MA TURA PFAS Category and Avoiding Regrettable Substitutes

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NEWMOA Science of PFAS Conference
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TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

Overview

- Chemical classes for prevention
- Massachusetts TURA - Certain PFAS NOL category
- Avoiding regrettable substitutes

Massachusetts Toxics Use Reduction Act (TURA)

Helps Massachusetts companies and communities ***reduce the use of toxic chemicals*** while **promoting competitive advantage** of Massachusetts businesses

- Chemical use reporting
- Biennial toxics use reduction planning
- Annual fee

TURA Program

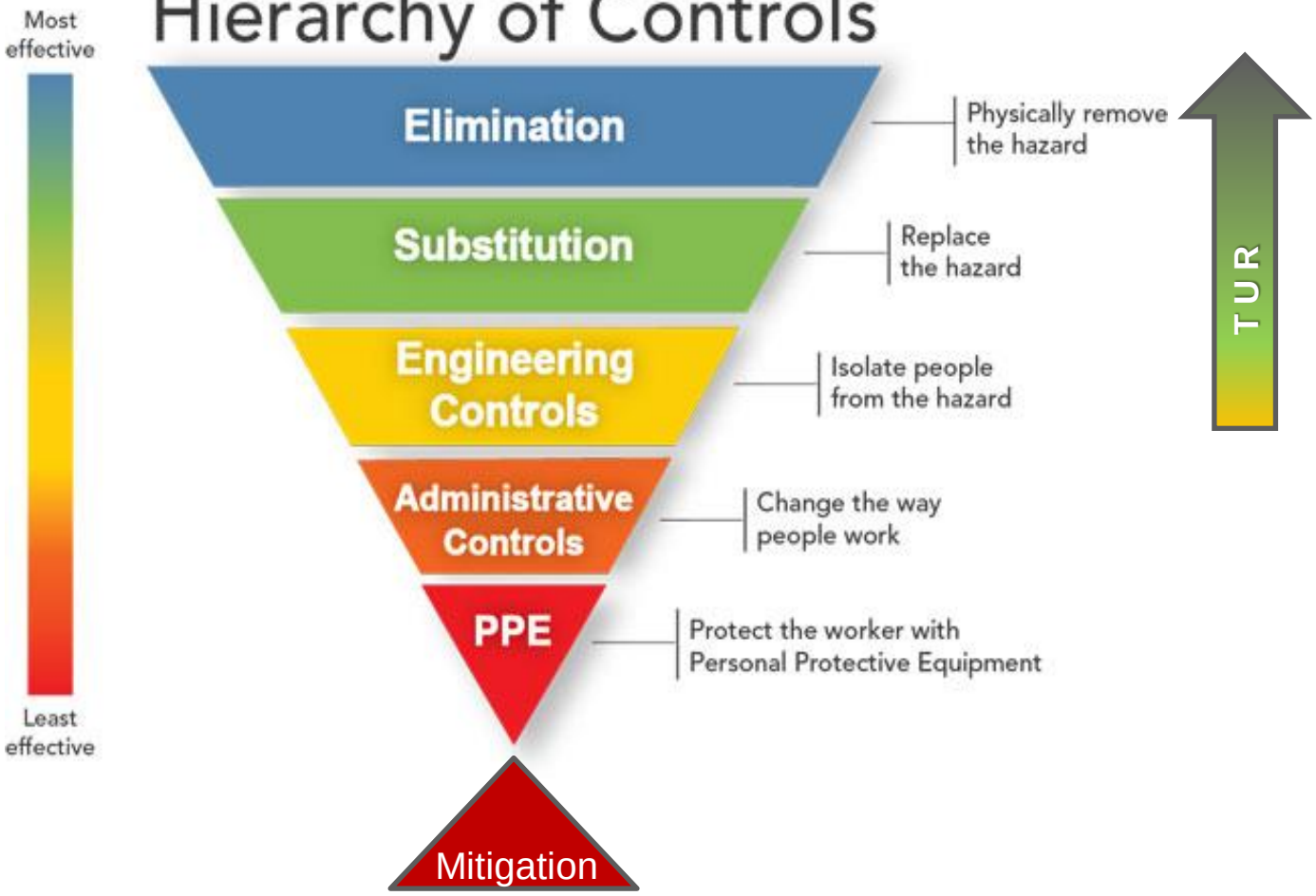
Massachusetts Department of Environmental Protection (MassDEP): Planner certification, filings, enforcement, data analysis

Massachusetts Office of Technical Assistance and Technology (OTA): Business Assistance, On-site, confidential technical assistance

Massachusetts Toxics Use Reduction Institute (TURI): Training, grants, research, alternatives assessment, Science Advisory Board, policy analysis, technical support, laboratory, library

Science Advisory Board	Advisory Committee	Administrative Council
• Scientific recommendations	• Multi-stakeholder policy input	• Votes on policy initiatives (e.g. listing chemicals)

Hierarchy of Controls



Primary Prevention

Secondary Prevention

Tertiary Prevention

OECD 2018

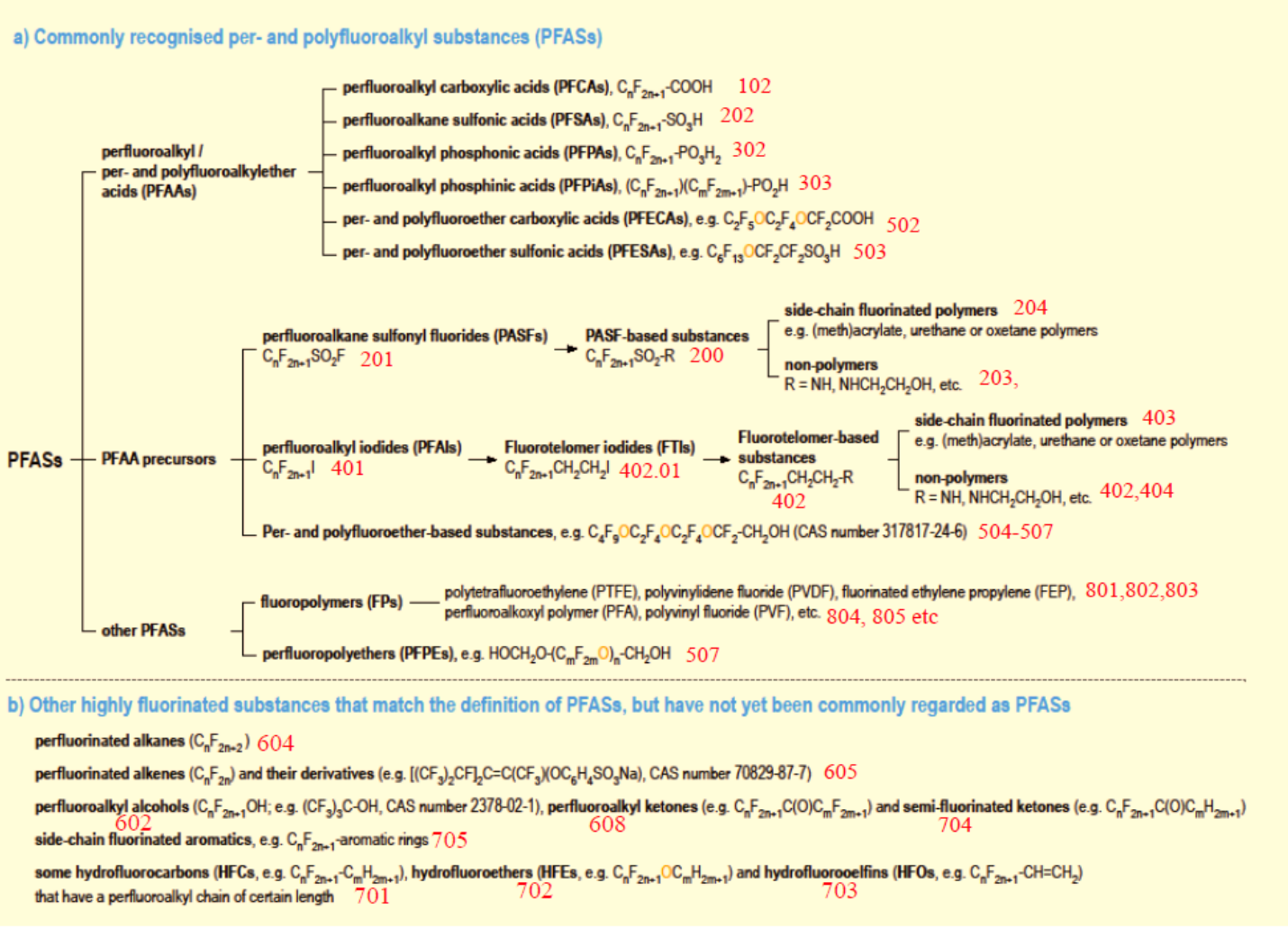


Figure 2. Schematic overview of the structure categories of identified PFASs

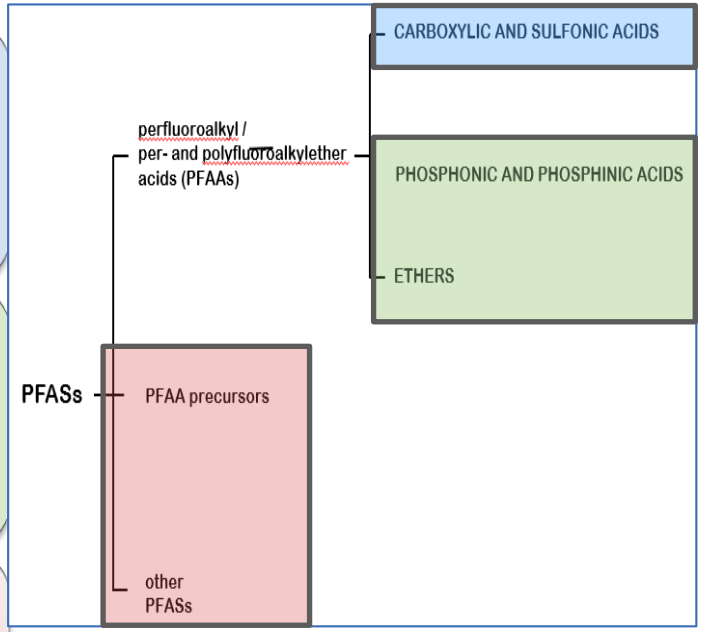
OECD ENV/JM/MONO(2018)7
Toward A New Comprehensive Global Database Of Per- And Polyfluoroalkyl Substances (Pfass):
Summary Report On Updating The OECD 2007 List Of Per- And Polyfluoroalkyl Substances (Pfass)

TURA SAB PFAS Evaluation

To understand the characteristics of a range of PFAAs, the SAB examined eight substances of varying chain lengths: PFNA (C9); PFOS and PFOA (C8); PFHpA (C7); PFHxA and PFHxS (C6); and PFBA and PFBS (C4).

The SAB then reviewed two ethers (GenX and ADONA), and phosphonic and phosphinic acids (PFPA and PFPiAs) of varying chain lengths.

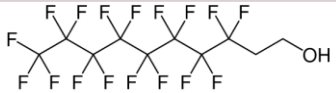
The SAB reviewed various health impacts as well as a number of degradation/transformation pathways, through which a PFAS precursor breaks down into one of the end degradation products.



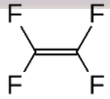
PRECURSORS

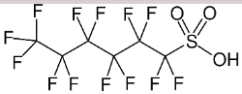
Raw Materials

8:2 FTOH



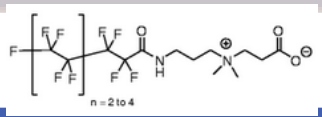
TFE and PFAAs



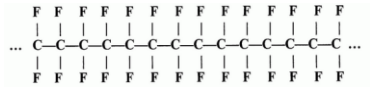


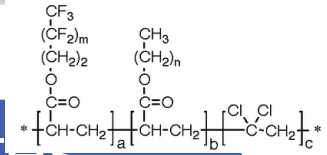
Commercial Products

Surfactants, e.g., AFFF



PTFE (Teflon); side chain polymers

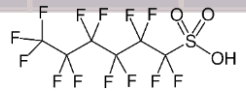




Transient degradation intermediates

Terminal Degradation Products - PFAAs

PFBA	PFBS	PFHxA	PFHxS	PFHpA	PFOA	PFOS	PFNA	GenX	PFPAs



TURA listed category: Certain PFAS NOL

- Those PFAS that contain:
  - a perfluoroalkyl moiety with three or more carbons
    - (e.g., $–C_nF_{2n}–$, n ≥ 3; or $CF_3–C_nF_{2n}–$, n≥2) or
  - a perfluoroalkylether moiety with two or more carbons
    - (e.g., $–C_nF_{2n}OC_mF_{2m}–$ or $–C_nF_{2n}OC_mF_m–$, n and m ≥ 1), and
  - wherein for the example structures shown, the dash (–) is not a bond to a hydrogen and may represent a straight or branched structure, and
  - that are not otherwise listed

More information:
https://www.turi.org/Our_Work/Toxic_Chemicals/Chemical_Information/Per-_and_poly-fluoroalkyl_substances_PFAS/PFAS_Tracking_Required_Under_TURA

Why designate a category or class?

ADVERSE SUBSTITUTIONS

INCOMPLETE LIST OF CAS NUMBERS

SIMILAR HAZARDS ACROSS A GROUP

CONFIDENTIAL BUSINESS INFORMATION

Prevention Approach:
Avoiding Regrettable Substitutes

Use an Alternatives Assessment framework

Evaluate use and function. Is it necessary?

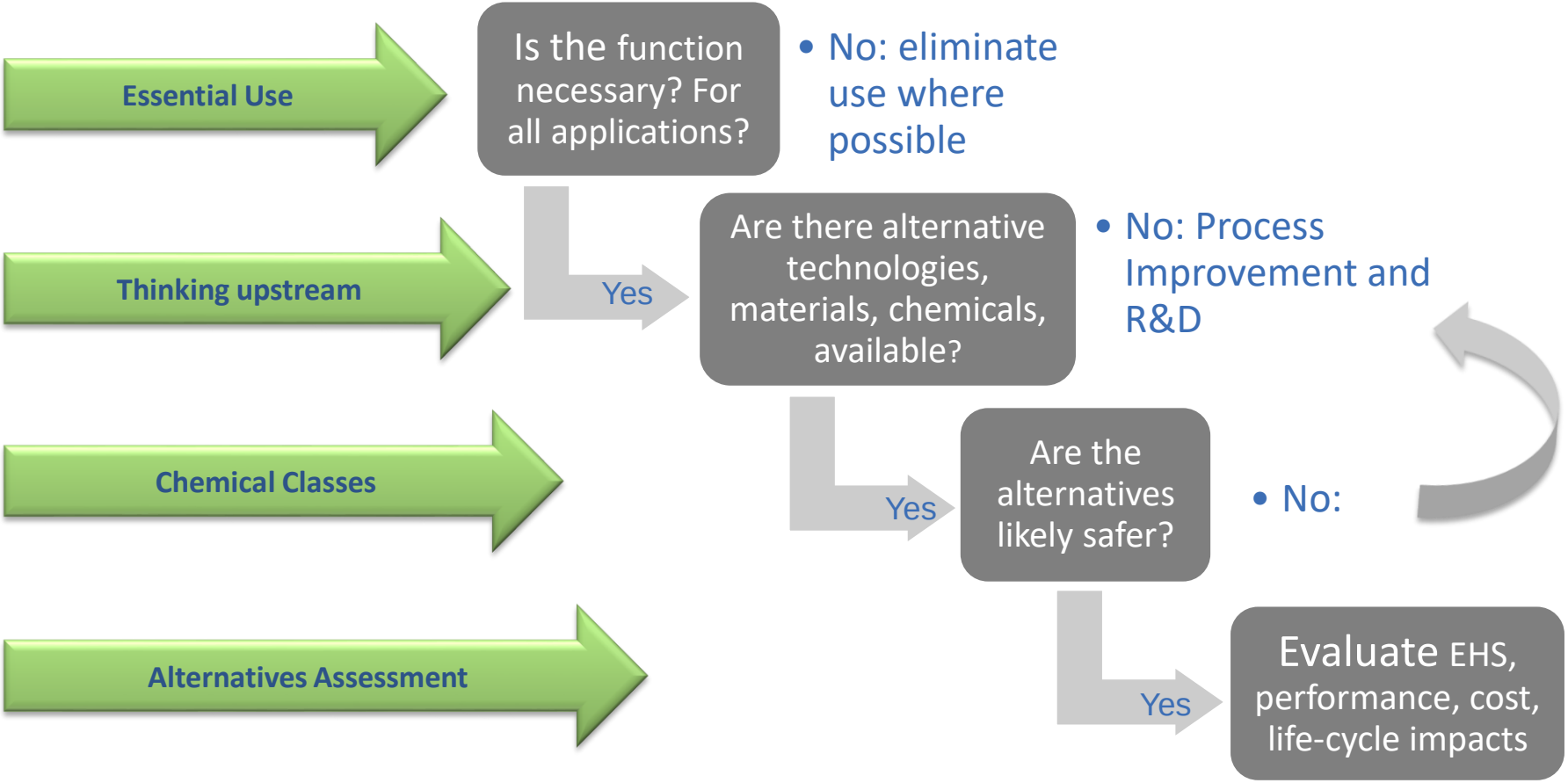
Essential uses concept

Evaluate safer alternatives

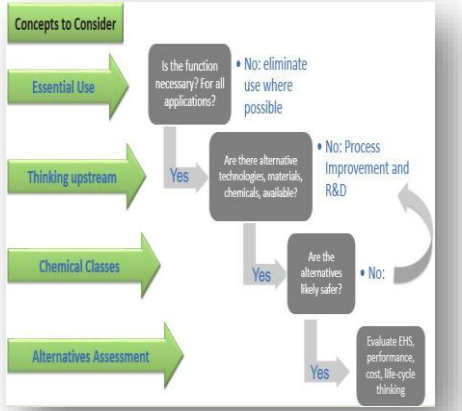
Class approach, life-cycle thinking

If use is essential and no safer alternatives available, look for process improvements, eliminating emissions and exposure. Move to R&D.

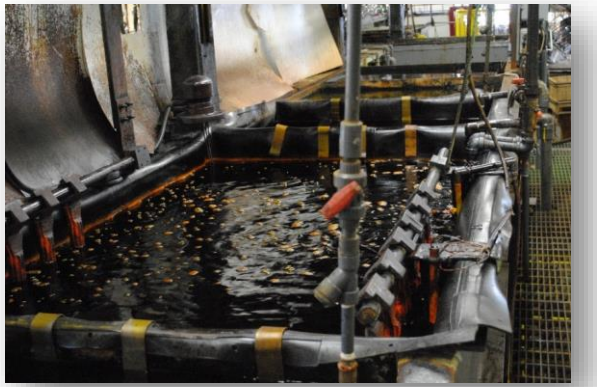
Concepts to Consider



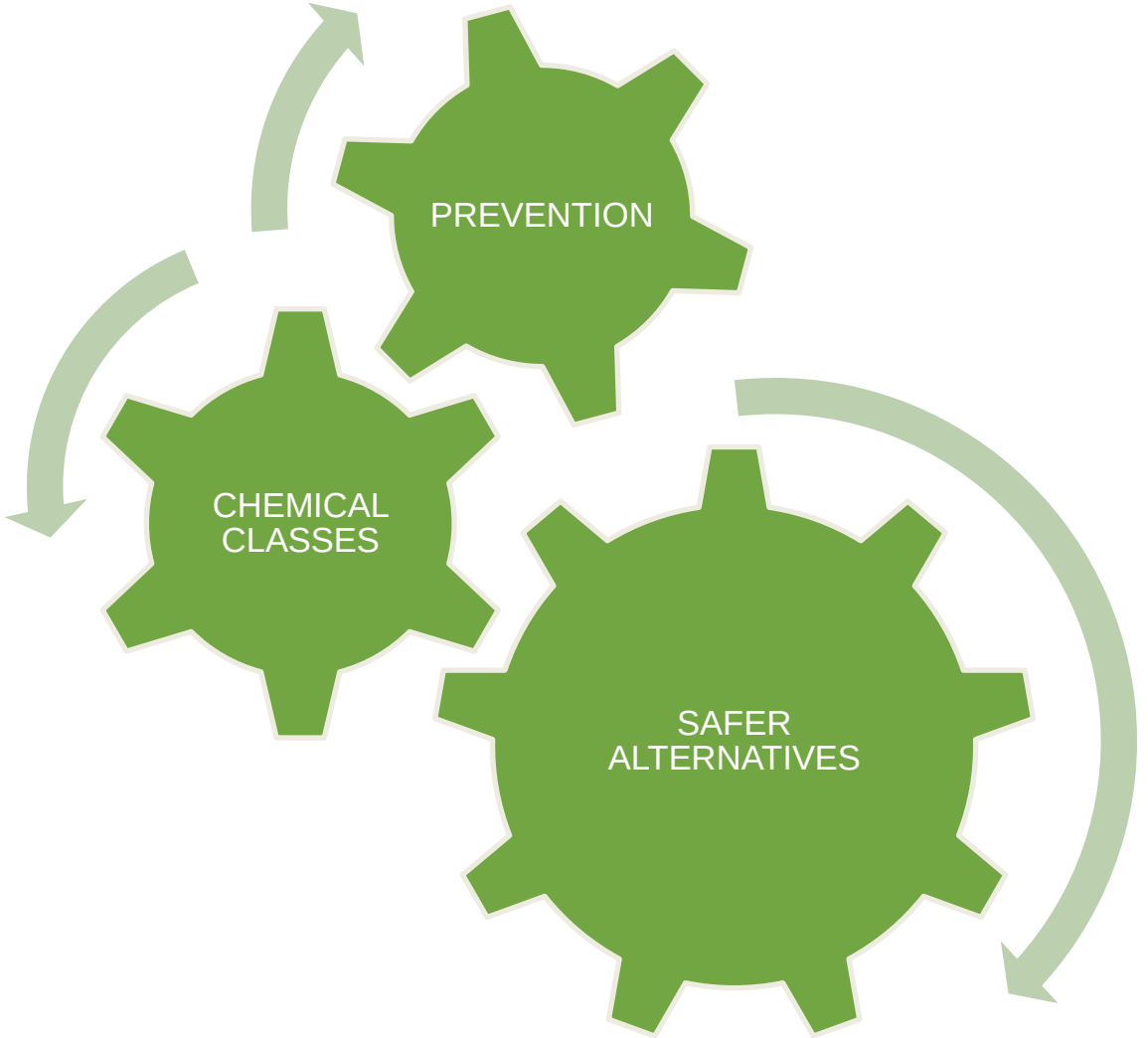
Hex Chrome Fume/Mist Suppressants



- Function – low surface tension
  - Limits release of Cr^{+6} from metal finishing baths
- Essential? For all or some applications?
  - Performance criteria vary somewhat with application
- Alternatives
  - Non-hex chrome metal finishing
  - Closed systems
  - Drop in alternatives
    - C6 fluorinated surfactants (same chemical class)
    - Non-fluorinated surfactants



- Need for continued R&D for Cr^{+6} metal finishing alternatives and non-fluorinated fume suppressants


PREVENTION
CHEMICAL CLASSES
SAFER ALTERNATIVES

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