

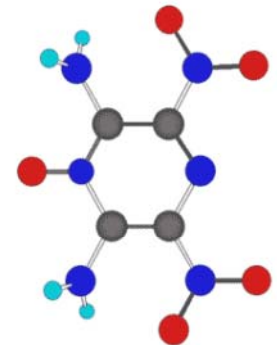
Emerging Contaminants - The New Frontier -



What is an Emerging Contaminant?

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- **Chemicals & materials with:**
 - Perceived or real threat to human health or environment
 - Either no peer reviewed health standard or an evolving standard
- **May have:**
 - Insufficient human health data/science
 - New detection limits
 - New exposure pathways



National & International Interest

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- **National Geographic Magazine-Oct 06**
- **USGS Survey of 139 streams in 30 states**
 - ECs found in 80% of streams
- **Renewable Nat'l Resources Foundation Report**
- **European Union – REACH**
 - Unless pre-registered, chemicals can't be sold
 - Tox data must be submitted to European Chemicals Agency
 - If toxic, mutagenic, or carcinogenic, more data required



How Can ECs Affect DoD?

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- **Adverse health effects on operating forces, DoD employees, and/or public**
 - Human health protection paramount
- **Reduced training/readiness**
 - Restrictions on use of ranges
- **Restricted or non-availability of material**
 - Adverse impact on mission-critical applications & industrial base
- **Increased O&M and/or cleanup costs**
 - Resource drain from mission needs

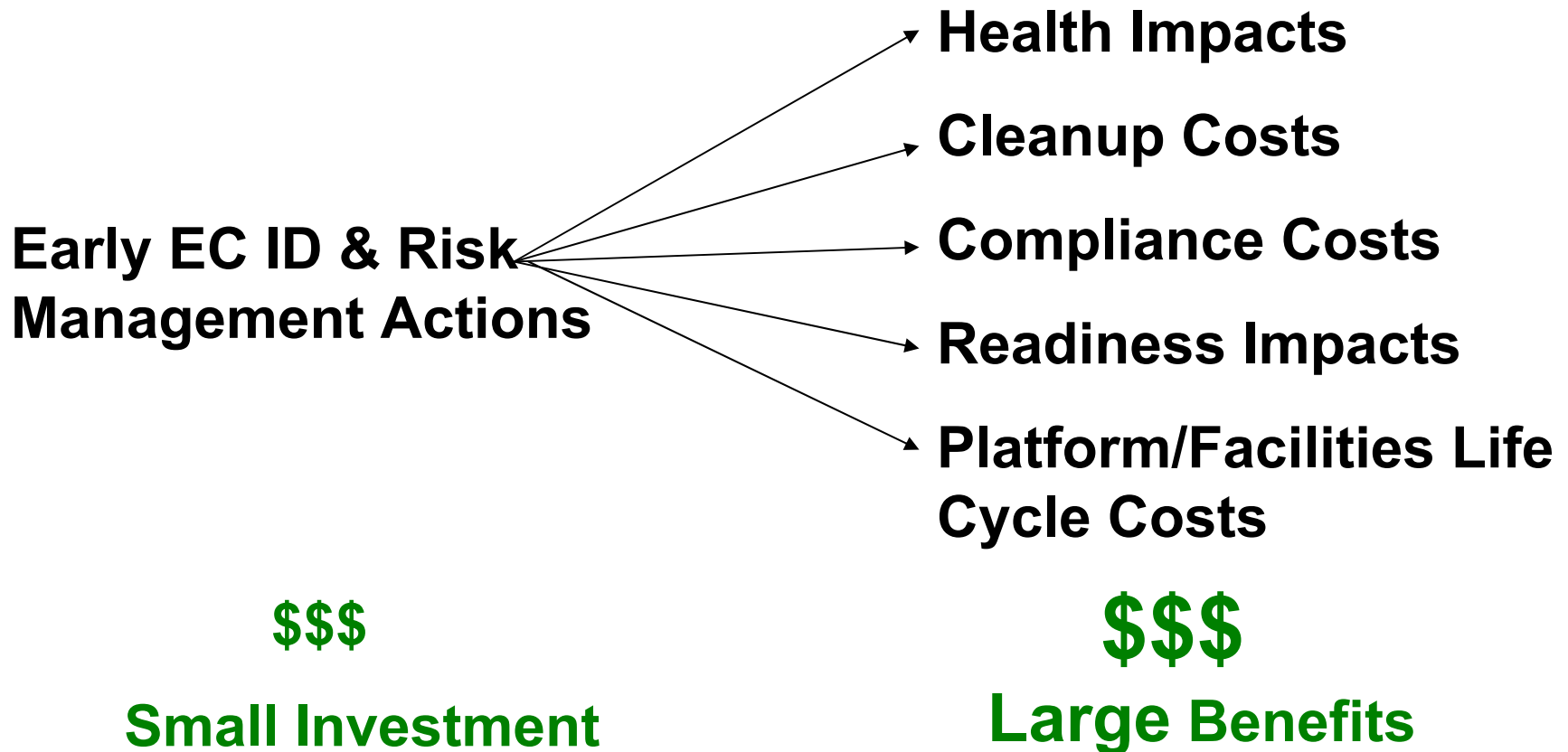
Examples – Past & Present

- **Ozone Depleting Substances** – Refrigerants, fire suppressants, solvents...phased out of production!
- **Perchlorate** - Munitions/propellant oxidizer...very low toxicity levels being set by states (2 ppb in MA)
- **Hexavalent Chromium** - Heavy metal used in DoD systems/platforms...recent, revised 10-fold reduction in acceptable exposure level
- **PBDEs** - Fire retardants...EU banned in July 06....states following with legislation
- **Naphthalene** - Component of JP-8/fuels used throughout DoD...proposed as a carcinogen by EPA...low toxicity levels could have major impacts

The Need for Action

Proactive vice Reactive

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Imagine

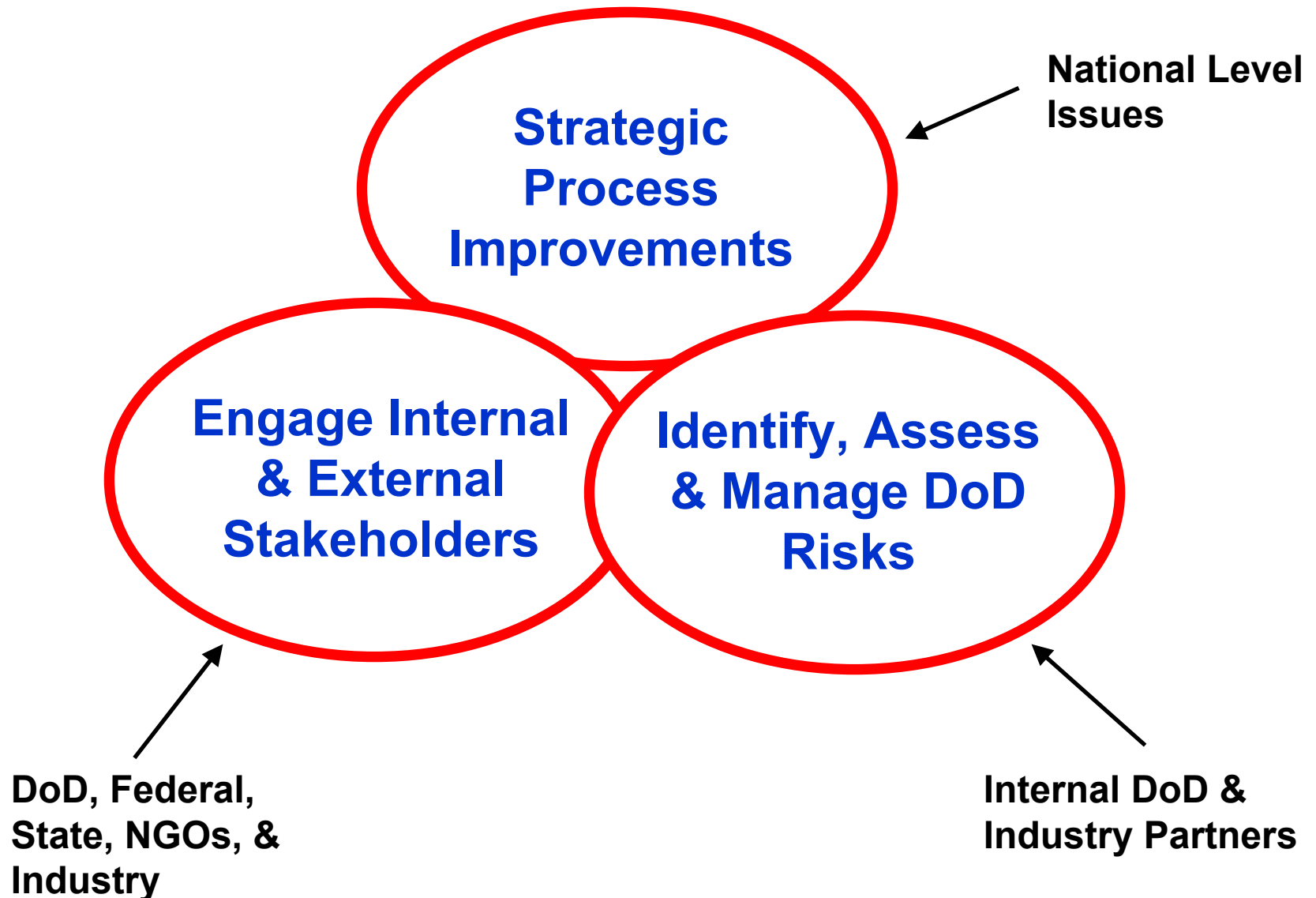
if the largest industrial complex in the nation could..

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- *Predict* which chemicals it uses or might use pose human health and environmental risks due to new science or regulatory status.
- *Develop* a consensus evaluation of types & magnitudes of the risks in using/releasing the chemical.
- *Develop* risk management options and invest in high-payback actions.
- *Achieve and measure* risk reduction.

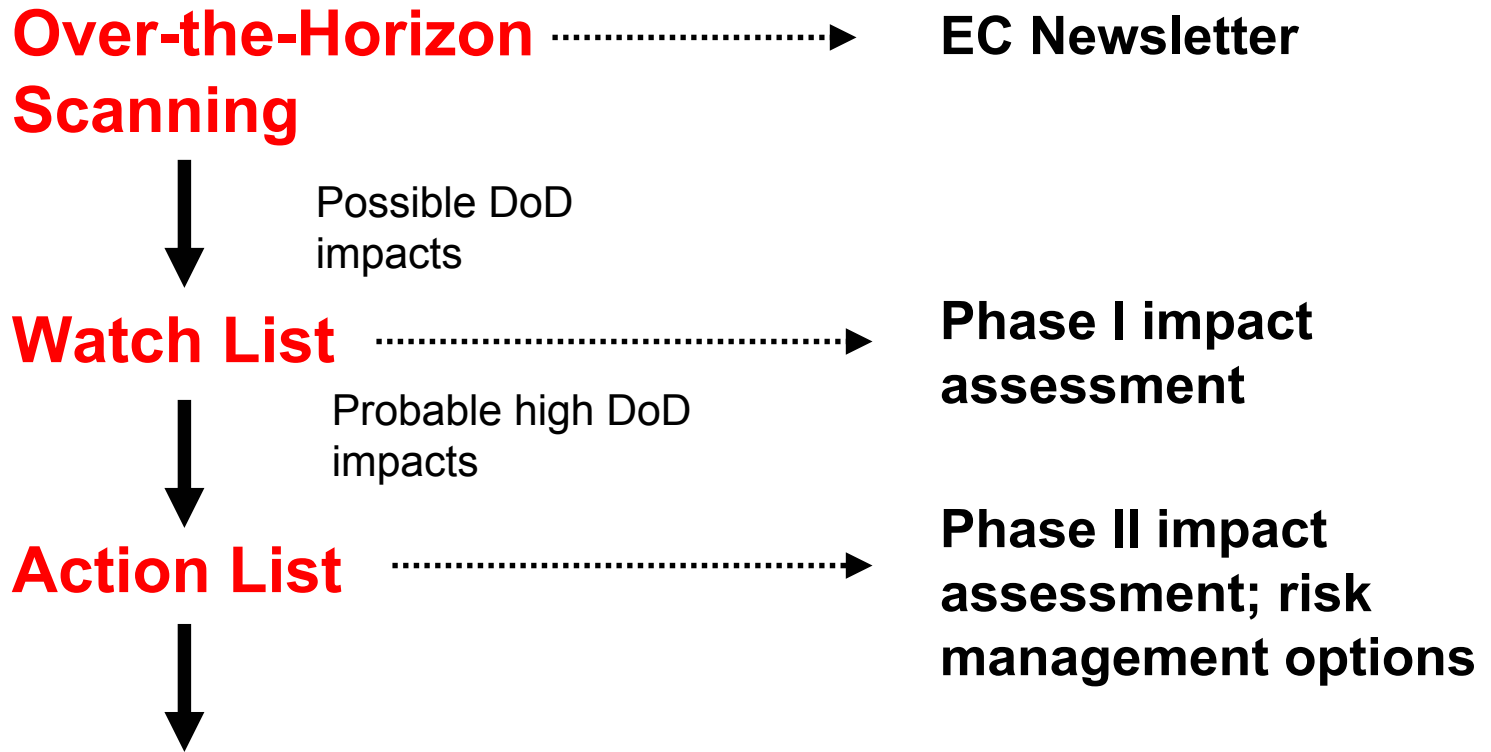
EC Directorate Strategic Priorities

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EC Tracking Process

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Risk Management Options to EC-IPT

Phase I EC Impact Assessment

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1. **Probability of Regulation/Re-regulation**

2. **Impact on DoD Functional Categories**

Environment Safety & Health	Readiness & Training	Acquisition	O&M of DoD Assets	Cleanup
H	H	H	H	H
M	M	M	M	M
L	L	L	L	L

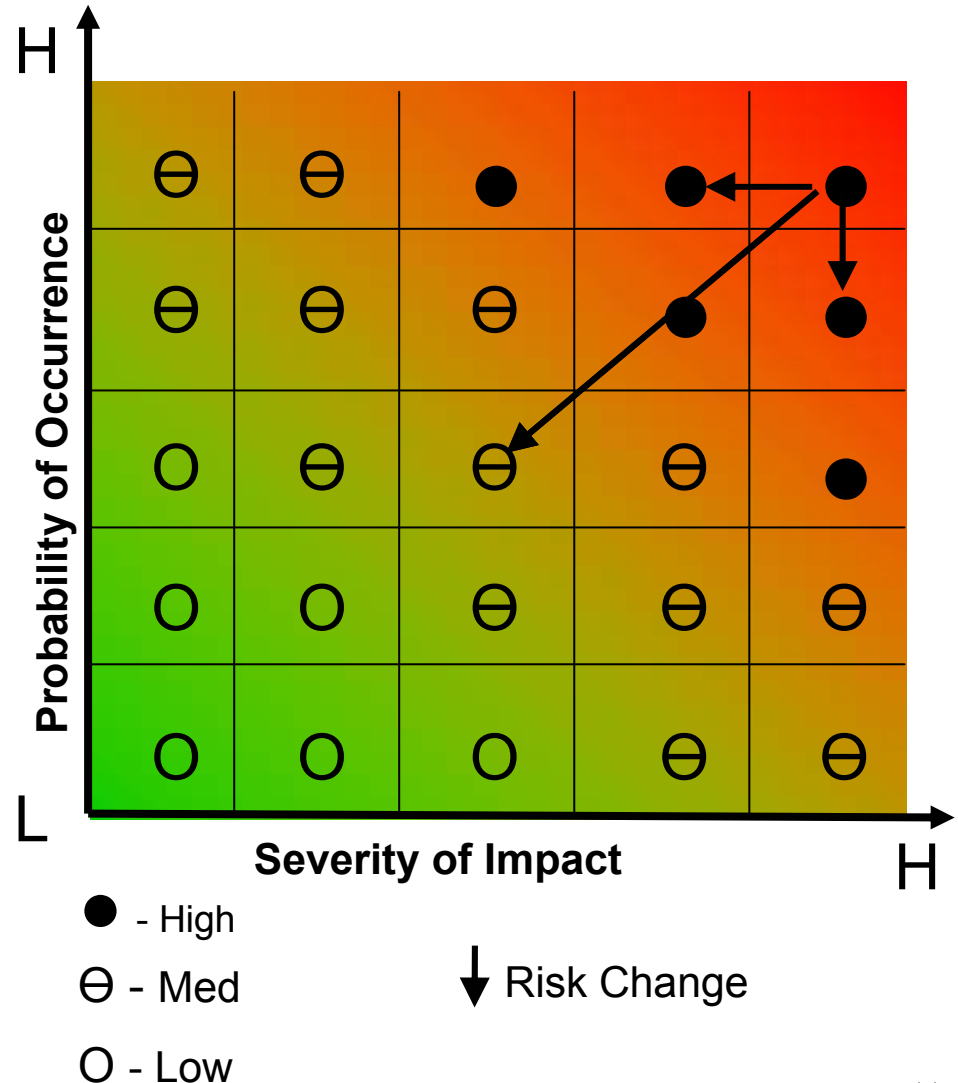
3. **Results** →

- **Decision – Move to Action List?**
- **Initial Risk Management Options**

Plotting EC Risk to DoD

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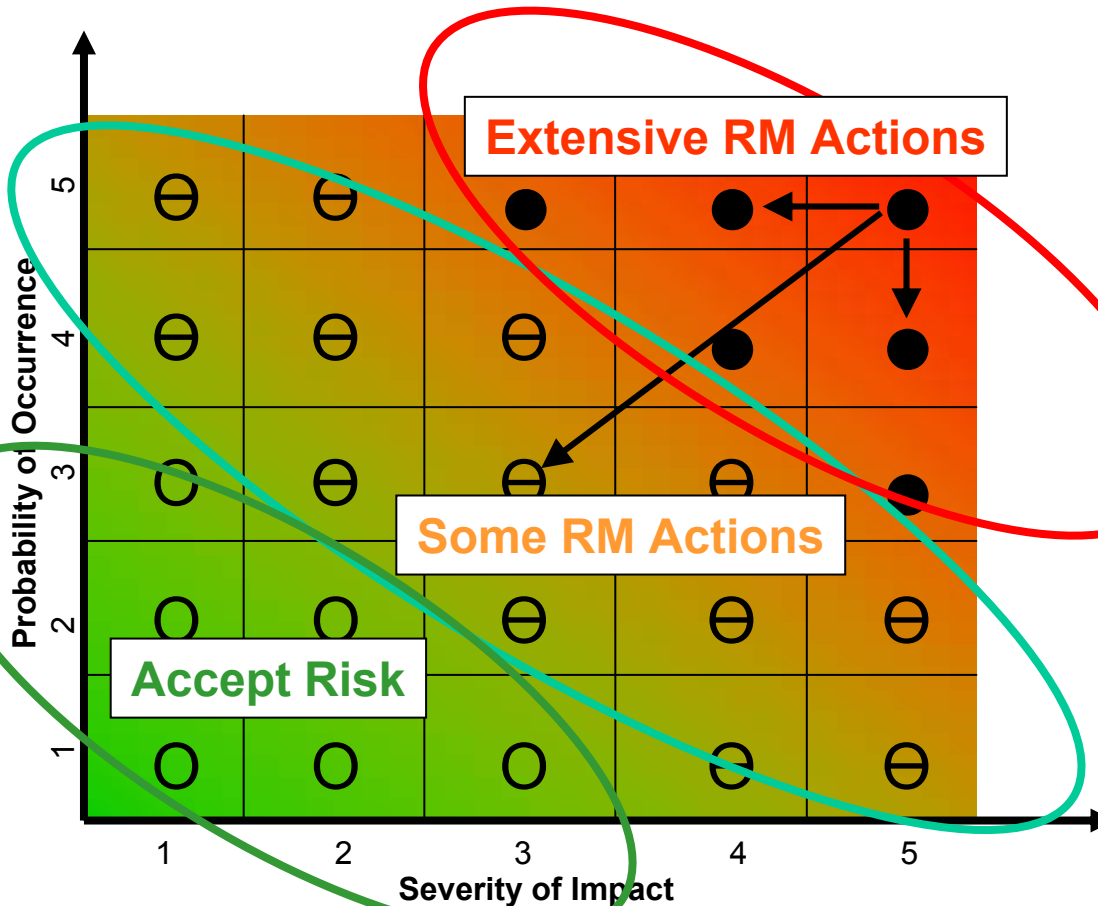
- High risk at top right
- Risk management actions move ECs to lower left...lower risk
- Seek to quantify risk reduction



Integrated Risk Management

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RM Options



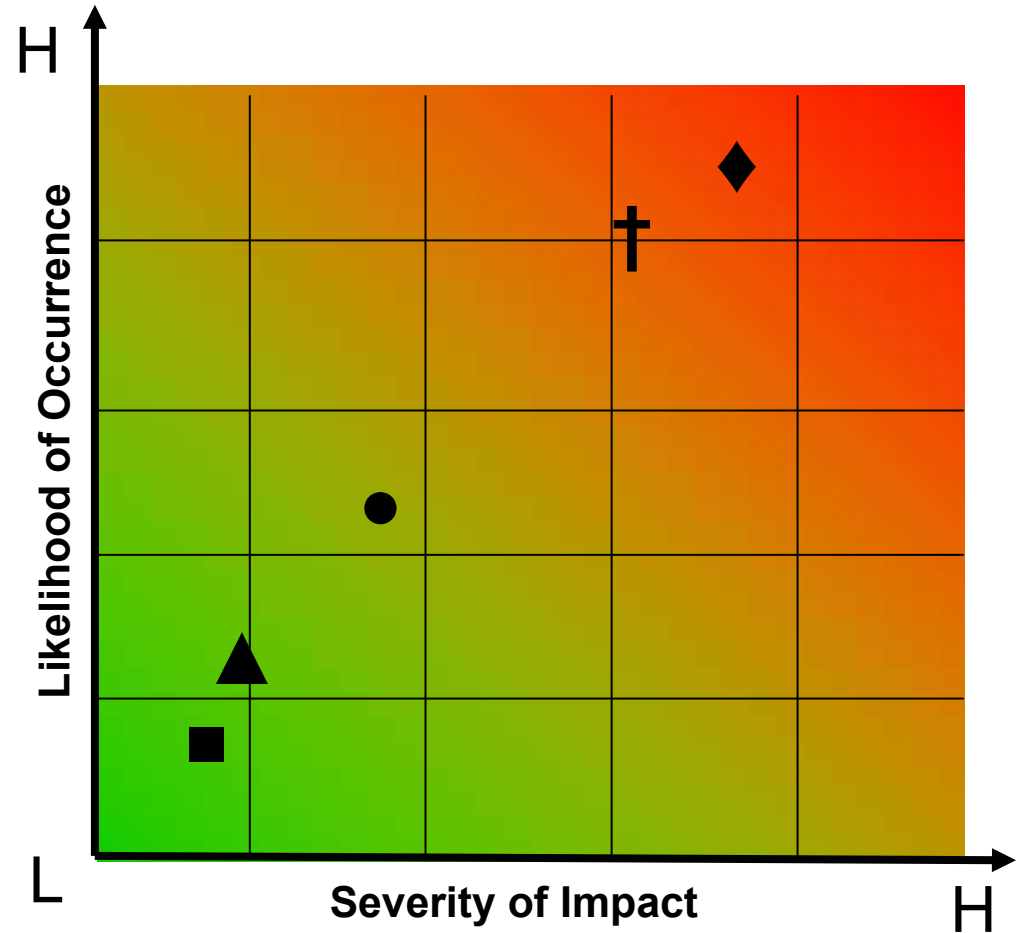
- Fill tox science gaps
- RDT&E
- Material substitution
- Process changes
- Regulatory engagement
- Stockpile material
- Exposure assessment & monitoring
- Personal Protective Equipment (PPE)
- Acquisition changes
- Benchmark with industry
- Risk communication
- Training

TCE Phase 1 Impact Assessment

Completed October 2006

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



EC Watch List

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- Tungsten & alloys
- Tetrachloroethylene
- Dioxin
- N-nitrosodimethylamine (NDMA)
- 1,4-dioxane
- 1,2,3-trichloropropane (TCP)
- Nanomaterials
- Perfluorooctanoic acid (PFOA)
- Dichlorobenzenes
- Beryllium
- Polybrominated biphenyl ethers (PBDEs)
- Di-nitrotoluenes (DNT)
- Naphthalene
- Lead



Recently added

Notes: - Impact assessments underway for all ECs except nanomaterials.

EC Action List

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- **Perchlorate**
- **Royal Demolition eXplosive (RDX)**
 - **Cyclotrimethylenetrinitramine**
- **Trichloroethene (TCE)**
- **Hexavalent Chromium**
- **Naphthalene**

**Recently elevated
from Watch List**



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

Perchlorate Risk Management Actions

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- **DoD & EPA synchronized policies**
 - Requires sampling in various media
 - Sets a “level of concern” based on NRC peer review
- **California Site Prioritization Protocol**
 - Joint DoD-State initiative to cull & prioritize sites for sampling & risk management
- **Army-Hughes Perchlorate Substitution Studies**
- **SERDP/ESTCP Treatment Studies**
 - Drinking water, wastewater, contaminated sites

EC Research Needs

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- **Toxicology & Risk Assessments**
 - Identify science gaps & conduct toxicity studies
- **Material Substitutions**
 - Green Chemistry considerations...use less toxic chemicals where possible
 - Life-cycle cost analyses in acquisition
- **Treatment for releases**
 - Air, drinking water, wastewater, and contaminated sites

ECOS-DoD Work Group Issues & Products

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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: Action triggers paper

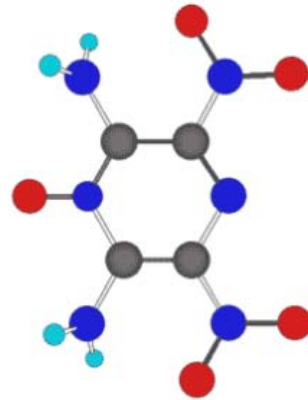
Summary

- **EC management requires a new paradigm**
 - Proactive vice reactive
 - Make targeted investments before regulatory action
 - Base decisions on life cycle costs
- **Efficient process being established for tracking, assessing and developing risk management options**
 - Leverages existing assets/resources
- **Potential large payback**
 - Protects people, mission and assets

Questions & Discussion

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EC Risk Management Requires a New Paradigm



BACKUP SLIDES

EC Action Triggers Issue Paper

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- **Issue: What conditions, authorities, considerations help determine whether to take response actions for ECs w/o risk levels or regulatory standards?**
- Existing laws provide authorities & flexibilities to both DoD and regulators to act...but
 - Considerable professional judgment required
- Four typical scenarios identified
 - Covers human health risk only

Typical EC Scenarios

	ECs Present at Levels Requiring Action¹	ECs Present But Necessity for Action Uncertain
Other contaminants present at levels requiring action	Scenario 1	Scenario 2
Other contaminants not present or at levels not requiring action	Scenario 3	Scenario 4

¹ Requiring action means that EC levels are such that the parties agree

EC Action Triggers Issue Paper

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- Based on site history, determine if real or suspected release
- Determine toxicity – use Provisional Values Issue Paper
 - Identify science gaps, if any, to regulators
- Determine if pathway & receptor exist
 - If yes, assess risk using best data and take appropriate response actions
 - If no...it depends
 - Possible delay in action if toxicity unclear
 - Possible risk management actions
- Where agreement can't be reached, parties reserve rights under existing laws

EC Risk Communication Paper

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- **Issue: How should we communicate EC issues & risks consistently to the public?**
- DoD and regulators need to engage early and develop a common message
- We need to be transparent on what is known and not known (e.g., uncertainties)
- The paper contains a template for developing EC information for the public

EC Provisional Values Issue Paper

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- **Issue: How should we determine toxicity for ECs not in IRIS?**
- EPA Hierarchy provides starting point
 - IRIS
 - Provisional Peer Reviewed Toxicity Values (PPRTVs)
 - Other Federal/state values (ATSDR-MRLs, CA-EPA)
- Agencies free to use best available, *peer reviewed* data...avoid use of non-peer reviewed
- Toxicity assessments should be transparent, publicly available, & consistent with duration of exposure being assessed