The webinar will begin shortly.

Safer Products for Washington: Electric and electronic enclosures (9:30 a.m.) Printing inks (12 p.m.)

Implementing RCW 70A.350: The Pollution Prevention for Healthy People and Puget Sound Act

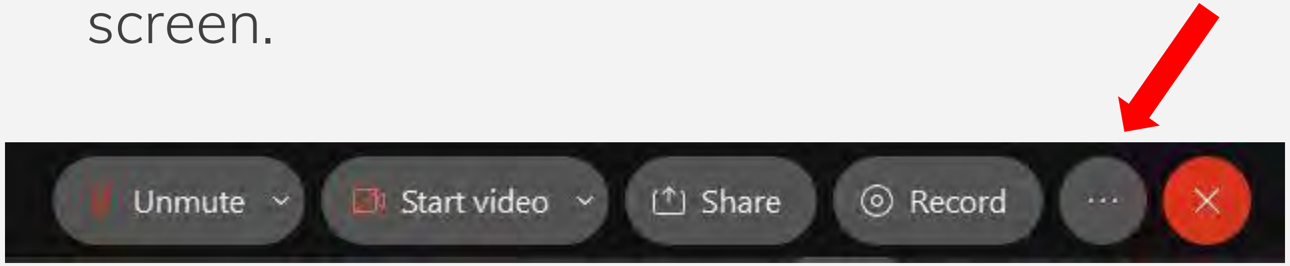
AUGUST 31, 2021

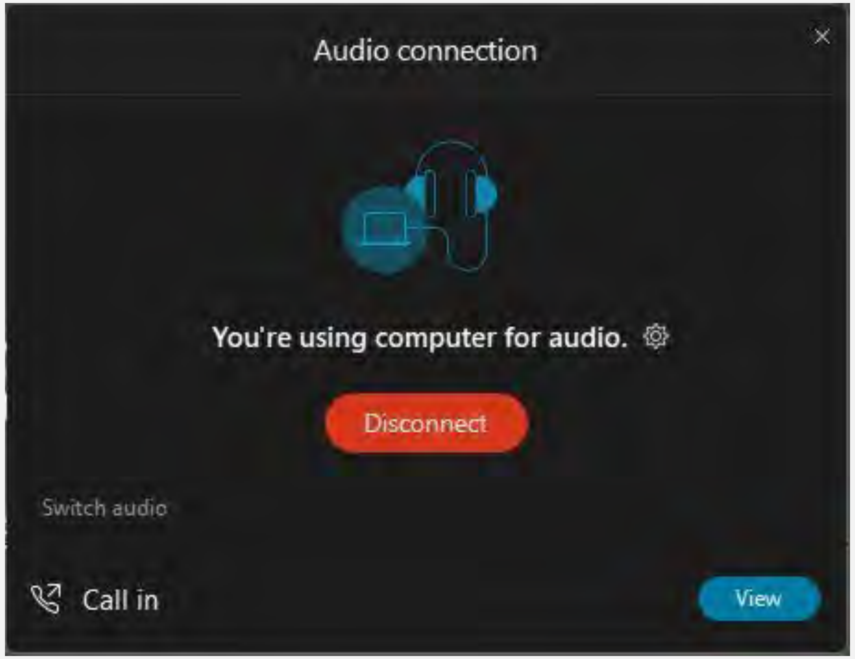
DEPARTMENT OF ECOLOGY State of Washington

Washington State Department of Health

Audio connection logistics

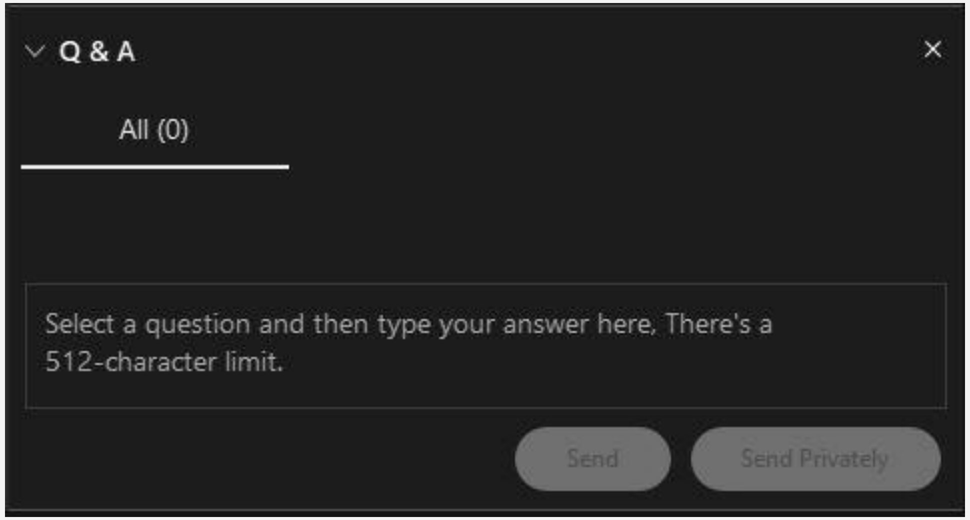
- For audio connection, we recommend using your computer speaker.
- If you are unable to join using computer audio, use “Call in” to access dial-in information.
- To open the audio options, select the three dots icon in the menu at the bottom of your screen.





Webinar logistics

- All lines are muted.
- Questions and input go in the Q & A box.
  - Ask anytime, we will address at the end.
- Technical difficulty issues go in the chat box.
- To open the chat box, select the chat button at the lower right hand side of your screen.
- In the event of major technical difficulties, we will reschedule the webinar.



- NOTE: Any reference in this presentation to persons, organizations, services, or activities does not constitute or imply endorsement, recommendation, or preference by the Washington State Department of Ecology.

Safer Products for Washington:

Electric and electronic equipment

From Ecology: Cheryl Niemi, Marissa Smith, Saskia van Bergen, Craig Manahan, Sascha Stump, Rae Eaton, Kimberly Goetz, Stacey Callaway, Lauren Tamboer, Amber Sergent.

From Health: Holly Davies, Elinor Fanning, Emily Horton.

DEPARTMENT OF ECOLOGY State of Washington

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Today's schedule

1. 9:30—Recap: Safer Products for Washington background
2. 9:40—Electric and electronic equipment
3. 10:20—Questions and discussion on electronic equipment

11:30—Break

1. 12:00—Recap: Safer Products for Washington background
2. 12:10—Printing inks
3. 1:00—Questions and discussion on printing inks
4. 2:00—Overview of all product categories

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Section 1. Safer Products for WA background

Safer Products for WA background

- Pollution Prevention for Healthy People and Puget Sound Act, signed into law May 2019.
- Act aims to reduce exposures to priority chemicals resulting from the use of consumer products.
- Act sets requirements for Ecology to:
  - Report to Legislature.
  - Consider and use information in specific ways.
  - Enact rulemaking (if needed).
- Safer Products for Washington is the implementation program for RCW 70A.350.

DEPARTMENT OF ECOLOGY State of Washington

Washington State Department of Health

Safer Products for WA Implementation Process

See an accessible version of this graphic.

A reminder: Phase 2 priority products

Priority chemical or chemical class	Priority product in the report
Flame retardants	**Electric and electronic equipment**
Flame retardants	Recreational polyurethane foam
PCBs	Paints and **printing inks**
PFAS	Carpet and rugs
PFAS	Aftermarket stain- and water-resistance treatments
PFAS	Leather and textile furnishings
Phenolic compounds (alkylphenol ethoxylates)	Laundry detergent
Phenolic compounds (bisphenols)	Thermal paper
Phenolic compounds (bisphenols)	Food and drink cans
Phthalates	Flooring
Phthalates	Personal care products

Priority products report: https://apps.ecology.wa.gov/publications/documents/2004019.pdf

Regulatory determinations

- In order to restrict the use of a priority chemical, **safer** alternatives must be **feasible** and **available.**
- The restriction must:
  - Reduce a significant source or use of priority chemical(s).

OR

  - Be necessary to protect sensitive species or sensitive populations.

Safer in the law

- Safer is defined in the law as "less hazardous to humans or the environment than the existing chemical or process."
- A safer alternative to a particular chemical may include:
  - A chemical substitute.
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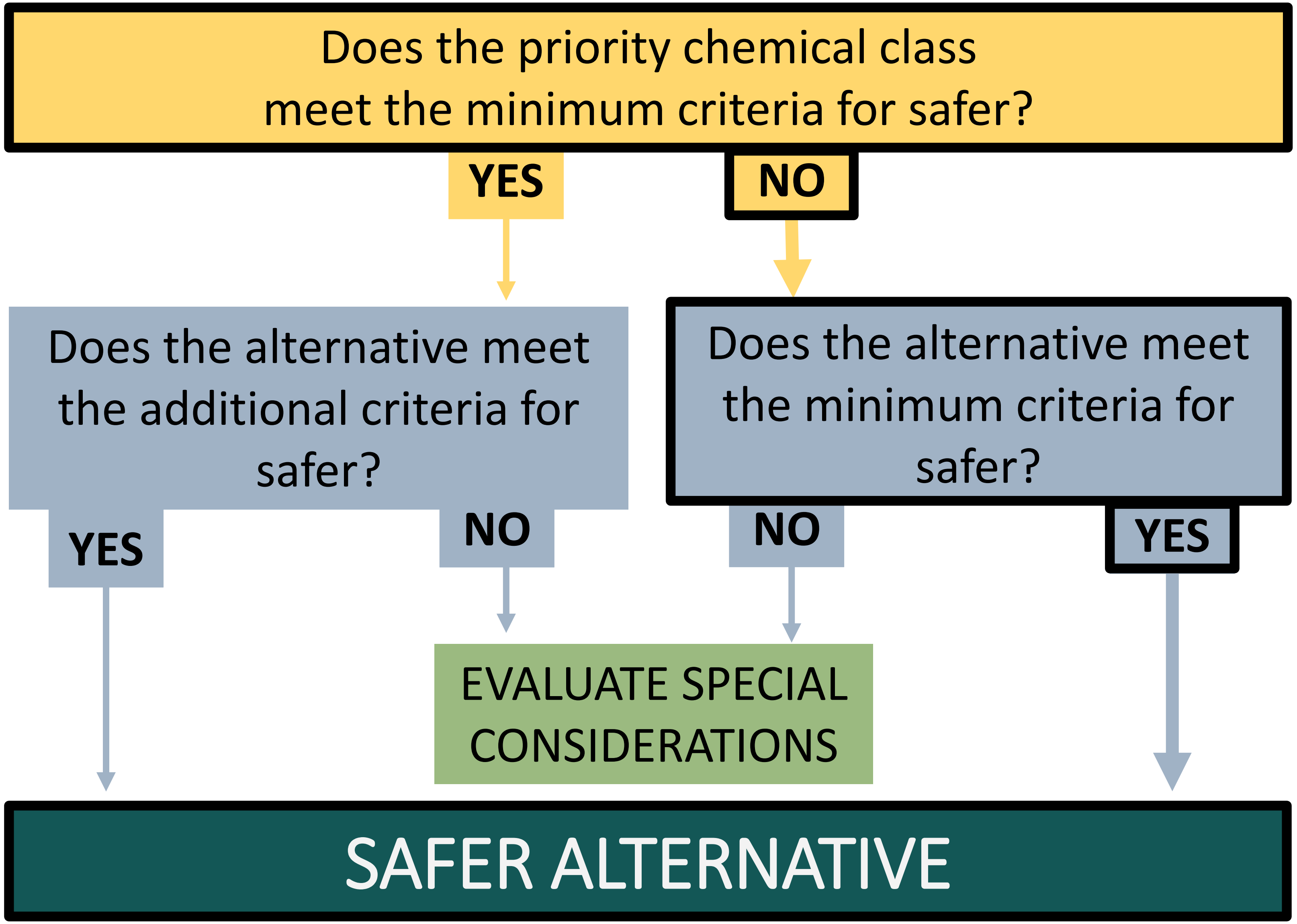
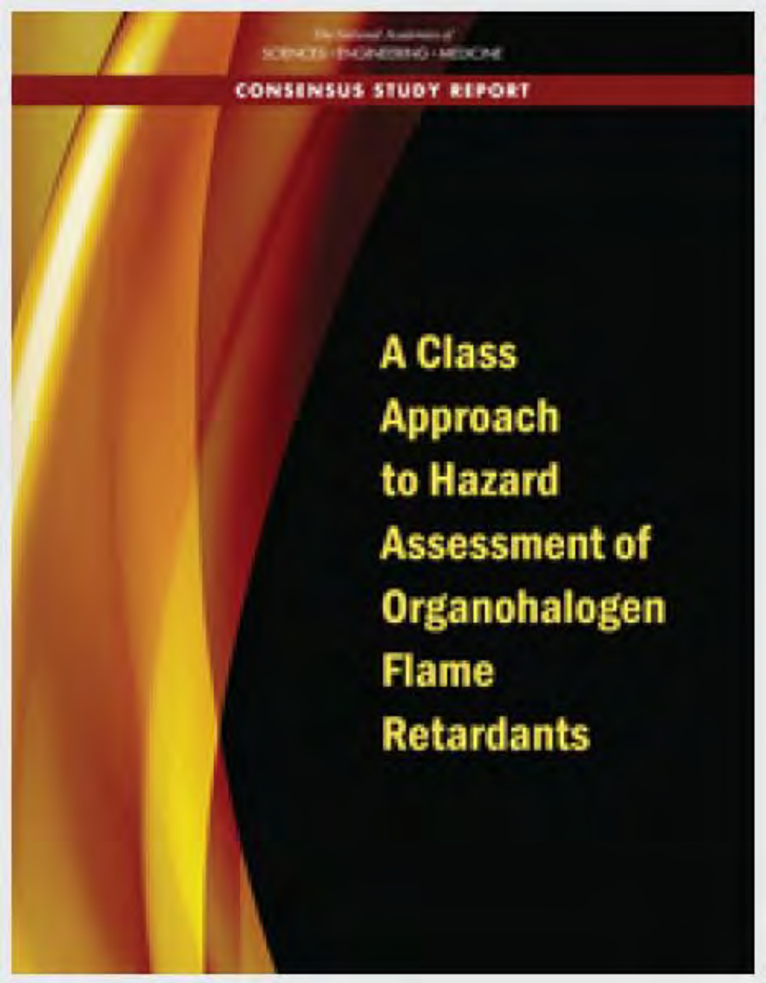
Criteria for safer is a *spectrum*

Process for identifying safer alternatives





How can we assess classes of chemicals?

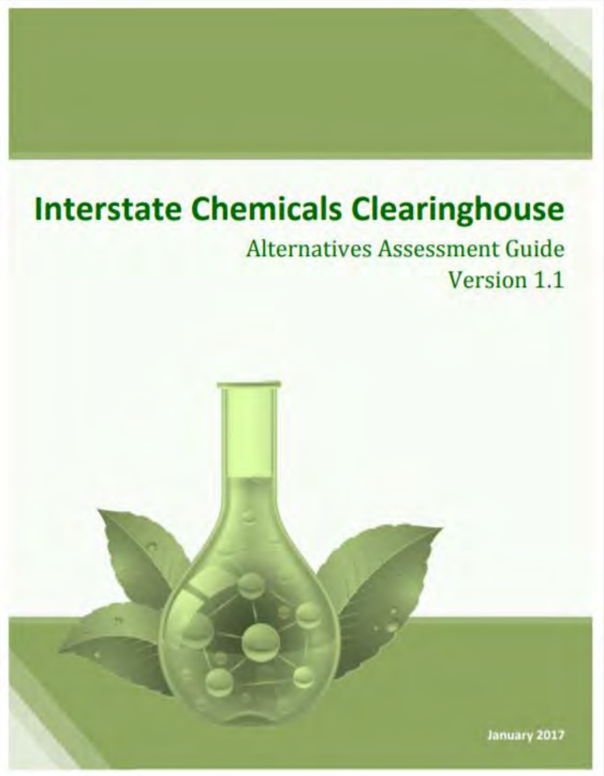
1. If there are all data rich chemicals → Assess the class based on data rich chemicals.
2. If there are all data poor chemicals → Unlikely to be a priority chemical class.
3. If there are data rich and data poor chemicals → Assess the class based on data rich chemicals.
4. If there is variable or discordant hazard data → Three options.

Minimum criteria for safer

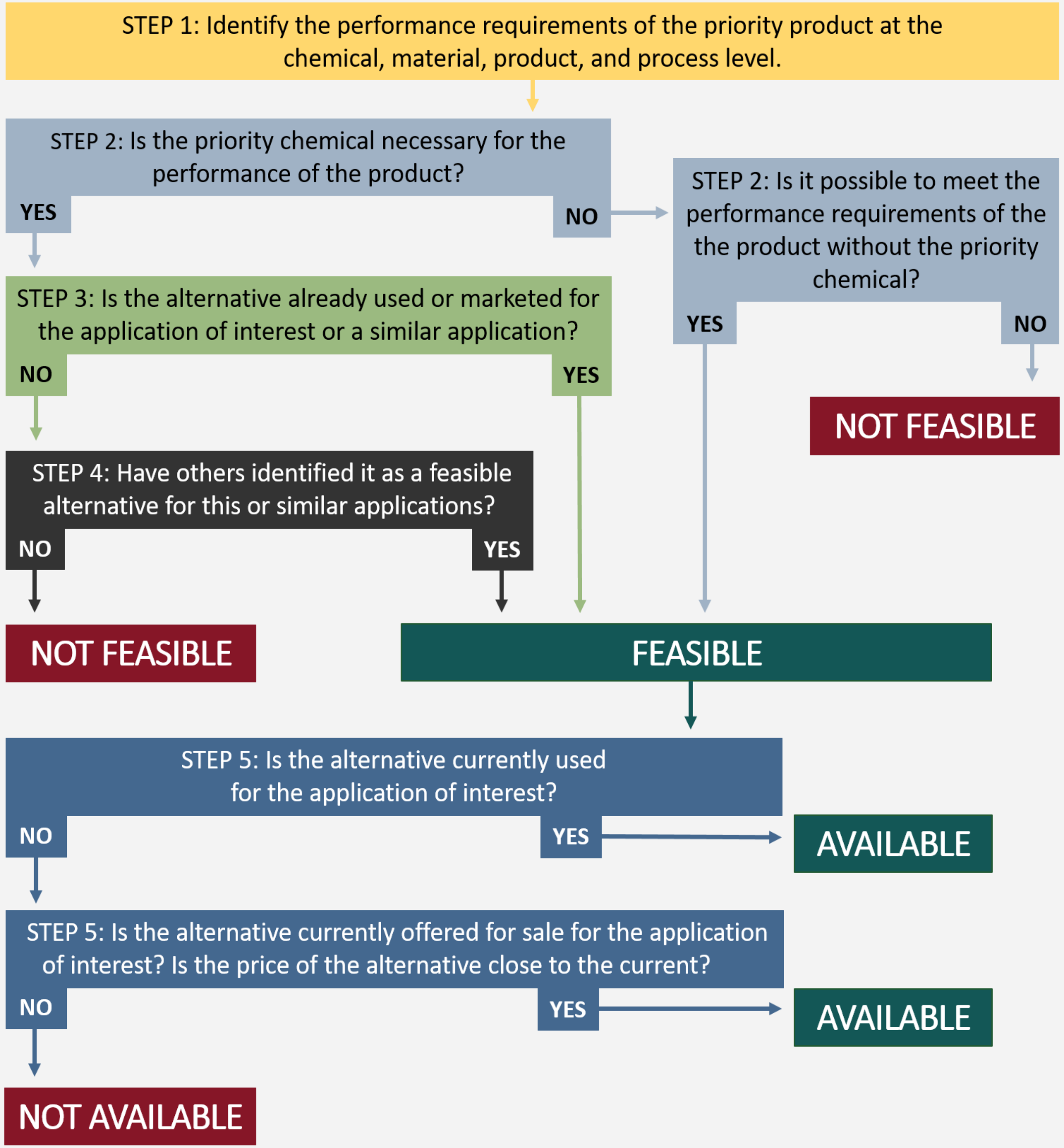
- Chemicals used to function like priority chemicals cannot have:
  - High concerns for carcinogenicity, mutagenicity, reproductive or developmental toxicity, or endocrine disruption.
  - High toxicity in other ways and very persistent and/or very bioaccumulative.
  - Very high persistence and very high bioaccumulation.
- For a full description—see the working draft criteria.

Feasible and available

- RCW 70A.350 requires that Ecology determine that safer alternatives are "feasible and available" before restricting the use of a priority chemical.
- Not defined in the statute.
- IC2 Alternatives Assessment Guide (2017)
  - Modules to assess potential alternatives.
  - Performance module—technical feasibility.
  - Cost and availability module—price competitive and available in sufficient quantity.



Process for identifying feasible and available alternatives



See an accessible version of this graphic.

Section 2. Electric & electronic equipment

The priority product category

- In 2019, the Legislature listed flame retardants as a priority chemical class.
- Identified electric and electronic equipment as a priority product (device casings/enclosures).
- They are a significant source or use of organohalogen flame retardants (OFRs).
- We identified alternatives to OFRs that are safer, feasible, and available.
- Working to determine whether these alternatives are not feasible for any specific applications.
- We welcome your input!

Electric and electronic equipment is a significant source of flame retardants

- Several flame retardants are used in the enclosures of electric and electronic equipment.
- Organohalogen flame retardants concentration in products is often greater than 1%.
  - Typical loading levels from bromine based is **2 – 25%**.
- Estimated in Washington:
  - Average U.S. home has 30 items with enclosed electronics.
  - Average replacement rate is approximately 2 per year.
  - Washington's E-Cycle program collected **4 – 6 million pounds** of plastic enclosures yearly between 2014 – 2018.
- Sensitive populations are exposed:
  - Many OFRs are detected in house dust and on surfaces.
  - Certain occupations often have higher exposures.

Flame retardants scope

- RCW 70A.350 defines flame retardants as **organohalogen flame retardants (OFRs)** and additionally those identified under RCW 70A.430.
- **OFRs as a chemical class** are described in the priority products report as chemicals meeting the following criteria:
  - **1.** The chemical is used with the intended function of slowing ignition and progression of fires.

AND

  - **2.** The chemical contains one or more halogen elements bonded to carbon.

Flame retardants scope

- Additional flame retardants identified under RCW 70A.430 are **organophosphate flame retardants**.
- Potential restriction on flame retardants in electric and electronic equipment could include:
  - The entire class of OFRs.
  - We do not anticipate a restriction on the organophosphate flame retardants identified under RCW 70A.430 for this priority product.

Identifying relevant OFRs

- We referenced the National Academies of Sciences 2019 report:
  - **A Class Approach to Hazard Assessment of Organohalogen Flame Retardants**
- Report identified 161 OFRs with reported use.
- We determined further sub-classification was not required to conduct our hazard analysis of the OFRs class.

Identifying data rich chemicals

We identified data rich chemicals in the class by looking for existing hazard assessments:

- GreenScreens®—conducted by a licensed profiler, publicly available.
- Authoritative Lists—review of supporting documents.
- Other hazard assessment methods are possible, but would need to be:
  - Compatible with our criteria for safer and scoring methodology.
  - Publicly available or third-party reviewed.

GreenScreen®
BM-1
Authoritative lists

GreenScreen®
BM-2

GreenScreen®
BM-2*
BM-3

**not all BM-2 meet additional criteria*

Criteria for safer is a *spectrum*

Hazards of OFRs

Members of the class are associated with:

- Carcinogenicity
- Endocrine activity
  - Disruption of hormone systems.
- Developmental toxicity
  - Neurological development.
- Reproductive toxicity
  - Reduced fertility.
- Aquatic toxicity
- Persistence and bioaccumulation
  - OFRs persist in the environment.
  - Contributes to chronic exposure.

Summary of OFRs assessments

- Identified 11 of 161 OFRs with existing GreenScreen® assessments.
- 7 OFRs scored as **Benchmark-1**:
  - Decabromodiphenyl ethane (DBDPE)
  - Tetrabromobisphenol A (TBBPA)
  - Ethylene bis(tetrabromophthalimide) (EBTBP)
  - Short chain chlorinated paraffins (SCCP)
  - Tris(2-chloroethyl) phosphate (TCEP)
  - Tris(1,3-dichloro-2-propyl) phosphate (TDCPP)
  - 1,3,5-triazine-2,4,6-tris(2,4,6-tribromophenoxy) (TTBP-TAZ)
- Identified 83 of 161 OFRs that score as **LT-1** using GreenScreen® List Translator due to their presence on authoritative lists.

Summary of OFRs assessments continued

- Identified 11 of 161 OFRs with existing GreenScreen® assessments.
- 3 OFRs scored as BM-2:
  - 2,2-bis(chloromethyl)trimethylene bis(bis(2-chloroethyl)phosphate) (V6)
  - 2-Ethylhexyltetrabromobenzoate (TBB)
  - Bis(2-ethylhexyl) tetrabromophthalate (TBPH)
- **We have found no evidence they are used in electric and electronic equipment.**

Usage of OFRs in electric and electronic equipment

- OFRs detected in electric and electronic enclosures include:
  - DecaBDE (CASRN: 1163-19-5, LT-1)
  - DBDPE (CASRN: 84852-53-9, BM-1)
  - TTBP-TAZ (CASRN: 25713-60-4, BM-1)
  - TBBPA (CASRN: 79-94-7, BM-1)
- Other studies have found total bromine content greater than 1% in these products, suggesting use of OFRs.

Conclusion: Hazards of OFRs

- **The class of organohalogen flame retardants (OFRs) will be treated as potentially hazardous.**
- Some variation in hazard scores across members of the OFRs class—but none are sufficiently less hazardous to be excluded.
- Vast majority of OFRs:
  - Score as **Benchmark-1** or **LT-1** chemicals.
  - Are present on authoritative and screening lists for multiple human health hazard endpoints.

Organohalogen
flame retardants
(OFRs)

Safer
alternatives

GreenScreen®
BM-1
Authoritative lists

GreenScreen®
BM-2

GreenScreen®
BM-2*
BM-3

**not all BM-2 meet additional criteria*

Criteria for safer is a *spectrum*

Safer in the law

- **"Less hazardous to humans or the environment than the existing chemical or process."**
- Safer alternatives can be chemical substitutes, or changes in materials or design.
- Safer alternatives to OFRs in electric and electronic equipment include:
  - BM-2 or BM-3 OPFRs, combined with a **maximum of 0.5%** fluoroorganic additives (e.g., PTFE) when required.
  - Change in casing material to meet fire safety requirements without flame retardants.
  - Other approaches that do not use OFRs.

Enclosures with certain organophosphate flame retardants and limited PTFE are safer

- Benchmark-2 or Benchmark-3 organophosphate flame retardants meet our minimum criteria for safer.
- To meet some flammability standards, additives may also be required to modify the dripping behavior of plastics.
  - A **maximum of 0.5%** fluoroorganic additives (e.g., PTFE) is considered safer in combination with BM-2 or BM-3 organophosphate flame retardants.
  - OFRs used at concentrations between **2 – 25%** in enclosures.
  - Will reduce a significant use of OFRs and potential source of exposure to the environment and sensitive populations.

General breakdown of an electric or electronic product with a plastic enclosure

Example product

Example components of an enclosure

General breakdown of an electric or electronic product with a plastic enclosure

Resins

Thermoplastic(s)

Additive(s)
(flame retardant, colorant, etc.)

Fire safety performance requirement for polymeric enclosures

UL Standards specify performance standards that a product category must meet.

UL 746C Standard for Polymeric Materials – Enclosure Requirements

Product category	Examples	UL94 Standard (minimum flammability rating)	Additional notes
Portable attended household	Blender, hand-held dryer	HB	Frequently no flame retardant necessary
Other portable	TV, laptop	V-2, V-1, V-0*	May require anti-drip function
All other equipment	Hardwired wall heater	5VB, 5VA*	Requires anti-drip function

*Standard may be lowered with metal sub-enclosure.

TCO Certified

- Third-party certification for IT products.
- TCO Certified Accepted Substance List—“positive list” of safer alternatives.
  - Lists **flame retardants,** plasticizers, and process chemicals that achieved a Benchmark score of 2, 3, or 4 in a hazard assessment by a licensed GreenScreen® profiler.
  - Allowance for fluoroorganic additives (e.g., PTFE), used to modify the dripping behavior of plastics in fire conditions, at **less than 0.5% by weight**.

Alternatives considered

- Flame retardants
- Resins
- Products

Example chemical alternatives in plastic enclosures—safer

Alternative	Compatible plastics or blends	Assessment
Triphenyl phosphate (TPP) CAS 115-86-6	PC/ABS, PPO/HIPS	GreenScreen® Benchmark 2
Resorcinol bis(diphenyl phosphate) (RDP) CAS 57583-54-7	PC/ABS, PPO/HIPS, PC, PA, PBT, PET	GreenScreen® Benchmark 2
Bisphenol A diphosphate (BDP) CAS 181028-79-5 or 5945-33-5	PC/ABS, PPO/HIPS, PC, PET	GreenScreen® Benchmark 3
Tetrakis(2,6-dimethylphenyl) 1,3-phenylene bisphosphate CAS 139189-30-3	PC/ABS, PPO/HIPS, PC	GreenScreen® Benchmark 3
Polyphosphonate co-carbonate CAS 77226-90-5 and Polyphosphonate CAS 68664-06-2	PC/ABS, PC/ASA, PC, PET, PBT, PC/PET	GreenScreen® Benchmark 2 (expired)—likely safer/Benchmark 3

ABS: Acrylonitrile butadiene styrene
PA: Polyamide
PPO: Polyphenylene oxide
PBT: Poly(butylene terephthalate)

HIPS: High impact polystyrene
PET: Polyethylene terephthalate
PC: Polycarbonate
ASA: Acrylonitrile butadiene styrene copolymer

This is not an exhaustive list of additive FR chemicals.

Example alternative chemicals—available

Alternative	Example manufacturers	Trade names
Triphenyl phosphate (TPP) **CAS 115-86-6**	Lanxess, GreenChemicals	Disflamoll® TP
Resorcinol bis(diphenyl phosphate) (RDP) **CAS 57583-54-7**	Adeka Polymer Additives Europe, Thor, ICL-IP, GreenChemicals	ADK STAB PFR, AFLAMMIT® PLF 280, Fyroflex RDP Fyroflex RDP-HP
Bisphenol A diphosphate (BDP) **CAS 181028-79-5 or 5945-33-5**	Adeka Polymer Additives Europe, GreenChemicals	ADK STAB FP-600, ADK STAB FP-700, GC BDP
Tetrakis(2,6-dimethylphenyl) 1,3-phenylene bisphosphate **CAS 139189-30-3**	Novista Group GYC Group	PX-200, GY-FR-PX200
Polyphosphonate co-carbonate **CAS 77226-90-5* and** **Polyphosphonate CAS 68664-06-2**	FRX Polymers	CO3000, CO6000, HM1100, HM5000, HM7000, HM9000

*Likely safer—need an updated assessment

Example: Feasible alternatives in PC/ABS 4:1 (some applications)

PC/ABS 4:1	% FR additive	UL94 (1.6mm)
Triphenyl phosphate (TPP) **CAS 115-86-6**	14	V-0 (1.7)
Resorcinol bis(diphenyl phosphate) (RDP) **CAS 57583-54-7**	9	V-0 (1.5)
Bisphenol A diphosphate (BDP) **CAS 181028-79-5 or 5945-33-5**	12.3	V-0 (1.5)
Tetrakis(2,6-dimethylphenyl) 1,3-phenylene bisphosphate **CAS 139189-30-3**	11.5	V-0 (1.5)
Polyphosphonate co-carbonate **CAS 77226-90-5***	15 – 20	V-0 (1.5)

Note: For V-0, an additive is needed to meet the anti-drip function.
*Likely safer—need an updated assessment.

Safer, feasible, available: Resin example

PC/ABS Covestro Bayblend®

- Non-flame-retardant resin is classified as HB.
- Grades can meet UL 94 V-0 and 5VA (thickness requirement depends on grade).
- Meets the TCO requirements.
- Marketed for housing for computers, monitors, printers, photocopiers, laptops, televisions, DVD players, mobile phones, panels for dishwashers, washing machines, housing for kitchen appliances, and medical applications.

Safer, feasible, available: Resin example

Polypropylene Compound Grades—Hanwha Total Petrochemical Co., LTD

- Can meet UL 94 V-0.
- Meets the TCO requirements.
- “Widely used for exterior of electric and electronic parts.”

We are also looking at other resin types that are feasible and available, and assessing for safer.

Safer, feasible, available: TCO Certified products

- TCO Certified products—use flame retardants on the TCO Certified Accepted Substance List and limit PTFE to 0.5%.
- Categories with products:
  - Displays
  - Notebooks
  - Desktops
  - All-in-one PCs
  - Projectors
  - Headsets
  - Servers

Considerations for potential restrictions

At this time, it appears **safer alternatives to halogenated flame retardants are feasible and available for use in external enclosures** of electric and electric equipment.

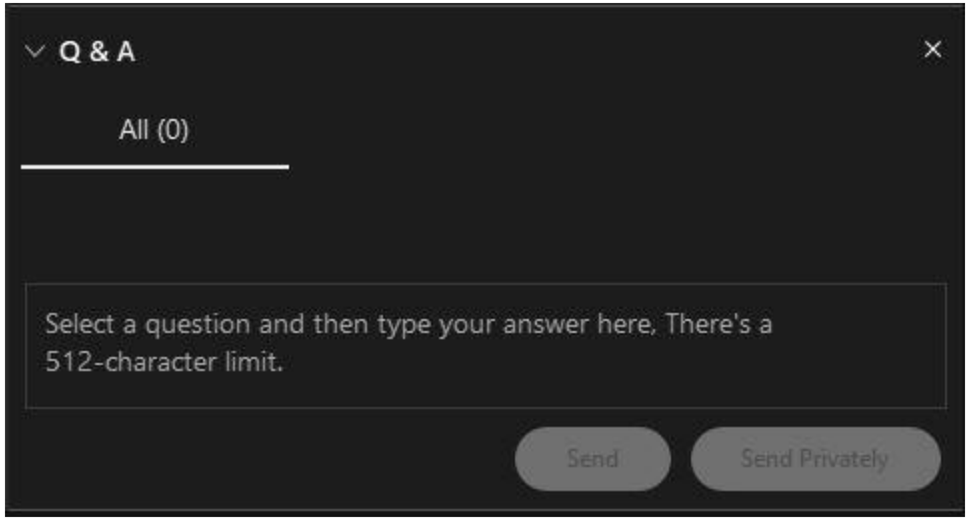
- Indicates that a restriction is a possible determination.
- Stakeholder input is welcome.

Section 3. Electric & electronic equipment discussion

Questions? Input to share?

Type in the Q & A box or raise your hand to unmute.

- Direct your question to everyone using the drop down arrow.
- If you need more than 512 characters, ask your question or give your input verbally.
- Raise your hand and we will unmute you to give your input.
    - If you're dialing in via phone, dial *3 to raise your hand.



Electric and electronic equipment discussion

Feedback category	Feedback from stakeholders during the August 31 discussion
Analysis process	• Clarify what is meant by external enclosure vs. internal parts. Consider industrial applications (AC systems, booster pumps, water pumps). Most of the time pumps are not considered to be a consumer product, but really an industrial type product. The use of common consumer products like blow dryers doesn’t really help us understand the intention there. • What is normal use? How a consumer interacts with product should inform decision. • If the component is interior to product but rarely accessed, is that in scope or not? What is the cutoff?
Performance and availability of alternatives	• What if GreenScreen® scores change after they have been identified as a safer alternative? • Obviously, flammability rating is important, and more so if you have a UL approval. But there’s other things like RTI electrical characteristics, mechanical characteristics, ballpoint testing, and mechanical properties that come into play here. Obviously not specifically relevant to this topic, but to ask manufacturers to change over to these safer products, it’s not necessarily a 1 for 1 when we’re only focused on flammability ratings. • Consider lithium ion batteries specifically.

Electric and electronic equipment discussion

Feedback category	Feedback from stakeholders during the August 31 discussion
Potential regulation	• Will the final rule more clearly describe scope of the product category? We hope it will. • How will recycled products be considered in regulations? Could you simply exempt recycled resins? Also address refurbished products. • Does the regulation apply to products already on the market? What about redesign—what timeframe would be allowed? What about parts for older products that are no longer being manufactured? • Might not be economically viable to redesign parts for older equipment—necessitating premature disposal of that equipment. In some other regulations, they have a spare parts exemption as an example. • Technically, we sell spare parts, but they could be considered consumer products because they're sold to the open market. So I think some thought needs to go in there to distinguish between those two—what is a spare part as opposed to what is a consumer offering? That line can get very gray.
Potential regulation	• My server parts have a 12-year lifespan. Even after end-of-life, we need to provide parts to service those products for 12 years. Our manufacturing process for those parts is taken down, and we cannot manufacture them anymore. How are you going to address service parts and all products that basically are sitting in warehouses waiting to be sold in the future? • Restrictions on PFAS in future could compromise viability of alternative flame retardants in the future. • Toxic-Free Future supports the ban on the entire class of organohalogens in casings. The industry has known for a very long time that this class of chemicals is on its way out. Europe has moved, New York has how adopted legislation. So in regard to the timeline issue, I would say we urge the agency to adopt it in a timeframe that is as urgent as is allowed under the law.

Stakeholder involvement next steps

- Make sure you are on our email list!
- Share your input on our potential regulatory determinations.
  - Invite us to present to your group.
  - Reach out to us to set up a meeting with our team.
- **Formal public comment period on draft regulatory actions report (Fall 2021 – Winter 2022).**

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Where are we at on the other products?

Priority product	Priority chemical class	Status
Leather and textile furnishings	PFAS	Identified safer, feasible, available alternatives to PFAS.
Laundry detergent	APEs	Identified safer, feasible, available alternatives to APEs.
Paints	PCBs	Paints with lower PCB concentrations are safer, evaluating feasible and available.
Thermal paper	Bisphenols	Pergafast™ 201 (CAS 232938-43-1) and electronic receipts are safer, feasible, available alternatives.
Recreational foam	Flame retardants	Flame retardant free foam is safer, feasible, and available, evaluating if the scope of feasibility applies to all facilities.
Can linings	Bisphenols	Identified safer, feasible, available alternatives to bisphenols in beverage cans.

Have ideas or input on any of these products? Please reach out! We'd love to hear from you!

Where are we at on the other products?

Priority product	Priority chemical class	Status
Personal care and beauty products	Phthalates	Identified safer, feasible, and available alternatives to phthalates in fragrances.
Aftermarket treatments	PFAS	Identified safer, feasible, available alternatives for aftermarket treatments used for fabric upholstery and furniture, as well as carpet.
Carpets and rugs	PFAS	Identified safer, feasible, available alternatives to PFAS.
Vinyl flooring	Phthalates	Identified safer, feasible, available alternative plasticizers.
Printing inks	PCBs	Update at 12pm!

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Webinar resumes at 12 p.m.

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Safer Products for Washington:

Printing inks

From Ecology: Cheryl Niemi, Marissa Smith, Saskia van Bergen, Craig Manahan, Sascha Stump, Rae Eaton, Kimberly Goetz, Stacey Callaway, Lauren Tamboer, Amber Sergent.

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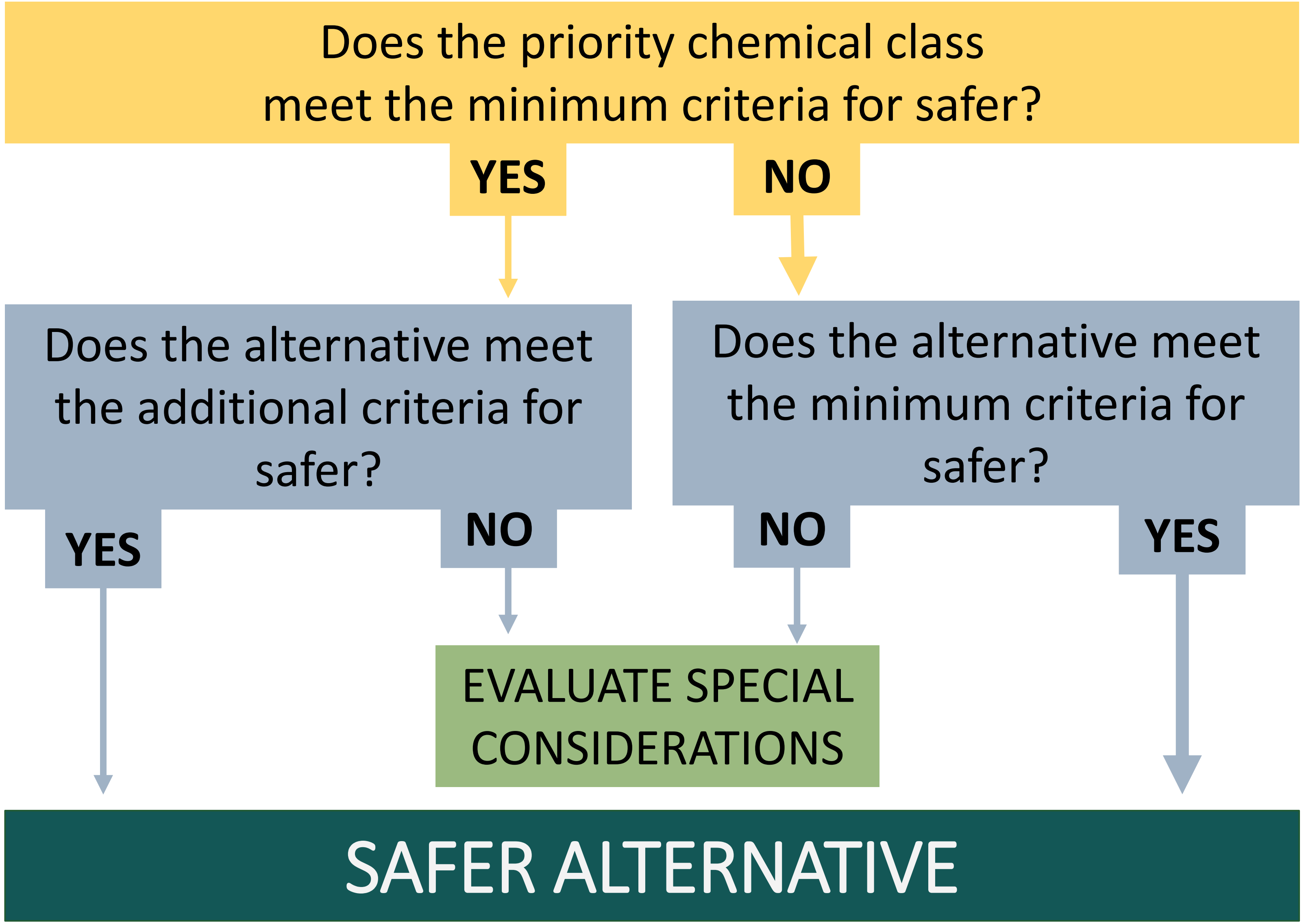
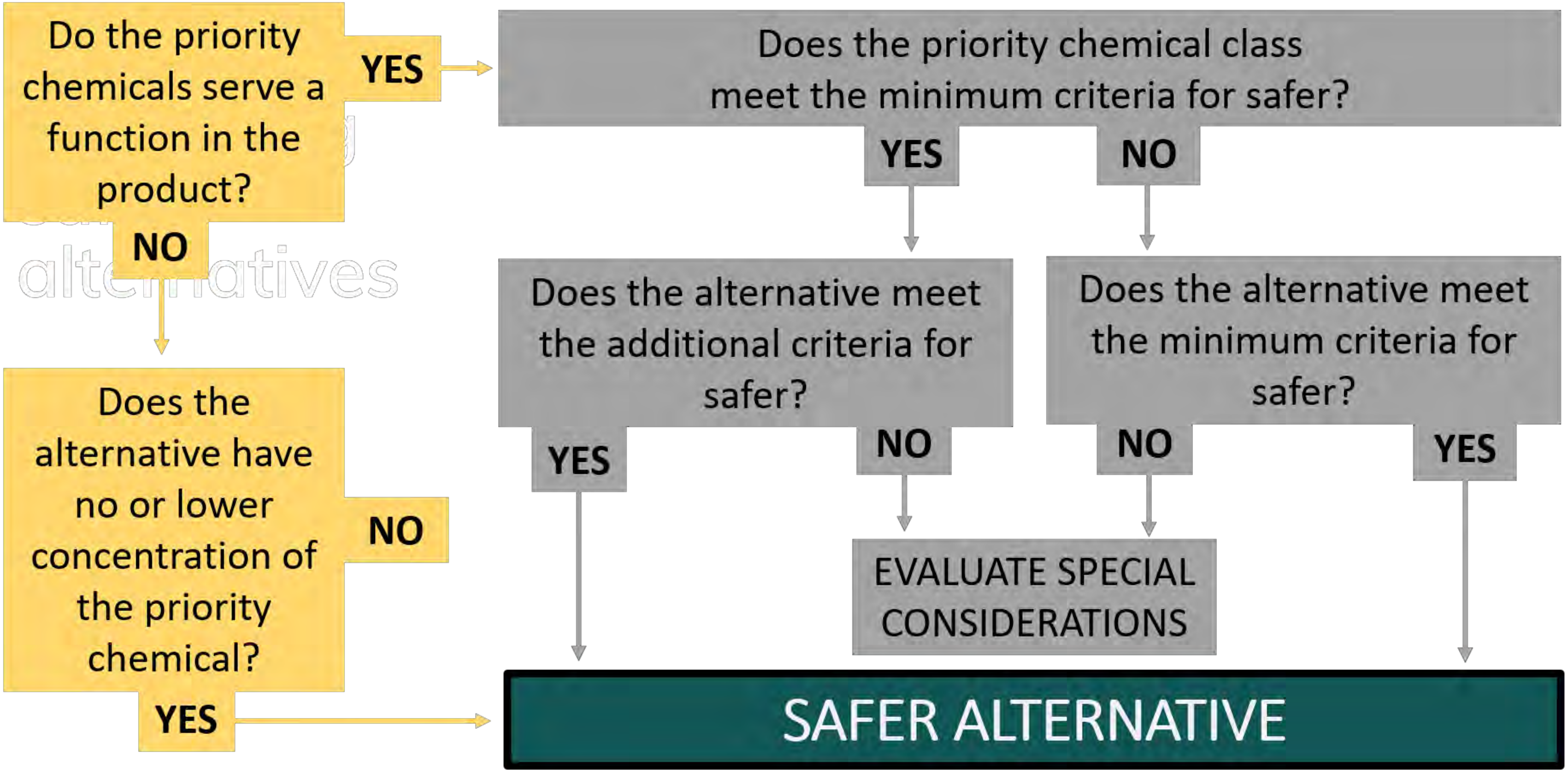
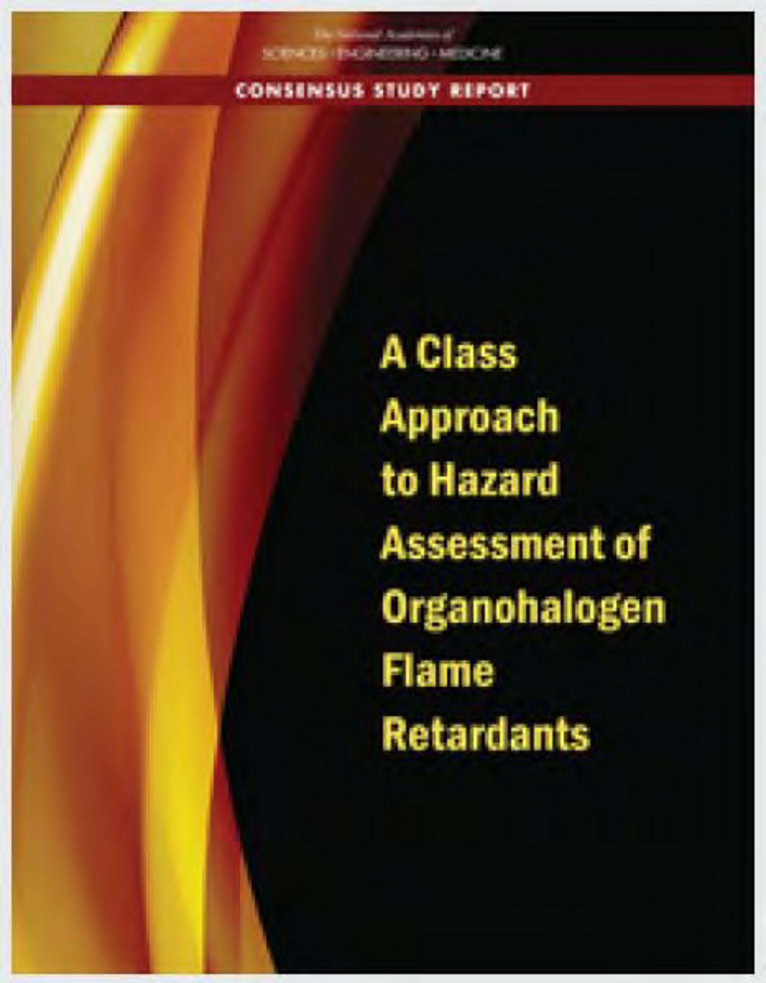



Do the priority chemicals serve a function in the product?
YES
NO
Does the priority chemical class meet the minimum criteria for safer?
YES
NO
Does the alternative meet the additional criteria for safer?
YES
NO
Does the alternative meet the minimum criteria for safer?
NO
YES
Does the alternative have no or lower concentration of the priority chemical?
NO
YES
EVALUATE SPECIAL CONSIDERATIONS
SAFER ALTERNATIVE



How can we assess classes of chemicals?

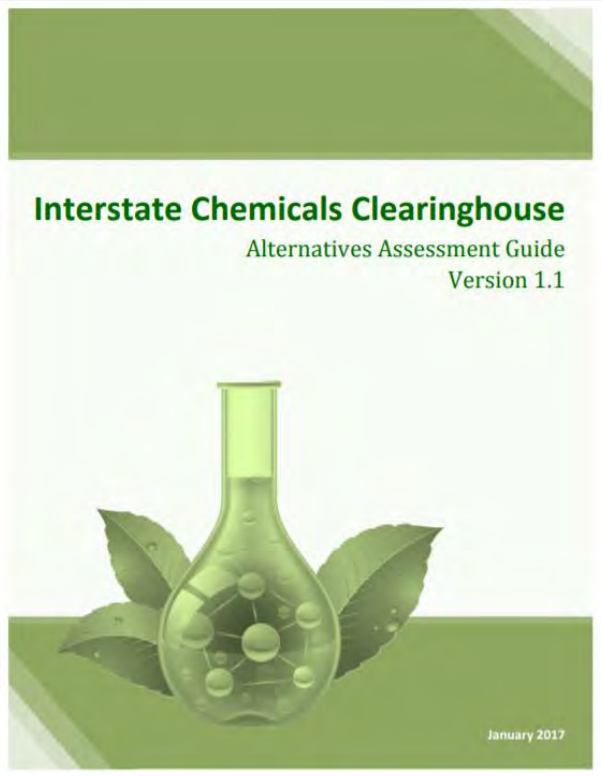
1. If there are all data rich chemicals → Assess the class based on data rich chemicals.
2. If there are all data poor chemicals → Unlikely to be a priority chemical class.
3. If there are data rich and data poor chemicals → Assess the class based on data rich chemicals.
4. If there is variable or discordant hazard data → Three options.

Minimum criteria for safer

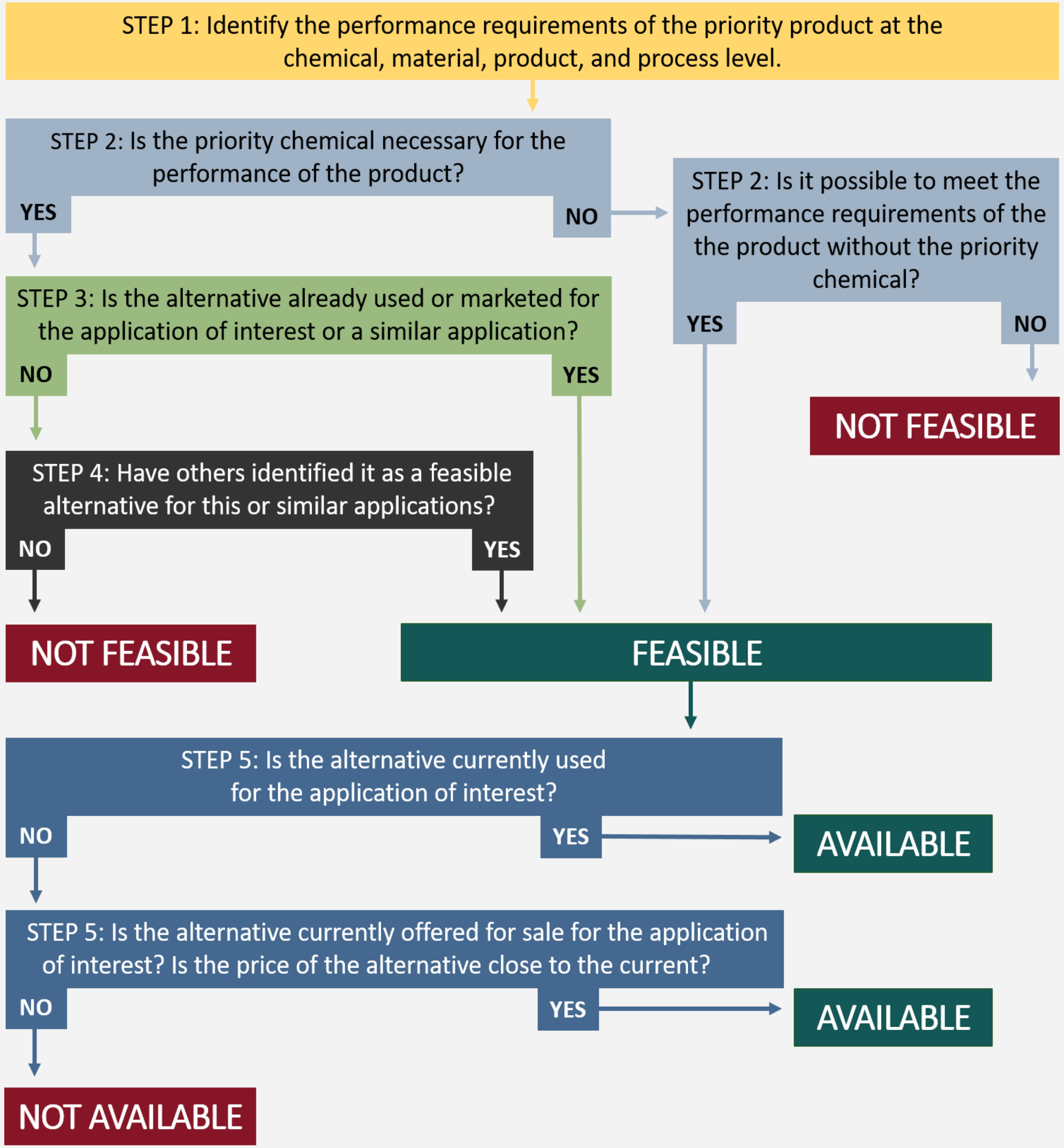
- Chemicals used to function like priority chemicals cannot have:
  - High concerns for carcinogenicity, mutagenicity, reproductive or developmental toxicity, or endocrine disruption.
  - High toxicity in other ways and very persistent and/or very bioaccumulative.
  - Very high persistence and very high bioaccumulation.
- For a full description—see the working draft criteria.

Feasible and available

- RCW 70A.350 requires that Ecology determine that safer alternatives are "feasible and available" before restricting the use of a priority chemical.
- Not defined in the statute.
- IC2 Alternatives Assessment Guide (2017)
  - Modules to assess potential alternatives.
  - Performance module—technical feasibility.
  - Cost and availability module—price competitive and available in sufficient quantity.



Process for identifying feasible and available alternatives



See an accessible version of this graphic.

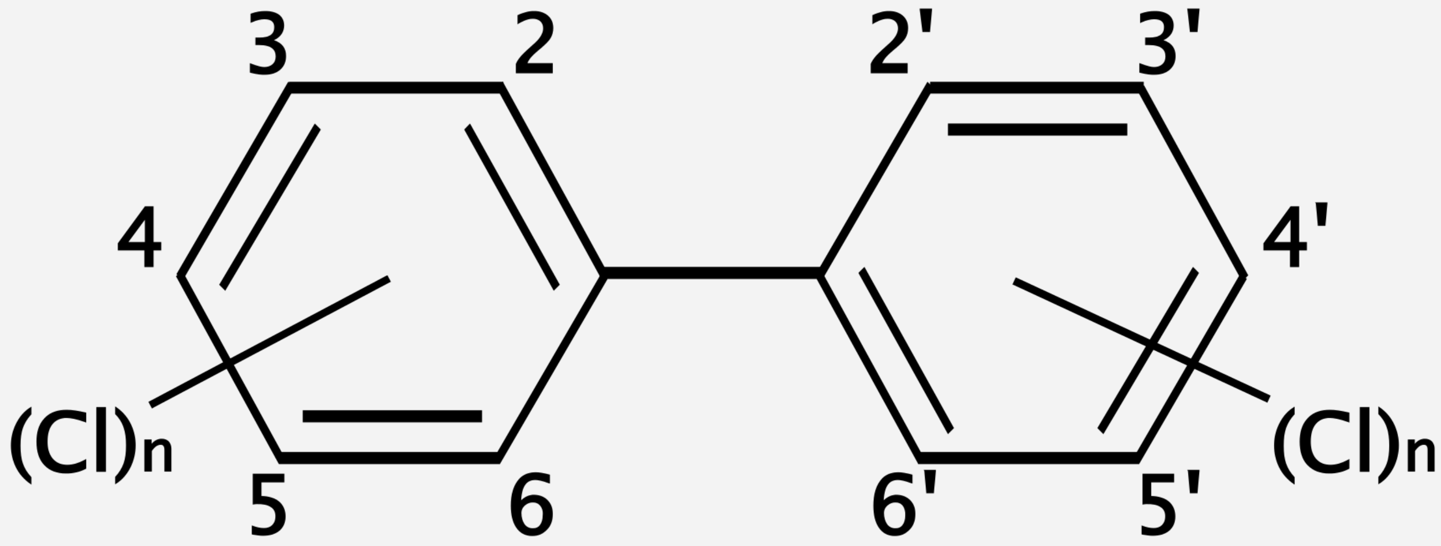
Section 2. Printing inks

Polychlorinated biphenyls (PCBs) in printing inks

- In 2019, the Legislature listed PCBs as a priority chemical class.
- Identified printing inks as a significant source of PCBs.
  - PCBs are inadvertent contaminants of inks—they have no function.
- Listed them as a priority product in our 2020 report.
- We are still working to determine whether printing inks with reduced PCBs are feasible and available.
- We welcome your input!

Scope of the priority chemical class

- Polychlorinated biphenyls (PCBs) are identified as a priority chemical class in RCW 70A.350.
- PCBs are defined as a class of chemicals that consist of two benzene rings joined together and containing one to ten chlorine atoms attached to the benzene rings.



Hazards of PCBs

Entire class has been identified as:

- Carcinogenic
  - International Agency for Research on Cancer
  - U.S. National Toxicology Program Review of Carcinogenicity
  - California Prop 65
- Developmentally toxic
  - California Prop 65
- Toxic to aquatic organisms
  - EU Globally Harmonized System for the Classification and Labeling of Chemicals

Hazards of PCBs continued

- Entire class identified as:
  - Persistent, Bioaccumulative, and Toxic
    - UN Stockholm Convention (Persistent Organic Pollutants)
    - EPA (Toxics Reporting Inventory)
    - OSPAR (PBTs for priority action)
- While eight PCBs are listed on the Persistent, Bioaccumulative, and Toxic list (WAC 173-333), our Chemical Action Plan evaluated the class as a whole since:
  - People are exposed to them as mixtures.
  - They are regulated as a class by many governments.

Why PCBs?

- Most intentional uses of PCBs restricted in 1977.
- PCBs are persistent—once released in the environment, challenging or impossible to remove, affecting wildlife for years to come.
- Still widely detected in people and the environment, including fish and seafood.
- Southern Resident Orca Task Force noted PCBs as a chemical class of concern.
- Department of Health advises human consumption restrictions for specific fish in 14 water bodies in WA due to PCBs levels in fish tissue.

Printing inks are a significant source of PCBs

- Estimated **56 million gallons of printing ink** used in Washington per year.
- People and the environment can be exposed to PCBs from printing inks:
  - During use (both in printing and with printed products).
  - From the environment after disposal of printed products.
- A restriction on PCBs in inks would reduce a significant source or use.

Types of printing ink

- Digital: Ink Jet and other “non-impact” printing
- Analog:
  - Offset Lithogoraphy: “litho” or “offset”
  - Flexography: “flexo”
  - Rotogravuere: “gravure”
  - Silkscreen: “screen”
- According to NAPIM, 45% of the market is Litho inks, and 30% is Flexo.
- Inks contain **5 – 30% pigment.**

Inks with lower concentrations of PCBs are safer

- Because PCBs are inadvertent contaminants of ink, **any ink with a lower concentration of PCBs could be considered a safer alternative** to ink with a higher concentration of PCBs.
- Published testing data can be used to investigate PCB concentrations.
- All tested inks are commercially available products sold in the U.S.
  - Therefore, these inks would also be considered feasible and available.

Ink data

- Source is assumed to be the same for all products—pigments.
- We know of no reason why one product would have significantly different needs or feasibility of PCB content.
- Published ink formulations have similar pigment concentrations and chemical pigment for different types of ink.
- Therefore, we combined all product types for this analysis.

Ink data

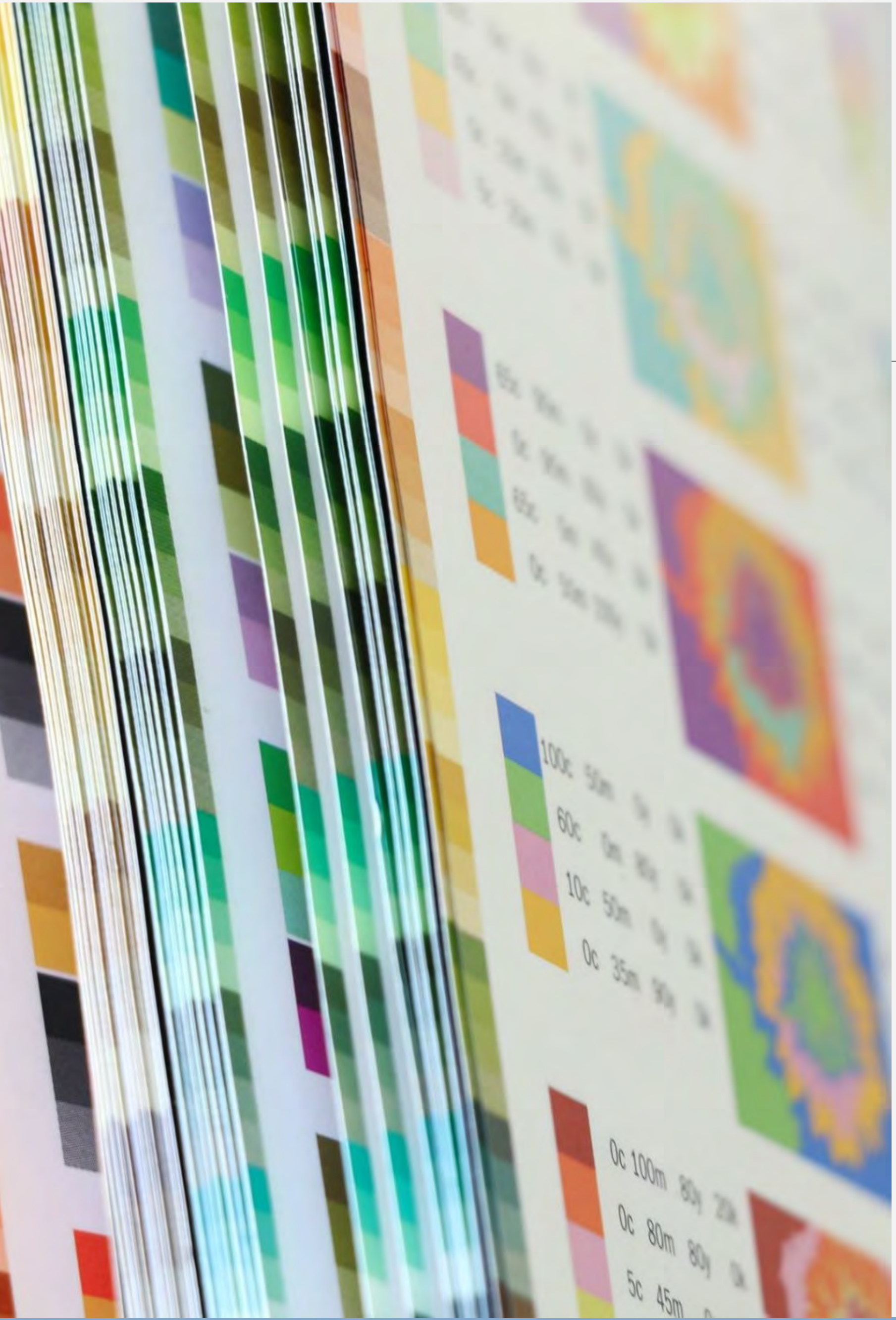
- Limited data identified in publicly available studies or journal articles.
- **Most printing is done with Cyan, Magenta, Yellow, and Black (CMYK) colors**—though some applications require specialized individual colors.
- Ecology only tested CMYK inks because they are the most common.
  - CMYK publishing inks from five different manufacturers.
  - Some offset, some digital, some not specified.

Ink data—total PCBs

- Ecology 2016 product testing
  - **Yellow**: <1ppb (2 samples)
- Ecology 2021 product testing—**preliminary data**
  - **Cyan**: <1ppb to ~550ppb (5 samples)
  - **Magenta**: <1ppb to ~300ppb (5 samples)
  - **Yellow**: <1ppb to ~500ppb (4 samples), 25,000 – 50,000ppb (25 – 50ppm) (1 sample)
  - **Black**: <1ppb to ~12ppb (3 samples)
- Data from HP showed two types of CMYK inks all with <1ppb total PCBs (not peer-reviewed or verified).
- Ecology tested one set of these CMYK inks and results were similar.

Considerations for potential restrictions

- Types of inks—how representative is our data of different ink formulations?
- CMYK versus spot colors—how does data on CMYK ink correlate and inform for use of single color formulations?
- Companies such as HP and Apple have criteria specifying <0.1ppm PCBs—suggesting that low PCB inks are feasible and available.



Considerations for potential restrictions continued

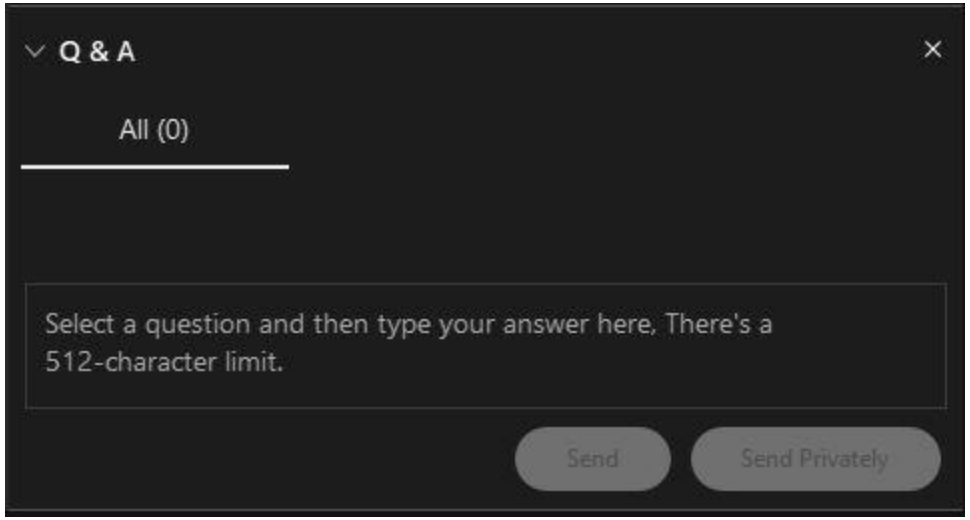
- Does finding several inks at low concentrations mean there are safer alternatives to inks at higher concentrations? How many samples are sufficient to show this?
- Is further testing needed? How would additional data impact our regulatory determination?
- What concerns would you have if we recommended or did not recommend a restriction?

Section 3. Printing inks discussion

Questions? Input to share?

Type in the Q & A box or raise your hand to unmute.

- Direct your question to everyone using the drop down arrow.
- If you need more than 512 characters, ask your question or give your input verbally.
- Raise your hand and we will unmute you to give your input.
    - If you’re dialing in via phone, dial *3 to raise your hand.



Printing inks discussion

Feedback category	Feedback from stakeholders during the August 31 discussion
Analysis process	• When looking for safer alternatives we typically are looking for alternatives that are intentionally used, for contaminants/byproducts, we do need to consider the variability. Maybe one day you pick a product off the shelf and test it and it's got a low level and you pick the same product from a different store and get a different level. The suppliers don't necessarily have the ability to control.
Feasibility/ availability of inks with lower PCBs	• Slide 75: Inks vary depending on usage specifications. Lots of formulations for specific colors. • Consumer product companies spend tens of millions of dollars on color specification. Coke and Starbucks and others spend millions on product testing, for very very specific color specifications. Trying to change those ink formulations and still meet those color specifications would be an incredibly expensive thing to do. • Inks sold to consumers versus commercial inks are handled in different ways. • When could applications be similar or different for PCB levels?
Potential regulation	• Trying to specify for your formulations "we want that low PCB contaminant version," that option isn't available, and that's a challenge. Colorant manufacturers have a lot of power in this equation. • All ink is in scope including powder, toner is not? The polymer beads is the common link to define the toners, the inks don't have that, and that's maybe the differentiating factor.
Other feedback	• Slide 73: Elaborate on the determination of "reducing a significant source or use" and the studies supporting the conclusion. • Slide 79: HP commented that their criteria in the general specifications doesn't generally mean feasible and available for all uses. Baseline information is available, but is it sustainable or repeatable? • Pigments and inks generally have high purity (lower level of contaminants). • Feasibility—concern about saying I can buy a printer ink for X and then assuming it is available for another application. • Desktop printers use dye not pigments. Commercial dyes aren't categorically known to contain PCBs. Certain sulfonated phthalocyanines are used as dyes but these aren't used as pigments.

Stakeholder involvement next steps

- Make sure you are on our email list!
- Share your input on our potential regulatory determinations.
  - Invite us to present to your group.
  - Reach out to us to set up a meeting with our team.
- **Formal public comment period on draft regulatory actions report (Fall 2021 – Winter 2022).**

Where are we at on the other products?

Priority product	Priority chemical class	Status
Leather and textile furnishings	PFAS	Identified safer, feasible, available alternatives to PFAS.
Laundry detergent	APEs	Identified safer, feasible, available alternatives to APEs.
Paints	PCBs	Paints with lower PCB concentrations are safer, evaluating feasible and available.
Thermal paper	Bisphenols	Pergafast™ 201 (CAS 232938-43-1) and electronic receipts are safer, feasible, available alternatives.
Recreational foam	Flame retardants	Flame retardant free foam is safer, feasible, and available, evaluating if the scope of feasibility applies to all facilities.
Can linings	Bisphenols	Identified safer, feasible, available alternatives to bisphenols in beverage cans.

Have ideas or input on any of these products? Please reach out! We'd love to hear from you!

Where are we at on the other products?

Priority product	Priority chemical class	Status
Personal care and beauty products	Phthalates	Identified safer, feasible, and available alternatives to phthalates in fragrances.
Aftermarket treatments	PFAS	Identified safer, feasible, available alternatives for aftermarket treatments used for fabric upholstery and furniture, as well as carpet.
Carpets and rugs	PFAS	Identified safer, feasible, available alternatives to PFAS.
Vinyl flooring	Phthalates	Identified safer, feasible, available alternative plasticizers.

Have ideas or input on any of these products? Please reach out! We’d love to hear from you!

Thank you for joining us!

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ecology.wa.gov/Safer-Products-WA

bit.ly/SaferProductsWA (Find links to everything here!)

Chapter 70A.350 RCW (formerly 70.365)

DEPARTMENT OF ECOLOGY State of Washington

Washington State Department of Health

End of presentation.

Safer Products for WA Implementation Process

The implementation process for Safer Products for Washington involves **four major phases**.

1. **Phase 1**. May 8, 2019: What chemicals are we most concerned about?
   - The first five priority chemical classes are PFAS, PCBs, phthalates, phenols, and flame retardants.
2. **Phase 2**. June 1, 2020: What consumer products contain these chemicals?
   - This phase identifies priority consumer products that are significant sources of exposure to people and the environment.
3. **Phase 3**. June 1, 2022: Do we need to regulate when these chemicals are used?
   - This phase determines regulatory actions—whether to require notice, restrict/prohibit, or take no action.
4. **Phase 4**. June 1, 2023: What rules do we need to keep people and the environment safe?
   - This phase includes restrictions on the use of chemicals in products or reporting requirements. Restrictions take effect one year after rule adoption.

After these four phases are completed, the **5-year cycle repeats**, and we return to Phase 1 to identify a new set of priority chemical classes.

Process for identifying feasible and available alternatives

- **Step 1**: Identify the performance requirements of the priority product at the chemical, material, product, and process level.
- **Step 2**: Is the priority chemical necessary for the performance of the product?
  - If yes, move to Step 3.
  - If no, is it possible to meet the performance requirements of the product without the priority chemical?
    - If yes, the alternative is feasible, and we move to Step 5 to assess availability.
    - If no, the alternative is not feasible.
- **Step 3**: Is the alternative already used or marketed for the application of interest or a similar application?
  - If yes, the alternative is feasible, and we move to Step 5 to assess availability.
  - If no, move to Step 4.
- (Continued on next slide.)

Continued: Identifying feasible and available alternatives

- **Step 4**: Have others identified it as a favorable alternative for this or similar applications?
  - If yes, the alternative is feasible, and we move to Step 5 to assess availability.
  - If no, the alternative is not feasible.
- **Step 5**: Is the alternative currently used for the application of interest?
  - If yes, the alternative is available.
  - If no, we move to the second part of Step 5.
- **Step 5 (second part)**: Is the alternative currently offered for sale for the application of interest? Is the price of the alternative close to the current?
  - If yes to both, the alternative is available.
  - If no (to one or both), the alternative is not available.