Identify Alternatives

Step 3

Identify Alternatives

Discovering Safer Alternatives

Identify Alternatives to Hazardous Chemicals/Processes

- **Consider a broad range of alternatives.**

  (i.e., chemical, material, product, and process options)

- **Utilize existing resources to find potential alternatives.**

  (i.e., databases, trade publications, manufacturer/vendor information, government publications, and tailored internet searches)

Types of Alternative Options

1) **None**- It is not necessary.
2) A different, **less hazardous chemical** that achieves the same, or better, results (aka "**drop in substitute**").
3) An **alternative material, product or process** that eliminates the need for using hazardous chemical.
4) **Re-design or reformulation** of a product that eliminates need for a process or material requiring hazardous chemical.

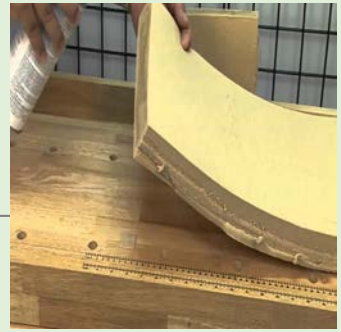
Is the Function Necessary?

Triclosan in Soap.

PFAS Water repellency on a Water Shoe.

Zinc in Athletic Shoe.

"Drop-in" Substitutes



- **Pro**
  - Require least changes to process, new capital investment, or worker re-training.
- **Cons**
  - Sometimes only partial substitutes for performance characteristics of currently-used chemical.
  - Frequently present similar or equally serious hazards as currently-used chemical(s) they're replacing.

“Drop in” Substitutes: Example

- **Identify less hazardous chemicals to make PVC plastic flexible (function: plasticizers)**
  - PVC naturally brittle.
  - DEHP- a phthalate mixed with PVC to make flexible, an occupational carcinogen, reproductive toxin, endocrine disruptor.
  - Less toxic chemicals available to make PVC flexible that work in specific PVC applications.

Seattle Bullitt Center: Living Building Challenge

- **Materials Red List** – Identified 14 chemical categories that must be avoided in products used in the project
- Used **Pharos** for first screening
- Example: **Phthalate-free water proof barrier coating**

Why Hunt for Alternatives Should Not be Limited to Drop-In Replacements

- **Safer drop-in alternatives aren't always available.**

- **Potential unanticipated workplace hazards if:**
  - Limited experience with the chemical by other companies.
  - Significant data gaps on health hazards.

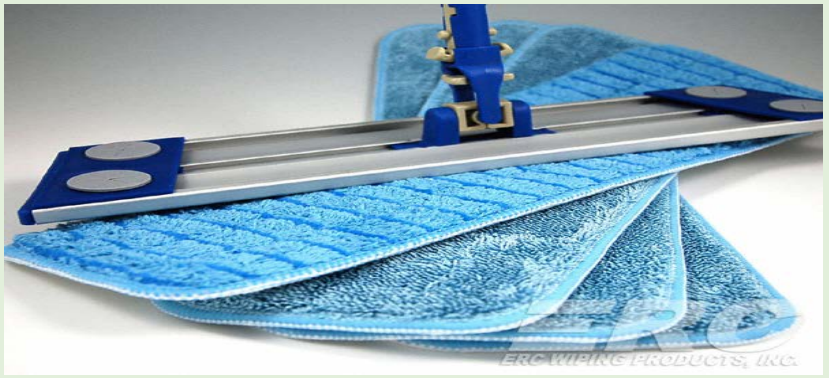
- **Changing materials, products or processes, or even re-designing products, may provide:**
  - Substantially less hazardous chemicals in workplace.
  - Better performance once through initial investment, learning period.

Material and Process Changes

- **Pros:**
  - Reduced hazards for workers
  - Potential for long-term cost-savings

- **Cons:**
  - Training for workers to use new equipment or materials
  - Commonly require some level of capital investment in equipment

Material and Process Changes: Examples



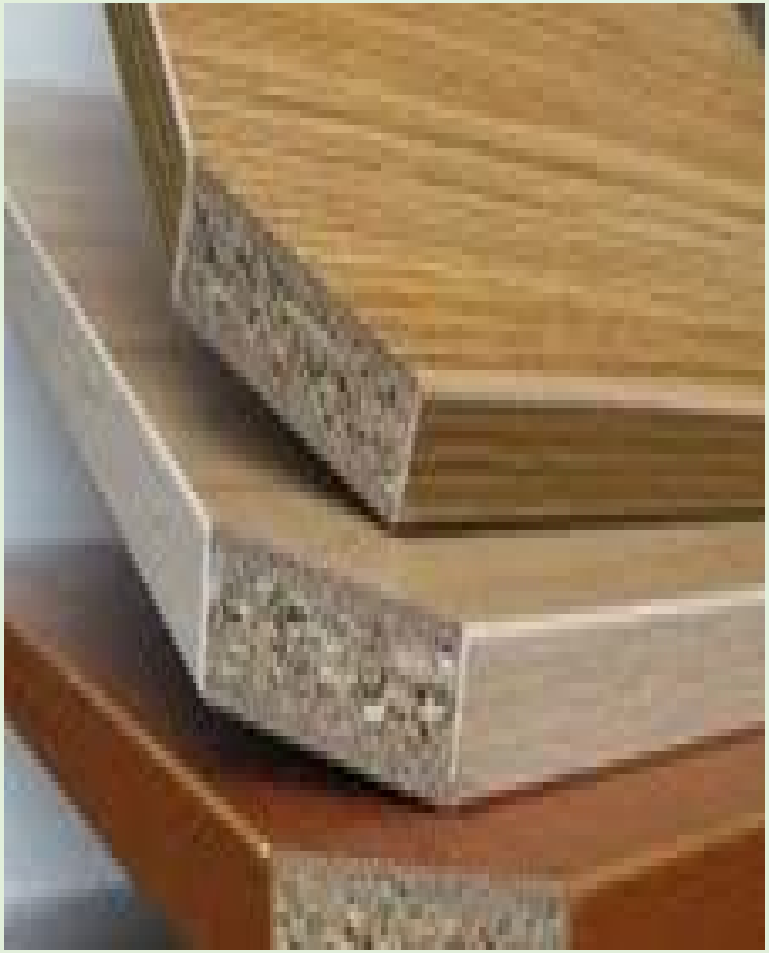
Re-designed/Reformulated Products

Opportunities for reducing use of hazardous chemicals in workplace.

- If the driver is customer demand for products without hazardous chemicals, elimination of hazardous chemicals in product may lead to reduction in related workplace use of those chemicals.

- When motivation for product re-design/reformulation is performance improvement, change may provide opportunity to modify production process to eliminate/reduce hazardous chemicals.

Re-Designed Products: Example
Plywood

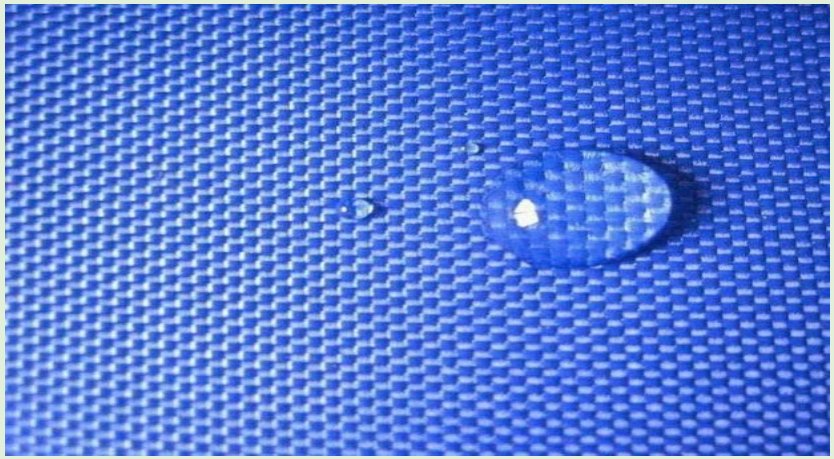


Formaldehyde-free

When we say PureBond technology is "formaldehyde-free", we're describing the way our hardwood plywood panels are comprised of no added formaldehyde components and assembled with no added formaldehyde adhesives.

Columbia's formaldehyde-free decorative panels are also compliant with the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standards, earning one point for LEED's EQ Credit 4.4 for Low-Emitting

Re-Designed Products: Example
Flame Resistance in Foam

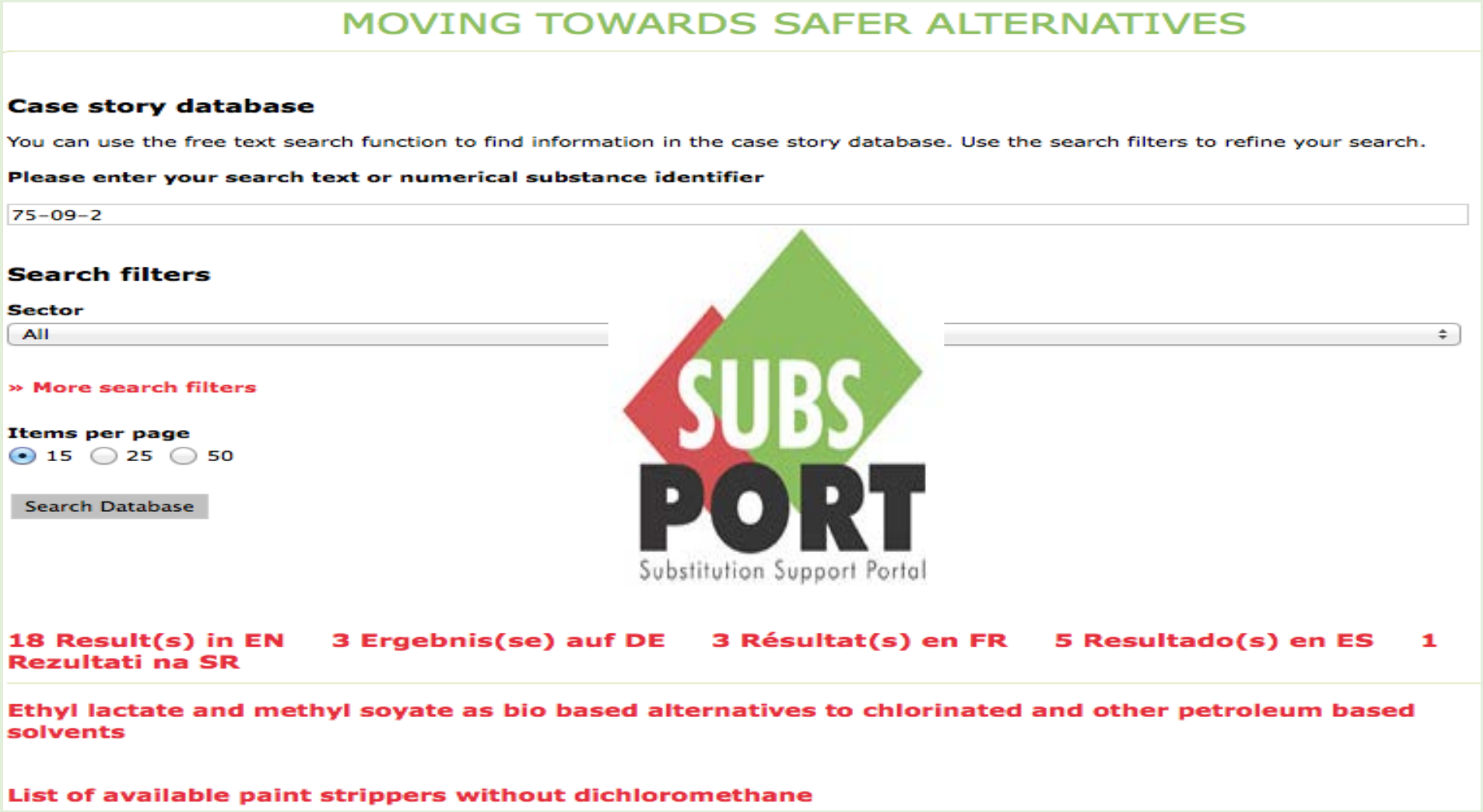


Information Sources for Alternatives

- "Safer"** Alternatives Technical Resources
- Trade Association Technical Support
- Industry Trade Journals
- Manufacturer/Vendor Information
- Experience of Other Companies
- State or Other Government Technical Assistance, Information or Research Resources

- ** Note that just because the alternatives are marked as safer, doesn't mean that they meet your standard of safer

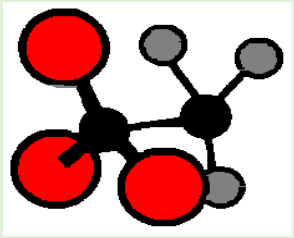
Alternatives Resources: SUBSPORT



Alternatives Resources:
ChemHAT → SUBSPORT

Link to SubsPORT from ChemHAT

Alternatives Resources:
Institute for Research and Technical Assistance



IRTA Resources

IRTA Newsletter	IRTA Staff	Reports

Assessment, Development and Demonstration of Alternatives for Five Emerging Solvents

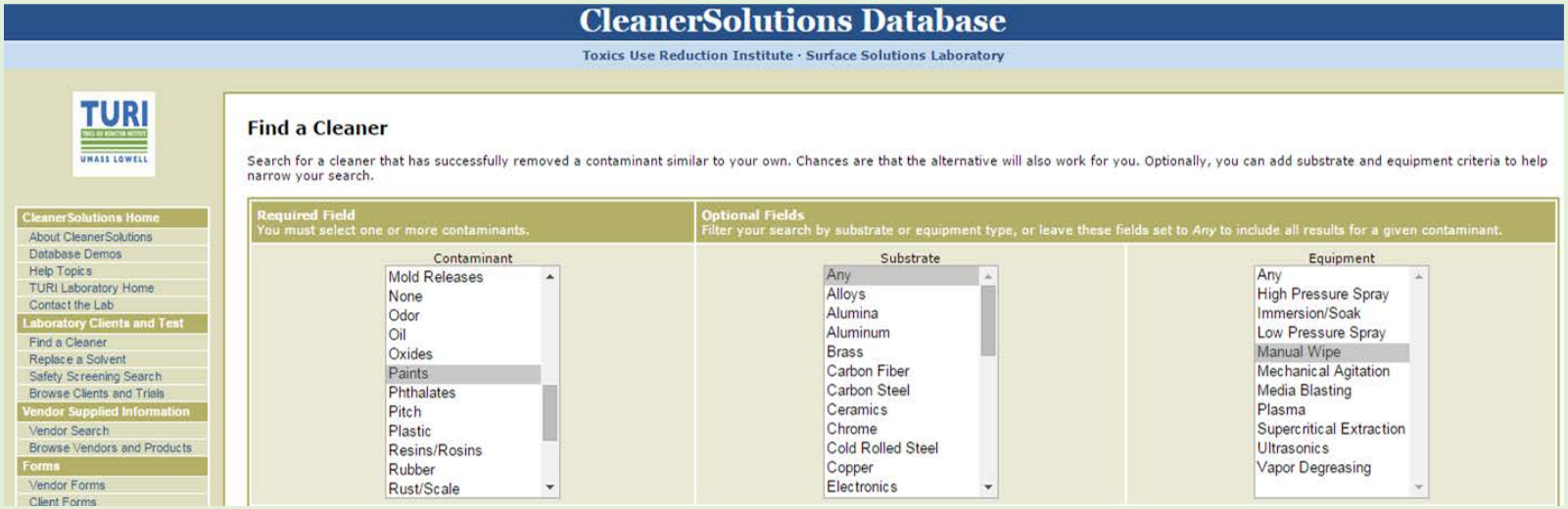
The project involved evaluating and demonstrating safer alternatives for five solvents that are known or likely to be toxic.

Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity Alternatives

Covers use of strippers by

- Large furniture stripping companies that use equipment to apply stripper.
- Small furniture stripping companies that apply stripper by hand.
- Contract stripping companies that strip on-site and apply stripper by hand.
- Consumer stripping where consumers apply the stripper by hand.

Alternatives Resources: CleanerSolutions



LINK

<< < Showing records 1 - 50 of 120 | Field Definitions > >>

Company Name Product Name	Safety Score	Classification	Contaminant	Substrate	Equipment	Client # / Project # / Trial #			Effective
Vertec BioSolvents Take Off Green [compare]	47	Biobased	Paints	Stainless Steel	Manual Wipe	190	1	3	Y
Vertec BioSolvents Vertec Paint Stripper [compare]	45	Biobased	Paints	Wood	Manual Wipe	190	1	2	Y
Vertec BioSolvents Vertec Paint Stripper [compare]	45	Biobased	Paints	Wood	Manual Wipe	190	1	2	Y
Vertec BioSolvents Vertec Paint Stripper [compare]	45	Biobased	Paints	Wood	Manual Wipe	190	1	2	Y
Vertec BioSolvents Take Off Green [compare]	47	Biobased	Paints	Wood	Manual Wipe	190	1	2	Y
Vertec BioSolvents Take Off Green [compare]	47	Biobased	Paints	Wood	Manual Wipe	190	1		Y
Vertec BioSolvents Take Off Green [compare]	47	Biobased	Paints	Wood	Manual Wipe	190	1		Y

Safer Alternatives Resources:

Safer Choice/Safer Chemical Ingredient List

Find Safer Products

- Browse the Full Product Listing
- Find Safer Choices to Use in Your Community

Safer Chemical List

- Safer Chemical Ingredients List (SCIL)
- How to List on SCIL

The Safer Choice Label

- Learn About Safer Choice

Related Programs

- Design for the Environment (DfE) Alternatives Assessments

SAFER CHOICE

Meets U.S. EPA Safer Product Standards

epa.gov/saferchoice

LINK to Products

Trade Association Resources

Some trade associations provide resources on safer alternatives to hazardous chemicals to their members.

- Technical resources on alternatives.
- Conferences or other session to exchange information on alternatives.

LINK to AFIRM Supplier Toolkit

Professional and Industry Trade Journals

- Most business sectors and specialties have their own trade journals that will cover alternatives to replace hazardous chemicals that are of concern to the companies they serve – especially when regulatory or market pressures.

- Technical/academic journals likely to have in-depth assessments of specific issues, but may be narrowly focused for exploratory phase.

Keep Asking to Achieve Your Goals: Manufacturer/Vendor Information

Methyl PROXITOL (PM) Propylene Oxide Glycol Ether

Shell Chemicals is a leading supplier of Methyl PROXITOL (PM) – part of our range of high purity Propylene Oxide Glycol Ethers (POGEs). POGEs are versatile, high performance oxygenated chemical solvents that are able to meet increasing technical and environmental demands of solvent-based formulations, particularly high solids coatings and waterborne technologies driven by legislation and consumer requirements.

Contact us to buy

Physical characteristics
Evaporation rate: Medium
Odour: Low
Solvency Power: High
Impurities: Low

Key technical properties	Value/unit
Purity	min 99.5% m/m
Water content	0.05% m/m
Acidity	0.002% m/m
Miscibility in water	Complete
Boiling point	120°C
Flash point	30°C

Main applications
Paints and coatings
Inks & dyes
Cleaners
Electronics
Pharmaceuticals
Cosmetics
Agrochemicals

Product overview | Datasheets | How to buy from us | Applications

Coatings

Propylene Oxide Glycol Ethers (POGEs) and their Acetates are effective in many surface coating technologies including:

- **high and low solid coatings**
- **waterborne emulsions**
- **water-reducible coatings**

As 'true solvents' POGEs are able to dissolve many resins in all proportions, and are particularly useful in promoting flow properties. They also encourage good gloss and film properties by maintaining the resin(s) in solution throughout the film formation [illegible]

Other Companies

Look for companies that can provide information about safer alternatives they've implemented.

- **Some companies that have adopted safer alternatives will share information about non-proprietary changes they have adopted.**

- **State technical assistance programs occasionally provide assistance to companies on pollution prevention or safer alternatives on the condition that they be open to sharing information about the changes with other companies that have similar applications.**

State P2 and Toxics Use Reduction Programs

TURI Publications

Category	Definition
Technical Research Reports	TURI's Technical Research Reports describe industry and university led efforts to advance TUR for specific industry applications, processes, progress or results for toxics use reduction research or the state of a toxics use reduction problem.
Methods and Policy Reports	Methods and Policy Reports provide information on methodologies and policy approaches for toxics use reduction. They include TURA program evaluations; analyses of the TURA data; chemical alternatives assessments; decision-making guidance; and studies of the public health implications of toxics use reduction.
Case Studies	Toxics Use Reduction requires a systems approach. A case study can be a helpful tool for understanding all of the variables that interact for a successful TUR solution - safer alternatives assessments and testing, work flow and process, as well as financial variables. These case studies from both the Office of Technical Assistance and Technology (OTA) and TURI cover a diverse group of industries and sizes of businesses.
Toxics Use Reduction for Industrial Processes	TURI is committed to helping Massachusetts industry find safer alternatives to toxic chemicals. These publications describe research and testing of safer alternatives for common industry processes: Cleaning, Coating and Painting, Plating, Printing

Northwest State P2 and Toxics Use Reduction Programs

DEPARTMENT OF ECOLOGY
State of Washington

DEQ
State of Oregon
Department of Environmental Quality

Washington State Department of Ecology.
https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Preventing-hazardous-waste-pollution/Technical-assistance-for-business

Oregon DEQ provides toxics reduction technical assistance to businesses:
http://www.deq.state.or.us/toxics/whatcanido.htm.

Washington State Labor and Industries Safety & Health Assessment Research for Prevention (SHARP) Program

SHARP
Safety & Health Assessment & Research for Prevention

Research Findings

Acid Burns in Car & Truck Wash

Occupational Hydrofluoric Acid Injury from Car and Truck Washing – Washington, 2001-2013

Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report (MMWR), 2015, 64(32): 874-877

Carolyn Reeb-Whitaker[1], Carly Eckert[2], Naomi Anderson[1], and David Bonauto[1]

Overview

Hydrofluoric acid (HF) causes corrosive chemical burns and is a serious systemic poison by all routes of exposure.

Car and truck wash cleaning products, rust removers, and aluminum brighteners often contain HF because it is inexpensive and highly effective in breaking down roadway matter. Workers are at risk of exposure to HF from skin

Key Findings

One death and 48 chemical burns from exposure to hydrofluoric acid-based products used during car and truck washing, including auto

Internet Searches

- **Especially valuable for new or innovative alternatives.**
- **Tailor searches.**
  - Specify the hazardous chemical for which you're seeking alternative
  - Define the application with as much specificity as possible
- **SUBSPORT Custom Search Engine.**
  - Searches multiple databases and websites related to substitution

Importance of Brainstorming Alternatives

Small Group Exercise

- **Break into groups, and practice using one of the different resources listed in your manual for seeking alternatives. Within your group, answer these questions:**
  - **Are there drop-in replacements for methylene chloride for these applications?**
  - **Partial replacements for particular uses?**
  - **Entirely different methods to do stripping?**
  - **Are there places you could go to get more information?**
  - **What additional resources would you like to have available?**

Summary and Review

- **In this lesson, we learned how to identify alternatives to hazardous chemicals/processes, which includes:**
  - Considering a broad range of alternatives (i.e., chemical, material, product, and process options)
  - Utilizing existing resources (i.e., databases, trade publications, manufacturer/vendor information, government publications, and tailored internet searches) to find potential alternatives