



Impacts to the U.S. Department of Defense (DoD) and Defense Industrial Base (DIB) from the Toxic Substances Control Act (TSCA)

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What are the impacts from chemical regulations on DoD supply chains for mission critical chemicals?





Evaluating Enterprise-Wide Impacts to DoD

■ People

- Office of the Deputy Assistant Secretary of Defense (Environment and Energy Resilience) (ODASD(E&ER))
- Emerging Chemicals Steering Group
- Emerging Chemicals Governance Council
- MERIT members

■ Policy

- DoDI 4715.18, Emerging Chemicals (Effective: September 4, 2019)

■ Processes

- Identify
- Assess
- Manage



**Acquisitions / Research,
Development, Testing, and Evaluation**



**Environment, Safety,
and Health**



Training and Readiness



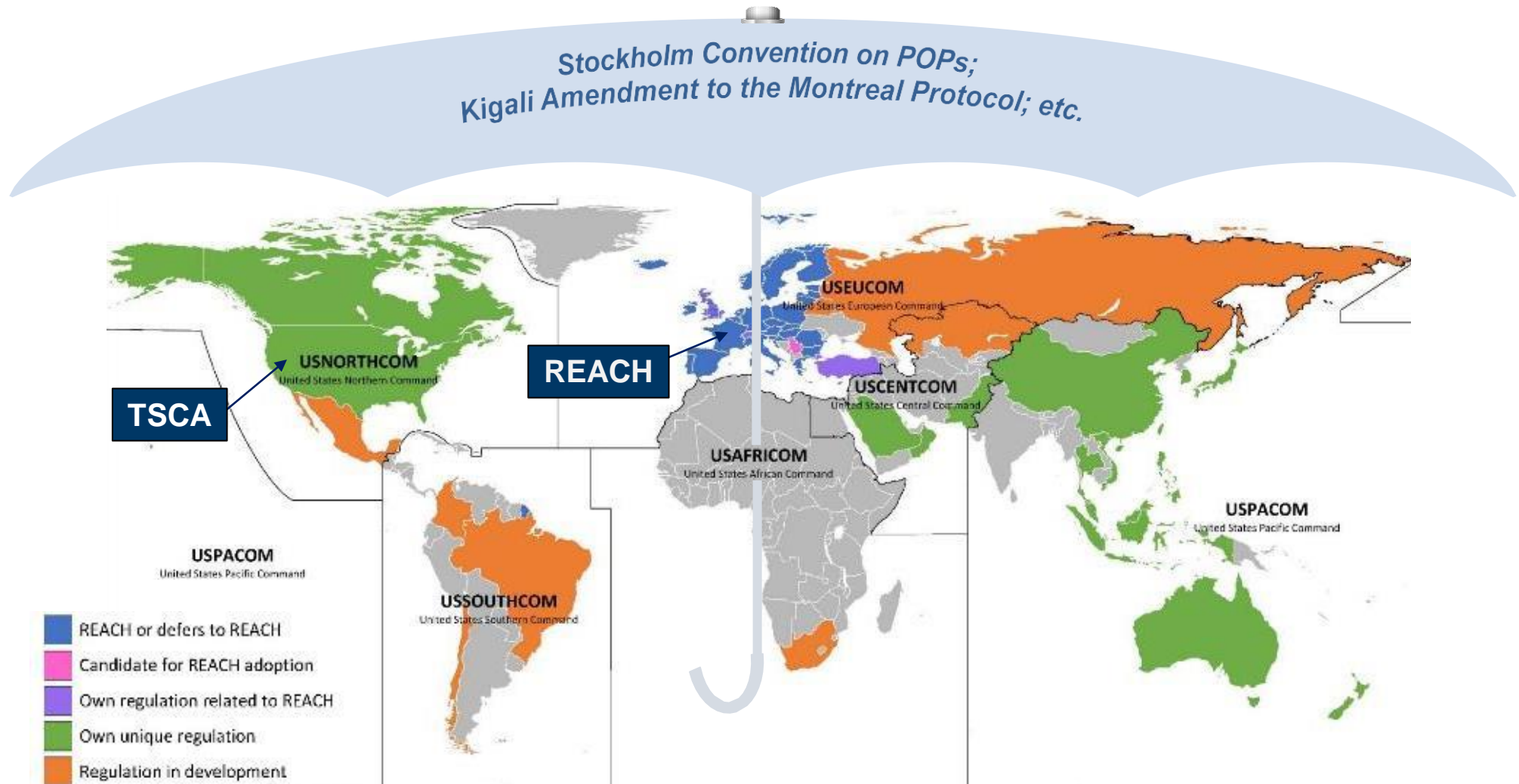
Cleanup / Remediation



**Production, Operation,
Maintenance, and
Disposal of Assets**



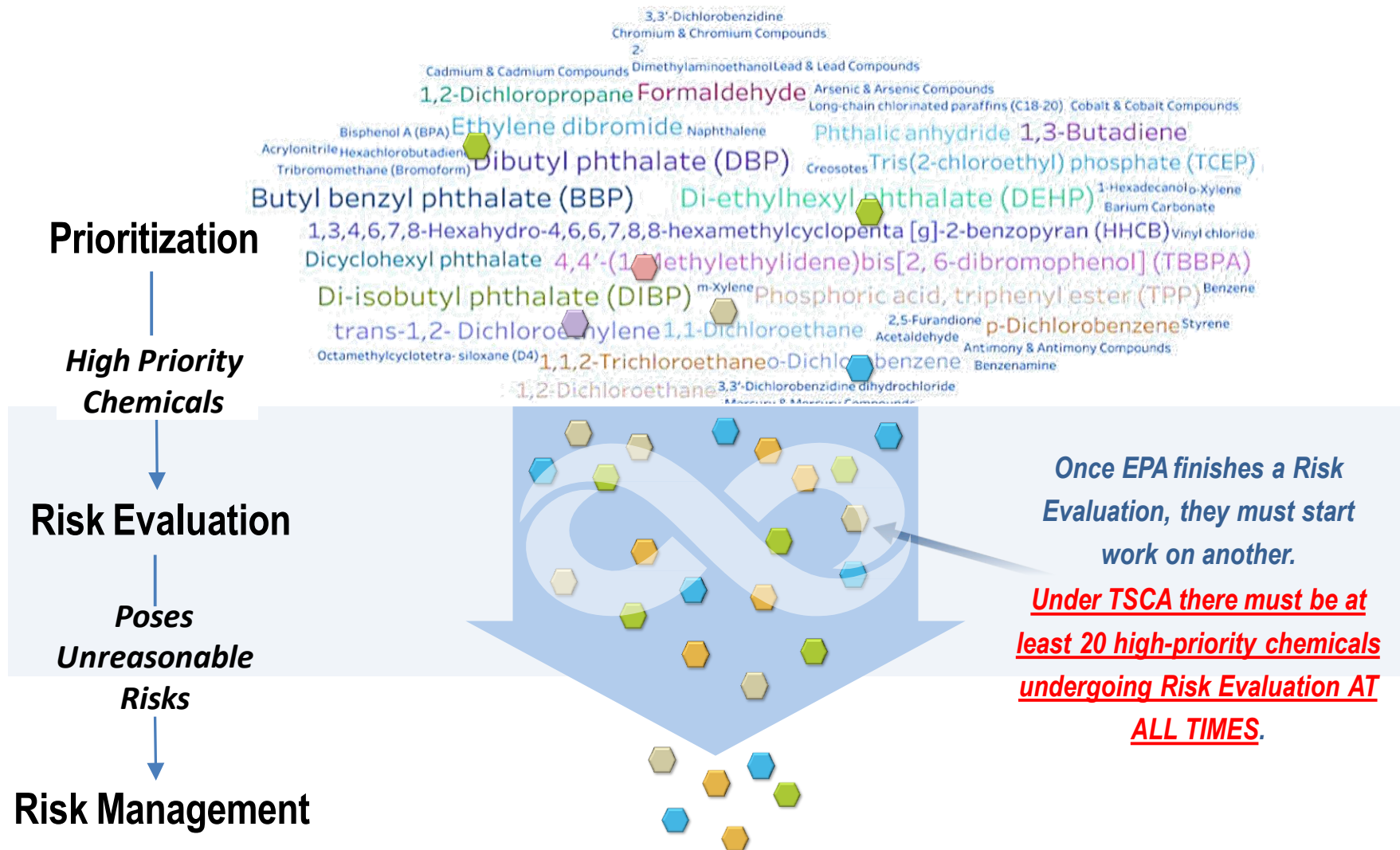
Global Chemical Management Regulations



U.S. environmental protection and occupational health regulations as well as other global regulations can limit DoD's ability to operate and maintain weapon systems by restricting access to mission critical chemicals.



Chemicals in the TSCA Pipeline





Examples of Chemicals Used by DoD Undergoing Regulation



1-Methyl-2-pyrrolidone (NMP)
Paint Stripper



Dibutyl Phthalate (DBP)
Ejection seat cartridges



Methylene Chloride
Polymer Bonded Explosives



Trichloroethylene (TCE)
Battery separators

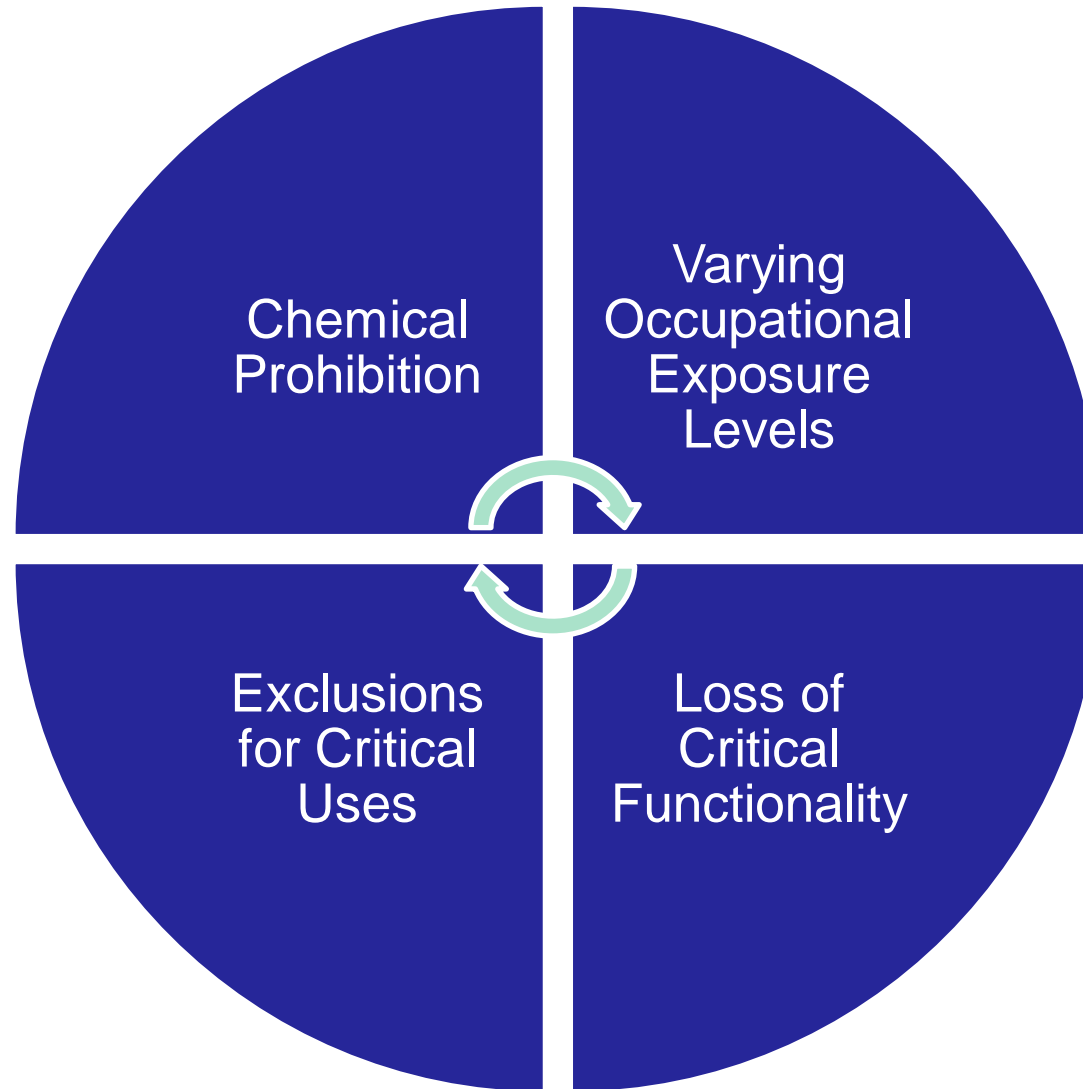


PIP(3:1)
Hydraulic Fluid





Potential Impacts from Regulatory Approaches





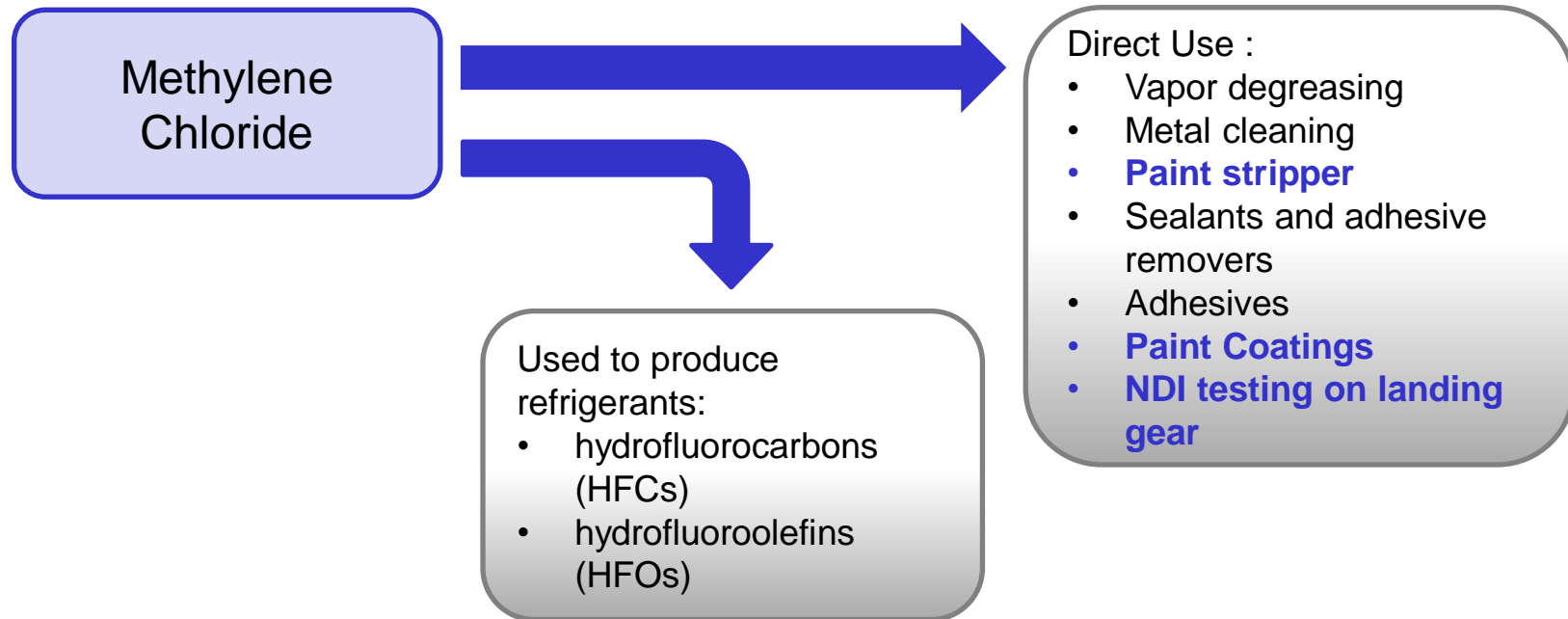
Impacts from Chemical Prohibition

- Need tiered approach for risk management to allow for less-burdensome risk management alternatives (labeling, packaging, use certification, etc.) instead of reliance on chemical prohibition
- Need alignment with White House policies (e.g., America's supply chains)
- Implications of Prohibitions
 - National Security – more pressure to purchase from foreign countries and increased risk of counterfeit parts
 - Readiness – eliminates use of mission critical chemicals
 - Technology innovation – reduces available alternatives



Impacts from Chemical Prohibition

- For example, methylene chloride could be prohibited and, as a result, impact critical capabilities





Varying Occupational Exposure Levels

- Need clarity on application of occupational exposure levels (OELs)
- EPA proposed workplace exposure limits (e.g., Existing Chemical Exposure Limits (ECELs)) that will supersede/conflict U.S. Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).

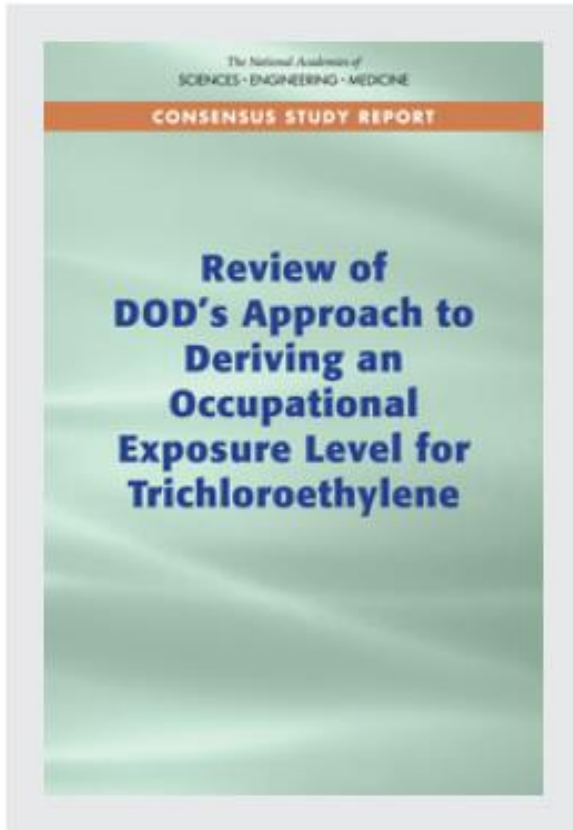
- Implications

- Technical feasibility
- Exposure limit prioritization

	EPA ECEL (Proposed)	vs.	OSHA PEL
Trichloroethylene	0.0011 ppm		100 ppm
Perchloroethylene	0.14 ppm		100 ppm
Methylene Chloride	2 ppm		25 ppm
Carbon Tetrachloride	0.03 ppm		10 ppm



OEL Concern: Trichloroethylene (TCE)



- DoD developed process for establishing OELs
- For TCE, DoD had concerns that current standards inadequate to protect workers
- DoD asked the National Academy of Sciences (NAS) for an independent review of its approach to calculating the TCE OEL
- NAS performed a rigorous review and DoD revised its approach according to NAS recommendations; the NAS suggested that a preliminary value of 0.9 parts per million (ppm) could be used in the interim
- In 2022, NAS continues to review the revised protocol and proposed OEL (1 ppm)
- DoD's proposed TCE OEL conflicts with EPA's proposed TCE ECEL



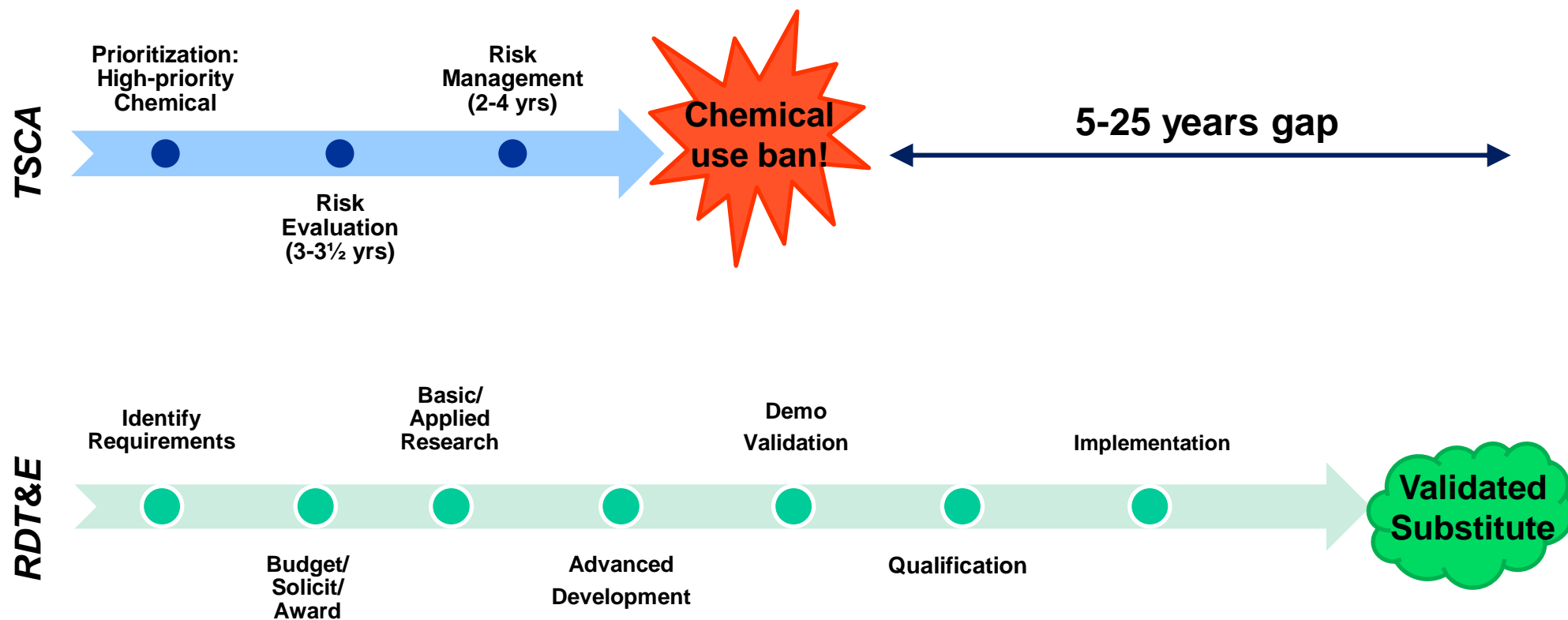
Exclusions for Mission Critical Uses

- DoD needs exclusions for mission critical uses and continued access to supply chain chemicals and products
- Further, DoD needs an off-ramp from EPA's prohibitions if a critical use is discovered after the rule on a specific chemical is finalized
- For example, with PIP(3:1):
 - DoD provided information to EPA on mission impacts from prohibition
 - EPA's PBT rule prohibits processing and distribution in commerce of PIP (3:1), and products containing the chemical substance, except for the following:
 - Processing and distribution in commerce for use in **aviation hydraulic fluid in hydraulic systems and use in specialty hydraulic fluids for military applications**;
 - Processing and distribution in commerce for use in **lubricants and greases**;
 - Processing and distribution in commerce for use in new and replacement parts for the **aerospace and automotive industries**





Need Safer Chemical Alternatives But Timing and Performance are Critical





Loss of Critical Functionality

- DoD recommends a holistic approach to managing risks from chemicals within a broad chemical category (e.g., such as solvents) providing similar functionality.
 - The sequential regulation (e.g., ban or restriction) of such chemicals may result in the loss of critical functionality for DoD.

TSCA 10/20 Solvents

- 1-Bromopropane (1-BP)
- Carbon Tetrachloride
- 1,4-Dioxane
- Methylene Chloride (MeCl)
- N-methylpyrrolidone (NMP)
- Perchloroethylene (PCE)
- Trichloroethylene (TCE)
- 1,2-Dichloroethane
- Trans-1,2-Dichloroethylene (t-DCE)
- 1,1,2-Trichloroethane
- 1,2-Dichloropropane
- 1,1-Dichloroethane

Function	Original	Alternative(s)
Metal Parts Cleaning	TCE	PCE MeCl
Solvent Carrier in Adhesives	MeCl	1-BP
Precision Cleaning	1-BP	t-DCE
Paint Stripping	MeCl	NMP



Solvent Alternatives: 1-Bromopropane (1-BP)

- 1-BP is used for precision cleaning; however, it could soon be prohibited under TSCA (1-BP is a TSCA 10 chemical)
- An alternative to 1-BP for precision cleaning has been identified; however, the formulation includes t-DCE, which is currently undergoing a risk evaluation under TSCA (it is a TSCA 20 chemical) and could, therefore, also be prohibited

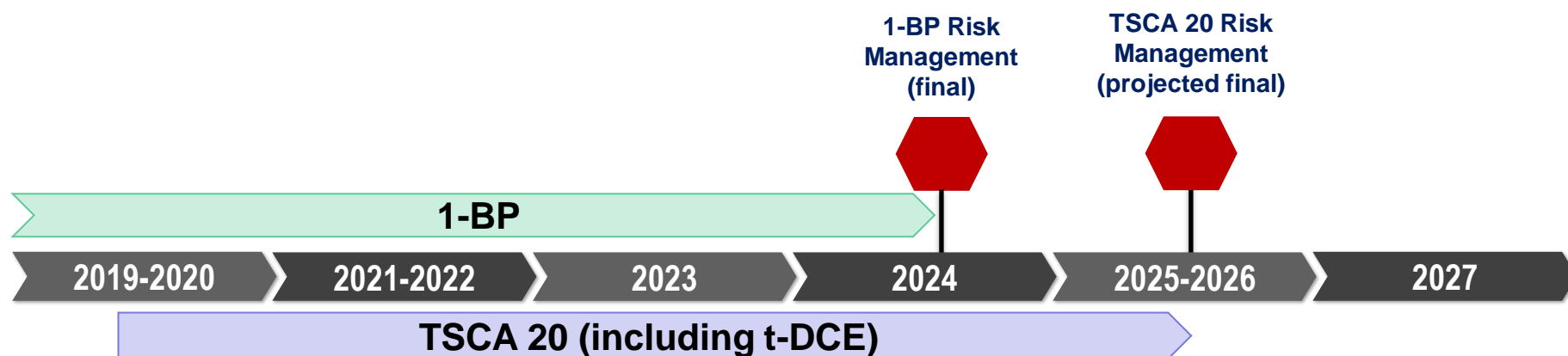


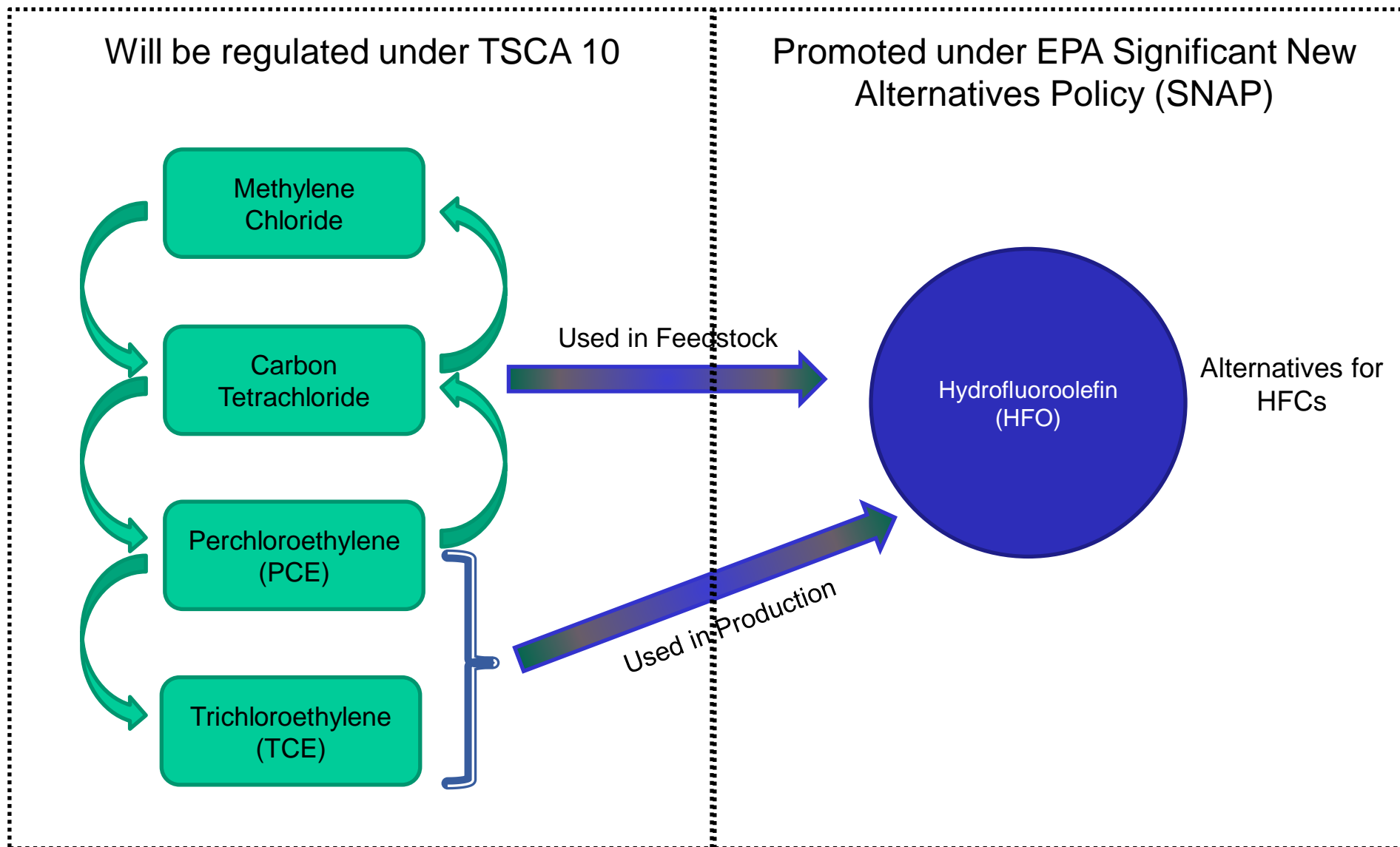
Table 2. Flammability Characteristics of 3M™ Novec™ Engineered Fluids

Not for specification purposes.

Product	Novec 71DE	Novec 71DA	Novec 72DE
Nominal Composition	50% t-DCE 50% C ₄ F ₉ OCH ₃	44.6% t-DCE 57.2% C ₄ F ₉ OCH ₃ 2.7% Ethanol	70% t-DCE 10% C ₄ F ₉ OCH ₃ 20% C ₄ F ₉ OC ₂ H ₅
Flash Point (Closed-cup) ³	None	None	None
Flame Limits ⁴	None	5.1 – 12.7%	6.7 – 13.7%



Impact Capability: Chlorinated Solvents





Hidden Impacts

Prohibition

Restrictions or Limitation

Apply Warnings
& instruction

Regulate
Commercial use

Chemical
Regulation

Regulation of
Disposal Methods

Recordkeeping

Technical
Feasibility of ECEL

**Supply Chain
Concerns**

Decreases mission
readiness

Niche Market for
exemptions

**Substitution
Regret**

Long Reconstitution Time

**Limitations of
Alternatives**

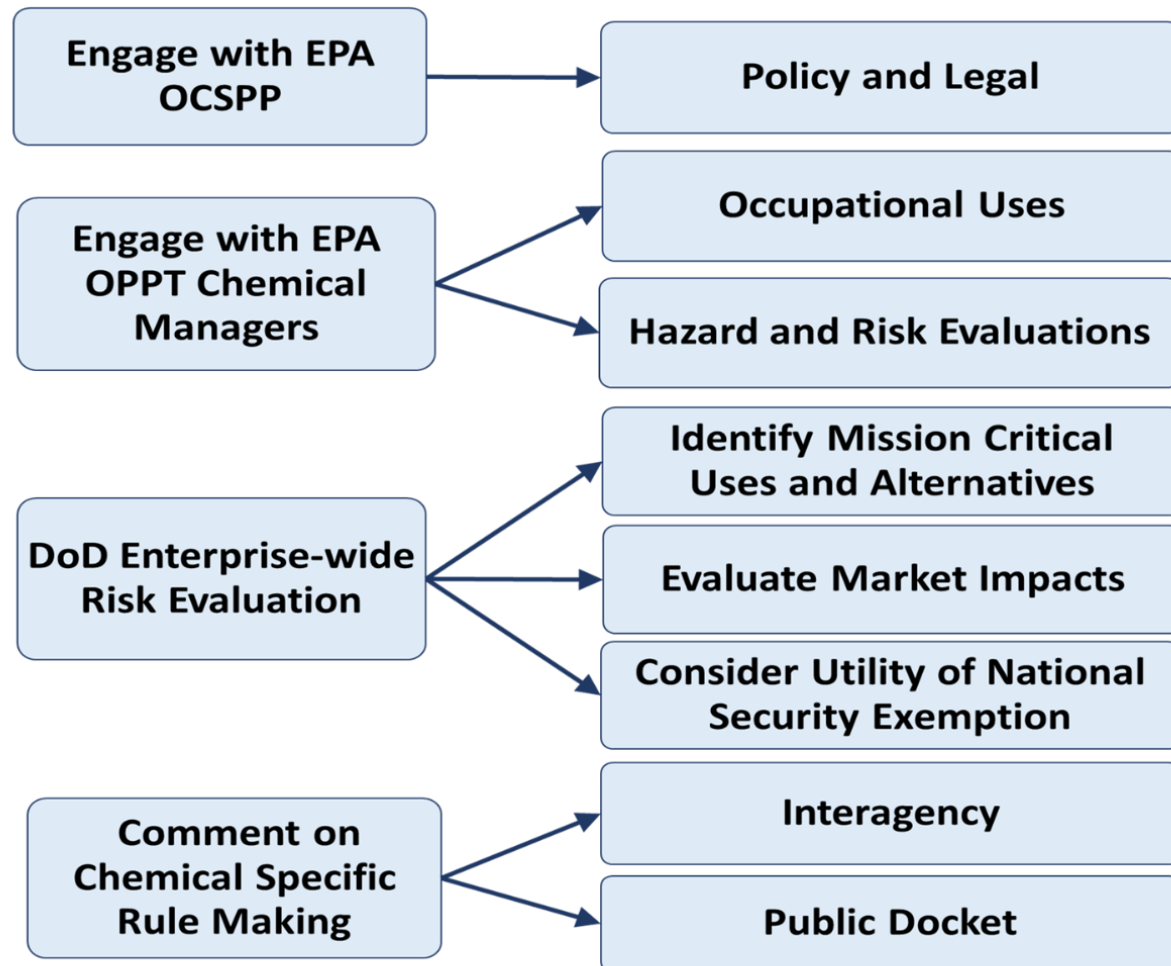
Possible TSCA Restrictions

Adverse DoD Impacts



DoD Interagency Engagement Opportunities

- Strategy depends on effective communication and information sharing with many stakeholders within DoD and the Defense Industrial Base, including chemical manufacturers, formulators, and distributors.
- Inform regulatory agencies about identified mission criticality of chemicals through the research of conditions and usage amount data.





Risk Barometer

How do we find chemical alternatives and avoid substitution regret?



RISK

Emerging
Regulations



RISK

Toxicology



RISK

Supply Chain
(Fragility and
Criticality)



Q&A

- The views and perspectives of the speaker/authors do not reflect the opinions of the Department of Defense.
- Please email the CMRM Program Office at osd.pentagon.ousd-atl.mbx.cmrmpp@mail.mil with any additional questions.



Abstract

- **Abstract Short Summary:** This session will highlight recent and anticipated risk evaluation and risk management issues relevant to U.S. Department of Defense (DoD) emerging chemicals of concern. Additionally, this session will demonstrate how DoD is engaging with the U.S. Environmental Protection Agency (EPA) and integrating the risk management determinations and proposed restrictions across the defense industrial base supply chain.
- **Abstract Keywords:** TSCA; Emerging Chemicals; risk management
- **Abstract Text:** The Toxic Substances Control Act (TSCA), amended in June 2016, provides the U.S. Environmental Protection Agency (EPA) with new authority to evaluate and address unreasonable risks to human health and the environment from chemical substances and mixtures, and from articles containing such substances and mixtures. EPA recently published risk management rules for five persistent, bioaccumulative, and toxic (PBT) chemicals and continues work to complete risk evaluations and develop proposed risk management rules for thirty high priority chemicals. Many of these chemicals are used in U.S. Department of Defense (DoD) sustainment activities or in the manufacturing of components for weapons systems and platforms. The DoD's Chemical and Material Risk Management (CMRM) Program tracks chemical regulations that may be of interest to the DoD and assesses risk to mission critical uses of chemicals undergoing risk evaluation and risk management. A collaborative, multi-pronged approach is used to identify and evaluate potential DoD mission impacts from the regulations by (1) identifying the conditions and usage amount of each chemical; (2) engaging subject matter experts (SMEs) to identify the mission criticality of the chemical uses; (3) engaging with industry to evaluate market impacts; and (4) engaging with EPA to share use information and comment on rulemakings through the Executive Order 12866 Interagency Process. This session will highlight recent and anticipated risk evaluation and risk management issues relevant to DoD chemicals of concern and how DoD mitigates risk across the defense industrial base supply chain from these regulatory changes.