UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE 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 NUMBER:

MA0003654

PUBLIC COMMENT PERIOD:

July 22, 2002 - September 5, 2002

NAME AND ADDRESS OF APPLICANT:

USGen New England, Inc. (USGenNE)
One Brayton Point Road
Somerset, MA 02726

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Brayton Point Station
One Brayton Point Road
Somerset, MA 02726

RECEIVING WATER:

Mount Hope Bay

CLASSIFICATION:

SB/SA

1 Proposed Action, Type of Facility, and Discharge Location

On January 15, 1998, New England Power Company (NEP) applied to the U.S. Environmental Protection Agency for reissuance of its NPDES permit to discharge into Mount Hope Bay from the Brayton Point Station in Somerset, MA. On September 1, 1998, ownership was transferred from NEP to USGen New England, Inc. (USGen NE).

The application was supplemented with a submittal dated December 21, 2001. The submittal provided information on: 1) Service Water System Biocide Treatment, 2) the SIDTEC On-Line Condenser Cleaning System, 3) Waste Streams from the Proposed Air Improvement Technologies, and 4) Foam Controlling Products.

The facility submitted an additional supplement entitled ""Brayton Point Station, Permit Renewal Application, Section 316(a) and (b) Demonstration" in December 2001. In the Executive Summary to Volume IV and Volume V, "Review of Technologies to Reduce Thermal Discharges, Entrainment, and Impingement Associated with Brayton Point Station", USGenNE points out that an evaluation of cooling system and flow reduction alternatives was begun in 1996 and continued when USGenNE bought the facility. A report in January 1997 identified a range of alternatives that individually or collectively could reduce thermal loading and reduce entrainment and improve impingement survivorship. Based on the January 1997 report, several alternatives were dropped from further consideration because they were believed to be infeasible. The 2001 report provides detailed information on the cooling system and flow reduction alternatives and comprehensively reviews the ways that mechanical-draft cooling towers could be used to reduce the thermal discharges and cooling water flow through Brayton Point Station.

EPA intends to reissue the facility's NPDES permit. This draft permit does not authorize the discharge of "once-through" cooling water and is based on the assumption that the facility will employ mechanical-draft cooling tower technology to meet the draft permit's flow and heat load allowances. The draft NPDES permit has been prepared and should be referred to when reading this fact sheet. The reader may also find it useful to review USGenNE's December 2001 Section 316(a) and (b) Demonstration, as well as EPA's determination pursuant to the Clean Water Act section 316(a) and (b) entitled "Clean Water Act NPDES Permitting Determination for Brayton Point Station's Thermal Discharge and Cooling Water Intake."

Brayton Point Station is a 1600 megawatt fossil fuel electrical generation facility. The current discharge consists of once-through cooling water, metal cleaning waste, low volume waste such as boiler blowdown and water treatment wastes, and intake screen sluice water. As previously stated, EPA believes cooling tower technology will be used to meet the proposed limits, and, therefore, once-through cooling water discharge will be replaced by cooling tower blowdown. Further, EPA believes that air pollution control equipment will be added to the station and that an additional low volume waste stream from air pollution equipment will be added.

The facility is located in Somerset, Massachusetts and discharges its effluent to Mount Hope Bay.

2 Description of Discharge

Attachment A contains:

Figure 1A - station site and location
Figure 2A, 3A - station water use and flow diagrams

Attachment B contains a quantitative description of the discharge in terms of significant effluent parameters based on permit reapplication and operational data.

3 Limitations and Conditions

The effluent limitations of the draft permit, the monitoring requirements, and any implementation schedule (if required) may be found in Part I (Effluent Limitations and Monitoring Requirements) of the draft NPDES permit.

4 Permit Basis and Explanation of Effluent Limitations Derivation

4.1 General Requirements

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. This draft NPDES permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and any applicable State regulations. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, 125, and 136.

When developing permit limits, EPA must consider the most recent technology-based treatment and water quality-based requirements. Subpart A of 40 CFR §125 establishes criteria and standards for the imposition of technology-based treatment requirements in permits under Section 301(b) of the CWA, including the application of EPA promulgated effluent limitations and case-by-case determinations of effluent limitations under Section 402(a)(1) of the CWA. EPA is required to consider technology and water quality-based requirements as well as all limitations and requirements in the current/existing permit when developing permit limits.

Technology-based treatment requirements represent the minimum level of control that must be imposed under Sections 301(b) and 402 of the CWA (see 40 CFR §125 Subpart

A) to meet best practicable control technology currently available (BPT) for conventional pollutants and some metals, best conventional control technology (BCT) for conventional pollutants, and best available technology economically achievable (BAT) for toxic and non-conventional pollutants. Effluent limitations guidelines for the Steam Electric Power Generating Point Source Category are found at 40 CFR Part 423.

In general, the statutory deadline for non-POTW, technology-based effluent limitations must be complied with as expeditiously as practicable but in no case later than three years after the date such limitations are established and in no case later than March 31, 1989 [see 40 CFR §125.3(a)(2)]. Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA can not be authorized by a NPDES permit.

In the absence of published technology-based effluent guidelines, the permit writer is authorized under Section 402(a)(1)(B) of the CWA to establish effluent limitations on a case-by-case basis using best professional judgement (BPJ).

Water-quality based limitations are required in NPDES permits when EPA and the State determine that effluent limits more stringent than technology-based limits are necessary to maintain or achieve state or federal water-quality standards. See Section 301(b) (1)(C) of the CWA. Receiving water requirements are established according to numerical and narrative standards adopted under state law for each water quality classification. When using chemical-specific numeric criteria to develop permit limits both the acute and chronic aquatic-life criteria, expressed in terms of maximum allowable in-stream pollutant concentration, are used. Acute aquatic-life criteria are considered applicable to daily time periods (maximum daily limit) and chronic aquatic-life criteria are considered applicable to monthly time periods (average monthly limit). Chemical-specific limits are allowed under 40 CFR 122.44 (d)(1) and are implemented under 40 CFR §122.45(d). The Region has established, pursuant to 40 CFR 122.45 (d)(2), a maximum daily limit and average monthly discharge limits for specific chemical pollutants.

The facility's design flow is used when deriving constituent limits for daily and monthly time periods as well as weekly periods where appropriate. Also, the dilution provided by the receiving water is factored into this process. Narrative criteria from the state's water-quality standards are often used to limit toxicity in discharges where: (1) a specific pollutant can be identified as causing or contributing to the toxicity but the state has no numeric standard; or (2) toxicity cannot be traced to a specific pollutant.

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 state or federal water-quality standards.

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 causes or has "reasonable potential" to cause or contribute to an excursion above any

water-quality criterion. See CFR Section 122.44(d)(1). An excursion occurs if the projected or actual in-stream concentration exceeds 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 permit's application, Monthly Discharge Monitoring Reports (DMRs), and State and Federal Water Quality Reports; (3) sensitivity of the species to toxicity testing; (4) known water-quality impacts of processes on wastewater; and, where appropriate, (5) dilution of the effluent in the receiving water.

The CWA requires that EPA obtain state certification confirming that all water-quality standards will be satisfied. The permit must conform to the conditions established pursuant to a State Certification under Section 401 of the CWA (40 CFR §124.53 and §124.55). EPA regulations pertaining to permit limits based upon water-quality standards and state requirements are contained in 40 CFR §122.44(d).

Water quality standards consist of three parts: (1) beneficial designated uses for a water-body or a segment of a water-body; (2) numeric and/or narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) antidegradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts Surface Water Quality Standards, found at 314 CMR 4.00, include these elements. 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. These standards also include requirements for the regulation and control of toxic constituents and require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established. The conditions of the permit reflect the goal of the CWA and EPA to achieve and then to maintain water quality standards.

The effluent monitoring requirements have been established to yield data representative of the discharges under the authority of Section 308(a) of the Clean Water Act, according to regulations set forth at 40 C.F.R. 122.41(j), 122.44(i) and 122.48. The monitoring program in the permit specifies routine sampling and analysis which will provide continuous general information on the reliability and effectiveness of the installed pollution abatement equipment. The approved analytical procedures are to be found in 40 CFR 136 unless other procedures are explicitly required in the permit.

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 requirements of the CWA [see Sections 402(o) and 303(d)(4) of the CWA and 40 CFR §122.44(l)(1 and 2)]. EPA's antibacksliding provisions found at 40 CFR §122.44(l) generally prohibit the relaxation of permit limits, standards, and conditions. Effluent limits based on BPJ, water quality, and state certification requirements must also meet the antibacksliding provisions found at Section 402(o) and 303(d)(4) of the CWA.

CWA §§316 (a) and (b) pertaining to thermal discharge and cooling water intake structure (CWIS) requirements, respectively, are discussed in detail in EPA's "Clean Water Act NPDES Permitting Determinations for Brayton Point Station's Thermal Discharge and Cooling Water Intake."

4.2 Facility Information

Brayton Point Station is owned by USGen New England, Inc. (USGenNE) and is operated by PG&E National Energy Group (PG&E NEG). PG&E NEG has operated the station since September 1, 1998. Prior to that time, New England Power Company owned and operated the plant.

Brayton Point Station was built on approximately 250 acres in Somerset, MA in the early 1960's. Brayton Point is a peninsula formed by the confluence of the Lee and Taunton rivers.

Brayton Point Station consists of four operation units that combust fossil fuels. The table below describes these units.

UNIT	CAPACITY (MEGAWATT)	START DATE	FUEL	COOLING WATER USE (MGD)
1	250	1963	Coal	260
2	250	1964	Coal	260
3	650	1969	Coal	375
4	450	1974	Oil/Natural Gas	450

Cooling water, drawn from the Taunton River for units 1,2, and 3 and from the Lee River for unit 4, passes through the condensers and exits to the discharge canal. The canal is 3,200 feet long and terminates at the southern tip of the site at a venturi which results in rapid mixing of the warm discharge water and the cooler receiving water.

The plant site, including the locations of the Intake Structure and the Discharge Canal, is shown on Figure 1A in Attachment A.

This draft permit addresses the discharges listed below (see also the Station Water Use diagram, Figure 2A in Attachment A). Outfall 001 is the facility's point source.

Discharge Number	Average Flow Rate	Discharge Description

001	951 Million Gallons Day[1] (MGD) 39 MGD[2]	Circulating Water System Discharge (Condenser Cooling and Service Water Cooling), Wastewater Treatment System
003 (Internal outfall discharges to 001)	38 MGD[2]	Cooling Tower Discharge
004 (Internal outfall discharges to 001)	0.49 MGD[1] 1 MGD[2]	Wastewater Treatment System (Low Volume Waste Streams, Metal Cleaning Waste)
005	No Discharge in Last 5 Years 0 Discharge[3]	Thermal Backflush
017	5.2 MGD[1]	Units 1,2, and 3 intake screen sluice water (backwash)
020	18.5 MGD[1]	Unit 4 intake screen wash and fish bypass return

Footnotes:

[1] Taken from Form 2C of permit application
[2] Anticipated future waste stream flow
[3] Discharge from 005 will no longer will be allowed in future operations

4.3 Internal Waste Streams: Cooling Tower Blowdown, Low Volume Waste, and Metal Cleaning Waste

4.3.1 Outfall 003, Cooling Tower Blowdown

As previously explained, EPA anticipates that Brayton Point Station will employ cooling tower technology to meet the draft permit's new temperature and flow requirements. Therefore, EPA has established a new internal outfall, 003, to represent the discharge from the cooling tower(s). Flow from Outfall 003 may empty into the Discharge Canal.

EPA has established best available technology economically achievable (BAT) limits for free available chlorine, chromium, zinc, and the 126 priority pollutants for cooling tower blowdown. These requirements are found at 40 CFR 423.13(d)(1). Free Available Chlorine is limited as a maximum concentration, meaning it is not to be exceeded at any time (i.e., an instantaneous maximum) and on a daily average, that is, a single period of chlorine release not to exceed two hours, unless the utility can demonstrate that the units

in a particular location cannot operate at or below this level of chlorination. The values for these limits are 0.5 mg/l and 0.2 mg/l, respectively. These limits apply to the flow of the blowdown from the cooling tower(s), prior to mixing with any other waste stream.

In accordance with the BAT requirements found at 40 CFR 423.13(d)(1), the draft permit limits the concentration of chlorine that may be discharged from Outfall 003. The draft permit prohibits the use of any of the 126 priority pollutants for cooling tower maintenance chemicals, except for chromium and zinc. Draft permit conditions allowing the use of chromium and zinc have been established in accordance with the effluent guidelines. Sampling and monitoring for these requirements must be taken prior to Outfall 003 mixing with any other waste streams. See Section 4.5 of this Fact Sheet for the derivation of effluent limits.

4.3.2 Outfall 004, Wastewater Treatment System

In the current permit, low volume waste sources and metal cleaning wastes are combined under the term "Wastewater Treatment System (WWTS)", Outfall 004. Low volume waste sources consist of wastes from floor drains, water treatment wastes, boiler blowdown, boiler seal water, and future air pollution control equipment. Metal cleaning wastes consist of wastes from air preheater wash, boiler fireside wash, precipitator wash, boiler chemical cleaning, and feedwater heater chemical cleaning. However, according to the technology-based effluent guidelines at 40 CFR §423, low volume waste sources and metal cleaning wastes are independently named waste streams, with separate limits.

Under the existing permit it is possible for the permittee to dilute the metal cleaning wastes with the low volume waste sources in the wastewater treatment system; thereby potentially allowing the metals (copper and iron) to be discharged in excess of the limitations at 40 CFR §423. This is because the existing permit established limits and monitoring for the metals after mixing in the wastewater treatment system. Dilution is not an acceptable means of achieving technology-based limitations. In addition, if the metal cleaning wastes are greatly diluted, removal of the pollutant metals in the metal cleaning wastes becomes more difficult and less efficient because of the dilution. The effluent guidelines at 40 CFR §423 were developed to take advantage of the higher removal efficiencies achievable by treating a concentrated waste stream such as metal cleaning wastes.

In order to fully assure compliance with the effluent guidelines, this draft permit develops mass limits for copper and iron (see sections 4.5.6 and 4.5.7 for calculations and reporting methodologies). The limits apply to outfall 004, prior to mixing with any other waste streams. The draft permit requires that the pollutants in metal cleaning wastes be removed to a standard shown to be economically achievable and technically available. Alternatively, the facility may chose to cease the discharge of metal cleaning waste and instead contain and transport them to an outside facility for treatment and disposal.

The effluent limitations applied in the draft permit for outfall 004 are technology-based requirements found at 40 CFR §423. For metal cleaning wastes, the parameters limited in the draft permit are: total suspended solids, oil and grease, pH, copper and iron.

The metals nickel and zinc are limited in the current permit. The administrative record is somewhat unclear concerning the derivation of the original limits for zinc and nickel. There are no technology-based limits for zinc and nickel applicable to this facility, except for zinc as specified at 40 CFR §423 in cooling tower blowdown. Potential cooling tower blowdown, and associated technology-based limits are addressed under section 4.3.1 of this fact sheet. EPA has reviewed data submitted by the permittee and determined that, currently, there is no reasonable potential to violate water quality standards for these metals. The two metals will, therefore, no longer be limited as in the existing permit (at outfall 001, see section 4.3.1 for discussion of zinc in cooling tower blowdown). However, the metals nickel and zinc are also identified as potential pollutants from future air pollution control equipment and their potential contribution is unknown at this time. Therefore, the draft permit shall require quarterly monitoring at outfall 004, beginning on the date of discharge from any air pollution control equipment, to establish if there is a reasonable potential for either of the metals to cause or contribute to an exceedance of the ambient Water Quality Standards.

The monitoring requirements may be removed by future permit action if it is determined that the concentration of either nickel or zinc in the discharge from Outfall 004 is consistently below the threshold that would necessitate the inclusion of such a water quality based limit. Conversely, the reopener clause in the draft permit allows EPA or MADEP to modify the permit if it is determined that water quality-based limits for either metal are necessary.

Brayton Point Station is expected to install new technologies to reduce air emissions. The facility will be installing selective catalytic reduction (SCR) systems on units 1 and 3, and a wet flue gas desulferization (FGD) system on unit 3. In addition to these technologies, Brayton Point Station will install a coal ash reduction process (ARP) at the same time it installs the new air pollution control equipment. The ARP is a combustion process in which remaining carbon from fly ash is combusted. The heat from the combustion is recovered and the byproduct ash can be used for making concrete. As a result of these technologies, the facility will generate new waste streams which will go to the wastewater treatment system, and ultimately discharge though 004. These waste streams are considered low volume waste streams. The station has provided a summary of the estimated wastewater characteristics expected to result from the addition of the low volume waste stream(s) into the wastewater treatment system. See Attachment C.

This permit contains monitoring and reporting requirements based on future anticipated operations because EPA is unsure of the potential for any of the substances listed in Attachment C to violate water-quality standards.

For low volume waste sources, EPA has established best practicable control technology currently available (BPT) limits in the effluent guidelines found at 40 CFR Part 423 for total suspended solids (TSS) and oil and grease. The limits for TSS are 100 mg/l maximum for any one day and 30 mg/l for an average monthly (30 consecutive days), and the limits for oil and grease are 20 mg/l 100 mg/l maximum for any one day and 15 mg/l for an average monthly (30 consecutive days). Low volume waste sources (LVW) and metal cleaning wastes (MCW) may be combined for treatment provided the effluent limitations for each are individually met.

4.3.3 Storm Water Runoff, Outfalls 009, 010, 013, 015, 021, 022

The permittee will apply for coverage under EPA's Storm Water Multi-Sector General Permit for Industrial Activities. EPA expects that coverage will be obtained before this permit becomes effective, and, therefore, this draft permit does not address stormwater. The general permit will cover all discharges of stormwater, including coal pile runoff.

4.4 Cooling Water System

4.4.1 Outfall 001, Once-Through Cooling Water System

There are two primary ocean water uses: 1) for condensing steam (the "Circulating Water System"), and; 2) for cooling various heat generating equipment throughout the facility (the "Service Water System").

Currently, the circulating water system provides cooling water for condensing steam from any or all of the four units at Brayton Point Station. For units 1,2, and 3, water is drawn from the confluence of the Taunton River. Three variable speed pumps can supply as much as 921 million gallons per day (MGD) cooling water. Cooling water for unit 4 is drawn from the Lee River. Unit 4 may also operate in a "piggyback" mode, that is, water can be pumped from the discharge canal and used to condense steam from unit 4.

For this permit, EPA has determined that the facility must limit its intake of ambient water for cooling to approximately 56 MGD. Similarly, EPA has determined that the facility must reduce its heat discharge to Mount Hope Bay from approximately 42 Trillion BTUs per year down to 1.7 Trillion BTUs per year. See "Clean Water Act NPDES Permitting Determinations for Brayton Point Station's Thermal Discharge and Cooling Water Intake." The 56 MGD will be drawn for make-up water for future cooling towers (39,000 gallons per minute). This make-up water amount was determined from the information Brayton Point Station submitted for the entire station closed-cycle cooling option contained in its 316(a) and 316(b) demonstration of December 2001. Therefore, the authorization to discharge once-through cooling water has been discontinued in this draft permit.

4.4.2 Outfall 003, Cooling Tower Blowdown

As previously stated, EPA expects the facility to install cooling tower technology to meet this draft permit's flow and thermal limits. The facility has provided engineering and environmental data associated with the conversion of the entire station to closed-cycle cooling. See Brayton Point Station, Permit Renewal Application, Section 316(a) and (b) Demonstration.

The facility estimates that three towers will be needed to convert the entire station to closed-cycle cooling. These towers would consist of 30, 22, and 20 typical, mechanical-draft, counter-flow cells, for a total of 72 cells. Retrofitting the entire Station with conventional closed-cycle mechanical-draft cooling towers that utilize salt water would reduce cooling water flows from 931,000 gallons per minute (gpm) to 39,000 gpm, a reduction of approximately 96% in cooling water flow. The thermal discharge could be reduced from approximately 42 Trillion BTUs per year to 0.8 Trillion BTUs per year.

4.4.3 Outfall 005, Thermal Backflush

In addition to chlorination, thermal backflushing is a technique used in the industry to control biofouling of intake system components. Thermal backflushing involves the reversal of the normal cooling water flow such that the intake structure(s) serve as the discharge points (Outfall 005) and the discharge canal, conversely, functions as the intake structure.

Pursuant to EPA's 316(b) determination for this facility (See "Clean Water Act NPDES Permitting Determinations for Brayton Point Station's Thermal Discharge and Cooling Water Intake."), thermal backflushing is prohibited, and therefore, outfall 005 will be discontinued.

4.4.4 Outfall 017, Units 1,2, and 3 Intake Screen Wash

Under current operations, the intake traveling screens are continuously sprayed to return fish to the bay and to remove debris. For this permit, EPA has determined that the facility must limit its intake of ambient water for cooling to 56 MGD. The 56 MGD will be drawn for make-up water for future cooling towers (39,000 gallons per minute). The source of this make-up water will be from the unit 4 unit, as described in information

Brayton Point Station submitted for the entire station closed-cycle cooling option contained in its 316(a) and 316(b) demonstration of December 2001. Therefore, discharge from outfall 017 will be significantly reduced in this permit. EPA is allowing some operation of the screen backwash for units 1,2 and 3. This operation is allowed if the facility should switch to once-through cooling, as is allowed in the draft permit for a limited number of hours per year (see Section 5.2.1.c of this Fact Sheet).

4.4.5 Outfall 020, Unit 4 Intake Screen Wash and Fish Return

Outfall 020 serves as the discharge point for unit 4 intake screen wash and fish return system. For unit 4 intake, a design flow of 274,000 gpm is drawn through the trash racks. Approximately 260,000 gpm is pumped into the condenser for cooling, 6,000 gpm is used for screen wash, and 8,000 gpm is used for the fish bypass system, for a total a design flow of 14,000 gpm (20.2 MGD). The permittee reported an average flow value of 18.5 MGD for outfall 020 in its permit renewal application.

As previously stated in this fact sheet, the draft permit will limit the intake of cooling water to approximately 56 MGD for the entire facility. Unit 4 intake will be used to supply this cooling water. Therefore, EPA anticipates that BPS can reduce its screen wash flow from unit 4 proportionately. That is, the flow will be reduce from 260,000 gpm to 39,000 gpm, and therefore the screen wash flow should be reduced from 6,000 gpm to about 1,000 gpm (by a factor of approximately six). No reduction in the fish bypass system is anticipated.

Therefore, the maximum discharge from outfall 020 has been reduced from 20.2 MGD to 13 MGD.

4.5 Derivation of Effluent Limits: Requirements for Steam Electric Power Generating Facilities and the Commonwealth of Massachusetts' Water-Quality Standards.

Regulations for "Steam Electric Power Generating Point Source Category" are found at 40 CFR Part 423. The Massachusetts State Water-Quality Standards are found at 314 CMR 4.00.

4.5.1 Chlorine

4.5.1.a Acute Water-Quality Based Limit (Maximum Daily), Outfall 001

The existing permit limits the Total Residual Oxidant concentration to 0.065 mg/l (daily maximum) at outfall 001. This limit was derived based on the State of Massachusetts' acute water-quality standard for chlorine and the dilution provided by the receiving water. See below:

Massachusetts Acute Chlorine Standard = 0.013 mg/l

Dilution = 5:1 (from existing permit)

Permit Limit = Standard x Dilution

Permit Limit = (0.013 mg/l) x 5 = 0.065 mg/l

The existing permit specifies sampling and analysis of outfall 001 for this TRO condition once per week during the chlorination cycles, and, when possible,

during unit 3 chlorination.

The existing permit further specifies that this 0.065 mg/l TRO limit shall be an "instantaneous maximum", meaning that it is the value that shall not be exceeded, at any time. This definition is derived from the Steam Electric Power Generating Point Source Category, 40 CFR Part 423.

This permit condition will be maintained in the draft permit. EPA is proposing, in the draft permit, to increase the monitoring frequency to continuous. EPA believes this increased monitoring frequency is justified and appropriate based on the complexity of Brayton Point's chlorination scheme (see below). Requiring continuous monitoring will ensure any exceedance of State water-quality standards is detected.

4.5.1.b Chronic Water-Quality Based Limit (Average Monthly), Outfall 001

Massachusetts regulations contain a marine chronic criteria of 0.0075 mg/l for chlorine. Using the 5:1 dilution factor of the receiving water, the calculated water-quality based limit is:

Average Monthly Chlorine Concentration = (0.0075 mg/l) x 5 = 0.0375 mg/l

Since there is no published technology based limit and the facility has a reasonable potential to cause or contribute to an excursion above the chronic water-quality standard for chlorine, the water-quality limit applies.

4.5.1.c Effluent Guideline Limit (Instantaneous Maximum)

(i) Brayton Point Station's Current Chlorination Scheme, Outfall 001

Currently, Brayton Point Station is cooled via an open cycle system (Once-Through Cooling Water). Biofouling of the condenser tubing is controlled by the addition of chlorine, as sodium hypochlorite, to the cooling water. The existing permit allows a "targeted" chlorination cycle designed to minimize the use, and therefore, the discharge, of chlorine into the receiving water. The existing effluent limits were derived around this method of chlorination. The targeted chlorination program is briefly described below.

Targeted chlorination is implemented on Units 1, 2, and 3. Each unit's condenser inlet is divided into two sections (resulting in six separate condenser sections for the three units). Each half of the condenser intake header (see diagram) contains twelve nozzles. Each nozzle injects sodium hypochlorite for about 5 minutes, twice per day (for a total of two hours per day for each condenser section).

The permittee supplied operational data to EPA demonstrating that the mass of chlorine used during "targeted" chlorination is less than what would be used over a two hour chlorination cycle at a maximum concentration of 0.20 mg/l (the effluent guideline limit).

In the effluent guideline for "Steam Electric Power Generating Point Source Category", EPA has established a technology-based maximum discharge concentration of 0.20 mg/l for total residual oxidants ("instantaneous maximum"), as defined in 40 CFR 423.11, based on the best available technology economically achievable (BAT). This technology based effluent limit applies to plants with a total generating capacity of more than 25 megawatts and once-through cooling water systems. Each individual generating unit is not allowed to discharge chlorine for more than two hours per day, unless the discharger demonstrates to the permitting authority that a longer duration is necessary in order to control macro-invertebrate growth.

Brayton Point Station has demonstrated that the mass of chlorine used in the targeted chlorination programs is significantly below the mass of chlorine that would be used if the Station chlorinated each unit at the effluent guideline for up to 2 hours per day. Therefore, longer chlorination periods are allowed in the existing permit and this allowance is continued in the draft permit as well.

The effluent guidelines allow, at the permitting authority's discretion, TRO limits to be expressed as either mass (pounds) or concentration (mg/l).

In September of 2000, the Station demonstrated the use of the SIDTEC™ On-Line Condenser Cleaning System. The SIDTEC™ system distributes several thousand condenser tube cleaners called "rockets" through the generating unit's condenser tubes along with the condenser cooling water. These rockets are buoyant and are the same diameter size as the condenser tube. They are designed so that as they pass through the condenser, they clean the tubes and remove any build-up fouling material (micro-biological growth, mud and silt, etc.). The rockets exit the condenser and enter the discharge canal. Once in the discharge canal, a series of floating booms direct the rockets to the floating collection and transport device (SidSkim). The rockets are pumped from the SidScim to the de-watering skid. The overflow of the de-watering skid is discharged back into the discharge canal at a rate of about 400 - 800 gallons per minute. Secondary and tertiary booms are placed behind the SidSkim to ensure complete retrieval of the rockets.

The SIDTEC™ system is installed and operated on Units 1,2, and 3. Although sodium hypochlorite is still used to control micro-fouling, the treatment time is reduced by half, thus reducing the chemical usage by half, during the non-summer months.

(ii) Brayton Point Station's future chlorination scheme, Outfall 003

EPA anticipates that Brayton Point Station will employ cooling tower technology to meet the draft permit's new temperature and flow requirements.

EPA established limits for free available chlorine in the effluent limitation guidelines for cooling tower blowdown found at 40 CFR 423.13(d)(1). These limits are 0.2 mg/l free available chlorine on a daily average and 0.5 mg/l free available chlorine on a maximum basis ("instantaneous maximum"). These limits apply to the flow of the blowdown, prior to mixing with any other waste stream.

In anticipation of Brayton Point's use of cooling tower technology, EPA is placing FAC limits at a new internal outfall (outfall 003). This outfall shall be sampled and monitored prior to mixing with other waste streams and shall limit FAC to an average concentration of 0.2 mg/l and a maximum of 0.5 mg/l.

4.5.1.d Summary of Chlorine Limits

This draft permit, as well as the existing permit, contains both water-quality based and technology based effluent limits for chlorine.

The Maximum Daily TRO concentration into Mount Hope Bay is limited to 0.065 mg/l, in accordance with the State's acute chlorine water-quality standards. This draft permit limits the average monthly TRO value to 0.0375 mg/l in accordance with the State's chronic water-quality standard.

In accordance with 40 CFR 423.13(d)(1), an average concentration of 0.2 mg/l and a maximum concentration of 0.5 mg/l for free available chlorine (FAC) apply to cooling tower blowdown. An "instantaneous maximum" TRO concentration limit of 0.2 mg/l applies to each once-through unit being chlorinated. However, the draft permit conditions may be met using cooling tower technology and, therefore; the draft permit contains chlorine limits for cooling tower blowdown and does not contain chlorine limits for once-through cooling. These interim limits will be addressed in a separate EPA action.

The water-quality based TRO limits shall be measured at the discharge canal, prior to discharge into Mount Hope Bay and will be measured using the electrode method described in 40 CFR Part 136, Table 1B, Note 16. The technology-based limits shall be measured prior to mixing with other waste streams (at outfall 003) and shall be measured continuously, using the same method.

For the draft permit, chlorine may be used as a biocide. Except for chlorine and/or Spectrus CT1300, no other biocide shall be used without written approval from the Regional Administrator and the Commissioner. See Section 5.3 for

further discussion of biofouling control.

4.5.2 pH

The pH range for Class B marine waters is from 6.5 to 8.5 standard units (s.u.) as defined in the Massachusetts Surface Water Quality Standards, found at 314 CMR 4.00. Unless otherwise specified, pH shall be measured at the discharge canal.

4.5.3 Polychlorinated Biphenyl Compounds

Pursuant to 40 CFR Part 423, discharge of polychlorinated biphenyl compounds (PCBs) is prohibited.

4.5.4 TSS

40 CFR Part 423 limits the quantity of Total Suspended Solids (TSS) that can be discharged from metal cleaning operations, low volume waste streams, and coal pile run off. For low volume waste streams and metal cleaning waste streams, the limit is 100 mg/l daily maximum and 30 mg/l monthly average. Coal pile runoff is limited to maximum concentration of 50 mg/l at any time. Coal pile runoff will be addressed as part of the facilities coverage under EPA's Storm Water Multi-Sector General Permit for Industrial Activities. See section 4.3.3.

The technology-based limits apply to each individual waste stream, prior to mixing with other waste streams. Brayton Point Station sends its metal cleaning wastes and low volume waste streams to its Wastewater Treatment System (WWTS), prior to discharge into the discharge canal (internal outfall 004). See Figure 3A.

For this permit, EPA is allowing one sampling point for TSS. This sampling point is after the WWTS, and prior to discharge into the discharge canal (internal outfall 004). Monitoring for TSS at this location allows for mixing of waste streams. However, EPA believes this is not in conflict with the effluent guideline, since all waste stream entering the WWTS have the same limit, namely 100 mg/l and 30 mg/l. Therefore, the streams are not diluted after mixing and a flow weighted average for TSS at the sampling point results in the same limit as the effluent guidelines.

4.5.5 Oil and Grease

The derivation of the draft permit's limits for Oil and Grease is analogous the that of TSS. The limits in the draft permit for oil and grease are 20 mg/l maximum daily and 15 mg/l average monthly. The limits apply at outfall 004.

4.5.6 Copper

The effluent guideline technology copper limit at 40 CFR Part 423 is based on the concentration of copper in the metal cleaning waste flow. In the case of Brayton Point Station, the metal cleaning waste stream is routed to the WWTS prior to discharge into the discharge canal. The effluent limitation guidelines set a maximum daily limit of 1.0 mg/l and a 30 day average value of 1.0 mg/l.

The existing permit included the effluent limits. However, as previously discussed in section 4.3.3 above, the existing permit allowed the sampling point for copper to be after the WWTS. EPA now believes that sampling after the WWTS is inappropriate since it effectively allows the metal cleaning waste stream to mix with other waste streams prior to sampling, in apparent conflict with the effluent guidelines. EPA believes the correct application of the effluent guideline, regarding copper, should be as follows:

> The sampling point should remain the same, but mass limits should be specified at outfall 004. Mass limits would be derived as follows:
>
> LIMIT = EFFLUENT LIMIT x METAL CLEANING WASTE FLOW x CONVERSION FACTOR

The water-quality standards are based on the concentration of copper in the receiving water. Therefore, in order to determine which limit is more stringent, the technology and water-quality limits have been converted to mass based limits at the end of the pipe. This eliminates the need to account for the dilution of the metal cleaning waste flow, into the cooling water system, outfall 001. The same methodology is used to compare all technology and water-quality limits of internal waste streams.

The effluent limitation guidelines set a maximum daily limit of 1.0 mg/l and a 30 day average value of 1.0 mg/l. A mass limit can be derived by multiplying the concentration by the flow of the metal cleaning waste as follows:

Mass limit = (1.0 mg/l) x 0.04 MGD x 8.34 (lbs/MG)/(mg/l)

= 0.33 lbs/day

The water-quality chronic value is more stringent than the acute value, so for purposes of comparing effluent guidelines to state water-quality standards, the chronic will be used. The chronic State Water Quality Standard for Copper is 0.0037 mg/l (Total Recoverable Metal). Since this limit applies to the end of the pipe, a mass limit can be derived as follows:

Mass limit = (0.0037 mg/l) x 57 MGD x 8.34(lbs/MG)/(mg/l)

= 1.76 lbs/day

Mass limit x dilution = 1.76 lbs/day x 5 = 8.8 lbs/day

Since the effluent limitation guideline is more stringent, the draft permit will limit copper to 0.33 pounds per day. Sampling for copper from metal cleaning will be taken at a representative location after leaving the WWTS but prior to outfall 004 mixing with any other waste streams.

4.5.7 Iron

The effluent limitation guidelines at 40 CFR Part 423 set a maximum daily limit of 1.0 mg/l and a 30 day average value of 1.0 mg/l.

As with copper, the existing permit included the effluent limits, but the sampling point is after the WWTS. As discussed above, EPA now believes that sampling after the WWTS is inappropriate since it effectively allows the metal cleaning waste stream to mix with other waste streams prior to sampling. EPA believes the correct application of the effluent guideline, regarding iron should be the same as specified for copper (see above).

There is no marine acute or chronic water-quality criteria for iron, so the effluent limitation guideline shall be used.

The effluent limitation guidelines set a maximum daily limit of 1.0 mg/l and a 30 day average value of 1.0 mg/l. A mass limit can be derived by multiplying the concentration by the flow of the metal cleaning waste as follows:

Mass limit = (1.0 mg/l) x 0.04 MGD x 8.34 (lbs/MG)/(mg/l)

= 0.33 lbs/day

Sampling for iron will be the same as for copper and will be taken at a representative location after leaving the WWTS but prior to outfall 004 mixing with any other waste streams.

4.5.8 126 Priority Pollutants: Cooling Tower Blowdown

As previously stated, EPA anticipates that Brayton Point Station will employ cooling tower technology to meet the draft permit's new temperature and flow requirements.

40 CFR Section 423.13(d)(1) prohibits the discharge of any of the 126 priority pollutants contained in cooling tower chemical in detectable amounts, except for chromium and zinc. This prohibition is continued in the draft permit. The effluent guidelines allow, at the permitting authority's discretion, the use of engineering calculations (i.e., a mass balance which shows that any of the priority pollutants contained in cooling tower chemicals would not be detectable in the final discharge) to show compliance with the

prohibition on the discharge of priority pollutants. While this option for demonstrating compliance is included in the draft permit, EPA and MA DEP will use their discretion as to whether to accept such calculations or require monitoring and reporting.

EPA has determined that the proposed permit limitations satisfy all water-quality and technology requirements of the Clean Water Act, including the 1984 BAT requirements for toxic pollutants and BCT for conventional pollutants.

4.6 Chemical Use

The facility uses a variety of water treatment chemicals in the cooling water system, the service water system, the steam cycle, demineralizer regenrations, pH control of bottom ash, and chemical cleaning. It is not practical for EPA to assess the potential environmental impact for each chemical the permittee may use throughout the life of the permit. Assessing individual chemicals also does not take into account the interaction of these chemicals with each other, i.e., the additive, antagonistic, or synergistic effects.

For this round of permitting, EPA will set limits for certain chemicals used by the permittee, and require that the permittee conduct regular (quarterly) Whole Effluent Toxicity (WET) testing.

The permittee is required to identify each chemical used and its concentration prior to conducting each quarterly toxicity test.

If toxicity is shown, monitoring frequency and testing requirements may be increased. The permit may also be modified, or alternatively, revoked and reissued to incorporate additional toxicity testing requirements or chemical specific limits.

The permittee may propose to conduct feasibility studies involving new chemicals not currently listed. The Regional Administrator and the Commissioner will approve the studies before any such studies take place. The permittee will then be required to summarize the results of any such studies and submit the summary to the Regional Administrator and the Commissioner. The studies will address the discharge frequency, concentration, and the impact, if any, on the indigenous populations of the receiving water. The Regional Administrator or the Commissioner may require Whole Effluent Toxicity testing as part of feasibility studies.

The chemicals used at the facility are shown as follows:

CHEMICAL NAME	AMOUNT, LBS/YEAR	PURPOSE
Ammonia Biflouride	9,800	Chemical Clean
Hydroxy acetic Acid	68,000	Chemical Clean Unit 3

Formic Acid	29,000	Chemical Clean Unit 3
Hydrochloric Acid	47,000	Chemical Clean
Ammonium Bicarbonate	3,200	Chemical Clean
Ammonium Carbonate	1,000	Chemical Clean
Ammonium Hydroxide, 28%	15,000	Steam Cycle
Ammonium Hydroxide, 28%	20,000	Chemical Clean
Sodium Hydroxide, 50%	400,000	Demineralizer Regeneration
Sodium Hydroxide, 50%	153,000	Chemical Neutralization
Sodium Hydroxide, 25%	50,000	Bottom Ash pH control
Sodium Hydroxide, 100%	200	Steam Cycle
Sodium Hypochlorite	100,000	Cooling Water Treatment
Disodium Phosphate	1,000	Steam Cycle
Trisodium Phosphate	1,000	Steam Cycle
Sulfuric Acid, 98%	300,000	Demineralizer Regeneration
Hydrazine, 28%	2,000	Steam Cycle
Hydrazine, 28%	4,900	Chemical Clean
Spectrus CT1300	860 gallons	Biocide
Betz Foam-Trol 301	0.08 mg/l per minute	Foam Control
Foamtrol AF3551	0.08 mg/l per minute	Foam Control

1. Ammonium Biflouride

May be used during chemical cleans.

2. Hydoxy Acetic Acid

May be used during chemical cleans.

3. Formic Acid

May be used during chemical cleans.

4. Ammonium Bicarbonate

May be used during chemical cleans.

5. Hydrochloric Acid

Hydrochloric acid is used for chemical cleans.

6. Ammonium Carbonate

May be used during chemical cleans.

7. Ammonia Hydroxide

Ammonia as ammonium hydroxide maintains pH control in the steam cycle to minimize corrosion. Ammonia Hydroxide is also used in chemical cleans. Additional ammonia is discharged as the result reaction of hydrazine, as described below.

8. Sodium Hydroxide

Sodium Hydroxide is used in the regeneration of the blowdown demineralizers and pH control of bottom ash. Used for water treatment in the steam cycles of the boilers.

9. Sodium Hypochlorite

Sodium Hypochlorite is used as a biocide to control fouling of system components. Approximately 100,000 pounds are used annually. The facility discharges very little Total Residual Oxidant.

10. Disodium Phosphate

Used for water treatment in the steam cycles of the boilers.

11. Trisodium Phosphate

Used for water treatment in the steam cycles of the boilers.

12. Sulfuric acid

Sulfuric acid is also used in the regeneration of the blowdown demineralizers.

13. Hydrazine

Hydrazine is used as an oxygen scavenger and is commonly used throughout the industry as a corrosion preventative because of its non-toxic chemical reaction products. At the temperatures and pressure of the steam cycle, the hydrazine reacts quickly with the dissolved oxygen in the water to produce the by-products of ammonia and nitrogen. The

amount of hydrazine discharged is negligible.

14. Spectrus CT1300

Used as a biocide. Proposed for future use is approximately 5 times per year for a duration of 12 - 18 hours. Spectrus CT1300 will only be used in the service water system. The facility has reported that they will dose at approximately 4 - 8 ppm per application, resulting in a discharge concentration of approximately 0.2 ppm. EPA has reviewed the toxicity information for CT1300 and determined that an acceptable permit limit for this chemicals is 0.8 ppm (this is based on an $LC_{50} = 0.16$ for Mysid Shrimp and a dilution of 5:1 in the receiving water, 0.16 x 5 = 0.8 ppm). Therefore, the permit contains conditions for this chemical use based on the information the facility submitted. Additionally, the permit will require that the whole effluent toxicity testing be conducted when this chemical is in use.

15. Betz Foam-Trol301

Used for foam control in the station's discharge canal.

Laboratory chemicals are discharged to the sanitary sewer in accordance with the facility's industrial pretreatment permit. Therefore, laboratory chemicals are not addressed in this permit.

4.7 Whole Effluent Toxicity

EPA's **Technical Support Document for Water Quality-Based Toxics Control**, **March 1991**, **EPA/505/2-90-001**, recommends using an "integrated strategy" containing both pollutant specific (chemical) approaches and whole effluent (biological) toxicity approaches to better detect toxics in effluent discharges. Such information may then be used to control the entrance of those toxic pollutants into the nation's waterways. Pollutant-specific approaches, such as those in the Gold Book and State regulations, address individual chemicals, whereas, whole effluent toxicity approaches evaluate interactions between pollutants, i.e., the "Additivity", "Antagonistic" and/or "Synergistic" effects of pollutants. In addition, the presence of an unknown toxic pollutant can be discovered and addressed through this process.

Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts as does Massachusetts Water Quality Standards which state, in part that, "all surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife." The NPDES regulations under 40 CFR §122.44(d)(1)(v) require whole effluent toxicity (WET) limits in a permit when a

discharge has a "reasonable potential" to cause or contribute to an excursion above the State's narrative criterion for toxicity.

Region I adopted this "integrated strategy" on July 1, 1991, for use in permit development and issuance. EPA Region I modified this strategy to protect aquatic life and human health in a manner that is both cost effective as well as environmentally protective.

Brayton Point Station discharges wastewater which has an unknown potential for causing toxicity to organisms. Presently, there is inadequate information for EPA to base a "reasonable potential" determination concerning this discharge's toxicity potential to cause or contribute to an excursion of the State's narrative water quality criterion. Thus, an inclusion of a WET testing monitoring requirement in the draft permit is necessary, reasonable and appropriate to gather this information in order to make a technically-based "reasonable potential" determination regarding whether or not this discharger is unknowingly contributing toxics to the receiving water. This approach is consistent with that recommended in **Technical Support Document for Water Quality-based Toxics Control**, **March 1991**, **EPA/505/2-90-001,** page 60.

This WET test is a proactive method of protecting the environment so as to properly carry out EPA's Congressional mandate to prevent the discharge of toxic substances into the Nation's waterway. EPA cannot make a "reasonable potential" determination on an individual discharge without first evaluating WET test results obtained from a given facility's discharge.

Therefore, the draft permit is conditioned to require the permittee to report the results of chronic (and modified acute) WET tests using Inland Silverside (Menidia beryllina), acute WET tests using Mysid Shrimp (Mysidopsis bahia) and chronic Sea Urchin (Arbacia punctulata) WET tests on a quarterly basis. A 24-Hour composite sample is the required "sample type" for WET testing. If after eight consecutive sampling periods (two years), no toxicity is found, the permittee may request a reduction in toxicity testing to twice per year.

The toxicity tests shall be performed at times when various chemicals are in use at the facility. The permittee will be required to document and submit to EPA the various scenarios under which toxicity testing has been performed (i.e., identify internal outfall discharges and chemical use during testing). At a minimum, EPA will require the following toxicity testing schedule:

Quarter #1 WET Testing (January - March)

Day 1 (Acute and sample #1 for chronic)	Day 3 (sample #2 for chronic)	Day 5 (sample #3 for chronic)
Discharge of metal cleaning waste	Normal Operation	Normal Operation
Discharge of Spectrus CT1300	Cooling Tower Blowdown	Cooling Tower Blowdown

Cooling Tower Blowdown
Application of foam control agent

Quarter #2 WET Testing (April - June)

Day 1	**Day 3**	**Day 5**
(Acute and sample #1 for chronic)	**(sample #2 for chronic)**	**(sample #3 for chronic)**
Discharge of metal cleaning waste	Normal Operation	Normal Operation
Discharge of Spectrus CT1300	Cooling Tower Blowdown	Cooling Tower Blowdown
Cooling Tower Blowdown		
Application of foam control agent		

Quarter #3 WET Testing (July - September)

Day 1 (Acute and sample #1 for chronic)	Day 3 (sample #2 for chronic)	Day 5 (sample #3 for chronic)
Discharge of metal cleaning waste	Normal Operation	Normal Operation
Discharge of Spectrus CT1300	Cooling Tower Blowdown	Cooling Tower Blowdown
Cooling Tower Blowdown		
Application of foam control agent		

Quarter #4 WET Testing (October - December)

Day 1 (Acute and sample #1 for chronic)	Day 3 (sample #2 for chronic)	Day 5 (sample #3 for chronic)
Discharge of metal cleaning waste	Normal Operation	Normal Operation
Discharge of Spectrus CT1300	Cooling Tower Blowdown	Cooling Tower Blowdown
Cooling Tower Blowdown		
Application of foam control agent		

If these WET tests detect toxicity, the Regional Administrator and the Commissioner may decide to modify the permit. Such modifications may include a toxicity and/or additional pollutant limits to adequately protect the State's Surface Water Quality during the remaining life of the permit. Results of these toxicity tests will be considered "new information not available at permit development"; therefore, the permitting authority is allowed to use this information to modify an issued permit under authority in 40 CFR §122.62(a)(2).

Upon successful completion of 8 consecutive WET tests, the permittee may request a reduction in toxicity testing to a minimum of twice per year. If a reduction is granted, the remaining two toxicity tests shall be conducted to coincide with the use of Spectrus CT1300.

5 Technical and Regulatory Explanations

5.1 Significant Changes to Permit

The existing NPDES permit was issued on June 16, 1993 and expired on June 16, 1998.

The most significant changes since last permit issuance are: a) imposing of a total annual thermal limit and average daily flow limit consistent with a closed-cycle facility; b) the elimination of the Technical Advisory Committee (TAC) as a formal component of the permit; c) provisions for alternatives to chlorine as the primary biocide (i.e., use of the biocide Spectrus CT1300; d) mass-based limits of metal cleaning waste (copper and iron); e) modification of the biological monitoring program; f) WET testing requirements, and; g) coverage under the general permit for stormwater.

5.2 Section 316 of the Clean Water Act

Each time the permit is reissued, EPA must revisit its latest determinations under Sections 316(a) and (b) of the Clean Water Act. CWA Section 316(a) allows for variance-based limitations for thermal discharges if certain conditions are met, while CWA Section 316(b) governs cooling water intake requirements.

EPA's determinations and supporting evaluations under CWA Sections 316(a) and (b) for the Brayton Point Station NPDES permit are contained in EPA's document entitled "Clean Water Act NPDES Permitting Determinations for Brayton Point Station's Thermal Discharge and Cooling Water Intake" (EPA, June 2002). The reader should refer to this document for the biological, engineering, economic, legal and policy analyses upon which EPA's final determinations are based. Because this document is quite voluminous, in this Fact Sheet we will only briefly describe the results of these analyses and determinations. However, the "Clean Water Act NPDES Permitting Determinations for Brayton Point Station's Thermal Discharge and Cooling Water Intake" is part of the administrative record for the NPDES permit and is available to the public. A brief summary of the conclusions is presented below.

It should be noted here that the existing permit contained narrative thermal conditions (see Part I.A.1.g of existing permit) that have been deleted from the draft permit. EPA believes that the removal of these narrative conditions is warranted because the proposed numerical draft permit conditions for heat and flow are sufficiently stringent to ensure that the previously contained narrative statements will not be violated. These narrative conditions were included in the prior permit due to unavoidable uncertainty regarding whether the numeric permit conditions would prove sufficient to satisfy the biological standards set forth in the narrative conditions. In other words, the narrative standards provided "backstop" permit conditions to ensure that the biological goals would be met. For the current permit, EPA is more confident that the new numeric permit conditions will meet the appropriate biological goals and, therefore, the narrative, backstop conditions are no longer needed.

5.2.1 Thermal Discharge Effluent Limitations: Technology-Based, Water Quality-Based, Section 316(a) Variance-Based Limitations

In developing effluent limitations, EPA is to determine technology-based and water quality-based requirements, and whichever is more stringent governs the permit requirements. For thermal discharges, however, EPA may also consider granting a variance under Section 316(a) from either or both the technology-based and water quality-based effluent limitations if less stringent variance-based limitations will nevertheless be sufficient to "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife" (BIP) in and on the water body receiving the discharge. As a practical matter, EPA has with some permits simply jumped to developing permit limitations under a Section 316(a) variance if a set of limitations were determined to be sufficient assure protection and propagation of the BIP. In such cases, determining the technology-based and water quality-based limitations would serve no practical purpose. Similarly, in some cases, EPA has determined water quality-based conditions without determining the technology-based requirements, when we had reason to believe that it was clear that the water quality-based requirements would be more stringent than the technology-based standards.

In this case, however, it was not clear to EPA which CWA requirements would drive the thermal discharge standards. Therefore, we have endeavored to determine technology-based limits and water quality-based limits, as well as to determine whether alternative limitations based on a CWA Section 316(a) variance would be warranted. The permittee has requested a variance pursuant to Section 316(a) and has proposed specific thermal discharge limitations that would apply under such a variance.

5.2.1.a. Technology-Based Limits

EPA has developed Best Available Technology Economically Achievable (BAT) thermal discharge limitations for BPS on a case-by-case basis using Best Professional Judgment (BPJ) pursuant to CWA § 402(a)(1), 33 U.S.C. 1342(a)(1), and 40 C.F.R. 125.3. This is because BAT requirements apply to thermal discharges and there is presently no applicable National Effluent Guideline for thermal discharges from steam electric facilities. For BPS, EPA has determined that thermal discharges consistent with closed-cycle cooling using mechanical draft cooling towers for Units 1, 2, 3 and 4 at BPS are required to satisfy the BAT requirements of the CWA. Some thermal discharge is still necessary to accommodate blowdown requirements. Therefore, EPA has set the following performance standard limitation based on this technology (including blowdown requirements):

Yearly Heat Load Discharged to Mount Hope Bay: 0.8 Trillion British Thermal Units

Daily Maximum Temperature: 85 °F

5.2.1.b. Water-Quality Based Limits

The Commonwealth of Massachusetts has developed water-quality based limits based on a mixing zone designed to protect the designated uses of the Massachusetts portions of Mount Hope Bay and satisfy other aspects of the Commonwealth's water quality standards (including its mixing zone requirements). The resulting thermal limits from this mixing zone are:

Maximum Allowable Average Temperature at Benthic Monitoring Locations within the Bay: 5 °C from February 12 - April 23, 24 °C at all other times

Maintain zone of passage in Lee River during fish migration.

No Discharge as needed to Allow for the Normal Migration of Striped Bass.

At times, depending on background conditions, the mixing zone would allow only minimal or no discharge; at other times, however, the mixing zone would allow a discharge and for those times the mixing zone provides the following thermal discharge maximum limits to "cap" the allowed discharges: 1.2 Trillion BTUs per month

The submission of a nuisance species monitoring and prevention plan within 90 days of a final permit.

5.2.1.c Thermal Discharge Limits Under Section 316(a) of the CWA

BPS has submitted a variance request which included legal, biological, financial, and technical information. EPA has reviewed this information, as well as other available information, and has determined that thermal discharge limits sufficient to allow for the protection and propagation of the BIP are as follows:

Yearly Heat Load to Mount Hope Bay: 1.7 Trillion British Thermal Units

Maximum Discharge Temperature: 95 °F

The above variance-based thermal discharge limitation being proposed for the new BPS permit is somewhat less stringent than both the technology-based and water quality standards mixing zone-based thermal discharge limits. EPA has determined that both the technology-based and the water-quality based thermal limits are more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on Mount Hope Bay. At the same time, however, EPA has also determined that the specific variance-based limits proposed by the permittee are not sufficient to assure the protection and propagation of the BIP. Therefore, although EPA is

denying the specific variance-based limits proposed by the permittee, EPA is,

nevertheless, granting a variance pursuant to Section 316(a) of the CWA from both the technology-based and water-quality based limits and is imposing alternative, less stringent thermal effluent limits on BPS that will be sufficient to assure the protection and propagation of the balanced indigenous community of shellfish, fish, and wildlife in and on Mount Hope Bay. These variance-based limits, however, are significantly more stringent than the limitations proposed by the permittee in its variance application.

Specifically, as indicated above, the permittee shall be required to meet a yearly heat load not to exceed 1.7 Trillion British Thermal Units. This heat load is somewhat higher than the above referenced technology-based limit of 0.8 TBTU/year. This 0.9 TBTU increase over entire station closed-cycle may allow some switching to once-through cooling, should conditions such as potential icing and/or fogging warrant it. EPA has calculated, based on a maximum station heat load of 7360 MBTU/hr (combined condenser duty of all 4 units operating), that the facility may operate approximately 122 hours per year in the once-through mode while meeting the proposed thermal limits. See below:

$$(0.16 \times 10^{12}\ \text{BTU/yr})/(7.36 \times 10^{9}\ \text{BTU/hr}) = 122\ \text{hr/yr}$$

5.2.2 316(b), Cooling water intake structures

CWA § 316(b) governs requirements related to cooling water intake structures (CWISs) and requires "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." EPA recently promulgated new, final § 316(b) regulations providing specific technology standard requirements for *new* power plants and other types of *new* facilities with CWISs. 66 Fed. Reg. 65255 (Dec. 18, 2001) (effective date of the regulations is January 17, 2002). These regulations do <u>not</u>, however, apply to *existing* facilities such as BPS. EPA has also issued proposed §316(b) regulations for existing power plants with flows of 50 million gallons per day or more (so-called "Phase II" facilities), such as BPS, but these regulations are not yet final. These proposed regulations are currently undergoing public review and comment, are subject to change, and are not to be applied to permits currently under development for existing plants. 67 Fed. Reg. 17122 (April 9, 2002). As a result, EPA continues the longstanding practice of applying § 316(b) on a case-by-case basis to existing facilities.

EPA has considered the nature and magnitude of the adverse environmental impacts from Brayton Point Station's CWIS (namely, the entrainment and impingement of marine organisms) and has evaluated the technological options available for minimizing these impacts. EPA has also considered the costs of implementing these technological options.

While EPA is not authorized to *directly* order the installation of cooling towers, CWA § 316(b) does authorize EPA to impose a intake capacity (or flow) limit based on the permittee's ability to meet that limit using the best technologies available, such as, for example, cooling towers. Such a technology-based limit imposes a performance standard for CWIS capacity (or flow) which the permittee should be capable of meeting using a

particular technology but is permitted to meet in any manner it chooses.

EPA has determined that operation of BPS's cooling water intake structures is causing severe adverse environmental impacts and that minimizing these impacts requires cooling water intake flow or capacity to be greatly reduced. EPA investigated a wide range of technology options and has determined that there is a practicable method of reducing cooling water flows by approximately ninety-five percent without substantially reducing the amount of electricity that BPS can generate. Specifically, this method is to retrofit mechanical draft closed-cycle cooling towers for the four major generating units at the power plant to replace the current open-cycle cooling system. EPA has concluded that without a change of this magnitude the fishery of Mount Hope Bay is unlikely to recover to a healthy state, but that with this change it has a good chance of doing so. While this technology will clearly be expensive for the permittee to implement, EPA has also determined that the costs of this option are not wholly disproportionate to its benefits. Therefore, EPA is imposing a capacity (flow) requirement consistent with this technology. The draft permit limits the withdrawal of water from Mount Hope Bay to 56 Million Gallons per Day (for cooling tower makeup water). The resulting discharge from outfall 001 is 39 Million Gallons per Day (cooling tower blowdown plus wastewater treatment plant flow, with the balance lost to evaporation).

As with the thermal limit above, EPA has determined that allowing approximately 122 hours per year of operation in the once-through mode will not increase the facilities entrainment and impingement losses to a significant degree. Therefore, the draft permit allows an additional 6,847 million gallons of water withdrawal per year to allow the station to operate in the once-through mode. See below:

Once-through flow = 1347 million gallons/day x 1 day/24 hours = 56.125 million gallons per hour
122 hours/year of once-through flow allowed to meet thermal limit, so
Annual increase = 56.125 million gallons/hr x 122 hr/yr = 6847 million gallons per year

This translates into approximately 5 days of operation in the once-through cooling mode, although EPA expects that the facility will switch to once-through cooling on a less frequent basis should conditions warrant it.

It should be clear that it will take a significant amount of time to implement this technology option. EPA and Massachusetts will work with the permittee to agree upon an enforceable, expeditious schedule for putting the technology in place taking into account site constraints, regional energy needs, and other factors.

5.3 Biofouling Control

In addition to chlorination and the SIDTEC™ System to control macroinvertebrates, the permittee has requested that it be allowed to use the molluscicide Spectrus CT1300. The permittee submitted the Material Data Safety Sheet for this product which lists the hazardous ingredients as Alkyl Dimethly Benzyl Ammonium Chloride and Ethyl Alcohol

(Ethanol). The draft NPDES permit allows the use of this molluscicide on a limited basis. Brayton Point Station estimates that not more than 5 applications per year of Spectrus CT1300 in the Service Water System will control the growth of molluscs. The dose will be limited to 0.20 ppm over a period of 12-18 hours. This limit is based on aquatic toxicity information for Mysid Shrimp (LC_{50}) and the detection limit submitted by the permittee (Material Safety Data Sheet)

5.4 Essential Fish Habitat (EFH)

Under the 1996 Amendments (PL 104-297) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Service (NMFS) if EPA's actions, or proposed actions that EPA 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, "... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." 16 U.S.C. § 1802(10). Adverse effect 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.

EFH is only designated for species for which federal Fishery Management Plans exist (16 U.S.C. § 1855(b)(1)(A)). EFH designations were approved for New England by the U.S. Department of Commerce on March 3, 1999.

As the federal agency charged with authorizing the discharge from this facility, EPA is in the process of consulting with the National Marine Fisheries Service (NMFS) under section 305 (b)(2) of the Magnuson-Stevens Act for essential fish habitat (EFH). This consultation will be completed before the permit is finalized.

6 Biological Monitoring Program

The flow and heat limits in the draft permit will drastically reduce the facilities impact on Mount Hope Bay. However, since it will take some time to meet the draft permit conditions, the biological monitoring requirements have not been reduced in the draft permit. Some modifications to the program are outlined below:

The draft permit sets forth a Contingency Plan to allow the Permitting Authority the opportunity to respond in a timely manner to new information and to implement, when necessary, improvements in the Biological Monitoring Plan (BP).

The Contingency Plan identifies action that Brayton Point Station may undertake when improvements to the BP are necessary. The Contingency Plan authorizes the annual evaluation of the BP and associated data, and, if necessary, requires recommendations for improvements to the BP and the development of a Management Plan. At a minimum, the BP and BP data are evaluated through the following:

1. An annual review of the environmental/biological sampling and analysis plan and data;

2. The identification of change in the aquatic or biological system;

3. The determination of statistically significant change;

4. The determination of biological importance;

5 The determination of the likelihood that Brayton Point Station contributed to the change;

6. A review and analysis of BP data variability and power analysis update; and,

7. The identification of improved sampling and/or analysis technologies, including, but not limited to: statistical methods, sampling equipment, and modeling technologies.

The Permitting Authority is responsible for overseeing the implementation of improvements to the BP by the permittee. Indications of Contingency Plan implementation include, but are not limited to, exceedances of permit limits, observations divergent from baseline conditions, changes in population assemblages, changes in data variability, and non-attainment of state and/or federal water quality criteria. Best professional judgement and environmental risk as well as population impact assessments tools will be employed in the evaluation of BP data.

The BP will undergo an annual review according to the following schedule:

1. Sept. 1: Permittee submits the results from the previous year's BP to the Permitting Authority;

2. Nov. 1: Permitting Authority submits comments and questions to the Permittee;

3. Dec. 1: Permittee schedules meeting to present data and review proposed BP for the following year;

4. Feb. 1: Improvements Reviewed and approved by the Permitting Authority;

5. Mar. 1: Permittee continues BP or implements improvements.

The Clean Water Act and the NPDES permit place the burden of proof on the Permittee to show that it is not contributing to any environmental problems. The BP requires the Permittee to determine whether any adverse environmental impacts are occurring due to its operation. If they are, then the Permittee must, in a timely manner, develop and implement a Management Plan, approved by the Permitting Authority, to prevent such impacts. A report on these efforts must be submitted to EPA and MA DEP every thirty days until the issue has been resolved.

This Plan authorizes implementation of improvements, approved by the Permitting Authority, to the BP when warranted. Acceptable changed may be indicated by results and analysis of BP data. Changes may also be considered based on acceptable data from other sources. Analysis of data from measured parameters such as temperature, delta T, and rates of impingement, and entrainment may indicate the need for monitoring program enhancements or improvements.

The Permitting Authority will require annual review of sampling data and protocols and evaluate the need for more frequent sampling. Additional sampling locations and any other justified analytical or biological program improvements may be authorized. This review will be conducted by the EPA. Only improvements to the BP will be considered.

The draft permit allows for BP improvements, when justified. Examples of BP improvements include, but are not limited to:

1 Additional sampling stations;

2. Increased sampling frequency;

3. Changes demonstrated to reduce data variability or increased analysis sensitivity;

4. Changes demonstrated to increase the power to detect statistical significance;

5. Collection of additional data demonstrated to more definitively determine the facility's impacts, and;

6. Additional predictive models such as species-specific population, community, and/or trophic level risk assessments.

7 State Certification Requirements

EPA may not issue a permit in the Commonwealth of Massachusetts unless the Massachusetts Department of Environmental Protection (MA DEP) certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State's Water Quality Standards. The staff of the MA DEP 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.

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

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection, Massachusetts State Program Unit, 1 Congress Street, Suite 1100, Mail Code CMA, 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. Two public hearings will be held after at least thirty (30) days public notice since the Regional Administrator has determined that significant public interest exists regarding this draft permit. 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 the public hearings, 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. Within 30 days following the notice of the final permit decision, any interested person may submit a request for a formal evidentiary hearing to reconsider or contest the final decision. Requests for formal evidentiary hearings must satisfy the Requirements of 40 CFR §124.74. In general, the reader should reference 40 CFR 124--PROCEDURES FOR DECISION MAKING, Subparts A, D, E and F for specifics relative to this section.

9 EPA Contact

Additional information concerning the draft permit may be obtained between the hours of 9:00 A.M. and 5:00 P.M. (8:00 A.M. and 4:00 P.M. for the state), Monday through Friday, excluding holidays from:

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_____ **Linda M. Murphy, Director**
Date: **Office of Ecosystem Protection**
U.S. Environmental Protection Agency