



# Environmental Remediation Workshop

## KERP UXO Briefing

Kuwait Environmental Remediation Projects

*“Restoring Kuwait Treasures”*

v. 19 Jan 2015



# Kuwait Environmental Remediation Projects UXO Safety Awareness Briefing



## Purpose of this presentation.

- **History – Gulf War**
- **Impact / Results**
- **Possible types of Ordnance to be encountered**
- **Safety while in the field**

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## History

August 2, 1990 – February 26 1991



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## After the Battle



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## Environmental Impact

- 114 sq km of impacted surface area
- 798 wellheads detonated
- 603 caught fire
- Over 9 million barrels of oil discharged to sea
- Over 1 billion barrels of oil released/burned from wells
- 100 km of oil filled trenches
- Over 26 million cubic meters of contaminated soils
- **Unexploded Ordnance**



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## Unexploded Ordnance



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## Types of Ordnance you may encounter

- Mines
- Projectiles
- Grenades
- Sub Munitions

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## Mines



# Mines

## Normally two categories

Anti Personnel and Anti Tank



## Mines Anti Personnel Mines



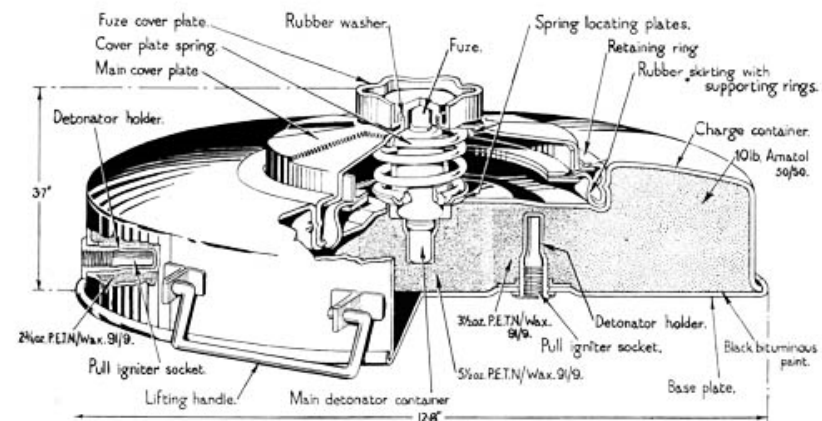
- Generally small in size.
- Made to mame not kill.
- Normally surrounds Anti Tank mines.
- Requires very little pressure to activate.

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## Mines Anti Tank

- Generally much larger.
- Meant to disable or destroy vehicles.
- Requires much more pressure to activate. (300 plus pounds)



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## Projectiles



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## Projectiles

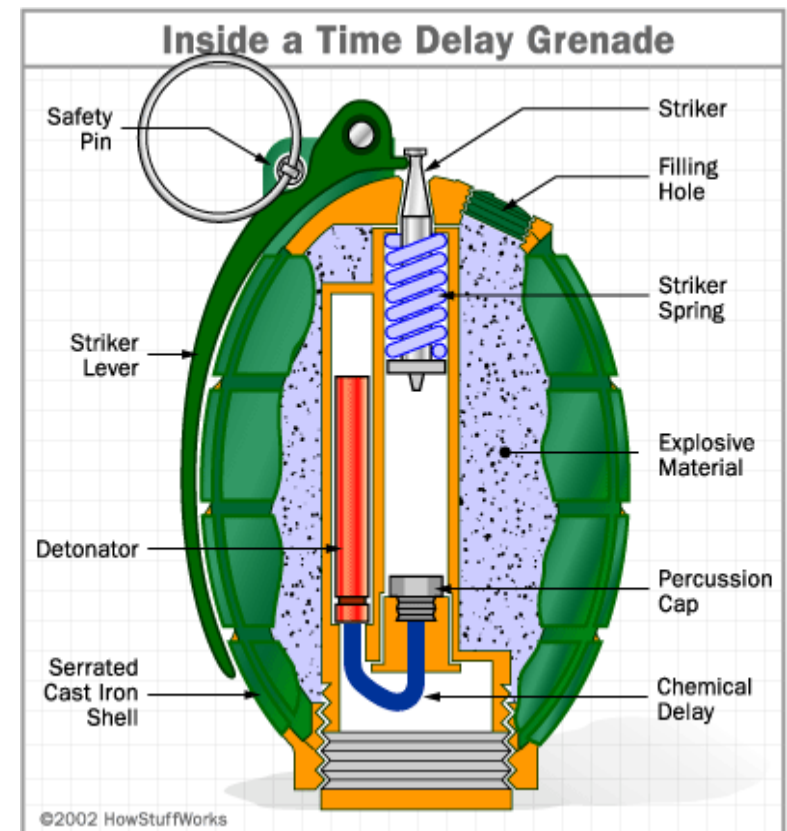


**From 20mm to 16 inches in diameter.**

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## Grenades

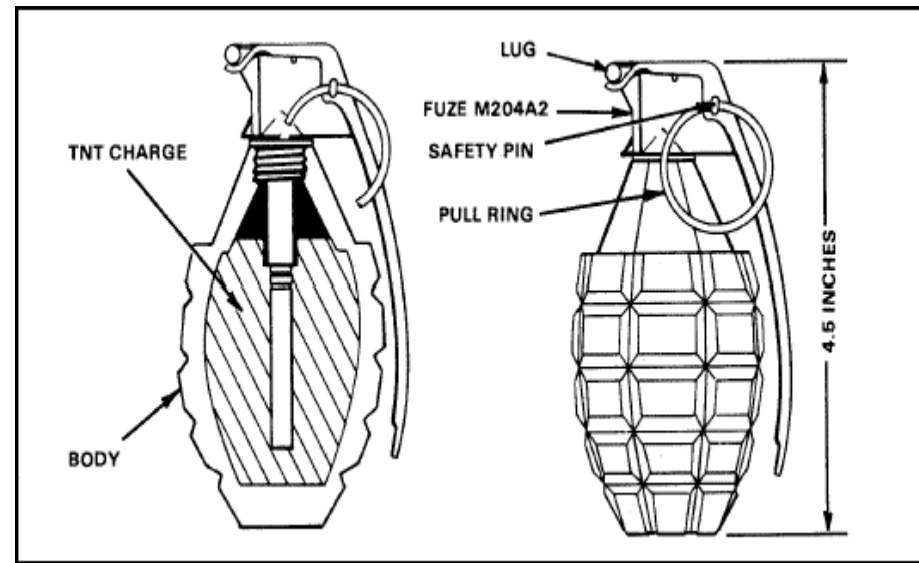


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## Grenades

EXAMPLES OF MILITARY GRENADES



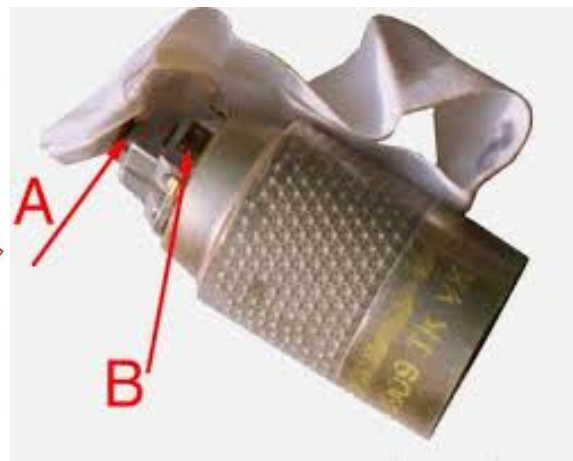
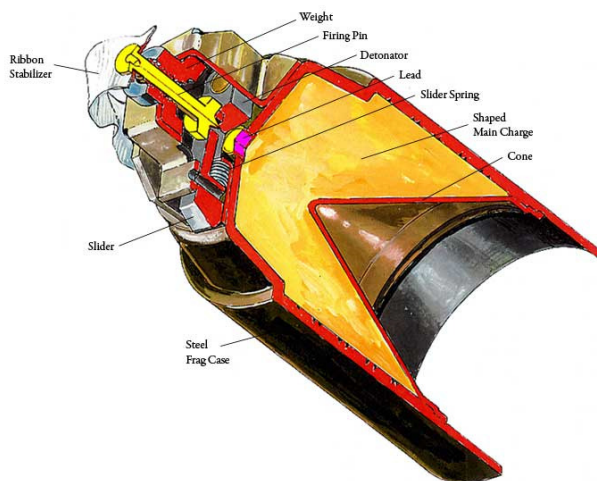
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## Sub-munitions



- Generally come in large numbers.
- Very sensitive to touch.
- Blow in place only.



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## Sub-munitions



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## Sub-munitions



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## Sub-munitions



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## Sub-munitions



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## Previous clearance efforts...

- 1992-97 Expedited UXO clearances done.
- Usually done on the surface or only to a depth of 10 cm.
- Drifting sands and flash flooding could have a negative impact.
- Wet Lakes were not done.
- Current clearance certificates do not meet the required depth of clearance for the KERP remediation projects.

There are no clearance certificates for the wet lake features. Therefore all areas will be subjected to further UXO survey and clearance to a depth which meets the remediation requirements. Due to shifting sands and depth limitations, all areas will need to be reinvestigated. Advancements in technology over the past 20+ years greatly improve our search capability. **This UXO clearance will be done in accordance with KNFP (NMAA for KERP) guidelines.**

# Kuwait Environmental Remediation Projects

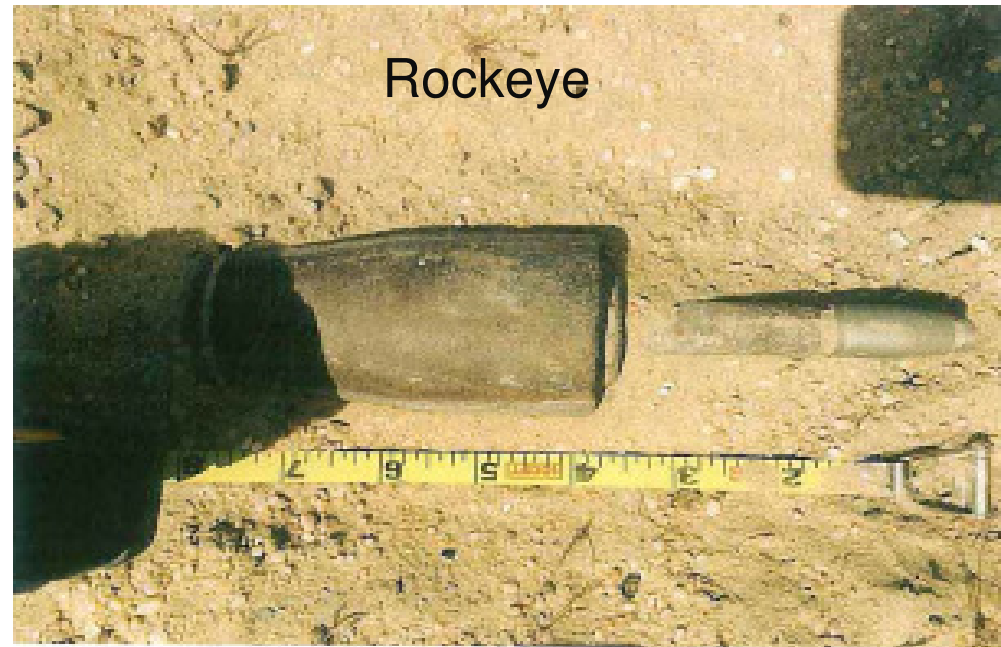
## UXO Safety Awareness Briefing



## Items found at the SEK Landfill location

**These items were found below the surface  
in areas with existing clearance certificates.**

Total Area Cleared : 389,804 square meters



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## Munitions Debris



## Items found at the NK Landfill location

1 High Explosive and  
4 Armor Piercing High Explosive

**These items were found below the surface  
in areas with existing clearance certificates.**

Total Area Cleared: 539,260 square meters

100mm High Explosive  
Projectile



100mm APHE



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## Shifting Sands and Flash Flooding

This can cause Mines or Ordnance to migrate



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## Safety on Site and review.

- Stay on established paths or roads.
- Bring a UXO escort when venturing into a new areas.
- **If you didn't bring it with you, it's not yours. Leave it alone.**
- If you suspect you have found a UXO remember the 3 “R’s”.

- **Recognize**
- **Retreat**
- **Report**



M16 Anti Personnel Mine

Notify KOC Emergency Control Center ( **ECC – Tel: 160 / 97299100** )

## Summary

- **Remediation Investigation / Design activities (Soil Sampling, Site Survey and Mapping) will require a minimum of UXO anomaly avoidance support.**
- **Survey and clearance to a depth of investigation sufficient to support proposed soil remediation methods will be required prior to any remediation activities involving the removal and treatment of contaminated material.**
- **Any intrusive operations below the stated depth of investigation provided on the clearance certificate will require UXO support during construction activities.**

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Any Questions?