

Nonylphenol Ethoxy-Carboxylates Screening Profile

Nonylphenol monoethoxy-carboxylate (NP1EC), nonylphenol diethoxy-carboxylate (NP2EC), and nonylphenol triethoxy-carboxylate (NP3EC) are contaminants that have been detected in potential drinking water sources 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 April 2014. 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 the nonylphenol ethoxy-carboxylates for a full review.

NP1EC, NP2EC, and NP3EC Uses

NP1EC, NP2EC, and NP3EC, collectively referred to as NPECs, are chemicals used to prevent corrosion in lubricating oils, greases, and fuels. They are also a by-product of textile and paper manufacturing.

NPECs can sometimes be created through the degradation of other chemicals in the wastewater treatment process.¹ This can result in an increase in concentration of NPECs in treated wastewater.

NPECs in the Environment

NPECs have been detected in Minnesota waters.

- NP1EC has been detected in Minnesota wastewater at a maximum concentration of 140 parts per billion (ppb),² and in Minnesota surface water at up to 15 ppb.³
- NP2EC has been detected in Minnesota wastewater at a maximum concentration of 140 parts per billion (ppb),² and in Minnesota surface water at a maximum concentration of 13 ppb.²
- NP3EC has been detected in treated wastewater at a maximum concentration of 19 ppb.³ It has not been detected in Minnesota surface water.

NP1EC, NP2EC, and NP3EC are not expected to build up in tissues of wildlife.⁴ In the environment, NPECs will likely degrade into nonylphenol, a chemical recently reviewed by the CEC program.⁵ Based on current information, NPECs are likely to be less toxic than nonylphenol.⁶

Exposure to NPECs

Exposure can occur through drinking contaminated water, eating contaminated food or coming into contact with products that contain NPECs.

Potential Health Effects

Although NPECs are generally less toxic than nonylphenol, they can break down into nonylphenol. In animal studies, high levels of nonylphenol caused harmful effects on the kidneys and hormone levels.⁵ MDH developed a health-based value for nonylphenol in drinking water of 20 ppb.⁵

Based on the screening assessment, a full review of NP1EC, NP2EC, and NP3EC may not be possible.

References

1. Ahel M, Giger W, Markus K. Behaviour of alkylphenol polyethoxylate surfactants in the aquatic environment. *Wat Res.* 1994;28(5):1131-1142.
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3. Lee et al. 2011, Endocrine active chemicals, pharmaceuticals, and other chemicals of concern in surface water, wastewater-treatment plant effluent, and bed sediment. Minnesota. USGS Data Series 575. <http://pubs.usgs.gov/ds/575/pdf/ds575.pdf>
4. U.S. Environmental Protection Agency. PBT Profiler. Last Updated September 2012. www.pbtprofiler.net
5. Minnesota Department of Health. Nonylphenols and drinking water information sheet. 2015. <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/nonylphinfo.pdf>
6. Canadian Environmental Quality Guidelines. Nonylphenol and its ethoxylates. 2002. <http://ceqg-rcqe.ccme.ca/download/en/273>

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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.

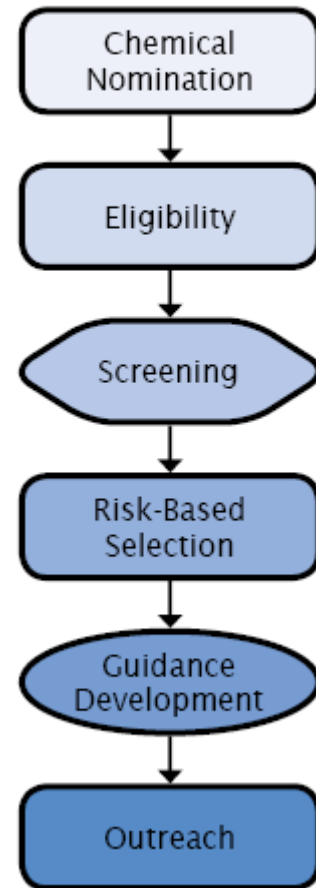
Guidance Development

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>