ANDERSON & KREIGER LLP

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September 14, 2006

BY HAND

United States Environmental
Protection Agency
1 Congress Street, Suite 1100
Boston, Massachusetts 02114-2023

Re: Comments of the City of Attleboro on Draft NPDES Permit No. MA0100595

Dear Sir or Madam:

The City of Attleboro ("City") hereby comments upon the draft National Pollutant Discharge Elimination System (NPDES) permit forwarded in the Environmental Protection Agency's (EPA) August 11, 2006 letter to the City.

Attached hereto as Exhibit A, and incorporated in this letter, are the technical comments of Camp, Dresser & McKee ("CDM") regarding the challenged limits. Attached as Exhibit B is the letter of Superintendent Paul Kennedy, also incorporated herein. In further support of these comments, the City submits a volume of attachments ("Appendix") to be included in the record. The City challenges the permit limits for total nitrogen and associated requirements; the limits for metals; and the other provisions set forth in Exhibits A and B.

A. NITROGEN LIMITS

1. Overview

The Massachusetts Department of Environmental Protection ("MaDEP") has not imposed the total nitrogen limit contained in the proposed permit. See Draft Permit, pp. 2, 4 and n. 9 ("This permit limit is a requirement of the U.S. Environmental Protection Agency (EPA) permit and is not a requirement of the Massachusetts Department of Environmental Protection (Mass DEP) permit. . . ."). This permit is, as far as we know, the first instance where EPA has proposed stricter nitrogen limits upon a Massachusetts discharger than imposed by Massachusetts itself. This raises legal and policy issues arising from the interstate nature of the analysis.

The problem is exacerbated by the absence of total daily maximum load ("TMDL") calculations or other reliable data supporting the downstream state's position here. EPA's draft permit ultimately rests upon an approach that the Clean Water Act attempted to avoid, that Massachusetts regulators contest, and that science cannot justify. This raises additional legal, factual and policy issues under the Clean Water Act.

As shown below, the draft permit's nitrogen limits should be stricken for several reasons.

2. Lack of Scientific Basis for Stricter Nitrogen Limits than Massachusetts Imposes.

The City's first concern is that the total nitrogen limits are unwarranted as a scientific matter. To accept the Rhode Island Department of Environmental Management's ("RIDEM") rationale in this case would establish an extremely unfortunate precedent for reliance upon unproven "science" and speculation.[1]

The Clean Water Act contemplated solid scientific support for imposing site-specific effluent limits upon publicly owned treatment works, with corresponding burdens upon ratepayers and taxpayers. Section 303(d) (33 U.S.C. § 1313(d)); 40 CFR 130.7. Rhode Island was supposed to establish TMDLs for the receiving waters "at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." Id.

RIDEM frankly acknowledges that it has been unable to develop a water quality model and a water quality restoration plan for the Providence and Seekonk Rivers. See "Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers", RIDEM, Office of Water Resources, December 2004 (Appendix, Tab 1) ("RIDEM 2004 Evaluation"):

> It has recently been determined that due to problems encountered when modeling the interaction between the deep channel and shallow flanks of these water bodies, the mass transport component of the model system cannot be successfully calibrated and validated . . . Because water doesn't mix in the model as it does in the rivers, we are unable to simulate the chemical and biological behavior of the system in the water quality phase of the modeling effort.

[1] Requiring expenditures by Attleboro based upon this state of scientific knowledge is particularly ironic, where RIDEM has declined to devote resources needed to develop a water quality model and other predictive tools until a technical advisory committee recommends the most promising approach. RIDEM, Nutrient Permit Modifications – Response to Comments, pp. 16, 22, 29, included in Appendix, Tab 3. Meanwhile, municipalities including Attleboro are forced to expend resources in facilities upgrades without even knowing what the final requirements will look like and what cost savings might have been achieved if those final requirements had been known prior to committing those resources – precisely what RIDEM itself refuses to do.

> Our inability to adequately validate the mass transport model also prevents us from applying the Massachusetts approach to settling load allocations that uses ambient total nitrogen concentration as the indicator, which is described below.

Id., p. 1. See also RIDEM "2004 CWA § 303(d) List of Impaired Waters" [listing Ten Mile River as group 2: "(TMDL Planned)"; the target date is 2008]. Instead, RIDEM relies upon an experiment, conducted between May 1981 and September 1983 in a static laboratory system (consisting of nine tanks at the University of Rhode Island) by the Marine Ecosystems Research laboratory, which sampled chlorophyll-a, dissolved oxygen and – tellingly – DIN (dissolved inorganic nitrogen), rather than total nitrogen. Id. The problems with applying that experiment to the dynamic rivers and embayment systems at issue here go even beyond the obvious differences between a laboratory and a complex real-world system.[2]

CDM has identified many reasons why the RIDEM 2004 Evaluation fails to establish a scientific basis for imposing limits upon Attleboro that Massachusetts has not imposed. See CDM report, attached hereto as Exhibit A. It has also pointed out that there are many potential causes of low dissolved oxygen, beyond wastewater plant effluent.

MaDEP has also documented the uncertainties and inadequacies of the existing scientific knowledge, if used for permitting purposes. It did so in a letter dated February 11, 2004, and then in its February 8, 2005, review comments on RIDEM permits and supporting documents including the RIDEM 2004 Evaluation. See Appendix, Tab 2. Many of MaDEP's comments have gone unanswered. Its insistence upon solid science has not been effectively rebutted. It is probably no coincidence that MaDEP, which can apply water quality models, comes up with a different answer.

Moreover, RIDEM was operating under a state legislative mandate to reduce nitrogen discharges by 50% by December 31, 2008. RIDEM, Nutrient Permit Modifications – Response to Comments, pp. 1, 3, citing RI Gen. Laws. § 46-12-2(f), Appendix, Tab 3. See also RIDEM "Plan for Managing Nutrient Loadings to Rhode Island Waters" (Feb. 1, 2005), Appendix, Tab 8. That mandate is a blanket reduction applicable to in-state facilities, not an applicable water quality standard, within the meaning of federal law. RIDEM has (understandably) acted upon this mandate (id.), which does not apply to Attleboro and can not be applied by EPA here. It would be error to require Attleboro to comply with RI Gen. Laws. § 64-12-2(f), but the draft permit would just that (and more), because it derives from RIDEM's implementation of that statute. It is not a fair answer to assert (again without reliable scientific support) that "EPA has concluded that the amount of nitrogen reduction will be at least as great as required by the

[2] Even as it states the belief "that the MERL tank results provide an adequate representation of the relationship between nitrogen and oxygen levels in the Providence and Seekonk Rivers" the RIDEM 2004 Evaluation, p. 27, concedes that "some uncertainty remains regarding predicted water quality improvements and loading reductions necessary to meet water quality standards. As noted above, significantly lower mean DIN concentrations were observed in the Providence and Seekonk Rivers as compared to the MERL experiment for an equivalent loading rate, which may be the result of large differences between the field and experimental flushing times, uptake by macroalgae and denitrification in the bottom waters."

proposed permit level." See Fact Sheet, p. 11. EPA should not require public investment based upon uncertain science that easily may turn out to be superseded by the time the required construction is designed or even completed, requiring still more investment, a changed course of action and imposition of charges or taxes. Of course, if future science (or even the current facts cited by CDM) demonstrates that EPA has overstated the contribution of the Attleboro plant to low oxygen levels or other conditions, then the situation would be even worse.

Ultimately, RIDEM's selection of limits is not based upon science, let alone a TMDL. In its search for guidance from EPA, it has used the criteria that apply "if there are not adequate data and predictive tools to characterize and analyze the pollution problem . . .." RIDEM 2004 Evaluation. Appendix, tab 1. This is essentially a correct admission about the lack of scientific support for RIDEM's approach – an approach that, as shown below, even RIDEM does not intend to implement for years, if ever. To be sure, the EPA guidance acknowledges that a "phased approach may be necessary", but RIDEM consciously delayed its modeling (see FN1, above) and then based its 2004 Evaluation upon implementation costs of certain approaches and the supposed water quality benefit that it presumes would result despite the lack of adequate data and predictive tools. On the supposed basis of cost-effectiveness, it selects 5 mg/l for four WWTPs and 8 mg/l for the others (including out-of-state plants), regardless of actual contribution to Rhode Island waters.[3] This is therefore **not a decision about relative contributions to problems within Rhode Island waters,** but, instead, is a crude means to postpone TMDLs and treat different discharges the same, regardless of location and attenuation before reaching affected waters.

3. Interstate Considerations

The interstate nature of the problem exacerbates the scientific, policy and legal difficulties. EPA contemplates the highly unusual step of promulgating a nitrogen limitation for a Massachusetts facility that MaDEP has declined to impose. There is no total nitrogen limits issue here under Section 401(a)(1) [33 U.S.C. § 1341(a)(1)] of the Clean Water Act, as Massachusetts has not required those limits to comply with the water quality standards of the state where Attleboro's discharge originates.

The total nitrogen limits therefore must be justified, if at all, under Section 401(a)(2) [33 U.S.C. § 1341(a)(2)]and 40 CFR § 122.44(d), relating to conditions in NPDES permits that will ensure compliance with the "applicable water quality requirements" of a "downstream affected state", namely Rhode Island. By now, such standards should be reflected in TMDLs. As a downstream state, Rhode Island has no authority to regulate the Massachusetts waters where the Attleboro plant discharges; the only question concerns the effect of the Massachusetts discharge

[3] It rejected a suggestion to evaluate Massachusetts contributions after current upgrades are in place, but, in doing so, discussed only the Upper Blackstone facility – a red herring as far as Attleboro's ongoing upgrade is concerned. Moreover, by applying the same 8 mg/l limit to Rhode Island and Massachusetts facilities, it failed to account for the observation (RIDEM 2004 evaluation, p. 19) that "[i]n the Ten Mile river, the DIN discharge to the Seekonk River was found to be 61% of the concurrent load estimate from the Attleborough and North Attleborough WWTFs using 1995-1996 flows."

once it reaches affected Rhode Island waters. See Arkansas v. Oklahoma, 503 U.S. 91 (1992)(downstream state's water quality standards are not applicable where any pollutants in the upstream discharge are not detectable at and within the downstream state's borders). In this context, EPA must determine what state-law standards are "applicable." Id., 503 U.S. at 110. "[T]reating state standards in interstate controversies as federal law accords with the Act's purpose of authorizing the EPA to create and manage a uniform system of interstate pollution regulation." Id.

Conversely, a non-TMDL system that imposes speculative burdens -- and does so disproportionately upon attenuated discharges originating out of state -- would be discriminatory and contrary to congressional mandate. Where, as argued below, the Attleboro draft permit limits are more stringent with regard to Rhode Island waters than the limits that RIDEM has applied in word and deed, the permit limits contravene the legislative purpose of uniformity.

Though in a different factual context, the Supreme Court has specifically cautioned against excessive application of the downstream state's regulations:

> If every discharge that had some theoretical impact on a downstream State were interpreted as 'degrading' the downstream waters, downstream States might wield an effective veto over upstream discharges.

Arkansas, 503 U.S. at 111. The parallel concern in this case is that, if Rhode Island can require greater dilution *within its waters* from out-of-state dischargers than from in-state ones, it can shift a disproportionate responsibility and expense of improving its water quality onto those who lack a political voice in Rhode Island's choices. As a matter of policy, fairness and law, EPA must not allow that to occur here and therefore must withdraw the total nitrogen permit limits proposed in the draft permit.

As argued extensively below, Attleboro's concern about even-handed treatment is heightened by the level of speculation and scientific uncertainty underlying Rhode Island's determinations and by Rhode Island's willingness to substitute higher interim nitrogen limits in place of its nominal discharge limits for Rhode Island facilities, for many years, until more is known.

4. EPA Has Not Justified The Proposed Nitrogen Limits As Necessary to Meet Rhode Island's Water Quality Standards.

While EPA's draft permit purports to address Rhode Island's Water Quality standards, it duplicates RIDEM's choice in the RIDEM 2004 Evaluation, and relies entirely upon RIDEM's analysis, which is incomplete, contradictory and applied inconsistently, if at all, in practice. Compare EPA Fact Sheet, pp. 10-12 (citing RIDEM 2004 Evaluation, comments and RIDEM's response) with attached CDM letter, Exhibit A. The result is a proposed total nitrogen limit that is excessively and discriminatorily strict, compared to Rhode Island's actual water quality standards.

a. The Draft Permit Contains Inappropriately Stricter Limits than Rhode Island DEM Nominally Imposes

By the time effluent from the Attleboro WWTP reaches the Seekonk River in Rhode Island, the concentration of nitrogen has been attenuated. RIDEM used an attenuation factor of 40%. RIDEM 2004 Evaluation, pp. 19, 20, Appendix, Tab 1. As CDM notes, wastewater treatment effluent is only 70% of the total nitrogen load to the Ten Mile River. Therefore, the proposed 8 mg/l limit at the Attleboro plant would only discharge 3.4 mg/l to the Seekonk River (8 x 60% x 70%). Requiring an 8 mg/l concentration of nitrogen at the Attleboro WWTF outfall is excessive to achieve a 8 mg/l (or even a 5 mg/l) concentration of nitrogen from the plant in the Seekonk River, which is all that Rhode Island has nominally required of its in-state plants.

The following table shows the nominal limits contained in RIDEM's recent permits that, assertedly, reflect current application of Rhode Island water quality standards to facilities discharging in Rhode Island, compared to Attleboro's effective 3.4 mg/l discharge:

	May-Oct	**Nov-Mar**
NBC-Bucklin	5.0 mg/l	Operational[4]
E. Providence	8.0 mg/l	Operational
NBC-Fields Pt.	5.0 mg/l	Operational
Woonsocket	5.0 mg/l	Operational
Cranston	8.0 mg/l	Operational
Warwick	8.0 mg/l	Operational
West Warwick	8.0 mg/l	Operational
Attleboro to Seekonk River (and at the outfall)	3.4 mg/l effective (8.0 mg/l nominal)	Operational

Attleboro's discharge to the affected waters thus has stricter proposed limits than all direct dischargers to Rhode Island.

This is particularly hard to understand given the relatively small design flow for the Attleboro facility. As show in the RIDEM 2004 Evaluation, p. 20, Table 4, Attleboro's design flow and estimated May-October design flow ranked 8th out of 10, less than a third of, for instance, the NBC-Bucklin plant (which is allotted 8.0 mg/l in May-Oct.), about 1/6th or the Fields point plant, and behind East Providence and Woonsocket as well.

[4] "Operational" means that the permit imposes no limit, but requires the permittee to "operate the treatment facility to reduce the discharge of total nitrogen, during the months of November through April [or March, for Attleboro], to the maximum extent possible using all available treatment equipment in place at the facility, except methanol addition."

To be sure, the EPA fact sheet asserts that the 40% attenuation figure should be adjusted downward to an extent not specified in the fact sheet. Any such adjustment would be speculative, would be overwhelmed by taking account of the fact that WWTP discharges are only 70% of the total nitrogen load, and should await real data as well as the achievement of the improvements upon which EPA's assertion rests. Moreover, as shown by CDM (Exhibit A), EPA's assumptions about reduction in attenuation are based upon erroneous analysis.

b. RIDEM's Nominal Limits Are Not The Actual Limits.

While RIDEM's nominal limits are excessively strict when applied to Attleboro's out-of-state discharge, its limits upon in-state plants are illusory. The proposed limits on Attleboro therefore are not required to meet the actual limits of the downstream state.

RIDEM knew that the in-state nitrogen limits would be appealed and settled before the limits would ever be applied:

> Upon issuance of the final modifications, it is anticipated that the permittees will appeal the permits and enter a consent agreement with DEM, which will include the December 2008 target date for completion of construction [set forth in RI Gen. Laws. § 46-12-2(f)].

RIDEM, Nutrient Permit Modifications – Response to Comments, p. 3, Appendix, Tab 3.

RIDEM correctly anticipated the appeals and settlements, but it did not live up to the promise regarding the December 2008 target date, as evidenced by at least two documents:

> Consent Agreement (final) between the Department of Environmental Management and Narragansett Bay Commission for the Fields Point Wastewater Treatment Facility, In Re: AAD No. 05-002/WRA, docket No. RIA-371, Appendix, Tab 6A ["Fields Settlement"].
>
> Consent Agreement (final) between the Department of Environmental Management and Narragansett Bay Commission for the Bucklin Point Wastewater Treatment Facility, In Re: AAD No. 05-001/WRA, docket No. RIA-372, Appendix, Tab 6B ["Bucklin Settlement"];

Both agreements provide NBC with a test period after commissioning of the initial construction to see if the plants can meet the 5 mg/l permit limits. The agreements allow NBC to argue against ever meeting the 5 mg/l limit, not only by their terms, but because the permits will expire and new permits may contain different limits (the anti-backsliding rules being inapplicable because both permits preserve NBC's challenges to the 2005 permits).

In the Fields Settlement (Attachment A of Appendix Tab 6A), RIDEM has actually agreed to a total nitrogen limit of 18.2 mg/l for the remaining term of the permit and beyond. It

also sets forth a construction schedule for new facilities which extends as far as December 1, 2018 before construction must be complete. See Appendix, Tab 7 [CDM calculation of deadlines in Bucklin and Fields Point consent decrees]. In the meantime, as long as NBC complies with the Fields Settlement, the permit nitrogen limits are superseded. Yet, as Attleboro understands it, Fields Point is just finishing facilities planning based upon meeting somewhat higher concentration than 5 mg/l. Basically, NBC is to build the plant they have been planning, and then have time to see if it can make it meet 5 mg/l.

At Bucklin Point, NBC just commissioned an expensive upgrade that was designed to achieve 8 mg/l summer average. At that facility, the Bucklin Agreement gives NBC until November 2007 to see if the plant can meet the 5 mg/l limit. If not, the Bucklin Agreement provides some time to plan, design and install further upgrades. By then a new permit will be in place. Under the terms of the agreement, completion of those upgrades can wait until July, 2013. See Appendix, Tab 7 [CDM calculation].

These settlements demonstrate two things. The nominally strict RIDEM limits are, in fact, not taking effect for some time, if ever, and are subject to evaluation of ongoing upgrades. They are, in fact, paper limits at this point. Attleboro does not believe that such limits, not applied in practice, are "requirements" of an affected state within the meaning of 40 CFR § 122.4. They therefore should not and must not be applied to Attleboro (as, for instance, by requiring a limit that achieves approximately 3.4 mg/l at the relevant discharge point).

Second, the opportunities afforded to NBC for evaluating compliance after completion of existing projects would be denied to Attleboro under the draft permit proposed by EPA. Whether as a matter of law or policy, EPA should not take that approach.

There is yet another lesson in these consent agreements. It is extremely poor public policy to require an upgrade based upon requirements to meet one set of limits (such as the recently completed upgrade at Bucklin Point or the upgrade in progress in Attleboro), only to change the limits when the upgrade is done, or in progress. The waste of time, effort and money from doing so is obvious. To address that problem requires postponing the limits and possibly never imposing them, as in the consent decrees. Attleboro is in exactly the same position. During the planning for its recent upgrade, it asked about nitrogen limits and was told that such limits would come later. Now, it is faced with the potential of having to meet 8 mg/l, only to be told (Fact Sheet at 11) that it may have to meet stricter limits even if it commits resources to meet the 8 mg/l limit.

c. RIDEM's Nominal Limits are Stricter than Rhode Island Water Quality Standards Require, As Argued in Pending Appeals in Rhode Island, the Outcome of Which Cannot Be Prejudged.

The RIDEM permits applying the new nitrogen limits were vulnerable to challenge by the permittees and, indeed have been challenged. For instance, attached as Tab 5A to the Appendix is the Request for Adjudicatory Hearing In Re: Woonsocket Wastewater Treatment

Facility, RIPDES Permit No.: RI 0100111 and attachments. Attached as Tab 5B are the comments of NBC regarding its draft permits, which were restated in NBC's appeal of the permits. The consent decrees between RIDEM and NBC also, of course, resulted from appeals based upon the illegality of RIDEM's total nitrogen limits; the consent decrees fully preserve these claims, if the planning and construction contemplated in those decrees not resolve matters. Whether or not those challenges have been settled, the points raised by the papers submitted by those licensees challenging the stated rationales for the new nitrogen limits are valid and are incorporated herein by reference.

Without limitation, the defects in applying Rhode Island water quality standards by imposing an 8 mg/l total nitrogen limit on discharges in Rhode Island waters (and, *a fortiori* a 5 mg/l or an effective 3.4 mg/l limit) include:

- Failure to present a comprehensive or coherent analysis of the dissolved oxygen dynamics of the Providence and Seekonk Rivers;
- Inconsistency with prior studies;
- Ignoring the significantly different conditions in the rivers, the Narragansett Bay and the laboratory;
- Ignoring the significant nitrogen reduction programs in discharging communities and the substantial reductions in nitrogen already achieved by those communities;
- Failure to follow RIDEM's own regulatory requirements;
- Failure to complete a TMDL that would provide the necessary basis for establishing nitrogen discharge limits for the regulated plants;
- Failure to evaluate whether the mandated reduction will have any significant benefit in fact;
- Requiring significant additional public investments without scientific evidence or consensus about the effect of the mandated nitrogen reduction on the relevant waters.
- The failure to schedule review of the nitrogen limits at an appropriate time, such as the next permit reissuance date, when permitting agencies can apply the data and science that, hopefully, will be available at that time.

See, e.g. Request for Adjudicatory Hearing, In Re: Woonsocket Wastewater Treatment Facility.

5. There is no Support for a Total Nitrogen Limit In Any Event, Where the Experiments considered Dissolved Inorganic Nitrogen.

Even if nitrogen limits are imposed, the draft permit cannot reasonably base total nitrogen limits upon the MERL experiment, which dealt with dissolved inorganic nitrogen ("DIN"). As CDM explains:

> RIDEM also errs when it uses the MERL values, which are based on dissolved inorganic nitrogen (DIN) loadings to compute total nitrogen (TN) limits in the permits. Effluents from wastewater treatment facilities often contain residual, refractory organic nitrogen that is not biologically available, as RIDEM has acknowledged in its response to

comments on the Rhode Island Permits (See page 18 of 41). If one accepts the area loading approach, and it is based on data developed around DIN, then the permit values ought be presented either as DIN, or adjusted to available Total N, in much the same manner that metals limits are adjusted from the biologically available form to total metals for permitting purposes.

METALS

CDM has also demonstrated that the draft permit's limits on metals are excessive, due to a generally-applicable miscalculation (especially a failure to consider the appropriate hardness factor), several specific errors, inconsistency with other permits, and failure to accommodate plant operations that improve the overall effluent. CDM's comments are incorporated.

While EPA acknowledged the City's inability to comply immediately with nutrient limitations (Fact Sheet, p. 6), it has not done the same for metals. Yet, the situation is the same. The City has already devoted extensive resources to plant improvements and operations to treat metals. Further investment in plant upgrades for this purpose is not warranted. The City will require its generators to implement an industrial pretreatment program, which will take time. Imposition of the proposed metals limits therefore will require a phased implementation by both the plant and those who discharge into its system.

CONCLUSION

For the above reasons, and the reasons contained in the CDM letter and Superintendent's letter attached, and in the exhibits to these comments, EPA should vacate the effluent limitations, monitoring requirements and operational requirements for Total Nitrogen, metals, and the other matters listed in Exhibits A and B.

Very Truly Yours,

Douglas H. Wilkins

cc (BY HAND): Linda M. Murphy (EPA) (w/encl.)
Glenn Haas (Mass. DEP) (w/encl.)

cc (By mail): Clients (w/encl.)

ATTACHMENTS

A. CDM Letter

B. Letter of Superintendent Paul Kennedy

SEPARATE BOUND APPENDIX:

1. RI DEM report "Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers (DEM 12/04)
2. Massachusetts comments on RI DEM report (2/11/05)
3. RI DEM Response to Comments Received on Proposed Permit Modifications for the Fields Point, Bucklin Point, Woonsocket and East Providence WWTFs (6/27/05)
4. RI DEM RIPDES permits for POTWs discharging to Upper Narragansett Bay and its tributaries
5. A. Appeal by Woonsocket

   B. Appeal by NBC
6. A. Agreement between NBC and RI DEM – Fields Point

   B. Agreement between NBC and RI DEM – Bucklin Point
7. CDM analysis of NBC/RIDEM agreement
8. RIDEM "Plan for Managing Nutrient Loadings to Rhode Island Waters" (2/1/05)
9. Governor's Narragansett Bay and Watershed Planning Commission, Nutrient and Bacteria Pollution Panel Initial Report (3/3/04)
10. Excerpts from USGS "Estimation of Total Nitrogen and Phosphorus in New England Streams Using Spatially Referenced Regression Models" (Scientific Investigations Report 2004-5012)
11. Excerpts from EMPACT website

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and

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Appendix to Comments of the City of Attleboro on Draft NPDES Permit No. MA0100595

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