam are managed by the OCFCD and encompass approximately 20.3 acres. The Agua Chinon Debris Dam has a capacity of 256 acre-feet (316,000 cubic meters) of water.

2.1.1 Removal Site Evaluation/Previous Investigations

A Revised Draft Final Feasibility Study (FS) Report (AECOM 2014) was prepared to present the development and evaluation of remedial alternatives to address risks and hazards to human health and the environment due to past releases of hazardous substances at IRP Site 1. The individual and comparative evaluations presented in the FS Report were intended to provide adequate information concerning remedial alternatives to decision-makers to address naphthalene- and MEC-impacted soil. The results of these evaluations were used as the basis for selecting appropriate alternatives for the Site.

Various environmental investigations have been conducted at IRP Site 1 as a part of the CERCLA process to characterize the physical attributes including the geology and hydrogeology, the nature and extent of contamination, potential risks to human health and the environment, and the feasibility of potential remedial technologies. A brief description of previous investigations performed at both the EOD Training Range and the Adjacent Property is included below.

2.1.1.1 Soil Investigations

Soil sampling was conducted at the EOD Training Range at various depths to delineate the nature and extent of impacted soil during several investigations. Sampling depths ranged from ground

surface to approximately 35 feet bgs, and the lateral extent of sampling encompassed the Northern and Southern EOD Training Ranges and other areas of IRP Site 1. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), dioxins/furans, explosives, perchlorate, and metals. SVOCs were reported above residential and industrial preliminary remediation goals (PRGs) within the Northern EOD Training Range, near the location of Phase II Remedial Investigation (RI) soil boring B-1. TPH was found in soil in the same vicinity. Naphthalene was reported above its PRG at depths ranging from 2 to 20 feet bgs in the vicinity of soil boring B-1, and was generally collocated with elevated concentrations of TPH.

2.1.1.2 Previous Munitions Investigations

MEC items have been found in the soil at the Northern EOD Training Range, and MEC and MD has been found in the soil at the Northern and Southern EOD Training Ranges and in near surface soil at the Adjacent Property.

In 2002, a MEC Range Evaluation (Earth Tech 2006) was completed to evaluate the explosives safety hazard at the EOD Training Range due to remnant MEC items originating from historical EOD Training. Overall, four safe-to-move MEC items and approximately 5,000 pounds of MD were recovered. The MEC items were recovered in the Northern EOD Training Range. MD was recovered in the Northern and Southern EOD Training Ranges, the Buffer Zone surrounding the Northern and Southern EOD Training Ranges, and the Training Range perimeter. MD items were also located just outside of the Training Range perimeter, leading to subsequent munitions characterizations on the Adjacent Property.

In 2008, a munitions characterization (Earth Tech 2009) was completed for the EOD Training Range and the Adjacent Property. In addition, soil-filled ammunition cans located in the eastern portion of the EOD Training Range IRP Site 1 were characterized for MEC as well as a 55-gallon drum containing items recovered during the 2002 Range Evaluation (Earth Tech 2006). At the Adjacent Property, 25 MEC items were collected from the ground surface at 21 locations, including one unsafe-to-move item, an M38/M40 sub-munition. Recovered MEC and MDEH were primarily 20 millimeter (mm) projectiles. Of the 106 total anomalies investigated, only 1 item was below 12 inches bgs.

Due to identification of MEC and MD during the 2008 munitions characterization (Earth Tech 2009), a TCRA was conducted in 2010 (AECOM 2011) to address potential explosive safety hazards from material potentially presenting and explosive hazard (MPPEH) located on the Adjacent Property. The field activities included an analog and digital geophysical investigation, followed by anomaly investigation, characterization and removal. During the 2010 TCRA (AECOM 2011), 161 MDEH items were recovered from depths ranging from the ground surface to 18 inches bgs. Of the MDEH items found, 157 (approximately 98 percent) were discovered from the surface to 12 inches bgs. There were 3 items recovered below 12 inches bgs and only

1 item recovered at 18 inches bgs. The predominant MDEH items recovered were again 20mm projectiles.

The Agua Chinon Wash was excluded from the 2010 TCRA (AECOM 2011) as it was classified as an area of low probability for encountering munitions because of previous, extensive excavation in the area during construction of a flood control retarding basin. In addition, approximately 8 acres of the Adjacent Property were not surveyed using geophysical equipment as part of the 2010 TCRA (AECOM 2011) due to the presence of steep terrain and/or dense vegetation; however, visual surveys were conducted in this area.

The previous activities validated the Conceptual Site Model (CSM) (further discussed in Section 3.3) that any potential MPPEH that was on the Adjacent Property as a result of kick-outs would primarily be within the top 12 inches of soil.

The future land use proposed for the Adjacent Property is residential use and open space and the private property owner plans to grade the area in preparation for development in the next 6 months. This could potentially expose workers and residents to potential remaining MPPEH hazards at the Adjacent Property.

2.1.2 Physical Location

Former MCAS El Toro is situated in south-central Orange County, California, approximately 8 miles southeast of Santa Ana and 12 miles northeast of Laguna Beach and comprises approximately 4,740 acres (Figure 1-1). IRP Site 1 is situated within a tributary canyon of the Borrego Canyon Wash at elevations ranging from approximately 610 to 760 feet above mean sea level.

The EOD Training Range is located in the northeast portion of the former MCAS El Toro in the foothills of the Santa Ana Mountains. The EOD Training Range is comprised of the Northern and Southern EOD Training Ranges (16.9 and 16.6 acres, respectively) and a Buffer Zone (40.3 acres) for a total area of approximately 74 acres (Figure 1-2). The Adjacent Property portion of IRP Site 1 covers approximately 44 acres located immediately to the west of the EOD Training Range (Figure 1-2). Most of the Adjacent Property is owned by TIC, with the exception of the area within and adjacent to the Agua Chinon Wash, which is owned by the OCFCD.

2.1.3 Site Characteristics

EOD training was conducted at the EOD Training Range from 1952 until closure of MCAS El Toro in July 1999 under the BRAC Act. Military ordnance used at the EOD Training Range included hand grenades, land mines, cluster bombs, smoke bombs, and rocket-propelled munitions. Civilian commercial-grade explosives, such as dynamite and plastic and gelatinous explosives, were also used at the EOD Training Range. Trenches and pits were periodically excavated and munitions were detonated. The trenches and pits were then filled with soil and

subsequently re-excavated to conduct additional munitions detonation activities. Limited historical information suggests that rocket motors or Jet-Assisted Take-Off units were also handled at the EOD Training Range. In 1982, approximately 2,000 gallons of sulfur trioxide chlorosulfonic acid (FS smoke) were reportedly burned in trenches located in the northern portion of the EOD Training Range. An estimated 300,000 gallons of petroleum fuels were burned from 1952 through 1993. In addition, there are unconfirmed reports that some low-level radioactive material was handled at the EOD Training Range (Weston 2000). The potential presence of radionuclides was investigated, and based on the investigation results (Weston 2006), the EOD Training Range received unrestricted release from the California Department of Public Health in September 2007.

The majority of the military EOD training (during the later operational years of the former MCAS El Toro) took place at the Northern EOD Training Range. According to the EOD Training Range records, from 1998 to 1999, the Southern EOD Training Range was infrequently used for nonmilitary training activities by local and federal law enforcement, including the Orange County Sheriff's Department and various federal agencies, including the Federal Bureau of Investigation (FBI). These agencies used the EOD Training Range for bomb technician, post-blast investigation, and emergency response training. These activities involved the use of explosive devices and products. Several demolition pits and a range observation building (mostly destroyed during the Santiago fire in 2007) are present on this portion of the EOD Training Range. In addition, a former observation bunker constructed from metal ammunition cans was present prior to the 2007 Santiago Fire. In 2008, since thick brush in the area was removed by the fire, munitions characterization activities were conducted, and as part of those activities the soil in the ammunition cans was characterized and properly disposed of.

2.1.3.1 Adjacent Property

The Adjacent Property covers approximately 44 acres located immediately to the west of the EOD Training Range boundary and perimeter fence (Figure 1-2). In 2008, after a fire in the area cleared vegetation, munitions characterization activities (identification and removal) were conducted in areas that were not previously accessible and 25 MEC items were removed. The 2010 TCRA (AECOM 2011) was conducted to further reduce the potential of explosive hazards associated with munitions on the Adjacent Property and is described further in the following sections. For purposes of the 2010 TCRA (AECOM 2011), the Adjacent Property was subdivided into three areas (Areas A, B, and C), as shown on Figure 1-2. These areas were subdivided based in part on results from the 2008 munitions characterization (Earth Tech 2009) and on the relative probability of encountering MPPEH as follows:

- Area A, property owned by TIC, was designated as having a relatively high probability of encountering MPPEH based primarily on its close proximity to the western boundary of the EOD Training Range. It includes the hillside west of and immediately adjacent to the EOD Training Range.

- Area B, property owned by the OCFCD, was designated as having a relatively low probability of encountering MPPEH. It extends westward from the western boundary of Area A and surrounds the Agua Chinon Wash, which is used as a flood control retarding basin. Significant regrading and construction activities occurred in 1998 to construct the basin and dam. Although the basin was not part of the 2010 TCRA, no munitions items were reported to be found during the construction or subsequent on-going maintenance activities conducted within the retarding basin.
- Area C, property owned by TIC, was also designated as having a relatively low probability of encountering MPPEH. It includes the area west of the Agua Chinon Wash. This area was included in the 2010 TCRA (AECOM 2011) because a 2-inch by 4-inch metal fragment was identified and removed from this area during the 2008 munitions characterization activities (Earth Tech 2009).

2.1.4 Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

As discussed in Section 2.1, MPPEH items (e.g., MEC, MD) were recovered during characterization and removal actions, within the EOD Training Range and on the Adjacent Property (Figure 1-2). Naphthalene has been detected above the site-specific risk reduction goal of 8,100 micrograms per kilogram (µg/kg) at depths ranging from 2 to 20 feet bgs within the Northern EOD Training Range (AECOM 2014). At the Adjacent Property there is a potential for exposure to buried MPPEH items due to soil erosion. Additionally, there is a potential for items that were initially deposited on the surface to have rolled down the hillsides on the Adjacent Property into the gullies leading from the EOD Training Ranges (Figure 2-1).

2.1.5 National Priorities List Status

IRP Site 1: the EOD Training Range is on the NPL with the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) EPA Identification Number CA6170023208. The Site is under the regulatory oversight of the EPA, RWQCB, and the DTSC. Former MCAS El Toro was placed on the NPL of Superfund Program sites on February 15, 1990. The alternative evaluation process for the MEC-impacted soil at IRP Site 1 started in 2002 with the MEC Range Evaluation (Earth Tech 2006). Previous investigations at IRP Site 1 are described in Sections 2.1.1, 2.1.3, and 2.2.1.

2.1.6 Maps, Pictures, and Other Graphic Representations

Figures 1-1 and 1-2 present the location of IRP Site 1 and the vicinity, and the location of the main areas within IRP Site 1. Figure 1-3 presents the relationship between munitions terms. Figure 2-1 presents the surface hydrology of IRP Site 1 and Figure 2-2 presents the naphthalene-soil removal design for the Northern EOD Training Range. Figures 3-1 and 3-2 present the CSM for the EOD Training Range and Adjacent Property. Figures 5-1 and 5-2 present the TCRA approach for the

EOD Training Range and Adjacent Property, respectively. Figure 5-3 presents the project schedule.

2.2 OTHER ACTIONS TO DATE

As noted previously, there have been several characterization activities for IRP Site 1 and a TCRA in 2010 (AECOM 2011) on the Adjacent Property. There is a current TCRA action planned for the naphthalene-impacted soil at the EOD Training Range and the MEC-impacted soil in the Adjacent Property.

2.2.1 Previous Actions

Previous investigation activities and actions are described in Sections 2.1.1 and 2.1.3. Site characterizations and the 2010 TCRA have been conducted at IRP Site 1 (EOD Training Range and the Adjacent Property). A listing of other studies is provided below from the FS (AECOM 2014).

- Phase I RI (JEG 1993) – Initial assessment of the nature and extent of contamination at IRP Site 1.
- Station-wide Perchlorate Evaluation (BNI 1999) – Investigation of the extent of Station-wide groundwater perchlorate concentrations, including IRP Site 1 groundwater.
- Verification of Perchlorate at IRP Site 1 (Earth Tech 2001) –Investigation to verify the presence of perchlorate at IRP Site 1.
- MEC Range Evaluation (Earth Tech 2006) – Conducted to evaluate explosives safety hazards at IRP Site 1 due to remnant MEC items originating from historical EOD training.
- Historical Radiological Assessment (Weston 2000) – Assessment of potential, likely, or known sources of radioactive material and radioactive contamination at former MCAS El Toro, including IRP Site 1.
- Radiological Scan Surveys and Soil Sampling (Weston 2006) – Conducted to evaluate whether Radium (Ra)-226 was released at IRP Site 1.
- Phase II RI (Earth Tech 2006) – Supplemental characterization of the physical attributes of IRP Site 1, evaluation of the nature and extent of contamination, and assessment of risk to human-health and the environment.
- Aquifer Characterization and Bench-Scale Treatability Testing (ECS 2006) – Investigation of hydrologic characteristics of IRP Site 1 and feasibility evaluation of perchlorate treatment in groundwater.
- Groundwater monitoring and evaluation for petroleum hydrocarbons (Earth Tech 2008) – Conducted from November to December 2007 for monitoring wells adjacent to and downgradient from locations where total petroleum hydrocarbons (TPH) were reported in the vadose zone soil to evaluate whether TPH in soil was impairing groundwater quality.

- Munitions Characterization (Earth Tech 2009) – Conducted in 2008 to further verify previous conclusions areas with coastal sage scrub that were inaccessible for munitions characterization in 2002 contained predominantly MD. The characterization activities included investigation of 106 anomalies and recovery of 25 MEC items. Only 1 of the 106 anomalies exceeded a depth of 12 inches bgs. Additionally, soil-filled ammunition cans located in the eastern portion of the Site were characterized for MEC, as well as a 55-gallon drum containing items recovered during the 2002 MEC Range Evaluation (Earth Tech 2006).

- TCRA (AECOM 2011) – Conducted in 2010 to address potential explosive safety hazards on the Adjacent Property.

2.2.2 Current Actions

The selected action for the Adjacent Property, as described in this Action Memorandum, is the final action for the Adjacent Property. The selected action for naphthalene-impacted area at the EOD Training Range will reduce the overall risk at this location but will likely require the implementation of institutional controls (ICs). There is the potential for additional actions at the EOD Training Range if the site-specific risk reduction goal is not met and/or the current land use changes.

2.3 REGULATORY AUTHORITIES' ROLES

Former MCAS El Toro is on the NPL list; therefore, EPA Region 9 is the lead federal regulatory agency for IRP Site 1. The lead regulatory oversight agency for the state is the DTSC. Additionally, the RWQCB Santa Ana Region plays an active role in decision-making for various sites at former MCAS El Toro.

2.3.1 Regulatory Agency Actions to Date

The EPA, DTSC, and RWQCB Santa Ana Region have provided technical advice, oversight, and assistance during various CERCLA investigations at IRP Site 1, including the Phase I and II RIs, FS preparation, and munitions characterization. The regulatory agencies have concurred with the findings presented in the Phase II RI report, and have reviewed the Draft FS Report, the Draft Final FS Report, and the Revised Draft Final FS Report for vadose zone soil. The regulatory agency representatives have and will continue to actively participate in regularly scheduled meetings regarding IRP Site 1.

2.3.1.1 Coordination Pertaining to RCRA Post-Closure Requirements

The DTSC maintains that the DON operated an open burn/open detonation facility within the IRP Site 1 investigation area, and therefore, DTSC maintains that Resource Conservation Recovery Act (RCRA) closure and post-closure requirements apply to the open burn/open detonation facility. The DON used munitions at the EOD Training Range for their intended purpose,

including the training of military personnel and explosives and emergency response specialists, and such training is neither waste treatment nor disposal. Therefore, the DON maintains that activities conducted at the EOD Training Range were not regulated under RCRA. The positions of the DON and DTSC have been recorded in the CERCLA documentation for IRP Site 1, including the Phase II RI Work Plan, the Phase II RI, and the Revised Draft Final FS (AECOM 2014) for the vadose zone. To facilitate resolution of the differing positions, the DON indicated that it would incorporate the substantive provisions of the State's RCRA closure and post-closure requirements into the CERCLA-related documentation for IRP Site 1. More details on this issue are presented in the discussion of Applicable or Relevant and Appropriate Requirements (ARARs) (Section 5.4).

2.3.2 Potential for Continued Regulatory Agency Response

The EPA, DTSC, and the RWQCB will provide technical advice and oversight and assistance during this TCRA and will continue to do so throughout the IRP process. It is expected that the DON's Defense Environmental Restoration Account funds will continue to be the exclusive source of funding for this program.

1 INCH = 300 FEET
(SCALE AT 11" X 17")
SCALE IN FEET
0 150 300
NAD 1983 STATEPLANE CALIFORNIA VI FIPS 0406 FEET

NOTES:
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ACRONYMS:
EOD = Explosive Ordnance Disposal
IRP = Installation Restoration Program
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PREPARED BY:
TETRA TECH EC, INC.
DESIGNED BY: J.DAHODA

TITLE:
ACTION MEMORANDUM: IRP SITE 1
SURFACE HYDROLOGY

A REVISION

PROJECT: FMCAS EL TORO
RD RA IRP SITE 1

PROJECT NO.: 106-45490011

FIGURE: Figure 2-1

LOCATION: EL TORO, CALIFORNIA

DATE: 10/17/2016

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TRENCH 34	
LE181, 2 ft bgs	
TOTAL XYLENES	98,000 µg/Kg
NAPHTHALENE	128,000 µg/Kg
TPH AS MOTOR OILS	ND
TPH AS DIESEL	37,000 mg/Kg
TPH AS GASOLINE	1,600 J mg/Kg
LE182, 6 ft bgs	
TOTAL XYLENES	5,400 J µg/Kg
NAPHTHALENE	9,900 µg/Kg
TPH AS MOTOR OILS	ND
TPH AS DIESEL	3,700 mg/Kg
TPH AS GASOLINE	250 J mg/Kg
LE183/LE184, 10 ft bgs	
TOTAL XYLENES	3,000 J/1,500 J µg/Kg
NAPHTHALENE	16,000/10,000 µg/Kg
TPH AS MOTOR OILS	ND/ND
TPH AS DIESEL	4,600/4,900 mg/Kg
TPH AS GASOLINE	220 J/170 J mg/Kg

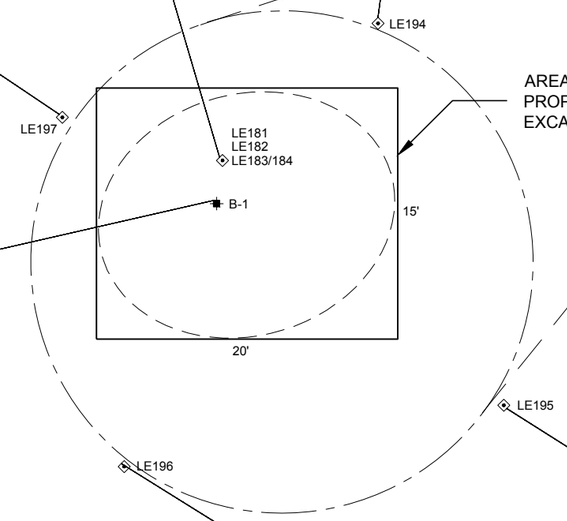
TRENCH 34W, LE197, 8 ft bgs	
TOTAL XYLENES	ND
TPH AS MOTOR OILS	6 J mg/Kg
TPH AS DIESEL	ND
TPH AS GASOLINE	ND

NOTE: NAPHTHALENE NOT ANALYZED IN THIS SAMPLE. TPH RESULTS USED AS A SURROGATE FOR EVALUATION.

TRENCH 34N, LE194, 3 ft bgs	
TOTAL XYLENES	ND
TPH AS MOTOR OILS	6 J mg/Kg
TPH AS DIESEL	ND
TPH AS GASOLINE	ND

NOTE: NAPHTHALENE NOT ANALYZED IN THIS SAMPLE. TPH RESULTS USED AS A SURROGATE FOR EVALUATION.

BOREHOLE B-1	
LE207, 5 ft bgs	
TOTAL XYLENES	5,400 µg/Kg
NAPHTHALENE	31,700 µg/Kg
TPH AS MOTOR OILS	ND
TPH AS DIESEL	12,000 mg/Kg
TPH AS GASOLINE	140 J mg/Kg
LE208, 10 ft bgs	
TOTAL XYLENES	2,800 J µg/Kg
NAPHTHALENE	13,000 µg/Kg
TPH AS MOTOR OILS	ND
TPH AS DIESEL	8,800 mg/Kg
TPH AS GASOLINE	530 J mg/Kg
LE209/LE210, 15 ft bgs	
TOTAL XYLENES	830 J/1,200 J µg/Kg
NAPHTHALENE	14,000 J/19,000 J µg/Kg
TPH AS MOTOR OILS	ND/ND
TPH AS DIESEL	4,300/11,000 mg/Kg
TPH AS GASOLINE	240 J/330 J mg/Kg
LE211, 20 ft bgs	
TOTAL XYLENES	17,000 J µg/Kg
NAPHTHALENE	46,000 µg/Kg
TPH AS MOTOR OILS	ND
TPH AS DIESEL	19,000 mg/Kg
TPH AS GASOLINE	710 J mg/Kg
LE212, 25 ft bgs	
TOTAL XYLENES	ND
NAPHTHALENE	ND
TPH AS MOTOR OILS	ND
TPH AS DIESEL	6J mg/Kg
TPH AS GASOLINE	ND
LE213, 30 ft bgs	
TOTAL XYLENES	ND
NAPHTHALENE	ND
TPH AS MOTOR OILS	ND
TPH AS DIESEL	4 J mg/Kg
TPH AS GASOLINE	0.03 J mg/Kg
LE214, 35 ft bgs	
TOTAL XYLENES	ND
NAPHTHALENE	28 J µg/Kg
TPH AS MOTOR OILS	ND
TPH AS DIESEL	5 J mg/Kg
TPH AS GASOLINE	0.03 J mg/Kg



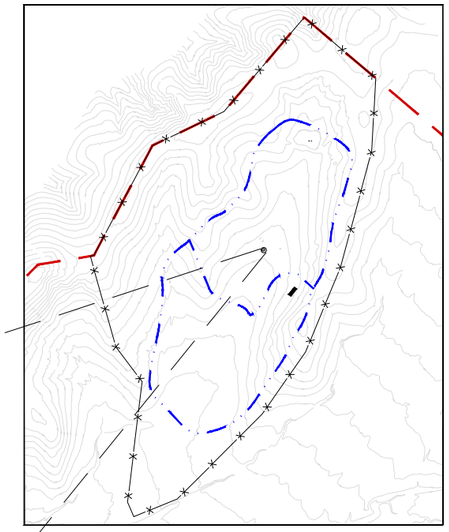
TRENCH 33, LE177, 3 ft bgs	
TOTAL XYLENES	ND
NAPHTHALENE	ND
TPH AS MOTOR OILS	67 mg/Kg
TPH AS DIESEL	324 mg/Kg
TPH AS GASOLINE	ND

TRENCH 34S, LE196, 8 ft bgs	
TOTAL XYLENES	ND
TPH AS MOTOR OILS	6 J mg/Kg
TPH AS DIESEL	ND
TPH AS GASOLINE	ND

NOTE: NAPHTHALENE NOT ANALYZED IN THIS SAMPLE. TPH RESULTS USED AS A SURROGATE FOR EVALUATION.

TRENCH 34E, LE195, 6 ft bgs	
TOTAL XYLENES	ND
TPH AS MOTOR OILS	10 J mg/Kg
TPH AS DIESEL	ND
TPH AS GASOLINE	ND

NOTE: NAPHTHALENE NOT ANALYZED IN THIS SAMPLE. TPH RESULTS USED AS A SURROGATE FOR EVALUATION.



IRP SITE 1
(EOD Training Range)

01-MW222

NORTH

0 5 10 FEET

SCALE: 1"= 10'

01-MW204

Legend:

- 01-MW222 — GROUNDWATER MONITORING WELL
- B-1 — DEEP SOIL BORING
- LE158 — SOIL SAMPLE COLLECTED AT THE SITE OF MEC INVESTIGATION TRENCH/POTHOLE
- ESTIMATED AREA OF NAPHTHALENE-DRIVEN SOIL EXCAVATION
- TENTATIVE BOUNDARY FOR IMPLEMENTATION OF INSTITUTIONAL CONTROLS FOR NAPHTHALENE-IMPACTED SOIL
- FORMER MCAS EL TORO BOUNDARY
- EOD TRAINING RANGE PERIMETER FENCE
- EOD TRAINING RANGE BOUNDARIES
- ELEVATION CONTOUR

SAMPLE LOCATION, I.D., AND DEPTH

TRENCH 34, LE181, 2 ft bgs	
NAPHTHALENE	128,000 µg/Kg

ANALYTE NAME — CONCENTRATION

NAPHTHALENE VALUE (µg/Kg)	
SITE-SPECIFIC RESIDENTIAL PRG	8,100

ACRONYMS:

- µg/Kg = MICROGRAMS PER KILOGRAM
- mg/Kg = MILLIGRAMS PER KILOGRAM
- J = VALIDATION QUALIFIER INDICATING THE CONCENTRATION IS AN ESTIMATED VALUE
- ND = NOT DETECTED
- bgs = BELOW GROUND SURFACE
- EOD = EXPLOSIVE ORDNANCE DISPOSAL
- FT = FEET
- I.D. = IDENTIFICATION
- IRP = INSTALLATION RESTORATION PROGRAM
- PRD = PRELIMINARY REMEDIATION GOAL
- RSL = REGIONAL SCREENING LEVEL
- MCAS = MARINE CORPS AIR STATION
- TPH = TOTAL PETROLEUM HYDROCARBONS
- TCRA = TIME-CRITICAL REMOVAL ACTION

NOTES

PREPARED BY:

TETRA TECH EC, INC.

DESIGNED BY: J.SNYDER

ACTION MEMORANDUM: IRP SITE 1
NAPHTHALENE-IMPACTED SOIL DESIGN

A REVISION

Project: MCAS EL TORO IRP SITE 1 | Project no.: 106-45490011 | FIGURE: FIGURE 2-2

Location: EL TORO, CALIFORNIA | Date: 10/17/2016

(tts153fs11) P:\NAVFAC - Naval Facilities Engineering Command\NAVFAC SW RAC 6\Former MCAS-El Toro, CA\CAD\Figures\Fig2-2_IRP-Site1_ActMem_WP_NaphthaleneSoil.dwg, JEREMY SNYDER, 10/17/2016 10:15 AM, ----

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3. THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

The following factors, identified in 40 CFR §300.415(b)(2), were considered in evaluating the potential or actual threats to public health or welfare due to releases into the environment, and in determining the appropriateness of a TCRA at IRP Site 1 (EOD Training Range and the Adjacent Property):

1. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants or contaminants;

2. Actual or potential contamination of drinking water supplies or sensitive ecosystems;

3. Hazardous substances or pollutants or contaminants in drums, barrels, tanks or other bulk storage containers, that may pose a threat of release;

4. High levels of hazardous substances or pollutants or contaminants in soil largely at or near the surface that can migrate or be released;

5. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

6. Threat of fire or explosion;

7. The availability of other appropriate federal or state response mechanisms to respond to the release; and

8. Other situations or factors that may pose threats to public health or welfare or the environment.

Several of the above factors apply to conditions at IRP Site 1 and are further discussed in the subsections below. A human-health screening risk assessment for the EOD Training Range was prepared as part of the Phase II RI to evaluate potential impacts to human health from the chemicals of concern in soil, primarily naphthalene (Earth Tech 2006). The risk assessment methodologies and results are presented in that report. A brief summary of the soil assessment risk on the EOD Training Range and hazard assessments for the EOD Training Range and the Adjacent Property are presented in the following sections.

3.1 THREATS TO PUBLIC HEALTH AND WELFARE

EOD Training Range: Three of the above factors would apply to the conditions at the EOD Training Range relevant to the naphthalene-impacted soil area. The potential of human exposure

to naphthalene and the potential for migration of the naphthalene would be mitigated by a response action that would meet the site-specific risk reduction goals.

Adjacent Property: Three of the above factors apply to conditions on the Adjacent Property. Given the human exposure to MEC/MPPEH items at the Adjacent Property, a response action that eliminates or minimizes the explosive safety hazard is required.

3.1.1 Actual or Potential Exposure to Nearby Human Populations from Hazardous Substances, Pollutants, or Contaminants

EOD Training Range: Naphthalene-impacted soil could be contacted by receptors including maintenance personnel, trespassers, FBI training personnel, construction and utility workers exposing them to a cancer risk as described in the CSM (Section 3.3).

Adjacent Property: People legally or illegally traversing the area could come in contact with MEC/MPPEH items potentially present within the Adjacent Property. The mishandling of MEC items could lead to unintentional detonation, which could result in exposure to the individual causing the detonation and/or exposure of those nearby to the resulting overpressure and/or fragmentation hazards. Therefore, MEC/MPPEH items may present explosive safety risk to nearby populations.

3.1.1.1 High Levels of Hazardous Substances or Pollutants or Contaminants in Soil Largely at or Near the Surface that can Migrate or be Released

EOD Training Range: There is potential for exposure to naphthalene through the vapor pathway, which could cause a cancer risk (see Section 3.3).

3.1.2 Threat of Fire or Explosion

Adjacent Property: Accidental human contact of the MEC potentially present within the Adjacent Property could cause the MEC to detonate, causing a fire or explosion.

3.1.3 Weather Conditions That May Cause Hazardous Substances or Contaminants to Migrate or be Released

EOD Training Range: There is potential for the naphthalene to migrate from the currently characterized area.

Adjacent Property: Erosion could cause some MEC/MPPEH items that were initially deposited in the near-surface soil as kick-outs to be exposed and migrate to lower elevations. This erosion could potentially cause the items to be more accessible for human contact if in Agua Chinon Wash, potentially increasing explosive safety risk, and a potential for fire or explosion.

3.2 THREATS TO THE ENVIRONMENT

EOD Training Range: There is a potential for the naphthalene-impacted soil to migrate to sensitive habitat.

Adjacent Property: Accidental human contact with the MEC potentially present within the Adjacent Property could cause the MEC to detonate, causing a fire or explosion.

3.3 CONCEPTUAL SITE MODEL

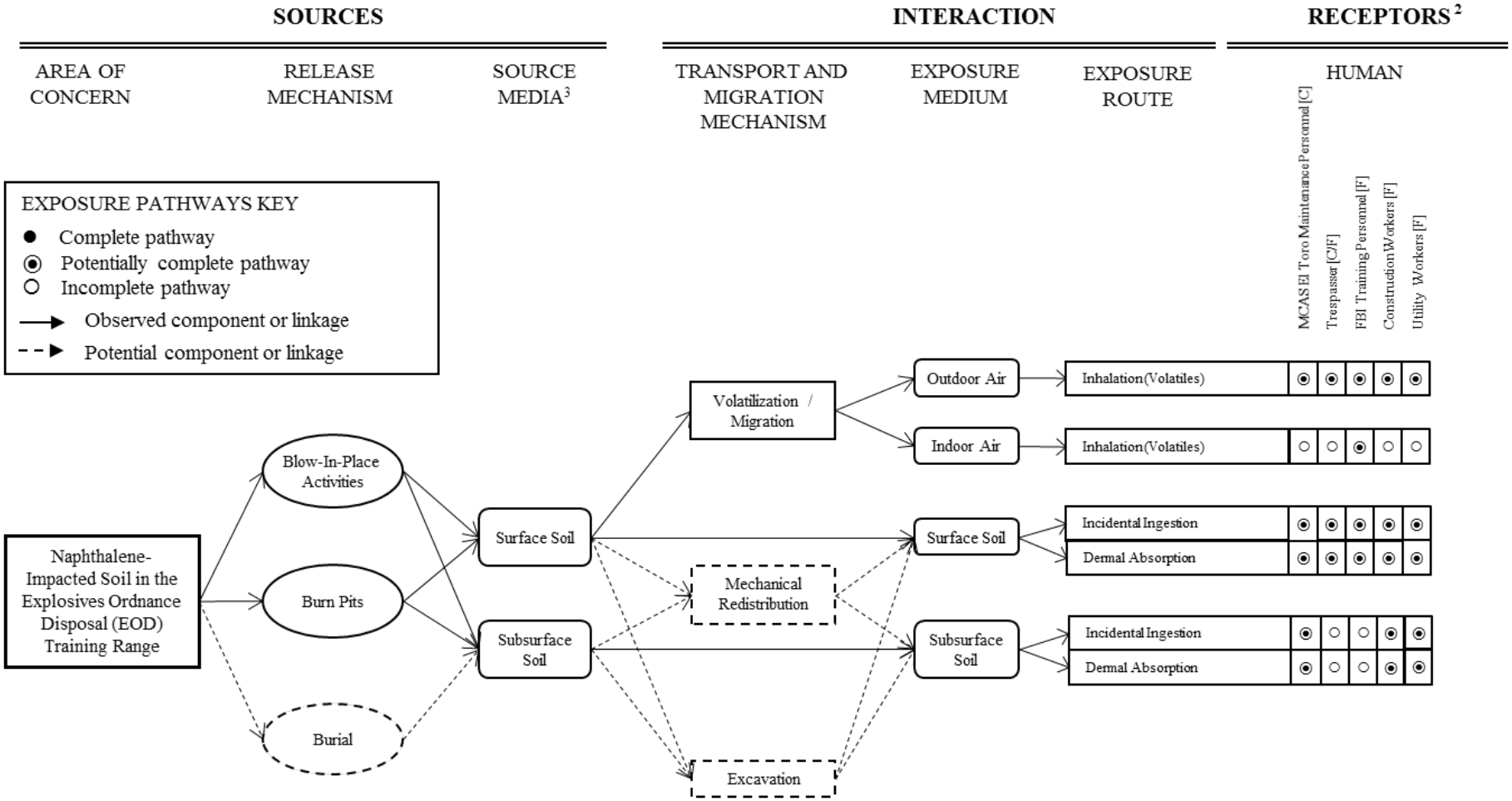
3.3.1 IRP Site 1 (EOD Training Range) CSM

A CSM was developed for IRP Site 1 that summarizes:

- physical characteristics of the site
- mechanisms of potential contaminant release
- environmental media (e.g., soil) potentially affected by the release
- fate and transport of chemicals or constituents of potential concern
- nature and distribution of these chemicals or constituents at locations of potential exposure
- exposure pathways at work at the site
- receptors potentially exposed to the chemicals or constituents of potential concern

The CSM for the EOD Range is provided on Figure 3-1. The CSM facilitated the assessment of the potential risks to human health and the environment and guided the development and evaluation of appropriate response alternatives designed to prevent or mitigate exposures and risks. The development of the CSM and subsequent analysis resulted in a focus on the naphthalene-impacted soil that was found to be present in the Northern EOD Training Range. This area of approximately 300 square feet was the only portion of this training range that was assessed and shown to be associated with any potential risk to human health, as discussed in the Phase II RI (Earth Tech 2006) and the FS (AECOM 2014). Munitions-related training activities that were conducted in this area were the sources leading to the naphthalene-impacted surface and subsurface soil. In addition, naphthalene may volatize and migrate upward as soil vapor through the soil due to diffusion, convection or along preferential pathways. This migrating vapor could then be released into the ambient (outdoor) air or intrude into an enclosed structure that potentially could be built on or near the naphthalene-impacted soil area. If a new building is constructed at this location, the future FBI training personnel working within it may be exposed to contamination via the inhalation of indoor air impacted by vapor intrusion. All potential receptors, with the exception of the trespasser, also may potentially be exposed to the subsurface soil during normal activities via incidental ingestion and dermal absorption. All other exposure pathways are considered to be incomplete based on the results and findings of previous investigations and sampling.

Figure 3-1. Conceptual Site Model for Naphthalene-Impacted Soil[1] at the EOD Training Range IRP Site 1



NOTES:

(1) The Phase II RI investigations indicated surface and subsurface soil contamination that would constitute a potential risk to human health at this Site is limited to an approximately 300 square foot area located in the center of the EOD Training Range. Naphthalene and TPH are the primary risk drivers.

(2) [C] = Current Receptor; [F] = Potential Future Receptor

(3) The Phase II RI investigations indicated that there was no contamination present in the surface water or sediment that would constitute a potential risk to human health, and no ecological or radiological risk was indicated to be present at the EOD Training Range.

A human health risk assessment was performed in accordance with the exposure framework provided by this CSM during the 2006 Phase II RI (Earth Tech 2006). The results of the human-health risk assessment showed that the incremental excess lifetime cancer risk for the subsurface soil (0 to 10 feet bgs) for all complete exposure pathways was within the NCP-defined risk management range of 10^{-6} to 10^{-4}. The noncancer hazard index (HI) for the subsurface soil (0 to 10 feet bgs) for all complete exposure pathways exceeded the target HI of 1, with naphthalene in indoor air due to potential vapor intrusion contributing a pathway-specific hazard quotient (HQ) of 15.8 and being the main contributor to the total naphthalene HI. As a result, the FS for IRP Site 1 identified naphthalene as a soil chemical of concern and included an evaluation of alternatives that would address the noncarcinogenic risks posed by the naphthalene-impacted soil in the central portion of IRP Site 1.

A site-specific PRG for naphthalene for the indoor pathway was computed as part of the FS using the Johnson and Ettinger (J&E) model for vapor intrusion. The PRG calculations applied site-specific parameters and toxicity values that were consistent with the 2006 Phase II RI, except that an updated inhalation unit risk factor of 3.4×10^{-5} micrograms per cubic meter ($\mu g/m^3$) was used to be consistent with the value that was being used by California EPA and referenced in the 2012 Regional Screening Levels (RSLs) tables. Based on these calculations, the site-specific PRG for naphthalene for the indoor air pathway is 8,100 µg/kg for the non-carcinogenic end point. This PRG also equated to an HQ of 1 for all complete soil exposure pathways (not just vapor intrusion) and had a corresponding carcinogenic risk of 4×10^{-5} (which was within the risk management range).

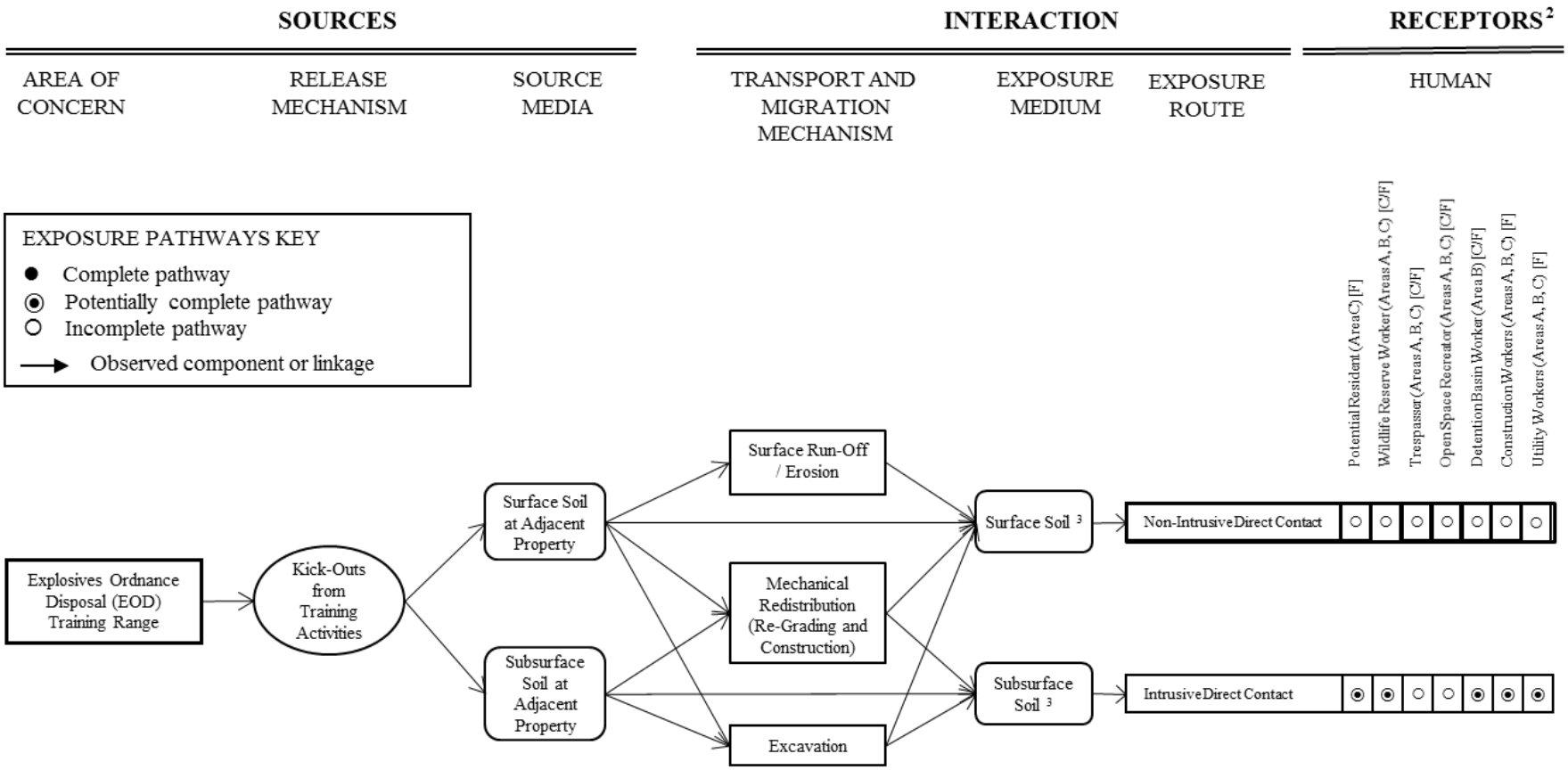
The site-specific residential PRG for the inhalation of vapors associated with the indoor air exposure pathway for naphthalene present in soil at IRP Site 1 was determined to be consistent with the RAO that was developed for the remediation of naphthalene-impacted soil at the EOD Training Range at IRP Site 1 for its unlimited use and unrestricted exposure:

- *Reduce the potential for exposure to naphthalene-impacted soil that would result in unacceptable risks to future receptors at IRP Site 1.*

3.3.2 Adjacent Property CSM and MEC Hazard Assessment

The CSM for the Adjacent Property is provided on Figure 3-2. Future residents and workers could come into contact with MPPEH (including MEC) potentially present within the Adjacent Property. The mishandling of MEC or MPPEH could lead to unintentional detonation; this would pose risk to the individual who caused the detonation as well as others nearby, who could be exposed to high pressure or munitions fragments caused by the detonation. Therefore, remaining MPPEH

Figure 3-2. Conceptual Site Model for MEC at the Adjacent Property[1]
IRP Site 1



NOTES:

(1) The Adjacent Property is divided into three areas: Area A (immediately adjacent and west of the Training Range), Area B (extending westward from the western boundary of Area A and comprising the Agua Chinon Wash Detention Basin and a steep slope northeast of the Agua Chinon Wash), and Area C (located west of the northern half of the Agua Chinon Wash.

(2) [C] = Current Receptor; [F] = Potential Future Receptor

(3) A comprehensive surface clearance and subsurface clearance to 12 inches depth in some locations and to 18 inches depth in others were performed during the 2010 TCRA. As a result, surface soil exposure pathways are designated as "Incomplete" to reflect the cleared surface soil, and subsurface soil exposure pathways are indicated as "Potentially Complete" to reflect the possibility that additional MEC items may be present in the soil where clearance to 18 inches was not completed during the TCRA.

may present an explosive safety risk during planned grading operations and future receptors on the Adjacent Property. Shallow grading operations include the use of earth moving machinery (e.g., bulldozers, excavators or soil scrapers) to alter the original topography to facilitate the construction for residential use.

The MEC hazard assessment (HA) methodology was also used to evaluate a baseline hazard score for MEC-impacted soil (post-2010 TCRA activities) at the Adjacent Property. The baseline hazard score was determined to be 435 (Hazard Category 4, the lowest of the four categories). This baseline score represents the post-TCRA MEC hazard; the pre-TCRA score was 675. The TCRA significantly reduced the MEC hazard on the property, as shown by a comparison of the pre-TCRA and post-TCRA MEC HA results. Although the MEC hazard score was reduced, the previous TCRA did not meet the future residential land use requirements.

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4. ENDANGERMENT DETERMINATION AND PROJECT CLEANUP LEVELS

The RI results (Earth Tech 2006) and the 2010 TCRA (AECOM 2011) confirmed that the actual or threatened releases of hazardous substances and contaminants from IRP Site 1 may present an imminent and substantial endangerment to public health, welfare, or the environment due to the presence of MEC and naphthalene within the project area. The 2010 TCRA did not meet the future residential land use requirements. If the 2016 TCRA is not performed, construction workers and future residents would be exposed to hazards from potential remaining MEC at the Adjacent Property, posing a potentially unacceptable hazard.

Naphthalene-impacted soil at the EOD Training Range will be excavated and disposed of off-site. The excavation will comply with the conceptual design that was presented in the FS (AECOM 2014). (See Section 3.3.1.) Figure 2-2 presents the naphthalene-soil removal design for the Northern EOD Training Range. For this project, samples will be collected within excavation sidewalls and results will be used to confirm naphthalene concentrations are below the site-specific risk reduction goal of 8,100 µg/kg from the FS (AECOM 2014). Soil cleanup levels, or project action limits (PALs), are based on available human health, environmental, and ecological screening levels developed by the EPA, DTSC, and the RWQCB. The methods for calculating the site-specific residential PRG for naphthalene of 8,100 µg/kg (based on an HQ of 1) are presented in Appendix G of the FS (AECOM 2014). .

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5. SELECTED ACTIONS AND ESTIMATED COSTS

This section summarizes the selected actions for the site. It also discusses ARARs, the project schedule, and the estimated costs. Under CERCLA, the DON's primary responsibility is to undertake removal actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected actions must comply with ARARs, unless a statutory waiver is justified. The selected actions also must be cost-effective and use permanent solutions and alternative treatment technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that, as their principal element, permanently and significantly reduce the volume, toxicity, or mobility of a waste. The following subsections summarize how the selected actions provided by this TCRA will meet these statutory requirements and preferences.

5.1 SELECTED ACTIONS

This section describes the selected actions that were evaluated in the FS (the latest version currently under revision) to address potential risks (EOD Training Range) and hazards (Adjacent Property) to human health and the environment. Other alternative technologies that were evaluated but not selected are covered in Section 5.3. A discussion of ARARs is included in Section 5.4, the proposed project schedule is summarized in Section 5.5, and estimated project costs are covered in Section 5.6.

5.1.1 Selected Action for the Naphthalene-Impacted Soil at the EOD Training Range

The potential risk to human health and the environment due to exposure to naphthalene in soil at the Northern EOD Training Ranges (near Boring B-1) is the basis for this TCRA. The DON has developed the following remedial action objective (RAO) from the FS (AECOM 2011) to address the risk to human health and the environment from naphthalene impacted site soils:

- *Reduce the potential for exposure to naphthalene-impacted soil that would result in unacceptable risks to potential future receptors at the Northern EOD Training Range.*

Alternative N-3 includes the excavation of naphthalene-impacted soil near Borehole B-1 to meet the site-specific risk reduction goal for both human and ecological receptors. The risk to potential receptors is from naphthalene-impacted soil with concentrations above the site-specific risk reduction goal level of 8,100 µg/kg located between 0 and 10 feet bgs. The soil excavation will therefore extend to 10 feet bgs and extend laterally until the site-specific action level is met (estimated 15 feet by 20 feet) as presented in Figure 5-1. The impacted soil will be transported for disposal at an appropriate off-site facility.

It is estimated that approximately 110 cubic yards of naphthalene-impacted soil will be excavated to a maximum depth of 10 feet bgs. Due to the potential for the presence of MEC in the excavated soil, excavation activities will be conducted using specialized armored equipment and under the supervision of UXO personnel trained in recognizing and handling munitions.

Confirmation soil samples will be collected from the sidewalls and bottoms of the excavated areas to confirm that soil exceeding the final site-specific risk reduction for naphthalene in the soil has been removed. If the sampling results confirm that the cleanup goal had been achieved, the excavated areas will be backfilled with clean soil or screened soil from the Adjacent Property. If confirmation sampling results show that the cleanup goal has not been attained, excavation will be expanded laterally but not vertically to greater than 10 feet bgs, and residual risks will be documented. In addition, ICs will be imposed to require an evaluation of vapor intrusion risks should future site use include human occupancy of structures.

After confirmation sampling results from sidewall samples confirm the site-specific risk reduction goal has been achieved, the excavated area will be backfilled with clean imported soil. Alternative N-3 will be the final action for naphthalene-impacted soil on the EOD Training Range if the cleanup goal has been met and the future site use remains the same as current use.

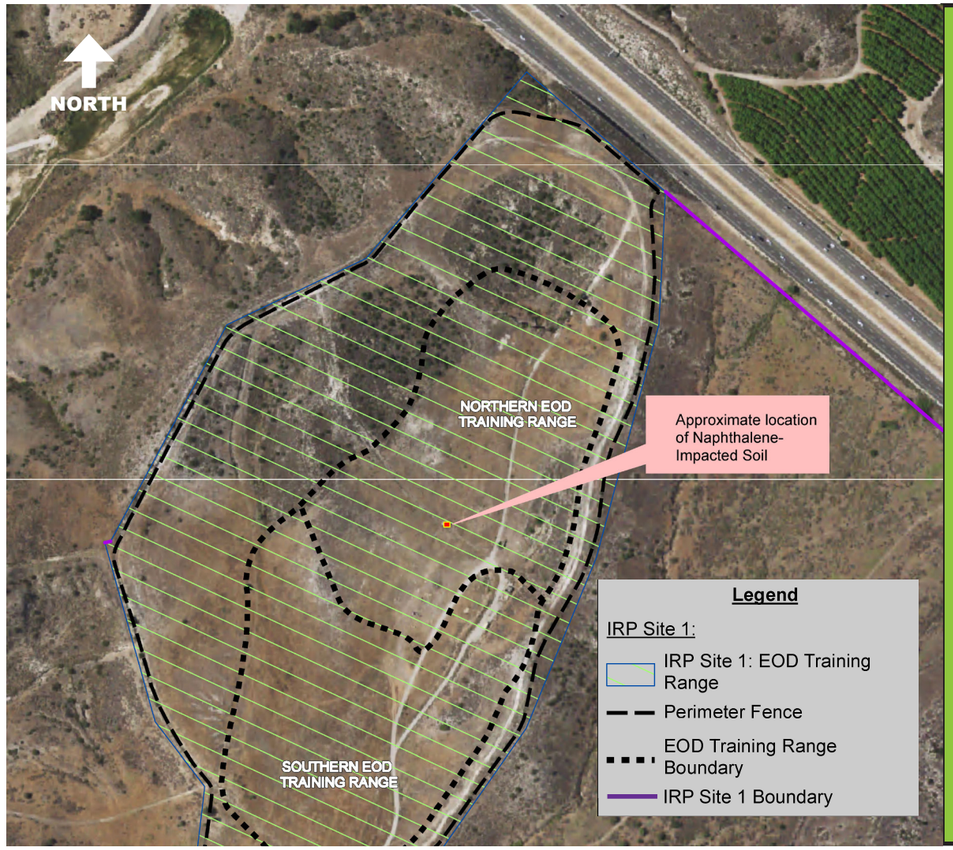
5.1.2 Selected Action for the MEC-Impacted Soil at the Adjacent Property

This TCRA is being performed to address potential risks and hazards to human health and the environment. The DON has developed the following RAO to address the risk to human health and the environment from site soils:

- *Reduce the potential for exposure to MPPEH that would result in unacceptable hazards to potential future receptors at the Adjacent Property.*

Under Alternative AP-4, removal of MPPEH resulting from kick-outs during range activities on the EOD Training Range would be conducted consistent with the residential reuse protocols within areas of the Adjacent Property surrounding the Agua Chinon Wash to the maximum depth that the MPPEH is encountered. Figure 5-2 summarizes the approach. Soil will be excavated to 12 inches bgs, the soil will be screened using mechanical sifting equipment, and a DGM survey will be conducted to identify any potential targets remaining below the 12-inch excavation depth. Identified targets will be intrusively investigated to depth. The excavation and mechanical screening of the top 12 inches of soil with varied screen sizes down to one-half inch provides a high level of confidence that any MPPEH in that soil profile will be identified and removed.

The DGM survey and intrusive investigation of individual targets of the remaining soil provides additional confidence that MPPEH in the soil profile will be identified and removed, based on the CSM. The potential for residual MEC contamination on the Adjacent Property was through kick-outs from range activities. The Adjacent Property was never owned or used by the DON



1 SITE History

Trench 34 was characterized during the Phase II Remedial Investigation → Risk assessment performed in the Feasibility Study → Feasibility Study developed a site-specific risk reduction goal (naphthalene) → Action Memorandum selected Alternative N-3: removal and off-site disposal of 110 cy of naphthalene - impacted soil

2 TECHNICAL APPROACH

Excavation of top 24 inches in 6-inch lift mag and dig each 6-inch lift prior to excavation → Spread and scan excavated material → Confirmation sampling (naphthalene) → Transport and off-site disposal → Backfill from approved source → Site restoration

ACRONYMS:
EOD = Explosive Ordnance Disposal
IRP = Installation Restoration Program

PREPARED BY: TETRA TECH EC, INC.

TITLE:
ACTION MEMORANDUM: IRP SITE 1
EOD TRAINING RANGE
TCRA APPROACH SUMMARY

PROJECT:	PROJECT NO.:	FIGURE:
MCAS EL TORO IRP SITE 1	106-45490011	**Figure 5-1**
PROJECT: EL TORO, CALIFORNIA	PROJECT: 10/12/2016	

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1 IRP SITE 1 - Historical Summary

1952-1999 Adjacent Property – MEC contamination due to kick-outs from EOD Training Range activities

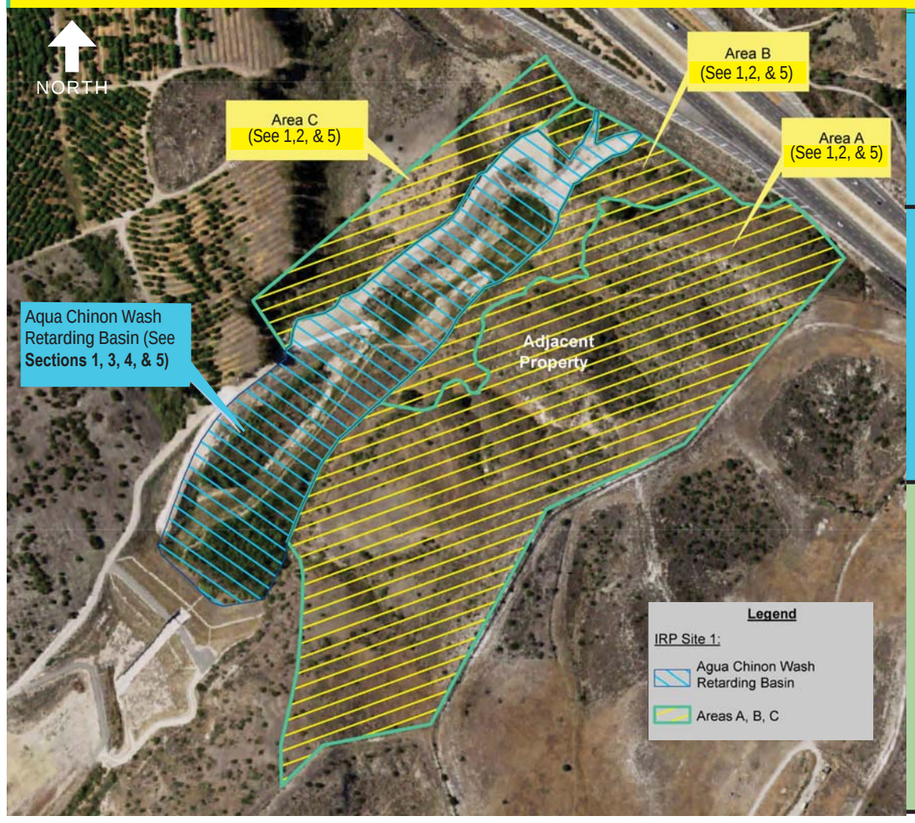
2008 MEC Characterization –106 anomalies **identified – 25 MEC items recovered**
1 item identified below 12 inches
(Less that 1% of total anomalies)

2010 TCRA – surface and subsurface clearance – 161 MEC items recovered – 98% of MEC between 0 to 12 inches depth
(only 1 item at 18 inches depth)

Conceptual Site Model – a majority of MEC has been removed; the release mechanism (kick-outs) resulted in **surface and shallow MPPEH; CSM has been validated through** previous characterization and removal activities

2 TECHNICAL APPROACH - Adjacent Property Areas A,B,C

Vegetation removal → Excavation of 12 inches of soil → **Mechanical screening and detector-aided scan of excavated soil** → QC/**QA** of **mechanical screening process** → DGM of excavated areas (100% coverage) → DGM data processing and preparation of target list → QA/QC of data and target list → Intrusive investigation of individual targets to depth → QA/QC of intrusive operations → **Backfill from approved source** → Site restoration



3 HISTORY - Aqua Chinon Retarding Basin

Constructed in 1998 → Entire area regraded → No reported munitions –related items → Minimal activity at the EOD range from 1998–1999 → **Routine maintenance performed in the area; e.g., excavation of accumulated sediment**

4 TECHNICAL APPROACH - Aqua Chinon Retarding Basin

Vegetation removal and surface clearance → 100% DGM coverage → DGM data processing QC of target lists → Intrusive investigation of individual targets to depth → QA/QC of intrusive operations → **Backfill from approved source** → Site restoration

5 CONTINGENCY APPROACH

It is anticipated that the **technical approaches will** provide clearance for the **adjacent property but in the event the above technical approaches cannot be** implemented in a small isolated area, one or more **of the following will be** applied:

Mechanical means – utilization of equipment as far up **slopes as possible** → Utilization of DGM surveys and intrusive investigations → Utilization of mag and dig operations → Visual inspection including photos and **review of photos for** potential impacts from EOD operations

ACRONYMS:
CSM = conceptual site model
DGM = digital geophysical mapping
EOD = Explosive Ordnance Disposal
MEC = munitions and explosives of concern
QA = quality assurance
QC = quality control
TCRA = Time Critical Removal Action

PREPARED BY: TETRA TECH EC, INC.

TITLE: ACTION MEMORANDUM: IRP SITE 1
ADJACENT PROPERTY
TCRA APPROACH SUMMARY

PROJECT:	PROJECT NO.:	FIGURE:
MCAS EL TORO IRP SITE 1	106-45490011	**Figure 5-2**
PROJECT: EL TORO, CALIFORNIA	PROJECT: 10/12/2016	

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for operations or training. Significant characterization has been conducted (105 of 106 anomalies investigated were within 12 inches of the surface). Surface and subsurface removals have been performed at the Adjacent Property, with only four MEC (2 percent of the total MEC recovered) found between 12 and 18 inches bgs. This indicates that a majority of MPPEH would be present within the top 12 inches; subsequent DGM survey in excavated areas and intrusive investigation of individual targets will address any potential MPPEH below 12 inches.

Any identified MPPEH will be removed and, as necessary, properly disposed of on-site by treatment using donor explosives in accordance with DoD policy and procedures. Due to the release mechanism and the shallow penetration depths of MPPEH (as validated during previous characterization and 2010 TCRA), it is believed that any potential MPPEH present on the steep slopes of Area A may have migrated downhill to the base of the gullies. These areas will receive significant focus. The excavation and geophysical surveys will be conducted consistent with upcoming 2016 TCRA Work Plan (currently in production with an anticipated release in mid-November 2016). Excavated and screened soil will be used to backfill and re-establish grade within the Adjacent Property.

Due to the limited range activity since the construction of the Agua Chinon Retarding Basin and the extensive intrusive activities and soil removal operations involved with the construction and maintenance of the Agua Chinon Retarding Basin, no initial excavation will be performed prior to the DGM survey. The Agua Chinon Wash will undergo a DGM survey followed by analog target investigation and removal.

If one of the methods presented above cannot be executed for an isolated area, the following method will be applied: 1) a mechanical method will be used to reach the area; 2) the area will be cleared using digital- or analog-assisted methods; and 3) a visual inspection will be conducted (including taking high resolution photos) to determine if there has been any impact from range activities.

If an MPPEH item is found near the boundary as described previously it will be determined by UXO-qualified personnel if the item is MDAS or if it must be handled as MEC. Once the category of the item is confirmed the CSM will be reviewed to determine if a modification to the technical approach in this area is required. The clearance area may expand beyond the project boundaries if a MDAS item is discovered within 50 feet or if a MEC item is found within 100 feet of the project boundary. A notification will be made to the Navy and stakeholders if this condition is met and prior to extending outside of the boundary. The step out would consist of a 100-foot x 100-foot grid centered upon the MDAS or MEC discovery location. The investigation of the step out grid would be in accordance with previously described methodology.

Care will be taken to protect potential endangered species during the field work (e.g., California gnatcatcher), and site restoration will be completed in accordance with the upcoming TCRA Work Plan. A one-time notification will be made to the current land owners (TIC and OCFCD).

The proposed field activities, including soil excavation, geophysical surveys, site restoration, and biological monitoring will be described in a TCRA Work Plan to be developed and submitted to the FFA signatories prior to implementation. Alternative AP-4 will be the final action for MEC-impacted soil in the Adjacent Property after all targets identified in the DGM data meeting the selection threshold are investigated and reduced below the millivolt selection threshold.

5.2 CONTRIBUTION TO REMEDIAL PERFORMANCE

5.2.1 Contribution to Remedial Performance Selected Action for the Naphthalene-Impacted Soil at the EOD Training Range

The planned TCRA is expected to achieve a comprehensive removal (to 10 feet bgs) and off-site disposal of naphthalene-impacted soil from the Northern EOD Training Range. At the completion of the project, ICs may be imposed that will require an evaluation of vapor intrusion risks, should future site use include human occupancy of structures.

5.2.2 Contribution to Remedial Performance Selected Action for the MEC-Impacted Soil at the Adjacent Property

The planned TCRA is expected to achieve a comprehensive removal and demilitarization of MPPEH. Therefore, the Adjacent Property will be suitable for unrestricted reuse and no land use controls due to munitions safety reasons will be necessary. At the completion of this TCRA, no further munitions response actions are anticipated to be required on the Adjacent Property.

5.3 DESCRIPTION OF ALTERNATIVE TECHNOLOGIES

5.3.1 Description of Alternative Technologies for the Naphthalene-Impacted Soil at the EOD Training Range

The following three remedial action alternatives were evaluated as part of the preparation of this TCRA Action Memorandum with a summary of the evaluation provided in Table 5-1:

- Alternative N-1: No Action
- Alternative N-2: ICs and Access Restrictions
- Alternative N-3: Excavation and Off-Site Disposal of Naphthalene-Impacted Soil

The three remedial action alternatives are described below.

Alternative N-1: No Action

Including a No Action Alternative is required under the NCP (40 CFR § 300.430 [e][6]) to serve as a baseline condition for developing and evaluating other alternatives. Under the No Action Alternative, none of the general response actions, including ICs/access restrictions, in-situ treatment, ex-situ treatment, removal, or disposal would be implemented for naphthalene-impacted soil.

Table 5-1. Summary of Individual and Comparative Analysis of Alternatives – Naphthalene-Impacted Soil at the EOD Training Range

Criterion	Alternative N-1: No Action	Alternative N-2: ICs and Access Restrictions	Alternative N-3: Excavation and Off-Site Disposal of Naphthalene-Impacted Soil
Overall Protection of Human Health and the Environment	*Does not Meet the Criterion* Not protective of human-health and the environment. Does not achieve RAOs.	*Meets the Criterion* Provides protection to human health and the environment provided the ICs are implemented effectively. Does not reduce the potential for migration of naphthalene-impacted soil.	*Meets the Criterion* Provides protection to human health and the environment by removing the naphthalene-impacted soil from the site exceeding the site-specific risk reduction goal.
Compliance with ARARs	*Not Applicable* Since no action entails no remedial action, ARARs would not be triggered.	*Meets the Criterion* Complies with all the identified ARARs	*Meets the Criterion* Complies with all the identified ARARs.
Long-Term Effectiveness	*Poor* No change in site risk.	*Fair* ICs would include restrictions on activities that may lead to exposure of humans to naphthalene-impacted soil. However, there is potential for migration of naphthalene-impacted soil.	*Good* Impacted soil is removed from the site. Significantly reduces risk at the site and is considered permanent solution.
Reduction of Toxicity/Hazard, Mobility, and Volume Through Treatment	*Poor* No reduction in naphthalene toxicity, mobility, or volume in the EOD Training Range soil.	*Poor* No reduction in naphthalene toxicity, mobility, or volume in the EOD Training Range soil.	*Fair* Reduces mobility and volume of impacted soil by excavation and off-site transportation. Does not address toxicity.
Short-Term Effectiveness	Good No short-term effectiveness associated with this alternative since no remedial actions are performed.	*Good* No significant construction activity that exposes workers to naphthalene-impacted soil would be implemented.	*Fair* Activities including excavation, on-site temporary storage, and off-site transportation may expose workers to naphthalene-impacted soil.
Implementability	*Good* No implementability issues associated with this alternative since no actions are performed.	*Fair* ICs and access restrictions are relatively easily implementable.	*Poor* Excavation and off-site disposal activities would require significant effort and experienced crew because of the potential presence of MEC.
Cost ($)	*Not Applicable* No cost	*Good* $171,000	*Good* $255,000
State Acceptance	The State comments will be formally presented in the Proposed Plan and documented in the ROD.		
Community Acceptance	Community acceptance will be evaluated following the public comment period for the Proposed Plan and documented in the ROD.		

Source: AECOM 2014, and as updated in the latest version currently under revision.

Acronyms:

ARARs – applicable or relevant and appropriate requirements
IC – Institutional Controls
IRP – Installation Restoration Program
MEC – munitions and explosives of concern
RAOs – remedial action objectives
ROD – Record of Decision

Alternative N-2: ICs and Access Restrictions

Under Alternative N-2, ICs and/or access restrictions would be implemented to minimize the potential for exposure to naphthalene-impacted soil that would result in risks to human health. The ICs would include land use restrictions (e.g., prevent digging) in an area surrounding the naphthalene-impacted soil to limit potential exposure of future landowner(s) and/or user(s), and to maintain the integrity of physical controls used to restrict unauthorized access and/or use of the Site. Under this Alternative, 5-year reviews would be required.

Alternative N-3: Excavation and Off-Site Disposal of Naphthalene-Impacted Soil

Under Alternative N-3, naphthalene-impacted soil would be excavated from the central portion of the EOD Training Range, in the vicinity of Borehole B-1, and disposed at an appropriate off-station disposal facility. Since the naphthalene-impacted soil is collocated with MEC-impacted soil, the objective of the naphthalene remedial action would be risk reduction for both potential human health receptors. To achieve this objective, the naphthalene-impacted soil would be excavated vertically to a depth of 10 feet bgs and laterally until the site-specific risk reduction goal for naphthalene of 8,100 µg/kg has been achieved. Once sampling results confirm that the goal has been achieved, the excavated area would be backfilled with clean imported fill.

Additional soil sampling will be conducted as part of the pre-excavation activities to better define the lateral extent of naphthalene-impacted soil. Approximately 110 bank (in-place) cubic yards of naphthalene-impacted soil would be excavated to a maximum depth of approximately 10 feet bgs, since a residential receptor would be assumed to be potentially exposed to soil from 0 feet to 10 feet bgs. Due to the potential for the presence of MEC in soil, excavation activities would be conducted using specialized equipment and under the supervision of UXO personnel trained in recognizing and handling energized munitions. Confirmation soil samples would be collected from the sidewalls and bottoms of the excavated areas to confirm that soil exceeding the final site-specific risk reduction for naphthalene in soil had been removed. If the sampling results confirm that the cleanup goal had been achieved, the excavated areas would be backfilled with clean soil or screened soil from the Adjacent Property. If confirmation sampling results show that the cleanup goal has not been attained, excavation will be expanded laterally but not vertically to greater than 10 feet bgs, and residual risks will be documented.

5.3.2 Description of Alternative Technologies for the MEC-Impacted Soil at the Adjacent Property

The following four remedial action alternatives were evaluated as part of the preparation of this TCRA Action Memorandum with a summary of the evaluation provided in Table 5-2:

- Alternative AP-1: No Action
- Alternative AP-2: ICs (Notifications)
- Alternative AP-3: MEC Survey of Eight Remaining Acres and ICs (Notifications)
- Alternative AP-4: Comprehensive MEC Removal and Verification and ICs (Notifications)

Table 5-2. Summary of Individual and Comparative Analysis of Alternatives – MEC-Impacted Soil at the Adjacent Property

Criterion	Alternative AP-1: No Action	Alternative AP-2: ICs (Notifications)	Alternative AP-3: MEC Survey of Eight Remaining Acres and ICs (Notifications)	Alternative AP-4: Comprehensive MEC Removal and Verification and ICs (Notifications)
Overall Protection of Human Health and the Environment	*Does not Meet the Criterion* Alternative AP-1 (No Action) does not increase the awareness about the potential for encountering MEC on the Adjacent Property and does not trigger ARARs, and is therefore rated as not meeting this threshold criterion.	*Meets the Criterion* ICs (notifications) would protect human health by providing notifications to the property owner of the MEC hazards present at the Site, and will increase awareness about the MEC hazards.	*Meets the Criterion* Implementing this alternative will reduce site risks/hazards to a greater degree compared to Alternatives AP-1 and AP-2, but to a lesser degree than Alternative AP-4.	*Meets the Criterion* Implementing this alternative will reduce site risks/hazards to a greater degree compared to Alternatives AP-1, AP-2, and AP-3.
Compliance with ARARs	*Not Applicable* ARARs would not be triggered.	*Meets the Criterion* Complies with all identified ARARs.	*Meets the Criterion* Complies with all identified ARARs.	*Meets the Criterion* Complies with all identified ARARs.
Long-Term Effectiveness	*Poor* Hazard Category 4 – this is the lowest Hazard Category, assuming current and reasonably anticipated future uses.	*Fair* Effective implementation of ICs would ensure that Adjacent Property owners are aware of the potential for encountering munitions.	*Fair to Good* This alternative would potentially reduce the hazard to a greater degree as compared to Alternatives AP-1 and AP-2, but to a lesser degree than Alternative AP-4.	*Good* This alternative would potentially reduce the hazard to a greater degree as compared to Alternatives AP-1, AP-2, and AP-3.
Reduction of Toxicity/ Hazard, Mobility, and Volume Through Treatment	*Poor* No reduction in MEC hazards or volume in Adjacent Property soil.	*Poor* No reduction in MEC hazards, or volume in Adjacent Property soil.	*Fair* Alternative AP-3 would reduce MEC hazards or volume in Adjacent Property soil.	*Good* The extent of reduction in MEC toxicity/hazard, mobility, and/or volume in soil through removal/demilitarization is greater in case of Alternative AP-4 compared to Alternative AP-3.
Short-Term Effectiveness	*Good* Since no remedial action would be performed, short-term effectiveness associated with this alternative is good because no worker exposure is expected.	*Good* No construction activity that exposes workers to MEC-impacted soil would be implemented.	*Fair to Good* Excavation, sifting, backfilling, and demilitarization of MEC items may pose short-term risks to site-workers. However, adherence to standard health and safety procedures would minimize exposure of the workers.	*Fair* Soil excavation, sifting, backfilling, and MEC demilitarization activities performed as part of Alternative AP-4 would present short-term risks/hazards to site workers. Based on the qualitative SER analysis, Alternatives AP-1 and AP-2 provide better short-term effectiveness than Alternatives AP-3 and AP-4. Additionally, since the scope of remedial action activities is greater for Alternative AP-4 than Alternative AP-3, Alternative AP-3 provides better short-term effectiveness compared to Alternative AP-4. However, adherence to standard health and safety procedures would minimize exposure of the workers.

Table 5-2. Summary of Individual and Comparative Analysis of Alternatives – MEC-Impacted Soil at the Adjacent Property (continued)

Criterion	Alternative AP-1: No Action	Alternative AP-2: ICs (Notifications)	Alternative AP-3: MEC Survey of Eight Remaining Acres and ICs (Notifications)	Alternative AP-4: Comprehensive MEC Removal and Verification and ICs (Notifications)
Implementability	*Good* No implementability issues are associated with this alternative since no actions are performed.	*Fair to Good* ICs (notifications) will require coordination with Adjacent Property owners.	*Fair* Soil excavation, sifting, backfilling, and demilitarization of MEC would require significant effort and experienced crew.	*Fair to Poor* Soil excavation, sifting, backfilling, and demilitarization of MEC would require significant effort and experienced crew. Since the scope of remedial action activities is greater for Alternative AP-4 than Alternative AP-3, Alternative AP-3 is easier to implement compared to Alternative AP-4.
Cost ($)*	*Not Applicable* No cost	*Good* $125,000	*Fair* $629,000	*Poor* $7,574,000
State Acceptance	The State comments will be formally presented in the Proposed Plan and documented in the ROD.			
Community Acceptance	Community acceptance will be evaluated following the public comment period for the Proposed Plan and documented in the ROD.			

Source: AECOM 2014, and as updated in the latest version currently under revision.

Notes:

* The Alternative with the lowest present worth cost was rated as good.

Acronyms:

ARARs – applicable or relevant and appropriate requirements
ICs – Institutional Controls
MEC – munitions and explosives of concern
ROD – Record of Decision

Alternative AP-1: No Action

Including a No Action Alternative is required under the NCP (40 CFR § 300.430 [e][6]) to serve as a baseline condition for developing and evaluating the other alternatives. Under the No Action Alternative, none of the general response actions, including ICs and/or MPPEH removal, would be implemented, and the current status of the Site with respect to the MEC hazard would remain essentially unchanged (i.e., post-2010 TCRA) from the hazard now present at the Site (Hazard Category 4 – the lowest Hazard Category, assuming current and reasonably anticipated future uses).

Alternative AP-2: ICs (Notifications)

Under Alternative AP-2, no additional removal of MPPEH items would be performed and ICs (notifications) would be implemented by providing additional notification to the current land owners, TIC and the OCFCD, about the potential presence of MPPEH items at Areas A, B, C and the Agua Chinon Wash on the Adjacent Property. The notification would also state that the previously discovered MEC items (primarily 20mm projectiles) are kick-outs from EOD range activities conducted within the boundaries of the EOD Training Range, and therefore any MPPEH items on the Adjacent Property are anticipated to be found at or near the ground surface to a maximum depth of 18 inches. The MEC hazard would remain essentially unchanged (i.e., post-2010 TCRA) from the current hazard score now applicable at the Site (Hazard Category 4 – the lowest Hazard Category, assuming current and reasonably anticipated future uses).

The 2010 TCRA significantly reduced the MEC hazard on the property to the extent practicable. Although the MEC HA score for this Alternative is numerically equivalent to the post-2010 TCRA score (i.e., the baseline), the notifications to the property owners would provide additional awareness of the potential explosives safety hazards at the Site, and thus the hazard would be further reduced. This Alternative will not attain the same level of protection as DTSC's recommended residential protocol. Therefore, notifications to the property owners would provide additional awareness of the potential explosive hazards, and would thus reduce the potential for encountering munitions. As a result, 5-year reviews would be required.

Alternative AP-3: MEC Survey of Eight Remaining Acres and ICs (Notifications)

Under Alternative AP-3, an MEC survey, including DGM survey methods, would be conducted to the maximum extent practicable within the approximately 8 acres that were not investigated using geophysical equipment during the 2010 TCRA due to steep terrain or dense vegetation. Any remaining individual metallic anomalies present would be identified using handheld geophysical instruments. The metallic objects would be evaluated to determine their potential MEC hazard, prior to demilitarization and their transport off-site as metallic scrap. Under Alternative AP-3, identified MEC would be removed from the Adjacent Property to the extent practicable such that it does not result in unacceptable hazards to potential future human receptors. However, previously in Alternative AP-2, ICs (notifications) would be implemented by notifying the current land owners, TIC and the OCFCD, about the potential presence of MEC items at the Adjacent Property. This alternative would result in a clearance depth of up to 18 inches throughout the Adjacent Property, and would involve conducting 5-year reviews following the completion of the removal action.

Alternative AP-4: Comprehensive MEC Removal and Verification and ICs (Notifications)

Under Alternative AP-4, removal of MEC items would be conducted consistent with current residential reuse protocols through excavation to the maximum depth MPPEH is encountered (for Areas A, B, and C [not in Agua Chinon Retarding Basin]). A DGM survey would be conducted to verify removal of MEC. Area B2 within Agua Chinon Wash would undergo a separate DGM survey followed by anomaly investigation and removal. Under Alternative AP-4, identified MEC would be removed from the Adjacent Property consistent with the DTSC's recommended residential protocol to the extent practicable such that it does not result in unacceptable hazards to potential future human receptors. However, as discussed under Alternative AP-2, ICs (one time notification) would be implemented by notifying the current land owners, TIC and the OCFCD, about the potential presence of MEC items the Adjacent Property. This Alternative would result in a clearance depth of up to 18 inches throughout the Adjacent Property. Alternative AP-4 would be a final action for MEC-impacted soil at the Adjacent Property and as such, 5-year reviews would not be required. The final cost could increase if there are significant variances to the CSM.

5.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

An FS Report was completed to present the development and evaluation of remedial alternatives to address risks and hazards to human health and the environment due to past releases of hazardous substances in vadose zone soil at IRP Site 1 (AECOM 2014). The development and evaluation of remedial alternatives for groundwater and the selected remedy was documented in the Final Groundwater Record of Decision for IRP Sites 1 and 2 (AECOM 2012).

The individual and comparative evaluations presented in the FS provided adequate information concerning remedial alternatives to decision-makers to address naphthalene- and MEC-impacted soil at the site. This section summarizes the Federal and State of California ARARs affecting the remediation of the soil at IRP Site 1 that were identified in the FS Report.

The individual and comparative analyses of the various alternate remedies included identification of the relative advantages and disadvantages of each remedy with respect to one another utilizing the nine NCP evaluation criteria. The results of these evaluations provided the basis for selecting an appropriate remedy for soil at the Site. Proposed remedies ranged from no action to a comprehensive excavation and off-site disposal of resulting wastes.

The following work was completed during the FS:

- Refinement of Conceptual Site Model
- Definition of the Vadose Zone FS Scope
- Development of Vadose Zone General Response Actions
- Delineation of Vadose Zone Target Remediation Zones
- Identification and Evaluation of Remediation Technologies and Process Options for the Vadose Zone

- Development of Vadose Zone Remedial Alternatives
- Individual Analysis of Vadose Zone Remedial Alternatives.
- Comparative Analysis of Vadose Zone Remedial Alternatives
- Evaluation of ARARs for the Selected Removal Action

Section 121(d) of CERCLA (42 USC § 9621[d]), as amended, states that remedial actions at CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate. Although Section 121 of CERCLA does not itself expressly require that CERCLA removal actions comply with ARARs, the EPA has promulgated a requirement in the NCP mandating that CERCLA removal actions ". . . shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (Title 40 CFR § 300.415[j]). It is DON policy to follow this requirement. Certain specified waivers may be used for removal actions, as is the case with remedial actions.

ARARs identified in the FS for Alternatives N-3 and AP-4 were used for identifying ARARs for the selected removal action. More detailed information regarding the ARARs evaluation is included in Appendix A of FS.

The selected remedy complies with the chemical-, location-, and action-specific ARARs pertinent to the selected remedy that are presented in Tables 5-3, 5-4, and 5-5, respectively. Development of the selected remedy required coordination between and active involvement of the DON and regulatory agencies (Federal and State) with stakeholders and property owners.

Table 5-3. Chemical-Specific ARARs*

Chemical/Requirement	Citation	ARAR Determination	Comments
Federal			
Resource Conservation and Recovery Act (42 USC, ch. 82, §§6901-6991[i]) *			
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Cal. Code Regs. Title 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether the excavated naphthalene-impacted soil from the EOD Training Range, residual munitions removed from the EOD Training Range, and the MEC-impacted soil at the Adjacent Property are hazardous.
Military Munitions Rule (40 CFR pt. 266 subpt. M) *			
Identification of hazardous waste munitions and treatment and storage requirements for hazardous waste munitions.	40 CFR § 266.201 and 266.202	Applicable	Applicable for determining whether military munitions at the EOD Training Range and the Adjacent Property are solid wastes.
State			
Cal/EPA Department of Toxic Substances Control *			
Defines state-regulated, non-RCRA hazardous waste.	Cal. Code Regs. Title 22, § 66261.22(a)(3) and (4), § 66261.24(a)(2)–(a)(8), § 66261.101, § 66261.3(a)(2)(C) or § 66261.3(a)(2)(F)	Applicable	Applicable for determining whether the excavated naphthalene-impacted soil from the EOD Training Range and the MEC recovered at the Adjacent Property is a non-RCRA hazardous waste.
State and Regional Water Quality Control Boards *			
Definitions of designated waste, nonhazardous waste, and inert waste.	Cal. Code Regs. Title 27, §§ 20210, 20220, and 20230	Applicable	Potential ARARs for classifying waste and determining ARAR status of other requirements.

Note:

* Statutes and policies and their citations are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Department of the Navy accepts the entire statues or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

Abbreviations and Acronyms:

ARAR – applicable or relevant and appropriate requirement
CFR – *Code of Federal Regulations*
DON – Department of the Navy
EOD – explosive ordnance disposal
MEC – munitions and explosives of concern
POC – point of contact
RCRA – Resource Conservation and Recovery Act
RWQCB – Regional Water Quality Control Board
SWRCB – State Water Resources Control Board
TCRA – time-critical removal action
USC – *United States Code*

Table 5-4. Location-Specific ARARs*

Location/Requirement	Citation	ARAR Determination	Comments
Federal			
Exec. Order No. 11990, Protection of Wetlands			
Wetland: Avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and avoid support of new construction in wetlands if practicable alternatives exist.	Exec. Order No. 11990	TBC	The substantive provisions of the cited executive order are TBC requirements for response actions at the EOD Training Range. The wetlands are not expected to be adversely impacted by the remedial action at IRP Site 1.
Endangered Species Act of 1973 (16 USC §§ 1531–1543)			
Where endangered species are present or listed habitat: Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat.	16 USC §§ 1531–1543	Relevant and Appropriate	The site is located in an area that supports endangered or threatened species or habitat. Therefore, the substantive provisions of the ESA constitute potential ARARs.
Migratory Bird Treaty Act of 1972 (16 USC. §§ 703–712)b			
Migratory bird area: Protects almost all species of native migratory birds in the U.S. from unregulated "take," which can include poisoning at hazardous waste sites.	16 USC § 703	Relevant and Appropriate	Migratory birds have been observed at the EOD Training Range and may be present on the Adjacent Property; therefore, the substantive requirements of the cited act are "relevant and appropriate" ARARs that are protective of potential migratory bird species, if present.

Note:

* Statutes and policies and their citations are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Department of the Navy accepts the entire statues or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

Abbreviations and Acronyms:

ARAR – applicable or relevant and appropriate requirement
DON – Department of the Navy
EOD – explosive ordnance disposal
ESA – Endangered Species Act
IRP – Installation Restoration Program
TBC – to be considered
TCRA – time-critical removal action
USC – *United States Code*

Table 5-5. Action-Specific ARARs*

Action/Requirement	Citation	ARAR Determination	Comments
Federal			
Resource Conservation and Recovery Act			
On-site waste generation: Person who generates waste shall determine if that waste is a hazardous waste.	Cal. Code Regs. Title 22, § 66262.10(a), 66262.11	Applicable	Substantive requirements are applicable for characterizing generated waste. The determination of whether wastes generated during remedial activities are hazardous will be made at the time the wastes are generated.
Waste analyzation: Requirements for analyzing waste for determining whether waste is hazardous.	Cal. Code Regs. Title 22, § 66264.13(a) and (b)	Applicable	Applicable when analyzing waste generated during naphthalene-impacted soil excavation activities at the EOD Training Range.
Hazardous waste accumulation: On-site hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers in accordance with § 66262.171–178 or in tanks, on drip pads, inside buildings, and is labeled and dated, etc.	Cal. Code Regs. Title 22 § 66262.34	Applicable	Substantive requirements are potentially applicable for accumulation of waste for less than 90 days if the waste is hazardous waste and is stored on-site. Wastes will not be stored on-site for greater than 90 days.
Site closure: Minimize the need for further maintenance controls and minimize or eliminate, to the extent necessary to protect human health and the environment, post closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to groundwater or surface water or to the atmosphere.	Cal. Code Regs. Title 22, § 66264.111(a) and (b)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the naphthalene impacted soil. The TCRA intent is to minimize or eliminate threats to human health and the environment.
Site closure: During the partial and final closure periods, all contaminated equipment, structures and soils shall be properly disposed or decontaminated by removing all hazardous waste and residues.	Cal. Code Regs. Title 22, § 66264.114	Relevant and appropriate	Substantive provisions are relevant and appropriate for the naphthalene-impacted soil.
Container storage: Containers of RCRA hazardous waste must be: • maintained in good condition, • compatible with hazardous waste to be stored, and • closed during storage except to add or remove waste.	Cal. Code Regs. Title 22, § 66264.171, .172, .173	Applicable	Substantive provisions are applicable if waste is RCRA hazardous and relevant and appropriate if the waste is not RCRA hazardous, and stored on-site in containers.
Container storage: Inspect container storage areas weekly for deterioration.	Cal. Code Regs. Title 22, § 66264.174	Applicable	Substantive provisions are applicable if waste is RCRA hazardous and relevant and appropriate if the waste is not RCRA hazardous, and stored on-site in containers.

Table 5-5. Action-Specific ARARs* (continued)

Action/Requirement	Citation	ARAR Determination	Comments
Container storage: Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.	Cal. Code Regs. Title 22, § 66264.175(a) and (b)	Applicable	Substantive provisions are applicable if waste is RCRA hazardous and relevant and appropriate if the waste is not RCRA hazardous, and stored on-site in containers.
Container storage: Keep incompatible materials separate. Separate incompatible materials stored near each other by a dike or other barrier.	Cal. Code Regs. Title 22, § 66264.177	Applicable	Substantive provisions are applicable if waste is RCRA hazardous and relevant and appropriate if the waste is not RCRA hazardous, and stored on-site in containers.
Container storage: At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners.	Cal. Code Regs. Title 22, § 66264.178	Applicable	Substantive provisions are applicable if waste is RCRA hazardous and relevant and appropriate if the waste is not RCRA hazardous, and stored on-site in containers.
Waste pile accumulation: Allows generators to accumulate solid remediation waste in a U.S. EPA-designated pile for storage only, up to 2 years, during remedial operations without triggering LDRs.	40 CFR § 264.554(d) (1) (i–ii) and (d)(2), (e), (f), (h), (i), (j), and (k)	Relevant and appropriate	Substantive provisions are applicable if waste is RCRA hazardous and relevant and appropriate if the waste is not RCRA hazardous but similar to RCRA hazardous waste, and stored on-site in staging piles.
Waste pile closure: At closure, owner shall remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste.	Cal. Code Regs. Title 22, § 66264.258(a)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the closure of staging piles.
Clean Air Act, Control of Fugitive Dusts			
Dust control: Establishes requirements for control of fugitive dust and guidance for minimizing the harmful effects of fugitive dust emissions during excavation and other removal activities. National Primary and Secondary Ambient Air Quality Standards.	42 USC 7401 et seq. 40 CFR Part 50	Applicable	The contractor will employ RACM to prevent or reduce the emission and/or airborne transport of fugitive dust during the TCRA.
Dust control: Shall not cause or allow the emissions of fugitive dust such that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source and shall not cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples.	SCAQMD Rule 403	Applicable	Fugitive dust emissions of particulate matter are expected from the excavation, grading, and earth-moving activities. Measures such as applying water to minimize fugitive dust emissions may be required.

Table 5-5. Action-Specific ARARs* (continued)

Action/Requirement	Citation	ARAR Determination	Comments
Emission: Limits equipment from discharging particulate emissions in excess of 0.01 to 0.196 grain per cubic foot based on a given volumetric (dry standard cubic feet per minute) exhaust gas flow rate averaged over 1 hour or on cycle of operation. It excludes steam generators or gas turbines.	SCAQMD Rule 404	Applicable	The heavy equipment (if required/used) used will comply with substantive requirements of this rule.
Emission: Limits equipment from discharging particulate emissions in excess of 0.99 to 30 pounds per hour based on a given process weight.	SCAQMD Rule 405	Applicable	The equipment (if required/ used) used will comply with substantive requirements of this rule.
Military Munitions Rule (40 CFR pt. 266 subpt. M)*			
Military munitions transportation: Standards for transportation of solid waste military munitions	40 CFR § 266.203(a)(1)(i) – (iii), (a)(3), (a)(4), and (c)	Applicable	Substantive provisions at 40 CFR § 266.203(a)(1)(i)-(iii) constitute ARARs for on-site transportation of recovered munitions from the EOD Training Range and the Adjacent Property.
Military munitions storage: Standards for storage of solid waste military munitions	40 CFR § 266.205(a)(1), (a)(3), and (e)	Applicable	The substantive provisions of the cited regulations constitute ARARs for on-site storage of military munitions recovered from the EOD Training Range and Adjacent Property areas. The recovered munitions will be stored in accordance with the DoD storage standards.
Military munitions demilitarization: Explosives and munitions emergencies involving military munitions or explosives are subject to 40 CFR 262.10(i), 263.10(e), 264.1(g)(8), 265.1I(11), and 270.1I(3), or alternatively to 40 CFR 270.61.	40 CFR § 266.204	Applicable	The requirements of 40 CFR § 266.204 are applicable to situations during the remedial action that satisfy the definition of explosives or munitions emergency presented in 40 CFR § 260.10. The demilitarization of MEC conducted to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency will be conducted in compliance with 40 CFR § 266.204 and cross-referenced requirements in 40 CFR § 266.204 identified as ARARs in this table.
Military munitions demilitarization: Persons responding to an explosives or munitions are not required to comply with the standards of 40 CFR Part 262 (Standards Applicable to Generators of Hazardous Waste).	40 CFR § 262.10(i)	Applicable	The requirements of 40 CFR § 262.10(i) are applicable to situations during the remedial action that satisfy the definition of explosives or munitions emergency presented in 40 CFR § 260.10. The demilitarization of MEC items conducted to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency will be conducted in compliance with 40 CFR § 262.10(i).

Table 5-5. Action-Specific ARARs* (continued)

Action/Requirement	Citation	ARAR Determination	Comments
Military munitions demilitarization: The regulations in 40 CFR Part 263 (Standards Applicable to Transporters of Hazardous Waste) do not apply to transportation during an explosives or munitions emergency response.	40 CFR § 263.10(e)	Applicable	The requirements of 40 CFR § 263.10(e) are applicable to situations during the remedial action that satisfy the definition of explosives or munitions emergency presented in 40 CFR § 260.10. The demilitarization of MEC items conducted to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency will be conducted in compliance with 40 CFR § 263.10(e).
Military munitions demilitarization: The requirements in Chapter 14 (Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities) of the Cal. Code Regs., Title 22, do not apply to a person engaged in treatment or containment activities during immediate response to a discharge of a hazardous waste.	Cal. Code Regs. Title 22, § 66264.1(g) (8)	Applicable	The requirements of Cal. Code Regs. Title 22, § 66264.1(g)(8) are applicable to situations during the remedial action that satisfy the definition of explosives or munitions emergency presented in 40 CFR § 260.10. The demilitarization of MEC items conducted to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency will be conducted in compliance with Cal. Code Regs. Title 22, § 66264.1(g)(8).
Military munitions demilitarization: The requirements in Chapter 15 (Interim Status Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities) of the Cal. Code Regs., Title 22, do not apply to a person engaged in treatment or containment activities during immediate response to a discharge of a hazardous waste.	Cal. Code Regs. Title 22, § 66265.1(e)(11)	Applicable	The requirements of Cal. Code Regs. Title 22, § 66265.1(e)(11) are applicable to situations during the remedial action that satisfy the definition of explosives or munitions emergency presented in 40 CFR § 260.10. The demilitarization of MEC items conducted to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency will be conducted in compliance with Cal. Code Regs. Title 22, § 66265.1(e)(11).
State			
Cal/EPA Department of Toxic Substances Control*			
Institutional controls: A land use covenant imposing appropriate limitations on land use shall be executed and recorded when Facility closure, corrective action, remedial or removal action, or other response actions are undertaken and Hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	Cal. Code Regs. Title 22, § 67391.1	Relevant and appropriate	Cal. Code Regs. Title 22, § 67391.1 provides for a land-use covenant to be executed and recorded when remedial actions are taken and hazardous substances will remain at the property at concentrations that are unsuitable for unrestricted use of the land. The substantive provisions of this regulation would be "relevant and appropriate" state ARARs in the event of the transfer of the EOD Training Range property to a non-federal entity, and for those areas on the base where hazardous substances will remain on-site.

Table 5-5. Action-Specific ARARs* (continued)

Action/Requirement	Citation	ARAR Determination	Comments
Property transfer: Provides conditions under which land use restrictions will apply to successive owners of land.	Cal. Civ. Code § 1471	Relevant and appropriate	These requirements are ARARs in the event of the transfer of the EOD Training Range property to a nonfederal entity. Generally, Cal. Civ. Code § 1471 allows an owner of land to make a covenant to restrict the use of land for the benefit of a covenantee. The covenant runs with the land to bind successive owners, and the restrictions must be reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous materials, as defined in Cal. Health & Safety Code § 25260. Substantive provisions are the following general narrative standard: "to do or refrain from doing some act on his or her own land . . . where(c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence of hazardous materials, as defined in Section 25260 of the California Health and Safety Code." This narrative standard would be implemented through incorporation of restrictive covenants in the deed and Environmental Restriction and Covenant Agreement at the time of transfer. These requirements are not ARARs for the Adjacent Property, since it is not DON-owned property and is owned by TIC and OCFCD.
Property transfer: Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Cal. Health & Safety Code § 25202.5	Relevant and appropriate	These requirements are ARARs in the event of the transfer of the EOD Training Range property to a non-federal entity. The substantive provisions of Cal. Health & Safety Code § 25202.5 are the general narrative standards to restrict "present and future uses of all or part of the land on which the . . . facility . . . is located . . ." These requirements are not ARARs for the Adjacent Property, since it is not DON-owned property and is owned by TIC and OCFCD.

Table 5-5. Action-Specific ARARs* (continued)

Action/Requirement	Citation	ARAR Determination	Comments
Property transfer: Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of Cal. Health & Safety Code § 25232(b)(1)(A)–(E).	Cal. Health & Safety Code §§ 25222.1 and 25355.5(a)(1)(C)	Relevant and appropriate	These requirements are ARARs in the event of the transfer of the EOD Training Range property to a non-federal entity. Generally, Cal. Health & Safety Code §§ 25222.1 and 25355.5(a)(1)(C) provide the authority for the DTSC to enter into voluntary agreements with land owners to restrict the use of property. The agreements run with the land restricting present and future uses of the land. The substantive requirements of the following Cal. Health & Safety Code § 25222.1 provisions are "relevant and appropriate": (1) the general narrative standard: "restricting specified uses of the property…" and (2) "…the agreement is irrevocable, and shall be recorded by the owner, …as a hazardous waste easement, covenant, restriction or servitude, or any combination thereof, as appropriate, upon the present and future uses of the land." The substantive requirements of the following Cal. Health & Safety Code § 25355.5(a)(1)(C) provisions are "relevant and appropriate": "…execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the land." These requirements are not ARARs for the Adjacent Property, since it is not DON-owned property and is owned by TIC and OCFCD.
Property transfer: Provides processes and criteria for obtaining written variances from a land-use restriction and for removal of the land use restrictions.	Cal. Health & Safety Code §§ 25223(c) and 25224	Relevant and appropriate	These requirements are ARARs in the event of the transfer of the EOD Training Range property to a non-federal entity. Cal. Health & Safety Code § 25223(c) sets forth "relevant and appropriate" substantive criteria for granting variances based upon specified environmental and health criteria. Cal. Health & Safety Code § 25224 sets forth the following "relevant and appropriate" substantive criteria for the removal of a land-use restriction on the grounds that "…the waste no longer creates a significant existing or potential hazard to present or future public health or safety." These requirements are not ARARs for the Adjacent Property, since it is not DON-owned property and is owned by TIC and OCFCD.

Table 5-5. Action-Specific ARARs* (continued)

Action/Requirement	Citation	ARAR Determination	Comments
Emissions: Visible emissions standard that states a person shall not discharge any air contaminant into the atmosphere from any single source of emission for a period or periods aggregating more than 3 minutes in a 60-minute period, which is (a) as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, or (b) of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in (a).	SCAQMD Rule 401	Applicable	Excavation, grading, earthmoving activities have the potential to produce visible emissions due to fugitive dust. Substantive requirements pertaining to visible emissions, such as wetting the soil may be required to minimize fugitive dust.

Note:

* Statutes and policies and their citations are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Department of the Navy accepts the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

Abbreviations and Acronyms:

ARAR – applicable or relevant and appropriate requirement
Cal/EPA – California Environmental Protection Agency
CFR – *Code of Federal Regulations*
DON – Department of the Navy
DTSC – Department of Toxic Substances Control
EOD – explosive ordnance disposal
LDR – land disposal restriction
MEC – munitions and explosives of concern
OCFCD – Orange County Flood Control District
PM_{10} – particulate matter, less than 10 micrometers in diameter
RACM – reasonably available control measures
RCRA – Resource Conservation and Recovery Act
SCAQMD – South Coast Air Quality Management District
TCRA – time-critical removal action
TIC – The Irvine Company
USC – *United States Code*

5.5 PROJECT SCHEDULE

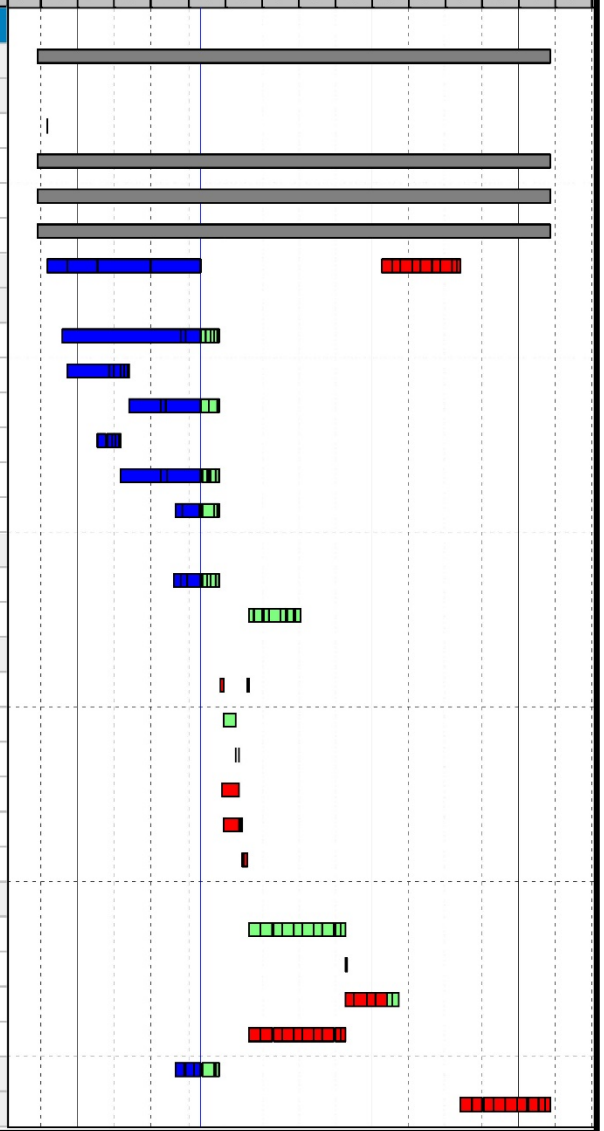
The fieldwork for the TCRA is expected to begin in December of 2016 and to be completed by 14 February 2017. The current project schedule is included as Figure 5-3.

5.6 ESTIMATED COSTS

The estimated cost of MPPEH removal from the Adjacent Property using the RACER™ 2014 system Version 11.1.12.0 is $7,574,000 (AECOM 2014, and as updated in the latest version currently under revision). The estimated cost of the excavation and off-site disposal of the naphthalene-impacted soil using the RACER 2011 system Version 10.4.0 is $255,000 (AECOM 2014, and as updated in the latest version currently under revision). The estimated total cost of this proposed TCRA is $7,829,000 for the removal of naphthalene-impacted soil from the EOD Training Range and the removal of MEC-impacted soil at the Adjacent Property. The final costs could increase if there are significant variances to the CSM. The estimated costs for the selected removal action are presented in Tables 5-6 and 5-7.

The cost estimates for the remedial alternatives were generated using RACER 2014, which is a parametric cost modeling system that uses a patented methodology for estimating costs. The RACER 2014 cost technologies are based on generic engineering solutions for environmental projects, technologies, and processes. The generic engineering solutions were derived from historical project information, industry data, government laboratories, construction management agencies, vendors, contractors, and engineering analysis.

Activity Name	Start	Finish
UMAC CTO 11 - FMCAS El Toro ROD RD & RA IR Site 1	23-Sep-15 A	23-Mar-19
General Conditions	23-Sep-15 A	23-Mar-19
WE 1 - Meetings, Project Management, and Administrative Support	23-Sep-15 A	18-Mar-19
Kick Off Meeting	15-Oct-15 A	15-Oct-15 A
BRAC Cleanup Team (BCT) Meetings	23-Sep-15 A	18-Mar-19
Restoration Advisory Board (RAB) Meetings	23-Sep-15 A	18-Mar-19
Project Management, Plans & Submittals	23-Sep-15 A	18-Mar-19
WE 2 - Decision Document (DD) for MEC (Adjacent Property)	16-Oct-15 A	06-Aug-18
WE 3 - Planning Documents	24-Nov-15 A	16-Dec-16
Time Critical Removal Action (TCRA) Work Plan [EPP; PQCP; WEAP; SWPPP; SRP; SAP; WMP]	24-Nov-15 A	16-Dec-16
Abbreviated Accident Prevention Plan (AAPP)	05-Dec-15 A	05-May-16 A
Accident Prevention Plan (APP)	06-May-16 A	16-Dec-16
Explosive Safety Submission (ESS) DF	18-Feb-16 A	16-Apr-16 A
Explosive Safety Submission (ESS)	17-Apr-16 A	16-Dec-16
Biological Summary Report (BSR)	31-Aug-16 A	16-Dec-16
WE 4 - Public Fact Sheets	27-Aug-16 A	05-Jul-17
First TCRA Fact Sheet Fact Sheet	27-Aug-16 A	15-Dec-16
Second TCRA Fact Sheet Fact Sheet	28-Feb-17	05-Jul-17
WE 5/9 - Time Critical Removal Action (DBA Applicable)	19-Dec-16	27-Feb-17
Mobilization/Demob	19-Dec-16	27-Feb-17
Dig, Screen & Backfill	28-Dec-16	26-Jan-17
Excav. & Disp. of Naphthalene-Impacted Soil (IRP Site 1)	25-Jan-17	02-Feb-17
Geophysical	23-Dec-16	01-Feb-17
Subsurface Clearance	28-Dec-16	10-Feb-17
Site Restoration	13-Feb-17	23-Feb-17
WE 6 - Removal Action Report (RAR)	28-Feb-17	05-Mar-18
Removal Action Report (RAR)	28-Feb-17	26-Oct-17
Navy installation Restoration Information Solution (NIRIS)	27-Oct-17	29-Oct-17
Closeout After Action Report	27-Oct-17	05-Mar-18
IC Documentation	28-Feb-17	26-Oct-17
WE 7 - Action Memorandum	31-Aug-16 A	15-Dec-16
WE 8 - EOD Decision Document (DD)	07-Aug-18	18-Mar-19



LOE
Actual Work
Remaining Work
Critical Remaining Work

UMAC CTO 11
Explosive Ordnance Disposal Training Range
Former Marine Corps Air Station, El Toro, Irvine, CA
LEVEL-3 SUMMARY SCHEDULE
Data Date: 29-Oct-16

TETRA TECH

Figure 5-3. Project Schedule

Table 5-6. Estimated Costs Over Time for Alternative N-3

Cost Element	Calendar Year 1 2016	Calendar Year 2 2017	Row Total
Remedial Design	$41,160		$41,160
Excavation and Backfilling		$78,275	$78,275
Off-site Transportation and Disposal		$31,951	$31,951
MEC Sifting		$51,586	$51,586
Escalated Subtotal (from 2011 to 2016)	$45,202	$177,702	$202,972
Contingency		$35,540	
Discount Factor	1	0.985	
Present Value	$45,202	$210,091	$255,000 *

Source: AECOM 2014, and as updated in the latest version currently under revision.

Notes:

* The costs are rounded off to nearest thousandth.

Acronyms:

MEC – munitions and explosives of concern

Table 5-7. Estimated Costs Over Time for Alternative AP-4

Cost Element	Calendar Year 1 2016	Calendar Year 2 2017	Row Total
Remedial Design	$194,378		$194,378
Institutional Controls (Notifications)	$17,641		$17,641
MEC Recovery at Adjacent Property Area B2		$346,950	$346,950
MEC Recovery at Adjacent Property Area A		$3,247,405	$3,247,405
MEC Recovery at Adjacent Property Area C		$1,192,221	$1,192,221
MEC Recovery at Adjacent Property Area B1		$868,238	$868,238
Escalated Sub-Total (from 2011 to 2016)	$232,839	$6,210,117	$7,075,654
Contingency (20 Percent)		$1,242,023	$1,242,023
Discount Factor	1	0.985	
Present Value	$232,839	$7,342,010	$7,574,000 *

Source: AECOM 2014, and as updated in the latest version currently under revision.

Notes:

* The costs are rounded off to nearest thousandth.

Acronyms:

MEC – munitions and explosives of concern

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6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

On the basis of results obtained during the Phase II Remedial Investigation (RI), naphthalene was reported in soil at concentrations exceeding its respective EPA Region 9 and California modified PRGs for residential and industrial soil. If action should be delayed or not taken at the EOD Training Range, it would result in potential for exposure to and migration of the naphthalene-impacted soil that would result in unacceptable risks to current and future receptors.

If action should be delayed or not taken at the Adjacent Property, potential MPPEH would continue to pose an unacceptable explosive safety hazard to potential receptors. In addition, there is a potential for shallow MPPEH items to be exposed due to soil erosion. MPPEH could further migrate from the site to nearby areas via erosion and/or surface water runoff as some MPPEH items that were initially deposited as kick-outs have likely rolled down the hillside into the gullies leading from IRP Site 1. This distribution of MPPEH items due to gravitational transport would result in an increased MEC hazard to the exposed population. If the action is delayed, future cleanup will potentially become more difficult due to redevelopment on the privately-owned Adjacent Property. A TCRA will provide a clearance that supports the future residential use. The private property owners plan to redevelop the property within the next 6 months, which could potentially expose workers and future residents to MEC hazards.

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7. PUBLIC INVOLVEMENT

As the lead agency, the DON initiated a Community Involvement Program (CIP) in 2012 in coordination with EPA, DTSC Region 4, and the RWQCB. The CIP is intended to solicit community input and to keep the community informed regarding ongoing Station activities.

The DON will circulate this Draft Action Memorandum for public comment, and the Administrative Record is available to the public. The public comment period on the Draft Action Memorandum is from November 1 to November 30, 2016. A summary of any comments received and the DON's response to those comments will be provided when available.

A Notice of Availability of the Administrative Record File will be posted on the DON website within 60 days of signing the Action Memorandum. Pertinent documents from the Administrative Record File will be made available for public review at Southwest Division, Naval Facilities Engineering Command, San Diego. A partial record file will be available for review at the Information Repository, which will contain a complete index of the Administrative Record File along with information about how to access the complete file at the Station.

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8. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues for this TCRA.

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9. RECOMMENDATION

This Action Memorandum was prepared in accordance with current EPA and DON guidance documents for TCRAs under CERCLA (EPA 2009, DON 1996). This Action Memorandum documents, for the Administrative Record, the DON's decision to undertake a TCRA on IRP Site 1 at former MCAS EL Toro, California.

In arriving at this decision, three alternatives were identified for the naphthalene impacted soil at the EOD Training Range evaluated, and ranked. The alternatives for the EOD Training Range included:

- Alternative N-1: No Action
- Alternative N-2: ICs and Access Restrictions
- Alternative N-3: Excavation and Off-Site Disposal of Naphthalene-Impacted Soil

In arriving at this decision, four alternatives were identified for the MEC-impacted soil at the Adjacent Property evaluated, and ranked. The alternatives for the Adjacent Property included:

- Alternative AP-1: No Action
- Alternative AP-2: ICs (Notifications)
- Alternative AP-3: MEC Survey of Eight Remaining Acres and ICs (Notifications)
- Alternative AP-4: Comprehensive MEC Removal and Verification and ICs (Notifications)

Based on the comparative analysis of the removal action alternatives completed in Section 5.3, the selected removal action for the EOD Training Range is Alternate N-3. The selected removal action for the Adjacent Property is AP-4.

Alternative N-3 for the EOD Training range was selected because naphthalene-impacted soils would be excavated and disposed of off-site, meeting the site-specific risk reduction goals.

Alternative AP-4 was selected recommended for the Adjacent Property because the unacceptable hazards to potential future receptors from MPPEH would be removed. The TCRA would be the final action for MEC-impacted soil at the Adjacent Property and as such, 5-year reviews would not be required and the area would be released for residential use.

Implementation of this TCRA requires experienced personnel; these personnel with the requisite training and experience are readily available. Equipment and materials are also available to implement these alternatives. The selected removal alternatives are cost-effective, since both will result in permanent reduction in risk and hazard to human health.

This decision document represents the selected removal actions for the naphthalene-impacted soil at the EOD Training Range and the MEC-impacted soil at the Adjacent Property at former MCAS EL Toro, California resulting from historical activities conducted within IRP Site 1, developed in accordance with CERCLA as amended, and is consistent with the NCP. This decision is based on the Administrative Record for the site.

Marc P. Smits BRAC Environmental Coordinator By direction of the Director	Date

10. REFERENCES

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APPENDIX A

REGULATORY AGENCY COMMENTS AND RESPONSE TO COMMENTS
(To be provided in final version.)

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