



# Borrego Maneuver Area DERP—FUDS No. J09CA7011 Remedial Investigation/Feasibility Study (RI/FS)

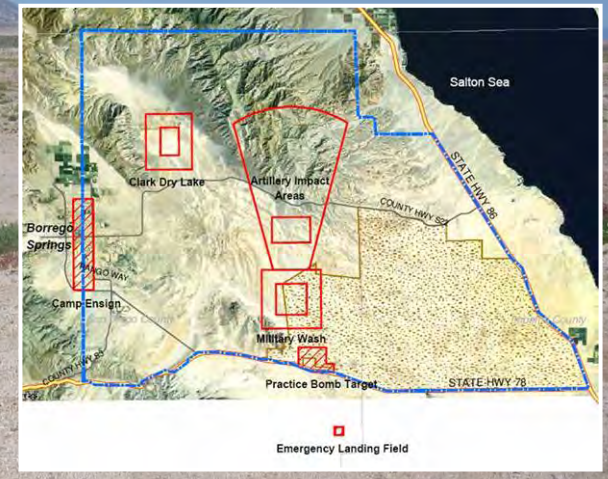
## Technical Planning Process (TPP) Meeting 1 January 18, 2005

**Larry Sievers**

Formerly Used Defense Site Program  
Manager

(213) 452-3990

[larry.a.sievers@usace.army.mil](mailto:larry.a.sievers@usace.army.mil)



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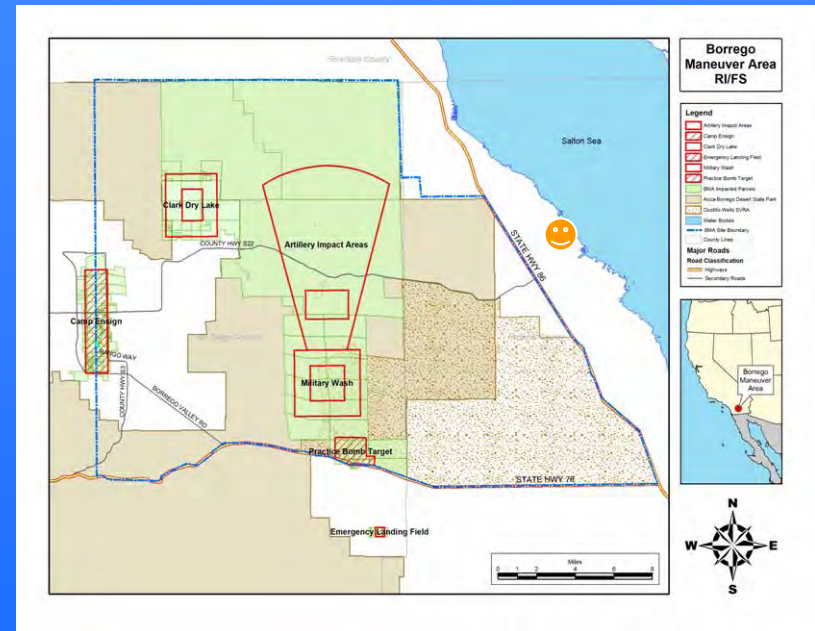




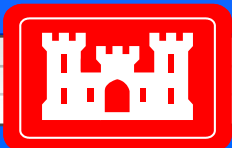
# Why the Borrego Maneuver Area? Why Now?

## Project Sites

- J09CA701101 Naval/Mechanized Artillery Area
- J09CA701102 Camp Ensign
- J09CA701103 Navy's Clark Lake
- J09CA701104 Target Area & Emergency Landing Field
- J09CA701105 Military Wash Areas E-1 & E-2
- J09CA701106 Benson/Ocotillo Dry Lake Practice Bomb Target
  - Potential Additions:
    - Winona 1 J09CA0167
    - Winona 2 J09CA0168
    - Rocketville and Bombville



- 1.) BMA is a priority site
- 2.) Remove risk from a potential munitions encounter
- 3.) Remove acreage from the cost liability profile



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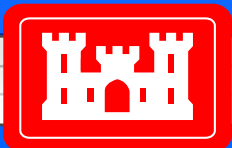




# Agenda



- Introductions
- Purpose and Objectives
- Schedule of TPP and RI/FS
- Formerly Used Defense Sites:
  - Program Implementation
  - Los Angeles District FUDS
  - MMRP phases
- Technical Project Planning
- Agency and Stakeholder Comments



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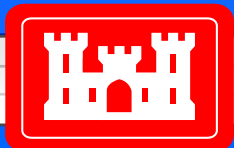
# Today's Purpose and Objectives

## Purpose is to Provide:

- Introduction to US Army Corps of Engineers Formerly Used Defense Site Military Munitions Response Program
- History/Problem Definition of the Borrego Maneuver Area
- Make Progress in the US Army Technical Planning Process

## Objectives for Stakeholders is Understanding of:

- The project planning efforts associated with the Borrego Maneuver Area Remedial Investigation / Feasibility Study
- The Implementation of the US Army Technical Planning Process
- The Schedule
- Roles and Responsibility



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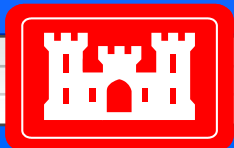


# Stakeholders In the MMRP RI/FS TPP

*"This is your Park, Property, Constituents & Our Challenge"*

## We want to know:

- Where you know about munition encounters - "Rocketville", "Bombville"
- Your concerns and requirements; environmental, cultural, liability
- Limitations to investigation and cleanup of potential UXO
- Your Goals
- How you can help us - Collection of your existing bio/cultural info, GIS data
- How we can help you - Presentations to your stakeholders (Off-road / Conservation Groups)?



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Mission: Serve the Public and meet Govt. customer needs

226,000 square miles

420 miles of shoreline

10% of the US population, growing

Regulatory/Construction/Flood Control

/Navigation/Recreation/Environmental



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# Borrego Maneuver Area TPP and RI/FS Schedule

TPP Meeting 1 January 18, 2006

TPP Meeting 2 February 15, 2006

-Comments on Conceptual Site Model

TPP Meeting 3 May 24, 2006 – Public Notice & News Release

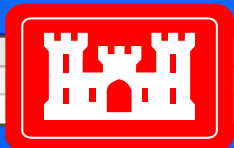
😊 -Brief Draft RI/FS Work Plan, 45 day review starts

-May 25, 2006 Public Availability Session – Poster Session introduce draft work plan

Final RI/FS Work Plan October 31, 2006

TPP Meeting 4 November 1, 2006

-Prioritize Field Starts



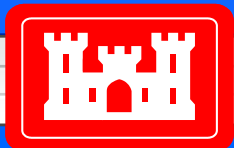
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# Formerly Used Defense Site (FUDS) Primer

Why	Congress 1986 ‘ <i>correction, detection and disposal of unexploded ordnance which creates an imminent and substantial endangerment...</i> ’
Where	‘ <i>the Secretary shall carry out all response actions under <u>CERCLA</u> at properties <u>owned by, leased or otherwise possessed by the United States</u>” – <u>USACE</u> assigned</i>
Who	USACE has almost 10,000 FUDS identified nationwide, over 1,300 in the Los Angeles District, funding limited
How	Military Munitions Response Program (MMRP) and Hazardous Toxic Radioactive Waste (HTRW) use the DoD investigation/cleanup methods based on Env. Protection Agency (EPA) CERCLA process



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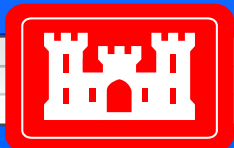


# National Status of FUDS Properties and Projects

Metric	Oct 04	Sep 05
Total Properties in Inventory	9,730	9,847
Total Properties Eligible for FUDS Program	6,789	6,909
Properties Requiring Response Actions (30%)	2,948	2,965
Total Projects In Inventory	4,871	5,018
Cost to Complete	\$18.1 Billion	\$18.6 Billion

**PROPERTY** is the entire property formerly owned/used by DoD and is generally analogous to “site”

**PROJECT** is the individual area of potential hazard, differentiated by *type of hazard* (HTRW, OE, BD/DR) and is generally analogous to “operable unit”



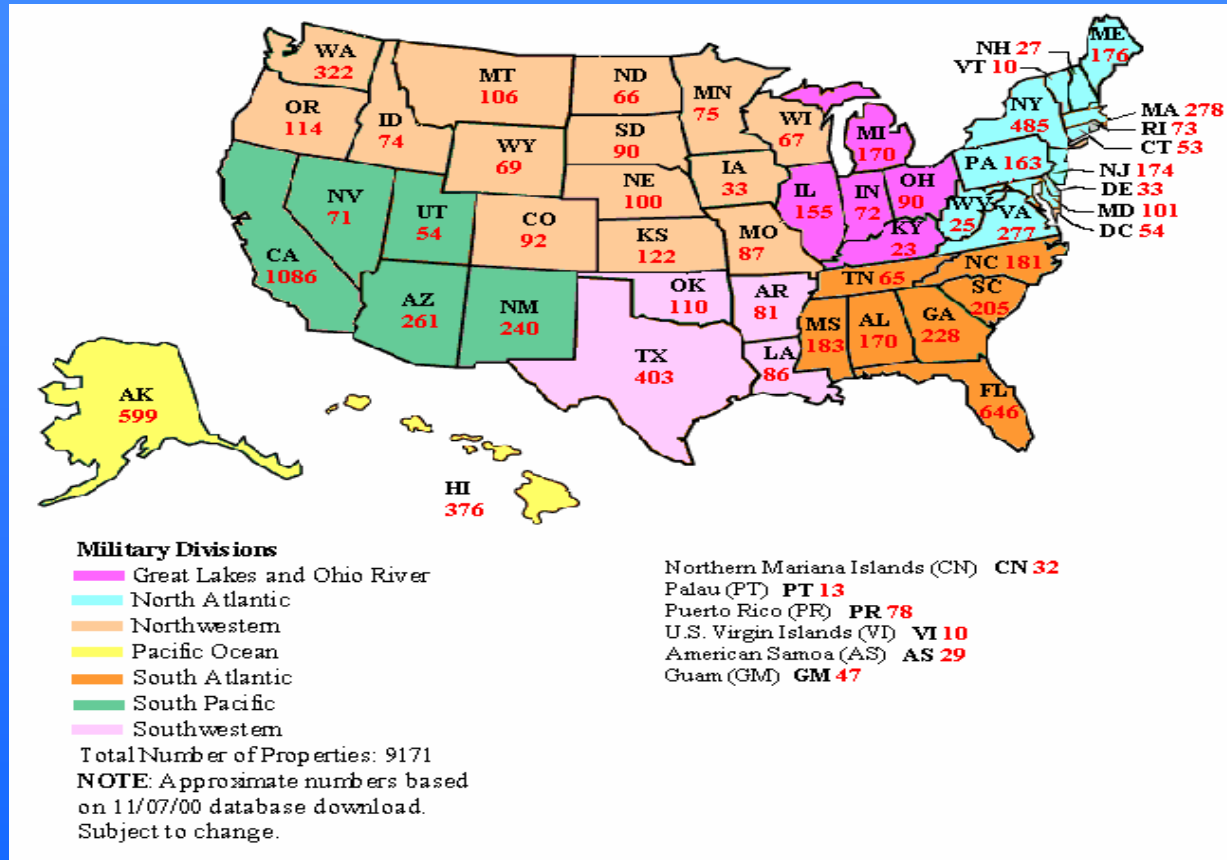
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# FUDS Properties by State

data from 2000



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# Los Angeles District by the Numbers



## Formerly Used Defense Sites

Total Inventory 1,283, minus duplicates

Total Sites 1,043

By State:	AZ	262
	CA	763
	NV	18

Total Number of Projects

503 (511 in FY05)

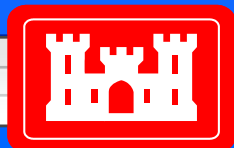
## MMRP by Risk Assessment Code (RAC):

RAC 1: 18  
 RAC 2: 33  
 RAC 3: 54  
 RAC 4: 102  
 RAC 5: 150

Project Category	#	Los Angeles District Cost to Complete	% of Nation's CTC
Partially Responsible Party	24	-----	-----
Preliminary Assessment/INPR	NA	\$1,300,000	0.04%
Building Demolition/Debris Removal	16	\$2,400,000	0.07%
Containerized HTRW	84	\$3,100,000	0.10%
Chemical Warfare Material	4	\$91,500,000	2.81%
Hazardous Toxic Radioactive Waste	27	\$105,800,000	3.35%
Military Munitions Response Program	348	\$3,052,500,000	27%
<b>TOTALS</b>	<b>503</b>	<b>\$3,256,600,000</b>	<b>18%</b>

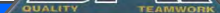


Old Metric now using:  
 Munitions Response Site Prioritization Protocol w/  
 A - F ratings



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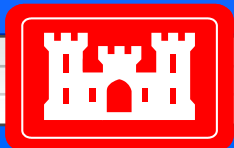




# San Diego County FUDS Property and Projects

<u>TOTAL SITE</u>	=	146
– Eligible SITE	=	76
Sites w/projects	=	25(17%)
• NDAI	=	51 (35%)
• Not Eligible/CATEX	=	68 (46%)
• New INPRs	=	2 (1%)

<u>TOTAL PROJECTS</u>	=	38 (11%)
–BD/DR	=	1 (3%)
–CON/HTRW	=	5 (14%)
–MMRP	=	29 (76%)
–PRP/HTRW	=	1 (3%)
–HTRW	=	2 (5%)



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# San Diego County MMRP Projects

## Project Status by RAC

- RAC 1 = 7
- RAC 2 = 3
- RAC 3 = 6
- RAC 4 = 3
- RAC 5 = 9

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Total 28

### • Project Status by RAC

- RAC 1 =

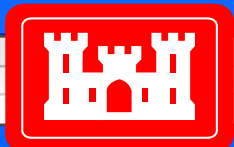
7

- » J09CA006701 Camp Elliot-Tierra Santa (LTM)
- » J09CA006702 Camp Elliot-Mission Trails (LTM)
- » J09CA006703 Camp Elliot-East Elliot (EE/CAs Sector 2, Sector 4 RA, Sectors 1 and 3 RA pending schedule)
- » J09CA006704 Camp Elliot-Area G,H,&D (EE/CA started May 16, 2005)
- » J09CA111001 UCSD (Camp Matthews) (PA/SI/Constr Support active)
- » J09CA707802 Camp Lockett Target Pit (SI start in May 2005)
- » J09CA724201 Camp Vista-Green Oak Ranch (SI start in May 2005)

- RAC 2 =

3

- » J09CA701101 Borrego Springs-(RI/FS start hopefully in June 2005)
- » J09CA704401 Border Field State Park (ASR)
- » J09CA723601 Linda Vista Practice Bombing Area (ASR)



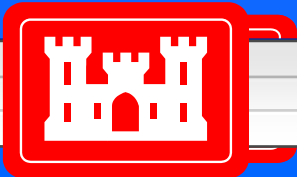
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## IMPERIAL COUNTY FUDS PROPERTY

• TOTAL SITE	=	65	13% of California
– Eligible SITE	=	43	9% of California
• Sites w/projects	=	38 (58%)	
– Total Projects	=	46	
» MMRP	=	41	
» CON/HTRW	=	5	
• NDAI	=	5 (8%)	
• Not Eligible/CATEX	=	22 (34%)	
– Active DOD Site	=	12	
– Duplicate/No Information	=	10	



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# Risk Assessment Code (RAC)

## RAC 1 - 4

Action is required to mitigate the Munitions and Explosives of Concern (MEC) hazard or protect personnel (i.e. fencing, physical barrier, guards, etc). Rankings 1-4 with 1 as highest priority, indicate the relative priority for cleanup among thousands of sites. It evaluates and scores the severity of a munitions (from catastrophic to negligible) and the probability (from frequent to improbable) of an MEC encounter.

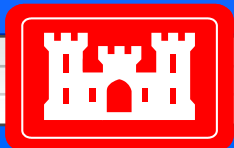
## RAC 5

Usually indicates no DOD action required.

PROBABILITY LEVEL	FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
SEVERITY CATEGORY:					
CATASTROPHIC I	1	1	2	3	4
CRITICAL II	2	2	3	4	5
MARGINABLE III	3	3	4	4	5
NEGLECTIBLE IV	4	4	4	5	5

RAC 1	Expedite INPR, recommending further action by USAESCH-Immediately call USAESCH-OE-S (comm 256-895-1582/1598).
RAC 2	High priority on completion of INPR-Recommend further action by USAESCH.
RAC 3	Complete INPR-Recommend further action by USAESCH.
RAC 4	Complete INPR-Recommend further action by USAESCH.
RAC 5	Usually indicates that No DOD Action Indicated (NDAI) is necessary, Submit NDAI and RAC to USAESCH.



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# Munitions Response Site Prioritization Protocol

## DEPARTMENT OF DEFENSE

Office of the Secretary

32 CFR Part 179

### Munitions Response Site Prioritization Protocol

AGENCY: Department of Defense.

ACTION: Final rule.

#### §179.7 Sequencing.

(a) *Sequencing considerations.* The sequencing of MRSs for action shall be based primarily on the MRS priority determined through applying the rule in this part. Generally, an MRS that presents a greater relative risk to human health, safety, or the environment will be addressed before an MRS that presents a lesser relative risk. Other factors, however, may warrant consideration when determining the sequencing for specific MRSs. In evaluating other factors in sequencing decisions, the Department will consider a broad range of issues. These other, or risk-plus factors, do not influence or change the MRS priority, but may influence the sequencing for action. Examples of factors that the Department may consider are:

Explosive Hazard	Chemical Warfare Material	Munitions Consituents			
Table 25 MRS Priority Based on Highest Hazard Evaluation Module Rating					
EHE Module Rating	Priority	CHE Module Rating	Priority	HHE Module Rating	Priority
		Hazard Evaluation A (Highest)	1		
Hazard Evaluation A (Highest)	2	Hazard Evaluation B	2	Hazard Evaluation A (Highest)	2
Hazard Evaluation B	3	Hazard Evaluation C	3	Hazard Evaluation B	3
Hazard Evaluation C	4	Hazard Evaluation D	4	Hazard Evaluation C	4
Hazard Evaluation D	5	Hazard Evaluation E	5	Hazard Evaluation D	5
Hazard Evaluation E	6	Hazard Evaluation F	6	Hazard Evaluation E	6
Hazard Evaluation F	7	Hazard Evaluation G (Lowest)	7	Hazard Evaluation F	7
Hazard Evaluation G (Lowest)	8			Hazard Evaluation G (Lowest) Low	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	

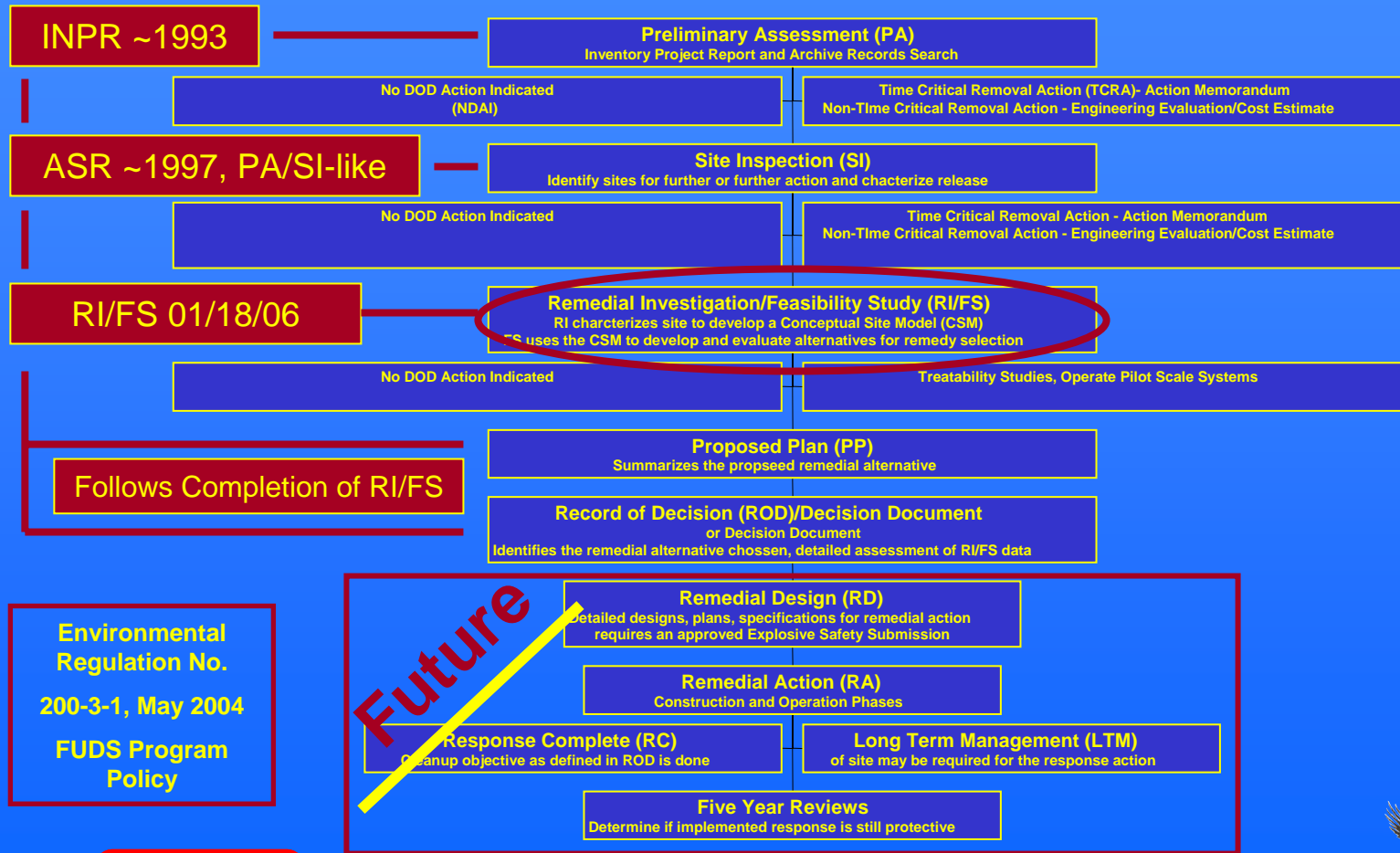


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# FUDS CERCLA (Superfund/NCP) Implementation Strategy



Environmental  
Regulation No.  
200-3-1, May 2004  
FUDS Program  
Policy



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# Let's Start With The End In Mind

## Borrego Maneuver Area

### PP/DD/RD/RA

#### Proposed Plan

- Description of the Proposed Remedial Alternative intended for public review

#### Decision Document

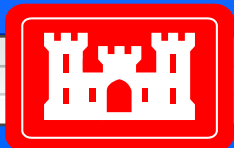
- 'Legal' description of the selected remedial alternative/goals/strategy
- Rationale for selection

#### Remedial Design

- Detailed designs, plans, specifications for remedial action, requires approved Explosive Safety Submittal

#### Remedial Action

- Construction and implementation phase for the selected remedial alternative



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# Borrego Maneuver Area RI/FS

## End Game Scenarios

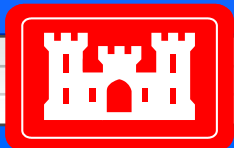
### – Permanent Solution

#### The RI/FS will:

- In the end, construct a Conceptual Site Model (CSM), validated through investigation
- Compare the CSM against remedial objectives and select alternatives

#### Remedial Alternatives:

- Do Nothing Alternative
  - Current Situation
- Institutional Controls
  - Signs, Training, Education, Deed Notifications
- Construction Support
  - Camp Matthews, supporting UCSD project
- Surface Removal
- Subsurface Removal
- Any combination



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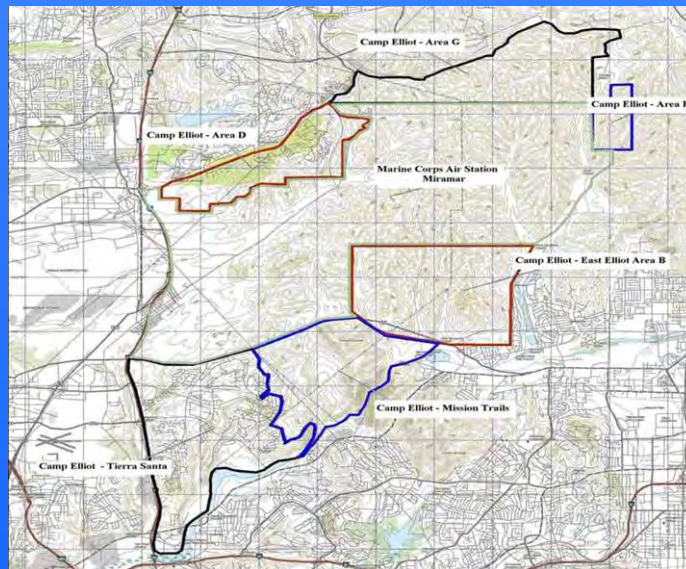




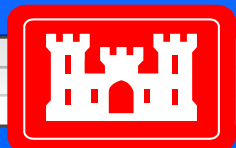
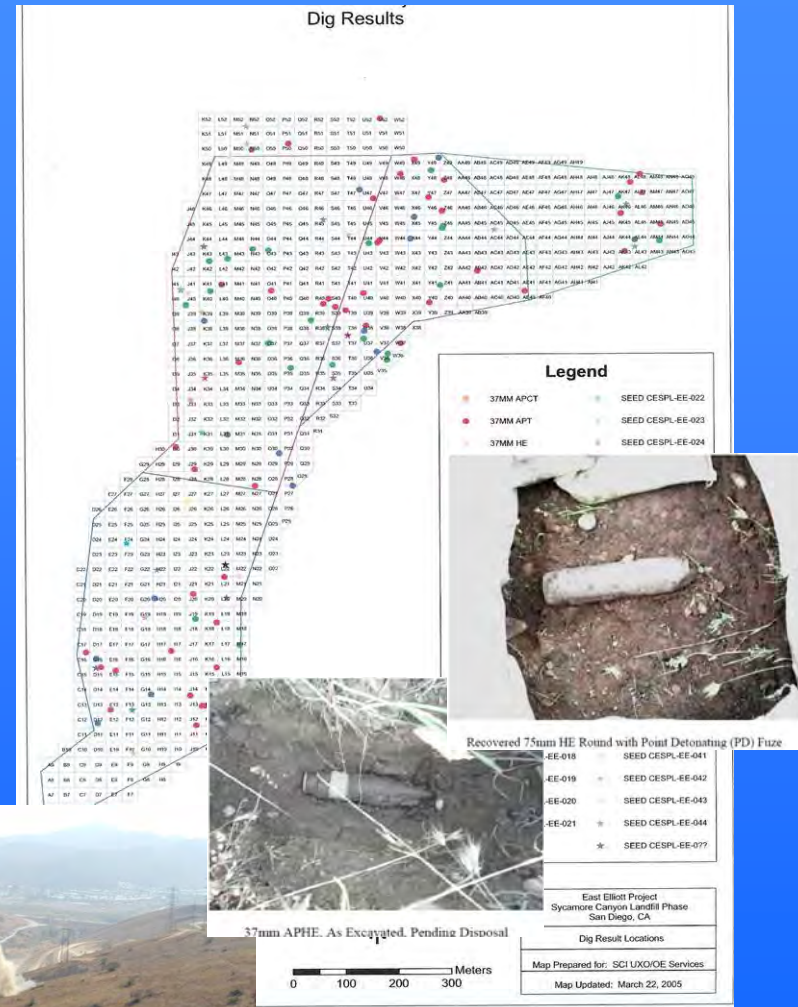
# Camp Elliott

-Sector 2 Subsurface removal

~25 former military munitions consisting of 75 mm artillery and 37 mm mortar projectiles found and destroyed



~\$45,000,000 Cost to Complete



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# Questions - USACE FUDS Program

Larry Sievers

FUDS Program Manager

(213) 452-3990

[larry.a.sievers@usace.army.mil](mailto:larry.a.sievers@usace.army.mil)

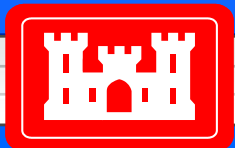


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# Acronyms



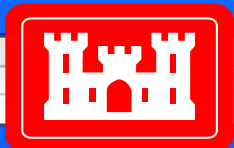
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# ACRONYMS

- ARAR – Applicable or Relevant and Appropriate Requirements
- ASR – Archive Search Reports FUDS – Formerly Used Defense Sites
- AP-T – Armor Piercing with Tracer
- CSM – Conceptual Site Model
- DD – Decision Document
- DoD – Department of Defense
- DQO – Data Quality Objective



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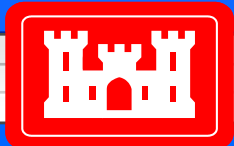






# ACRONYMS

- HE – High Explosives
- LTM – Long Term Monitoring
- MC – Munitions Constituent
- MEC – Munitions and Explosives of Concern
- MM – Millimeter
- MRA – Munitions Response Area
- MRS – Munitions Response Site
- PA – Preliminary Assessment
- RA – Remedial Action
- RD – Remedial/Removal Design



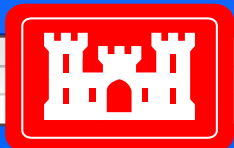
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# ACRONYMS

- RI/FS – Remedial Investigation/Feasibility Study
- ROE – Right of Entry
- SI – Site Inspection
- TPP – Technical Project Planning
- UXO – Unexploded Ordnance

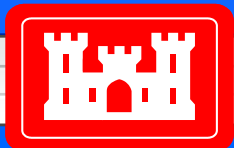


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# Technical Project Planning (TPP)



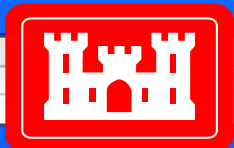
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# What is Technical Project Planning (TPP)?

- Systematic process that involves four phases of planning activities
- Process for developing the project team and getting stakeholders/regulators involved in the project upfront

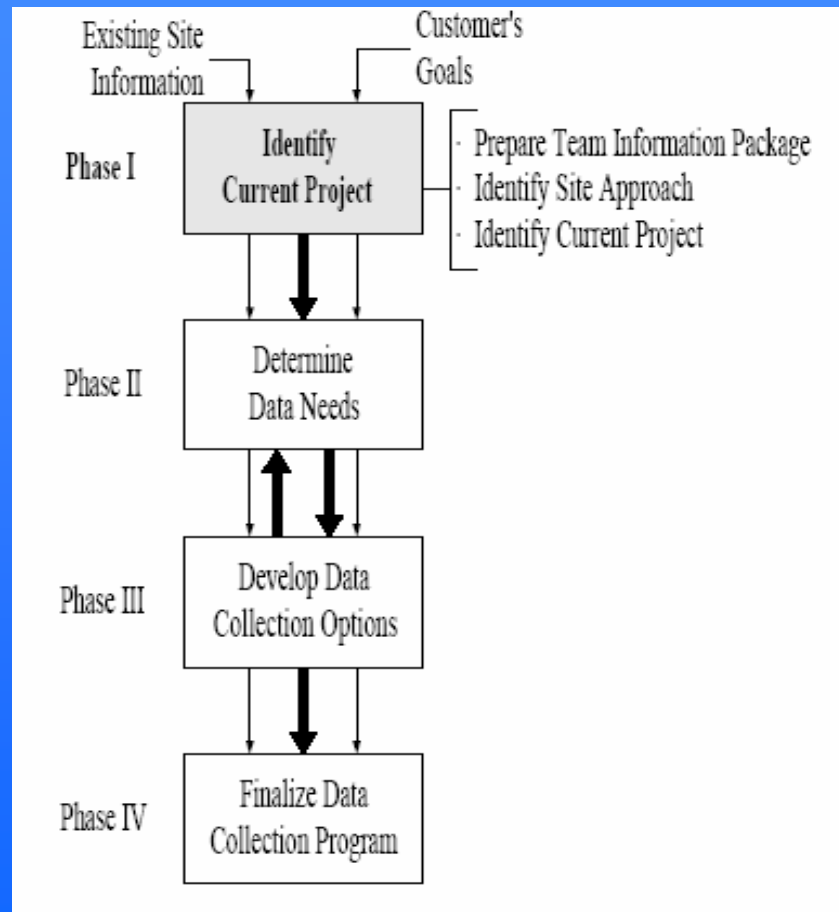


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# TPP Process Flowchart



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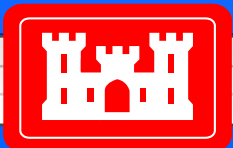






# Phase I - Identify Current Project

- Brings together decision makers and technical personnel to identify the current project, identify TPP Team goals and document short and long term objectives
- Preparation of team information package, determine overall site approach, and identify project focus
- Begin the formal planning process



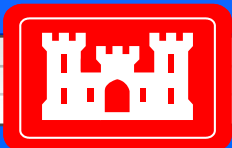
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## Phase II – Determine Data Needs

- Designed to ensure all data needed to satisfy the site objectives are identified
- Based on professional experience, input from all technical personnel, stakeholders, and regulators
- Evaluate the usability of existing data and define data needs
- Determine Data Collection Approaches



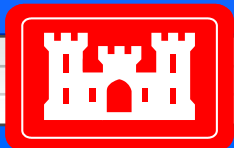
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## Phase III – Develop Data Collection Options

- Designed for planning sampling analysis approaches that will satisfy data needs based on Phases I and II
- Takes into consideration the following:
  - Physical access constraints
  - Right of Entry (ROE) constraints
  - Regulatory and stakeholder input



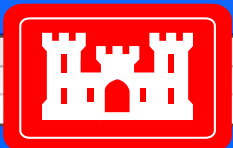
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# Phase IV – Finalize Data Collection Program

- Development of final Data Quality Objectives
- Finalize work plans
- Develop cost estimates for field data collection



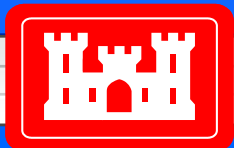
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# TPP Summary

- Designed to be an iterative planning process that engages the USACE, stakeholders and regulators into the project decision making process
- Dynamic process, not a rigid step by step process; some elements of each phase may be completed out of sequence depending on input into the process



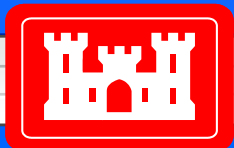
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# Remedial Investigation/Feasibility Study (RI/FS)

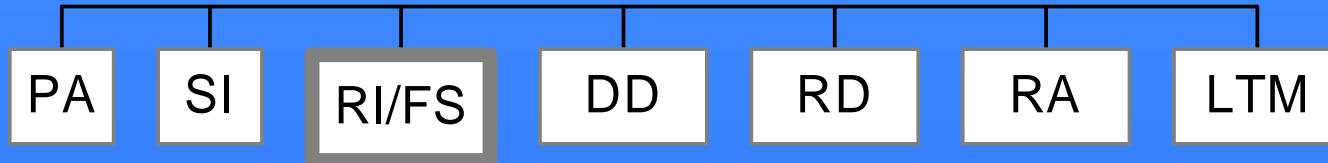


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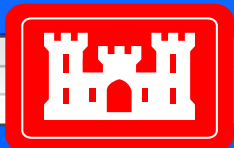




# CERCLA Process



*PA and SI completed during the initial inventory and prioritization of sites and data collection to develop Archive Search Reports (ASR's)*



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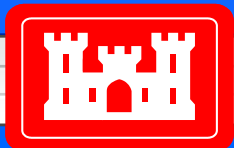




# RI/FS Purpose

Formerly Used Defense Sites (FUDS) ER 200-3-1

- RI intended to “adequately characterize the site for purpose of developing and evaluating effective remedial alternatives”
- “RI provides information to assess the **risks** to human health, safety, and environment that will be identified during risk screening in the RI/FS”



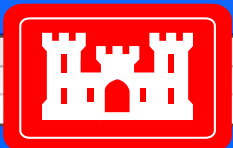
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## FS Objective

- “...ensure appropriate remedial alternatives are developed and evaluated...and an appropriate alternative is selected”
- The RI “should focus on collecting information to support the FS, so decisions on the appropriate remedial alternative can be made”



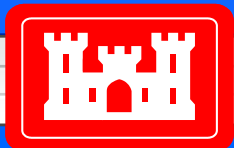
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## Further RI/FS Guidance

- **Objective-oriented** studies (rather than procedure-and process-driven procedures) can lead to timely and appropriate decisions
- **Innovative** technologies should be considered and evaluated as remedial alternatives



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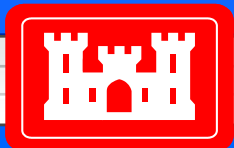






# RI/FS Approach

- The RI/FS approach is a dynamic, flexible process
- Tailored to specific circumstances of individual sites
- Promotes involvement by stakeholders and regulators



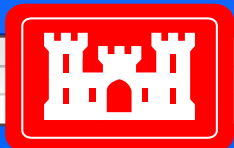
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# RI Process

- Field investigation to characterize sites
  - Geology, ownership, vegetation, topography, special environmental considerations, cultural resources, biological resources, land use, and other data studied and documented
  - Surface and subsurface MEC/MC surveys and sampling
  - Laboratory analysis, data evaluation, data management performed
  - RI Report with findings



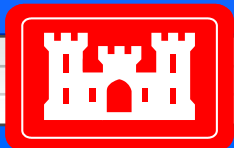
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# FS Process

- Development and screening of Remedial Alternatives (Examples)
  - No Action
  - Surface Clearance
  - Removal of MEC to Depth of Detection
  - Excavation of screening of soils
  - Institutional Controls
  - Combination of any above
- Detailed analysis of Remedial Action Alternatives with the RI data
- Development of a FS report



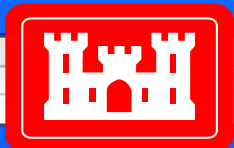
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## Initial RI/FS Activities

- Collect and analyze existing data
- Identify initial project/operable units (MRA's)
- Identify endangered/protected species/habitat
- Initiate FED/State ARAR identification
- Developing and Refining CSM and DQOs
- Prepare Project plans
- Collect RI field data

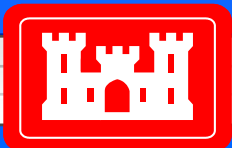


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# History



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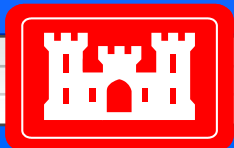
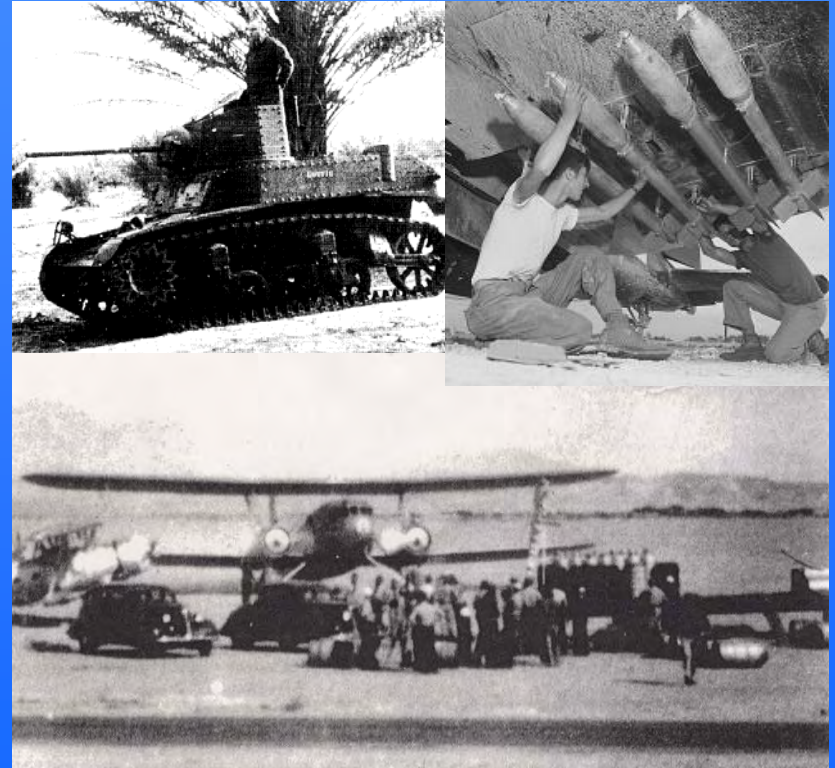






# Borrego Maneuver Area

- BMA land was obtained by the Department the Army from the State of California by use permit around 1942.
- The Borrego Maneuver Area was active from 1942 until 1944, with the primary documented user being the Army Anti-Aircraft Training Center (AARTC) at Camp Callan, California, from 1943 to 1944.
- The Borrego Maneuver Area was declared excess to the needs of the ARTC and returned to the State of California in 1944.



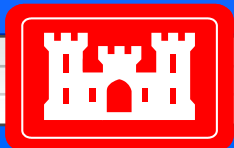
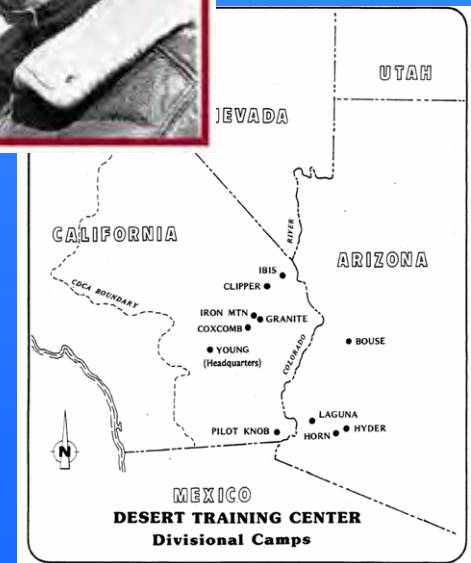
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# Desert Training Center

- General Patton created and commanded the largest training area ever in the USA, the Desert Training Center (DTC).
- The DTC was an 18,000 square-mile Army training ground used from 1942-1944.
- The DTC was also called the California-Arizona Maneuvers Area (CAMA).
- The DTC was initially established to train troops in desert survival and warfare, in anticipation of a battle with General Rommel's Afrika Corps.
- During its brief history, over a million US troops trained for combat here.
- Tanks were a primary fighting tool used at the DTC, and tank tracks still mark much of the landscape.



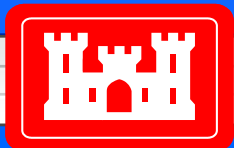
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# Clark's Dry Lake/Military Wash

- Replacement pilot and crew training in bombing, gunnery, and rocketry was performed at the Naval Clark's Dry Lake and the Borrego (Military) Wash target area's.



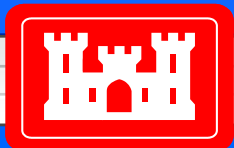
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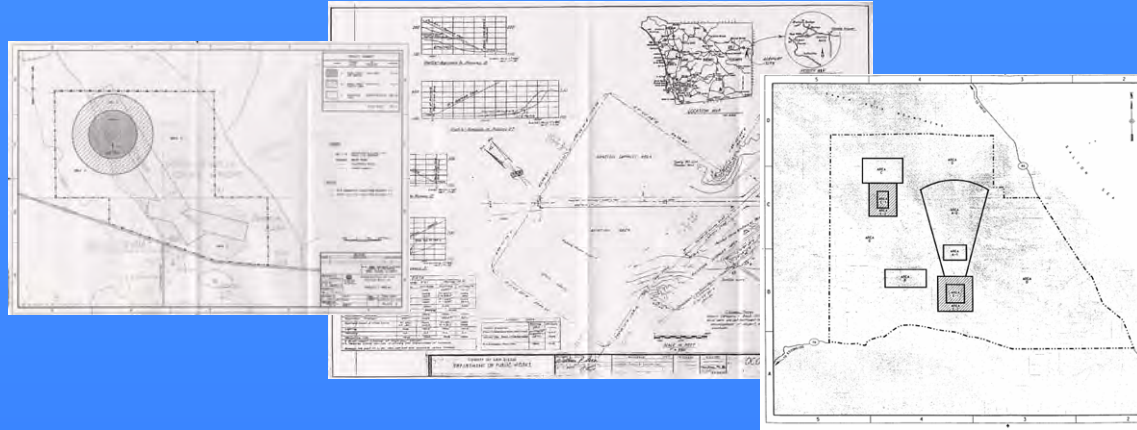
# Camp Ensign

- The Marines established a Camp at the Ensign Ranch in Borrego Springs where trainees from San Diego billeted, known as Camp Ensign.
- Groups of Marine trainees rotated through the camp for periods of about a week during which they gained proficiency in driving military trucks at night.

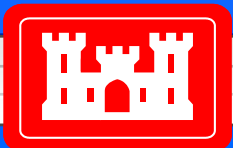


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# Conceptual Site Model (CSM)



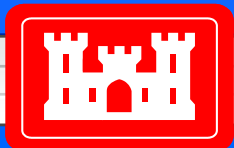
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# BMA Conceptual Site Model (CSM)

- The CSM will be an iterative model updated as new information is collected
- CSM will include information such as:
  - MRA's/MRS's
  - MEC suspected/identified
  - MC suspected/identified
  - Geology, topography, climate, biological resources, cultural resources, current/future land use, population, etc...



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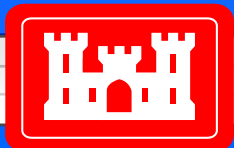
# Borrego Maneuver Area

## Current Sites:

J09CA701101	Mechanized Artillery Impact Range (A1) and Range Buffer (A2)
J09CA701102	Camp Ensign
J09CA701103	Clark's Dry Lake (E1 / E2 North)
J09CA701104	Target Area and Emergency Landing Field
J09CA701105	Military Wash (E1 / E2)
J09CA701106	Benson/Ocotillo Dry Lake Practice Bomb Target

\*\*

Other Sites as Identified



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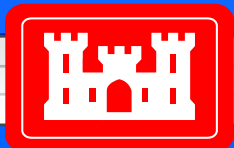
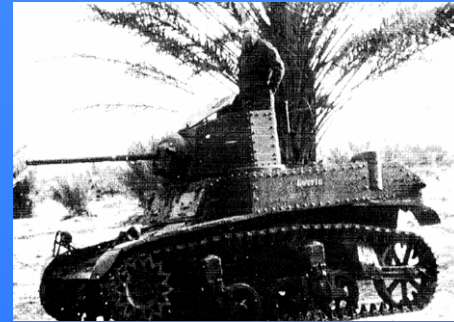


**J09CA701101**

## **Mechanized Artillery Impact Range (A1) and Range Buffer (A2)**

Area = 25,937 acres

- A1 = 2,085 ac
- A2 = 23,852 ac
- Area Type = MEC
- Past DoD Activities = MK II 40mm HE and 90mm HE projectiles
- MEC Related Items Found Since Closure = MKII 40mm HE Projectile (Impact Area only)
- Post-DoD Land Use and Current Land Use = State Park



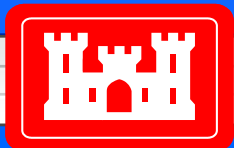
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## J09CA701102 Camp Ensign

- Area = 1,920 acres
- Area Type = Troop Billeting Area
- Past DoD Activities = No documented MEC activity
- MEC Related Items Found Since Closure = None Recorded
- Post-DoD Land Use and Current Land Use = Rural Residential



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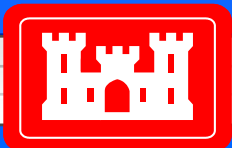


## J09CA701103

### Clark's Dry Lake (E1 / E2 North)



- Area = 5,580 acres
  - E1 North = 1,093 acres
  - E2 North = 4,487 acres
- Area Type = MEC
- Past DoD Activities = Small Arms - .50 cal Projectiles - 20mm AP, 40mm HE, 90mm HE; Rockets - 2.25" Practice, 5" HE; Bombs - 3 lbs/100 lbs Practice, 100 lbs Photoflash
- MEC Related Items Found Since Closure = Small Arms - .50 cal, Projectiles - 20mm AP, 40mm HE, 90mm HE, Rockets - 2.25" Practice, 5" HE, Bombs - 3 lbs/100 lbs Practice, 100 lbs Photoflash (E1 area only)
- Post-DoD Land Use and Current Land Use = Desert State Park



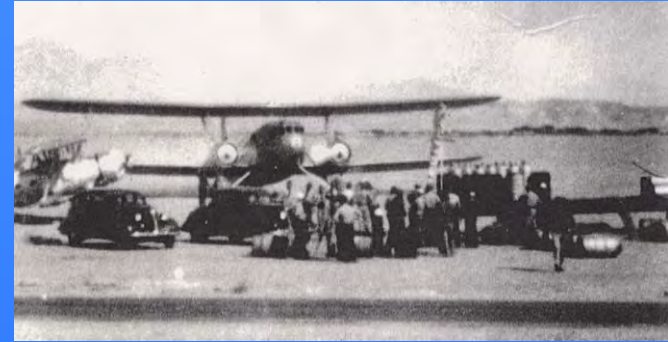
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J09CA701104

## Target Area and Emergency Landing Field



- Area = 222 acres
- Area Type = MEC
- Past DoD Activities = Small Arms - .30 / .50 cal; Projectiles - 20mm AP; Bombs – 3 / 4.5 / 100 lbs, Practice; 100 lbs Photoflash
- MEC Related Items Found Since Closure = Small Arms - .30 cal; Projectiles - 20mm AP; Bombs – 3 / 4.5 / 100 lbs Practice, 100 lbs Photoflash (Debris only)
- Post-DoD Land Use and Current Land Use = Desert Open Land



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## J09CA701105 Military Wash (E1 / E2)

- Area = 7,317 acres
  - E1 South = 2,019
  - E2 South = 5,298
- Area Type = MEC
- Past DoD Activities = Small Arms - .50 cal; Projectiles - 20mm AP, 40mm HE, 90mm HE; Rockets - 2.25" Practice, 5" HE; Bombs - 3 lbs/100 lbs Practice, 100 lbs Photoflash
- MEC Related Items Found Since Closure = Small Arms - .50 cal; Projectiles - 20mm AP, 40mm HE, 90mm HE; Rockets - 2.25" Practice, 5" HE; Bombs - 3 lbs/100 lbs Practice, 100 lbs Photoflash (E1 area only)
- Post-DoD Land Use and Current Land Use = Desert State Park



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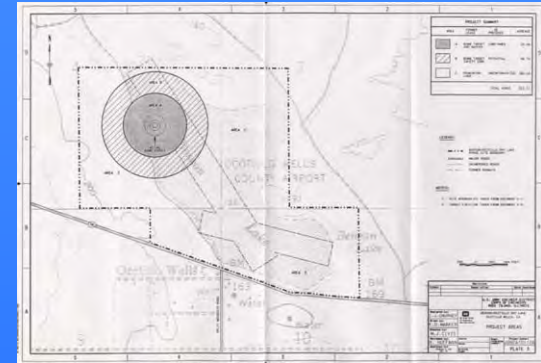




# J09CA701106

## Benson/Ocotillo Dry Lake Practice Bomb Target

- Area = 353 acres
- Area Type = MEC
- Past DoD Activities = Small Arms - .50 cal; Bombs – 3 / 4.5 / 100 lbs Practice, 100 lbs Photoflash (no evidence of high explosive munitions used)
- MEC Related Items Found Since Closure = Small Arms - .50 cal; Bombs – 3 / 4.5 / 100 lbs Practice, 100 lbs Photoflash (no evidence of high explosive munitions used)
- Post-DoD Land Use and Current Land Use = Municipal Airport



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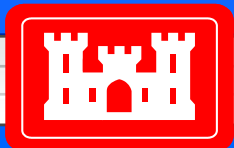






## Other Sites

- J09CA016700 Winona BT 1 #90
- J09CA016800 Winona BT 2 #91
- Rocketville
- Bombville
- ??
- ??



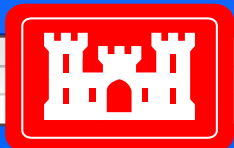
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# Munitions Constituents (MC) Summary List

- Possible Explosive/Incendiary/Propellant studied (not inclusive)
  - Smokeless Powder
  - Red Phosphorus
  - Flash Powder
  - Black Powder
  - TNT
  - Tracer Composition
  - Composition B
  - Ballistite
  - Double Base Powder
  - Pyrotechnic Mixture
  - E.C. Blank Powder



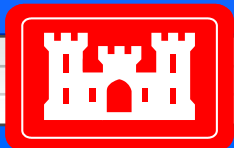
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# Munitions Constituents (MC) Summary List

- Possible Metals/others studied (not inclusive)
  - Antimony
  - Arsenic
  - Chromium
  - Copper
  - Lead
  - Magnesium
  - Thallium
  - Zinc
  - Perchlorate



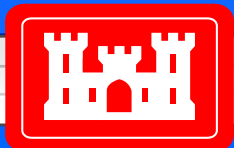
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# Munitions of BMA

As listed in the Archive Search Reports (ASR)



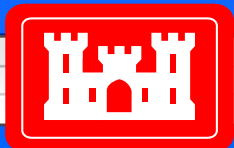
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# BMA Munitions Inventory

- Bomb, 3 to 4.5-LB Practice
- Bomb, 100-LB Photoflash, AN-M46
- Bomb, 100-LB Practice, MK15 MOD 3
- Bomb, 100-LB Practice, MK15 MOD 4
- Bomb, 100-LB Practice, M38A2
- Projectile, 20MM AP
- Projectile, 40MM HE
- Projectile, 90MM HE
- Rocket, 5-Inch HE
- Rocket, 3.25-Inch Practice Target
- Rocket, 2.25-Inch Practice Target
- Small Arms Ammunition, .30/.50 Caliber
- Others will be added if identified in RI/FS



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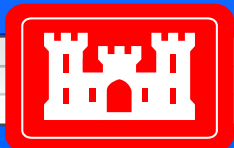
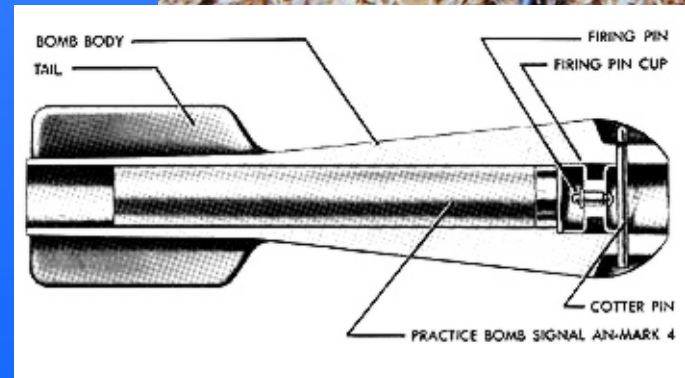
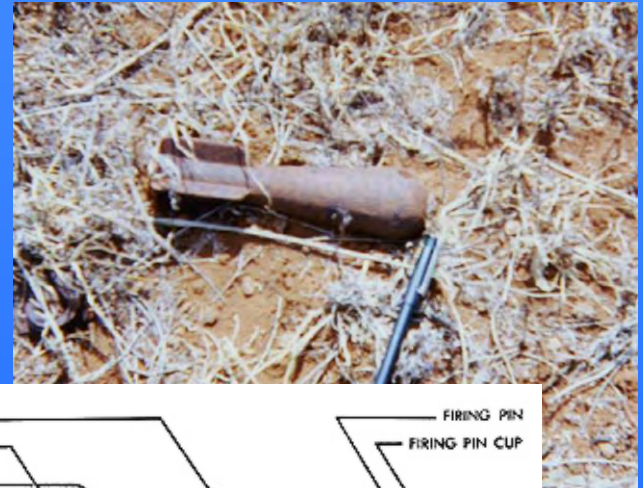






## Bomb, 3 to 4.5-LB Practice

- Zinc or Cast Iron Construction
- AN-MK5 or MK23
- Contains a AN-MK4 smokeless powder/red phosphorus spotting signal
- Possible trace Perchlorate source



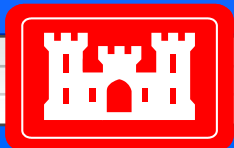
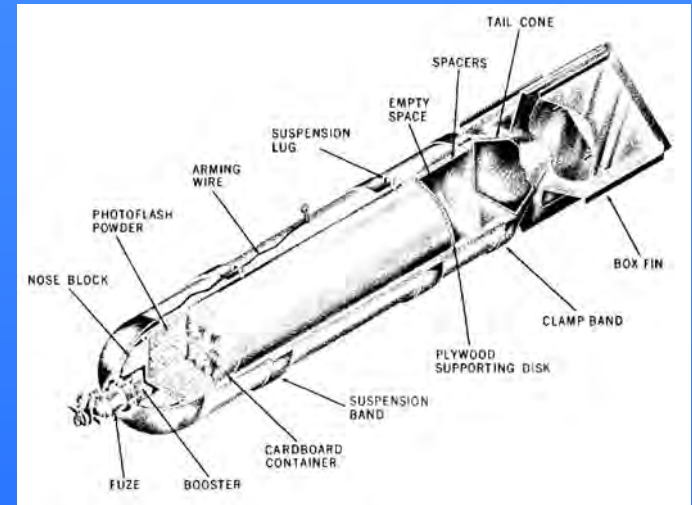
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# Bomb, 100-LB Photoflash, AN-M46

- Contains 25 Lbs Flash Powder
- Possible Perchlorate source



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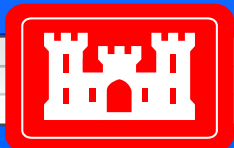
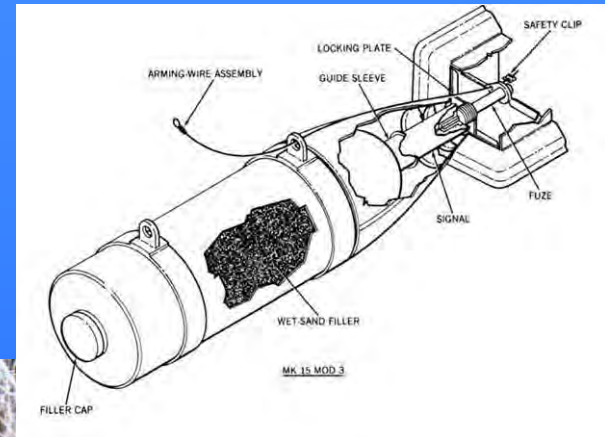






# Bomb, 100-LB Practice, MK 15 MOD 3

- Sand/Water filled practice bomb
- Contains a 1 Lb Black Powder Spotting Charge
- No known Perchlorate sources



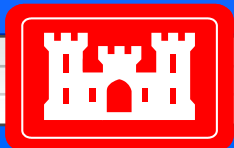
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# Bomb, 100-LB Practice, MK 15 MOD 4

- Sand/Water filled practice bomb
- Contains a smokeless powder/red phosphorus spotting signal
- Possible trace Perchlorate source



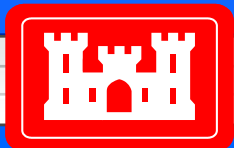
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# Bomb, 100-LB Practice, M38A2

- Contains a 3-lb Black Powder spotting charge
- No known Perchlorate sources



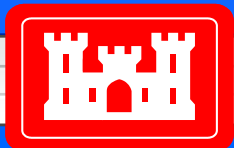
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# Projectile, 20MM, AP-T

- Fired by A/C at ground targets
- AP does not contain explosives
- Contains tracer composition
- Possible Perchlorate source (trace amounts)



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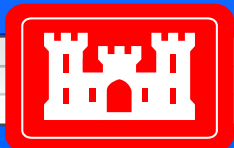
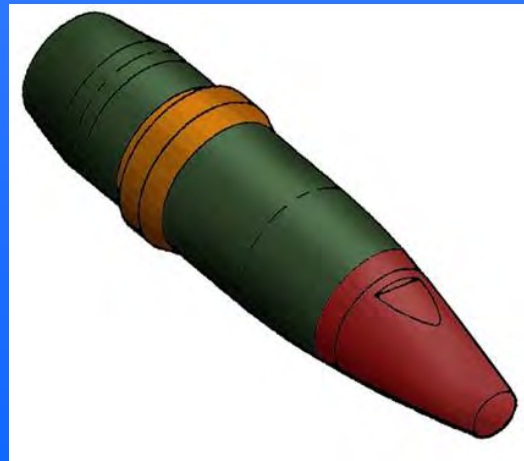






# Projectile, 40MM HEI-T, MKII

- Contains 88 grams of TNT
- Self Destruct Tracer with 2 grams Black Powder
- Tracer may be a trace Perchlorate source



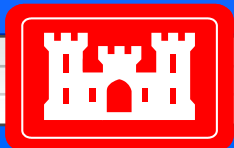
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# Projectile, 90MM HE, M71

- Contains 975 grams of Composition B explosives
- No tracer
- No known Perchlorate sources



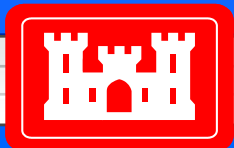
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# Rocket, 5-Inch HE

- Used against enemy troops, Bivouac areas and light armor
- Contains 8.6 Lbs TNT in warhead, 8.5 LBS Ballistite in motor
- May have Perchlorate properties in Ballistite



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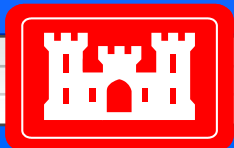
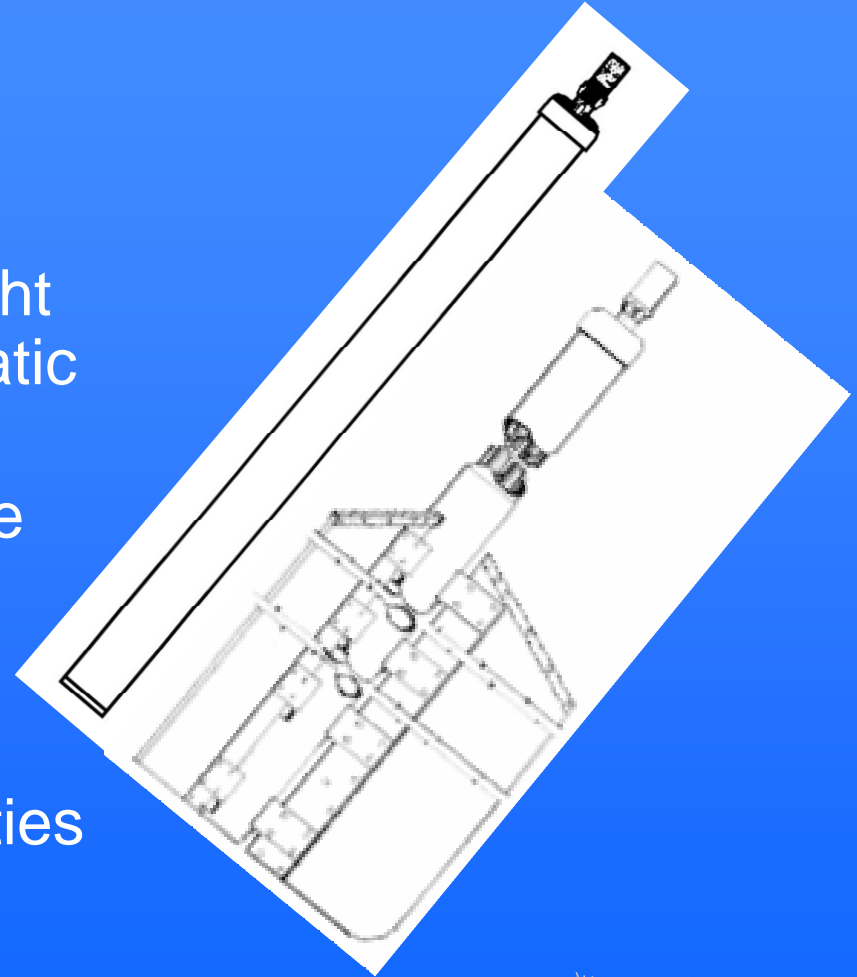






# Rocket, 3.25-Inch Practice Target

- Used for target practice at night by surface troops with automatic weapons
- Contains 3.2 Lbs Double Base Powder and a flare with a pyrotechnic mixture Flare
- No HE Warhead
- May have Perchlorate properties



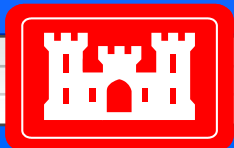
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# Rocket, 2.25-Inch Practice, Target. (SCAR)

- Contains 1.75 Lbs Ballistite and a tracer composition
- May be perchlorate source



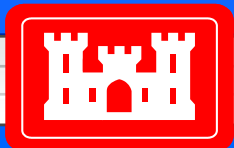
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# Small Arms Ammunition

- Includes .30 and .50 caliber
- Contains Lead Antimony on some versions
- Contains tracer composition on some versions
- May have trace Perchlorate from double base powder and tracers



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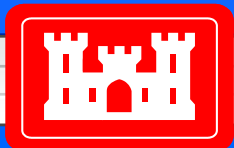




# Safety Procedures for Unexploded Ordnance

## Safety Precautions

- Do not touch
- Consider all suspect munitions parts dangerous
- Minimum amount of time near suspected items
- Never attempt to move or uncover
- Never use a cell phone or radio within 50 feet
- Never assume color code is accurate



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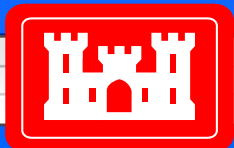




# Safety Procedures for Unexploded Ordnance

**Report the item, be prepared to provide:**

- General description length, width, color
- If the location is amenable to a blow-in-place, for example, is it near a structure or open space
- Take a digital photo to e-mail to responding agency
- Be prepared to take responders back to the location
- With highly visible flagging
- Get coordinates if possible, hand held GPS
- If in area frequented by visitors, close area or leave guard to eliminate chance encounters



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