UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

August 17, 2005

Yvonne Bolton, Chief
Bureau of Water Management
Connecticut Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-3020

SUBJECT: **Notification of Approval of Upper Naugatuck River TMDL**

Dear Ms. Bolton:

Thank you for Connecticut's submittal of the Upper Naugatuck River Total Maximum Daily Load (TMDL), Thomaston, CT, for Whole Effluent Toxicity. This waterbody is included on Connecticut's 2004 303(d) list and was prioritized for TMDL development. The purpose of the TMDL is to address an impairment of aquatic life support due to toxicity from point and nonpoint source pollution.

The U.S. Environmental Protection Agency (EPA) hereby approves Connecticut's March 7, 2005 Upper Naugatuck River TMDL, received by EPA on March 10, 2005. EPA has determined that this TMDL meets the requirements of §303(d) of the Clean Water Act (CWA), and of EPA's implementing regulations (40 CFR Part 130). Attached is a copy of our approval documentation.

We are very pleased with the quality of your TMDL submittal. Your staff has done an excellent job of preparing the TMDL report, and documenting the development process. My staff and I look forward to continued cooperation with the CT DEP in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA.

If you have any questions, please contact Stephen Silva (617-918-1561) or Steven Winnett (617-918-1687) of my staff.

Sincerely,

Linda M. Murphy

Linda M. Murphy, Director
Office of Ecosystem Protection

cc Betsey Wingfield, CT DEP
Lee Dunbar, CT DEP
Chris Bellucci, CT DEP
Stephen Silva, EPA
Steven Winnett, EPA
Michael Marsh, EPA
Ann Williams, EPA/ORC

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: **Upper Naugatuck River**, Thomaston, Connecticut
HUC 01100005; ID# CT6900-00_05; located in Thomaston, CT;
2004 303(d) list: Aquatic Life Support; 2003-5 TMDL development.

STATUS: Final

IMPAIRMENT/POLLUTANT: Aquatic life support impairment due to toxicity from point and nonpoint source pollution. The TMDL is calculated for whole effluent toxicity (WET).

BACKGROUND: EPA New England received a **Total Maximum Daily Load Analysis for the Upper Naugatuck River, Thomaston, Connecticut** from the Connecticut Department of Environmental Protection (CT DEP) on March 10, 2005, with a request to review and approve TMDLs for whole effluent toxicity. The TMDL submission includes the following:

- Submittal letter dated March 7, 2005, and received by EPA New England March 10, 2005,
- Total Maximum Daily Load Analysis for the Upper Naugatuck River, Thomaston, Connecticut
- Response to Comments Received
- Upper Naugatuck River TMDL Support Document: Determining the Probable Candidate Cause
- Comparative Risk Analysis: Potential for Pollutants to Cause Water Quality Impairment, Naugatuck River, Thomaston
- Potential Environmental Impacts on the Naugatuck River from Four Industrial Facilities located in Thomaston
- Upper Naugatuck River TMDL Support Document, TMDL Implementation: Recommended Procedures for Determining NPDES Permit Limits for Metals
- Fact Sheet for Toxicity TMDL for Upper Naugatuck River
- Notice of Intent to Adopt a Total Maximum Daily Load Analysis for the Upper Naugatuck River , Thomaston, CT
- Copy of Publication of Public Notice of TMDL in the Waterbury Republican-American, June 17, 2004

The following review explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with § 303(d) of the Clean Water Act, and EPA's implementing regulations in 40 CFR Part 130.

REVIEWERS: Steven Winnett (617-918-1687) E-mail: winnett.steven@epa.gov
Michael Marsh (617-918-1556) E-mail: marsh.mike@epa.gov
David McDonald (617-918-8609) E-mail: mcdonald.dave@epa.gov

REVIEW ELEMENTS OF TMDLs

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. § 130 describe the statutory and regulatory requirements for approvable TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.

1. Description of Water Body, Pollutant of Concern, Pollutant Sources and Priority Ranking

The TMDL analytical document must identify the water body as it appears on the State/Tribe's 303(d) list, the pollutant of concern and the priority ranking of the water body. The TMDL submittal must include a description of the point and nonpoint sources of the pollutant of concern, including the magnitude and location of the sources. Where it is possible to separate natural background from nonpoint sources, a description of the natural background must be provided, including the magnitude and location of the source(s). Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and, (4) explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments, or chlorophyll a and phosphorus loadings for excess algae.

The TMDL analytical document identifies the Upper Naugatuck River (segment CT 6900-00_05) as it appears in Connecticut's **2002 and 2004 Lists of Water Bodies Not Meeting Water Quality Standards**, including its status as having an aquatic life support impairment due to toxicity. The aquatic life support impairment was identified using bioassessment protocols established by the State's Consolidated Assessment and Listing Methodology. In the 2004 list, the water body is ranked as currently under study for TMDL development, which could begin within two years should the situation allow.

An adequate description of the Upper Naugatuck's physical and biological characteristics, and watershed and land uses is presented in the final TMDL document (pages 2-6). Also, three figures are provided which locate the River segment and its four point sources and potential sources of groundwater contamination. The impaired section to which the TMDL applies is a five-mile section of the Naugatuck River upstream of the City of Waterbury, and between the Route 6 Bridge crossing to the north and the Frost Road Bridge to the south.

Toxicity from point source discharges is identified in the final TMDL document as the pollutant of concern. The TMDL documents discuss the weight of evidence approach taken in examining the evidence for several different potential causes for the aquatic life support impairment. DEP considered chemical stressors from industrial and municipal point and nonpoint sources, changes

in hydrology caused by impoundments, historic land use characteristics, and impacts to aquatic life caused by toxicity before selecting the latter as the most likely cause of the impairment. The support document, "Determining the Probable Candidate Cause" details the identification and analysis of the probable causes, and conceptual models of each potential cause show their strengths and weaknesses as the best candidate.

The TMDL analytical document identifies four point sources as Quality Rolling and Deburring, the Thomaston POTW, Whyco Technologies, Inc., and Summit Corporation, and adequately describes their magnitude and location. It discusses (page 10-11) the sources' history and improvements (where applicable), their current operations, and magnitude of effluent flows (Table 4). The TMDL will be implemented by reissuing the National Pollutant Discharge Elimination System (NPDES) permit to the four permittees with limits for the treated effluents this analysis covers.

The TMDL study area is in a largely undeveloped area, with a small population center in its upper end. The TMDL analysis assumes storm water and surface runoff to be negligible (not a significant loading factor) in the study area as there are no known sources of storm water flow during the low flow periods defined as the TMDL's critical conditions. Estimates of groundwater delivery are included as nonpoint sources for the three sites in the study area, in close proximity to the river, which are known to be sources of contaminated ground water: Envirite, Whyco Technologies, and Summit Corporation.

Assessment: EPA New England concludes that the CT DEP has done an adequate job of describing the TMDL water body segment, pollutant of concern, and identifying and characterizing the sources of impairment. EPA appreciates the thoroughness of the analytical effort demonstrated by the support document, and its annotated conceptual models of each potential cause, which DEP included in the TMDL package documenting its decision as to the probable cause of the impairment. EPA concludes that DEP took a reasonable approach in identifying several possible sources of the impairment and analyzing their potential as the likely cause, before using weight of evidence to select toxicity as the most likely source of impairment.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribe water quality standard, including the designated use(s) of the water body, the applicable numeric or narrative water quality criterion, and the antidegradation policy. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

The TMDL document (pages 2-6) adequately describes the applicable water quality standards, including the designated use (aquatic life support), and the applicable criteria for toxicity. The

Upper Naugatuck River is classified as Class C/B for the length of the impaired section, from the Route 6 bridge crossing to the Frost Road Bridge. The C/B surface water classification indicates that the Upper Naugatuck River is not meeting certain Class B water quality criteria or fails to support one or more of the Class B designated uses. The goal for the Upper Naugatuck River is achievement of Class B; designated uses for Class B surface waters include fish and wildlife habitat, agricultural and industrial supply, and other legitimate uses including navigation. The Class B criteria specify the desired water quality conditions for benthic invertebrates, which are the primary indicator of this water body's impairment. The TMDL is for the length of the impaired section, defined above.

Whole effluent toxicity (WET) measurements are used as a surrogate for a mix of toxic pollutants in order to ensure that water quality standards are attained, including the narrative standard (#14) that surface waters shall be free from chemical constituents in concentrations or combinations that could result in acute or chronic toxicity to aquatic organisms, or otherwise impair the biological integrity of aquatic ecosystems, and do not create an unacceptable risk to human health. The TMDL focuses on whole effluent toxicity because current information indicates that instream toxicity as a whole, rather than one or more specific pollutants in isolation, are causing the impairment (CT DEP 2002). In its Technical Support Document for Water Quality-Based Toxic Control (EPA/505/2-90-001), EPA recommends the use of the Whole Effluent Toxicity approach for aquatic life protection, saying that whole effluent toxicity "is a useful parameter for assessing and protecting against impacts upon water quality and designated uses caused by the aggregate toxic effect of the discharge of pollutants."

Assessment: EPA New England concludes that CT DEP has properly presented its water quality standards and has made a reasonable interpretation of the narrative water quality criteria in the standards, which is that the discharge should not cause toxic conditions in the receiving water body. DEP's analysis showed that no single or several individual and identifiable contaminants were the likely cause of the impairment, and showed the likelihood that a complex array of chemicals was responsible. EPA therefore concludes that the use of Whole Effluent Toxicity is a reasonable measurement target for the TMDL, especially as it has recommended the use of WET in such situations.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in EPA guidance, a TMDL identifies the loading capacity of a water body for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards (40 C.F.R. §130.2(f)). The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. §130.2(i)). The TMDL submittal must identify the water body's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation.

In many circumstances, a critical condition must be described and related to physical conditions in the water body as part of the analysis of loading capacity (40 C.F.R. § 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the water body in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.

The TMDL document identifies the loading capacities in Table 3 (page 16), and provides a discussion of the critical conditions for Upper Naugatuck River. DEP used toxic units as the measurement target for the loading capacities. Connecticut's regulations at 22a-430-4(l)(5)(A) determine that compliance with toxicity limitations shall be made using acute and chronic toxicity, and the regulations define the maximum allowable toxicity based on acute and chronic toxicity as presented in the TMDL document. Maximum allowable toxicity was calculated based on lethal concentrations (LC_{50}s – the concentration at which 50% of the test organisms die) and acute and chronic toxic units (page 15 and Fact Sheet).

EPA's Technical Support Document for Water Quality-Based Toxic Control (EPA/505/2-90-001) presents the use of toxic units, saying that "acute and chronic toxic units make it easy to quantify the toxicity of an effluent and to specify water quality criteria based upon toxicity." Toxicity is often presented in terms of a concentration which will cause an observable effect, sometimes known as effect concentration. With effect concentrations, a smaller number means that an effluent is more toxic (i.e., the lower the concentration that will cause an observable effect, the more toxic the effluent). Toxic units are the inverse of effect concentrations in that a higher number means that an effluent is more toxic, and so, "it is more understandable to translate concentration-based toxicity measurements into toxic units. In this way, the potential confusion involving the inverse relationship is overcome and the permit limit derivation process is better used." (EPA/505/2-90-001)

The loading capacities for the toxicity were calculated by multiplying maximum allowable toxicity by the critical stream flow conditions. Critical conditions are defined as the "worst case" scenario of environmental conditions in the River in which the pollutant load capacity established in the TMDL will not cause an exceedance of the narrative toxicity criteria discussed above. The critical conditions for toxicity were defined as low streamflow conditions (7Q10) combined with average daily permitted flows from the four point sources. Stream gage data were available to estimate the critical flow entering the TMDL study area, but not to directly estimate critical low flow conditions at other points along the study reach. The critical, 7Q10 streamflow for all downstream flows at key points was estimated using the Cervione Method, with additions for flow from the four point sources, and by scaling the flows based on drainage area size. The average daily permitted flow from the four point sources was estimated from discharge monitoring data reported to DEP. Estimated subsurface flows from the three groundwater sites were also added into the load capacity.

EPA New England considers this to be a reasonable approach for developing loading capacities that

are sufficient to meet water quality standards.

A strength of the analysis is the conservative approach of calculating the load capacities based on the critical, worse case condition of low flow. Any additional flow would provide greater dilution and/or further buffer the toxic effluents and improve the conditions. The use of toxic units in the analysis allows the TMDL to be expressed as a "mass" of toxicity, which is an advantage when the actual chemical constituents causing the toxicity are not explicitly known.

Assessment: EPA New England concludes that this method of establishing a TMDL is reasonable. DEP used a method that is mandated in the State's regulations and is recommended in EPA technical support documents. The method is designed to be used in the situation described in the TMDL document (complex set of chemicals as the source of toxicity) and is considered to be an understandable way to translate the concept of toxicity (with its potential for confusion) into permit limits. EPA also concludes that the loading capacity which is derived from this method, and from DEP's implementation of it through critical conditions, has been appropriately set at a level necessary to attain and maintain applicable water quality standards.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 C.F.R. § 130.2(g)). Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. § 130.2(g)). Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources.

If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. If the TMDL recommends a zero LA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero LA implies an allocation only to point sources will result in attainment of the applicable water quality standard, and all nonpoint and background sources will be removed.

The TMDL analysis identifies the load allocations (LAs) on pages 17 and 18. The LA for the Upper Naugatuck River was separated into allocations for three sites in the TMDL study area known to be the source of contaminated groundwater in close proximity to the river: Envirite, Whyco Technologies, and Summit Corporation.

Consistent with procedures used in the State's Remediation Standards Regulations, the load allocations were calculated by multiplying the maximum allowable acute and chronic toxicity (expressed in acute and chronic toxic units) by ten times the estimated groundwater flow rate. Ground water flow rates were calculated for the three RCRA sites identified in the TMDL. Although these groundwater flow rates have a high degree of uncertainty, the allocations were made with the recognition that adjustments may need to be made to them in future when there is greater knowledge about the sites. EPA New England believes this approach is reasonable because it represents a practical estimation of pollutant concentrations in the absence of data for the stream itself.

As noted earlier, there is no load allocation for storm water and surface runoff as there are no known sources of such flows during the critical conditions defined for this TMDL. Higher flows at other times would provide dilution and buffering for any such runoff that occurred.

Assessment: EPA New England concludes that the load allocation is adequately specified in the TMDL at a level necessary to attain and maintain water quality standards.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources (40 C.F.R. §130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and background will result in attainment of the applicable water quality standard, and all point sources will be removed.

In preparing the wasteload allocations, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity. When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated WLA can be assigned to the group of facilities. But it is necessary to allocate the loading capacity among individual point sources as necessary to meet the water quality standard.

The TMDL submittal should also discuss whether a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. In such cases, the State/Tribe will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.

There are four permitted point sources in the TMDL study area, which include three industrial operations (Quality Rolling and Deburring, Whyco Technologies, Inc., and Summit Corporation) and the Thomaston POTW. WLAs were established for the three industrial permittees, but the POTW was not included because extensive monitoring had indicated that it was not a source of toxicity. The individual acute and chronic Waste Load Allocations for toxicity from the three industrial operations were calculated by multiplying the acute and chronic loading capacities in the river at the point it enters the study area (at the Route 6 bridge) by the proportion of the total effluent which each operation's discharge represents (Table 4). These Waste Load Allocations will be implemented through the reissuance of the NPDES permits to the three industrial operations with the limits developed consistent with the WLAs. Please see EPA's approval document appendix, "Use of Toxic Units in Calculating Wasteload Allocations, and Expressing Permit Limits in the Upper Naugatuck River TMDL" for an example of how the toxic unit method could be employed to derive permit limits.

Assessment: EPA New England concurs that the WLA component of the TMDL is appropriately determined and allocated to the identified point sources.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA §303(d)(1)(C), 40 C.F.R. § 130.7(c)(1)). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

The TMDLs have an explicit numerical margin of safety (MOS) built in. For any of the specified locations in the study area, the MOS is calculated as the difference between the sum of the WLA and LA, and the TMDL (i.e., loading capacity: see Tables 6 and 7). The margin of safety decreases as the river flows downstream. For both acute and chronic toxicity, the MOS ranges from 84% to 23% of the loading capacity.

The TMDL also has an implicit margin of safety. The TMDL document notes that eventually, the entire 7Q10 flow entering the study area is allocated to the three industrial facilities as assimilative capacity, but additional flow from tributaries, uncontaminated groundwater, and the POTW provide additional assimilative capacity to the river, even during dry periods, as their flows are non-toxic. In addition, as the critical conditions under which the TMDLs are developed are worst case conditions of the minimum flow the River could experience, any flows higher than 7Q10 during the year provide additional dilution and buffering capacity. Since the River's water quality is protected under critical low flow conditions, it will be protected under higher flows, and the result will be receiving water quality that is capable of attaining and maintaining water quality standards.

Assessment: EPA New England concludes that an adequate MOS is provided, particularly where both an explicit and an implicit MOS exist.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA §303(d)(1)(C), 40 C.F.R. §130.7(c)(1).

The TMDL is based on steady state, critical low-flow conditions. The higher flows present during other parts of the year will provide more dilution and buffering capacity for any additional storm water and other surface runoff that may occur. Consequently, these TMDLs will be protective in all seasons.

Assessment: EPA New England concludes that seasonal variation has been adequately accounted for in the TMDL because the TMDL was developed to be protective of the most environmentally sensitive period, the low flow period.

8. Monitoring Plan for TMDLs Developed Under the Phased Approach

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan when a TMDL is developed under the phased approach. The guidance recommends that a TMDL developed under the phased approach also should provide assurances that nonpoint source controls will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. EPA's guidance provides that a TMDL developed under the phased approach should include a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards.

Although monitoring implementation plans are not a required element for the development of a TMDL and its final approval, CT DEP included implementation in its TMDL development (page 22). The TMDL submission states that CT DEP will continue to collect water chemistry and benthic macroinvertebrate data from the river, and water quality monitoring and assessment will be conducted as described in the CT DEP Rotating Basin Ambient Monitoring Strategy. DEP will continue to use benthic macroinvertebrate data as the primary measure of progress in meeting the aquatic life support designated use.

Assessment: EPA New England concludes that the ongoing monitoring by the CT DEP is sufficient to evaluate the adequacy of the TMDL.

9. Implementation Plans

On August 8, 1997, Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.

Although implementation plans are not a required element of the development of TMDLs and their final approval, CT DEP included implementation in its TMDL development (page 22-23). The TMDLs will be implemented by incorporating the Waste Load Allocations specified in these TMDLs into the reissued NPDES permits for the three industrial operations. Load allocations for groundwater established in the TMDL will be implemented under the authority of CT's Remediation Standard Regulations for the three groundwater contamination sites. In addition, DEP will be reassessing the NPDES permit limits for metals for the permitted facilities.

Assessment: Addressed, though not required.

10. Reasonable Assurances

EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for EPA to determine that the load and wasteload allocations will achieve water quality standards.

In a water impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, States/Tribes are strongly encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State/Tribe implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

The TMDL submission states that the NPDES permits issued to the permitted sources in the water body, and site remediation activities related to the sources of contaminated groundwater provide legally enforceable controls and offer reasonable assurance that Water Quality Standards will be met in the TMDL segment of the Upper Naugatuck River. The goals of the TMDL are to achieve water quality standards and full support of designated uses in the water body, and DEP has the regulatory authority to implement controls which will achieve those goals.

Assessment: Addressed, though not required, since this TMDL does not establish less stringent WLAs in reliance on greater load reductions from nonpoint sources.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. § 130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. § 130.7(d)(2)).

Inadequate public participation could be a basis for disapproving a TMDL; however, where EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

Public participation for these TMDLs was achieved in accordance with CT DEP's statutes. Documentation of the public participation and DEP's response to comments were included in the TMDL submittal to EPA, in the form of copies of the public notice of and request for comments on the draft TMDL in the Waterbury Republican-American, June 17, 2004, and the submitted document, "Response to Comments received for Proposed Total Maximum Daily Load Analysis for Upper Naugatuck River, Thomaston, Connecticut." The DEP held several meetings with governmental officials and the regulated community, and extended the comment period once in

response to a request. This TMDL analysis was modified from an earlier draft based on comments received from reviewers through the public participation process.

Assessment: EPA New England concludes that CT DEP has done an adequate job of involving the public during the development of the TMDL, provided adequate opportunities for the public to comment on the TMDL, and provided reasonable responses to the public comments.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a technical review or is a final submittal. Each final TMDL submitted to EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit; and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the water body, the pollutant(s) of concern, and the priority ranking of the water body.

The submittal letter (dated March 7, 2005, and received by EPA New England on March 10, 2005) adequately identified the TMDLs as a final document submitted under Section 303(d) of the Clean Water Act for EPA review and approval.

Data for entry in EPA's National TMDL Tracking System & Region 1 TMDL Webpage

TMDL Name *	**Upper Naugatuck River**
Water body segment names(s)	Naugatuck River, segment 05
List ID (from system)	CT6900-00_05
Number of TMDLs *	1
Lead State	Connecticut (CT)
TMDL Status	Final
Pollutant ID(s)	2 (toxicity)
TMDL End Point	
TMDL Type	Point and Nonpoint Source
Point source ID (permit) #s	Quality Rolling and Deburring – CT0025305 Whyco Technologies, Inc. – CT0001457 Summit Corporation – CT0001180
Impairment ID(s) (from system)	Aquatic Life Support (ALS):
Cycle (list date)	2004
Establishment Date (approval) *	August 17, 2005
EPA Developed	No
Towns affected *	Thomaston, CT

* = data needed for Region 1 "Approved TMDLs" web page

Use of Toxic Units in Calculating Wasteload Allocations, and Expressing Permit Limits in the Upper Naugatuck River TMDL

Waste Load Allocations for the three industrial operations in the TMDL study area were calculated by multiplying the TMDL entering the study area by the percent of the total effluent (by permitted flow) each operations' effluent represents. The summary below illustrates how TMDLs could be converted to permit limits using one of the three permitted operations, QRD, as an example. This example represents one way to convert WLAs in the TMDL into NPDES permit limits for whole effluent toxicity.

NOTE: The procedures for calculating chronic and acute TMDLs, below, are established in Section 22a-430-4(l) Regulations of Connecticut State Agencies. In these examples, flows are estimated from a U.S. Geological Survey (USGS) gage with over 40 years of discharge data.

The chronic TMDL (or chronic loading capacity) entering the study area is 93.24 gallons chronic toxic units (CTU) per second. This was calculated by multiplying 7Q10 flow entering the TMDL study reach, times 1 CTU. 7Q10 is a statistical measure of low flow. The waste load allocation (WLA) for Quality Rolling and Deburring (QRD), whose effluent is 16% of the total effluent from the three operations, is calculated as the TMDL times the flow proportion as follows:

Chronic WLA = 93.24 galCTU/sec * (0 .16) = 14.92 galCTU/sec

To convert the WLA to gallons CTU per day:

14.92 galCTU/sec * 60 (sec/min) * 60 (min/hr) * 24 (hr/day) = 1,289,088 galCTU/day

To calculate the maximum toxic strength of the discharge at the permitted flow, divide the WLA by the effluent flow from QRD, which has a current permitted monthly average of 100,800 gal/day:

1,297,728 galCTU/day / 100,800 gal/day = 12.79 CTU

12.80 CTU protects against chronic effects.

The acute TMDL (or acute load capacity) entering the study area is 30.77 gallons acute toxic units (ATU) per second. This was calculated by multiplying 7Q10 flow entering the TMDL study reach, times 0.33 ATU. The waste load allocation (WLA) for Quality Rolling and Deburring (QRD), whose effluent is 16% of the total effluent from the three operations, is calculated as the TMDL times the flow proportion as follows:

Acute WLA = 30.77 galATU/sec * (0.16) = 4.92 galATU/sec

The next step is to convert the WLA to gallons ATU per day:

4.92 galATU/sec * 60 (sec/min) * 60 (min/hr) * 24 (hr/day) = 425,088 galATU/day

To calculate the maximum toxic strength of the discharge at the permitted flow, divide the WLA by the effluent flow from QRD, which has a monthly current permitted average of 100,800 gal/day:

425,088 galATU/day / 100,800 gal/day = 4.24 ATU

4.24 ATU protects against acute effects.

NOTE: Because the WLAs were proportioned by flow, each facility has the same chronic and acute target number, 12.80 CTU and 4.24 ATU, respectively.

To decide which condition is more restrictive, compare the magnitude of the acute and chronic restrictions:

NOTE: Conversions between acute and chronic endpoints are performed using conversion factors specified in Regulations of Connecticut State Agencies - Section 22a-430-3(j)(7)(A) and (B)

Acute = 4 ATU = 80 CTU (since 1 ATU = 20 CTU)
Chronic = 13 CTU = 0.65 ATU (since 1 CTU = 0.05 ATU)

The chronic condition is more restrictive because 13 CTU is less than 80 CTU, and 0.65 AU is less than 4 ATU. (Remember that a higher TU value is more toxic.)

Therefore, the chronic values would be used to calculate the permit limits in this example and would be protective of both the acute and chronic condition.

To calculate permit limits based on the more restrictive chronic condition, the LC50 and NOAEL can be calculated. The first step is to convert CTU to ATU:

13 CTU * 0.05 ATU/CTU = 0.65ATU

The LC50 is then calculated, which is the concentration at which 50% of the organisms die:

LC50 = 100 / 0.65 ATU = 154%

This implies that the LC50 required to protect against both acute and chronic impacts is below the detection limit for the LC 50 test since the test can not measure effects at a concentration greater than that of undiluted (100%) effluent. In that case, CT would use the point at which

there are no observable acute effects (No Observable Acute Effect Level – NOAEL) to express the permit limits. CT presumes the NOAEL is one third (1/3) of the LC50, based on conversion factors codified in Regulations of Connecticut State Agencies - Section 22a-430-3(j)(7)(A) and (B),

NOAEL = 156 / 3 = 52%

NOTE: Similarly, the effluent limitations for the other two facilities would also be NOAEL = 52%, since the WLAs which were used to develop the NOAEL were proportioned by the flow from each facility.

Using this example, CT would include a requirement, as an effluent limitation in the permits, that the NOAEL of the effluent be greater than or equal to 52%. A short (acute) test period is used to derive the NOAEL.

Should the test indicate greater toxicity than is allowable in the permit, it would be a violation of the permit, the permittee would report that result to the permit authority (DEP) on the Discharge Monitoring Report, and they would also have to repeat the test. Should the second test indicate greater toxicity than is allowable in the permit, the permittee would be required to perform a Toxicity Identification Evaluation to determine the most probable cause of the toxicity (as codified in Section 22a-430-3(j)(10)(C) of the Regulations of Connecticut State Agencies).