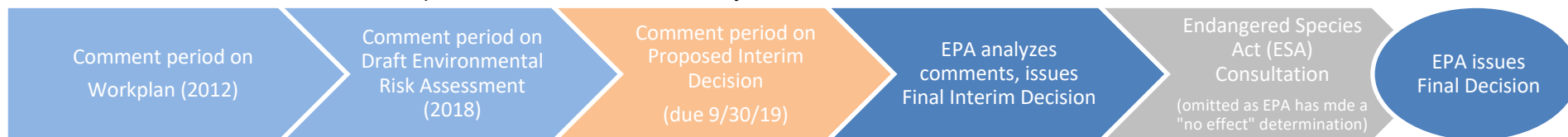


**Pesticide:** Tri-N Butyl Tetradecyl Phosphonium Chloride (TTPC); EPA-HQ-OPP-2011-0952  
**Use:** Antimicrobial used in cooling towers and industrial water systems.  
**Why we care:** Toxic to aquatic organisms.  
**Actions taken:** Informal communication via EPA Region 9 about omitting wastewater discharge in draft risk assessment.  
**Status:** EPA released the Proposed Interim Decision in July 2019.



**Next steps:** EPA will analyze comments and issue a Final Interim Decision. No ESA consultation is planned as EPA made a “no effect” determination.

**Recommendation:** No action at this time. Keep TTPC on watch list due to its aquatic toxicity.

From EPA’s Risk Assessment and Proposed Interim Decision:	Response from a POTW Perspective:
<p><i>“TTPC is expected to strongly sorb to sludge and to biodegrade in waste water treatment and is not likely to reach aquatic or terrestrial environments.”</i> (Proposed Decision, p. 9)</p> <p>TTPC is very highly toxic to aquatic organisms. <i>Daphnia magna</i> EC50 = 25 µg ai/L (Risk Assessment page 10). Freshwater and marine diatom toxicity occurs at even lower concentrations. Freshwater <i>Navicula pelliculosa</i> EC50 1.2 µg ai/L; saltwater <i>Skeletonema costatum</i> EC50 3.2 µg ai/L. (Risk assessment, p. 19)</p> <p><i>“The current uses are not expected to result in any significant release of TTPC into the aquatic or terrestrial environments based on the strong sorption to sediment and sludge. Therefore, no acute or chronic risk quotients have been calculated. Risks to nontarget organisms are presumed to be minimal.”</i> (Risk Assessment, p.11)</p> <p><i>“Due to the fact that TTPC degrades during wastewater treatment and it is expected to sorb strongly to sludge and sediment, no down-the-drain assessment is being conducted.”</i> (Risk Assessment, p.10)</p> <p><i>“The Agency does not possess acceptable data on the potential of TTPC to sorb to activated sludge. However, the results of the adsorption/desorption study indicate that</i></p>	<p>A down-the-drain assessment should be conducted to verify this presumption. Other chemicals with similar chemical properties are known to pass through POTWs and have been found in effluent and aquatic sediments at concentrations exceeding toxicity thresholds for aquatic organisms. TTPC is relatively toxic to aquatic organisms as compared to other chemicals (chemicals with effects thresholds in the low ug/L range are classified as “very highly toxic”).</p>

<p><i>TTPC has a high potential to sorb in a wide range of environmental conditions and the positive charge of TTPC makes it highly likely that TTPC would sorb to sludge. EpiSuite [a computational environmental fate prediction program used by US EPA] also estimates that up to 83% of TTPC would be removed by sorption during wastewater treatment.”</i> (Risk Assessment, p. 9-10)</p>	
<p>Risk Assessment identifies Tetrabutylphosphonium chloride (TBPC) as the ultimate degradate of TTPC, but it does not address risks from TBPC at all.</p> <p>During wastewater treatment: <i>“Based on a ready biodegradability study, about 50% of applied TTPC is expected to remain unchanged and about 50% is expected to degrade to TBPC [Tetrabutylphosphonium chloride].”</i> (Risk Assessment p. 9)</p> <p>In biosolids, 100% transformation of TTPC to TBPC was reported in one study. (Risk Assessment, p. 15). TBPC is not water soluble and is likely to bioaccumulate and to partition into biosolids and aquatic sediments. (Risk Assessment, p. 15)</p> <p><i>“EPI Suite estimates 88% removal of TBPC during wastewater treatment.”</i> (Risk Assessment, p. 16)</p>	<p>The risk assessment should have evaluated the degradate, given its high formation rate and persistence.</p> <p>The degradate TBPC is relatively not particularly toxic to aquatic organisms, based on limited test data. <i>C. daphnia</i> EC50=1.5 mg/L, algae <i>Pseudokirchneriella subcapitata</i> EC50 = 2.8 mg/L, fathead minnow LC50&gt;100mg/L. (Toxicity data from EU ECHA database.) Due to its relatively moderate toxicity, aquatic risks from the degradate are unlikely.</p>
<p>POTW process interference (toxicity to wastewater treatment organisms) occurs, with an EC50 of 14.3 mg/L (Risk Assessment Page 9). A rough calculation from product labels indicates that industrial wastewater and cooling water application rates result in a treated water concentration of about 30 µg/L.</p>	<p>Process interference is unlikely to occur unless concentrated product is dumped into POTW influent flow.</p>