Attachment 3

Report

Town of Salisbury, MA

Copper Optimization Engineering Report

CONTRACT NO: 2120536

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1.0 BACKGROUND & DATA ANALYSIS

In accordance with Section III.1 of Administrative Order Docket No. 11-012 (the AO), this Copper Optimization Engineering Report (the Report) has been prepared on behalf of the Town of Salisbury (the Town). The Report describes the nature and extent of National Pollutant Discharge Elimination System (NPDES) permit violations for effluent concentrations of Total Copper, identifies known sources of copper, establishes a mass balance of copper through the Salisbury Wastewater Treatment Plant (WWTP), and evaluates additional measures with the goal of achieving full compliance with an existing or modified Total Copper limit.

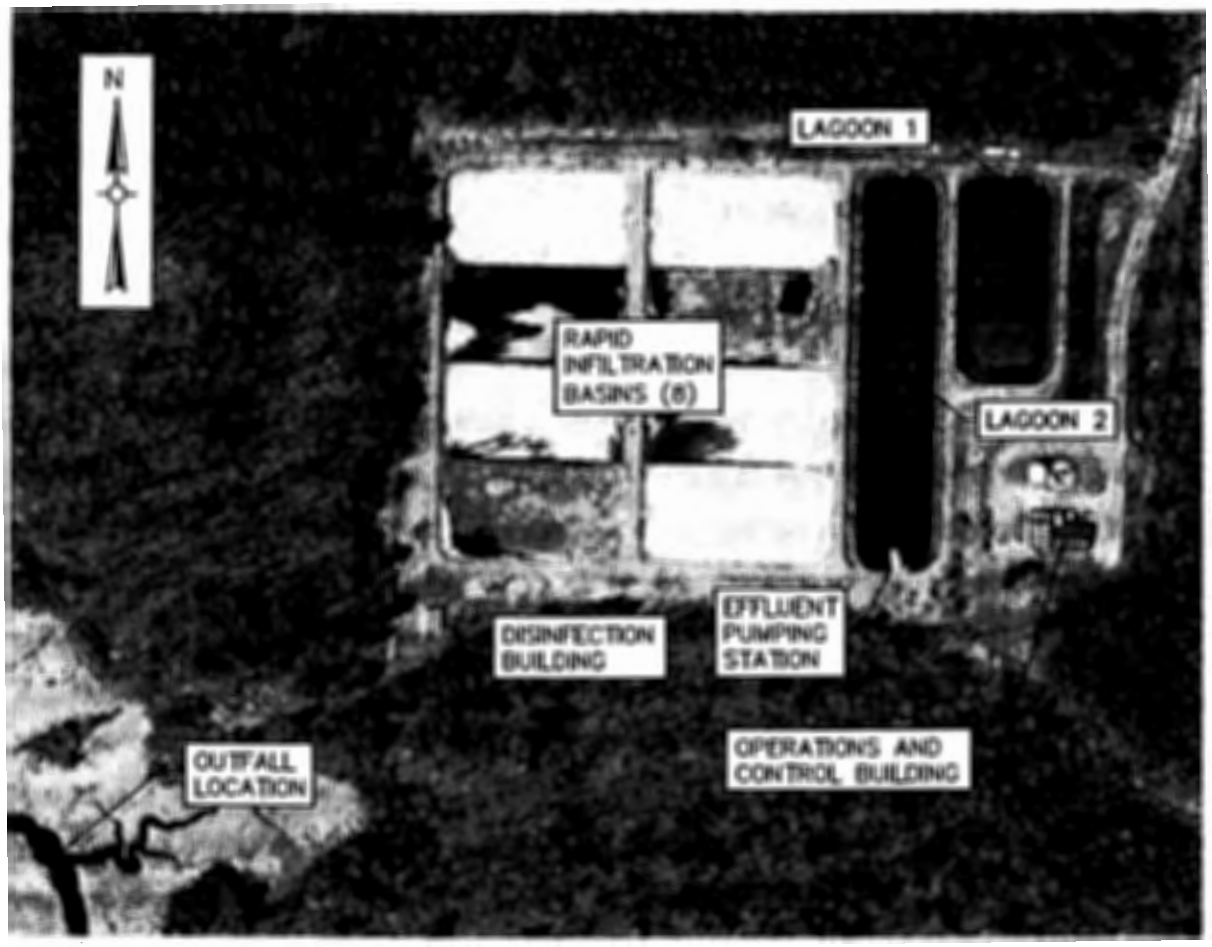
1.1 Description of Existing Facilities

The WWTP was constructed in 1986 and has a permitted design flow of 1.3 million gallons per day (mgd). Influent to the WWTP flows through a manual bar screen into Lagoon 1. Lagoon 1 has a surface area of approximately 54,000 square feet and a maximum depth of approximately 16 feet, providing an operational volume of approximately five million gallons. Lagoon 1 is subdivided into two cells by a float-supported baffle. From Lagoon 1, wastewater flows by gravity to Lagoon 2, which has a surface area of approximately 66,000 square feet, a maximum depth of approximately 16 feet, and an operational volume of approximately seven million gallons. Lagoon 1 and the first portion of Lagoon 2 are aerated using coarse bubble diffusers supplied by four fifty (50) horsepower blowers located in the WWTP building. No aeration is applied to the second portion of Lagoon 2 in order to facilitate solids settling and liquid separation.

From Lagoon 2, wastewater is pumped to one of eight (8) lined rapid infiltration basins, each of which has an approximate surface area of 55,000 square feet and an approximate 10 foot depth of sand over an underdrain system. Discharge to the basins is rotated to control biological growth within the basins and allows systematic maintenance. Filtered lagoon effluent is disinfected using ultraviolet disinfection,

reaerated through a gravity drop manhole, and discharged into a tidal creek that drains to the Merrimack River (Merrimack River Basin; State Code 84). Figure 1-1 shows the layout of the WWTP site.

Figure 1-1: WWTP Site Plan



A blower replacement project is currently ongoing at the WWTP. Three of the four existing fifty (50) horsepower blowers are being replaced by three seventy-five (75) horsepower high efficiency positive displacement rotary lobe blowers. The three new blowers have variable frequency drive systems that will enable them to operate at lower speeds during periods of reduced oxygen and mixing demands. Peak demands can be met using two new blowers, with the third acting as a redundant unit. Since space allowed, existing blower number 4 is also to remain in place as a second redundant unit.

1.2 Current Permit Requirements and Nature of Copper Violations

The WWTP was constructed under the Innovative/Alternative Grant Program and operates under NPDES permit number MA0102873 (the permit). This permit is administered by the Environmental Protection Agency (EPA) with the involvement of the Massachusetts Department of Environmental Protection (DEP).

The current permit became effective in 2008 and expired on January 1, 2013. The permit authorizes the Town to discharge its effluent from the WWTP to an unnamed tidal creek that drains to the Merrimack River, which subsequently flows into the Atlantic Ocean. The tidal creek at the outfall location is designated a Class SA waterway and the Merrimack River is designated a Class SB waterway.

In accordance with the permit Fact Sheet, EPA has established water quality limits for a number of constituents in accordance with water quality criteria and available dilution during the low flow condition commonly referred to as 7Q10. EPA and DEP define the 7Q10 flow as follows:

> *"The 7Q10 is the lowest observed mean river flow for seven consecutive days recorded over a ten year recurrence interval. For rivers and streams, Title 314 CMR 4.03(3)(a) requires that the 7Q10 be used to represent the critical hydrogeologic conditions at which water quality must be met."*

Although direct flow conditions have not been measured for the tidal creek since before the start of WWTP operations, EPA and DEP assert that low tide conditions produce a condition in which the only tidal creek flows can be attributed to the discharge. Such a condition results in zero dilution and an associated dilution factor of one (1). This factor is used by EPA to establish water quality based effluent limits. This is done by multiplying the water quality criteria by the dilution factor. In Salisbury's case, these values are obviously equivalent and therefore quite stringent.

Numerical and other critical permit limits are summarized in Table 1-1.

Table 1-1: Summary of NPDES Critical Permit Effluent Limits

Parameter	Item	Units	May 1 to October 31	November 1 to April 30
Flow	Average Monthly	mgd	1.3	1.3
Carbonaceous Biochemical Oxygen Demand	Average Monthly	mg/l	5	5
	Average Weekly	mg/l	7	7
	Maximum Day	mg/l	Report	Report
Total Suspended Solids	Average Monthly	mg/l	5	5
	Average Weekly	mg/l	7	7
	Maximum Day	mg/l	Report	Report
Dissolved Oxygen	Minimum	mg/l	6	6
Ammonia Nitrogen (May 1 – Oct 31)	Average Monthly	mg/l	5	Report
	Average Weekly	mg/l	7	Report
	Maximum Day	mg/l	10	Report
Total Copper	Average Monthly	µg/l	3.1	3.1
	Maximum Day	µg/l	4.8	4.8
Whole Effluent Toxicity (LC_{50})	Average Monthly	%	≥100	≥100
Whole Effluent Toxicity (Chronic NOEC)	Average Monthly	%	≥100	≥100

A permit renewal application was submitted to EPA and DEP in September 2012 after the completion of all mandated analytical monitoring and reporting. The package was deemed administratively complete in November 2012. Once a draft permit is issued, the Town and other interested parties are expected to review and comment on the permit terms prior to the issuance of a final permit. At present, the copper limits are uniform year round.

The prior permit did not have numerical limits for effluent Total Copper, but simply reporting requirements. The range reported by the Town during the prior permit period was between 7 µg/l and 26 µg/l. The new permit includes numerical Total Copper limits

as shown in Table 1-1 above. The permit indicates that these numerical limits were applied because copper in the WWTP effluent has the potential to exceed the water quality criteria.

In July 2011, EPA issued the AO to the Town, citing periodic violations of the ammonia nitrogen effluent discharge limit and consistent violations of the total copper effluent discharge limit.

The AO finds that since January 1, 2010, the Town has "consistently discharged wastewater containing total copper in excess of the effluent limits set forth in the NPDES permit". As required separately under the terms of the AO, Weston & Sampson previously submitted an Ammonia Nitrogen Removal Engineering Report (the Ammonia Report) on behalf of the Town that evaluated the potential causes of the ammonia nitrogen violations at the WWTP and identified potential corrective actions to improve ammonia nitrogen compliance. The primary means of achieving this goal was to investigate a change to a tidal discharge. Recognizing that Total Copper was also a pollutant of concern, this approach would also be beneficial to concurrently addressing this compliance issue.

With regard to recent permit compliance, reported effluent data between January 2009 and November 2012 has been compiled in the generation of Table 1-2 below. The majority of these values are directly from the permit-mandated monthly sampling activities. In addition, a number of results are also included from the AO-mandated copper sampling program that occurred between October 2011 and January 2012. The purpose of this program was to assist in the development of a mass balance of all WWTP copper loadings that is discussed in subsequent Report sections.

With regard to the collection of effluent samples, they are collected by WWTP operations staff using a composite sampler located in the disinfection building. The sampler is not hard piped but draws samples from the effluent piping through vinyl collection tubing. It is a Model 900 unit as manufactured by American Sigma and is in

good working order. Inspection of this arrangement does not indicate the presence of metal components that could be adversely impacting the reported Total Copper concentrations.

Table 1-2: Total Copper Effluent Data Summary

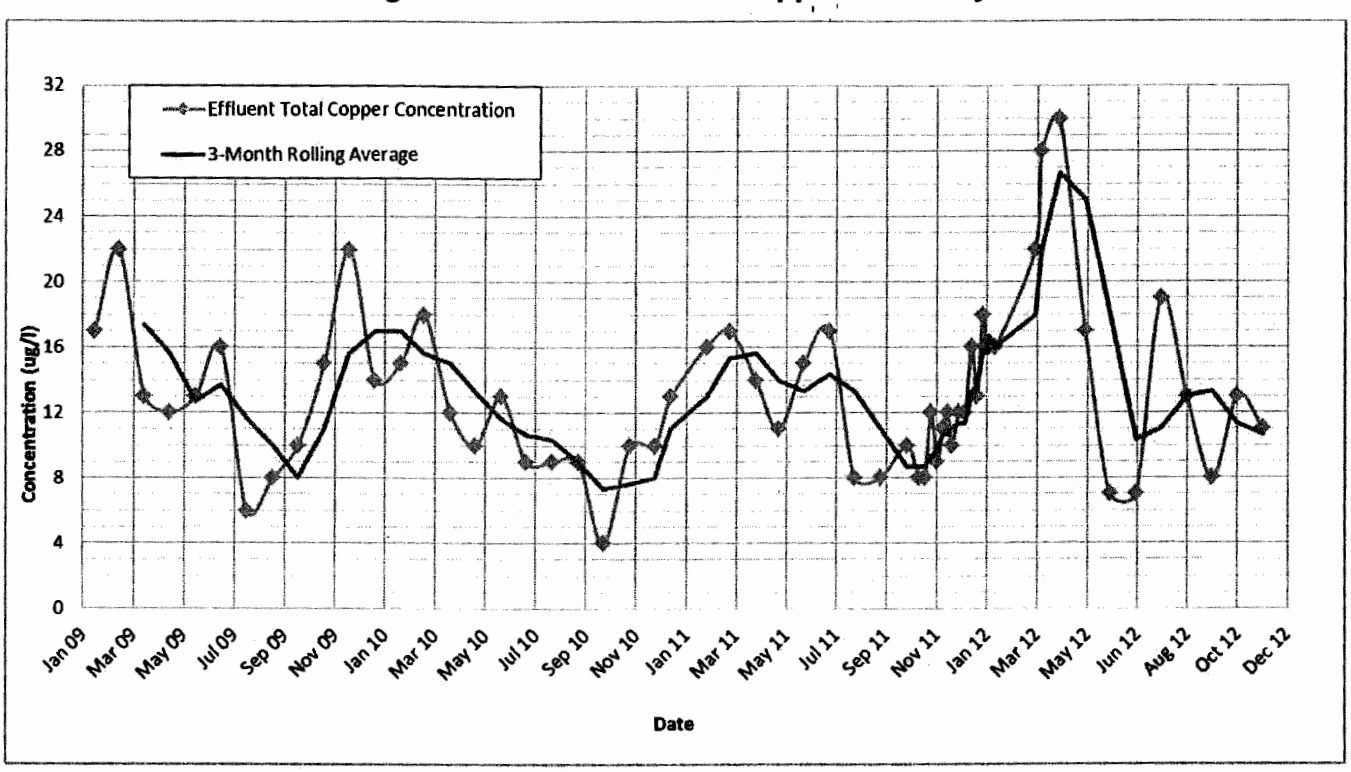
Year	Range of Monthly Averages	Mean of Monthly Averages
2009	6 - 22 µg/l	14.0 µg/l
2010	4 - 18 µg/l	11.0 µg/l
2011	8 - 18 µg/l	12.2 µg/l
2012 [1]	7 - 30 µg/l	15.9 µg/l

1. Samples analyzed in 2012 were collected between January and November.

Table 1-2 clearly shows the difficulties the Town has experienced with regard to achieving compliance with the 3.1 µg/l Total Copper limit. However, such compliance issues should be separate from any comparison of actual removal efficiencies. This is addressed in later sections of this Report, but it is important to clarify that the WWTP consistently achieves significant reductions in copper loadings prior to discharge.

In order to further assess the effluent data, the data points utilized to generate Table 1-2 were plotted for the same January 2009 through November 2012 timeframe. In addition to the raw data, a 3-month trailing average was also plotted to show seasonal and annual variations in copper removal. Refer to Figure 1-2 for this depiction.

Figure 1-2: Effluent Total Copper Summary



The 3-month rolling average, shown in red, indicates that the highest concentrations generally occur in late winter and early spring, with diminishing concentrations through summer and early autumn of each year.

As will be shown in subsequent Report sections, the majority of copper removal occurs in Lagoon 2 as solids are retained in the sludge. Given its dimensions and overall volume, Lagoon 2 exhibits characteristics more akin to a reservoir or lake than a treatment reactor. One of the ways this manifests itself is through lake turnover, or limnic eruption. This happens during a period of rising water temperatures. In the settled portion of the lagoon, this would result in the vertical conveyance of solids through the water column to downstream WWTP components. While the majority of solids would still be captured in the rapid infiltration basins and therefore not show elevated effluent TSS concentrations, dissolved copper would reach the effluent stream and be reflected in the sampling data.

1.3 Inventory & Mass Balance of Copper

In order to determine the process efficiencies related to copper removal through the WWTP, Paragraph III of Attachment A of the AO directed the Town to perform a copper sampling program in late 2011 that concluded in early 2012. This program was developed to establish a mass balance of influent and effluent loadings. Composite samples were collected from the following locations:

- Headworks/bar rack (influent).
- Outlet of Lagoon 1 (primary effluent).
- Outlet of Lagoon 2 (secondary effluent).
- Post-ultraviolet light disinfection (final effluent).

The full mass loading and balance assessment has been provided in Appendix A of this Report. A summary of data showing the mass balance based on the sampling program averages is provided in the tables below. Percent removal has been determined for each step in the treatment process.

Table 1-3: Copper Sampling Program Results
Average Loading Concentrations

Parameter	Units	Average Concentration
Influent Loading	µg/l	98
Primary Effluent Loading	µg/l	81
Secondary Effluent Loading	µg/l	22
Final Effluent Loading	µg/l	12

Table 1-3 shows the progression of copper levels from influent to effluent, through the plant processes. On average during the sampling program, the WWTP received 0.098

mg/L of total copper. Effluent copper averaged 0.012 mg/L. While this is above the permit limit, it is consistently below the interim limit of 0.025 mg/l imposed by the AO.

Using the data provided in Table 1-3, a Mass Balance was generated to understand the fate of the copper through the WWTP processes. These calculations were based on the average 0.738 mgd WWTP flow received during the days of program sampling. The results are shown in Table 1-4 below and on Figure 1-2, found on the next page.

Table 1-4: Copper Sampling Program Results

Mass Loading Basis

Parameter	Units	Average Loading	Percent Removal	Cumulative Percent Removal
Influent Loading	lbs/d	0.594	NA	NA
Primary Effluent Loading	lbs/d	0.500	15.8 %	15.8 %
Secondary Effluent Loading	lbs/d	0.132	62.0 %	77.8 %
Final Effluent Loading	lbs/d	0.075	9.6 %	87.4 %

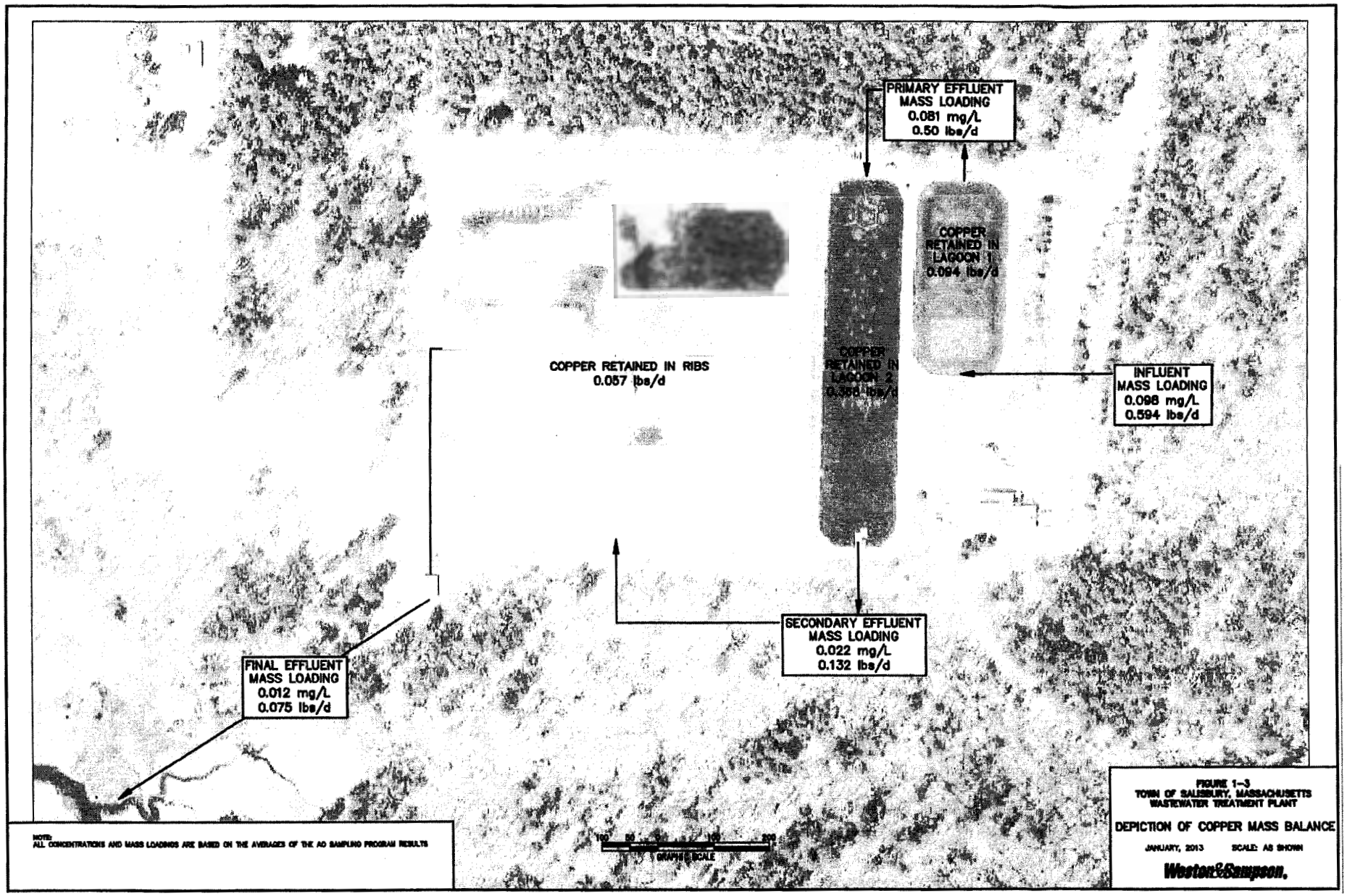

PRIMARY EFFLUENT
MASS LOADING
0.081 mg/L
0.50 lbs/d
COPPER
RETAINED IN
LAGOON 1
0.094 lbs/d
COPPER RETAINED IN RIBS
0.057 lbs/d
COPPER
RETAINED IN
LAGOON 2
0.358 lbs/d
INFLUENT
MASS LOADING
0.098 mg/L
0.594 lbs/d
SECONDARY EFFLUENT
MASS LOADING
0.022 mg/L
0.132 lbs/d
FINAL EFFLUENT
MASS LOADING
0.012 mg/L
0.075 lbs/d
NOTE:
ALL CONCENTRATIONS AND MASS LOADINGS ARE BASED ON THE AVERAGES OF THE AD SAMPLING PROGRAM RESULTS
100 50 0 100 200
GRAPHIC SCALE
FIGURE 1-3
TOWN OF SALISBURY, MASSACHUSETTS
WASTEWATER TREATMENT PLANT
DEPICTION OF COPPER MASS BALANCE
JANUARY, 2013 SCALE: AS SHOWN
Weston&Sampson.

Table 1-4 shows that the average copper loading is 0.594 pounds per day. Lagoon 1 is successful in removing, on average, 0.094 pounds per day, which is a 16 percent reduction. Lagoon 2 retained an average of 0.368 pounds per day of copper, which represents a 73 percent reduction from the loading received in Lagoon 2. Cumulatively, Lagoon 1 and Lagoon 2 reduced the copper loading by 78 percent.

Between secondary effluent and final effluent, the rapid infiltration basins, on average, reduced the copper load by another 10%, which correlates to an average loading reduction of 0.059 pounds per day. Through the WWTP, a total average reduction is 0.519 pounds per day of the original 0.594 pounds per day mass loading. This accounts for an overall 87.4 percent removal efficiency.

1.4 Allowable Copper Loading

The permit includes an average monthly Total Copper limit of 3.1 µg/l. When considering the allowable copper loading, two approaches were utilized. The first assumes an equivalent mass loading reduction and applies it to the required effluent loading to calculate the maximum influent loading. Based on the sampling data presented above and in Appendix A, and assuming the same 87.4 percent removal efficiency, the maximum copper loading that would enable the WWTP to achieve permit compliance would be 0.151 pounds per day. Based on the average flows received at the WWTP during the sampling program, this corresponds to an influent copper concentration of 24.6 µg/l.

The second approach assumes that the influent loading requires constant and determines the additional removal efficiency that must be provided by the WWTP to meet the effluent permit limit. Applying the average influent copper concentration of 98 µg/l and the average month 3.1 µg/l permit limit, a removal efficiency of 96.8 percent would be required for compliance.

This additional 0.053 pounds per day of copper loading equates to an 11 percent removal efficiency improvement. For comparison purposes, 0.053 pounds is less than one ounce.

1.4.1 Reduction Methods

In order to remove the required 96.8 percent of the influent copper loading, the Town needs to implement process changes that can provide such removal efficiencies, or reduce influent loadings such that existing processes can be relied upon to achieve permit compliance. The third alternative is to re-establish water quality criteria and associated permit limits so that the existing process can continue to be utilized.

These approaches are addressed in subsequent Report sections.

2.0 DISCRETE COPPER SOURCE INVESTIGATIONS

Investigation of the source of the copper entering the wastewater stream is required to enable the evaluation of reduction alternatives. The wastewater in the Town is nearly all sanitary waste streams from residential and commercial users with minor contributions from industrial users. The source of the copper within the sanitary waste was investigated by looking at the raw water supply quality, drinking water treatment chemicals, distribution system materials, residential plumbing materials, and residential chemical disposal.

Insignificant or non-existent sources of copper include industrial discharge, septage, leachate, other hauled waste, POTW side-stream and internal process flows. The most significant source of copper was found to be the raw well water supply for the Town's drinking water system.

2.1 WATER SUPPLY

2.1.1 Water System Overview

The Salisbury Water System is owned by the Town of Salisbury and currently operated by Pennichuck Water Service Company. The water system consists of the following components:

- Three groundwater sources (Well #5, Well #6, and Well #7).
- Emergency interconnections with Amesbury and Seabrook.
- 52 miles of distribution system piping.
- One booster pump station.
- Two water storage tanks.

The system serves 95 percent of the Town. The Town of Salisbury is mainly a residential community with seasonal waterfront residents and supporting commercial businesses. Land use in Salisbury is broken down by category as shown in Table 2-1 below:

Table 2-1: Land Usage Categories as Compared to Assessor Parcel Allocation

Type of Use	Land Area (as percent of total town area)	Portion of Parcels (as percent of total number of parcels)
Residential	33.3	74.7
Commercial	7.0	5.4
Industrial	0.8	0.5
Agricultural	6.5	1.0
Public & Non-Profit	21.3	2.7
Vacant	31.1	15.7

The values for the table summarizing types of land uses were obtained from the Salisbury Master Plan 2008.

The metered water usage in Town is reported to the Massachusetts DEP each year in the Public Water Supply Annual Statistical Report. A summary of metered water usage categorized by type of use is displayed in Table 2-2.

Table 2-2: 2011 Metered Water Usage

Type of Use	Number of Metered Water Users	Metered Water Consumption (MG/Year)	% Water Use
Residential	3240	166.66	72.4
Commercial / Industrial	217	46.82	20.4
Municipal / Non-Profit	20	16.61	7.2
Totals	3477	230.07	100.0

In addition to metered water usage, water is used for firefighting, water main flushing, treatment, and water main breaks.

2.1.2 Water Quality and Copper Levels

The water quality of the drinking water provided to the Town of Salisbury was investigated as a source of copper loading to the WWTF. Table 2-3 displays water quality data for each Salisbury Water System source. Emergency interconnections exist with the Town of Amesbury and Town of Seabrook, NH. These are used intermittently and have not been used in the last year. Due to the infrequent contribution to the Salisbury Water system from interconnecting Towns, the water quality of those systems was not investigated.

Table 2-3: Raw Drinking Water Quality

Parameter	Units	Well #5 & 6	Well #7	Secondary MCL
Total Copper	mg/l	0.195	0.104	1.0 mg/l
pH	S.U.	7.13	6.9	6.5 - 8.5
Alkalinity	mg/l	79.6	112	None
Hardness	mg/l as $CaCO_3$	80.7	163	None
Chloride	mg/l	212	53	250
Sulfate	mg/l	15	30	
Total Dissolved Solids	mg/l	500	216	500

The data in Table 2-3 was obtained from the 2012 Drinking Water Quality Report prepared by Pennichuck Water Service Company.

The raw water quality of the wells shows that levels of copper in the source water exceed the permit limit of 3.1 µg/l Total Copper regularly. More importantly, however, the raw water copper levels equal or exceed the influent copper levels recorded at the WWTP. The raw water pH, alkalinity, and hardness indicate low potential for corrosive water. However, the high dissolved solids directly correlate to a high conductivity which

can contribute to the electro-chemical corrosion process. Also, the ratio of alkalinity to the total chlorides and sulfates, known as the Aggressiveness Index, is well below the recommended value.

The raw water is pumped from the wells to the water distribution system. To sequester iron and manganese and inhibit corrosion in the distribution system, chemicals are injected in the well discharge piping. The treatment consists of chemical addition to adjust pH and sequester manganese. Water quality data indicating the level of copper in the drinking water at the point of use (POU) is provided in Table 2-4 below. The copper level recorded is the 90 percent level, indicating that 10 percent of the samples tested are above that level and 90 percent were below that concentration.

Table 2-4: Point-of-Use Drinking Water Quality

Year	90 Percent Copper (mg/l)
2011	1.25

The data in Table 2-4 was obtained from the 2012 Drinking Water Quality Report prepared by Pennichuck Water Service Company. The Salisbury Water System is in compliance with the requirements of EPA's Lead and Copper Rule.

2.1.3 Drinking Water Corrosion Control Evaluation

As shown in Table 2-4, the Salisbury Water System delivers water to residential taps which contains copper at levels above the current WWTP permit limit of 3.1 µg/L. In addition to copper naturally occurring in the water supply, leaching of copper within the distribution system contributes to copper loading at the WWTF. The corrosiveness of the distribution system water, along with the piping materials, level of stagnation at the testing location, and distribution system conditions contribute to leaching of copper from plumbing materials. Note that the monitoring of copper levels within the distribution

system is limited to fixed sample locations selected for the Lead and Copper Rule compliance monitoring and reporting is limited to a single 90th percentile value.

The Salisbury Water System employs corrosion control treatment in the form of pH adjustment using potassium hydroxide. A zinc polyphosphate chemical is used to sequester manganese in the raw water. Using the limited water quality data available, the corrosiveness of the drinking water was investigated using the Rothberg, Tamburini & Winsor (RTW) Model for Water Process and Corrosion Chemistry, Version 4.0 desktop computer model. The RTW model is an EPA-approved tool for evaluating corrosivity in water systems.

Based on Table 2-3 and the RTW model results, the water supplies for the Town are not highly corrosive to most metals, but may be considered aggressive. While not an indicator of an actively corrosive water, aggressive waters are thought to inhibit the formation of a protective calcium carbonate layer on piping systems. The pH of the three water supply wells is approximately 7.0 prior to treatment. The alkalinity of Salisbury's raw water is considered sufficient to buffer the water and maintain consistent water quality in the distribution system, indicating a stable water. If alkalinity is not sufficient to buffer the water, then the pH may vary widely within the distribution system and cause varying levels of pipe material leaching. The current phosphate chemical was selected to sequester iron and manganese and may not inhibit copper pipe corrosion. There are many different phosphate chemical blends that produce different levels of corrosion protection based on the unique chemistry of each water system.

To further evaluate the effectiveness of the water system's corrosion control treatment, a raw water and distribution system water quality monitoring program could be developed. The parameters of interest are pH, alkalinity, temperature, Hardness, chlorides, sulfates, and total dissolved solids, as well as chlorine dosage, chlorine residual, and treatment chemical dosages. Targeting a higher pH, alternate pH adjustment chemicals and corrosion control chemicals would be evaluated and bench tested using Salisbury raw water. Water quality of the treated samples would be evaluated using desktop modeling. Bench scale testing of the recommended changes,

if any, could be performed. The results of the study would provide recommendations for optimization of the corrosion control treatment through chemical changes or dosage adjustment.

Optimizing the corrosion control treatment could reduce copper leaching from plumbing systems, thereby reducing the copper load to the WWTF. However, the copper levels at the influent of the WWTF are similar to the levels recorded at the wells, indicating that copper is not significantly leached into the distribution system water. The primary source of the copper loading appears to be the raw well water.

2.2 Evaluation of Industrial Users

The Town of Salisbury WWTF receives waste from mainly residential and commercial users. In addition, any miscellaneous industrial users have separate plumbing systems to handle these waste streams and therefore discharge to the collection system wastewater having characteristics of domestic waste streams. There are no known industries in Salisbury that discharge industrial wastes containing copper in concentrations differing from their residential and commercial counterparts.

2.3 Local Limits Evaluation

The Town allows connections to the public sewer in accordance with federal and state law as well their local bylaw. Chapter 209 of the Town's General Bylaws regulates the connection and use of the sewer system. This bylaw has been updated and modified as appropriate since its inception in the 1980's.

Section 209.8 pertains to the use of public sewers and speaks, in part, to prohibited discharges. This includes numerical limits for metals based on both concentration and mass loading bases. For total copper, the maximum day local limit is 2.7 mg/l or 0.058 pounds per day. Based on a maximum day concentration limit, the mass loading corresponds to 2,500 gallons per day as originating from an industrial user.

Although a number of communities utilize an allocation method for distributing the maximum pollutant loading across an industrial user base, Salisbury's lack of industrial users preclude this approach. In addition, there are no known users that discharge copper at a concentration more than the typical residential or commercial customer. For this reason, it is not recommended to develop local limits at this time. However, should the customer base change in the future to include such users, the sewer bylaw and associated local limits will likely need to be re-assessed at that time.

2.4 Technology/Pretreatment Evaluation & Pollution Prevention Evaluation

Although a number of communities would require a detailed analysis of industrial users and the need for pretreatment standards to be developed at the individual user level, the lack of such users in Town makes the need to develop these standards unnecessary at the present time.

2.5 Septage, Leachate, and Other Hauled Wastes

The Town does not receive septage, leachate, or other hauled wastes at the WWTP. To date, the Town has not expressed an interest in expanding their user base in this manner; therefore, process change alternatives or any other accommodations to better position the WWTP to manage such changes are not included in this Report.

2.6 Household Domestic Wastes

When considering the use of copper-containing products in Salisbury, it is important to consider what household products typically contain copper and whether there is a significant need or demand for such products in Salisbury. In general, household cleaning products do not contain copper. Instead, copper is included as an active ingredient in herbicidal and fungicidal products and in fertilizers.

As previously discussed, the Town constructed the WWTP in 1986. The sewer collection system was installed concurrently to convey sewage from individual service

connections to the WWTP. Since the initial round of sewer system construction contracts, a number of more recent extensions have been installed to serve a broader user base.

Gravity mains are primarily polyvinyl chloride (PVC) pipe, and pressurized (force) mains are either ductile iron (DI) or PVC pipe. These mains have fewer joints than materially used in prior generations of construction, such as vitrified clay and asbestos-cement pipe. The joints of PVC and DI pipe of this vintage are also gasketed. When properly constructed, these pipe features not only drastically reduce infiltration but minimize root intrusion, two problems that plague older sewer systems throughout New England.

Discussions with Town staff indicate that sewer blockages are almost exclusively the result of fats, oils, and grease (FOG) blockages, most often at commercial establishments experiencing excessive FOG generation. Infiltration and inflow studies have primarily taken the form of closed circuit television inspection of sewer mains. These studies have identified pipe defects that warranted rehabilitation. These defects are generally separated joints between service connection chimneys and the main in tidal areas that are devoid of vegetation having deep root structures.

These factors have enabled Salisbury to avoid root intrusion into their mains, thereby minimizing sewer blockages and the need for such products to be introduced into the waste stream. The minimal use of such products does not necessitate the consideration of a ban on sales or usage at this time.

3.0 POTW MODIFICATIONS

As directed by the AO, this section of the Report focuses on identifying available options for implementing controls to achieve full compliance with the Total Copper limit of the permit. While a number of items pertaining to source control have been addressed in Section 2, options targeting WWTP treatment optimization and modifying the permit limit are discussed herein.

The sections below are divided by the general type of work and the specific steps to be taken by the Town. Potential control strategies are also addressed in Section 4.

3.1 Existing WWTP Removal Efficiency

As discussed in Section 1.3, influent loadings to the WWTP averaged 98 µg/l over the study sampling period. This correlates to an average mass loading of 0.594 pounds per day. Based on the average 12 µg/l discharge concentration determined for the same sampling period, the WWTP is removing 87.4 percent of the total copper loading. As determined by the previously-described mass loading analysis, the majority of the copper is captured in the settled sludge within Lagoon 2. This mass is ultimately removed and disposed of during periodic sludge removal contracts. The Town has removed sludge several times since the WWTP was originally constructed; the most recent event was in 2011.

Assessment of copper sources and control of such sources was discussed in Section 2 of this Report. It appears likely that major sources of copper outside of the potable water supply do not exist, but the Town intends to continue to consider any other sources moving forward.

These include not only corrosion control measures utilized by Pennichuck Water Services Company, but also closely evaluating new sewer users as connections increase. This is of particular importance in the Fanaras Drive area of Town, to which sewer was extended in 2008. Parcels in this area are zoned industrial, and while

connections to date do not produce industrial wastewater, this possibility exists in the future.

3.2 Quality Assurance/Quality Control for Sampling and Testing

Effluent Total Copper samples are collected in accordance with the permit. This entails the collection of a 24-hour composite sample consisting of at least 24 individual grab samples within a consecutive 24-hour period. These grabs are combined to produce a single composite that is transported utilizing standard chain of custody protocol and tested at an independent certified laboratory.

The Total Copper limit requires a single composite sample per month. Accordingly, this means that the sample result represents both the maximum daily and average monthly result.

Collection and handling procedures have been reviewed with Town staff and have been deemed appropriate for the pollutant. Results have been relatively consistent since the imposition of a numerical Total Copper permit limit. Based on a review of these procedures and historic information, it appears that the reported concentrations are an accurate reflection of copper removal through the WWTP.

3.3 Potential Operational Changes

With the present level of copper removal quantified and compared to that necessary for permit compliance, the below section is intended to evaluate operational changes that may produce greater copper removal or achieve compliance through more unconventional approaches.

Since this Report is the second major deliverable required by the AO, a number of items to be discussed are considered in parallel with those measures identified in the ammonia-nitrogen report. This approach is intended to provide an "economy of scale" to future activities with dual goals of achieving permit compliance with both pollutants of concern.

Each activity may be implemented alone or in tandem with other options; however, some upgrades are likely to be redundant. All upgrades would require a design and permitting effort, as well as construction delivery method and construction phase services. The potential upgrades have been listed in order of priority, with the most easily implemented upgrades given highest priority.

Before undertaking upgrades to the WWTP, a preliminary plan or design, as appropriate, will be developed to identify short-term work to be undertaken and describe the proposed work and schedule. After review by the Town, this preliminary design will be presented to EPA and DEP for discussion.

3.3.1 Process Sampling

In accordance with the requirements of the NPDES permit, current sampling at the WWTP is conducted as necessary on the WWTP influent and effluent. However, understanding the processes occurring within the WWTP requires additional monitoring. The sampling program shall be designed with input from the WWTP operational staff. Sampling points are expected to include the outlet of both Lagoon 1 and 2, and perhaps at the midpoint of each lagoon as well. Sampling parameters shall include, at a minimum, total and dissolved copper, temperature, BOD_5, TSS, ammonia-nitrogen, nitrate, nitrite, DO, pH, and alkalinity. Samples shall be collected concurrently with weekly permit samples.

The ammonia-nitrogen report also discussed a seasonal program that collects data relative to inhibitory compounds such as formaldehyde-methanol, paraformaldehyde, phenol-based compounds, and quaternary ammonium. The purpose of this specialized program is to ascertain whether such compounds are present in WWTP influent during periods of state reservation activity and would reflect the presence of chemicals found in RV holding tanks.

In the case of the copper samples, this data will be tabulated in a manner that refines the mass balance analysis presented in Section 1. Any program will continue through full scale optimization to assess the effectiveness of all measures undertaken.

3.3.2 DCR Activities at the Salisbury Beach State Reservation

The Salisbury Beach State Reservation has been under state control for over 50 years and now includes 484 seasonal camp sites. The reservation is officially open between April and Thanksgiving weekend each year, but the peak season is typically mid-May through mid-October. The reservation is connected to the Salisbury sewer system and conveys all dump station waste to the municipal system.

The reservation benefits from a highly attractive location and provides a host of amenities. Coupled with a modest rate structure, the reservation generally has more than 400 recreational vehicles onsite during the peak season.

In 2011, shortly after receiving the AO, the Town considered how their user base could be impacting permit compliance. After determining that the industrial base was as discussed in prior Report sections, the reservation was identified as a potential source of high pollutant loads. Several grab samples were taken from a location immediately downstream of the DCR connection point and analyzed for a number of pollutants. Given the nature of these RV holding tanks and stabilizing/odor control products, of primary concern was ammonia-nitrogen and phenolic compounds, the latter of which can inhibit the biological nitrification reactions necessary to meet the WWTP's ammonia-nitrogen limit. It was determined through this limited sampling that DCR was in violation of the influent phenol limit defined in the sewer bylaw.

Once DCR was made aware of the violations, reservation management sought funding to conduct a study of their operations and make recommendations to meet the bylaw. In the fall of 2012, the Town and their representatives met with DCR and their consultant, Coneco Engineers & Scientists, to discuss the nature of the violations and

reservation activity and tour the DCR facility. The Town intends to remain engaged with all parties as they continue to resolve these issues.

3.3.3 Chemical Precipitation

As assessed previously, the concentrations of copper conveyed to the WWTP are relatively low, averaging far less than one part per million. Based on the AO-imposed sampling program, the WWTP is removing approximately seven of every eight parts present in the waste stream. So any additional reduction technique needs to be able to access and capture that last 1/8th of the mass currently reaching the salt marsh as part of the effluent flow.

One means of improving this performance is through the addition of a metal salt to chemically remove soluble and insoluble nutrients or metals from solution. Once drawn out of solution, these solids may be sequestered and removed from the waste stream, usually in a manner consistent with existing biological processes.

Full scale usage is dependent on multiple factors, including:

- Effectiveness of improving pollutant removal.
- Possible process implications.
- Sludge production and energy demands.
- Storage, handling, and safety considerations.
- Cost and availability.

Compounds such as aluminum sulfate, ferric chloride, or ferric sulfate have been used at water and wastewater facilities for this purpose. Since each has unique positives and negatives, the most appropriate method to determine whether this or other compounds would work is to perform bench scale testing.

A bench scale testing program will be developed to evaluate the effectiveness of using a chemical precipitant to remove soluble and insoluble copper to levels below the permit

limit. This planning also needs to consider full-scale impacts. These impacts include issues such as whether:

- The use of ferric chloride or ferric sulfate is expected to negatively impact the disinfection process by coating the ultraviolet light disinfection equipment.
- Discharge limits need to be re-assessed as a result of using an aluminum-based coagulant. Many Massachusetts water bodies have been deemed aluminum impaired, so the use of aluminum-based compounds needs to be fully considered before implementation.

The program will be prepared and submitted to EPA for approval prior to beginning work.

Testing will be completed using primary effluent, which will likely be taken from the influent end of Lagoon 2. This location may be most appropriate since the wastewater remains under aeration, which is critical to ensure full contact between the precipitant and the wastewater, but also includes the final settling zone prior to pumping to the RIBs. It is within this quiescent zone that most organic solids are removed, and the mass balance analysis described in Section 1 indicates that this is also the case with regard to copper removal.

Under controlled conditions, samples are collected and mixed with varying concentrations of precipitants. Samples are then allowed to settle, at which point laboratory samples are prepared of both the settled sludge and supernatant to develop the individual and cumulative mass balance for all samples. Control samples are also generated to insure against the development of faulty data points.

Another component to the program will be the consideration of polymer. Anionic polymers are often used as a polishing step to improve performance of coagulants. As the optimal coagulant compound and dosage is being established, a dosage of polymer will be added to samples with removal efficiencies measured.

At the conclusion of the program, a testing report will be prepared that:

- Determines whether a specific coagulant is suitable for use on a full scale basis and makes a formal recommendation to either implement new chemical feed systems or consider other alternatives.
- Quantifies estimated removal rates and compares those rates to the permit limit
- Develops preliminary estimates of required dosage volumes, the location of the chemical injection points, and mixing requirements to ensure full introduction into the waste stream.
- Estimates of additional sludge production and discusses how this additional waste load will be accommodated without causing other process difficulties.
- Prepares conceptual plans showing the location of these new chemical feed systems and how they will be housed and accessed on the WWTP site.
- Estimates planning level costs for the design, construction, and operation of these new treatment processes and support systems, including electrical supply, instrumentation needs, and structural enclosures.

Based on the average concentrations measured during the copper sampling program, it is reasonable to expect that the use of a chemical coagulant would improve copper removal. However, until a bench testing program is completed, it cannot be determined whether this process optimization will achieve permit compliance for the Town.

3.3.4 Lagoon 2 Modifications

Since the majority of the copper is removed through the settling of sludge, energy reduction in the unmixed zone is critical to achieving improved copper removal. Accordingly, the installation of a partition or other energy dissipating device within Lagoon 2 could significantly aid in the removal of solids and associated copper loads prior to transfer to the RIBs.

The location and geometry of such a partition or energy mitigating structure will require further consideration, but may provide benefits for a relatively low capital cost.

Additional details will be established as part of the bench scale testing efforts described above.

Any system will also need to be designed in a manner that will:

- Be effective over a wide range of flow conditions, including significant storm peaks
- Not produce anaerobic or anoxic conditions that might cause other deleterious effects such as sludge bulking
- Not hinder future sludge removal activities

3.4 Tidal Discharge

In the ammonia-nitrogen section of the AO, the Town was directed to consider extension of the WWTP effluent outfall in order to achieve greater dilution and potentially reduce the effluent permit limits. While this did not explicitly apply to the copper report, this approach represents a reasonable possibility of achieving permit compliance for both the ammonia-nitrogen and Total Copper and therefore warrants inclusion in this Report as well. It also should be noted herein that the WWTP was originally designed to discharge on a tidal cycle as a means of achieving the same objective of greater dilution. Several discharges in New England have been permitted by EPA Region 1 and delegated states for tidally-timed discharges.

The existing outfall discharges to a tidal creek that varies significantly in volume and velocity over the course of the day due to the influence of the tidal cycle. The WWTP has a significant storage capacity due to its lagoon volume and discharging effluent only during periods when the tide is high would provide greater dilution in the receiving water without requiring significant modifications to the WWTP or its operations.

Despite its original design, the WWTP has never been operated on a tidal cycle due to the EPA's earlier decision to maintain a dilution factor based on stream flow during low tide, regardless of effluent discharge timing. However, the AO offers an opportunity to

reevaluate this option and initiate a new discussion with EPA regarding the basis of their requirements.

3.4.1 Work Plan Development and Approval

Evaluating the impact by tidal discharge on dilution in the receiving waters will require a comprehensive study by specialists. A Work Plan will be developed to describe the required data and analyses and the field studies required to gather the data. It appears that two potential approaches to the study are available. In the first, a field study using tracer dyes to measure actual dilution at the existing outfall would be conducted at times selected to represent tidal cycle effects in the receiving water as well as seasonal changes.

The second option would be to collect data on flow and bathymetry of the receiving stream in order to construct a computer model of the stream, allowing virtual evaluation of a variety of scenarios. Although these methods are not mutually exclusive, it will be necessary to further analyze the costs and benefits of each approach before finalizing the Work Plan.

After review by the Town, this Work Plan will be presented to EPA and DEP for discussion and approval to ensure that work undertaken is consistent with the data needs and policies of the regulatory agencies. It is important to note that this plan will be integrated into the ammonia-nitrogen study so a solution to both pollutants may be identified.

3.4.2 Dilution Factor Study

Following approval by the regulatory agencies, the Work Plan will be implemented to collect data and study the potential impacts of tidal discharge on dilution in the receiving waters. Depending on the method selected to conduct the study, the work may consist of a series of field work periods followed by data analysis, or a shorter initial period of field work followed by a longer period of modeling. The results of the Work Plan will be

used to assess the environmental impact associated with effluent discharge at various points in the tidal cycle.

3.4.3 Design and Construction

In order to implement tidal discharge from the WWTP on a pilot basis, the controls and instrumentation included in the original construction of the WWTP must be evaluated for viability. It is anticipated that much of this equipment will require replacement due to its age. The controls and instrumentation are required in order to monitor the tidal cycle, automatically discharge effluent during the selected portion of the tidal cycle, and activate alarms and other emergency measures when high flow conditions in the lagoons require immediate discharge.

3.5 Outfall Extension

The extension of the WWTP outfall to achieve greater dilution in the receiving water is an option identified by the EPA during the development of the ammonia-nitrogen report. Due to the cost and time associated with designing, permitting, and constructing the extension, tidal discharge has been identified as a practicable, low impact alternative option. If the dilution factor study resulting from the tidal discharge trial is successful, this method will be proposed to EPA in place of outfall extension. If the tidal discharge approach is not approved as an alternative, outfall extension will be considered further. This approach will be vetted through EPA and DEP with the development of an approvable work plan.

3.5.1 Design and Construction

The first step in designing the outfall extension will be selection of a route for the new outfall pipe. A route will be selected based on factors such as the ownership of parcels to be crossed, the number and length of required stream crossings, and any permitting issues identified along the potential routes. Preliminary assessments show that the total extension length is likely to range from 2,000 feet to 2,500 feet depending on the selected route. In addition to the route, the best method of installation will need to be

selected, in particular whether the pipe will be installed using trenchless or conventional open-trench methods.

3.5.2 Permitting

In advance of final design, a major permitting effort will be needed to allow the construction of the outfall extension. Based on preliminary analysis, the anticipated area of impact will trigger requirements for the following permits:

- Notice of Intent to the Salisbury Conservation Commission for work in wetland resource areas, 100-year flood zone, and 200-foot Riverfront Protection Area
- Project review by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) for work in species habitat
- Chapter 91 license from Massachusetts DEP for placement of a new structure in a tidal waterway
- Army Corps of Engineers permit for fill/excavation in navigable waters
- Water Quality Certificate for fill within NHESP habitat.

The total time required to submit and obtain the required permits is expected to range between 12 and 18 months. At this time an Environmental Notification Form (ENF) is not expected to be required as the proposed work appears to fall below the required thresholds. However, an ENF could be triggered by the decision of the agencies involved, for instance if NHESP determines that the construction will be considered a "take" of NHESP habitat. Triggering an ENF will extend the required permitting period and increase the permitting cost.

3.5.3 Dilution Factor Study

As with the evaluation of tidal discharge, evaluating the potential impact of extending the outfall will require a comprehensive study by specialists. The study is expected to follow the same general outline as the proposed dilution study for tidal discharge and be merged with the ammonia-nitrogen study. A work plan will be developed to describe the required data and analyses and the field studies required to gather the data. After

implementing this work plan, data analysis and water quality modeling will be used to assess the environmental impact associated with effluent discharge at the prospective new discharge location or locations. This includes the consideration of mixing zones for the establishment of a site specific water quality copper criterium.

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4.0 RANKING OF SOURCES AND CONTROL STRATEGIES

The following section summarizes copper sources, considers the reduction potential of previously-identified alternatives, and establishes a schedule for implementation.

4.1 Copper Source Summary

Section 2 addresses sources of copper and how the mass loading is received, stored, and discharged at the WWTP. The copper load has been determined to originate at the municipal potable water supply sources and does not appear to be elevated through the water distribution system or user base prior to reaching the WWTP.

Additional anti-corrosion methods will be reviewed with the water system operator, but this is not expected to reduce influent copper loads.

It is recommended that top priority be given to implementing the compliance options described in Sections 3.3.1, 3.3.3, and 3.3.4. These options involve:

- Wastewater sampling, which dovetails with a similar sampling program recommendation in the ammonia-nitrogen report.
- Planning of a bench scale testing program.
- Evaluation of modifications to Lagoon 2 that may be necessary if chemical feed systems are ultimately installed upstream.
- The development of a work plan to study the change in WWTP process to allow a tidal discharge, and the associated change in dilution factor.

Coordination with DCR on their efforts at the Salisbury Beach State Reservation is also discussed in Section 3.3.2; this work is expected to be ongoing.

Following initiation of the sampling efforts, investigation of tidal discharge as discussed in Section 3.4 shall begin. This approach was also recommended as part of achieving

compliance with the permit's ammonia-nitrogen limit; since this effort has not yet begun, it is prudent to build a program that satisfies both commitments concurrently.

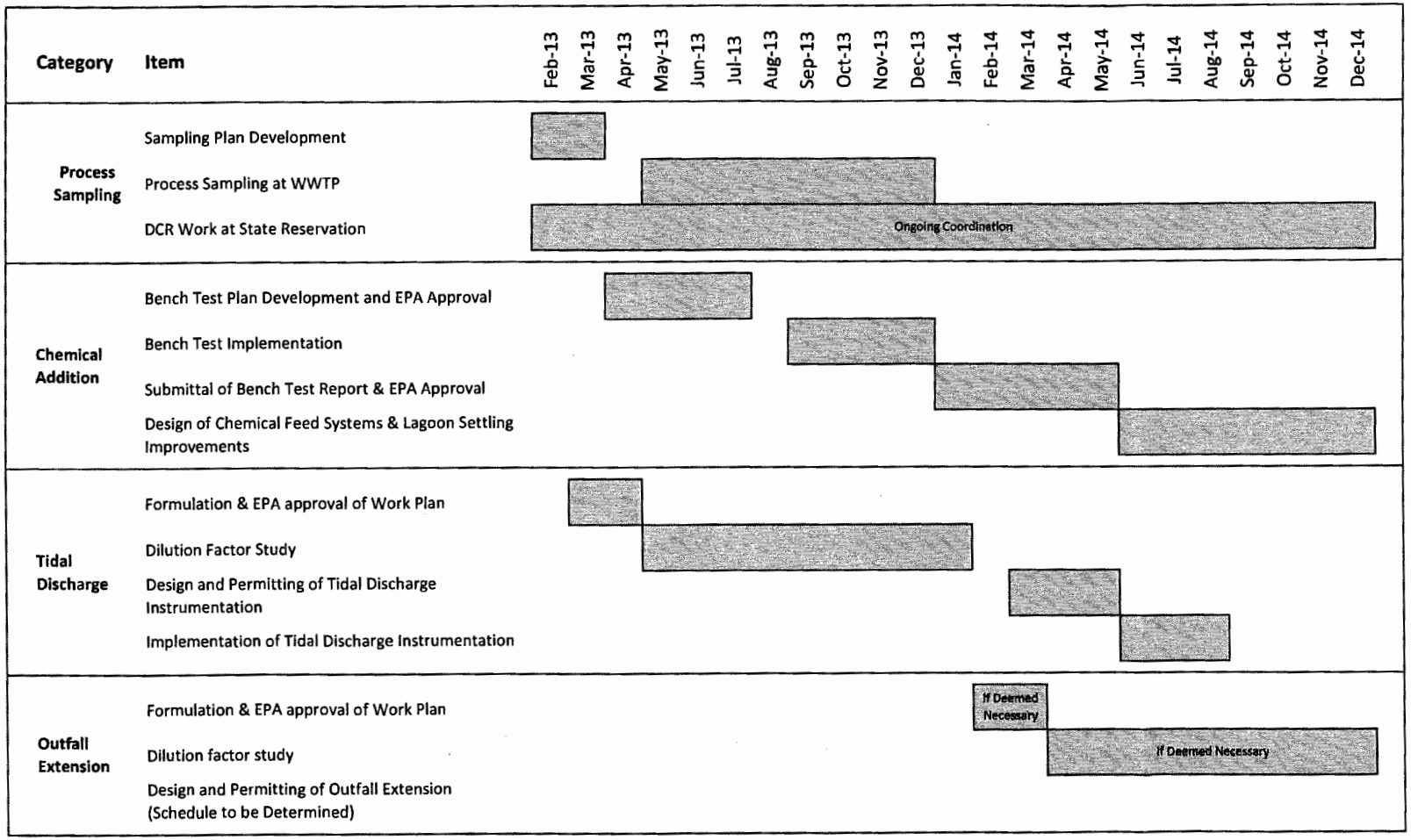
A tidal discharge can be implemented on a full-scale pilot basis with only minimal modifications to the WWTP's controls and instrumentation. This differs greatly from the outfall extension, which will require a major permitting and construction effort. If, during the development of the Work Plan on tidal discharge or the ensuing dilution factor study, it is determined that tidal discharge is not a viable option, the outfall extension option will be advanced in accordance with a mutually beneficial compliance schedule.

4.2 Proposed Schedule

Table 4-1, provided on the following page, summarizes the proposed implementation schedule for the items discussed above. It is important to note that a schedule cannot be set for a number of items because the selection and implementation of several alternatives is dependent upon the results of alternatives deemed a higher immediate priority or as part of parallel efforts associated with improving ammonia-nitrogen reduction performance.

The Town is prepared to discuss both report schedules with EPA prior to their approval and integration into the AO.

Table 4-1: Implementation Schedule



APPENDIX A

Copper Sampling Program Results

Copper Sampling Program & Mass Balance Analysis

Sampling Date	Influent Data			Primary Effluent			Secondary Effluent				Final Effluent			
	Flow	Copper Concentration	Copper Loading	Copper Concentration	Copper Retained in Lagoon 1	Percent Removal from Lagoon 1, Mass Loading Basis	Copper Concentration	Copper Retained in Lagoon 2	Percent Removal from Lagoon 2	Percent Removal, Lagoons 1 & 2, Mass Loading Basis	Copper Concentration	Copper Retained in RIBs	Total Copper Removed	Total Percent Removal, Mass Loading Basis
	mgd	mg/l	lbs/d	mg/l	lbs/d		mg/l	lbs/d			mg/l	lbs/d	lbs/d	
10/12/2011	0.674	0.112	0.630	0.037	0.422	67.0%	0.011	0.148	70%	90.2%	0.008	0.017	0.585	92.9%
10/20/2011	1.008	0.093	0.782	0.092	0.008	1.1%	0.019	0.614	79%	79.6%	0.008	0.092	0.715	91.4%
10/27/2011	0.848	0.096	0.679	0.094	0.014	2.1%	0.017	0.545	82%	82.3%	0.012	0.035	0.594	87.5%
11/3/2011	0.631	0.074	0.513	0.117	-0.298	-58.1%	0.015	0.707	87%	79.7%	0.009	0.042	0.450	87.8%
11/10/2011	0.779	0.100	0.650	0.100	0.000	0.0%	0.022	0.507	78%	78.0%	0.011	0.071	0.578	89.0%
11/16/2011	0.646	0.123	0.663	0.104	0.102	15.4%	0.02	0.453	81%	83.7%	0.012	0.043	0.598	90.2%
11/21/2011	0.597	0.123	0.612	0.103	0.100	16.3%	0.021	0.408	80%	82.9%	0.01	0.055	0.563	91.9%
11/30/2011	0.791	0.074	0.488	0.063	0.073	14.9%	0.021	0.277	67%	71.6%	0.012	0.059	0.409	83.8%
12/7/2011	0.808	0.098	0.660	0.061	0.249	37.8%	0.021	0.270	66%	78.6%	0.012	0.061	0.580	87.8%
12/15/2011	0.655	0.095	0.519	0.052	0.235	45.3%	0.026	0.147	52%	73.7%	0.016	0.049	0.432	83.2%
12/21/2011	0.648	0.089	0.481	0.057	0.173	36.0%	0.026	0.168	54%	70.8%	0.013	0.070	0.411	85.4%
12/28/2011	0.761	0.093	0.590	0.093	0.000	0.0%	0.028	0.413	70%	69.9%	0.016	0.063	0.476	80.6%
1/4/2012	0.622	0.107	0.555	0.103	0.021	3.7%	0.044	0.308	57%	58.9%	0.016	0.145	0.472	85.0%
1/12/2012	0.659	0.090	0.495	0.051	0.214	43.3%	0.015	0.198	71%	83.3%	0.016	-0.005	0.407	82.2%
Average	0.738	0.098	0.594	0.081	0.094	15.8%	0.022	0.368	72.9%	77.6%	0.012	0.057	0.519	87.4%

Percent Removal Required for Permit Compliance, Based on Average Influent Concentration = 95.8%

APPENDIX B

National Pollutant Discharge Elimination System (NPDES) Permit

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§26-53),

Salisbury Sewer Commission

is authorized to discharge from the facility located at

Salisbury Wastewater Treatment Plant
187 Elm Street
Salisbury, MA 01950

to receiving water

a tidal creek that drains to the Merrimack River (Merrimack River Basin; State Code 84)

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

This permit shall become effective on the first day of the calendar month immediately following sixty days after signature.

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

This permit supersedes the permit issued on February 21, 2002.

This permit consists of 11 pages in Part I including effluent limitations, monitoring requirements, Attachment A. Toxicity Test Procedures, Attachment B. Sludge Compliance Guidance and, 25 pages in Part II. Standard Conditions.

Signed this 9th day of October, 2007 effective 1/1/08

/S/ SIGNATURE ON FILE expires 1/1/13

Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

Director
Division of Watershed Management
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number 001. Such discharge shall be limited and monitored by the permittee as specified below. The effluent sampling location is after UV disinfection.

Effluent Characteristic	Units	Effluent Limits			Monitoring Requirements	
		Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type[3]
Flow	MGD	1.3	----	----	Continuous	Recorder
Flow[2]	MGD	Report	----	Report	Continuous	Recorder
$CBOD_5$ [4]	mg/l	5	7	Report	2/Week	24-Hour Composite[5]
	lbs/day	54	76	Report	2/Week	24-Hour Composite[5]
TSS [4]	mg/l	5	7	Report	2/Week	24-Hour Composite[5]
	lbs/day	54	76	Report	2/Week	24-Hour Composite[5]
pH		(See Condition I.A.1.b. on Page 5)			1/Day	Grab[5]
Dissolved Oxygen	mg/l	6 mg/l minimum			1/Day	Grab[5]
Fecal Coliform[1,6]	cfu/100 ml	50	75	100	3/Week	Grab
Enterococci[1,6]	cfu/100 ml	35	----	104	3/Week	Grab
Copper, Total[7,8]	ug/l	3.1	----	4.8	1/Month	24-Hour Composite[5]

Effluent Characteristic	Units	Discharge Limitation			Monitoring Requirement	
		Average Monthly	Average Weekly	Maximum Daily	Measurement Frequency	Sample Type[3]
Total Ammonia Nitrogen, as N (Nov. 1- April 30)	mg/l	Report	Report	Report	2/Week	24-Hour Composite[5]
Total Ammonia Nitrogen, as N (May 1- Oct. 31)	mg/l	5.0	7.0	10.0	2/Week	24-Hour Composite[5]
Total Kjeldahl Nitrogen	mg/l	Report	----	Report	1/Month	24-Hour Composite[5]
Total Nitrate	mg/l	Report	----	Report	1/Month	24-Hour Composite[5]
Total Nitrite	mg/l	Report	----	Report	1/Month	24-Hour Composite[5]
LC_{50}[10,12]	%	≥100			4/year[9]	24-Hour Composite[5]
Chronic NOEC[11,12]	%	≥100			4/year[9]	24-Hour Composite[5]

All samples shall be representative of the effluent that is discharged through outfall 001.

Footnotes:

1. Required for State Certification.

2. Report annual average, monthly average, and the maximum daily flow. The limit is an annual average, which shall be reported as a rolling average. The value shall be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the previous eleven months.

3. All required effluent samples shall be collected at the point specified on page 2 of the permit. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

   A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of every month. Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report.

   All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 24-hour composites unless specified as a grab sample in 40 CFR §136.

4. Sampling required for influent and effluent.

5. A 24-hour composite sample shall consist of at least twenty-four (24) grab samples taken during one consecutive 24-hour period, combined proportional to flow or continuously collected proportionally to flow. Daily grab samples are collected during regular operating working hours. Regular operating working hours are Monday through Friday, 7:00 am to 3:00 pm.

6. The permittee shall achieve the enterococci limits in accordance with the compliance schedule found in Part E. 2 of the permit. Enterococci samples shall be taken concurrently with one of the required fecal coliform samples. The monthly average limit for fecal coliform is expressed as a geometric mean. The units may be expressed as MPN for samples tested using the Most Probable Number method, or colony forming units (CFU) when using the Membrane Filtration method.

7. The minimum detection level (ML) for copper is defined as 3.0 ug/l. This value is the minimum detection level for copper using the Furnace Atomic Absorption analytical method. For effluent limitations less than 3.0 ug/l, compliance/non-compliance will be determined based on the ML. Sample results of 3.0 ug/l or less shall be reported as zero on the discharge monitoring report.

8. The permittee shall comply with the copper monthly limitation of 3.1mg/l and a daily maximum limitation of 4.8 in accordance with the schedule contained in Section E of the permit. The permittee shall report the monthly average and daily maximum copper level during the interim period.

9. The permittee shall conduct chronic (and modified acute) toxicity tests four times per year. The chronic test may be used to calculate the acute LC_{50} at the 48-hour exposure interval. The permittee shall test the Inland Silverside (*Menidia berllina*). Toxicity test samples shall be collected during the second week of the months of March, June, September and December. The test results shall be submitted by the last day of the month following the completion of the test.

The results are due April 30, July 31, October 31 and, January 31, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment A** of this permit.

Test Dates Second Week in	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
March June September December	April 30 July 31 October 31 January31	Menidia beryllina (Inland Silverside) See Attachment A	≥100%	≥100%

10. The LC_{50} is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.

11. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction at a specific time of observation as determined from hypothesis testing where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, the permittee must report the lowest concentration where there is no observable effect. The 100% limit is defined as a sample which is composed of 100% effluent. This is a maximum daily limit derived as a percentage of the inverse of the dilution factor of 1.

12. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall follow procedures outlined in **Attachment A Section IV., DILUTION WATER** in order to obtain permission to use an alternate dilution water. In lieu of individual approvals for alternate dilution water required in **Attachment A**, EPA-New England has developed a Self-Implementing Alternative Dilution Water Guidance document (called "Guidance Document") which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. If this Guidance document is revoked, the permittee shall revert to obtaining approval as outlined in **Attachment A**. The "Guidance Document" has been sent to all permittees with their annual set of DMRs and Revised Updated Instructions for Completing EPA's Pre-Printed NPDES Discharge Monitoring Report (DMR) Form 3320-1 and is not intended as a direct attachment to this permit. Any modification or revocation to this "Guidance Document" will be transmitted to the permittees as part of the annual DMR instruction package. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

Part I.A.1. (Continued)

a. The discharge shall not cause a violation of the water quality standards of the receiving waters.

b. The pH of the effluent shall not be less than 6.5 nor greater than 8.5 and not more that 0.2 standard units outside of the natural background range. There shall be no change from natural background conditions that would impair any use assigned to this Class.

c. The discharge shall not cause objectionable discoloration of the receiving waters.

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

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

f. If the average annual flow in any calendar year exceeds 80% of the facility's design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing plans for further flow increases and discuss how the permittee will remain in compliance with the effluent limitations in the permit.

2. All POTWs must provide adequate notice to the Director of the following:

a. any new introduction of pollutants into that POTW from an indirect discharger in a primary industry category discharging process water; and

b. any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. for purposes of this paragraph, adequate notice shall include information on:

(1) The quantity and quality of effluent introduced into the POTW; and

(2) Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

Pollutants introduced into POTW's by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

4. Toxics Control

a. The permittee shall not discharge any pollutant or combination of pollutants in toxic amounts.

b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.

c. Chlorine is not monitored or limited in this permit, therefore, the use of chlorine for effluent disinfection is prohibited.

5. Numerical Effluent Limitations for Toxicants

EPA or MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (CWA), state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including but not limited to those pollutants listed in Appendix D of 40 CFR Part 122.

B. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from the outfall listed in Part I A.1.of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs) are not authorized by this permit and shall be reported in accordance with Section D.1.e. (1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes MassDEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at http://www.mass.gov/dep/water/approvals/surffms.htm#sso.

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 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. Preventative Maintenance Program

The permittee shall maintain an ongoing preventative maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges.

3. Infiltration/Inflow Control Plan:

The permittee shall develop and implement a plan to control infiltration and inflow (I/I) to the separate sewer system. The plan shall be submitted to EPA and MassDEP **within six months of the effective date of this permit** (see page 1 of this permit for the effective date) and shall describe the permittee's program for preventing infiltration/inflow-related effluent limit violations, and all unauthorized discharges of wastewater, including overflows and by-passes due to excessive infiltration/inflow.

The plan shall include:

- An ongoing program to identify and remove sources of infiltration and inflow. The program shall include the necessary funding level and the source(s) of funding.
- An inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts. Priority should be given to removal of public and private inflow sources that are upstream from, and potentially contribute to, known areas of sewer system backups and/or overflows.
- Identification and prioritization of areas that will provide increased aquifer recharge as the result of reduction/elimination of infiltration and inflow to the system.
- An educational public outreach program for all aspects of I/I control, particularly private inflow.

Reporting Requirements:

A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MassDEP annually, **by March 31.** The summary report shall, at a minimum, include:

- A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year.
- Expenditures for any infiltration/inflow related maintenance activities and corrective actions taken during the previous year.
- A map with areas identified for I/I-related investigation/action in the coming year.
- A calculation of the annual average I/I, the maximum month I/I for the reporting year.
- A report of any infiltration/inflow related corrective actions taken as a result of unauthorized discharges reported pursuant to 314 CMR 3.19(20) and reported pursuant to the Unauthorized Discharges section of this permit.

D. ALTERNATE POWER SOURCE

In order to maintain compliance with the terms and conditions of this permit, the permittee shall continue to provide an alternative power source with which to sufficiently operate its treatment works (as defined at 40 CFR 122.2).

E. SCHEDULE OF COMPLIANCE

1. No later than two years from the effective date of the permit, the permittee shall achieve compliance with the monthly average and daily maximum copper limits of 3.1 mg/l and 4.8 mg/l. During the interim, the permittee shall report the monthly average and daily maximum results for copper. At the end of this two year period, the copper limits in the permit go into effect.

   If the permittee reliably achieves the effluent limit prior to the end of the two year schedule, it shall notify EPA on its monthly discharge monitoring report and the final limit will go into effect on the first day of the month following notification.

2. No later than one year from the effective date of the permit, the permittee shall achieve compliance with the monthly average and daily maximum limits for enterococci. During the interim, the permittee shall report the monthly average and daily maximum values once per week.

F. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices and with the CWA Section 405(d) technical standards.

2. The permittee shall comply with the more stringent of either the state or federal (40 CFR Part 503), requirements.

3. The requirements and technical standards of 40 CFR Part 503 apply to facilities which perform one or more of the following use or disposal practices:

   a. Land application - the use of sewage sludge to condition or fertilize the soil
   b. Surface disposal - the placement of sewage sludge in a sludge-only landfill
   c. Sewage sludge incineration in a sludge-only incinerator

4. The 40 CFR Part 503 conditions do not apply to facilities which place sludge within a municipal solid waste landfill. These conditions also do not apply to facilities which do not dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons- reed beds), or are otherwise excluded under 40 CFR 503.6.

5. The permittee shall use and comply with the attached compliance guidance document to determine appropriate conditions. See **Attachment B**. Appropriate conditions contain the following elements:

   - General requirements
   - Pollutant limitations
   - Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
   - Management practices
   - Record keeping
   - Monitoring
   - Reporting

Depending upon the quality of material produced by a facility, all conditions may not apply to the facility.

6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attraction reduction at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year:

less than 290	1/ year
290 to less than 1500	1 /quarter
1500 to less than 15000	6 /year
15000 +	1 /month

7. The permittee shall sample the sewage sludge using the procedures detailed in 40 CFR 503.8.

8. The permittee shall submit an annual report containing the information specified in the guidance by **February 19**. Reports shall be submitted to the address contained in the reporting section of the permit. Sludge monitoring is not required by the permittee when the permittee is not responsible for the ultimate sludge disposal. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such case, the permittee is required only to submit an annual report by **February 19** containing the following information:

* Name and address of contractor responsible for sludge disposal
* Quantity of sludge in dry metric tons removed from the facility by the sludge contractor

G. MONITORING AND REPORTING

1. Reporting

Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report Form(s) postmarked no later than the 15th day of the month following the effective date of the permit.

Signed and dated originals of these, and all other reports required herein, shall be submitted to the Director and the State at the following addresses:

Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, Massachusetts 02114

The State Agency is:

Massachusetts Department of Environmental Protection
Northeast Region
Bureau of Resource Protection
205B Lowell Street
Wilmington, MA 01887

Signed and dated Discharge Monitoring Report Forms and toxicity reports required by this permit shall also be submitted to the State at:

Massachusetts Department of Environmental Protection
Division of Watershed Management
Surface Water Discharge Permit Program
627 Main Street, 2nd floor
Worcester, MA 01887

H. STATE PERMIT CONDITIONS

This Discharge Permit is issued jointly by the U. S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) under Federal and State law, respectively. As such, all the terms and conditions of this Permit are hereby incorporated into and constitute a discharge permit issued by the Commissioner of the MassDEP pursuant to M.G.L. Chapter 21, §43.

Each Agency shall have the independent right to enforce the terms and conditions of this Permit. Any modification, suspension or revocation of this Permit shall be effective only with respect to the Agency taking such action, and shall not affect the validity or status of this Permit as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this Permit is declared, invalid, illegal or otherwise issued in violation of State law such permit shall remain in full force and effect under Federal law as an NPDES Permit issued by the U.S. Environmental Protection Agency. In the event this Permit is declared invalid, illegal or otherwise issued in violation of Federal law, this Permit shall remain in full force and effect under State law as a Permit issued by the Commonwealth of Massachusetts.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
ONE CONGRESS STREET
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: MA0102873

NAME AND ADDRESS OF APPLICANT:

Salisbury Sewer Commission
Elm Street
Salisbury, MA 01950

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Salisbury Sewer Commission
Elm Street
Salisbury, MA 01950

RECEIVING WATER: **a tidal Creek to the Merrimack River (Merrimack River Basin and Coastal Drainage Basin)**

CLASSIFICATION: **SA**

I. *Proposed Action*

The above named applicant has requested that the U.S. Environmental Protection Agency (EPA) reissue its National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water.

The existing NPDES permit was issued on February 21, 2002 and expired on February 21, 2007. The applicant submitted a complete application for permit reisssuance on August 21, 2006 therefore, the existing permit will be administratively extended and continue in effect until the new permit is issued, according to 40 CFR 122.21.

II. *Type of Facility and Discharge Location*

The facility is an advanced wastewater treatment plant with seasonal nitrification. It serves approximately 5000 people and treats municipal wastewater only. The draft permit has been written to reflect the current operations and conditions at the facility and authorizes a discharge from Outfall 001 to a tidal creek that flows to the Merrimack River.

III. *Description of Discharge*

A quantitative description of the facility's discharge in terms of significant effluent parameters based on recent monitoring data between January 1, 2006 and March 1, 2007, is shown in Table 1 of this fact sheet.

Figure 1 of the fact sheet is a map showing the geographic location of the facility and Figure 2 is a diagram of the facility's treatment process.

IV. *Limitations and Conditions*

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

V. *Permit Basis and Explanation of Effluent Limitation Derivation*

The Town of Salisbury operates the 1.3 million gallons per day (MGD) wastewater treatment facility, which was built in 1987. The collection system is 100 percent sanitary sewers. The treatment train consists of an aerated lagoon system followed by rapid sand infiltration and ultraviolet disinfection. There are seventeen pump stations in Salisbury; all are operated and maintained by the Town.

Sludge is digested aerobically, stabilized with lime, then trucked off-site for incineration.

POTW Discharges

Overview of Federal and State Regulations

General Requirements

EPA is required to consider technology and water quality requirements when developing permit effluent limits. Technology based treatment requirements represent the minimum level of control that must be imposed under Sections 402 and 301(b) of the Clean Water Act (CWA), see 40 CFR 125 Subpart A. For publicly owned treatment works (POTWs), technology based requirements are effluent limitations based on secondary treatment as defined in 40 CFR Part 133.

EPA regulations require NPDES permits to contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve federal or state water quality standards.

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards include requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criterion is established. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained, or attained.

The permit must limit any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that caused, has reasonable potential to cause, or contribute to an excursion above any water quality criterion. An excursion occurs if the projected or actual in stream concentrations exceed the applicable criterion.

In determining reasonable potential, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permittee's most recent permit application, discharge monitoring reports and State Water Quality reports, (3) sensitivity of the species to toxicity testing, (4) statistical approach outlined in Technical Support Document for Water Quality-based Toxics Controls, (USEPA ,1991) in Section 3 and, where appropriate, (5) dilution of the effluent in the receiving water.

A permit may not be renewed, reissued, or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-backsliding requirement of the CWA. EPA's anti-backsliding provisions, found in Section 402(o) of the CWA and 40 CFR 122.44(l), generally prohibit the relaxation of permit limits, standards, and conditions. Therefore, the effluent limits

in a reissued permit must be at least as stringent as those of the previous permit except under certain limited circumstances defined in Section 402(o) of the CWA and 40 CFR Part 122.44(l).

III. *Water body Classification and Usage*

The classification of the receiving water has changed in the draft permit from SB to SA. The facility discharges to an unnamed tidal creek as noted in Section II. Type of Facility and Discharge Location of this fact sheet. The unnamed tidal creek where the final effluent is discharged is not listed in 314 CMR 4.05, Classes and Criteria in the Massachusetts State Water Quality Standards. Unlisted waters are covered in 314 CMR 4.06(4) which require unlisted coastal and marine waters be classified as SA and presumed High Quality Waters.

Flow

Federal regulations at 40 CFR122.45(b)(i) require that effluent limits be calculated based on design flow of the facility. The design flow rate of this treatment facility is 1.3 MGD. The flow limit will remain the same as in the existing permit and shall be measured continuously. The permittee shall report the annual average flow using the annual rolling average method noted in Footnote 2 of the draft permit. The monthly average flow recorded for the period of January 2005 through March 2007 ranged between 0.51 MGD and 1.35 MGD and the annual average flow ranged between 0.61MGD and 0.70 MGD.

Available Dilution

Water quality limits in the draft permit are based on water quality criteria and the available dilution during 7Q10 low flow conditions in the receiving stream at or near the point of discharge. The 7Q10 is the lowest observed mean river flow for seven consecutive days recorded over a ten year recurrence interval. For rivers and streams, Title 314 CMR 4.03(3)(a) requires that the 7Q10 be used to represent the critical hydrologic conditions at which water quality must be met.

At times during the summer, stream flow in the tidal creek may be minimal such that during low flow periods the effluent may discharge to a wetland. As a result, there is no stream flow to provide dilution when the discharge is at low tide. Therefore, a dilution factor of 1 is used for water quality based effluent limits in the draft permit; the same dilution factor used in the current permit. Limits based on numeric water quality criteria are equivalent to the criteria when the dilution factor is one.

Biochemical Oxygen Demand ($BOD)_5$ and Total Suspended Solids (TSS)

The BOD_5 and TSS effluent limits shall remain the same as in the existing permit. The limits are more stringent than secondary requirements found at 40 CFR Part 133. They are based on the 1979 facilities planning study and subsequent environmental impact report that were prepared when the facility was designed.

A review of BOD_5 and TSS data submitted on the monthly discharge monitoring reports showed no exceedances for either parameter between January 2005 and January 2007. The permittee reported meeting the 85% removal requirement for BOD_5 and TSS for the last several years.

Dissolved Oxygen (DO)

A dissolved oxygen limitation of 6.0 mg/l is in the draft permit. This limit is included to ensure that the discharge does not cause or contribute to a violation of the Massachusetts Surface Water Quality Standards, 314 CMR 4.05 (4)(b)(1). The water quality standards require that the dissolved oxygen concentration in Class SA water shall not be less than 6.0 mg/l unless background conditions are lower. A monitoring frequency of once per day is in the draft permit.

Monthly monitoring data is not available at this time because the existing permit does not have a dissolved oxygen limitation. Limited data on dissolved oxygen from the facility's toxicity tests indicate that the final effluent will meet this requirement.

pH

The draft permit established pH limitations based on State Water Quality Standards. The State's standards are more stringent than the pH limitations set forth in 40 C.F.R. 133.102. In accordance with 314 CMR 4.05(4)(a)(3), the pH for Class SA waters shall be in the range of 6.5 through 8.5 standard units and not more than 0.2 standard units outside the background range. There shall be no change from background conditions that would impair any use assigned to this Class. The frequency of monitoring is once per day. The pH data submitted for the period from January 2005 through January 2007 shows occasional violation of the minimum pH level.

Bacteria limits, Fecal Coliform, and Enterococci

The fecal coliform limits in the draft permit are the same as those in the existing permit. The existing permit contains a monthly average geometric mean limit of 50 organisms/100 ml, a weekly average geometric mean limit of 75 organisms/100 ml and, a maximum daily limit of 100 organisms/100 ml. These limits were established to minimize impacts on water quality conditions in the receiving water and are based on the 1979 facilities plan and subsequent environmental reports.

The permittee reported no exceedances for fecal coliform between January 2005 and March 2007.

In addition to the fecal coliform limits, the draft permit includes effluent limits for enterococci based on promulgated federal water quality criteria established to protect primary contact recreational uses (see 40 CFR 131 dated November 2004). MassDEP has adopted the same numeric criteria for enterococci in its water quality standards. The federal criteria will be withdrawn upon EPA approval of the state criteria.

The criteria require that no single enterococci sample exceed 104 colonies per 100 ml and that geometric mean of all samples taken within the most recent six months based on a minimum of five samples shall not exceed 35 enterococci colonies per 100 ml in non-bathing beaches. The draft permit has a monthly average limit of 35 enterococci colonies per 100 ml and a maximum daily limit of 104 colonies per 100 ml. The draft permit includes a compliance schedule of one year to attain the new enterococci limit.

Toxic Pollutants

EPA is required to limit any pollutant that is or may be discharged at a level that caused, or has reasonable potential to cause, or contribute to an excursion above any water quality criterion. See 40 CFR §122.44(d) (1) (VI). Data submitted with the permit renewal application and previous monitoring data were compared to possible effluent limitations to determine if there is a reasonable potential to cause or contribute to a violation of water quality.

The calculations for toxic metals were based on the EPA National Recommended Water Quality Criteria: 2002 (EPA-822-R-02-047), as adopted in the Massachusetts Water Quality Standards 314 CMR 4.05(5)(e).

Metals

Certain metals in waters can be toxic to aquatic life. There is a need to limit toxic metal concentrations where the discharge has the reasonable potential to cause or contribute to an exceedance of water quality standards. The limitations for toxic metals are based on the EPA National Recommended Water Quality

Criteria: 2002 (EPA-822-R-02-047), as adopted in the Massachusetts Water Quality Standards 314 CMR 4.05(5)(e).

Copper

The current permit has a maximum daily reporting requirement for copper levels in the effluent. The range reported between January 2005 and January 2007 were between 7 ug/l and 26 ug/l. For marine water, the acute water quality criteria for copper is 4.8 ug/l and the chronic criteria is 3.1 ug/l
This indicates there is reasonable potential that levels in the effluent will exceed water quality criteria.

Average monthly limit = 3.1 ug/l Maximum daily limit = 4.8 ug/l

The draft permit includes a two year compliance schedule for meeting the monthly average and maximum daily copper limit. See Section E in the draft permit. If, prior to the required compliance date the permittee believes it can reliably achieve the effluent limitation in the permit, it shall notify EPA on its monthly discharge monitoring report, and the final limit will go into effect on the first day of the month following notification.

Nutrients

Nutrients are compounds containing nitrogen and phosphorus. Although nitrogen and phosphorus are essential for plant growth, high concentrations of either can cause eutrophication, a condition in which aquatic plant and algal growth is excessive. Plant and algae respiration and decomposition reduces oxygen concentrations in the water, creating poor habitat for fish and other aquatic animals. Nitrogen in the form of ammonia can be toxic to aquatic life, and can also deplete dissolved oxygen in the receiving water due to dissolved oxygen used in the breakdown of ammonia to nitrate/nitrite

The effluent from the Salisbury facility discharges to a marine water. The toxicity level of ammonia is based on the salinity, temperature and pH of the receiving water (USEPA 1999).

Ammonia -Nitrogen

The seasonal effluent limitations and reporting requirements for ammonia-nitrogen in the current permit are based on achieving the water quality standards for dissolved oxygen and have remained unchanged in the draft permit. The seasonal limits from May 1 through October 31 are 5 mg/l for the average monthly limit, 7 mg/l for the weekly average limit and, 10 mg/l for the maximum daily limit; ammonia-nitrogen monitoring and reporting are required for the remainder of the year

There were several exceedances reported between May 2005 and October 2006. See Table 2 below for ammonia levels in the effluent between January 2006 and January 2007.

Table 2

Date	Average Monthly Ammonia, mg/l	Average Weekly Ammonia, mg/l	Max. Daily Ammonia, mg/l
January 2007	16.3	1.8	1.9
December 2006	13.7	0.9	1.2
November 2006	7.8	10.7	10.7
October 2006	1.3	3.0	3.0
September 2006	1.0	2.1	2.1
August 2006	0.9	1.1	1.1
July 2006	0.8	1.0	1.0
June 2006	5.3	7.7	7.7
May 2006	10.1	15.9	15.9

April 2006	12.5	13.8	13.8
March 2006	8.3	9.2	9.2
February 2006	11.1	13.3	13.3
January 2006	14.5	13.8	13.8

The draft permit includes a reporting requirement for the concentration and mass levels of total nitrite, total nitrate and Total Kejdahl Nitrogen.

To determine if cold weather ammonia limits were necessary during this permit reissuance, the EPA reviewed the Ambient Water Quality Criteria for Ammonia (Saltwater) -1989, USEPA 440/66/004. Instream data on the pH, temperature and salinity of the receiving water were needed to determine ammonia criteria. In this case, the location of the final discharge is inaccessible, therefore the Agency assumed the following conditions of the receiving water as required in the ambient criteria document stated above,USEPA 440/66/004 ; a pH of 7.0 (typical of marine water), a salinity of 10g/kg (the discharge is located in a estuary) and a range of the receiving water temperature between 0^0 C and 10^0 C. Based on these parameters, the acute criteria range for total ammonia is between 191 and 270 mg/l, and the chronic criteria would be between 29 and 41. Both the acute and chronic criteria are above levels in the effluent so winter ammonia limits in the permit are not needed at this time.

Whole Effluent Toxicity Testing

Under Section 301(b)(1) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards [314 CMR 4.05(5)(e)], include the following narrative statements and require that EPA criteria established pursuant to Section 304(a)(l) of the CWA be used as guidance for interpretation of the following narrative criteria:

> *"All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. Where the State determines that a specific pollutant not otherwise listed in 314 CMR 4.00 could reasonably be expected to adversely affect existing or designated uses, the State shall use the recommended limit published by EPA pursuant to 33 U.S.C. 1251 §304(a) as the allowable receiving water concentrations for the affected waters unless a site-specific limit is established. Site specific limits, human health risk levels and permit limits will be established in accordance with 314 CMR 4.05(5)(e)(1)(2)(3)(4)."*

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs above those which may be contributed from industrial users. These pollutants include metals, chlorinated solvents, aromatic hydrocarbons and other constituents. EPA Region I current policy is to include toxicity testing requirements in all permits, while Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic sewage, and in accordance with EPA regulations and policy, the draft permit includes chronic and acute toxicity limitations and monitoring requirements. (See, e.g. Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50FR30784 (July 25, 1985); see also EPA Technical Support Document for Water Quality-Based Toxics Control," (EPA/505/2-90-001, September 1991).

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analysis; (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistic effect of pollutants;

and (3) pollutants for which there are inadequate analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in connection with pollutant-specific control procedures to control the discharge of toxic pollutants.

The Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters (February 23, 1990) requires 7-day chronic and modified acute toxicity testing four times per year for discharges having a dilution factor of less than 10.

The LC_{50} limit remains at 100% based on the Massachusetts Implementation Policy.

The chronic no observed effect concentration (C-NOEC) whole effluent toxicity limit is calculated using the instream waste concentration (IWC) of the effluent. The IWC is the inverse of the dilution.

C-NOEC = 1/ dilution factor = 1/1 = 1.0 = 100 %

This is the same limit that is in the existing permit.

The draft permit will continue to require testing one specie only, the inland silverside, *Menidia beryllina.* The tests results for the last two years are shown in (Table 4) and are within the permit limits. The toxicity test schedule has been changed from what is in the current permit. Testing is currently done in March, June, September and December but the draft permit requires the test be conducted in the second week of January, April, July and October. See page 5 of the draft permit. EPA and MassDEP require all facilities discharging into the Merrimack Watershed to use this schedule in an effort to determine the collective impact to the watershed. See Permit **Attachment A,** Freshwater Chronic Toxicity Test Procedure and Protocol, for a description of the testing requirements.

VI. ***Unauthorized Discharges***

The permittee is not authorized to discharge wastewater from any pump station emergency overflow. Overflows, including sanitary sewer overflows (SSOs), must be reported in accordance with reporting requirements found in Part II. General Requirements, Section D.1.e. of the permit (24-hour reporting). If a discharge does occur, the permittee must notify the EPA, the MassDEP, and others, as appropriate (i.e. local Public Health Department), both orally and in writing as specified in the draft permit.

VII. ***Operation and Maintenance of the Sewer System***

The Town of Salisbury owns, operates and maintains the sewer collection system that transports sewage to the treatment plant.

Infiltration/Inflow Requirements

The draft permit includes requirements for the permittee to control infiltration and inflow (I/I). Infiltration is groundwater that enters the collection system though physical defects such as cracked pipes or deteriorated joints. Inflow is extraneous flow entering the collection system through point sources such as roof leaders, yard and area drains, sump pumps, manhole covers, tide gates, and cross connections from storm water systems.

Significant I/I in a collection system may displace sanitary flow, reducing the capacity and the efficiency of the treatment works, and may cause bypasses to secondary treatment. It greatly increases the potential for sanitary sewer overflows (SSO) in separate systems.

The permit standard conditions for 'Proper Operation and Maintenance' are found at 40 CFR §122.41(e). These require proper operation and maintenance of permitted wastewater systems and related facilities to

achieve permit conditions. Similarly, the permittee has a 'duty to mitigate' as stated in 40 CFR §122.41 (d). This requires the permittee to take all reasonable steps to minimize or prevent any discharge in violation of the permit which has a reasonable likelihood of adversely effecting human health or the environment. EPA and MassDEP maintain that an I/I removal program is an integral component to insuring permit compliance under both of these provisions.

MassDEP has stated that inclusion of the I/I conditions in the draft permit shall be a standard State Certification requirement under Section 401 of the Clean Water Act and 40 CFR 124.55(b).

VIII. ***Pretreatment***

The facility does not treat pollutants from major industrial facilities. Pollutants introduced into the POTW by a nondomestic source shall not enter the POTW or interfere with the operation or performance of the works.

IX. ***Sludge Information and Requirements***

Section 405(d) of the Clean Water Act requires that sludge conditions be included in all POTW permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's Standard for the disposal of sewage sludge (40 CFR 503). Attachment B of the permit is the Sludge Compliance Guidance and provides guidance on sewage sludge use and disposal practices.

In an effort to improve nitrification, the permittee had sludge dredged from the lagoons in 2003 and 2005. Prior to 2003, the lagoons had never been dredged. The Town's budget for the plant now includes dredging for the lagoons every two years. The sludge is transported offsite to Synagro/NETCO in Woonsocket, RI for incineration.

X. ***Essential Fish Habitat (EFH)***

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C.§ 1801 et seq. (1998)), EPA is required to consult with National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C.§ 1855(b). The Amendments broadly define "essential fish habitat" as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. 16 U.S.C.§ 1802(10). Adverse impact means any impact, which reduces the quality and/or quantity of EFH. 50 C.F.R.§ 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. Id.

Essential fish habitat is only designated for fish species for which Federal Fisheries Management Plans exist. 16 U.S.C.§ 1855(b)(1)(A). The U.S. Department of Commerce on March 3, 1999 approved EFH designations for New England.

A review of the relevant essential fish habitat information provided by NMFS indicated that Essential Fish Habitat does not exist in the vicinity of the proposed discharge.

EPA has determined that a formal EFH consultation with NMFS is not required because the proposed discharge will not adversely impact EFH.

XI. ***Endangered Species Act***

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical

habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The United States Fish and Wildlife Services (USFWS) administers Section 7 consultations for fresh water species, where as the National Marine Fisheries Services (NMFS) administers Section (7) consultations for marine species and anadromous fish.

EPA believes the authorized discharge from this facility is not likely to adversely affect any federally-listed species, or their habitats. This preliminary determination is based on the location of the outfall, and the reasons provided in the EFH discussion (Section X of this fact sheet). EPA is seeking concurrence with this opinion from NOAA Fisheries and the USFWS through the informal ESA consultation process.

XII. ***State Certification Requirements***

The staff of the State Water Pollution Control Agency has reviewed the draft permit. EPA has requested permit certification by the State pursuant to 40 CFR.124.53 and expects that the draft permit will be certified.

XIII. ***Public Comment Period, Hearing Requests and Procedures for Final Decision***

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 U.S.EPA, Massachusetts Office of Ecosystem Protection (CMA), One Congress Street- Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator 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 or requested notice.

XIV. ***EPA and MA DEP Contacts***

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

Betsy Davis
US Environmental Protection Agency
1 Congress Street
Suite 1100 (CPE)
Boston, Massachusetts 02114-2023
Telephone: (617) 918-1576

or

Paul Hogan
MA Department of Environmental Protection
Division of Watershed Management
627 Main Street
Worcester, MA 01608
Telephone: (508) 767-2796

Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

Date:

Attachment A of the Fact Sheet
Salisbury Wastewater Treatment Plant
Summary of NPDES Permit Reporting Requirements Dates

Permit Page	Requirement and Dates	Submit to:
5	Whole Effluent Toxicity Tests results are due April 30, July 31, October 30 and January 31.	EPA/MassDEP
7	The permittee shall develop and implement a plan to control I/I to the separate sewer system. The plan shall be submitted to EPA and MassDEP six months from the effective date of the permit. See Part 1.C.3.	EPA/MassDEP
8	A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MassDEP annually by the permittee by the anniversary date of the effective date of the permit	EPA/MassDEP
10	The permittee shall submit an annual report containing the information specified in the sludge section of the permit by February 19.	EPA/MassDEP
10	Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report Form(s) postmarked no later than the 15th day of the month following the effective date of the permit.	EPA/MassDEP

APPENDIX C

Administrative Order

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
Boston, MA 02109-3912

JUL 13 2011

RECEIVED
JUL 14 2011
TOWN MANAGER
BOARD OF SELECTMEN

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Neil J. Harrington
Town Manager
Town of Salisbury
5 Beach Road
Salisbury, MA 01952

Re: In the Matter of Town of Salisbury, Massachusetts
Administrative Order Docket No. 11-012

Dear Mr. Harrington:

Enclosed is an Administrative Order ("Order") issued by the U.S. Environmental Protection Agency ("EPA") pursuant to Section 309(a)(3) of the Clean Water Act (the "Act"), 33 U.S.C. § 1319(a)(3). The Order is based on violations of the National Pollutant Discharge Elimination System ("NPDES") permit issued to the Salisbury wastewater treatment facility and Section 301(a) of the Act, 33 U.S.C. § 1311(a).

Specifically, the Order finds that the Salisbury wastewater treatment facility has consistently discharged total copper and periodically discharged ammonia-nitrogen in concentrations in excess of the effluent limitations contained in Permit No. MA0102873. The Order requires that, by December 31, 2011, the Town shall submit an ammonia nitrogen removal engineering report recommending additional controls needed to achieve compliance with the ammonia nitrogen limit. The ammonia nitrogen removal engineering report shall among other alternatives, evaluate the feasibility of relocating the WWTF outfall to a location providing greater dilution by the receiving waters, and shall include a proposed schedule for implementing these controls. The Order also requires that within 545 days of receipt of the Order the Town shall submit a copper optimization engineering report evaluating the controls needed to achieve compliance with the total copper limit, including a proposed schedule for implementing these controls. The Order is effective upon receipt. Violation of the terms and conditions of this Order may subject the Town to further enforcement action under the Act.

II. FINDINGS

The Director makes the following findings of fact:

1. The Town of Salisbury (the "Town" or "Permittee") is a municipality, as defined in Section 502(4) of the Act, 33 U.S.C. § 1362(4), established under the laws of the Commonwealth of Massachusetts.
2. The Town is a person under Section 502(5) of the Act, 33 U.S.C. § 1362(5). The Town is the owner and operator of a publicly-owned treatment works (the "POTW") from which pollutants, as defined in Section 502(6) of the Act, 33 U.S.C. § 1362(6), are discharged from a point source, as defined in Section 502(14) of the Act, 33 U.S.C. § 1362(14), to an unnamed tidal creek, a Class SA waterway, that drains to the Merrimack River, a Class SB waterway, which flows into the Atlantic Ocean. Both waterways are waters of the United States, as defined in 40 C.F.R. § 122.2, and navigable waters under Section 502(7) of the Act, 33 U.S.C. § 1362(7). The POTW includes a 1.3 million gallon per day ("MGD") advanced wastewater treatment facility ("WWTF") that discharges an annual average daily flow of 0.7 MGD of treated wastewater to the unnamed tidal creek.
3. Section 301(a) of the Act, 33 U.S.C. § 1311(a), makes unlawful the discharge of pollutants to waters of the United States except in compliance with, among other things, the terms and conditions of an NPDES permit issued pursuant to Section 402 of the Act, 33 U.S.C. § 1342.
4. On October 9, 2007, the Permittee was issued NPDES Permit No. MA0102873 ("NPDES Permit") by the Director of the Office of Ecosystem Protection of EPA, Region I, under the authority of Section 402 of the Act, 33 U.S.C. § 1342. The NPDES Permit became effective on January 1, 2008 and expires on December 31, 2013.
5. The NPDES Permit authorizes the Permittee to discharge pollutants from the WWTF (Outfall No. 001) to the unnamed tidal creek, subject to the effluent limitations, monitoring requirements and other conditions specified in the NPDES Permit.
6. Part I.A.1. of the NPDES Permit includes concentration effluent limitations for, among other things, total copper and total ammonia nitrogen.
7. Part I.E.1. of the NPDES Permit provides that no later than two years from the effective date of the NPDES Permit, i.e. January 1, 2010, the Permittee shall achieve compliance with the monthly average and daily maximum limitations for total copper established by the NPDES Permit.
8. Since January 1, 2010, the Permittee has consistently discharged wastewater containing total copper in excess of the effluent limits set forth in the NPDES Permit.

9. Part I.A.1. of the NPDES Permit establishes seasonal monthly average, weekly average, and daily maximum effluent concentration limitations for total ammonia nitrogen that are in effect from May 1st until October 31st, annually.

10. Since the effective date of the NPDES Permit, the Permittee has frequently discharged wastewater containing total ammonia nitrogen in excess of effluent limits set forth in the NPDES Permit.

11. The Permittee's discharges of pollutants in excess of the limits contained in the NPDES Permit violate the conditions of the NPDES Permit and, therefore, violate Section 301(a) of the Act, 33 U.S.C. § 1311(a).

III. ORDER

Accordingly, it is hereby ordered that:

1. Total Ammonia Nitrogen Removal

a. By December 31, 2011, the Permittee shall submit to EPA and the Massachusetts Department of Environmental Protection ("MassDEP") for review and approval a detailed engineering report (the "Ammonia Nitrogen Removal Engineering Report") describing the measures taken by the Permittee to achieve compliance with the NPDES Permit's total ammonia nitrogen limit, evaluating the results of these measures, and evaluating any additional controls needed to achieve full compliance with the NPDES Permit's total ammonia nitrogen limits. The Ammonia Nitrogen Engineering Report shall among other alternatives, evaluate the feasibility of relocating the WWTF outfall to a location providing greater dilution by the receiving waters. The Ammonia Nitrogen Engineering Report shall recommend measures to achieve compliance with the effluent limits and include a schedule for implementing these controls (the "Ammonia Nitrogen Implementation Schedule").

b. The Ammonia-Nitrogen Implementation Schedule submitted pursuant to Paragraph III.1.a. of this Order shall be incorporated and enforceable hereunder upon the Implementation Schedule's approval by; and as amended by, EPA.

2. Copper Optimization

a. Within 545 calendar days of receipt of this Order, the Permittee shall submit to EPA and the MassDEP for review and approval a detailed engineering report (the "Copper Optimization

Engineering Report") including a schedule for implementing controls to achieve full compliance with the NPDES Permit's total copper limits (the "Copper Implementation Schedule"). The Copper Optimization Engineering Report shall be consistent with the Copper Optimization Scope of Work included as **Attachment A.**

b. The Copper Implementation Schedule submitted pursuant to Paragraph III.2.a. of this Order shall be incorporated and enforceable hereunder upon the Implementation Schedule's approval by, and as amended by, EPA.

3. Interim Effluent Limitations

a. From the effective date of this Order and until the earliest of (1) the date that EPA modifies the terms and conditions of the interim limits or (2) the date that EPA determines that the Town has not complied with the interim milestones set forth in this Order or (3) the date for completion of the relevant Implementation Schedule, the Permittee shall, at a minimum, comply with the interim effluent limitations and monitoring requirements contained in **Attachment B** of this Order.

b. The Permittee shall also comply with all effluent limitations, monitoring requirements and other conditions specified in the NPDES Permit for the parameters not covered in **Attachment B.**

4. Quarterly Progress and Work Projection Reports:

Beginning with the calendar quarter ending September 30, 2011 and continuing through the calendar quarter when the controls to achieve full compliance with the NPDES Permit's ammonia nitrogen and copper limits are completed and fully operational, the Permittee shall submit quarterly reports on the Town's progress in implementing the provisions of this Order. The reports shall be submitted by the last day of the month following the calendar quarter monitoring period. At a minimum, these progress reports shall include a description of:

a. The activities undertaken during the reporting period directed at achieving compliance with this Order;

b. The status of all plans, reports, and other deliverables required by this Order that the Town completed and submitted during the reporting period; and

c. The expected activities to be completed during the next reporting period in order to achieve compliance with this Order.

IV. NOTIFICATION PROCEDURES

1. Where this Order requires a specific action to be performed within a certain time frame, the Permittee shall submit a written notice of compliance or noncompliance with each deadline. Notification shall be mailed within fourteen (14) days after each required deadline. The timely submission of a required report shall satisfy the requirement that a notice of compliance be submitted.

2. If noncompliance is reported, notification shall include the following information:

   a. A description of the noncompliance;

   b. A description of any actions taken or proposed by the Permittee to comply with the lapsed schedule requirements;

   c. A description of any factors that explain or mitigate the noncompliance; and

   d. An approximate date by which the Permittee will perform the required action. After a notification of noncompliance has been filed, compliance with the past-due requirement shall be reported by submitting any required documents or providing EPA with a written report indicating that the required action has been achieved.

3. Submissions required by this Order shall be in writing and shall be submitted to the following addresses:

   U.S. Environmental Protection Agency, Region I
   Office of Environmental Stewardship
   5 Post Office Square – Suite 100
   Boston, MA 02109-3912
   Attn: George W. Harding, P.E.

   and

   Massachusetts Department of Environmental Protection
   Northeast Regional Office
   205B Lowell Street
   Wilmington, MA 01887
   Attn: Kevin Brander

V. GENERAL PROVISIONS

1. The Permitee may, if it desires, assert a business confidentiality claim covering part, or all, of the information requested in the manner described by 40 C.F.R. § 2.203(b). Information covered by such a claim will be disclosed by EPA only in accordance with the procedures set forth in 40 C.F.R. Part 2, Subpart B. The Permittee should carefully read the above-cited regulations before asserting a business confidentiality claim since certain categories of information are not properly the subject of such a claim. For example, the Act provides that "effluent data" shall in all cases be made available to the public. See Section 308(b) of the Act, 33 U.S.C. § 1318(b).
2. This Order does not constitute a waiver or a modification of the terms and conditions of the NPDES Permit. The NPDES Permit remains in full force and effect. EPA reserves the right to seek any and all remedies available under Section 309 of the Act, 33 U.S.C. § 1319, as amended, for any violation cited in this Order.
3. This Order shall become effective upon receipt by the Permittee.

07/12/11
Date

Susan Studlien
Susan Studlien, Director
Office of Environmental Stewardship
Environmental Protection Agency, Region I

ATTACHMENT A

COPPER OPTIMIZATION SCOPE OF WORK

The report shall include:

I. BACKGROUND AND PROBLEM STATEMENT

A. A description of the nature and extent of the NPDES Permit effluent violations for copper and other metals and a description of the equipment used to sample the final effluent noting any metal components (i.e. copper tubing).

B. An analysis of historical influent monitoring data including the results of the monitoring required under Paragraph III of this Attachment to locate and quantify the sources of the influent copper loadings to the Publicly-Owned Treatment Works (POTW) and to account for influent copper variability.

C. An inventory of each discrete category of copper sources and an estimate of each category's annual mass contribution relative to the total POTW loading. The analysis shall include both short-term (daily, weekly) and long-term (seasonal) fluctuations from each source. Where monitoring data are not available, estimates and the source of each estimate shall be provided. At a minimum, the following potential sources of copper shall be evaluated:

1. Public and private water supply(ies) that provide water to the users of the Permittee's collection system including any private sources that supply water to industrial users of the Permittee's collection system;

2. Significant Industrial Users (SIUs) of the Permittee's collection system;

3. Industrial/commercial sources that are known to, or are suspected of, discharging copper. These shall include, but not be limited to, industries that do not meet the definition of a SIU, medical facilities, printers, schools, laboratories, photo processing operations, laundry and dry cleaning operations, and other institutions that may discharge wastewater to the POTW;
   a. Domestic, commercial, and industrial septage, hauled

wastewater, or liquid sludge received from other POTWs as well as landfill leachate that is treated at the POTW;

b. Household domestic wastewater that includes chemical additives, particularly copper-based root control additives; and

c. Side-stream flows from sludge dewatering, compost area runoff, or any other internal plant flow or treatment chemical process.

As part of these evaluations, the Permittee shall assess the impact of copper on the POTW influent and effluent, sludge quality, sludge processing, activated sludge (concerns/inhibition), the receiving water and aquatic life.

D. A mass balance delineating the sources of copper entering the POTW and the fate of copper within the POTW;

E. A determination of the projected maximum allowable POTW headworks loading for each discrete category of copper discharged to the POTW, a description of the specific treatment technologies and source reduction initiatives that will be implemented to meet the projected maximum allowable POTW headworks loadings, schedules for the implementation of the selected treatment technologies and source reduction measures, and an estimate of the expected copper reductions associated with the implementation of the selected treatment technologies and source reduction measures.

II. DISCRETE COPPER SOURCE INVESTIGATIONS

A. WATER SUPPLY

1. The evaluation of the domestic drinking and industrial water supply(ies) that serve(s) the users of the POTW shall, at a minimum, include:
   a. A determination of the quantity and percent of the total copper loading in the POTW influent that can be attributed to the copper found in the raw water supply(ies) as well as the copper that has leached from homeowner distribution systems;
   b. An evaluation of the feasibility (consisting of a desktop and/or demonstration study) and status of implementation of various corrosion control technologies, including, but not limited to, each of the following, applied separately, and where appropriate in combination with one another, to achieve optimal corrosion

control for that particular water system:

(1) Alkalinity and pH adjustment;
(2) Calcium hardness adjustment; and
(3) Phosphate or silicate-based corrosion inhibitors (The evaluation of phosphorus-based additive alternatives must also consider the impacts of the additional phosphorus on receiving water quality).

c. An assessment of the impact of the additional treatment options on other drinking water quality parameters (e.g. lead, alkalinity, pH, bacteria, calcium, disinfection byproducts formation, taste, odor, color, etc...) within the water supply system;
d. An evaluation of the materials that comprise the water distribution system;
e. Identification of chemical, physical, and other constraints that may affect the implementation of a particular treatment option for the drinking water supply;
f. A description of each water supply's management, its relation to the POTW authority and the water supply's compliance status with the requirements of EPA's Lead and Copper Rule. Identify any barriers to a coordinated, cost-effective joint approach to copper reduction in the water supply(ies) beyond the minimum requirements of the Lead and Copper Rule. Identify what actions can be taken to overcome the identified barriers.

B. EVALUATION OF INDUSTRIAL USERS

An evaluation of the copper contributions from the industrial users to the POTW that shall include:

1. INVENTORY
   Identification, listing, and evaluation of all industrial and commercial users that discharge copper to the POTW. These sources may include, but are not limited to, significant industrial users[1], such as electroplaters, metal finishers, metal fabrication and machine shops,

[1] *Under 40 C.F.R. 403.3(t), the term Significant Industrial User means any industrial user subject to Categorical Pretreatment Standards under 40 C.F.R. 403.6 and 40 C.F.R chapter I, subchapter N, or any other industrial user that discharges an average of 25,000 gallons per day or more of process waste water to the POTW or contributes a process waste stream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant.*

leather tanning and textile mills. Other potential industrial/commercial copper sources may include medical facilities, printers, schools, laboratories, photo processing operations, laundry and dry cleaning operations, or other institutions that may contribute wastewater to the POTW where dyes or other products used in these operations may contain copper. The amount of copper annually discharged from these sources to the POTW shall be expressed in pounds and as a percent of the total amount of copper being introduced to the POTW from all sources.

2. LOCAL LIMITS EVALUATION
   a. An evaluation of the adequacy of any existing local limit for copper (or other metal of concern) developed by the POTW. The evaluation shall include a comprehensive headworks analysis that quantifies the total amount of copper being introduced to the POTW from all categories of sources and the maximum allowable headworks loading from all categories of sources.
   b. Based upon the headworks analysis, and the other evaluations included in the Scope of Work, determine the need to:
      (1) develop a local limit for copper;
      (2) revise any existing local limit(s) for copper; and
      (3) expand the applicability of the limit(s) to include new industrial/commercial users if the evaluations conducted in this scope of work reveal that more stringent controls are necessary.
   c. The local limits evaluation shall be performed in accordance with EPA's Guidance Manual for the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program (Dec.,1987). In the event that the Copper Optimization Engineering Report and headworks analysis determines that the treatment modifications and source reduction measures selected by the Permittee under Paragraph IV.D. of this Scope of Work are not expected to result in the POTW's compliance with its NPDES Permit copper limits, and that the local domestic/background copper loadings will continue to be greater than the maximum allowable headworks loading allowing no allocation for any pollutant loadings from industrial users, a local limit for copper must be established in accordance with Paragraph II.B.2.d. In the event that the

treatment modifications and source reduction measures selected by the Permittee under Paragraph IV.D. of this Scope of Work are expected to result in the POTW's compliance with its NPDES Permit copper limits, the local limits established for copper must be consistent with the maximum allowable industrial headworks loading.

d. Under those circumstances where the headworks loading analysis determines that there is no allocation for any pollutant loadings from industrial users due to contributions from other sources, the copper local limit must be developed at a level equal to the POTW's NPDES copper limit, adjusted to reflect the POTW's removal efficiency for copper. For example, if the POTW's NPDES permit monthly average copper limit is 15 micrograms/liter (ug/l) and the POTW is capable of removing 80% of the copper discharged to the POTW, the monthly average local limit for copper would be established at (15 ug/l)/(0.2) or 75 ug/l.

e. The development of the local limit for copper or revisions to the local limit for copper under this paragraph shall be included as a separate section of the engineering report that must be submitted pursuant to Paragraph III.1. of this Order for EPA's review and concurrence.

3. TECHNOLOGY/PRETREATMENT EVALUATION

An evaluation of industry-specific treatment technologies or operational modifications that must be implemented to ensure compliance with the local limits calculated for copper in Paragraph II.B.2. above. The evaluation can be conducted by the Permitee or can be delegated to the industrial/commercial user. The evaluation of facility-specific treatment technologies or operational modifications necessary to comply with any local limits established under this Order shall include, but shall not be limited to, the following:

a. The name and location of the industrial/commercial facility (the "facility");

b. A description of the operations conducted and major products produced at the facility with a specific emphasis on those activities and operations that contribute copper to the facility's

wastewater;

c. An evaluation of the characteristics of the wastewater discharged to the POTW, including additional representative sampling necessary to quantify the copper contribution from the facility;

d. A description of the wastewater treatment unit operations and processes employed at the facility including an estimate of the annual mass copper removal efficiency of the treatment facilities with specific emphasis on those operations and processes that remove copper;

e. A detailed description of all treatment technologies and operational modifications that may potentially reduce the quantity of copper discharged from the facility, including an estimate of the expected annual copper reduction and capital and operation and maintenance cost associated with the implementation of each alternative; and

f. Prioritization of the alternatives based upon their expected effectiveness, technical and economic feasibility.

4. POLLUTION PREVENTION EVALUATION

In addition to the technology/pretreatment evaluation required in Paragraph II.B.3. above, the POTW shall develop, or require each of the commercial/industrial users that discharge copper to the POTW to develop, a Waste Minimization Plan for the purpose of further reducing the copper loadings from each industrial/commercial user through pollution prevention/source reduction alternatives. At a minimum, the Waste Minimization Plan for each significant source of copper, shall include, but shall not be limited to, the following information:

a. The name of the industrial/commercial facility and location of the site;

b. A general description of the major products manufactured and produced at the facility;

c. A process flow diagram of the unit operations highlighting those activities and operations that contribute copper to the facility's wastewater;

d. An evaluation of source reduction approaches available to the generator that may reduce copper in the commercial/industrial wastestreams. The evaluation shall consider at least the

following areas:

(1) Raw materials changes;
(2) Operational process changes;
(3) Product quality changes; and
(4) Administrative steps taken to reduce copper including but not limited to:
    (a) Inventory Control;
    (b) Employee Award Programs;
    (c) In-house Policies;
    (d) Employee Training;
    (e) Corporate or Management Commitment, and
    (f) Other Programs or Approaches;

e. An evaluation of the effects of the source reduction methods on emissions and discharges to other media;

f. The report shall prioritize each evaluated approach and shall also discuss the following:
    (1) Expected change in the amount of copper generated;
    (2) Technical and financial feasibility; and
    (3) Employee health and safety implications;

g. A list of alternatives not selected for further evaluation as a potentially viable source reduction approach and a rationale for rejecting each alternative.

5. RECOMMENDATIONS

Evaluate combinations of both pretreatment technologies and pollution prevention approaches to determine the most effective course of metals reduction.

C. SEPTAGE, LEACHATE, AND OTHER HAULED WASTES

1. SEPTAGE

a. Report the quantity and category (homeowner, commercial, neighboring community, etc...) of septage received at the POTW and the total annual copper loading as a percentage of the total annual copper loading to the POTW. Provide the basis for the measurement or estimate. Describe any chemical monitoring, tracking, or permit system used to control the level of septage discharged to the POTW;

b. Identify the copper loading from each category of septage on an

average daily and annual basis, describing whether there are seasonal changes in the amount or character of the septage;

c. If septage discharges are accepted from communities not served by the same water supplier as the POTW, these discharges must be sampled, and separately identified as part of the program outlined under Paragraph III. Describe whether the contributing communities comply with EPA's Lead & Copper Rule and whether they have taken any additional corrosion control measures to reduce copper beyond the requirements of the Lead & Copper Rule.

2. LEACHATE
   a. Identify the name and location of the source, and the location of the discharge of any leachate received by the POTW; and
   b. Report the average daily, monthly average and annual volume of leachate received by the POTW. Characterize the chemical content of the leachate and determine the total annual copper loading of the leachate as a percentage of the total annual copper loading to the POTW providing the basis for the measurement or estimate. Describe any chemical sampling, tracking, or permit system used to monitor or regulate the leachate received by the POTW.

3. OTHER HAULED WASTEWATERS
   a. If the Permittee accepts non-septage hauled wastewater from industrial or commercial establishments, describe the approval process for individual or contract dischargers citing any sampling protocols and the local sewer use ordinance, where applicable.
   b. Identify all non-septage wastewaters hauled to the POTW and describe the chemical monitoring and the tracking or permit system used to control such discharges.
   c. Report the amount of non-septage wastewater delivered to the POTW on an average daily and annual basis.
   d. Determine the non-septage hauled waste copper loading as a percent of the total POTW loading. Provide the basis for the measurement or estimate.

4. Identify control strategies for septage, leachate and other hauled wastes including scheduling modifications, chemical treatment at

the point of injection, restrictions on, or banning of, categories of discharges, or other means of improved management controls and prioritize the alternatives based upon their expected effectiveness, technical and economic feasibility.

D. HOUSEHOLD DOMESTIC WASTES

1. Identify through a residential survey, by sales analyses of products commonly available in the region, or by estimate of domestic chemical product usage, the amount of copper that may be discharged to the collection system from the use of household chemical products.

2. Estimate the usage of copper-based root control products within the sewered and non-sewered septage-generating service areas. Consider homeowner and contractor use of these chemical additives.

3. Estimate the annual household domestic waste copper loading as a percent of the total annual POTW copper loading providing the basis for the measurement or estimate.

4. Propose the development and implementation of public outreach and programs that educate consumers regarding the impact of household products on the environment and the availability of alternative products.

5. Consider bans on sales or use of products associated with increased levels of copper in the POTW effluent and explain the rationale and limitations for either implementing or not implementing any bans.

E. SIDE-STREAM OR INTERNAL FLOWS

1. Describe the POTW unit operations and processes and provide a process flow diagram highlighting side-stream return flows from sludge dewatering, compost area runoff, and locations of septage introduction, chemical addition, etc...

2. Identify the quantity of all wastewater treatment chemical additives

used at the POTW, chemical makeup, injection points, and seasonal or episodic usage patterns.

3. Evaluate the annual side-stream and internal copper loading as a percent of the total annual POTW copper loading providing the basis for the measurement or estimate.

4. Identify alternative POTW management or treatment options for the reduction of copper in side-streams, internal flows, or chemical usage and implementation time frames for each considered option.

III. POTW MODIFICATIONS

A. An assessment of the percent of the annual copper loading in the wastewater influent that has historically been removed by the POTW noting any seasonal variations.

B. Provisions for a sampling program that shall be initiated within 90 days of the issuance of this Order, in which weekly monitoring of the level of total and dissolved copper in the POTW influent and effluent, side-streams, and any leachate discharged to the collection system or wastewater treatment facility shall be conducted. This sampling program shall continue for three consecutive months and shall be comprised of twenty-four hour composite samples. Influent and side-stream sampling shall be coordinated with effluent copper sampling and shall be representative of all flows entering the POTW. The results of this monitoring shall be included as a separate table in the report.

C. Provisions for a sampling program that shall be initiated within 90 days following the issuance of this Order, in which weekly monitoring of the level of total and dissolved copper in septage and any hauled wastewater discharges to the POTW shall be conducted. Representative weekly grab samples shall be taken for three consecutive months. Where possible, the grab samples shall be coordinated with the composite sampling requirements of Paragraph III.B. The results of this monitoring shall be included as a separate table in the report.

D. Provisions for a three-month sampling program that shall be initiated within 90 days of the issuance of this Order, in which weekly monitoring of the level of total and dissolved copper in the effluents from various

unit processes at the POTW (i.e. primary effluent, secondary effluent, final effluent, sludge, etc...) are used to develop a mass balance that characterizes the level of copper removal through the various treatment operations. Where possible, the samples shall be coordinated with the composite sampling requirements of Paragraphs III.B and III.C. Identify gaps in this mass balance exercise explaining where copper "losses" may have occurred. The results of this monitoring shall be included as a separate table in the report.

E. A summary of the results of the monitoring required in III.B., III.C., and III.D. above, including an assessment of the magnitude and variability of the level of copper entering the POTW to determine whether all likely sources of copper have been identified and whether effluent variability correlates to influent variability or is the result of treatment variability or other factors.

F. A quality assurance/quality control program to ensure that appropriate sampling and analytical techniques and chain of custody procedures are implemented such that the monitoring results of the sampling programs are accurate at the levels required by the permit's effluent limits (i.e. clean techniques are used where required and the analytical equipment used to analyze the samples is capable of achieving the detection levels required by the NPDES permit effluent limit).

G. An evaluation of the POTW's ability to achieve greater removals of copper through operational changes, including but not limited to, single-point and multiple-point chemical addition, and/or installation of additional treatment. These evaluations shall include an assessment of the level of copper that is expected to be removed through the implementation of the evaluated treatment plant modifications.

H. Development of capital and operational costs and schedules for implementing any improvements necessary at the POTW to reduce the copper content in the effluent.

IV. RANKING OF SOURCES AND CONTROL STRATEGIES

A. Rank each category of copper sources, including side-stream sources, by annual average quantity and percent contribution to the overall POTW loading. If important seasonal differences exist, rank the sources during

the various seasons.

B. Summarize the influent and effluent copper reduction potential of each of the alternatives evaluated under Paragraphs II and III.

C. For each alternative that is likely to reduce the level of copper discharged by the POTW, evaluate the technical, political, and economic feasibility of the alternative and rank each alternative with regards to effectiveness and implementability.

D. Select the options, or mix of alternatives, that provide the greatest likelihood of achieving significant effluent copper reduction leading to compliance with the POTW effluent limits.

E. Include specific schedules for the implementation of each of the alternatives selected under Paragraph IV.D and propose a monitoring program that will determine the effectiveness of the completed treatment modifications and source reductions measures.

ATTACHMENT B

INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (From the effective date of this Order and until the earliest of (1) the date that EPA modifies the terms and conditions of the interim limits or (2) the date that EPA determines that the Town has not complied with the interim milestones set forth in this Order, or (3) the date for completion of the relevant Implementation Schedule)

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Concentration			
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Total Copper[1]	25 ug/l	Report	~~1/Week~~ 1/month	24-hr composite
Total Ammonia Nitrogen, as N (Nov. 1- June 15)[2]	Report	Report	2/Week	24-Hr composite
Total Ammonia Nitrogen, as N (June 15- Oct. 31)[3]	10 mg/l	Report	2/Week	24-Hr composite

[1] The permittee shall operate the treatment system at all times to optimize the removal of copper.

[2] The permittee shall operate the treatment system at all times to optimize the removal of ammonia nitrogen.

[3] The 10 mg/l interim limit is a seasonal average, i.e. the average of all Total Ammonia Nitrogen samples collected between June 15 and October 31. The seasonal average result shall be reported on the October discharge monitoring report. The permittee shall report the average monthly and maximum daily results for each month during the season. The permittee shall operate the treatment system at all times to optimize the removal of ammonia nitrogen.