2024 National Pollution Prevention Training and Conference

P2 Tools for Success

December 11, 2024
11:00AM – 12:00PM ET

Moderated by Alizabeth Olhasso, EPA

Speakers:

- **Charlotte (Charlie) Snyder, EPA, Data Analysis and Right to Know Branch**
- **Jason Marshall, Toxics Use Reduction Institute**
- **Dr. Cris Brazil, Kansas State University**

POLLUTION PREVENTION
AND THE
TOXICS RELEASE INVENTORY

USING TRI TOOLS TO FIND P2 DATA

Charlie Snyder, US EPA
December 11, 2024

PRESENTATION OVERVIEW

- Quick intro to TRI
- What facilities report
- Pollution prevention data
- Tools demonstration:
  - TRI Toxics Tracker
  - Solvent Substitutions
- Questions and discussion

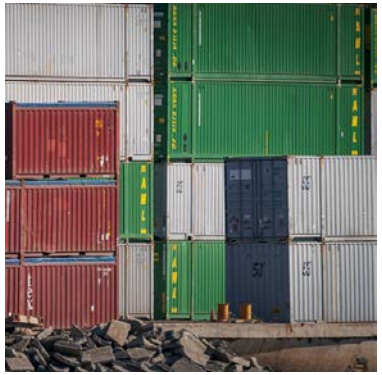
WHAT IS THE TRI?

TRI-listed chemicals may pose a threat to human health and the environment

TRI tracks the management of these chemicals in waste

ENVIRONMENTAL RELEASES

WASTE MANAGEMENT



WASTE TRANSFERS

POLLUTION PREVENTION

WHAT IS THE TRI?

800+
individual chemicals and chemical categories

21,000+
industrial and federal facilities

SINCE 1987
annual reporting directly from facilities

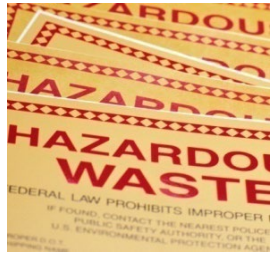
WHICH FACILITIES REPORT TO TRI?

1. Facility must be in a **TRI-covered industry sector or category**, including:

MANUFACTURING

COAL/OIL ELECTRICITY GENERATION

CERTAIN MINING FACILITIES



HAZARDOUS WASTE MANAGEMENT

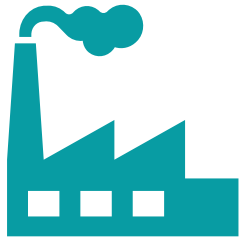
FEDERAL FACILITIES

2. Facility must have the equivalent of at least **10 full-time employees**
3. Facility must manufacture, process, or otherwise use more than a **certain threshold amount of a TRI-listed chemical within a calendar year**

WHAT IS A RELEASE?

Releases are the different ways that chemicals from industrial facilities enter the

AIR



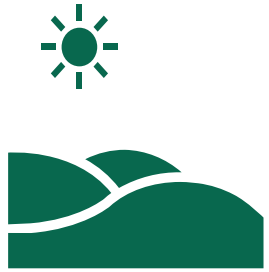
Stack emissions

Fugitive emissions

WATER

Surface water discharges

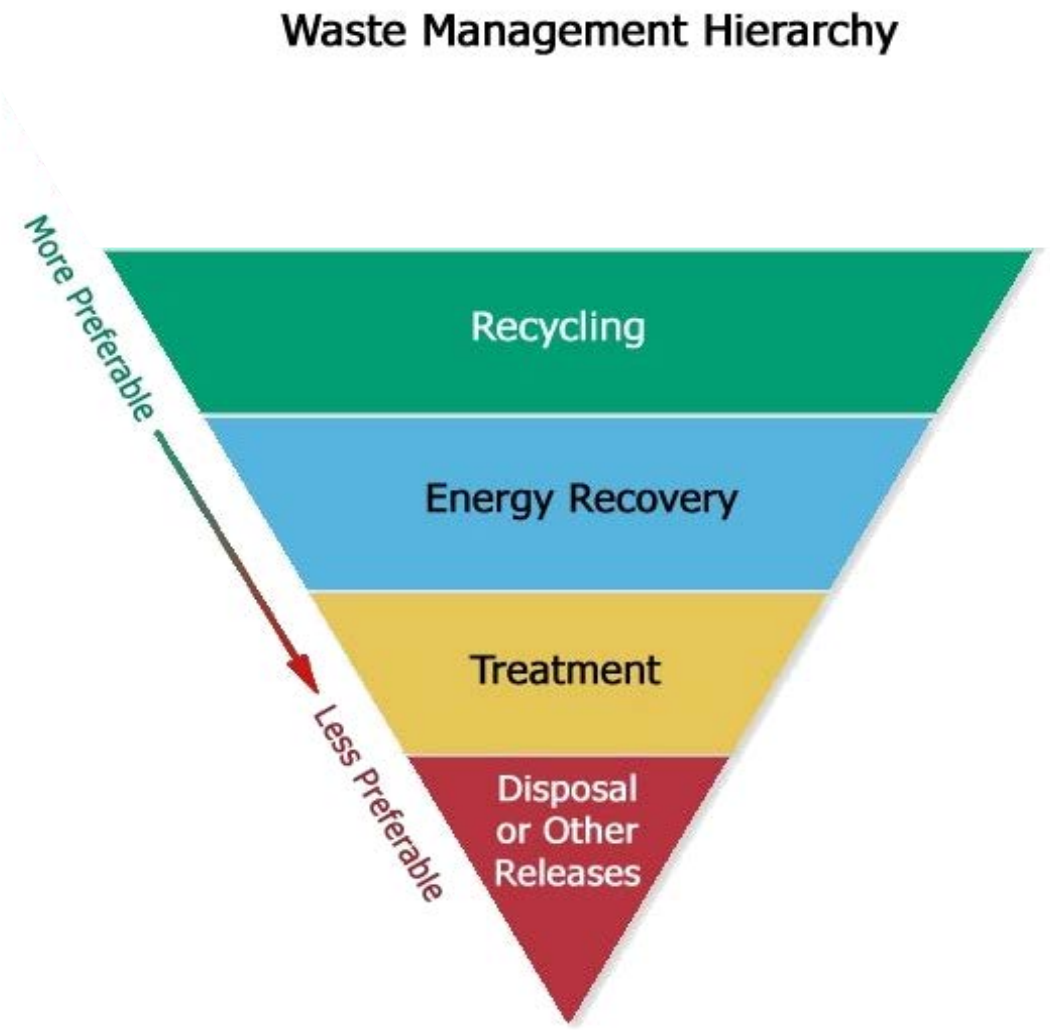
LAND



Disposal to land

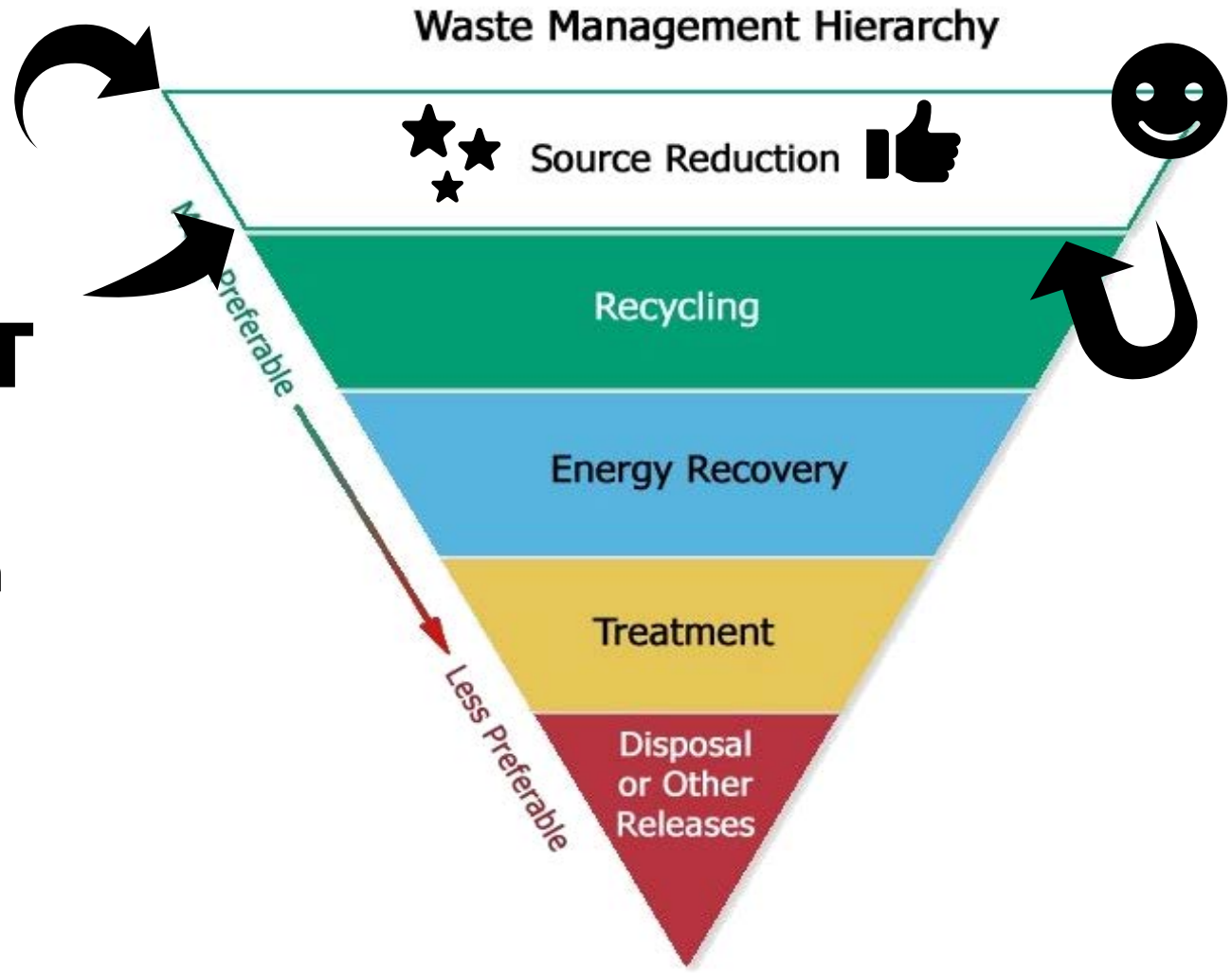
WHAT IS PRODUCTION RELATED WASTE?

Production related waste is the chemical waste that comes from normal operations at a facility.



FACILITIESMUST REPORT P2

Facilities are required by the Pollution Prevention Act to report newly implemented P2 activities.



WHAT DO FACILITIES REPORT TO TRI?

- **On-site releases**
  - Air emissions
  - Surface water discharges
  - Disposal to land
- **Other on-site waste management**
  - Recycling
  - Energy recovery
  - Treatment
- **Transfers to off-site locations**
- **Pollution prevention activities**
  - Pollution prevention activities
  - Barriers to pollution prevention
  - Optional comments

WHAT P2 INFORMATION DO FACILITIES REPORT?

- **P2 activities**
- **Barriers to P2** [*optional*]
- **Free-text comments** [*optional*]

HOW DO FACILITIES REPORT P2 INFORMATION?

P2 ACTIVITIES

Select from 24 codes organized into five categories to describe the source reduction activity.

HOW DO FACILITIES REPORT P2 INFORMATION?

BARRIERS TO P2

B1	Insufficient capital
B2	Require technical information on pollution prevention
B3	Concern that product quality may decline
B4	Source reduction unsuccessful
B5	Specific regulatory/permit burdens
B6	Maxed out
B7	No known substitutes or alternatives
B8	Reduction does not appear to be technically feasible
B99	Other barriers

HOW DO FACILITIES REPORT P2 INFORMATION?

FREE-TEXT COMMENTS

As facilities add source reduction activities and barriers, they have the option to report additional information in open-ended text fields.

- Source Reduction
- Waste Management
- Other Information

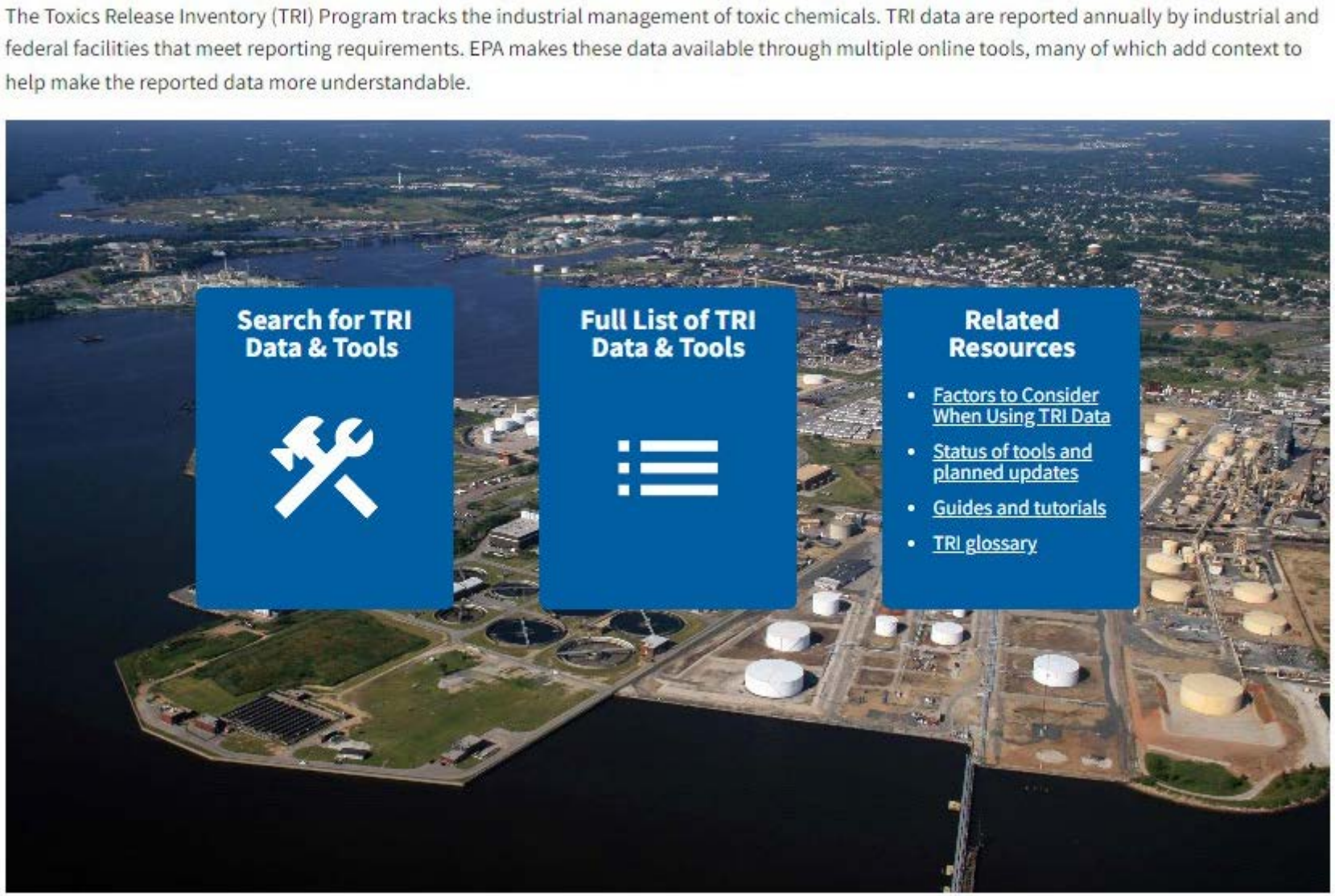
Facilities can include information not captured by P2 codes alone, e.g:

- Processes affected by source reduction
- Other benefits such as lower water use
- Use of specific materials

ACCESSING TRI DATA

NEW!
TRI TOOLBOX

- Find tools based on topic or area of interest
- See full suite of TRI tools and data formats
- Find resources on how to use TRI data



https://www.epa.gov/toxics-release-inventory-tri-program/tri-toolbox

DEMO

TRI TOXICS TRACKER

EPA TRI Toxics Tracker

Show Print View | How to Search | Contact U

ReportingYear 3 of 10

CLEAR | BACK | FORWARD

- Home Page
- Map
- Summary
- Tribal Lands
- Releases
- Waste Managed
- Waste Transfers
- Pollution Prevention
- Chemicals
- Potential Harm
- Customizable Tables

You are currently viewing data for facilities based on your search parameters shown in the green bar above

Filters and Options

# Facilities	# Reporting Years	# Chemicals Reported	# Reporting Forms
23,868	3 (2021 - 2023)	568	235,652

Pollution Prevention

MORE INFO

Facilities with Source Reduction	Source Reduction Activities	Barriers to P2	Free-Text Comments
3,008	10,879	11,624	24,758

About Pollution Prevention Data

Pollution prevention (P2), also known as "source reduction", is any practice that reduces, eliminates, or prevents the creation of pollution prior to recycling, treatment, disposal, or release into the environment. Facilities are required to report any new source reduction activities each year by selecting codes on the TRI reporting form that best correspond to the implemented activity. If facilities are unable to implement new source reduction activities, they may report barriers to source reduction using barrier codes. Facilities also have the option to provide additional details in comments.

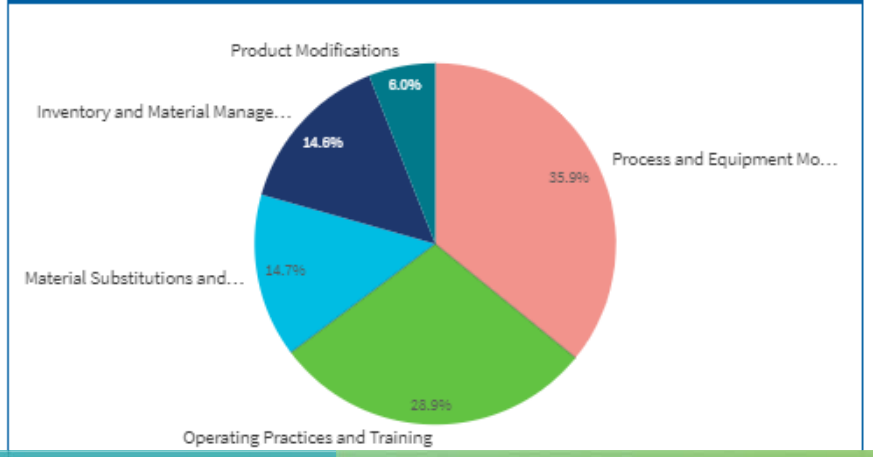
Quick Filters:

- Green Chemistry and Engineering Activities
- Source Reduction Reported
- Barriers to P2 Reported

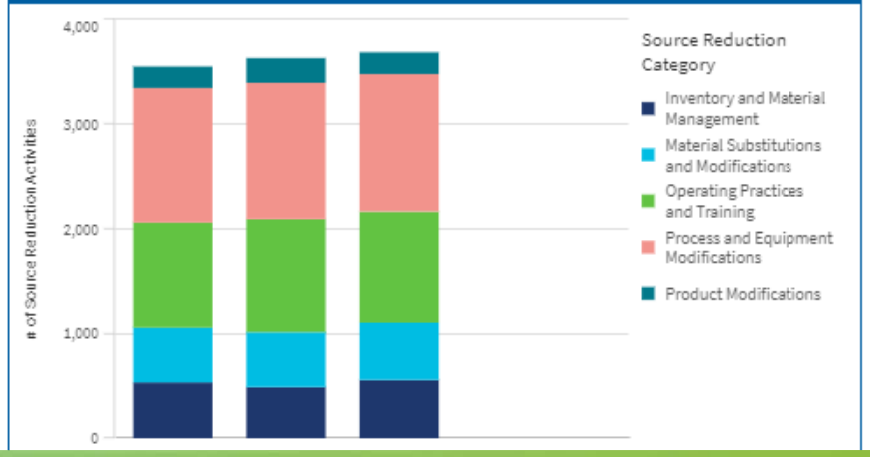
Source Reduction Category | Source Reduction Activity | Barrier to Source Reducti... | Comment Type

Source Reduction | Barriers | By Chemical | By Industry Sector | By Location | Activities and Comments | View All Pollution Prevention Charts

Source Reduction Activity by Category



Source Reduction Activity by Category and Year



COMMENT ANALYSIS FOR SOLVENT SUBSTITUTIONS

TRI facilities submitted **46,035 source reduction comments** from 2005 to 2020

Created methodology to automate analysis of optional comments to find information about solvent substitutions: Identified 1,926 comments related to solvent substitutions during this 15-year timespan.

SELECT COMMENTS FOR TRI-LISTED SOLVENTS

Pull free-text comments from forms for TRI-listed chemicals commonly used as solvents

KEYWORD FILTERING

Narrowed group of comments by selecting those containing keywords

Substitution phrases

- Substitute, alternative

Processes

- Powder coating, mechanical cleaning

Known alternatives

- Aqueous, water-based

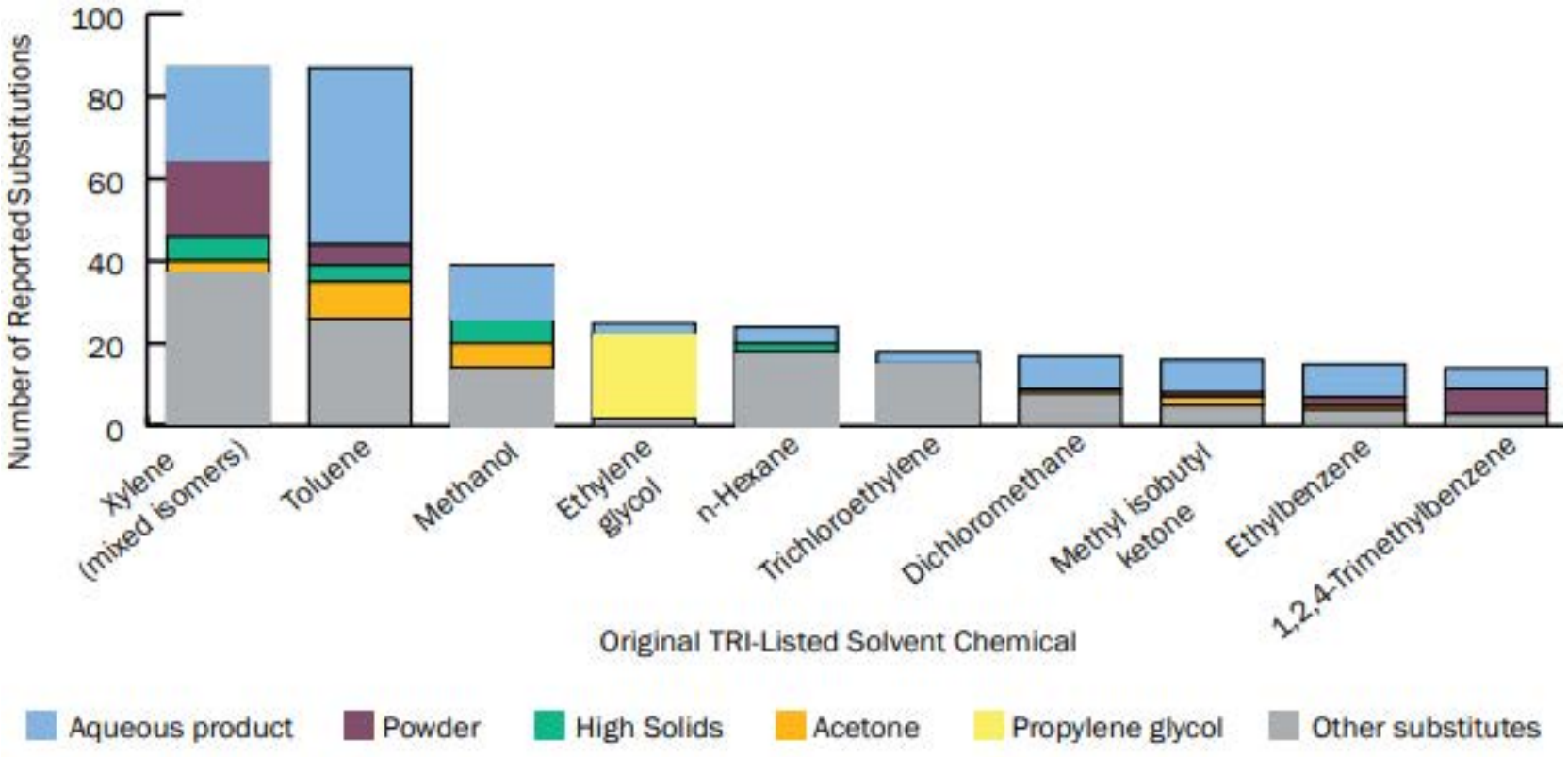
MANUAL REVIEW

Review comments to identify original solvent and replacement chemical or process

DATABASE OF SPECIFIC SOLVENT SUBSTITUTIONS

WORKFLOW FOR COMMENT ANALYSIS

391 comments describe specific substitutions, reported by facilities in 16 industry sectors



116 distinct combinations

Most replaced

- Xylene (mixed isomers)
- Toluene
- Methanol

Most common substitutes

- Aqueous products
- Powder coatings
- High solids formulations

ACCESSING SOLVENT SUBSTITUTION INFORMATION REPORTED TO TRI

Webpage | Handout | Interactive table | Downloadable spreadsheet

Solvent Substitution Comments Reported to TRI, 2005–2020

No selections applied | Selections

Industry Sectors with Substitutions	Specific Substitution Comments	Distinct Substitution Combinations
16	391	116

Sub to TRI
TSCA Flag
SCIL Flag

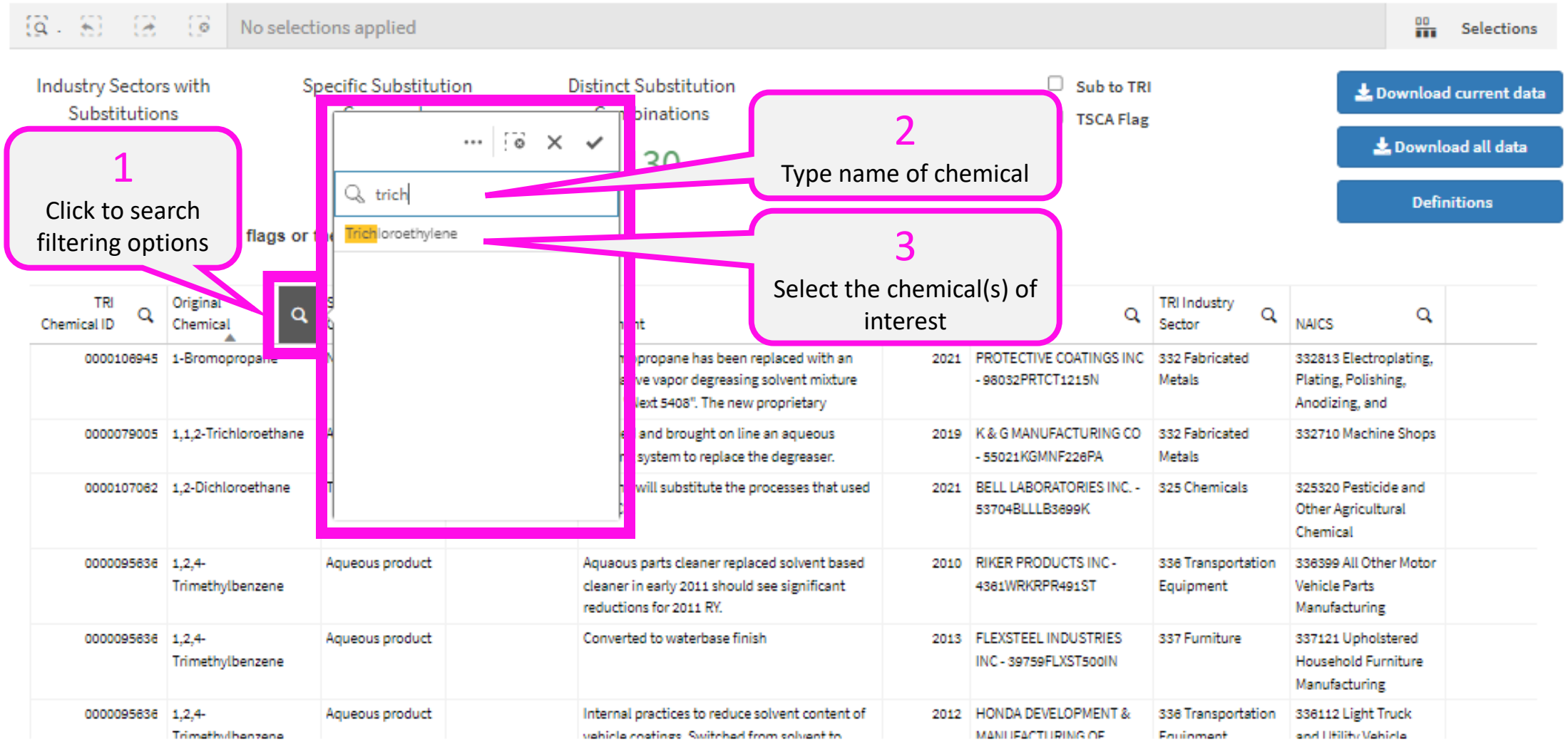
Download current data
Download all data
Definitions

To narrow results, use the flags or the table headers to filter.

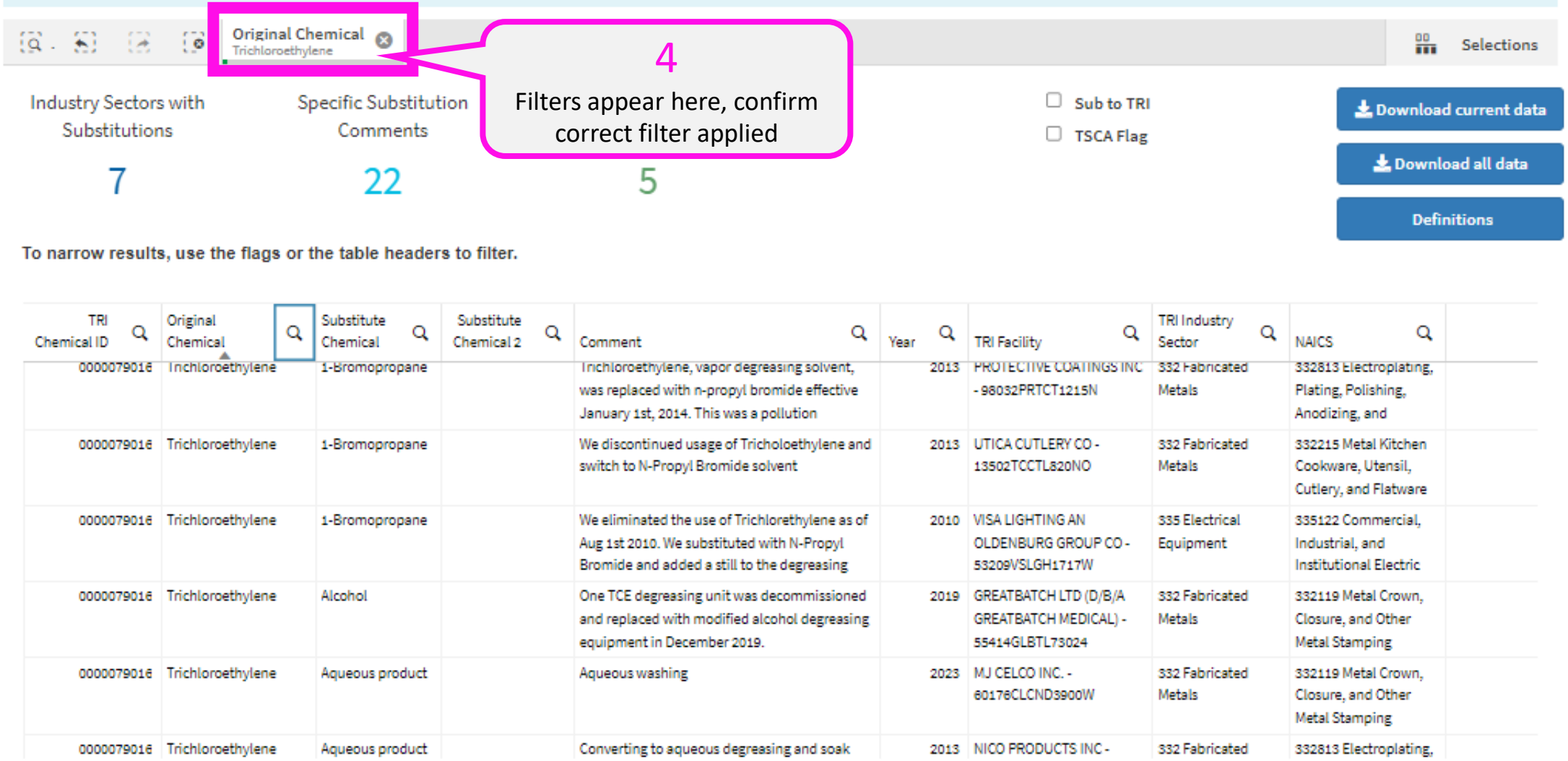
TRI Chemical ID	Original Chemical	Substitute Chemical	Substitute Chemical 2	Comment	Year	TRI Facility	TRI Industry Sector	NAICS
0000079005	1,1,2-Trichloroethane	Aqueous product		Installed and brought on line an aqueous washing system to replace the degreaser.	2019	K & G MANUFACTURING CO - 55021KGMNF226PA	332 Fabricated Metals	332710 Machine Shops
0000095636	1,2,4-Trimethylbenzene	Aqueous product		Aquaous parts cleaner replaced solvent based cleaner in early 2011 should see significant reductions for 2011 RY.	2010	RIKER PRODUCTS INC - 4361WRKRPR491ST	336 Transportation Equipment	336399 All Other Motor Vehicle Parts Manufacturing
0000095636	1,2,4-Trimethylbenzene	Aqueous product		Converted to waterbase finish	2013	FLEXSTEEL INDUSTRIES INC - 39759FLXST500IN	337 Furniture	337121 Upholstered Household Furniture Manufacturing
0000095636	1,2,4-Trimethylbenzene	Aqueous product		Internal practices to reduce solvent content of vehicle coatings. Switched from solvent to water based coatings for a significant portion of vehicle manufacturing process.	2012	HONDA DEVELOPMENT & MANUFACTURING OF AMERICA LLC - ALABAMA - 35096HNDMF1800H	336 Transportation Equipment	336112 Light Truck and Utility Vehicle Manufacturing
0000095636	1,2,4-Trimethylbenzene	Aqueous product		Reduction in total amount of chemicals used and going to a water based product for final	2011	SHAFER COMMERCIAL SEATING -	337 Furniture	337211 Wood Office Furniture

DEMO

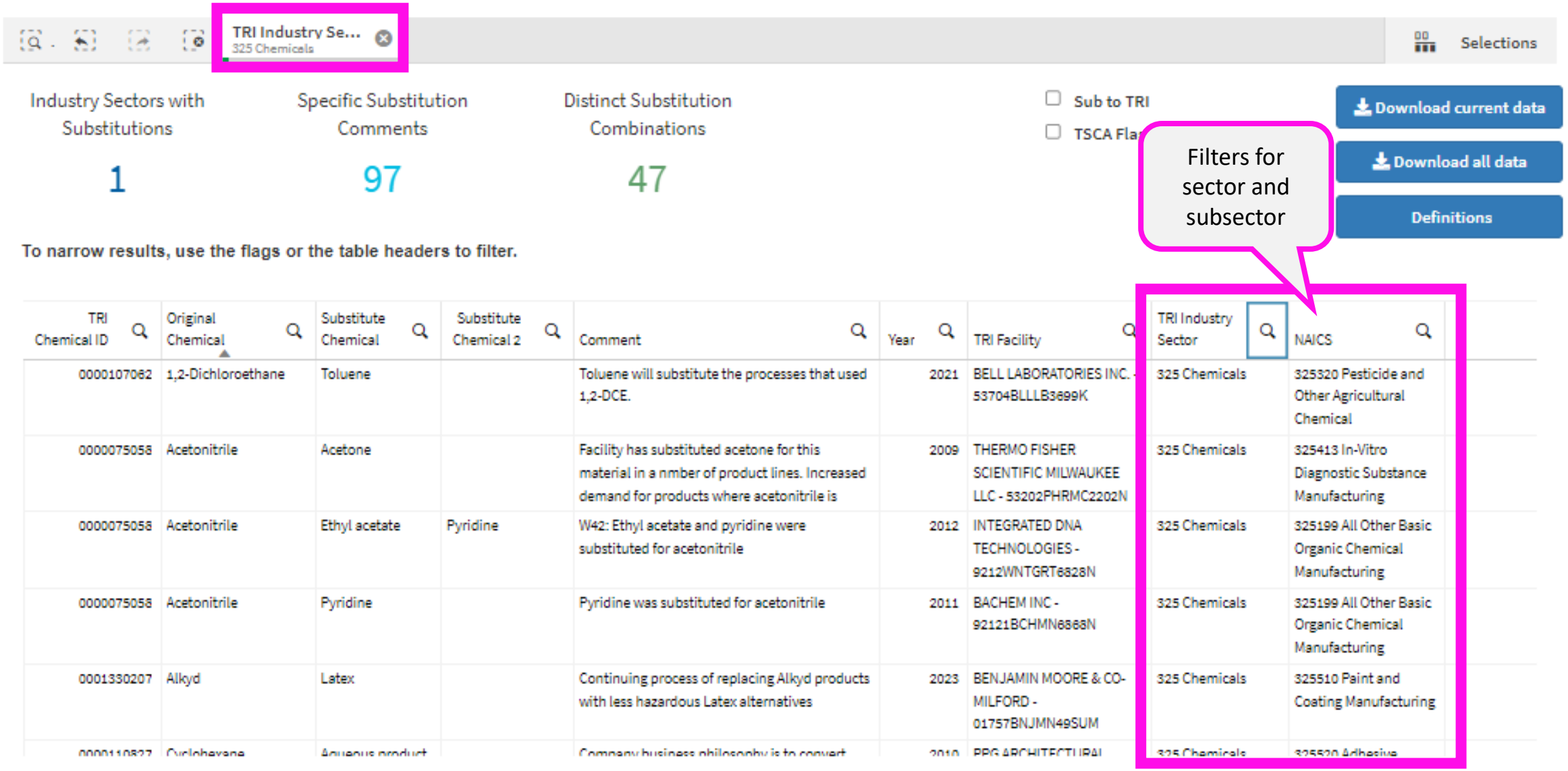
TRI SOLVENT SUBSTITUTIONS


No selections applied
Selections
Industry Sectors with Substitutions
Specific Substitution
Distinct Substitution
Sub to TRI
TSCA Flag
Download current data
Download all data
Definitions
1
Click to search filtering options
2
Type name of chemical
3
Select the chemical(s) of interest
trich
Trichloroethylene
TRI Chemical ID
Original Chemical
TRI Industry Sector
NAICS
0000106945 1-Bromopropane
propane has been replaced with an ve vapor degreasing solvent mixture lext 5408". The new proprietary
2021 PROTECTIVE COATINGS INC - 98032PRTCT1215N
332 Fabricated Metals
332813 Electroplating, Plating, Polishing, Anodizing, and
0000079005 1,1,2-Trichloroethane
and brought on line an aqueous system to replace the degreaser.
2019 K & G MANUFACTURING CO - 55021KGMNF226PA
332 Fabricated Metals
332710 Machine Shops
0000107062 1,2-Dichloroethane
will substitute the processes that used
2021 BELL LABORATORIES INC. - 53704BLLLB3699K
325 Chemicals
325320 Pesticide and Other Agricultural Chemical
0000095636 1,2,4-Trimethylbenzene
Aqueous product
Aquaous parts cleaner replaced solvent based cleaner in early 2011 should see significant reductions for 2011 RY.
2010 RIKER PRODUCTS INC - 4361WRKRPR491ST
336 Transportation Equipment
336399 All Other Motor Vehicle Parts Manufacturing
0000095636 1,2,4-Trimethylbenzene
Aqueous product
Converted to waterbase finish
2013 FLEXSTEEL INDUSTRIES INC - 39759FLXST500IN
337 Furniture
337121 Upholstered Household Furniture Manufacturing
0000095636 1,2,4-Trimethylbenzene
Aqueous product
Internal practices to reduce solvent content of
2012 HONDA DEVELOPMENT & MANUFACTURING OF
336 Transportation Equipment
336112 Light Truck and Utility Vehicle

Solvent Substitution Comments Reported to TRI, 2005-2023



TRI Chemical ID	Original Chemical	Substitute Chemical	Substitute Chemical 2	Comment	Year	TRI Facility	TRI Industry Sector	NAICS
0000079016	Trichloroethylene	1-Bromopropane		Trichloroethylene, vapor degreasing solvent, was replaced with n-propyl bromide effective January 1st, 2014. This was a pollution	2013	PROTECTIVE COATINGS INC - 98032PRTCT1215N	332 Fabricated Metals	332813 Electroplating, Plating, Polishing, Anodizing, and
0000079016	Trichloroethylene	1-Bromopropane		We discontinued usage of Tricholoethylene and switch to N-Propyl Bromide solvent	2013	UTICA CUTLERY CO - 13502TCCTL820NO	332 Fabricated Metals	332215 Metal Kitchen Cookware, Utensil, Cutlery, and Flatware
0000079016	Trichloroethylene	1-Bromopropane		We eliminated the use of Trichlorethylene as of Aug 1st 2010. We substituted with N-Propyl Bromide and added a still to the degreasing	2010	VISA LIGHTING AN OLDENBURG GROUP CO - 53209VSLGH1717W	335 Electrical Equipment	335122 Commercial, Industrial, and Institutional Electric
0000079016	Trichloroethylene	Alcohol		One TCE degreasing unit was decommissioned and replaced with modified alcohol degreasing equipment in December 2019.	2019	GREATBATCH LTD (D/B/A GREATBATCH MEDICAL) - 55414GLBTL73024	332 Fabricated Metals	332119 Metal Crown, Closure, and Other Metal Stamping
0000079016	Trichloroethylene	Aqueous product		Aqueous washing	2023	MJ CELCO INC. - 60176CLCND3900W	332 Fabricated Metals	332119 Metal Crown, Closure, and Other Metal Stamping
0000079016	Trichloroethylene	Aqueous product		Converting to aqueous degreasing and soak	2013	NICO PRODUCTS INC -	332 Fabricated	332813 Electroplating,


TRI Industry Se...
325 Chemicals
Selections
Industry Sectors with Substitutions
1
Specific Substitution Comments
97
Distinct Substitution Combinations
47
Sub to TRI
TSCA Fla
Download current data
Download all data
Definitions
Filters for sector and subsector
To narrow results, use the flags or the table headers to filter.
TRI Chemical ID
Original Chemical
Substitute Chemical
Substitute Chemical 2
Comment
Year
TRI Facility
TRI Industry Sector
NAICS
0000107062 | 1,2-Dichloroethane | Toluene | | Toluene will substitute the processes that used 1,2-DCE. | 2021 | BELL LABORATORIES INC. - 53704BLLLB3699K | 325 Chemicals | 325320 Pesticide and Other Agricultural Chemical
0000075058 | Acetonitrile | Acetone | | Facility has substituted acetone for this material in a nmber of product lines. Increased demand for products where acetonitrile is | 2009 | THERMO FISHER SCIENTIFIC MILWAUKEE LLC - 53202PHRMC2202N | 325 Chemicals | 325413 In-Vitro Diagnostic Substance Manufacturing
0000075058 | Acetonitrile | Ethyl acetate | Pyridine | W42: Ethyl acetate and pyridine were substituted for acetonitrile | 2012 | INTEGRATED DNA TECHNOLOGIES - 9212WNTGRT6828N | 325 Chemicals | 325199 All Other Basic Organic Chemical Manufacturing
0000075058 | Acetonitrile | Pyridine | | Pyridine was substituted for acetonitrile | 2011 | BACHEM INC - 92121BCHMN6868N | 325 Chemicals | 325199 All Other Basic Organic Chemical Manufacturing
0001330207 | Alkyd | Latex | | Continuing process of replacing Alkyd products with less hazardous Latex alternatives | 2023 | BENJAMIN MOORE & CO-MILFORD - 01757BNJMN49SUM | 325 Chemicals | 325510 Paint and Coating Manufacturing

Solvent Substitution Comments Reported to TRI, 2005–2023

No selections applied | Selections

Industry Sectors with Substitutions: 16

Specific Substitution Comments: 450

Distinct Substitution

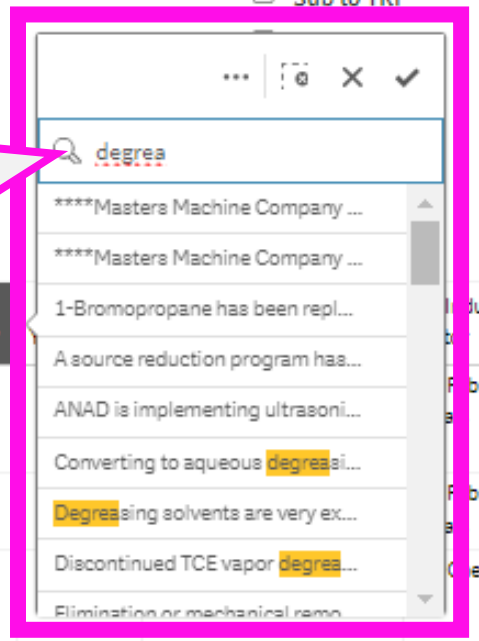
Sub to TRI

Download current data

Download all data

Definitions

Search comments for processes, equipment, etc. by typing keyword. Hit enter to see all comments with selected keyword



To narrow results, use the flags or the table headers

TRI Chemical ID	Original Chemical	Substitute Chemical	Substitute Chemical 2	Comment			Industry	NAICS
0000106945	1-Bromopropane	Next 5408		1-Bromopropane has been replaced with an alternative vapor degreasing solvent mixture called "Next 5408". The new proprietary			bricated	332813 Electroplating, Plating, Polishing, Anodizing, and
0000079005	1,1,2-Trichloroethane	Aqueous product		Installed and brought on line an aqueous washing system to replace the degreaser.			bricated	332710 Machine Shops
0000107062	1,2-Dichloroethane	Toluene		Toluene will substitute the processes that used 1,2-DCE.			emicals	325320 Pesticide and Other Agricultural Chemical
0000095636	1,2,4-Trimethylbenzene	Aqueous product		Aquaous parts cleaner replaced solvent based cleaner in early 2011 should see significant reductions for 2011 RY.	2010	RIKER PRODUCTS INC - 4361WRKRPR491ST	336 Transportation Equipment	336399 All Other Motor Vehicle Parts Manufacturing
0000095636	1,2,4-Trimethylbenzene	Aqueous product		Converted to waterbase finish	2013	FLEXSTEEL INDUSTRIES INC - 39759FLXST500IN	337 Furniture	337121 Upholstered Household Furniture Manufacturing
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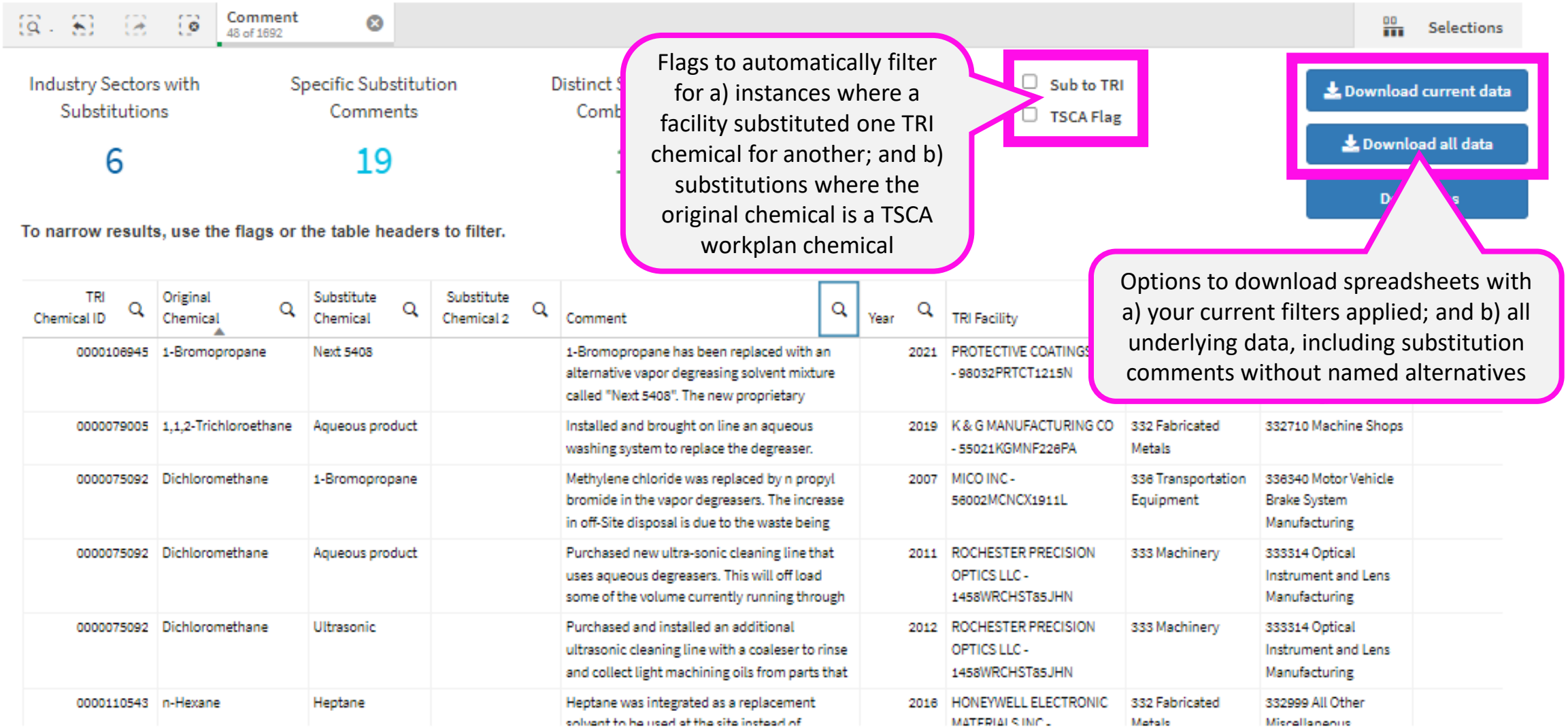

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0000079005	1,1,2-Trichloroethane	Aqueous product		Installed and brought on line an aqueous washing system to replace the degreaser.	2019	K & G MANUFACTURING CO - 55021KGMNF226PA	332 Fabricated Metals	332710 Machine Shops
0000075092	Dichloromethane	1-Bromopropane		Methylene chloride was replaced by n propyl bromide in the vapor degreasers. The increase in off-Site disposal is due to the waste being	2007	MICO INC - 56002MCNCX1911L	336 Transportation Equipment	336340 Motor Vehicle Brake System Manufacturing
0000075092	Dichloromethane	Aqueous product		Purchased new ultra-sonic cleaning line that uses aqueous degreasers. This will off load some of the volume currently running through	2011	ROCHESTER PRECISION OPTICS LLC - 1456WRCHST85JHN	333 Machinery	333314 Optical Instrument and Lens Manufacturing
0000075092	Dichloromethane	Ultrasonic		Purchased and installed an additional ultrasonic cleaning line with a coaleser to rinse and collect light machining oils from parts that	2012	ROCHESTER PRECISION OPTICS LLC - 1456WRCHST85JHN	333 Machinery	333314 Optical Instrument and Lens Manufacturing
0000110543	n-Hexane	Heptane		Heptane was integrated as a replacement solvent to be used at the site instead of	2016	HONEYWELL ELECTRONIC MATERIALS INC -	332 Fabricated Metals	332999 All Other Miscellaneous

QUESTIONS?

Visit our booth!

TRI staff are on site to help with TRI tools and specific queries

TRI Program Home

https://www.epa.gov/tri

Additional questions and follow-up

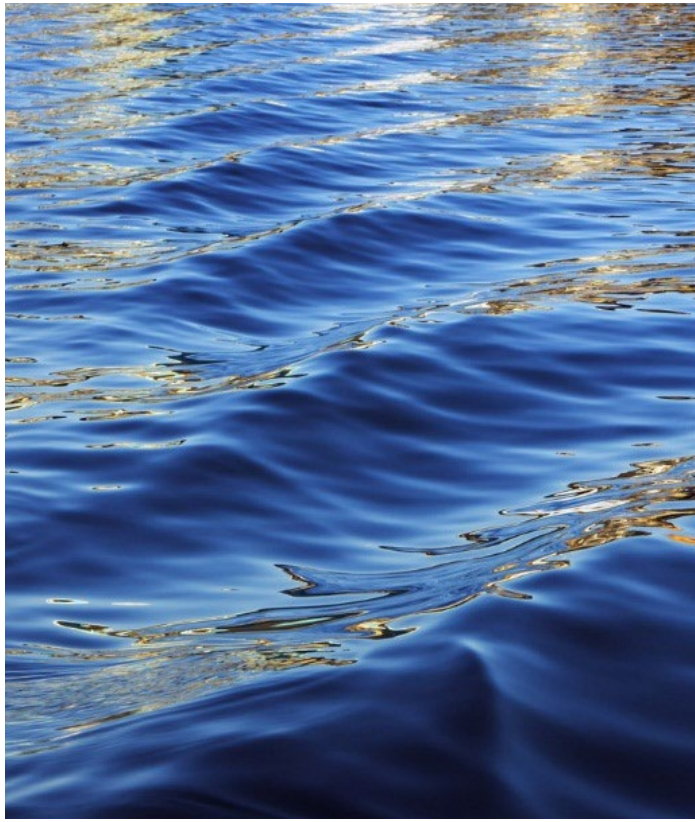
"Contact Us" link

TRI.Help@epa.gov

snyder.charlotte@epa.gov

P2 Technical Assistance Tools

Jason Marshall
Laboratory Director
Toxics Use Reduction Institute
University of Massachusetts Lowell



TURI Lab and Research Team

- Jason Marshall – lab director
- Alicia McCarthy – sanitizing performance testing and training
- Amelia Wagner – cleaning performance testing, on-site visit assistance
- Alex Symko – cleaning performance testing, on-site visit assistance
- Gabriel Salierno – green chemistry
- Greg Morose – research program manager






TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

Toxics Use Reduction Institute (TURI)

Specializes in assisting facilities in reducing their use of toxic chemicals through education and hands on assistance

- Safety
- Feasibility
- Cost savings of safer alternative

Supports Businesses

- Successfully implement projects that protect their workers, communities and the environment
- Reducing use of toxic chemicals
- Offers grants to help businesses
  - Research
  - Evaluate
  - Adopt safer alternatives

TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

Training, Testing, Technical Assistance, Transfer Success

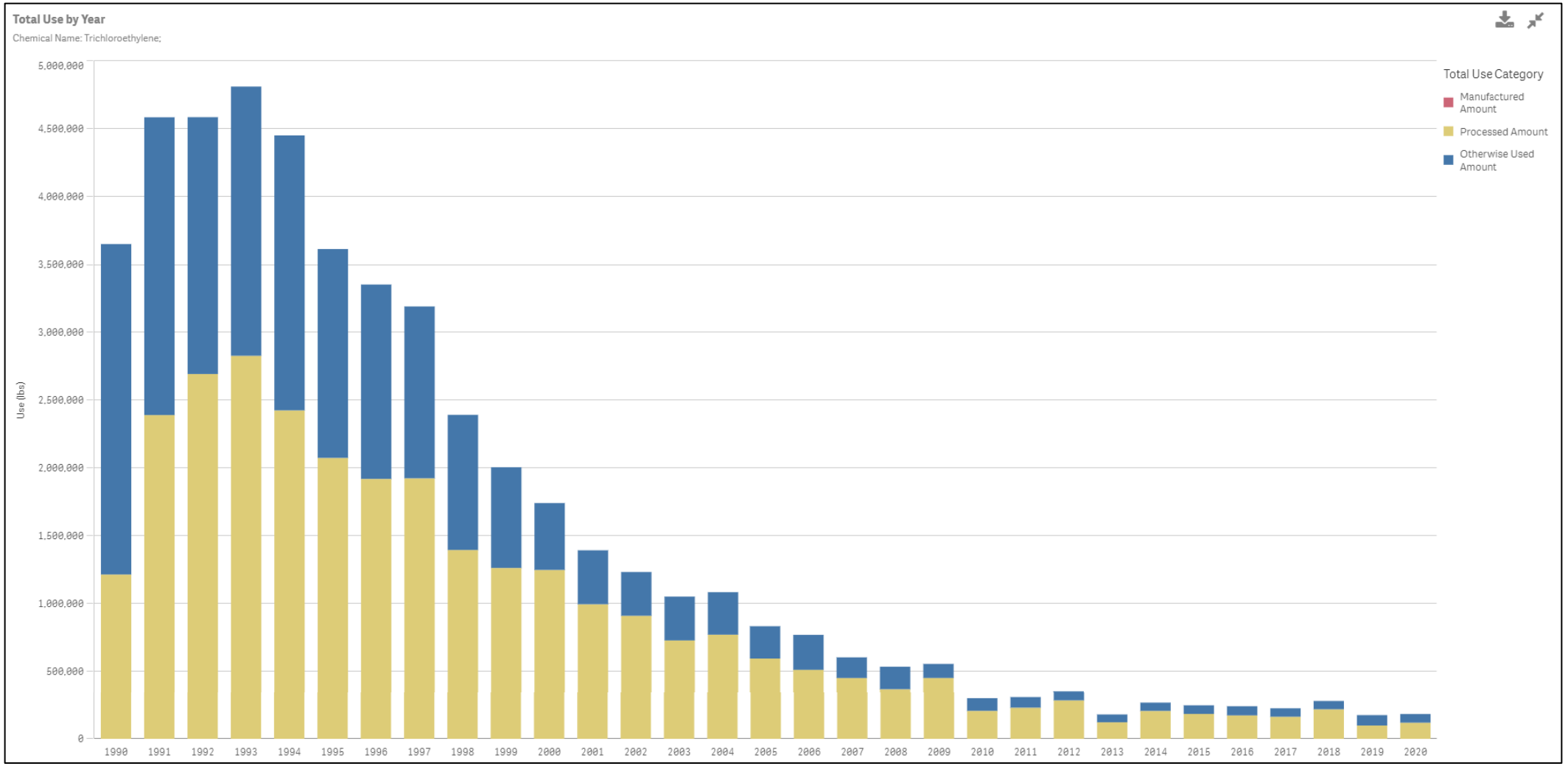
Provide TUR Background	Showcase lab resources	Providing On-site Technical Assistance	Outreach Materials
• History of the program • Success of the program	• Testing • CleanerSolutions • P2OASys • HSPiP	• Beginning of project • During project • During implementation on-site	• Case studies reports • Videos • Guidance documents

EPA proposed ban on TCE

Work closely with TCE end users to identify operating conditions that will best fit the desired cleaning needs

Focus on companies within Environmental Justice locations

TCE Usage in Massachusetts



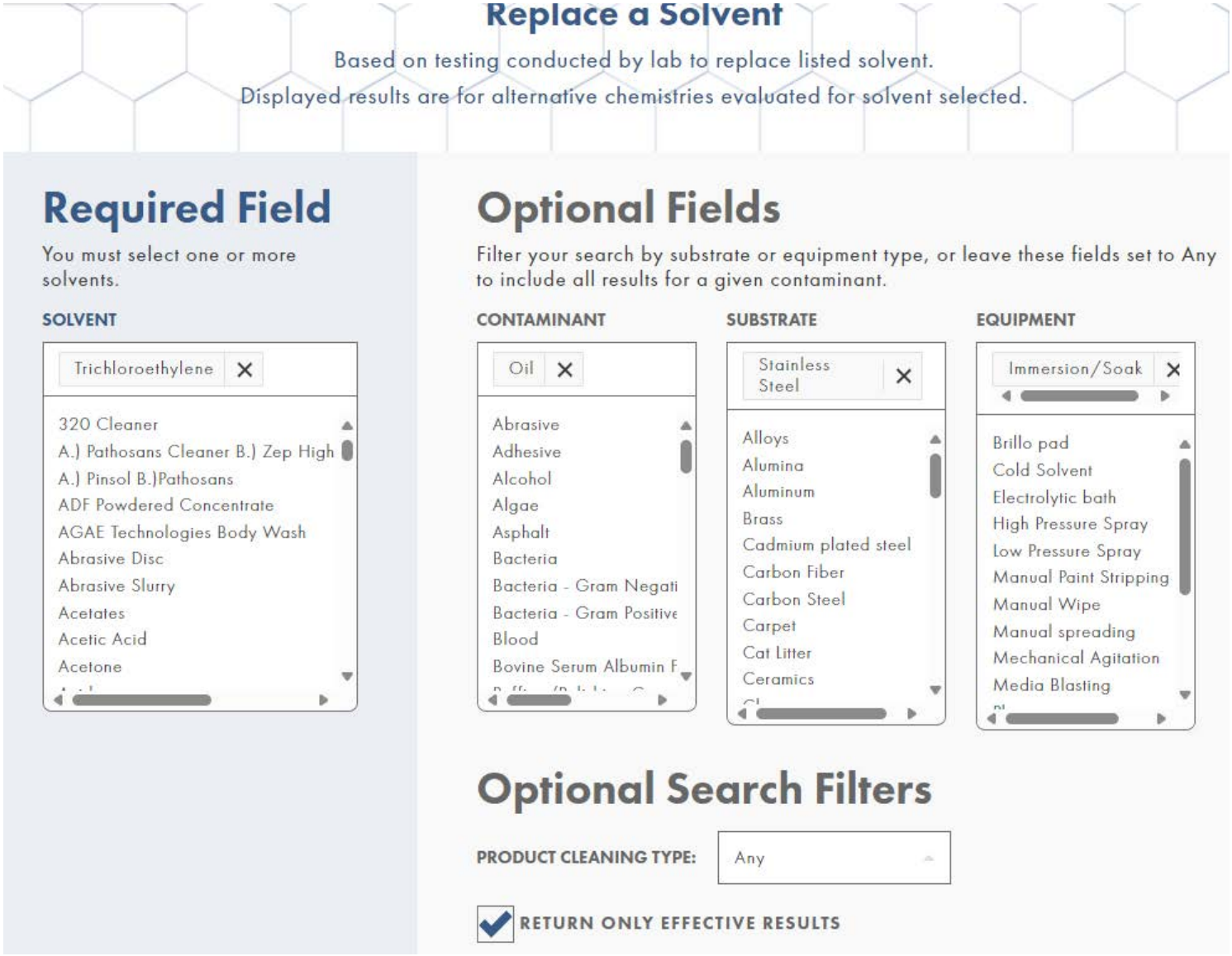
TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

TCE Lab Testing: Massachusetts Companies Assisted

Sector	MA Companies Reporting Use of TCE Since 1993	
	Number (total = 47)	Percentage
Capacitor Manufacturing	2	4
Plating and Metalworking	22	47
Aircraft	1	2
Semiconductor/Electronics	2	4
General Manufacturing	14	30
Jewelry	4	9
Tools	1	2
Wire and Cable	1	2

CleanerSolutions.org

Find an Alternative for Current Solvent



Searching for a Cleaner

SEARCH CRITERIA

Solvent: Trichloroethylene
Contaminant: Oil
Substrate: Stainless Steel
Equipment: Immersion/Soak
Effective: Yes

RESULTS

Found 70 records
Showing records 1 - 50

COMPARE	COMPANY NAME PRODUCT NAME	SAFETY EVALUATION	CLASSIFICATION	CONTAMINANT	SUBSTRATE	EQUIPMENT	CLIENT # PROJECT # TRIAL #
☐	**Alconox Inc** Citranox	4.1	Acidic Aqueous	Oil	Stainless Steel	Immersion/Soak	481 1 1
☐	**Fisher Scientific** Dimethyl glutarate (CAS:1119-40-0)	3.6	Ester Organic	Oil	Stainless Steel	Immersion/Soak	481 1 1
☐	**Keteca USA** Water Works Heavy Duty Degreaser	3.6	Alkaline Aqueous	Oil	Stainless Steel	Immersion/Soak	481 1 1
☐	**Kyzen Corporation** Metalnox M6386	4.6	Alcohol	Oil	Stainless Steel	Immersion/Soak	481 1 1
☐	**Mirachem Corporation** Mirachem 500	4.6	Alkaline Aqueous	Oil	Stainless Steel	Immersion/Soak	481 1 1
☐	**Fisher Scientific** Dimethyl glutarate (CAS:1119-40-0)	3.6	Ester Organic	Oil	Stainless Steel	Immersion/Soak	471 1 9
☐	**Gemtek Products** SC Aircraft & Metal Cleaner Super Concentrate	4.1	Alkaline Aqueous	Oil	Stainless Steel	Immersion/Soak	471 1 9
☐	**Kyzen Corporation** Metalnox M6386	4.6	Alcohol	Oil	Stainless Steel	Immersion/Soak	471 1 9
☐	**Fisher Scientific** Dimethyl glutarate (CAS:1119-40-0)	3.6	Ester Organic	Oil	Stainless Steel	Immersion/Soak	471 1 6
☐	**Gemtek Products** SC Aircraft & Metal Cleaner Super Concentrate	4.1	Alkaline Aqueous	Oil	Stainless Steel	Immersion/Soak	471 1 6
☐	**Fisher Scientific**		Ester				

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Trial Purpose:

The purpose of this experiment was to determine the effectiveness of cleaners on fresh parts provided by the company.

Date Run:
03/22/2021

Experiment Procedure:
Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Dimethyl Glutarate 100%, SC Aircraft & Metal Cleaner 20%. Dimethyl Glutarate and SC Aircraft & Metal were heated to 120°F while Metalnox was kept at room temperature. One stainless steel part provided by the company was obtained for each of the cleaners being tested. Parts were pre-soiled with grind oil by the company. Photos and a white glove test were utilized to show the presence of the soil on the substrates before cleaning. Once solutions reached the proper temperature, parts were submerged into their respective cleaners. Unheated immersion in Metalnox 6386 was conducted for 15 minutes. After 15 minutes had passed, the part was removed from solution and dried with a heat gun. Heated immersion with a stir bar added for agitation was conducted for 30 minutes for both Dimethyl Glutarate and SC Aircraft & Metal Cleaner. After 30 minutes had passed, the part cleaned with SC Aircraft was rinsed in a deionized water bath also at 120°F for 30 seconds. Both parts were then dried with a heat gun. Following the drying step, more photos and an additional white glove test were utilized to show the removal of soil after the cleaning process. Effectiveness of the cleaners was determined.

Trial Results:

Cleaner	Observations
Metalnox 6386	Can see a clear distinction between cleaned and uncleaned area.
Dimethyl Glutarate	Solution has developed a slight yellow tint indicating the removal of the oil. Clear distinction between cleaned and uncleaned area.
SC Aircraft & Metal	Oil visibly pooling at the surface of solution indicating removal.

All parts dried very quickly using the heat gun (approximately 2 minutes).

All cleaners were visibly effective at removing the oil from stainless steel parts. Photos will be provided that clearly show the removal of the oil following the cleaning process. Parts did not sustain any visible damage or changes from the cleaners. Next steps would be to discuss the results with the company.

Success Rating:
Results successful using TACT (time, agitation, concentration, and temperature, as well as rinsing and drying) and/or other cleaning chemistries examined.

Conclusion:
Upon completion of testing, it was verified that all cleaners were effective at removing the oil from stainless steel parts. Next steps would be to discuss the results with the company.

Metalnox M6386

VENDOR PROVIDED INFORMATION

Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors.

Vendor Name: Kyzen Corporation

Product Classification: Alcohol

Recommended Contaminants: Cutting/Tapping Fluids, Oil

Recommended Equipment: Immersion/Soak, Mechanical Agitation

Recommended Substrates: Aluminum, Brass, Copper, Glass/Quartz, Gold, Nickel, Stainless Steel, Steel, Sterling/Silver, Tin, Titanium

Safety Evaluation Detail

+ About the evaluation

CATEGORY	SCORE
Acute Human Effect	8
Chronic Human Effects	2
Ecological Hazards	4
Environmental Fate & Transport	5
Atmospheric Hazard	2
Physical Properties	8
Process Factors	4
Life Cycle Factors	4
Overall Score	**4.6**

Laboratory Evaluation of Metalnox M6386 | Field Definitions

CLIENT #	PROJECT #	TRIAL #	CONTAMINANT	SUBSTRATE	EQUIPMENT	EFFECTIVE
457	1	0	Lubricating/Lapping Oils, Oil	Titanium	Immersion/Soak	✗
457	1	1	Oil	Titanium	Immersion/Soak	✓
457	1	2	Oil	Titanium	Ultrasonics	✓
457	1	3	Oil	Titanium	Ultrasonics	✓
332	1	1	Buffing/Polishing Compounds	Aluminum	Immersion/Soak	✓
332	1	2	Buffing/Polishing Compounds	Aluminum	Immersion/Soak	✗
458	1	8	Oil	Steel	Immersion/Soak	✓
458	1	9	Oil	Steel	Immersion/Soak	✓
458	1	10	Oil	Steel	Immersion/Soak	✓
458	1	13	Oil	Cold Rolled Steel	Immersion/Soak	✗
332	1	8	Buffing/Polishing Compounds	Aluminum	Immersion/Soak	✗

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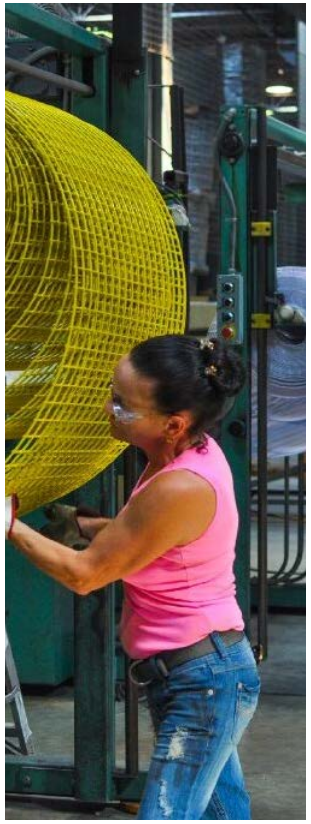

Pollution Prevention Options Analysis System Hazard Discussion Tool (P2OASys)

p2oasys.turi.org
Toxics Use Reduction Institute
University of Massachusetts Lowell

P2OASys Hazard Assessment Tool

Allows user to assess potential impacts of alternative chemistries/technologies

- Environmental
- Worker
- Public health

Help users use a more comprehensive and systematic way of thinking about

- Current and alternative processes
- Based on quantitative and qualitative factors

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P2OASys is

For screening purposes

One resource in your decision-making process

Used to organize chemical hazard information obtained from various sources

Helpful to organize manufacturing process information that can affect occupational health and safety

Designed to compare the EHS attributes of formulated products (using both SDS and chemical ingredient information)

Easily used to clarify environmental, occupational or public health hazards prior to adopting alternative chemicals, products or processes

P2OASYS

TURI developed the Pollution Prevention Options Analysis System tool to help companies and others organize information to compare the environmental, health and safety attributes of chemicals, formulated products and production process changes

See full description here

START ASSESSMENT | **LOAD** FROM DATABASE | **IMPORT** FROM FILE | **COMPARE** SUMMARY | **VIEW** RAW DATA

Name	Data Points / Safety Evaluation	Actions
Trichloroethylene	80 / 8.4	

UPLOAD TO DATABASE | **EXPORT** TO FILE

P2OASys Categories

Trichloroethylene 8.4

SAVE CHANGES

EXPAND ALL

COLLAPSE ALL

Acute Human Effects	8
Chronic Human Effects	9
Ecological Hazards	8
Environmental Fate & Transport	9
Atmospheric Hazard	6
Physical Properties	10
Process Factors	7
Life Cycle Factors	10

Inhalation Toxicity	4
Oral Toxicity	4
Dermal Toxicity	4
Respiratory Irritation	4
Dermal Irritation	8
Eye Irritation	8
Exposure Limits	8
IDLH	2
Health	6

	Units	Value	Score	Memo
Key Phrases		Reversible :	8	
GHS Category Level		1B	8	
GHS H Phrases		H315	8	

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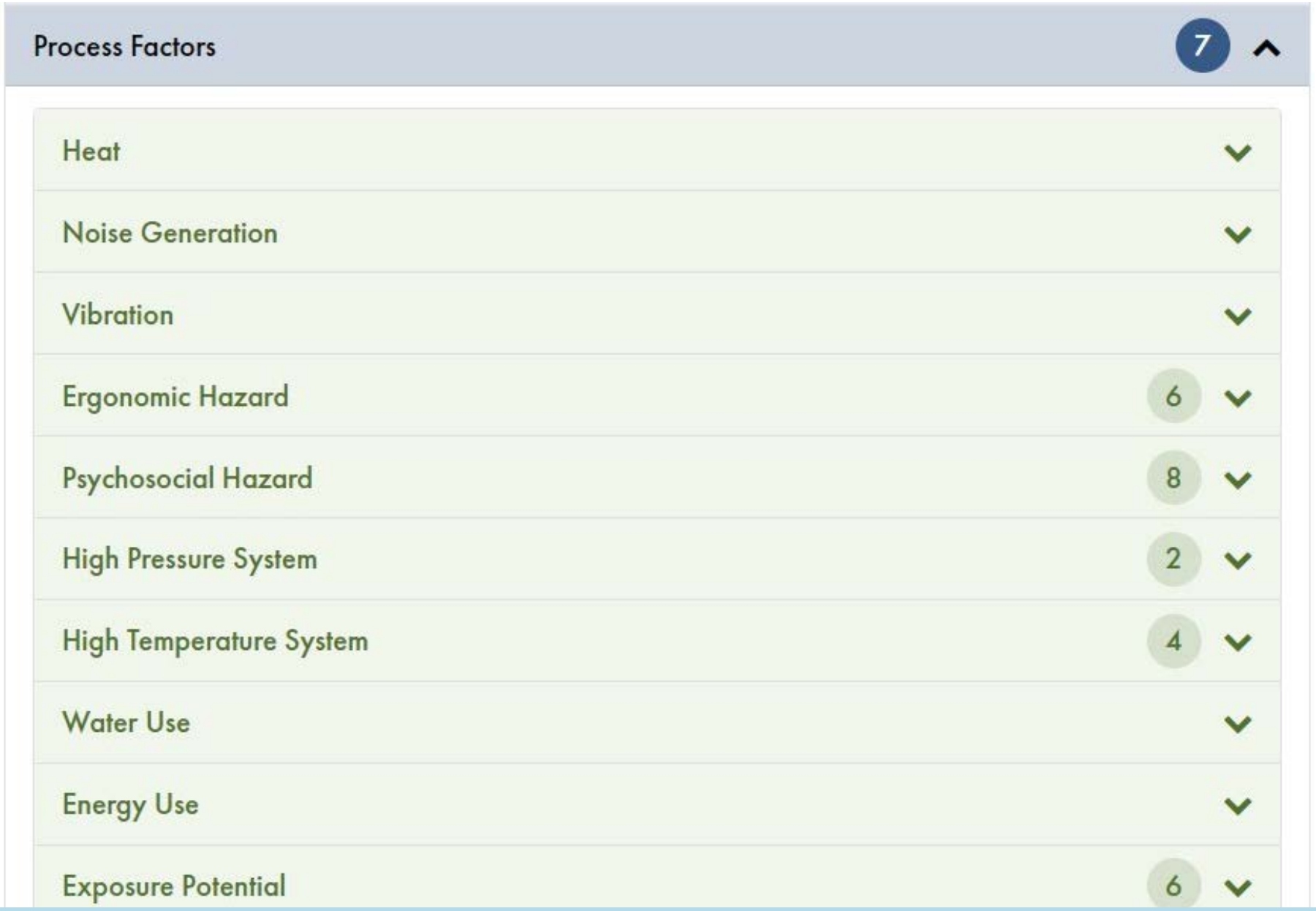
What Makes P2OASys Different

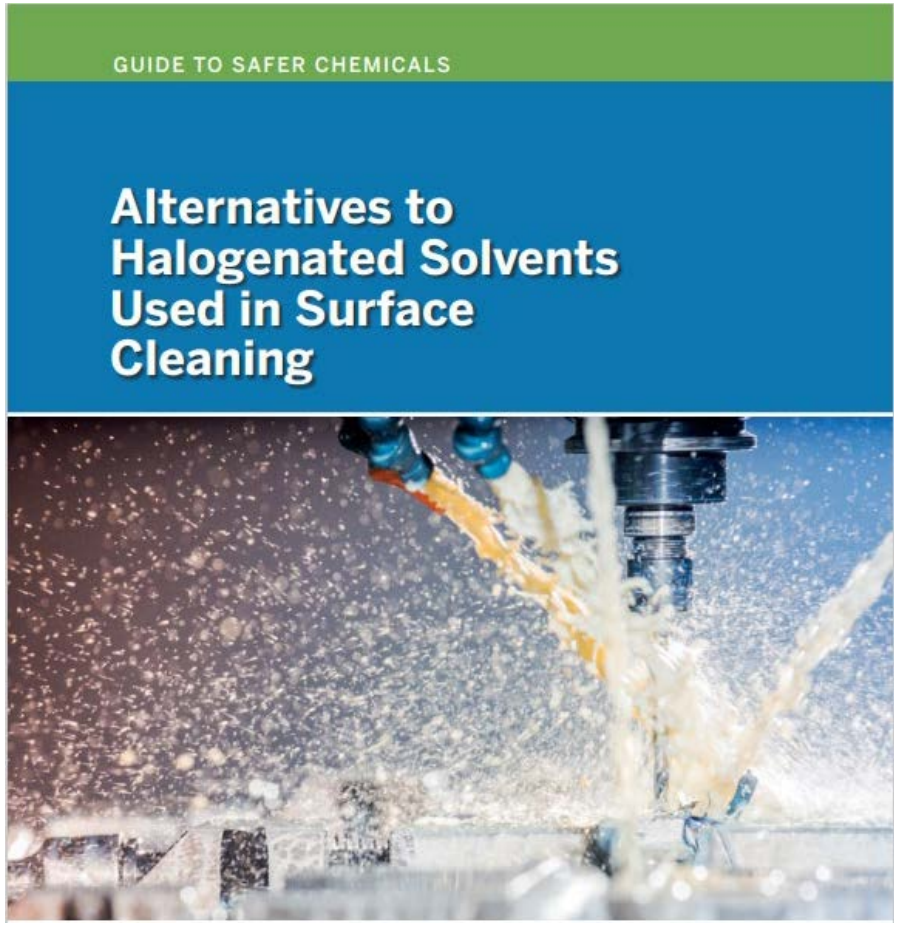


Categories	Trichloroethylene	Aquavantage 1400 GD	Emerald HD 2	Buckeye Immersion Cleaner	Alconox	Dimethyl Glutarate
Acute Human Effects	8	7	5	9	8	2
Chronic Human Effects	9	8	2	4	2	2
Ecological Hazards	8	7	4	5	7	3
Environmental Fate & Transport	9	8	4	7	8	8
Atmospheric Hazard	6	2	2	2	2	2
Physical Properties	10	8	7	7	6	5
Process Factors	7	4	6	5	6	4
Life Cycle Factors	10	4	4	4	6	3
Product Score	8.4	6	4.3	5.4	5.6	3.6

Hazards of Concern ≥8	Trichloroethylene	Aquavantage 1400 GD	Emerald HD 2	Buckeye Immersion Cleaner	Alconox	Dimethyl Glutarate
Acute Human Effects						
Inhalation				10		
Dermal Irritation	8				8	
Eye Irritation	8	8		8	8	
PEL/TLV	8					
Chronic Human Effects						
Carcinogen	10					
Mutagen/ Teratogen	8					
Reproductive/Devlopmental	8					
Neurotoxicity	8					
Endocrine System Effects	8	10				
Other Chronic Organ Effects	8					

Review

- Cleanersolutions.org can be a great starting point
  - Request testing for chemicals not in database
- P2OASys is a great tool to organize your options and review the pros and cons of each alternative you are considering
- Resources available through TURI
  - http://guides.turi.org/beyond_sds
  - Alternatives Testing Laboratory
  - Assessment of Alternatives to Halogenated Solvents Used in Surface Cleaning



turi.org/publications/alternatives-to-halogenated-solvents-used-in-surface-cleaning/

Toxics Use Reduction Institute

www.turi.org

978-934-3275

The Offices at Boott Mills West
126 John Street, Suite 14
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Jason Marshall

TURI Lab Director

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KANSAS STATE UNIVERSITY

P2 Tools in Action

Pathways to Safer Solutions

Cris Brazil, PhD – Pollution Prevention Specialist
cristianekbrazil@ksu.edu

Pollution Prevention Institute

Pollution Prevention Institute (PPI)

- Since 1989
- K-State College of Engineering - Engineering Extension
- 100% grant-funded
- Non-regulatory
- P2 Program
- Small Business Environmental Assistance Program (SBEAP)

Supporting Kansas through Pollution Prevention (P2)

Workshops, seminars, and educational materials

Internship program

Technical assistance to any size industry

We work with industries, communities, and institutions to:

- Preserve Kansas resources
- Promote sustainable practices
- Protect public health
- Support the economy
- Highlight Environmental Justice (EJ)
- Amplify P2 efforts

2024 Summer Interns

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The Benefits of Reducing Toxic Chemicals

Community

Cleaner air for nearby residents

Industry

Lower regulatory burden, reduced waste generation, increased operational efficiency

People
Planet
Profit

Water

Protection of local waterways and aquatic systems

Workers

Healthier workplaces for employees

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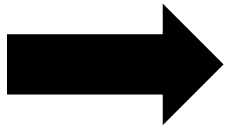
In an Ideal World…

- We could reach **all companies** in Kansas
- Identify **every** potential project
- Have access to **all solutions and technologies**
- Companies would **implement every opportunity**

Resistance to change
Technical constraints
Limited resources



Which companies should we prioritize?
How do we engage companies?
Which P2 projects are most feasible?

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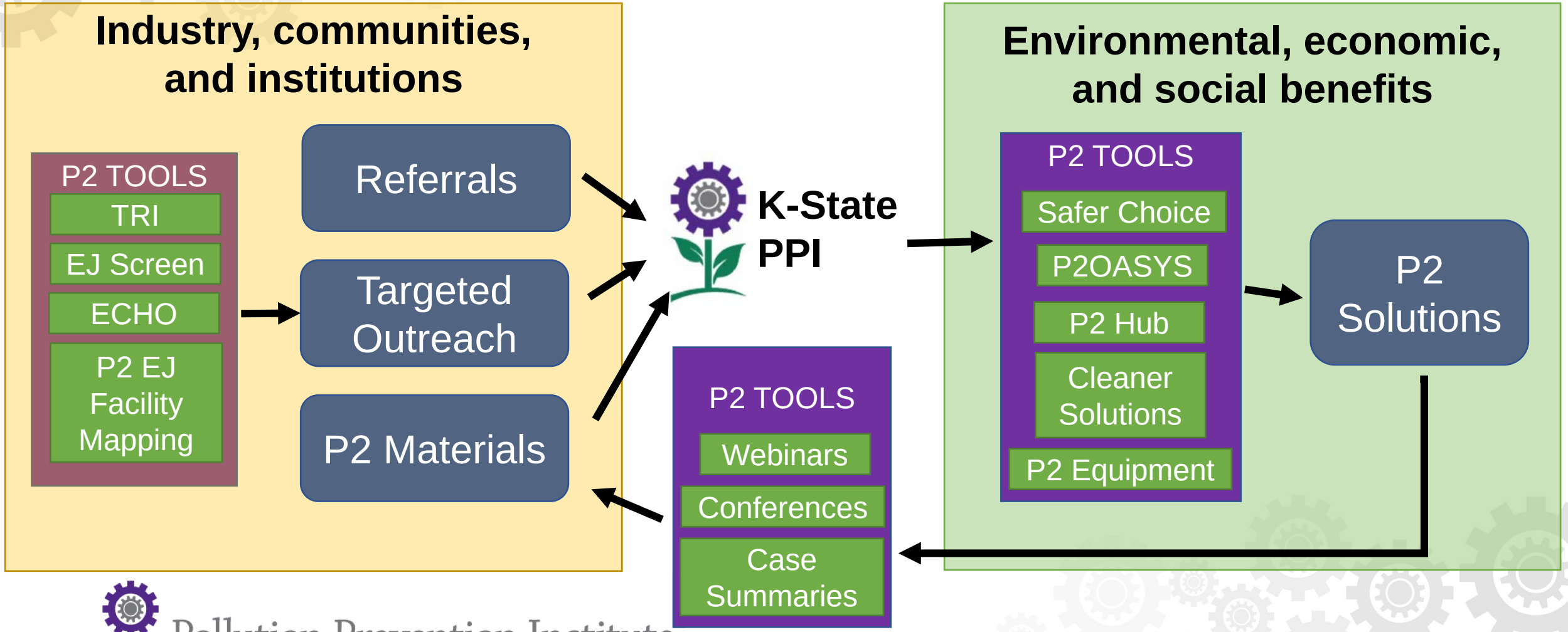
How P2 Tools Address Challenges

- Enhancing decision-making
- Bridging technical gaps
- Amplifying education and support
- Identifying high-impact, inclusive opportunities

How P2 Happens



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Targeted Outreach - Examples

- Toxics Release Inventory (TRI)
  - Identify industries with significant environmental impact and commonly used chemicals
- P2 EJ Facility Mapping Tool
  - Identify facilities in overburdened EJ communities
- Enforcement and Compliance History Online (ECHO)
  - Prioritize outreach to facilities needing compliance assistance
- EJ Screen
  - Identify areas with high pollution burden and socio-economic challenges

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Finding P2 Solutions - Examples

- Case Summaries, P2 Hub, Webinars
  - Successful examples, new ideas, technical solutions
- Cleaner Solutions, Safer Choice, P2OASYS
  - Identify less hazardous chemicals and materials

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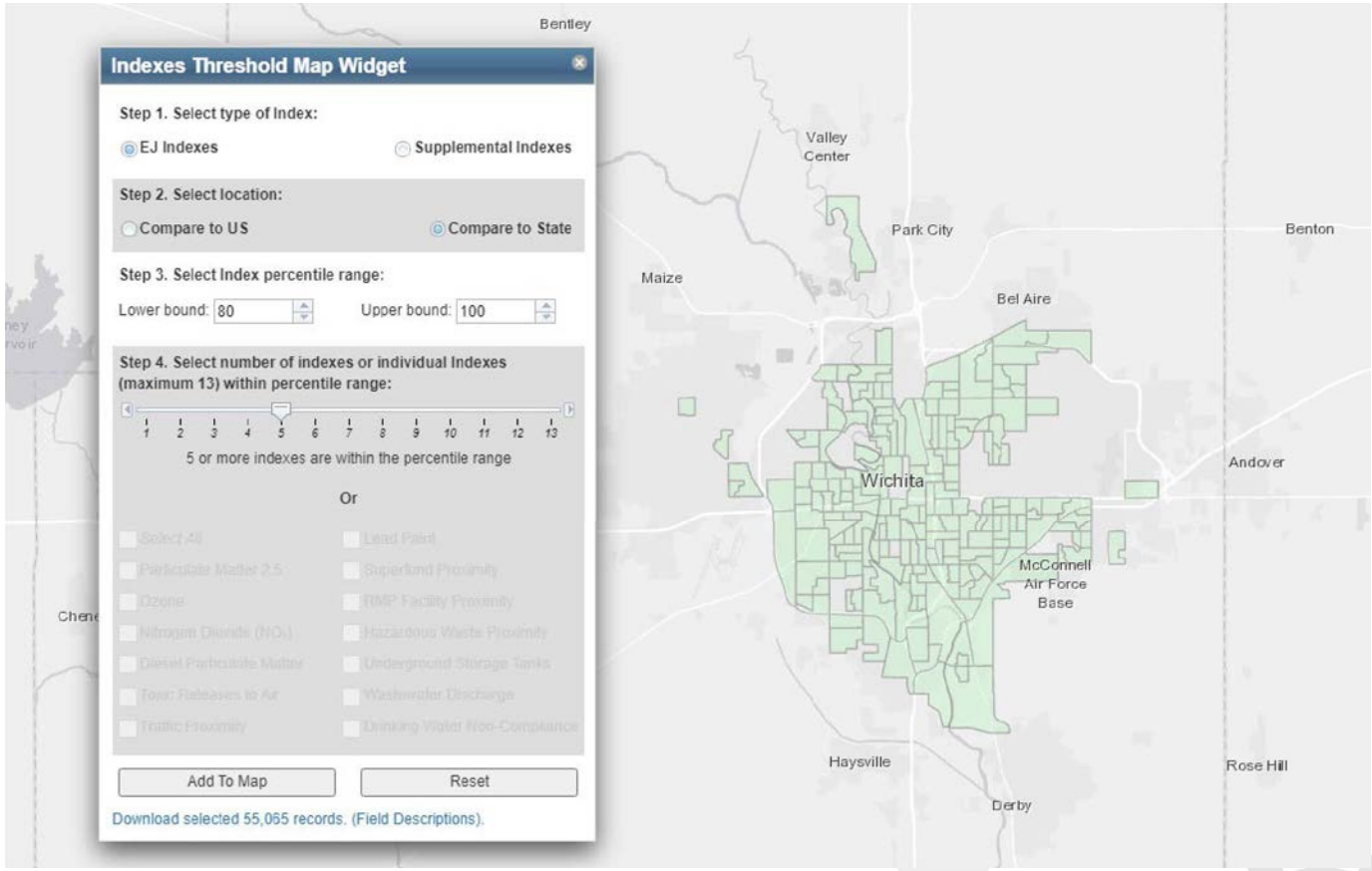
www.sbeap.org

Targeting TCE Reduction

TRI Trichloroethylene (TCE) releases in KS

EJ Screen



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CleanerSolutions Database

Solutions for Surface Cleaning

FIND A PRODUCT | **REPLACE** A SOLVENT | **SAFETY** EVALUATION | **BROWSE** CLIENT TYPES | **PARTS** DESCRIPTION SEARCH

Current Search Information

SEARCH CRITERIA

Solvent: Trichloroethylene
Substrate: Aluminum
Effective: Yes
Currently Available Results Only: Yes

RESULTS

Found 106 records
Showing records 1 - 50

REFINE YOUR SEARCH BY SAFETY EVALUATION

- 2 < 4 Lower concern (13)
- 4 < 6 Medium concern (63)
- 6 < 8 High concern (29)
- 8 - 10 Very high concern (1)

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3P PROCESSING

Intern: Sarah Baden
Major: Biosystems and Environmental Engineering
School: Kansas State University

SUMMARY OF 2024 P2 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
TCE vapor degreaser replacement	7,825 lbs. solvent 90,100 kWh electricity -29,615 gallons of water 87.16 $MTCO_2e$	$31,320	Recommended
Paint gun cleaning, solvent use reduction	14,990 lbs. solvent -2,000 kWh electricity 10.54 $MTCO_2e$	$24,025	Recommended
Tank covers, water use reduction	128,300 kWh electricity 96,760 gallons of water 124.93 $MTCO_2e$	$4,915	Recommended
Hazardous waste reduction	More research needed	$290	More research needed
Total[1]	**22,815 lbs. solvent 216,400 kWh 67,145 gallons of water**	**$60,260**	
GHG reductions[1,2]	**222.63 $MTCO_2e$**		

SPIRIT AEROSYSTEMS CASE STUDY

Wichita, Kansas • EPA Region 7
NAICS: 336411 Aircraft Manufacturing
NAICS: 423860: Transportation Equipment and Supplies (except Motor vehicle) Merchant Wholesalers

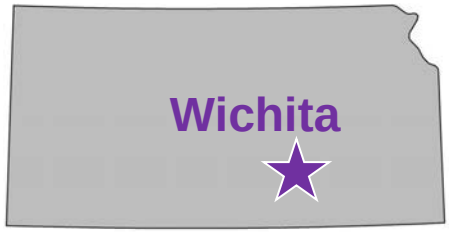

TABLE 1 – SUMMARY OF ALL PROJECTS

Reductions	Annual Estimated Environmental Impact	Estimated cost savings ($/year)	Status
Overflow solvent reduction-machine replacement	11.5 tons VOCs 2.71 tons HAPs 3,300-gal hazardous material and hazardous waste reduced	$48,000	Recommended
Returned solvent waste reduction	3.9 tons VOCs 1.9 tons HAPs 1,100 gal of hazardous material and hazardous waste reduced	$14,000	Implemented
Fuselage integration solvent reduction	12.5 tons VOCs 3.3 tons HAPs 3600-gal of hazardous material and hazardous waste reduced	$42,500	Implemented
Strut Nacelle East distillation unit	4 tons VOCs 0.4 tons HAPs 970 gallons of hazardous material 1,200 gallons hazardous waste	$14,000	Implemented
Facility-wide distillation units	160 tons VOCs 16 tons HAPs 38,000 gallons hazardous material 47,000 gallons hazardous waste reduced	$620,000	Recommended
Total	**190 tons VOCs 24 tons HAPs 46,000 hazardous material reduced 55,000 gallons hazardous waste reduced**	**$724,000**	*Project status updated 5/2024*

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REDGUARD

Intern: Franseira Maldonado Mundo
Major: Industrial systems and manufacturing engineering
School: Wichita State University

SUMMARY OF 2024 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
Powder coat	2,956 lbs. of MEK 12,715 lbs. of VOC 1,026 lbs. of HAP	$98,451	Recommended
Lighting exchange	236,782 kWh 253 $MTCO_2e$	$24,554	In progress – 33 %
Water consumption reduction	526,100 gallons of water 77,920 kWh, 78 $MTCO_2e$	$10,823	Recommended
Solar panels	5,733 kWh 5 $MTCO_2e$	$32,722	Recommended
Solar panel water pump	5,733 kWh 5 $MTCO_2e$	$596	Not recommended
Total[2]	**2,956 lbs. of MEK 12,689 lbs. of VOC 1,026 lbs. of HAP 629,333 kWh 526,100 gallons of water**	**$167,146**	
GHG reductions[1,2]	**527 metric tons CO_2e**		

P2 Virtual Reality Training Tool

- Simulate real-world P2 scenarios
- Users step into the role of a pollution prevention specialist
- Interactive learning and broader reach
- Explore virtual facilities and identify opportunities for improvement
  - Air leaks, water leaks, lighting, chemical replacements
- Launch expected for **Spring 2025**

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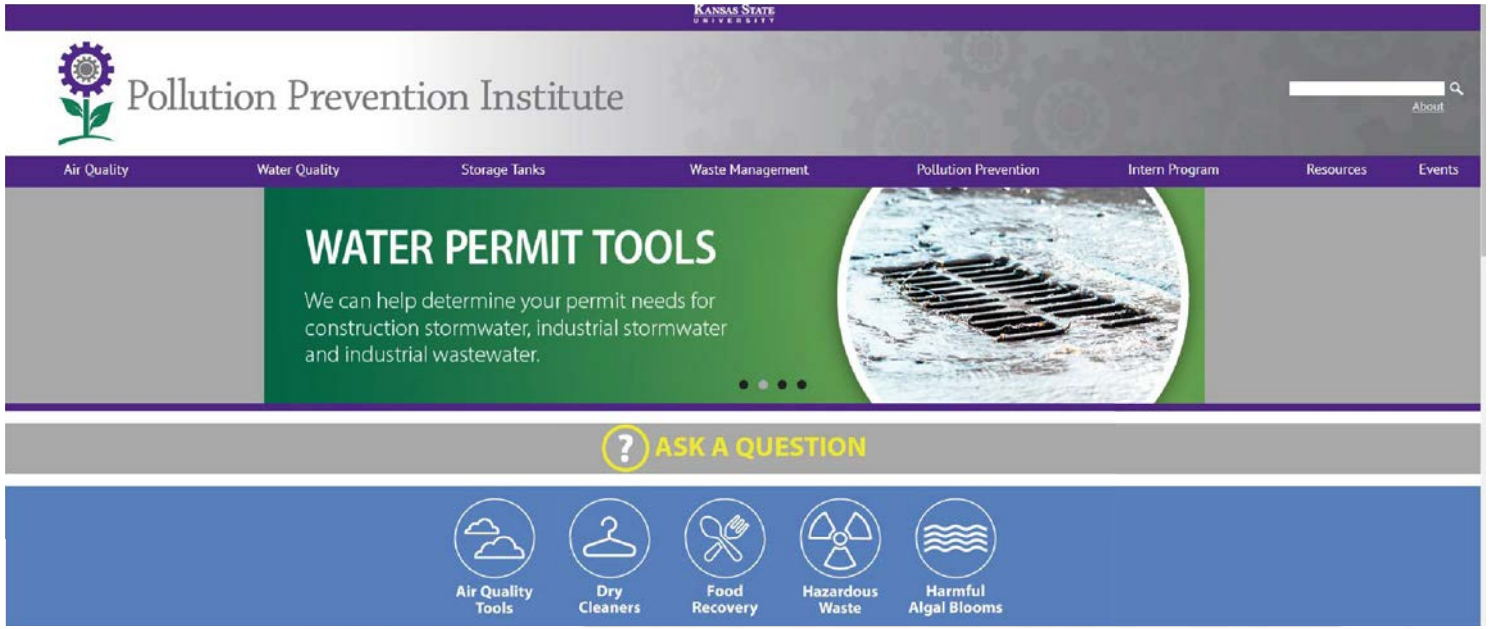
Thank you!

- www.sbeap.org
- ksu-ppi@ksu.edu



- Cris Brazil
- cristianekbrazil@ksu.edu

Pollution Prevention Institute

2024 National Pollution Prevention Training and Conference

P2 Tools for Success

December 11, 2024
11:00AM – 12:00PM ET

Moderated by Alizabeth Olhasso, EPA

Speakers:

- **Charlotte (Charlie) Snyder, EPA, Data Analysis and Right to Know Branch**
- **Jason Marshall, Toxics Use Reduction Institute**
- **Dr. Cris Brazil, Kansas State University**