

Headquarters U.S. Air Force

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Hot Topics: An Overview



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Anatomy of a Hot Topic

- What are “Hot Topics”?
- What do they have in common?
- How should they be approached?
- Examples of recent Hot Topics
 - MTBE
 - Perchlorate
 - UXO/Energetics





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What are Hot Topics

- **Special contamination problems that may require unique technological solutions**
- **Topics often addressed at a policy level**
- **Topic knowledge often lags behind the demand to take action**



What Do They Have In Common?

Widespread Occurrence

- **Usually involve risk management issues**
- **Emerging science and technology**
- **Diverging views on appropriate action**
- **High visibility with the public and regulators**
- **Potential for costly remediation**
- **Difficult to program for resource requirements**





How Should They Be Approached?

- **Obtain the latest DoD and Air Force policy and monitor policy decisions**
- **Be aware of current scientific and technological information**
- **Develop a plan of action**
- **Be prepared to answer community concerns with facts**
- **Use a team approach if appropriate**



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MTBE

- **Methyl tertiary butyl ether**
- **Oxygenate in reformulated gasoline (RFG)**
- **RFG must be sold in 10 largest metro areas with greatest summertime ozone problems**
- **14 major U.S. public water supplies are contaminated**
- **Current usage: 350,000 gpd**



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MTBE Issues

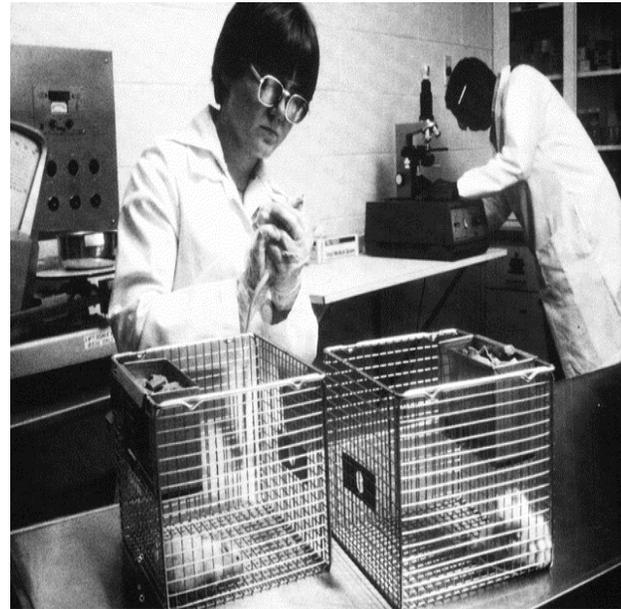
- **Use of oxygenates in RFG has led to a 27% reduction in VOCs (EPA, 2000)**
- **“There is no significant additional air quality benefit to use of oxygenates like MTBE...” (UC-Davis, 1998)**
- **EPA published Advanced Notice of Proposed Rulemaking to issue rule under TSCA that would change the use of MTBE (March, 2000)**
- **High remediation costs due to high water solubility, low sorption, and slow biodegradation**



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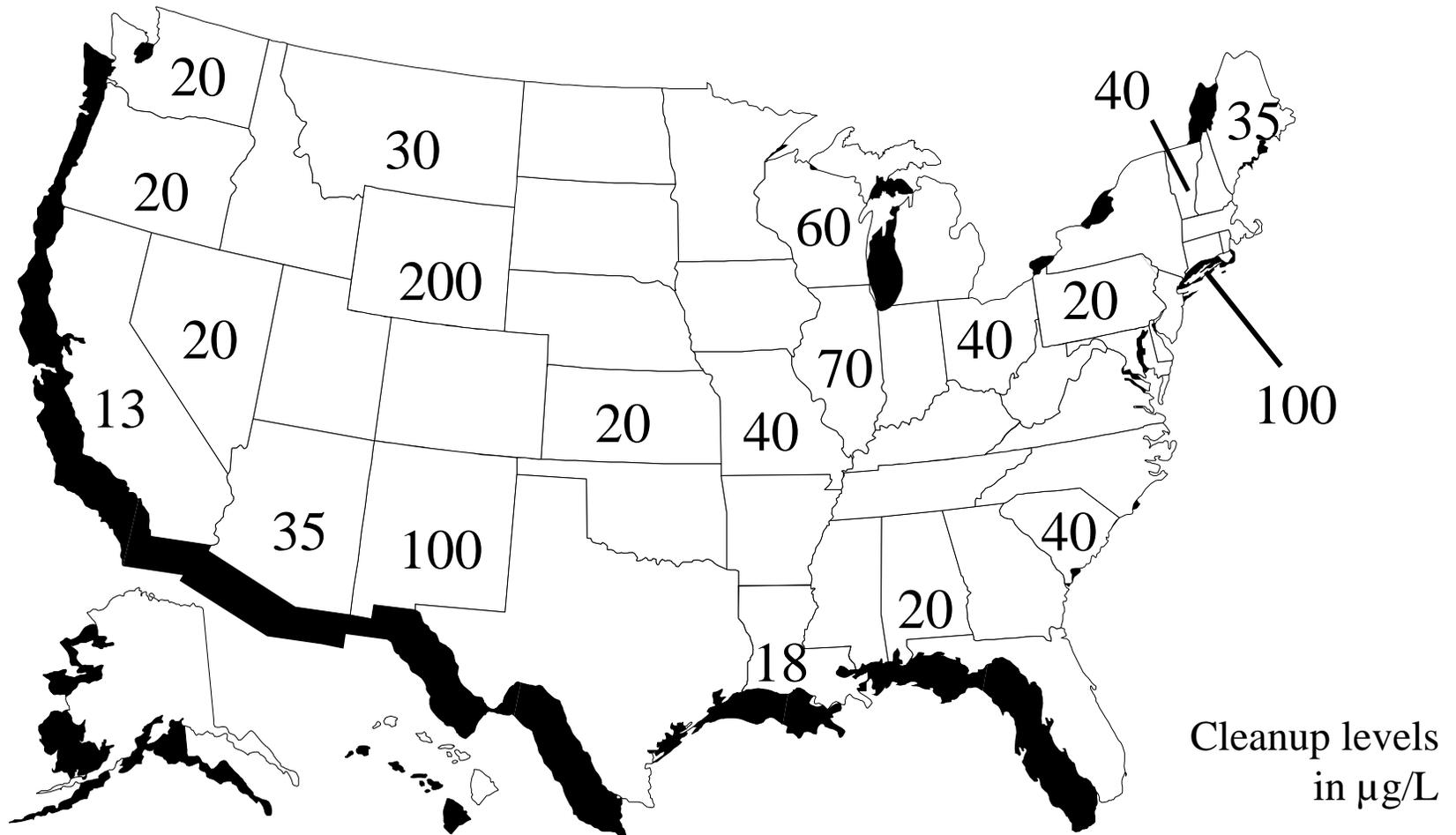
MTBE – Regulatory Status

- **Canada – considered “not toxic” to humans or the environment**
- **USEPA Preliminary Remediation Goals for drinking water**
 - **Reg III – 6,300 ug/l**
 - **Region IX – 20 ug/l**
- **California remediation goal – 6.3 ug/l**
- **State Safe Drinking Water Act values**





MTBE SDWA Cleanup Levels by State Current & Proposed (March 2000)



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Cleanup Technologies

- Air stripping
- Activated charcoal
- Enhanced bioremediation
- Air sparging

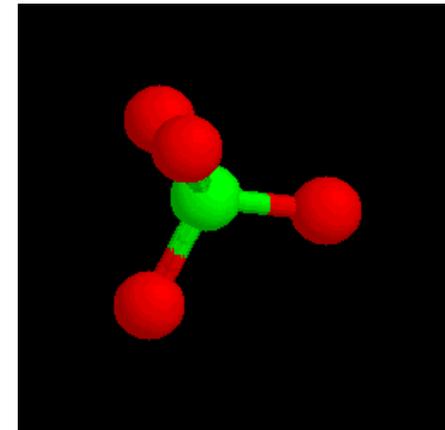


- **38 bills introduced by 106th Congress**
 - **Examples**
 - **“to waive the oxygen content” in RFG**
 - **“to prohibit the use of MTBE...in gasoline”**
 - **“to provide funding for MTBE contamination”**
- **Bioremediation research:
most promising cleanup
technology**



Perchlorate

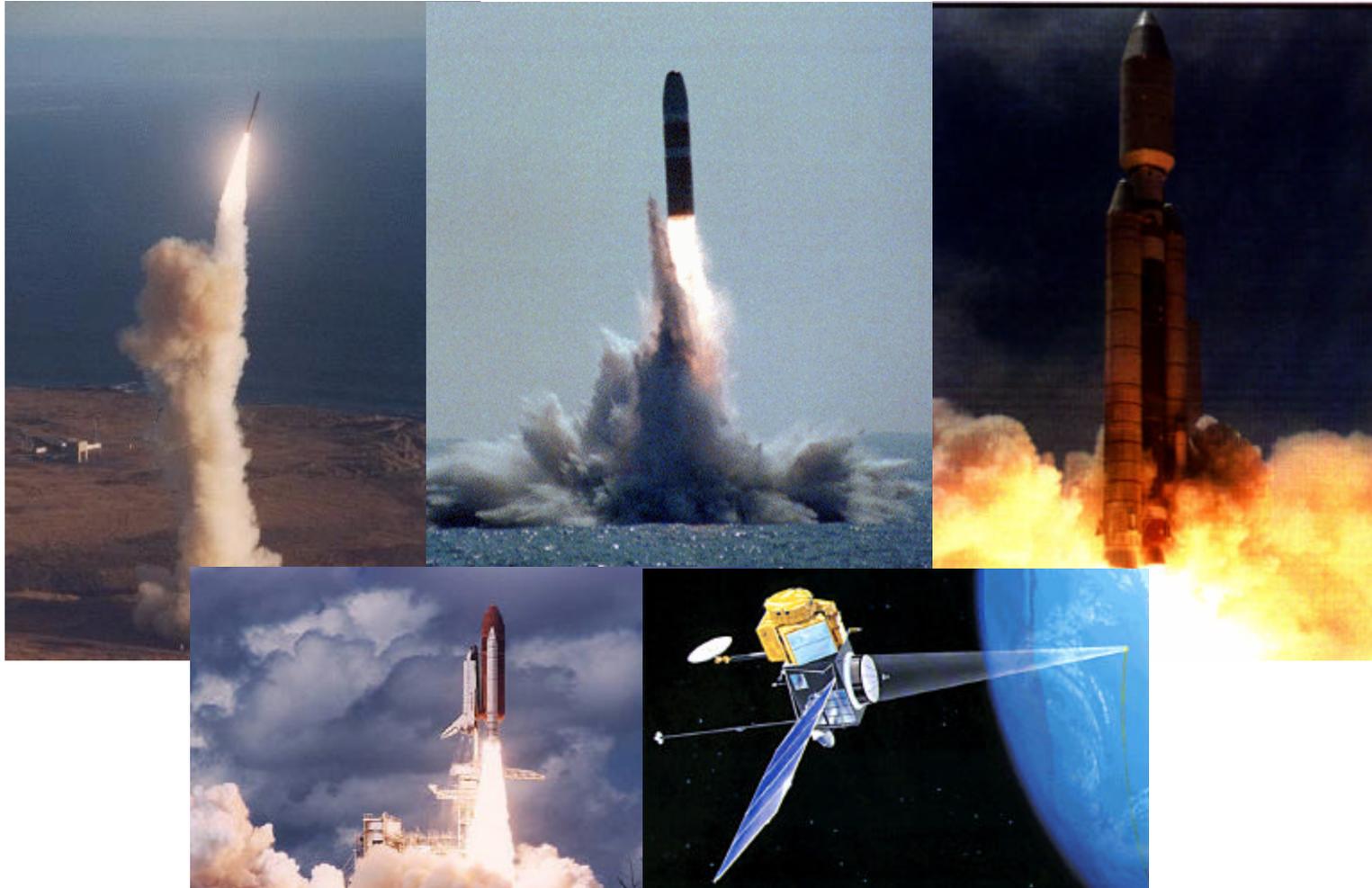
- **Primary oxidizer in solid rockets**
 - Titan, Minuteman, Peacekeeper, Hawk, Polaris, Space Shuttle
 - Army, Navy, Air Force, NASA
- **Used in explosives and fireworks**
- **Found in fertilizers**
- **Medicine**
- **Neither sinker nor floater**
- **Very stable in water**





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Perchlorate



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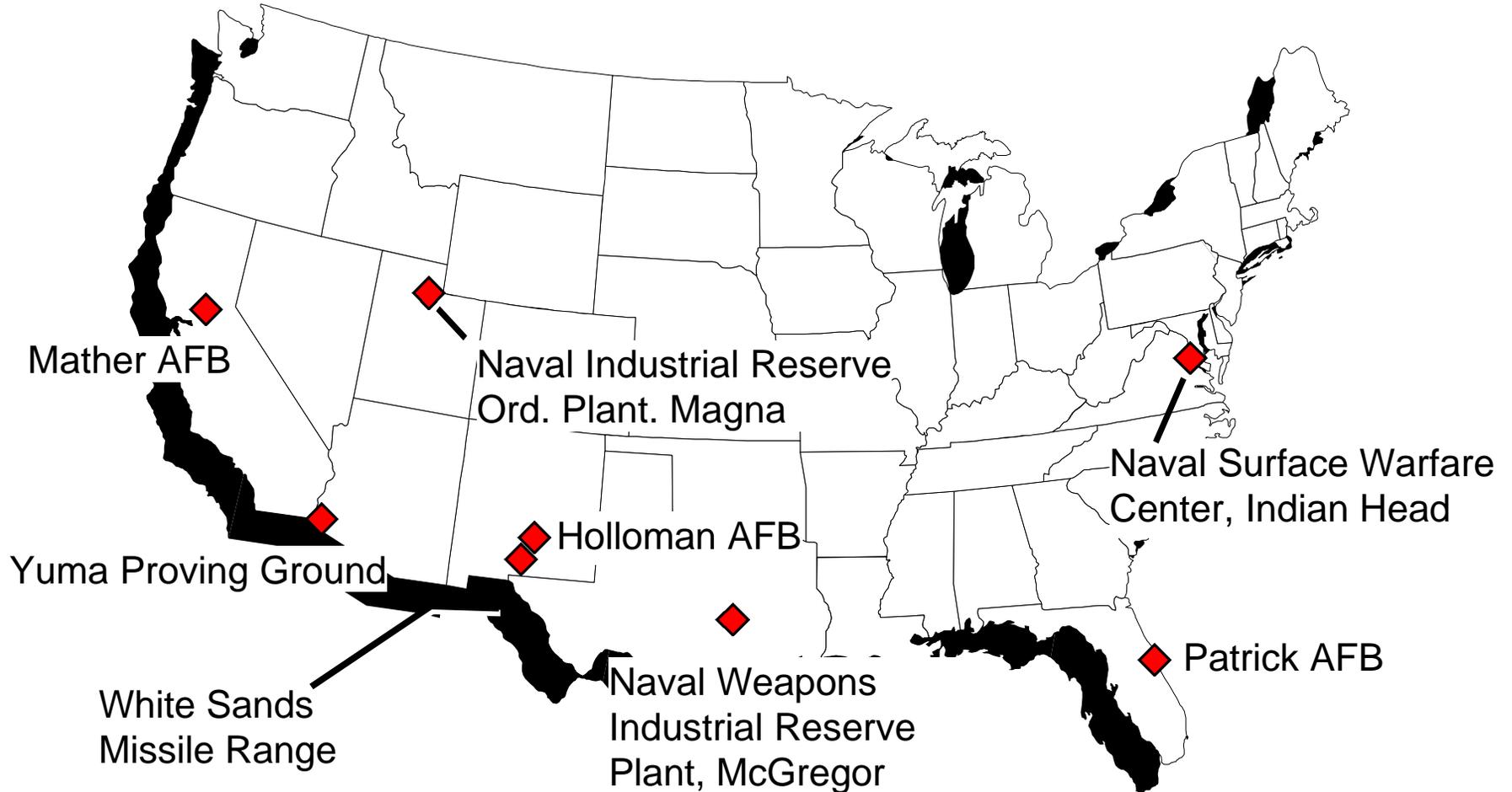


Perchlorate Issues

- **Low concentrations (4 to 16 ppb) have been found in Lake Mead and the Colorado River**
- **Detected in public drinking water sources**
 - **Nevada**
 - **Central Arizona**
 - **Southern California**
- **Effects on ecological receptors and bioaccumulation potential unknown**



Some DoD Perchlorate Sites



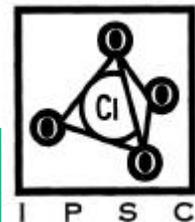
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IPSC Major Partners

- DoD and NASA
- EPA
- 14 state regulatory representatives
- Native American tribal representatives
- Perchlorate Study Group (industry)
- American Water Works Association
- USDA, FDA
- Citizen stakeholders

Inter-Agency Perchlorate Steering Committee

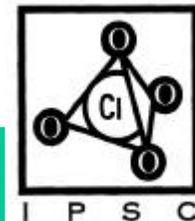




Integrated Approach

- Analytical methods
- Health effects
- Treatment technology
- Transport, transformation, and ecological effects

Inter-Agency Perchlorate Steering Committee





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Treatment Technologies

- **Ion exchange column**
 - **Las Vegas Wash, NV**
 - **Removing up to 31 lbs/day**

- **Bioremediation**
 - ***In situ* treatment with addition of carbon source (Rancho Cordova, CA)**
 - ***Ex situ* treatment pilot study (McGregor, TX)**



On the Horizon

-
- **2nd External Peer Review (EPA)** **Late FY 01**
 - Proposed human health value
 - Proposed ecological screening value

 - **Surface water criteria (USAF et al.)** **Mid FY 02**
 - Ecological receptors
 - Fish consumption
 - Fish + water consumption

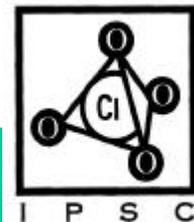
 - **IRIS (EPA)** **Mid FY 02**
 - Reference dose for humans



DoD Perchlorate Contacts

- **Mr. Dave Carillo, HQ USAF/ILEVR**
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- **Lt Col Dan Rogers, DoD ClO₄ Technical Lead**
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- **Maj Jeff Cornell, AFCEE/ERT**
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Inter-Agency Perchlorate Steering Committee





For Online Information

- **Preliminary Remediation Goals**
 - www.epa.gov/region09/waste/sfund/prg/index.htm
 - www.epa.gov/reg3hwmd/risk/riskmenu.htm
- **Perchlorate**
 - www.epa.gov/ogwdw000/ccl/perchlor/perchlo.html
 - www.epa.gov/ogwdw000/ccl/perchlor/ipsc.html
 - www.coastal-institute.org/e18a/PerchlorateSurvey.html
- **MTBE**
 - www.epa.gov/mtbe/
 - www.apec.org/ehs/mtbelink.htm
 - www.epa.gov/oms/consumer/fuels/mtbe/mtbe.htm



MTBE and Perchlorate

■ **MTBE**

- **Not mission-essential**
- **Regionalized impacts to cleanup program**
- **DoD not involved in regulatory process; time to complete phase out >5 years**
- **Cleanup values published**

■ **Perchlorate**

- **Mission-essential for DoD and NASA**
- **Site-specific impacts to cleanup program**
- **Action levels published for EPA Region IX**
- **EPA risk-based cleanup criteria forthcoming; <1 year**

- **Explosive ordnance (EO) is any munition, weapon delivery system, or ordnance item that contains explosives, propellants, or chemical agents**





UXO/Energetics (Continued)

- **Unexploded ordnance (UXO) is EO after**
 - **It is armed or otherwise prepared for action**
 - **It is launched, placed, fired, or released**
 - **It remains unexploded through malfunction or otherwise armed**

- **Energetics refers to propellants or explosives in EO**



UXO/Energetics (Continued)

- DoD estimates that over 15 million acres in the United States—on about 1,500 different sites—may contain some level of UXO
- DOD Directive 6055.9 provides safety and restoration cleanup standards for all DoD lands





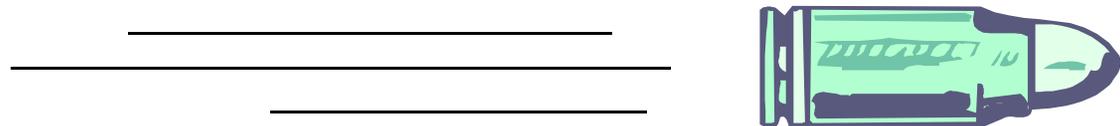
UXO/Energetics (Continued)

- **Increased concern about UXO and EO has been largely driven by BRAC and regulatory concerns regarding ranges and munitions**
- **The primary technologies used for sub-surface UXO detection are similar to those used in WWII, “Mag and Flag”**
- **Mag and Flag is expensive, labor-intensive, and plagued by false detections**



UXO/Energetics (Continued)

- **UXO remediation for BRAC and FUDS sites can be fundamentally different from EOD and Active Range Clearance**
- **Range Rule status**
- **The Munitions Rule is an EPA document that took effect in 1997**
- **Land Use Controls (LUC) or institutional controls (IC) will be required and must be enforceable**





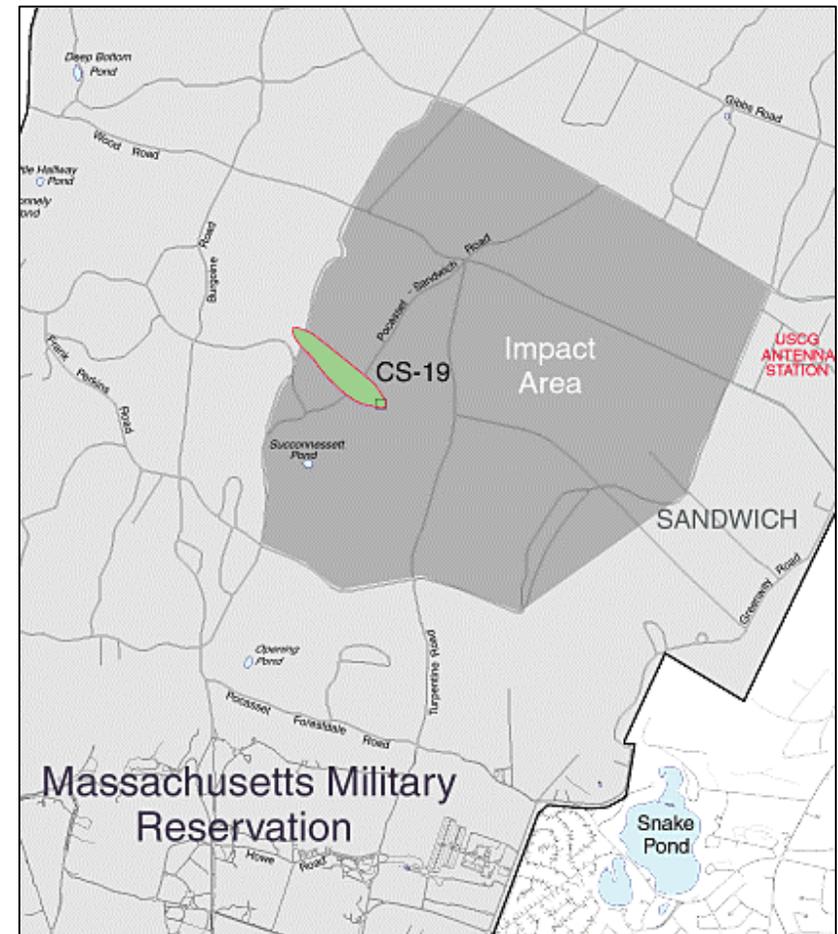
UXO/Energetics (Continued)

- **Research is ongoing in UXO/EO detection and/or *in situ* remediation at Environmental Security Technology Certification Program (ESTCP) – <http://www.estcp.org/projects/uxo>**
- **Detection research includes multisensor towed array detection system (MTADS), airborne UXO detection technology, and data processing algorithms for location and discrimination**
- **Other agencies involved in UXO detection include UXO Center of Excellence and Defense Agency Advanced Research Projects**



UXO/Energetics (Concluded)

- **Examples of energetics include RDX, HMX and Perchlorate**
 - **Royal Demolition explosive (RDX)**
 - **High Melting explosive (HMX)**
 - **Ammonium Perchlorate**
- **Example at MMR, Chemical Spill-19**





How to Obtain Funding for New Technology

- **Air Force**
 - **AFCEE/ERT Broad Agency Announcement (BAA)**
 - **Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis (AFIERA)**
- **DoD**
 - **Environmental Security Technology Verification Program (ESTCP)/SERDP**
- **EPA**
 - **Superfund Innovative Technology Evaluation (SITE)**
 - **Environmental Technology Verification Program (ETV)**
- **For more information, attend Session B-2 on January 31**





Summary

- **“Hot Topics” are special contamination problems that may require unique technological solutions. They are often addressed at a policy level. The science and technology may lag behind the demand to take action.**
- **Hot Topics usually share the following characteristics:**
 - **Widespread Occurrence**
 - **Usually involve risk management issues**
 - **Emerging science and technology**
 - **Diverging views on appropriate action**
 - **High visibility with the public and regulators**
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Summary (Concluded)

- **Approach a Hot Topic by:**
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