

A P E R E S E A R C H C O U N C I L

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July 15, 2009

Connecticut Department of Environmental Protection
Water Quality Standard Review
79 Elm Street
Hartford, CT 06106

Via email: dep.wqsreview@ct.gov

Dear Sir or Madam:

Attached are comments of the Alkylphenols & Ethoxylates Research Council on the Connecticut Department of Environmental (DEP) Protection “Notice of Intent to Conduct a Triennial Review of Water Quality Standards (April 16, 2009).”

If you have any questions please contact me at (202) 419-1500
or blosey@regnet.com.

Barbara S. Losey
Deputy Director

cc: Robert J. Fensterheim (APER-NA, Executive Director)

**Comments
of the
Alkylphenols & Ethoxylates Research Council
on the
Connecticut Department of Environmental Protection
Notice of Intent to Conduct a Triennial Review of Water Quality
Standards (April 16, 2009)**

**Alkylphenols & Ethoxylates Research Council
1250 Connecticut Avenue, NW
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July 15, 2009

**Comments of the
Alkylphenols & Ethoxylates Research Council on the
Connecticut Department of Environmental Protection
Notice of Intent to Conduct a Triennial Review of Water Quality Standards
(April 16, 2009)
Submitted July 15, 2009**

The Alkylphenols & Ethoxylates Research Council (APERC) is pleased to submit these comments in response to the Connecticut Department of Environmental Protection (DEP) request for public input to DEP's review and revision of its Water Quality Standards (WQS).¹ For more than twenty years, APERC, previously called the Alkylphenols and Ethoxylates Panel, and its member companies have been actively engaged in toxicological and environmental fate and effects research on alkylphenols (APs) and their derivative compounds.² Consequently, APERC can contribute considerable information and expertise relevant to the environmental and toxicological assessment of these substances.

APERC is comprised of major North American producers of APs including nonylphenol (NP), which has federal Ambient Aquatic Life Water Quality Criteria (WQC) that were established by US EPA since the last DEP revision of the Connecticut WQS in 2002.^{3, 4} APERC recommends that DEP adopt the federal WQC for NP as Numerical WQC in Appendix D of the Connecticut WQS to:

- Ensure that the State of Connecticut WQS are compliant with the Clean Water Act (CWA);
- Provide a clear definition of aquatic concentrations of NP that are protective of the aquatic environment: thereby supporting an over-arching framework for ensuring that surface and ground waters in Connecticut are protected from degradation; and
- Support the policy set forth in the Connecticut WQS to “adopt standards that promote the State’s economy in harmony with the environment.”⁵

The following comments provide more detailed discussion in support of DEP's adoption of the federal WQC for NP as Numerical WQC in the Connecticut WQS.

¹ Connecticut Department of Environmental Protection. (2009, April 16). Notice of Intent to Conduct a Triennial Review of Water Quality Standards. http://www.ct.gov/dep/cwp/view.asp?a=2719&q=438600&depNav_GID=1654.

² Members of the Alkylphenols & Ethoxylates Research Council include: Dover Chemical Corporation; SI Group; Texas Petrochemicals, Inc. and The Dow Chemical Company.

³ US Environmental Protection Agency (US EPA). (2006, February 23). Notice of availability of final aquatic life ambient water quality criteria for nonylphenol. *Federal Register*, 71 (36), 9337-9339. <http://www.epa.gov/fedrgstr/EPA-WATER/2006/February/Day-23/w2558.htm>.

⁴ State of Connecticut Department of Environmental Protection (CT DEP). (2002). Water quality standards: Surface water quality standards effective December 17, 2002; Ground water quality standards effective April 12, 1996. http://www.ct.gov/dep/lib/dep/water/water_quality_standards/wqs.pdf

⁵ CT DEP. (2002).

I. ADOPTION OF THE FEDERAL WQC FOR NP AS NUMERICAL WQC IN THE CONNECTICUT WQS WILL ENSURE THAT THE STATE OF CONNECTICUT IS COMPLIANT WITH THE FEDERAL CWA

Section 22a-426 of the Connecticut General Statutes requires that the Commissioner of Environmental Protection adopt standards of water quality “consistent with the federal Clean Water Act and ...for the purpose of providing clear and objective public policy statements of a general program to improve the water resources of the state.”⁶ Section 304(a)(1) of the Clean Water Act CWA of 1977 (P.L. 95-217) requires that the Administrator of the EPA publish WQC that “accurately reflect the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare...which may be expected from the presence of pollutants in any body of water, including ground water”.

In order to be consistent with federal guidance under Section 304 of the CWA, DEP should adopt the following NP WQC⁷ that EPA finalized in 2006:

- Acute WQC for NP - 28.0 µg/L (fresh water) and 7.0 µg/L (salt water)
- Chronic WQC for NP - 6.6 µg/L (fresh water) and 1.7 µg/L (salt water)

II. ADOPTION OF THE FEDERAL WQC FOR NP WILL SUPPORT DEP’S OVERALL POLICY FOR MANAGEMENT OF WATER QUALITY IN ACCORDANCE WITH SECTION 22A-426 OF THE CONNECTICUT GENERAL STATUTES BY PROVIDING A CLEAR DEFINITION OF AQUATIC CONCENTRATIONS OF NP THAT ARE PROTECTIVE OF THE AQUATIC ENVIRONMENT; THEREBY SUPPORTING AN OVER-ARCHING FRAMEWORK FOR ENSURING THAT SURFACE AND GROUND WATERS IN CONNECTICUT ARE PROTECTED FROM DEGRADATION

WQS are the foundation of the nation's surface water quality protection program and they form the legal basis for controls on the amount of pollutants entering waters from sources such as industrial facilities, wastewater treatment plants and storm sewers. The Connecticut WQS (2002) document states that one of the purposes of the WQS is “to provide clean and objective statements for existing and projected water quality and the general program to improve Connecticut’s water resources.”⁸ Numeric WQC are one element of state WQS, which provide clear and objective criteria for evaluating the quality of Connecticut’s water bodies.

⁶ Connecticut Code Title Sec. 22aChapter 426 (Formerly Sec. 25-54e). Standards of water quality law.justia.com/connecticut/codes/title22a/sec22a-426.html.

⁷ US EPA. (2006, February 23).

⁸ CT DEP. (2002).

As noted above, in 2006 EPA finalized the acute and chronic Aquatic Life Ambient WQC for NP, the most toxic of the NPE biodegradation intermediates, which are protective of aquatic species that dwell in fresh and marine water.⁹

The EPA WQC for NP were derived based on an extensive ecotoxicity data covering a broad range of species and as a result are protective of aquatic species that dwell in both fresh and marine aquatic environments. In developing the NP WQC, the EPA Office of Water conducted a significant review of the data available for this compound. Following the Agency's general guidance for the development of WQC, EPA utilized a statistical extrapolation procedure that provides an estimate of the highest concentration to which an aquatic community can be exposed indefinitely without unacceptable effects.¹⁰ In addition, the support document notes that the NP WQC were derived "based upon consideration of comments received from independent peer reviewers and the public."¹¹ EPA's conclusions were consistent with a species sensitivity distribution analysis conducted by Staples et al. (2004) that calculated a similar freshwater chronic value based on 90 chronic toxicity values for NP reported for 16 species of freshwater aquatic invertebrate and vertebrate species that was based on essentially the same chronic data set used by EPA.¹²

Since EPA uses whole organism apical endpoints such as reproduction and growth effects, which reflect the culmination of molecular, biochemical and tissue-level effects at the whole organism level, to derive the WQC values, the NP WQC address all mechanisms of action - including estrogenic effects – that result in measurable alterations in these apical endpoints. Although NP has been shown to have weak estrogenic activity, EPA noted in the NP WQC Document "the ability of nonylphenol to induce estrogenic effects has seldom been reported at concentrations below the freshwater Final Chronic Value of 6.5965 µg/L."¹³

III. ADOPTION OF THE FEDERAL WQC FOR NP AS NUMERICAL WQC WILL ALSO SUPPORT THE POLICY SET FORTH IN THE CT WQS TO "ADOPT STANDARDS THAT PROMOTE THE STATE'S ECONOMY IN HARMONY WITH THE ENVIRONMENT."¹⁴

NP and NPEs are treatable in wastewater treatments plants and they are neither persistent nor bioaccumulative; therefore they can be effectively managed using WQC\WQS and, as necessary, National Pollutant Discharge Elimination System (NPDES) permits to

⁹ US EPA. (2006, February 23).

¹⁰ US Environmental Protection Agency (US EPA). (1985). Guidelines for deriving numerical national water quality criteria for the protection of aquatic organisms and their uses. <http://www.epa.gov/waterscience/criteria/aqlife/>.

¹¹ US Environmental Protection Agency (US EPA). (2005). Aquatic life ambient water quality criteria - nonylphenol. Report 822-R-05-005. US Environmental Protection Agency, Washington, DC, USA.

¹² Staples, C., Mihaich, E., Carbone, J., Woodburn, K., & Klečka, G. (2004). A weight of evidence analysis of the chronic ecotoxicity of nonylphenol ethoxylates, nonylphenol ether carboxylates, and nonylphenol. Human and Ecological Risk Assessment, 10 (6), 999-1017.

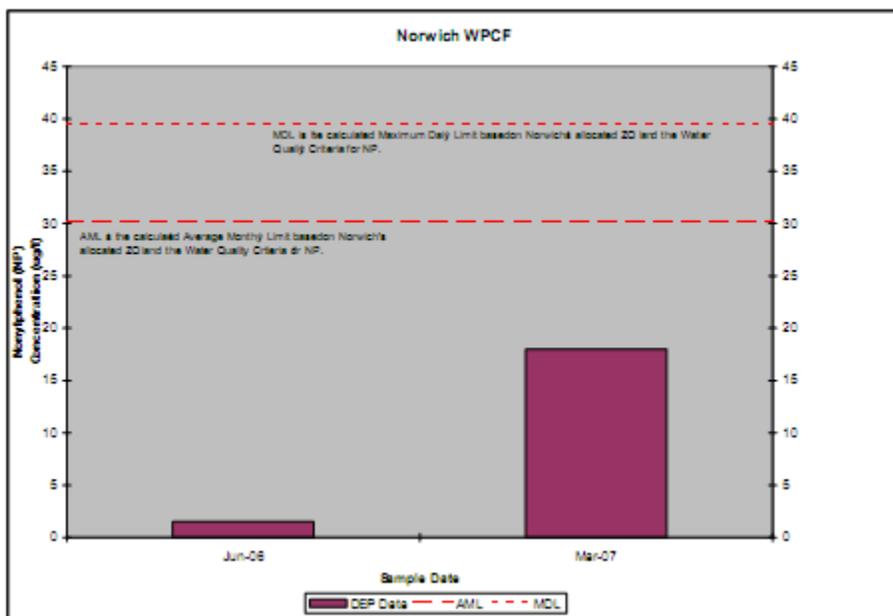
¹³ US EPA. (2005).

¹⁴ CT DEP. (2002).

monitor and control effluent concentrations.^{15,16,17,18,19} This is demonstrated by the attached analysis of results of DEP's own monitoring studies on effluent concentrations of NP in wastewater treatment plant effluent in Norwich and East Hartford, CT.²⁰

Figure 1 below illustrates that levels of NP in effluent from the Norwich Water Pollution Control Facility (WPCF), as measured by DEP, are already well within the calculated NPDES permit levels for NP based on the federal WQC.

Figure 1 - Norwich



Based on APERC's discussions with DEP and the monitoring results for East Hartford illustrated in Figure 2 below, it is clear that even when NP concentrations in effluents exceeded the calculated Connecticut NPDES permit level (as derived based on the federal WQC for NP) corrective action was effective at reducing effluent concentrations to permit-compliant levels. Therefore, incorporating the federal WQC for NP into

¹⁵ Melcer, H., Klečka, G., Monteith, H., Staples, C. (2007) Wastewater Treatment of Alkylphenols and Their Ethoxylates : A State of the Science Review. Published by Water Environment Federation, Alexandria, VA.

¹⁶ European Chemicals Bureau (ECB). (2003). PBT Working Group substance information sheets for nonylphenol (CAS 25154-52-3) and phenol, 4-nonyl, branched (CAS 84852-15-3).

¹⁷ Environment Canada (EC). (2007). Ecological categorization of substances on the Domestic Substance List; Categorization decisions. (Completed in September 2006). http://www.ec.gc.ca/substances/ese/eng/dsl/cat_index.cfm

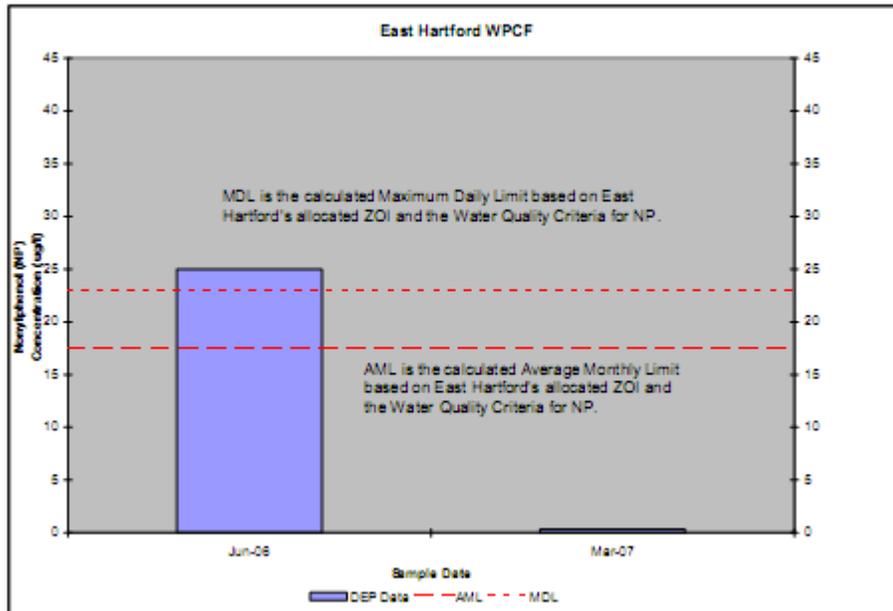
¹⁸ Staples, C.A., Klecka, G.M., Naylor, C.G., & Losey, B.S. (2008). C8- and C9-alkylphenols and ethoxylates: I. Identity, physical characterization, and biodegradation pathways analysis. Human and Ecological Risk Assessment, 14 (5), 1007–1024.

¹⁹ Klecka, G.M., Staples, C.A., Naylor, C.G., Woodburn, K.B., & Losey, B.S. (2008). C8- and C9-alkylphenols and ethoxylates: II. Assessment of environmental persistence and bioaccumulation potential. Human and Ecological Risk Assessment, 14 (5), 1025–1055.

²⁰ Ecsady, C. Fuss & O'Neil. (2008, November 6). Memo to Alkylphenols & Ethoxylates Research Council: Application of nonylphenol water quality criteria to Norwich, CT WPCF and East Hartford, CT MDC WPCF NPDES discharges.

Connecticut WQS is not likely to be a technical or economic burden on either the DEP or the local business community in Connecticut.

Figure 2 - East Hartford



IV. SUMMARY

DEP should ensure Connecticut's compliance and consistency with Clean Water Act (CWA) by adopting the federal NP WQC that were finalized by EPA in 2006. In doing so, DEP will provide a clear definition of aquatic concentrations of NP that are protective of the aquatic environment and ensure that surface and ground waters in Connecticut are protected from degradation.



MEMORANDUM

TO: Barbara Losey, Alkylphenols & Ethoxylates Research Council

FROM: Christopher J. Ecsedy, P.E., LEP, Fuss & O'Neill, Inc.

DATE: November 6, 2008

RE: Application of Nonylphenol Water Quality Criteria to Norwich, CT WPCF and East Hartford, CT MDC WPCF NPDES Discharges

COPY: John Wertam, Shipman & Goodwin LLP

The purpose of this memorandum is to calculate what would be permit limits for Nonylphenol (NP) in wastewater discharges from the East Hartford and Norwich, Connecticut Water Pollution Control Facility (WPCFs). Fuss & O'Neill calculated potential NPDES permit limits for NP using the adopted federal water quality criteria established for such compounds. The following provides a summary of our approach.

The assessment involved developing independent permit limit calculations consistent with the Environmental Protection Agency's (EPA's) methodology for calculating toxics based permit limits. EPA's 1991 Technical Support Document (TSD)¹ and the Federal Water Quality Criteria² for NP were used to calculate appropriate NP limits. The allowable Zone of Influence given in the permits was used to calculate a wasteload allocation (WLA). The ZOI represents the "mixing" zone for the constituent considered³. The applicable criteria must be met at the boundary of this mixing zone. The statistical methods provided in the TSD were used to calculate average monthly limits (AML) and maximum daily limits (MDL) for NP at each facility. This approach is consistent with DEP's methodology for calculating NPDES permit limits for WPCFs in Connecticut.

The following assumptions were made in developing these calculations:

1. Salt water values were used for Norwich; fresh water values were used for East Hartford.
2. It is assumed that the coefficient of variation is 0.6 for NP. This is a default value suggested in the EPA TSD.
3. We have used the 99th percentile statistics in these computations.

¹ United States Environmental Protection Agency, Technical Support Document for Water Quality-based Toxics Control, Office of Water, EPA/505/2-90-0001, PB91-127415, March 1991

² United States Environmental Protection Agency, Aquatic Life Ambient Water Quality Criteria - Nonylphenol FINAL, Office of Water, EPA-822-R-05-005, December, 2005.

³ The ZOI for Norwich and East Hartford were obtained from NPDES Permits CT0100412 and CT0100170, respectively. For Norwich, the permitted ZOI is 4,659,167 gallons per hour (gph) and for East Hartford, the permitted ZOI is 581,655 gph.

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Memorandum to Ms. Barbara Losey

November 6, 2008

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4. We have assumed that 2 samples per month would be required. We have assumed a lower number of samples per month than is typically required for metals because NP is a more costly analyte than most metals.

The results of this assessment were compared to NP results for samples collected by the DEP in June 2006 and March 2007 for Norwich and East Hartford.⁴ Analytical data for only NP was used because the ethoxylates are not included in the federal water quality criteria for NP. Comparisons between AMLs, MDLs and reported NP concentrations are illustrated on the attached graphs.

⁴ Connecticut Department of Environmental Protection, Evaluation of Nonylphenol and Nonylphenol Ethoxylates in Sewage Treatment Plants in Connecticut, Bureau of Water Protection and Land Reuse, Planning & Standards Division, October 2008

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