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MAXIMUM ALLOWABLE LOADS

Equation used to calculate mass limits for CBOD and TSS.

$$L = C \times Q_{PDF} \times 8.345$$

where:

L	-	Maximum allowable load, in lbs/day
C	-	Maximum allowable effluent concentration for reporting period, in mg/l. Reporting periods are average monthly (CBOD: 25 mg/l, TSS: 30 mg/l), average weekly (CBOD: 40 mg/l, TSS: 45 mg/l) and maximum daily (CBOD: 45 mg/l, TSS:50 mg/l).
Q_{PDF}	-	Treatment plant's design flow, in MGD. Q_{PDF} = 0.265 MGD
8.345	-	Factor to convert effluent concentration, in mg/l, and plant's design flow, in MGD, to lbs/day.

AVAILABLE DILUTION FACTOR

Equation used to derive the 7Q10 flow at Outfall 001.

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where:

			At Troy POTW Outfall	At Webb Gage South Branch
A	-	Drainage Area in square miles	18.90 sq. mi.	36.0 sq. mi.
y	-	Mean Basin Elevation in feet above sea level	1300.9 ft	1273.6 ft

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D -	Fraction of Basin Covered with Coarse-Grained Stratified Drift in Contact with Streams	0.366 sq. mi.	0.366 sq. mi.

The calculated 7Q10 at the Troy POTW outfall is 0.8410 cfs, and for the Webb Gage location it is 1.8871 cfs. A ratio of these two calculated 7Q10s was then taken; 0.8410/1.8871 = 0.4729. This ratio was applied to the actual 7Q10, 1.932 cfs, from the Hydrologic Gaging Station at Webb, NH (Station No. 01160000) to determine the 7Q10 at the Troy POTW. The 7Q10 determined for the Troy POTW; therefore, is 0.91cfs. The equation form of this operation follows:

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Applying the ratio of the calculated 7Q10s at Troy and

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the Webb Station to the actual 7Q10 value at the Webb Station was done to eliminate the variability caused by the withdraw and discharge of water from the South Branch of the Ashuelot River.

Equation used to calculate available dilution factor at Outfall 001.

where:

Q_{001} - Estimated 7Q10 flow at Outfall 001, in cfs, as previously calculated. Q_{001}=0.91 cfs

Q_{PDF} - Treatment plant's design flow, in MGD.

1.54 - Factor to convert MGD to CFS.

0.9 - Factor to reserve of 10 % of river's

WATER QUALITY CRITERIA BASED LIMIT

Equation used to calculate average monthly and maximum daily Total Residual Chlorine and Ammonia as Nitrogen limits.

$$\textit{Chlorine/Ammonia Limit} = \textit{Dilution Factor} \times \textit{Water Quality Criterion} \times (0.822)$$

where:

Dilution Factor (DF) - As previously calculated; DF = 2.0

Water Quality Criterion - Maximum allowable effluent concentration for Chlorine or Ammonia, in mg/l.

(0.822) - **AMMONIA ONLY** Factor to convert an Ammonia concentration to Ammonia as Nitrogen concentration.

Chlorine Water Quality Criteria

Chlorine concentration limits based on State of New Hampshire Water Quality Standards.

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Chronic Criterion:	0.011 mg/l
Acute Criterion:	0.019 mg/l
Chronic Limit:	0.02 mg/l
Acute Limit:	O.04 mg/l

Ammonia (as Nitrogen) Water Quality Criteria

Ambient Conditions. As discussed in the body of the Fact Sheet effluent limits for Ammonia were calculated using the water quality criteria in EPA's (December) *1999 Update of Ambient Water Quality Criteria for Ammonia*. The Ammonia limits are depended on pH and temperature. The ambient data for temperature and pH were derived from data collected at Troy for the NHDES Ambient River Monitoring Program.

Summer (May 1st-Sep 30th)

Chronic Criteria:	3.58 mg/l at pH 6.57, Temp: 21.1°C
Chronic Limit:	7.2 mg/l (15.9 lbs/day)

Winter (Oct 1st-Apr 30th)

Chronic Criteria:	5.43 mg/l at pH: 6.57, Temp: 10°C
Chronic Limit:	10.9 mg/l (24.1 lb/day)

Note: Ammonia Acute limits not included in draft permit as explained in Fact Sheet.

CHRONIC-NO OBSERVED EFFECT CONCENTRATION (C-NOEC)

Equation used to calculate WET's C-NOEC limit which is set equal to or greater than the Receiving Water Concentration (RWC). See Attachment D.

ATTACHMENT C

where:

RCW = Receiving Water Concentration, in percent

DF = Dilution Factor as calculated on previous page

100 = Factor to convert reciprocal to a percent

$$RCW = \frac{1}{DilutionFactor x 100}$$