

Emerging Contaminants - The New Frontier -

Acquisition, Technology and Logistics



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Part 1 – EC Background & DoD Program Basics

What is an Emerging Contaminant?

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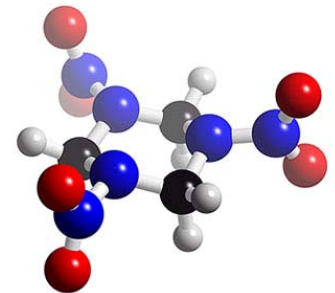
- Chemicals & materials that have pathways to enter the environment and present potential unacceptable human health or environmental risks...

and either

- do not have regulatory peer-reviewed human health standards

or

- the regulatory standards are evolving due to new science, detection capabilities, or pathways.



EC Examples – Past & Present

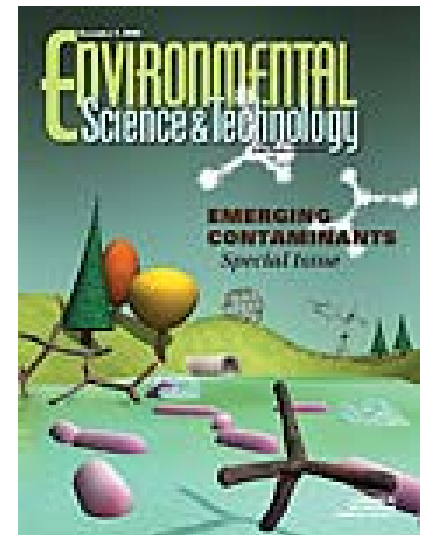
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- **Ozone Depleting Substances** – Refrigerants, fire suppressants, solvents...phased out of production
- **Perchlorate** – Munitions/propellant oxidizer...highly water soluble...affects thyroid function...intense Congressional interest regarding DoD releases
- **Hexavalent Chromium** – Heavy metal used in weapons systems/platforms...recent, revised 10-fold reduction in Permissible Exposure Level (PEL)
- **PFOA** – Used to make fire retardant/high performance materials...bio-persistent....95% phase-out by 2010...100% by 2015
- **Naphthalene** – Component of JP-8/fuels used throughout DoD. Proposed “carcinogenicity” listing by EPA. New toxicity levels could have major impacts
- **Sulfur Hexafluoride** – Global warming gas used in essential applications

U.S & International Interest

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- **USGS Survey of 139 streams in 30 states**
 - ECs found in 80% of streams
- **U.S. Executive Order 13423 (January 24, 2007)**
 - Requires Chemical Management Plans
 - Life Cycle Chemical Management
- **European Union – REACH**
 - Registration, Evaluation, Authorization & Restriction of Chemicals
- **EPA ChAMP**
 - Chemical Assessment & Management Program
- **TSCA Reforms?**



National Trends

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- **Use of Precautionary Principle**
 - Must understand health & environmental effects before using chemicals
- **Chemical Management and Green Chemistry**
 - E.U. REACH*, E.O. 13423, U.S. ChAMP¹, possible Toxic Substances Control Act reforms
- **Biomonitoring – What’s showing up in humans?**
 - Center for Disease Control’s national biomonitoring & Calif. voluntary program
- **Evolving Risk Assessment Process**
 - Increasing transparency...showing uncertainty range
 - Shift from animal dose/response →toxicogenomics with human cells
 - Use of computational sciences
 - Application of Age-Dependent Adjustment Factor (ADAF)
 - National Academy of Sciences report released 3 Dec !

Our Vision

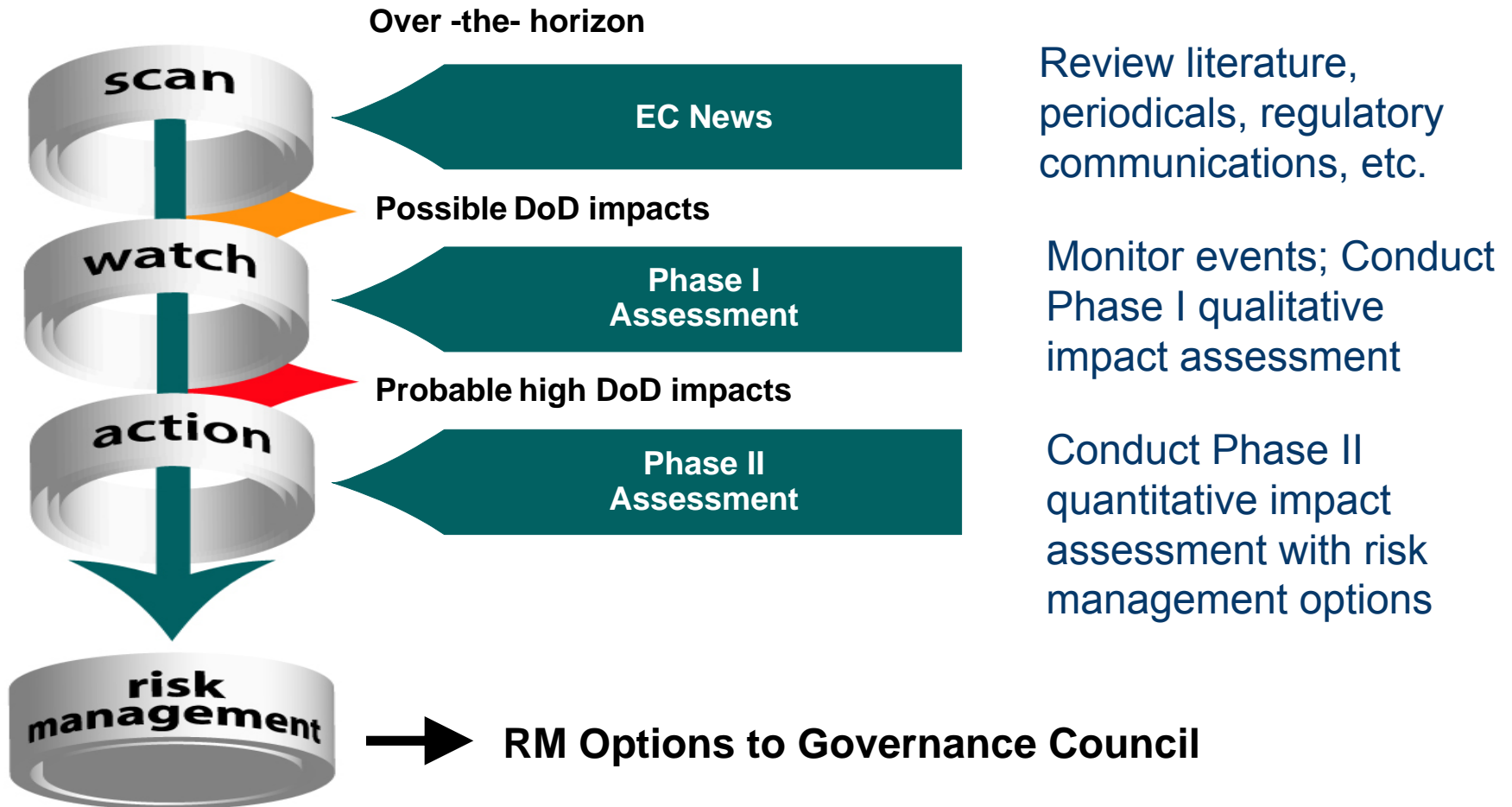
Imagine if the largest industrial complex in the nation could...

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- *Predict* which chemicals we use, or might use, have evolving science that may change the regulatory status and pose health or environmental risks.
- *Develop* a consensus evaluation of types & magnitudes of the risks in using/releasing such chemicals.
- *Develop* risk management options and invest in high-payback actions.
- *Achieve and measure* risk reduction.

EC “Scan-Watch-Action” Process

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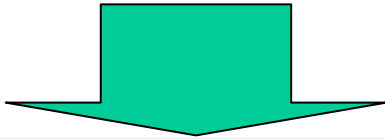


Phase I Impact Assessment Process

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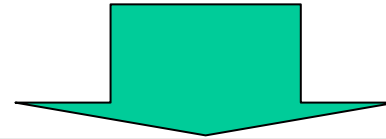
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Likelihood of Toxicity
Value/Regulatory Change


















2

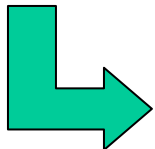
Scoping and Data Collection



3

Impact on DoD Functional Areas

ES&H	Training & Readiness	Acquisition/ RDT&E	POMD of DoD Assets	Cleanup
				
				
				

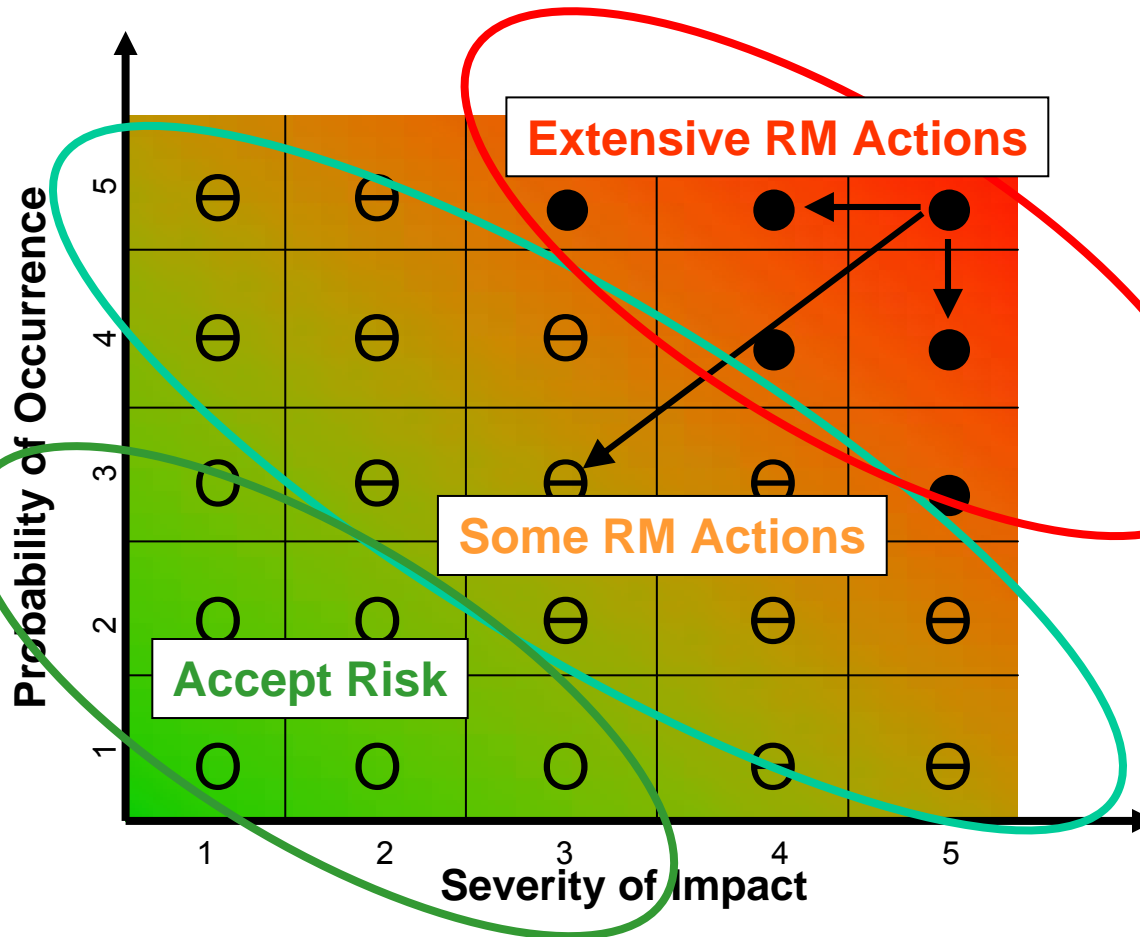


Results:

- Recommendation – Move to Action List?
- Initial Risk Management Options

Plot Risk & Develop Risk Management Options

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RM Options

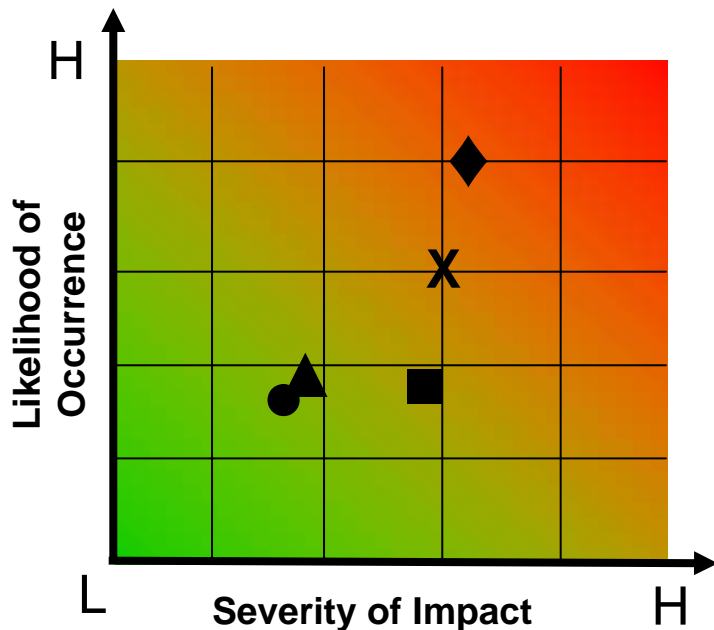
- Fill tox science gaps
- RDT&E
- Material substitution
- Process/spec changes
- Regulatory engagement
- Stockpile material
- Exposure assessment & monitoring
- Personal Protective Equipment (PPE)
- Alert acquisition managers
- Benchmark with industry
- Risk communication
- Training

1,4-Dioxane Phase I Impact Assessment

Completed December 2006

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1,4-Dioxane: Volatile, colorless liquid used primarily as a stabilizer for chlorinated solvents such as 1,1,1-trichloroethane (TCA). Also used in paints, resins, varnishes, waxes, paint strippers and fumigants. Undergoing IRIS assessment.



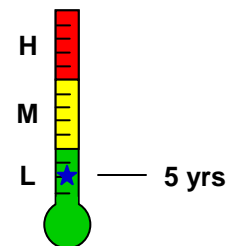
- ◆ ES&H
- O&M of Assets
- Readiness & Training
- X Cleanup
- ▲ Acquisition/RDT&E

Likelihood of Toxicity Value/ Regulatory Change

1. Probability the USEPA will establish a revised set of IRIS toxicity benchmarks for 1,4-dioxane

In the absence of federal guidelines, individual states and USEPA Regional Offices are establishing guidance levels for 1,4-dioxane (e.g., Colorado, California, USEPA Regions 3, 6, and 9)

Probability Timeframe



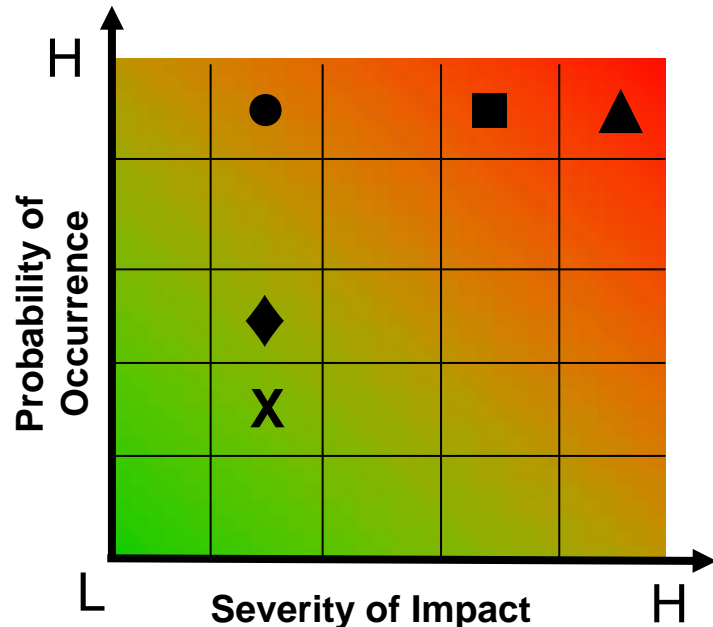
SF6 Phase I Impact Assessment

Completed January 2008

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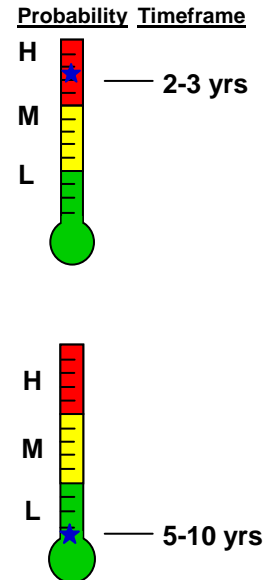
Sulfur Hexafluoride (SF6) is used in radar systems (e.g., AWACS aircraft); helicopter rotor-blade leak tests; discharge testing in fire suppression systems; electrical switch gear; and propulsion systems for specific weapons in service (e.g., MK-50 torpedo) and under design.

Likelihood of Toxicity Value/Regulatory Change



- ◆ ES&H
- PO&MD of Assets
- Training & Readiness
- X Cleanup
- ▲ Acquisition/RDT&E

1. Probability that Greenhouse Gas emission initiatives will restrict use/availability of SF6
2. Probability the OSHA will revise the permissible exposure limit (PEL) for SF6



EC Watch List

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- ✓ Tungsten alloys
 - Sodium Tungstate
- ✓ Tetrachloroethylene (PCE)
- ✓ Dioxin
- ✓ 1,4-dioxane*
- Nanomaterials
- ✓ Perfluorooctyl sulfonate (PFOS)
- ✓ Di-nitrotoluenes (DNT)*
- ✓ Lead
- ✓ Nickel
- ✓ Cadmium
 - Manganese
 - Cerium
 - Cobalt
- ✓ Perfluorooctanoic acid (PFOA)...moved from action list

Dropped After Assessment:

- Polybrominated biphenyl ethers (PBDEs)
- 1,2,3-trichloropropane (TCP)
- N-nitrosodimethylamine (NDMA)
- Dichlorobenzenes

✓ Phase I Impact Assessment completed

* To be re-assessed

EC Action List

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- ✓ **Perchlorate**
 - **Royal Demolition eXplosive (RDX)**
 - **Cyclotrimethylenetrinitramine**
 - ✓ **Trichloroethylene (TCE)**
 - ✓ **Hexavalent Chromium (Cr6+)**
 - **Naphthalene**
 - **Beryllium (Be)**
 - **Sulfur Hexafluoride (SF6)**
- ✓ **Phase II Impact Assessment completed. All others initiated.**

Note: - Some risk management actions underway on all ECs including research on toxicity, substitutes, & treatment.

Part 2 – EC Program Update

Accomplishments & New Initiatives

EC Program Accomplishments – FY08

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- **Benchmarked gov't & industry chemical ranking systems**
- **Multi-Attribute Analysis process for Risk Management Options (RMOs) ranking**
- **Completed 6 Phase I Impact Assessments**
 - Sulfur hexafluoride, cadmium, lead, tungsten alloys, hexavalent chromium, naphthalene
- **Completed 3 Phase II Impacts Assessments & RMOs**
 - Hexavalent chromium, TCE, & perchlorate
- **Completed state survey + 3 policy papers with EPA & the Environmental Council of States**
 - Minimizes field disputes at DoD installations

ECOS-DoD-EPA Work Group Products

✓ **Completed – ECOS Resolution Passed**

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- **Issue: How do states define ECs? What are ECs of concern?**
 - Product: State EC Survey ✓
- **How can states & federal agencies send a consistent risk message to the public?**
 - Product: Risk communication paper ✓
- **What values should be used if no IRIS value?**
 - Product: Provisional toxicity values paper ✓
- **What conditions, requirements, authorities influence the decision to expend funds on EC response when threat to human health is not clear?**
 - Product: EC action triggers paper ✓

Questions & Discussion

