RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

March 28, 2012

CERTIFIED MAIL

Mr. Don C. Wolfe
Chairman
Burrillville Sewer Commission
Post Office Box 71
Harrisville, RI 02830

RE: Burrillville Wastewater Treatment Facility Final Permit
RIPDES Permit No. RI0100455

Dear Mr. Wolfe:

Enclosed is your final Rhode Island Pollutant Discharge Elimination System (RIPDES) Permit issued pursuant to the referenced application. State regulations, promulgated under Chapter 46-12 of the Rhode Island General Laws of 1956, as amended, require this permit to become effective on the date specified in the permit.

As outlined in the fact sheet for this permit, the Department of Environmental Management (DEM) is willing to enter into a Consent Agreement which will establish interim limits for any pollutants for which the Burrillville Wastewater Treatment Facility cannot comply and establish an enforceable compliance schedule for completing any treatment plant process changes that will be necessary to bring the facility into permit compliance. Please note that, in order to enter into a Consent Agreement, the Burrillville Sewer Commission will need to file a hearing request and a stay request in accordance with the attached instructions within thirty (30) days of receipt of this letter.

Also enclosed is a copy of the Department's response to the comments received on the draft permit and information relative to hearing requests and stays of RIPDES Permits.

We appreciate your cooperation throughout the development of this permit. Should you have any questions concerning this permit, feel free to contact Brian Lafaille, PE of the State Permits Staff at (401) 222-4700, extension 7731.

Sincerely,

Joseph B. Haberek, PE
Principal Sanitary Engineer

Enclosures
cc: Traci Pena, RIDEM-OWR (electronic)
Annie McFarland, RIDEM-OWR (electronic)
John E. Martin III, Burrillville Sewer Commission (electronic)
James Geremia, Geremia and Associates (electronic)
Joseph Haberek, RIDEM-OWR (electronic)

RESPONSE TO COMMENTS

From February 8, 2012 to March 13, 2012, the Rhode Island Department of Environmental Management (DEM) solicited public comment on a draft Rhode Island Pollutant Discharge Elimination System (RIPDES) permit for the Burrillville Wastewater Treatment Facility. The following is a synopsis of the significant comments received and the DEM responses to those comments.

The following responses address the comments that were raised by the Burrillville Sewer Commission in a letter dated February 17, 2012.

Comment 1: On behalf of the Burrillville Sewer Commission, the Commission would, again, like to restate our concerns over the proposed wastewater discharge limits for Phosphorus and Copper at the Burrillville Treatment Plant.

First, the proposed seasonal discharge limit for a Phosphorus level of 0.1 mg/l would have a significant financial impact on our users. The projected cost for the proposed improvements to meet the Phosphorus limit would cost between $3Million - $4 Million. This translates into a 30% increase in each user's annual bill.

To achieve the proposed Phosphorus effluent limits will require a period of up to four years to evaluate the technology, prepare a Facilities Plan, proceed with the design plans and construction phase before the system can be placed into operation.

Response 1: As indicated in the Permit Fact Sheet the Environmental Protection Agency Region 10's April 2007 document titled "Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus" indicates that total phosphorus levels of 0.1 mg/l are both technically and reasonably achieveable using existing treatment technologies. In addition to ensuring that the 0.1 mg/l total phosphorus limit is technically and reasonably feasible, the DEM also performed an analysis to determine if the 0.1 mg/l limit will be protective of water quality. RI has a current water quality numeric standard of 25 ug/l that applies to any discharges to impoundments (i.e. lakes, ponds, kettleholes, or reservoirs) that have a retention time of 14 days or greater and is applicable to the river, at the point where it enters the impoundment. The Upper Slatersville Reservoir, which is the first large impoundment downstream of the Burrillville WWTF, has a retention time much larger than 14 days at 7Q10 flows. Therefore, the limits for the WWTF must be assigned such that the river, at the point where it enters the Reservoir, will not exceed 25 ug/l total phosphorus. By following the RIPDES procedures for assigning permit limits when background data is not available, the total phosphorus permit limit for the WWTF was calculated to be 0.1 mg/l. This limit will ensure that the in-stream concentration of the river, at the point where it discharges into the Upper Slatersville Reservoir, will not exceed 25 ug/l. Given the fact that the total phosphorus limit of 0.1 mg/l is technically achievable and necessary to protect water quality, the DEM is unable to modify the limit in the draft permit as requested by the Commission. However, as previously indicated the DEM is willing to enter into a consent agreement with the Commission that will include interim limits and a compliance schedule for the necessary upgrades to the Wastewater Treatment Plant to be made.

Comment 2: Second, the proposed discharge limit for Copper of 8.0 ug/l is extremely difficult to consistently achieve with conventional technology employed at the Wastewater Treatment Facility. Your cover letter indicates that the Department believes the Copper limit of 8.0 ug/l will be achieved once the new Phosphorus system is placed into operation. It is unclear to the Commission as to how the plant could achieve these levels soley by the addition of a new Phosphorus removal system.

If it is the State's intention to rely solely on the Phosphorus system to achieve the Copper effluent issued in the proposed permit, we ask that a specific period of time be given after the Phosphorus upgrades are fully operational to see if the plant can meet the Copper limit. If Copper limit of 8.0 ug/l cannot be achieved after that time, we request that the Department should reconsider the proposed limit. Thank you again for this opportunity to present our concerns.

Response 2: The DEM feels that the upgrades to the Wastewater Treatment Plant necessary to comply with the proposed Total Phosphorus limit will also enable the Commission to achieve compliance with the Total Copper permit limitations as a result of the increased solids removal that will be realized with the phosphorus removal process. The DEM is willing to enter into a consent agreement that will include interim limits for these pollutants and an enforceable compliance schedule to make the necessary upgrades. Once the necessary Total Phosphorus upgrades are completed the Commission shall be provided time in the consent agreement schedule to determine if additional measures are necessary to attain compliance with the final permit limits for Total Copper. If additional measures are necessary, then DEM will either modify the consent agreement or enter into a new consent agreement with the Commission to extend the interim limits for copper and include a new compliance schedule. At this point in time, the DEM does not anticipate requiring the Commission to install copper-specific treatment if the Phosphorus upgrades do not allow the Wastewater Treatment Plant to also meet its new copper limits.

HEARING REQUESTS

If you wish to contest any of the provisions of this permit, you may request a formal hearing within thirty (30) days of receipt of this letter. The request should be submitted to the Administrative Adjudication Division at the following address:

Bonnie Stewart, Clerk
Department of Environmental Management
Office of Administrative Adjudication
One Capitol Hill - Second Floor
Providence, Rhode Island 02903

Any request for a formal hearing must conform to the requirements of Rule 49 of the State Regulations.

STAYS OF RIPDES PERMITS

Should the Department receive and grant a request for a formal hearing, the contested conditions of the permit will not automatically be stayed. However, the permittee, in accordance with Rule 50, may request a temporary stay for the duration of adjudicatory hearing proceedings. Requests for stays of permit conditions should be submitted to the Office of Water Resources at the following address:

Angelo S. Liberti, P.E.
Chief of surface Water Protection
Office of Water Resources
235 Promenade Street
Providence, Rhode Island 02908

All uncontested conditions of the permit will be effective and enforceable in accordance with the provisions of Rule 49.

AUTHORIZATION TO DISCHARGE UNDER THE
RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of Chapter 46-12 of the Rhode Island General Laws, as amended,

Burrillville Sewer Commission
P.O. Box 71
Harrisville, RI 02830

is authorized to discharge from a facility located at the

Burrillville Wastewater Treatment Facility
141 Clear River Drive
Oakland, Rhode Island 02858

to receiving waters named

Clear River

in accordance with the effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective July 1, 2012.

This permit and the authorization to discharge expire at midnight, five (5) years from the effective date.

This permit supersedes the permit issued on May 15, 2006.

This permit consists of 19 pages in Part I including effluent limitations, monitoring requirements, etc. and 10 pages in Part II including General Conditions.

Signed this 29th day of March, 2012.

Angelo S. Liberti, P.E., Chief of Surface Water Protection
Office of Water Resources
Rhode Island Department of Environmental Management
Providence, Rhode Island

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number(s) 001A.
   Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs./day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly *(Minimum)	Average Weekly *(Average)	Maximum Daily *(Maximum)	Measurement Frequency	Sample Type
Flow	1.5 MGD	--- MGD				Continuous	Recorder
BOD_5 (May - Oct)	125.1 lb/day	212.7 lb/day	10 mg/l	15 mg/l	17 mg/l	3/Week	24-Hr. Comp.
BOD_5 (Nov - April)	375.3 lb/day	625.5 lb/day	30 mg/l	45 mg/l	50 mg/l	3/Week	24-Hr. Comp.
BOD_5 - % Removal			85%			1/Month	Calculated
TSS (May - Oct)	187.7 lb/day	312.8 lb/day	15 mg/l	20 mg/l	25 mg/l	3/Week	24-Hr. Comp.
TSS (Nov - April)	375.3 lb/day	625.5 lb/day	30 mg/l	45 mg/l	50 mg/l	3/Week	24-Hr. Comp.
TSS - % Removal			85%			1/Month	Calculated
Settleable Solids			--- ml/L	--- ml/l	--- ml/l	1/Day	Grab

--- Signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

Sampling for BOD and TSS shall be performed Tuesday, Thursday and either Saturday or Sunday. All BOD_5 and TSS samples shall be taken on the influent and effluent with appropriate allowances for hydraulic detention (flow-through) time.

Sampling for Flow and Settleable Solids shall be performed Sunday-Saturday.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: Outfall 001A. (Final Discharge After Dechlorination).

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number(s) 001A.
   Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs./day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly *(Minimum)	Average Weekly *(Average)	Maximum Daily *(Maximum)	Measurement Frequency	Sample Type
Enterococci			54 cfu[1] 100 ml		175 cfu[1] 100 ml	3/Week	Grab
Fecal Coliform			--- MPN[1] 100 ml	--- MPN[1] 100 ml	--- MPN[1] 100 ml	3/Week	Grab
Total Residual Chlorine (TRC)			41 ug/l		71 ug/l	Continuous	Recorder[2]
pH			(6.0 SU)		(9.0 SU)	2/Day	Grab

[1]Two (2) of the three (3) and Enterococci samples are to be taken on Tuesday and Thursday at the same time as one of the TRC samples. The Fecal Coliform samples shall be taken at the same time as the Enterococci samples. The Geometric Mean shall be used to obtain the "weekly average" and "monthly average" for Fecal Coliform and the "monthly average" for Enterococci.

[2]The use of a continuous TRC recorder after chlorination and prior to dechlorination is required to provide a record that proper disinfection was achieved at all times. Compliance with these limitations shall be determined by taking three (3) grab samples, Monday - Friday (except holidays), equally spaced over one (1) eight-hour working shift with a minimum of three (3) hours between grabs, and on Saturdays, Sundays, and Holidays by taking at least two (2) grab samples each day with a minimum of two (2) hours between grabs. The maximum daily and average monthly values are to be computed from the averaged grab sample results for each day. The following methods may be used to analyze the grab samples: (1) Low Level Amperometric Titration, Standard Methods (18th Edition) No. 4500-Cl E; and (2) DPD Spectrophotometric, EPA No. 330.5 or Standard Methods (18th Edition) No. 4500-Cl G.

*Values in parentheses ( ) are to be reported as Minimum/Maximum for the reporting period rather than Average Monthly/Maximum Daily.

Sampling for TRC and pH shall be performed Sunday-Saturday.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: Outfall 001A. (Final discharge after dechlorination).

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

3. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number(s) 001A.
   Such discharges shall be monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs. per day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Phosphorus, Total							
(November-March)			1.0 mg/l		--- mg/l	1/Week	24-Hr. Comp.
(April-October)			0.1 mg/l		--- mg/l	1/Week	24-Hr. Comp.
Orthophosphorus (November – March)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
TKN (as N)							
(November-April)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
(May-October)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
Nitrate, Total (as N)							
(November-April)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
(May-October)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
Nitrite, Total (as N)							
(November-April)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
(May-October)			--- mg/l		--- mg/l	1/Week	24-Hr. Comp.
Ammonia, Total (as N)							
(November – April)			31.5 mg/l		147 mg/l	1/Week	24-Hr. Comp.
(May – October)			8.9 mg/l		42 mg/l	1/Week	24-Hr. Comp.
Nitrogen, Total (TKN + Nitrate + Nitrite, as N)							
(November-April)			--- mg/l		--- mg/l	1/Week	Calculated
(May-October)			--- mg/l[1]		--- mg/l	1/Week	Calculated

[1] The permittee shall operate the treatment facility to reduce the discharge of Total Nitrogen to the maximum extent possible using all available treatment equipment in place at the facility.

--- signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

Samples taken in compliance with the monitoring requirements specified above shall be taken Tuesday, Thursday and either Saturday or Sunday at the following locations: Outfall 001A. (Final discharge after dechlorination).

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

4. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number(s) 001A.

   Such discharges shall be monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs. per day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Copper, Total			8.0 µg/l		10.6 µg/l	1/ Week	24-Hr. Comp.
Lead, Total			0.15 µg/l[1]		38.4 µg/l	1/ Week	24-Hr. Comp.
Cyanide			--- µg/l		--- µg/l	1/ Quarter	Composite[2]
Zinc, Total			--- µg/l		--- µg/l	1/ Quarter	24-Hr. Comp.
Cadmium, Total			--- µg/l		--- µg/l	1/ Quarter	24-Hr. Comp.
Nickel, Total			--- ug/l		--- ug/l	1/ Quarter	24-Hr. Comp.
Aluminum, Total			--- ug/l		--- ug/l	1/Quarter	24-Hr. Comp.

--- signifies a parameter which must be monitored and data must be reported; no limit has been established at this time.

[1] The limit at which compliance/noncompliance determinations will be based is the Quantitation Limit which is defined as 3.0 µg/l for lead. This value may be reduced by permit modification as more sensitive methods are approved by EPA and the State.

[2] Compliance with these limitations shall be determined by taking three (3) grab samples per day with a minimum of three (3) hours between grabs and preserved immediately upon collection. All three (3) samples shall be composited then analyzed for available cyanide.

Samples taken in compliance with the monitoring requirements specified above shall be taken Monday through Friday at the following locations: Outfall 001A. (Final discharge after dechlorination).

PART I

A. **EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

6. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge from outfall serial number(s) 001A.

   Such discharges shall be monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations					Monitoring Requirement	
	Quantity - lbs. per day		Concentration - specify units				
	Average Monthly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type
Ceriodaphnia sp							
LC50[1]					100% or Greater[2]	1/Quarter	24-Hr. Comp.
C-NOEC[3]					25% or Greater[4]	1/Quarter	24-Hr. Comp.

[1]LC_{50} is defined as the concentration of wastewater that causes mortality to 50% of the test organisms.

[2]The 100% or greater limit is defined as a sample which is composed of 100% effluent.

[3]C-NOEC is defined as the highest concentration of toxicant or effluent at which no adverse effects are observed.

[4]The 25% or greater limit is defined as a sample which is composed of 25% effluent.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: Outfall 001A in accordance with I.B. of the permit.

7. a. The pH of the effluent shall not be less than 6.0 nor greater than 9.0 standard units at any time, unless these values are exceeded due to natural causes or as a result of the approved treatment processes.

   b. The discharge shall not cause visible discoloration of the receiving waters.

   c. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.

   d. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and 5-day biochemical oxygen demand. The percent removal shall be based on monthly average values.

   e. When the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the design flow, the permittee shall submit to the permitting authorities a projection of loadings up to the time when the design capacity of the treatment facility will be reached, and a program for maintaining satisfactory treatment levels consistent with approved water quality management plans.

8. The permittee shall analyze its effluent annually for the EPA Priority Pollutants as listed in 40 CFR 122, Appendix D, Tables II and III. The results of these analyses shall be submitted to the Department of Environmental Management by January 15th of each year for the previous calendar year's sample. If the priority pollutant scan is to be used to satisfy part I.B.7, the scan must be submitted with the 3rd quarter bioassay by October 15th. The State user fee samples may be utilized provided that the sampling is coordinated in advance. All sampling and analysis shall be done in accordance with EPA Regulations, including 40 CFR, Part 136; grab and composite samples shall be taken as appropriate.

9. This permit serves as the State's Water Quality Certificate for the discharges described herein.

B. BIOMONITORING REQUIREMENTS AND INTERPRETATION OF RESULTS

1. General

Beginning on the effective date of the permit, the permittee shall perform four (4) chronic toxicity tests per year on samples collected from discharge outfall 001A. The permittee shall conduct the tests during dry weather periods (no rain within forty-eight (48) hours prior to or during sampling unless approved by RIDEM) according to the following test frequency and protocols. Chronic and acute toxicity data shall be reported as outlined in Section 8. The chronic daphnid tests shall be used to calculate the acute LC_{50} at the forty-eight (48) hour exposure interval. Test results will be interpreted by the State. The State may require additional screening, range finding, definitive acute or chronic bioassays as deemed necessary based on the results of the initial bioassays required herein. Indications of toxicity could result in requiring a Toxicity Reduction Evaluation (TRE) to investigate the causes and to identify corrective actions necessary to eliminate or reduce toxicity to an acceptable level.

2. Test Frequency

For four sampling events, (one each calendar quarter) the permittee will conduct seven day chronic toxicity tests on the species listed below, for a total of four (4) chronic toxicity tests per year. This requirement entails performing one-specie testing as follows:

Species	Test Type One Species Test (Four Times Annually)	Frequency
Daphnid (Ceriodaphnia sp.)	Reproduction/Survival Acute Static (LC_{50})	Quarterly

A sampling event is defined as three 24-hour composites collected over the seven-day test period (see Section 4).

3. Testing Methods

Chronic toxicity tests shall be conducted in accordance with protocols listed in the latest edition of Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA-600/4-89/011), incorporating any deviations from protocol listed herein, or additional methods if approved by the Director of RIDEM.

4. Sample Collection

For each sampling event a twenty-four- (24) hour flow proportioned composite final effluent, after dechlorination, sample shall be collected during a dry weather period (no rain 48 hours prior to or during sampling unless approved by RIDEM). For each sampling event, the effluent samples shall be collected on days 0, 3 and 5 of the 7-day exposure period. The first sample is used for test initiation, Day 1, and for test solution renewal on Day 2. The second sample would be used for test solution renewal on Days 3 and 4. The third sample would be used for test solution renewal on Days 5, 6 and 7.

To eliminate the problem of potential rainfall interference during the five-day sampling period for the chronic tests, RIDEM suggests collecting enough sample on Day 0 to properly store and use one-third on both Days 3 and 5 if rain has occurred since Day 0. In addition, if no rainfall has occurred since Day 3, enough sample should also be collected on Day 3 to use for Day 5 if necessary.

In the laboratory, the initial sample (Day 0) will be split into two (2) subsamples, after thorough mixing, for the following:

A: Chemical Analysis
B: Chronic Toxicity Testing

Day 3 and 5 samples will be held until test completion. If either the Day 3 or 5 renewal sample is of sufficient potency to cause lethality to 50% or more test organisms in any of the dilutions for either species, then a chemical analysis shall be performed on the appropriate samples as well.

All samples held overnight shall be refrigerated at 4°C.

5. Dilution Water

Dilution water used for freshwater chronic toxicity analyses should be of sufficient quality to meet minimum acceptability of test results (see Section 6). For both species, natural freshwater shall be used as the dilution water. This water shall be collected from the Pawtucket Reservoir. If this natural freshwater diluent is found to be, or suspected to be toxic or unreliable, an alternate or laboratory source of water of known quality with a hardness and pH similar to that of the receiving water may be substituted AFTER RECEIVING WRITTEN APPROVAL FROM RIDEM.

6. Effluent Toxicity Test Conditions for the Daphnid (Ceriodaphnia sp.) Survival and Reproduction Test[1]

1.	Test Type	Static Renewal
2.	Temperature (C)	25° ± 1° C
3.	Light Quality	Ambient laboratory illumination
4.	Photoperiod	16 hours light, 8 hours dark
5.	Test Chamber Size	30 ml
6.	Test Solution Volume	15 ml
7.	Renewal of Test Solutions	Daily, using most recently collected sample.
8.	Age of Test Organisms	Less than twenty-four (24) hours and all released within an eight (8) hour period of each other.
9.	Number of Neonates Per Test Chamber	1
10.	Number of Replicate Test Chambers Per Treatment	10
11.	Number of Neonates Per Test Concentration	10
12.	Feeding Regime	Feed 0.1 ml each of YTC and algal suspension per exposure chamber daily.
13.	Aeration	None
14.	Dilution Water	Pawtucket Reservoir, see Section V.
15.	Effluent Concentrations	Five (5) dilutions plus a control: 100%, 50%, 25%, 12.5%, 6.25% and 0% effluent.
16.	Test Duration	Until 60% of control females have three (3) broods (may require seven (7) days).
17.	End Points	Survival and reproduction.

18.	Test Acceptability	80% or greater survival and an average of fifteen (15) or more young per female in the control solutions. At least 60% of surviving females in controls should have produced third brood.
19.	Sampling Requirements	For off-site tests, a minimum of three (3) samples are collected (i.e., Days 0, 3 & 5) and used for renewal (see Section IV). Off-site test samples must be first used within forty-eight (48) hours of collection.
20.	Sample Volume Required	Minimum 2 liters/day

[1]Adapted from EPA/600/4-89/001

7. Chemical Analysis

The following chemical analysis shall be performed for every two-specie sampling event.

Parameter	Effluent	Diluent	Detection Limit (mg/l)
Hardness[1]	X	X	0.5
Alkalinity	X	X	2.0
pH	X	X	---
Specific Conductance	X	X	---
Total Solids and Suspended Solids	X	X	---
Ammonia	X	X	0.1
Total Organic Carbon	X		0.5
Cyanide	X		0.010

[1]Method 314A (Hardness by Calculation) from APHA (1985) Standard Methods for the Examination of Water and Wastewater. 16th Edition

During the first, second, and fourth calendar quarter bioassay sampling events the following chemical analyses shall be performed:

Total Metals	Effluent	Diluent	Minimum Detection Limit (ug/l)
Cu	X	X	1.0
Pb	X	X	1.0
Zn	X	X	5.0
Cd	X	X	0.1
Ni	X	X	1.0
Al	X	X	20.0

The above metal analyses may be used to fulfill, in part or in whole, monthly monitoring requirements in the permit for these specific metals.

During the third calendar quarter bioassay sampling event, the final effluent sample collected during the same twenty-four (24) hour period as the bioassay sample, shall be analyzed for priority pollutants (as listed in Tables II and III of Appendix D of 40 CFR 122). The bioassay priority pollutant scan shall be a full scan and may be coordinated with other permit conditions to fulfill any priority pollutant scan requirements.

In addition, the following chemical analyses shall be performed as part of each daily renewal procedures on each dilution and the controls.

Parameter	Beginning of 24-Hour Exposure Period	End of 24-Hour Exposure Period
Dissolved Oxygen	X	X
Temperature	X	
pH	X	
Specific Conductance	X	
Alkalinity	X[1]	
Hardness	X[1]	

[1]These are performed on the 100% effluent and control samples only.

8. Toxicity Test Report Elements

A report of results will include the following:

- Description of sample collection procedures and site description.
- Names of individuals collecting and transporting samples, times, and dates of sample collection and analysis.
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests (quality assurance); light and temperature regime; dilution water description; other information on test conditions if different than procedures recommended.
- Raw data and laboratory sheets.
- Any other observations or test conditions affecting test outcome.
- Results of required chemical and physical analyses.

Toxicity test data shall include the following:

Chronic

- Daily survival of test organisms in the controls and all replicates in each dilution. Survival data should be analyzed by Fisher's Exact Test prior to analysis of reproduction data.
- Young per female for all replicates in each dilution for Ceriodaphnia and weight for minnow larvae.
- Dissolved oxygen, pH, specific conductance and temperature for each dilution.
- Results of Dunnett's Procedure and/or other EPA recommended or approved methods for analyzing the data.
- C-NOEC = Chronic No Observed Effect Concentration
- LOEC = Lowest Observed Effect Concentration
- MATC = Maximum Allowable Toxicant Concentration

Acute - (These data points are to be obtained 48 hours into the chronic test).

- Survival for each concentration and replication at time 24 and 48 hours.
- Dissolved oxygen, pH and specific conductance for each concentration.
- LC_{50} and 95% confidence limits using one of the following methods in order of preference: Probit, Trimmed Spearman Karber, Moving Average Angle, or the graphical method; printout or copy of these calculations. The Probit, Trimmed Spearman Karber and Moving Average Angle methods of analyses can only be used when mortality of some of the test organisms are observed in at least two (2) of the (% effluent) concentrations tested (i.e., partial mortality). If a test results in a 100% survival and 100% mortality in adjacent treatments ("all or nothing" effect), a LC_{50} may be estimated using the graphical method.

9. Reporting of Bioassay Testing

Bioassay Testing shall be reported as follows:

Quarter Testing to be Performed	Report Due No Later Than	Results Submitted on DMR for
January 1 - March 31	April 15	March
April 1 - June 30	July 15	June
July 1 - September 30	October 15	September
October 1 - December 31	January 15	December

Bioassay testing following the protocol described herein shall commence during the 3rd quarter 2012, and the first report shall be submitted to RIDEM no later than October 15, 2012.

A signed copy of these reports, required herein, shall be submitted to:

Electronic Computer Operator
Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, Rhode Island 02908-5767

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II of this permit and the following terms and conditions:

1. Maintenance Staff

   The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit.

2. Infiltration/Inflow

   The permittee shall minimize infiltration/inflow to the sewer system. A summary report of all actions taken to minimize infiltration/inflow during the previous two (2) years shall be submitted to RIDEM, Office of Water Resources, by the 15th day of January every other year. The first report is due January 15, 2013.

D. SLUDGE

The permittee shall conform and adhere to all conditions, practices and regulations as contained in the State of Rhode Island Rules and Regulations for Sewage Sludge Management. The permittee shall comply with its Order of Approval for the disposal of sludge.

E. DETECTION LIMITS

The permittee shall assure that all wastewater testing required by this permit, is performed in conformance with the method detection limits listed below. In accordance with 40 CFR Part 136, EPA approved analysis techniques, quality assurance procedures and quality control procedures shall be followed for all reports required to be submitted under the RIPDES program. These procedures are described in "Methods for the Determination of Metals in Environmental Samples" (EPA/600/4-91/010) and "Methods for Chemical Analysis of Water and Wastes" (EPA/600/4-79/020).

The report entitled "Methods for the Determination of Metals in Environmental Samples" includes a test which must be performed in order to determine if matrix interferences are present, and a series of tests to enable reporting of sample results when interferences are identified. Each step of the series of tests becomes increasingly complex, concluding with the complete Method of Standard Additions analysis. The analysis need not continue once a result which meets the applicable quality control requirements has been obtained. Documentation of all steps conducted to identify and account for matrix interferences shall be documented and maintained onsite.

If, after conducting the complete Method of Standard Additions analysis, the laboratory is unable to determine a valid result, the laboratory shall report "could not be analyzed". Documentation supporting this claim shall be maintained onsite. If valid analytical results are repeatedly unobtainable, DEM may require that the permittee determine a method detection limit (MDL) for their effluent or sludge as outlined in 40 CFR Part 136, Appendix B.

When calculating sample averages for reporting on discharge monitoring reports (DMRs):

1. "could not be analyzed" data shall be excluded, and shall not be considered as failure to comply with the permit sampling requirements;

2. results reported as less than the MDL shall be reported in accordance with the DEM's DMR Instructions.

Therefore, all sample results shall be reported as: an actual value, "could not be analyzed", or zero. The effluent or sludge specific MDL must be calculated using the methods outlined in 40 CFR Part 136, Appendix B. Samples which have been diluted to ensure that the sample concentration will be within the linear dynamic range shall not be diluted to the extent that the analyte is not detected. If this should occur the analysis shall be repeated using a lower degree of dilution.

The MDL for a given analyte may vary with the type of sample. MDLs which are determined in reagent water may be lower than those determined in wastewater due to fewer matrix interferences. Wastewater is variable in composition and may therefore contain substances (interferents) that could affect MDLs for some analytes of interest. Variability in instrument performance can also lead to inconsistencies in determinations of MDLs.

To help verify the absence of matrix or chemical interference the analyst is required to complete specific quality control procedures. For the metals analyses listed above the analyst must withdraw from the sample two equal aliquots; to one aliquot add a known amount of analyte, and then dilute both to the same volume and analyze. The unspiked aliquot multiplied by the dilution factor should be compared to the original. Agreement of the results within 10% indicated the absence of interference. Comparison of the actual signal from the spiked aliquot to the expected response from the analyte in an aqueous standard should help confirm the finding from the dilution analysis (Methods for Chemical Analysis of Water and Wastes EPA-600/4-79/020).

For organic pollutants the laboratory must on an ongoing basis, spike at least 5% of the samples from each sample site being monitored. For laboratories analyzing 1 to 20 samples per month, at least one spiked sample per month is required. The spike should be at the discharge permit limit or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be larger. (40 CFR Part 136 Appendix B Method 624 and 625 subparts 8.3.1 and 8.3.11).

LIST OF TOXIC POLLUTANTS

The following list of toxic pollutants has been designated pursuant to Section 307(a)(1) of the Clean Water Act. The Method Detection Limits (MDLs) represent the required Rhode Island MDLs.

Volatiles - EPA Method 624		MDL ug/l (ppb)
1V	acrolein	10.0
2V	acrylonitrile	5.0
3V	benzene	1.0
5V	bromoform	1.0
6V	carbon tetrachloride	1.0
7V	chlorobenzene	1.0
8V	chlorodibromomethane	1.0
9V	chloroethane	1.0
10V	2-chloroethylvinyl ether	5.0
11V	chloroform	1.0
12V	dichlorobromomethane	1.0
14V	1,1-dichloroethane	1.0
15V	1,2-dichloroethane	1.0
16V	1,1-dichloroethylene	1.0
17V	1,2-dichloropropane	1.0
18V	1,3-dichloropropylene	1.0
19V	ethylbenzene	1.0
20V	methyl bromide	1.0
21V	methyl chloride	1.0
22V	methylene chloride	1.0
23V	1,1,2,2-tetrachloroethane	1.0
24V	tetrachloroethylene	1.0
25V	toluene	1.0
26V	1,2-trans-dichloroethylene	1.0
27V	1,1,1-trichloroethane	1.0
28V	1,1,2-trichloroethane	1.0
29V	trichloroethylene	1.0
31V	vinyl chloride	1.0

Acid Compounds - EPA Method 625		MDL ug/l (ppb)
1A	2-chlorophenol	1.0
2A	2,4-dichlorophenol	1.0
3A	2,4-dimethylphenol	1.0
4A	4,6-dinitro-o-cresol	1.0
5A	2,4-dinitrophenol	2.0
6A	2-nitrophenol	1.0
7A	4-nitrophenol	1.0
8A	p-chloro-m-cresol	2.0
9A	pentachlorophenol	1.0
10A	phenol	1.0
11A	2,4,6-trichlorophenol	1.0

Pesticides - EPA Method 608		MDL ug/l (ppb)
1P	aldrin	0.059
2P	alpha-BHC	0.058
3P	beta-BHC	0.043
4P	gamma-BHC	0.048
5P	delta-BHC	0.034
6P	chlordane	0.211
7P	4,4 ' -DDT	0.251
8P	4,4 ' -DDE	0.049
9P	4,4 ' -DDD	0.139
10P	dieldrin	0.082
11P	alpha-endosulfan	0.031
12P	beta-endosulfan	0.036
13P	endosulfan sulfate	0.109
14P	endrin	0.050
15P	endrin aldehyde	0.062
16P	heptachlor	0.029
17P	heptachlor epoxide	0.040

Pesticides - EPA Method 608		MDL ug/l (ppb)
18P	PCB-1242	0.289
19P	PCB-1254	0.298
20P	PCB-1221	0.723
21P	PCB-1232	0.387
22P	PCB-1248	0.283
23P	PCB-1260	0.222
24P	PCB-1016	0.494
25P	toxaphene	1.670

Base/Neutral - EPA Method 625		MDL ug/l (ppb)
1B	acenaphthene *	1.0
2B	acenaphthylene *	1.0
3B	anthracene *	1.0
4B	benzidine	4.0
5B	benzo(a)anthracene *	2.0
6B	benzo(a)pyrene *	2.0
7B	3,4-benzofluoranthene *	1.0
8B	benzo(ghi)perylene *	2.0
9B	benzo(k)fluoranthene *	2.0
10B	bis(2-chloroethoxy)methane	2.0
11B	bis(2-chloroethyl)ether	1.0
12B	bis(2-chloroisopropyl)ether	1.0
13B	bis(2-ethylhexyl)phthalate	1.0
14B	4-bromophenyl phenyl ether	1.0
15B	butylbenzyl phthalate	1.0
16B	2-chloronaphthalene	1.0
17B	4-chlorophenyl phenyl ether	1.0
18B	chrysene *	1.0
19B	dibenzo (a,h)anthracene *	2.0
20B	1,2-dichlorobenzene	1.0
21B	1,3-dichlorobenzene	1.0
22B	1,4-dichlorobenzene	1.0
23B	3,3 ' -dichlorobenzidine	2.0
24B	diethyl phthalate	1.0
25B	dimethyl phthalate	1.0
26B	di-n-butyl phthalate	1.0
27B	2,4-dinitrotoluene	2.0
28B	2,6-dinitrotoluene	2.0
29B	di-n-octyl phthalate	1.0
30B	1,2-diphenylhydrazine (as azobenzene)	1.0
31B	fluoranthene *	1.0
32B	fluorene *	1.0
33B	hexachlorobenzene	1.0
34B	hexachlorobutadiene	1.0
35B	hexachlorocyclopentadiene	2.0
36B	hexachloroethane	1.0
37B	indeno(1,2,3-cd)pyrene *	2.0
38B	isophorone	1.0
39B	naphthalene *	1.0
40B	nitrobenzene	1.0
41B	N-nitrosodimethylamine	1.0
42B	N-nitrosodi-n-propylamine	1.0
43B	N-nitrosodiphenylamine	1.0
44B	phenanthrene *	1.0
45B	pyrene *	1.0
46B	1,2,4-trichlorobenzene	1.0

OTHER TOXIC POLLUTANTS

	MDL ug/l (ppb)
Antimony, Total	3.0
Arsenic, Total	1.0
Beryllium, Total	0.2
Cadmium, Total	0.1
Chromium, Total	1.0
Chromium, Hexavalent	20.0
Copper, Total	1.0
Lead, Total	1.0
Mercury, Total	0.2
Nickel, Total	1.0
Selenium, Total	2.0
Silver, Total	0.5
Thallium, Total	1.0
Zinc, Total	5.0
Asbestos	**
Cyanide, Total	10.0
Phenols, Total***	50.0
TCDD	**
MTBE (Methyl Tert Butyl Ether)	1.0

* Polynuclear Aromatic Hydrocarbons
** No Rhode Island Department of Environmental Management (RIDEM) MDL

NOTE:

The MDL for a given analyte may vary with the type of sample. MDLs which are determined in reagent water may be lower than those determined in wastewater due to fewer matrix interferences. Wastewater is variable in composition and may therefore contain substances (interferents) that could affect MDLs for some analytes of interest. Variability in instrument performance can also lead to inconsistencies in determinations of MDLs.

To help verify the absence of matrix or chemical interference the analyst is required to complete specific quality control procedures. For the metals analyses listed above the analyst must withdraw from the sample two equal aliquots; to one aliquot add a known amount of analyte, and then dilute both to the same volume and analyze. The unspiked aliquot multiplied by the dilution factor should be compared to the original. Agreement of the results within 10% indicates the absence of interference. Comparison of the actual signal from the spiked aliquot to the expected response from the analyte in an aqueous standard should help confirm the finding from the dilution analysis. (Methods for Chemical Analysis of Water and Wastes EPA-600/4-79/020).

For Methods 624 and 625 the laboratory must on an ongoing basis, spike at least 5% of the samples from each sample site being monitored. For laboratories analyzing 1 to 20 samples per month, at least one spiked sample per month is required. The spike should be at the discharge permit limit or 1 to 5 times higher than the background concentration determined in Section 8.3.2, whichever concentration would be larger. (40 CFR Part 136 Appendix B Method 624 and 625 subparts 8.3.1 and 8.3.11).

F. MONITORING AND REPORTING

1. Monitoring

All monitoring required by this permit shall be done in accordance with sampling and analytical testing procedures specified in Federal Regulations (40 CFR Part 136).

2. Reporting

Monitoring results obtained during the previous month shall be summarized and reported on Discharge Monitoring Report (DMR) Forms, postmarked no later than the 15th day of the month following the completed reporting period. A copy of the analytical laboratory report, specifying analytical methods used, shall be included with each report submission. The first report is due on August 15, 2012. Signed copies of these, and all other reports required herein, shall be submitted to:

Electronic Computer Operator
Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, Rhode Island 02908

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 PROMENADE STREET
PROVIDENCE, RHODE ISLAND 02908-5767

FACT SHEET

RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES) PERMIT TO DISCHARGE TO WATERS OF THE STATE

RIPDES PERMIT NO. **RI0100455**

NAME AND ADDRESS OF APPLICANT:

Burrillville Sewer Commission
P.O. Box 71
Harrisville, RI 02830

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Burrillville Wastewater Treatment Facility
141 Clear River Drive
Oakland, Rhode Island 02858

RECEIVING WATER: **Clear River**

CLASSIFICATION: **B1**

I. Proposed Action, Type of Facility, and Discharge Location

The above-named applicant has applied to the Rhode Island Department of Environmental Management for reissuance of a RIPDES Permit to discharge into the designated receiving water. The facility is engaged in the treatment of domestic and industrial sewage. The discharge is from the treatment of domestic and industrial wastewater.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on DMR data from July 2006 through May 2011 is shown on Attachment A-1. Based on a review of available effluent data submitted with the most recent permit application, User Fee Program Data, and historical Discharge Monitoring Report (DMR) data, the facility may not be able to comply with its final permit limits at outfall 001A for Phosphorus and Total Copper. It is anticipated that a Consent Agreement will be necessary in order to establish an enforceable compliance schedule that will provide time for Burrillville to bring the discharge into compliance with these limitations.

III. Permit Limitations and Conditions

The final effluent limitations and monitoring requirements may be found in the draft permit.

IV. Permit Basis and Explanation of Effluent Limitation Derivation

The Town of Burrillville owns and operates the Wastewater Treatment Facility located on 141 Clear River Drive, Oakland, Rhode Island. The discharge to the Clear River consists of treated sanitary sewage contributed by the municipality of Burrillville. Treatment consists of Preliminary Treatment, Primary Settling, Activated Sludge, Secondary Clarification, Phosphorous Removal, Chlorination/ Dechlorination and Effluent Re-Aeration. A process flow diagram is attached as Figure 1.

The requirements set forth in this permit are from the State's Water Quality Regulations and the State's Regulations for the Rhode Island Pollutant Discharge Elimination System, both filed pursuant to RIGL Chapter 46-12, as amended. RIDEM's primary authority over the permit comes from EPA's delegation of the program in September 1984 under the Federal Clean Water Act (CWA).

Development of RIPDES permit limitations is a multi-step process consisting of: determining if Federal effluent guidelines apply; calculation of allowable water quality-based discharge levels based on background data and available dilution; assigning appropriate Best Professional Judgement (BPJ) based limits; comparing existing and proposed limits; comparing discharge data to proposed limits; and developing interim limits as appropriate. A brief description of these steps is presented below. For a more detailed presentation, the "Burrillville Wastewater Treatment Facility Permit Development Document dated September 2011" is available upon request.

The "Average Monthly" and "Average Weekly" BOD_5 and TSS limitations as well as the pH limitations contained in this permit are based upon the secondary treatment requirements of Section 301 (b)(1)(B) of the CWA as defined in 40 CFR 133.102 (a) - (c). The "Maximum Daily" BOD_5 and TSS limits and the fecal coliform limits are based on Rhode Island requirements for Publicly Owned Treatment Works (POTW's) under Section 401 (a)(1) of the CWA and in 40 CFR 124.53 and 124.56. The "Average Monthly", "Average Weekly", and "Daily Maximum" BOD_5 and TSS limitations, for May through October, were reduced consistent with the reductions which will be experienced with nutrient removal. The "Percent Removal" requirements are assigned in accordance with 40 CFR 133.103. Settleable Solids monitoring has been included as a process-control parameter that can aid in the assessment of the operation of the plant but need not have an effluent limit.

The Rhode Island Water Quality Regulations include Enterococci criteria for primary contact/swimming of a geometric mean of 54 colonies/100ml and a single sample maximum of 61 colonies/100ml. The "single sample maximum" value is only used to evaluate swimming advisories at designated public beaches and does not apply to the receiving water in the area of the outfall. EPA's November 12, 2008 memorandum regarding "Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation" clarifies that it is not appropriate to use dilution for bacteria criteria in receiving waters that are designated for primary contact recreation. Therefore, because the receiving water is designated for primary contact recreation, the DEM has assigned a monthly average Enterococci limit of 54 colonies/100ml. The daily maximum enterococci limit has been set at the 90% upper confidence level value for "lightly used full body contact recreation" of 175 colonies/100ml. The DEM has also assigned Fecal Coliform monitoring to ensure that the WWTF is providing treatment that is comparable to historic treatment levels.

Using the upstream 7Q10 river flow of 6.29 cfs (for aquatic life criteria) and a mean harmonic flow of 32.38 cfs (for human health criteria) the appropriate dilution factors were determined. Using the facility's design flow of 1.5 MGD (2.32 cfs), a water quality dilution factor of 3.7 for acute and chronic criteria and a human health dilution factor of 15.0 were calculated. An exception to these dilution factors was made for Ammonia limitations. Ammonia removal is strongly dependant on temperature (nitrification rate decreases as temperature decreases). Since Ammonia does not bioaccumulate or accumulate in sediment, seasonal dilution factors and historical pH and temperature background data were used to determine the appropriate Ammonia limitations. A winter 7Q10 river flow of 14.02 cfs was used to yield a dilution factor of 7.04 and a summer 7Q10 of 6.29 cfs used to give a dilution factor of 3.71.

For those metals criteria based on hardness, a lognormal-lognormal relationship was developed between flow and hardness from data collected at the Forestdale US Geological Survey gauging

station. Based on this relationship and the above-mentioned 7Q10 flow, a hardness of 23.5 mg/l was calculated and utilized to develop potential permit limitations.

Based on the above dilution factors and the freshwater aquatic life and non-Class A human health criteria, from the Rhode Island Water Quality Regulations, allowable discharge concentrations were established using 80% allocation when no background data was available and 90% allocation when background data was available. 100% allocation of total residual chlorine (TRC) was used due to the fact that Chlorine is not expected to be found in ambient water and it is a non-conservative pollutant.

In accordance with 40 CFR Part 122.4(d)(1)(iii), it is only necessary to establish limitations for those pollutants in the discharge which have the reasonable potential to cause or contribute to the exceedance of the in-stream criteria. In order to evaluate the need for permit limitations, the allowable discharge levels (permit limits) were compared to Discharge Monitoring Report (DMR) data, State User Fee Program data, and data provided in the permit application. An assessment was made to determine if limits were necessary, using the data collected during the previous five (5) years. Based on these comparisons, water quality limitations have been deemed necessary for Total Residual Chlorine, Ammonia, Copper, and Lead. In addition, monitoring for Cyanide, Cadmium, Zinc, Nickel, and Aluminum has been included in the permit as part of the bioassay requirements.

Rule 8.D(2), Table 1 of the Rhode Island Water Quality Regulations requires that "phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible". The Environmental Protection Agency Region 10's April 2007 document titled "Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus" (Document #: EPA 910-R-07-002) indicates that total phosphorus levels of 0.1 mg/l are both technically and reasonably achievable using existing treatment technologies. Specifically, the report indicated that "chemical addition to wastewater with aluminum- or iron-based coagulants followed by tertiary filtration can reduce total phosphorus concentrations in the final effluent to very low levels...consistently near or below 0.01 mg/l" and that the "cost of applying tertiary treatment for phosphorus removal is affordable, when measured by the monthly residential sewer fees charged.. from as low as $18 to the highest fee of $46." Based on the information presented in this report, the DEM has made a determination that a total phosphorus limit of 0.1 mg/l is "technically and reasonably feasible" and has, therefore, assigned this limit to the WWTF.

In addition to ensuring that the 0.1 mg/l total phosphorus limit is technically and reasonably feasible, the DEM has performed an analysis to determine if the 0.1 mg/l limit will be protective of water quality.

RI has a current water quality numeric standard of 25 ug/l that applies to any discharges to impoundments (i.e. lakes, ponds, kettleholes, or reservoirs) that have a retention time of 14 days or greater and is applicable to the river, at the point where it enters the impoundment. Attachment F of the Burrillville Wastewater Treatment Facility Permit Development Document dated September 2011 contains a summary of the calculations conducted to determine the applicable phosphorus limits that should be assigned to the Burrillville WWTF to meet the 25 ug/l criteria. The Upper Slatersville Reservoir, which is the first large impoundment downstream of the Burrillville WWTF, has a retention time much larger than 14 days at 7Q10 flows. Therefore, the limits for the WWTF must be assigned such that the river, at the point where it enters the Reservoir, will not exceed 25 ug/l total phosphorus. By following the RIPDES procedures for assigning permit limits when background data is not available (i.e., using zero for background and 80% of the water quality criteria is allocated), the total phosphorus permit limit for the WWTF was calculated to be 0.1 mg/l. This limit will ensure that the in-stream concentration of the river, at the point where it discharges into the Upper Slatersville Reservoir, will not exceed 25 ug/l. Using a WWTF discharge limit of 0.1 mg/l, will result in an in-stream total phosphorus concentration of 26.9 ug/l at the outfall. The recommended EPA criteria applicable to Rhode Island waters are described in the document titled *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Nutrient Ecoregion XIV (EPA 822-B-00-022, December 2000)*. This document identifies the EPA recommended guidelines applicable to Rhode Island waters as 23.75 ug/l in flowing rivers and 8.0 ug/l for ponds and lakes. However, these recommended guidelines do not substitute for the CWA or EPA's regulations, nor are the documents themselves regulations.

Thus, they cannot impose legally binding requirements on EPA, States, Indian tribes or the regulated community. Using the WWTF's design flows and 7Q10 flow of the River, the DEM has determined that by assigning a total phosphorus limit of 0.1 mg/l the in-stream phosphorus concentration of the River would fall between the current RI Water Quality Regulation's Criteria and Ecoregion criteria. Therefore, the DEM has made a determination that a total phosphorus limit of 0.1 mg/l is appropriate. This limit is in effect from April through October.

In addition to the 0.1 mg/l Total Phosphorus limit in effect from April through October, the permit also contains a Total Phosphorus limit of 1.0 mg/l during November through March. The November – March limit is necessary to ensure that the levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the sediments. This limitation assumes that the dissolved fraction of the Total Phosphorus will pass through the system. To verify that the particulate fraction is low (i.e., the Total Phosphorus being discharged is in the dissolved form), a monitoring requirement for orthophosphorus has been included for the November – March period in order to determine the particulate fraction. It is expected that the WWTF will need to upgrade to meet these new Total Phosphorus limits, therefore, the DEM anticipates entering into a consent agreement with the Town that will include a compliance schedule for Total Phosphorus.

The required priority pollutant scans are specified in the State User Fee program. The biomonitoring requirements are set forth in 40 CFR 131.11 and in the State's Water Quality Regulations. RIDEM's toxicity permitting policy is based on past toxicity data and the level of available dilution. The bioassay requirements in the permit consist of chronic toxicity tests, where the chronic data can be used to calculate the acute LC_{50}, and an acute LC_{50} toxicity limit of $\geq$ 100% effluent. Calculation of the chronic C-NOEC with a chronic toxicity limit of $\geq$ 25% effluent is also required. If recurrent toxicity is demonstrated, then toxicity identification and reduction will be required.

The effluent monitoring requirements have been specified in accordance with the RIPDES regulations as well as 40 CFR 122.41 (j), 122.44 (i), and 122.48 to yield data representative of the discharge. The requirement of testing for nutrients; phosphorus, nitrogen, and ammonia, is necessary to make a determination on nutrient loadings in the receiving water.

The permit contains requirements for the permittee to comply with the State's Sludge Regulations and RIDEM's Order of Approval for sludge disposal in accordance with the requirements of Section 405(d) of the Clean Water Act (CWA). Permits must contain sludge conditions requiring compliance with limits, state laws, and applicable regulations as per Section 405(d) of the CWA and 40 CFR 503. The RIDEM Sludge Order of Approval sets forth the conditions to ensure this compliance.

The Office has determined that all permit limitations are consistent with the Rhode Island Anti-degradation policy.

The remaining general and specific conditions of the permit are based on the RIPDES regulations as well as 40 CFR Parts 122 through 125 and consist primarily of management requirements common to all permits.

V. Comment Period, Hearing Requests, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the Rhode Island Department of Environmental Management, Office of Water Resources, 235 Promenade Street, Providence, Rhode Island, 02908-5767.

Following the close of the comment period, and after a public hearing, the Director will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments, provided oral testimony, or requested notice. Within thirty (30) days following the notice of the final permit decision any interested person may submit a request for a formal hearing to reconsider or contest the final decision. Requests for formal hearings must satisfy the requirements of Rule 49 of the Regulations for the Rhode Island Pollutant Discharge Elimination System.

the requirements of Rule 49 of the Regulations for the Rhode Island Pollutant Discharge Elimination System.

VI. **DEM Contact**

Additional information concerning the permit may be obtained between the hours of 8:30 a.m. and 4:00 p.m., Monday through Friday, excluding holidays from:

Brian Lafaille, P.E.
Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, Rhode Island 02908
Telephone: (401) 222-4700, ext: 7731

1/27/12
Date

Joseph B. Haberek, P.E.
Principal Sanitary Engineer

ATTACHMENT A-1

DESCRIPTION OF DISCHARGE: Secondary treated domestic and industrial wastewater.
DISCHARGE: 001A - Secondary Treatment Discharge

AVERAGE EFFLUENT CHARACTERISTICS AT POINT OF DISCHARGE:

PARAMETER	AVERAGE[1]	MAXIMUM[2]
FLOW	0.85 MGD	1.15 MGD
BOD_5	5.04 mg/l	10.02 mg/l
BOD_5 load	38.44 lb/day	109.86 lb/day
BOD_5 % removal	97.73 %	
TSS	7.90 mg/l	12.68 mg/l
TSS load	56.3 lb/day	130.34 lb/day
TSS % removal	97.39 %	
Fecal Coliform	11.39 MPN/100 ml	106 MPN/100 ml
pH	6.44 S.U.(Minimum)	7.24 S.U.(Maximum)
Settleable Solids	0.01 ml/l	0.01 ml/l
Chlorine Residual	10.00 ug/l	10.00 ug/l
Nitrogen, Nitrate	2.91 mg/l	5.51 mg/l
Nitrogen, Nitrite	0.29 mg/l	0.69 mg/l
Nitrogen, Total	15.23 mg/l	19.59 mg/l
Nitrogen, Total Kjeldhal	12.04 mg/l	15.99 mg/l
Ammonia (June-Oct)	2.0 mg/l	3.5 mg/l
Ammonia (Nov-May)	15.7 mg/l	21.0 mg/l
Phosphorus	0.65 mg/l	0.96 mg/l
Copper	8.64 ug/l	11.19 ug/l
Lead	1.02 ug/l	1.08 ug/l
Zinc	31.61 ug/l	37.49 ug/l

[1]Data represents the mean of the monthly average data from July 2006 to May 2011.
[2]Data represents the mean of the daily maximum data from July 2006 to May 2011.

Whole Effluent Toxicity Testing Results (percent effluent)

Species: Ceriodaphnia Dubia

Monitoring Quarter	LC50 Result	C-NOEC Result
3rd Quarter 2006	>100%	100%
4th Quarter 2006	>100%	50%
1st Quarter 2007	>100%	25%
2nd Quarter 2007	>100%	50%
3rd Quarter 2007	>100%	100%
4th Quarter 2007	>100%	50%
1st Quarter 2008	>100%	100%
2nd Quarter 2008	>100%	50%
3rd Quarter 2008	>100%	50%

4th Quarter 2008	>100%	50%
1st Quarter 2009	>100%	100%
2nd Quarter 2009	>100%	100%
3rd Quarter 2009	>100%	100%
4th Quarter 2009	>100%	100%
1st Quarter 2010	>100%	100%
2nd Quarter 2010	>100%	100%
3rd Quarter 2010	>100%	100%
4th Quarter 2010	>100%	100%
1st Quarter 2011	>100%	100%

Burrillville Wastewater Treatment Facility

Burrillville, Rhode Island

Permit Development Document
RIPDES Permit No. RI0100455

Rhode Island Department of Environmental Management
Office of Water Resources
January 2012

Burrillville Wastewater Treatment Facility
Permit Development Document

Introduction

The Town of Burrillville owns and operates a wastewater treatment facility located on 141 Clear River Drive, Oakland, Rhode Island. The discharge to the Clear River consists of secondary treated domestic and industrial wastewater effluent. Treatment consists of the following: Preliminary Treatment, Primary Settling, Activated Sludge, Secondary Clarification, Phosphorous Removal, Chlorination/Dechlorination, and Effluent Aeration. A process flow diagram is shown in Figure #1.

Development of Rhode Island Pollutant Discharge Elimination System (RIPDES) permit limitations is a multi-step process consisting of the following steps: calculating allowable water quality-based discharge levels based on instream criteria, background data and available dilution; assigning applicable technology-based limits and appropriate Best Professional Judgment (BPJ) limits; comparing existing permit limits to the new allowable discharge levels; and evaluating the ability of the facility to meet the final permit effluent limits.

Water quality criteria are comprised of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by EPA or States for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal. A technology-based limit is a numeric limit, which is determined by examining the capability of a treatment process to reduce or eliminate pollutants.

Conventional Pollutant Permit Limitations

The November through April "Average Monthly" and "Average Weekly" biochemical oxygen demand (BOD_5), total suspended solids (TSS), and year-round pH limitations are based upon the secondary treatment requirements in Section 301(b)(1)(B) of the Clean Water Act (CWA), as defined in 40 CFR 133.102 (a)-(c). "Maximum Daily" BOD_5 and TSS limits are based on Rhode Island requirements for Publicly Owned Treatment Works (POTWs) under Rule 17.04(b) of the RIPDES Regulations and as provided in 40 CFR 123.25. The May through October "Average Monthly", "Average Weekly" and "Daily Maximum" BOD_5 and TSS limits have been reduced consistent with the reductions that will be experienced with nutrient removal.

RIDEM and EPA agree that the Total Suspended Solids are an appropriate measure of the solids content being discharged to the receiving waters and that Settleable solids are a "process-control parameter" that can aid in assessment of the operation of the plant but need not be an effluent limit. Therefore, permit requirements for Settleable Solids are being maintained as monitor only.

The "Percent Removal" requirements for BOD_5 and TSS are in accordance with 40 CFR 133.102(a) and (b) respectively.

The Rhode Island Water Quality Regulations include Enterococci criteria for primary contact/swimming of a geometric mean of 54 colonies/100ml and a single sample maximum of 61 colonies/100ml. However, the "single sample maximum" value is only used by the Department of Health to evaluate swimming advisories at designated public beaches and is not applied to the receiving water in the area of the Burrillville WWTF's outfall. EPA's November 12, 2008 memorandum regarding "Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation" clarifies that it is not appropriate to use dilution for bacteria criteria in receiving waters that are designated for primary contact recreation. Therefore, because the receiving water is designated for primary contact recreation, the DEM has assigned a monthly average Enterococci limit of 54 colonies/100ml. The daily maximum enterococci limit has been set at the 90% upper confidence level value for "lightly used full body contact recreation" of 175 colonies/100ml. The DEM has also assigned Fecal Coliform monitoring as a "process-control parameter" that will ensure that the WWTF is providing treatment that is comparable to historic treatment levels.

Water Quality Based Permit Limitations

The allowable effluent limitations were established on the basis of acute and chronic aquatic life criteria and human health criteria using the following: available instream dilution; an allocation factor; and background concentrations when available and/or appropriate. The aquatic life and human health criteria are specified in the Rhode Island Water Quality Regulations, as amended. Aquatic life criteria have been established to ensure the protection and propagation of aquatic life while human health criteria represent the pollutant levels that would not result in a significant risk to public health from ingestion of aquatic organisms. The more stringent of the two criteria was then used in establishing allowable effluent limitations. Details concerning the calculation of potential permit limitations, selection of factors, which influence their calculation, and the selection of final permit limitations are included below or in the attached documents. The Town's first permit to contain water quality based limits was issued in 1991.

The nearest USGS gauging station along the Branch River is located downstream of the Burrillville facility at the Forestdale Gauging Station. Therefore, the receiving water flow upstream of the wastewater discharge was calculated by subtracting the plant's average wastewater flow from the flow at the Forestdale Gauging Station and multiplying this number by the ratio of the drainage area at the wastewater treatment facility and the drainage area at the Forestdale Gauging Station.

$$Q_{USGS2} = Q_{USGS\,1} - Q_{avg}$$

$$Q_U = \frac{DA_{WWTF} \times Q_{USGS2}}{DA_{USGS}}$$

Where: Q_U = Flow upstream of the WWTF (Receiving Water Flow)
Q_{USGS1} = Flow at USGS (Forestdale)
Q_{USGS2} = Corrected Flow at USGS (Forestdale)
Q_{avg} = Average Wastewater Flow (Fact Sheet, Attachment A-1 2000 permit)
DA_{WWTF} = Drainage Area at the WWTF
DA_{USGS} = Drainage Area at the USGS Gage

The dilution factor was calculated as:

$$DF = \frac{Q_D + Q_U}{Q_D}$$

Where: DF = Dilution Factor
Q_D = Design Flow
Q_U = Flow upstream of the WWTF (Receiving Water Flow)

Appendix B of the Water Quality Regulations describes the flows used to determine compliance with human health and aquatic life criteria. The design flow to be utilized for freshwater human health criteria is the harmonic mean flow. The harmonic mean flow is a long-term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows. The harmonic mean flow calculated using the above methodology is 32.38 cfs, which gives a dilution factor of 14.96. Aquatic life criteria shall not be exceeded at or above the lowest average 7 consecutive day low flow with a recurrence frequency of once in 10 years (7Q10). The 7Q10 flow calculated using the above methodology is 6.29 cfs, which gives a dilution factor of 3.71. An exception to these dilution factors was made for Ammonia limitations. Ammonia removal is strongly dependant on temperature (nitrification rate decreases as temperature decreases) and pH. Since Ammonia does not bioaccumulate or accumulate in sediment, seasonal dilution factors and historical pH and Temperature background data were used to determine the appropriate Ammonia limitations. A winter 7Q10 river flow of 14.02 cfs was used to yield a dilution factor of 7.04 and a summer 7Q10 of 6.29 cfs used to give a dilution factor of 3.71.

It has been observed that there is generally a strong inverse correlation between river flow and hardness. Therefore, a lognormal-lognormal relationship was developed between flow and hardness from data collected at the Forestdale US Geological Survey gaging station to establish aquatic life criteria for metals (which are based on hardness). Based on this relationship, a hardness of 23.5 mg/l was determined for the 7Q10 flow of 6.29 cfs to determine the appropriate metals criteria. Details of the relationship are presented in Attachment A.

The allowable discharge limits were calculated as follows:

Background concentration unknown or available data is impacted by sources that have not yet achieved water quality based limits.

$$Limit_l = (DF) * (Criteria) * (80\%)$$

Where: DF = acute or chronic dilution factor, as appropriate

Available background data was not used for the Clear River upstream of the Burrillville Wastewater Treatment Facility due to the fact that the available data may be impacted by the discharge from the Zambarano Memorial Hospital WWTF.

Reference Attachment B for calculations of allowable limits based on Aquatic Life and Human Health Criteria.

The formulas and data noted above were applied with the following exceptions

A) Pollutants that, based on the acute and chronic dilution factors, have a higher allowable chronic limit than allowable acute limit. For this situation, both the "Monthly Average" and "Daily Maximum" limits were set at the allowable acute limit.

B) Total residual chlorine. The limits for total residual chlorine (TRC) were established in accordance with the RIDEM Effluent Disinfection Policy. The "Monthly Average" and "Daily Maximum" were based on a 100% allocation, a zero background concentration, and the appropriate dilution factor(s). The 100% allocation factor for TRC was used due to the non-conservative nature of chlorine and the improbability of the receiving water having a detectable background TRC concentration.

C) Pollutants with water quality based monthly average limits in the previous RIPDES permit. The relaxation of monthly average limits from the previous permit was restricted in accordance with the antibacksliding provisions of the Clean Water Act and the Policy on the Implementation of the Antidegradation Provisions of the Rhode Island Water Quality Regulations.

Provided below is a brief introduction to Antibacksliding and Antidegradation; as well as a discussion on how the two policies were used to calculate water quality based limits.

Antibacksliding

Antibacksliding restricts the level of relaxation of water quality based limits from the previous permit. Section 303(d)(4) of the Clean Water Act addresses antibacksliding as the following:

Section 303(d)(4)

A) Standards not attained - For receiving waters that have not attained the applicable water quality standards, limits based on a TMDL or WLA can only be revised if the water quality standards will be met. This may be done by (i) determining that the cumulative effect of all such revised limits would assure the attainment of such water quality standards; or (ii) removing the designated use which is not being attained in accordance with regulations under Section 303.

B) Standards attained - For receiving waters achieving or exceeding applicable water quality standards, limits can be relaxed if the revision is consistent with the State's Antidegradation Policy.

Therefore, in order to determine whether backsliding is permissible, the first question that must be answered is whether or not the receiving water is attaining the water quality standard. The office has determined the most appropriate evaluation of existing water quality is by calculating the pollutant levels, which would result after consideration of all currently valid RIPDES permit limits or historic discharge data (whichever is greater), background data (when available), and any new information (i.e.: dilution factors).

Antidegradation

The RIDEM document entitled "Policy on the Implementation of the Antidegradation Provisions of the Rhode Island Water Quality Regulations (the Policy) establishes four tiers of water quality protection:

Tier 1. In all surface waters, existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

Tier 2. In waters where the existing water quality exceeds the levels necessary to support the propagation of fish and wildlife and recreation in and on the water, that quality shall be maintained and protected except for insignificant changes (i.e.: short-term minor changes) in water quality as determined by the Director and in accordance with the Antidegradation Policy. In addition, the Director may allow significant degradation, which is determined to be necessary to achieve important economic or social benefits to the State (important benefits demonstration) in accordance with the Antidegradation Policy.

Tier 2½. Where high quality waters constitute Special Resource Protection Waters SRPWs[1], there shall be no measurable degradation of the existing water quality necessary to protect the characteristics which cause the waterbody to be designated a SRPW. The new or increased discharge or activity will not be allowed unless the applicant can provide adequate evidence that specific pollution controls and/or other mitigation measures will completely eliminate any measurable impacts to the water quality necessary to protect the characteristics that cause the waterbody to be designated a SRPW. Notwithstanding that all public drinking water supplies are SRPWs, public drinking water suppliers may undertake temporary and short-term activities within the boundary perimeter of a public drinking water supply impoundment for essential maintenance or to address emergency conditions in order to prevent adverse effect on public health or safety. These activities must comply with the requirements set fourth in Tier 1 and Tier 2.

Tier 3. Where high quality waters constitute an Outstanding Natural Resource ONRWs[2], that water quality shall be maintained and protected. The State may allow some limited activities that result in temporary and short-term changes in the water quality of an ONRW. Such activities must not permanently degrade water quality or result in water quality lower than necessary to protect the existing uses in the ONRW.

The formulas previously presented ensure that permit limitations are based upon water quality criteria and methodologies established to ensure that all designated uses will be met.

In terms of the applicability of Tier 2 of the Policy, a water body is assessed as being high quality on a parameter-by-parameter basis. In accordance with Part II of the Policy, "Antidegradation applies to all new or increased projects or activities which may lower water quality or affect existing water uses,

[1]SRPWs are surface waters identified by the Director as having significant recreational or ecological uses.

[2]ONRWs are a special subset of high quality water bodies, identified by the State as having significant recreational or ecological water uses.

including but not limited to all 401 Water Quality Certification reviews and any new, reissued, or modified RIPDES permits." Part VI.A of the Policy indicates that it is not applicable to activities which result in insignificant (i.e.: short-term minor) changes in water quality and that significant changes in water quality will only be allowed if it is necessary to accommodate important economic and social development in the area in which the receiving waters are located (important benefits demonstration). Part VI.B.4 of the Policy states that: "Theoretically, any new or increased discharge or activity could lower existing water quality and thus require the important benefits demonstration. However, RIDEM will: 1) evaluate applications on a case-by-case basis, using BPJ and all pertinent and available facts, including scientific and technical data and calculations as provided by the applicant; and 2) determine whether the incremental loss is significant enough to require the important benefits demonstration described below. [If not then as a general rule RIDEM will allocate no more than 20%.] Some of the considerations which will be made to determine if an impact is significant in each site specific decision are: 1) percent change in water quality parameter value and their temporal distribution; 2) quality and value of the resource; 3) cumulative impact of discharges and activities on water quality to-date; 4) measurability of the change; 5) visibility of the change; 6) impact on fish and wildlife habitat; and 7) impact on potential and existing uses. As a general guide, any discharge or activity which consumes greater than 20% of the remaining assimilative capacity (See Section VI.B.2) will be considered a significant impact and will be required to demonstrate important economic or social benefits to justify the activity (See Section VI.C. below). However, on a case-by-case basis, any proposed percent consumption of the remaining assimilative capacity may be deemed significant and invoke full requirements to demonstrate important economic or social benefits."

In terms of a RIPDES permit, an increased discharge is defined as an increase in any limitation, which would result in an increased mass loading to a receiving water. The baseline for this comparison would be the monthly average mass loading established by the previous permit. It would be inappropriate to use the daily maximum mass loading since the Policy is not applicable to short-term changes in water quality.

In this permit, all monthly average limitations are either the same as or more stringent than the limits in the 2006 permit. Therefore, the limits contained in this permit are consistent with the Department's, anti-degradation policy.

In accordance with 40 CFR 122.4(d)(1)(iii), it is only necessary to establish permit limits for those pollutants in the discharge which have the reasonable potential to cause or contribute to the exceedance of instream criteria. In order to evaluate the need for permit limits, the most stringent calculated acute and chronic limits are compared to the Discharge Monitoring Report (DMR) and the State User Fee Program data.

A complete listing of State User Fee Program data from 2006 to 2010 and DMR data from July 2006 to May 2011 are provided in Attachments C and D, respectively.

Attachment E is a summary comparison of the allowable limits vs. the DMR and State User Fee Program data. Based on the analysis presented above, permit limits are required for Total Residual Chlorine, Total Ammonia, Total Copper, and Total Lead.

Although reasonable potential was not established for the following pollutants (i.e., effluent data was not available or effluent monitoring has demonstrated discharge levels far below the permissible levels), monitoring is being required quarterly as part of the DEM's standard bioassay testing parameters: Cyanide,Total Cadmium, Total Zinc, Total Nickel, and Total Aluminum. These pollutants in addition to Total Copper and Total Lead are all part of the DEM's list of pollutants that must be measured as part of the bioassay procedures.

Nutrient Limitations

Rule 8.D(2), Table 1 of the Rhode Island Water Quality Regulations requires that "phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible". The Environmental Protection Agency Region 10's April 2007 document titled "Advanced Wastewater Treatment to Achieve Low Concentration of Phosphorus" (Document #: EPA 910-

R-07-002) indicates that total phosphorus levels of 0.1 mg/l are both technically and reasonably achievable using existing treatment technologies. Specifically, the report indicated that "chemical addition to wastewater with aluminum- or iron-based coagulants followed by tertiary filtration can reduce total phosphorus concentrations in the final effluent to very low levels...consistently near or below 0.01 mg/l" and that the "cost of applying tertiary treatment for phosphorus removal is affordable, when measured by the monthly residential sewer fees charged.. from as low as $18 to the highest fee of $46." Based on the information presented in this report, the DEM has made a determination that a total phosphorus limit of 0.1 mg/l is "technically and reasonably feasible" and has, therefore, assigned this limit to the WWTF.

In addition to ensuring that the 0.1 mg/l total phosphorus limit is technically and reasonably feasible, the DEM has performed an analysis to determine if the 0.1 mg/l limit will be protective of water quality.

RI has a current water quality numeric standard of 25 ug/l that applies to any discharges to impoundments (i.e. lakes, ponds, kettleholes, or reservoirs) that have a retention time of 14 days or greater and is applicable to the river, at the point where it enters the impoundment. Attachment F contains a summary of the calculations conducted to determine the applicable phosphorus limits that should be assigned to the Burrillville WWTF to meet the 25 ug/l criteria. The Upper Slatersville Reservoir, which is the first large impoundment downstream of the Burrillville WWTF, has a retention time much larger than 14 days at 7Q10 flows. Therefore, the limits for the WWTF must be assigned such that the river, at the point where it enters the Reservoir, will not exceed 25 ug/l total phosphorus. By following the RIPDES procedures for assigning permit limits when background data is not available (i.e., using zero for background and 80% of the water quality criteria is allocated), the total phosphorus permit limit for the WWTF was calculated to be 0.1 mg/l. This limit will ensure that the in-stream concentration of the river, at the point where it discharges into the Upper Slatersville Reservoir, will not exceed 25 ug/l. Using a WWTF discharge limit of 0.1 mg/l, will result in an in-stream total phosphorus concentration of 26.9 ug/l at the outfall. The recommended EPA criteria applicable to Rhode Island waters are described in the document titled *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Nutrient Ecoregion XIV (EPA 822-B-00-022, December 2000)*. This document identifies the EPA recommended guidelines applicable to Rhode Island waters as 23.75 ug/l in flowing rivers and 8.0 ug/l for ponds and lakes. However, these recommended guidelines do not substitute for the CWA or EPA's regulations, nor are the documents themselves regulations. Thus, they cannot impose legally binding requirements on EPA, States, Indian tribes or the regulated community. Using the WWTF's design flows and 7Q10 flow of the River, the DEM has determined that by assigning a total phosphorus limit of 0.1 mg/l the in-stream phosphorus concentration of the River would fall between the current RI Water Quality Regulation's Criteria and Ecoregion criteria. Therefore, the DEM has made a determination that a total phosphorus limit of 0.1 mg/l is appropriate. This limit is in effect from April through October.

In addition to the 0.1 mg/l Total Phosphorus limit in effect from April through October, the permit also contains a Total Phosphorus limit of 1.0 mg/l during November through March. The November – March limit is necessary to ensure that the levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the sediments. This limitation assumes that the dissolved fraction of the Total Phosphorus will pass through the system. To verify that the particulate fraction is low (i.e., the Total Phosphorus being discharged is in the dissolved form), a monitoring requirement for orthophosphorus has been included for the November – March period in order to determine the particulate fraction. It is expected that the WWTF will need to upgrade to meet these new Total Phosphorus limits, therefore, the DEM anticipates entering into a consent agreement with the Town that will include a compliance schedule for Total Phosphorus.

Based on a reasonable potential analysis which demonstrated the facility's ability to meet existing Ammonia limits based on historical discharges, the monthly average Ammonia limits for November through April have been kept at 31.5 mg/L to be consistent with RIDEM's anti-backsliding policy. The Town has also agreed to operate the WWTF to reduce the discharge of Total Nitrogen to the maximum extent possible, to improve control of the nitrification process, and to achieve operational cost savings during the months of May-October. This will help the State achieve the nutrient reduction goals of RIGL 46-12-2(f).

Bioassay Testing

Biomonitoring requirements are set forth in 40CFR 131.11 and in the State's Water Quality Regulations. RIDEM's toxicity permitting policy is based on the level of available dilution. The dilution factor of 3.71 requires that chronic toxicity be evaluated. Therefore the bioassay requirements in the permit consist of chronic toxicity tests, where the chronic data can be used to calculate the acute LC_{50}, and an acute LC_{50} limit of $\geq$ 100% effluent. The permit also requires calculation of the chronic C-NOEC, with a chronic toxicity limit of $\geq$ 25% effluent. If recurrent toxicity is demonstrated, toxicity identification and reduction will be required.

Priority Pollutant Scans

One full priority pollutant scan is required each year during the third calendar quarter bioassay sampling event, and may be coordinated with the State User Fee Program.

Final Permit Limitations

Table #1. Final Permit Limitations

Parameter	Monthly Average	Weekly Average	Daily Maximum
Flow	1.5 MGD		--- MGD
BOD_5 loading May – Oct	125.1 lb/day		212.7 lb/day
BOD_5 loading Nov – April	375.3 lb/day		625.5 lb/day
BOD_5 May – Oct	10 mg/l	15 mg/l	17 mg/l
BOD_5 Nov – April	30 mg/l	45 mg/l	50 mg/l
BOD_5 % Removal	85 %		
TSS loading May – Oct	187.7 lb/day		312.8 lb/day
TSS loading Nov – April	375.3 lb/day		625.5 lb/day
TSS May – Oct	15 mg/L	20 mg/L	25 mg/l
TSS Nov – April	30 mg/L	45 mg/L	50 mg/L
TSS % Removal	85%		
Settleable Solids	--- ml/L	---- ml/L	---- ml/L
Enterococci	54 cfu 100 ml		175 cfu 100 ml
Fecal Coliform	--- MPN 100 ml	--- MPN 100 ml	--- MPN 100 ml

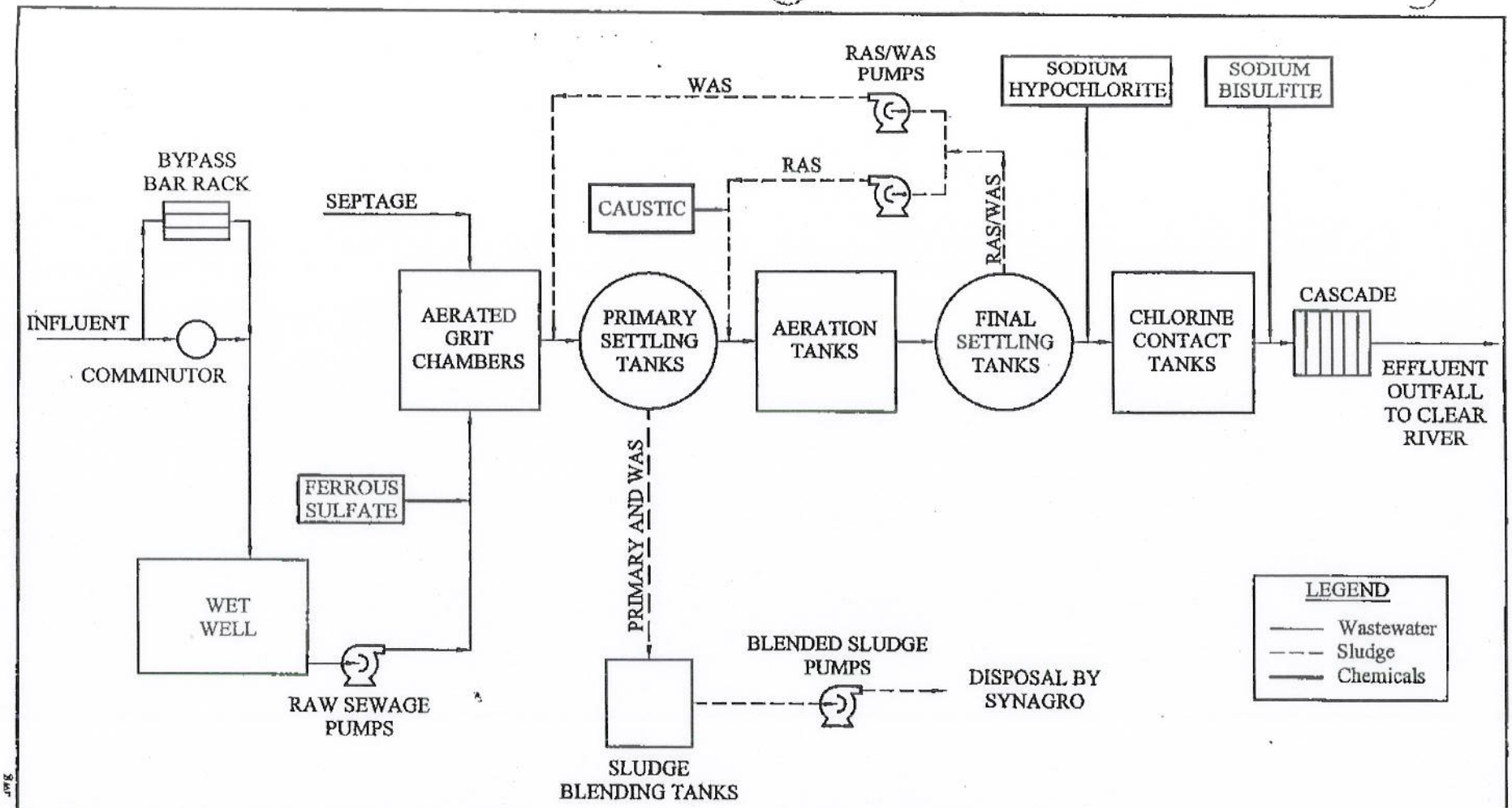
Parameter	Monthly Average	Weekly Average	Daily Maximum
Total Residual Chlorine (TRC)	41 µg/L		71 µg/L
pH	6.0 s.u. (min.)		9.0 s.u. (max.)
Phosphorus, Total (November – March)	1.0 mg/l		--- mg/l
Phosphorus, Total (April-October)	0.1 mg/l		--- mg/l
Orthophosphorus (November-March)	--- mg/l		--- mg/l
Nitrate, Total (as N) (November – April)	--- mg/l		--- mg/l
Nitrate, Total (as N) (May – October)	--- mg/l		--- mg/l
Nitrite, Total (as N) (November – April)	--- mg/l		--- mg/l
Nitrite, Total (as N) (May – October)	--- mg/l		--- mg/l
Total Ammonia (as N) (November – April)	31.5 mg/L		147 mg/L
Total Ammonia (as N) (May – October)	8.9 mg/L		42 mg/L
Total Nitrogen (TKN + Nitrate + Nitrite, as N) (November – April)	--- mg/l		--- mg/l
Total Nitrogen (TKN + Nitrate + Nitrite, as N) (May - October)	--- mg/l		--- mg/l
Cyanide	--- µg/L		--- µg/L
Total Copper	8.0 µg/L		10.6 µg/L
Total Lead	0.15 µg/L[1]		38.4 µg/L
Total Zinc	--- µg/L		--- µg/L
Total Cadmium	--- µg/L		--- µg/L
Total Nickel	--- µg/L		--- µg/L
Total Aluminum	--- µg/L		--- µg/L
LC_{50} – Ceriodaphnia sp			≥ 100 %
C-NOEC – Ceriodaphnia sp			≥ 25 %

Notes: --- signifies a parameter that must be monitored and data reported; no limit has been established at this time.

[1] The limit at which compliance/noncompliance determinations will be based is the Quantitation Limit which is defined as 3.0 µg/l for lead. These values may be reduced by permit modification as more sensitive methods are approved by EPA and the State.

FIGURE #1

Burrillville Wastewater Treatment Facility
Process Flow Diagram



Drawing Name: Figur. .dwg

BURRILLVILLE WASTEWATER TREATMENT FACILITY

BASIC WASTEWATER FLOW DIAGRAM

BETA ENGINEERS • SCIENTISTS

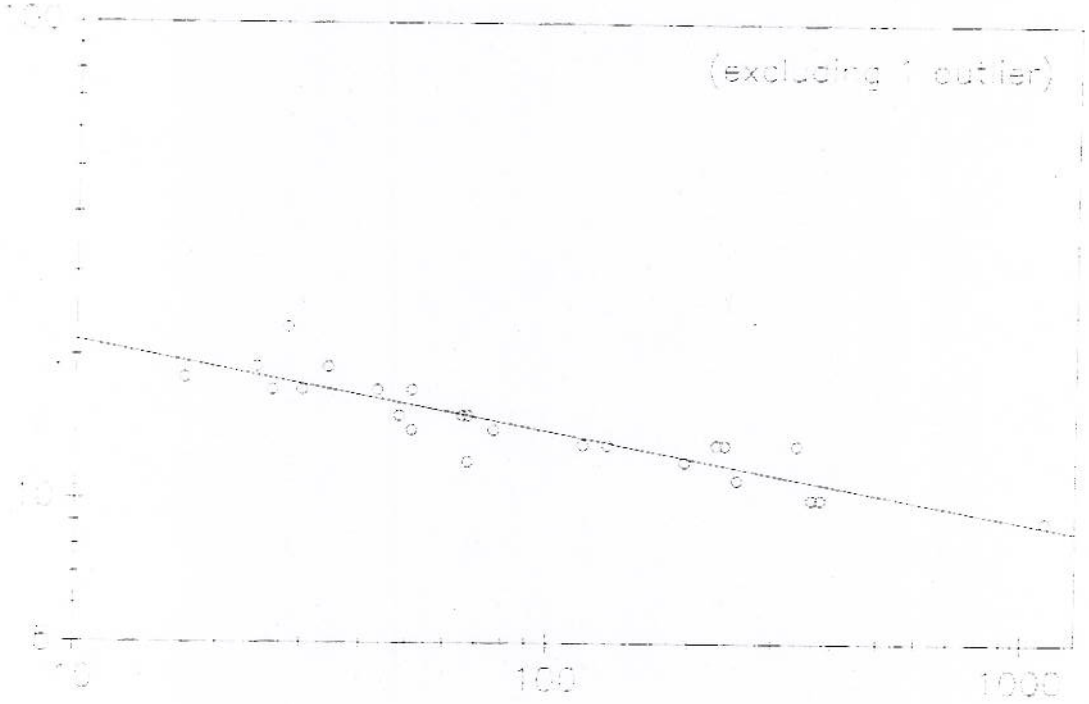
August 2006

FIGURE 1-1 BASIC FLOW DIAGRAM

ATTACHMENT A

Flow Data
Flow/Hardness Relationship (FW)

BRANCH RIVER AT FORESTDALE
Flow vs. Hardness



Hardness (mg/L as CaCO3)

Flow (cfs)

ATTACHMENT B

Calculation of Allowable Acute and Chronic Discharge Limitations Based on Freshwater Aquatic Life Criteria and Human Health Criteria

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY SPECIFIC DATA INPUT SHEET

NOTE: LIMITS BASED ON RI WATER QUALITY CRITERIA DATED JULY 2006

FACILITY NAME: **Burrillville WWTF 2011 Permit**

RIPDES PERMIT #: **RI0100455**

	DISSOLVED BACKGROUND DATA (ug/L)	ACUTE METAL TRANSLATOR	CHRONIC METAL TRANSLATOR
ALUMINUM	**NA**	**NA**	**NA**
ARSENIC	**NA**	**1**	**1**
CADMIUM	**NA**	**1.004589416**	**0.969589416**
CHROMIUM III	**NA**	**0.316**	**0.86**
CHROMIUM VI	**NA**	**0.982**	**0.962**
COPPER	**NA**	**0.96**	**0.96**
LEAD	**NA**	**1.002017155**	**1.002017155**
MERCURY	**NA**	**0.85**	**0.85**
NICKEL	**NA**	**0.998**	**0.997**
SELENIUM	**NA**	**NA**	**NA**
SILVER	**NA**	**0.85**	**NA**
ZINC	**NA**	**0.978**	**0.986**
AMMONIA (as N)	**NA**		

USE NA WHEN NO DATA IS AVAILABLE

NOTE 1: METAL TRANSLATORS FROM RI WATER QUALITY REGS.

pH =	**6.3** S.U.
HARDNESS =	**23.5** (mg/L as CaCO3)

FLOW DATA	
DESIGN FLOW =	**1.499** MGD
=	2.319 CFS
7Q10 FLOW =	**6.290** CFS
7Q10 (JUNE-OCT) =	**6.290** CFS
7Q10 (NOV-MAY) =	**14.020** CFS
HARMONIC FLOW =	**32.380** CFS
HARMONIC FLOW =	**32.380** CFS

DILUTION FACTORS	
ACUTE =	**3.712**
CHRONIC =	**3.712**
(MAY-OCT) =	**3.712**
(NOV-APR) =	**7.045**
HARMONIC FLOW =	**14.960**
HARMONIC FLOW =	**14.960**

WATER QUALITY BASED EFFLUENT LIMITS - FRESHWATER

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: _____ RIPDES PERMIT #: RI0100455

Month	Upper 90th% pH	Upper 90th% Temp (°C)	Acute Criteria* mg/L as N	Chronic Criteria* mg/L as N
May	**6.76**	**16.2**	**28.1**	**5.65**
Jun	**6.79**	**21.6**	**28.1**	**4.00**
Jul	**6.86**	**25**	**26.2**	**3.12**
Aug	**6.86**	**24.8**	**26.2**	**3.16**
Sep	**7.26**	**20.8**	**17.5**	**3.4**
Oct	**7.03**	**13.9**	**24.1**	**5.91**
Nov	**6.65**	**8.9**	**29.8**	**6.44**
Dec	**6.86**	**3.9**	**26.2**	**6.12**
Jan	**6.79**	**1.7**	**28.1**	**6.29**
Feb	**6.9**	**2.2**	**26.2**	**6.12**
Mar	**6.49**	**4.7**	**32.6**	**6.67**
Apr	**6.62**	**11.8**	**31.3**	**6.57**

**NOTE: Criteria from Appendix B of the RI Water Quality Regs., July 2006.*

* pH and Temperature data points calculated based on Upper 90th percentile of historical WQ data collected at the USGS Forestdale Station on the Branch River USGS Station # 01111500

* The receiving water body is a cold water body, therefore it is assumed that salmonids are present and the more stringent acute criteria was selected.

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: Burrillville WWTF 2011 Permit RIPDES PERMIT #: RI0100455

NOTE: METALS CRITERIA ARE EXPRESSED AS DISSOLVED, METALS LIMITS ARE EXPRESSED AS TOTAL

CHEMICAL NAME	CAS #	BACKGROUND CONCENTRATION (ug/L)	FRESHWATER CRITERIA ACUTE (ug/L)	DAILY MAX LIMIT (ug/L)	FRESHWATER CRITERIA CHRONIC (ug/L)	HUMAN HEALTH NON-CLASS A CRITERIA (ug/L)	MONTHLY AVE LIMIT (ug/L)
PRIORITY POLLUTANTS:							
TOXIC METALS AND CYANIDE							
ANTIMONY	7440360		450	1336.263053	10	640	29.69473452
ARSENIC (limits are total recoverable)	7440382	NA	340	1009.620974	150	1.4	16.75538482
ASBESTOS	1332214			No Criteria			No Criteria
BERYLLIUM	7440417		7.5	22.27105089	0.17		0.504810487
CADMIUM (limits are total recoverable)	7440439	NA	0.491637091	1.453233794	0.089738		0.274832422
C OMIUM III (limits are total recoverable)	16065831	NA	174.0200077	1635.277826	22.63642773		78.16078045
CHROMIUM VI (limits are total recoverable)	18540299	NA	16	48.3824595	11		33.95447814
COPPER (limits are total recoverable)	7440508	NA	3.43392459	10.62182073	2.598241488		8.036884499
CYANIDE	57125		22	65.32841594	5.2	140	15.44126195
LEAD (limits are total recoverable)	7439921	NA	12.94716259	38.36885966	0.504532339		1.495179377
MERCURY (limits are total recoverable)	7439976	NA	1.4	4.89089745	0.77	0.15	2.112023296
NICKEL (limits are total recoverable)	7440020	NA	137.5270127	409.2012154	15.27500523	4600	45.49520812
SELENIUM (limits are total recoverable)	7782492	NA	20	59.38946903	5	4200	14.84736726
SILVER (limits are total recoverable)	7440224	NA	0.285795658	0.998426612	NA		No Criteria
THALLIUM	7440280		46	136.5957788	1	0.47	2.969473452
ZINC (limits are total recoverable)	7440666	NA	34.35270789	104.3041453	34.63371164	26000	104.3041453
VOLATILE ORGANIC COMPOUNDS							
ACROLEIN	107028		2.9	8.61147301	0.06	290	0.178168407
ACRYLONITRILE	107131		378	1122.460965	8.4	2.5	24.94357699
BENZENE	71432		265	786.9104647	5.9	510	17.51989336
BROMOFORM	75252		1465	4350.278607	33	1400	97.9926239
C BON TETRACHLORIDE	56235		1365	4053.331261	30	16	89.08420355
CHLOROBENZENE	108907		795	2360.731394	18	1600	53.45052213
CHLORODIBROMOMETHANE	124481			No Criteria		130	1555.857162
CHLOROFORM	67663		1445	4290.889138	32	4700	95.02315045
DICHLOROBROMOMETHANE	75274			No Criteria		170	2034.582442
1,2DICHLOROETHANE	107062		5900	17519.89336	131	370	389.0010222
1,1DICHLOROETHYLENE	75354		580	1722.294602	13	7100	38.60315487
1,2DICHLOROPROPANE	78875		2625	7794.867811	58	150	172.2294602
1,3DICHLOROPROPYLENE	542756			No Criteria		21	251.3307723
ETHYLBENZENE	100414		1600	4751.157523	36	2100	106.9010443
BROMOMETHANE (methyl bromide)	74839			No Criteria		1500	17952.19802
CHLOROMETHANE (methyl chloride)	74873			No Criteria			No Criteria
METHYLENE CHLORIDE	75092		9650	28655.41881	214	5900	635.4673186

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: Burrillville WWTF 2011 Permit RIPDES PERMIT #: RI0100455

NOTE: METALS CRITERIA ARE EXPRESSED AS DISSOLVED, METALS LIMITS ARE EXPRESSED AS TOTAL

CHEMICAL NAME	CAS #	BACKGROUND CONCENTRATION (ug/L)	FRESHWATER CRITERIA ACUTE (ug/L)	DAILY MAX LIMIT (ug/L)	FRESHWATER CRITERIA CHRONIC (ug/L)	HUMAN HEALTH NON-CLASS A CRITERIA (ug/L)	MONTHLY AVE LIMIT (ug/L)
1,1,2,2TETRACHLOROETHANE	79345		466	1383.774628	10	40	29.69473452
TETRACHLOROETHYLENE	127184		240	712.6736284	5.3	33	15.73820929
TOLUENE	108883		635	1885.615642	14	15000	41.57262832
1,2TRANSDICHLOROETHYLENE	156605			No Criteria		10000	119681.3201
1,1,1TRICHLOROETHANE	71556			No Criteria			No Criteria
1,1,2TRICHLOROETHANE	79005		900	2672.526106	20	160	59.38946903
TRICHLOROETHYLENE	79016		1950	5790.473231	43	300	127.6873584
V L CHLORIDE	75014			No Criteria		2.4	28.72351683
ACID ORGANIC COMPOUNDS							
2CHLOROPHENOL	95578		129	383.0620753	2.9	150	8.61147301
2,4DICHLOROPHENOL	120832		101	299.9168186	2.2	290	6.532841594
2,4DIMETHYLPHENOL	105679		106	314.7641859	2.4	850	7.126736284
4,6DINITRO2METHYL PHENOL	534521			No Criteria		280	3351.076964
2,4DINITROPHENOL	51285		31	92.053677	0.69	5300	2.048936682
4NITROPHENOL	88755			No Criteria			No Criteria
PENTACHLOROPHENOL	87865		0.048837949	0.145022994	0.037468765	30	0.111262504
PHENOL	108952		251	745.3378364	5.6	1700000	16.62905133
2,4,6TRICHLOROPHENOL	88062		16	47.51157523	0.36	24	1.069010443
BASE NEUTRAL COMPUNDS							
ACENAPHTHENE	83329		85	252.4052434	1.9	990	5.641999558
ANTHRACENE	120127			No Criteria		40000	478725.2805
BENZIDINE	92875			No Criteria		0.002	0.023936264
POLYCYCLIC AROMATIC HYDROCARBONS				No Criteria		0.18	2.154263762
F ?CHLOROETHYL)ETHER	111444			No Criteria		5.3	63.43109967
Bi(2CHLOROISOPROPYL)ETHER	108601			No Criteria		65000	777928.5809
BIS(2ETHYLHEXYL)PHTHALATE	117817		555	1648.057766	12	22	35.63368142
BUTYL BENZYL PHTHALATE	85687		85	252.4052434	1.9	1900	5.641999558
2CHLORONAPHTHALENE	91587			No Criteria		1600	19149.01122
1,2DICHLOROBENZENE	95501		79	234.5884027	1.8	1300	5.345052213
1,3DICHLOROBENZENE	541731		390	1158.094646	8.7	960	25.83441903
1,4DICHLOROBENZENE	106467		56	166.2905133	1.2	190	3.563368142
3,3DICHLOROBENZIDENE	91941			No Criteria		0.28	3.351076964
DIETHYL PHTHALATE	84662		2605	7735.478342	58	44000	172.2294602
DIMETHYL PHTHALATE	131113		1650	4899.631195	37	1100000	109.8705177
DI-n-BUTYL PHTHALATE	84742			No Criteria		4500	53856.59406
2,4DINITROTOLUENE	121142		1550	4602.68385	34	34	100.9620974

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: Burrillville WWTF 2011 Permit RIPDES PERMIT #: RI0100455

NOTE: METALS CRITERIA ARE EXPRESSED AS DISSOLVED, METALS LIMITS ARE EXPRESSED AS TOTAL

CHEMICAL NAME	CAS #	BACKGROUND CONCENTRATION (ug/L)	FRESHWATER CRITERIA ACUTE (ug/L)	DAILY MAX LIMIT (ug/L)	FRESHWATER CRITERIA CHRONIC (ug/L)	HUMAN HEALTH NON-CLASS A CRITERIA (ug/L)	MONTHLY AVE LIMIT (ug/L)
1,2DIPHENYLHYDRAZINE	122667		14	41.57262832	0.31	2	0.92053677
FLUORANTHENE	206440		199	590.9252169	4.4	140	13.06568319
FLUORENE	86737			No Criteria		5300	63431.09967
HEXACHLOROBENZENE	118741			No Criteria		0.0029	0.034707583
HEXACHLOROBUTADIENE	87683			No Criteria		180	2154.263762
HEXACHLOROCYCLOPENTADIENE	77474		0.35	1.039315708	0.008	1100	0.023755788
HEXACHLOROETHANE	67721		49	145.5041991	1.1	33	3.266420797
I[illegible] HORONE	78591		5850	17371.41969	130	9600	386.0315487
NA[illegible]HTHALENE	91203		115	341.4894469	2.6		7.720630974
NITROBENZENE	98953		1350	4008.78916	30	690	89.08420355
N-NITROSODIMETHYLAMINE	62759			No Criteria		30	359.0439604
N-NITROSODI-N-PROPYLAMINE	621647			No Criteria		5.1	61.03747327
N-NITROSODIPHENYLAMINE	86306		293	870.0557213	6.5	60	19.30157744
PYRENE	129000			No Criteria		4000	47872.52805
1,2,4trichlorobenzene	120821		75	222.7105089	1.7	70	5.048104868
PESTICIDES/PCBs							
ALDRIN	309002		3	8.908420355		0.0005	0.005984066
Alpha BHC	319846			No Criteria		0.049	0.586438469
Beta BHC	319857			No Criteria		0.17	2.034582442
Gamma BHC (Lindane)	58899		0.95	2.820999779		1.8	21.54263762
CHLORDANE	57749		2.4	7.126736284	0.0043	0.0081	0.012768736
4,4DDT	50293		1.1	3.266420797	0.001	0.0022	0.002969473
4,4DDE	72559			No Criteria		0.0022	0.02632989
[illegible] DD	72548			No Criteria		0.0031	0.037101209
DIELDRIN	60571		0.24	0.712673628	0.056	0.00054	0.006462791
ENDOSULFAN (alpha)	959988		0.22	0.653284159	0.056	89	0.166290513
ENDOSULFAN (beta)	33213659		0.22	0.653284159	0.056	89	0.166290513
ENDOSULFAN (sulfate)	1031078			No Criteria		89	1065.163749
ENDRIN	72208		0.086	0.255374717	0.036	0.06	0.106901044
ENDRIN ALDEHYDE	7421934			No Criteria		0.3	3.590439604
HEPTACHLOR	76448		0.52	1.544126195	0.0038	0.00079	0.009454824
HEPTACHLOR EPOXIDE	1024573		0.52	1.544126195	0.0038	0.00039	0.004667571
POLYCHLORINATED BIPHENYLS3	1336363			No Criteria	0.014	0.00064	0.007659604
2,3,7,8TCDD (Dioxin)	1746016			No Criteria		0.000000051	6.10375E-07
TOXAPHENE	8001352		0.73	2.16771562	0.0002	0.0028	0.000593895
TRIBUTYLTIN			0.46	1.365957788	0.072		0.213802089

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: Burrillville WWTF 2011 Permit RIPDES PERMIT #: RI0100455

NOTE: METALS CRITERIA ARE EXPRESSED AS DISSOLVED, METALS LIMITS ARE EXPRESSED AS TOTAL

CHEMICAL NAME	CAS #	BACKGROUND CONCENTRATION (ug/L)	FRESHWATER CRITERIA ACUTE (ug/L)	DAILY MAX LIMIT (ug/L)	FRESHWATER CRITERIA CHRONIC (ug/L)	HUMAN HEALTH NON-CLASS A CRITERIA (ug/L)	MONTHLY AVE LIMIT (ug/L)
NON PRIORITY POLLUTANTS:							
OTHER SUBSTANCES							
A MINUM (limits are total recoverable)	7429905	NA	750	2227.105089	87		258.3441903
AMMONIA as N(winter/summer)	7664417		26.2 | 17.5	1E+05 | 51966	6.12 | 3.12		34490 | 9264.76
4BROMOPHENYL PHENYL ETHER			18	53.45052213	0.4		1.187789381
CHLORIDE	16887006	21300	860000	2815203.334	230000		710589.025
CHLORINE	7782505		19	70.52499448	11		40.83025996
4CHLORO2METHYLPHENOL			15	44.54210177	0.32		0.950231505
1CHLORONAPHTHALENE			80	237.5578761	1.8		5.345052213
4CHLOROPHENOL	106489		192	570.1389027	4.3		12.76873584
2,4DICHLORO6METHYLPHENOL			22	65.32841594	0.48		1.425347257
1,1DICHLOROPROPANE			1150	3414.894469	26		77.20630974
1,3DICHLOROPROPANE	142289		303	899.7504558	6.7		19.89547213
2,3DINITROTOLUENE			17	50.48104868	0.37		1.098705177
2,4DINITRO6METHYL PHENOL			12	35.63368142	0.26		0.772063097
IRON	7439896			No Criteria	1000		2969.473452
pentachlorobenzene	608935		13	38.60315487	0.28		0.831452566
PENTACHLOROETHANE			362	1074.949389	8		23.75578761
1 ,5tetrachlorobenzene			321	953.200978	7.1		21.08326151
1,1,1,2TETRACHLOROETHANE	630206		980	2910.083983	22		65.32841594
2,3,4,6TETRACHLOROPHENOL	58902		7	20.78631416	0.16		0.475115752
2,3,5,6TETRACHLOROPHENOL			8.5	25.24052434	0.19		0.564199956
2,4,5TRICHLOROPHENOL	95954		23	68.29788939	0.51		1.51443146
2,4,6TRINITROPHENOL	88062		4235	12575.72007	94		279.1305045
XYLENE	1330207		133	394.9399691	3		8.908420355

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: Burrillville WWTF RIPDES PERMIT #: RI0100455

CHEMICAL NAME	CAS#	DAILY MAX LIMIT (ug/L)	MONTHLY AVE LIMIT (ug/L)
PRIORITY POLLUTANTS:			
TOXIC METALS AND CYANIDE			
ANTIMONY	7440360	1336.26	29.69
ARSENIC, TOTAL	7440382	1009.62	16.76
ASBESTOS	1332214	No Criteria	0.00000
BERYLLIUM	7440417	22.27	0.50
CADMIUM, TOTAL	7440439	1.45	0.27483
CHROMIUM III, TOTAL	16065831	1635.28	78.16
C OMIUM VI, TOTAL	18540299	48.38	33.95
COPPER, TOTAL	7440508	10.62	8.04
CYANIDE	57125	65.33	15.44
LEAD, TOTAL	7439921	38.37	1.50
MERCURY, TOTAL	7439976	4.89	2.11
NICKEL, TOTAL	7440020	409.20	45.50
SELENIUM, TOTAL	7782492	59.39	14.85
SILVER, TOTAL	7440224	1.00	1.00
THALLIUM	7440280	136.60	2.97
ZINC, TOTAL	7440666	104.30	104.30
VOLATILE ORGANIC COMPOUNDS			
ACROLEIN	107028	8.61	0.17817
ACRYLONITRILE	107131	1122.46	24.94
BENZENE	71432	786.91	17.52
BROMOFORM	75252	4350.28	97.99
CARBON TETRACHLORIDE	56235	4053.33	89.08
OROBENZENE	108907	2360.73	53.45
LORODIBROMOMETHANE	124481	No Criteria	1555.86
CHLOROFORM	67663	4290.89	95.02
DICHLOROBROMOMETHANE	75274	No Criteria	2034.58
1,2DICHLOROETHANE	107062	17519.89	389.00
1,1DICHLOROETHYLENE	75354	1722.29	38.60
1,2DICHLOROPROPANE	78875	7794.87	172.23
1,3DICHLOROPROPYLENE	542756	No Criteria	251.33
ETHYLBENZENE	100414	4751.16	106.90
BROMOMETHANE (methyl bromide)	74839	No Criteria	17952.20
CHLOROMETHANE (methyl chloride)	74873	No Criteria	0.00000
METHYLENE CHLORIDE	75092	28655.42	635.47
1,1,2,2TETRACHLOROETHANE	79345	1383.77	29.69

CHEMICAL NAME	CAS#	DAILY MAX LIMIT (ug/L)	MONTHLY AVE LIMIT (ug/L)
TETRACHLOROETHYLENE	127184	712.67	15.74
TOLUENE	108883	1885.62	41.57
1,2TRANSDICHLOROETHYLENE	156605	No Criteria	119681.32
1,1,1TRICHLOROETHANE	71556	No Criteria	0.00000
1,1,2TRICHLOROETHANE	79005	2672.53	59.39
TRICHLOROETHYLENE	79016	5790.47	127.69
VINYL CHLORIDE	75014	No Criteria	28.72
ACID ORGANIC COMPOUNDS			
2CHLOROPHENOL	95578	383.06	8.61
2,4DICHLOROPHENOL	120832	299.92	6.53
2,4DIMETHYLPHENOL	105679	314.76	7.13
4,6DINITRO2METHYL PHENOL	534521	No Criteria	3351.08
2,4DINITROPHENOL	51285	92.05	2.05
4NITROPHENOL	88755	No Criteria	0.00000
PENTACHLOROPHENOL	87865	0.15	0.11126
PHENOL	108952	745.34	16.63
2,4,6TRICHLOROPHENOL	88062	47.51	1.07
BASE NEUTRAL COMPUNDS			
ACENAPHTHENE	83329	252.41	5.64
ANTHRACENE	120127	No Criteria	478725.28
BENZIDINE	92875	No Criteria	0.02394
PAHs		No Criteria	2.15
BIS(2CHLOROETHYL)ETHER	111444	No Criteria	63.43
BIS(2CHLOROISOPROPYL)ETHER	108601	No Criteria	777928.58
BIS(2ETHYLHEXYL)PHTHALATE	117817	1648.06	35.63
BUTYL BENZYL PHTHALATE	85687	252.41	5.64
2CHLORONAPHTHALENE	91587	No Criteria	19149.01
1,2DICHLOROBENZENE	95501	234.59	5.35
1,3DICHLOROBENZENE	541731	1158.09	25.83
1,4DICHLOROBENZENE	106467	166.29	3.56
3,3DICHLOROBENZIDENE	91941	No Criteria	3.35
DIETHYL PHTHALATE	84662	7735.48	172.23
DIMETHYL PHTHALATE	131113	4899.63	109.87
DI-n-BUTYL PHTHALATE	84742	No Criteria	53856.59
2,4DINITROTOLUENE	121142	4602.68	100.96
1,2DIPHENYLHYDRAZINE	122667	41.57	0.92
FLUORANTHENE	206440	590.93	13.07

CALCULATION OF WATER QUALITY BASED NON-CLASS AA FRESHWATER DISCHARGE LIMITS

FACILITY NAME: Burrillville WWTF RIPDES PERMIT #: RI0100455

CHEMICAL NAME	CAS#	DAILY MAX LIMIT (ug/L)	MONTHLY AVE LIMIT (ug/L)
FLUORENE	86737	No Criteria	63431.10
HEXACHLOROBENZENE	118741	No Criteria	0.03471
HEXACHLOROBUTADIENE	87683	No Criteria	2154.26
HEXACHLOROCYCLOPENTADIENE	77474	1.04	0.02376
HEXACHLOROETHANE	67721	145.50	3.27
ISOPHORONE	78591	17371.42	386.03
N^PHTHALENE	91203	341.49	7.72
I :OBENZENE	98953	4008.79	89.08
N-NITROSODIMETHYLAMINE	62759	No Criteria	359.04
N-NITROSODI-N-PROPYLAMINE	621647	No Criteria	61.04
N-NITROSODIPHENYLAMINE	86306	870.06	19.30
PYRENE	129000	No Criteria	47872.53
1,2,4trichlorobenzene	120821	222.71	5.05
PESTICIDES/PCBs			
ALDRIN	309002	8.91	0.00598
Alpha BHC	319846	No Criteria	0.59
Beta BHC	319857	No Criteria	2.03
Gamma BHC (Lindane)	58899	2.82	2.82
CHLORDANE	57749	7.13	0.01277
4,4DDT	50293	3.27	0.00297
4,4DDE	72559	No Criteria	0.02633
4,4DDD	72548	No Criteria	0.03710
DIELDRIN	60571	0.71	0.00646
. :OSULFAN (alpha)	959988	0.65	0.16629
ENDOSULFAN (beta)	33213659	0.65	0.16629
ENDOSULFAN (sulfate)	1031078	No Criteria	1065.16
ENDRIN	72208	0.26	0.11
ENDRIN ALDEHYDE	7421934	No Criteria	3.59
HEPTACHLOR	76448	1.54	0.01
HEPTACHLOR EPOXIDE	1024573	1.54	0.00
POLYCHLORINATED BIPHENYLS3	1336363	No Criteria	0.01
2,3,7,8TCDD (Dioxin)	1746016	No Criteria	0.00
TOXAPHENE	8001352	2.17	0.00
TRIBUTYLTIN		1.37	0.21

CHEMICAL NAME	CAS#	DAILY MAX LIMIT (ug/L)	MONTHLY AVE LIMIT (ug/L)
NON PRIORITY POLLUTANTS:			
OTHER SUBSTANCES			
ALUMINUM, TOTAL	7429905	2227.11	258.34
AMMONIA (as N), WINTER (NOV-API	7664417	147653.11	34489.96
AMMONIA (as N), SUMMER (MAY-OC	7664417	51965.79	9264.76
4BROMOPHENYL PHENYL ETHER		53.45	1.19
CHLORIDE	16887006	2815203.33	710589.02
CHLORINE	7782505	70.52	40.83
4CHLORO2METHYLPHENOL		44.54	0.95
1CHLORONAPHTHALENE		237.56	5.35
4CHLOROPHENOL	106489	570.14	12.77
2,4DICHLORO6METHYLPHENOL		65.33	1.43
1,1DICHLOROPROPANE		3414.89	77.21
1,3DICHLOROPROPANE	142289	899.75	19.90
2,3DINITROTOLUENE		50.48	1.10
2,4DINITRO6METHYL PHENOL		35.63	0.77
IRON	7439896	No Criteria	2969.47
pentachlorobenzene	608935	38.60	0.83
PENTACHLOROETHANE		1074.95	23.76
1,2,3,5tetrachlorobenzene		953.20	21.08
1,1,1,2TETRACHLOROETHANE	630206	2910.08	65.33
2,3,4,6TETRACHLOROPHENOL	58902	20.79	0.48
2,3,5,6TETRACHLOROPHENOL		25.24	0.56
2,4,5TRICHLOROPHENOL	95954	68.30	1.51
2,4,6TRINITROPHENOL	88062	12575.72	279.13
XYLENE	1330207	394.94	8.91

ATTACHMENT C

Summary of State User Fee Data
2006 to 2010

Summary of State User Fee Data
2006 to 2010

Date	User Fee Cycle	ParameterName	Conc. (ug/l)	Max	Average
07/18/06	19	Bis(2-ethylhexyl) phthalate	18.6	18.6	18.6
07/18/06	19	BOD	3000		
07/10/07	20	BOD	3000		
07/15/08	21	BOD	5000		
09/30/09	22	BOD	1000		
07/20/10	23	BOD	5000	5000	3400
07/15/08	21	Cadmium, Total	1		
09/30/09	22	Cadmium, Total	1	1	1
07/18/06	19	Chloroform	3.1		
07/10/07	20	Chloroform	5		
07/15/08	21	Chloroform	1.5		
09/30/09	22	Chloroform	1.8		
07/20/10	23	Chloroform	1	5	2.48
07/20/10	23	Chromium, Total	2	2	2
07/10/07	20	Copper, Total	10		
07/15/08	21	Copper, Total	14		
09/30/09	22	Copper, Total	8		
07/20/10	23	Copper, Total	6	14	9.5
07/10/07	20	Cyanide	40		
07/15/08	21	Cyanide	20	40	30
07/20/10	23	Diethyl Phthalate	31.87	31.87	31.87
07/18/06	19	Lead, Total	6	6	6
07/10/07	20	Nickel, Total	5		
07/15/08	21	Nickel, Total	6		
09/30/09	22	Nickel, Total	7		
07/20/10	23	Nickel, Total	7	7	6.25
07/20/10	23	Settleable Solids	0.1	0.1	0.1
07/18/06	19	Toluene	11		
07/15/08	21	Toluene	1.2		
07/20/10	23	Toluene	3.5	11	5.233333333
07/18/06	19	TSS	10000		
07/10/07	20	TSS	8000		
07/15/08	21	TSS	6000		
09/30/09	22	TSS	24000		
07/20/10	23	TSS	9000	24000	11400
07/18/06	19	Zinc, Total	47		
07/10/07	20	Zinc, Total	45		
07/15/08	21	Zinc, Total	37		
09/30/09	22	Zinc, Total	2.7		
07/20/10	23	Zinc, Total	34	47	33.14

ATTACHMENT D

Summary of Discharge Monitoring Report Data
July 2006 – May 2011

BURRILLVILLE WWTF

DMR Data Summary 6/10/11

***** NOT ICIS CERTIFIED*****

001A

BOD, 5-day, 20 deg. C Location= 1

	MO AVG lb/d	DAILY MX lb/d
Mean	38.3948	110.9655
Minimum	8.9	23.6
Maximum	179.9	635.1
Data Count	58	58

	MO AVG mg/L	WKLY AVG mg/L	DAILY MX mg/L
Mean	5.0241	7.119	10.1103
Minimum	1.6	1.9	2.9
Maximum	12.4	16.6	23.3
Data Count	58	58	58

Chlorine, total residual Location= 1

	MO AVG ug/L	DAILY MX ug/L
Mean	10	10
Minimum	10	10
Maximum	10	10
Data Count	58	58

Coliform, fecal general Location= 1

	MO GEO MPN/100mL	WKLY GEO MPN/100mL	DAILY MX MPN/100mL
Mean	11.2241	41.0172	104.2069
Minimum	2	2	2
Maximum	114	259	360
Data Count	58	58	58

Copper, total (as Cu) Location= 1

	MO AVG ug/L	DAILY MX ug/L
Mean	8.6259	11.1552
Minimum	4.3	5
Maximum	12.3	16
Data Count	58	58

Flow, in conduit or thru treatment pl

	MO AVG Mgal/d	DAILY MX Mgal/d
Mean	.8506	1.1587
Minimum	.595	.638
Maximum	1.8119	4.072
Data Count	58	58

Lead, total (as Pb) Location= 1

	MO AVG ug/L	DAILY MX ug/L
Mean	1.019	1.081
Minimum	1	1

BURRILLVILLE WWTF

DMR Data Summary 6/10/11

	MO AVG ug/L	DAILY MX ug/L
Maximum	1.4	3.2
Data Count	58	58

Nitrogen, ammonia total (as N) Loc

	MO AVG mg/L	DAILY MX mg/L
Mean	9.9948	13.7586
Minimum	1.1	1.7
Maximum	26.5	34
Data Count	58	58

Nitrogen, Kjeldahl, total (as N) Loca

	MO AVG mg/L	DAILY MX mg/L
Mean	12.0172	15.9879
Minimum	2.5	3.8
Maximum	29	36
Data Count	58	58

Nitrogen, nitrate total (as N) Locatic

	MO AVG mg/L	DAILY MX mg/L
Mean	2.905	5.4709
Minimum	.04	.04
Maximum	7.83	19.7
Data Count	58	58

Nitrogen, nitrite total (as N) Locatio

	MO AVG mg/L	DAILY MX mg/L
Mean	.2864	.6867
Minimum	.05	.05
Maximum	3.21	8.25
Data Count	58	58

Nitrogen, total Location= 1

	MO AVG mg/L	DAILY MX mg/L
Mean	15.1966	19.5483
Minimum	5.4	6.8
Maximum	33.5	36.5
Data Count	58	58

pH Location= 1

	MINIMUM SU	MAXIMUM SU
Mean	6.4231	7.2405
Minimum	6.08	6.67
Maximum	6.76	7.89
Data Count	58	58

Phosphorus, total (as P) Location=

	MO AVG mg/L	DAILY MX mg/L
Mean	.6481	.9647
Minimum	.27	.39

BURRILLVILLE WWTF

DMR Data Summary 6/10/11

	MO AVG mg/L	DAILY MX mg/L
Maximum	.98	2.5
Data Count	58	58

Solids, settleable Location= 1

	MO AVG mL/L	WKLY AVG mL/L	DAILY MX mL/L
Mean	.01	.01	.01
Minimum	.01	.01	.01
Maximum	.01	.01	.01
Data Count	58	58	58

Solids, total suspended Location= 1

	MO AVG lb/d	DAILY MX lb/d
Mean	56.2103	130.6517
Minimum	27.6	39
Maximum	131.8	931
Data Count	58	58

	MO AVG mg/L	WKLY AVG mg/L	DAILY MX mg/L
Mean	7.8672	10.2328	12.681
Minimum	4.1	4.7	4.8
Maximum	13.7	19.8	37
Data Count	58	58	58

Zinc, total (as Zn) Location= 1

	MO AVG ug/L	DAILY MX ug/L
Mean	31.6293	37.5
Minimum	14.8	20
Maximum	43.4	59
Data Count	58	58

BOD, 5-day, 20 deg. C Location= G

	MO AVG lb/d	DAILY MX lb/d
Mean	1677.6379	3749.2931
Minimum	1200	1939
Maximum	2678	21939
Data Count	58	58

	MO AVG mg/L	WKLY AVG mg/L	DAILY MX mg/L
Mean	246.9138	317.2759	432.7931
Minimum	131	175	189
Maximum	451	1254	3313
Data Count	58	58	58

Copper, total (as Cu) Location= G

	MO AVG ug/L	DAILY MX ug/L
Mean	217.8103	332.1207
Minimum	78	89
Maximum	438	950
Data Count	58	58

Lead, total (as Pb) Location= G

BURRILLVILLE WWTF

DMR Data Summary 6/10/11

	MO AVG ug/L	DAILY MX ug/L
Mean	12.2345	25.6379
Minimum	3.2	4.9
Maximum	118.2	543
Data Count	58	58

Solids, total suspended Location= (

	MO AVG lb/d	DAILY MX lb/d
Mean	2206.6034	5248.1552
Minimum	1264	2452
Maximum	3525	16505
Data Count	58	58

	MO AVG mg/L	WKLY AVG mg/L	DAILY MX mg/L
Mean	320.931	405.1379	566.8621
Minimum	198	211	300
Maximum	498	764	968
Data Count	58	58	58

Zinc, total (as Zn) Location= G

	MO AVG ug/L	DAILY MX ug/L
Mean	248.6379	344.5862
Minimum	112	128
Maximum	487	961
Data Count	58	58

BOD, 5-day, percent removal Locat

	MINIMUM %
Mean	97.7397
Minimum	90.9
Maximum	99.4
Data Count	58

Solids, suspended percent removal

	MINIMUM %
Mean	97.4052
Minimum	95.2
Maximum	99
Data Count	58

<u>001Q</u>

Beryllium, total (as Be) Location= 1

	DAILY MX ug/L
Mean	1.005
Minimum	.02
Maximum	2
Data Count	4

Endrin Location= 1

BURRILLVILLE WWTF

DMR Data Summary 6/10/11

	DAILY MX ug/L
Mean	.05
Minimum	.05
Maximum	.05
Data Count	4

Heptachlor Location= 1

	DAILY MX ug/L
Mean	.02
Minimum	.02
Maximum	.02
Data Count	4

Phenols Location= 1

	DAILY MX ug/L
Mean	1
Minimum	1
Maximum	1
Data Count	4

001T

LC50 Static Renewal 48Hr Acute Ce

	MINIMUM %
Mean	100
Minimum	100
Maximum	100
Data Count	19

Noael Statre 7Day Chronic Ceriodaț

	MINIMUM %
Mean	80.2632
Minimum	25
Maximum	100
Data Count	19

ATTACHMENT E

Comparison of Allowable Limits with Discharge Monitoring Report Data, State User Fee Data, and Permit Application Data

Facility Name: *Burrillville WWTF*

RIPDES Permit #: *RI0100455*

Outfall #: *001A*

NOTE: METALS LIMITS ARE TOTAL METALS

Parameter	CAS #	Concentration Limits (ug/L) Based on WQ Criteria		Antideg. Limits (ug/L)	User Fee Program Data (ug/l) 2006 - 2010		Permit Application Data (ug/L) 12/28/2010		Ave. DMR Data Effluent (ug/L) 7/06 - 5/11		Potential WQ Based Permit Limits (ug/L)	
		Daily Max	Monthly Ave	Monthly Ave	Max	Ave	Max	Ave	Daily Max	Monthly Ave	Daily Max	Monthly Ave
PRIORITY POLLUTANTS:												
TOXIC METALS AND CYANIDE												
ANTIMONY	7440360	1336.26	29.69	---	---	---	<1.0	<1.0	---	---	1336.263053	29.69473452
ARSENIC, TOTAL	7440382	1009.62	16.76	---	---	---	<1.0	<1.0	---	---	1009.620974	16.75538482
ASBESTOS	1332214	No Criteria	0.00	---	---	---	---		---	---	---	0
BERYLLIUM	7440417	22.27	0.50	---	---	---	<1.0	<1.0	<1.005	---	22.27105089	0.504810487
CADMIUM, TOTAL	7440439	1.45	0.27	---	1	1	<1.0	<1.0	---	---	1.453233794	0.274832422
CHROMIUM III, TOTAL	16065831	1635.28	78.16	---	2	2	2	<1.3	---	---	1635.277826	78.16078045
CHROMIUM VI, TOTAL	18540299	48.38	33.95	---	2	2	2	<1.3	---	---	48.3824595	33.95447814
COPPER, TOTAL	7440508	10.62	8.04	---	14	9.5	16	8.7	11.19	8.64	10.62182073	8.036884499
CYANIDE	57125	65.33	15.44	---	40	30	40	20	---	---	65.32841594	15.44126195
LEAD, TOTAL	7439921	38.37	1.50	---	6	6	3.2	1	1.08	1.02	38.36885966	1.495179377
MERCURY, TOTAL	7439976	4.89	0.75	---	---	---	<0.5	<0.5	---	---	4.89089745	0.754707539
NICKEL, TOTAL	7440020	409.20	45.50	---	7	6.25	7	6.3	---	---	409.2012154	45.49520812
SELENIUM, TOTAL	7782492	59.39	14.85	---	---	---	<1.0	<1.0	---	---	59.38946903	14.84736726
SILVER, TOTAL	7440224	1.00	1.00	---	---	---	<1.0	<1.0	---	---	0.998426612	0.998426612
THALLIUM	7440280	136.60	2.01	---	---	---	<1.0	<1.0	---	---	136.5957788	2.010037746
ZINC, TOTAL	7440666	104.30	104.30	---	47	33	59	31.2	37.49	31.61	104.3041453	104.3041453
VOLATILE ORGANIC COMPOUNDS												
ACROLEIN	107028	8.61	0.18	---	---	---	<20.0	<20.0	---	---	8.61147301	0.178168407
ACRYLONITRILE	107131	1122.46	24.94	---	---	---	<5	<5.0	---	---	1122.460965	24.94357699
BENZENE	71432	786.91	17.52	---	---	---	<1.0	<1.0	---	---	786.9104647	17.51989336
BROMOFORM	75252	4350.26	97.99	---	---	---	<1.0	<1.0	---	---	4350.276607	97.9926239
CARBON TETRACHLORIDE	56235	4053.33	89.08	---	---	---	<1.0	<1.0	---	---	4053.331261	89.08420355
CHLOROBENZENE	108907	2360.73	53.45	---	---	---	<1.0	<1.0	---	---	2360.731394	53.45052213
CHLORODIBROMOMETHANE	124481	No Criteria	1555.86	---	---	---	<1.0	<1.0	---	---	---	1555.857162
CHLOROFORM	67663	4290.89	95.02	---	5	2.48	5	2.3	---	---	4290.889138	95.02315045
DICHLOROBROMOMETHANE	75274	No Criteria	2034.58	---	---	---	<1.0	<1.0	---	---	---	2034.582442
1,2DICHLOROETHANE	107062	17519.89	389.00	---	---	---	<1.0	<1.0	---	---	17519.89336	389.0010222
1,1DICHLOROETHYLENE	75354	1722.29	38.60	---	---	---	<1.0	<1.0	---	---	1722.294602	38.60315487
1,2DICHLOROPROPANE	78875	7794.87	172.23	---	---	---	<1.0	<1.0	---	---	7794.867811	172.2294602
1,3DICHLOROPROPYLENE	542756	No Criteria	89.81	---	---	---	<1.0	<1.0	---	---	---	89.81019718
ETHYLBENZENE	100414	4751.16	106.90	---	---	---	<1.0	<1.0	---	---	4751.157523	106.9010443
BROMOMETHANE (methyl bromide)	74839	No Criteria	6415.01	---	---	---	<1.0	<1.0	---	---	---	6415.014084
CHLOROMETHANE (methyl chloride)	74873	No Criteria	0.00	---	---	---	<1.0	<1.0	---	---	---	0
METHYLENE CHLORIDE	75092	28655.42	635.47	---	---	---	<1.0	<1.0	---	---	28655.41881	635.4673186
1,1,2,2TETRACHLOROETHANE	79345	1383.77	29.69	---	---	---	<1.0	<1.0	---	---	1383.774628	29.69473452
FLUORENE	86737	No Criteria	22666.38	---	---	---	<10.0	<10.0	---	---	---	22666.3831
HEXACHLOROBENZENE	118741	No Criteria	0.03	---	---	---	<10.0	<10.0	---	---	---	0.034707583
HEXACHLOROBUTADIENE	87683	No Criteria	2154.26	---	---	---	<10.0	<10.0	---	---	---	2154.263762
HEXACHLOROCYCLOPENTADIENE	77474	1.04	0.02	---	---	---	<10.0	<10.0	---	---	1.039315706	0.023755788
HEXACHLOROETHANE	67721	145.50	3.27	---	---	---	<10.0	<10.0	---	---	145.5041991	3.266420797
ISOPHORONE	78591	17371.42	386.03	---	---	---	<10.0	<10.0	---	---	17371.41969	386.0315487
NAPHTHALENE	91203	341.49	7.72	---	---	---	<10.0	<10.0	---	---	341.4894469	7.720630974
NITROBENZENE	98953	4008.79	89.08		---	---	<10.0	<10.0	---	---	4008.78916	89.08420355
N-NITROSODIMETHYLAMINE	62759	No Criteria	359.04	---	---	---	<10.0	<10.0	---	---	---	359.0439604
N-NITROSODI-N-PROPYLAMINE	621647	No Criteria	61.04	---	---	---	<10.0	<10.0	---	---	---	61.03747327
N-NITROSODIPHENYLAMINE	86306	870.06	19.30	---	---	---	<10.0	<10.0	---	---	870.0557213	19.30157744
PYRENE	129000	No Criteria	17106.70	---	---	---	<10.0	<10.0	---	---	---	17106.70422
1,2,4trichlorobenzene	120821	222.71	5.05	---	---	---	<10.0	<10.0	---	---	222.7105089	5.048104868
PESTICIDES/PCBs												
ALDRIN	309002	8.91	0.01	---	---	---	---	---	---	---	8.908420355	0.005984066
Alpha BHC	319846	No Criteria	0.59	---	---	---	---	---	---	---	---	0.586438469

Facility Name: ***Burrillville WWTF***
RIPDES Permit #: ***RI0100455***
Outfall #: ***001A***

NOTE: METALS LIMITS ARE TOTAL METALS

Parameter	CAS #	Concentration Limits (ug/L) Based on WQ Criteria		Antideg. Limits (ug/L)	User Fee Program Data (ug/l) 2006 - 2010		Permit Application Data (ug/L) 12/28/2010		Ave. DMR Data Effluent (ug/L) 7/06 - 5/11		Potential WQ Based Permit Limits (ug/L)	
		Daily Max	Monthly Ave	Monthly Ave	Max	Ave	Max	Ave	Daily Max	Monthly Ave	Daily Max	Monthly Ave
Beta BHC	319857	No Criteria	2.03	---	---	---	---	---	---	---	---	2.034582442
Gamma BHC (Lindane)	58899	2.82	2.82	---	---	---	---	---	---	---	2.820999779	2.820999779
CHLORDANE	57749	7.13	0.01	---	---	---	---	---	---	---	7.126736284	0.012768736
4,4DDT	50293	3.27	0.00	---	---	---	---	---	---	---	3.266420797	0.002969473
4,4DDE	72559	No Criteria	0.03	---	---	---	---	---	---	---	---	0.02632989
4,4DDD	72548	No Criteria	0.04	---	---	---	---	---	---	---	---	0.037101209
DIELDRIN	60571	0.71	0.01	---	---	---	---	---	---	---	0.712673628	0.006462791
ENDOSULFAN (alpha)	959988	0.65	0.17	---	---	---	---	---	---	---	0.653284159	0.166290513
ENDOSULFAN (beta)	33213659	0.65	0.17	---	---	---	---	---	---	---	0.653284159	0.166290513
ENDOSULFAN (sulfate)	1031078	No Criteria	380.62	---	---	---	---	---	---	---	---	380.624169
ENDRIN	72208	0.26	0.11	---	---	---	---	---	<0.05	---	0.255374717	0.106901044
ENDRIN ALDEHYDE	7421934	No Criteria	1.28	---	---	---	---	---	---	---	---	1.283002817
HEPTACHLOR	76448	1.54	0.01	---	---	---	---	---	<0.02	---	1.544126195	0.009454824
HEPTACHLOR EPOXIDE	1024573	1.54	0.00	---	---	---	---	---	---	---	1.544126195	0.004667571
POLYCHLORINATED BIPHENYLS3	1336363	No Criteria	0.01	---	---	---	---	---	---	---	---	0.007659604
2,3,7,8TCDD (Dioxin)	1746016	No Criteria	0.00	---	---	---	---	---	---	---	---	6.10375E-07
TOXAPHENE	8001352	2.17	0.00	---	---	---	---	---	---	---	2.16771562	0.000593895
TRIBUTYLTIN		1.37	0.21	---	---	---	---	---	---	---	1.365957788	0.213802089
TETRACHLOROETHYLENE	127184	712.67	15.74	---	---	---	<1.0	<1.0	---	---	712.6736284	15.73820929
TOLUENE	108883	1885.62	41.57	---	11	5.2	3.5	1.7	---	---	1885.615642	41.57262832
1,2TRANSDICHLOROETHYLENE	156605	No Criteria	42766.76	---	---	---	<1.0	<1.0	---	---	---	42766.76056
1,1,1TRICHLOROETHANE	71556	No Criteria	0.00	---	---	---	<1.0	<1.0	---	---	---	0
1,1,2TRICHLOROETHANE	79005	2672.53	59.39	---	---	---	<1.0	<1.0	---	---	2672.526106	59.38946903
TRICHLOROETHYLENE	79016	5790.47	127.69	---	---	---	<1.0	<1.0	---	---	5790.473231	127.6873584
VINYL CHLORIDE	75014	No Criteria	28.72	---	---	---	<1.0	<1.0	---	---	---	28.72351683
ACID ORGANIC COMPOUNDS												
2CHLOROPHENOL	95578	383.06	8.61	---	---	---	<10.0	<10.0	---	---	383.0620753	8.61147301
2,4DICHLOROPHENOL	120832	299.92	6.53	---	---	---	<10.0	<10.0	---	---	299.9168186	6.532841594
2,4DIMETHYLPHENOL	105679	314.76	7.13	---	---	---	<10.0	<10.0	---	---	314.7641859	7.126736284
4,6DINITRO2METHYL PHENOL	534521	No Criteria	1197.47	---	---	---	---	---	---	---	---	1197.469296
2,4DINITROPHENOL	51285	92.05	2.05	---	---	---	<10.0	<10.0	---	---	92.053677	2.048936682
4NITROPHENOL	88755	No Criteria	0.00	---	---	---	<10.0	<10.0	---	---	---	0
PENTACHLOROPHENOL	87865	0.15	0.11	---	---	---	<10.0	<10.0	---	---	0.145022994	0.111262504
PHENOL	108952	745.34	16.63	---	---	---	<10.0	<10.0	1	---	745.3378364	16.62905133
2,4,6TRICHLOROPHENOL	88062	47.51	1.07	---	---	---	<10.0	<10.0	---	---	47.51157523	1.069010443
BASE NEUTRAL COMPUNDS												
ACENAPHTHENE	83329	252.41	5.64	---	---	---	<10.0	<10.0	---	---	252.4052434	5.641999558
ANTHRACENE	120127	No Criteria	171067.04	---	---	---	<10.0	<10.0	---	---	---	171067.0422
BENZIDINE	92875	No Criteria	0.02	---	---	---	<10.0	<10.0	---	---	---	0.023936264
PAHs		No Criteria	2.15	---	---	---	---	---	---	---	---	2.154263762
BIS(2CHLOROETHYL)ETHER	111444	No Criteria	63.43	---	---	---	<10.0	<10.0	---	---	---	63.43109967
BIS(2CHLOROISOPROPYL)ETHER	108601	No Criteria	277983.94	---	---	---	<10.0	<10.0	---	---	---	277983.9436
BIS(2ETHYLHEXYL)PHTHALATE	117817	1648.06	35.63	---	18.6	18.6	<10.0	<10.0	---	---	1648.057766	35.63368142
BUTYL BENZYL PHTHALATE	85687	252.41	5.64	---	---	---	<10.0	<10.0	---	---	252.4052434	5.641999558
2CHLORONAPHTHALENE	91587	No Criteria	6842.68	---	---	---	<10.0	<10.0	---	---	---	6842.68169
1,2DICHLOROBENZENE	95501	234.59	5.35	---	---	---	<10.0	<10.0	---	---	234.5884027	5.345052213
1,3DICHLOROBENZENE	541731	1158.09	25.83	---	---	---	<10.0	<10.0	---	---	1158.094646	25.83441903
1,4DICHLOROBENZENE	106467	166.29	3.56	---	---	---	<10.0	<10.0	---	---	166.2905133	3.563368142
3,3DICHLOROBENZIDENE	91941	No Criteria	3.35	---	---	---	<10.0	<10.0	---	---	---	3.351076964
DIETHYL PHTHALATE	84662	7735.48	172.23	---	31.87	31.87	31.9	15.5	---	---	7735.478342	172.2294602
DIMETHYL PHTHALATE	131113	4899.63	109.87	---	---	---	<10.0	<10.0	---	---	4899.631195	109.8705177
DI-n-BUTYL PHTHALATE	84742	No Criteria	19245.04	---	---	---	<10.0	<10.0	---	---	---	19245.04225
2,4DINITROTOLUENE	121142	4602.68	100.96	---	---	---	<10.0	<10.0	---	---	4602.68385	100.9620974

Facility Name: ***Burrillville WWTF***

RIPDES Permit #: ***RI0100455***

Outfall #: ***001A***

NOTE: METALS LIMITS ARE TOTAL METALS

Parameter	CAS #	Concentration Limits (ug/L) Based on WQ Criteria		Antideg. Limits (ug/L)	User Fee Program Data (ug/l) 2006 - 2010		Permit Application Data (ug/L) 12/28/2010		Ave. DMR Data Effluent (ug/L) 7/06 - 5/11		Potential WQ Based Permit Limits (ug/L)	
		Daily Max	Monthly Ave	Monthly Ave	Max	Ave	Max	Ave	Daily Max	Monthly Ave	Daily Max	Monthly Ave
1,2DIPHENYLHYDRAZINE	122667	41.57	0.92	---	---	---	<10.0	<10.0	---	---	41.57262832	0.92053677
FLUORANTHENE	206440	590.93	13.07	---	---	---	<10.0	<10.0	---	---	590.9252169	13.06568319
NON PRIORITY POLLUTANTS: OTHER SUBSTANCES												
ALUMINUM, TOTAL	7429905	2227.11	258.34	---	---	---	---	---	---	---	2227.105089	258.3441903
AMMONIA (as N), WINTER (NOV-APR)	7664417	147653.11	34489.96	---	---	---	---	---	21000	15700	147653.1107	34489.96326
AMMONIA (as N), SUMMER (MAY-OCT)	7664417	51965.79	9264.76	---	---	---	---	---	3500	2000	51965.7854	9264.757169
4BROMOPHENYL PHENYL ETHER		53.45	1.19	---	---	---	<10.0	<10.0	---	---	53.45052213	1.187789381
CHLORIDE	16887006	2815203.33	710589.02	---	---	---	---	---	---	---	2815203.334	710589.025
CHLORINE	7782505	70.52	40.83	---	---	---	10	10	10	10	70.52499448	40.83025996
4CHLORO2METHYLPHENOL		44.54	0.95	---	---	---	---	---	---	---	44.54210177	0.950231505
1CHLORONAPHTHALENE		237.56	5.35	---	---	---	---	---	---	---	237.5578761	5.345052213
4CHLOROPHENOL	106489	570.14	12.77	---	---	---	---	---	---	---	570.1389027	12.76873584
2,4DICHLORO6METHYLPHENOL		65.33	1.43	---	---	---	---	---	---	---	65.32841594	1.425347257
1,1DICHLOROPROPANE		3414.89	77.21	---	---	---	---	---	---	---	3414.894469	77.20630974
1,3DICHLOROPROPANE	142289	899.75	19.90	---	---	---	---	---	---	---	899.7504558	19.89547213
2,3DINITROTOLUENE		50.48	1.10	---	---	---	---	---	---	---	50.48104868	1.098705177
2,4DINITRO6METHYL PHENOL		35.63	0.77	---	---	---	---	---	---	---	35.63368142	0.772063097
IRON	7439896	No Criteria	2969.47	---	---	---	---	---	---	---	---	2969.473452
pentachlorobenzene	608935	38.60	0.83	---	---	---	---	---	---	---	38.60315487	0.831452566
PENTACHLOROETHANE		1074.95	23.76	---	---	---	---	---	---	---	1074.949389	23.75578761
1,2,3,5tetrachlorobenzene		953.20	21.08	---	---	---	---	---	---	---	953.200978	21.08326151
1,1,1,2TETRACHLOROETHANE	630206	2910.08	65.33	---	---	---	---	---	---	---	2910.083983	65.32841594
2,3,4,6TETRACHLOROPHENOL	58902	20.79	0.48	---	---	---	---	---	---	---	20.78631416	0.475115752
2,3,5,6TETRACHLOROPHENOL		25.24	0.56	---	---	---	---	---	---	---	25.24052434	0.564199956
2,4,5TRICHLOROPHENOL	95954	68.30	1.51	---	---	---	---	---	---	---	68.29788939	1.51443146
2,4,6TRINITROPHENOL	88062	12575.72	279.13	---	---	---	---	---	---	---	12575.72007	279.1305045
XYLENE	1330207	394.94	8.91	---	---	---	---	---			394.9399691	8.908420355
NON WQ BASED PARAMETERS												
BOD5	---	No Criteria	No Criteria	---	5000	3400	23300	4930	10020	5040	---	---
TSS	---	No Criteria	No Criteria	---	24000	11400	37000	7800	12680	7900	---	---
pH (min, max)	---	No Criteria	No Criteria	---	---	---	7.89	6	7.24	6.44	---	---
Flow (mgd)	---	No Criteria	No Criteria	---	---	---	4.07	0.84	1.15	0.85	---	---
Fecal Coliform (MPN/100ml)	---	No Criteria	No Criteria	---	---	---	360	6.4	106	11.39	---	---
TKN	---	No Criteria	No Criteria	---	---	---	36000	8900	15990	12040	---	---
Nitrate + Nitrite	---	No Criteria	No Criteria	---	---	---	20020	3730	---	---	---	---
Nitrogen, Nitrate		No Criteria	No Criteria	---	---	---	---	---	5.51	2.91	---	---
Nitrogen, Nitrite		No Criteria	No Criteria	---	---	---	---	---	690	290	---	---
Nitrogen, Total		No Criteria	No Criteria	---	---	---	---	---	19590	15230	---	---
Ammonia (June-Oct)		No Criteria	No Criteria	---	---	---	---	---	3500	2000	---	---
Ammonia (Nov-May)		No Criteria	No Criteria	---	---	---	---	---	21000	15700	---	---
Phosphorus	---	No Criteria	No Criteria	---	---	---	2500	690	960	650	---	---
Hardness (as CaCO3)	---	No Criteria	No Criteria	---	---	---	51500	48300	---	---	---	---
Chloroethane	---	No Criteria	No Criteria	---	---	---	<1.0	<1.0	---	---	---	---
2-Chloro-ethylvinyl ether	---	No Criteria	No Criteria	---	---	---	<5.0	<5.0	---	---	---	---
1,1-Dichloroethane	---	No Criteria	No Criteria	---	---	---	<1.0	<1.0	---	---	---	---
p-chloro-m-cresol	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
4,6-Dinitro-o-cresol	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
2-Nitrophenol	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Acenaphthylene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Benzo(a)anthracene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Benzo(a)pyrene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
3,4 Benzo-Fluoranthene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---

Facility Name: *Burrillville WWTF*

RIPDES Permit #: *RI0100455*

Outfall #: *001A*

NOTE: METALS LIMITS ARE TOTAL METALS

Parameter	CAS #	Concentration Limits (ug/L) Based on WQ Criteria		Antideg. Limits (ug/L)	User Fee Program Data (ug/l) 2006 - 2010		Permit Application Data (ug/L) 12/28/2010		Ave. DMR Data Effluent (ug/L) 7/06 - 5/11		Potential WQ Based Permit Limits (ug/L)	
		Daily Max	Monthly Ave	Monthly Ave	Max	Ave	Max	Ave	Daily Max	Monthly Ave	Daily Max	Monthly Ave
Benzo(ghi)Perylene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Benzo(k)Fluoranthene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Bis (2-Chloroethoxy) Methane	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
4-Chlorophenyl Phenyl Ether	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Chrysene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Di-n-Octyl Phthalate	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Dibenzo(a,h)anthracene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
2,6-Dinitrotoluene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Indeno(1,2,3-cd) pyrene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---
Phenanthrene	---	No Criteria	No Criteria	---	---	---	<10.0	<10.0	---	---	---	---

ATTACHMENT F

Phosphorus Limit Calculations

Burrillville WWTF Phosphorus Limit Calculation

Determine if the Upper Slatersville Reservoir is a "Lake, Pond, Kettlehole, or Reservoir"
(i.e., Retention Time at 7Q10 is 14 Days or Greater)

Surface Area of Reservoir:	138 acres	=	6011280 ft^2	*(from DEM Fisheries Investigations Handbook)*
Average Depth of Reservoir:	7.5 ft			*(from DEM Fisheries Investigations Handbook)*
Retention Time at 7Q10:	55.666 days			*(calculated)*

Retention time is greater than 14 days, therefore, it is a "reservoir".

Data From USGS Station at Forestdale
(Downstream of Slatersville Reservoirs and Forestdale Pond)

Drainage Area:	91.2 mi^2	*(from RIPDES 7Q10 Statistics Table)*
7Q10 @ Station:	13.69 cfs	*(from RIPDES 7Q10 Statistics Table)*

WWTF Data

Average WWTF Flow:	0.85 MGD	=	1.309 cfs	*(from Attachment A-1 of 2011 RIPDES Permit)*
Design WWTF Flow:	1.5 MGD	=	2.31 cfs	*(from RIPDES Permit)*
Drainage Area @ WWTF:	46.9 mi^2			*(from Permit Development Document)*
7Q10 @ WWTF:	6.36698 cfs			*(calculated)*

Flow into Slatersville Reservoirs

% of Drainage Area Between USGS station and WWTF:	50	*(estimated based on river mile)*
Drainage Area @ Reservoir:	69.05 mi^2	*(calculated)*
7Q10 @ Reservoir:	9.37399 cfs	*(calculated)*

TP Limit for WWTF to Protect Reservoir Influent Criteria

TP Criteria @ Reservoir Influent:	25 ug/l	=	0.025 mg/l	*(from RI Water Quality Regs)*
Background TP Concentration:	0 ug/l	=	0 mg/l	
% Allocation of Criteria:	80 %			*(RIPDES Policy w/o Background Data)*
Effluent Dillution Factor @ Reservoir Influent:	5.05801			*(calcualted)*
Limit to Protect Reservoir:	101.16 ug/l	=	0.10116 mg/l	*(calcualted)*
Resulting Instream Concentration End of Pipe:	26.931 ug/l	=	0.026931 mg/l	*(calcualted)*