TCE reduction in Minnesota

Legislative update – January 2020

MINNESOTA POLLUTION CONTROL AGENCY

Report findings

The MPCA has completed assessments from 86 facilities in the state that use or generate trichloroethylene (TCE). Twenty-six (26) facilities use TCE in their industrial processes and the remaining 60 facilities generate TCE emissions as a byproduct of a combustion process or vapor emissions from a landfill. The MPCA is in the process of assessing 24 additional facilities whose data was not available yet for this report. Those assessments, along with other new facility assessments, will be included in future reports.

Since the amount of TCE emissions as a result of byproducts was minimal, the MPCA focused resources on the highest risk facilities and worked to gather additional facility data, model potential impacts, conduct air monitoring around the facilities, and negotiate agreements to reduce or eliminate TCE.

Since May 2019, the MPCA worked with facilities to remove approximately 174,150 pounds of TCE emissions from their processes in the past nine months. The estimated emissions reductions are based on MPCA assessments using 2017 air emissions data. More than 80 percent (83.9%) of the reduction was a result of compliance and enforcement actions against Water Gremlin, the largest emitter of TCE in the state. Five additional companies voluntarily agreed to stop using TCE by the end of 2019, while several others have committed to reducing their usage. Fourteen (14) facilities reported continued use of TCE. A full list of facilities is included in this report.

TCE by the numbers

2 micrograms per cubic meter of TCE is the Health Based Value set by MDH

86 facilities have been assessed

26 use TCE in industrial processes

60 generate TCE as a byproduct of combustion or vapor emissions

174,150 lbs of TCE emissions removed from facilities

In 2019, the MPCA used TCE air emission inventories to conduct air modeling for facilities using the solvent in their industrial processes. After reviewing the modeling, the MPCA found instances of facilities potentially emitting TCE above the HBV (2 µg/m³). These facilities were Cooperative Plating, Greatbatch Medical, Honeywell Aerospace, Kangas Enameling, Lake Region Medical, Larsen's Manufacturing, Nico Products, and Viking Drill & Tool. While these facilities were in compliance with current permit conditions, the MPCA engaged with each facility to determine a possible pathway to reduce or halt TCE usage. Results of MPCA's outreach are detailed in this report.

Using Health Based Values

The Minnesota Department of Health (MDH) and other health agencies develop health benchmarks to evaluate potential human health risks from exposures to chemicals in ambient air. A health benchmark is a concentration of a chemical that is likely to pose little to no risk to human health. In 2002, MDH developed a type of health benchmark called a Health Risk Value (HRV) for TCE. The acute exposure HRV was set at 2,000 µg/. Other values were used for longer terms of exposure.

In 2018, MDH issued new guidance for TCE, known as a Health Based Value (HBV) to 2 µg/m³, for all durations of exposure. Health effects will not necessarily occur if people are exposed to amounts of TCE that exceed the HBV. These values can change over time when new scientific information becomes available.

Reexamining air permits

Through the application of state and federal laws, the MPCA issues permits to regulated parties that restrict the emissions of volatile organic compounds (VOCs), including TCE, and hazardous air pollutants (HAP) to levels that comply with current state and federal regulations. In limited instances, the MPCA estimates TCE concentrations in the air and uses the HBVs to determine if there could be potential health impacts.

Using MDH's revised guidance for TCE, the agency continues to take a closer look at air permits where TCE is identified as a possible pollutant. Currently, few air permits contain specific TCE-related limitations. A facility may be in compliance with its current air permit but may potentially be exceeding the HBV for TCE. The process of estimating an air concentration to compare to an HBV uses air modeling tools that require information about facility stack parameters, terrain, geographic information, meteorological data, and air pollution control equipment parameters. The MPCA continues to use this analysis in its technical review of the air emissions data.

Next steps

When it comes to addressing the use of TCE in industrial processes, there is no "one size fits all" solution for companies. Each facility and industrial process is unique, which requires the MPCA and other state agencies to allocate significant resources to helping facilities transition to other solvents. For some facilities, the transition from TCE to a new solvent will require regulatory approval before the transition. During this transition period, a facility may be allowed to emit TCE above modeled HBVs for limited periods of time. For these facilities, the MPCA is requiring the facility to work as quickly as possible to make the transition. The MPCA is also using air monitoring and modeling information to ensure that potential health impacts are minimized.

The process of identifying and reducing or eliminating TCE has been iterative. The MPCA continues to learn about new sources and, as such, the agency expects the list of facilities using and emitting TCE will change over time based on information gathered.

Numerous facilities have already switched to other solvents, while others are working to identify process changes or conduct a specific analysis of alternative solvents. The MPCA and MDH will coordinate community outreach in neighborhoods with suspected TCE exposure. These efforts will be scaled according to the level of suspected TCE exposure, neighborhood characteristics, and community interest.

Measurable action plan

By summer 2020, the MPCA will have developed and initiated a measurable action plan that focuses on community engagement, additional TCE modeling and monitoring data, and new enforcement options for facilities exceeding the HBVs for TCE. The MPCA and MDH will provide progress updates to the Legislature. In addition, up-to-date project information will be posted on MPCA's website and a final summary report of the project will be submitted to the Legislature in 2021.

Human health

- Develop a community outreach plan
- Develop a community health assessment

Monitoring & guidance

- Use modeling and/or monitoring data to document TCE changes or reductions
- Incorporate new TCE modeling and monitoring data in future agreements or permits
- Update guidance documents on the web

Working with partners

- Identify practical strategies to reduce usage and emissions for facilities that are still using or generating TCE in their processes
- Review enforcement options for those that are above HBVs or in noncompliance with permit requirements or conditions

Facility identification

The MPCA has assessments from 86 facilities in the state. Twenty-six (26) facilities use TCE in their industrial processes and the remaining 60 facilities generate TCE emissions as a byproduct of a combustion process or vapor emissions from a landfill. The MPCA is in the process of assessing 24 additional facilities whose data was not available yet for this report. Those assessments, along with other new facility assessments, will be included in future reports.

Facilities listed have air permits from the MPCA and either have permitted and/or reported TCE use or generation. Emissions in the table are based on the 2017 air toxics emissions inventory which represents the best available data given to the agency. While most facilities are not required to provide emissions data, the MPCA has requested TCE emissions data from permittees. The agency will continue to encourage facilities to share emissions data.

The summaries below explain, for each permitted facility, the facility location(s), past TCE emissions, and any actions taken to reduce or eliminate TCE emissions.

Highest priority

The MPCA prioritized facilities that represented the highest risk to impact human health. This was based on several factors, including the highest actual or potential emissions of TCE and proximity to communities or neighborhoods that experience disproportionate environmental harms and risks. The MPCA determined that eight facilities initially met these criteria: Cooperative Plating, Greatbatch Medical, Honeywell Aerospace, Kangas Enameling, Lake Region Medical, Larsen's Manufacturing, Nico Products, and Viking Drill & Tool.

Using company-reported emissions data, the MPCA conducted air dispersion modeling to estimate if each facility had TCE emissions that resulted in surrounding air concentrations that exceeded the short-term or chronic HBV (2 µg/m³). Modeling showed that the facilities exceeded the short-term health risk by a range of 2 to 95 times. Recognizing that TCE's short-term HBV had recently changed from 2,000 µg/m³ to 2 µg/m³, the MPCA contacted each facility to determine the next steps. For some facilities, additional air monitors were deployed to determine if modeling was accurately predicting TCE air concentrations.

Since MPCA conducted the TCE prioritization, four facilities have ceased using TCE and another three have significantly reduced TCE usage and are seeking an alternative solvent.

Facility name	Industry	2017 TCE Emissions (lbs)	Short-term risk (Times over modeled HBV)	Location	TCE emission source	TCE status as reported by facility
Viking Drill & Tool	Fabricated metal and hardware	21,620	55	St. Paul	Degreaser	TCE replaced with alternative solvent in May 2019
Greatbatch Medical	Medical technology	18,060	33	Minneapolis	Degreaser	TCE emissions will be reduced to HBV per compliance agreement with MPCA in November 2019
Larsen's Manufacturing	Fire protection equipment manufacturing	16,340	48	Fridley	Degreaser	Company identifying TCE alternatives
Cooperative Plating	Fabricated metal and hardware	8,240	64	St. Paul	Degreaser	TCE replaced with n-Propyl Bromide (nPB) in May 2019. Small amounts of TCE used for de-masking. Company analyzing alternatives to TCE and nPB

Facility name	Industry	2017 TCE Emissions (lbs)	Short-term risk (Times over modeled HBV)	Location	TCE emission source	TCE status as reported by facility
Lake Region Medical	Medical technology	5,664	4.8	Chaska	Degreaser	MPCA monitoring showed below HBV. Company identifying alternatives and continues TCE reductions
Honeywell Aerospace	Aviation manufacturing	4,532	95	Minneapolis	Degreaser	TCE use reduced. Company analyzing appropriate TCE alternatives
Kangas Enameling	Fabricated metal and hardware	3,300	4.9	Hopkins	Degreaser	Discontinued TCE use in June 2019. Company analyzing appropriate TCE alternatives
Nico Products	Fabricated metal and hardware	958	2.1	Minneapolis	Degreaser	TCE replaced with aqueous solution in October 2019

Remaining TCE users

Of the remaining 18 facilities reporting TCE usage in permits, 10 facilities have discontinued using TCE. Of the facilities that reported TCE emissions, most have minimal levels of TCE. The MPCA will continue to work with these facilities to find suitable alternatives and monitor future TCE emissions.

Facility name	Industry	2017 TCE Emissions (lbs)	Location	TCE emission source	TCE status as reported by facility
3M - R & D Facility	Research and development	3.2	Maplewood	Small amounts of TCE in use	Discontinued TCE use
Alliant Techsystems Operations LLC	Defense contractor	0.60	Elk River	Cleaning	Discontinued TCE use
Arkema Inc	Chemical manufacturing	1.2	Blooming Prairie	Use small amounts of TCE	No change
Avtec Finishing Systems Inc	Metal coating	4,950	New Hope	Degreaser	TCE replaced with n-Propyl Bromide (nPB) in 2018
Bodycote Thermal Processing	Metal coating	Under review	Eden Prairie	Degreaser	No change
Energy Economics Inc.	Utility equipment manufacturer	45	Dodge Center	Degreaser	TCE replaced with alternative solvent
Graco Minnesota Inc - Koch Center	Chemical supplier	1.2	Rogers	Surface coating	No change
Hiawatha Rubber Co.	Rubber manufacturer	Under review	Minneapolis	Degreaser	TCE use reduced 55%
International Paper - Fridley	Paper mill	370	Fridley	Degreaser	TCE replaced with alternative solvent in November 2018
K & G Manufacturing	Machine shop	Under review	Faribault	Degreaser	No change

Facility name	Industry	2017 TCE Emissions (lbs)	Location	TCE emission source	TCE status as reported by facility
LCS Co.	Metal stamping	Under review	Mendota Heights	Degreaser	TCE replaced with alternative solvent in April 2017
Mack Engineering Corp	Machine manufacturing	Under review	Minneapolis	Degreaser	TCE replaced with alternative solvent in July 2019
Marvin Windows & Doors	Window manufacturing	6.2	Warroad	Degreaser	TCE replaced with alternative solvent in 2016
MN Twist Drill (MTD) Acquisition LLC	Tool manufacturing	Under review	Chisholm	Degreaser	No change
Viracon Inc	Glass fabricator	Under review	Owatonna	Degreaser	TCE replaced with alternative solvent in 2019; small amounts of TCE still in use
Water Gremlin Co.	Lead parts manufacturer	146,200	White Bear Township	Degreaser	TCE replaced with alternative solvent in 2019 under MPCA enforcement action
Welsh Equipment Inc	Heavy duty truck sales	Under review	Dodge Center	Degreaser	No change
X-cel Optical Company	Glass manufacturing	Under review	Sauk Rapids	Degreaser	Facility will close in June 2020

Facilities emitting TCE as a byproduct and other means

While the MPCA has developed a list of facilities that are currently emitting TCE as a byproduct of an industrial process, the agency has not prioritized this list as the self-reported emissions levels are minimal and unlikely to reach the HBV threshold. The agency will continue to monitor these facilities and conduct appropriate outreach if TCE emissions increase at high rates.

Facility name	Industry	2017 TCE Emissions (lbs)	Location	TCE emission source	TCE status as reported by facility
3M - Corporate Incinerator	Waste management	147	Cottage Grove	Byproduct from combustion	Levels decreasing
Aaron Carlson Corp	Closed	0.10	Minneapolis	Byproduct from combustion	Facility closed
Accent Home & Kitchen Center Inc	Cabinet making	0.07	Ramsey	Byproduct from combustion	No change
Advanced Disposal Services Rolling Hills Landfill	Landfill	Under review	Buffalo	Landfill gas	No change
Alamco Wood Products LLC	Lumber	0.09	Albert Lea	Byproduct from combustion	No change
Andersen Corp	Windows	4.2	Bayport	Byproduct from combustion	No change
Andersen Corp	Windows	97	North Branch	Byproduct from combustion	No change

Facility name	Industry	2017 TCE Emissions (lbs)	Location	TCE emission source	TCE status as reported by facility
BAE Systems Land & Armaments LP	Defense contractor	90	Fridley	TCE contamination in groundwater	Remediation system in place since 1986
Blandin Paper Co/MN Power - Rapids Energy Center	Paper mill	66	Grand Rapids	Byproduct from combustion	No change
Cintas Corp	Laundry	Under review	Brooklyn Park	Textile laundering	No change
Cintas Corp	Laundry	Under review	Duluth	Textile laundering	No change
Cintas Corp	Laundry	Under review	Eagan	Textile laundering	No change
Cintas Corp	Laundry	Under review	Maple Grove	Textile laundering	No change
Cintas Corp – Industrial	Laundry	420	Minneapolis	Textile laundering	No change
Cintas Corp - Linen	Laundry	Under review	Minneapolis	Textile laundering	No change
Cintas Corp	Laundry	Under review	Montevideo	Textile laundering	No change
Cintas Corp	Laundry	Under review	Owatonna	Textile laundering	No change
Cintas Corp	Laundry	Under review	Plymouth	Textile laundering	No change
Cintas Corp	Laundry	420	St. Cloud	Textile laundering	No change
Distinctive Floral Co - Len Busch Roses	Wholesale florist	4.6	Plymouth	Byproduct from combustion	No change
District Energy St Paul Inc - Hans O Nyman	Energy generation	61	St. Paul	Byproduct from combustion	No current emissions
East Central Solid Waste Commission	Landfill	Under review	Mora	Landfill gas	No change
Endres Processing LLC & Endres Farms "Reconserve of Minnesota Inc"	Food byproduct recycling	0.36	Rosemount	Byproduct from combustion	No change
Eveland's Inc	RV manufacturer	0.05	Backus	Byproduct from combustion	No change
Ferche Millwork Inc	Moulding and millwork	0.48	Rice	Byproduct from combustion	No change
Fibrominn Biomass Power Plant	Power generation	Under review	Benson	Byproduct from combustion	No change
Foldcraft Co - Kenyon	Furniture and millwork	0.08	Kenyon	Byproduct from combustion	No change
Grand Rapids City MS4	Wastewater	8.6	Grand Rapids	TCE from evaporated wastewater	No change
Hedstrom Lumber Co Inc	Lumber	1.2	Grand Marais	Byproduct from combustion	No change
Hibbing Public Utilities Commission	Power generation	35.2	Hibbing	Byproduct from combustion	No longer burning biomass
Hill Wood Products Inc	Wood product manufacturing	0.25	Cook	Byproduct from combustion	No change
Koda Energy LLC	Power generation	74	Shakopee	Byproduct from combustion	No change
Long Prairie Shavings Mill	Sawmill	2.7	Long Prairie	Byproduct from combustion	No change
Louisiana - Pacific Corp	Building materials manufacturer	3.0	Two Harbors	Byproduct from combustion	No change

Facility name	Industry	2017 TCE Emissions (lbs)	Location	TCE emission source	TCE status as reported by facility
Marathon Saint Paul Park Refining Co LLC	Fuel refining	1.2	St. Paul Park	Byproduct from combustion	No change
Met Council - Seneca WWTP	Wastewater treatment	2.4	Eagan	Byproduct from combustion	No change
Met Council Metropolitan WWTP	Wastewater treatment	Under review	St. Paul	Byproduct from combustion	No change
Minnesota Power - Taconite Harbor Energy Center	Power generation	Under review	Schroeder	Byproduct from combustion	No change
Norbord Minnesota	Wood panel manufacturer	28	Solway	Byproduct from combustion	No change
Northern Engraving Corp	Vehicle parts manufacturing	Under review	Spring Grove	TCE vapor contamination	Party to remediation effort
Northshore Wood Products	Wood manufacturing	0.00	Duluth	Byproduct from combustion	No change
Packaging Corp of America - Boise White Paper LLC	Paper mill	63	International Falls	Byproduct from combustion	No change
PFB Manufacturing LLC	Chemical manufacturing	0.48	Lester Prairie	Byproduct from combustion	Burning natural gas instead of biomass since 2018
Pine Bend Energy LLC	Waste management	1.0	Inver Grove Heights	Landfill gas	No change
Potlatch Land & Lumber LLC	Lumber	13	Bemidji	Byproduct from combustion	No change
Rajala Mill Co	Lumber	0.88	Bigfork	Byproduct from combustion	No change
Rotochopper Inc	Wood processing equipment manufacturer	0.26	St. Martin	Byproduct from combustion	No change
Saint Gabriels Hospital	Medical facility	0.34	Little Falls	Byproduct from combustion	No change
Sappi Cloquet LLC	Paper mill	180	Cloquet	Byproduct from combustion	No change
Specialty Minerals Inc	Mineral processing	1.1	International Falls	Byproduct from combustion	No change
Specialty Minerals Inc	Mineral processing	0.02	Cloquet	Byproduct from combustion	No change
St. John's University	University	0.01	Collegeville	Byproduct from combustion	No change
Stewart's Forest Products Inc	Wood manufacturing	0.06	Fort Ripley	Byproduct from combustion	No change
US Steel Corp - Minntac	Mining	19	Mountain Iron	Byproduct from combustion	No change
Viking Waterbeds Inc	Manufacturer	0.01	St. Joseph	Byproduct from combustion	No change
Virginia Department of Public Utilities	Power generation	32	Virginia	Byproduct from combustion	No change

Facility name	Industry	2017 TCE Emissions (lbs)	Location	TCE emission source	TCE status as reported by facility
Willmar Municipal Utilities	Power generation	Under review	Willmar	Byproduct from combustion	No longer burning biomass (as of 2019)
Woodcraft Industries	Wood manufacturing	0.80	Foreston	Byproduct from combustion	No communication from the company
Woodcraft Industries Inc.	Wood manufacturing	1.6	St. Cloud	Byproduct from combustion	No communication from the company
Xcel Energy	Power generation	0.06	Red Wing	Byproduct from combustion	No change

About the report

This report details the implementation of a 2019 appropriation passed by the 2019 Minnesota Legislature and signed into law by Governor Tim Walz[1]. Using these funds over the FY2020-21 biennium, the Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Health (MDH) are working to reduce tricholoroethylene (TCE) from air emissions of permitted facilities statewide and to assess health risks in areas with suspected TCE exposure. Facilities are voluntarily providing TCE data to the MPCA. The agencies will report to the Legislature on their progress implementing this appropriation.

The MPCA, using numerous databases, emissions inventory data and permit information, identified and contacted permitted facilities statewide that use TCE in processes or that generate TCE emissions. MPCA started its assessment with a list of more than 100 facilities with known or suspected TCE emissions. As the agency continued its assessment, additional facilities were discovered. These facilities are diverse and include industry, landfills, and municipal wastewater treatment facilities. The processes that use or emit TCE at each facility can also be unique.

About TCE

Trichloroethylene (TCE) is used in a variety of industrial and domestic applications such as a solvent for degreasing metal parts. It can be found in consumer products, including some wood finishes, adhesives, paint removers, and stain removers. TCE can also be used in the manufacture of other chemicals.

TCE is a nonflammable, colorless liquid (at room temperature). It evaporates easily into air and has an ether-like odor at high concentrations. At lower levels, TCE has no odor to warn people that contaminants are in the air.

Negative health effects can occur when breathing TCE. Populations sensitive to TCE include children, pregnant women, and developing fetuses. Potential impacts at levels above Health Based Values could include effects to the immune and reproductive systems, liver, kidneys, and fetal heart malformation during pregnancy. There is more information about the health effects of TCE on the MDH website[2].

1 MN Session Laws – 2019, First Special Session, Chapter 4, Article 1, Section 2, Subdivision 3 (b). $393,000 the first year and $393,000 the second year are from the environmental fund to further evaluate the use and reduction of trichloroethylene around Minnesota and identify its potential health effects on communities. Of this amount, up to $121,000 each year may be transferred to the commissioner of Health.

2 https://www.health.state.mn.us/communities/environment/risk/docs/guidance/air/tceairinfo.pdf