

Tributyl Phosphate Screening Profile

Tributyl phosphate (TBP) is a contaminant that has been detected in surface water and groundwater in Minnesota. The information in this profile was collected for the screening process of the Minnesota Department of Health's Contaminants of Emerging Concern (CEC) program in February 2017. The chemicals nominated to the CEC program are screened and ranked based on their toxicity and presence in Minnesota waters. Based on these rankings, some chemicals are selected for a full review. CEC program staff have not selected tributyl phosphate for a full review.

TBP Uses

TBP is a chemical mainly used as a flame retardant for aircraft hydraulic fluid. It is also used in the process of mining rare earth elements, such as uranium and plutonium. TBP is occasionally used in casings for oil wells, floor finishes, nuclear fuel processing, and fluorescent dyes. Prior to the 1980s, some herbicides contained TBP. Currently, there are no consumer products known to have TBP.¹

TBP in the Environment

TBP may enter the environment through waste streams connected to the production and use of the chemical. TBP is not expected to build up in tissues of fish or other wildlife.¹ TBP has been detected in Minnesota waters:

- in groundwater at a maximum concentration of 13 parts per billion (ppb)—this water was below a landfill,²
- in surface water at an estimated maximum concentration of 0.32 ppb,⁴ and
- in treated wastewater at an average concentration of 0.22 ppb⁵ and maximum detection of 1.8 ppb².

Exposure to TBP

The main exposure pathway for TBP is through skin contact with the chemical at a job site that uses TBP.¹

Potential Health Effects

In laboratory animals, the urinary tract was most affected by high doses of TBP. Other effects included increased liver weight, decreased spleen weight, and degenerative changes in the testes. High doses of TBP have also been shown to cause bladder cancer in animal studies.⁶

Based on the screening assessment, TBP will likely rank higher than many other nominated CEC chemicals, so a full review of TBP may be possible in the future.

References

1. United Nations Environment Programme (UNEP) 2004. [OECD SIDS: Tributyl Phosphate.](http://www.inchem.org/documents/sids/sids/126-73-8.pdf) (<http://www.inchem.org/documents/sids/sids/126-73-8.pdf>).
2. Lee, Kathy, et al. 2004. [Presence and distribution of organic wastewater compounds in wastewater, surface, ground, and drinking waters, Minnesota, 2000-02 U.S. Geological Survey Scientific Investigations Report](https://pubs.usgs.gov/sir/2004/5138/20045138.pdf) (<https://pubs.usgs.gov/sir/2004/5138/20045138.pdf>).
3. U.S. Geological Survey (USGS) & Minnesota Pollution Control Agency. 2014. [Contaminants of Emerging Concern in Ambient Groundwater in Urbanized Areas of Minnesota, 2009-12](https://pubs.usgs.gov/sir/2014/5096/pdf/sir2014-5096.pdf) (<https://pubs.usgs.gov/sir/2014/5096/pdf/sir2014-5096.pdf>).
4. USGS. 2014. [USGS Water-Quality Data for the Nation](https://nwis.waterdata.usgs.gov/nwis/qw) (<https://nwis.waterdata.usgs.gov/nwis/qw>). Accessed January 2015.
5. USGS Contaminants of Emerging Concern Database. 2015. Accessed by MDH staff November 2016.
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Contaminants of Emerging Concern Program

Chemical Review Process

The Contaminants of Emerging Concern (CEC) program investigates the potential health concerns of contaminants of emerging concern in drinking water. This investigation includes a rapid assessment ('screening') to prioritize nominated chemicals for in-depth research and evaluation that result in drinking water guidance and information about exposure.

Chemical Nomination and Eligibility

Minnesota risk managers, stakeholders, and the public are encouraged to nominate contaminants for review. After chemicals are nominated, MDH program staff determine eligibility by examining the likelihood that the chemical will enter Minnesota waters and whether adequate guidance already exists.

Screening and Risk Based Selection

Program staff conduct a screening of where and how a contaminant is used in the state, its potential to enter the water supply, and its potential to harm humans. The results from the screening are used to prioritize nominated chemicals.

Chemicals having higher exposure and harm potential are selected for in-depth review and development of guidance (a contaminant water concentration that is not harmful to people). Chemicals that rank lower remain candidates for future in-depth review. For some contaminants, however, the information is too limited. For chemicals that are not selected for in-depth review, the results of the screening assessment are summarized in a Screening Profile. The screening and prioritization process is repeated as additional chemicals are nominated and screened.

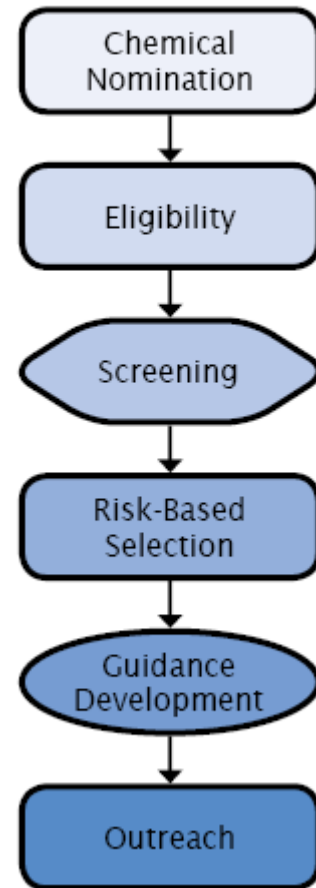
Guidance Development

When a chemical is selected for a full review, program staff carefully review exposure and toxicological information to understand how humans may be exposed and what adverse health effects occur from exposure. Staff combine the results of in-depth analyses of toxicity and exposure to calculate a guidance, a level of contaminant in water that causes little to no harm to someone drinking the water.

Outreach

CEC program staff work to communicate the results of the chemical review process. This includes making key findings publicly available on web pages and at a variety of meetings and events. An email subscription service (GovDelivery) is also used to alert the interested public (subscribers) of chemical review activities and guidance values.

Chemical Review Process



Subscribe to the CEC Program GovDelivery service to receive notification when reviews are initiated for water contaminants and other announcements by visiting: <http://www.health.state.mn.us/cec>