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Clean Water SoCal

May 21st, 2025

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Director Health, Safey and Environmental at NASSCO

- CHST and CIT (Board of Certified Safety Professionals)
- Chair, NASSCO's Health and Safety Committee
- Member, NASSCO's CIPP Safety Workgroup
- Past President, St. Louis Chapter ASSP
- Subject Matter Expert for NIOSH CIPP study
- Author - Health Risks Assessment from Cured-in Place Pipelining Fugitive Styrene Emissions in Laterals

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Styrene Emissions Highlights

Defining the NIOSH Studies

- Evaluation of Exposures to Styrene during Cured-in-place Pipe Liner Preparation and during Pipe Repairs using Hot Water and Steam
- HHE Report No. 2019-0080-3379 July 2021
- Employer requested study

2021 NIOSH Recommendations

1. Ventilation and possible substitution
2. Continued monitoring of employees
3. Continued improvement of training on confined space for employees
4. Training employees on hazards of styrene in the workplace
5. Implement a smoking cessation program for employees

TTC Phase 2 Study

- Exhaust discharge
- 15-foot radius perimeter
- Stack minimum 6 feet high
- Inside perimeter < 5 minutes
- Over 5 minutes, proper PPE
- Protect the public by maintaining a work zone perimeter around the job site
- Liner transport truck
  - Wear proper PPE when opening door and entering truck

P3 Safety Recommendations

- Emissions from the Cold Storage Trucks
  - TTC Recommendations open doors and vent under below industrial limits
  - If limits are exceeded wrapping liner, heavier coatings, or PPE

  - NASSCO - job site air monitoring
  - testing for styrene in refer when workers must enter (PID/detector tubes)
  - Have PID alarm set at 20 ppm and not enter if alarmed
  - Impervious coatings and ventilation

VOCs in Laterals - University of Waterloo (CATT) & Aegion Study

Results:

1) Styrene will not enter buildings from laterals if the p-traps are functional.

2) Styrene in laterals with functional traps will move into the main once the lateral is re-established

Published in the scientific journal ASCE – **Health Risks Assessment from Cured-In-Place Pipe Lining Fugitive Styrene Emissions in Laterals.**

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Current research on Styrene Toxicology

Styrene Rodent Genetic Toxicity

- This Mouse Study published in March of 2023 in Environmental and Molecular Mutagenesis.

- Key Findings
  - Oral gavage dosages up to 300 mg/kg/dy for 28 days.
  - Styrene did NOT produce DNA damage.
  - Styrene Mutagenesis is standard in strains of rats and mice.

Styrene Mouse Genetic Toxicity

Evaluation of mouse lung mutations is critical to understanding cancer risk assessments for styrene.

- This Mouse Study published in March of 2023 in Environmental and Molecular Mutagenesis.
- Key Findings
  - Styrene was NON-Mutagenic in Big Blue male mice that received 300mg/kg/dy oral gavage.
  - Styrene did NOT produce any increase in Liver, Lung, Glandular Stomach and Duodenum tissues.

Styrene Epidemiology

US FRP Cohort Mortality

- This cohort study has been ongoing for over 30 years
- Studying workers in the Butyl Rubber Industry
- Styrene exposures > 50 ppm daily

- Findings
  - No consistent or compelling evidence that occupation styrene exposure is associated with elevated cancer mortality or risk, including lung and lymphohematopoietic cancer.
  - Bias Study supported the main study findings that show styrene exposures withing the US FRP workers are unlikely to contribute to increased risk of lung caner.

DOW Styrene Cohort Mortality Study

- Study of 2,904 Dow chemical workers
- Engaged in Manufacturing of Styrene based products
- Study of 60 + years
- Study covers 138,303 person-years of observation

- Findings
  - Overall, no consistent or compelling evidence that styrene exposure is associated with the risk of cancer mortality including lung and LH cancers.

SIRC/ACMA Styrene Lung Cancer Risk Assessment

Published in July 2024 In Journal of Toxicology and Environmental Health

Key Findings

- Assessment found that for the general population and workers manufacturing or using styrene.
- Styrene exposure is unlikely to present potential lung cancer risk.

TSCA Section 4 Ecotox Tests

OECD 223 - Earthwork Reproduction

- ❑ Stability of styrene in both sediment and soil was determined
- ❑ Concentrations measured over 56 days
- ❑ In soil, concentrations declined over time

- ❖ Fiindings
- ❖ The toxicity endpoints in the sediment organisms did NOT indicate any styrene associated effects

Summary: Understanding Acute and Chronic Exposure to Styrene in CIPP

EPA Risk Assessment Update

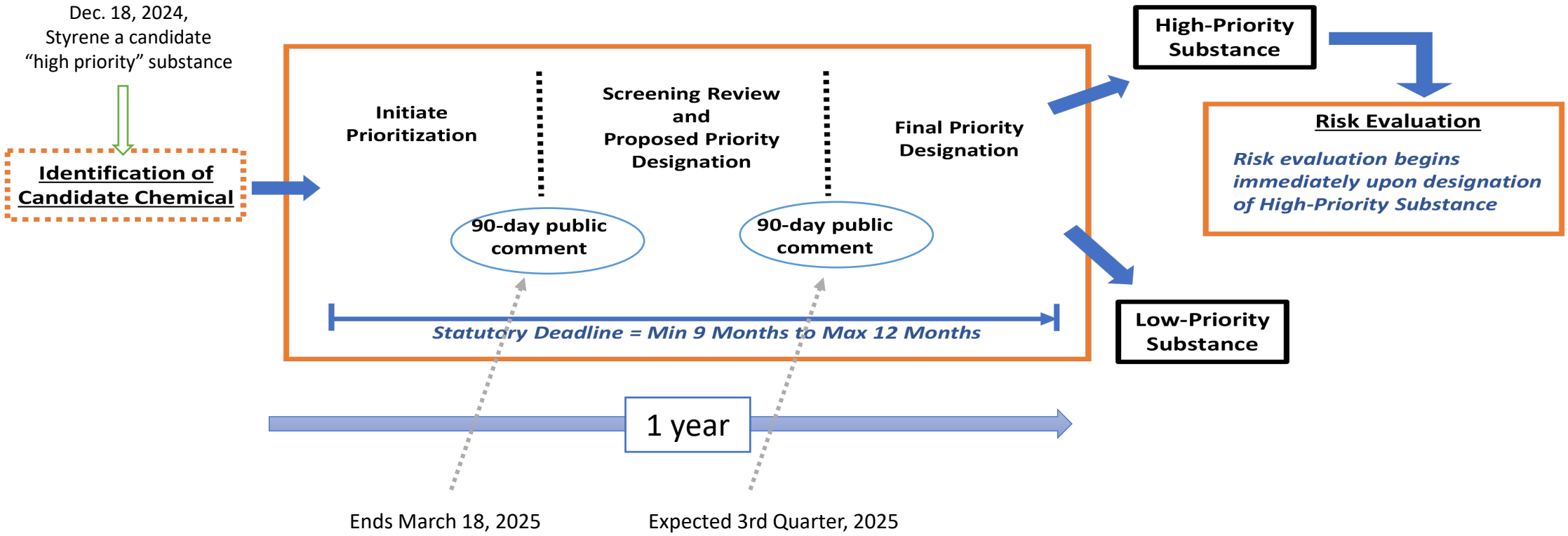
Toxic Substances Control Act of 1976

- Regulate manufacture, import and use of chemicals to prevent unwarranted health or environmental impacts
- NEW CHEMICALS: EPA must approve Premanufacturing Notice (PMN) before commencement of commercial activity

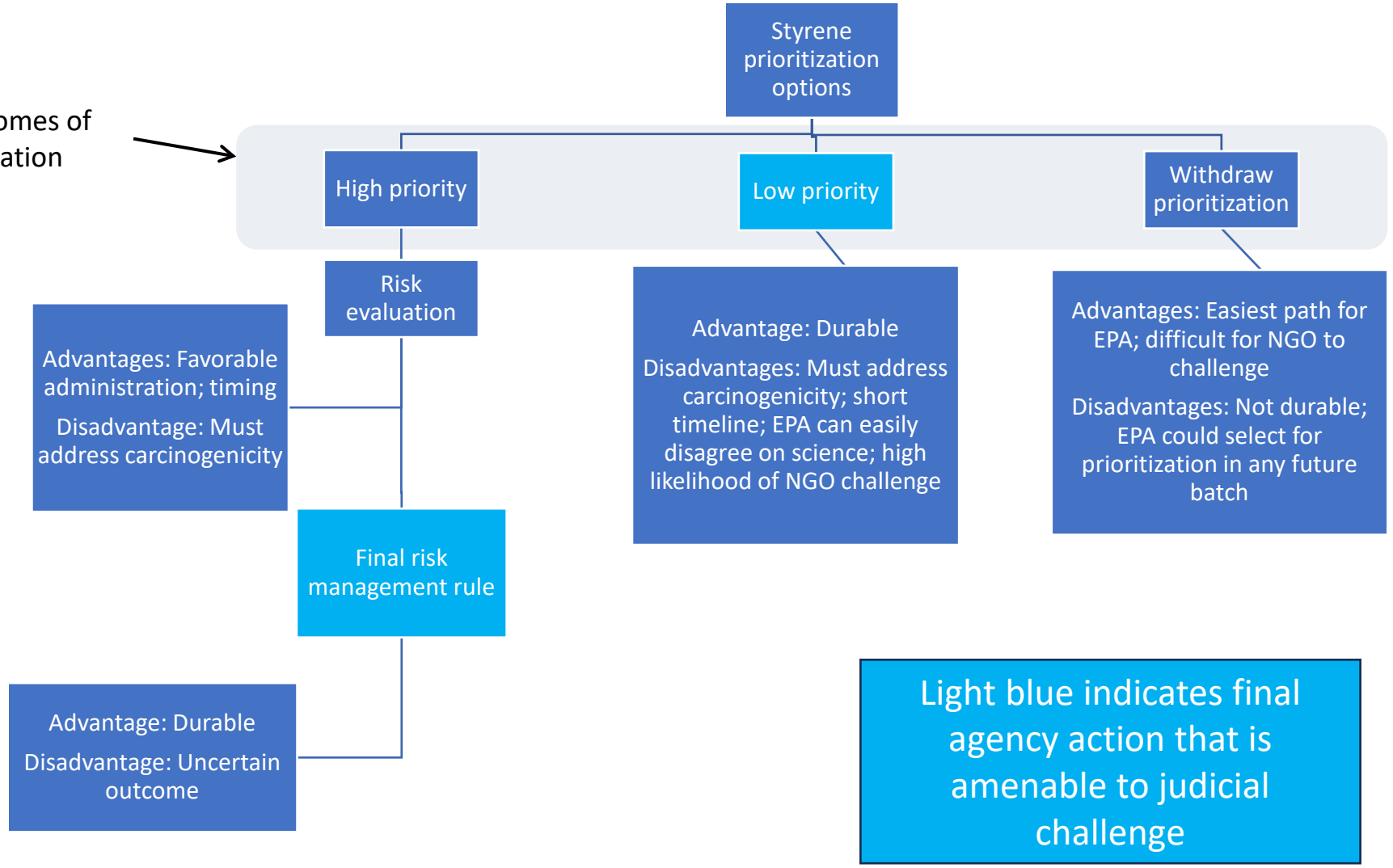
TSCA Amendments of 2016

- Established a new three-phase process to regulate EXISTING CHEMICALS
- Set deadlines for EPA progress
- Gave EPA the authority to order toxicity tests
- Chemical manufacturers and importers pay a fee to pay for EPA's TSCA program

I. Prioritization - https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/prioritization-existing-chemicals-under-tsca

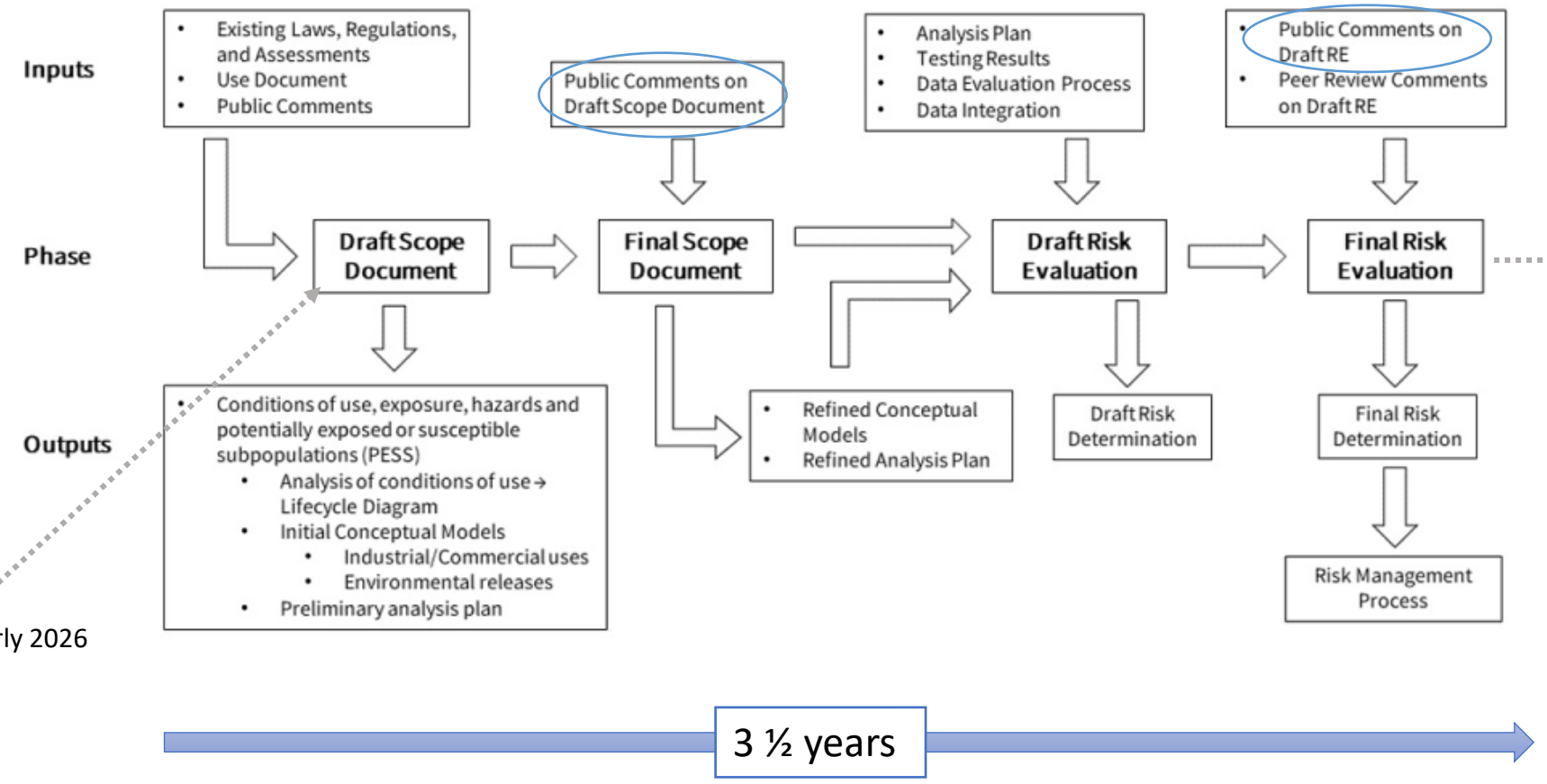


Three possible outcomes of EPA styrene prioritization



Light blue indicates final agency action that is amenable to judicial challenge

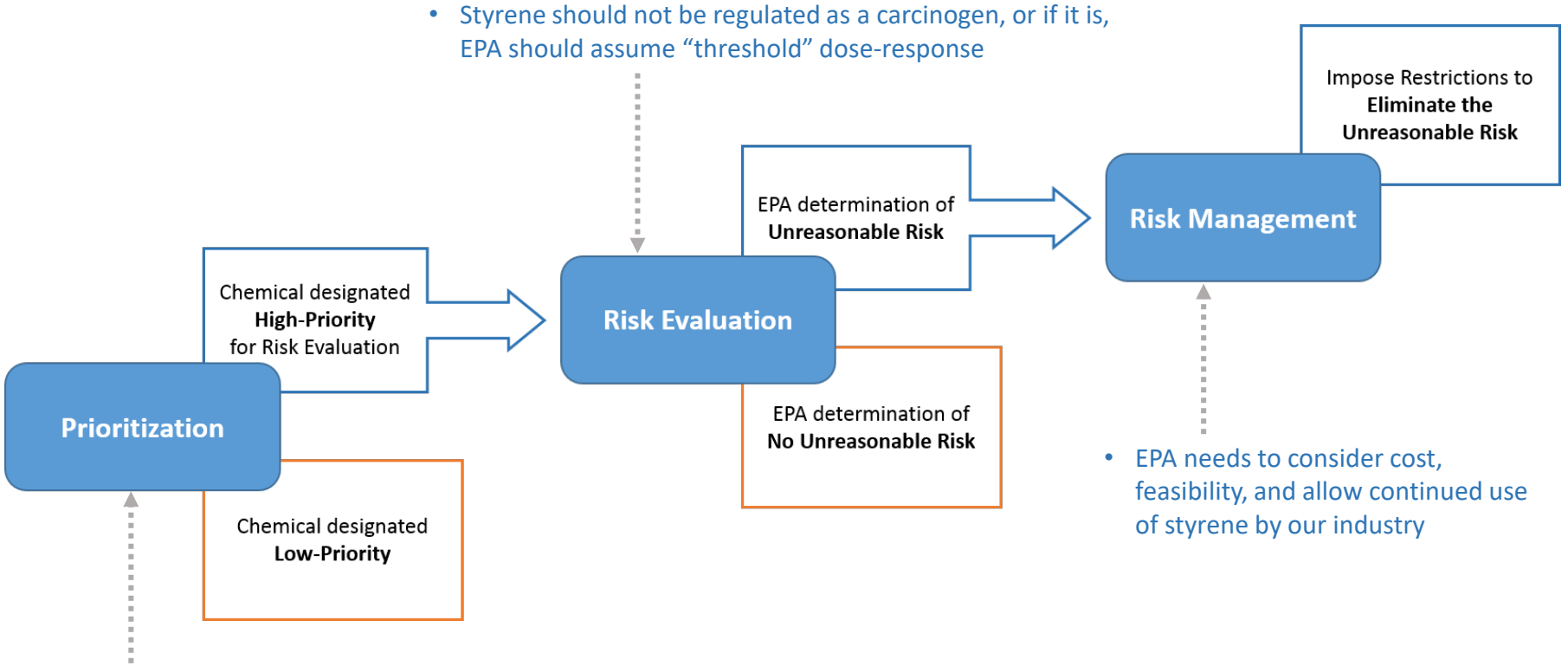
II. Risk evaluation - https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluations-existing-chemicals-under-tsca



- Identification of the exposure level(s) associated with unreasonable risk
- Identification of the COU that are associated with unreasonable risk (because of high exposures)

Expected early 2026

Potential advocacy messages



- Styrene should not be regulated as a carcinogen, or if it is, EPA should assume "threshold" dose-response
- EPA needs to consider cost, feasibility, and allow continued use of styrene by our industry
- Styrene does not meet statutory criteria for prioritization and Dec. 18 action should be rescinded
- Suggestive evidence shows that styrene presents no unreasonable risk at current exposures and should therefore be "low priority"

NASSCO.org Website

Your source for Safety, Health and Environmental information on Styrene

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Thank You!