

Recent Obsolescence Pressures on Energetics

A View from Materials Chemists



Dr. Bill Sanborn - Materials Engineering Fellow
Bill Mollberg - Sr. Principal Multi-Disciplined Engineer
Raytheon Materials Engineering - Tucson

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Increased Worldwide Demand for Munitions



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What is Obsolescence?

“Materials are considered obsolete if they are required for the fulfillment of the military mission and their procurement in adequate quantity, quality, or time, is sufficiently uncertain, for any reason, to require planning for an alternative”

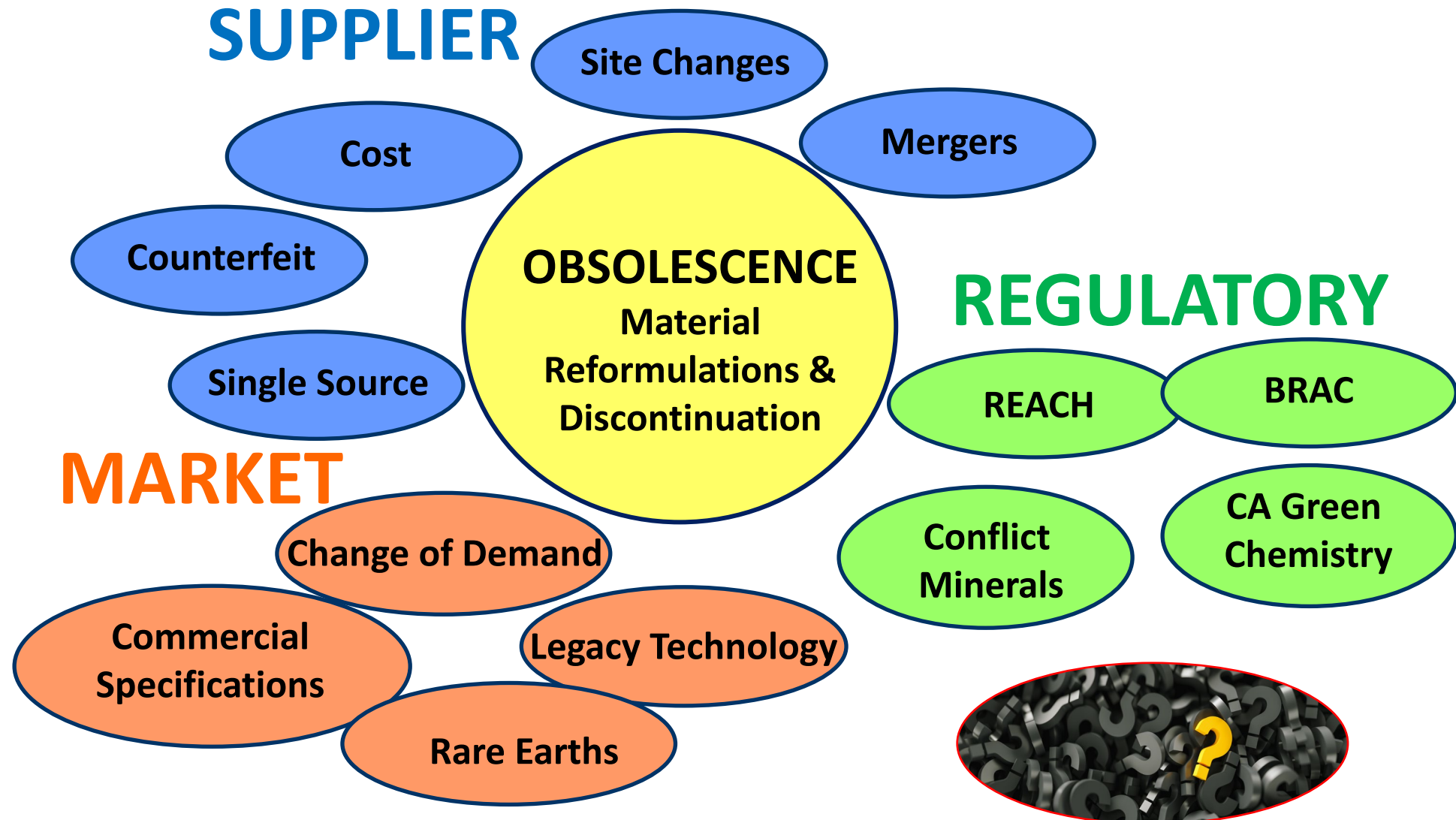
- US Army Definition (Jamie Neidert – Chief Scientist [Ret.], AMRDEC)

- Discontinuation
- Reformulation
- Specification – Qualified Products List/Database (QPL/D) drop off, specification revisions
- Quantity – Lifetime buy, government stockpile
- Quality – Material cannot meet requirements
- Process change
- Factory Relocation
- Availability in a timely manner



Obsolescence is more than an item not being available

Many Factors Drive the Risk of Obsolescence



Additional Regulation for Energetics

- **SAFETY!**

- Specifications

- Material safe and effective as exactly made and TESTED by the requirements of the specification using the same materials
- Many Specifications outdated for current policy, safety testing, supply chain and technology
 - Results in gaps between safety and contractual requirements

- Qualified Energetics

- Have been evaluated as safe to use in USG munition systems
 - Not just that they meet the specification
- Each Service responsible for ensuring the safety of systems using energetics
- USG final arbiter as to “IF” safety has been affected by change



World Events

- **Ukraine** - The conflict in Ukraine is creating unprecedented demands on modern supply chains
 - Just in time
 - Raiding stockpiles
- **Impacts**
 - **Military explosive <MIL-X>** - CONUS (continental US) manufacturer ceased production prior to 2000 and transferred the TDP to foreign supplier
 - Foreign supplier announced that orders will be filled for contracted quantities
 - **NC propellants** –Foreign supplier for nitrocellulose (NC) rocket motor propellant switched priority to gun propellant demands



Energetic Materials demands to support conflicts are forcing supplies to alter priorities

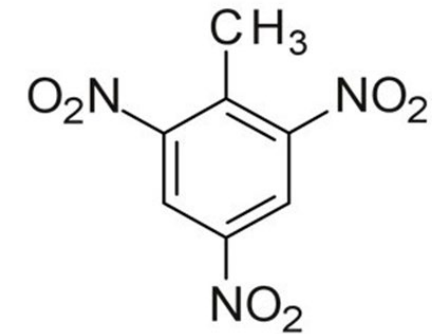
World Events - Ukraine (cont.)

- Likely future restrictions

- **TNT** – no CONUS supplier, mostly approved suppliers in Europe

- Melt Cast energetics

- ex. Octol

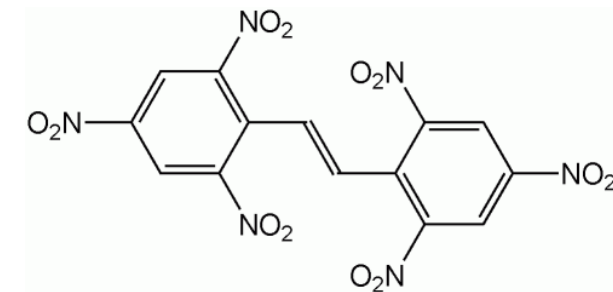


- **HNS** – low volume energetic for military use, but high volume for mining

- European supplier

- Different processes for military vs. mining

- Made from TNT

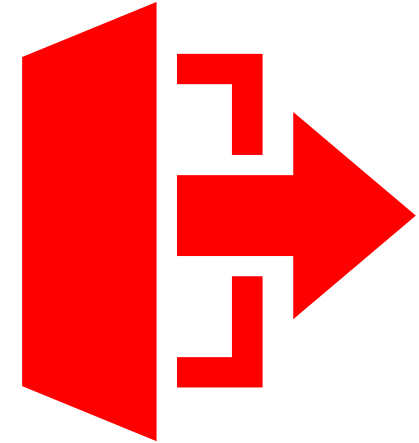


- **Others** - ???

Exiting the Business

Old Actions, New Consequences

- **<MIL-X>**
 - Moved to foreign supplier
- **HNS**
 - Moved to foreign supplier
- **CH-6**
 - MIL-STD-1316 and -1901 inline allowed material
 - Limited availability



Suppliers missing in action

New Regulatory Pressures

- **PFAS** – poly/perfluoroalkyl substances are long lasting chemicals that break down slowly
 - Health risks
 - Becoming highly regulated
 - Used in the manufacture of fluoroelastomers, FKM may be affected
 - Viton A????; Fluorel???
 - **PBXN-5, -6, -7, -12**
 - Viton B or A ?????
 - Pyros –ZPP, THPP, NEI-22 output, MTV, WBKS delay, some BKNO3, etc.



- **Monitor and adjust**

PFAS regulation may affect Viton containing energetics



Case for Confusion

- **Qualified Pyrotechnic**

- Supplier announces the change of the resin binder

- Obsolescence case – quantity restrictions

- Likely economic due to short shelf life

- Issues

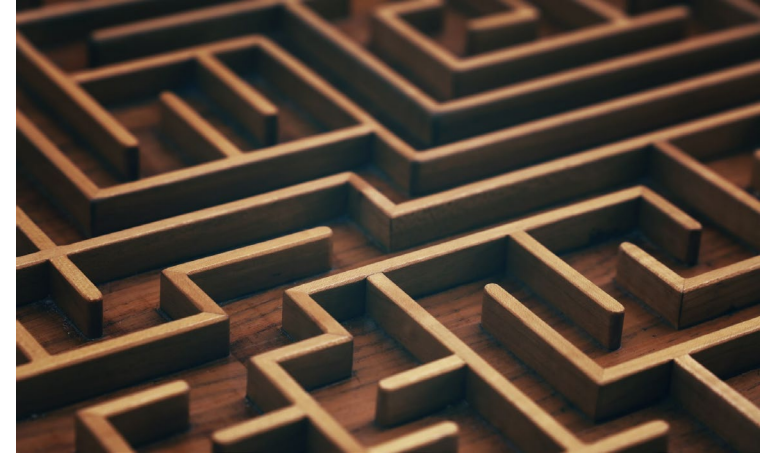
- Legacy resin does not meet material specification in MIL-SPEC, but is a “suggested” material, however, it has been used for ~60 years in the pyrotechnic

- “New” pyrotechnic meets requirements of MIL-SPEC and next level system requirements, but no safety data collected since not required by MIL-SPEC

- Qualified energetic material

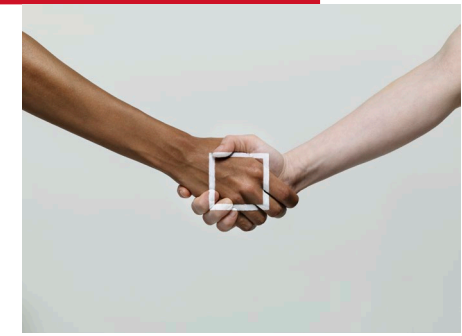
- Does the material change affect the qualification status?

- **Where in the supply chain is this change approved?**



When changes are managed in a specification, the confusion is eliminated

Recommendations and Suggestions (Dr. Bill's World)



- **No magic solutions** – need to adapt for rapid responses
- **Update specifications for qualified energetics**
 - MIL-DTL-82874E(OS) for PBXN-7 is a good example of proactive change management as it specifies what tests are required when changes occur
- **Tackle issues early – pro-action, not reaction**
 - Schedule should not be used by suppliers to force acceptance of materials changes
 - USG management of change for qualified energetics suppliers to address issues
 - Provides early evaluation
 - Provide industry wide position on the change – safety data is not proprietary
- **Better coordination between suppliers and USG safety boards**
- **Stretch goal** – reestablish and expand CONUS capability for critical energetics

Address early, coordinate and update requirements