to advanced wastewater limits. The City has removed approximately 70% of the phosphorus from its effluent for a number of years. The WWTP has also been the recipient of awards for their efforts and dedication to environmental protection.

The limit is proposed without benefit of a Total Maximum Daily Load (TMDL) study for phosphorus in the Housatonic. The Massachusetts Year 2006 Integrated List of Waters 303(d) does not identify nutrients as a pollutant of concern for the river. Those identified requiring a TMDL are priority organics, pathogens, and turbidity. Both of these seem to contradict the limited information presented in the Fact Sheet for the rationale to propose the limit.

Response 2.a.1.

Neither the designation of a pollutant as causing an impairment (and therefore requiring the development of a TMDL) nor the scheduling and completion of a TMDL are prerequisites for the establishment of water quality-based effluent limitations in NPDES discharge permits. Both the CWA Section 301(b)(1)(C) and the federal regulations found at 40 CFR § 122.44(d) require EPA to impose any necessary requirements and limitations in NPDES permits in addition to or more stringent than technology-based effluent limitations that are necessary to achieve state water quality standards in the receiving water, including narrative criteria for water quality. EPA is required to include effluent limitations in discharge permits for any pollutant or pollutant parameter which EPA has determined "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality" (40 CFR § 122.44(d)(1)(i)). The procedures followed by EPA when evaluating the potential for a discharge to cause or contribute to an excursion above a water quality criterion are specified in the federal regulations found at 40 § 122.44(d)(1)(ii). If EPA concludes, after using the procedures found at 40 CFR § 122.44(d)(1)(ii.), toxicity testing data, or other available information, that a discharge causes or has the reasonable potential to cause or contributes to an in-stream excursion above a narrative criterion within an applicable State water quality standard, effluent limitations must be included in NPDES discharge permits in order to ensure that water quality standards in the receiving water are met (40 CFR § 122.44(d)(1)(v)).

The relevant Massachusetts water quality standards pertaining to nutrients (and the negative effects resulting from excessive nutrient inputs) include the following minimum water quality criteria that apply to all surface waters: (a) aesthetics – "free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste, or turbidity; or produce undesirable or nuisance species of aquatic life"; (b) bottom pollutants and alterations – "free from pollutants in concentrations or combinations or from alterations that adversely affect the physical or chemical nature of the bottom, interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms"; and (c) nutrients – "unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00. Any existing point source discharge containing nutrients in concentrations that would cause or contribute to

cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs" (see 314 CMR §4.05(5)(a), (b) and (c)). As described in the fact sheet, the Housatonic River has been designated as a Class B water by the State of Massachusetts, and as such, is designated as a habitat for fish, other aquatic life, and wildlife, and for primary (i.e., swimming) and secondary (i.e., boating) contact recreation (see 314 CMR § 4.06 (Table 12) and § 4.05(3)(b)).

In the absence of a numeric criterion for phosphorus, EPA relies on the provisions found at 40 CFR § 122.44(d)(1)(vi)(A), nationally-recommended criteria, technical guidance and other information published under Section 304(a) of the CWA, as well as site-specific surveys and data and peer-reviewed scientific literature when interpreting and applying a narrative criterion and in the development of effluent limits that will achieve water quality standards in the receiving water (also see 40 CFR § 122.44(d)(1)(vi)(B)).

As described in the fact sheet, the 1.0 mg/l phosphorus limit in the permit that was issued in 2000 was determined to be inadequate to ensure that the discharge would not cause a violation of water quality standards in the receiving water. This determination was based on a calculation of the instream phosphorus concentration resulting from the discharge. The following equation was used to project the concentration of phosphorus in the receiving water downstream from the discharge:

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Where:

Q_r = Receiving water flow downstream of the discharge ($Q_d + Q_s$)
C_r= Concentration of phosphorus in the receiving water downstream of the discharge
Q_d = Design flow of the facility
C_d = Concentration of phosphorus in the discharge
Q_s= Receiving water flow upstream of the discharge
C_s = Concentration of phosphorus in the receiving water upstream of the discharge

The effectiveness of the 1.0 mg/l phosphorus limit in assuring that water quality criteria are not exceeded in the receiving water as a result of the discharge was evaluated by estimating the instream phosphorus concentration downstream from the discharge under critical flow (7Q10) conditions using a background phosphorus concentration (C_s) of 0.149 mg/l (as explained in the fact sheet, this value is the average of the results of analyses conducted on samples collected upstream from the discharge by MassDEP in 2002 and presented in the Housatonic River Watershed 2002 Water Quality Assessment Report (MassDEP 2007)), the lowest concentration of phosphorus permitted to be discharged under the permit that was issued in 2000 (C_d = 1.0 mg/l), the 7Q10 flow of the receiving water (Q_s = 25.7 cfs), the design flow of the facility (Q_d = 17.0 MGD = 26.35 cfs), and the flow of the receiving water downstream of the discharge (Q_r = 52.1 cfs) as follows:

$$C_r = Q_sC_s + Q_dC_d / Q_r$$

$$C_r = [(25.7 \text{ cfs})(0.149 \text{ mg/l}) + (26.35 \text{ cfs})(1.0 \text{ mg/l})] / 52.1 \text{ cfs} = 0.58 \text{ mg/l}$$

This calculation, which accounts for ambient conditions and the lack of significant dilution under critical flow conditions, demonstrates that the 1.0 mg/l phosphorus limitation in the permit that was issued in 2000 does not ensure adequate protection of the quality of the downstream receiving water and suggests that discharges of phosphorus equal to 1.0 mg/l will result in downstream concentrations that greatly exceed both the ecoregional and Gold Book criteria of 0.024 µg/l and 0.1 mg/l, respectively.

In recognition of the fact that the facility has consistently discharged phosphorus in concentrations less than 1.0 mg/l phosphorus limit under the permit that was issued in 2000, and to further illustrate the potential for the discharge to cause or contribute to a violation of water quality standards, two additional calculations were performed which project the instream phosphorus concentration in the receiving water downstream from the discharge using actual effluent data from 2005-2007 (see Table 1) and the equation shown above.

Table 1: Discharges of Phosphorus from the Pittsfield WWTP (2005-2007)

Reporting Period:	Average Monthly (mg/l)	Average Weekly (mg/l)	Maximum Daily (mg/l)
April 1st - April 30th	0.71-1.19 (0.9)	0.83-1.29 (1.05)	0.83-1.31 (1.06)
May 1st - August 30th	0.78-0.87 (0.83)	0.85-0.97 (0.90)	0.86-1.03 (0.94)
Sept. 1st - March 31st	0.66-1.32 (0.90)	———	0.66-1.32 (0.90)

Note: Data taken from monthly discharge monitoring reports (DMRs) submitted to EPA by the permittee. Minimum and Maximum values are shown, with the average values in parenthesis.

The first calculation takes a more conservative approach by accounting for a background phosphorus concentration (C_s) of 0.149 mg/l (again, this value is the average of the results from analyses conducted on samples collected in 2002 by MassDEP) in addition to the maximum monthly average concentration of phosphorus discharged from the facility during the months in which the 1.0 mg/l phosphorus limit applied (May 1 – August 30th) (C_d = 0.87 mg/l), the 7Q10 flow of the receiving water (Q_s = 25.7 cfs), the design flow of the facility (Q_d = 17.0 MGD = 26.35 cfs), and the receiving water flow downstream of the discharge (Q_r = 52.1 cfs) as follows:

$$C_r = Q_sC_s + Q_dC_d / Q_r$$

$$C_r = (25.7 \text{ cfs})(0.149 \text{ mg/l}) + (26.35 \text{ cfs})(0.87 \text{ mg/l}) / 52.1 \text{ cfs} = 0.51 \text{ mg/l}$$

The second equation assumes a background phosphorus concentration equal to zero, in order to determine the impact of the discharge alone on the downstream phosphorus concentration, in the absence of upstream sources (all other variables were held constant):

$$C_r = Q_sC_s + Q_dC_d / Q_r$$

$$C_r = (25.7 \text{ cfs})(0 \text{ mg/l}) + (26.35 \text{ cfs})(0.87 \text{ mg/l}) / 52.1 \text{ cfs} = 0.44 \text{ mg/l}$$

In addition to demonstrating the inadequacy of the 1.0 mg/l limit in ensuring that water quality standards will be met in the receiving water, the results of the above analyses indicate that the discharge is likely causing or contributing to excursions above water quality criteria in the receiving water, even without considering the ambient phosphorus concentration.

Along with the above calculations, other available information pertaining to the receiving water was used to determine the need for a lower phosphorus limit, in accordance with the requirements of 40 CFR§ 122.44(d)(1)(vi)(B). Water quality problems due to excess phosphorus inputs and the resultant eutrophication were acknowledged in the Housatonic River Basin 1997/1998 Water Quality Assessment Report (MassDEP 2000). However, the issue was overshadowed by the extensive PCB contamination plaguing the river (Housatonic River Basin 1997/1998 Water Quality Assessment Report, pg. 10 (Mass DEP 2000)). The negative effects of cultural eutrophication resulting from excess phosphorus loadings in the receiving water and its impoundments are well documented and directly addressed in the Housatonic River Watershed 2002 Water Quality Assessment Report (MassDEP 2007). The data presented in this report indicate that nationally-recommended instream phosphorus criteria are being exceeded even before the river receives additional loadings of phosphorus from the Pittsfield WWTP's discharge (Housatonic River Watershed 2002 Water Quality Assessment Report, Appendix B (MassDEP 2007)). Further, the results of biological and habitat analyses presented in this report are indicative of nutrient enrichment both upstream and downstream from the Pittsfield WWTP (Housatonic River Watershed 2002 Water Quality Assessment Report, Appendix C (MassDEP 2007)).

The effects of excess inputs of phosphorus into rivers and streams may not become fully apparent until they enter sensitive portions of the waterbody, such as impoundments, whose physical dynamics predispose them to the water quality problems caused by excess quantities of nutrients. Depending on the physical, chemical, and biological processes occurring within an impoundment, phosphorus that had been sequestered by aquatic plants and/or in sediments may be released into and/or re-suspended in the water column, rendering it available for biological uptake either within the impoundment or in downstream waters. The potential for the re-introduction of biologically available phosphorus into free-flowing waters from lakes and impoundments is recognized in technical guidance documents published by EPA (see Water Quality Criteria for Water, pg. 241 (USEPA 1986) and Nutrient Criteria Technical Guidance Manual – Rivers and Streams, Chapt. 1, pg. 3 (USEPA 2000 [EPA822-B-00-002]).

The tendency for phosphorus to be retained in the water column and/or transported downstream is reflected in the eutrophic conditions observed in Woods Pond, an impoundment located downstream from the discharge, including the presence of dense assortments of aquatic macrophytes, phytoplankton, and dense algal growth, all of which are indicative of nutrient enrichment. The significantly higher concentrations of chlorophyll *a* detected in samples collected from the impoundment (23 µg/l (July 2002, MassDEP) and 24.2 µg/l (September 2002, MassDEP)) relative to those collected upstream from the

Pittsfield WWTP (3.3 µg/l (July 2002, MassDEP) and 2.2 µg/l (September 2002, MassDEP)) provide additional evidence supporting the conclusion that the river is indeed experiencing the negative effects of nutrient enrichment (Housatonic River Watershed 2002 Water Quality Assessment Report (MassDEP 2007)). Woods Pond is listed as a Category 5 water (waters requiring a TMDL) due to impairments caused in part by noxious aquatic plants and turbidity in the approved Massachusetts Year 2004 Integrated List of Waters as well as in the approved Massachusetts Year 2006 Integrated List of Waters. The integrated lists include the CWA Section 303(d) listing of waters not attaining designated uses.

In April of 2008, MassDEP submitted the proposed Massachusetts Year 2008 Integrated List of Waters (303(d) List) to EPA. In the proposed list, the upper 9.2 miles of the segment of the Housatonic River that begins at the outlet of Woods Pond (MA21-19), is listed as impaired due to excess algal growth and total phosphorus (proposed Massachusetts Year 2008 Integrated List of Waters (MassDEP 2008)). As a major source of phosphorus inputs to the river upstream from the impacted segment, the Pittsfield WWTP is clearly causing or contributing to this impairment.

The data and observations presented in the Housatonic River Watershed 2002 Water Quality Assessment Report (MassDEP 2007) suggests that inputs of phosphorus upstream from Woods Pond are negatively affecting the quality of the receiving water both within and downstream from the impoundment (see also Housatonic River Watershed 2002 Water Quality Assessment Report, Appendix B and C (MassDEP 2007)). In addition to the dense assortment of floating aquatic plants and phytoplankton, and the dense covering of algae on submerged vegetation observed within Woods Pond, high in-stream concentrations of phosphorus and the presence of moderate to dense filamentous green and brown-colored algae were observed at sampling stations located downstream from the outlet of Woods Pond. The species composition of the benthic community downstream from the outlet of Woods Pond is also indicative of nutrient enrichment and the release of phosphorus from the outlet of the Pond is suspected as contributing to the nutrient load in downstream receiving waters in the Housatonic River Watershed 2002 Water Quality Assessment Report, Appendix C (MassDEP 2007)).

EPA has determined that the available data and information summarized above clearly indicate water quality impairments in the receiving water due nutrients. In addition to the documented effects of phosphorus-related water quality problems, the projected instream phosphorus concentration under the current limit and lack of significant dilution under critical flow conditions indicate that discharges of phosphorus from the Pittsfield WWTP have the reasonable potential to cause or contribute to an exceedance of water quality criteria, thus justifying imposing a lower phosphorus limit.

Under a limit of 0.2 mg/l, the discharge would result in a downstream phosphorus concentration of approximately 0.1mg/l, under critical flow conditions and assuming a background phosphorus concentration of zero, as shown below.

$C_r = [(25.7 \text{ cfs})(0 \text{ mg/l}) + (26.35 \text{ cfs})(0.2 \text{ mg/l})] / 52.1 \text{ cfs} = 0.101 \text{ mg/l} \sim 0.1 \text{ mg/l}$

Unfortunately, this is not a realistic projection given the existence of data showing upstream phosphorus concentrations ranging from 0.096 mg/l – 0.202 mg/l (Housatonic River Watershed 2002 Water Quality Assessment Report, Appendix B (MassDEP 2007)). It is likely that the ambient phosphorus concentration fluctuates depending on the physical, chemical, and biological processes occurring within the receiving water. Therefore, assuming that the background phosphorus concentration fluctuates from ≥ 0 mg/l to 0.149 (the average of the MassDEP 2002 results), it is expected that the downstream phosphorus concentration would also fluctuate between ≥ 0.1 mg/l and 0.2 mg/l, (see equation below). Since the recommended criteria would be exceeded, a limit of 0.2 mg/l would not be adequately protective of the quality of the downstream receiving water at all times.

C_r = [(25.7 cfs)(0.149 mg/l) + (26.35 cfs)(0.2 mg/l)] / 52.1 cfs = 0.2 mg/l

Again, assuming that the background phosphorus concentration of phosphorus lies somewhere between ≥ 0 mg/l and 0.149 mg/l, maximum discharges of phosphorus under a limit of 0.1 mg/l during critical flow conditions would result in downstream phosphorus concentrations ranging from ≥ 0.05 mg/l – 0.1 mg/l (see equations below), which would meet the recommended criteria.

(a) assuming a minimum ambient phosphorus concentration equal to 0 mg/l:

C_r = [(25.7 cfs)(0 mg/l) + (26.35 cfs)(0.1 mg/l)] / 52.1 cfs = 0.051 mg/l

(b) assuming a maximum ambient phosphorus concentration equal to 0.149 mg/l:

C_r = [(25.7 cfs)(0.149 mg/l) + (26.35 cfs)(0.1 mg/l)] / 52.1 cfs = 0.124 mg/l

Based on an extensive review of available information and the analyses presented above, EPA has determined that a phosphorus limitation of 0.1 mg/l is necessary to ensure that the discharge does not cause or contribute to a violation of water quality standards in the receiving water at any time and shall remain in the final permit.

Comment 2.a.2.

The calculations and sources of background information do not seem appropriate to develop the limit for Pittsfield. Additionally, all other NPDES permitted facilities located along the Housatonic are not being required to remove phosphorus to the proposed permit limit. Permits issued as recently as the end of last year do not contain limits in the range of the proposed Pittsfield limit.

Response 2.a.2.

It is unclear why the commenter believes that the calculations and sources of background information used to develop the phosphorus limit proposed in the draft permit seem inappropriate.

The information and procedures used to determine the need for and to derive the 0.1 mg/l phosphorus limit are consistent with the requirements of 40 CFR § 122.44(d)(1)(ii), 40 CFR

§ 122.44(d)(1)(v) and 40 CFR § 122.44(d)(1)(vi)(A) and (B) and also conform with the procedures followed by EPA Region I in making decisions regarding the imposition of water quality-based effluent limits in NPDES permits. In addition to applicable regulations, water quality standards, technical guidance, and scientific literature, other sources of information such as receiving water quality data, stream survey results, the available dilution in the receiving water, the design flow of the permitted facility and effluent monitoring data are among the information taken into consideration when determining appropriate effluent limitations. As described in the fact sheet and in the response to the above comment, following a close examination of all of these factors, EPA concluded that a total phosphorus limit of 0.1 mg/l is necessary to ensure that the water quality standards in the receiving water will be met at all times.

As explained in the response to the previous comment, the currently available data and information, some of which became available as recently as late 2007, strongly suggests that nutrient inputs are causing eutrophic conditions within the Housatonic River and its impoundments. It is anticipated that more stringent phosphorus limits will be included in discharge permits for other POTWs discharging to the Housatonic as they come up for re-issuance. For example, the draft permit for the Lee WWTP, which is located downstream from the Pittsfield facility, was recently released for public comment with a seasonal phosphorus limit of 0.2 mg/l, which is considerably lower than the 1.0 mg/l limit they have been operating under.

Comment 2.a.3.

The WWTP is not capable of meeting the limit without significant additional infrastructure. The cost to attain the new limit is substantial; the City has recently been studying its infrastructure systems in an effort to develop accurate projections for capital improvement spending and has determined that there are substantial needs within the existing water, storm water, and wastewater utilities. The cost to remove phosphorus to the proposed permit level is estimated in the tens of millions of dollars. The spending of the City's limited funds to remove a small fraction of phosphorus seems inappropriate in the face of the current capital infrastructure needs.

Response 2.a.3.

As stated in the response to the opening comment, EPA is generally prohibited from considering cost when both determining whether or not a water quality-based limit is necessary and when developing an appropriate limit. Section 301(b)(1)(C) of the CWA requires achievement of "any more stringent limitations than the technology-based requirements set forth in Section 301(b)(1)(A) and (B), including those necessary to meet water quality standards established pursuant to any State law or regulation.." Therefore, NPDES permits must contain effluent limitations which are sufficiently stringent to attain and maintain the water quality in the receiving water, in the absence of considering the cost to achieve such limits, availability or effectiveness of treatment technologies. (*See U.S. Steel Corp. vs. Train, 556 F.2d 822, 838 (7th Cir. 1977) [finding "states are free to force technology" and "if the states wish to achieve better water quality, they may [do so], even at the cost of economic and social dislocation"*]).

While the CWA precludes EPA from considering the economic impacts when developing effluent limits, the costs involved in achieving compliance with a water quality-based effluent limitation, including the costs involved in the planning, design, and construction of new or upgraded facilities, may be taken into account when establishing a reasonable schedule of compliance leading towards meeting a water quality-based effluent limitation. Upon issuance of the final permit, an administrative compliance order will be issued by either EPA or MassDEP which contains a sensible schedule of compliance for the planning, design, and construction of facilities necessary to achieve compliance with the permit conditions.

Comment 2.b. Aluminum

The permit proposes a limit for aluminum, which the facility will be unable to meet on a consistent basis. The pollutant is not a priority pollutant and is extremely abundant in the natural environment. The source data regarding the development of the aluminum limit is not robust and data sets cited in the study are contrary to the water quality criteria proposed. The proposed limit for aluminum does not seem to recognize the use of aluminum salts for water and wastewater treatment. The City's water plant uses aluminum-based chemistry to clean the water and the residuals are disposed to the treatment plant. Additionally, the WWTP uses aluminum-based chemistry to remove phosphorus. The elimination of aluminum from the water and wastewater processes will not be easily attained and may require the investment of millions of dollars and increased operation and maintenance (O&M) costs.

Response 2.b.

The State of Massachusetts' Water Quality Standards require that effluent limitations for metals be based upon the criteria published in the National Recommended Water Quality Criteria: 2002 (USEPA 2002 [EPA-822-R-02-047]), unless site-specific criteria are established or MassDEP determines that natural background concentrations are higher than the criteria (314 CMR § 4.05(5)(e)). MassDEP has not established site-specific criteria for aluminum for the Housatonic River, nor have they determined that the natural concentrations of aluminum in the river are greater than the criteria published by EPA. Therefore, because the criteria in the National Recommended Water Quality Criteria: 2002 (USEPA 2002[EPA-822-R-02-047]) have been adopted by the State into their water quality standards, they were used to develop the effluent limits for aluminum in the draft permit in order to ensure attainment of water quality standards in the receiving water.

Regardless of whether a treatment process employed by the facility contributes to the loading of a particular pollutant to the waste stream, water quality-based effluent limitations must be incorporated into a discharge permit upon EPA's conclusion that discharges of the pollutant have the reasonable potential to cause or contribute to a violation of state water quality standards, in accordance with the requirements of the CWA and applicable NPDES regulations (see CWA § 301(b)(1)(C) and 40 CFR § 122.44(d)(1)(iii)).

In determining reasonable potential, EPA considers: 1) existing controls on point and non-point sources of pollution; 2) pollutant concentration and variability in the effluent and receiving water as determined from the permit's reissuance application, DMRs, and State and Federal Water Quality Reports; 3) sensitivity of the species to toxicity testing; 4) the

statistical approach outlined in Chapter 3 of the Technical Support Document for Water Quality-Based Toxics Control (USEPA March 1991 [EPA/502/2-90-001]), and, where appropriate, 5) dilution of the effluent in the receiving water (see also 40 CFR § 122.44(d)(ii)).

The following paragraphs illustrate the methods used to determine that there is reasonable potential for the discharge to cause or contribute to an excursion above the chronic water quality criterion for aluminum. An excursion occurs when the actual or projected in-stream concentration of a pollutant or pollutant parameter exceeds water quality criteria within a state water quality standard.

The first method (the method used in the development of the draft permit limits) involves comparing the concentration of the pollutant in the effluent to the concentration that may be discharged without exceeding the criteria in the receiving water. An allowable effluent concentration was calculated by multiplying the criteria by the calculated dilution factor of 1.97 as follows:

Criteria Maximum Concentration[2] (CMC) = 750 µg/l = 0.75 mg/l
Criteria Chronic Concentration (CCC) = 87 µg/l = 0.087 mg/l

Allowable Acute Effluent Concentration = CMC X 1.97 = 0.75 mg/l X 1.97 = 1.5 mg/l
Allowable Chronic Effluent Concentration = CCC X 1.97 = 0.087 mg/l X 1.97 = 0.171 mg/l

As described in the fact sheet, the results of metals analyses conducted on samples of the effluent in conjunction with whole effluent toxicity (WET) tests from 2005-2007 were used to assess the potential for the discharge to exceed water quality criteria. The concentration of aluminum discharged from the Pittsfield WWTP from 2005-2007 ranged from 0.10 mg/l to 0.410 mg/l, with the average concentration being 0.211 mg/l (see Appendix D of the fact sheet). The maximum concentration discharged (0.410 mg/l) is greater than the concentration that may be discharged without exceeding the chronic water quality criteria (0.171 mg/l). Therefore, a chronic water quality-based effluent limitation equal to the calculated allowable chronic effluent concentration was included in the permit in accordance with the provisions of 40 CFR § 122.44(d)(1)(iii).

The second method used to evaluate the potential for a discharge to cause or contribute to an excursion above water quality criteria involves projecting the concentration of the pollutant in the receiving water downstream from the discharge under critical stream conditions (7Q10 flow), and then comparing that value to the water quality criteria.

The instream aluminum concentration downstream from the discharge was estimated using the following equation:

$$C_r = Q_s C_s + Q_d C_d / Q_r$$

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[2] Acute (Criteria Maximum Concentration) and chronic (Criteria Chronic Concentration) criteria are from the National Recommended Water Quality Criteria for Water: 2002 (USEPA 2002).

Where:

C_r = Instream aluminum concentration, downstream of the discharge
Q_s = Receiving water flow upstream from the discharge (7Q10 flow)
C_s = Instream aluminum concentration, upstream from the discharge
Q_d = Design flow of the facility
C_d = Concentration of aluminum in the discharge
Q_r = Receiving water flow downstream of the discharge ($Q_d + Q_s$)

It should be noted that due to a lack of ambient instream monitoring data upstream from the discharge, this analysis assumes a background concentration of 0 mg/l. As mentioned in the comment, aluminum is present in the natural environment, so it is likely that the actual background concentration is higher than the assumed value, which would make the projected concentration downstream of the discharge higher than shown in the calculations.

The design flow of the facility (Q_d = 17 MGD = 26.35 cfs), the 7Q10 flow of the receiving water at the point of discharge (Q_s = 25.7 cfs), the 7Q10 flow in the receiving water downstream from the discharge ($Q_r = Q_d + Q_s$ = 52.1 cfs) and the maximum concentration of aluminum discharged from the facility from 2005-2007 (Q_d = 0.41 mg/l) were used to project the instream concentration of aluminum, which was estimated to be 0.21 mg/l as follows:

$$C_r = Q_sC_s + Q_dC_d / Q_r$$

$$C_r = [(25.7 \text{ cfs})(0 \text{ mg/l}) + (26.35 \text{ cfs})(0.41 \text{ mg/l})] / 52.1 \text{ cfs} = 0.21 \text{ mg/l}$$

Comparing this value to the acute and chronic criteria, it can be seen that under critical conditions, the instream concentration of aluminum in the receiving water would exceed the chronic criteria (0.087 mg/l), suggesting that the discharge has the reasonable potential to cause or contribute to an exceedance above water quality criteria.

The results of the two analyses presented in the preceding paragraphs supports EPA's conclusion that reasonable potential exists for the discharge to cause or contribute to an excursion above the chronic water quality criterion for aluminum, which warrants the inclusion of the chronic effluent limit in the permit. The average monthly limit for aluminum proposed in the draft permit shall remain in the final permit.

EPA recognizes the use of sodium aluminate for the facilitation of phosphorus removal. However, as described in the preceding paragraphs, EPA must include limitations that satisfy the technology and water quality requirements of the CWA when reasonable potential exists for the discharge to cause or contribute to an excursion above water quality criteria within a State water quality standard (see CWA § (b)(1)(C) and 40 CFR § 122.44(d)(1)). The premittee is encouraged to evaluate alternative coagulants and/or other treatment technologies during any facilities planning that may be undertaken to achieve the new phosphorus limitation.

Comment 2.c. *E. coli*

The permit changes the indicator organism for pathogen reduction effectiveness testing. The change is without benefit of study by the City to determine if the WWTP is capable of meeting the proposed limit.

Response 2.c.

Water quality criteria for *E. coli* replaced those for fecal coliform bacteria in the Massachusetts Surface Water Quality Standards, which were promulgated in December 2006 (314 CMR 4.00) and approved by EPA on September 19, 2007. The *E. coli* limitations in the draft permit are based upon the State water quality standards for Class B waters (314 CMR § 4.05(b)(4), in accordance with the requirements of 40 CFR § 122.44(d)(1). In addition, the *E. coli* limitations in the draft permit are a State certification requirement. Therefore, the *E. coli* limitations and conditions in the final permit shall remain unchanged from the draft.

The final permit contains a compliance schedule of one year (from the effective date of the permit) before the *E. coli* limitations go into effect, consistent with other POTW discharge permits recently issued in Massachusetts. During this period, the fecal coliform bacteria limitations in the permit that was issued in 2000 shall remain in effect, and the facility shall report the average monthly and maximum daily quantities of *E. coli* in the discharge. It is suggested that this period be used to monitor *E. coli* removal efficiencies as well as to make any adjustments to the treatment process that may be necessary to achieve the new limits.

Comment 3. <u>Additional Monitoring</u>

The draft permit adds several new monitoring requirements as well as increasing the frequency of many of the test parameters. The overall increase in samples collected and analyzed by the laboratory is more than 40%. Many of the tests require substantial effort and cost for equipment and materials. Not only will this increase the annual operating expense to the WWTP, but also will require the hiring of additional laboratory staff. The increased monitoring does not provide any additional protection to the environment and appears to only accomplish having the City pay to develop information for regulators to issue more unfounded stringent limits.

Response 3.

EPA is receptive to reducing the monitoring and reporting frequencies of some pollutant parameters when it has been determined that such reductions will not pose a threat to human and/or aquatic life. The decision to reduce monitoring frequencies for individual pollutants and/or pollutant parameters is based on the compliance and enforcement history of the permitted facility, the monitoring frequencies in the current permit, and the percentage below the current limit that a particular pollutant is discharged at (see also *Interim Guidance for Performance-Based Reductions of NPDES Permit Monitoring Frequencies* EPA 1996 (EPA-833-B-96-001)). In addition, site-specific conditions with respect to the permitted facility and the receiving water are also considered when making such determinations.

Following a review of the factors listed above, a decision was made to grant a reduction in the monitoring frequencies for $CBOD_5$ and TSS from five times per week to three times per week. In addition, the frequency for conducting whole effluent toxicity tests has been

reduced in the final permit from four to two times per year (see Response to Comment B.4.). The monitoring frequencies for these parameters have been changed in the final permit to reflect these reductions.

Comment 4. Whole Effluent Toxicity

The permit requirements remain unchanged; however, the City repeatedly passed this test over the last permitting cycle. We request that the requirement be reduced to two times per year, which is provided by EPA's existing guidance documents included in the draft permit.

Response 4.

Following a review of WET test results from 2000-2007, all of which indicate that the Pittsfield WWTP has consistently met the acute (LC_{50}) and chronic (C-NOEC) limitations in the permit that was issued in 2000, EPA has determined that a reduction in the frequency of WET testing from four to two tests per year is appropriate. The permittee shall conduct toxicity testing two times per year, during the second week in January and July. The test results shall be submitted to EPA and MassDEP by February 28th and August 31st.

Footnote #16 has been changed in the final permit to read as follows:

> *The permittee shall conduct chronic (and modified acute) toxicity tests two times per year, in accordance with the schedule table below. The chronic test may be used to calculate the LC_{50} at the 48-hour exposure interval. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during the second week of the months of January and July. The test results shall be submitted by the last day of the month following the completion of the test. The test results are due February 28th and August 31st, respectively. The tests must be performed in accordance with the test procedures and protocols specified in* ***Attachment A*** *of this permit.*

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit (LC_{50})**	**Chronic Limit (C-NOEC)**
January July	February 28th August 31st	*Ceriodaphnia dubia* (daphnid) See **Attachment A**	≥ 100%	≥ 50%

Comment 5. Routine Sampling Program

The City performs all testing in conformance with the existing permit, federal and state regulations, and Standard Methods for sample analysis. In combination with these requirements, the City uses several standard operating procedures to perform all sampling and testing. The requirement appears unnecessary and redundant.

Response 5.

It is assumed that the above comment is in reference to Footnote # 3 on page 5 of the draft permit, which states the following:

> *All required effluent samples shall be collected at the point specified in Part I.A.1.g. of this permit. Any change in the sampling location must be reviewed and approved in writing by EPA and MassDEP.*
>
> *A routine sampling program shall be developed in which samples are taken at the same location, same time, and same days of every month. Any deviations from the routine sampling program shall be documented in correspondence attached to the applicable discharge monitoring report (DMR) that is submitted to EPA.*
>
> *All samples shall be tested using the methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136. All samples shall be 24-hour composites unless specified as a grab sample in 40 CFR § 136.*

The requirements in Footnote # 3 of the draft permit (for the development of a routine sampling program as well as for the use of the approved analytical methods found in 40 CFR § 136 (or alternative methods approved by EPA in accordance with 40 CFR § 136)), are being included in all NPDES discharge permits issued to POTWs in Massachusetts. EPA acknowledges that the Pittsfield WWTP currently has sampling and analysis procedures in place that conform to the applicable requirements of the permit that was issued to them in 2000 as well as with State and federal regulations. The intent of including the specific language in Footnote # 3 of the draft permit is to ensure that all permittees develop sampling programs that are consistent from month-to-month, which results in the generation of data that more accurately represents the effluent and reduces the variability amongst the effluent data collected and submitted by POTWs throughout the state. Additionally, in recognition of the fact that circumstances may arise which preclude the WWTP staff from adhering to the sampling program, the language in Footnote #3 also serves to standardize the procedure to be followed in the event of any deviations from the approved program.

Comment 6. <u>Total Residual Chlorine</u>

The draft permit extends the disinfection season by two weeks as well as requires the installation of an "alarm system" for the chlorination and dechlorination systems. The City consistently meets the permit limits and is unaware of any incident relative to the Housatonic River arising from the discharge of un-disinfected effluent. The City recently made extensive upgrades to the disinfection system. The incorporation of an "alarm system" will be costly and the extension of the disinfection season will result in additional costs for capital and chemical due to the likelihood of low temperature impacts to the chemical feed systems. The City is confident that the recently upgraded systems are entirely reliable and do not require an "alarm system".

Response 6.

The disinfection season has been extended from April 1st - October 15th to April 1st - October 31st to fully encompass the period when the river is likely to be used for recreation, in order to provide adequate protection of the primary and secondary contact recreation designated uses. The final permit shall remain unchanged from the draft with respect to the disinfection season.

The requirement in Footnote # 8 of the draft permit for the incorporation of an alarm system into the chlorination and dechlorination systems, is being included in all NPDES permits issued to POTWs in Massachusetts that use chlorination for disinfection of their effluent, regardless of their compliance history and the age of the system(s). For clarification, EPA is not requiring that the City install any type of continuous residual chlorine analyzer for the monitoring and recording of the chlorine concentration in the effluent, before and after disinfection. Rather, the intent of this requirement is to ensure that facilities with chlorination and/or dechlorination systems have an alarm system installed solely for the purpose of alerting WWTP personnel in the event of a malfunction and/or interruption of the chemical dosing systems (i.e., for detecting a failure of the chemical delivery system) which could potentially affect the amount of chlorination and/or dechlorination chemicals added to the effluent. This requirement shall remain in the final permit.

For clarification, Footnote # 8 has been modified in the final permit to read as follows:

> *"Chlorination and dechlorination systems shall include an alarm system for indicating interruptions or malfunctions of the chlorine and dechlorination chemical dosing systems within 60 days of the effective date of the permit. Any interruption or malfunction of the chlorine dosing system that may have resulted in levels of chlorine which were inadequate for achieving effective disinfection, or interruptions or malfunctions of the disinfection system that may have resulted in excessive levels of chlorine in the final effluent, shall be reported with the monthly DMRs. The report shall include the date and time of the interruption or malfunction, the nature of the problem, and the estimated amount of time that reduced levels of chlorine or dechlorination chemicals were added to the effluent."*

Comment 7. <u>POTW Notice – Industrial</u>

The draft permit identifies several new POTW reporting requirements including a severely restrictive condition regarding industrial dischargers. The specific condition requires "adequate notice" of "any" new or substantial change in pollutants. This condition is extremely broad by definition and onerous.

Response 7.

This condition is standard language and is contained within all NPDES discharge permits issued to POTWs. For clarification, as a general rule, EPA considers a "substantial change" to have occurred when there is greater than a 20% change in an industrial user's flow or loading of a particular pollutant to the POTW (see page 2-6 of the <u>Guidance Manual for the Use of Production-Based Pretreatment Standards and the Combined Wastestream Formula</u> (USEPA 1985 [EPA 833-B-85-201]).

Comment 8. Special Conditions

The draft permit requires the City to optimize the facility for the removal of nitrogen. The permit also requires an annual report. The City believes that this requirement is unfair and without basis, likely leading to an unattainable limit that will result in other costly upgrades to the WWTP. The existing WWTP was designed for the oxidation of ammonia compounds and not for nitrate removal. There are no opportunities within the existing facilities to provide for further nitrogen reduction. This requirement also seems to counter the back-up in the Fact Sheet included with the draft permit which indicates that no further reductions for Total Nitrogen are required to meet the Connecticut goals.

Response 8.

Part I.C. (Special Conditions) of the draft permit requires the permittee to conduct an evaluation which identifies any aspects of the treatment process at the existing facility that can be modified to maintain and/or enhance nitrogen removal rates. The permit requires that the facility implement optimization methods in order to maintain current loadings of nitrogen. Each year subsequent to the first year in which the reissued permit is effect, the permittee shall report to EPA and MassDEP the annual nitrogen load discharged from the facility and shall summarize any optimization measures employed at the facility over the past year to enhance or maintain nitrogen removal rates.

The requirements of Part I.C. of the draft permit are being included in all NPDES discharge permits issued to POTWs which discharge to receiving waters that are tributaries to Long Island Sound. The intent of these requirements is to ensure that loadings of total nitrogen from out-of-basin point sources discharging to the Connecticut, Thames, and Housatonic River watersheds remain at or below the required aggregate 25% reduction from the baseline total nitrogen loading required by the Waste Load Allocation included in the TMDL for Long Island Sound. The requirements of Part I.C. of the draft permit shall remain unchanged in the final permit.

Comment 9. Unauthorized Discharges

Any requirements for connected communities need to be addressed to those communities.

Response 9.

Please see response to comment B.1.

Comment 10. Operation and Maintenance

There are several new requirements contained within this section including the official development of an O&M program, an Infiltration and Inflow control plan, and an annual report including the co-permittees. The City currently maintains a preventative maintenance program. The City is also underway with an extensive I/I and SSES program to determine the capital improvements needed to sustain the infrastructure. New requirements for another program are not justified. This additional requirement is burdensome. It also appears that the City is responsible to collect data from connected communities and submit this to the

EPA and MassDEP. The City currently has no means by which to require the submittal of this information or the ability to enforce a requirement under this section. The EPA and MassDEP should require this information to be collected directly from the co-permittees.

Response 10.

The requirements in Part I.E. (Operation and Maintenance of the Sewer System) of the draft permit are being included in all NPDES permits issued to POTWs throughout Massachusetts, in order to ensure, amongst the other requirements of this section, that all permittees (including co-permittees) are working towards developing I/I control programs, and that sufficient funds are being allocated to support such programs.

As described in Section VII. of the fact sheet and as stated in the response to comment B.1., the requirements of Part I.E. of the draft and final permits (including Part I.E.3., Infiltration/ Inflow Control Plan), apply to each of the towns that have been named as co-permittees in the draft permit. Therefore, each of these individual communities is responsible for carrying out the activities required by this section of the draft permit for the portions of the wastewater collection system they own and operate. Each of the co-permittees is responsible for the development and submittal of an I/I control plan as well as the annual I/I summary reports required by Part I.E.3. of the draft permit for their respective wastewater collection systems. EPA is not requiring the City of Pittsfield to be responsible for any of the activities required by Part I.D. and Part E. of the permit with respect to any portion of the wastewater collection system that lie outside of the City's jurisdiction.

EPA commends the City of Pittsfield for maintaining their preventative maintenance program as well as for undertaking a program to address I/I. Any operation and maintenance programs currently in place (or portions of such programs) may be used to satisfy the requirements of Part I.E. of the permit.

Comment 11. <u>Development of Limitations for Industrial Users</u>

The City currently maintains an Industrial Pretreatment Program and is updating several portions of its program. Currently based upon the limited industrial capacity of the region, it is unnecessary to complete a local limits review as most of the industries are permitted due to categorical status or for non-priority pollutants. The City requests that this mandatory requirement be removed from the permit.

Response 11.

The permittee is required to submit a written technical report to EPA analyzing local limits. In preparing this evaluation, the permittee is only required to complete and submit the Reassessment of Technically Based Local Limits (TBLLs) (**Attachment C** of the draft and final permits) with the technical evaluation to assist in determining whether existing local limits need to be revised. Based on the evaluation, EPA will determine if a technically-based local limits report is necessary.

The requirement for the submission of this report shall remain in the final permit.

Comment B.12. Industrial Pretreatment Program

As stated above, the City maintains an IPP in conformance with the existing permit. We are currently in the process of updating to meet the Streamlining Rule. The deadline contained in the permit is unnecessary. Additionally, the reporting dates for the annual IPP have changed and are inconsistent with the dates contained in the permit.

Response B.12.

The due date (within 90 days of the effective date of the permit) for the submission of all modifications required by the Streamlining Rule is being included in all discharge permits issued to POTWs, and shall remain in the final permit.

The October 31st due date for the submission of the annual industrial pretreatment program report in the draft permit has not changed from the permit that was issued in 2000, and shall remain in the final permit.

Comment 13. State Certification

It appears that State certification has not been made yet. The City is concerned that requirements may change again before final issuance.

Response 13.

Under the CWA Section 401(a)(1) and pursuant to the requirements of 40 CFR § 124.53, EPA may not issue a permit until the state in which the discharge originates from (or will originate from) certifies the permit. The provisions of 40 CFR § 122.44(d) require permit conditions and limitations to be sufficiently stringent so as to ensure that the receiving water will meet water quality standards established under Section 303 of the CWA, including numeric and narrative State water quality standards (40 CFR § 122.44(d)(1) and 40 CFR § 122.44(d)(1)(i). The State of Massachusetts must certify that the conditions contained in the permit are adequately protective of the receiving water to ensure attainment of state water quality standards. Requests for certification are sent to MassDEP at the time a draft NPDES permit is released for public comment. The State provides certification upon signing of the final permit. Prior to a draft permit being released for public comment, there is extensive dialogue between the EPA and MassDEP during the development of limitations and conditions that satisfy both state and federal requirements. Therefore, EPA anticipates that the limitations and conditions of the draft permit will be certified.

Comment 14. Page 4 of the Fact Sheet:

The City does not currently have gravity thickeners at the WWTP.

Response 14.

We regret the error in the fact sheet; however, fact sheets are written to support the draft permit and are not revised as part of the final permit decision. The response to the above comment is noted here in the Response to Comments document, which becomes part of the

administrative record. We do not believe that your correction necessitates any changes to the final permit.

Comment 15. Available Dilution

There appear to be some inconsistencies in the methodology used to calculate the dilution ratios for the proposed permit limits. The basis of comparison is the average daily design flow of the facility (17 MGD), which is substantially higher than the actual effluent flow (less than 7 MGD) during 7Q10 periods.

Response 15.

The provisions of 40 CFR § 122.45(b) require EPA to base the limitations, conditions, and prohibitions contained within NPDES permits for POTWs on the design flow of the facility. Therefore, in accordance with this requirement, the calculations used to develop the dilution factor and effluent limitations in the draft permit were based on the 17.0 MGD design flow of the facility.

Comment 16. Non-Conventional Pollutants

Nitrogen appears to be the next target for WWTP's; however, it appears that Pittsfield is the recipient of the first such requirement. Many recently issued NPDES permits to other treatment facilities do not contain any nitrogen requirements, even though they may have substantially better existing facilities to meet this requirement. The inclusion of additional reporting and study requirements to Pittsfield seems arbitrary and unnecessary based upon the analysis provided.

Response 16.

The requirements for nitrogen in Part I.C. of the draft permit (and described in Part V.B.3.c. of the fact sheet) are being included in all NPDES permits issued to POTWs throughout Massachusetts that are tributary to Long Island Sound. To date, the only other final permit in Massachusetts that has been issued with the nitrogen optimization requirement was issued on September 29, 2007 to the Easthampton POTW. However, draft permits with the optimization requirement have been recently released for public comment to a number of POTWs including Northampton, Northfield, Montague, and Lee.

EPA acknowledges that the monitoring frequencies for total Kjeldahl nitrogen (TKN), total nitrite nitrogen (NO_2), and total nitrate nitrogen (NO_3) in the permit that was issued in 2000 have been increased in the draft. In addition, the draft permit also includes a new total nitrogen reporting requirement. The results of the weekly TKN, NO_2, and NO_3 analyses can be used to determine the concentration of total nitrogen (TN) in the final effluent (TN = TKN + NO_2 + NO_3) without any additional laboratory analysis. EPA believes that the increase in the monitoring frequencies for TKN, NO_2, and NO_3, as well as the additional total nitrogen reporting requirement in the draft permit are necessary in order to accurately characterize the effluent. The requirements for nitrogen, including those contained within Part I.C. (Special Conditions) of the draft permit, shall remain in the final permit.

Comment 17. Phosphorus

We restate that the basis for the phosphorus limit is not thorough and does not contain convincing evidence of the need to lower the limit. Without the benefit of a TMDL, it is not appropriate to make a single entity responsible for the health of the River. Also it does not appear that the stringent limit is necessary to other facilities located on the Housatonic.

Response 17.

See response to comments B.2.a.1., 2. and 3.

Comment 18. Copper

The Fact Sheet provides analysis that shows the existing copper limit is overly stringent. Irrespective of this fact, due to anti-backsliding requirements it is stated this limit can not be modified to the correct and more appropriate value. Additionally, the hardness value applied is different than the one used for zinc. We feel this is inappropriate.

Response B.18.

The Massachusetts Surface Water Quality Standards include requirements for the regulation and control of toxic constituents and also require that EPA criteria established pursuant to Section 304(a) of the CWA shall be used unless site-specific criteria are established (314 CMR § 4.05(5)(e)). Since EPA has not approved site-specific criteria for zinc in the Housatonic River, national recommended criteria were used to determine acute and chronic criteria in the receiving water where the Pittsfield WWTP discharge outfall is located. The calculations used in the derivation of criteria for zinc, taken from Appendix B of the 2002 National Recommended Water Quality Criteria: 2002 (USEPA 2002 [EPA-822-R-02-047]), incorporate the hardness of the receiving water, which was determined from the analysis of receiving water samples that were collected upstream from the discharge for use as dilution water in the whole effluent toxicity tests conducted in June 2005, September 2005, June 2006, and September 2006..

Site-specific criteria for copper were included in the revised Massachusetts Surface Water Quality Standards (revised in December 2006 and approved by EPA on March 26, 2007). These criteria were developed for specific receiving waters, including the Housatonic River, where national criteria are invalid due to site-specific physical, chemical, or biological considerations, and do not exceed the safe exposure levels determined by toxicity testing (314 CMR 4.05(5)(e) Table 28). In accordance with the state water quality standards for toxic pollutants (314 CMR § 4.05(5)(e)), the site-specific criteria rather than the EPA-recommended criteria (which factors in hardness values for the receiving waters in which the criteria are being applied) were used as the basis for the development of effluent limitations for copper in the draft permit.

MassDEP prepared PROTOCOL FOR AND DETERMINATION OF SITE SPECIFIC COPPER CRITERIA IN AMBIENT WATERS IN MASSACHUESSTS (the "site specific protocol"; MassDEP, January 2007) in conjunction with the new criteria (see **Attachment A**). In this document, MassDEP states that "While site-specific copper criteria are being

established, prudence dictates that loads of copper and other metals be minimized. This, in part, is because possible impacts on sediment quality and toxicity remain an open question. Therefore, as part of the site-specific criteria, all reasonable efforts to minimize the loads of metals, and copper in this case, are part of the criteria revision protocol. So, the Department, on a case-by-case basis, will develop permit copper limits. Each determination will be based not only on the adjusted concentration resulting from the appropriate multiplier but will reflect the demonstrated level of copper reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment." Therefore, consistent with this protocol and following the receipt of the above comment, EPA and MassDEP determined that a re-examination of the effluent data was warranted in order to develop limits that will not only meet the revised criteria, but that also reflect the demonstrated performance of the facility.

Antibacksliding requirements found at Clean Water Act (CWA) 402(o) and 40 CFR 122.44(l) generally prohibit relaxation of effluent limits. Water quality-based limits can only be relaxed if one of the exceptions found at CWA 402(o)(2) is met or if the requirements of CWA 303(d)(4) are met. In this case, none of the exceptions listed in 402(o)(2) apply[3]

CWA 303(d)(4) requires that a determination be made whether the receiving water is attaining the applicable water quality standard. If the water is in attainment of the standard, a relaxation of the limit would be allowed subject to the state antidegradation policy. If the receiving water is not in attainment of the applicable standard, the existing limit must be based on a wasteload allocation or a total maximum daily load (TMDL) and the relaxed limit is only allowed if attainment of water quality standards is ensured.

When re-evaluating the copper limitation proposed in the draft permit and the effluent data from the facility, EPA first calculated limits that would be necessary to ensure that the receiving water would be in attainment of the new criteria using the following equation:

$$Q_rC_r = Q_dC_d + Q_sC_s$$

Which can be rearranged as:

$$C_d = \frac{Q_rC_r - Q_sC_s}{Q_d}$$

Where:
Q_r = Receiving water flow downstream of the discharge ($Q_d + Q_s$)
C_r = Copper concentration in the receiving water downstream of the discharge
Q_d = Discharge flow from the facility
C_d = Copper concentration in the discharge

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[3] It may appear that that the exception found at 402(o)(2)(B)(i) would apply. This exception is for a situation where "information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance". However, new water quality criteria are "revised regulations" and are therefore specifically excluded as "new information".

Q_s = Receiving water flow upstream of the discharge
C_s = Copper concentration upstream of the discharge

Acute and chronic (maximum daily and average monthly) effluent limits which would result in an instream copper concentration equal to the new site-specific criteria were calculated using an estimated upstream copper concentration (C_s) of 2.5 µg/l (one-half of the minimum level (ML) for the Inductively Coupled Plasma analytical method), the 7Q10 flow in the receiving water (Q_s = 25.7 cfs), the design flow of the facility (Q_d = 17 MGD = 26.35 cfs), and a downstream flow of 52.1 cfs ($Q_r = Q_s + Q_d$). The copper concentration in the receiving water was set at the applicable criteria. A conversion factor of 0.96 was used to convert dissolved copper concentrations (which is what the criteria are set at) to total recoverable copper concentrations (which is what effluent limits for metals are set at) using the formula $Copper_{(dissolved)} = Copper_{(total)} * 0.96$. This conversion factor is recommended in the National Recommended Water Quality Criteria:2002 (USEPA 2002 [EPA-822-R-02-047]) where there is no site specific translator to convert dissolved criteria to a total recoverable limit (also see Metal Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criteria (USEPA 1996 [EPA-823-B96-007]).

The effluent limitations that would be necessary in order for the chronic (monthly average) and acute (daily maximum) site-specific criteria to be met in the receiving water were calculated to be 34.9µg/l and 48.5 µg/l, respectively, as follows:

Average Monthly (Chronic) Limitation:

$$C_d = \frac{Q_r C_r - Q_s C_s}{Q_d}$$

Where:
Q_s = 25.7 cfs
$C_s = 2.5\ \mu g/l_{(total\ copper)}$
Q_d = 26.35 cfs
Q_r = 52.1 cfs
$C_r = 18.9\ \mu g/l_{(total\ copper)} = 18.1\ \mu g/l_{(dissolved\ copper)} / 0.96$

$$C_d = [(52.1\ cfs)(18.9\ \mu g/l) - (25.7\ cfs)(2.5 ug/l)] / 26.35\ cfs$$

$$C_d = 34.9 \mu g/l\ (total\ copper)$$

Maximum Daily (Acute) Limitation:

$$C_d = \frac{Q_r C_r - Q_s C_s}{Q_d}$$

Where:
Q_s = 25.7 cfs
C_s = 2.5 µg/l
Q_d = 26.35 cfs
Q_r = 52.1 cfs

C_r = 26.8 µg/l (total copper) = 25.7 µg/l $_{(dissolved\ copper)}$ /0.96

$$C_d = [(52.1\ cfs)(26.8\ \mu g/l) - (26.35\ cfs)(2.5\ \mu g/)] / 26.35\ cfs$$

$$C_d = 48.5\ \mu g/l\ (total\ copper)$$

In each case, the calculated limit was greater than the limit in the permit that was issued in 2000 (16.7 µg/l (average monthly) and 24.9 µg/l (maximum daily)). However, pursuant to the state's antidegradation policy (314 CMR § 4.04) and MassDEP's PROTOCOL FOR AND DETERMINATION OF SITE SPECIFIC COPPER CRITERIA IN AMBIENT WATERS IN MASSACHUESSTS (MassDEP, January 2007. See **Attachment A**), the limit in the final permit is not based entirely on these calculations because it must also reflect the demonstrated level of copper reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment. Therefore, data reflecting the concentration of copper discharged from the facility over the previous permit cycle (2000-2007) was reviewed to characterize the performance of the facility (see **Appendix A., Table 1**).

In order to capture the statistical variation in the data (see **Appendix A, Tables 1 & 2**), EPA referred to Appendix E, Lognormal Distribution and Permit Limit Derivations, of the Technical Support Document for Water Quality-based Toxics Control (USEPA. March 1991 [EPA/505/2-90-001]). This document provided technical guidance on the statistical procedures used to factor in the copper data submitted by the facility in their monthly discharge monitoring reports (DMRs) from 2000-2007.

The guidance recommends using the 99th percentile of the data for calculating the maximum daily limit and the 95th percentile of the data for calculating the average monthly limit (see **Appendix A, Table 2**). Based on these calculations, the average monthly limit would be 18 µg/l and the maximum daily limit would be 22.9 µg/l. The following calculations show that average monthly and maximum discharges of copper from the facility in quantities equal to these limitations would result in instream copper concentrations (C_r) of 10.3 µg/l and 12.8 µg/l, respectively, which both meet the site-specific criteria.

Discharges of Copper = Average Monthly Limit of 18 µg/l (Cd = 18 µg/l)

$C_r = Q_sC_s + Q_dC_d / Q_r$

Where:

Q_s = 25.7 cfs
C_s = 2.5 µg/l
Q_d = 26.35 cfs
C_d = 18 µg/l
Q_r = 52.1 cfs

$C_r = [(25.7\ cfs)(2.5\ \mu g/l) + (26.35\ cfs)(18.0\ \mu g/l)] / 52.1\ cfs = 10.3\ \mu g/l$

Discharges of Copper = Maximum Daily Limit of 22.9 µg/l (Cd = 22.9 µg/l)

$C_r = Q_sC_s + Q_dC_d / Q_r$

Where:

Q_s = 25.7 cfs
C_s = 2.5 µg/l
Q_d = 26.35 cfs
C_d = 22.9 µg/l
Q_r = 52.1 cfs

C_r = [(25.7 cfs)(2.5 µg/l) + (26.35 cfs)(22.9 µg/l)] / 52.1 cfs = 12.8 µg/l

The average monthly and maximum daily limitations calculated based on the performance of the facility are more stringent than those calculated to meet the water quality criteria. Accordingly, the limitations for copper in the final permit are established at the more stringent of the limits calculated to achieve the new water quality criteria and those based on demonstrated performance of the facility. Therefore, the final permit contains an average monthly limit of 18.0 µg/l and a maximum daily limit of 22.9 µg/l.

Note on the Copper Calculations Provided in Appendix A, Table 2:

A description of the lognormal distribution is provided in the Technical Support Document for Water Quality-based Toxics Control, Appendix E, Lognormal Distribution and Permit Limit Derivations (EPA March 1991 [EPA/505/2-90-001]). The available copper data were fitted to a lognormal distribution using the equations provided in the technical support document to determine the average monthly and maximum daily copper limits. The 95th and 99th percentiles of the lognormal distribution provide the average monthly and maximum daily limits, respectively.

In the event that there were non-detect values in the copper data set, the data was fitted to a delta-lognormal distribution. In delta-lognormal distributions, non-detect values are weighted in proportion to their occurrence in the data. The values above the detection limit were assumed to be lognormally distributed values.

Closing Comment:

The City strongly believes the new limits and requirements contained within the draft permit are unfair, without basis, and in many cases unfeasible. Moreover, there appears to be no rationale suggesting such requirements will provide any significant improvements in the water quality of the Housatonic River, especially when measured against the negative environmental and financial impacts that will result from the construction and operation of further treatment facilities aimed at achieving compliance with the draft permit limits. The extensive capital, staffing, man-power, electricity, fuel, chemicals, and sludge produced to make fractional improvement in effluent quality are not justified. It is our sincere desire that the EPA will work cooperatively with the City to develop a fair and balanced permit that will

not result in enormous rate impacts to the users of the wastewater system, while continuing to meet the goals of the Clean Water Act.

Response to Closing Comment:

We believe that the limitations included in the final permit are necessary to meet the requirements of the Clean Water Act and State Water Quality Standards. Specific responses are included in the body of this Response to Comments document

Additional Changes Made to the Final Permit:

1. Footnote # 10: "See Part I.F. Special Conditions..." has been changed to "see Part I.C. Special Conditions..."

2. Footnote 16: The WET test schedule table in the draft permit incorrectly lists the acute limit (LC_{50}) as being ≥ 50 %, and the chronic (C-NOEC) limit as being ≥ 100%. This table has been corrected in the final permit to reflect the correct acute and chronic limits of ≥ 100% and ≥ 50 %, respectively. The Footnote now reads as:

   *The permittee shall conduct chronic (and modified acute) toxicity tests two times per year, in accordance with the schedule table below. The chronic test may be used to calculate the LC_{50} at the 48-hour exposure interval. The permittee shall test the daphnid, Ceriodaphnia dubia, only. Toxicity test samples shall be collected during the second week of the months of January and July. The test results shall be submitted by the last day of the month following the completion of the test. The test results are due February 28th and August 31st, respectively. The tests must be performed in accordance with the test procedures and protocols specified in **Attachment A** of this permit.*

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit (LC_{50})**	**Chronic Limit (C-NOEC)**
January July	February 28th August 31st	*Ceriodaphnia dubia* (daphnid) See **Attachment A**	≥ 100%	≥ 50%

3. The listing of "Lenox (North)" as a co-permittee has been changed to "Lenox", since they are the same entity. This change is reflected on the cover sheet as well as in Part I.D. of the final permit.

Appendix A: Statistical Derivation of Copper Limitations Based on the Lognormal Distribution of the Data Collected from 2000-2007

Table 1: Concentration of Copper Discharged From 2000-2007

Date	Cu (µg/L)	Date	Cu (µg/L)	Date	Cu (µg/L)
Dec. 2000	11.4	Nov. 2003	7.4	Oct. 2006	10
Jan. 2001	8.9	Dec. 2003	7	Nov. 2006	9.9
Feb. 2001	5.6	Jan. 2004	7.5	Dec. 2006	12.7
March 2001	6.2	Feb. 2004	7.5	Jan. 2006	9.1
April 2001	8.8	March 2004	8.7	Feb. 2006	12.8
May 2001	0	April 2004	6.7	March 2006	11
June 2001	8.4	May 2004	5.2	April 2006	6.9
July 2001	11.4	June 2004	7.2	May 2006	7.4
Aug. 2001	13	July 2004	8.1	June 2006	8.2
Sept. 2001	11.6	Aug. 2004	11.6	July 2006	10
Oct. 2001	11.1	Sept. 2004	15.8		
Nov. 2001	13.8	Oct. 2004	10		
Dec. 2001	15.8	Nov. 2004	15.8		
Jan. 2002	12	Dec. 2004	6.3		
Feb. 2002	2	Jan. 2005	8.8		
March 2002	13	Feb. 2005	10.2		
April 2002	10.2	March 2005	6.8		
May 2002	11.8	April 2005	6		
June 2002	15.6	May 2005	10		
July 2002	10	June 2005	9		
Aug. 2002	11.6	July 2005	14.5		
Sept. 2002	15.5	Aug. 2005	14.4		
Oct. 2002	12.7	Sept. 2005	15		
Nov. 2002	9.6	Oct. 2005	15.3		
Dec. 2002	12.4	Nov. 2005	11		
Jan. 2003	10.5	Dec. 2005	15.1		
Feb. 2003	11.6	Jan. 2006	11.7		
March 2003	12.2	Feb. 2006	9.2		
April 2003	7.1	March 2006	8.3		
May 2003	7.7	April 2006	7.9		
June 2003	9.8	May 2006	13.4		
July 2003	12	June 2006	4.8		
Aug. 2003	12	July 2006	12.4		
Sept. 2003	14.1	Aug. 2006	15		
Oct. 2003	6.2	Sept. 2006	15.8		

Note: Effluent data taken from monthly discharge monitoring reports submitted by the permittee