



Chemical and Material Risk Management Directorate

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Evaluating Emerging Contaminant Issues Within DoD

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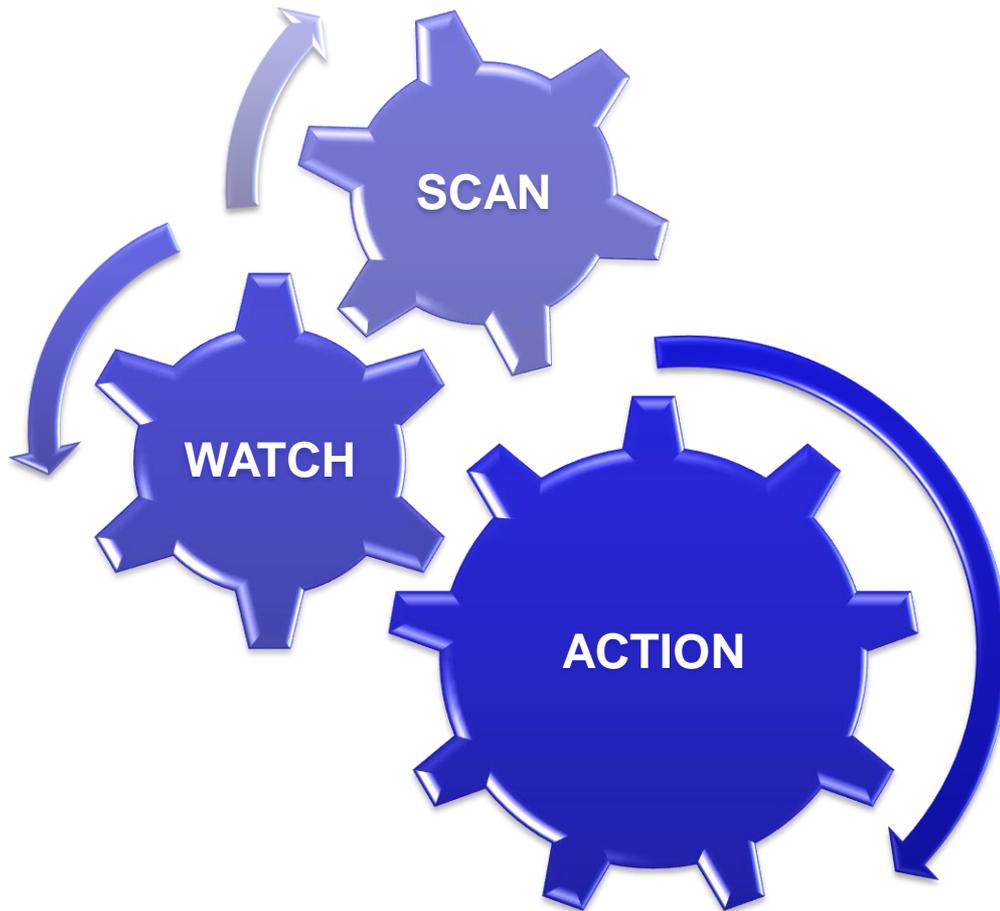
The Emerging Contaminants Program

What We Do

- ❖ **Scan the horizon and identify chemicals and materials that either lack human health standards or have an evolving science and/or regulatory status.**
 - ◆ Determine which of these chemicals and materials DoD uses, or plans to use, and how we use them.
 - ◆ Assess the impacts of the science, toxicity, or regulatory changes on people, the environment, and DoD functions and mission.
 - ◆ Collaborate with stakeholders to mitigate the risks.
- ❖ **Integrate science, technology, and policy to pursue the sustainable use of chemicals and materials.**

The Emerging Contaminants Program

Scan – Watch – Action



Review scientific literature and regulatory communications to identify chemicals/materials of interest.

Monitor events; Conduct a Phase I (qualitative) impact assessment to indicate areas of risk to DoD.

Conduct a Phase II (quantitative) impact assessment; Develop risk management options.

Scan – Watch – Action Process

From Scanning To Screening

External Resources	<p>Hazardous Substances Data Bank (HSDB) Integrated Risk Information System (IRIS) Agency for Toxic Substances and Disease Registry (ATSDR) American Conference of Governmental Industrial Hygienists (ACGIH) Values National Institute for Occupational Safety and Health (NIOSH) Values Occupational Safety and Health Administration (OSHA) Values Toxics Release Inventory (TRI)</p>
DoD Resources	<p>Hazardous Materials Information Resource System (HMIRS) Munitions Items Disposition Action System (MIDAS) Normalization of Data (NORM) Environmental Resources Program Information Management System (ERPIMS) Environmental Restoration Information System (ERIS) Knowledge-Based Corporate Reporting System (KBCRS)</p>

Scope of the Process

DoD Functional Areas

- **ES&H** — Impacts on human health and safety and environmental protection.
- **Acquisition/RDT&E** — Impacts to the acquisition, procurement, maintenance, and RDT&E of materials for use in new and planned DoD systems.
- **Production, Operations, Maintenance, and Disposal of Assets** — Impacts to routine maintenance and sustainment activities for all existing DoD assets, including asset disposal.
- **Cleanup** — Impacts to environmental response actions under active installation IRP, FUDS, compliance Cleanup, Military Munitions Response Program, and BRAC Restoration.
- **Readiness and Training** — Impacts on training military forces, testing military weapons and equipment, and force deployment and readiness capabilities.

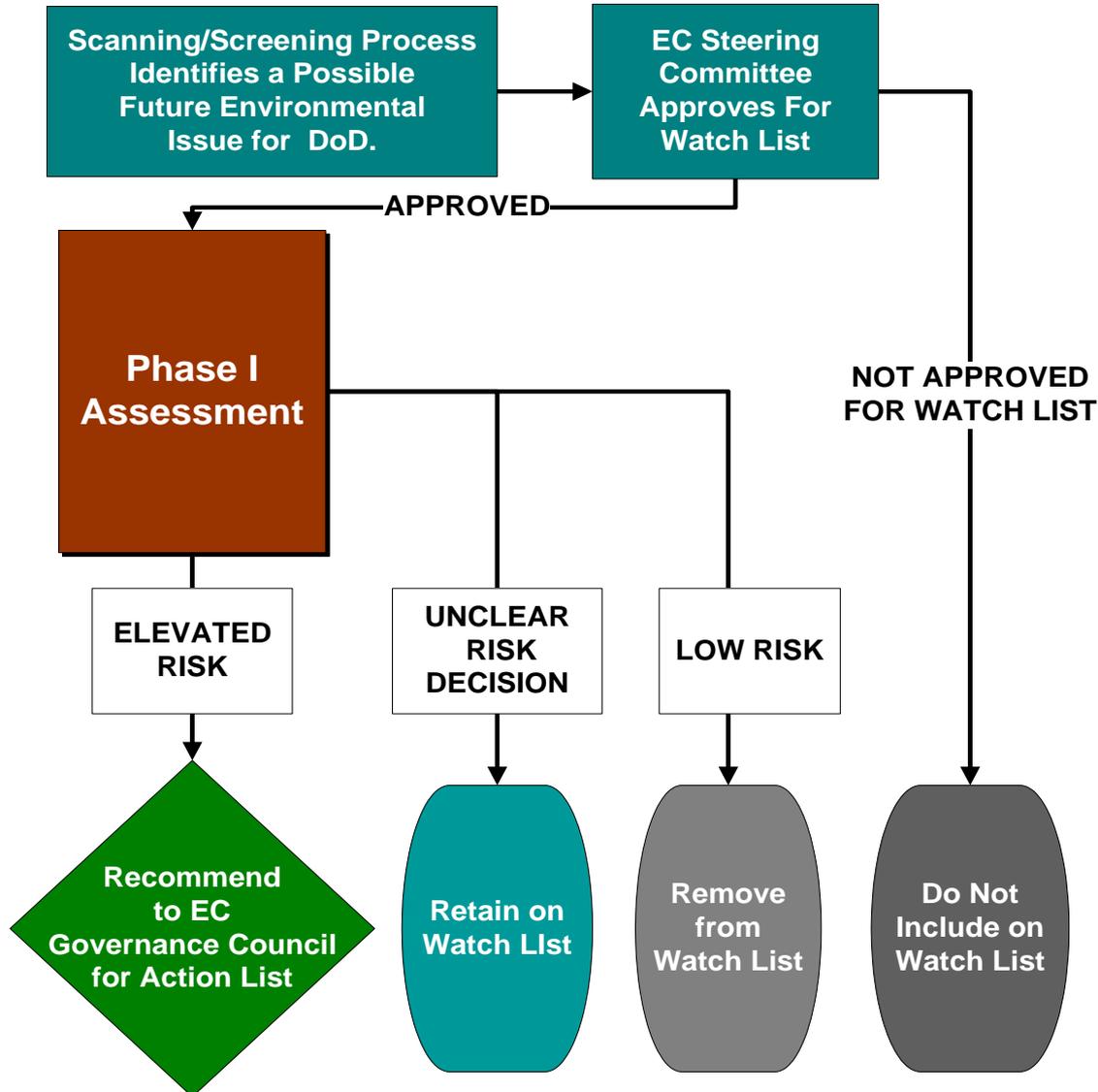
Screening Data

Reason For Interest:	<p>1. Cadmium is being reassessed under the Integrated Risk Information System (IRIS). The Status Report for cadmium with estimated start and completion dates is viewable at: http://cfpub.epa.gov/iris/rac/index.cfm?fuseaction=viewChemical.showChemical&sw_id=1010.</p> <p>2. California's Office of Environmental Health Hazard Assessment (OEHHA) has lowered the drinking water public health goal (PHG) from 0.07 ppb to 0.04 ppb based on kidney toxicity. http://www.oehha.ca.gov/water/phg/pdf/122206cadmiumphg.pdf</p> <p>3. Cadmium is included in both the European Union and California "restriction of the use of certain hazardous substance" regulations http://www.rohs.gov.uk/ http://www.dtsc.ca.gov/HazardousWaste/EWaste/</p>
Impact Area	Qualitative Analysis
Training/ Readiness	<ul style="list-style-type: none"> • MIDAS shows cadmium present in thousand of munition items • Used in many weapons critical applications, which require functional performance unique to defense and space systems • Potential impacts to equipment performance and longevity due use of alternatives • Potential for impact to ranges due additional environmental requirements
Environment, Safety, and Health	<ul style="list-style-type: none"> • IRIS reassessment scheduled for completion 28 September 2009 • Potential changes to environmental and occupational health standards
Operation and Maintenance of Assets	<ul style="list-style-type: none"> • Cadmium is widely used in the DOD in military aircraft landing gear, munitions, brakes, batteries, paints, plastics, solders, and electrical connectors and fasteners • Potential impact from increased cost and maintenance for substitute products • Compliance and potential legal liabilities from use, removal, and disposal are increasingly expensive. • Potential impact to equipment longevity and maintenance schedules due to use of alternatives
Cleanup	<ul style="list-style-type: none"> • Potential screening level or monitoring changes due to change in environmental health standards • ERIS -58 sites with 13,985 detects • NORM-116 sites with 876 detects • ERPIMS-125 sites with 51, 981 detects • KBCRS-1899 sites
Acquisition/ Research Development	<ul style="list-style-type: none"> • Cadmium is extensively used in the DOD, due to it longevity • Efforts to minimize use within DoD • Potential impact from increased testing activities to determine if substitute products meet DOD requirements • Potential impact from increased research activities for substitute products to meet DOD requirements • Joint Cadmium Alternatives Team has been initiated.

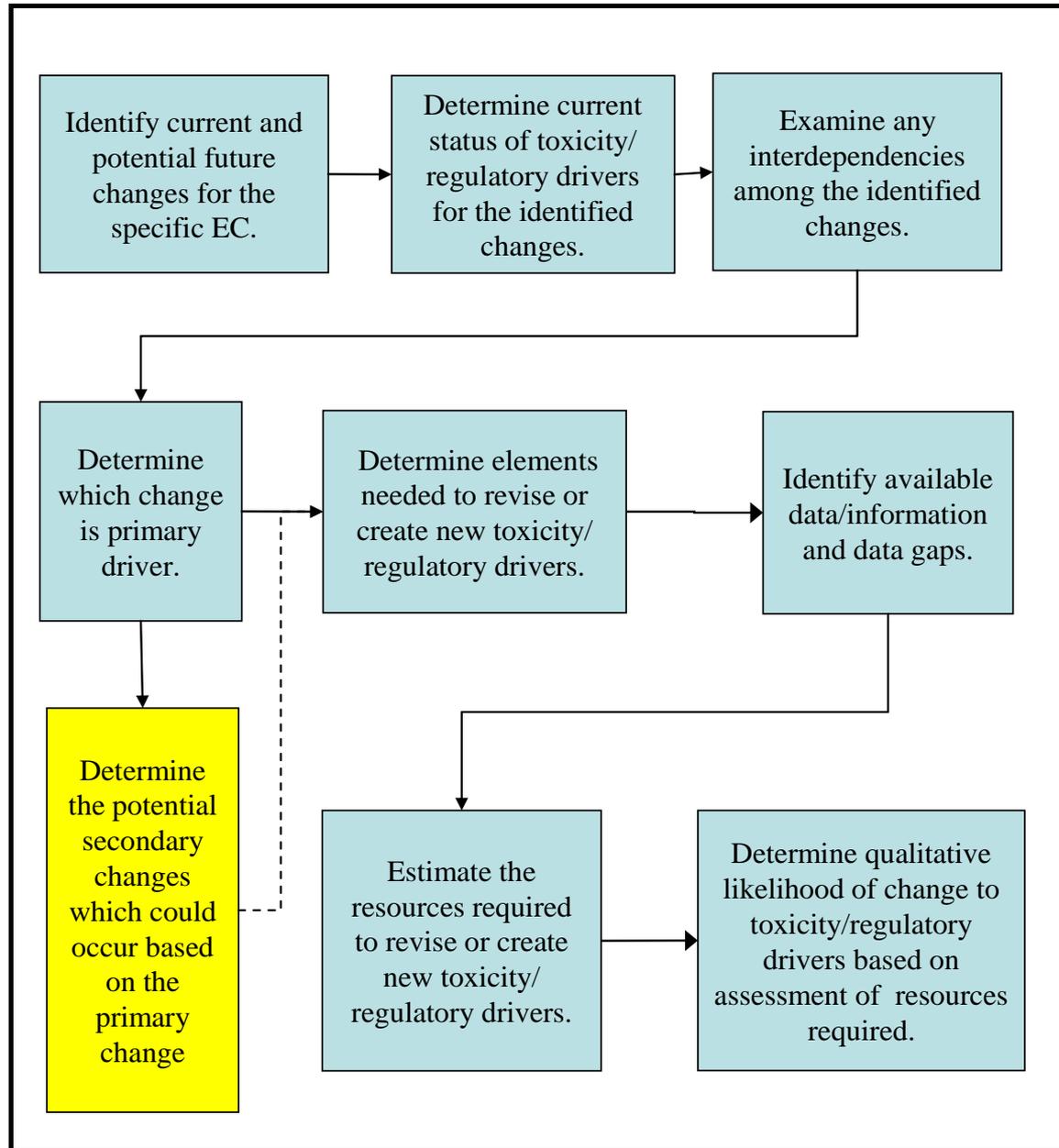
Phase I Impact Assessment

- ❖ Process where the risk to DoD posed by a potential regulatory change for a chemical or material is assessed by Subject Matter Experts (SMEs) within DoD.
- ❖ It also provides a vehicle for DoD SMEs to propose preliminary risk management options (RMOs) that can be further explored in subsequent analysis.

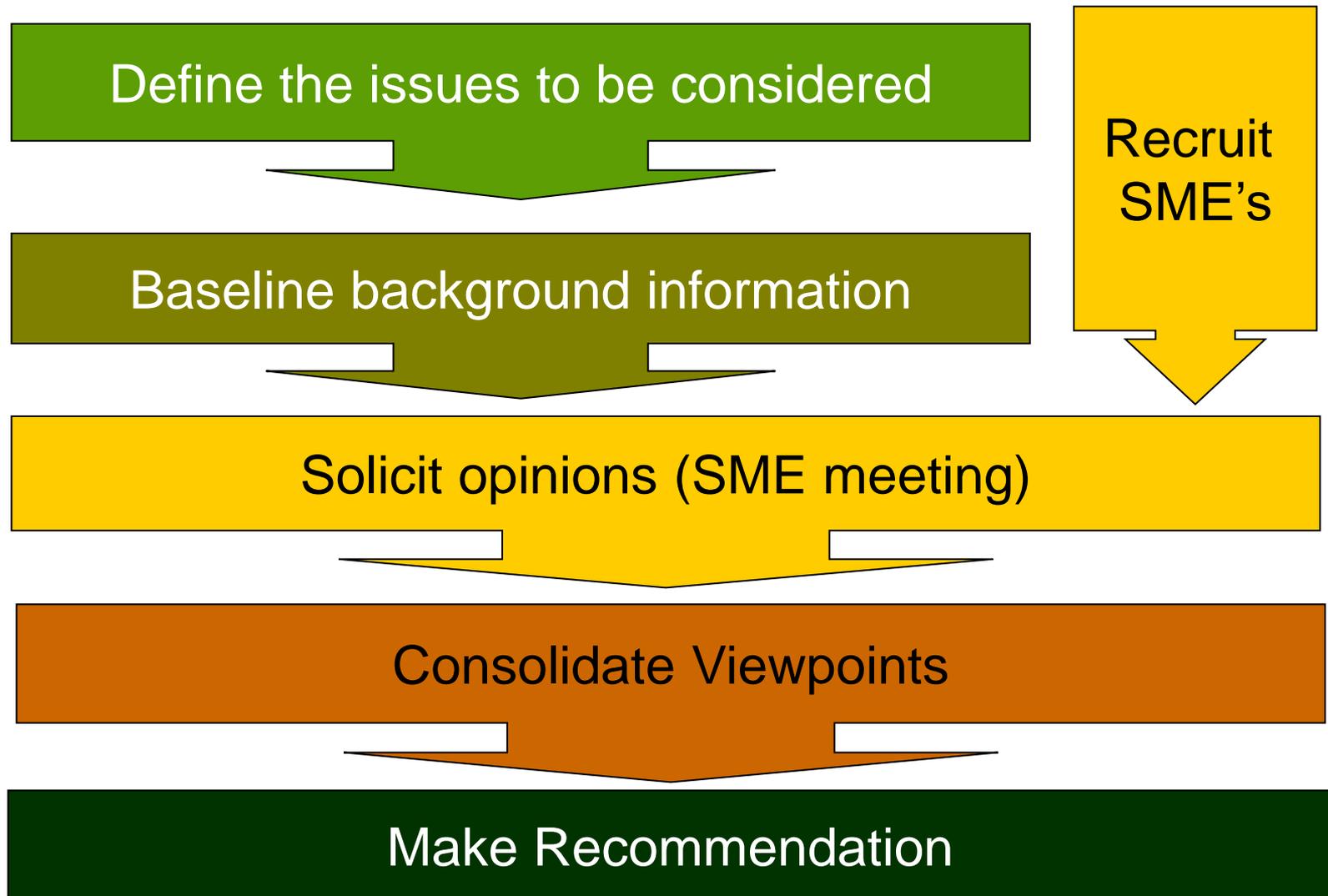
Phase I Impact Assessment Decision Flow



Defining the Issues

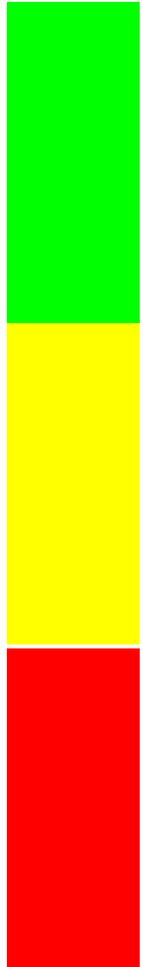


The Phase I Impact Assessment Process



Phase I Impact Assessment Criteria

- There are 26 evaluation criteria in each of five functional areas. Each with a unique consequence and likelihood assigned.
- Subject matter experts assign a likelihood and severity and these are combined with a 5 x 5 risk matrix to generate a risk (High-Medium-Low).
 - ◆ E.g. *(Medium Risk) Property Transfer and Re-Use: Lowering the toxicity value in the next 5-8 years will plausibly result in an increase in the requirements for real property transfer. Many sites will require some investigation which may only entail historical research. Property transfers are minimally impacted.*



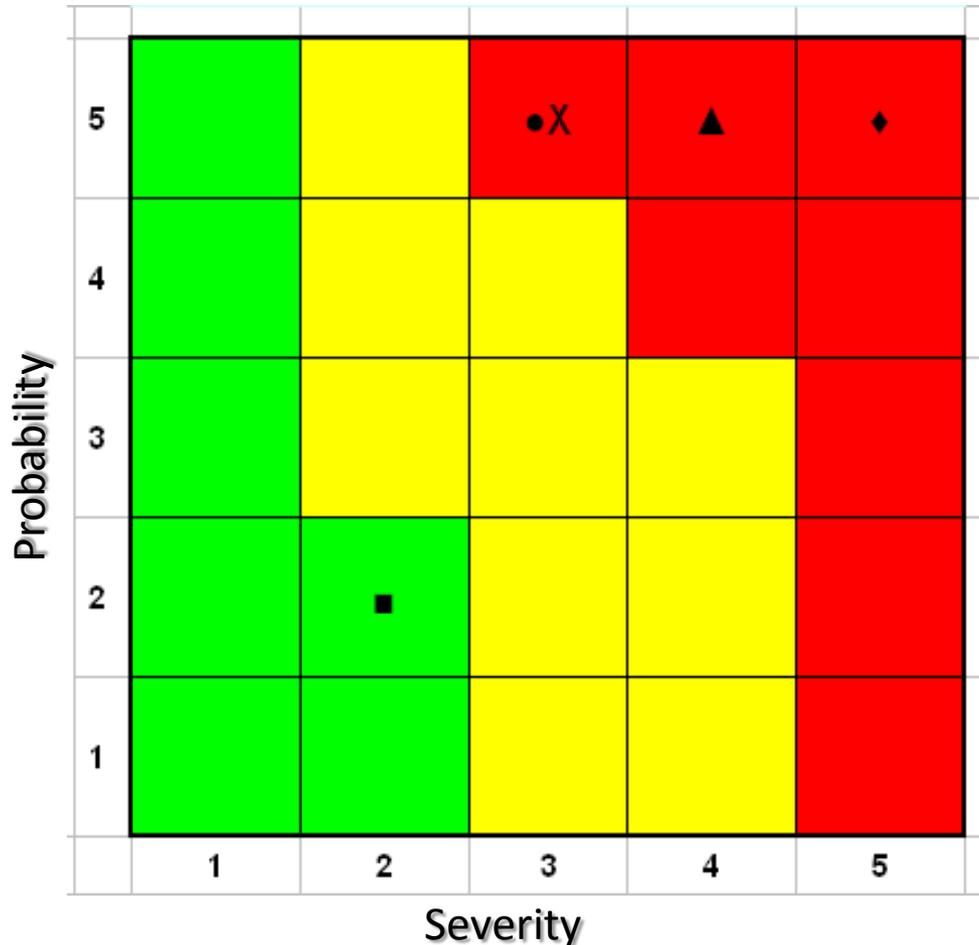
Elicitation Tools



- Scores and comments are collected using the **Emerging Contaminants Assessment System (ECAS)**, and web-based collaboration tool.
- The meeting facilitator poses each question, provides an opportunity for discussion and question clarification, and then asks SMEs to enter scores and comments.

Assessment Results

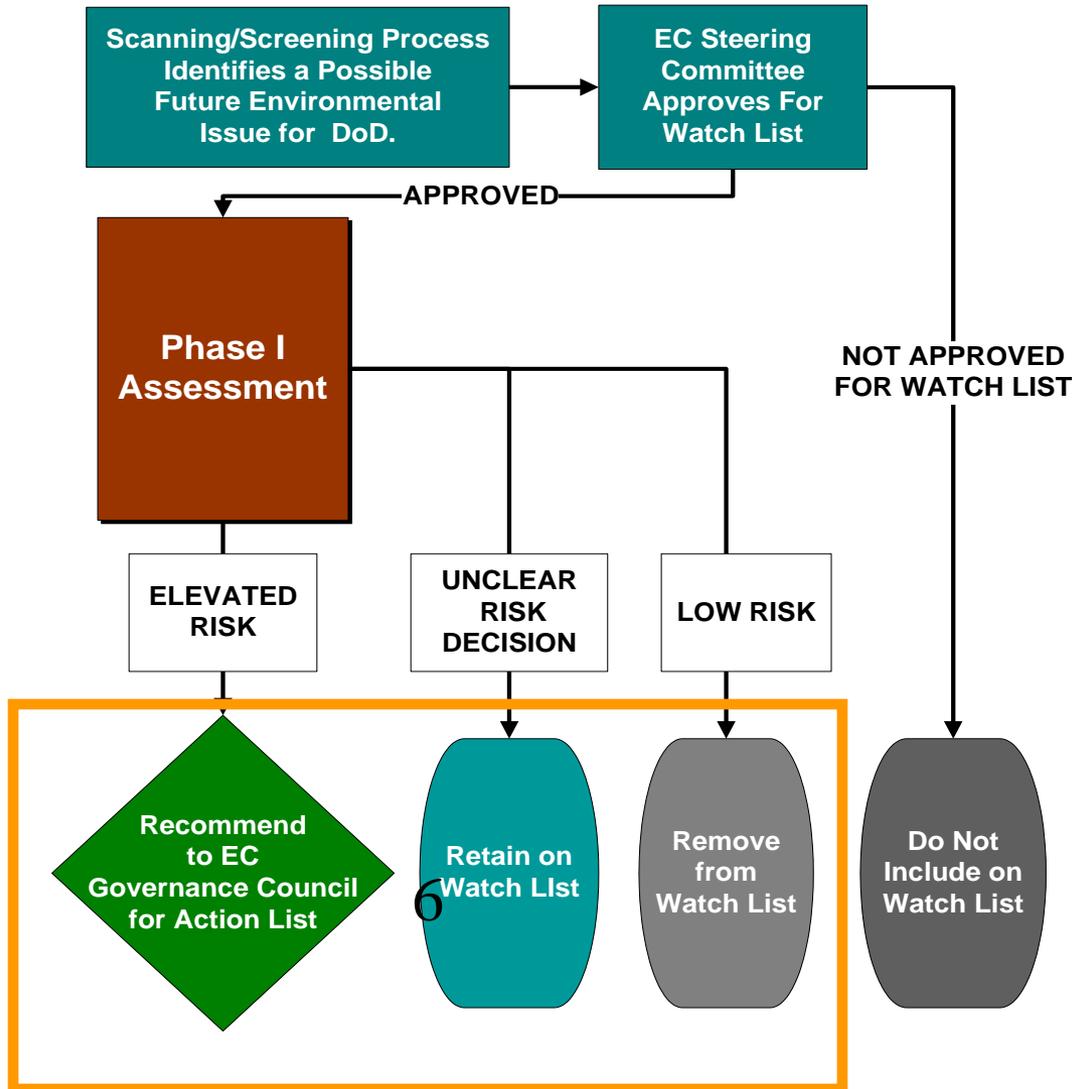
EC Risk Matrix



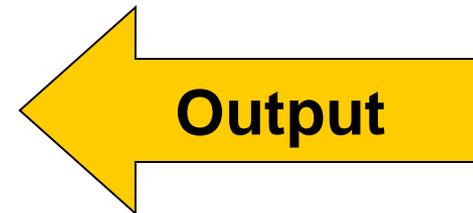
Scores from the ECAS are used to generate a series of risk matrices.

Comments are used to generate a full report of the assessment and subject matter expert elicitation.

Phase I Impact Assessment Output



- Recommendations about disposition of chemical (Watch, Action or Neither) based on risk to DoD.
- Initial Risk Management Options



Phase I Impact Assessment Completed

- ✓ Perchlorate
- ✓ Hexavalent Chromium (Sept 2006)
- ✓ Naphthalene (Sept 2006)
- ✓ Trichloroethylene (TCE) (Oct 2006)
- ✓ 1,2,3-Trichloropropane (TCP) (Nov 2006)
- ✓ n-Nitrosodimethylamine (NDMA) (Nov 2006)
- ✓ 1,4-Dioxane (Dec 2006)
- ✓ Dinitrotoluenes (DNT) (Dec 2006)
- ✓ Perfluorooctanoic Acid (PFOA) (Jan 2007)
- ✓ Perfluorooctyl Sulfonate (PFOS) (Jan 2007)
- ✓ Polybrominated Diphenyl Ethers (PBDEs) (Jan 2007)
- ✓ Dioxins (Feb 2007)
- ✓ Tetrachloroethylene (PCE) (Feb 2007)
- ✓ Beryllium (Mar 2007)
- ✓ Lead (Mar 2007)
- ✓ RDX (Royal Demolition eXplosive) (Mar 2007)
- ✓ Tungsten (Mar 2007)
- ✓ Nickel (May 2007)
- ✓ Hexavalent Chromium (Jul 2007)
- ✓ Tungsten Alloy (Dec 2007)
- ✓ Sulfur Hexafluoride (SF6) (Jan 2008)
- ✓ Naphthalene (Apr 2008)
- ✓ Cadmium (May 2008)
- ✓ Lead (July 2008)
- ✓ Cerium (May 2009)
- ✓ Cadmium (Sept 2010)
- ✓ Dinitrotoluenes (DNT) (Jan 2011)
- ✓ Nanomaterials (Metal-Based) (Feb 2011)
- ✓ Manganese (May 2011)
- ✓ Diisocyanates (Jun 2011)
- ✓ Phthalate Esters (Jun 2011)
- ✓ Nanomaterials (Carbon-Based) (Nov 2011)
- ✓ Decabromodiphenyl Ether (Apr 2012)
- ✓ Vanadium and Compounds (Oct 2012)
- ✓ 1-Bromopropane (1-BP) (Jan 2013)

This summary is for chemicals on which all three parts of a Phase I Impact Assessment were completed.

Phase I Impact Assessment Results Summary

Recommended for Watch List

- Cadmium and Compounds
- Cerium ***
- Cobalt and Compounds
- Decabromodiphenyl Ether (deca-BDE)
- Diisocyanates
- Dinitrotoluenes (DNT)
- 1,4-Dioxane
- Dioxins
- Manganese and Compounds
- Nanomaterials (Metal- and Carbon-Based)
- Nickel
- Perfluorooctyl Sulfonate (PFOS)
- Tetrachloroethylene (PCE) ***
- Tungsten
- Tungsten Alloy
- Vanadium and Compounds

Dropped After Phase I

- Dichlorobenzenes
- n-Nitrosodimethylamine (NDMA)
- Polybrominated diphenyl ethers (PBDEs)
- 1,2,3-Trichloropropane (TCP)

Recommended for Phase II / Action List

- Beryllium
- Hexavalent Chromium
- Lead
- Naphthalene
- Perchlorate *
- Perfluorooctanoic Acid (PFOA) **
- Phthalate Esters
- RDX
- Sulfur Hexafluoride (SF6)
- Trichloroethylene (TCE) **
- 1-Bromopropane (1-BP) (*proposed*)

Future Assessments (anticipated date)

- 1,4-Dioxane (Inhalation only) (TBD)
- n-Nitrosodimethylamine (NDMA) (TBD)
- 2,4-Dinitroanisole (DNAN) and 5-Nitro-1,2,4-triazol-3-one (NTO) (components in insensitive explosive formulations) (TBD)
- Cobalt (pending IRIS review) (TBD)

* Demoted to Watch List in September 2010

** Subsequent Phase II Impact Assessment recommended delisting from the Action List and adding to the Watch List ***

Regulatory developments supported delisting from the Watch List

Successes and Challenges

- Credibility of the Process
- SME Participation and Acceptance
- Process Agility and Evolution
- Increasing Expectations

Shifting scanning/screening process "Left"

