What will Emerge Next?

A data-based analysis to anticipate emerging contaminants

Authors:
Denice Nelson
Kate Sellers
Nadine Weinberg

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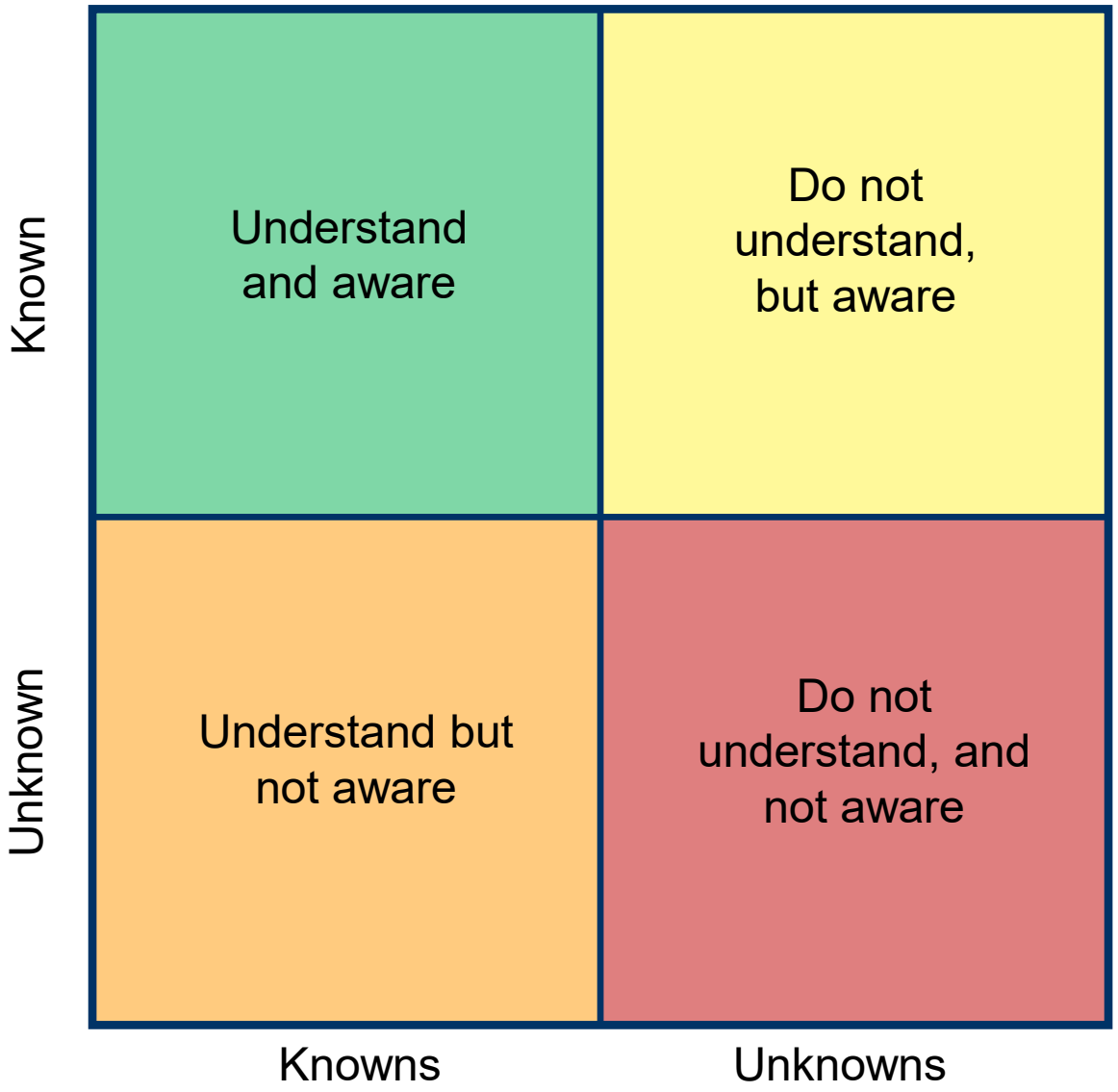
The business of sustainability

ERM

The Origin of this Presentation



TSCA Reform: The Basis

1976 TSCA:

- Law allowed EPA to evaluate the risk from exposure to new chemicals, and regulate if necessary to limit risk
- Could not require testing unless substance presents an unreasonable risk, grandfathers in ~62,000 chemicals

2016 Lautenberg Chemical Safety for 21st Century Act (LCSA):

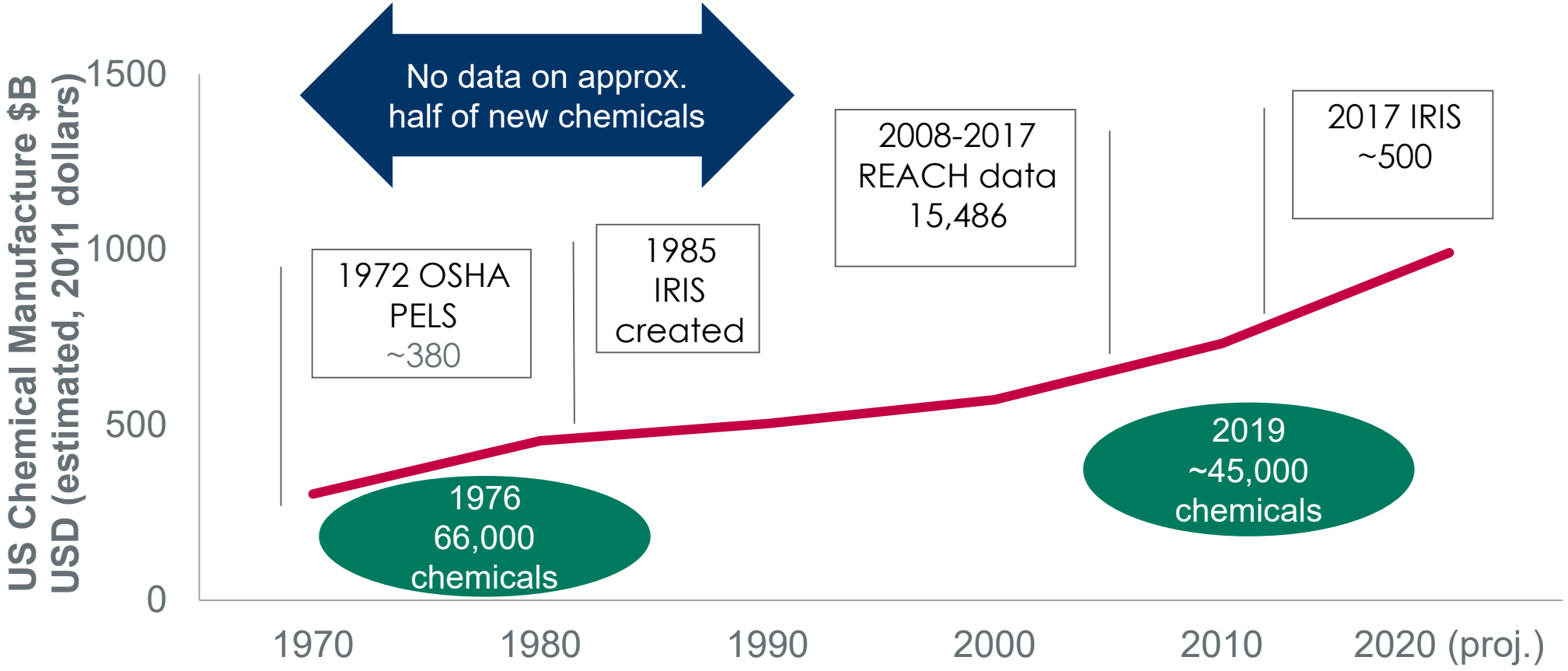
- Requires risk assessment of prioritized existing chemicals
- Provides a consistent source of funding for EPA to carry out responsibilities

Putting 40 years into perspective:

1976: Apple II computer

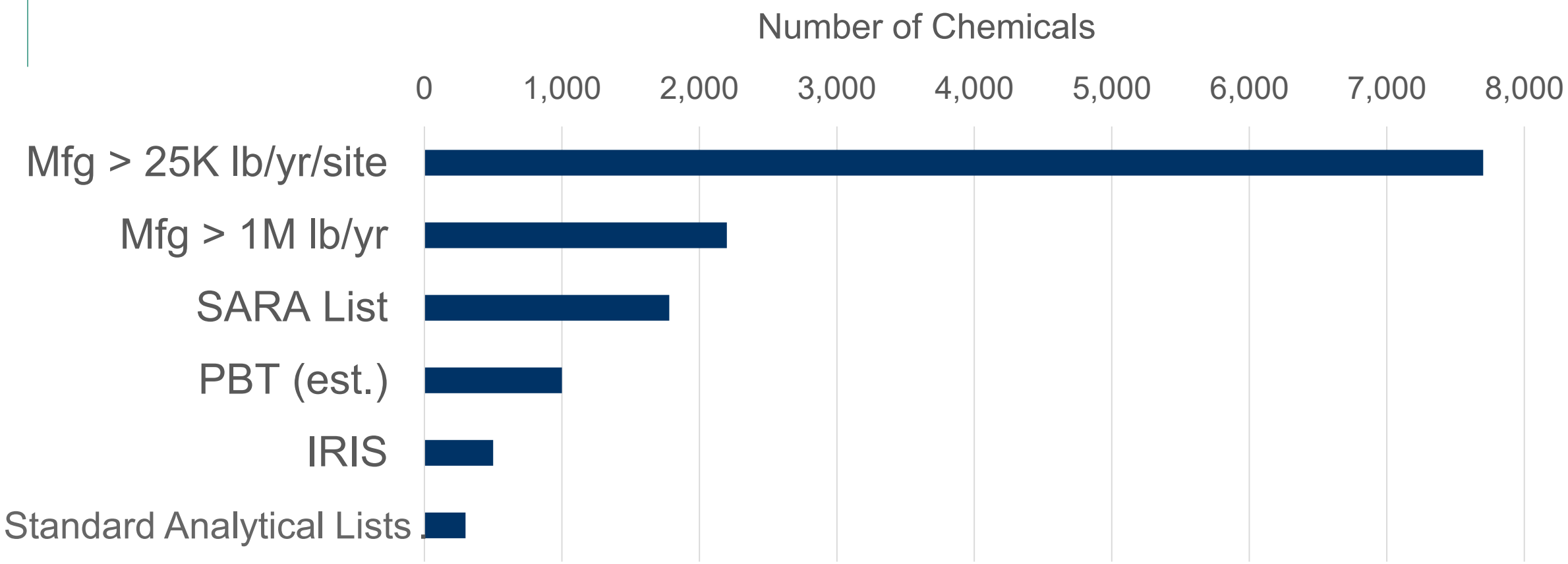
2016: iPhone 7

Chemical Characterization: 1976 TSCA to 2016 CSA



PELS = Permissible Exposure Limits
IRIS = EPA's Integrated Risk Information System

Implications for Site Investigation and Cleanup



- We only find what we look for
- Under 1976 TSCA, little to no data on fate and transport, toxicity or eco toxicity of most chemicals

TSCA Reform: Why should we care?

- Clean up goals for remediation sites could change or new chemicals may require cleanup activities which can affect environmental reserves
- Worker protection limits/training and associated personal protective equipment (PPE) requirements could change
- Chemicals could come under public scrutiny

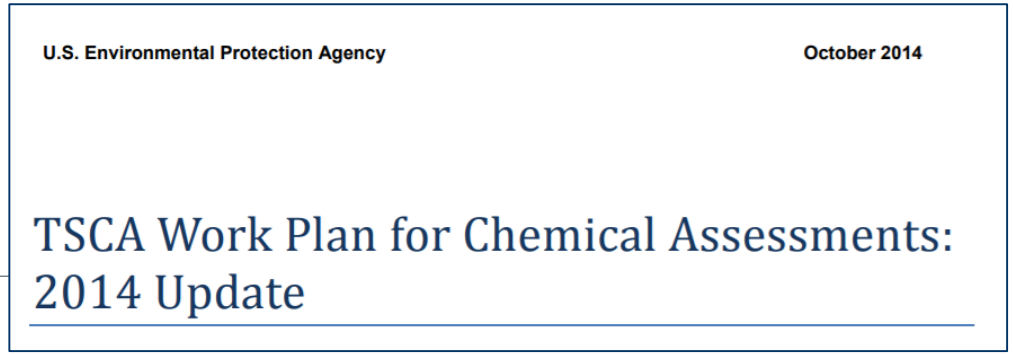
EPA in Process of Identifying Chemicals for Evaluation

6 months: 2016	Year 1: 2017	Year 3: 2019	Year 3: 2019
Publish list of first 10 risk evaluations	Publish scope of 1st 10 risk evaluations (completed June 2017)	Publish 1st 10 risk evaluations (drafts released prior)	Designate 20 low priority; initiate 20 high priority risk evaluations

- Methylene chloride
- Trichloroethylene
- N-methylpyrrolidone
- Tetrachloroethylene
- Carbon Tetrachloride
- Cyclic aliphatic bromide cluster
  - 1-Bromopropane
  - 1,4-Dioxane
- Pigment Violet 29
- Asbestos

June 2018, Problem Formulation for 1st 10 chemicals & systematic review guidance

Just Released: March 2019


U.S. Environmental Protection Agency October 2014

TSCA Work Plan for Chemical Assessments: 2014 Update

First Ten Chemicals

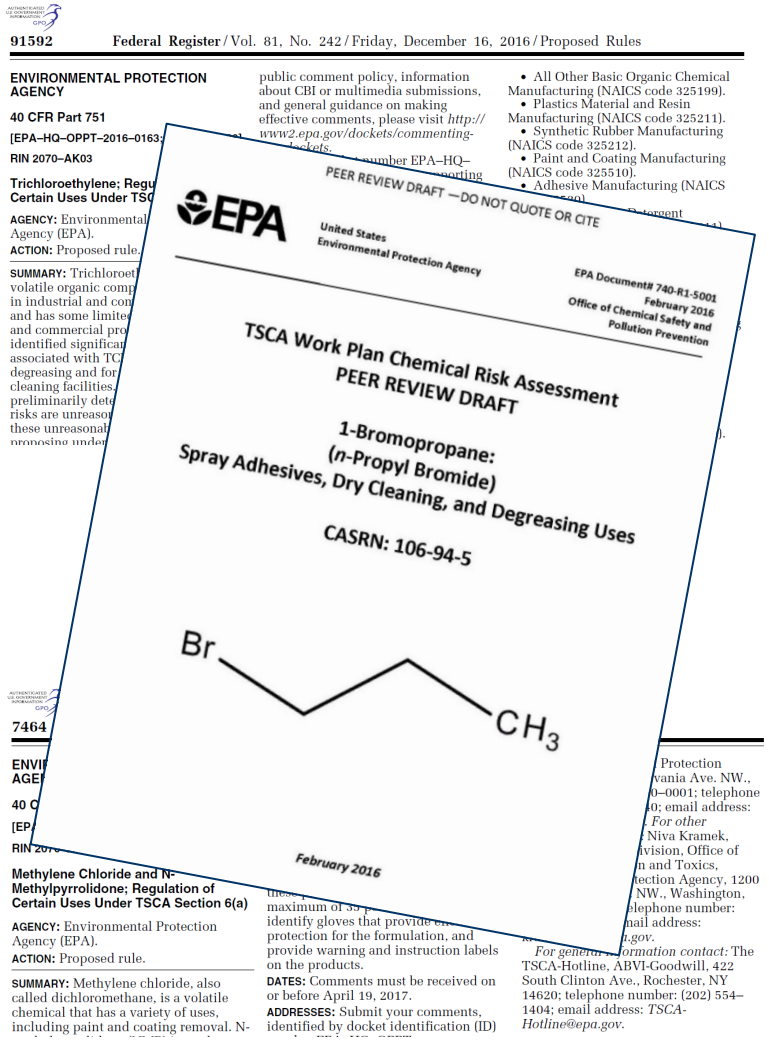
NMP: Approved as a substitution for methylene chloride (DCM) in the 1990's

Denotes compound also present on several other lists (SIN, SVHC and Reach Banned)

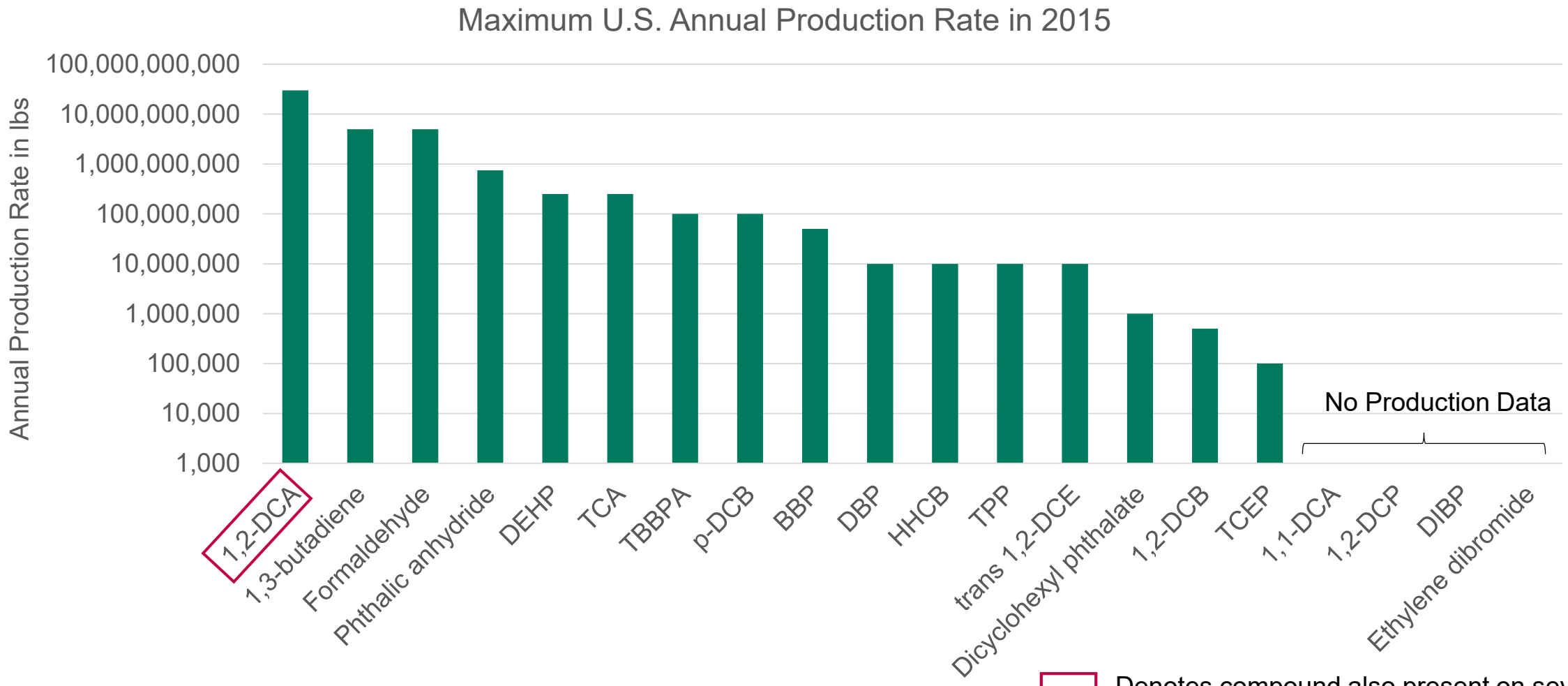
Note: Annual US Production Rate data collected from the EPA 2016 National Aggregate Production Volume report located in the EPA database downloaded from https://chemview.epa.gov/chemview. Data are from 2015 with the exception of Pigment Violet 29 and Asbestos for which the most recent data is from 2011.

What changes are we seeing?

- TCE: EPA looking to completely ban or limit certain uses
  - Clean up goal not likely to change significantly (or at all)
- Methylene Chloride (DCM): EPA looking to completely ban or limit certain uses
- N-methylpyrrolidone (NMP): EPA looking to completely ban or limit certain uses
- 1-Bromopropane: Draft Risk Assessment released
  - Estimated drinking water screening level: 11 ug/L
  - Estimated risk VI numbers: residential indoor air ~ 4 ug/m^3, commercial indoor air ~18 ug/m^3, groundwater to indoor air screening levels of ~ 6 ug/L for a resident and ~24 ug/L for a commercial worker.
- Pigment Violet 29: EPA concluded low risk, low exposure
  - Challenged by several groups



Next Twenty Chemicals



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New Chemical Prioritization/Selection Approach

EPA docket open until Dec 1, 2019

01

Pre-prioritization

Gather information on 73 Work Plan chemicals and any others of concern to public or other agencies

Complete

02

Prioritization

20 high priority (potential risk concern?)
20 low priority (low or no risk?)

Start Dec 2019 and on-going

03

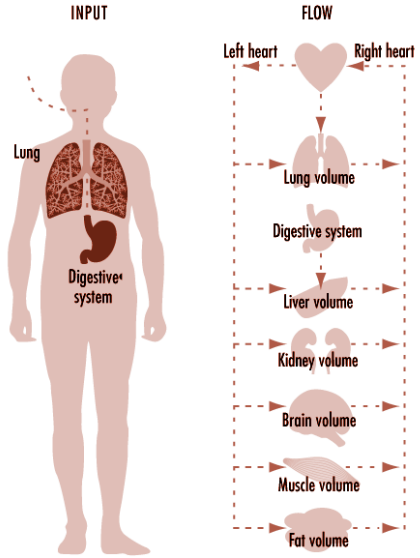
Risk Assessment Process

Complete risk assessment in 3-3.5 years; designate high priority chemical as each evaluation completed

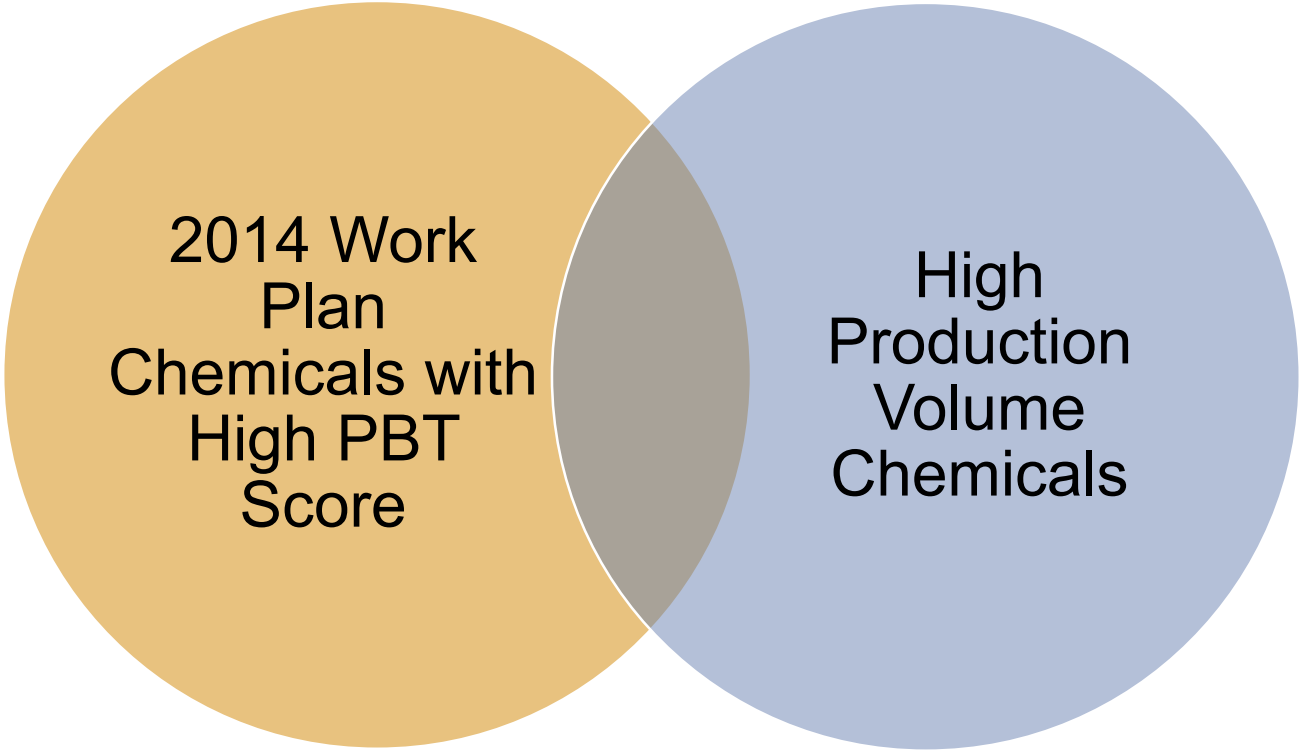
04

Long-Term Strategy

Bin chemicals considering 6 factors, data quality and quantity



PBT Work Plan Chemicals

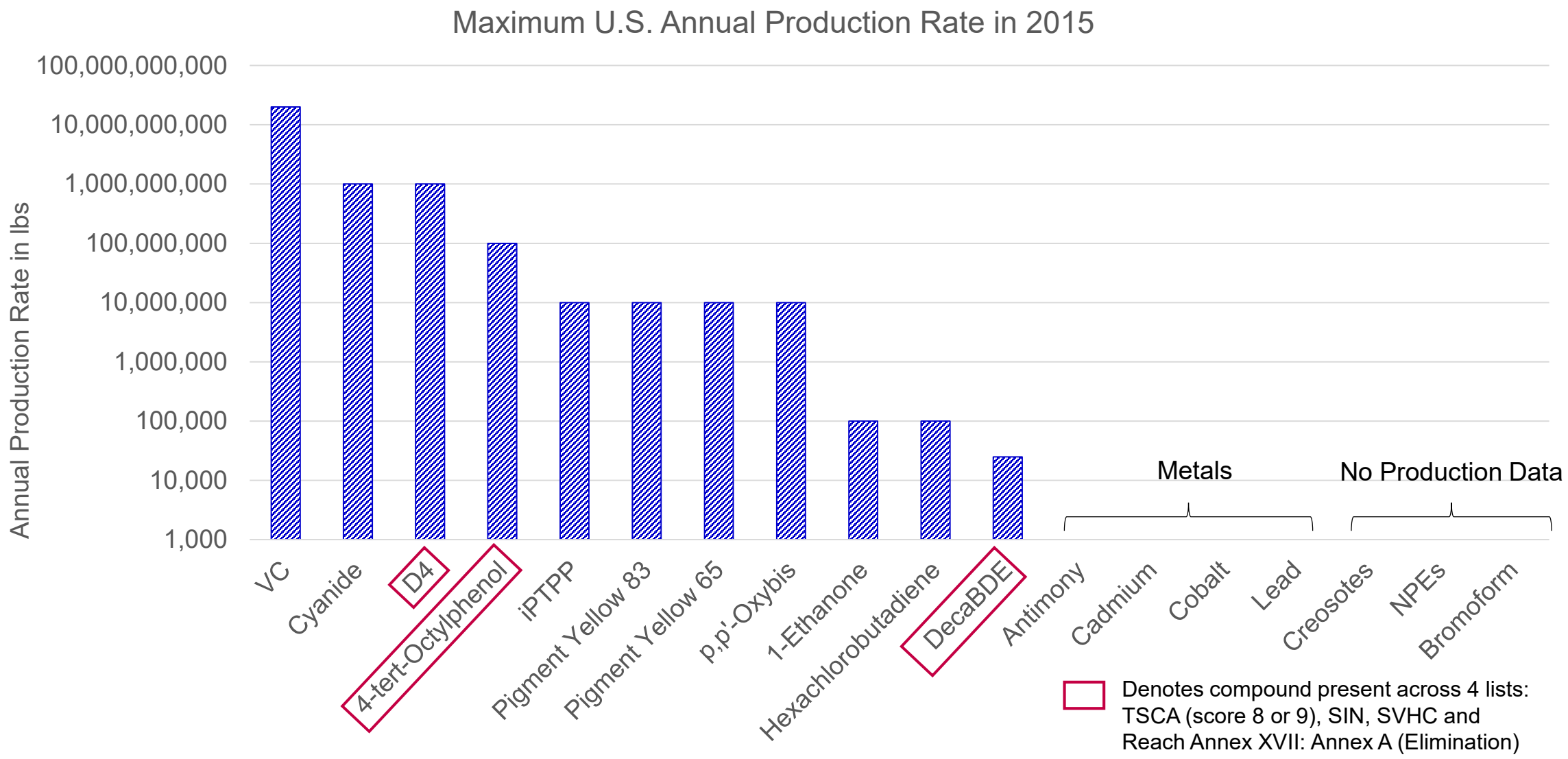


Categories for awareness

- Flame retardants (esp. brominated)
- Pigments (esp. yellow)
- Fragrances
- Personal Care Products

PBT: Persistent and Bioaccumulative and Toxic

High Priority Candidates



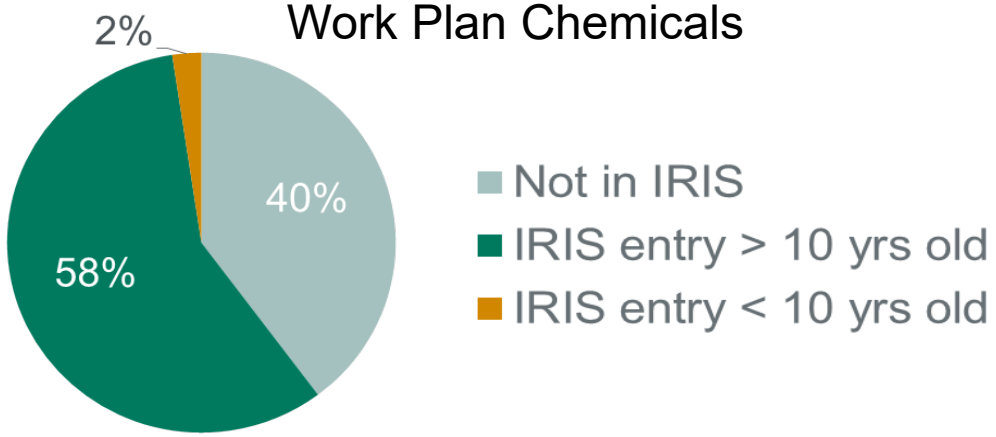
Annual US Production Rate data collected from the EPA 2016 National Aggregate Production Volume report located in the EPA database downloaded from https://chemview.epa.gov/chemview

Top Five Chemicals for the "Watch" List

Chemical Name	CAS	Max 2015 Max US Production Rate (lbs)	Uses
Octamethylcyclotetrasiloxane Short name: D4	556-67-2	1,000,000,000 Increase from 2012	• **Industrial**: Adhesives and sealants, intermediates, lubricants and lubricant additives • **Consumer**: Adhesives and sealants, automotive care products, cleaning and furnishing care products, paints and coatings, personal care products, plastic and rubber products
4-tert-Octylphenol (4-(1,1,3,3-Tetramethyl-butyl)phenol) Short name: 4-tert-Octylphenol	140-66-9	100,000,000 Stable from 2012	• **Industrial**: Tackifier • **Consumer**: Rubber Tires
1,2-Dichloroethane Short name: 1,2-DCA	107-06-2	30,000,000 Stable from 2012	• **Industrial**: Fuels/fuel additives, functional fluids, intermediates, laboratory chemicals • **Consumer**: Fuels and related products, plastic and rubber products
Hexabromocyclododecane Short name: HBCD	3194-55-6	10,000,000 Decrease from 2012	• **Industrial**: Flame retardant • **Consumer**: Building materials
Decabromodiphenyl ethers Short name: DecaBDE	1163-19-5	25,000 Decrease from 2012	• **Industrial**: Flame retardant • **Consumer**: Fabric, textile and leather products, plastic and rubber products

Scale of Impacts

Limited information in IRIS for Work Plan Chemicals



- All chemicals evaluated under TSCA to have toxicity estimates revised or recalculated

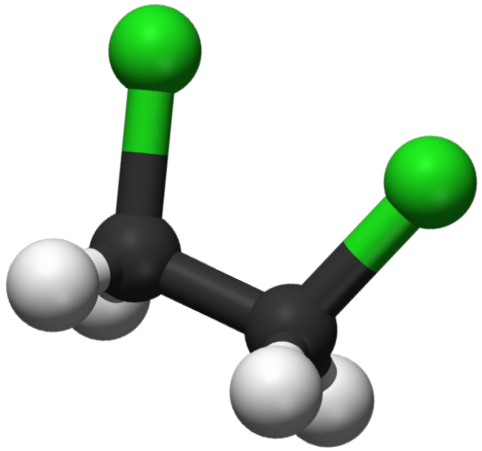
Use in Manufacturing

- New restrictions on use
- New occupational exposure limits and PPE requirements
- Increased public scrutiny

Contaminated Sites

- New clean up goals
- Changes to personnel protection, emission limits
- Increased public scrutiny

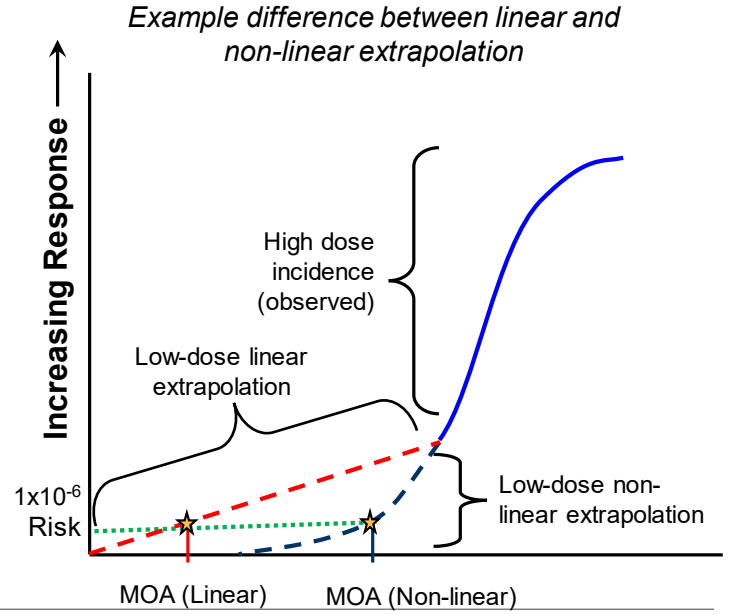
1,2-DCA: Potential for Regulatory Criteria Change?



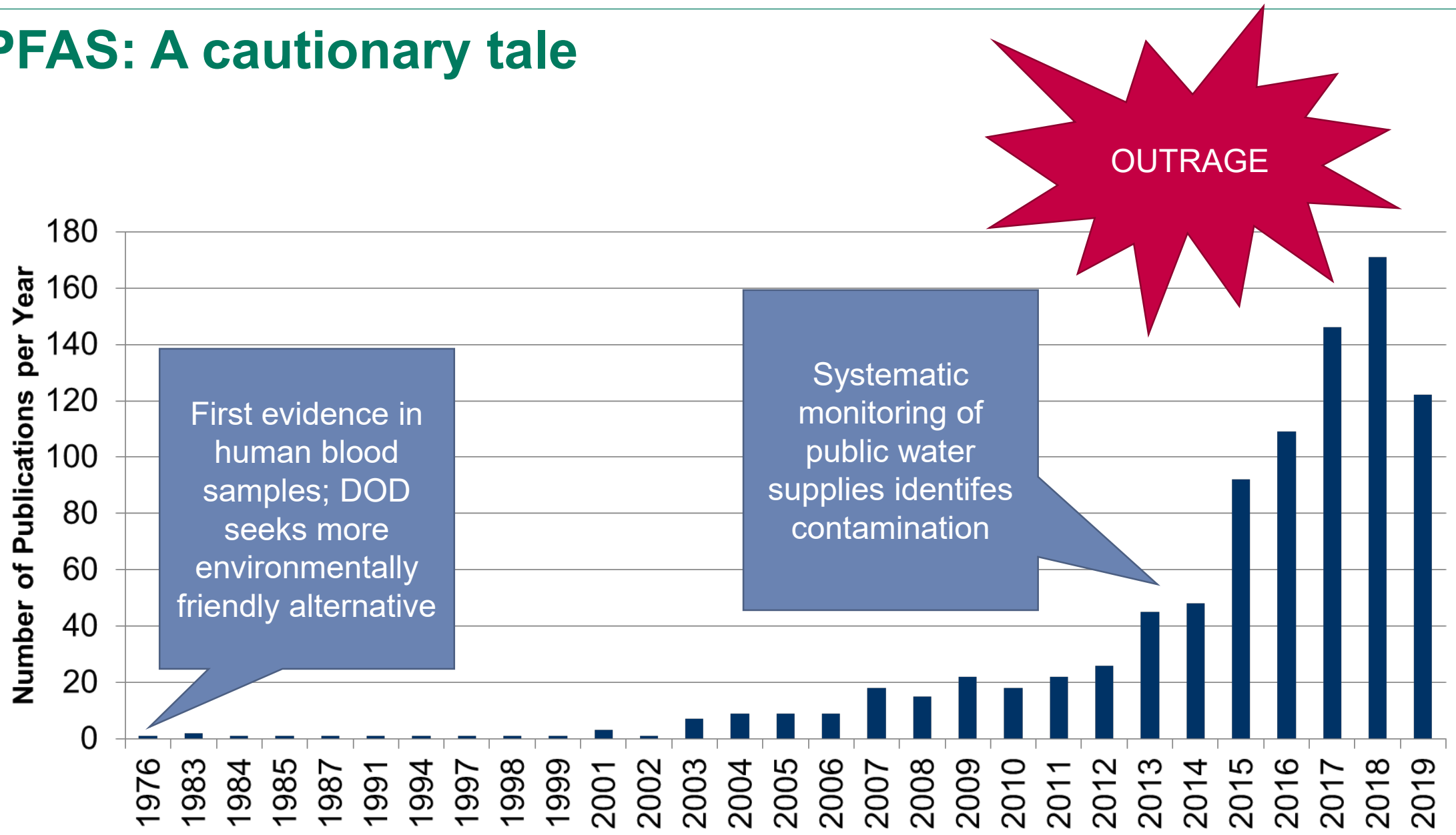
1,2-Dichloroethane
- MCL: 5 ppb
- IRIS Date: 1987
- Classified as probable human carcinogen

- REACH dossier: classified as a suspected human carcinogen
- REACH values consistent with current USEPA values
- REACH dossier also indicated values may be highly conservative

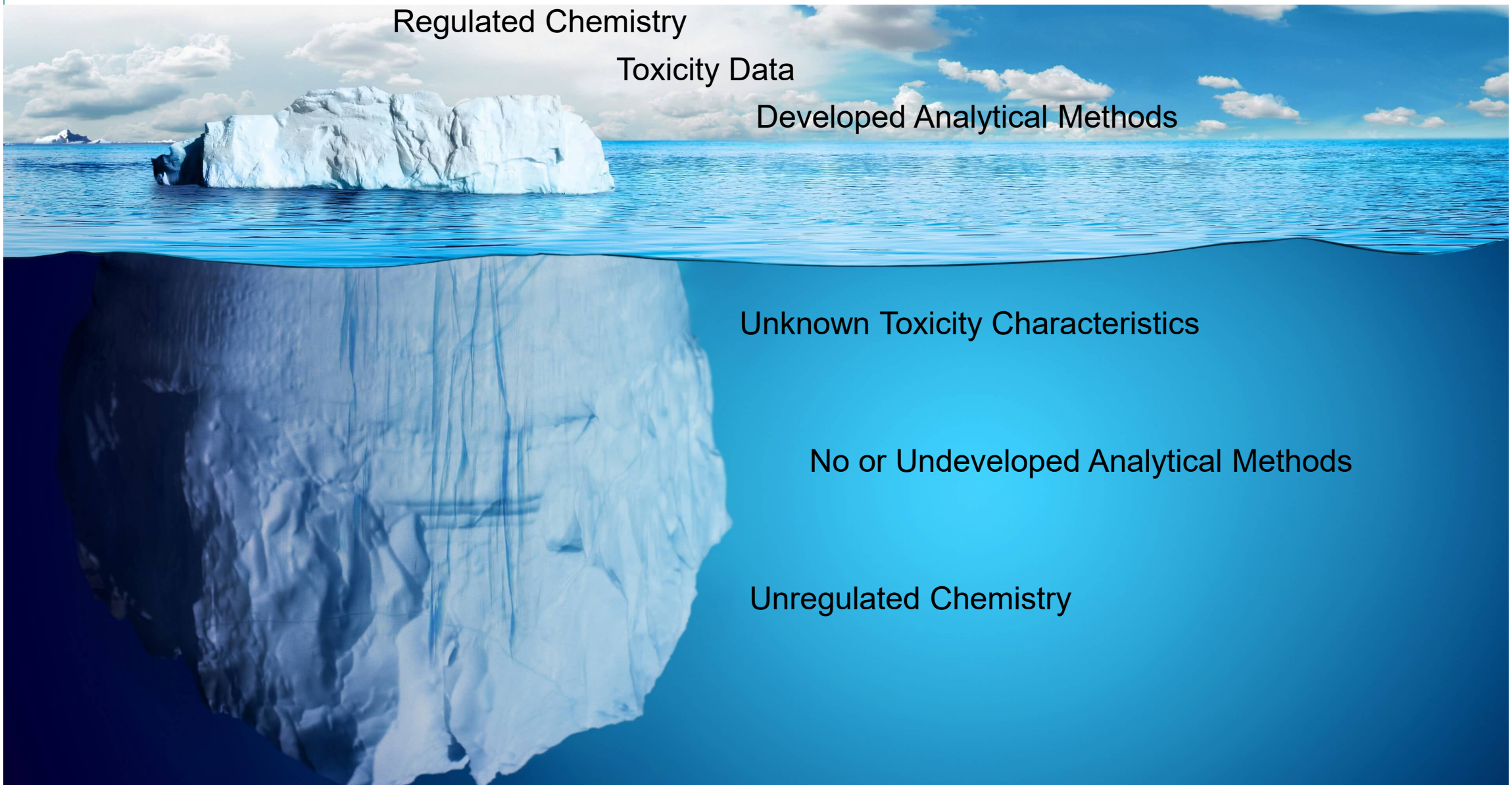
1,2-Dichloroethane: Data suggest a threshold mode of action (non-linear extrapolation) may be appropriate



PFAS: A cautionary tale



Known vs Unknown



Emerging Contaminants

- Potential that hazards may now be quantified for some chemicals previously not assessed
- Comparison of lists shows that numerous persistent, bioaccumulative, or toxic compounds manufactured in high volumes in the US are not routinely assessed at sites
- Cause for awareness, not panic: not all of these compounds will be released … or regulated
- Watch developments; seek opportunities to comment and contribute sound scientific perspective

Thank you

Denice Nelson, PhD, PE
Partner,
Site Investigation &
Remediation
Denice.Nelson@erm.com

Kathleen Sellers, PE
Technical Director,
Product Stewardship
ERM
Kate.Sellers@erm.com

Nadine Weinberg
Partner,
Risk Assessment
ERM
Nadine.Weinberg@erm.com