

***The Ordnance Time Almost Forgot
MMRP Time Critical Removal Action
At the
Tilcon Quarry, Picatinny Arsenal***

December 4, 2007





Time Critical Removal Action (TCRA) Tilcon Quarry Background

- During a Site Inspection in the Spring of 2006 it was discovered that Picatinny EOD had responded on numerous occasions to the Quarry
- Further investigation identified the 1926 Lake Denmark explosion as the origin of MEC recovered by EOD
- A subsequent visit to the quarry indicated that as mining operations were moving closer to 1926 explosion site more MEC items were being recovered
- Fall of 2006 it was deemed prudent to immediately initiate a TCRA for the Quarry
- An accidental detonation in a quarry crusher in Dec 2006 validated the expedited response plan



Picatinny Arsenal History

- Army Powder Depot – 1880
- Navy Establishes Post – 1891
- Army Constructed Powder Factory – 1907
- Army develops process for manufacturing complete rounds
- Installation experiments with new types propellant and HE
- Experiments with melt and press loading HE
- Develops Fuze and booster loading
- Develops Pyrotechnics Plant



Picatinny Arsenal History

- Explosives at Picatinny Arsenal at the time of 1926 explosion
 - Bulk Black Powder
 - Stored 25 -100 pounds in iron barrels
 - Smokeless Powder
 - Stored 110 pounds in metal lined boxes
 - Gun Cotton stored wet (20% water)
 - TNT
 - Stored in crystalline form in wooden boxes
 - Amatol
 - Explosive D
 - Ammonium Nitrate
 - Picric Acid
 - Mercuric Fulminate
 - Nitroglycerin
 - Dynamite
 - Miscellaneous Experimental Explosives



Lake Denmark, Saturday, July 10, 1926

- Deemed the "Disaster that rocked Morris County"
- Historical evidence indicates a lightning bolt struck the Lake Denmark Naval Ammunition Depot
- Three detonations were triggered within 30 minutes of lightning strike
- Resulting fire destroyed over 7 miles of the base and resulted in a series of minor explosions for 3 days
- Local headlines reported the blasts could be felt as far as 30 miles away
- The depot was virtually destroyed.



Lake Denmark Powder Depot

- 10 July 1926
- First explosion occurred at 5:20 PM
 - Two detonations in Magazine 8 – 775,000 lbs. TNT loaded in depth charges
 - Five Minutes later Magazine 9 detonated – 167,000 lbs. TNT loaded in depth charges
 - Twenty Minutes later Shell House 22 detonated – Projectiles and bombs
 - Bulk Explosive Storage Facilities did not detonate but burned
- Lighting cause of fire and detonation
- 3.2 million pounds of explosives burned or detonated:
 - Small arms, bulk explosives, projectiles, depth bombs & aerial bombs
- Approximately 2.4 million pounds of explosives detonated
- 21 People Killed
- All 500 buildings damaged
- \$84 Million dollars in damages (1926 dollars)
- 35ft. craters formed at detonation points
- Kick-outs up to 1 mile around ground zero



Lake Denmark Powder Depot

TEMPORARY MAGAZINE NO. 8.

	WEIGHT OF EXPLOSIVES
2106 50 LB. DEPTH CHARGES	105,300
AISLE-20 FT.	
100 MK I. A.C. BOMBS	2,500
1150 MK II A.C. BOMBS	141,460
AISLE-3 FT.	
1800 300 LB. DEPTH CHARGES	540,000

TOTAL- 789,260

TEMPORARY MAGAZINE NO. 9.

	WEIGHT OF EXPLOSIVES
1200 100 LB. BOXES TNT. (BULK)	120,000
AISLE-20 FT.	
500 100 LB. BOXES TNT. (BULK)	50,000
BOMB PARTS IN BOXES	
200 MK II A.C. BOMBS	34,600
AISLE-10 FT.	
25,000 50 LB. BOXES TNT GRADE "A" (BULK)	1,250,000
T.N.T. (BULK)	237,000

1,691,600

SHELL HOUSE NO. 22

40 14" PROJECTILES	
AISLE-3 FT.	
80 14" A.P. PROJECTILES	
2931 MK I. A.C. BOMBS	
200 MK II BOMBS	
2200 MK II BOMBS	
600 6" PROJECTILES	
AISLE-8 FT.	
1400 B-MKI BOMBS	
1000 5" PROJECTILES	

775,000

SIZE OF BUILDINGS APPROXIMATELY 50 X 200 FT.



Lake Denmark Powder Plant

- Two large craters were filled in with debris, ordnance and soil
- Fill sites are secured by fence
- Numerous ordnance items have been found throughout installation
- No investigations have been conducted



Crater made by explosion of Building 8:
approx. 670,000 lbs. of TNT stored

Panoramic view of Navy Hill with fires still
burning. Lake Picatinny in foreground





Lake Denmark Powder Plant



The landscape near the explosion





Lake Denmark Explosion Area





Lake Denmark Main Gate





Lake Denmark Post Detonation





Tilcon Quarry

- Tilcon Quarry located southeast of Picatinny Arsenal, 800 ft. from 1926 explosion
- Rock quarrying has been conducted since the 1950s
- Ordnance finds have only been reported within the last two years – 9 items
- Interviews with workers indicate that ordnance have been found over the last 20 years
- Thursday, December 15, 2006 detonation occurred in rock crusher
- TCRA started following Monday





Site Inspection Picatinny Arsenal, NJ



MALCOLM
PIRNIE

Map 4-1
1926 Explosion Site - Off Installation
SI Activities and Findings
Legend

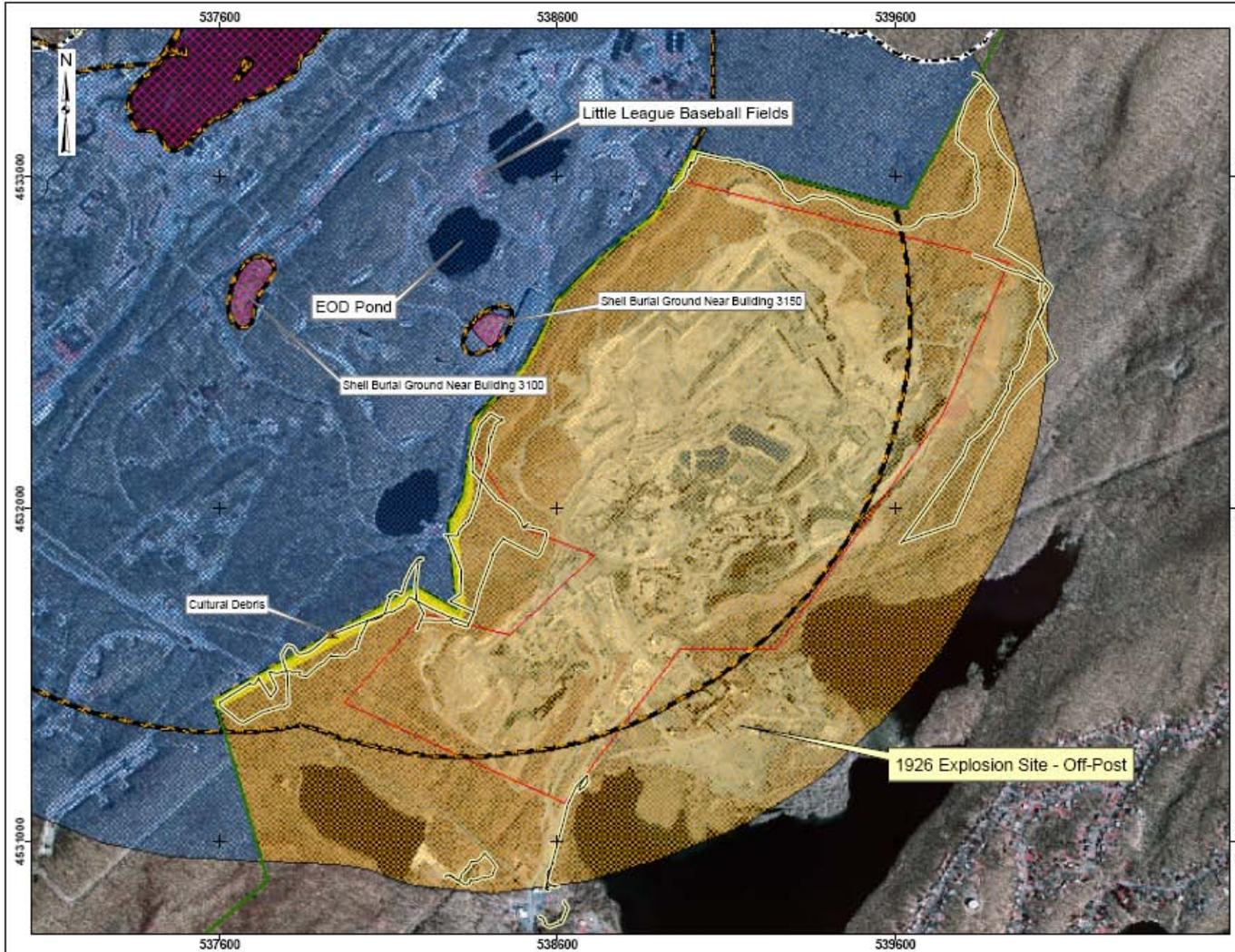
- Installation Boundary
- Approximate Area for Visual Survey
- Adjacent MRS
- CTT Range/Site Inventory**
- 1926 Explosion Site
- Historical Records Review**
- 1926 Explosion Site
- 1926 Explosion Site - Off-Post
- Military Range Area**
- Operational Range Area
- Mt. Hope Quarry
- Surface Danger Zone
- Site Reconnaissance
- Munitions Debris

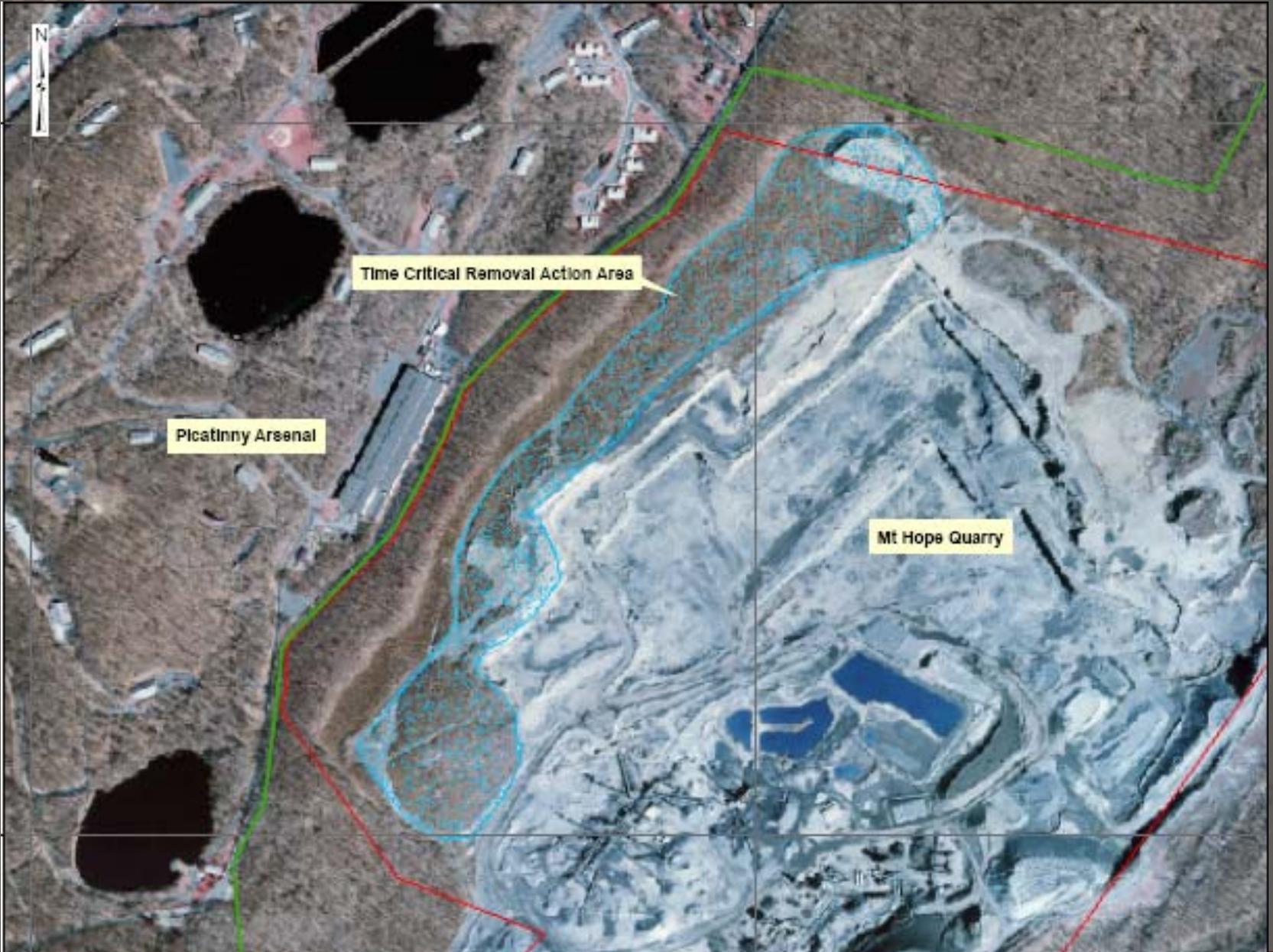
0 215 430 860 Meters

Data Source: Aerials: NJDEP, CIR, Orthomagery, 2002
CTT Data: AEC, CTT Range Inventory, 2005

Coordinate System: UTM Zone 18N
Datum: NAD 83
Units: Meters

Contract: W912DR-05-D-0004
Edition: Internal Draft Site Inspection
Date: August 2007







Digital Geophysical Mapping

Geophysical Prove-Out

- 50 ft by 75 ft
- 19 seed items
- EM-61 performed best
 - 95% PD
- 9 mV Threshold



ID	Item	Depth (inches)
1	105 mm projectile	12
2	5-inch projectile	24
3	155 mm projectile	12
4	105 mm projectile	24
5	155 mm projectile	24
6	122 mm projectile	12
7	105 mm projectile	42
8	(2) 105 mm projectiles	42
9	122 mm projectile	36
10	105 mm projectile	24
11	155 mm projectile	36
12	Scrap found on-site	12
13	105 mm projectile	36
14	122 mm projectile	48
15	122 mm projectile	48
16	Trailer Ball	12
17	Partial 5-inch projectile	24
18	155 mm projectile	60
19	122 mm projectile	36



Results of TCRA

- 3,380 Anomalies Detected
- 2,729 Anomalies Reacquired
- 3,375 Pounds Munitions Debris
- 1,583 Pounds of Scrap Metal
- 21 MEC Items Found
 - 10 - 5 Inch Projectiles
 - 11 - 6 Inch Projectiles
- MEC found between 1" - 48" bgs





TCRA Report
Piscataway Army Arsenal, NJ

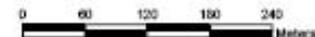


Map 2-1
TCRA Grids

Legend

- Installation Boundary
 - Mt. Hope Quarry
 - TCRA Area - 22.6 acres
 - DGM Grid*
- Discarded Military Munitions
- 5" Projectile (1/2 round with HE)
 - Complete 5" projectile with HE
 - Complete 5" projectile empty
 - Complete 5" projectile with HE

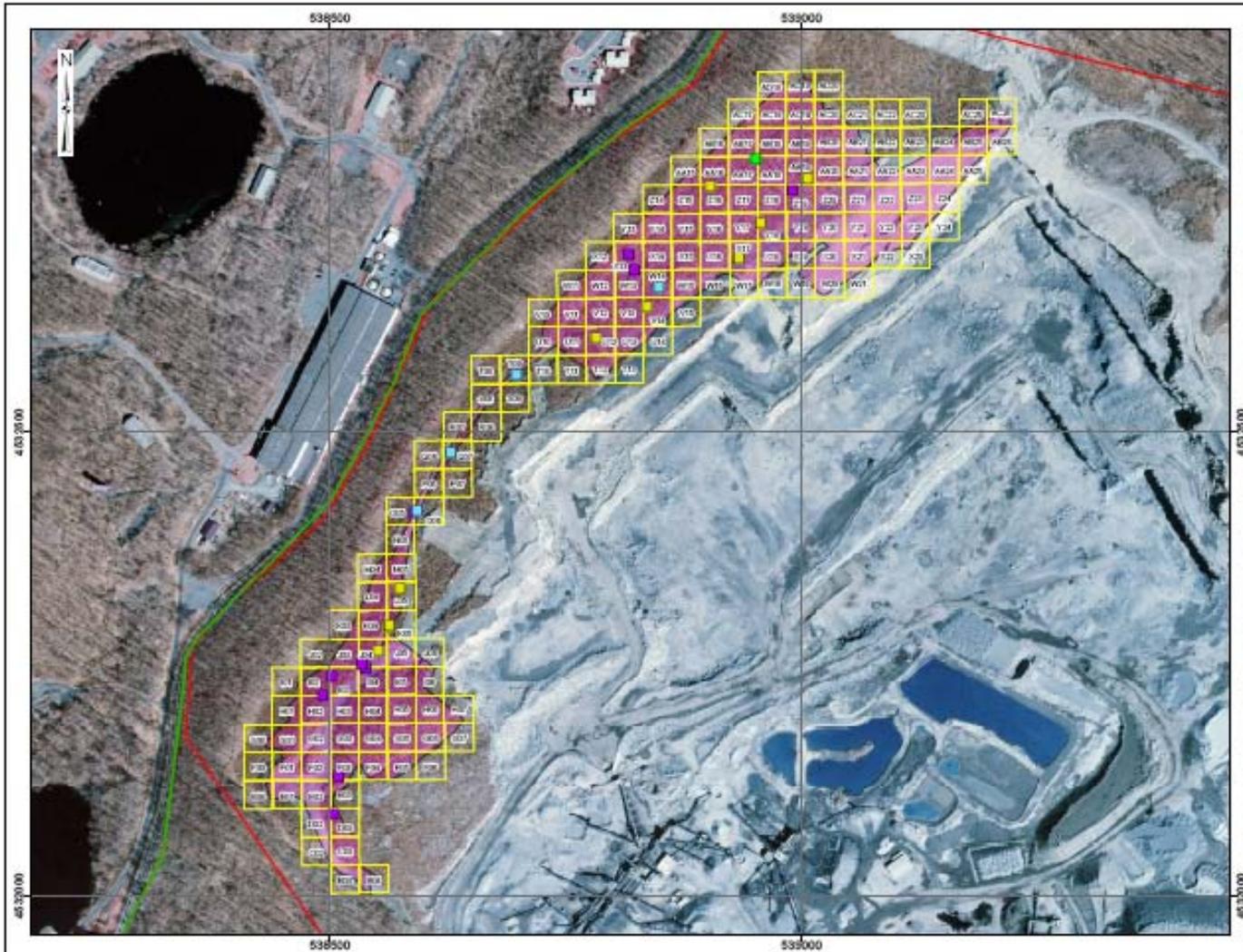
*The grid areas outside the TCRA boundary were only surveyed within the boundary.



Data Source: Aerials: NJDEP, CIR Orthomography, 2002
CTT Data: AEC, CTT Range Inventory, 2006

Coordinate System: UTM Zone 18
Datum: North American Datum 1983
Units: Meters

Contract: W912DR-05-D-0004
Date: August 2007





Tilcon Safety Brief and FACT Sheet



US Army Corps of Engineers

FACT SHEET

1926 EXPLOSION SITE

Off-Post
Munitions
Response
Site

Mount Hope, New Jersey

The U.S. Army Corps of Engineers (USACE) has completed a Time Critical Removal Action at the 1926 Explosion Site—Off-Post (Mt. Hope Quarry) to address the threat to human health posed by Munitions and Explosives of Concern (MEC) to workers and site visitors from items and/or material dispersed by the 1926 Explosion.

Experience has shown that due to the public's fascination with military ordnance, individuals sometimes remove MEC to keep as souvenirs, MEC that may have been removed from Mt. Hope Quarry or Picatinny Arsenal may be particularly hazardous due to the manner in which they were emplaced (by the 1926 Explosion). Given the potential hazards to human life posed by these materials, local authorities have implemented a program where ordnance items which are reported will be safely removed from the property with no action taken against the owner or resident. Again, these items are considered extremely dangerous. The explosives contained within older ordnance degrades over time and may become even more sensitive and unstable.

Definition

MEC is a specific category of military munitions that may pose unique explosives safety risks. They may be unexploded ordnance, discarded military munitions, or munitions related chemical constituents present in high enough concentrations to pose an explosive hazard.

Informational - Please Read

Munitions and Explosives of Concern (MEC) Safety

If you encounter known MEC or items you suspect may be MEC, follow the 3 R's

1 Recognize: When you discover a suspicious item or possible munitions, remember that they can be very dangerous. Do not touch, kick, throw or do anything else to disturb the item. Also, remember that the munitions are sometimes not readily identifiable, and may appear to be any other metallic or rusty item. Use caution, leave it alone and do not touch it.

2 Retreat: If you encounter a suspicious item, possible MEC, or any potentially hazardous item, mark the general location of the item (a minimum of 10 feet away) and retreat to a minimum of 300 feet away on the same path used to approach the item.

3 Report: Remember the location of the suspicious items and call your local police department.

If you have or suspect you have MEC (ordnance) in your home or on your property please call your local law enforcement or 911



Munitions debris identified at the quarry. Items include fragments of 3", 5", and 6" projectiles.



5-inch Projectile identified at the quarry.

Safety FIRST

- USACE BAL & Malcolm Pirnie provided MEC Safety Training to Tilcon Employees
- One employee had ordnance at home
- FACT sheet distributed to all Tilcon employee's





Questions?