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APR 11 2003

Mr. Frank Gostomski
Health and Ecological Criteria Division (4304T)
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Re: Draft Ambient Aquatic Life Water Quality Criteria for Tributyltin; Notice of Availability; 67 FR 79090 (27 December 2002)

Dear Mr. Gostomski

This letter provides Department of Navy (Navy) comments on EPA's efforts to finalize the water quality criteria for tributyltin (TBT) as outlined in the Draft Ambient Aquatic Life Water Quality Criteria for Tributyltin, 67 FR 79090 (27 December 2002). The Navy recommends that EPA take into consideration the enclosed comments regarding the scientific and technical merit of the proposed criteria. These comments demonstrate that, while a value lower than the draft TBT chronic criterion of 10 ng/l may be justified, a chronic criterion of 1 ng/l is overly conservative.

The Navy recognizes that water quality criteria are based solely on the factors listed in section 304(a) of the Clean Water Act, 33 U.S.C. § 1314(a). Nevertheless, it is important that EPA recognize the economic and technical difficulties in achieving water quality standards. Even after full implementation of the TBT hull-coating ban in 2008 by the International Maritime Organization (IMO) Treaty, a chronic criterion of 1 ng/l may not be attainable for some years in the majority of harbors within the United States, given that TBT is present in other sources, such as cooling water biocides and legacy contamination of sediments.

The Navy appreciates the opportunity to comment on the draft criteria for TBT. My point of contact is Ms. Tanya Courtney at (703) 602-1738 or via email at Tanya.Courtney@navy.mil.

Sincerely,

Donald R. Schregardus
Deputy Assistant Secretary of the Navy
(Environment)

Navy Comments to Draft
Ambient Aquatic Life Water Quality Criteria for Tributyltin;
Notice of Availability; 67 FR 79090 (27 December 2002)

Concentration effects on marine organisms. Two papers were used in the Addendum of the Water Quality Criteria (WQC) Document for TBT to justify the reduction of the criterion from the draft 1997 value of 10 ng/L to 1 ng/L. The Matthiessen and Gibbs (1998) paper reports, as cited in the document, endocrine disruption in the form of imposex in neogastropod marine snails at less than 5 ng/L TBT. These effects on marine snails represent the lowest concentration effects observed for TBT on any marine organisms. However, significant reproductive population effects in the neogastropod *N. lapillus* appear to occur at concentrations above 5 ng/L. Because significant population effects are not observed at or below 5 ng/L, there does not appear to be any justification for lowering the criterion to 1 ng/L based primarily on the endocrine disrupting effects on the neogastropod marine snails. The second paper used to support the 10-fold reduction in the criterion value was Fisher, et al. (1999), which reported an increase in infection to a protozoan pathogen in the eastern oyster exposed to 30 ng/L and 90 ng/L TBT. Although this paper suggests some degree of immuno-suppression, the experimental concentrations are far too high, without additional data, to support a 1 ng/L criterion.

2. *Biomagnification of TBT in invertebrates and mammals.* While TBT does biomagnify in certain invertebrates, particularly mollusks, there is not much evidence that there is significant food chain biomagnification in fish, birds and mammals, which have active systems for metabolizing TBT. It is known that plants and many animals actively metabolize TBT[1] primarily through their cytochrome P-450 system. In marine mammals, butyltins in liver tissues of dolphins are mostly degradation products, with about 10% on average as TBT (90% dibutyltin (DBT) and monobutyltin (MBT)), whereas their fish food source average about 50% TBT, indicating rapid debutylation of the TBT.[2] In muscle tissue there is a somewhat higher proportion of TBT relative to degradation products, but far lower overall concentrations. On average, the biomagnification factor (BMF) was 1, demonstrating some uptake from food, but suggesting little if any food chain magnification in the dolphin (Tursiops). Therefore, biomagnification of TBT in the food chain does not appear to be supported in the data relating to marine mammals.

3. *Degradation of TBT in sediment.* The criteria document suggests that TBT degradation in sediment is much slower than degradation in the water column. Sediment studies, not referenced in the criteria document, have shown that there is both rapid biotic and abiotic degradation of TBT in fine-grained sediments at the sediment-water interface.[3,4] Sediments in these studies were observed to degrade 50% or more of the TBT to DBT and MBT in both sterile and unsterilized sediments in a period of days, suggesting both chemical and biological degradation processes. It is likely that much of the residual TBT measured in harbor and estuarine sediments is either in particulate form from paint chips, making it less available, or has been mixed into the sediment in anoxic layers with reduced degradation.

4. *Degradation of TBT in water.* In the background section of the Executive Summary, the second sentence states that TBT is a problem in the aquatic environment because of its toxicity and links to imposex and immuno-suppression and "is very persistent." To be more accurate, the phrase on persistence should be deleted as TBT has been found to have a half-life in water varying from a few days to three weeks.[3, 5]

5 *Derivation of TBT Criteria.* EPA's decision to reduce the Draft TBT criterion from 10 ng/L to 1 ng/L was based on two new references provided in the WQC document Addendum describing chronic threshold effects in Mollusks. While these papers do document apparent endocrine disruption in some neogastropods and potential immuno-suppression in the eastern oyster, it has not been shown that population effects occur at concentrations near the proposed chronic criterion of 1 ng/L. Based on our review of these two papers and the results of a Navy study to evaluate whether the current levels of TBT in receiving waters were protective of human health and the environment,[6] we believe the use of low chronic threshold values in this case results in a highly conservative proposed chronic criterion for TBT.

References

[1] Lee, R.F. 1996. Metabolism of tributyltin by aquatic organisms. In: Organotin: Environmental Fate and Effects. (Eds.) Champ, M.A. and P.F.Seligman. Chapman and Hall, London. pp. 369-382.

[2] Kannan, K., K. Senthilkumar, B.G. Loganathan, S. Takahashi, D.K. Odell and S. Tanabe. 1997. Elevated accumulation of tributyltin and its breakdown products in Bottlenose Dolphins (Tursiops truncates) found stranded along the U.S. Atlantic and Gulf Coasts. Environ. Sci. Technol. 31,296-301.

[3] Seligman, P.F., R.J. Maguire, R.F. Lee, K.R. Hinga, A.O. Valkirs and P.M. Stang. 1996. Persistence and fate of tributyltin in aquatic ecosystems In: Organotin Environmental Fate and Effects, M.A. Champ and P.F. Seligman (Eds). Chapman Hall, New York, pp 239-457.

[4] Stang, P.M., R.F. Lee and P.F. Seligman. 1992. Evidence for rapid non-biological degradation of tributyltin in fine-grained sediments. Environ. Sci. Technol., 26, 1382-1387.

Seligman, P.F., A.O. Valkirs and R.F. Lee. 1986. Degradation of tributyltin in San Diego Bay, California, water. Environ. Sci. Technol., 20, 1299-1235

[6]U.S. Navy. 1997. Navy Program to Monitor Ecological Effects of Organotin: A Report to Congress as Required Under the Nation Defense Authorization Act for Fiscal Year 1997 (Section 333). 76pp.