AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

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

P & G Gillette

is authorized to discharge from the facility located at

One Gillette Park
Boston, MA 02127

to receiving water named

Fort Point Channel
Boston Inner Harbor (MA70-02)

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

This permit shall become effective on the first day of the calendar month following 60 days after signature.

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

This permit supersedes the permit issued on September 17, 2003.

This permit consists of 15 pages in Part I including effluent limitations, monitoring requirements, and state permit conditions; Attachment A Marine Acute Toxicity Test Procedure and Protocol (September 1996); Attachment B List of Approved Treatment Chemicals; and 25 pages in Part II including Standard Conditions.

Signed this 10th day of July, 2012

/s/SIGNATURE ON FILE

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

David Ferris, Director
Massachusetts Wastewater Management Program
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to discharge **process water, boiler blowdown, and non-contact cooling water** from **outfall 001** to the Fort Point Channel. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Units	Discharge Limitation		Monitoring Requirement[1]	
		Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow	MGD	Report	26.0 (Summer) 23.5 (Non-summer)[2]	1/Day	Estimate
pH Range	S.U.	6.5 to 8.5		5/Week[3]	Grab
Temperature	˚F	Report	83.0	1/Day[4]	Grab
Rise in Temperature (ΔT)	˚F	Report	Report	1/Day[5]	Calculation
Total Suspended Solids	mg/l	--	Report	1/Quarter[6]	Grab
Heat Load	mBTU/d	Report	Report	1/Day[11]	Calculation
Oil and Grease	mg/l	--	Report	1/Quarter[6]	Grab
Whole Effluent Toxicity[7,8]	%	--	Report LC50	1/Year	Grab[9]

See pages 7-8 for explanation of footnotes

2. During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to discharge **process water, filter backwash, and non-contact cooling water** from **outfall 002** to the Fort Point Channel. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	**Units**	**Discharge Limitation**		**Monitoring Requirement[1]**	
		Average Monthly	**Maximum Daily**	**Measurement Frequency**	**Sample Type**
Flow[10]	MGD	Report	26.0 (Summer) 23.5 (Non-summer)[2]	1/Day	Estimate
pH Range	S.U.	6.5 to 8.5		5/Week[3]	Grab
Temperature	˚F	Report	83.0	1/Day[4]	Grab
Rise in Temperature (ΔT)	˚F	Report	Report	1/Day[5]	Calculation
Heat Load	mBTU/d	Report	Report	1/Day[11]	Calculation
Total Suspended Solids	mg/l	--	Report	1/Quarter[6]	Grab
Oil and Grease	mg/l	--	Report	1/Quarter[6]	Grab

See pages 7-8 for explanation of footnotes

3. During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to discharge **process water, strainer flush, and non-contact cooling water** from **outfall 003** to the Fort Point Channel. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Units	Discharge Limitation		Monitoring Requirement[1]	
		Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow	MGD	Report	8.1 (Summer) 7.4 (Non-summer)[2]	1/Day	Estimate
pH Range	S.U.	6.5 to 8.5		5/Week[3]	Grab
Temperature	˚F	Report	83.0	1/Day[4]	Grab
Rise in Temperature (ΔT)	˚F	Report	Report	1/Day[5]	Calculation
Heat Load	mBTU/d	Report	Report	1/Day[11]	Calculation
Total Suspended Solids	mg/l	--	Report	1/Quarter[6]	Grab
Oil and Grease	mg/l	--	Report	1/Quarter[6]	Grab

See pages 7-8 for explanation of footnotes

4. During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to discharge **non-contact cooling water** from **outfall 004** to the Fort Point Channel. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Units	Discharge Limitation		Monitoring Requirement[1]	
		Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow[10]	MGD	Report	19.6 (Summer) 15.4 (Non-summer)[2]	1/Day	Estimate
pH Range	S.U.	6.5 to 8.5		5/Week[3]	Grab
Temperature	˚F	Report	83.0	1/Day[4]	Grab
Rise in Temperature (ΔT)	˚F	Report	Report	1/Day[5]	Calculation
Heat Load	mBTU/d	Report	Report	1/Day[11]	Calculation

See pages 7-8 for explanation of footnotes

5. During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to withdraw **seawater** at **cooling water intake structure** (outfall 005) from the Fort Point Channel. Such withdrawals shall be limited and monitored by the permittee as specified below:

Withdrawal Characteristic	**Units**	**Withdrawal Limitation**		**Monitoring Requirement[1]**	
		Average Monthly	**Maximum Daily**	**Measurement Frequency**	**Sample Type**
Intake Flow	MGD	40 (Summer) 30 (Non-summer)[2]	45 (Summer) 35 (Non-summer)[2]	Continuous	Meter

6. During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to discharge **heated effluent** from **outfalls 001, 002, 003, and 004** to the Fort Point Channel. The total discharge from all outfalls shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	**Units**	**Discharge Limitation**		**Monitoring Requirement[1]**	
		Average Monthly	**Maximum Daily**	**Measurement Frequency**	**Sample Type**
Heat Load	mBTU/d	Report	8,782	1/Day[11]	Calculation

See pages 7-8 for explanation of footnotes

Footnotes:

1. Samples taken in compliance with the monitoring requirements specified above shall be taken at the point of discharge prior to mixing with the receiving water unless otherwise noted, except for monitoring of intake flow at the cooling water intake structure, which shall be continuously recorded via flow meter.

2. Summer operating conditions are permitted from June 1 through September 30. Non-summer operating conditions are permitted from October 1 through May 31.

3. pH samples at Outfalls 001, 002, and 004 shall be collected from the end of the outfall pipe prior to mixing with the receiving water five days per week, Monday through Friday. pH samples at Outfall 003 shall be collected at the North Dock Sample Port five days per week, Monday through Friday.

4. Discharge temperature within each outfall shall be monitored at the end of pipe prior to mixing with the receiving water once daily within one (1) hour before or after peak low tide based on the daily tide prediction at NOAA Boston Station 8443970. Intake temperature shall also be monitored during this period at the CWIS after the wedgewire screens but prior to being pumped to buildings. When the tide schedule permits, monitoring shall take place during low tide occurring between the hours of 9:00 am and 5:00 pm. The permittee shall report the date and time of day that each temperature measurement (intake or discharge) is taken and the time of the corresponding low tide based on the tide chart in monthly discharge monitoring reports.

5. The temperature rise (ΔT) is the difference between the discharge temperature (measured at each of the four outfalls) and the intake temperature (measured at the CWIS after the wedgewire screens but prior to being pumped to buildings) at the time of collection of the grab sample for temperature (see Footnote 4) at each outfall.

6. Total suspended solids and oil and grease samples shall be taken at a point representative of the discharge through the outfall prior to mixing with non-contact cooling water or any other discharges.

7. The Permittee shall conduct 48-Hour Static Acute Whole Effluent Toxicity (WET) tests on effluent samples once each year in August using mysid shrimp (*Mysidopsis bahia*) following the protocol in Attachment A (Marine Acute Toxicity Test Procedure and Protocol, dated September 1996).

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

   For each WET test the Permittee shall report on the appropriate Discharge Monitoring Report (DMR), the concentrations of the salinity, total residual oxidants, total solids, ammonia, total organic carbon, aluminum, cadmium, copper, chromium, lead, nickel and

zinc found in the 100 percent effluent sample. These chemical parameters shall be determined to at least the minimum quantification level shown in Attachment A, page 6, or as amended. Also, the Permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

After submitting three years and a minimum of three consecutive sets of WET test results the permittee may request a reduction in the frequency of WET testing requirements. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from EPA that the WET testing frequency requirement has been changed.

8. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test Procedure and Protocol**) **Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs)*, which may be found on the EPA Region I web site at http://www.epa.gov/Region1/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

9. A grab sample for whole effluent toxicity shall be taken from a point representative of the discharge from Outfall 001 after mixing with non-contact cooling water but before comingling with any other waste streams. The sample shall be representative of discharge from the boiler blowdown and two reverse osmosis system waste streams comingled with non-contact cooling water.

10. Non-contact cooling water flow volumes may be diverted from Outfall 004 to Outfall 002 when Outfall 004 is taken offline. The total combined maximum daily discharge from the two outfalls may not exceed 26 million gallons per day (MGD).

11. The heat load shall be calculated on a daily basis using the following equation:

$$Q = C_p m \Delta T$$

where:

Q = Heat load, million British Thermal Units (mBTU)/day
Cp = Heat capacity (specific heat) of water = 1.0 BTU/pound ˚F
m = mass of water = cooling water flow rate (MGD) x density of intake water = cooling water flow rate x 8.34 pounds/gallon
ΔT = discharge temperature – intake temperature, ˚F

Daily heat load for each outfall shall be calculated using the estimated daily flow rate and observed ΔT. Maximum daily heat load from all outfalls shall be calculated using the single highest ΔT observed among the four outfalls and the total daily cooling water flow measured at the cooling water intake structure.

PART I.A. (continued)

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

8. The pH of the effluent shall be in the range of 6.5 Standard Units (SU) through 8.5 SU and not more than 0.2 units outside the natural background range, unless these values are exceeded due to natural causes.

9. The discharge shall not cause objectionable color, odor, or turbidity to the receiving waters.

10. The discharge shall not contain a visible oil sheen, foam, or floating solids at any time.

11. The thermal discharge shall not interfere with spawning of indigenous populations nor harm the balanced, indigenous population of the receiving water.

12. The effluent shall not contain materials in concentrations or in combinations which are hazardous or toxic to aquatic life or which would impair the uses designated by the classification of the receiving water.

13. Pollutants which are not limited by this permit, but which have been specifically disclosed in the permit application, may be discharged up to the frequency and level disclosed in the application and included as Attachment B to this permit, provided that such discharge does not violate Section 307 or 311 of the Clean Water Act (CWA) or applicable state water quality standards.

14. Notwithstanding specific conditions of this permit, the effluent must not lower the quality of any classified body of water below such classification, or lower the existing quality of any body of water if the existing quality is higher than the classification.

15. This permit shall be modified, or revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

    a. contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or

    b. controls any pollutant not limited by this permit.

If the permit is modified or reissued, it shall be revised to reflect all currently applicable requirements of the Act.

16. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe (40 CFR §122.42):

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(i) One hundred micrograms per liter (100 µg/l);

(ii) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or

(iii) Any other notification level established by the Director in accordance with 40 CFR §122.44(f) and Massachusetts regulations.

b. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(i) Five hundred micrograms per liter (500 µg/l);

(ii) One milligram per liter (1 mg/l) for antimony;

(iii) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR §122.21(g)(7); or

(iv) Any other notification level established by the Director in accordance with 40 CFR §122.44(f) and Massachusetts regulations.

c. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

17. Toxics Control

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

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

B. UNAUTHORIZED DISCHARGES

This permit authorizes the permittee to discharge only in accordance with the terms and conditions of this permit and only from outfalls listed in Part I.A. of this permit. Discharges of wastewater from any other point sources which are not authorized by this permit or other NPDES permits shall be reported in accordance with Section D.1.e.(1) of the Standard Conditions of this permit (twenty-four hour reporting).

C. BEST TECHNOLOGY AVAILABLE

1. The location, design, construction, and capacity of the permittee's non-contact cooling water intake structure (CWIS) shall reflect the best technology available (BTA) for minimizing the adverse environmental impacts from entrainment of fish eggs and larvae. In order to satisfy this BTA requirement, the permittee shall operate the CWIS in compliance with the following specifications:

    a. The permittee shall, to the extent practicable, schedule annual maintenance outages between May 15th and June 1st.

    b. The permittee shall use the existing variable frequency drives to limit the summer operating monthly average intake flow at the CWIS to 40 MGD and the maximum daily intake flow to 45 MGD, and the non-summer operating monthly average intake flow at the CWIS to 30 MGD and the maximum daily intake flow to 35 MGD. Summer operating conditions may be applied from June 1 through September 30. Non-summer operating conditions must be applied from October 1 and May 31.

2. The location, design, construction, and capacity of the permittee's CWIS shall reflect the BTA for minimizing the adverse environmental impacts from the impingement of aquatic organisms. In order to satisfy this BTA requirement, the permittee shall continue to intake all cooling water through the existing 9.5 mm wedgewire screens at a maximum through-screen velocity no greater than 0.5 fps at all times.

3. Any change in the location, design, or capacity of the intake structure outside of the specifications of this Permit must be approved in advance in writing by the Regional Administrator and Director of the Wastewater Management Program of MassDEP. The design of the intake structure shall be reviewed for conformity to applicable regulations pursuant to Section 316(b) of the CWA when such regulations are promulgated.

D. BIOLOGICAL MONITORING

1. The Permittee shall conduct entrainment sampling three (3) times per week between February 15 and July 30th for three years. Three entrainment samples shall be collected each sampling week and shall target three separate periods of the diurnal cycle (for example, once on Monday morning at 8:00 am, once on Wednesday afternoon at 2:00 pm, and once on Friday night at 8:00 pm). At a minimum, the sampling program shall address the following:

a. Samples shall be collected from the manhole cover in the pump house using the same methodology as the permittee's 2004 entrainment study. Sampling shall be conducted using a 0.333 millimeter mesh 60-centimeter plankton net. The volume of water sampled shall be measured and equal to approximately 100 cubic meters (m^3). A standard mesh of 0.202 mm shall be required during the period of highest abundance of early stage winter flounder (March 15 to April 30).

b. In the laboratory, all eggs and larvae shall be identified to the lowest practical taxa and counted. Subsampling with a plankton splitter shall be used if the count of eggs and larvae in a sample is greater than 400 organisms so that a minimum of 200 eggs and larvae will be present in any subsample.

2. Egg and larvae counts shall be converted to densities per 100 m^3 of water based on the flow through the sampling net and the data shall be presented in the annual Biological Monitoring Report (BMR) detailed in Part I.D.5 below. Estimates of total numbers of eggs and larvae based on facility flow rates shall also be provided. Entrainment losses shall be converted from weekly estimates of density per unit volume, to monthly and annual loss estimates based on the permitted flow. In addition, loss estimates should be converted to adult equivalents for species for which regionally specific larval survival rates are available.

3. Larval winter flounder shall be enumerated by stage as follows:

a. Stage 1 - From hatching until the yolk sac is fully absorbed (approximately 2.3 to approximately 3.8 mm);

b. Stage 2: From the end of Stage 1 until a loop or coil forms in the gut (approximately 2.6 to approximately 4.0 mm);

c. Stage 3: From the end of Stage 2 until the left eye migrates past the midline of the head during transformation (approximately 3.5 to approximately 8.0 mm);

d. Stage 4: From the end of Stage 3 until the full complement of juvenile characteristics is present (approximately 7.5 to approximately 8.2mm).

4. After one year of biological monitoring has been completed and reported, the permittee may submit a written request to EPA to reduce monitoring frequency. Biological monitoring shall continue at the frequency specified in the permit until notice is received by certified mail from EPA that the monitoring requirements have been changed.

5. Results of the entrainment monitoring shall be reported in a CWIS Biological Monitoring Report following each year of the study, which shall include monitoring logs and raw data collected in the previous year and summarize the data both graphically, where appropriate, and in text. The monitoring report shall also include the results of all calculations conducted

in accordance with Part I.D.2. The CWIS Biological Monitoring Report shall be submitted to EPA, MassDEP, and Massachusetts Division of Marine Fisheries by February 28th each year.

E. TEMPERATURE MONITORING

1. **Within sixty (60) days of the effective date of this permit**, the permittee shall install two strings of continuous temperature monitors in the Fort Point Channel. The permittee shall install one string suspended from the Evelyn Moakley Bridge and a second string suspended from the Congress Street Bridge consistent with the monitoring locations from the previous ambient temperature study. Each string shall consist of five temperature probes positioned at fixed intervals from 0.5 to 5.5 meters below the water surface.

   Each string shall be equipped with a data logging device to allow the development of a continuous data record. The temperature monitoring equipment shall remain in place for one year from the commencement of monitoring. The permittee is solely responsible for gaining all permits and authorizations necessary for the placement of the temperature monitoring strings in the Fort Point Channel. The data shall be summarized and reported to EPA and MassDEP quarterly.

F. MONITORING AND REPORTING

1. **For a period of one year from the effective date of the permit**, the permittee may either submit monitoring data and other reports to EPA in hard copy form or report electronically using NetDMR, a web-based tool that allows permittees to electronically submit discharge monitoring reports (DMRs) and other required reports via a secure internet connection. **Beginning no later than one year after the effective date of the permit**, the permittee shall begin reporting using NetDMR, unless the facility is able to demonstrate a reasonable basis that precludes the use of NetDMR for submitting DMRs and reports. Specific requirements regarding submittal of data and reports in hard copy form and for submittal using NetDMR are described below:

   a. Submittal of Reports Using NetDMR

   NetDMR is accessed from: http://www.epa.gov/netdmr. **Within one year of the effective date of this permit**, the permittee shall begin submitting DMRs and reports required under this permit electronically to EPA using NetDMR, unless the facility is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt out request").

   DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

b. Submittal of NetDMR Opt Out Requests

Opt out requests must be submitted in writing to EPA for written approval at least sixty (60) days prior to the date a facility would be required under this permit to begin using NetDMR. This demonstration shall be valid for twelve (12) months from the date of EPA approval and shall thereupon expire. At such time, DMRs and reports shall be submitted electronically to EPA unless the permittee submits a renewed opt out request and such request is approved by EPA. All opt out requests should be sent to the following addresses:

Attn: NetDMR Coordinator
U.S. Environmental Protection Agency, Water Technical Unit
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

and

Massachusetts Department of Environmental Protection
Surface Water Discharge Permit Program
627 Main Street, 2nd Floor
Worcester, Massachusetts 01608

c. Submittal of Reports in Hard Copy Form

Monitoring results shall be summarized for each calendar month and reported on separate hard copy Discharge Monitoring Report Form(s) (DMRs) postmarked no later than the 15th day of the month following the completed reporting period. Signed and dated originals of the DMRs, and all other reports or notifications required herein or in Part II shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Water Technical Unit (OES04-SMR)
5 Post Office Square - Suite 100
Boston, MA 02109-3912

Duplicate signed copies of all reports or notifications required above shall be submitted to the State at the following addresses:

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

Any verbal reports, if required in **Parts I** and/or **II** of this permit, shall be made to both EPA New England and to MassDEP.

In addition, a copy of the annual CWIS Biological Monitoring Report shall be submitted to the Massachusetts Division of Marine Fisheries by Feburary 28th at the following address:

Division of Marine Fisheries
Annisquam Marine Fisheries Station
Attn: Dr. Jack P. Schwartz
30 Emerson Avenue
Gloucester, MA 01930

G. STATE PERMIT CONDITIONS

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 C.M.R. 3.00. All of the requirements contained in this authorization, as well as the standard conditions contained in 314 CMR 3.19, are hereby incorporated by reference into this state surface water discharge permit.

2. This authorization also incorporates the state water quality certification issued by MassDEP under § 401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, § 27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.

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

Attachment B

List of Approved Treatment Chemicals

Treatment Chemical	Concentration in Boiler Blowdown (mg/L)	Calculated Concentration at Outfall 001 (mg/L)
Disodium phosphate	20	0.008
Polymethacrylate	7	0.0028
Acrylic copolymer	9	0.0036
Molybdenum	0.9	0.00036
Diethylhydroxyamine	0.15	0.00006
Hydroquinone	0.15	0.00006
Morpholine	1	0.0004
Cyclohexylamine	2	0.0008
Benzotriazole	3	0.00009
Tolyltriazole	2	0.00006
Sodium nitrite	150	0.0045
Sodium nitrate	33	0.00099
Molybdenum	14	0.00042
Isothiazolin	1.5	0.000045

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES PURSUANT TO THE CLEAN WATER ACT (CWA)

NPDES PERMIT NUMBER: **MA0003832**

PUBLIC NOTICE START AND END DATES: May 27, 2011 – June 27, 2011

NAME AND MAILING ADDRESS OF APPLICANT:

The Gillette Company
One Gillette Park
Boston, MA 02127

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

The Gillette Company
One Gillette Park
Boston, MA 02127

RECEIVING WATER(S): Fort Point Channel
(Boston Inner Harbor Basin, MA70-02)

RECEIVING WATER CLASSIFICATION(S): SB (CSO)

SIC CODE: 3421 Cutlery, Handtools and Hardware

Table of Contents

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

The above applicant has applied to the U.S. Environmental Protection Agency (EPA) for re-issuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge into the designated receiving water. The Existing Permit was signed September 17, 2003 and became effective on the date of signature. This permit was due to expire on September 17, 2008. EPA received a permit renewal application from The Gillette Company dated March 20, 2008. Since the permit renewal application was deemed timely and complete by EPA, the permit has been administratively continued.

The Gillette Company ("Gillette") is located in Boston, Massachusetts, and is a manufacturer of razors and blades. The location of the facility is illustrated in Attachment A. The facility discharges non-contact cooling water (NCCW) and process water/boiler blowdown to the Fort Point Channel, which empties into the Boston Inner Harbor. Gillette also withdraws water from the Fort Point Channel through a cooling water intake structure (CWIS) for use as NCCW. The discharge of stormwater is not authorized under this Draft Permit. Under the term of the previously issued NPDES permit, the discharge of stormwater was authorized under a separate NPDES permit issued to the Massachusetts Highway Department (Permit MA0038291). Following the completion of the Central Artery project, the responsibility for discharge of stormwater has reverted to Gillette. The permittee is seeking authorization for stormwater discharges under the 2008 Multi-Sector General Permit.

II. Description of Discharge

A quantitative description of the effluent parameters based on recent discharge monitoring reports (DMRs) is shown on Attachment B of this fact sheet.

III. Receiving Water Description

Gillette discharges into the Fort Point Channel, which empties into the Boston Inner Harbor Basin (MA70-02). The Boston Inner Harbor is classified as Class SB (CSO) by the Massachusetts Department of Environmental Protection (MassDEP). Title 314 CMR 4.05(4)(b) states that Class SB waters have the following designated uses*: These waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas). These waters shall have consistently good aesthetic value*. The CSO designation identifies the waters impacted by the discharge of combined sewer overflows (CSO).

MassDEP's water quality assessments summarize current water quality data for each watershed and assess the status of designated uses as defined in the water quality standards. The 1999

Water Quality Assessment for the Boston Harbor Watershed indicated that designated uses for fish consumption and shellfish harvesting were impaired in the Boston Inner Harbor, but designated uses for aquatic life, primary and secondary contact recreation, and aesthetics were supported. Designated uses that were supported were given an alert status due to the highly industrialized nature of the Inner Harbor and the multiple CSO discharges. MassDEP conducted additional water quality monitoring in the Inner Harbor in support of the 2008 Water Quality Assessment. According to the 2008 Assessment, Fort Point Channel is impaired for aquatic life due to seasonally frequent and prolonged low dissolved oxygen (DO) conditions and primary and secondary contact recreation uses are impaired due to elevated *Enterococci* bacterial levels in the channel. The likely sources of low DO and elevated bacteria include industrial point source discharges, wet weather discharges from point sources, stormwater, CSOs, and discharges from municipal separate storm sewer systems. Designated uses for fish consumption and shellfish harvesting continue to be impaired throughout the Inner Harbor.

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such require the development of total maximum daily loads (TMDL). Both the Massachusetts Final 2008 303(d) and Proposed 2010 303(d) Integrated List of Waters state that the Boston Harbor (MA70-02), from the Mystic and Chelsea Rivers, Chelsea/Boston, to the line between Governors Island and Fort Independence, East Boston/Boston (including Fort Point, Reserved and Little Mystic channels), is not attaining water quality standards due to priority organics and pathogens. The discharges from Gillette are not expected to contribute to these impairments.

IV. Permit Basis and Explanation of Effluent Limit Derivations

The effluent limitations, monitoring requirements, and any implementation schedule, if required, may be found in Part 1 (Effluent Limitations and Monitoring Requirements) of the Draft Permit. The permit re-application is part of the administrative file.

A. General Requirements

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States without a 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 Permit was developed in accordance with various statutory and regulatory requirements established pursuant to the CWA and applicable State regulations. During development, EPA considered the most recent technology-based treatment requirements, water quality-based requirements, and all limitations and requirements in the current permit. The regulations governing the EPA NPDES permit program are generally found at 40 CFR Parts 122, 124, 125, and 136. The standard conditions of the Draft Permit are based on 40 CFR §122.41 and consist primarily of management requirements common to all permits. The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308(a) of

the CWA in accordance with 40 CFR §122.41(j), §122.44(i) and §122.48.

B. Technology-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.

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. In general, technology-based effluent guidelines for non-POTW facilities 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 cannot be authorized by a NPDES permit.

EPA has not promulgated technology-based National Effluent Guidelines for Cutlery, Hand Tools, and Hardware (SIC 3421). In the absence of 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 Judgment (BPJ).

C. Water Quality-Based Requirements

Water quality-based criteria 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). Water quality-based criteria consist of three (3) 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) of the water body; and 3) anti-degradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts State Water Quality Standards, found at 314 CMR 4.00, include these elements. The State Water Quality Regulations limit or prohibit discharges of pollutants to surface waters and thereby assure that the surface water quality standards of the receiving water are protected, maintained, and/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, be used unless site-specific criteria are established. EPA regulations pertaining to permit limits based upon water quality standards and state requirements are contained in 40 CFR §122.44(d).

Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts. The State of Massachusetts has a similar narrative criteria in their water quality regulations that prohibits such discharges [See Massachusetts 314 CMR 4.05(5)(e)]. The

effluent limits established in the Draft Permit assure that the surface water quality standards of the receiving water are protected, maintained, and/or attained.

D. Anti-Backsliding

EPA's anti-backsliding provision as identified in Section 402(o) of the CWA and at 40 CFR §122.44(l) prohibits the relaxation of permit limits, standards, and conditions unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued. Anti-backsliding provisions apply to effluent limits based on technology, water quality, best professional judgment (BPJ) and State Certification requirements. Relief from anti-backsliding provisions can only be granted under one of the defined exceptions [See 40 CFR §122.44(l)(i)]. Since none of these exceptions apply to this facility, the effluent limits in the Draft Permit are as stringent as or more stringent than those in the 2003 Permit.

E. Anti-Degradation

Federal regulations found at 40 CFR § 131.12 require states to develop and adopt a statewide antidegradation policy which maintains and protects existing instream water uses and the level of water quality necessary to protect the existing uses, and maintains the quality of waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and to support recreation in and on the water. The Massachusetts Antidegradation Regulations are found at 314 CMR 4.04.

This Draft Permit is being reissued with allowable effluent limits as stringent as or more stringent than the current permit and accordingly will continue to protect the existing uses of the Fort Point Channel and Boston Inner Harbor. EPA anticipates that MassDEP shall make a determination that there shall be no significant adverse impacts to the receiving waters and no loss of existing uses as a result of the discharge authorized by this permit.

F. CWA § 316 (a) and § 316 (b)

Heat is defined as a pollutant under Section 502(6) of the CWA. 33 U.S.C. § 1362(6). As with other pollutants, discharges of heat (or "thermal discharges") generally must satisfy both technology-based standards (specifically, the BAT standard) and any more stringent water quality-based requirements that may apply. State WQS may include numeric temperature criteria, as well as narrative criteria and designated uses, that apply to particular water body classifications and may necessitate restrictions on thermal discharges.

Section 316(a) of the CWA, 33 U.S.C. § 1326(a), provides, however, that thermal discharge limits less stringent than technology-based and/or water quality-based requirements may be authorized if the biological criteria of Section 316(a) are satisfied. The approval of less stringent thermal discharge limits under CWA § 316(a) is referred to as a "Section 316(a) variance." In addition, the Massachusetts SWQS provide that "any determinations concerning thermal

discharge limitations in accordance with 33 U.S.C. 1251 § 316(a) will be considered site-specific limitations in compliance with 314 CMR 4.00." *See* 314 CMR 4.05(4)(a)(2)(c) and 4.05(4)(b)(2)(c) (for Class SA and SB waters, respectively).

With any NPDES permit issuance or reissuance, EPA is also required to evaluate or re-evaluate compliance with applicable standards, including those stated in CWA § 316(b) regarding cooling water intake structures. CWA § 316(b) applies if the permit applicant seeks to withdraw cooling water from a water of the United States. To satisfy § 316(b) the permit applicant must demonstrate to the satisfaction of the EPA (or, if appropriate, the State) that the location, design, construction, and capacity of the facility's cooling water intake structure(s) (CWIS) reflect the Best Technology Available (BTA) for minimizing adverse environmental impacts. CWA § 316(b) applies to this permit due to the presence and operation of a cooling water intake structure. A detailed discussion of the requirements pertaining to this regulation is presented in Section VI of this Fact Sheet.

V. Explanation of the Permit's Effluent Limitation(s)

A. Facility Information

Gillette manufactures blades and razors. The site consists of approximately 43 acres and over 1.5 million square feet of manufacturing, office, warehouse, and R&D laboratory space in 20 buildings (plus four ancillary structures). Major manufacturing related operations at Gillette include plastic injection molding; plastic extrusion; metal stamping, forming, and fabrication; heat-treating; sharpening; aqueous cleaning; sputtering and low energy sintering; and assembly. Manufacturing support operations include: aboveground fuel storage (vaulted subsurface structure), gaseous hydrogen storage, liquid nitrogen storage, air compressors and dryers, vacuum pumps, water chillers and coolers, 10 MW co-generation power plant for steam/electric generation, electrical substations, deionized water pretreatment, wastewater treatment systems, and the meta-filter oil recycling system (closed loop). The municipality supplies potable water and sewage treatment. Gillette generates approximately 60% of its energy onsite, and purchases the rest. The facility is permitted by EPA and MassDEP to use natural gas and No. 6 fuel oil.

B. Cooling Water Intake Structure (CWIS)

The facility withdraws water from the Fort Point Channel to use as once-through non-contact cooling water (NCCW) for the condensers and heat exchangers in the power house, and 'Z' and Plastics buildings. The CWIS is located on the eastern bank of the Fort Point Channel, approximately 0.6 miles from where the channel joins the Boston Harbor. At mean lower low water (MLLW) the top of the CWIS is approximately 8.7 feet below the surface. The channel floor was dredged by the Army Corps of Engineers (ACOE) to a depth of greater than 60 ft with a bottom sloping away from the bulkhead attached to the wedgewire screen down to that depth. The total depth of the water at the intake structure at MLLW is approximately 15.5 feet.

The CWIS is comprised of two wetwells, three variable-frequency drive (VFD) pumps, four intake tunnels, and four cylindrical wedgewire screens. The two concrete wetwells extend 30 feet down from the floor of the pump room. The three seawater pumps are each rated at 15,000 gallons per minute (gpm). Under normal operations, two of the seawater pumps operate to supply water with the third pump off. System operation is controlled automatically by a Programmable Logic Controller (PLC) system with control stations located in both the power plant control room and the intake structure electrical room.

The two wetwells are connected to the Fort Point Channel through four horizontal tunnels located near the bottom of the wetwells. Each tunnel can be isolated from the channel and dewatered for maintenance or repair. The two wetwells also have a manually-operated interconnecting sluice gate between them so that any of the four inlet tunnels can provide water to any seawater pump.

Cylindrical wedgewire screens are located at the end of each intake tunnel. Each of the four 9.5 mm screens is 12 feet long and 54" in diameter. The rated flow capacity for each of the four screen assemblies is 15,000 gpm. According to Gillette, the maximum through screen slot velocity is 0.5 feet per second at the rated flow capacity. The entire screen assembly is mounted to the bulkhead on a rail system, which allows the screens to be withdrawn from the channel for cleaning and inspection as required (at least annually). An airburst system on each of the cylindrical wedgewire screens is used to remove any debris that accumulates in order to maintain the low through-screen velocity (TSV). The airburst system sequence is manually initiated by the operators (preferably on an outgoing tide) and, once started, automatically clears each of the four intake screens in succession.

C. Description of Outfalls

Outfall 001 discharges NCCW from the power house steam plant and Z Building. In addition, Outfall 001 discharges waste streams consisting of (1) backwash and reject water from the process water and boiler make-up water treatment reverse osmosis systems, and (2) boiler blowdown. The source of water for these discharges is city water. Outfall 002 discharges NCCW from the power house chiller plant heat exchangers and process water, including strainer flush, from the power house steam plant and Z Building. The facility is also authorized to discharge NCCW from the power house chiller plant heat exchangers to Outfall 004. Outfall 003 discharges process water, including strainer flush, and NCCW from the Z Building. The process flow diagram for these four outfalls is illustrated in Attachment D.

Stormwater is collected from 11 acres of almost entirely impervious surfaces, including roof drains from the Z-building and catch basins from the parking lot and Channelwalk alongside the Fort Point Channel. The permittee is seeking coverage for stormwater runoff under EPA's 2008 Multi-Sector General Permit (MSGP); therefore, stormwater discharges are not authorized by this individual Draft Permit.

D. Derivation of Effluent Limits under the Federal CWA and/or the

Commonwealth of Massachusetts' Water Quality Standards

The Draft Permit for Gillette includes numeric and narrative effluent limitations, as well as requirements specific to the CWIS under CWA § 316(b). The effluent parameters in the Draft Permit are discussed in more detail below.

1. Flow

The current Permit includes maximum daily flow limits at each outfall and requires the permittee to report average monthly flows. The average monthly and maximum daily recorded flows at each outfall from discharge monitoring reports (DMRs) from November 2003 through November 2010 are presented in Attachment B. According to the DMRs, the maximum daily flow limits were met at all outfalls except on one occasion at Outfall 003 during June 2006. Flow limits at all outfalls are continued from the current Permit and shall be measured at a frequency of once (1) per day when an outfall is in use. Additionally, NCCW from the power house chiller plant heat exchanger may be discharged from either Outfall 002 or 004, but the total combined flow from Outfalls 002 and 004 may not exceed 26 MGD. This provision is also continued from the current permit, and, according to DMRs, was consistently met between November 2003 and November 2010 (maximum combined flow was 22 MGD in August 2007, see Attachment B). The Draft Permit also limits intake flow through the CWIS in compliance with CWA § 316(b) (see Section VI of the Fact Sheet and Part I.A.1 through I.A.5 of the Draft Permit).

2. pH

Massachusetts State Surface Water Quality Standards require the pH of Class SB waters to be within the range of 6.5 to 8.5 standard units (s.u.) and not more than 0.2 units outside of the natural background range. A summary of the discharge monitoring data submitted by the facility during the time period of November 2003 to November 2010 indicates that the permittee exceeded the maximum pH limit (8.5 s.u.) at Outfalls 001, 002, and 003 on 4 occasions each, and at Outfall 004 on 1 occasion (Attachment B). These exceedances consistently occurred concurrently at all outfalls. Because the reported maximum pH levels at Gillette exceeded the water quality standards, EPA concludes there is a reasonable potential for the discharge to cause or contribute to an excursion above a state water quality standard. The pH permit limit range of 6.5 to 8.5 in the Draft Permit has been carried forward from the current permit and is in accordance with the State Surface Water Quality Standards for Class SB waters. The discharge shall not exceed this pH range unless due to natural causes. In addition, there shall be no change from background conditions that would impair any uses assigned to the receiving water class.

3. Total Suspended Solids and Oil and Grease

The current permit discontinued monitoring for oil and grease and total suspended solids (TSS) based on significant changes to the facility that removed exposure of storm water runoff to pollutants. Limited effluent monitoring from Outfall 001 in 2003 indicate oil and grease levels ranging from 4 to 13 mg/l and TSS levels ranging from 49 to 360 mg/l. In the 2003 permit,

stormwater runoff to Outfalls 001 was determined to meet the no exposure exclusion in the Massachusetts Storm Water General Permit, and the responsibility for the control of stormwater discharges to Outfall 003 passed to the Massachusetts Highway Department. However, no monitoring of the process water/blowdown/strainer flush wastes was ever conducted to ensure that the effluent from Outfalls 001, 002, and 003 does not contain either oil and grease or TSS prior to comingling with stormwater. Therefore, the Draft Permit requires that Outfalls 001, 002, and 003 be monitored quarterly for oil and grease and TSS for determining whether the discharge has the reasonable potential to cause or contribute to exceedances narrative state water quality criteria for solids and/or oil and grease. Monitoring of these waste streams must be conducted prior to comingling with NCCW and any stormwater discharge authorized by the MSGP.

4. Temperature/Heat Load

In developing a permit's effluent limits, EPA compares technology-based and water quality-based requirements, and whichever is more stringent governs the permit requirements.

The Massachusetts Surface Water Quality Standards (WQS) for Class SB waters require that the in-stream temperature shall not exceed 85˚F (29.4˚C) nor a maximum daily mean of 80˚F (26.7˚C) and that the rise in temperature due to a discharge shall not exceed 1.5°F (0.8˚C) during the summer months (July through September) nor 4˚F (2.2˚C) during the winter months (October through June). Additionally, the WQS state that there shall be no change from background conditions that would impair any use designated to this class [314 CMR 4.05 (4)(b)]. The WQS allow for a mixing zone for the initial dilution of a discharge, which is limited to an area or volume as small as feasible [314 CMR 4.03 (2)]. There are available technologies, such as closed-cycle cooling (discussed in more detail in Sections VI.C. and VI.G.3 of this Fact Sheet) that could reduce the maximum discharge temperature from the facility. In this case, a technology-based thermal limit established on the basis of, for instance, closed-cycle cooling, would likely be more stringent than the current water quality-based permit limit.

According to CWA § 316(a) and regulations promulgated thereunder at 40 CFR Part 125, subpart H, permitting authorities may include thermal discharge effluent limitations in permits that are less stringent than those required by otherwise applicable standards and limitations if the discharger demonstrates that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration must show that the alternative effluent limitations desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made.

The current permit contains a water quality-based daily maximum temperature limit of 83°F for all outfalls. According to DMR reports between November 2003 and November 2010, this limit was never exceeded at any of the outfalls. In the 2003 Permit issuance, the EPA-supported CORMIX model was used to predict the increase in temperature in Fort Point Channel as a result of the four cooling-water discharges. In this case, the model predicted a thin (1 to 2 feet thick)

surface plume from the point of discharge from the outfalls to roughly midway between the Congress Street and Northern Avenue bridges. As a requirement of the current permit, the permittee conducted an Ambient Temperature and Mixing Zone Study from October 2003 through October 2004 to demonstrate that water quality standards are met at the edge of the mixing zone. EPA specified that ambient temperatures would be monitored at the Northern Avenue Bridge, while a second station at the Congress Street Bridge (near the edge of the mixing zone) would be used to assess temperatures impacted by the thermal plume. The permittee summarized the results of the temperature monitoring in a series of reports prepared by HydroAnalysis, Inc, which are analyzed below.

EPA evaluated the results of the permittee's temperature monitoring, quarterly reports, and raw data to determine if the thermal plume under the current operating conditions, as defined by the CORMIX model and supported by additional monitoring, is protective of the balanced, indigenous population (BIP) in Fort Point Channel. The combined thermal discharges from Gillette's outfalls in 2004 did not exceed water quality standards for average daily temperature (80˚F) and maximum temperature (85˚F) at the Congress Street Bridge. In addition, the monitoring results confirmed that the thermal plume is limited to the surface (between 0 and 1.5 meters below surface). Surface and bottom temperatures at the Northern Avenue Bridge tended to have similar diurnal cycles, while surface and bottom temperatures at Congress Street were generally less similar with little bottom temperature variation, particularly in spring and summer. The comparison between the two locations demonstrates the presence of a thermal plume impacting temperatures at the surface but not deeper waters at the Congress Street Bridge and suggests that the Northern Avenue Bridge is indicative of ambient temperatures (i.e., beyond influence of a surface thermal plume).

The temperature difference from the Congress Street Bridge to the Northern Avenue Bridge was consistently less than 4˚F in spring and fall. The temperature difference was less than 4˚F in winter approximately 86% of the time at 0.5m and 99.9% of the time at 1.5m (average winter delta T of 1.2˚F). The temperature difference was less than 1.5˚F in summer approximately 93% of the time at 0.5m and more than 96% of the time at 1.5m (average summer delta T of 0.4˚F). Overall, EPA concludes that the thermal plume from the discharge at Gillette does not substantially impact the temperature of the receiving water and ensures that ambient conditions remain protective of the BIP. Although the temperature difference between the two monitoring locations exceeded water quality standards for delta T on a small number of occasions, suggesting that the mixing zone can extend past the Congress Street Bridge at times during the winter and summer, these instances were generally short in duration.

The Massachusetts Water Quality Standards Implementation Policy for Mixing Zones directs that "mixing zones shall not interfere with the migration or free movement of fish or other aquatic life. There shall be safe and adequate passage for swimming and drifting organisms with no deleterious effects on their populations." In this case, EPA and MassDEP have determined that the mixing zone adequately provides for the existing and designated uses of this segment and sufficiently minimizes impacts on aquatic life because impacts from the thermal plume are limited to the surface, leaving the majority of the water column (from about 1.5m to 6m) as safe habitat for drifting and swimming organisms, as well as for benthic organisms. In addition, the mixing zone is typically limited to the area extending from the outfalls to the Congress Street

Bridge. The CORMIX model indicated that the thermal plume could extend from bank to bank during some periods, particularly ebb and low tides, which could interfere with a zone of passage allowing for safe movement of fish. However, although anadromous or catadromous species may be present, Fort Point Channel does not lead to upstream spawning or feeding habitat. Therefore, the waterbody does not serve as a migration route for fish and does not need to provide a zone of passage for migrating fish. Although exceedances of the delta temperature limit might be cause for concern in another physical setting, the levels of exceedance mentioned in the preceding paragraph within the Fort Point Channel were not considered to be excessively disruptive to the aquatic community within the channel. Therefore, the intent of the Implementation Policy was judged to be upheld.

The Agencies' analysis of thermal impacts is based on the results of the in-stream monitoring and CORMIX modeling under certain present or simulated operational conditions, and the conclusions are valid only under similar conditions. As a condition of best technology available (BTA) to minimize adverse environmental impacts from entrainment of eggs and larvae in compliance with § 316(b) of the CWA, EPA determined that the facility must limit the intake volume to a maximum daily flow of 39.0 million gallons per day (MGD) and average monthly flow of 35 MGD. The maximum daily flow limit in the draft permit is a 35% reduction from the maximum permitted flow in the current permit. The more stringent flow limit in the draft permit could result in a larger delta T across the heat exchangers if the facility were to have the same heat output at a maximum daily flow of 39.0 MGD as they could have under a maximum discharge volume of 60 MGD.

To ensure that the results of the CORMIX model are consistent with facility operation under the draft permit, EPA included a limit on heat load based on the conditions simulated by the CORMIX model. If the facility complies with a heat load limit based on the model conditions, the results of the CORMIX model, and therefore, the conclusions regarding thermal impacts based on those results, will still be applicable to the discharge from the outfalls. EPA calculated the maximum daily heat load simulated in the CORMIX model under summer and winter conditions (see Attachment E). Under summer conditions (delta T of 18.1°F), the maximum daily heat load contributed by all four outfalls to the Fort Point Channel was 10,296 million British Thermal Units (mBTUs). Under winter conditions (maximum delta T of 18.2°F at Outfall 004), the maximum daily heat load contributed by all four outfalls to the Fort Point Channel was 9,414 mBTUs. EPA determined that if the facility's future operations contribute a maximum daily heat load of 9,400 mBTUs year-round, the conclusions of the thermal analysis herein will be valid and the facility's thermal discharge will be unlikely to interfere with the existing or designated uses of the Fort Point Channel and will remain protective of the aquatic community.

Overall, the 2004 monitoring results and the CORMIX model demonstrate that the impacts from Gillette's thermal discharge are generally confined to the surface (at a depth less than 1.5m) and do not extend past the Congress Street Bridge except for limited periods during winter and summer. In addition, EPA and MassDEP have determined that the mixing zone as defined by CORMIX modeling and confirmed with thermal monitoring meets the guidelines provided in the 1993 Massachusetts Implementation Policy for Mixing Zones and, as such, the facility's thermal discharge is not likely to interfere with the existing or designated uses of the Fort Point Channel.

EPA concludes that the permittee's submissions, as analyzed by EPA and MassDEP, have demonstrated that the current water quality-based permit limits satisfy Massachusetts water quality standards and are protective of the BIP in Fort Point Channel. Therefore, the draft permit includes a water quality-based maximum daily temperature limit of 83°F continued from the current permit, as well as a new maximum daily limit on heat load from the facility, which will ensure that the guidelines of the Implementation Policy for Mixing Zones will continue to be met under future operating conditions. It is also EPA's understanding that Gillette is seeking to retain the existing permit's water quality-based thermal discharge limits in its new permit. Thus, in effect, Gillette has requested that EPA grant it a variance from any technology-based thermal discharge limits under § 316(a) of the CWA. EPA is proposing to grant the variance because, as stated above, it has determined that the existing water quality-based thermal discharge limits will assure the protection and propagation of the BIP. In addition, the draft permit includes a narrative requirement that the thermal plume not interfere with spawning of indigenous populations nor harm the BIP.

5. Whole Effluent Toxicity

Gillette uses several water conditioning formulations in boilers and boiler water/process water treatment systems. Treated water and equipment blowdown are discharged to Outfall 001 from these sources. See the flow diagram in Attachment D. Blowdown effluent from the power house accounts for approximately 50 gallons per day (gpd). Treated filter backwash and reject from the boiler makeup water treatment reverse osmosis system accounts for approximately 16,000 gpd, and filter backwash and reject from the process water treatment reverse osmosis system (located in the Z building) accounts for approximately 12,000 gpd. According to the permittee, the water treatment system additives are maintained at concentrations between 0.15 to 150 mg/l in these waste streams. Some of the water treatment system additives have changed since issuance of the last permit.

The waste streams combine with NCCW before being discharged from Outfall 001. The total discharge flow through Outfall 001 is permitted up to a maximum of 26 MGD. Based on average monthly flow rates through Outfall 001 of approximately 16 MGD, the boiler blowdown waste streams account for approximately 0.04% of the combined discharge, and the discharges from the boiler makeup and process water reverse osmosis treatment systems account for approximately 2% of the combined discharge. At this level of dilution, the concentration of water treatment system additives at Outfall 001 ranges from 0.045 to 8 µg/l. Hydroquinone, a boiler water additive, has the lowest LC50 of all the various treatment additives. Ecotoxicology data for hydroquinone indicate an LC50[1] of 0.83 mg/l for salt water shrimp after 84 hours of exposure.[2] At Outfall 001, the concentration of hydroquinone prior to mixing with the receiving water is 0.06 µg/l, which is well below the LC50. Of the suite of additives in Outfall 001, disodium phosphate is found in the highest concentration (8 µg/l). Adverse toxic effects of sodium

[1] LC50 is a median lethal concentration, or the concentration of the toxicant that is lethal to 50% of the test organisms during the time prescribed by the test method.

[2] United Nations Environment Programme, Organization for Economic Co-operation and Development. Screening Information Dataset for High Volume Chemicals: Hydroquinone. CASRN 123-31-9. http://www.chem.unep.ch/irptc/dids/OECDSIDS/123319.pdf

phosphate on American oyster larvae may be observed at concentrations between 15 and 150 mg/l, which is several orders of magnitude higher than the concentration in Outfall 001.[3] The concentration of other additives at Outfall 001 is similarly less than their respective LC50s.

The above referenced toxic effect levels reflect the toxicity of a single chemical, but provide no indication of the potential toxic impacts resulting from the suite of chemicals combined in the effluent at Outfall 001. Whole effluent toxicity (WET) testing monitors the cumulative impacts of a number of potential toxicants. Gillette conducted WET testing at Outfall 001 for acute toxicity quarterly from January 2001 through July 2003 in compliance with the 1996 NPDES permit. In all tests, the LC50 was consistently greater than 100 percent effluent. However, no toxicity testing has been conducted since 2003, and the chemicals from the boiler blowdown have changed. EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, March 1991) (p.59) suggests that effluents at the dilution present at Outfall 001 (between 1,000:1 and 100:1) have been shown to be both acutely and chronically toxic.

Given that the suite of chemicals has changed since the acute WET tests were conducted, and because the cumulative toxicity of a suite of chemicals may be greater than the toxicity of any one constituent, the Draft Permit requires annual acute WET testing for determining whether the discharge has the reasonable potential to cause or contribute to exceedances of state water quality criteria for toxicity at 314 CMR 4.05(5)(e). In addition, even in cases where EPA determines that there is no reasonable potential for excursions above the applicable numeric or narrative water quality criterion, the *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, March 1991) (p. 60) recommends that toxicity testing be repeated at a frequency of at least once every 5 years. Finally, a toxicity monitoring requirement supports the narrative requirement at Part I.A.10 of the Draft Permit that prohibits the discharge of "materials in concentrations or in combinations which are hazardous or toxic to aquatic life or which would impair the uses designated by the classification of the receiving water." Based on the results of tests conducted during the first three years of this permit, the permittee may request a reduction in the frequency of WET testing.

VI. 316(b): Determination of Best Technology Available (BTA) for Cooling Water Intake Structures (CWIS)

With any NPDES permit issuance or reissuance, EPA is required to evaluate or re-evaluate compliance with applicable standards, including the technology standard specified in Section 316(b) of the CWA for cooling water intake structures (CWIS). Section 316(b) requires that:

> [a]ny standard established pursuant to section 301 or section 306 of this Act and applicable to a point source shall require that the location, design, construction, and

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[3] Environmental Protection Agency, ECOTOX Database. Aquatic Report: Phosphoric acid, Chemical # 7558807. http://cfpub.epa.gov/ecotox/quick_query.htm Report generated September 15, 2010. Reference: Kunigelis, S.C., Wilbur, K.M. 1987. The effects of inorganic phosphates on trocophore larvae of the oyster, *Crassostrea virginica*. Int. J. Inverteb. Reprod. Dev. 12(2):161-172.

capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

33 U.S.C. § 1326(b). The operation of CWISs can cause or contribute to a variety of adverse environmental effects, such as killing or injuring fish larvae and eggs entrained in the water withdrawn from a water body and sent through the facility's cooling system, or by killing or injuring fish and other organisms by impinging them against the intake structure's screens. CWA § 316(b) applies if a point source discharger seeks to withdraw cooling water from a water of the United States through a CWIS. CWA § 316(b) applies to this permit due to the presence and operation of a CWIS at Gillette.

A. Introduction and Regulatory Background

In the absence of applicable regulations, for many years EPA has made § 316(b) determinations on a case-by-case basis based on best professional judgment (BPJ), for both new and existing facilities with regulated CWISs. In December 2001, EPA promulgated new, final § 316(b) regulations that provide specific technology-based requirements for *new* facilities of any kind with a CWIS with an intake flow greater than two (2) MGD. 66 Fed. Reg. 65255 (Dec. 18, 2001) (Phase I rule). The Phase I rule is in effect but does not apply to this permit because the Gillette facility in Boston, MA, is not a new facility.

In July 2004, EPA published final regulations applying § 316(b) to large, *existing* power plants (Phase II rule), defined in 40 CFR § 125.91 as existing point sources employing CWISs that withdraw at least 50 MGD and generate and transmit electric power as their primary activity. Following litigation that resulted in the remand to EPA of many of the rule's provisions, *see Riverkeeper, Inc. v. U.S. EPA*, 475F.3d 83 (2d Cir. 2007); *rev'd in part, Entergy Corp. v. Riverkeeper, Inc.,* ___ U.S. ___, 129 S.Ct. 1498, 1510 (2009), the Agency suspended the Phase II rule in July 2007. 72 FR 37107 (July 9, 2007). The suspension left only 40 CFR § 125.90(b) in effect, which provides that in the absence of applicable categorical standards, BTA determinations are to be made on a case-by-case, BPJ basis.

On June 16, 2006, EPA published the Phase III Rule, which established categorical requirements for new offshore oil and gas extraction facilities that have a design intake flow threshold of greater than 2 MGD, but dictated that the BTA would be determined on a case-by-case, BPJ basis for existing electrical generation facilities with a design intake flow less than 50 MGD and existing manufacturing facilities. 71 FR 35006 (June 16, 2006). In 2009, EPA petitioned the 5th Circuit to remand those provisions of the Phase III Rule that established 316(b) requirements for existing facilities on a case-by-case basis using best professional judgment. On July 23, 2010, the United States Court of Appeals for the 5th Circuit issued a decision upholding EPA's rule for new offshore oil and gas extraction facilities. Further, the Court granted the request by EPA and environmental petitioners to remand the existing facility portion of the rule back to the Agency for further rulemaking. *ConocoPhillips Co. v. U.S. Envtl. Prot. Agency*, 612 F.3d 822, 842 (5th Cir. 2010).

On April 20, 2011, EPA published proposed regulations to apply CWA § 316(b) to CWISs at existing power plants and manufacturers, and new units at existing facilities. 76 FR 22174-22288 (April 20, 2011). The proposed rule addresses existing facilities formerly covered by the remanded portions of the Phase II and Phase III rules. Since this proposed rule has not been finalized and is not yet effective, it does not apply to the Gillette facility.

Thus, currently there are no effective national categorical standards applying § 316(b) to the CWISs at the Gillette facility. As a result, EPA has developed technology-based requirements for the facility's CWISs by applying CWA § 316(b) on a BPJ, site-specific basis.

B. Methodology for the BPJ Application of CWA § 316(b)

Neither the CWA nor EPA regulations dictate a specific methodology for developing BPJ-based limits under § 316(b). As dictated by the text of § 316(b), however, the permit limits must ensure that the design, location, capacity and construction of CWISs reflect the BTA. In addition, the language of § 316(b) directs that the BTA is an "available" technology that is deemed the "best" for "minimizing" adverse environmental impacts.[4] EPA has read CWA § 316(b) to intend that entrainment and impingement be regarded as "adverse impacts" that must be minimized by application of the BTA. This might or might not require complete elimination of such impacts in a given case.

EPA has looked by analogy to factors considered in the development of effluent limitations under the CWA and EPA regulations for guidance concerning additional factors to consider in making a BTA determination under CWA § 316(b). In setting effluent limitations on a site-specific BPJ basis, EPA considers a number of factors specified in the statute and regulations. *See, e.g.,* 33 U.S.C. §§ 1311(b)(2)(A) and 1314(b)(2); 40 C.F.R. § 125.3(d)(3).[5] These factors

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[4] Thus, a proper determination based on a BPJ analysis results in a valid, facility-specific BTA determination. In *NRDC v. EPA*, 859 F.2d 156, 199 (D.C. Cir. 1988) (industry and environmental group challenge to 1979 revisions to NPDES regulations, including the ban on backsliding from BPJ limits), the court explained:

> [i]n what EPA characterizes as a 'mini-guideline' process, the permit writer, after full consideration of the factors set forth in section 304(b), 33 U.S.C. § 1314(b) (which are the same factors used in establishing effluent guidelines), establishes the permit conditions 'necessary to carry out the provisions of [the CWA].' § 1342(a)(1). These conditions include the appropriate ... BAT effluent limitations for the particular point source. ... [T]he resultant BPJ limitations are as correct and as statutorily supported as permit limits based upon an effluent limitations guideline.

Id. See also Texas Oil & Gas Ass'n v. EPA, 161 F.3d 923, 929 (5th Cir. 1998) ("[For BPJ permits i]ndividual judgments thus take the place of uniform national guidelines, but the technology-based standard remains the same.").

[5] *See also NRDC v. EPA*, 863 F.2d at 1425 ("in issuing permits on a case-by-case basis using its 'Best Professional Judgment,' EPA does not have unlimited discretion in establishing permit limitations. EPA's own regulations implementing [CWA § 402(a)(1)] enumerate the statutory factors that must be considered in writing permits.").

include: (1) the age of the equipment and facilities involved, (2) the process employed, (3) the engineering aspects of applying various control techniques, (4) process changes, (5) cost, and (6) non-water quality environmental impacts (including energy issues). The CWA sets up a loose framework for assessing these statutory factors in setting BAT limits.[6] It does not require their comparison, merely their consideration.[7] "[I]n enacting the CWA, 'Congress did not mandate any particular structure or weight for the many consideration factors. Rather, it left EPA with discretion to decide how to account for the consideration factors, and how much weight to give each factor."[8] In sum, when EPA considers the statutory factors in setting BAT limits, it is governed by a standard of reasonableness.[9] It has "considerable discretion in evaluating the relevant factors and determining the weight to be accorded to each in reaching its ultimate BAT determination."[10] One court has succinctly summarized the standard for judging EPA's consideration of the statutory factors in setting BAT effluent limits: "[s]o long as the required technology reduces the discharge of pollutants, our inquiry will be limited to whether the Agency considered the cost of technology, along with other statutory factors, and whether its conclusion is reasonable."[11]

Thus, in determining the BTA for this permit, EPA has the discretion to consider the above-listed factors and to decide how to consider and weigh them in making its decision. Again, the factors from the effluent limitation development process are not strictly applicable as a matter of law to

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[6] *BP Exploration & Oil, Inc.*, 66 F.3d at 796; *Weyerhauser v. Costle*, 590 F.2d 1011, 1045 (D.C. Cir. 1978) (citing Senator Muskie's remarks on CWA § 304(b)(1) factors during debate on CWA). *See also EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 74, 101 S.Ct. 295, 300, 66 L.Ed.2d 268 (1980) (noting with regard to BPT that "[s]imilar directions are given the Administrator for determining effluent reductions attainable from the BAT except that in assessing BAT total cost is no longer to be considered in comparison to effluent reduction benefits").

[7] *Weyerhauser*, 590 F.2d at 1045 (explaining that CWA § 304(b)(2) lists factors for EPA "consideration" in setting BAT limits, while CWA § 304(b)(1) lists both factors for EPA consideration and factors for EPA "comparison" -- *e.g.*, "total cost versus effluent reduction benefits" -- in setting BPT limits).

[8] *BP Exploration & Oil, Inc.*, 66 F.3d at 796; *Weyerhauser v. Costle*, 590 F.2d at 1045.

[9] *BP Exploration & Oil*, 66 F.3d at 796; *Am. Iron & Steel Inst. v. EPA*, 526 F.2d 1027, 1051 (1975), *modified in other part*, 560 F.2d 589 (3d Cir. 1977), *cert. denied*, 435 U.S. 914 (1978).

[10] *Texas Oil & Gas Ass'n*, 161 F.3d at 928; *NRDC v. EPA*, 863 F.2d at 1426. *See also Weyerhauser*, 590 F.2d at 1045 (discussing EPA's discretion in assessing BAT factors, court noted that "[s]o long as EPA pays some attention to the congressionally specified factors, the section [304(b)(2)] on its face lets EPA relate the various factors as it deems necessary").

[11] *Ass'n of Pacific Fisheries v. EPA*, 615 F.2d 794, 818 (9th Cir. 1980) (industry challenge to BAT limitations for seafood processing industry). *See also Chemical Manufacturers Ass'n (CMA) v. EPA*, 870 F.2d 177, 250 n.320 (5th Cir. 1989), *citing* Congressional Research Service, *A Legislative History of the Water Pollution Control Act Amendments of 1972* at 170 (1973) (hereinafter "*1972 Legislative History*") (in determining BAT, "'[t]he Administrator will be bound by a test of reasonableness.'"); *NRDC v. EPA*, 863 F.2d at 1426 (same); *American Iron & Steel Inst.*, 526 F.2d at 1051 (same).

a BTA determination under § 316(b) because they are not specified in § 316(b). Nevertheless, EPA has looked to the effluent limitation development process for guidance and will consider these factors, and perhaps other factors, to the extent the Agency deems them relevant to its determination of the BTA. Ultimately, EPA's determination of the BTA must be reasonable.

According to 40 C.F.R. § 125.3(c)(2), a BPJ-based BAT analysis also should consider the "appropriate technology for the category of point sources of which the applicant is a member, based on all available information," and "any unique factors relating to the applicant." In addition, the United States Supreme Court recently confirmed that EPA is authorized to consider a comparative assessment of the costs and benefits of technology options in determining the BTA under CWA § 316(b). *See Entergy Corp. v. Riverkeeper, Inc.,* ___ U.S. ___, 129 S.Ct. 1498, 1510 (2009). As indicated above, a permit writer developing permit limits on a site-specific, BPJ basis applies the same performance-based approach to an individual point source that EPA would apply to whole categories and classes of point sources when it develops national categorical standards.[12]

C. Best Performing Technology – Closed-Cycle Cooling

In applying the BAT standard for setting effluent limits, the CWA calls for EPA to look to the single "best" performing plant in the industry (in terms of effluent reduction) as the starting point for determining the "best available" technology for the industry.[13] EPA has also determined that it may look to any viable "transfer technologies"—that is, technology from another industry that can be "transferred" to the industry in question—as well as technologies shown to be viable in research even if not yet implemented at a full-scale facility.[14] To ensure that the location, design, construction, and capacity of Gillette's CWIS reflect the best technology available for

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[12] *See, e.g., Texas Oil & Gas Ass'n*, 161 F.3d at 929 (under 40 C.F.R. § 125.3, "EPA must determine on a case-by-case basis what effluent limitations represent the BAT level, using its 'best professional judgment.' Individual judgments thus take the place of uniform national guidelines, but the technology-based standard remains the same.") (citation omitted); *NRDC v. EPA*, 859 F.2d at 201('in establishing BPJ limits, EPA considers the same statutory factors used to establish national effluent guidelines. BPJ limits thus represent the level of technology control mandated by the CWA for the particular point source."); *Trustees for Alaska v. EPA*, 749 F.2d 549, 553 (9th Cir. 1984) (EPA must consider statutorily enumerated factors in its BPJ determination of effluent limits); USEPA NPDES Permit Writer's Manual (2010) at 5-44 to 5-48. *See also NRDC v. EPA*, 863 F.2d at 1425 ("courts reviewing permits issued on a BPJ basis hold EPA to the same factors that must be considered in establishing the national effluent limitations" (citations omitted)).

[13] *E.g., Texas Oil & Gas Ass'n v. United States E.P.A.*, 161 F.3d 923, 928 (5th Cir. 1998); *Association of Pacific Fisheries v. Environmental Protection Agency*, 615 F.2d 794, 816-17 (9th Cir. 1980); *American Meat Inst. v. E.P.A.*, 526 F.2d 442, 462-63 (7th Cir. 1975).

[14] These approaches to determining BAT are supported by the CWA's legislative history and have been upheld by the courts. *E.g., Am. Petroleum Inst. v. EPA,* 858 F.2d 261, 264-65 (5th Cir. 1988); *Pacific Fisheries,* 615 F.2d at 816-17*; BASF Wyandotte Corp. v. Costle,* 614 F.2d 21, 22 (1st Cir. 1980); *Am. Iron & Steel Inst. v. EPA,* 526 F.2d 1027, 1061 (3d Cir. 1975); *Am. Meat Inst.,* 526 F.2d at 462-63.

minimizing adverse environmental impacts, EPA's analysis begins with an inquiry into the capabilities of the best-performing CWISs in the same industrial category.[15] Although Gillette is a manufacturing facility, the power generating capability, along with the operation of the CWISs and discharge of NCCW, make Gillette similar in important ways to steam electric power plants. Therefore, for the purposes of this discussion and analysis, Gillette will be compared directly to power plants whose primary function is the generation and transmission of electricity by means of the steam cycle.

As a general matter, the best performing facilities in terms of reducing entrainment and impingement by CWISs at existing open-cycle cooling power plants are those facilities that have converted from open-cycle cooling to closed-cycle cooling using some type of "wet" cooling tower technology. Converting to closed-cycle cooling can reduce water withdrawals by more than 90 percent and thereby achieve a corresponding reduction in entrainment and impingement. EPA's research has identified a number of facilities that have made this type of technological improvement. *See Draft Permit Determinations Document for Brayton Point Station NPDES Permit,* at pp. 7-37 to 7-38; *Responses to Comments for Brayton Point Station NPDES Permit*, at p. IV-115.[16,17]

EPA concludes that converting to a closed-cycle cooling system using wet cooling towers would *generally* be the best performing technology with regard to reducing the adverse environmental impacts of existing power plants with CWISs. Nevertheless, converting to closed-cycle cooling might not be determined to be the BTA either for a particular facility on a BPJ basis or for an entire category of facilities on a national basis. Thus, a conclusion regarding the best-performing CWIS technology for use as a reference point in the BTA analysis for this permit is not a determination of the BTA for any other facility, much less for the entire category of facilities nationally.

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[15] It is important to emphasize that this is a site-specific determination and is not a finding regarding what would constitute appropriate national, industry category-wide BTA-based requirements under § 316(b).

[16] In the Phase I CWA § 316(b) Rule, EPA determined that entrainment and impingement mortality reductions commensurate with the use of closed-cycle cooling reflect the BTA for *new* facilities with CWISs. *See* 40 C.F.R. Part 125, Subpart I (Phase I CWA § 316(b) Rule).

[17] Although the use of "dry" cooling might achieve an even greater marginal reduction in entrainment and impingement, EPA has not identified a single case of a facility retrofitting from open-cycle cooling to dry cooling. Although EPA is unaware of any technical reason that such a conversion would necessarily be impracticable at all facilities—though it seems likely that it would be infeasible at a larger proportion of existing facilities than would a conversion to wet cooling because of factors such as the greater space needed for dry cooling—it would likely achieve only a small marginal additional reduction over the high end of the reduction range for wet cooling towers and would be significantly more expensive. In the absence of examples of such a conversion ever having been implemented, EPA is not prepared to determine that converting to dry cooling is the required BTA for an existing facility like the Gillette plant. It should also be noted that in developing the Phase I Rule, EPA similarly declined to mandate dry cooling as the required BTA for new facilities, while recognizing that dry cooling was a *permissible* technology that would satisfy § 316(b) if a facility chose to install it.

D. Consideration of Site-specific Factors

Because a BPJ-based application of CWA § 316(b)'s BTA standard is conducted on a case-by-case, site-specific basis, EPA must evaluate whether the technologies under consideration are practicable (or feasible) for use at the particular facility in question. In other words, although a technology works at one facility, it might not actually be feasible at another plant due to site-specific issues (*e.g.,* space limitations). Thus, a technology that works at another facility but is not feasible at Gillette would not be the BTA for this permit. Conversely, a feasible technology for Gillette might not be feasible for another facility.

Again turning for guidance to the process for devising BPJ-based effluent limits, EPA regulations direct the Agency to consider "unique factors relating to the applicant." 40 C.F.R. § 125.3(c)(2). This parallels the above-described site-specific evaluation that EPA conducts in its BPJ application of CWA § 316(b).

As noted earlier, in developing BAT limits on a BPJ basis, EPA considers the six factors set forth in the statute and regulations for developing BAT effluent limitations: (1) the age of the equipment and facilities involved, (2) the process employed, (3) the engineering aspects of applying various control techniques, (4) process changes, (5) cost, and (6) non-water quality environmental impacts (including energy issues). *See* 33 U.S.C. § 1314(b)(2)(B); 40 C.F.R. § 125.3(d)(3).

Finally, as also indicated above, the United States Supreme Court recently held that EPA is authorized, though not statutorily required, to consider a comparative assessment of an option's costs and benefits in determining the BTA under CWA § 316(b). *Entergy,* 129 S.Ct. 1498, 1508-1510, *rev'g in part, Riverkeeper*, 475F.3d 83. As the Supreme Court explained, in its determination, "EPA sought only to avoid extreme disparities between costs and benefits." *Entergy*, 129 S.Ct. at 1509. As the Court also explained, EPA had for decades engaged in this type of cost/benefit comparison using a "wholly disproportionate test" to ensure that costs were not unreasonable when considered in light of environmental benefits.18 *Id.* at 1509 (citing *In re Public Service Co. of New Hampshire*, 1 E. A. D. 332, 340 (1977); *In re Central Hudson Gas and Electric Corp.*, EPA Decision of the General Counsel, NPDES Permits, No. 63, pp. 371, 381 (July 29, 1977)). In *Public Service*, EPA's Administrator stated that "I do not believe that it is reasonable to interpret Section 316(b) as requiring the use of technology whose cost is wholly disproportionate to the environmental benefit to be gained." In *Central Hudson*, *id.*, EPA's then General Counsel stated that:

> ... EPA must ultimately demonstrate that the present value of the cumulative annual cost of modifications to cooling water intake structures is not wholly out of proportion to the magnitude of the estimated environmental gains (including attainment of the objectives of the Act and § 316(b)) to be derived from the modifications.

[18] As the Court described, in developing the Phase II Rule, EPA had (for the first time) used a "significantly greater than test." The Court also indicated that either test was permissible under the statute. 129 S.Ct. at 1509.

The relevant "objectives of the Act and § 316(b)" include the minimization of adverse environmental impacts from cooling water intake structures, restoring and maintaining the physical and biological integrity of the Nation's waters, and achieving, wherever attainable, water quality providing for the protection and propagation of fish, shellfish and wildlife, and providing for recreation, in and on the water. 33 U.S.C. §§ 1251(a)(1) and (2), 1326(b).

E. State Water Quality Standards

In addition to satisfying technology-based requirements, NPDES permit limits for CWISs must also satisfy any more stringent provisions of state water quality standards (WQS) or other state legal requirements that may apply, as well as any applicable conditions of a state certification under CWA § 401. *See* CWA §§ 301(b)(1)(C), 401(a)(1), 401(d), 510; 40 C.F.R. §§ 122.4(d), 122.44(d). *See also* 40 C.F.R. § 125.84(e). This means that permit conditions for CWISs must satisfy numeric and narrative water quality criteria and protect designated uses that may apply from the state's WQS.

The CWA authorizes states to apply their WQS to the effects of CWISs and to impose more stringent water pollution control standards than those dictated by federal technology standards.[19] The United States Supreme Court has held that once the CWA § 401 state certification process has been triggered by the existence of a discharge, then the certification may impose conditions and limitations on the activity as a whole – not merely on the discharge – to the extent that such conditions are needed to ensure compliance with state WQS or other applicable requirements of state law.[20]

With respect to cooling water withdrawals, both sections 301(b)(1)(C) and 401 authorize the Region to ensure that such withdrawals are consistent with state WQS, because the permit must assure that the overall "activity" associated with a discharge will not violate applicable WQS. *See PUD No. 1*, 511 U.S. at 711-12 (Section 401 certification); *Riverkeeper I,* 358 F.3d at 200-

[19] The regulation governing the development of WQS notes that "[a]s recognized by section 510 of the Clean Water Act, States may develop water quality standards more stringent than required by this regulation." 40 C.F.R. § 131.4(a). The Supreme Court has cited this regulation in support of the view that states could adopt water quality requirements more stringent than federal requirements. *PUD No. 1 of Jefferson County v. Wash. Dep't of Ecology*, 511 U.S. 700, 705 (1994). *See also* 33 U.S.C. § 1370; 40 C.F.R. § 125.80(d). *See also* 40 C.F.R. § 125.80(d); *Riverkeeper, Inc. v. U.S. Environmental Protection Agency,* 358 F.3d 174, 200-201 (2d Cir. 2004) ("*Riverkeeper I"*).

[20] *PUD No. 1*, 511 U.S. at 711-12. holds that "in setting discharge conditions to achieve WQS, a state can and should take account of the effects of other aspects of the activity that may affect the discharge conditions that will be needed to attain WQS. The text [of CWA § 401d)] refers to the compliance of the applicant, not the discharge. Section 401(d) thus allows the State to impose "other limitations" on the project in general to assure compliance with various provisions of the Clean Water Act and with "any other appropriate requirement of State law." For example, a state could impose certification conditions related to CWISs on a permit for a facility with a discharge, if those conditions were necessary to assure compliance with a requirement of state law, such as to protect a designated use under state WQS. *See id.* at 713 (holding that § 401 certification may impose conditions necessary to comply with designated uses).

202; *In re Dominion Energy Brayton Point, LLC*, 12 E.A.D. 490, 619-41 (EAB 2006). Therefore, in EPA-issued NPDES permits, limits addressing CWISs must satisfy: (1) the BTA standard of CWA § 316(b); (2) applicable state water quality requirements; and (3) any applicable conditions of a state certification under CWA § 401. The standards that are most stringent ultimately determine the final permit limits.

The Massachusetts Department of Environmental Protection (MassDEP) has designated the Fort Point Channel in the vicinity of this discharge a Class SB Water. Though the standard for Class SB waters does not include any specific numeric criteria that apply to cooling water intakes, it is nevertheless clear that MassDEP must impose the conditions it concludes are necessary to protect the designated uses of the channel, including that it provide good quality habitat for fish and other aquatic life and a recreational fishing resource. See 314 CMR 4.05(4)(b). In addition, 314 CMR 4.05(1) of the Massachusetts WQS provides that each water classification "is identified by the most sensitive, and therefore governing, water uses to be achieved and protected." This means that where a classification lists several uses, permit requirements must be sufficient to protect the most sensitive use.

More recently, Massachusetts has amended its WQS to make explicit its interpretation of the implicit meaning of its pre-existing WQS. On December 29, 2006, Massachusetts amended 314 CMR 4.05 to clarify that "in the case of a CWIS regulated by EPA under [CWA § 316(b)], the Department has the authority under [CWA § 401,] M.G.L. c. 21, §§ 26 through 53 and 314 CMR 3.00 to condition the CWIS to assure compliance of the withdrawal activity with 314 CMR 4.00, including, but not limited to, compliance with narrative and numerical criteria and protection of existing and designated uses." 314 CMR 4.05(3)(b)(2)(d). On January 11, 2007, Massachusetts submitted this revision (among others) to EPA for review pursuant to Section 303(c) of the Act. On July 29, 2007, EPA wrote a letter to MassDEP stating that "there is nothing in the CWA that prohibits MassDEP from adopting and enforcing WQS related to CWISs to ensure that water withdrawals are conducted in a manner that protect[s] designated and existing uses and compl[ies] with narrative and numeric criteria." Letter from Stephen S. Perkins, EPA, to Arleen O'Donnell, MassDEP (July 29, 2007). In a decision issued on April 11, 2011, the Massachusetts Supreme Judicial Court rejected an industry challenge to MassDEP's authority to apply its WQS to regulate the effects of CWISs. *Entergy Nuclear Generation Company v. Department of Environmental Protection*, 459 Mass. 319 (2011).

In summary, the Massachusetts WQSs apply to CWISs and the Gillette permit's requirements must be sufficient to ensure that the facility's CWISs neither cause nor contribute to violations of the WQS and satisfy the terms of the state's water quality certification under CWA § 401. EPA anticipates that the MassDEP will provide this certification before the issuance of the final permit.

F. Biological Impacts

Section 316(b) of the CWA addresses the adverse environmental impact of cooling water intake structures (CWIS) at facilities requiring NPDES permits. The principal adverse environmental impacts typically associated with CWISs evaluated by EPA are the *entrainment* of fish eggs,

larvae, and other small forms of aquatic life through the plant's cooling system, and the *impingement* of fish and other larger forms of aquatic life on the intake screens. *See* 66 FR at 65292 ("[I]t is reasonable to interpret adverse environmental impact as including impingement and entrainment, diminishment of compensatory reserve, stresses to the population or ecosystem, harm to threatened and endangered species, and impairment of State or authorized Tribal water quality standards."). Entrainment and impingement can kill large numbers of the aforementioned aquatic organisms and contribute to diminished populations of local species of commercial and/or recreational importance, locally important forage species, and local threatened or endangered species. As such, CWISs can have effects across the food web. In effect, CWISs can substantially degrade the quality of aquatic habitat by adding to the ecosystem a significant anthropogenic source of mortality to resident organisms. In addition to considering these adverse impacts directly, their effects as cumulative impacts or stressors in conjunction with other existing stressors on the species should also be considered. Furthermore, losses of particular species could contribute to a decrease in the balance and diversity of the ecosystem's overall assemblage of organisms. *See* 66 FR 65256, 65262-65 (Dec. 18, 2001) (preamble to Final Phase I rule under CWA § 316(b)).

Entrainment of organisms occurs when a facility withdraws water into the CWIS from an adjacent water body. Fish eggs and larvae in the water are typically small enough to pass through intake screens and become entrained along with the cooling water within the facility. As a result, the eggs and larvae are exposed to shear forces from mechanical pumps, physical stress or injury from contact with pipe surfaces, elevated temperatures from waste heat removal, and, in some cases, high concentrations of chlorine or other biocides. 66 FR at 65263. These organisms are typically killed or otherwise harmed as a result of entrainment. The number of organisms entrained is dependent upon the volume and velocity of cooling water flow through the plant and the concentration of organisms in the source water body that are small enough to pass through the screens of CWIS. The extent of entrainment can be affected by the intake structure's location, the biological community in the water body, the characteristics of any intake screening system or other entrainment reduction equipment used by the facility, and by season. 66 FR at 65263.

Impingement of organisms occurs when a facility draws water through its CWIS and organisms too large to pass through the screens, and unable to swim away, become trapped against the screens and other parts of the intake structure. In some cases, contact with screens or other equipment can cause an organism to lose its protective slime and/or scales, or suffer other injuries, which may result in delayed mortality. The quantity of organisms impinged is a function of the intake structure's location and depth, the velocity of water drawn to the entrance of the intake structure (approach velocity) and through the screens (through-screen velocity), the seasonal abundance of various species of fish, and the size of various fish relative to the size of the mesh in any intake barrier system (e.g., screens). 66 FR at 65263. For resident fish in the Fort Point Channel, the CWISs pose multiple threats to single populations in that organisms are exposed to entrainment mortality as eggs and larvae and impingement mortality as juveniles and adults. It should be noted that this discussion focuses on fish because more information is available on CWIS impacts to fish, but CWISs can also harm other types of organisms (*e.g.*, shellfish).

As a requirement of the current permit, Gillette conducted a site-specific entrainment study from May through September of 2004. Entrainment samples were collected 3 days per week during morning, afternoon, or night hours. Larvae collected included winter flounder, American sand lance, Atlantic cod, bay anchovy, cunner, gulf seasnail, northern pipefish, radiated shanny, rainbow smelt, rock gunnel, and seasnail. According to Gillette, the cooling water intake flow averaged 28 MGD during the sampling period. No site-specific impingement studies were required or have been conducted by the facility.

1. Impingement

The velocity of water entering a CWIS, or intake velocity, exerts a direct physical force against which fish and other organisms must act to avoid impingement. As intake velocity increases at a CWIS, so does the potential for impingement. EPA considers intake velocity to be one of the more important factors that can be controlled to minimize adverse environmental impacts at CWISs. See 65 FR 49060, 49087 (Aug. 10, 2000). EPA has identified a "through screen" velocity (TSV) threshold of 0.5 feet per second (fps) as protective to minimize impingement of most species of adult and juvenile fish. This determination is fully discussed at 65 FR 49060, 49087-88.

As stated above, no site-specific impingement studies have been required from or conducted by Gillette. According to the permittee, the maximum through-screen velocity (TSV) of the screens (at rated pump capacity) is 0.5 fps, and the effective TSV under normal operating conditions is approximately 0.1 fps. These velocities are less than or equal to the TSV that EPA considers protective to avoid impingement at CWISs. In addition, the wedgewire screens are equipped with an air blow system designed to clear any accumulated debris from the screen face, which ensures that the TSV remains low and higher velocity "hotspots" are not created by occlusion of the screen. The combination of 9.5 mm mesh, low TSV, and an airburst system are considered BTA to minimize the impingement of fish likely to be present in Fort Point Channel. At this time, the permittee is not required to make improvements to further minimize impingement at the facility.

2. Entrainment

In the 2004 entrainment study, Gillette estimated that nearly 10 million larvae were entrained between May and September. Entrainment occurred primarily in May (92%) and June (7.7%) and was dominated by Stage 2 winter flounder (92%). Other entrained species included American sand lance, gulf seasnail, rainbow smelt, and rock gunnel. Mean density was high for winter flounder (42 per $100m^3$ for stage 2 and 3.3 per $100m^3$ for stage 3), but less than 1 per $100m^3$ for every other species collected (ranging from 0.02 per $100m^3$ to 0.3 per $100m^3$). According to the facility, no lobster larvae were present in any of the entrainment samples. The facility estimated, based on adult equivalence modeling, that the entrained larvae account for over 2,600 age 1 equivalent adults, including 1,733 winter flounder and 341 rainbow smelt. Based on the information collected in this study, EPA concludes that Gillette has the potential to entrain eggs and larvae, suggesting that the existing technology may not be the BTA to minimize entrainment of eggs and larvae at Gillette. However, EPA believes that the 2004 study is insufficient to determine the magnitude of the adverse impact for several reasons:

(1) The 2004 study did not initiate sampling until May 12, which is too late to capture the beginning of the peak larval period and may have resulted in an underestimation of the entrainment impacts across all species.

(2) The permittee did not enumerate or identify any entrainment of fish eggs, which can make up a large percentage of entrained organisms and can for which some technologies (e.g., fine-mesh wedgewire screen or aquatic filter barrier) effectively reduce mortality.

(3) The estimated number of larvae entrained (10 million) is driven largely by the entrainment of very high densities of stage 2 winter flounder on two sampling dates (May 19 and May 20). It is unclear whether the high entrainment density for stage 2 winter flounder is typical of the Fort Point Channel, or if the pulse was unusual. Data from other entrainment monitoring suggest that the sample may be unusual. Neither Mystic Station, in the Inner Harbor, nor GE Aviation, on the Saugus River, have entrained densities remotely as high as the density of winter flounder entrained on two sampling dates at Gillette. If the high density of winter flounder that drives the entrainment estimates at Gillette are not typical, than the magnitude of the entrainment impact (including the estimation of adult equivalents) may be severely overestimated. For example, if the sample density of stage 2 winter flounder on the two highest dates is replaced with the density from the third highest date, the total number of larvae entrained over the study decreases from 10 million to about 5.5 million.

It is clear, based on EPA's review of the 2004 monitoring results, that additional entrainment monitoring is warranted at this facility. In the meantime, however, EPA must make a BTA determination for this facility based on available data.

G. Assessment of Cooling Water Intake Structure Technologies

Currently, the permittee employs 9.5 mm-slot cylindrical wedgewire screens at their CWIS. EPA has determined that these screens are BTA for minimizing adverse impingement impacts. However, the design, location, construction and capacity of Gillette's CWIS must also reflect BTA for minimizing adverse entrainment impacts, as required by CWA § 316(b). This section discusses potentially available technological alternatives for ensuring that the location, design, construction, and capacity of Gillette's CWIS reflect the BTA for minimizing entrainment.

This discussion considers engineering, environmental, economic, and other issues related to each alternative, and concludes with EPA's determination of the CWIS BTA for this permit renewal. For this analysis, EPA has considered the permit record, including the many recent submittals made by the permittee, such as Environmental Resources Management's (ERM) Reponses to EPA's Information Request to P&G Gillette Pursuant to Section 308 of the Clean Water Act: Technology Assessment Information (July 2009) and ERM's Response to EPA's Comments on § 308 Technology Assessment (May 2010).

1. Location

The location of a CWIS in the waterbody can be an important factor in minimizing its adverse environmental impacts. For example, a CWIS located in the productive littoral zone (i.e., light-penetrating) rather than deeper waters could result in greater entrainment impacts; likewise, a CWIS located in a nearshore marine environment (such as an estuary) has a higher potential for entrainment than an intake located in offshore deeper waters where eggs and larvae are not as prevalent (EPA Technical Development Document for the Phase I Rule, Chapter 5). EPA evaluated the location of Gillette's CWIS in the waterbody, the type of waterbody, and the depth of the intake structure to determine how to best minimize adverse environmental impacts under CWA § 316(b).

The CWIS at Gillette is located on the eastern bank of the Fort Point Channel, approximately 0.6 miles from the opening of the channel to the Boston Harbor. As described in Part VI.B of this Fact Sheet, the channel floor was dredged by the Army Corps of Engineers (ACOE) to depth of greater than 60 ft with a bottom sloping away from the suction crib down to that depth. At Gillette, the intake screens are positioned at depth, about 2 to 3 feet above the bottom and about 9 feet below the surface at mean lower low water (MLLW).

Based on this evaluation, EPA concludes that no alternative CWIS location is available that would better minimize adverse impacts more than the existing CWIS location and depth profile. In addition, the Fort Point Channel is a dead end, industrial-use channel maintained by dredging, which is a better location than in a productive estuary, an anadromous or catadromous fish migration route, or even in the Harbor where potentially more organisms would be exposed to the CWIS. EPA concludes that maintaining the existing location of the CWIS is an available component of the BTA to reduce entrainment at this facility.

2. Design, Construction, and Operation of the CWIS

The design, construction, and operation of a CWIS are additional important factors in minimizing its adverse biological impacts. Fish protection technologies, including physical exclusion systems such as barrier nets or screens, can reduce entrainment impacts if properly designed, installed, and maintained.

Wedgewire Screens

As described above in Part V.B., the CWIS is comprised of four intake tunnels that connect to two wetwells containing a total of three pumps. Cylindrical wedgewire screens are located at the channel end of each intake tunnel. Each of the four 9.5 mm screens is 12 feet long and 54" diameter. These screens effectively minimize impingement through a low TSV and use of an airburst system. However, at 9.5 mm, the slot size is too large to effectively exclude eggs and larvae at Gillette. For example, winter flounder larvae, the dominant species entrained at Gillette, range in size from approximately 3.0 mm (Stage I) to 9.0 mm (Stage IV) (Life History Table for Winter Flounder, p. A-14 in Responses to EPA's Information Requests to P&G Gillette Pursuant to Section 308 of the Clean Water Act: Biological Assessment Information, July 2009).

Wedgewire screens can be fitted with a small (0.5 to 1 mm) slot size to prevent entrainment of the small egg and larvae sizes near Gillette. Cylindrical wedgewire screens with these slot sizes have been used or tested at a number of facilities, including Chalk Point Station, Charles Point Recovery Facility, Oyster Creek Nuclear Generating Station, and Arbuckle Hydroelectric Station, as well as in controlled laboratory studies.[21] Wedgewire screens effectively exclude small eggs and larvae and may not result in high rates of impingement with a sufficient ambient current to aid organisms in bypassing the structure and remove debris from the screen face. In laboratory tests, ambient velocities between 0.25 and 1.0 fps effectively minimized entrainment in combination with small slot sizes (0.5 mm) and low through-slot velocities (0.5 fps).[22] The permittee estimated a flow per ebb or flood tide in the Fort Point Channel of approximately 11 million cubic feet per tidal cycle (509 cubic feet per second), which is likely to provide sufficient sweeping flow except at slack tide.

EPA evaluated the availability of cylindrical wedgewire screens at Gillette. The existing 9.5-mm cylindrical wedgewire screens are relatively new technology (in use at Gillette since 1995), but are not effective for entrainment. The permittee evaluated the potential to retrofit or replace the existing cylindrical wedgewire screens with 1.75 mm-slot or 0.76 mm-slot wedgewire screens. In consideration of engineering feasibility of fine-mesh cylindrical wedgewire screens, retrofitting the existing screens with smaller slot size screens while maintaining the existing through-screen velocity at 0.5 fps would reduce the withdrawal capacity of the intake. The existing capacity of the 54-inch screens is 86.4 MGD, and the current permitted capacity is 60.1 MGD. Replacing these screens with 0.76 mm or 1.75 mm, 30-inch diameter screens would reduce capacity to 22.2 MGD (0.76 mm) or 32.8 MGD (1.75 mm). Neither of these volumes is sufficient to meet the cooling water demands at Gillette (based on maximum daily and average monthly cooling water withdrawals from 2003 through 2010, see Attachment B). Replacing the existing screens with 54-inch screens would result in a withdrawal capacity ranging from 38.5 MGD (0.76 mm) to 58.4 MGD (1.75 mm). At this volume, the 1.75-mm screens would meet maximum daily cooling water needs and the 0.76-mm screens would meet capacity on an average monthly basis, and maximum daily capacity most of the time (the 95th percentile for intake flow calculated for the sample data from 2003 to 2010 is 39.1 MGD). The permittee estimated the cost of installing wedgewire screens at approximately $365,000, although additional costs could be incurred by any necessary retrofits to the existing intake tunnels, airburst system, or pumps to ensure compatibility with the new screen assemblies. Installation of screens that cannot meet the existing cooling water demands at the facility (e.g., 30-inch diameter screens) would require additional wedgewire assemblies, which may be associated with increased costs by the permittee to replace or enlarge part or all of the airburst system, intake tunnels, wetwells, and/or intake pumps.

The TSV of the screens would continue to meet EPA's recommended level (0.5 fps), which would satisfy the BTA requirement for impingement. However, because the screens would be

[21] EPRI 2007. Electric Power Research Institute. Fish Protection at Cooling Water Intake Structures: A Technical Reference Manual. Palo Alto, CA. No. 1014934.

[22] Electric Power Research Institute. 2003. Laboratory Evaluation of Wedgewire Screens for Protecting Early Life Stages of Fish at Cooling Water Intakes. Technical Report No. 1005339.

operated near capacity to accommodate the reduction in overall withdrawal capacity with the smaller slot size, the effective TSV under normal operating conditions will be closer to 0.5 fps. With the existing screens, the effective TSV under normal operating conditions is 0.1 fps.
EPA also considered the potential for wedgewire screens to minimize entrainment. The ability of fine mesh screens to effectively exclude organisms from being entrained at a specific site depends on the relative sizes of the mesh and the aquatic organisms of concern. Commonly entrained larvae at Gillette during the 2004 study included winter flounder larvae, rock gunnel, American sand lance, and rainbow smelt, with larval sizes ranging from 3 to 7 mm at hatching (Bigelow and Schroeder 1953). The potential for entrainment of eggs at Gillette is unknown because the permittee did not enumerate or identify eggs in the 2004 study. Field and laboratory studies suggest that 0.5 mm mesh retained[23] significantly more eggs and larvae than 1.0 mm mesh, including winter flounder with a mean length of 6.1 mm (ESEERCO 1981, EPRI 2003, EPRI 2008). EPA concludes that these studies, combined with the size range of species common to the Fort Point Channel, suggest that 1.75-mm screens would not be sufficient to reduce entrainment at Gillette. Ideally, a mesh size no greater than 0.5 mm would reduce entrainment at Gillette; however, the permittee only evaluated the feasibility of 0.76-mm wedgewire screens.

The tiny eggs and delicate larvae that are entrained through coarse-mesh wedgewire screens, such as are currently in use at Gillette, are still at a high risk of being killed if they are instead impinged on a fine-mesh screen. The egg and larval life stages are quite fragile. While the fate of eggs and larvae following any impingement on fine-mesh screens is integral to the overall performance of the technology, EPA is unaware of any studies that have evaluated the survival of eggs and larvae exposed to wedgewire screens. In laboratory tests, impingement of eggs and larvae excluded from entrainment by 0.5 mm wedgewire screens was generally low (less than 13 percent for eggs and less than 9 percent for winter flounder and rainbow smelt larvae) (EPRI 2003). However, impingement of eggs and larvae on wedgewire screens has not been studied in field settings.

The few survival studies that have been conducted have been tested with fine-mesh (0.5 mm) traveling screens (which are different from wedgewire screens). In these studies, survival is species- and stage-specific, is influenced by intake velocity, and can be poor for fragile species. The limited results available suggest that, for some species, larval survival on fine mesh screens may be poor.[24] On the other hand, results of the limited available survival data suggest that this technology may effectively reduce entrainment mortality for eggs and crustacean larvae.[25]

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[23] Retention describes the proportion of a given type of organism that is successfully excluded by a screening system and can be measured by the number of larvae recovered in front of the screen after an experimental trial.

[24] In one study of a prototype screen, initial and latent survival of larvae was generally low (less than 20%) (Taft et al. 1981). High mortality was also observed in laboratory and field studies for winter flounder, alewife, bay anchovy, and common carp larvae, regardless of velocity or impingement duration (ESEERCO 1981, EPRI 2007, EPRI 2008).

[25] Initial survival of fish eggs in the Taft et al. study (1981) was 100% for some species (e.g., weakfish, black drum, Southern Kingfish, silver perch) and 40 to 75% for other species (anchovy, herring, sardine, croaker). Hatchability and latent survival did not differ between test and control samples, suggesting that

EPA conservatively assumes that wedgewire screens are not effective to reduce mortality of larvae associated with the CWIS because, while entrainment may be reduced, larvae may be killed by impingement. Entrainment of eggs may be reduced by fine-mesh wedgewire screens and, in some site-specific cases, this technology might be the BTA. At Gillette, 0.76-mm screens are available and would meet the BTA requirements for impingement and the cooling water demands of the facility. However, EPA cannot evaluate the potential effectiveness of this technology at Gillette because entrainment of eggs has not been studied. Therefore, EPA has concluded that although 0.76-mm cylindrical wedgewire screens are available and may be reconsidered for this site in the future, this technology is not the BTA to reduce entrainment at this time.

Aquatic Filter Barrier

Aquatic filter barriers are anchored in front of an intake to passively filter water and exclude organisms larger than the mesh size of the net. This technology reduces entrainment by having a mesh size small enough to effectively exclude most eggs and larvae (e.g. 0.5 mm), and minimize impingement by having TSVs low enough (i.e., less than 0.5 fps) to protect most life stages and species of aquatic organisms. However, aquatic filter barriers also incorporate a compressed air system to clear debris to help maintain the screen's performance. These systems would be expected to work best in low flow environments with minimal debris loading. Installations of these technologies for entrainment reduction are limited (e.g., NYC Waterfalls exhibit, Lovett Generating Station (NY), and Taunton Water Development Project (MA)), but results of monitoring studies suggest that the technology can effectively minimize entrainment.[26] No data are currently available, to EPA's knowledge, on the survival of eggs and larvae at these installations. Excluding organisms may not be enough to minimize adverse environmental impacts of the CWIS. As with wedgewire screens, a sufficient ambient flow should be present so that eggs and larvae may be swept away from the media and entrainable organisms do not accumulate at the face of the technology where they suffer mortality due to impingement, predation, and competition for food.

Gillette evaluated the feasibility of an aquatic filter barrier in Fort Point Channel. According to the permittee, at a loading rate of 3 to 5 gallons per minute per square foot, a mean sea level depth of 22.5 feet, and maximum permitted capacity of 60.1 MGD, the size of the aquatic filter barrier ranges from 374 to 622 feet. The area in front of the intake is large enough to accommodate a barrier net of this length. The sweeping flow from the tidal flux is also likely sufficient to ensure that debris is swept away from the net on outgoing tides. The potential for entrainment occurs mainly from early spring to mid-summer, and peaks in May and June. This seasonal entrainment period would possibly allow Gillette to deploy the net only during the

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latent impacts of impingement on fish eggs may be minimal. Similarly, initial and latent survival of decapod zoea was high in both test and control samples, suggesting that mortality of crustacean larvae from fine mesh screens is low (Taft et al. 1981).

[26] Extensive biological studies of the aquatic filter barrier at Lovett Station indicate that entrainment, primarily post-yolk sac larvae, was reduced between 73 percent (in 2004) to 92 percent (in 2005) for all species combined with low rates of impingement (ASA 2004).

spring and summer months, which would avoid issues with icing or damage during winter. According to Gillette, the average capital cost of aquatic filter barrier is $1.2 million with $200,000 in annual operation and maintenance costs.

Aquatic filter barriers are not likely to impact processes at the plant. However, according to the permittee, a barrier net of this size would restrict navigation and travel within the Fort Point Channel, and may diminish aesthetic value along the public waterfront.

Aquatic filter barriers can successfully reduce entrainment of eggs and larvae.[27] However, EPA is unaware of specific studies that have evaluated the survival of larvae impinged on the barrier net. As a result, EPA conservatively assumes that aquatic filter barriers are not effective to reduce mortality of larvae associated with the CWIS because, while entrainment may be reduced, larvae may be killed by impingement. On the other hand, there is some evidence that eggs are not adversely impacted by impingement.[28] At Gillette, a fine-mesh aquatic filter barrier is available and would meet the BTA requirements for impingement. However, EPA cannot evaluate the potential effectiveness of this technology at Gillette to reduce entrainment. Only the number of larvae entrained can be estimated from the 2004 study, and EPA currently lacks data to determine if larvae survive impingement on fine-mesh screens. Eggs, which may survive impingement on aquatic filter barriers, were not quantified at Gillette. Therefore, EPA has concluded that although an aquatic filter barrier is available and may be reconsidered for this site in the future, it is not the BTA to reduce entrainment at this time.

3. Capacity

"Capacity" refers to the potential withdrawal rate for a given CWIS operating at its maximum (or design) flow rate. Capacity is another important factor that can minimize the adverse environmental impacts of a CWIS. As noted in the 316(b) Phase I regulations, the volume of water withdrawn has a direct influence on the numbers of organisms entrained, especially with regard to pelagic (free-floating) eggs and larvae (see 66 FR 65273). A reduction in water withdrawals, possible either through the implementation of a closed-cycle cooling system via cooling towers or a variable frequency drive (VFD), is one of the most effective methods to reduce entrainment (66 FR 65273). Entrainment decreases proportional to the reduction in volume withdrawn, whereas other technologies designed to exclude organisms or deposit them away from the intake still expose eggs and larvae to potential impacts associated with the CWIS (e.g. impingement).

Closed-Cycle Cooling System

[27] Full-scale deployment of an aquatic filter barrier at Lovett Generating Station on the Hudson River between 2004 and 2007 suggests that exclusion of eggs and larvae with 0.5 mm mesh is similar to that of wedgewire screens (average exclusion of all species was 79% and maximum exclusion was 95% in 2007) (ASA 2007).

[28] In a study of egg hatchability on G-weave fabric, survival of impinged river herring eggs was high (80-100%) and was not generally different from survival of the control group, suggesting that impingement had little impact on hatchability of river herring eggs under laboratory conditions (Alden 2007).

Closed-cycle cooling recirculates cooling water and can reduce cooling water intake volumes up to 96 to 98 percent, in turn directly reducing the number of organisms entrained in the CWIS (66 FR 65273). To date, closed-cycle cooling is the most effective means of reducing entrainment and impingement because it dramatically reduces the volume of cooling water required (66 FR 65273).

The permittee submitted an analysis of the availability of closed-cycle cooling (performed by Environmental Resources Management) on May 21, 2010 in response to additional questions from EPA in February 2010. According to ERM's analysis, natural draft towers (180-250 ft) are not available due to height restrictions imposed by FAA regulations (for Logan Airport flyspace) and the Fort Point District 100 Acres Master Plan (September 2006). However, mechanical draft towers (estimated at 35 ft high and 129 by 129 feet square or 0.4 acres) would meet height restrictions at the facility, the strictest of which is the 55 foot maximum height limitation at the edge of the open space zone under the Master Plan. This height is for the towers only and does not include any visible vapor plumes resulting from their operation. The analysis comments that "rise and dispersion of a vapor plume would effectively increase the height of the visual impacts associated with a cooling tower over those impacts originating from the physical height of the tower," but does not provide additional analysis of any potential vapor plume. Operation of plume abatement technology, while increasing capital costs, would likely be sufficient to minimize impacts from the vapor plume.

The property currently has 12 acres of undeveloped land, as well as rooftops of existing buildings, available for construction of mechanical draft towers. The permittee did not estimate the total height of a cooling tower situated on an existing rooftop, so it is unknown if the overall structure (building plus cooling tower) would exceed height restrictions. Regarding the undeveloped land, the Central Artery tunnel, which runs beneath the 12 acres, is designed to support "limited development" with buildings no more than 85 to 100 feet in height. This limitation should not prohibit installation of mechanical draft cooling towers, which would be only 35 feet high. ERM estimated the capital cost of mechanical draft towers at $4,036,915. They did not include any potential shutdown time for the power plant (during which they would have to purchase all power) or annual operation and maintenance costs.

Based on the above evaluation, EPA concludes that cooling towers are feasible for implementation at Gillette. However, for reasons explained in Section VI.F.2 of this Fact Sheet, the existing entrainment data at Gillette are insufficient to determine if the impacts from entrainment warrant the expenditure for mechanical draft cooling towers. Therefore, EPA has concluded that although closed-cycle cooling is available and may be reconsidered for this site in the future, it is not the BTA to reduce entrainment at this time.

Variable Frequency Drives

The intake structure at Gillette has three VFD pumps, each with a design capacity of approximately 15,000 gallons per minute (gpm) for a total of 86.4 million gallons per day (MGD). The use of VFD pumps limits the intake flow by automatically adjusting the speed based on the facility's need for cooling water. Use of VFD pumps allows the facility to maximize pump efficiency and adjust the intake volume to meet daily requirements. The current

Permit limits maximum daily intake flow at 60.1 MGD. According to the permittee, the flow per ebb or flood tide is about 11 million cubic feet (over 6 hours). An intake volume of 60.1 MGD represents about 5.6% of the estimated total tidal exchange volume per day. However, historical data indicate that the average maximum daily intake rate from July 2004 to April 2009 was 33.6 MGD (see Attachment B), which suggests that the permitted intake volume can be lowered to better match operating conditions. Reducing the permitted flow will prohibit the permittee from withdrawing more seawater than is required by cooling demands, which may expose fewer organisms to the CWIS. The use of VFDs has the added benefit of reducing the electrical needs of the facility compared to running the pumps at full capacity year-round. Finally, because the through-screen velocity (TSV) is 0.5 fps at rated flow (15,000 gallons per screen), use of VFDs to reduce capacity results in a TSV lower than 0.5 fps. This low TSV satisfies BTA to reduce impingement at the CWIS.

Based on recorded intake flows, EPA proposes to limit average monthly flow to 35 MGD and maximum daily flow to 39.0 MGD. These limits are equivalent to the 95th percentile of recorded flows between November 2003 and November 2010 (see Attachment B). These limits are more stringent than those in the current permit, and the proposed maximum daily intake limit in the Draft Permit represents a 35% reduction in flow from the current permit. Compared to the current permitted flow, the Draft Permit limit is equivalent to a 35% reduction in entrainment. Therefore, EPA has concluded that, at this time, and given the lack of entrainment data to evaluate the potential effectiveness of other options (e.g., wedgewire screens or aquatic filter barriers), optimizing the use of VFDs to maintain a 35% reduction in maximum daily flow from the current permit is one component of the BTA to minimize entrainment at Gillette.

Scheduled Outages

According to the permittee, the annual outage for maintenance (approximately 3 days) could be consistently scheduled for Memorial Day weekend, which occurs in late May. Scheduling outages to coincide with peak abundances of life stages/species that have the possibility of being entrained and/or impinged would further reduce entrainment at Gillette.

EPA looked to the 2004 entrainment study at Gillette, as well as the 2005 entrainment study at Mystic Station, to determine if late May coincides with a high level of entrainment in the Inner Harbor. In both years, winter flounder larvae were highest from May 12 through June 2, and peaked around May 18 to May 20. Based on the seasonal entrainment data from these two studies, EPA concludes that scheduling outages on Memorial Day weekend will further reduce the potential for entrainment of winter flounder, which are most commonly entrained in late May. In this case, winter flounder is a good target species for reducing entrainment because it was by far the most abundant species entrained at Gillette.

In terms of the BAT factors, scheduled outages are not associated with any costs or engineering and non-water quality impacts. No process changes or implementation issues would result because the permittee is granted flexibility if, for operational reasons to be provided to EPA, they cannot comply within the specified time period. Thus, scheduling outages to coincide with periods of high abundance of life stages/species is one component of the BTA to minimize entrainment at Gillette.

H. Determination of BTA

EPA evaluated several potential operational and technological improvements to minimize adverse environmental impacts resulting from entrainment at Gillette. The resulting BTA determination was made on a case-by-case, BPJ basis.

Regarding the location of the CWIS, its situation in a dead-end, industrial use channel is preferred over a more exposed location in the Inner Harbor. In addition, the depth of the intake minimizes impingement of benthic adults and entrainment of demersal eggs. EPA has concluded that the current CWIS location should be maintained. In addition, the current operation of the recently installed 9.5 mm wedgewire screens meets EPA's most stringent recommendations to reduce impingement mortality associated with CWISs (see 65 FR 49060 and 49087-88). The existing wedgewire screen technology should be maintained with a TSV no greater than 0.5 fps to reduce impingement.

Regarding the design and construction of the CWIS, EPA evaluated two exclusion technologies to reduce entrainment: fine-mesh wedgewire screens and an aquatic filter barrier. Replacing the existing wedgewire screens would decrease the intake capacity at the CWIS, but 0.76 mm, 54-inch screens would likely prevent entrainment of some eggs and larvae while still meeting the cooling water demands at the facility. Ideally the screens would be 0.5 mm to minimize entrainment, although the permittee did not evaluate screens of this slot size. An aquatic filter barrier is available and could be used to reduce entrainment of eggs and larvae. The advantage of the aquatic filter barrier is that it could be deployed seasonally when the presence of eggs and larvae in the water column is highest. However, EPA has determined that, at this time, neither fine-mesh wedgewire screens nor an aquatic filter barrier is the BTA at Gillette because there is not enough data to determine the benefit of entrainment reductions realized by the technologies. The 2004 Gillette entrainment study did not quantify entrainment of eggs, which, at this time, are the only early life stages that EPA recognizes will both be excluded by fine mesh and survive potential impingement on the screens. If entrainment of eggs at Gillette is measured in the future, EPA may reconsider the availability and benefit of these technologies.

Regarding the capacity of the CWIS, EPA evaluated several technological and operational options for Gillette. Mechanical draft cooling towers would likely reduce the intake capacity 95 to 98%, although the permittee did not estimate the withdrawal (of make-up water) if the facility were retrofitted with closed-cycle cooling. The mechanical draft towers are available at the site based on the estimated size of the towers, available space, and height restrictions. However, EPA has concluded that closed-cycle cooling is not BTA at this time because the existing data are insufficient to determine if the entrainment impacts warrant the substantial costs of retrofitting the facility with cooling towers. EPA may reconsider the availability and effectiveness of closed-cycle cooling based on additional entrainment data in the future. Continued use of the existing VFDs is available and may result in an entrainment reduction of as much as 36% from the current permitted intake. Scheduling outages during Memorial Day weekend will reduce entrainment because this time period coincides with high densities of winter flounder.

I. Permit Requirements Based on BTA Determination

For this Draft Permit, EPA is making a 316(b) determination for this facility on a BPJ basis. EPA has considered the design, construction, and capacity of the existing CWISs, improvements proposed by Gillette, available technologies, and potential adverse environmental impacts and determined that the following measures represent BTA:

(i) The permittee shall, to the extent practicable, schedule annual maintenance outages between May 15th and June 1st. The permittee shall report the dates of all scheduled outages and submit them to EPA and MassDEP along with the subsequent monthly DMR. For maintenance outages not scheduled between May 15th and June 1st, the permittee shall include an explanation of why it was not practicable for the outage to occur within this time period.

(ii) The permittee shall use the existing variable frequency drives to limit the monthly average intake flow at the CWIS to 35 MGD and the maximum daily intake flow to 39 MGD.

(iii) The permittee shall continue to intake all cooling water through the existing 9.5 mm wedgewire screens at a maximum through-screen velocity no greater than 0.5 fps at all times.

J. Biological Monitoring Study

EPA has determined on a site-specific, BPJ basis that the requirements included in Part I.C of the Draft Permit reflect the BTA for this specific facility under CWA § 316(b). At the same time, the biological monitoring conducted at the CWIS in 2004 in compliance with the current permit was not sufficient to characterize the magnitude of the adverse impacts from entrainment. By not initiating sampling until May 12, the 2004 study likely missed a substantial portion of the entrainment period, which begins as early as February. In addition, the 2004 study did not quantify the entrainment of eggs, which precluded EPA from evaluating the potential reductions in entrainment mortality associated with implementation of fine-mesh wedgewire screens or aquatic filter barriers. To this end, the Draft Permit requires additional biological monitoring that will provide valuable information to consider when re-issuance of this permit is evaluated in the future. Biological monitoring requirements are presented in Part I.D of the Draft Permit.

VII. Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Sect. 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds,

permits or undertakes, "may adversely impact any essential fish habitat." 16 U.S.C. Sect. 1855(b). The Amendments broadly define "essential fish habitat" (EFH) as "waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. Sect. 1802(10). Adverse impact means any impact which reduces the quality and/or quantity of EFH. 50 CFR § 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.

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. Table 2 includes a list of the EFH species and applicable life stage(s) for the Fort Point Channel and Boston Harbor:

Table 2: Essential Fish Habitat in the Vicinity of Gillette

Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**
Atlantic Cod (*Gadus morhua)*	X	X	X	X
Haddock (*Melanogrammus aeglefinus)*	X	X		
Pollock (*Pollachius virens)*	X	X	X	X
Whiting (*Merluccius bilinearis)*	X	X	X	X
Red hake (*Urophycis chuss*)	X	X	X	X
White hake (*Urophycis tenuis)*	X	X	X	X
Winter flounder (*Pleuronectes americanus)*	X	X	X	X
Yellowtail flounder (*Pleuronectes ferruginea)*	X	X	X	X
Windowpane flounder (*Scopthalmus aquosus)*	X	X	X	X
American Plaice (Hippoglossoides platessoides)	X	X	X	X
Ocean pout (*Macrozoarces americanus)*	X	X	X	X
Atlantic halibut (*Hippoglossus hippoglossus)*	X	X	X	X
Atlantic sea scallop (*Placopecten magellanicus)*	X	X	X	X
Atlantic sea herring (*Clupea harengus)*		X	X	X
Long finned squid (*Loligo pealei)*	n/a	n/a	X	X
Short finned squid (*Illex illecebrosus)*	n/a	n/a	X	X
Atlantic butterfish (*Peprilus triacanthus)*	X	X	X	X
Atlantic mackerel (*Scomber scombus*)	X	X	X	X
Scup (*Stenotomus chrysops)*	n/a	n/a	X	X
Black sea bass (*Centropistus striata)*	n/a		X	X
Surf clam (*Spisula solidissima)*	n/a	n/a	X	X
Bluefish tuna (*Thunnus thynnus)*			X	X

The once-through cooling system utilized by the facility has the potential to impact the EFH species and other aquatic resources in three major ways: (1) by entrainment of small organisms into and through the CWIS; (2) by impingement of juvenile and adult organisms on the intake screens; and (3) by discharging heated effluent to the receiving waters. A review of Gillette's Entrainment Study from 2004 indicates that, of the EFH species in Table 2, both winter flounder and Atlantic cod are present in the Fort Point Channel. Additional species that are present in the vicinity of the facility, but not identified as EFH species, may be selected as prey by EFH

species, such as cunner and bay anchovy. If these prey species are affected by Gillette's CWIS or thermal discharge, it may indirectly affect EFH species through loss of prey. Therefore, EPA recognizes that this facility's operation has the potential to cause adverse effects to EFH species.

EPA has concluded that the limits and conditions in the Draft Permit minimize adverse effects to EFH for the following reasons:

- The Draft Permit prohibits the discharge from causing violations of the state water quality standards in the receiving water.
- The Draft Permit limits the maximum daily thermal discharge to 83.0˚F. Under this limit in the current permit, the thermal discharge at the Congress Street Bridge has not exceeded water quality standards for 24-hour average temperature or maximum daily temperature to date. CORMIX modeling and thermal monitoring demonstrates that the mixing zone required to meet the water quality standards for temperature rise is limited to the surface and rarely extends past the Congress Street Bridge. EPA and MassDEP have determined this mixing zone to be consistent with the State's Mixing Zone Implementation Policy and protective of existing and designated uses of the Fort Point Channel, including aquatic life.
- The Draft Permit requires the permittee to limit intake velocity and capacity to reduce impingement and entrainment. Additional monitoring will provide more entrainment data, which will ensure that these adverse impacts are minimized.

EPA believes that the Draft Permit limits and requirements adequately protect EFH for the managed species, and therefore additional mitigation is not warranted. NMFS has been notified of this assessment and the agency has been provided with a copy of the Draft Permit and fact sheet for review and comment.

VIII. Endangered Species Act

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical (a "critical habitat"). The ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, and plants to see if any such listed species might potentially be impacted by the re-issuance of this NPDES permit. The available ESA information indicates that there are no federally listed endangered species in the vicinity of the facility's discharge. Therefore, consultation under Section 7 of the ESA with NMFS and USFWS is not required. During the public comment period, EPA has provided a

copy of the Draft Permit and fact sheet to NMFS and USFWS.

IX. Monitoring

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41(j), 122.44(l), and 122.48.

The Draft Permit includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. The Draft Permit requires that, no later than one year after the effective date of the permit, the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt out request").

In the interim (until one year from the effective date of the permit), the permittee may either submit monitoring data and other reports to EPA in hard copy form, or report electronically using NetDMR.

NetDMR is a national web-based tool for regulated Clean Water Act permittees to submit discharge monitoring reports (DMRs) electronically via a secure Internet application to U.S. EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR § 122.41 and § 403.12. NetDMR is accessed from the following url: http://www.epa.gov/netdmr Further information about NetDMR, including contacts for EPA Region 1, is provided on this website.

EPA currently conducts free training on the use of NetDMR, and anticipates that the availability of this training will continue to assist permittees with the transition to use of NetDMR. To participate in upcoming trainings, visit http://www.epa.gov/netdmr for contact information for Massachusetts.

The Draft Permit requires the permittee to report monitoring results obtained during each calendar month using NetDMR no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA and will no longer be required to submit hard copies of DMRs to MassDEP. However, permittees must continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP.

The Draft Permit also includes an "opt out" request process. Permittees who believe they can not use NetDMR due to technical or administrative infeasibilities, or other logical reasons, must demonstrate the reasonable basis that precludes the use of NetDMR. These permittees must submit the justification, in writing, to EPA at least sixty (60) days prior to the date the facility would otherwise be required to begin using NetDMR. Opt outs become effective upon the date

of written approval by EPA and are valid for twelve (12) months from the date of EPA approval. The opt-outs expire at the end of this twelve (12) month period. Upon expiration, the permittee must submit DMRs and reports to EPA using NetDMR, unless the permittee submits a renewed opt out request sixty (60) days prior to expiration of its opt out, and such a request is approved by EPA.

Until electronic reporting using NetDMR begins, or for those permittees that receive written approval from EPA to continue to submit hard copies of DMRs, the Draft Permit requires that submittal of DMRs and other reports required by the permit continue in hard copy format.

X. State Certification Requirements

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving waters 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 Water Quality Standards. The staff of the Massachusetts Department of Environmental Protection (MassDEP) 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.

XI. 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 Attn: Danielle Gaito, 5 Post Office Square, Suite 100 (OEP06-4), Boston, Massachusetts 02109-3912. 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 meeting may be held if the criteria stated in 40 C.F.R. § 124.12 are satisfied. In reaching a final decision on the Draft Permit, the EPA 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 any public hearings, if such hearings are held, the EPA 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 petition for review of the permit to EPA’s Environmental Appeals Board consistent with 40 C.F.R. § 124.19.

XII. EPA and MassDEP Contacts

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EPA Office of Ecosystem Protection

5 Post Office Square, Suite 100 (OEP06-4)
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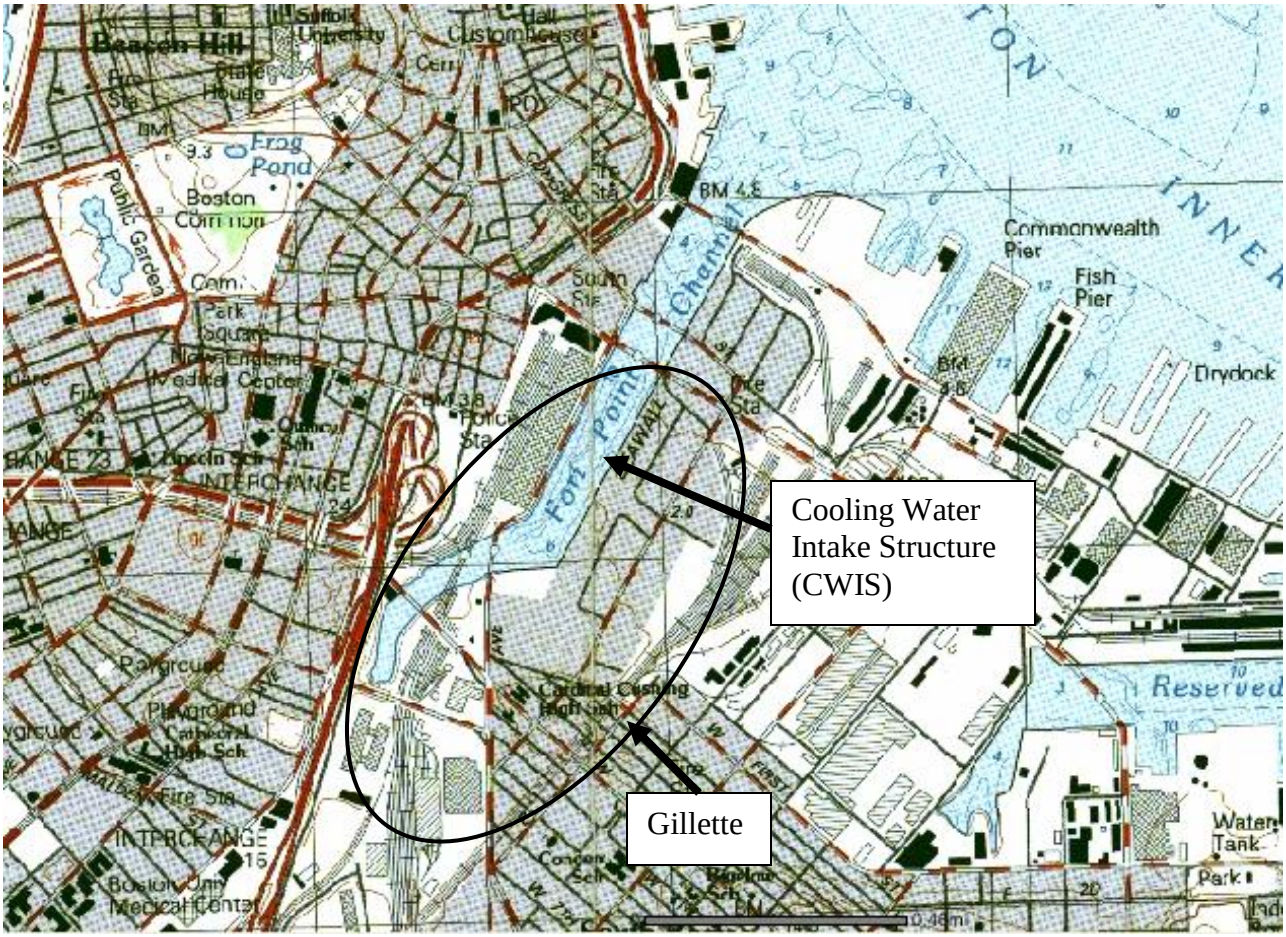
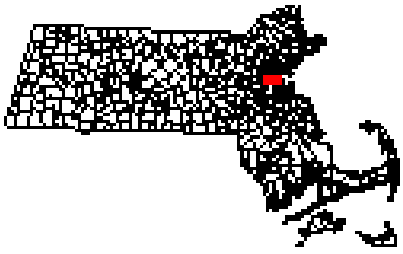
email: catherine.vakalopolous@state.ma.us

Date: _____

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

ATTACHMENT A
The Gillette Company (MA0003832)
Site Locus Map





Source: MassGIS USGS Topographic Maps
United States December 1995

ATTACHMENT B
The Gillette Company (MA0003832)
Outfall 001 Discharge Monitoring Report
November 2003 through November 2010

Date	Flow (MGD)		pH (s.u.)		Temperature (°F)	
	Avg Monthly	Daily Max	Avg Monthly	Daily Max	Avg Monthly	Daily Max
11/30/2003	17.0	18.0	7.5	8.1	54.0	64.0
12/31/2003	17.0	18.0	7.5	7.8	43.0	51.0
01/31/2004	17.0	18.0	7.1	8.2	36.0	62.5
02/29/2004	17.0	18.0	7.8	8.2	43.0	59.0
03/31/2004	16.0	17.0	7.8	8.5	50.8	68.0
04/30/2004	16.0	17.0	8.0	8.4	59.3	68.0
05/31/2004	17.0	18.0	7.8	8.2	61.3	69.0
06/30/2004	17.0	18.0	7.9	8.0	62.0	68.0
07/31/2004	17.0	18.0	7.8	8.0	72.0	78.8
08/31/2004	17.0	18.0	7.5	8.5	69.0	81.0
09/30/2004	17.0	18.0	6.7	8.2	68.0	78.0
10/31/2004	16.0	18.0	7.5	8.3	57.0	68.0
11/30/2004	15.0	18.0	7.7	8.1	71.0	71.0
12/31/2004	13.0	15.0	7.9	8.2	49.7	64.0
01/31/2005	13.0	14.0	8.0	8.2	43.0	51.0
02/28/2005	16.0	17.0	8.1	8.2	33.2	51.0
03/31/2005	17.0	18.0	8.0	8.3	39.8	55.1
04/30/2005	16.0	17.0	8.0	8.2	50.0	61.3
05/31/2005	17.0	17.0	7.8	8.3	56.7	66.3
06/30/2005	17.0	19.0	8.1	8.3	59.0	74.6
07/31/2005	18.0	19.0	8.0	8.4	69.0	76.0
08/31/2005	19.0	21.0	8.0	8.4	71.4	80.3
09/30/2005	18.0	19.0	8.3	8.5	70.1	76.4
10/31/2005	17.0	19.0	8.1	8.5	58.6	68.1
11/30/2005	17.0	18.0	8.0	8.6	52.2	64.2
12/31/2005	16.0	18.0	8.1	8.7	40.0	59.1
01/31/2006	16.0	18.0	7.8	8.5	43.6	58.3
02/28/2006	16.0	17.0	7.4	8.4	42.4	45.2
03/31/2006	16.0	17.0	7.0	8.1	41.2	52.0
04/30/2006	17.0	18.0	7.9	8.1	49.3	57.5
05/31/2006	17.0	19.0	7.8	8.0	55.0	67.0
06/30/2006	18.0	20.0	7.7	7.9	64.1	72.3
07/31/2006	18.0	21.0	7.8	7.9	6.7	74.2
08/31/2006	19.0	20.0	7.0	7.8	70.2	78.1
09/30/2006	19.0	20.0	7.6	7.8	70.1	74.6
10/31/2006	18.0	20.0	7.7	7.9	61.2	70.1
11/30/2006	17.0	19.0	7.7	8.0	56.0	65.4
12/31/2006	17.0	19.0	7.7	8.1	45.0	65.3
01/31/2007	17.0	19.0	7.8	7.9	46.4	60.2
02/28/2007	17.0	19.0	7.9	8.5	41.4	50.6
03/31/2007	17.0	19.0	7.9	8.1	38.0	50.3
04/30/2007	9.0	10.0	7.9	8.1	50.0	64.1
05/31/2007	17.0	19.0	8.0	8.0	66.5	69.4
06/30/2007	18.0	19.0	7.0	7.9	68.6	76.7
07/31/2007	7.0	8.0	7.0	8.0	67.0	77.0

08/31/2007	8.0	9.0	7.2	8.4	69.6	76.4
09/30/2007	7.0	8.0	7.7	8.0	73.7	76.4
10/31/2007	7.0	9.0	7.8	8.1	68.2	72.4
11/30/2007	13.0	17.0	7.9	8.0	58.6	74.0
12/31/2007	16.0	17.0	7.9	8.0	47.0	55.2
01/31/2008	ND	ND	ND	ND	ND	ND
02/29/2008	16.0	18.0	8.0	8.3	47.3	52.3
03/31/2008	14.0	15.0	8.0	8.2	46.6	55.0
04/30/2008	14.0	15.0	8.1	8.2	52.9	68.7
05/31/2008	16.0	17.0	8.1	8.2	58.9	68.3
06/30/2008	18.0	19.0	7.7	8.1	67.5	76.0
07/31/2008	16.0	18.0	7.7	8.1	72.3	76.7
08/31/2008	17.0	19.0	6.9	8.0	74.1	81.5
09/30/2008	14.0	16.0	6.9	8.0	65.6	77.4
10/31/2008	14.0	16.0	7.3	7.9	64.0	70.3
11/30/2008	15.0	16.0	7.6	7.9	57.4	63.1
12/31/2008	18.0	21.0	7.6	8.0	43.9	52.8
01/31/2009	14.0	16.0	7.3	8.0	40.8	44.1
02/28/2009	18.0	21.0	7.7	8.3	45.6	52.8
03/31/2009	16.0	17.0	7.1	8.7	46.6	51.3
04/30/2009	14.0	16.0	7.7	8.9	51.9	59.2
05/31/2009	14.0	16.0	7.2	8.0	59.7	61.8
06/30/2009	14.0	16.0	7.5	7.9	66.1	69.8
07/31/2009	14.0	16.0	7.6	7.8	70.8	73.6
08/31/2009	15.0	15.0	6.8	7.7	72.0	77.3
09/30/2009	15.0	15.0	6.9	7.1	69.8	76.0
10/31/2009	15.0	15.0	6.8	7.9	60.0	65.8
11/30/2009	15.0	15.0	7.1	7.9	54.6	58.6
12/31/2009	14.0	14.0	7.9	8.0	47.5	54.0
01/31/2010	13.0	14.0	7.6	8.1	44.0	53.5
02/28/2010	13.0	15.0	8.0	8.2	42.5	46.5
03/31/2010	14.0	17.0	7.7	8.0	47.0	54.0
04/30/2010	15.0	15.0	7.2	8.0	54.0	60.0
05/31/2010	12.0	13.0	7.9	8.2	58.6	65.0
06/30/2010	14.0	15.0	7.6	8.1	65.0	71.0
07/31/2010	15.0	16.0	7.8	8.1	72.4	77.0
08/31/2010	15.0	18.0	6.9	7.9	70.5	74.2
09/30/2010	15.0	16.0	7.7	7.9	68.0	76.0
10/31/2010	14.0	16.0	7.7	8.0	63.3	73.2
11/30/2010	25.0	26.0	7.7	8.2	56.7	61.0
11/30/2003	17.0	18.0	7.5	8.1	54.0	64.0

ND = No Discharge

Permit Limit	**--**	**26.0**	**6.5**	**8.5**	**--**	**83**
Minimum	7.0	8.0	6.7	7.1	6.7	44.1
Maximum	25.0	26.0	8.3	8.9	74.1	81.5
Average	15.5	17.0	7.6	8.1	56.2	65.6
St. Deviation	2.8	2.9	0.4	0.3	12.4	9.8
# Samples	84.0	84.0	84.0	84.0	84.0	84.0
# Exceedances	--	0	0	4	--	0

The Gillette Company (MA0003832)
Outfall 002 Discharge Monitoring Report
November 2003 through November 2010

Date	Flow (MGD)		pH (s.u.)		Temperature (°F)	
	Avg Monthly	Daily Max	Avg Monthly	Daily Max	Avg Monthly	Daily Max
11/30/2003	10.0	11.0	7.2	7.9	55.0	63.0
12/31/2003	10.0	11.0	7.5	7.7	43.0	51.0
01/31/2004	10.0	11.0	7.5	8.2	37.0	61.0
02/29/2004	6.0	9.0	7.7	8.5	41.0	59.0
03/31/2004	5.0	6.0	7.9	8.5	49.2	69.0
04/30/2004	5.0	6.0	8.0	8.4	52.1	67.0
05/31/2004	6.0	9.0			61.0	71.0
06/30/2004	6.0	8.0	7.9	8.2	61.0	69.0
07/31/2004	7.0	9.0	7.7	8.0	73.0	78.0
08/31/2004	8.0	10.0	7.5	8.5	72.0	80.0
09/30/2004	8.0	10.0	6.9	8.2	68.0	77.0
10/31/2004	7.0	9.0	7.8	8.3	57.0	69.0
11/30/2004	5.0	8.0	7.8	8.1	49.0	59.0
12/31/2004	4.0	6.0	8.0	8.2	40.0	57.0
01/31/2005	4.0	6.0	8.0	8.3	42.0	47.0
02/28/2005	5.0	7.0	8.1	8.4	34.7	42.6
03/31/2005	7.0	8.0	7.6	8.3	34.6	46.7
04/30/2005	6.0	7.0	7.8	8.3	43.0	61.5
05/31/2005	7.0	8.0	7.8	8.4	52.6	65.9
06/30/2005	8.0	9.0	8.0	8.3	62.0	78.3
07/31/2005	9.0	12.0	8.0	8.4	68.0	79.0
08/31/2005	9.0	14.0	8.2	8.4	70.2	78.4
09/30/2005	7.0	12.0	8.1	8.4	66.3	75.6
10/31/2005	7.0	12.0	8.1	8.5	51.6	69.8
11/30/2005	8.0	8.0	8.3	8.6	54.2	61.8
12/31/2005	6.0	7.0	8.2	8.7	40.1	56.6
01/31/2006	6.0	7.0	7.5	8.5	42.7	66.0
02/28/2006	6.0	7.0	7.4	8.4	42.9	47.8
03/31/2006	6.0	7.0	7.7	8.2	36.6	46.9
04/30/2006	7.0	8.0	7.8	8.1	47.7	61.2
05/31/2006	7.0	8.0	7.7	8.1	53.0	62.0
06/30/2006	7.0	8.0	7.7	7.9	58.7	72.7
07/31/2006	7.0	9.0	7.5	7.9	64.0	69.0
08/31/2006	9.0	10.0	7.4	7.8	67.5	76.4
09/30/2006	9.0	10.0	7.6	7.8	65.3	71.3
10/31/2006	8.0	10.0	7.7	7.9	56.3	69.1
11/30/2006	8.0	9.0	7.8	7.9	50.3	61.7
12/31/2006	7.0	9.0	7.8	7.9	43.1	61.4
01/31/2007	7.0	8.0	7.7	7.9	40.2	58.3
02/28/2007	6.0	8.0	7.9	8.1	36.2	42.3
03/31/2007	6.0	8.0	7.9	8.1	38.0	48.2
04/30/2007	6.0	8.0	8.0	8.1	49.9	59.4
05/31/2007	8.0	10.0	8.0	8.0	61.5	68.4
06/30/2007	8.0	10.0	7.0	8.0	62.0	67.1
07/31/2007	8.0	10.0	7.0	8.0	66.0	74.0
08/31/2007	8.0	10.0	7.2	8.5	66.8	75.3

09/30/2007	ND	ND	ND	ND	ND	ND
10/31/2007	8.0	10.0	7.8	8.2	65.6	71.2
11/30/2007	6.0	8.0	7.9	8.0	56.7	70.1
12/31/2007	6.0	7.0	8.0	8.0	44.0	52.0
01/31/2008	5.0	6.0	7.7	8.3	39.7	46.3
02/29/2008	7.0	8.0	8.0	8.3	42.3	46.3
03/31/2008	4.0	5.0	8.0	8.2	43.7	51.1
04/30/2008	4.0	5.0	8.1	8.2	51.5	56.8
05/31/2008	4.0	5.0	8.1	8.3	56.0	60.3
06/30/2008	4.0	5.0	7.7	8.1	65.1	75.0
07/31/2008	4.0	5.0	7.4	8.1	69.4	77.0
08/31/2008	4.0	5.0	6.9	6.9	70.1	77.7
09/30/2008	4.0	5.0	6.9	7.8	62.2	75.1
10/31/2008	4.0	5.0	7.5	7.9	60.6	66.6
11/30/2008	4.0	5.0	7.5	7.8	52.1	56.5
12/31/2008	4.0	7.0	7.8	7.9	46.1	52.6
01/31/2009	4.0	5.0	7.1	8.0	40.1	44.6
02/28/2009	4.0	7.0	7.6	7.7	45.9	52.6
03/31/2009	6.0	6.0	7.4	8.7	42.1	46.3
04/30/2009	6.0	6.0	7.7	8.9	48.7	52.6
05/31/2009	7.0	6.0	7.6	8.2	56.8	60.1
06/30/2009	4.0	5.0	7.0	7.9	62.0	66.2
07/31/2009	4.0	6.0	7.5	7.8	67.5	70.1
08/31/2009	5.0	7.0	6.8	7.7	68.7	70.9
09/30/2009	5.0	7.0	6.9	7.2	69.5	75.0
10/31/2009	6.0	6.0	7.1	7.9	58.4	66.7
11/30/2009	6.0	6.0	7.0	7.9	55.0	58.3
12/31/2009	5.0	6.0	7.9	8.0	50.5	59.0
01/31/2010	5.0	5.0	7.7	8.1	46.5	59.0
02/28/2010	5.0	5.0	7.7	8.2	38.4	43.6
03/31/2010	5.0	9.0	7.5	8.1	43.8	46.0
04/30/2010	4.0	5.0	7.6	8.1	53.0	57.0
05/31/2010	5.0	5.0	7.8	8.1	59.0	66.3
06/30/2010	6.0	6.0	7.8	8.1	65.0	70.0
07/31/2010	6.0	6.0	7.8	8.2	72.0	77.7
08/31/2010	6.0	7.0	7.0	8.0	71.0	75.2
09/30/2010	6.0	6.0	7.3	7.9	68.0	75.0
10/31/2010	5.0	6.0	7.5	8.0	62.2	69.8
11/30/2010	4.0	4.0	7.6	8.2	53.8	62.0
11/30/2003	10.0	11.0	7.2	7.9	55.0	63.0

ND = No Discharge

Permit Limit	**--**	**26.0**	**6.5**	**8.5**	**--**	**83**
Minimum	4.0	4.0	6.8	6.9	34.6	42.3
Maximum	10.0	14.0	8.3	8.9	73.0	80.0
Average	6.1	7.6	7.6	8.1	54.2	63.2
St. Deviation	1.6	2.1	0.4	0.3	11.1	10.6
# Samples	84.0	84.0	83.0	83.0	84.0	84.0
# Exceedances	n/a	0	0	4	n/a	0

The Gillette Company (MA0003832)
Outfall 003 Discharge Monitoring Report
November 2003 through November 2010

Date	Flow (MGD)		pH (s.u.)		Temperature (°F)	
	Avg Monthly	Daily Max	Avg Monthly	Daily Max	Avg Monthly	Daily Max
11/30/2003	6.5	7.0	7.7	8.0	54.0	63.0
12/31/2003	6.0	7.0	7.1	7.9	42.0	57.0
01/31/2004	6.0	7.0	7.2	8.2	39.0	62.0
02/29/2004	5.0	6.0	7.8	8.4	41.0	59.0
03/31/2004	5.0	5.0	7.8	8.2	50.2	67.0
04/30/2004	4.0	5.0	8.0	8.3	55.4	68.0
05/31/2004	4.0	6.0	7.9	8.1	59.0	66.0
06/30/2004	4.0	5.0	8.0	8.1	62.0	68.0
07/31/2004	4.0	6.0	7.7	8.0	74.0	75.2
08/31/2004	5.0	6.0	7.5	8.2	71.0	78.0
09/30/2004	5.0	6.0	6.8	8.2	62.0	75.0
10/31/2004	4.0	5.0	7.5	8.3	57.0	68.0
11/30/2004	4.0	5.0	7.8	8.1	50.0	66.0
12/31/2004	3.0	5.0	7.5	8.2	39.0	57.0
01/31/2005	3.0	5.0	7.7	8.2	44.0	56.0
02/28/2005	3.0	5.0	8.1	8.4	36.4	51.1
03/31/2005	4.0	5.0	8.0	8.3	36.7	58.0
04/30/2005	3.0	4.0	8.0	8.2	46.2	55.3
05/31/2005	3.0	4.0	8.1	8.3	49.8	63.3
06/30/2005	4.0	7.0	8.0	8.3	61.1	77.0
07/31/2005	7.0	7.0	8.0	8.4	69.3	78.4
08/31/2005	7.0	7.0	8.2	8.4	68.8	76.4
09/30/2005	3.0	7.0	8.3	8.4	64.5	79.8
10/31/2005	3.0	7.0	8.0	8.5	51.3	67.6
11/30/2005	5.0	6.0	8.2	8.6	51.2	60.3
12/31/2005	5.0	6.0	8.2	8.6	37.0	51.9
01/31/2006	5.0	6.0	7.6	8.5	41.3	57.1
02/28/2006	5.0	6.0	7.4	8.4	41.4	44.6
03/31/2006	5.0	6.0	7.7	8.1	38.8	47.7
04/30/2006	6.0	7.0	7.8	8.1	46.3	53.7
05/31/2006	6.0	7.0	7.8	8.1	53.0	61.0
06/30/2006	18.0	20.0	7.7	7.9	64.1	72.3
07/31/2006	6.0	7.0	7.5	7.9	64.0	70.0
08/31/2006	7.0	8.0	7.7	7.9	68.3	72.1
09/30/2006	6.0	7.0	7.7	7.8	62.8	72.0
10/31/2006	6.0	7.0	7.7	7.9	58.1	64.8
11/30/2006	6.0	7.0	7.7	7.9	48.4	61.0
12/31/2006	5.0	7.0	7.7	7.9	41.3	58.8
01/31/2007	5.0	6.0	7.7	7.9	39.0	49.7
02/28/2007	5.0	6.0	7.9	8.1	32.9	41.2
03/31/2007	5.0	6.0	7.8	8.1	43.4	43.9
04/30/2007	5.0	6.0	7.9	8.0	48.2	54.0
05/31/2007	6.0	7.0	7.9	8.0	59.0	62.0
06/30/2007	6.0	7.0	7.0	7.9	60.4	66.5
07/31/2007	6.0	7.0	7.0	8.0	67.0	75.0
08/31/2007	6.0	8.0	7.5	8.5	67.4	75.0

09/30/2007	6.0	7.0	7.9	8.0	68.3	71.0
10/31/2007	6.0	7.0	7.9	8.2	63.7	66.0
11/30/2007	5.0	7.0	7.9	8.0	55.0	66.0
12/31/2007	ND	ND	ND	ND	ND	ND
01/31/2008	5.0	6.0	7.4	8.3	40.0	49.2
02/29/2008	5.0	6.0	8.0	8.2	41.6	44.6
03/31/2008	6.0	7.0	8.0	8.2	43.0	43.9
04/30/2008	6.0	7.0	8.1	8.2	51.6	67.5
05/31/2008	6.0	7.0	8.1	8.2	56.3	65.0
06/30/2008	6.0	7.0	7.7	8.2	64.7	74.0
07/31/2008	6.0	7.0	7.7	8.1	70.1	77.0
08/31/2008	6.0	7.0	6.9	8.0	71.6	75.9
09/30/2008	6.0	7.0	6.9	7.8	64.9	73.1
10/31/2008	6.0	7.0	7.7	7.9	62.4	69.1
11/30/2008	6.0	7.0	7.5	7.9	55.5	60.6
12/31/2008	6.0	7.0	7.8	7.9	46.5	52.1
01/31/2009	5.0	6.0	7.3	8.0	40.9	44.2
02/28/2009	6.0	7.0	7.8	7.9	46.3	52.2
03/31/2009	4.0	5.0	7.4	8.7	42.9	43.9
04/30/2009	3.0	5.0	7.7	9.0	49.5	53.9
05/31/2009	3.0	5.0	7.6	8.2	57.4	62.5
06/30/2009	4.0	5.0	7.1	8.2	63.0	66.3
07/31/2009	4.0	5.0	7.6	7.8	68.4	70.2
08/31/2009	4.0	6.0	6.8	7.8	69.4	71.3
09/30/2009	5.0	6.5	7.0	7.5	68.6	77.0
10/31/2009	4.0	5.0	7.0	7.9	59.7	65.9
11/30/2009	4.0	5.0	7.0	7.9	56.0	58.6
12/31/2009	4.0	5.0	7.9	8.0	48.0	53.5
01/31/2010	4.0	5.0	7.6	8.1	43.3	53.5
02/28/2010	4.0	6.0	7.8	8.3	38.5	42.5
03/31/2010	4.0	7.0	7.8	8.1	43.0	44.0
04/30/2010	5.0	5.0	7.2	8.1	51.0	44.0
05/31/2010	4.0	5.0	7.9	8.1	57.5	66.4
06/30/2010	5.0	6.0	7.7	8.0	65.0	71.0
07/31/2010	7.0	7.0	7.6	8.2	71.5	77.6
08/31/2010	7.0	8.0	6.9	7.9	70.3	73.4
09/30/2010	6.0	7.0	7.2	7.9	67.0	75.0
10/31/2010	4.0	5.0	7.5	8.0	1.6	71.6
11/30/2010	3.0	3.0	7.8	8.2	55.7	62.6
11/30/2003	6.5	7.0	7.7	8.0	54.0	63.0

ND = No Discharge

Permit Limit	**--**	**8.1**	**6.5**	**8.5**	**--**	**83**
Minimum	3.0	3.0	6.8	7.5	1.6	41.2
Maximum	18.0	20.0	8.3	9.0	74.0	79.8
Average	5.1	6.3	7.6	8.1	53.7	62.7
St. Deviation	1.8	1.8	0.4	0.2	12.5	10.6
# Samples	84.0	84.0	84.0	84.0	84.0	84.0
# Exceedances	n/a	1.0	0.0	4	n/a	0.0

The Gillette Company (MA0003832)
Outfall 004 Discharge Monitoring Report
November 2003 through November 2010

Date	Flow (MGD)		pH (s.u.)		Temperature (°F)	
	Avg Monthly	Daily Max	Avg Monthly	Daily Max	Avg Monthly	Daily Max
11/30/2003	ND	ND	ND	ND	ND	ND
12/31/2003	ND	ND	ND	ND	ND	ND
01/31/2004	ND	ND	ND	ND	ND	ND
02/29/2004	ND	ND	ND	ND	ND	ND
03/31/2004	ND	ND	ND	ND	ND	ND
04/30/2004	ND	ND	ND	ND	ND	ND
05/31/2004	ND	ND	ND	ND	ND	ND
06/30/2004	ND	ND	ND	ND	ND	ND
07/31/2004	ND	ND	ND	ND	ND	ND
08/31/2004	ND	ND	ND	ND	ND	ND
09/30/2004	ND	ND	ND	ND	ND	ND
10/31/2004	ND	ND	ND	ND	ND	ND
11/30/2004	ND	ND	ND	ND	ND	ND
12/31/2004	ND	ND	ND	ND	ND	ND
01/31/2005	ND	ND	ND	ND	ND	ND
02/28/2005	ND	ND	ND	ND	ND	ND
03/31/2005	ND	ND	ND	ND	ND	ND
04/30/2005	ND	ND	ND	ND	ND	ND
05/31/2005	ND	ND	ND	ND	ND	ND
06/30/2005	ND	ND	ND	ND	ND	ND
07/31/2005	ND	ND	ND	ND	ND	ND
08/31/2005	ND	ND	ND	ND	ND	ND
09/30/2005	ND	ND	ND	ND	ND	ND
10/31/2005	ND	ND	ND	ND	ND	ND
11/30/2005	ND	ND	ND	ND	ND	ND
12/31/2005	ND	ND	ND	ND	ND	ND
01/31/2006	ND	ND	ND	ND	ND	ND
02/28/2006	ND	ND	ND	ND	ND	ND
03/31/2006	ND	ND	ND	ND	ND	ND
04/30/2006	ND	ND	ND	ND	ND	ND
05/31/2006	ND	ND	ND	ND	ND	ND
06/30/2006	ND	ND	ND	ND	ND	ND
07/31/2006	ND	ND	ND	ND	ND	ND
08/31/2006	ND	ND	ND	ND	ND	ND
09/30/2006	ND	ND	ND	ND	ND	ND
10/31/2006	ND	ND	ND	ND	ND	ND
11/30/2006	ND	ND	ND	ND	ND	ND
12/31/2006	ND	ND	ND	ND	ND	ND
01/31/2007	ND	ND	ND	ND	ND	ND
02/28/2007	ND	ND	ND	ND	ND	ND
03/31/2007	ND	ND	ND	ND	ND	ND
04/30/2007	8.0	9.0	7.9	8.1	49.2	51.7
05/31/2007	ND	ND	ND	ND	ND	ND
06/30/2007	ND	ND	ND	ND	ND	ND
07/31/2007	9.0	11.0	7.0	7.6	73.0	75.0
08/31/2007	10.0	12.0	7.2	8.1	64.6	78.0

09/30/2007	10.0	11.0	7.8	7.9	72.0	74.5
10/31/2007	10.0	11.0	7.9	8.1	68.9	74.0
11/30/2007	ND	ND	ND	ND	ND	ND
12/31/2007	ND	ND	ND	ND	ND	ND
01/31/2008	ND	ND	ND	ND	ND	ND
02/29/2008	ND	ND	ND	ND	ND	ND
03/31/2008	3.0	4.0	7.9	8.1	41.4	44.0
04/30/2008	4.0	5.0	8.1	8.3	55.3	64.0
05/31/2008	5.0	7.0	7.9	8.3	54.0	68.0
06/30/2008	5.0	7.0	7.7	8.1	69.2	77.6
07/31/2008	5.0	7.0	7.4	8.1	69.3	80.0
08/31/2008	6.0	8.0	6.9	7.9	68.6	79.8
09/30/2008	6.0	8.0	6.9	8.0	63.8	74.8
10/31/2008	6.0	8.0	7.1	7.9	62.4	70.3
11/30/2008	7.0	8.0	7.5	7.9	54.4	66.1
12/31/2008	ND	ND	ND	ND	ND	ND
01/31/2009	6.0	8.0	7.0	7.9	39.9	44.3
02/28/2009	8.0	10.0	7.6	8.1	45.9	51.9
03/31/2009	7.0	8.0	7.6	7.6	40.8	44.2
04/30/2009	6.0	7.0	7.7	8.9	49.7	60.2
05/31/2009	6.0	7.0	7.6	8.2	58.1	62.0
06/30/2009	6.0	7.0	7.2	8.0	64.7	66.8
07/31/2009	6.0	7.0	7.0	7.8	66.0	73.3
08/31/2009	6.0	7.0	6.9	7.7	67.3	78.3
09/30/2009	6.0	7.0	6.9	7.1	67.2	78.5
10/31/2009	6.0	7.0	7.0	7.9	60.2	65.1
11/30/2009	5.0	6.0	7.0	7.9	52.8	56.4
12/31/2009	5.0	6.0	7.9	8.0	46.8	54.0
01/31/2010	5.0	6.0	7.9	8.0	42.9	54.0
02/28/2010	5.0	7.0	7.8	8.2	39.8	53.3
03/31/2010	5.0	8.0	7.4	8.0	41.7	43.0
04/30/2010	5.0	7.0	7.6	8.1	52.0	63.0
05/31/2010	4.0	5.0	6.7	8.2	55.0	73.0
06/30/2010	7.0	7.0	7.7	7.9	65.0	70.0
07/31/2010	6.0	7.0	7.6	8.2	67.0	75.5
08/31/2010	7.0	8.0	6.8	8.0	68.3	74.6
09/30/2010	6.0	6.0	7.6	7.9	66.0	76.0
10/31/2010	5.0	5.0	7.6	7.9	63.6	72.5
11/30/2010	4.0	5.0	7.7	8.5	55.8	62.0
11/30/2003	ND	ND	ND	ND	ND	ND

ND = No Discharge

Permit Limit	**--**	**8.1**	**6.5**	**8.5**	**--**	**83**
Minimum	3.0	4.0	6.7	7.1	39.8	43.0
Maximum	10.0	12.0	8.1	8.9	73.0	80.0
Average	6.1	7.4	7.4	8.0	57.9	65.7
St. Deviation	1.7	1.8	0.4	0.3	10.4	11.4
# Samples	37.0	37.0	37.0	37.0	37.0	37.0
# Exceedances	n/a	0	0	1	n/a	0

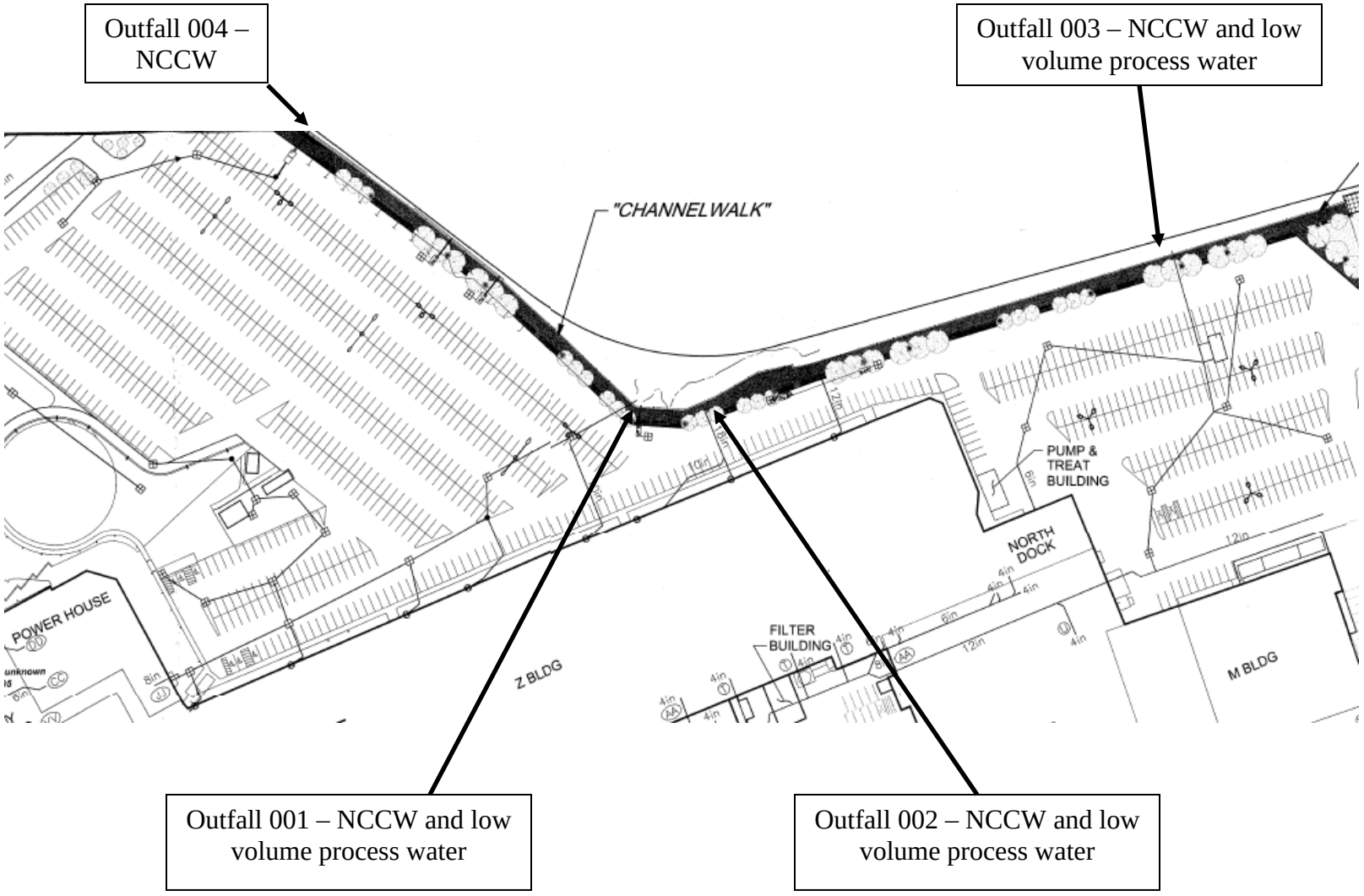
The Gillette Company (MA0003832)
Outfall 005 CWIS Monitoring Report
November 2003 through November 2010

Date	Flow (MGD)	
	Avg Monthly	Daily Max
11/30/2003	33.6	35.9
12/31/2003	33.1	35.9
01/31/2004	32.2	35.4
02/29/2004	27.5	32.6
03/31/2004	25.0	26.1
04/30/2004	25.3	27.7
05/31/2004	26.5	32.5
06/30/2004	26.2	30.9
07/31/2004	27.6	32.9
08/31/2004	29.4	33.5
09/30/2004	30.2	33.3
10/31/2004	26.5	31.5
11/30/2004	23.8	31.1
12/31/2004	19.7	25.8
01/31/2005	19.9	24.2
02/28/2005	23.7	28.7
03/31/2005	27.7	31.0
04/30/2005	24.9	27.5
05/31/2005	26.7	28.8
06/30/2005	28.9	35.2
07/31/2005	33.8	38.2
08/31/2005	35.3	41.6
09/30/2005	31.1	38.3
10/31/2005	30.1	38.4
11/30/2005	29.2	32.4
12/31/2005	27.5	31.1
01/31/2006	28.5	30.9
02/28/2006	27.8	29.7
03/31/2006	26.4	30.2
04/30/2006		
05/31/2006	30.3	34.4
06/30/2006	31.3	34.9
07/31/2006	31.6	37.1
08/31/2006	35.4	38.0
09/30/2006	34.6	37.2
10/31/2006	32.0	37.4
11/30/2006	31.4	35.3
12/31/2006	29.3	35.1
01/31/2007	28.9	32.8
02/28/2007	27.6	33.3
03/31/2007	28.2	33.3
04/30/2007	29.2	30.1
05/31/2007	30.4	36.3
06/30/2007	32.2	36.0
07/31/2007	30.5	36.6
08/31/2007	30.2	39.2

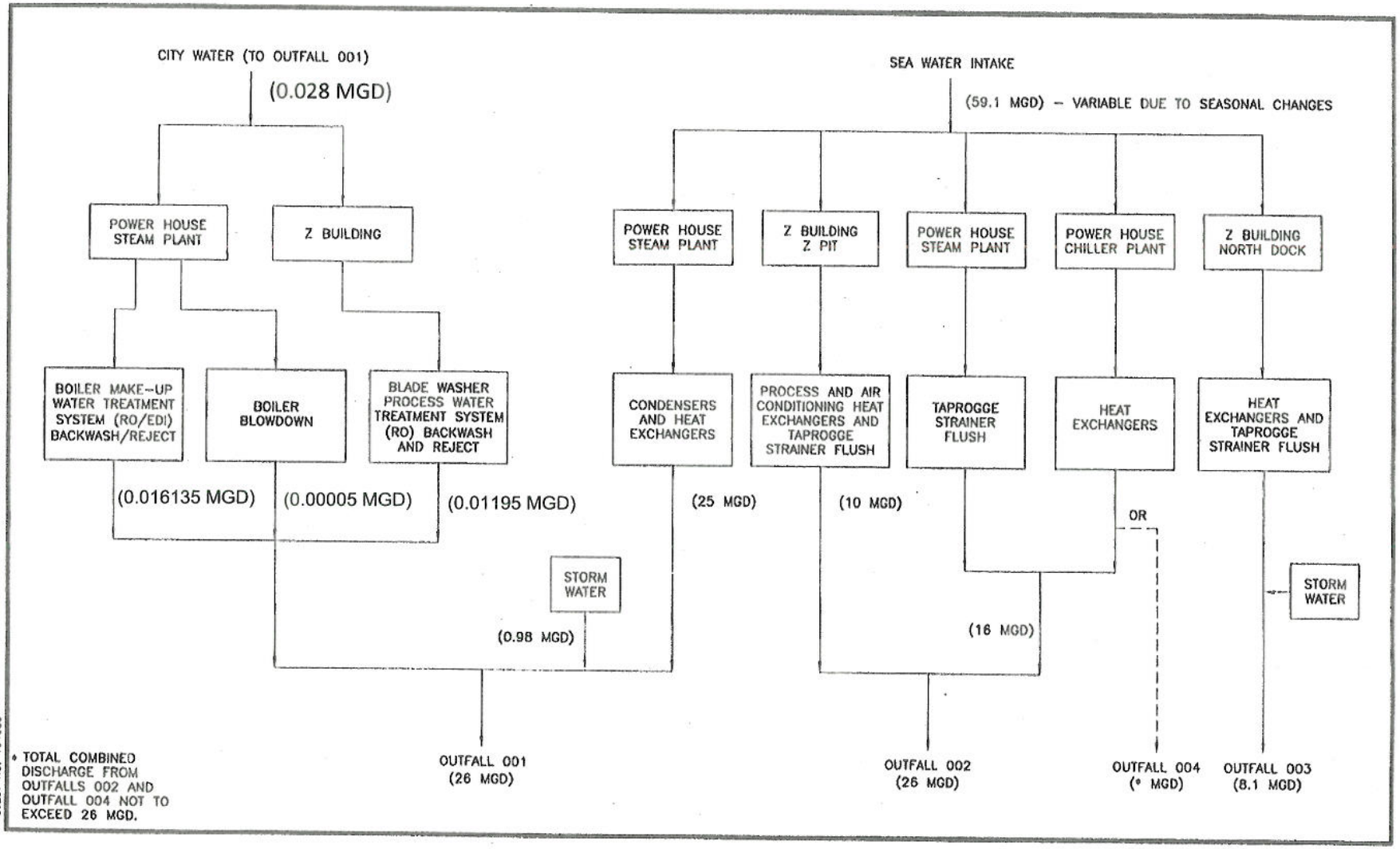
09/30/2007	31.6	34.8
10/31/2007	31.5	33.8
11/30/2007	24.0	31.8
12/31/2007	26.7	30.2
01/31/2008	26.5	27.5
02/29/2008	28.2	31.9
03/31/2008	28.0	31.1
04/30/2008	29.5	32.5
05/31/2008	33.1	35.5
06/30/2008	34.7	37.2
07/31/2008	32.9	34.9
08/31/2008	34.1	35.8
09/30/2008	34.3	36.1
10/31/2008	33.8	36.2
11/30/2008	34.7	36.0
12/31/2008	27.8	34.8
01/31/2009	31.4	34.8
02/28/2009	36.0	45.0
03/31/2009	33.1	34.4
04/30/2009	28.7	34.2
05/31/2009	30.1	34.4
06/30/2009	28.1	33.9
07/31/2009	28.9	32.2
08/31/2009	30.9	35.6
09/30/2009	31.9	33.5
10/31/2009	30.9	33.3
11/30/2009	30.5	32.5
12/31/2009	28.5	31.0
01/31/2010	27.2	30.5
02/28/2010	27.0	33.5
03/31/2010	28.0	41.0
04/30/2010	29.1	31.6
05/31/2010	25.0	28.0
06/30/2010	32.0	34.0
07/31/2010	34.0	36.0
08/31/2010	35.0	41.0
09/30/2010	33.3	35.3
10/31/2010	28.5	32.5
11/30/2010	25.4	26.7
11/30/2003	33.6	35.9

Permit Limit	**--**	**60**
Minimum	19.7	24.2
Maximum	36.0	45.0
Average	29.6	33.6
St. Deviation	3.4	3.7
# Samples	84	84
# Exceedances	--	0
95^{th} Percentile	34.7	39.1

ATTACHMENT C
The Gillette Company (MA0003832)
Outfall Location Map



ATTACHMENT D
The Gillette Company (MA0003832)
Flow Diagram



PROJECT NO. 104080

EarthTech
A Tyco International Ltd. Company

THE GILLETTE COMPANY, BOSTON, MA
NPDES PERMIT RENEWAL
FLOW SCHEMATIC ATTACHMENT FORM 2C
MARCH 2008

Attachment E
Calculation of Heat Load

Calculation of heat load from the simulated conditions in the CORMIX model, performed by HydroAnalysis, Inc. and reported on pages 7-9 and Table 1 in the July 2002 CORMIX Report.

Heat Load (Q), million British thermal units per day (mBTU/day) calculated using the equation:

$$\mathbf{Q = C_p m \Delta T}$$

where Cp = heat capacity (specific heat) of water (= 1.0 BTU/pound °F), m = mass of water = cooling water flow rate, million gallons per day (MGD) x 8.34 pounds/gallon, and ΔT = discharge temperature – intake temperature, °F.

Winter conditions

Outfall	Flow (MGD)	ΔT (°F)	Q (mBTU)/day	Total Q (mBTU)/day
001	25.1	18.0	3,768	
002	5.9	5.6	276	
003	12.3	15.5	1,590	
004	24.9	18.2	3,780	9,414

Summer Conditions

Outfall	Flow (MGD)	ΔT (°F)	Q (mBTU)/day	Total Q (mBTU)/day
001	25.1	18.1	3,789	
002	5.9	18.1	891	
003	12.3	18.1	1,857	
004	24.9	18.1	3,759	10,296

Response to Comments on Draft National Pollutant Discharge Elimination System (NPDES) Permit No. MA0003832

Introduction:

In accordance with the provisions of 40 C.F.R. §124.17, this document presents EPA's responses to comments received on the Draft NPDES Permit (MA0003832). The responses to comments explain and support the EPA determinations that form the basis of the Final Permit. The Gillette Company Draft Permit public comment period began May 27, 2011 and ended on June 27, 2011. Upon request by the permittee, the public comment period was extended until August 8, 2011. Comments were received from the Massachusetts Division of Marine Fisheries (Section I) and the permittee (Section II).

The Final Permit is substantially identical to the Draft Permit that was available for public comment. Although EPA's decision-making process has benefitted from the various comments and additional information submitted, the information and arguments presented did not raise any substantial new questions concerning the permit. EPA did, however, improve certain analyses and make certain clarifications in response to comments in addition to correcting minor typographical errors. These improvements and changes are detailed in this document and reflected in the Final Permit. A summary of the changes made in the Final Permit are listed below. The analyses underlying these changes are explained in the responses to individual comments that follow.

1. Part I.A.1. Changed the maximum daily flow limits at Outfall 001 from 26.0 MGD year-round to 26.0 MGD (Summer) and 23.5 MGD (Non-summer). Added Footnote 2 defining summer and non-summer periods. (See RTC II.1.a – d.)
2. Part I.A.1. Changed measurement frequency for temperature monitoring at Outfall 001 from continuous to once per day. (See RTC II.2.a – e.)
3. Part I .A.1. Changed measurement frequency for rise in temperature monitoring at Outfall 001 from hourly to once per day. (See RTC II.2.a – e.)
4. Part I.A.2. Changed the maximum daily flow limits at Outfall 002 from 26.0 MGD year-round to 26.0 MGD (Summer) and 23.5 MGD (Non-summer). (See RTC II.1.a – d.)
5. Part I.A.2. Changed measurement frequency for temperature monitoring at Outfall 002 from continuous to once per day. (See RTC II.2.a – e.)
6. Part I .A.2. Changed measurement frequency for rise in temperature monitoring at Outfall 002 from hourly to once per day. (See RTC II.2.a – e.)
7. Part I.A.3. Changed the maximum daily flow limits at Outfall 003 from 8.1 MGD year-round to 8.1 MGD (Summer) and 7.4 MGD (Non-summer). (See RTC II.1.a – d.)
8. Part I.A.3. Changed measurement frequency for temperature monitoring at Outfall 003 from continuous to once per day. (See RTC II.2.a – e.)
9. Part I .A.3. Changed measurement frequency for rise in temperature monitoring at Outfall 003 from hourly to once per day. (See RTC II.2.a – e.)
10. Part I.A.4. Changed the maximum daily flow limits at Outfall 004 from 16.0 MGD year-round to 19.6 MGD (Summer) and 15.4 MGD (Non-summer). (See RTC II.1.a – d.)
11. Part I.A.4. Changed measurement frequency for temperature monitoring at Outfall 004 from continuous to once per day. (See RTC II.2.a – e.)

12. Part I .A.4. Changed measurement frequency for rise in temperature monitoring at Outfall 004 from hourly to once per day. (See RTC II.2.a – e.)
13. Part I.A.5. Changed average monthly intake flow limit at the cooling water intake structure from 35 MGD year-round to 40 MGD (Summer) and 30 MGD (Non-summer). Changed maximum daily intake flow limit from 39 MGD year-round to 45 MGD (Summer) and 35 MGD (Non-summer). (See RTC II.1.e.)
14. Part I.A.6. Reduced total maximum daily heat load limitation from combined outfalls 001, 002, 003, and 004 from 9,400 mBTU per day to 8,782 mBTU per day. Added requirement to report estimated daily heat load from combined outfalls 001, 002, 003, and 004. (See RTC II.2.a – e.)
15. Footnote 4, Page 7. Added footnote that specifies the monitoring location for temperature at end of pipe within one hour (before or after) peak low tide. (See RTC II.2.a – e.)
16. Footnote 5, Page 7. Clarified that the calculation of temperature rise (T) is the difference between the influent and effluent temperatures at the time of collection of the grab sample at each outfall. (See RTC II.2.a – e.)
17. Footnote 11, Page 8. Changed calculation of heat load from an hourly to a daily basis and clarified that heat load (Q) and mass of water (m) are daily values. Deleted language that referred to calculation of daily heat load from hourly heat load values. (See RTC II.2.a – e.)
18. Deleted requirement at Part I.C.1.a. to report scheduled annual maintenance outages. (See RTC II.6.)
19. Part I.C.1.b. Updated requirement to use variable frequency drives to limit maximum daily flows corresponding to new intake flow limitations at the cooling water intake structure (CWIS) for Summer and Non-Summer periods (see permit change 13). (See RTC II.7)
20. Part I.D.4. Added language to allow permittee to request a reduction in biological monitoring frequency or duration after one year of data collection. (See RTC II.9.)
21. Part I.D.5. Added Massachusetts Division of Marine Fisheries to list of agencies receiving Cooling Water Intake Structure Biological Monitoring Report. (See RTC I.)
22. Added Part I.E requiring permittee to conduct ambient temperature monitoring in Fort Point Channel. (See RTC II.2.a – e.)
23. Part I.F.1.c. Added address for Massachusetts Division of Marine Fisheries. (See RTC I.)

I. Comment from Massachusetts Division of Marine Fisheries

Comment: The Division of Marine Fisheries (MarineFisheries) requests to receive copies of entrainment monitoring reports described in Part I.D. "Biological Monitoring" in accordance with the schedule for submission described in Part I.D.4. We request the below address be included in the permit under Part I.E. "Monitoring and Reporting" to which the entrainment monitoring reports should be sent.

Response: Part I.D.5 of the Final Permit has been changed to specify that EPA, MassDEP, and MarineFisheries shall receive copies of the CWIS Biological Monitoring Report. The following address has been included in Part I.E.1.c. of the Final Permit:

Division of Marine Fisheries
Annisquam Marine Fisheries Station
Attn: Dr. Jack P. Schwartz
30 Emerson Avenue
Gloucester, MA 01930

II. Comments from The Gillette Company

Comment 1: Flow

Comment 1.a. (Outfall 001) Retain Maximum Daily Flow Discharge Limitation of 26 MGD for summer operation, and insert a new Maximum Daily Flow Discharge Limitation of 23.5 MGD for non-summer operation. Summer operation is defined as June 1 through September 30. Non-summer operation is defined as October 1 through May 31.

Facility requires the ability to discharge up to 26 MGD during summer operating period, but with less cooling needs due to lower intake temperatures, can reduce their Maximum Daily Flow Discharge during non-summer operations.

Comment 1.b. (Outfall 002) Retain Maximum Daily Flow Discharge Limitation of 26 MGD for summer operation, and insert a new Maximum Daily Flow Discharge Limitation of 23.5 MGD for non-summer operation. Summer operation is defined as June 1 through September 30. Non-summer operation is defined as October 1 through May 31.

Facility requires the ability to discharge up to 26 MGD during summer operating period, but with less cooling needs due to lower intake temperatures, can reduce their Maximum Daily Flow Discharge during non-summer operations.

Comment 1.c. (Outfall 003) Retain Maximum Daily Flow Discharge Limitation of 8.1 MGD for summer operation, and insert a new Maximum Daily Flow Discharge Limitation of 7.4 MGD for non-summer operation. Summer operation is defined as June 1 through September 30. Non-summer operation is defined as October 1 through May 31.

Facility requires the ability to discharge up to 8.1 MGD during summer operating period, but with less cooling needs due to lower intake temperatures, can reduce their Maximum Daily Flow Discharge during non-summer operations.

Comment 1.d. (Outfall 004) Revise Maximum Daily Flow Discharge Limitation to 19.6 MGD for summer operation, and insert a new Maximum Daily Flow Discharge Limitation of 15.4 MGD for non-summer operation. Summer operation is defined as June 1 through September 30. Non-summer operation is defined as October 1 through May 31.

Facility has calculated that a Maximum Daily Flow Discharge Limitation of 19.6 MGD is required to allow current operations and planned equipment changes to continue operating during the summer operating period. With less cooling needs due to lower intake temperatures, the facility can reduce their Maximum Daily Flow Discharge during non-summer operations.

Response to Comment 1.a. – d.: The proposed flow limits for Outfall 001, 002, and 003 are more stringent than the year-round maximum daily flow limits in the Draft Permit. EPA appreciates the permittee's effort to identify the actual flow volume needed for operations and to decrease flows when possible. EPA agrees that the "summer" period is defined as June 1 through September 30 and the "non-summer" period is defined as October 1 through May 31.

The maximum daily flow limit for Outfall 001 at Part I.A.1 of the Final Permit has been changed to a non-summer limit of 23.5 MGD and a summer limit of 26.0 MGD. The maximum daily flow limit for Outfall 002 at Part I.A.2 of the Final Permit has been changed to a non-summer limit of 23.5 MGD and a summer limit of 26.0 MGD. The maximum daily flow limit for Outfall 003 at Part I.A.3 of the Final Permit has been changed to a non-summer limit of 7.4 MGD and a summer limit of 8.1 MGD.

The proposed non-summer flow limit of 15.4 MGD for Outfall 004 is more stringent than the year-round maximum daily flow limit of 16.0 MGD from the Draft Permit, while the proposed summer flow limit of 19.6 MGD is less stringent. The decrease in flow during the months of March through May, when densities of early life stages of fish are likely to be elevated, will further reduce entrainment of these organisms. In addition, the Draft Permit, at Part I.A.2 and I.A.4, Footnote 8, limits the combined discharge from Outfalls 002 and 004 to 26.0 MGD. Thus, although the Final Permit authorizes a higher flow at Outfall 004 during the summer than was allowed under the Draft Permit, the combined flows at Outfalls 002 and 004 must still meet the total flow limit of 26.0 MGD from the Draft Permit, resulting in no net increase in flow from the combined discharge. The Maximum Daily Flow Limit at Part I.A.4 of the Final Permit has been changed to a non-summer limit of 15.4 MGD and a summer limit of 19.6 MGD. The Final Permit has retained the condition at Footnote 8 from the Draft Permit (renumbered to Footnote 10) that limits the combined discharge from Outfalls 002 and 004 to a maximum daily flow of 26.0 MGD.

Comment 1.e: Revise Average Monthly Withdrawal Limitation to 40 MGD and revise Maximum Daily Withdrawal Limitation to 45 MGD during summer operations. Insert a new Average Monthly Withdrawal Limitation of 30 MGD and insert a new Maximum Daily Withdrawal Limitation of 35 MGD during non-summer operations. Summer operation is defined as June 1 through September 30. Non-summer operation is defined as October 1 through May 31.

The recent and on-going improvements to power generation and plant systems, as well as non-contact cooling and heating requirements, has changed the cooling water needs for the facility. The facility has determined that an Average Monthly Withdrawal Limitation of 40 MGD and a Maximum Daily withdrawal Limitation of 45 MGD is required to allow current operations and planned equipment changes to continue operating during the summer operating period. With less cooling needs due to lower intake temperatures, the facility can reduce their Average Monthly Withdrawal Limitation to 30 MGD and their Maximum Daily Withdrawal Limitation to 35 MGD during non-summer operations. The requested withdrawal rates for summer operation are higher than the proposed limits, but are significantly less than the currently permitted withdrawal

rate of 60.1 MGD. The requested withdrawal rates for non-summer operation are lower than the limits proposed in the Draft NPDES Permit.

Response to Comment 1.e: The intake flow limits in the Draft Permit were based on reported intake flows at the facility from November 2003 to November 2010 but did not consider changes to the facility's operation with the commencement of co-generation operation. The intake flows prior to co-generation operation may not be representative of flows with the new technology. The intake limits proposed in the comment are less stringent than the Draft Permit during the summer period, but more stringent during the non-summer period, including late winter and early spring (through May) when densities of eggs and larvae in Boston Harbor are likely to be particularly high. The proposed limits are more stringent than the intake limit in the current permit. In addition, the proposed limits will reduce capacity on an annual basis compared to the limits in the Draft Permit.

The Final Permit at Part I.A.5. has been revised to include an Average Monthly Intake Limit of 30 MGD during non-summer operations (Oct 1 – May 31) and 40 MGD during summer operations (June 1 – Sep 30) and a Maximum Daily Limit of 35 MGD during non-summer operations and 45 MGD during summer operations.

Comment 2: Temperature and Heat Load

Comment 2.a. (Outfall 001) Continue to monitor temperature 5/week via grab sample during low tide and taken at a point of discharge prior to mixing with the receiving water. Monitor temperature in this manner while a continuous temperature monitor is installed at a point within Outfall 001 located inside the Power House. Once continuous temperature monitor is installed, continue with 5/week grab samples during low tide at the outfall discharge and commence continuous temperature monitoring at a point inside the Power House. Dual temperature monitoring will continue in this manner for three (3) months to establish a correlation between the continuous monitoring point inside the Power House and the 5/week monitoring at the outfall discharge during low tide. At this time, Gillette will propose a new Maximum Daily temperature limit to be established at the upstream monitoring point within the Power House that correlates to an equivalent value of 83 degree F at the outfall discharge.

Installation of a continuous temperature monitor within Outfall 001 is not feasible at a point near the discharge but prior to mixing with receiving water, due to the location of the outfall and impacts from the receiving water during non-low tide conditions. In addition, site constraints including but not limited to the existence of the mandated publicly accessible Harbor Walk along Fort Point Channel, significantly limit[s] the ability to conduct construction activities and equipment installations in these areas. To meet the proposed condition would require installation of a continuous temperature monitor much further upstream within Outfall 001 at a point inside the Power House to avoid impacts from the receiving water during non-low tide conditions. The proximity of a new temperature probe immediately downstream of the air compressors and process water systems is anticipated to yield higher temperatures than the temperature at the discharge occurring at the outfall and prior to mixing with the receiving water. A Maximum Daily Temperature higher than 83 degrees F at the new upstream monitoring point inside the Power House within the outfall will therefore be required that correlates to a Maximum Daily

Temperature of 83 degrees F at the outfall discharge. In addition, two (2) temperature probes will be required to continuously monitor temperatures for Outfall 001 (i.e., two flow streams merge to form flow within Outfall 001). Values for Average Monthly and Maximum Daily Temperature will be averaged for the two temperature probes associated with Outfall 001.

Comment 2.b. (Outfall 002) Continue to monitor temperature 5/week via grab sample during low tide and taken at a point of discharge prior to mixing with the receiving water. Monitor temperature in this manner while a continuous temperature monitor is installed at a point within Outfall 002 located inside the Z Building. Once continuous temperature monitor is installed, continue with 5/week grab samples during low tide at the outfall discharge and commence continuous temperature monitoring at a point inside the Z Building. Dual temperature monitoring will continue in this manner for three (3) months to establish a correlation between the continuous monitoring point inside the Z Building and the 5/week monitoring at the outfall discharge during low tide. At this time, Gillette will propose a new Maximum Daily temperature limit to be established at the upstream monitoring point within the Z Building that correlates to an equivalent value of 83 degree F at the outfall discharge.

Installation of a continuous temperature monitor within Outfall 002 is not feasible at a point near the discharge but prior to mixing with receiving water, due to the location of the outfall and impacts from the receiving water during non-low tide conditions. In addition, site constraints including but not limited to the existence of the mandated publicly accessible Harbor Walk along Fort Point Channel, significantly limit[s] the ability to conduct construction activities and equipment installations in these areas. To meet the proposed condition would require installation of a continuous temperature monitor much further upstream within Outfall 002 at a point inside the Z Building to avoid impacts from the receiving water during non-low tide conditions. The proximity of a new temperature probe immediately downstream of the Z Building process water system is anticipated to yield higher temperatures than the temperature at the discharge occurring at the outfall and prior to mixing with the receiving water. A Maximum Daily Temperature higher than 83 degrees F at the new upstream monitoring point inside the Z Building within the outfall will therefore be required that correlates to a Maximum Daily Temperature of 83 degrees F at the outfall discharge. In addition, two (2) temperature probes will be required to continuously monitor temperatures for Outfall 002, in the event that flow from Outfall 004 is diverted to Outfall 002. Values for Average Monthly and Maximum Daily Temperature will be averaged for the two temperature probes associated with Outfall 002 if the discharge from Outfall 004 is diverted to Outfall 002.

Comment 2.c. (Outfall 003) Continue to monitor temperature 5/week via grab sample during low tide and taken at a point of discharge prior to mixing with the receiving water. Monitor temperature in this manner while a continuous temperature monitor is installed at a point within Outfall 003 located inside the Z Building Plastics Facility. Once continuous temperature monitor is installed, continue with 5/week grab samples during low tide at the outfall discharge and commence continuous temperature monitoring at a point inside the Z Building Plastics Facility. Dual temperature monitoring will continue in this manner for three (3) months to establish a correlation between the continuous monitoring point inside the Z Building Plastics Facility and the 5/week monitoring at the outfall discharge during low tide. At this time, Gillette will propose a new Maximum Daily temperature limit to be established at the upstream monitoring point

within the Z Building Plastics Facility that correlates to an equivalent value of 83 degree F at the outfall discharge.

Installation of a continuous temperature monitor within Outfall 003 is not feasible at a point near the discharge but prior to mixing with receiving water, due to the location of the outfall and impacts from the receiving water during non-low tide conditions. In addition, site constraints including but not limited to the existence of the mandated publicly accessible Harbor Walk along Fort Point Channel, significantly limit[s] the ability to conduct construction activities and equipment installations in these areas. To meet the proposed condition would require installation of a continuous temperature monitor much further upstream within Outfall 003 at a point inside the Z Building Plastics Facility to avoid impacts from the receiving water during non-low tide conditions. The proximity of a new temperature probe immediately downstream of the Z Building Plastics Facility process water system is anticipated to yield higher temperatures than the temperature at the discharge occurring at the outfall and prior to mixing with the receiving water. A Maximum Daily Temperature higher than 83 degrees F at the new upstream monitoring point inside the Z Building Plastics Facility within the outfall will therefore be required that correlates to a Maximum Daily Temperature of 83 degrees F at the outfall discharge.

Comment 2.d. (Outfall 004) Continue to monitor temperature 5/week via grab sample during low tide and taken at a point of discharge prior to mixing with the receiving water. Monitor temperature in this manner while a continuous temperature monitor is installed at a point within Outfall 004 located inside the Power House. Once continuous temperature monitor is installed, continue with 5/week grab samples during low tide at the outfall discharge and commence continuous temperature monitoring at a point inside the Power House. Dual temperature monitoring will continue in this manner for three (3) months to establish a correlation between the continuous monitoring point inside the Power House and the 5/week monitoring at the outfall discharge during low tide. At this time, Gillette will propose a new Maximum Daily temperature limit to be established at the upstream monitoring point within the Power House that correlates to an equivalent value of 83 degree F at the outfall discharge.

Installation of a continuous temperature monitor within Outfall 004 is not feasible at a point near the discharge but prior to mixing with receiving water, due to the location of the outfall and impacts from the receiving water during non-low tide conditions. In addition, site constraints including but not limited to the existence of the mandated publicly accessible Harbor Walk along Fort Point Channel, significantly limit[s] the ability to conduct construction activities and equipment installations in these areas. To meet the proposed condition would require installation of a continuous temperature monitor much further upstream within Outfall 004 at a point inside the Power House to avoid impacts from the receiving water during non-low tide conditions. The proximity of a new temperature probe immediately downstream of the chiller systems is anticipated to yield higher temperatures than the temperature at the discharge occurring at the outfall and prior to mixing with the receiving water. A Maximum Daily Temperature higher than 83 degrees F at the new upstream monitoring point inside the Power House within the outfall will therefore be required that correlates to a Maximum Daily Temperature of 83 degrees F at the outfall discharge. In the event that discharge from Outfall 004 is diverted to Outfall 002, a secondary temperature probe will be installed along the diversion line to continue monitoring

temperatures associated with the Power House Chiller Systems. During discharge diversion operations, values for Average Monthly and Maximum Daily Temperature will be averaged for the two temperature probes associated with Outfall 002.

Comment 2.e. Delete the requirement for monitoring and reporting heat load, and delete the Maximum Daily Discharge Limitation of 9,400 mBTU.

Monitoring for heat load is not feasible due to the lack of continuous temperature monitoring for Outfalls 001, 002, 003, and 004 and due to the lack of continuously monitoring flow data for Outfalls 001, 002, 003, and 004.

Response to Comment 2.a. – e. Continuous temperature monitoring was proposed in the Draft Permit due to concerns related to the anticipated increase in overall heat load with recent facility upgrades, including the operation of a co-generation system, compared to conventional boilers. Existing ambient temperature monitoring and thermal modeling were performed prior to commencement of co-generation and do not reflect temperature changes due to the new technology. A continuous temperature record would closely track effluent temperatures and characterize temperature variability under the new operating parameters. Continuous temperature monitoring would also enable the permittee to calculate and report hourly rise in temperature and hourly heat load at each outfall. The permittee has raised several issues related to temperature limits in the Draft Permit, including the feasibility of installing and operating continuous temperature monitors at each outfall and calculating heat load.

After reviewing engineering diagrams of the facility and speaking with the permittee, EPA confirmed that installing continuous temperature monitors at the end of each outfall prior to mixing with the receiving water is not feasible. The outfalls can be submerged during periods other than low tide, which would cause any monitoring equipment located at the end of the pipe to monitor the temperature of the effluent mixed with the receiving water and would not be representative of the effluent temperature. The permittee proposed alternative locations for continuous temperature monitors: in the Power House for waste streams from Outfalls 001 and 004, in the Z Building for waste streams for Outfall 002, and in the Z Building Plastics Facility for waste streams for Outfall 003. At Outfalls 001, 002, and 004 (when the discharge is combined with Outfall 002), at least two waste streams would be monitored separately prior to discharge, which would require a flow-weighted average to obtain a single temperature value at the outfall. In addition, the end-of-pipe temperature limit (83°F) at the upstream locations may be more stringent limit than necessary to avoid thermal impacts in the receiving water (due to additional cooling between the monitoring location and end-of-pipe). The permittee proposed a monitoring study to develop new, less stringent upstream temperature limits correlating with an end-of-pipe limit of 83°F for each outfall. At the alternative monitoring locations, averaging of separately monitored waste streams combined with less stringent temperature limits may not provide a precise measure of the actual discharge temperature at the outfalls. Continuous temperature monitoring would be an extensive and costly engineering project, and it is not clear if the results would be more representative of effluent temperatures than a daily grab sample taken at the outfalls during low tide prior to mixing with the receiving water.

During the application process for permit re-issuance, the permittee indicated that the operation of the co-generation (co-gen) system may increase the heat load compared to previous operating conditions. Daily temperature monitoring data from January 2009 through December 2011 indicates that the maximum rise in temperature (ΔT) and potential heat load have increased since operation of co-generation commenced in June 2011. The maximum ΔT in 2009-2010 (prior to co-generation) was 19.0°F compared to 23.4°F following commencement of co-generation. In addition, the highest maximum daily flows occurred after commencement of co-generation, although the average monthly flows with co-generation did not tend to be greater than average monthly flows prior to co-generation.

The Draft Permit included a limitation on maximum daily heat load consistent with the conditions of the CORMIX model (9,400 mBTUs per day). This limit was based on a CORMIX simulation at an intake volume of at least 60.1 MGD, which is less stringent than the withdrawal authorized in the Final Permit. EPA reviewed daily temperature data from January 2009 through December 2011 and confirmed that the actual heat load during this period was less than 9,400 mBTU per day limit. The estimated maximum potential heat load was 6,332 mBTUs (on October 26, 2011). This estimate is a more conservative value than the actual heat load because it assumes that the total effluent flow from the facility on this date (32.4 MGD) was at the maximum ΔT of 23.4°F, while in reality only a portion of the total flow (the flow from Outfall 004) was at a ΔT of 23.4°F. The ΔT of effluent flows from Outfalls 001, 002, and 003 on the same date were 8.8°F, 12.5°F, and 1.7°F, respectively, resulting in a lower heat load than calculated here. Based on DMR data, the daily heat load after commencement of the co-gen system is still less than the limit in the Draft Permit.

Temperature monitoring is necessary to calculate the ΔT at each outfall and total heat load from the facility; however, continuous temperature monitoring is not necessary to report ΔT and heat load on a daily basis. Daily sampling at low tide will likely capture a wide range of operating scenarios, including a representative "worst-case," given that 365 data points will be collected each year. EPA is satisfied that daily grab samples taken at low tide prior to mixing with the receiving water will be representative of the effluent temperature and that continuous temperature monitoring is not necessary. EPA reduced the monitoring frequency for temperature from continuous to daily, but retains a daily heat load limit. Rather than relying on simulated conditions that may no longer be representative of the effluent following recent facility upgrades, EPA calculated a new limit that represents a "worst-case" daily heat load based on actual operating parameters: the maximum permitted intake flow allowed in the Final Permit (45 MGD) and maximum observed rise in temperature (23.4°F).

$$\mathbf{Q = (1.0)(45*8.34)(23.4°F) = 8{,}782\ mBTUs}$$

The Final Permit includes a revised maximum total daily heat load limit of 8,782 mBTUs (which is more stringent than the limit in the Draft Permit) and also requires the permittee to report a daily heat load for each outfall. As the permittee points out in Comment 2.e., flow is not monitoring continuously, rather, it is estimated based on the intake flow at the CWIS. To ensure that the daily heat load limit is not exceeded, the maximum daily heat load should be calculated using the single highest ΔT from all four outfalls and the total daily intake volume measured at

the CWIS. A daily heat load for each outfall should be calculated using the observed ΔT and estimated daily discharge volume at that outfall. The estimated heat load will likely be less than the reported maximum because some proportion of the total flow will have a ΔT less than the observed maximum. Heat load will be calculated using daily flow and ΔT values rather than calculated as a sum of hourly average heat load (based on continuous temperature monitoring) as required in the Draft Permit. The Final Permit's heat load limit is sufficiently stringent to ensure that the conditions represented in the CORMIX simulation are not exceeded, while maintaining the permittee's ability to operate the facility to meet their cooling and process water needs. Additionally, the Final Permit at Part I.E. requires the permittee to conduct one year of ambient temperature monitoring in Fort Point Channel (similar to the study conducted in 1994) to confirm that the thermal plume under the new operating regime is protective of the aquatic community.

Comment 3.a. Gillette requests a 12-month delay for commencing continuous monitoring of the temperature for Outfalls 001, 002, 003, and 004. Gillette likewise requests a 12-month delay for commencing hourly reporting of Average Monthly and Maximum Daily Rise in Temperature for Outfalls 001, 002, 003, and 004, and requests the reporting frequency be revised to Daily for Temperature and Rise in Temperature reporting during the 12-month delay. In the event that extenuating circumstances result in the need for additional time to install the required temperature monitors, Gillette will provide written justification to EPA Region 1 and MassDEP, and request additional time to complete the installation process.

Gillette will require 12 months to design, procure, and install the new continuous temperature monitors, and to set up the required Programmable Logic Controller (PLC) and Digital Control System (DCS) needed for the continuous temperature monitoring. Work to install the systems must be completed during a scheduled shutdown of operations at the Gillette facility.

Comment 3.b. Delay monitoring of discharge temperatures on a continuous basis for up to 12 months. In addition, temperature averaging will be required for Outfall 001 and for Outfall 002 (during diversion of flows from Outfall 004). Reference discussion under Comment 2.a. through 2.d.

Response to Comment 3.a. –b. The Final Permit does not require continuous temperature monitoring. See Response to Comment (RTC) 2.

Comment 4. Revise Part I.A.8 to read "The pH of the effluent shall not be less than 6.5 Standard Units (SU), nor greater than 8.5 SU at any time, or no more than 0.2 units outside the background range, unless these values are exceeded due to natural causes. A pH greater than 8.5 SU or less than 6.5 SU but within 0.2 SU outside the background range, or outside of 0.2 units of background range due to natural cases, will not be determined to be a violation of the permit limits."

Changing "and" to "or" and noting that excursions outside of the control of Gillette are not deemed permit violations will ensure that these potential pH excursions are not unfairly attributed to Gillette operations.

Response to Comment 4. The pH limit at Part I.A.8 ("shall be in the range of 6.5 through 8.5 standard units and not more than 0.2 units outside of the natural background range"), including the use of "and," is consistent with the Massachusetts Surface Water Quality Standards at 314 CMR 4.05(4)(b)(3) and has not been changed in the Final Permit. As written in the Final Permit, if the pH of the effluent is due to natural causes outside the control of Gillette, the excursion would not be a violation of the permit condition.

Comment 5. Revise Part I.A.10. to read "The discharge shall not contain, other than in trace amounts, a visible oil sheen, foam, or floating solids." All four outfalls are subject to tidal influence. Materials entering the outfall pipes during incoming tides may appear to be the result of Gillette operations when in fact they originated from Fort Point Channel. In addition, foam can occur due to natural causes and the interactions between the receiving water and discharges from the outfalls."

Response to Comment 5. The condition of the limit at Part I.A.10 ("shall not contain a visible oil sheen, foam, or floating solids at any time") is consistent with the Massachusetts Surface Water Quality Standards at 314 CMR 4.05(4)(b)(5) and (7) and has not been changed in the Final Permit. Floating materials entering the pipes during incoming tides are not subject to the NPDES permit because they are not a result of the discharge from the point source. EPA has not, to date, recognized foam resulting from natural causes to be a violation of this permit condition at other facilities.

Comment 6. Delete Part I. C.1.a. of the Permit ("The permittee shall, to the extent practicable, schedule annual maintenance outages between May 15th and June 1st. The permittee shall report the dates of all scheduled outages and submit them to EPA and MassDEP along with the subsequent monthly DMR. For maintenance outages not scheduled between May 15th and June 1st, the permittee shall include an explanation of why it was not practicable for the outage to occur within this time period.

Gillette is a manufacturing facility with operations and maintenance requirements subject to a variety of factors. The need for reporting scheduled outages would cause a disclosure of proprietary business information and impose a competitive disadvantage. Adequate permit conditions and monitoring are in place to control discharges and monitor impacts to receiving waters without providing undue burden on [the] facility to schedule outages that are already based on sound industry standards for operations, or to report proprietary business maintenance and production schedule information.

Response to Comment 6. Part I.C.1.a ("scheduled maintenance outages") has been altered to require the permittee to schedule annual maintenance outages between May 1st and June 1st to the extent practicable. Timing outages during this period would potentially benefit fish by reducing flow when densities of eggs and larvae are at their peak. EPA has removed the condition requiring the permittee to report outages in response to the permittee's concern about proprietary business practices.

Comment 7. Revise Part I.C.1.b. to read "The permittee shall use the existing variable frequency drives to limit the monthly average intake flow at the CWIS to 40 MGD and the

maximum daily intake flow to 45 MGD during summer operations, and limit the monthly average intake flow at the CWIS to 30 MGD and the maximum daily intake flow to 35 MGD during non-summer operations. Summer operation is defined as June 1 through September 30. Non-summer operation is defined as October 1 through May 31. Consistent with Comment #1, #4, #6, #8, and #10.

Response to Comment 7. Part I.C.1.b has been revised to reflect a summer monthly average intake flow of 40 MGD and maximum daily intake flow of 45 MGD, and a non-summer monthly average intake flow of 30 MGD and maximum daily intake flow of 35 MGD. Also see RTC 10.

Comment 8. This provision (Part I.C.1.3. of the Draft Permit) will not apply to maintenance and repair activities associated with the CWIS which have already been previously identified to EPA Region 1 and MassDEP.

Gillette has notified EPA Region 1 and MassDEP of repairs to the CWIS screens which are currently being planned.

Response to Comment 8. EPA concurs with the comment that the provision at Part I.C.1.3 of the permit is not intended to apply to minor maintenance and repair activities.

Comment 9. Revise Part I.D.1. of the Permit to read "The Permittee shall conduct entrainment sampling two (2) times per week between February 15 and June 30 for two (2) years. Two [(2)] entrainment samples shall be collected each sampling week and shall target two [(2)] separate periods of the diurnal cycle.

Sampling two times per week will provide a good representation of the diurnal cycle and is typical of industry sampling standards. Past entrainment sampling (2004) showed that the last period of larvae collection was the last week of June. Sampling beyond June 30th is financially and operationally burdensome. Finally, sampling for two years is more than sufficiently representative of good industry sampling practices.

Response to Comment 9. The biological monitoring requirements in the Draft Permit are consistent with or less stringent than biological monitoring conditions in other NPDES individual permits for coastal discharges. Biological monitoring is particularly important at this facility given that the existing data are not sufficient to characterize entrainment losses at Gillette. The Final Permit requires three years entrainment sampling three times a week from February 15th to July 30th. However, the following language has been added to the Final Permit at Part I.D.4 to allow the permittee to request a reduction in monitoring frequency after one year:

"After one year of biological monitoring has been completed and reported, the permittee may submit a written request to EPA to reduce monitoring frequency. Biological monitoring shall continue at the frequency specified in the permit until notice is received by certified mail from EPA that the monitoring requirements have been changed."

Comment 10. Request for delayed commencement of continuous temperature monitoring may result in delay of submittal of DMRs and reports using NetDMR.

Response to Comment 10. The Final Permit does not require continuous temperature monitoring. See RTC 2. The permittee shall commence use of NetDMR for submitting electronic discharge monitoring reports within one year of the effective date of the Final Permit.

Comment 11. Please note a change in the Certifying Official from Julie Serowick to John Lambert.

Response to Comment 11. Noted.