UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
1 CONGRESS STREET - SUITE 1100
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.: **MA0101010**

PUBLIC NOTICE DATE:

NAME AND ADDRESS OF APPLICANT:

City of Brockton
City Hall
45 School Street
Brockton, MA 02301

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Brockton Advanced Water Reclamation Facility
303 Oak Hill Way
Brockton, Massachusetts 02401

NAME AND ADDRESS OF CO-PERMITTEES

Town of Abington
Sewer Department
350 Summer Street
Abington, MA 02351

Town of Whitman
Department of Public Works
100 Essex Street
P.O. Box 454
Whitman, MA 02382

RECEIVING WATER: **Taunton River Watershed (MA62)**
Salisbury Plain River

CLASSIFICATION: **Class B**

I. Proposed Action, Type of Facility and Discharge Location

The above named applicant has requested that the U.S. Environmental Protection Agency reissue its NPDES permit to discharge into the designated receiving waters, the Salisbury Plain River. The facility is an advanced wastewater treatment facility engaged in the collection and treatment of domestic and industrial wastewater. Two co-permittees, the Towns of Abington

and Whitman discharge wastewater to the treatment plant owned and operated by the applicant. The draft permit establishes requirements for the permittee and co-permittees.

The existing NPDES permit was issued on September 30, 1999 and expired September 30, 2003. The applicant filed a complete application for permit reissuance as required by 40 Code of Federal Regulations (CFR) § 122.6. The existing permit authorizes a discharge from Outfall 001. The draft permit will be written to reflect the current operation and conditions at the facility.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on recent effluent monitoring data may be found 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 flow process diagram of the facility.

III. Permit Basis and Explanation of Effluent Limitation Derivation

Facility Description

The Brockton Wastewater Treatment Facility is an 18 MGD advanced wastewater treatment facility. The wastewater enters at the mechanical bar racks and grit chamber with a cyclone separator to remove coarse sewage solids and other material from the influent. Iron salts are added at this point to aid in phosphorus removal by precipitation. The wastewater then flows to four primary settling tanks. If necessary, lime is added for pH adjustment. Wastewater then goes through diffused aeration activated sludge treatment and sand filtration. During warm weather months, nitrification, and phosphorus removal and disinfection are provided. Disinfected effluent is dechlorinated using sulfur dioxide gas. The treated wastewater then flows down a cascade aerator into the Salisbury Plain River.

Sludge from the secondary clarifers is pumped into a holding tank and thickened in a diffused air floatation thickener with polymer. The thickened activated sludge is mixed with primary sludge and uses a centrifuge for dewatering, and incinerated on-site. The remaining ash is buried in the POTW landfill.

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 publically owned treatment works, technology based requirements are effluent limitations based on secondary treatment as defined in 40 CFR Part 133. However, the state may require more stringent conditions than promulgated effluent limitations or standards in sections 301, 304, 306, 307, 318, and 405 of the CWA that would be necessary to achieve water quality standards established under section 303 of the CWA, according to 40 CFR§ 122.44. MA DEP require tertiary treatment for this facility.

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 Clean Water Act (CWA), discharges are subject to effluent limitations based on Water Quality Standards. The Massachusetts Surface Water Quality Standards include the 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 site specific criteria are established. The State will limit or prohibit discharges of pollutants to surface water to assure that surface water quality standards of the receiving water 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, or has reasonable potential to cause, or contributes 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 existing controls on point and non-point sources of pollution, variability of the pollutant in the effluent, sensitivity of the species to toxicity and where appropriate, the dilution of the effluent in the receiving water.

According to 40 CFR 122.44(l), when a permit is reissued effluent limitations, standards or conditions must be at least as stringent as effluent limitations in the previous permit unless the circumstances on which the previous permit were based have materially and substantially changed since the time the permit was issued.

Waterbody Classification and Usage
The receiving water, Salisbury Plain River, is classified as a Class B warm water surface water in the Massachusetts Surface Water Quality Standards, 314 CMR 4.05(4)(a). Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. The waters should have consistently good aesthetic value.

A warm water fishery is defined in the Massachusetts Surface Water Quality Standards (314 CMR 4.02) as water in which the maximum mean monthly temperature generally exceeds 20° Celsius during the summer months and are not capable of supporting a year-round population of cold water stenothermal aquatic life.

Flow
The permit requirement for reporting monthly average flow and maximum daily flow has been carried over in the draft permit. To address high flows, the City of Brockton will implement an I/I Control Plan as discussed in the I/I section of this fact sheet, and flows from communities outside of Brockton shall be capped as described below.

The City of Brockton has a contractual agreement, that will continue during this permit cycle, to accept up to 1.0 MGD of wastewater from the Town of Abington and up to 1.0 MGD of wastewater from the Town of Whitman at the treatment facility. The permit requires that wastewater flows from Abington and Whitman be restricted to wastewater originating from within the Towns of Abington and Whitman.

In communities other than Abington and Whitman, the permittee is not authorized to accept any new sewer connections from facilities not currently connected to the WWTP. Increased flows from facilities currently connected to the WWTP shall be offset, to the extent feasible, in order to minimize any net increase in flow to the WWTP.

Available Dilution
Available dilution water of the receiving water is determined using the facility's design flow and the 7-day mean low flow at the 10-year recurrence interval (7Q10) of the receiving water just above the facility's outfall.

Qwwtp = Brockton WWTP Design Flow : 18 MGD

Receiving stream - Salisbury Plain River

There is no stream gaging information available on the Salisbury Plain River. The 7Q10 of the Wading River is a near-by river with similar hydrologic characteristics. An in-stream 7Q10 flow of 0.39 MGD has been used to determine the dilution factor.

Qs = In stream 7 day 10 year low flow (7Q10) : 0.39 MGD

Dilution Factor = $(Q_s + Q_e) / Q_e = (0.39 + 18) / 18 = 1.02$

Conventional Pollutants
$CBOD_5$, BOD_5, and TSS
The limits for $CBOD_5$, and TSS as well as the reporting requirements for BOD_5 will remain the same as in the existing permit. Concentration and mass limits are carried over from the existing permit for $CBOD_5$, and TSS and, are based on the facility's design flow of 18 MGD. The limits are more stringent than secondary treatment limits due to water quality concerns in the receiving water.

Bacterial Limitations, **Dissolved Oxygen, and pH**
The numerical limitations for fecal coliform, dissolved oxygen (DO), and pH are based on state certification requirements under Section 401 (a) (1) of the CWA, as described in 40 CFR 124.53 and 124.55, and will remain unchanged from limits for these parameters in the existing permit.
To reflect the seasonal period of chlorination, the draft permit only includes bacteria limits for the period between April 1 through October 31. The average monthly and maximum daily limits will remain the same as in the existing permit, a geometric mean of 200/100 ml and not more than 10 percent of the samples taken during a calendar month shall exceed 400/100 ml.

Non-Conventional Pollutants
Total Phosphorus
The Massachusetts Surface Water Quality Standards (314 CMR 4.00) does not contain numerical criteria for total phosphorus. The criteria for nutrients is found at 314 CMR 4.05(5)(c), which states that nutrients "shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication". The Water Quality Standards also require that "any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best average total phosphorus limit of 0.2 mg/l which represents the highest and best practical treatment for POTWs.. Therefore, the average monthly phosphorus concentration limit in the draft permit is 0.2 mg/l with an average monthly mass limit of 30 lbs/day.

The 0.2 mg/l total phosphorus limit is a 60 day rolling average limit. The 60 day average value for each day in a given month, beginning on the 60th day after April 1, must be calculated and the highest 60 day average value for that month must be reported on the monthly discharge monitoring report (DMR). In addition, the maximum daily value must be reported for each month.

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. The EPA Quality Criteria of Water, 1986 (Gold Book) recommends in-stream phosphorus concentrations of 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impounds, and 0.025 mg/l within the lake or reservoir.

More recently, EPA has released "Ecoregional Nutrient Criteria", established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The

published criteria represent conditions in waters in that ecoregion minimally impacted by human activities, and thus representative of water without cultural eutrophication. Brockton is within Ecoregion XIV, Eastern Coastal Plains. The total phosphorus criteria for this ecoregion, found in Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV, published in the December, 2000 is 24 ug/l (0.024 mg/l).

A report published in February 2001 by the Taunton River Watershed Association includes monitoring data for total phosphorous upstream and downstream of the wastewater treatment plant. This report indicates that eutrophication is a problem in the Salisbury Plain River due to elevated nutrient levels. Data for a segment of the Salisbury Plain River downstream of the wastewater treatment plant shows a range of total phosphorus concentrations between 0.08 to 0.96 mg/l in 2000 while upstream of the Brockton WWTF the range for total phosphorus in 2000 was 0.01 to 0.66 mg/l. Seasonal monthly average effluent data from DMRs for the period May 2001 to October 2002 shows the range of phosphorus between 0.3 and 1.7 mg/l. Since the treatment plant is the only facility discharging into the river between the two sampling points, the effluent from the facility appears to be the primary source of phosphorus between the two points.

When, in the future MADEP adopts nutrient criteria, a TMDL is completed, or additional water quality information shows that the phosphorus limit is not stringent enough to meet water quality standards, a more stringent limit will be imposed. MADEP and EPA expect that future upgrades to the wastewater treatment plant will include design considerations for effluent limitations that achieve phosphorus levels that meet the phosphorus criteria for this ecoregion.

Nitrogen
The limits on total ammonia are based on water quality concerns and potential nutrient impacts to the Taunton River Watershed. Nitrogen loadings to Mt.Hope Bay are a significant concern and the facility has been estimated to contribute as much as 30% of the nitrogen loading to the Bay. Therefore, reporting requirements for Total Kjeldahl Nitrogen (TKN) and, Nitrite/Nitrate will provide information on the permittee's discharge of nitrogen and shall remain in the draft permit.

MADEP and EPA expect that future upgrades to the wastewater treatment plant will include design considerations for stringent nitrogen effluent limitations.

Toxic Pollutants
Chlorine:
Chlorine and chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The effluent limit for daily maximum Total Residual Chlorine (TRC) was developed using the chronic criterion defined in the EPA Quality Criteria for Water, 1986 (Gold Book), as adopted by the MADEP into the State Water Quality Standards. The criterion was multiplied by the available receiving water dilution for the appropriate flow scenario to obtain the TRC limit found in the draft permit. The criterion states that the average total residual chlorine in the receiving water should not exceed 11 ug/l for chronic toxicity protection, and 19 ug/l for acute toxicity protection. Therefore, for maximum protection from the toxic effects of TRC, the dilution factor is multiplied by the chronic criterion to obtain a maximum daily TRC limit for the flow scenario.

Chlorine calculation:
Acute chlorine water quality criteria is 19 ug/l.
Chronic chlorine water quality criteria is 11 ug/l.
Design flow dilution factor is 1.02

Average Monthly Total Residual Chlorine Limit = 1.02 x 0.011 mg/l = 0.011 mg/l = 11.22 ug/l

Maximum Daily Total Residual Chlorine Limit = 1.02 x 0.019 mg/l = 0.019 mg/l = 19.38 ug/l

Metals

Certain metals in water can be toxic to aquatic life. There is a need to limit toxic metal concentrations in the effluent where aquatic life may be impacted. An evaluation of the reasonable potential of toxicity on the concentration of metals in the effluent shows there is a reasonable potential of toxicity for copper.

EPA is required to limit any pollutant or pollutant parameter that is or may be discharged at a level that caused, has reasonable potential to cause, or contributes to an excursion above any water quality criterion.

Calculation of reasonable potential for copper:

The copper limits are based on a hardness of the receiving water recorded in the recent toxicity tests and, the National recommended Water Quality Criteria. See Federal Register, December 10, 1998.

Allowable Receiving Water Concentration, C = Criteria (Total Recoverable) x Dilution Factor

Copper: Acute C = 7.29 ug/l x 1.02 = 7.44 ug/l which is less than 9.7 ug/l in the effluent concentration of copper averaged from January 2002 to June 2003 as recorded on the discharge monitoring reports. There is a reasonable potential that copper being discharged in the effluent will exceed the water quality criteria.

Chronic C = 5.17 ug/l x 1.02 = 5.27 ug/l which is less than 9.7 ug/l in the effluent concentration of copper averaged from January 2002 to June 2003 as recorded on the discharge monitoring reports There is a reasonable potential that copper being discharged in the effluent will exceed the water quality criteria.

Water Quality Criteria for hardness-dependent metals:

Where: m_a = pollutant-specific coefficient
b_a = pollutant-specific coefficient
h = Hardness = 50 mg/l as $CaCO_3$
ln = natural logarithm
CF = pollutant-specific conversion factor (CF is used to convert total recoverable to dissolved metal)

Chronic Criteria (dissolved) = $\exp\{m_c[\ln(\text{hardness})] + b_c\}$ (CF)

here: m_a = pollutant-specific coefficient
b_a = pollutant-specific coefficient
h = Hardness = 50 mg/l as $CaCO_3$
ln = natural logarithm
CF = pollutant-specific conversion factor (CF is used to convert total recoverable to dissolved metal)

Chronic Criteria (dissolved) = $\exp\{m_c[\ln(\text{hardness})] + b_c\}$ (CF)

Where: m_c = pollutant-specific coefficient
b_c = pollutant-specific coefficient
h = Hardness = 50 mg/l as $CaCO_3$
ln = natural logarithm
CF = pollutant-specific conversion factor (CF is used to convert total recoverable to dissolved metal)

Calculation of acute limit for copper :

$m_a = 0.9422$ $b_a = -1.7$ CF = 0.96

Acute criteria (dissolved) = exp{0.9422[ln(50)] - 1.7} (.96) = 6.99 ug/l
Acute criteria (Total) = exp{0.9422[ln(50)] - 1.7} = 7.29

Dilution Factor = 1.02

Effluent Limitation: = 1.02 x 6.99 ug/l = 7.13 ug/l (dissolved)
Total Recoverable = 7.13 / CF = 7.13 / 0.96 = 7.43 ug/l *

The acute (maximum daily), water quality based limitation for Total Recoverable Copper is 7.4 ug/l.

Calculation of chronic limit for copper :

$m_c = 0.8545$ $b_c = -1.7$ CF = 0.96

Chronic criteria (dissolved) = exp{0.8545[ln(50)] - 1.7} (.96) = 4.96 ug/l
Chronic criteria (Total) = exp{0.8545[ln(50)] - 1.7} = 5.17

Dilution Factor = 1.02

Effluent Limitation: = 1.02 x 4.96 ug/l = 5.06 ug/l (dissolved)
Total Recoverable = 5.06 / CF = 5.06 / 0.96 = 5.27 ug/l *

The chronic (monthly average), water quality based limitation for Total Recoverable Copper is 5.3 ug/l.

* Inverse conversion factor is used to determine total recoverable metal. EPA Metals Translator : Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA- 823-B-96-007) is used as the basis for using the criteria conversion factor. National guidance requires that permit limits be based on total recoverable metals and not dissolved metals. Consequently, it is necessary to apply a translator in order to develop a total recoverable permit limit from a dissolved criteria. The translator reflects how a discharge partitions between the particulate and dissolved phases after mixing with the receiving water. In the absence of site specific data on how a particular discharge partitions in the receiving water, a default assumption that the translator is equivalent to the criteria conversion factor is used in accordance with the Translator Guidance.

Whole Effluent Toxicity Tests
National studies conducted by the EPA have demonstrated that industrial and domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Based on the potential for toxicity from domestic and industrial contributions,

the state water quality criterion, the level of dilution at the discharge location and in accordance with EPA national and regional policy and 40 C.F.R.122.44(d), the draft permit includes a whole effluent acute toxicity limitation (LC50) and acute biomonitoring requirements. (See "Policy for the Development of Water Quality Based Permit Limitations for Toxic Pollutants", 50 Federal Register 30748, July 24, 1985, and EPA's Technical Support Document for Water Quality Based Toxics Control", September, 1985 and the "Implementation Policy for the Control of Toxic pollutants in Surface Waters", February 23, 1990.)

Pursuant to EPA Region I policy, a discharge having a dilution ratio less than 10 to 1 requires chronic and modified acute toxicity testing at least 4 times per year. An additional two toxicity tests are required when the treatment plant total daily flow exceeds 30 mgd. These two test may be conducted during any month of the year.

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 analyses; (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistics effects of pollutants; and (3) pollutants for which there are inadequate analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants

Therefore, based on the potential for toxicity from domestic contributions, the potential for toxicity resulting from industrial contributions, as discussed in the section of the fact sheet addressing pretreatment, the available dilution at the discharge location, water quality standards and in accordance with EPA regulation and policy, the draft permit includes chronic and acute effluent toxicity limitations and monitoring requirements. (See EPA's Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-90-01).

The Chronic-No Observed Effect Concentration (C-NOEC) limitation in the draft permit prohibits chronic adverse effects (e.g. on survival, growth, and reproduction), when aquatic organisms are exposed to the POTW discharges at the calculated available dilution. The chronic (C-NOEC) whole effluent toxicity limits of I.A.1 was calculated using the in-stream waste concentration ("IWC") of the WTP effluent:

IWC = 1/1.02 x 100 % = 98%

The LC50 limitation prohibits acute effects (lethality to more that 50% of the test organisms when exposed undiluted (100% of effluent) to POTW effluent for a period of time.

Pretreatment Program

The permittee is required to administer a pretreatment program based on the authority granted under 40 CFR § 403 and section 307 of the Clean Water Act. Brockton's pretreatment program received EPA approval on September 28, 1990 and, as a result, appropriate pretreatment program requirements were incorporated into the previous permit commensurate with that approval and Federal Pretreatment Regulations in effect when the permit was issued.

Since issuance of the previous permit Federal Pretreatment Regulations in 40 CFR §403 were amended in October 1988 and, again in July 1990. Those amendments established new requirements for implementation of pretreatment programs. By reissuing this NPDES permit, the permittee is obligated to modify its pretreatment program to be consistent with current Federal Regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) evaluating local limits; (2) revise its local sewer-user ordinance, as appropriate, to be consistent with Federal Regulations; (3) revise

an enforcement response plan: (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) adopt a definition of significant industrial user.

These requirements are necessary to ensure continued compliance with the POTW's permit and its sludge use or disposal practices.

The draft permit requires the permittee to provide EPA in writing within 180 days of the permit's effective date a: (1) technical report analyzing their need to revise local limits; and (2) description of proposed changes to permittee's pretreatment program deemed necessary to assure conformity with current Federal Pretreatment Regulations. These requirements may be new to this draft permit and are commensurate with current EPA New England, pretreatment policy. In addition, the permittee must continue to submit, annually on March 1, a pretreatment report detailing the activities of the program for the twelve month period, 60 days prior to the due date.

Based on the potential for toxicity as a result of industrial discharges to the POTW, and as discussed subsequently, the draft permit includes effluent toxicity limitations and requires the performance of effluent toxicity tests. These tests will assist in assessing the effectiveness of the permittee's pretreatment program and also may be used as a basis for development of or revision of specific numeral pretreatment limits.

Operation and Maintenance of the Sewer System

The City of Brockton, the Towns of Abington and, Whitman each own and operate a portion of the sewer collection system that transports sewage to the wastewater treatment plant where it is treated at the facility. The draft permit therefore includes the Towns of Abington and Whitman as co-permittees for the operation and maintenance of each Towns separate sewer systems. Specifically, the City of Brockton and the two Towns are each required to comply with Part I.C. Unauthorized Discharges, Part I.D. Operation and Maintenance of the Sewer System and, Part I.E. Alternate Power Source of the draft permit for the portions of the collection system it owns and operates.

Inflow/Infiltration Requirements

The draft permit includes requirements for the permittee and co-permittees to control infiltration and inflow (I/I). I/I is extraneous water entering the wastewater collection system through a variety of sources. The permittee and co-permittees shall develop an I/I removal program commensurate with the severity of the I/I in the collection system. In sections of the collection system that have minimal I/I, the control program will logically be scaled down.

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 reduce 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 and co-permittees have a >duty to mitigate= as stated in 40 CFR '122.41 (d). This requires the permittee and co-permittees 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 MADEP maintain that an I/I removal program is an integral component to insuring permit compliance under both of these provisions.

The facility has frequently exceeded its design flow of 18 MGD particularly, during wet weather events. High flows contribute to the facility being out of compliance with other effluent limits in the permit that potentially impact the water quality of the receiving water. Between January 2002 to June 2003, the facility discharged an average of 20.8 MGD to the Salisbury Plain River. The City of Brockton has agreed to implement an I/I control plan for approximately $20 million dollars over the next seven year to reduce flow.

The MADEP 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).

Sewage Sludge

Section 405(d) of the CWA requires that EPA develop technical standards regulating the use and disposal of sewage sludge. These regulations were signed on November 25, 1992, published in the Federal Register on February 19, 1993, and became effective on March 22, 1993. Domestic sludges which are land applied, disposed of in a surface disposal unit, or fired in a sewage sludge incinerator are subject to Subpart E Part 503 regulations. Part 503 regulations have a self-implementing provision, however, the CWA requires implementation through permits. Domestic sludges which are disposed of in municipal solid waste landfills are in compliance with Part 503 regulations provided the sludge meets the quality criteria of the landfill and the landfill meets the requirements of 40 CFR Part 258.

Subpart E of the Part 503 regulations outlines the standards for the incineration of sewage sludge. The permit contains general requirements, management practices, pollutant limitations, an operational standard, monitoring frequency, record keeping and reporting requirements implementing the provisions of the regulation. The basis of each provision is detailed below.

Pollutant Limitations for Incinerator

The sludge standards regulate seven metals. The pollutant limits in the permit are based on the requirements in 40 CFR '503.43.

Mercury and beryllium are regulated by the National Emission Standard for Hazardous Air Pollutants (NESHAPs) found in 40 CFR Part 61. The permit requires that the firing of sewage sludge in the facility's incinerators does not cause a violation of the NESHAPs for mercury and beryllium.

The allowable sludge concentrations for arsenic, cadmium, chromium, and nickel are calculated from Equation (5) in 40 CFR '503.43(d)(1):

$$C = \frac{RSC \times 86{,}400}{} \qquad \text{Eq. (5)}$$

$$DF \times (1 - CE) \times SF$$

Where:

C = Daily concentration of arsenic, cadmium, chromium or nickel in sewage sludge, in milligrams per kilogram of total solids (dry-weight basis).

CE = Sewage sludge incinerator control efficiency for arsenic, cadmium, chromium or nickel, in hundredths.

DF = Dispersion factor, in micrograms per cubic meter per gram per second.

RSC = Risk-specific concentration, in micrograms per cubic meter for arsenic, cadmium, chromium or nickel.

SF = Sewage sludge feed rate, in metric tons per day (dry-weight basis).

86,400 = Conversion factor of 86,400 sec/day.

The parameters, with the exception of the RSC, are site specific to the City of Brockton's incinerator. The RSC is derived for each pollutant based on a risk assessment.

A RSC is the allowable increase in the average daily ground level ambient air concentration for a pollutant above background levels that result from the firing of sewage sludge in an incinerator. It is equivalent to the amount of a pollutant that a person living near the incinerator can inhale with a probability of 1 in 10,000 that the person will contact cancer as a result of inhaling the pollutant.

The RSC was calculated from the equation below:

$$RSC = \frac{RL \times BW}{q^* \times I_a} \times 10^3$$

Where:

RSC = Risk-specific concentration, in micrograms per cubic meter for arsenic, cadmium, chromium or nickel.

RL = Risk level, 1×10^{-4}, or 1 chance in 10,000 of developing cancer.

BW = Body weight, 70 kg (154 lbs). This is the average weight of an adult male.

q_1^* = Allowable dose of a pollutant from EPA's Integrated Risk Information System database. Cancer potency value for each carcinogenic metal (arsenic, cadmium, chromium or nickel), in $(ug/kg\text{-}day)^{-1}$.

I_a = Inhalation rate of 20 m^3/day. Normal inhalation rate for an adult male.

10^3 = Conversion factor of 1000 ug/m^3.

The RSC calculated from this equation is intended to protect the "Highly Exposed Individual" (HEI). The HEI is a person who remains for an extended period of time, 70 years, at the point of maximum ground level pollutant concentration. The RSC values for the metals regulated are found in Tables 1 and 2 of 40 CFR §503.43.

The pollutant limit for lead is calculated using equation (4) of 40 CFR §503.43(c)(1):

$$C = \frac{0.1 \times NAAQS \times 86,400}{} \quad \text{Eq. (4)}$$

DF x (1 - CE) x SF

Instead of using a RSC, a percentage of the National Ambient Air Quality Standard (NAAQS) for lead was used. The NAAQS for lead is found in 40 CFR Part 50.12. It is 1.5 ug/m^3. The reader should refer to equation (5) above for the definitions of DF, CE and SF and apply them with respect to lead. Although lead is classified as a probable human carcinogen, the Clean Air Science Advisor Committee of the Science Advisory Board recommended that the NAAQS for lead be based on the noncarcinogenic effects. Developmental neurotoxicity is considered to be the most sensitive end point for lead exposure. The calculated concentration from Equation (4) also protects the HEI described above.

Operational Standard for Incinerator

Total Hydrocarbon (THC)

The total hydrocarbon (THC) standard, based on §503.44, is an operational standard rather than a risk based standard. Hydrocarbons are simple organic compounds containing carbon and hydrogen. The standard designed is to regulate organic emissions from sewage sludge incinerators. Total hydrocarbons represent a subset of organic compounds and is used in the regulation since it is impractical to attempt to monitor sludge stack emissions for all organic compounds which may be present.

The measured THC value must be corrected to seven percent oxygen and zero percent moisture. The correction to seven percent oxygen is used because seven percent is the standard amount of oxygen used to reference measurements for pollutant limits expressed as concentration; it is also equivalent to 50 percent excess air (excess air is added to a system above the amount of air needed for complete combustion to occur); and without correction, inaccurate readings may occur since oxygen may dilute the THC reading. Similarly, the correction for moisture is needed since the presence of moisture can also dilute the actual THC reading and THC is conventionally expressed in terms of a dry volumetric basis, hence the need to set the standard based on zero moisture.

As with the metals limitations, the THC operational standard is intended to protect the HEI.

Management Practices

The permit contains management practices based on 40 CFR §503.45 that pertain to the operation of the incinerator. The management practices include the installation of equipment for monitoring the CO concentration, the oxygen concentration, and information to determine the moisture content in the stack exit gas. The permit requires that these instruments be installed, operated and maintained in accordance with manufacturer's written instructions. The instruments must meet the performance specifications outlined in "Continuous Emissions Monitoring Guidance for Part 503 Sewage Sludge Regulations." The permit requires that the certification of the Continuous Emissions Monitoring system occur 90 days from the effective date of the permit.

The permit also limits the maximum freeboard temperature for the incinerator, requires notification to EPA and the State if any monitoring equipment is broken or shutdown for longer than 72 hours, and prohibits adversely affecting a threatened or endangered species or their critical habitat.

The monitoring frequency is based on 40 CFR §503.46. The City is required to monitor selected heavy metals six times per year. The record keeping requirements are based on 40 CFR §503.47. The sampling

and analysis requirements are based on 40 CFR §503.8. The general conditions and definitions found in Part II are based on the requirements in 40 CFR Parts 122, 501, and 503. The permit prohibits any discharge of sludge. Section 405(d) of the Clean Water Act (CWA) requires that sludge conditions be included in all POTW permits.

participation and intergovernmental coordination shall be conducted in accordance with Permit Procedures (314 CMR 2.00).

IV. State Certification Requirements

The staff of the Massachusetts Department of Environmental Protection 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.

V. Comment Period, and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the 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.

VI. EPA and MA DEP Contact

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
MA NPDES permit Program Unit
US Environmental Protection Agency
New England, 1 Congress Street, Suite 1100
Boston, MA 02114-2023
Tele: (617) 918-1576

---------- Linda M. Murphy, Director
Date Office of Ecosystem Protection
U.S. Environmental Protection Agency

Attachment A of the Fact Sheet
Brockton Advanced Water Reclamation Facility
Summary of NPDES Permit Reporting Requirements Dates

Permit Page	Requirement and Dates	Submit to:
5.	Copies of the continuous TRC Analyzer recording charts will be submitted with the DMRs. See footnote # 7	EPA/MA DEP
6.	Whole Effluent Toxicity Tests results are due March 31, June 30, September 31, December 31 of each year. See footnote # 11	EPA/MA DEP
8.	Within 90 days of the effective date of this permit, the permittee shall prepare and submit a written technical evaluation to the EPA analyzing the need to revise local limits. See Part 1.A.6.b.	EPA
9.	The permittee shall provide EPA and MA DEP with an annual report describing the permittee's pretreatment activities for the twelve month period ending sixty days prior to the due date. The annual report shall be submitted no later than March 1 of each year. See Part 1.C.2.	EPA/MA DEP
10.	The permittee and two co-permittees shall develop and implement a plan to control I/I to the separate sewer system. The plan shall be available to EPA and submitted to MA DEP six months of the effective date of the permit. See Part 1.E.3.	MA DEP
11.	A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MA DEP annually by the permittee and two co-permittees by the anniversary date of the effective date of the permit See Part I.E.3.	EPA/MA DEP
13	The permittee shall submit certification stating that the continuous emissions monitoring system meets the performance specification. See Part 1. G.4. e.	EPA
16.	The permittee shall submit an annual report containing the information specified in the sludge section of the permit by February 19. See Part 1.G.8.	EPA/MA DEP

17.	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. See Part 1.I.1.	EPA/MA DEP