EXHIBIT C

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

FINAL SECTION 401 WATER QUALITY CERTIFICATION
NPDES PERMIT NO. NH0100595

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

July 29, 2009

Brian Pitt
Office of Ecosystem Protection
USEPA New England
Mail Code CMP
One Congress St, Suite 1100
Boston, MA 02114-2023

Subject: Jaffrey Wastewater Treatment Plant
Certification of NPDES/State Permit No. NH0100595

Dear Mr. Pitt:

By letter dated April 4, 2007, the U.S. Environmental Protection Agency requested State Certification of NPDES Permit NH0100595 for the Jaffrey Wastewater Treatment Plant in Jaffrey, New Hampshire.

The EPA publicly noticed the availability of the draft permit, including the Fact Sheet, in a notice dated April 5, 2007. The Public Notice provided a public comment period until May 4, 2007, and stated that the draft permit and fact sheet could be obtained at the EPA New England website at http://www.epa.gov/ne/npdes/draft_permits_listing_nh.html or by writing or calling the permit writer at the EPA Boston office. The public comment period was extended by request to May 21, 2007.

After appropriate staff review, State Certification is hereby granted in accordance with the attached Water Quality Certification In Fulfillment of Section 401 of the Unites States Clean Water Act (33 U.S.C. 1341) dated July 27, 2009. The permit will ensure that the requirements in Title 50 RSA 485-A, and administrative rule New Hampshire Env-Wq 1700 (Surface Water Quality Regulations) are met.

Upon final issuance by the federal EPA, the Department of Environmental Services may adopt the permit, including all terms and conditions, as a state permit pursuant to RSA 485-A:13.

Sincerely,

Harry T. Stewart, P.E.
Director
Water Division

cc: Paul Heirtzler, DES
Dan Arsenault, EPA-NE

WATER QUALITY CERTIFICATION

In Fulfillment of

Section 401 of the United States Clean Water Act (33 U.S.C 1341)

Activity Name	Discharge of Treated Effluent from the Jaffrey Wastewater Treatment Facility (WWTF)
Activity Location	Jaffrey, New Hampshire
Affected Surface waters	Contoocook River downstream of the Jaffrey WWTF
Owner/Applicant	Town of Jaffrey Public Works Department 23 Knight Street Jaffrey, NH 03452
Appurtenant Permit(s):	U.S. Environmental Protection Agency NPDES Permit No. NH0100595
DATE OF APPROVAL (subject to Conditions below)	July 27, 2009

A. INTRODUCTION

The Town of Jaffrey (Applicant) has applied to the U.S. Environmental Protection Agency (EPA) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit to discharge treated effluent into the Contoocook River from the Jaffrey Wastewater Treatment Facility (Activity). The previous NPDES permit was issued on July 30, 2001 and expired on October 1, 2006. The expired permit was administratively extended by EPA because the applicant filed a complete application pursuant to federal regulations. On April 5, 2007, the EPA issued a draft NPDES permit and fact sheet for public comment.

The facility is involved in the collection and treatment of domestic, commercial and industrial wastewaters. Until the spring of 2009, secondary treatment was provided using an aerated / facultative lagoon system that utilizes ultraviolet light for disinfection. The Town recently upgraded the wastewater treatment facility (WWTF) to an oxidation ditch with an average annual daily design flow of 0.75 mgd and a maximum monthly design flow of 1.25 mgd.

This 401 Water Quality Certification (401 Certification) documents laws, regulations, determinations and conditions related to the Activity for the attainment and maintenance of NH surface water quality standards, including the provisions of

NH RSA 485-A:8 and NH Code of Administrative Rules Env-Ws 1700, for the support of designated uses identified in the standards.

B. 401 CERTIFICATION APPROVAL

Based on the findings and conditions noted below, the New Hampshire Department of Environmental Services (NHDES) has determined that any discharge associated with the Activity will not violate surface water quality standards, or cause additional degradation in surface waters not presently meeting water quality standards. NHDES hereby issues this 401 Certification subject to the conditions defined in Section E of this 401 Certification, in accordance with Section 401 of the United States Clean Water Act (33 U.S.C. 1341).

C. STATEMENT OF FACTS AND LAW

C-1. Section 401 of the United States Clean Water Act (33 U.S.C. 1341) states, in part: "Any applicant for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate...that any such discharge will comply with the applicable provisions of sections 301, 302, 303, 306, and 307 of this title.....No license or permit shall be granted until the certification required by this section has been obtained or has been waived...No license or permit shall be granted if certification has been denied by the State..."

C-2. Section 401 further states, in part "Any certification provided under this section shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to assure that any applicant for a Federal license or permit will comply with any applicable effluent limitations and other limitations...and shall become a condition on any Federal licenseor permit subject to the provisions of this section."

C-3. Section 401(a) of the CWA requires certifying states to "establish procedures for public notice in the case of all applications for certification by it, and to the extent it deems appropriate, procedures for public hearings in connection with specific applications".

C-4. NH RSA 485-A:12, III, states: "No activity, including construction and operation of facilities, that requires certification under section 401 of the Clean Water Act and that may result in a discharge, as that term is applied under section 401 of the Clean Water Act, to surface waters of the state may commence unless the department certifies that any such discharge complies with the state surface water quality standards applicable to the classification for the receiving surface water body. The department shall provide its response to a request for certification to the federal agency or authority responsible for issuing the license, permit, or registration that requires the certification under section 401 of the Clean Water Act. Certification shall include any conditions on, modifications to, or monitoring of the proposed activity necessary to provide assurance that the proposed discharge complies

with applicable surface water quality standards. The department may enforce compliance with any such conditions, modifications, or monitoring requirements as provided in RSA 485-A:22."

C-5. According to 40 C.F.R 124.53(b), NPDES applications received by EPA without a State certification shall be forwarded by the EPA Regional Administrator to the certifying State agency with a request that certification be granted or denied.

C-6. According to 40 C.F.R 124.53(c), If State certification has not been received by the time a draft permit is prepared, the EPA Regional Administrator shall send the following to the certifying State agency:

a. A copy of the draft permit

b. A statement that the EPA cannot issue or deny the permit until the certifying State agency has granted or denied certification under 40 C.F.R. 124.55, or waived its right to certify.

c. A statement that the State will be deemed to have waived its right to certify unless the right is exercised within a reasonable time not to exceed 60 days from the date the draft permit is mailed to the certifying agency unless the EPA Regional Administrator finds that unusual circumstances require a longer time.

C-7. According to 40 C.F.R. 124.53(d), State certification shall be granted or denied within a reasonable time specified under 40 C.F.R. 124.53(c)(3) [see section C-6.c of this certification]. The State shall send a copy of the certification to the Applicant and to the Regional Administrator.

C-8. According to 40 C.F.R 124.53(e)(2), when a State certifies a draft permit instead of a permit application, it shall include any conditions more stringent than those in the draft permit which the State finds necessary to meet the requirements listed in the applicable provisions of sections 208(e), 301, 302, 303, 306, and 307 of the CWA. For each more stringent condition, the certifying State agency shall cite the CWA or State law references upon which that condition is based. Failure to provide such a dtation waives the right to certify with respect to that condition.

C-9. According to 40 C.F.R 124.53(e)(3), when a State certifies a draft permit instead of a permit application, it shall include a statement of the extent to which each condition of the draft permit can be made less stringent without violating the requirements of State law, including water quality standards. Failure to provide this statement for any condition waives the right to certify or object to any less stringent condition which may be established during the EPA permit issuance process.

C-10. According to 40 C.F.R. 124.55 (a) (1) and (2), no final NPDES permit shall be issued if certification is denied or unless the final permit incorporates the

requirements specified in 40 C.F.R 125.53 (e)(1) and (2) [see section C-8 of this certification].

C-11. According to 40 C.F.R. 124.55 (b), if there is a change in State law or regulation upon which a certification is based, or if a court of competent jurisdiction or appropriate State board or agency stays, vacates or remands a certification, a State which has issued State certification may issue a modified certification or notice of waiver and forward it to the EPA. If the modified certification is received before final agency action on the permit, the permit shall be consistent with the more stringent condtions which are based upon State law identified in such certification. If the certification or notice of waiver is received after final EPA action on the permit, the EPA Regional Administrator may modify the permit on request from the permittee only to the extent necessary to delete any conditions based on a condition in a certification invalidated by a court of competent jurisdiction or by an appropriate State board or agency.

C-12. According to 40 C.F.R. 124.55 (c), a State may not condition or deny certification on the grounds that State law allows a less stringent permit condition. The EPA Regional Administrator shall disregard any such certification conditions, and shall consider those conditions or denials as waivers of certification.

C-13. According to 40 C.F.R. 124.55 (d), a condition in a draft permit may be changed during review by the EPA in any manner consistent with the certification meeting the requirements of 40 C.F.R. 124.53(d). No such changes shall require EPA to submit the permit to the State for recertification.

C-14. The Applicant is responsible for the Activity.

C-15. RSA 485-A:8 and Env-Ws 1700 (Surface Water Quality Regulations, effective December 3, 1999) together fulfill the requirements of Section 303 of the Clean Water Act that the State of New Hampshire adopt water quality standards consistent with the provisions of the Act.

C-16. Env-Ws 1701.02, entitled "Applicability", states that:

(a) These rules shall apply to all surface waters.

(b) These rules shall apply to any person who causes point or nonpoint source discharge(s) of pollutants to surface waters, or who undertakes hydrologic modifications, such as dam construction or water withdrawals, or who undertakes any other activity that affects the beneficial uses or the level of water quality of surface waters."

C-17. Env-Ws 1702.18 defines a discharge as:

"a. The addition, introduction, leaking, spilling, or emitting of a pollutant to surface waters, either directly or indirectly through the groundwater, whether done intentionally, unintentionally, negligently, or otherwise; or

b. The placing of a pollutant in a location where the pollutant is likely to enter surface waters."

C-18. Env-Ws 1702.39 defines a pollutant as: "pollutant" as defined in 40 CFR 122.2. This means "dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water."

C-19. Env-Ws 1702.46 defines surface waters as "perennial and seasonal streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, watercourses and other bodies of water, natural or artificial," and waters of the United States as defined in 40 CFR 122.2."

C-20. Surface waters are navigable waters for the purposes of certification under Section 401 of the Clean Water Act. Surface waters are jurisdictional wetlands for the purposes of wetlands permitting under RSA 482-A.

C-21. Env-Ws 1703.01 (c) states that "All surface waters shall provide, wherever attainable, for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the surface waters."

C-22. Env-Ws 1703.14, entitled "Nutrients", states that

"a. Class A waters shall contain no phosphorus or nitrogen unless naturally occurring.

b. Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring.

c. Existing discharges containing either phosphorus or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.

d. There shall be no new or increased discharge of phosphorus into lakes or ponds.

e. There shall be no new or increased discharge(s) containing phosphorus or nitrogen to tributaries of lakes or ponds that would contribute to cultural eutrophication or growth of weeds or algae in such lakes and ponds."

C-23. Env-Ws 1703.19, entitled "Biological and Aquatic Community Integrity", states that

"a. The surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of similar natural habitats of a region; and

b. Differences from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function."

C-24. Env-Ws 1703.21 (a)(1) states that "Unless naturally occurring or allowed under part Env-Ws 1707, all surface waters shall be free from toxic substances or chemical constituents in concentrations or combinations that injure or are inimical to plants, animals, humans or aquatic life."

C-25. Env-Ws 1703.07 through 1703.11 contain standards relative to dissolved oxygen, bacteria, benthic deposits, oil and grease, and turbidity.

C-26. Env-Ws 1703.21, Table 1703.1 contains standards for numerous toxic substances.

C-27. Activities that result in discharges (both directly, and indirectly through groundwater) may not cause or contribute to the violation of water quality standards

C-28. Surface waters in which water quality does not comply with water quality standards are considered impaired. When impairment is due to a pollutant, additional discharge of that pollutant to the surface water is not allowed.

C-29. Section 303(d) of the Clean Water Act (33 U.S.C. 1313(d)) and the regulations promulgated thereunder (40 C.F.R. 130.0 – 40 C.F.R. 130.11) require that states identify and list surface waters that are violating state water quality standards. For these water quality-impaired waters, states must establish Total Maximum Daily Loads (TMDLs) for the pollutants causing the impairments and submit the list of impaired surface waters and TMDLs to EPA for approval. TMDLs are not needed if water quality standards are met or if other pollution control requirements (*e.g.*, best management practices) required by local, State, or Federal authority" are stringent enough to implement applicable water quality standards (WQS) (see 40 CFR 130.7(b)(1)) within a reasonable period of time.[1]

C-30. The Applicant has applied to the U.S. Environmental Protection Agency (EPA) for reissuance of its federal National Pollutant Discharge Elimination System (NPDES) permit to discharge treated effluent into the Contoocook River from the Jaffrey WWTF (Activity). The previous NPDES permit was issued on July 30, 2001 and expired on October 1, 2006. The expired permit was administratively extended by EPA because the applicant filed a complete application pursuant to federal regulations.

C-31. The New Hampshire 2006 and 2008 Section 303(d) List of Impaired Waters (see http://des.nh.gov/organization/divisions/water/wmb/swqa/2008/documents/a

1. Memorandum dated October 12, 2006 from Diane Regas of US EPA regarding "Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions"

ppendix_08_303d_list.pdf) includes the following assessment units on the Contoocook River downstream of the Activity and upstream of the Peterborough WWTF as being impaired or threatened for dissolved oxygen, phosphorus or chlorophyll a:

Table 1

Assessment Unit ID	Assessment Unit Name	Model Reaches[1]	Pollutant of Concern	Pollutant – Assessed Category[2]	Measured WQS Violation	Threatened[3]
NHRIV700030101-16	Contoocook River, CWF	2, 3, 4, 5, & 6	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHRIV700030101-17	Contoocook River, CWF	6 & 7	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHRIV700030104-03	Contoocook River, CWF	8, 9, 10, & 11	Dissolved Oxygen Saturation	5-T		Y
			Oxygen, Dissolved	5-P	Y	
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHIMP700030104-04	Contoocook River, IMP, CWF	8 & 11	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHRIV700030104-12	Contoocook River, CWF	13	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHIMP700030104-08	Contoocook River, IMP, CWF	14	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHRIV700030104-16	Contoocook River, CWF	15 & 16	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHIMP700030104-12	CONTOOCOOK RIVER, IMP	16	Dissolved Oxygen Saturation and Concentration	5-T		Y
			Phosphorus (Total)	5-T		Y
			Chlorophyll-a	5-T		Y
NHRIV700030104-17	Contoocook River, CWF	17	Chlorophyll-a	5-T		Y
			Phosphorus (Total)	5-T		Y

C-32. In 2004, NHDES began a dissolved oxygen (DO) and nutrient TMDL to address measured and predicted (i.e., threatened) dissolved oxygen and chlorophyll a impairments in the Contoocook River and, to determine appropriate effluent limits for the Jaffrey WWTF for dissolved oxygen (DO), 5-day carbonaceous biochemical oxygen demand ($CBOD_5$), ammonia nitrogen (NH_3-N) and total phosphorus (TP). Two rounds of sampling were conducted in 2004. A computer model (QUAL2E v5) was used to develop appropriate limits. The limits of modeling extended from just upstream of the Jaffrey WWTF to just upstream of the Peterborough WWTF (which is upstream of Powder Mill Pond). Target water quality criteria used in the model for determining compliance were based on:

a. meeting ambient water quality standards for NH_3-N and DO from Env-Wq 1700;

b. meeting thresholds for phytoplankton chlorophyll a from the NHDES 2006 Consolidated Assessment and Listing Methodology (CALM)(see http://des.nh.gov/organization/divisions/water/wmb/swqa/2006/documents/appendix4.pdf);

c. meeting aesthetic thresholds for periphyton chlorophyll a from literature;

d. maintaining concentrations at the downstream terminus of the study to levels near existing measured values to minimize the impact on future effluent limits for the Peterborough WWTF and on the quality of Powder Mill Pond (located downstream of the Peterborough WWTF) which is listed on the 2006 draft 303(d) list as being impaired for chlorophyll a and DO;

e. reducing sediment oxygen demand (SOD) in downstream impoundments and in Powder Mill Pond to help achieve DO water quality standards.

C-33. From May 30, 2006 to July 28, 2006, NHDES public noticed the draft TMDL for public comment ["Draft Total Maximum Daily Load (TMDL) Study for Dissolved Oxygen and Nutrients in the Contoocook River (Jaffrey to Peterborough), NHDES, May 2006]. Comments were received from the Applicant, their consultants, the Town of Peterborough, and the EPA.

C-34. On February 6, 2007, NHDES met with the Applicant to discuss their comments on the draft DO/Nutrient TMDL and to discuss revised effluent limits proposed by NHDES. At that meeting, the Applicant's engineer informed NHDES that filtration would be needed if permit limits were less than 10 mg/L for $CBOD_5$, less than 15 mg/L for TSS or less than 0.5 mg/L for TP. Based on comments received from the Applicant on February 6, 2007, and additional analyses, NHDES sent an email to the Town on February 23, 2007 with the recommended effluent permit limits shown in Table 2 and 3 below.

Jaffrey WWTF
Revised Final Permit Limits
2/23/07

Table 2

Proposed Permit Limits in Final TMDL [Warm Weather based on 0.75 mgd]

Parameter	Warm Weather Limits						
	Implied Flow	Ave Monthly	Ave Weekly	Max Daily	Ave Monthly	Ave Weekly	Max Daily
	(mgd)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)
Flow	0.75	Report		Report			
$CBOD_5$ (July 1 - Sept 30)		10	10	17	63	63	104
$CBOD_{20}$ (July 1 - Sep 30)		Report					
TSS (July 1 - Sept 30)		15	15	25	94	94	157
NH_3-N (July 1 - Sept 30)		1.10	1.10	1.84	6.9	6.9	11.5
TP (July 1 - Sept 30)		0.50		Report	3.1		Report
Dissolved Oxygen (June 1 - Sept 30)	No less than 7.0 mg/L						
Chlorophyll a (July 1 - Sept 30)		0.0010		Report	0.0104		Report

Notes:

1. $CBOD_5$ based on $CBOD_{20}/CBOD_5$ ratio of 2.0. Periodic sampling of both $CBOD_{20}$ and $CBOD_5$ is needed to confirm this ratio.
2. WWTF effluent chl a was modeled at 1 ug/L (0.001 mg/L)
3. Average Monthly limits were set equal to Average Weekly limits.
4. Max Daily limits equal 1.67 times the Ave Monthly limit similar to the Max Daily/ Ave Monthly ratio for secondary treatment (50/30).
5. Annual Load limits are needed to control pollutants contributing to SOD and are equal to the Ave Monthly concentration limit (mg/L) x 0.75 mgd x 8.34 x 365 days/year.
6. For compliance, annual loads are to be computed by summing the total load for each month (i.e., ave monthly load x days in month) for January through December.
7. Shaded values are from the TMDL
8. Town should continue to implement measures to reduce infiltration/inflow.
9. WWTF design should allow for the addition of filtration in the future, if needed.

Table 3

Proposed Permit Limits in Final TMDL (Cold Weather based on 1.25 mgd)

Parameter	Cold Weather Limits						
	Implied Flow	Ave Monthly	Ave Weekly	Max Daily	Ave Monthly	Ave Weekly	Max Daily
	(mgd)	(mg/L)	(mg/L)	(mg/L)	(lbs/day)	(lbs/day)	(lbs/day)
Flow	1.25	Report		Report			
$CBOD_5$ (Oct 1 - Jun 30)		10	10	17	104	104	174
$CBOD_{20}$ (Oct 1 - Jun 30)		Report					
TSS (Oct 1 - Jun 30)		15	15	25	156	156	261
NH_3-N (June and October)		1.10	1.10	1.84	11.5	11.5	19.2
NH3-N (Nov 1 - May 31)		7.00	7.00	11.69	73.0	73.0	121.9
TP (June and October)		0.50		Report	5.2		Report
TP (Nov 1 -May 31)		1.00		Report	10.4		Report
Dissolved Oxygen (Oct 1 - May 31)	No less than 8.0 mg/L						
Chlorophyll a (Nov 1 - Jun 30)		0.0010		Report	0.010		Report

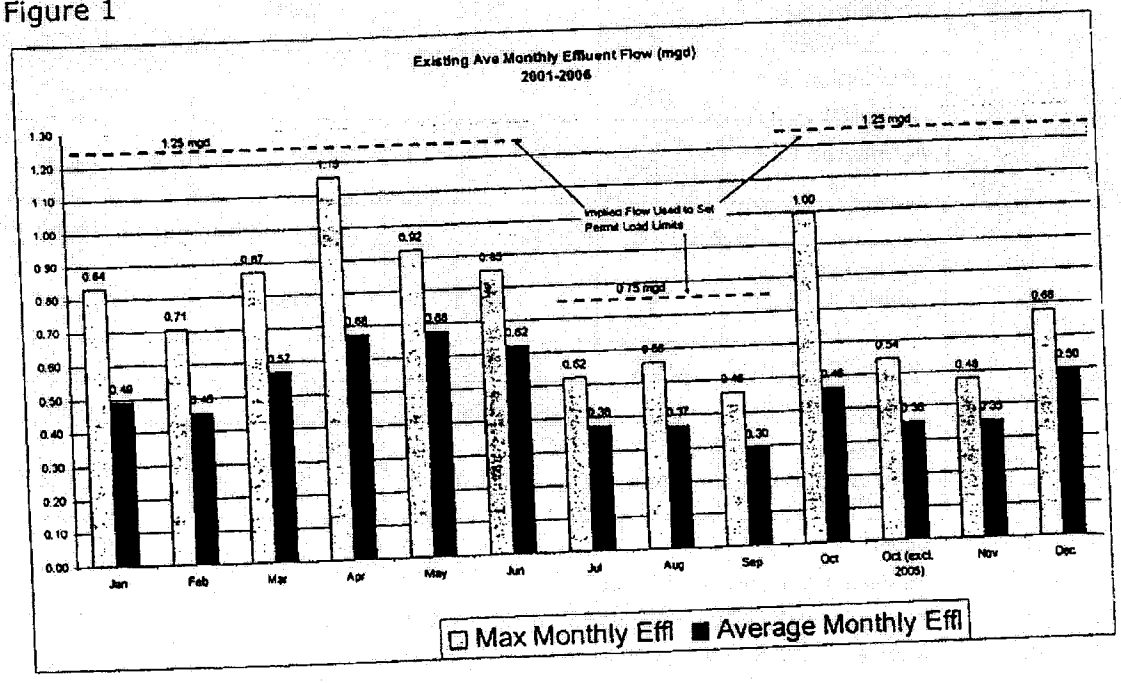
Notes:

1. $CBOD_5$ based on $CBOD_{20}/CBOD_5$ ratio of 2.0. Periodic sampling of both $CBOD_{20}$ and $CBOD_5$ is needed to confirm this ratio.
2. WWTF effluent chl a was modeled at 1 ug/L (0.001 mg/L)
3. Average Monthly limits were set equal to Average Weekly limits.
4. Max Daily limits equal 1.67 times the Ave Monthly limit similar to the Max Daily/ Ave Monthly ratio for secondary treatment (50/30).
5. Shaded values are from the TMDL
6. Town should continue to implement measures to reduce infiltration/inflow.
7. WWTF design should allow for the addition of filtration in the future, if needed.

a. As shown in Tables 2 and 3, to achieve the desired effluent limits and meet the water quality objectives, it was necessary to base loadings on two different implied WWTF flows; 0.75 mgd which is the average annual daily design flow and 1.25 mgd which is the maximum monthly design flow. To determine when it would be reasonable to apply these flows,

historical average monthly WWTF flows from 2001 through 2006 were examined. Average monthly flows were examined because the permit includes average monthly loads. Results are shown in the Figure 1 below. As shown, the maximum average monthly effluent flow for the period July through August was 0.56 mgd. To provide a factor of safety, proposed permit limits for this time period were based on the average annual daily design flow of 0.75 mgd. For the remaining months, the maximum monthly design flow of 1.25 mgd was used which is just above the highest recorded average monthly flow of 1.15 mgd during this time period. It should be noted that approximately 40% of the average annual daily design flow of 0.75 mgd is due to infiltration / inflow (I/I). Consequently, if the Town continues to remove I/I, it will provide additional assurance that the proposed effluent limits shown above will be met.

Figure 1



b. The calibrated and validated QUAL2E (version 5) computer model described in the draft DO/Nutrient TMDL referenced in section C-33 of this certification was used to develop the effluent limits shown in the tables above for $CBOD_5$, NH_3-N, DO and TP. Applicable water quality criteria (including statute and regulations) and targets used in the model are discussed in Chapter 3 of the draft DO/Nutrient TMDL. Tables 4 and 5 below show model results for predictive runs designed to establish permit limits. July through September are considered the most critical months because this is when river flows are generally the lowest and water temperatures are the highest. Such conditions usually result in lowest dissolved oxygen concentrations and highest levels of biomass (ie. phytoplankton and periphyton).

Table 4: Model Results for July through September Permit Limits

Parameter	Units	Water Quality Criteria without Margin of Safety	Margin of Safety	Water Quality Target Used in Model	Model Result
Average Daily Dissolved Oxygen	%	≥ 75	10%	≥ 77.5	78%
Instantaneous Minimum Dissolved Oxygen	mg/L	≥ 5.0	10%	≥ 5.3	5.95
Chronic Ammonia Nitrogen	mg/L	≤ 2.71	10%	≤ 2.4	0.34
Phytoplankton Chlor a	ug/L	≤ 15	10%	≤ 13.5	2.95
Periphyton Chlor a	mg/ft^2	≤ 9.3	10%	≤ 8.4	5.68
Downstream Targets (Reach 17 just upstream of Peterborough WWTF)					
Reach 17 Average Daily DO	%	≥ 82.8	0%	≥ 82.8	87.1
Reach 17 CBODU	mg/L	≤ 2.0	0%	≤ 2.0	2.36
Reach 17 TP	ug/L	≤ 28	0%	≤ 28	18.6
Reach 17 Phytoplankton Chlor a	ug/L	≤ 2.0	0%	≤ 2.0	2.88

Notes:

Modeled WWTF flow = 0.75 mgd

Modeled WWTF CBOD5 = 10 mg/L (CBODU = 20 ug/L)

Modeled WWTF NH3-N = 1.10 mg/L

Modeled WWTF TP = 0.5 mg/L

Modeled WWTF chlorophyll a = 1 ug/L

Modeled Water temperature is= 25 degrees C

Modeled River flow = 7Q10

Table 5: Model Results for October through June Permit Limits

Parameter	Units	Water Quality Criteria without Margin of Safety	Margin of Safety	Water Quality Target Used in Model	Model Result
Average Daily Dissolved Oxygen	%	≥ 75	10%	≥ 77.5	June = 76.0 October = 76.5 Nov thru May = 77.3
Instantaneous Minimum Dissolved Oxygen	mg/L	≥ 5.0	10%	≥ 5.3	June = 6.4 October = 7.97 Nov thru May = 7.44
Chronic Ammonia Nitrogen	mg/L	≤ 2.71 (@ 25°C) ≤ 5.32 (@14°C)	10%	≤ 2.4 (@ 25°C) ≤4.79 (@ 14°C)	June = 0.56 October = 0.57 Nov thru May = 3.60
Phytoplankton Chlor a	ug/L	≤ 15	10%	≤ 13.5	June = 3.1 October = 2.9 Nov thru May = 2.9
Periphyton Chlor a	mg/ft^2	≤ 9.3	10%	≤ 8.4	June = 7.37 October = 5.97 Nov thru May = 8.1
Downstream Targets (Reach 17 just upstream of Peterborough WWTF)					
Reach 17 Average Daily DO	%	≥ 82.8	0%	≥ 82.8	June = 87.9 October = 90.1 Nov thru May = 85.4
Reach 17 CBODU	mg/L	≤ 2.0	0%	≤ 2.0	June = 3.4 October = 3.7 Nov thru May = 3.6
Reach 17 TP	ug/L	≤ 28	0%	≤ 28	June = 29.8 October = 37.9 Nov thru May = 62.0
Reach 17 Phytoplankton Chlor a	ug/L	≤ 2.0	0%	≤ 2.0	June = 3.1 October = 1.5 Nov thru May = 2.6

Notes:

Modeled WWTF flow = 1.25 mgd

Modeled WWTF CBOD5 = 10 mg/L (CBODU = 20 ug/L)

Modeled WWTF NH3-N = 1.10 mg/L for June and October and 7.0 mg/L for November through May

Modeled WWTF TP = 0.5 mg/L for June and October and 1.0 mg/L for November through May

Modeled WWTF chlorophyll a = 1 ug/L

Modeled WWTF DO = 7 mg/L for June and 8 mg/L for October through May

Modeled Water temperature for June =20 degrees C, October =12 degrees C and November through May =14 degrees C.

Modeled River flow = 7Q10

As shown in the Tables 4 and 5 above, the modeled and proposed WWTF effluent limits for $CBOD_5$, NH_3-N and WWTF DO, presented to the Applicant on 2/23/07 are primarily needed to meet the average daily DO water quality criteria.

c. With regards to total suspended solids (TSS), New Hampshire does not have numeric water quality criteria for TSS. In the past, NHDES has typically set TSS effluent limits equal to the BOD_5 effluent limit concentration or a little higher than the $CBOD_5$ concentration (i.e., approximately 5 mg/L higher) as this level is typically achievable by treatment. This is similar to the concentrations and relationships considered attainable by properly operated secondary treatment plants as specified in the 40 C.F.R. 133.102 which allow a maximum average monthly concentration of 30 mg/L BOD_5 (or 25 mg/L $CBOD_5$) and 30 mg/L TSS. This suggests that TSS for properly operated secondary treatment plants should be equal to the BOD_5 or about 5 mg/L higher than the $CBOD_5$. Therefore, since the proposed average monthly and average weekly limit is expressed as $CBOD_5$ and is equal to 10 mg/L, the recommended average monthly and average weekly TSS concentration was set 5 mg/L higher or at 15 mg/L. At a WWTF flow of 1.25 mgd (1.93 cfs) and a 7Q10 of 1.89 cfs, this results in an instream concentration of approximately 8 mg/L [15/((1.93+1.89)/1.93)]. Since these conditions occur very infrequently (i.e., on the average once every 10 years), the proposed TSS effluent limits are not expected to cause a water quality concern. Further, the proposed TSS effluent limits are just a little above the average monthly TSS effluent limits in the draft NPDES permit referenced in section C-39 of this certification (10 to 14 mg/L).

   The maximum daily concentration of 25 mg/L TSS was determined by multiplying the average monthly concentration of 15 mg/L by 1.67 which is the maximum day to average monthly ratio used by NHDES for secondary treatment (i.e., 50/30). Based on past experience, properly operated plants have been able to achieve the maximum daily limit calculated in this fashion. Elsewhere in this certification, maximum daily limits calculated in this manner are referred to as "technology based" limits.

d. TP limits proposed in February 2007 were not based on meeting phytoplankton and periphyton chlor a values as modeled results were significantly below the aesthetic thresholds of 13.5 ug/L and 8.4 mg/ft2 at the proposed WWTF TP limits shown in Tables 2 and 3. In fact, modeling showed that predicted phytoplankton chlor a violations under existing permitted conditions, were primarily due to high concentrations of phytoplankton chlor a (~ 60 ug/L) discharged from the existing WWTF lagoons as opposed to growth of phytoplankton in the river caused by excess TP discharged from the WWTF. Instead, the proposed WWTF TP limits shown in Tables 2 and 3 are primarily based on maintaining water column concentrations in Reach 17 just upstream of the Peterborough WWTF (and Powder Mill Pond) near measured values to avoid unreasonable increases that could adversely and unfairly impact effluent

permit limits for the Peterborough WWTF. In addition, reductions in the Applicant's WWTF TP and WWTF chlor a will result in less sediment oxygen demand (SOD) due to less growth and deposition of biomass (i.e., phytoplankton and periphyton chlor a) in downstream impoundments, including Powder Mill Pond which is listed as impaired for dissolved oxygen and chlor a. At the proposed 2007 WWTF TP limits of 0.5 mg/L from June through October and 1.0 mg/L for the remaining months, the annual loading of TP to the Contoocook River will be reduced by approximately 75% as compared to the existing permit which is based on a year-round flow of 1.25 mgd and an existing average annual TP concentration of approximately 2.6 mg/L.

It should be noted that the model was not truly calibrated for periphyton as sampling did not include collection of periphyton biomass or chlor a data. Although field observations and notes did indicate the presence of periphyton, it was not filamentous or at levels considered to be aesthetically objectionable. In the model, default rates were used which resulted in periphyton values that were considered reasonable at the time because they were below the literature based aesthetic threshold. In an approximate way, the model therefore corroborated field observations. As discussed in section C-44, studies conducted since 2007, which are based on thresholds not modeled in 2007, suggest that more stringent TP effluent limits are needed to meet water quality standards.

C-35. On March 6, 2007, the limits shown in section C-34 of this Certification were sent to the EPA for comment.

C-36. On March 8, 2007, a conference call was held between NHDES, the Town of Jaffrey and their consultants, and EPA to discuss the proposed limits transmitted to EPA on March 6, 2007.

C-37. On March 15, 2007, the EPA sent a letter to the Town with tables showing limits that will be proposed in the draft NPDES permit and the following discussion regarding interim limits: "In situations where a wastewater treatment plant is not capable of achieving compliance with a new water quality based limit, it is EPA's practice to issue an administrative order after a permit is issued with more stringent water – quality based limits that contains an expeditious compliance schedule to achieve the new limits. These orders typically contain interim limits based on the capabilities of the wastewater treatment plant. We anticipate that such a schedule would provide time for the Town to complete construction and commence operation of the upgrade, evaluate capabilities of the new upgraded facility, and determine whether additional facilities such as effluent filters would be needed to comply with the new limits. The schedule will also provide time for construction of filters if determined to be necessary to meet the new limits. Such a schedule would also, incidentally, provide the Town with the opportunity, if it so chooses, to conduct effluent and receiving water monitoring following completion of construction and initiation of operation, with the intent of demonstrating that additional facilities are not necessary to

attain water quality standards. Based on current information we anticipate that any administrative order issued to address more stringent limits in the final permit would contain an interim monthly average phosphorus effluent limitation of 0.5 mg/L. This interim limit would be applicable following completion of the upgrade construction. The administrative order may also include interim limits for metals should the limits not be attained by the new treatment plant. If the Town conducts receiving water monitoring and it demonstrates that total phosphorus limits less stringent than the final limts in the new permit are adequate to maintain water quality standards, the permit may be modified to include these limits. However, please note that close coordination with EPA and the NHDES would need to take place prior to initiating such a study."

C-38. On April 4, 2007 NHDES received a letter and a copy of the draft NPDES permit and fact sheet to be issued for public comment from the EPA. The letter included the following request for certification: " By transmittal of the above draft permit, we are requesting that the State make a determination regarding certification."

C-39. From April 5, 2007 to May 4, 2007, the EPA issued a joint public notice of a draft NPDES permit and fact sheet, a request for State water quality certification under section 401 of the CWA, and issuance of a State surface water discharge permit under NH RSA 485-A:13,I(a). for the Activity. At the request of the Pierce Atwood law firm, the EPA agreed to extend the public comment period end date to May 21, 2007. EPA's draft permit limits for some (but not all) parameters are shown in Table 6 at the end of this 401 Certification. As shown, it includes a TP limit of 0.16 mg/L from April through October, and 1.0 mg/L for the remaining months.

C-40. On May 15, 2007, EPA issued an Administrative Order (AO) to the Town of Jaffrey for violations of the effluent limits contained in the 2001 NPDES permit. The AO includes a schedule to complete construction of a WWTF upgrade to meet the 2001 NPDES permit by April 30,2009 and to attain full operation by June 30, 2009. Although the 2001 NPDES did not include phosphorus limits, EPA informed the Town in March 2007 that their design should be capable of meeting a TP limit in the future.

C-41. On June 27, 2007, NHDES conducted additional modeling to determine maximum daily limits for NH_3-N based on meeting the minimum ambient DO target of 5.3 mg/L. These limits are higher than the "technology based" maximum daily limits proposed on February 23, 2007 (see section Tables 2 and 3 in section C-34 of this certification).

C-42. In April of 2009, the upgraded WWTF (excluding filtration for TP) became operational (per letter of May 6, 2009 from the Town of Jaffrey to NHDES).

C-43. On May 6, 2009, the Town of Jaffrey sent a letter to NHDES requesting clarification of NHDES' position concerning application of state water quality standards to the development of TP limits in the NPDES permit for the Jaffrey WWTF. The Town stated that having been selected for federal ARRA stimulus

funding, they are moving ahead with design of a filtration/pellet boiler(Aqua -Aerobics cloth disk filters) which should be capable of just meeting the 0.16 mg/L TP limit in the EPA draft permit and want some assurance that this limit will not be any stricter in the near future.

C-44. On May 11, 2009, NHDES issued a letter in response to the Town's letter of May 6, 2009, stating that methods to develop numeric nutrient criteria are evolving in New Hampshire and nationally. Based on the most recent data, NHDES evaluated the application of a possible new numeric phosphorus criteria method which is now in the early stages of development and consideration by NHDES. Based on this new analysis, NHDES does not anticipate phosphorus effluent limits less than 0.16 mg/L at this time and is committed to supporting limits no more stringent than 0.16 mg/L for the Jaffrey WWTF for at least the next 10 years. This commitment is in recognition and appreciation of the significant investment that Jaffrey is making to improve water quality in the Contoocook River.

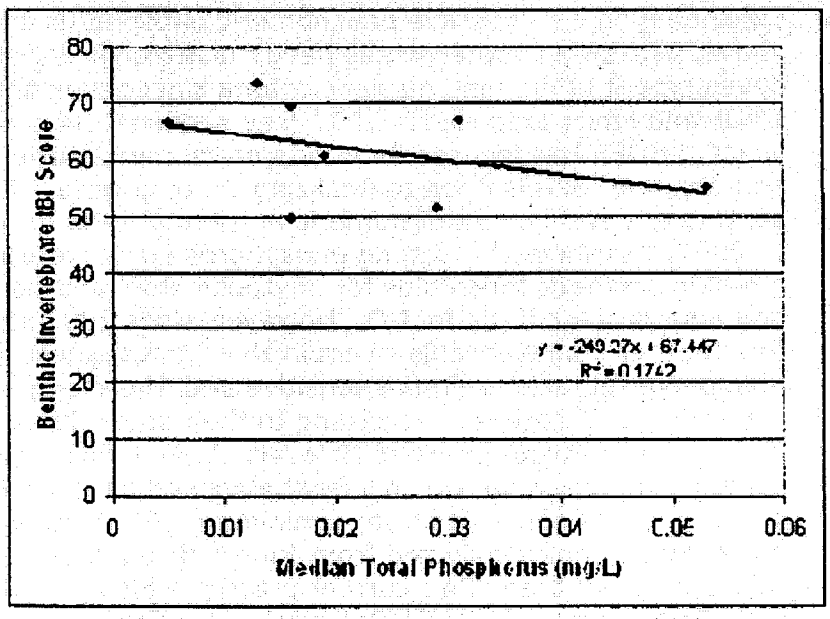
a. Expanding on the "possible new numeric phosphorus criteria" mentioned above, NHDES and other states have made significant progress towards development of numeric nutrient criteria since development of the draft TMDL and limits proposed in 2007 (see section C-34). Over the past few years, NHDES has focused its efforts on numeric nutrient criteria for lakes and estuaries and is close to finalizing those criteria. Efforts are now shifting to development of numeric nutrient criteria for rivers and streams. In 2007, thresholds for setting phosphorus limits were primarily based on meeting aesthetic thresholds for phytoplankton and periphyton chlor a and aquatic life criteria for DO. However, since 2007 studies conducted by Smith et. al. [2] on wadeable rivers in New York suggest that aquatic macroinvertebrates are more sensitive and, therefore, should be used to set ambient TP criteria. According to their study, impairment of aquatic macroinvertebrates occurs at TP levels above 0.065 mg/L. To determine compliance, this value would likely be applied as mean base flow concentrations generated from a minimum of 3 depth integrated composite samples collected from June 1 through September 30[3]. Note this is different than EPA's current practice which is to determine compliance (and set WWTF TP limits) assuming a maximum ambient TP concentration of 0.1 mg/L for river flows at or above the 7Q10 low flow. Since mean base flow conditions during the period June 1 through September 30 are higher than 7Q10 low flow conditions, its possible that effluent limits based on New York's lower proposed ambient criteria of 0.065 mg/L, could be similar to limits based on EPA's method.

2 Alexander J. Smith, Robert W. Bode, Gary S. Kleppel. A Nutrient Biotic Index (NBI) for Use with Benthic Macroinvertebrate Communities. Ecological Indicators 7 (2007) 371-386.

3 Alexander J. Smith. Draft New York State Fact Sheet. Ambient Water Quality Value for Protection of Aquatic Life Use in Wadeable Streams and Rivers. January 14, 2008.

Similar to New York, NHDES plans to collect benthic macroinvertebrate and nutrient data over the next two years with the expectation of establishing numeric criteria for TP based on macroinvertebrate impairment. Data collected to date is shown below in Figure 2. Although the regression is not statistically significant because of the limited data, and assuming a benthic IBI threshold of 54 per the NHDES 2008 Consolidated Assessment and Listing Methodology (see http://des.nh.gov/organization/divisions/water/wmb/swqa/2008/documents/appendix_04_calm.pdf), the data suggests a TP ambient criteria of about 0.055 mg/L which is similar to the criteria being considered by New York. Again, this is not based on a statistically significant relationship and will be refined over the next few years as NHDES collects more data.

Figure 2: Relationship between total phosphorus and benthic invertebrate IBI score



Assuming that NHDES eventually adopts numeric TP criteria based on protection of benthic macroinvertebrates with compliance based on the average or median of ambient samples collected over the period June through September, NHDES conducted an analysis (i.e., a continuous simulation) to determine what the predicted median or average ambient concentration would likely be for various WWTF TP loads. For this continuous simulation, WWTF flows were set equal to the following:

1.25 mgd for October through June

0.75 mgd for July through September

Similar to draft NPDES permit, WWTF TP concentrations were set equal to:

1 mg/L from November through March

0.16 mg/L from April through October

Average daily flows for the years 1963 through 1966 were obtained from the USGS gage in Peterborough (39 years of record) and transposed to just upstream of the Jaffrey WWTF by watershed area. These years were selected because they had some of the lowest average monthly flows from June through September.

Upstream river concentrations were varied with river flow in accordance with a relationship developed using upstream phosphorus concentrations.

Using the mass balance equation, the predicted ambient concentration just downstream of the Jaffrey WWTF was then calculated for each day from 1963 through 1966. Results indicated that the predicted average and median ambient TP concentration just downstream of the Jaffrey WWTF for the period June through September should not exceed approximately 0.05 mg/L, which is a little less but close to NHDES' current best estimate of what New Hampshire's numeric TP criteria might be (approximately 0.055 mg/L). Therefore, based on this analysis, which represents the best available information at this time, NHDES now considers the WWTF effluent flows, TP loads , and TP effluent concentrations used in the continuous simulation model described above, to be necessary to meet water quality standards. These limits are shown in Table 7 at the end of this 401 Certification.

C-45. On May 15, 2009, a meeting was held to discuss TP limits with the Town of Jaffrey, NHDES and EPA.

C-46. On May 19, 2009, the Town of Jaffrey issued a letter to NHDES stating that they have decided to forgo the Aqua-Aerobics cloth disk filter (capable of meeting a phosphorus limit of 0.16 mg/L) and instead will proceed with the design of a ballasted floc clarification system (Actiflo or CoMag) that would be capable of meeting TP limits of 0.10 mg/L or lower.

D. FINDINGS

D-1. The Contoocook River is a surface water of the State under Env-Wq 1702.46.

D-2. The Contoocook River downstream of the Activity is a Class B surface water under RSA 485-A:8. Therefore, Class B New Hampshire surface water quality standards apply to this Activity. Class B waterways are considered suitable for fishing, swimming, and, after adequate treatment, as a water supply

D-3. The Activity will result in a discharge to the Contoocook River.

D-4. The Activity requires a National Pollutant Discharge Elimination System (NPDES) permit to discharge treated effluent into the Contoocook River from the Jaffrey WWTF (Activity). The NPDES permit is a federal permit.

D-5. Since the Activity will result in a discharge to a surface water of the state, and since the Activity requires a federal NPDES permit, the Activity requires water quality certification under Section 401 of the federal Clean Water Act.

D-6. On April 4, 2007, the EPA sent a letter to NHDES requesting certification of the draft NPDES permit in accordance with section 401 of the CWA.

D-7. On April 5, the EPA issued a joint public notice of the draft NPDES permit, the request for State certification under section 401 of the CWA and issuance of a state discharge permit under NH RSA 485-A:13, I(a). This satisfies the requirement in section 401 of the CWA to public notice applications for 401 water quality certification (see section C-3).

D-8. Based on modeling and analyses conducted by NHDES to determine appropriate effluent limits for the Jaffrey WWTF that will comply with New Hampshire water quality standards, the following is concluded:

a. The EPA draft permit limits shown in Table 6 of this certification for $CBOD_5$, NH_3-N, DO, TSS and TP includes some limits that are not stringent enough to meet water quality standards and some that are believed to be more stringent than needed to meet water quality standards. Table 7 shows effluent limits recommended by NHDES. In Table 7, effluent limits that need to be more stringent than the EPA draft permit to meet water quality standards are shown in 12 Font, Bold, Italics with underline (ie., ***1.1***), effluent limits that can be more lenient and still meet water quality standards are shown in 12 Font, Italics (i.e, *7.0*), effluent limits that agree with the draft NPDES permit are shown in 9 font (i.e., 0.16). Explanations as to why the limits shown in Table 7 are needed to meet NH water quality standards are provided in section C-34 and C-41 of this certification for $CBOD_5$, NH_3-N, DO and TSS and in section C-44 for TP.

b. The proposed TP effluent limits in the draft NPDES permit shown in Table 6 of this certification only include a concentration but no mass limit. Since a flow limit is not included, the permit does not include any limitation on the mass of TP (i.e., pounds per day) that may be discharged. A mass limit is needed to ensure that downstream ambient TP levels do not exceed estimated thresholds to prevent impairment of benthic macroinvertebrates (see section C-44). Proposed mass limits are shown on Table 7.

E. WATER QUALITY CERTIFICATION CONDITIONS

E-1. Effluent limits for $CBOD_5$, NH_3-N, DO, TSS and TP for the Jaffrey WWTF shall be no less stringent than the effluent limits shown in Table 7 of this certification. Effluent limits for all other parameters shall be no less stringent than those included in the EPA draft NPDES permit referenced in section C-39 of this certification.

E-2. The terms and conditions of this 401 Certification may be modified and additional terms and conditions added as necessary to ensure compliance with New Hampshire water quality standards, when authorized by law, and after notice and opportunity for hearing.

F. APPEAL

If you are aggrieved by this decision, you may appeal the decision to the Water Council. Any appeal must be filed within 30 days of the date of this decision, and must conform to the requirements of Env-Wc 200. Inquires regarding appeal procedures should be directed to the NHDES Council Appeals Clerk, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095; telephone 603-271-6072.

If you have questions regarding this Certification, please contact Stergos Spanos at (603) 271-6637 or Gregg Comstock at (603) 271-2983.

Harry T. Stewart
Director, NHDES Water Division

cc: Randall Heglin (Jaffrey Public Works Director)
Doug Starr (Jaffrey Town Engineer)
Roger Jansen (EPA)
Brian Pitt (EPA)
Paul Heirtzler
Stergios Spanos
Paul Currier
Gregg Comstock

Table 6: EPA's Draft NPDES Permit Limits for $CBOD_5$, NH_3-N, TSS, TP and D.O.

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Implied Flow (mgd)	1.25						1.25					
$CBOD_5$ (mg/L)	14, 23, 40 (ave mo, ave wk, max day)						10, 12, 16					
$CBOD_5$ (lb/d)	146, 240, 417						104, 125, 167					
NH_3-N (mg/L)	16.3, - , 30						5.3, - , 8.6					
NH_3-N (lb/d)	170, - , 313						55, - , 90					
TSS (mg/L)	14, 23, 40						7, 12, 16					
TSS (lb/d)	146, 240, 417						73, 125, 167					
Total P (mg/L)	1.0 (ave mo)					0.16 (ave mo)	0.16 (ave mo)					
Total P (lb/day)												
D.O. (mg/L)	Not < 7.0											

Table 7: NHDES Proposed Limits. Limits in 12 Font , Bold, Italics and Underline (i.e., *1.1*) represent limits more stringent more stringent than EPA's Draft NPDES permit. Limits in 12 Font,,Italics (i.e., *7.0*) represent limits less stringent than EPA's draft permit. Limits in 9 Font (i.e., 1.25) represent limits that agree with EPA's draft NPDES permit.

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Implied Flow (mgd)	1.25						1.25		*0.75*			1.25
$CBOD_5$ (mg/L)	*10, 10, 17* (ave mo, ave wk, max day)						10, *10*, 17		10, *10*, 17			10, *10*, 17
$CBOD_5$ (lb/d)	*104, 104, 174*						104, *104*, 174		*63, 63, 104*			104, *104*, 174
NH_3-N (mg/L)	*7.0, 7.0, 25*						*7.0, 7.0*, 25	*1.1, 1.1, 2.8*				*1.1, 1.1, 7.2*
NH_3-N (lb/d)	*73, 73, 260*						*73, 73, 260*	*11.5, 11.5, 29.2*	*6.9, 6.9, 17.5*			*11.5, 11.5, 75*
TSS (mg/L)	*15, 15, 25*						*15, 15, 25*		*15, 15, 25*			*15, 15, 25*
TSS (lb/d)	*156, 156, 261*						*156, 156, 261*		*94, 94, 157*			*156, 156, 261*
Total P (mg/L)	1.0 (ave mo)					0.16 (ave mo)		0.16 (ave mo)				
Total P (lb/day)	*10.4*					*1.67*			*1.0*			*1.67*
D.O. (mg/L)	*Not < 8.0*							Not < 7.0				*Not < 8.0*