National Pollutant Discharge Elimination System Permit Factsheet

NPDES Permit Summary	
Applicant	Pfizer, Inc
Permit No.	CT0000957
Application No.	201814996
Date Application Received	November 20, 2018
Location Address	445 Eastern Point Rd, Groton, CT 06340-5157
Facility Contact	Eric Watters, EHS Lead Office Phone: 860-715-0088 Email: eric.watters@pfizer.com
Mailing Address	445 Eastern Point Rd, Groton, CT 06340-5157
Discharge Monitoring Report ("DMR") Contact	Eric Watters, EHS Lead Office Phone: 860-715-0088 Email: eric.watters@pfizer.com
Secretary of State Business ID	0088341
Permit Term	5 Years
Permit Category	National Pollutant Discharge Elimination System (NPDES) MINOR (MI)
SIC & NAICS Code(S)	8731
Applicable Effluent Limit Guidelines ("ELGs")	N/A
Permit Type	Reissuance
Ownership	Privately Owned Facility
Receiving Water	DSN 008: Thames River
Waterbody Segment Id's	DSN 008: CT-E1_014-SB
Waterbody Classification	SB
Discharge Locations	DSN 008: Latitude 41.33056, Longitude -72.07889
Compliance Schedule	N/A
Staff Engineer	Joseph Grandelski, Environmental Engineer Phone: 860-424-3608 E-Mail: joseph.grandelski@ct.gov

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Section 1 Facility Summary

1.1 Permit Fees

Application Fee:

Filing Fee	Invoice No.: DEP317856	Amount: $1,300.00	Date Paid: 11/20/2018
Processing Fee	Invoice No.: N/A	Amount: None	Date Paid: N/A

Annual Fee:

Wastewater Category (per Regs. Conn. State Agencies Section 22a-430-7)	**Flow Category**	**DSN**	**Annual Fee** (per Regs. Conn. State Agencies Section 22a-430-7 and Conn. Gen. Stat. Section 22a-6f)
Blowdown from Heating and Cooling Equipment *(bleed off or draining of boiler & minor leaks from a boiler; boiler blowdown; boiler lab testing wastewater; boiler washdown; chilled water; cleaning of chilled water strainers & filters; cooling tower blowdown/draining; West Basin cooling system strainer cleaning wastewater)*	---	008-1	$4,337.50
Hydrostatic Pressure Testing	0-50,000 gpd	008-1	$660.00
Cooling Water (Non-Contact)	5,000 – 100,000 gpd	008-1	$660.00
Stormwater *(spill containment area stormwater; stormwater)*	---	008-1	$2,912.50
Water Production Wastewater *(condensate polisher resin regeneration wastewater; reverse osmosis non-permeate; sand filter backwash; water softener regeneration wastewater)*	---	008-1	$660.00
Miscellaneous *(air compressor/air dryer condensate; air conditioning condensate; backflow preventer & fire protection test water; building maintenance wastewater; deaerator and vent stack condensate; dewatering wastewater; eyewash stations and miscellaneous plant sinks; floor drain wastewater; primary neutralization system draining; pump seal water; raw water tank overflow; steam cleaning and power wash wastewater; steam condensate; wastewater drained from solids filter system)*	---	008-1	$0.00
TOTAL			**$9,230.00**

1.2 Application Submittal Information

On November 20, 2018, the Department of Energy and Environmental Protection ("DEEP") received an application (Application 201814996) from Pfizer Inc. ("the Permittee", "the Applicant", "the facility"), located in Groton, CT, for the renewal of its NPDES Permit No. CT0000957, expiring on May 21, 2019 ("the previous permit").

Consistent with the requirements of Section 22a-6g of the Connecticut General Statutes (Conn. Gen. Stat.), the Permittee published a Notice of Permit Application in *The Day* (New London) on October 30, 2018. On January 16, 2019, the application was determined to be timely and administratively sufficient.

The Permittee seeks authorization for the following in Application 201814996:

DSN	Proposed Average Daily Flow (gpd)	Proposed Maximum Daily Flow (gpd)	Proposed Wastestreams	Treatment Type	Discharge To
008-1	500,000	750,000	*Air compressor/air dryer condensate*; *Air conditioning condensate*; *Backflow preventer & fire protection test water*; *Bleed off or draining of boiler & minor leaks from a boiler*; *Boiler blowdown*; *Boiler lab testing wastewater*; *Boiler washdown*; *Building maintenance wastewater; Chilled water; Cleaning of chilled water strainers & filters; Condensate polisher resin regeneration wastewater; Cooling tower blowdown/draining; Deaerator and vent stack condensate; Dewatering wastewater; Eyewash stations and miscellaneous plant sinks; Floor drain wastewater; Hydrostatic test water; Non-contact cooling water; Primary neutralization system draining; Pump seal water; Raw water tank overflow; Reverse osmosis non-permeate; Sand filter backwash; Spill containment area stormwater; Steam cleaning and power wash wastewater; Steam condensate; Stormwater; Wastewater drained from solids filter system; Water softener regeneration wastewater; West Basin cooling system strainer cleaning wastewater*	equalization; neutralization; heat dissipation/ removal;	Thames River

Refer to Attachment 1 for a description of each wastestream and the chemicals that may be present in each wastestream.

1.3 Other Permits

The Permittee has permit coverage for other wastewater discharges under the following permitting mechanisms:

- Noncontact cooling water wastewater from Central Utilities Buildings 1 and 2 are permitted under the *Comprehensive General Permit for Discharges to Surface Water and Groundwater* (CTCSW0023).

- Miscellaneous wastewaters that are discharged to the sanitary sewer are permitted under the *General Permit for the Discharge of Wastewaters From Significant Industrial Users* (CTSIU0132), which includes air compressor condensate and blowdown, boiler blowdown, chilled and reheat water and steam condensate, liquid ring vacuum and compressor pump wastewater, water treatment wastewater, reverse osmosis reject water, building maintenance wastewater, fire suppression system testing wastewater, and noncontact cooling water.

- Other process and non-process wastewater is permitted under Pretreatment Permit SP0000083, which includes laboratory wastewaters, animal resource wastewater, miscellaneous condensate, pump seal water, fire suppression test water, domestic water released from relief valves and drains, discharge from steam and heat exchanger relief valves, discharge from backflow preventors, kilo laboratory wastewater, air compressor blowdown, groundwater, stormwater, discharge from steam and heat exchanger relief valves, water treatment wastewater, Research Pilot Plant wastewater & scrubber water.

- Domestic sewage wastewater is permitted under the *Domestic Sewage Wastewater General Permit* (GDS000021 & GDS000019).

1.4 Description of Industrial Process

Pfizer Inc. is a business that performs research and development of pharmaceutical products. The Standard Industrial Classification (SIC) code for site activities is 8731 (Commercial Physical and Biological Research). The treatment system is used to treat wastewater from the power plant that provides steam and electricity to the site for heating, ventilation, and air conditioning, which the facility refers to as "Utilities." This wastewater is discharged to the Thames River by way of DSN 008-1 under this permit. Historically, Pfizer conducted pharmaceutical manufacturing, however, these operations ceased in 2007.

1.5 Facility Description

See Attachment 2 for a facility map.

Pfizer Inc. is located on approximately 160 acres, which consists of two campuses on opposite sides of Eastern Point Road. The East Campus is dedicated to pharmaceutical research and development activities and contains hundreds of labs and related support operations. Any laboratory wastewaters associated with research and development are collected, treated, and discharged into the City of Groton's sewer system; these discharges are authorized under Pretreatment Permit SP0000083 (see Section 1.3 – Other Permits). The West Campus is located adjacent to the Thames River. The discharges associated with this permit are related to the facility's support/utilities operations. The Pfizer Utilities team produces electricity, steam, and chilled water that is used to support operations at the Groton site. The Utilities operations are located in Buildings 84, 101, 160, 165, and 168. Power generation equipment includes boilers, gas and steam turbines, cooling towers, and boiler water treatment systems.

Electricity is generated from steam turbines with steam produced from boilers fired with natural gas or fuel oil. A cogeneration turbine utilizing a fuel combustion turbine and a heat recovery boiler provides up to 10.5 megawatts of electricity and 110,000 lbs/hr of steam for the facility. Reduced steam pressure from the turbines is used for heating, ventilation, and air conditioning (HVAC). Steam condensate is returned to Building 101 as feed water for the boilers. Two small cooling towers on the roof of Building 101, the Building 84 cooling tower, and a small cooling tower at Building 160 provide closed-loop cooling for turbine generator air and oil coolers, generator heat exchangers, and oil coolers on a natural gas compressor and turbine generator. Chilled water is used for building air conditioning. The water is cooled with electric chillers. The water used in these processes is from city water.

1.6 Facility Changes

The Regulations of the Connecticut State Agencies ("Regs. Conn. State Agencies") require that permittees notify DEEP and obtain written approval of any facility expansion or process change that may result in an increased or new discharge or constitute a new source, and of any expansion or significant changes made to a wastewater collection system, treatment system, or its method of operation in accordance with Regs. Conn. State Agencies Section 22a-430-3(i). These regulatory provisions are commonly referred to as "3(i) determinations". DEEP will review the notification and determine if the change can be implemented under the current permit or if the requested change requires a permit modification to protect waters of the State in accordance with Regs. Conn. State Agencies Section 22a-430-4(p).

The permit was modified as follows:

A minor permit modification issued October 10, 2014, addressed the following:

- Added "power washing of the Building 84 metal fan deck and blades, plastic tower media, and concrete basin" to the list of waste streams;
- The method of analysis changed from "EPA Method 6020 & 1640 with chelation" to "EPA Method 6020 or 1640 with chelation";
- The age of *Americamysis bahia* changed from "1-5 days old with no more than 24-hour range in age" to "7 days old". The age of *Cyrinodon variegatus* changed from "1-14 days old with no more than 24-hour range in age" to "less than 24 hours";
- Reporting of supplemental monitoring associated with chronic toxicity testing was added to the requirements of Attachment A; and
- The number of toxicity replicate test chambers per concentration listed in Attachment D changed from 12 to 8 for *Americamysis bahia* and 6 to 4 for *Cyrinodon variegatus*.

A permit modification, issued February 26, 2016, for the elimination of once-through cooling water, reduced the maximum permitted flow of DSN 008-1 from 45.0 million gallons per day ("mgd") to 750,000 gallons per day ("gpd") and removed Intake 01H & DSN 009-1, consisting of a discharge of traveling screen backwash associated with the saltwater intake. To accommodate the significant reduction of flow and provide treatment of the remaining Utilities' wastewaters, the Permittee installed a new neutralization system in Building 168, and a modular splash fill pack and spray nozzle system to provide cooling of the wastewater in the basin. See Section 1.7 – Treatment System Description for more information. Additional flow monitoring and sensing equipment was also installed both at the basin and as part of the neutralization system in Building 168.

The following 3(i) determinations have been approved during the previous permit term:

Date Issued	3(i) Number	3(i) Description	Change Implemented
03/31/2015	201502166	Approved the temporary bypass of the West Equalizing Basin to allow for the installation of a concrete wall in Area 2 of the basin.	Yes
10/14/2015	201506294	Approved the temporary storage of chilled water drained from the chilled water supply and return lines as part of facility changes to comply with Section 10(A) of the previous permit.	Yes
12/10/2015	201509256	Approval of the temporary change to discharge via both DSN 008-1 and DSN 007-1 (a historic emergency outfall for DSN 008-1) to address Section 10 requirements of the previous permit.	Yes
4/05/2016	201603710	Approved the elimination of pH probes 1 and 1A from Area 1 of the West Equalizing Basin, which were associated with former manufacturing and biological treatment operations and approved the use of either sodium hydroxide or a blend of sodium and potassium hydroxide for pH adjustment in the primary neutralization system in Building 168 and the secondary neutralization system in Area 2 of the Basin.	Yes
1/19/2017	201615454	Approved the substitution of NALCO 7290E as a resin cleaner in the condensate polisher regeneration cycle for NALCO 4264; substitution of NALCO 3D Trasar 3DT494 as a corrosion inhibitor in the cooling towers for NALCO 3D Trasar 3DT294; and the discharge of stormwater from roof drains on Buildings 101, 165, 168 into the wastewater treatment system discharged via DSN 008-1.	Yes
3/10/2017	201701211	Approved the replacement of the secondary neutralization system in the southern end of the West Equalizing Basin with a new system sized for the current operating conditions, which includes relocating existing pH probes to new areas in the Basin and installation of piping in the Basin to allow water to be recirculated from Area 2 to Area 1 for pH control/adjustment.	Yes
3/02/2018	201710273	Approved planned/unplanned bypass of the primary neutralization system for assessment or repair. In such cases, the secondary neutralization system associated with the West Equalizing Basin will be used.	Yes
11/05/2018	201813788	Approved the installation of a bag filter in the piping system prior to Tank T100 to remove accumulated solids in the Pump Stations #2 and #4.	Yes
3/27/2020	202002978	Approved the expansion of the “dewatering wastewater” waste stream to include dewatering on-site vaults, tunnels, and manholes that contain steam condensate piping/equipment to allow for safe entry to perform inspections and maintenance or protect the equipment	Yes

Date Issued	3(i) Number	3(i) Description	Change Implemented
		from high water levels. Approved the expansion of the "steam condensate" waste stream to include incidental steam condensate that may be comingled with the dewatering wastewater.	
7/21/2020	202007893	Approved the mechanical removal of weeds/algae and bottom sediment from the West Equalizing Basin and powerwashing the sides of the basin using wastewater from the basin.	Yes
8/12/2020	202008824	Approved the replacement of a corrosion inhibitor with Nalco Trac114 Plus.	Yes
5/17/2022	202205838	Approved a decrease of the calibration frequency of the West Basin pH probes 2,3,4,5 from weekly to monthly.	Yes
4/10/2023	202302248	Approved the installation of Airmax PondSeries PS 40 Aeration in the West Equalizing Basin to reduce organic growth in the basin.	Yes
5/02/2024	202405093	Approved an additional aeration system (Airmax LakeSeries LS80 Aeration System) to Area 1 of the West Equalizing Basin and moving the diffuser locations within the basin as conditions warrant.	No
6/07/2024	202405198	Approved the installation of advanced oxidation water treatment within the condenser water loops (FlowMark Water Treatment Model DS-PI-3 in Building 84 and Model DS-PI-2 in Buildings 101 and 160). The proposed oxidation system consists of UV lamps that produce ozone, which acts as a disinfectant/biocide in the system.	No

1.7 Treatment System Description

A portion of Utilities' wastewater from the Power Plant (Buildings 101, 165, and 168) and all of the Utilities' wastewater from the Cogen Building (B160) discharge through a combination of drains and collection piping into Pump Station No. 2 ("PS2"). The remainder of the Utilities' wastewater from the Power Plant discharges through drains and collection piping into Pump Station No. 4 ("PS4"). Additional wastewater from stormwater and smaller Utilities operations are also sent to PS2 & PS4 via drains and collection piping. Stormwater from the southern portion of the plant footprint flows directly into the West Equalizing Basin (treatment through equalization). The PS2 and PS4 vaults are interconnected so if a pump is disabled in one vault, the water will flow into the other vault.

The combined wastewater from PS2 and PS4 is pumped through two bag filter units that remove solids prior to being treated in the Burt Process Equipment ("BPE") Primary Neutralization System, located on the first floor of B168. This consists of a 5000-gallon pretreatment & equalization tank (T-100) and two 3,000-gallon tanks that provides course (T-200) and fine (T-300) pH adjustment. Wastewater is then pumped through a 1,000-gallon transfer station (T-400) to Manhole No. 11 at the northern end of the West Equalizing Basin. Additionally, floor drain wastewater from Building 160 is directed to an oil/water separator before flowing to PS2.

Wastewater flows by gravity from Manhole No. 11 within the West Equalizing Basin, into Area 1. Monitoring of pH is performed at the southern end of Area 1 (Probe 2). From Area 1, the wastewater flows into the southern portion of Area 2, where additional pH monitoring (Probe 3) and secondary neutralization (treatment in a second BPE system) is performed, if necessary. In the case that the primary BPE requires maintenance or repair, this system is allowed to be bypassed as long as the secondary BPE is operational.

The wastewater continues to flow to the northern portion of Area 2, where the temperature is monitored and cooling (treatment) of the wastewater is performed if necessary. The cooling system operates by spraying the wastewater over a modular splash fill pack suspended over the basin's water surface, releasing as much as 7,500 thousand BTUs per hour (MBH) to the air. The final portion of Area 2 contains the effluent pH (Probe 5) and flow monitoring. The wastewater then flows to Area 3, which contains the discharge pipe out to the Thames River (DSN 008).

Additional ancillary equipment in the basin includes an oil boom and oil skimmer in Area 1. Area 1 also contains an aeration system to prevent organic growth, which consists of submerged diffusers.

1.8 Compliance History

Based on DMRs and Aquatic Toxicity Monitoring Reports ("ATMRs") submitted to DEEP, the Permittee reported the following effluent violations in the last five years:

Effluent Violations in The Past 5 Years					
Month/ Year	**DSN**	**Parameter**	**Type of Limit**	**Permitted Limit**	**Reported Value**
08/2021	008-1	Di[2-ethylhexyl] phthalate [DEHP]	Daily Maximum	3.2 µg/L	6.05 µg/L
09/2021	008-1	Solids, total suspended	Monthly Average	20.0 mg/L	32.0 mg/L
09/2021	008-1	Solids, total suspended	Daily Maximum	30.0 mg/L	32.0 mg/L

The exceedance of DEHP was investigated, including operations and sample collection setup and the cause was inconclusive. Composite sampling conducted the following days returned non-detect results.

The exceedance of TSS was thought to have occurred due to a significant, episodic rain event associated with Hurricane Ida and was not representative of normal Utilities' wastewater discharge.

1.8.1 Is the Permittee subject to an ongoing enforcement action? ☐ Yes ☒ No

Notice of Violation ("NOV") NOVWRIN16026 was issued on December 5, 2016, for discharging boiler house operations wastewater to the ground without a permit, discharging stormwater from roof drains through DSN 008 without a permit, and not accurately reporting total residual chlorine. An approval of 3i Application No. 201615454 was issued on January 19, 2017, and approved the discharge of stormwater from roof drains on Buildings 101, 165, 168 into the wastewater treatment system discharged via DSN 008-1. The NOV was closed on March 15, 2024.

1.8.2 Did the previous permit have a compliance schedule? ☒ Yes ☐ No

Section 10(A) of the previous permit included a compliance schedule, which required Pfizer to implement closed-cycle cooling as the best technology available to comply with Section 316(b) of the Clean Water Act ("CWA"). DEEP approved the plan and schedule titled *Section 10(A)(1) – Plan & Schedule for Cooling Water Project* to expand and upgrade the cooling tower on September 19, 2014. Pfizer ceased the use of once-through noncontact cooling water on March 10, 2016, and submitted certification to DEEP on March

31, 2016, that the 316(b) project was complete and they had eliminated the use of the intake structure, in accordance with Section 10(A)(3) of the previous permit. DEEP approved the certification on April 6, 2016.

In order to accommodate this change, Pfizer modified the basin for lower daily flows by installing a reinforced concrete wall near the northern end of Area 2 with a trapezoidal weir at the top of the basin, and two 8-inch pipes through Area 3 to the final discharge. An oil boom and skimmer system were installed in Area 1. A cooling system was installed in Area 2, along with pH and temperature sensors and flowmeters.

In other areas of West Campus, Pfizer installed a new chiller system (Building 90), modified the cooling tower (Building 84), installed a new chiller pad (former Building 126), installed oil water separators (Building 101), added a BPE Primary Neutralization (Building 168) to treat the remaining wastewaters flowing through PS2 and PS4.

Section 10(H) of the permit modification issued on February 26, 2016, included additional requirements to investigate the inconsistencies of copper levels in the Thames River and investigate whether the minimum levels listed in Table A of the previous permit are the lowest minimum levels achievable. The *Thames River Copper Levels Study* was received on April 7, 2017. It noted possible interferences in the receiving water sampling due to high salt (dissolved solids) content, which also coincided with the Permittee switching from EPA Method 200.7 to EPA Method 200.8 to achieve a lower minimum level ("ML"). In the last five years Thames River samples, analyzed with EPA Method 200.8, have not shown elevated levels, but have averaged 5.7 µg/L (see Section 3.6 – Waterbody Ambient Conditions).

DEEP issued an approval of an extension request for the ML study until September 1, 2016, and Pfizer submitted the *Section 10: Compliance Schedule Minimum Levels Study* on August 22, 2016. Pfizer submitted an updated evaluation of MLs in 2018 with the NPDES permit renewal application. See Section 3.11.1 – Sufficiently Sensitive Methods for a discussion of MLs incorporated into the permit.

1.9 General Issues Related To The Application

1.9.1 Federally Recognized Indian Land

As provided in the permit application, the site is not located on federally-recognized Indian land.

1.9.2 Coastal Area/Coastal Boundary

The application is not for a new permit or a modification of an existing permit where the physical footprint of the subject activities is modified.

1.9.3 Endangered Species

The site is not located within an area identified as a habitat for endangered, threatened or special concern species according to the *Surface Water Discharge NDDB Screening Map (formerly the Freshwater Mussel map)*.

1.9.4 Aquifer Protection Areas

As provided in the permit application, the site is not located within a protected area identified on a Level A or B map.

1.9.5 Conservation or Preservation Restriction

As provided in the permit application, the property is not subject to a conservation or preservation restriction.

1.9.6 Public Water Supply Watershed

As provided in the permit application, the site is not located within a public water supply watershed.

Section 2 Receiving Water Body Information

The receiving waterbody is the estuary at the mouth of the Thames River. This segment of the Thames River is identified as CT-E1_014-SB and includes the mouth of the Thames River from Eastern Point to the I-95 crossing. It is classified as SB because it is tidal. According to Regs. Conn. State Agencies 22a-426-4(j), the designated uses for Class SB waters are: (1) habitat for marine fish, other aquatic life and wildlife; (2) commercial shellfish harvesting, where authorized; (3) recreation; (4) industrial water supply; and (5) navigation.

This segment of the Thames River was assessed in 2022 according to the Connecticut 305b Assessment Results for Estuaries (final-2022-iwqr-appendix-a-3-connecticut-305b-assessment-results-for-estuaries.pdf) and is listed in Connecticut's 2022 Integrated Water Quality Report as being impaired. The two impaired designated uses are habitat for marine fish, other aquatic life and wildlife caused by low dissolved oxygen levels and shellfish harvesting due to fecal coliform (final-2022-iwqr-appendix-b-1-list-of-impaired-waters-for-connecticut-epa-category-5.pdf).

The dissolved oxygen impairment identified in this receiving water is directly linked to the Long Island Sound ("LIS") Total Maximum Daily Load ("TMDL") titled *A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound* (https://portal.ct.gov/-/media/deep/water/lis_water_quality/nitrogen_control_program/tmdlpdf.pdf), which was developed to address low dissolved oxygen levels in LIS. The LIS TMDL focuses on excess nitrogen loading as the primary cause of hypoxia, rather than low dissolved oxygen resulting directly from end-of-pipe discharges. Elevated nitrogen inputs stimulate algal growth, and the subsequent decomposition of organic matter depletes oxygen in bottom waters, leading to dissolved oxygen impairment. The facility has been assigned a waste load allocation ("WLA") for total nitrogen, which has been incorporated into this permit. See Section 3.8 of this fact sheet for further discussion of the annual loading limit for total nitrogen.

The discharge is not expected to have an impact on dissolved oxygen levels in the receiving water. Monitoring for dissolved oxygen was conducted during the previous permit term, and the lowest reported concentration was 8.0 mg/L. Therefore, dissolved oxygen monitoring is not being required in this permit.

Segment CT-E1_014-SB was incorporated into the statewide TMDL for bacteria-impaired waters in September 2013, as documented in *Estuary 11: New London / Groton* (https://portal.ct.gov/-/media/deep/water/tmdl/ctfinaltmdl/estuary11newlondongroton). The facility was not designated a WLA in the TMDL because compliance with this TMDL is based on ambient water quality and not water quality at the point of discharge (i.e., end of pipe). Stormwater is a component of the discharge, and the TMDL identified stormwater as a potential bacteria source in the river segment. Fecal coliform is the indicator species used to assess shellfish uses in saltwater. Monitoring during the previous permit term indicated that fecal coliform is present in the discharge, therefore, monitoring of fecal coliform continues to be required in the permit. In the previous permit, samples were collected quarterly during the period May 1st through September 30th, which is the duration of the recreation season, however the applicable season for shellfish use is year-round, therefore, monitoring for fecal coliform will now be required semi-annually, which will capture the seasonal variability of the presence of bacteria.

See Attachment 2 for a USGS Quadrangle map showing the discharge location in the Thames River.

Section 3 Permit Conditions and Effluent Limitations

3.1 Effluent Guidelines

The following ELGs were reviewed to determine their applicability to the facility's discharge, DSN 008-1: 40 CFR Part 423 (Steam Electric Power Generating Point Source Category) and 40 CFR Part 439 (Pharmaceutical Manufacturing Point Source Category).

The EPA's *Guidance for NPDES Permits Issued to Electric Cogenerating Plants and Industrial Facilities with Electric Generating Plants* dated June 30, 1988, addressed the question if the requirements of 40 CFR Part 423 were applicable to an industrial site with a cogenerating plant or a steam electric power generating facility. The guidance specified that the requirements are specifically applicable in the cases that all of the following conditions are met:

1. At least 50% of the facility revenue is derived from the generation of electricity;
2. At least 50% of the fuel is oil, gas, coal, and/or nuclear;
3. A steam-electric cycle is used; and
4. A discharge exists to waters of the United States or a POTW.

Pfizer does not derive at least 50% of its revenue from the generation of electricity, so the ELGs at 40 CFR Part 423 are not applicable.

The composition of wastewater in DSN 008-1 is similar to that of "low volume waste sources" defined at 40 CFR 423.11, which are limited by total suspended solids ("TSS"). This was considered when developing case-by-case Technology Based Effluent Limits ("TBELs"), described in Section 3.9.

Additionally, Pfizer is not subject to the ELGs at 40 CFR Part 439, which applies to pharmaceutical manufacturing. Pfizer ceased pharmaceutical manufacturing operations on-site and closed its biological wastewater treatment system in 2008. Subpart E – Research is also not applicable because any wastewaters associated with pharmaceutical research are discharged to the sanitary sewer.

3.2 Pollutants of Concern

The following pollutants have been identified as pollutants of concern and are included as monitoring requirements in the permit for the reasons noted below:

Pollutant	Reason For Inclusion			
	Pollutant With an Applicable Technology-Based Limit	Pollutant With a WLA from a TMDL	Pollutant Identified as Present in The Effluent Through Sampling	Pollutant Otherwise Expected to Be Present in The Effluent
Biochemical Oxygen Demand, 5-Day			X	
Bis(2-ethylhexyl) phthalate			X	
Chlorine, Total Residual			X	
Chromium, Total			X	
Copper, Total			X	
Fecal coliform			X	
Iron, Total			X	

Pollutant	Reason For Inclusion			
	Pollutant With an Applicable Technology-Based Limit	Pollutant With a WLA from a TMDL	Pollutant Identified as Present in The Effluent Through Sampling	Pollutant Otherwise Expected to Be Present in The Effluent
Lead, Total			X	
Nickel, Total			X	
Nitrogen, Ammonia Total			X	
Nitrogen, Kjeldahl Total			X	
Nitrogen, Nitrate Total			X	
Nitrogen, Nitrite Total				X
Nitrogen, Total		X		
Oil and Grease, Total			X	
pH			X	
TSS			X	
Temperature			X	
Zinc, Total			X	

3.3 Basis for Limits

Technology and water-quality based requirements are considered when developing permit limits. TBELs represent the minimum level of control imposed under the CWA. Industry-specific technology-based limits are set forth in 40 CFR Sections 405 – 471 (EPA's ELGs) and in Regs. Conn. State Agencies Section 22a-430-4(s)(2). Water quality-based limits are designed to protect water quality and are determined using the procedures set forth in EPA's *Technical Support Document for Water Quality-Based Toxics Control*, 1991 ("TSD"). When both technology and water quality-based limits apply to a particular pollutant, the more stringent limit would apply. In addition, water quality-based limits are required when any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) is or may be discharged at a level that causes, has reasonable potential to cause, or contributes to an excursion above any water quality criteria. Numeric water quality criteria are found in Regs. Conn. State Agencies Section 22a-429-9 of the WQS.

3.4 Zone of Influence

A zone of influence ("ZOI") of 1,229,167 gallons per hour was carried over from the previous permit, based on the dilution factor of 60:1. The ZOI is not applicable to bis(2-ethylhexyl) phthalate, which has the health designation of carcinogenic and high potential to bioaccumulate or bioconcentrate in the WQS. The ZOI is based on a dye study that was conducted by Metcalf & Eddy in July and September 1986 during spring and neap tides and documented in the report *Water Quality and Hydraulic Studies in the Lower Thames River* dated July 6, 1987. The results indicated that conditions observed under the spring tide resulted in the lowest level of dilution. See Attachment 3 for maps of the dilution factors determined in that study. The previous permit determined that this is the smallest mixing zone that would meet all applicable criteria.

3.5 Reasonable Potential Analysis

Pursuant to CWA Section 301(b)(1)(C) and 40 CFR Section 122.44(d)(1), NPDES permits must contain any requirements in addition to TBELs that are necessary to achieve water quality standards established under Section 303 of the CWA. See also 33 United States Code ("USC") Section 1311(b)(1)(C). In addition, limitations "must control any pollutant or pollutant parameter (conventional, non-conventional, or toxic) which the permitting authority determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard, including State narrative criteria for water quality." 40 CFR Section 122.44(d)(1)(i). To determine if the discharge causes, or has the reasonable potential to cause, or contribute to an excursion above any WQS, EPA considers: 1) existing controls on point and non-point sources of pollution; 2) the variability of the pollutant or pollutant parameter in the effluent; 3) the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity); and 4) where appropriate, the dilution of the effluent by the receiving water. See 40 CFR Section 122.44(d)(1)(ii).

If the permitting authority determines that the discharge of a pollutant will cause, has the reasonable potential to cause, or contribute to an excursion above WQSs, the permit must contain Water Quality Based Effluent Limits ("WQBELs"), or require additional monitoring if there is insufficient data to develop a WQBEL for that pollutant. See 40 CFR Section 122.44(d)(1)(i).

Reasonable Potential Analysis Results:

A reasonable potential analysis ("RPA") was conducted for the following parameters: ammonia, bis(2-ethylhexyl) phthalate, chlorine, chromium, copper, iron, lead, nickel, and zinc. Bis(2-ethylhexyl) phthalate, copper, and nickel have been determined to have a reasonable potential to contribute or cause an excursion above the WQS. Copper and nickel had been monitored on a quarterly basis, with at least 20 data points available to calculate a coefficient of variation. Both copper and nickel were found to have reasonable potential to exceed the water quality criteria due to elevated levels of these pollutants already being present in the receiving water. The results of the analysis are provided in the table below.

Reasonable Potential Analysis				
Parameter	**Projected maximum effluent concentration** C_e	**Projected maximum receiving water concentration** $\frac{Q_e C_e + Q_u C_u}{Q_d}$	**Most stringent criteria**	**Is there reasonable potential to exceed WQC?**
Ammonia	$0.23 \times 2.9 = 0.67\ mg/L$	$0.059\ mg/L$	0.76 mg/L	No
Bis(2-ethylhexyl) phthalate[1]	$6.05 \times 2.0 = 12.1\ \mu g/L$	$12.1\ \mu g/L$	2.2 µg/L	**YES**
Total Residual Chlorine	$90 \times 2.0 = 180\ \mu g/L$	$7.0\ \mu g/L$	7.5 µg/L	No
Chromium	$10 \times 3.2 = 32\ \mu g/L$	$0.75\ \mu g/L$	42 µg/L	No
Copper	$35.9 \times 2.6 = 93.3\ \mu g/L$	$7.2\ \mu g/L$	3.1 µg/L	**YES**
Iron	$1300 \times 4.2 = 5460\ \mu g/L$	$178\ \mu g/L$	1000 µg/L	No
Lead	$3.4 \times 3.8 = 12.9\ \mu g/L$	$0.30\ \mu g/L$	8.1 µg/L	No

Reasonable Potential Analysis				
Parameter	**Projected maximum effluent concentration** C_e	**Projected maximum receiving water concentration** $\frac{Q_e C_e + Q_u C_u}{Q_d}$	**Most stringent criteria**	**Is there reasonable potential to exceed WQC?**
Nickel	$212 \times 6.8 = 1442\ \mu g/L$	$30.7\ \mu g/L$	8.2 µg/L	**YES**
Zinc	$80 \times 3.2 = 256\ \mu g/L$	$5.6\ \mu g/L$	81 µg/L	No
Q_u = ZOI = 1,229,167 gph; Q_e = 500,000 gpd = 20,833 gph; $Q_d = Q_u + Q_e$ = 1,250,000 gph; C_u = upstream concentration; C_e = (maximum observed concentration in effluent) x (multiplier from Table 3-1 of EPA's TSD); C_d = calculated downstream concentration				
[1]No ZOI is considered for bis(2-ethylhexyl) phthalate as it is defined in Regs. Conn. State Agencies 22a-426-9(a) as carcinogenic with high potential to bioaccumulate or bioconcentrate.				

Bis(2-ethylhexel) phthalate:

The governing water quality criteria for bis(2-ethylhexel) phthalate is the human health criteria and is classified in the WQS (Regs. Conn. State Agencies 22a-426-9) as a possible/probable carcinogen with high potential to bioaccumulate or bioconcentrate, so this parameter was evaluated for the potential to exceed the WQS at the end-of-pipe.

Total Ammonia Nitrogen:

In order to conduct an RPA for ammonia, the acute (35 µg/L) and chronic (233 µg/L) criteria that are applicable to Class SB surface waters needs to be converted from un-ionized ammonia to total ammonia. As specified in Regs. Conn. State Agencies 22a-426-9, this is done according to EPA's *Ambient Water Quality Criteria for Ammonia (Saltwater)-1989* (EPA 440/5-88-004). This document specifies this conversion is highly influenced by pH and temperature, with higher pH and higher temperature corresponding to more restrictive criteria, and slightly correlated with salinity, with lower salinity associated with more restrictive criteria. The criteria were calculated using maximum observed pH and temperature values and minimum observed salinity value, which would result in the most protective criteria. The ambient data for temperature in Section 3.6 represent average and maximum values for summer temperatures.

The guidance specifies that the percentage of un-ionized ammonia ("UIA") is based on pK_a and pH. Theoretical models for pK_a were developed by Whitfield and described in the 1974 paper *The hydrolysis of ammonia ions in sea water - a theoretical study*. Hampson then developed a program to in his 1977 paper *Relationship between total ammonia and free ammonia in terrestrial and ocean waters*, which uses the following equations:

$$\%\ UIA = \frac{100}{1 + 10^{\left(pK_a + 0.0324(298 - T) + 0.0415\frac{P}{T} - pH\right)}}$$

Where P = 1 ATM, T is temperature (°K).

$$pK_a = 9.245 + 0.116I$$

Which is the Model B regression equation developed by Whitfield, 1974.

$$I = \frac{19.9273S}{1000 - 1.005109S}$$

Where I is the molar ionic strength and S is salinity.

Next, the water quality criteria (expressed as un-ionized ammonia) are converted to total ammonia:

$$[NH_3 + NH_4{}^+] = \frac{Un - ionized\ WQC}{\%\ UIA}$$

Finally, total ammonia is converted to a concentration of total ammonia as nitrogen using a conversion factor of 0.822, which is equivalent to the percent molecular mass of N in NH_3:

$$0.822 = \frac{14.00674}{14.00674 + 3(1.00794)} = \frac{molecular\ mass\ of\ N}{molecular\ mass\ of\ NH_3}$$

$$Total\ Ammonia\ as\ N = 0.822[NH_3 + NH_4{}^+]$$

Temp	pH	Salinity	Pressure	Molal Ionic Strength	pKa*	% Unionized:	Unionized WQC		Total NH3		Total NH3 as N	
(deg C)	(su)	(ppt)	(ATM)	(not valid if >0.85):	@ 25 deg C		Acute	Chronic	Acute	Chronic	Acute	Chronic
							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
21.0	8.0	12.0	1.0	0.242	9.273	3.805%	0.233	0.035	6.12	0.92	5.03	0.76

The most stringent acute and chronic criteria for total ammonia (as N) are 5.03 mg/L and 0.76 mg/L, respectively, which would be protective of the segment of the Thames at critical conditions of maximum temperature, maximum pH, and minimum salinity that have been observed over the past 5 years.

3.6 Waterbody Ambient Conditions

Ambient Thames River samples were collected upstream of Pfizer's discharge semiannually with chronic toxicity testing. The data collected between March 2020 and February 2025 showed the following average background concentrations, which represent the upstream ambient water quality conditions that were used in the reasonable potential analysis.

Thames River Background Concentrations of Pollutants, 2020-2025

Pollutant	Concentration
Ammonia	0.049 mg/L
Bis(2-ethylhexyl) phthalate	0.21 µg/L
Chlorine	4.0 µg/L
Chromium	0.22 µg/L
Copper	5.7 µg/L
Iron	88.6 µg/L
Lead	0.090 µg/L
Nickel	6.8 µg/L
Zinc	1.4 µg/L

Ambient Measurements for Ammonia Calculations			
Parameter	**Average**	**Minimum**	**Maximum**
pH (S.U.)	7.6	6.4	8.0
Temperature (°C)	16.0	11.5	20.7
Salinity (g/L)	23	12	30

3.7 Whole Effluent Toxicity

The Permittee shall comply with effluent standards or prohibitions established by CWA Section 307(a) and Regs. Conn. State Agencies Section 22a-430-4(l) and may not discharge toxic pollutants in concentrations or combinations that are harmful to humans, animals, or aquatic life. If toxicity is suspected in the effluent, DEEP may require the Permittee to perform acute or chronic whole effluent toxicity testing.

The previous permit required Pfizer to perform acute and chronic aquatic toxicity testing on a semi-annual basis for DSN 008-1. These tests were conducted simultaneously using a modified acute toxicity test, in which the Permittee demonstrated compliance with the acute toxicity limit by measuring the 48-hour survival of the prescribed species during the chronic toxicity test, provided that the control met the test acceptability criteria of 90% survival at 48 hours.

Chronic toxicity test methods are not approved for use to determine acute toxicity in 40 CFR Part 136. Additionally, EPA's recently published *National Pollutant Discharge Elimination System Whole Effluent Toxicity Permit Writers' Manual* (EPA-833-B-24-001) does not recommend this approach. Acute toxicity monitoring is now required to conducted following the procedures described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA-821-R-02-012), which is the approved method in 40 CFR Part 136. A minimum daily limit for acute toxicity of $LC_{50} \geq 100\%$ effluent was included in the permit, consistent with Regs. Conn. State Agencies Section 22a-430-3(j)(7)(A)(i) and 22a-430-4(l)(5).

The average salinity of the receiving water during the last 5 years was 23 ppt. Therefore, consistent with Regs. Conn. State Agencies 22a-430-3(j)(7)(A)(iii), the test species to be used in the aquatic toxicity tests are *Americamysis bahia* (formerly Mysidopsis bahia) and *Cyprinodon variegatus*.

The need for more stringent limits was evaluated via reasonable potential analysis.

Reasonable Potential Analysis:

The Permittee conducted semi-annual acute and chronic aquatic toxicity testing. The test results from the previous five years are listed below:

Aquatic Toxicity Results, 2020-2025				
Monitoring Period End Date	Acute, 48-hr		Chronic, 7-day	
	LC_{50} Static 48Hr Acute *Americamysis bahia* (formerly *Mysidopsis bahia*)	**LC_{50} Static 48Hr Acute *Cyprinodon variegatus***	**IC_{25} (growth) *Americamysis bahia***	**IC_{25} (growth) *Cyprinodeon variegatus***
8/31/2020	100	100	100	100
2/28/2021	100	100	100	100
8/31/2021	100	100	100	100
2/28/2022	100	100	100	100
8/31/2022	100	100	100	100
2/28/2023	100	100	100	100
8/31/2023	100	100	100	100
2/29/2024	100	100	100	100
8/31/2024	100	100	100	100
2/28/2025	100	100	100	100

The most toxic data was at LC_{50} = 100% and IC_{25} = 100%.

Converting to Toxic Units:

$$TUa = \frac{100}{LC_{50}} = \frac{100}{100} = 1.00\,TUa$$

$$TUc = \frac{100}{IC_{25}} = \frac{100}{100} = 1.00\,TUc$$

A standard coefficient of variation of 0.6 is assumed, which corresponds to a statistical multiplier of 3.0 for n=10.

The EPA's TSD recommends using acute toxicity criteria of TUa = 0.3 and TUc = 1.0.

Projected TUa and TUc in the receiving water, using a dilution of 1.67% at the edge of the mixing zone:

$$Projected\,TUa = 1.00 \times 3.0 \times 0.0167 = 0.050$$

$$Projected\,TUc = 1.00 \times 3.0 \times 0.0167 = 0.053$$

Both the projected TUa and TUc are below the EPA's recommended aquatic toxicity criteria of TUa = 0.3 and TUc = 1.0.

Effluent Limits:

The results of the reasonable potential analysis indicate that the current minimum daily effluent limit for DSN 008-1 of $LC_{50} \geq 100\%$ effluent for acute toxicity is protective. This limit is maintained in the permit, consistent with Regs. Conn. State Agencies Section 22a-430-3(j)(7)(A)(i) and 22a-430-4(l)(5). Semi-

annual acute and chronic aquatic toxicity monitoring is maintained in the permit to determine compliance with the acute toxicity limit and continue monitoring for potential chronic impacts.

3.8 Water Quality Based Effluent Limitations ("WQBELs")

The CWA and federal regulations require that effluent limitations based on water quality considerations be established for point source discharges when such limitations are necessary to meet state or federal water quality standards that are applicable to the designated receiving water. This is necessary when less stringent TBELs would interfere with the attainment or maintenance of water quality criteria in the receiving water. See CWA Section 301(b)(1)(C) and 40 CFR Section 122.44(d)(1),122.44(d)(5), 125.84(e) and 125.94(i).

The RPA described in Section 3.5 indicated that WQBELs are needed for bis(2-ethylhexyl) phthalate, copper, and nickel. The permit limit for bis(2-ethylhexyl) phthalate is calculated consistent with the recommendations in EPA's TSD for permitting for human health protection. This includes setting the average monthly limit ("AML") equal to the WLA and calculating the maximum daily limit ("MDL") using an AML/MDL ratio provided in Table 5-3 of the TSD. Calculations of limits based on the RPA are provided in the table below.

WQBEL Calculations

Determine WLA

Parameter	$WLA_{ac} = \frac{(QC)_d - (QC)_u}{Q_e}$	$WLA_{ch} = \frac{(QC)_d - (QC)_u}{Q_e}$	$WLA_{HH} = \frac{(QC)_d - (QC)_u}{Q_e}$
Bis(2-ethylhexyl) phthalate[1] ($\mu g/L$)	---	---	2.2
Copper ($\mu g/L$)	288	186	156,002
Nickel ($\mu g/L$)	4038	90.8	575,608

Determine Long Term Averages ("LTA") and Permit Limits

Parameter	**LTA_{ac}** = WLAac x 99th percentile multiplier (Table 5-1 of EPA's TSD)	**LTA_{ch}** = WLAch x 99th percentile multiplier (Table 5-1 of EPA's TSD)	**LTA_{HH}** = WLA_{HH}	**Governing LTA**	**AML** = LTA x 95th percentile multiplier (Table 5-2 of EPA's TSD)	**MDL** = LTA x 99th percentile multiplier (Table 5-2 of EPA's TSD)
Copper ($\mu g/L$)	$288 \times 0.281 = 80.9$	$186 \times 0.481 = 89.4$	156,002	80.9	$80.9 \times 1.65 = 133$	$80.9 \times 3.56 = 288$
Nickel ($\mu g/L$)	$4038 \times 0.117 = 472$	$90.8 \times 0.204 = 18.5$	575,608	18.5	$18.5 \times 2.78 = 51.4$	$18.5 \times 8.55 = 158$

Parameter	**LTA_{HH}** = WLA_{HH}	**AML** = LTA	**MDL** = AML x 99th percentile multiplier (Table 5-3 of EPA's TSD)
Bis(2-ethylhexyl) phthalate ($\mu g/L$)	2.2	2.2	$2.2 \times 1.56 = 3.4$

WLA = Waste Load Allocation; Q_u = ZOI = 1,229,167 gph, Q_e = effluent flow = 20,833 gph; Q_d = downstream flow = $Q_u + Q_e$ = 1,250,000 gph; C_u = upstream concentration; C_d = WQC; LTA = long term average; AML = average monthly limit; MDL = maximum daily limit;
[1]No ZOI is considered for bis(2-ethylhexyl) phthalate, so Q_u = 0 gph and $Q_d = Q_e$ = 20,833 gph.

The WQBELs for copper and nickel are new limits. During the previous 5 years, the Permittee reported an average and maximum copper concentrations of 15.3 µg/L and 35.9 µg/L and an average and maximum nickel concentration of 15.1 µg/L and 212 µg/L. The elevated nickel result is not typical of the Permittee's discharge results, with the next largest reported value being 16.8 µg/L. The Permittee will be able to comply with these new limits.

Mass limitations were calculated for applicable pollutants as required by 40 CFR 122.45(f). Mass limits were calculated by multiplying the concentration limits by the average daily flow and a conversion factor, as shown in the table below.

Mass-Based Limit Calculations	
Bis(2-ethylhexyl) phthalate (*g/day*)	$AML = 2.2\frac{\mu g}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{g}{10^6\ \mu g} = 4.2\ g/day$ $MDL = 3.4\frac{\mu g}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{g}{10^6\ \mu g} = 6.4\ g/day$
Copper (*g/day*)	$AML = 133\frac{\mu g}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{g}{10^6\ \mu g} = 251\ g/day$ $MDL = 288\frac{\mu g}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{g}{10^6\ \mu g} = 545\ g/day$
Iron (*kg/day*)	$AML = 3.0\frac{mg}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{kg}{10^6\ mg} = 5.6\ kg/day$ $MDL = 5.0\frac{mg}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{kg}{10^6\ mg} = 9.4\ kg/day$
Nickel (*g/day*)	$AML = 51.4\frac{\mu g}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{g}{10^6\ \mu g} = 97\ g/day$ $MDL = 158\frac{\mu g}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{g}{10^6\ \mu g} = 299\ g/day$
TSS (*kg/day*)	$AML = 20.0\frac{mg}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{kg}{10^6\ mg} = 37.8\ kg/day$ $MDL = 30.0\frac{mg}{L} \times 500{,}000\ gpd \times \frac{3.785\ L}{gal} \times \frac{kg}{10^6\ mg} = 56.7\ kg/day$

Total Nitrogen: As described in Section 2, the facility's discharge is subject to a TMDL for dissolved oxygen, which is a function of the annual loading rates of nitrogen. The TMDL includes WLAs of total nitrogen, by zone, to certain facilities. Over time, reductions of annual loading rates of total nitrogen will lead to attainment of the water quality standard for dissolved oxygen. Phase III of the TMDL specifies a 58.5% reduction of nitrogen from in-basin sources by 2014. The adjusted 2014 stepdown was 331 lbs/day (average monthly). This has been changed from an average monthly limit to an annual mass loading limitation (annual average), consistent with *A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound*.

Oil & Grease: An MDL of 5 mg/L and a maximum instantaneous limit ("MIL") of 7.5 mg/L was carried forward from the previous permit. These oil and grease limits were developed under the previous permit based on a visual standard of 5 mg/L and interpretation of the water quality standard for oil and grease found at Regs. Conn. State Agencies Section 22a-426-9(a)(1), which states that Class SB waters shall meet the oils and grease criteria of, "None except for small amounts that may result from the discharge from a grease waste treatment facility providing appropriate treatment and none exceeding levels necessary to protect and maintain all designated uses."

pH: WQBELs for pH are included in the permit consistent with the WQS for Class SB waters. The limits of 6.8 – 8.5 are more stringent than the previous permit.

3.9 Technology Based Effluent Limitations ("TBELs")

Technology-based treatment requirements represent the minimum level of control that must be imposed under CWA Section 301(b) and 402 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. See 40 CFR Section 125 Subpart A and Regs. Conn. State Agencies Section 22a-430-4(l)(4)(A).

Subpart A of 40 CFR Section 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 ELGs and case-by-case determinations of effluent limitations under CWA Section 402(a)(1). EPA promulgates New Source Performance Standards ("NSPS") under CWA Section 306 and 40 CFR Section 401.12. See also 40 CFR Section 122.2 (definition of "new source") and 122.29.

In the absence of published technology-based effluent guidelines, the permit writer is authorized under CWA Section 402(a)(1)(B) and Regs. Conn. State Agencies Section 22a-430-4(m) to establish effluent limitations on a case-by-case basis using best professional judgment ("BPJ").

Iron: An AML = 3.0 mg/L, an MDL = 5.0 mg/L, and MIL = 7.5 mg/L have been carried forward from the previous permit. These case-by-case limits were developed for iron pursuant to Regs. Conn. State Agencies Section 22a-430-4(m) and 40 CFR Part 125.3(a). This limit is based on the state's technology-based treatment requirements for certain industrial dischargers published at Regs. Conn. State Agencies 22a-430-4(s). This level of treatment has been determined to be achievable and has been applied to dischargers with iron as a pollutant of concern.

TSS: An AML = 20.0 mg/L, an MDL = 30.0 mg/L, and an MIL = 45.0 mg/L have been carried forward from the previous permit. These case-by-case limits were developed for TSS pursuant to Regs. Conn. State Agencies Section 22a-430-4(m) and 40 CFR Part 125.3(a). This limit is based on the state's technology-based treatment requirements for certain industrial dischargers published at Regs. Conn. State Agencies 22a-430-4(s). This level of treatment has been determined to be achievable and has been consistently applied to dischargers with TSS as a pollutant of concern.

3.10 Comparison of Effluent Limits

After evaluating the applicable "TBELs", WQBELs, and the limits established in the previous permit, the most stringent limits have been retained or applied in this reissued permit. Pollutants of concern that are subject only to monitoring requirements (i.e., without numerical limits) are not included in the table below. A summary of the calculations used to determine reasonable potential and effluent limitations are presented in Section 3.8 above.

Parameter	Units	Limits							
		Technology / BPJ		Water Quality			Previous Permit		
		Average Monthly Limit	Maximum Daily Limit	Average Monthly Limit	Maximum Daily Limit	Annual Loading	Average Monthly Limit	Maximum Daily Limit	Maximum Instantaneous Limit
Acute Toxicity, *Americamysis bahia*, LC_{50}	%							**100**	**33**

Parameter	Units	Limits							
		Technology / BPJ		Water Quality			Previous Permit		
		Average Monthly Limit	Maximum Daily Limit	Average Monthly Limit	Maximum Daily Limit	Annual Loading	Average Monthly Limit	Maximum Daily Limit	Maximum Instantaneous Limit
Acute Toxicity, *Cyprinodon variegatus*, LC_{50}	%							**100**	**33**
Bis(2-ethylhexyl) phthalate	µg/L			**2.2**	3.4		**2.2**	**3.2**	**4.8**
Bis(2-ethylhexyl) phthalate	g/day			**4.2**	6.4		**4.2**	**6.1**	
Copper, Total	µg/L			**133**	**288**				
Copper, Total	g/day			**251**	**545**				
Iron, Total	mg/L	**3.0**	**5.0**				**3.0**	**5.0**	**7.5**
Iron, Total	g/day	**5.6**	**9.4**						
Nickel, Total	µg/L			**51.4**	**158**				
Nickel, Total	g/day			**97**	**299**				
Nitrogen, Total	lbs/day					**331**			
Oil & Grease, Total	mg/L							**5.0**	**7.5**
TSS	mg/L	**20.0**	**30.0**				**20.0**	**30.0**	**45.0**
TSS	kg/day	**37.8**	**56.7**						
Temperature, Maximum	°F								**90.0**
Temperature Difference	°F							**32.1**	
				Min	**Max**		**Min**	**Max**	
pH	S.U.			**6.8**	**8.5**		6.0	9.0	

3.11 Effluent Limitations, Sampling Frequency, and Type

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
DSN 108:				
Acute Aquatic Toxicity *Americamysis bahia*	$LC_{50} \geq 100\%$	Regs. Conn. State Agencies 22a-430-4(l)(5)(A). Anti-backsliding regulations	Semi-Annually	Daily Composite
Acute Aquatic Toxicity *Cyprinodon variegatus*	$LC_{50} \geq 100\%$	Regs. Conn. State Agencies 22a-430-4(l)(5)(A). Anti-backsliding regulations	Semi-Annually	Daily Composite
Chronic Aquatic Toxicity (Survival) *Americamysis bahia*	Monitoring only requirement for pollutant of concern		Semi-Annually	Daily Composite

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
Chronic Aquatic Toxicity (Growth) *Americamysis bahia*	Monitoring only requirement for pollutant of concern		Semi-Annually	Daily Composite
Chronic Aquatic Toxicity (Fecundity) *Americamysis bahia*	Monitoring only requirement for pollutant of concern		Semi-Annually	Daily Composite
Chronic Aquatic Toxicity (Survival) *Cyprinodon variegatus*	Monitoring only requirement for pollutant of concern		Semi-Annually	Daily Composite
Chronic Aquatic Toxicity (Growth) *Cyprinodon variegatus*	Monitoring only requirement for pollutant of concern		Semi-Annually	Daily Composite
BOD_5	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
Bis(2-ethylhexyl) phthalate	AML = 2.2 µg/L MDL = 3.2 µg/L MIL = 4.8 µg/L	WQBELs	Monthly	Daily Composite
Bis(2-ethylhexyl) phthalate	AML = 4.2 g/day MDL = 6.1 g/day	Conversion of WQBELs to mass limits	Monthly	Daily Composite
Chlorine, Total Residual;	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
Chromium, Total	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Copper, Total	AML = 133 µg/L MDL = 288 µg/L	WQBELs	Quarterly	Daily Composite
Copper, Total	AML = 251 g/day MDL = 545 g/day	Conversion of WQBELs to mass limits	Quarterly	Daily Composite
Fecal coliform	Monitoring only requirement for pollutant of concern		Semi-Annually	Grab
Flow Rate (Average Daily)	500,000 gpd	Permitted discharge flow per application	Continuous	Totalizer
Flow, Maximum during 24-hr period	750,000 gpd	Permitted discharge flow per application	Continuous	Totalizer
Iron, Total	AML = 3.0 mg/L MDL = 5.0 mg/L MIL = 7.5 mg/L	BPJ based on the State's TBEL requirements at Regs. Conn. State Agencies 22a-430-4(s)	Quarterly	Daily Composite
Iron, Total	AML = 5.6 kg/day MDL = 9.4 kg/day	Conversion of BPJ limits to mass limits	Quarterly	Daily Composite
Lead, Total	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Nickel, Total	AML = 51.4 µg/L MDL = 158 µg/L	WQBELs	Quarterly	Daily Composite
Nickel, Total	AML = 97 g/day MDL = 299 g/day	Conversion of WQBELs to mass limits	Quarterly	Daily Composite
Nitrogen, Ammonia (total as N)	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Nitrogen, Kjeldahl (total as N)	Monitoring only requirement due to TMDL		Monthly	Daily Composite

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
Nitrogen, Nitrate (as N)	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Nitrogen, Nitrite (as N)	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Nitrogen, Total (as N)	Monitoring only requirement due to TMDL		Monthly	Calculation
Nitrogen, Total (Annual Loading)	AML = 331 lbs/day	WQBEL based on TMDL	Annual	Calculation
Oil & Grease, Total	MDL = 5.0 mg/L MIL = 7.5 mg/L	WQBEL based on EPA's Red Book	Quarterly	Grab Sample Average
pH, Minimum	MIL = 6.8 SU	WQC	Continuous	Continuous
pH, Maximum	MIL = 8.5 SU	WQC	Continuous	Continuous
TSS	AML = 20.0 mg/L MDL = 30.0 mg/L MIL = 45.0 mg/L	BPJ based on the State's TBEL requirements at Regs. Conn. State Agencies 22a-430-4(s)	Monthly	Daily Composite
TSS	AML = 37.8 kg/day MDL = 56.7 kg/day	Conversion of limit to mass limits	Monthly	Daily Composite
Temperature, Maximum	MIL = 90.0 °F	Thermal variance request	Continuous	Continuous
Temperature Difference (Sample & Upstream)	MDL = 32.1 °F	Thermal variance request	Daily	Calculation
Waste Heat Rejection Rate	Monitoring only requirement for pollutant of concern		Daily	Calculation
Zinc, Total	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite

AML: Average Monthly Limit
MDL: Maximum Daily Limit
MIL: Maximum Instantaneous Limit
BPJ: Best Professional Judgement
WQC: Water Quality Criteria
RP: Reasonable Potential
WQBELs: Water Quality Based Effluent Limits
TBEL: Technology Based Effluent Limit

3.11.1 Sufficiently Sensitive Methods:

EPA at 40 CFR 122.21(e)(3) and 40 CFR 122.44(i) requires sufficiently sensitive test methods to be utilized for all parameters in a NPDES permit. A method approved under 40 CFR 136 or required through other regulations is sufficiently sensitive when:

- The method ML is at or below the level of the applicable water quality criterion or effluent limitation (if below the water quality criterion), whichever is more stringent, for the measured pollutant or pollutant parameter; or
- The method ML is above the applicable water quality criterion, but the amount of the pollutant or pollutant parameter in a facility's discharge is high enough that the method detects and quantifies the level of the pollutant or pollutant parameter in the discharge; or
- The method has the lowest ML of the analytical methods approved under 40 CFR part 136 or required under 40 CFR chapter I, subchapter N (effluent limit guidelines) or O (sewage sludge)

for the measured pollutant or pollutant parameter. Note some ELGs will specify a required ML for certain analyses.

DEEP has specified ML requirements in the permit to ensure compliance with the sufficiently sensitive test method regulations. The MLs listed in the NPDES permit are the minimum concentration at which quantification must be achieved and verified during the laboratory analysis of the parameter. They are not necessarily equivalent to the MLs that would be formally established by a lab under the ML definition at 40 CFR 136. In other words, at a minimum, the Permittee's analytical method must achieve the ML listed in the permit. This may vary from the actual ML established by the lab for the analysis, using the MDL, lowest calibration point, or other acceptable method under 40 CFR 136.

Historically, Pfizer's permit limit for bis(2-ethylhexyl) phthalate was lower than the ML that they were able to achieve through analyses approved under 40 CFR Part 136. As part of the 2016 permit modification, they were required to investigate whether the prescribed MLs in the previous permit were the lowest achievable MLs for those parameters. The 2016 Minimum Levels Study concluded that two labs were able to achieve MLs lower than 2.2 µg/L but only using methods that were not approved under 40 CFR Part 136. Pfizer updated this study in 2018 as part of the permit renewal application and determined that one lab was able to achieve an ML lower than the ML prescribed in their permit but still not at or below their permit limit. Based on the lab results submitted in the past two years, Pfizer has been able to achieve a MLs of 2 µg/L that is considered sufficiently sensitive. Therefore, the ML required by their permit is set as the WQC at 2.2 µg/L.

3.12 Antidegradation

Implementation of the Antidegradation Policy follows a tiered approach pursuant to the federal regulations (40 CFR Section 131.12) and consistent with the Connecticut Antidegradation Policy included in the WQS (Section 22a-426-8(b-f) of the Regs. Conn. State Agencies). Tier 1 Antidegradation review applies to all existing permitted discharge activities to all waters of the state. Tiers 1 and 2 Antidegradation reviews apply to new or increased discharges to high quality waters and wetlands, while Tiers 1 and 3 Antidegradation reviews apply to new or increased discharges to outstanding national resource waters.

This discharge is an existing discharge, and the Permittee does not propose an increase in volume or concentration of constituents. Therefore, only the Tier 1 Antidegradation Evaluation and Implementation Review was conducted to ensure that existing and designated uses of surface waters and the water quality necessary for their protection are maintained and preserved, consistent with WQS, Regs. Conn. State Agencies Sec.22a-426-8(a)(1). This review involved:

- An evaluation of narrative and numeric water quality standards, criteria and associated policies;
- The discharge activity both independently and in the context of other dischargers in the affected waterbodies; and
- Consideration of any impairment listed pursuant to Section 303d of the federal Clean Water Act or any TMDL established for the waterbody.

DEEP has determined that the discharges or activities are consistent with the maintenance, restoration, and protection of existing and designated uses assigned to Segment CT-E1_014-SB of the Thames River (described in Section 2). Compliance with all the limits and conditions in this permit will ensure that existing and designated uses of surface waters and the water quality necessary for their protection are maintained and preserved.

3.13 Anti-Backsliding

This permit has effluent limitations, standards or conditions that are at least as stringent as the final effluent limitations, standards, or conditions in the previous permit as required in 40 CFR Section 122.44(l) and Regs. Conn. State Agencies Section 22a-430-4(l)(4)(A)(xxiii).

3.14 Cooling Water Intake Structure Section 316(b)

Section 316(b) of the Federal Water Pollution Control Act, USC Section 1326(b) states that "any standard established pursuant to Section 301 or 306 of this Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures ("CWIS") reflect the best technology available ("BTA") for minimizing adverse environmental impact".

The federal regulations establish requirements under Section 316(b) of the CWA for existing power generating facilities and existing manufacturing and industrial facilities with a cooling water intake structure having a design intake flow greater than 2 million gallons per day of water from waters of the United States and use at least 25 percent of the water they withdraw exclusively for cooling purposes. Section 125.92 defines "Cooling water intake structure" as "the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. The cooling water intake structure extends from the point at which water is first withdrawn from waters of the United States up to and including the intake pumps."

Section 125.90(b), states "Cooling water intake structures not subject to requirements under Section 125.94 through 125.99 or subparts I or N of this part must meet requirements under Section 316(b) of the CWA established by the Director on a case-by-case, best professional judgment ("BPJ") basis."

At the issuance of the last permit, the Permittee operated a CWIS that was subject to 316(b). The Permittee evaluated BTA and determined that closed-cycle cooling represented the best alternative to minimize adverse environmental impacts. The previous permit included a compliance schedule to implement closed-cycle cooling. Following these changes, on February 26, 2016, the previous permit was modified, which removed DSN 009-1 that included discharges associated with the cooling water intake structure and Intake 01H. It also reduced the average monthly and daily maximum flow limits from 25 mgd and 45 mgd to 500,000 gpd and 750,000 gpd, respectively. The Permittee no longer operates a cooling water intake structure, therefore, is no longer subject to 316(b).

3.15 Variances and Waivers

The WQS for Allowable Temperature Increase in Class SB waters states, "There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this Class and, in no case exceed 83°F, or in any case raise the temperature of receiving water more than 4°F. During the period including July, August and September, the temperature of the receiving water shall not be raised more than 1.5°F unless it can be shown that spawning and growth of indigenous organisms will not be significantly affected." (Regs. Conn. State Agencies 22a-426-9(a)(1)). The WQS also allows for the Commissioner to designate a "zone of influence for assimilation of a thermal discharge" that "shall be no greater than 25% of the cross-sectional area or volume of flow of the receiving water" (Regs. Conn. State Agencies 22a-426-4(l)(8)).

Section 316(a) of the Federal Water Pollution Control Act, USC Section 1326(a) allows for thermal effluent limitations to be less stringent than those required by otherwise applicable standards if it can be shown that such limits are more stringent than necessary to assure the protection and propagation of a balanced indigenous population ("BIP") of shellfish, fish, and wildlife in and on the receiving waterbody.

On August 4, 2025, the Permittee submitted a request for an alternative thermal effluent limit consistent with Regs. Conn. State Agencies Section 22a-430-4(q)(2)(A)(ii) and in accordance with the criteria and procedures specified in 40 CFR Part 125 Subpart H. The thermal variance request included a maximum instantaneous temperature limit of 90.0°F and a maximum temperature difference (sample and upstream) limit of 32.1°F, consistent with the variance granted in the previous permit.

At the issuance of the previous permit, DEEP determined that the thermal component of the discharge would not contribute to appreciable harm to the BIP. The previous permit included a maximum instantaneous temperature limit of 90°F, a temperature difference limit of 32.1°F between the effluent and upstream NOAA Station 8461490, and monitoring for Waste Heat Rejection Rate (in BTUs/day) based on the calculated temperature difference. These permit limits were performance-based limits calculated from the worst-case effluent data. The maximum instantaneous limit was set at three standard deviations above the mean July temperature, and the maximum temperature increase limit was set at the 99th percentile (2.327 standard deviations above the mean) of the December, January, and February discharge temperatures. At that time, the permitted average and maximum daily flows were 25.0 mgd and 45.0 mgd, respectively. Following Pfizer's elimination of their once-through cooling system in 2016, there was a modification of the permit in which their permitted average and maximum daily flows were reduced to 500,000 gpd and 750,000 gpd, respectively. The modified permit carried over the permit limits and 316(a) determination, noting that the thermal mixing zone would be smaller under the reduced flows.

The 316(a) determination of the previous permit was based on three studies. In 1986, Pfizer undertook a study designed to evaluate the effects of its discharge on the Thames River (*Water Quality and Hydraulic Studies in the Lower Thames River*, July 1987 by Metcalf & Eddy). As part of this study, a dye dilution study was conducted to determine a mixing zone for Pfizer's discharge. The study considered two outfalls, DSN 001-1, which has since been eliminated, and DSN 008-1, which is Pfizer's remaining discharge and was their most significant discharge at the time of the study. DSN 008-1 discharges into the river though a Y-shaped multiport diffuser that lies on the bottom of the river and extends 500 feet into the river channel before splitting into two branches each approximately 250 feet in length. Each branch contains 17 carbon steel diffusers. The effluent flows when the study was conducted were 10 to 11 mgd for DSN 001-1 and 40 to 65 mgd for DSN 008-1. The study found that the lowest level of dilution occurred during the spring tide conditions.

In 1999, Pfizer submitted a *Thermal Plume Study at Pfizer Inc. Groton* that was prepared by Parsons Engineering Science, Inc. This study evaluated the thermal discharge from DSNs 004-1, 005-1, and 008-1 by calculating a temperature rise based on total daily discharge volume (3 mgd, 16 mgd, and 70 mgd respectively), daily maximum discharge temperatures of the three DSNs (95°F, 95°F, and 90°F respectively), and daily average river temperatures for a period from August 1996 through February 1998. Considering a zone of influence with a dilution factor of 100:1, the worst-case temperature rise was calculated to be 0.52°F above ambient temperatures.

Finally, in 2013, Pfizer conducted field studies to evaluate the impacts of the thermal aspect of the discharge on the Thames River and submitted the report *Thermal Plume and Habitat Assessment Study*. The study collected temperature and salinity samples of the river at various depths and for four different tidal scenarios (1 hour past high tide, 3 hours past high tide, 1 hour past low tide, and 3 hours past low tide) during a two-day period in July 2013. The facility discharged 7 to 8 mgd during the study period, and the maximum

temperature of the discharge was 82.9°F and 85.5°F. The study concluded that the WQS for temperature increase were met a very short distance from the diffuser. In the worst-case scenario (1 hour after slack tide), the plume was 49.5 meters long, 54.58 meters wide, 3.3 meters high and maintained within the navigational channel, occupying approximately 0.025% of the cross-sectional area of the river, which is approximately 4,000 feet wide at the point of Pfizer's discharge. In all other worst-case scenarios, the water quality standard would be met within 2 meters, and the plume would be less than 40 meters wide. The study included biological sampling and an evaluation of the chronic impacts to the rocky intertidal biological community and concluded there would be minimal to negligible impact on the biota, neither acute nor chronic effects to fish, and no impact to buoyant eggs and larvae, because the plume never reaches the surface.

In 2025, as part of the request for a renewed thermal variance, Pfizer submitted the report *Addendum to 2013 Thermal Plume and Habitat Assessment Study, July 2025*, and *Addendum 2 to 2013 Thermal Plume and Habitat Assessment Study, September 2025*, which updated the worst-case thermal plume model based on current operating conditions. Between May 2020 through May 2025, the average monthly discharge was 0.162 mgd, compared to the 7-8 mgd discharged during the 2013 modeling. Updated modeling using current permit limits indicated a decrease in the degree and extent the thermal plume during worst-case (1 hour after low slack tide) conditions. The plume was modeled under multiple scenarios, including maximum permitted flow (750,000 gpd) and average ambient July temperature, maximum permitted flow and maximum ambient temperature observed during the past 5 years, and maximum permitted flow and minimum winter temperatures observed during the past 5 years, to determine when the water quality standard would be met. The modeling determined that the water quality standards for temperature increase or maximum temperature would be met outside of a plume that is 0.01 meters long, 38.08 meters wide, 0.01 meters high. DEEP reviewed data from the past five years, which showed that the discharge temperature exhibits seasonal variation that ranged from 51.5°F in the winter to 85.9°F in the summer. The temperature difference ranged from 2.9°F to 18.7°F, with an average of 10.2°F. Carrying forward these limits will continue to be protective of the BIP and the WQS for temperature will be met within inches of the discharge pipe.

In summary, DEEP had determined in the previous permit, that the thermal component of the discharge would not contribute to appreciable harm to the BIP at a discharge rate of 7-8 mgd, maximum instantaneous temperature of 90°F, and a maximum temperature increase of 32.1°F between the effluent and upstream. This evaluation was based on a thermal verification study and modeling. The Permittee has since reduced their daily flow by over 90% through the elimination of their once-through cooling system. Updated modeling submitted by the Permittee confirms that the size of the thermal plume has also decreased by over 90%, further reducing the effects of the thermal component of the discharge on the receiving water. The largest component of the plume is its width, due to the use of a diffuser, which allows the thermal plume to dissipate in the water column and downstream soon after leaving the diffuser pipe, while only occupying approximately 3% of the width of the river. The results of the study indicate that the thermal discharge at a maximum instantaneous limit of 90°F and a maximum temperature increase of 32.1°F between the effluent and upstream with a de minimis ZOI will not result in any appreciable harm and therefore are approved in accordance with Regs. Conn. State Agencies 22a-426-4(l)(8)) and USC Section 1326(a).

3.16 E-Reporting

The Permittee is required to electronically submit documents in accordance with 40 CFR Section 127.

Section 4 Summary of New Permit Conditions and Limits from The Previous Permit

- New water quality-based permit limits have been incorporated for copper and nickel based on a reasonable potential analysis to exceed the water quality criteria for SB surface waters.
- Mass-based limits were added for iron and TSS to ensure that the total quantity of iron and TSS discharged is still protective of water quality when flow rates are above average. Details of the calculations are provided in Section 3.8.
- The pH minimum limit has been raised from 6.0 to 6.8, and pH maximum limit has been lowered from 9.0 to 8.5. These limits are equivalent to the WQC for Class SB surface waters.
- Monitoring for fecal coliform was previously conducted during May and August. Monitoring is now required during February and August.
- The permit includes new language in Section 9 defining the circumstances around noncompliance that are required to be reported to the Commissioner and requires the notifications to be submitted through an online noncompliance form.
- Acute toxicity monitoring is now required to conducted as a separate test from chronic toxicity testing, following the procedures described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA-821-R-02-012). Acute toxicity testing will be required semi-annually in May and November. Chemical monitoring that is required with aquatic toxicity was previously listed in Sections 6 of the previous permit, and the monitoring requirement for acute aquatic toxicity was listed in Table A of the previous permit. These monitoring requirements have been moved to Tables B (DSN 008-AT) and C (DSN 008-CT), which will allow the Permittee to report aquatic toxicity results and paired chemical and receiving water monitoring results in NetDMR. Additionally, ATMRs are now required to be submitted electronically rather than in hardcopy.
- The total nitrogen limit of 331 lbs/day has been changed from an average monthly limit to an annual mass loading limitation (annual average), consistent with *A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound*. The Permittee will report the average monthly loading at a monthly frequency and will be required to meet an annual loading limit, which is calculated as follows: Total nitrogen (annual loading) shall be reported as the sum of the average monthly total nitrogen from January through December divided by 12 and rounded to the nearest whole number.

Section 5 Public Participation Procedures

5.1 Information Requests

The application has been assigned the following numbers by the Department of Energy and Environmental Protection. Please use these numbers when corresponding with this office regarding this application.

Application No. 201814996 Permit Id No. CT0000957

Interested persons may obtain copies of the application from Eric Watters, Pfizer Inc, 445 Eastern Point Road, Groton, CT 06340.

The application is available for inspection by contacting Joseph Grandelski at joseph.grandelski@ct.gov, at the Department of Energy and Environmental Protection, Bureau of Materials Management and Compliance Assurance, 79 Elm Street, Hartford, CT 06106-5127 from 8:30 - 4:30, Monday through Friday.

Any interested person may request in writing that his or her name be put on a mailing list to receive notice of intent to issue any permit to discharge to the surface waters of the state. Such request may be for the entire state or any geographic area of the state and shall clearly state in writing the name and mailing address of the interested person and the area for which notices are requested.

5.2 Public Comment

Prior to making a final decision to approve or deny any application, the Commissioner shall consider written comments on the application from interested persons that are received within 30 days of this public notice. Written comments should be directed to Joseph Grandelski, Environmental Engineer, Bureau of Materials Management and Compliance Assurance, Department of Energy and Environmental Protection, 79 Elm Street, Hartford, CT 06106-5127 or DEEP.IndustrialNPDESPublicComments@ct.gov and should indicate the Permit ID No. CT0000957 in the subject line. The Commissioner may hold a public hearing prior to approving or denying an application if in the Commissioner's discretion the public interest will be best served thereby, and shall hold a hearing upon receipt of a petition signed by at least twenty five (25) persons. Notice of any public hearing shall be published at least thirty (30) days prior to the hearing.

Petitions shall be submitted within thirty (30) days from the date of publication of this public notice and should include the application number noted above and also identify a contact person to receive notifications. Petitions may also identify a person who is authorized to engage in discussions regarding the application and, if resolution is reached, withdraw the petition. Upon receipt of a petition, the Commissioner shall take action as required by relevant laws, including Public Act 25-84, which was effective upon passage in June 2025. The Office of Adjudications will accept electronically-filed petitions for hearing in addition to those submitted by mail or hand-delivered. Petitions with required signatures may be sent to deep.adjudications@ct.gov; those mailed or delivered should go to the DEEP Office of Adjudications, 79 Elm Street, Hartford, CT 06106. If the signed original petition is only in an electronic format, the petition must be submitted with a statement signed by the petitioner that the petition exists only in that form. Original petitions that were filed electronically must also be mailed or delivered to the Office of Adjudications within 30 days of electronic submittal. Additional information can be found at www.ct.gov/deep/adjudications.

The Connecticut Department of Energy and Environmental Protection is an Affirmative Action/Equal Opportunity Employer that is committed to complying with the requirements of the Americans with Disabilities Act ("ADA"). If you are seeking a communication aid or service, have limited proficiency in English, wish to file an ADA or Title VI discrimination complaint, or require some other accommodation, including equipment to facilitate virtual participation, please contact the DEEP Office of Diversity and Equity at 860-418-5910 or by email at deep.accommodations@ct.gov. Any person needing an

accommodation for hearing impairment may call the State of Connecticut relay number - 711. In order to facilitate efforts to provide accommodation, please request all accommodations as soon as possible following notice of any agency hearing, meeting, program, or event.

Attachment 1

Wastestream Descriptions

WASTESTREAM NAME	WASTESTREAM DESCRIPTION
Air compressor/air dryer condensate	In the plant buildings, moisture from ambient air is condensed during the compression cycle in oil-free compressors/dryers and released to area floor drains. No chemical additives. The nitrogen plant, located north of Building 101, uses non-petroleum-based lubricant in an air compressor. Condensate consists primarily of moisture from ambient air and is discharged to Pump Station No. 4 (PS4).
Air conditioning condensate	Moisture from ambient air condenses on HVAC coils and is released to area floor drains. No chemical additives.
Backflow preventer & fire protection test water	Backflow preventers are required by building code to prevent back feed of chemically treated water to the City potable water supply. During semi-annual testing of the backflow preventers, City potable water is released to area floor drains. Quarterly, the Pfizer Fire Department tests flow on fire protection systems. System water is City potable water. No chemical additives.
Bleed off or draining of boiler & minor leaks from a boiler	Periodically, to facilitate inspection or repairs, boiler water is drained from the boiler water tank. This water would have the same treatment chemicals as the boiler blowdown water. There are also occasions where boilers have minor leaks of boiler water which go to floor drains. No additional treatment chemicals are added.
Boiler blowdown	Boiler blowdown is boiler water that is released from the boilers in order to maintain the appropriate conductivity/chemical concentrations in the system. Blowdown from the three boilers and heat recovery boiler on the cogeneration turbine is manually controlled based on conductivity test results. The NALCO products NexGuard 22310, SUR-GARD 1700, and NALCO 8735 are used in the boiler water. NALCO 8735 is also present in the steam condensate used as boiler feed water.
Boiler lab testing wastewater	Boiler water analytical labs are used for testing parameters such as pH, conductivity, hardness, and iron in boiler feed water. The labs have continuous, low volume releases of city water, distilled/purified water, and boiler water. Limited quantities of analytical reagents are used for testing.
Boiler Washdown	Typically, once per year, the internal sections of each boiler are washed down using city water. The soot hopper is emptied of solid waste prior to cleaning. The discharge from the washdown contains residual soot.
Building maintenance wastewater	Periodically, city water is used to remove dirt, dust, and other debris from floors, walls, and other building structures. Areas to be washed are wiped to remove any chemicals/oils prior to washing. The wastewater would discharge to area floor drains. No chemical additives.

WASTESTREAM NAME	WASTESTREAM DESCRIPTION
Chilled water	Chilled water is in a system loop and is typically not discharged. However, during seasonal pump/chilled water system alignment changes or to facilitate maintenance activities, chilled water is drained. The NALCO products NALCO Trac107 PLUS, NALCO 7320, and NALCO 8735 are used in the chilled water.
Cleaning of chilled water strainers & filters	There are several strainers associated with the chilled water loop. Strainers are cleaned with city water periodically to keep system flow optimal. As needed, chilled water filters are removed and replaced. It is necessary to drain the vessel for access to the filters. Strainer & filter cleaning wastewater is discharged to floor drains. The NALCO products NALCO Trac107 PLUS, NALCO 7320, and NALCO 8735 used in the chilled water may be present in the wastewater.
Condensate polisher resin regeneration wastewater	Steam condensate is collected and "polished" through filtration (this described process) and ion exchange (softener described under Water Softener regeneration wastewater category). The polishing is designed to maintain a desired pH (approx. 8.5) and remove iron particulates and scale products. NALCO 8735 is added to the collected steam condensate to maintain desired pH. The condensate is then passed through the resin columns. A city water/salt solution (both normal and rust-free sodium chloride products are used) along with NALCO 7290E resin cleaner is used to regenerate the resin beds – typically once every few weeks. The regeneration water will contain any silica/carbonate/iron contaminants filtered from condensate.
Cooling Tower Blowdown/Draining	Cooling towers are located at Buildings 101 and 160 and Building 84 is a cooling tower. To ensure system effectiveness including corrosion inhibition and bacterial control, either ProMoss (sphagnum moss) and a hydrogen peroxide generator or the NALCO products STABREX ST70, 3D TRASAR 3DT494, NALCO 7320, NALCO 73199, and NALCO 73551 are added to the tower water. Cooling tower blowdown is released from the towers to maintain conductivity and other system parameters. Periodically, tower sumps, condenser water piping, and possibly chilled water piping connected to the tower would be drained for maintenance or freeze protection. ProMoss bags and peroxide system filters are changed out on a set periodicity, and the used bags/filters are drained prior to disposal. City water is used for cooling tower water make-up.
Deaerator and vent stack condensate	The rooftop deaerators and vent stacks release condensate. Some of this condensate is collected in piping routed to roof drains while some will be released to the air. When released to the air, some condensate may land on the roof and eventually be discharged through roof drains. No chemical additives.
Dewatering wastewater	When the groundwater table rises, groundwater can enter the crawlspaces of Buildings 101 and 168. The groundwater in the southern portion of Building 101 is collected in a sump and directed to Pump Station No. 2 (PS2). There is also a utility tunnel located outside between Buildings 90 & 101 that receives groundwater. A sump within the tunnel directs the groundwater to Pump Station No. 4 (PS4). There are occasions where Utilities needs to physically enter the Buildings 101 and 168 crawlspaces and utility tunnel for maintenance work and manual pump the groundwater to PS4. No chemical additives. Additionally, site steam vaults (includes vaults, tunnels, and manholes that contain steam and/or steam condensate piping and equipment) need to be dewatered for safe entry to perform inspections or maintenance and to limit piping and equipment

WASTESTREAM NAME	WASTESTREAM DESCRIPTION
	exposure to high water levels. Steam vaults contain groundwater and potentially steam condensate. Water is pumped from the vaults to dedicated containers which are then drained to either PS2 or PS4. No chemical additives.
Eyewash stations and miscellaneous plant sinks	There are several eyewash stations that discharge to floor drains and miscellaneous building sinks that discharge to PS2 or PS4. Water is City potable water. No chemical additives. Building 78 contains a sink that uses both City water and recirculated West Basin Area 2 water. The Area 2 water is primarily used for monthly West Basin monitoring. Discharge from this sink is routed to Area 1 of the West Basin. No chemical additives.
Floor drain wastewater	Floor drains in Buildings 101, 160, 165 & 168 collect several wastewaters including steam, air compressor/air dryer and air conditioner condensate, backflow preventer and fire protection test water, boiler water, building maintenance wastewater, eyewash stations and miscellaneous plant sinks, pump seal water, and steam cleaning/power wash wastewater. No additional chemical additives.
Hydrostatic test water	City water is used periodically to hydrostatically test newly installed or repaired pipelines or tanks. The pipes or tanks would be clean prior to adding the city water for the test. No chemical additives are used.
Non-contact cooling water	Non-contact cooling water is composed of four main streams: cooling water from fan oil or bearing coolers, feed pump oil coolers, feed pump bearing coolers, and sample coolers. The wastewater is city water with no chemical additives.
Primary Neutralization System draining	During planned or unplanned maintenance, the Building 168 Primary Neutralization System at times requires a partial or full system drain so that components can be worked on. This wastewater is directed back to PS2 or PS4 and may consist of any of the categories described herein under “Wastestream Descriptions”.
Pump seal water	City water is fed into the pump impeller casing and forms a liquid seal creating compression chambers. During operation, city water is typically fed and discharged at the same rate. Pfizer utilizes some units with once-pass through design and some with water recirculation. Pump seal water discharges to area floor drains. No chemical additives.
Raw water tank overflow	The raw water tank on the roof of Building 101 is designed to overflow to a curtain drain which is directed to PS4. Water is City potable water. No chemical additives.
Reverse osmosis non-permeate	Make-up boiler feed water is generated by passing softened and filtered water through a reverse osmosis unit. The reverse osmosis system generates a non-permeate wastewater. No chemicals are typically added and the non-permeate, generated continuously, is comprised solely of city water. Although not a normal occurrence, the pH of the reverse osmosis concentrate may need to be adjusted to be maintained as slightly caustic. If this occurs, NALCO 8735 would be added. In these instances, the non-permeate may contain trace amounts of this chemical. Reverse osmosis filters are regenerated off-site.

WASTESTREAM NAME	WASTESTREAM DESCRIPTION
Sand filter backwash	Sand filters are located on the cooling tower water systems in Buildings 84 and 160. The sand filters are used to remove particulates that may become entrained in the system water. The sand filters are backwashed with city water or the cooling tower water based on differential pressure and at least once per day. The backwash water would likely contain trace amounts of cooling tower treatment chemicals. No other chemicals are added to the sand filters.
Spill containment area stormwater	Precipitation (rain or snow) collected in secondary containment around exterior tanks and the containment below the B160 Truck Unloading Area is directed to PS2 or PS4 as needed. Prior to transfer, the collected stormwater is visually inspected for oil sheen.
Steam cleaning and power wash wastewater	Periodically, city water or steam is used to power wash air coils/fins, instrumentation, or seals. Power washing occurs after any visual chemicals/oils have been removed. The wastewater discharges to area floor drains. No chemical additives.
Steam condensate	Steam generated by site boilers and the cogeneration turbine is sent out to the site for HVAC use and returned as steam condensate. The steam condensate is collected in a tank and NALCO 8735 is added to the tank to maintain a slightly caustic pH. The condensate is then polished using a resin system. The condensate is subsequently used as boiler feed water. Although the NALCO products NexGuard 22310 and SUR-GARD 1700 are used in boiler water treatment, they are not likely to be present in the steam condensate. This is due to site research requirements for HVAC systems. When discharged, steam condensate is typically directed to area floor drains. Some of the steam condensate from Building 160 is pumped to PS2. The steam condensate collection tank is designed to overflow and would be directed to Pump Station No. 4 (PS4). Additionally, site steam vaults (includes vaults, tunnels, and manholes that contain steam and/or steam condensate piping and equipment) need to be dewatered for safe entry to perform inspections or maintenance and to limit piping and equipment exposure to high water levels. Steam vaults contain groundwater and potentially contain steam condensate. Water is pumped from the vaults to dedicated containers and then drained to either PS2 or PS4. No chemical additives.
Stormwater	The stormwater collection system within a parking area and along a stretch of road to the east of the south end of the West Basin is directed to DSN 008. Another stormwater drain just to the north of B168 collects and directs stormwater from a roadway to Pump Station No. 2 or No. 4. Roof drains on Buildings 101, 165 and 168 collect and direct stormwaters to PS2 or PS4 (note that on occasion Utilities will manually move standing pools of stormwater to roof drains if needed). No chemical additives.
Wastewater drained from solids filter system	The Building 168 solids filter system in the influent piping to the Primary Neutralization System is designed such that during normal operation there is some drain water generated from the bottom of the units. This wastewater is directed back to PS2 or PS4 and may consist of any of the categories described herein under “Wastestream Descriptions”.

WASTESTREAM NAME	WASTESTREAM DESCRIPTION
Water softener regeneration wastewater	Make-up boiler feed water is generated by passing city water through a water softener, followed by a carbon filter unit and then through a reverse osmosis unit. A city water/salt brine solution is used to regenerate the water softener unit – typically twice per week. The regeneration wastewater will contain any magnesium, silica and carbonate contaminants filtered from the city water. No chemicals besides salt are used (both normal and rust-free sodium chloride products are used). The carbon filter generates no wastewater and is not regenerated on site.
West Basin cooling system strainer cleaning wastewater	The West Basin cooling system has a strainer prior to the basin water passing through the pumps. Periodically, the strainer needs to be cleaned to remove debris and keep system flow optimal. City water may be used to rinse the strainer. The rinse water is discharged in the West Basin prior to the monitoring location. No chemical additives.

Attachment 2

USGS Quadrangle Map

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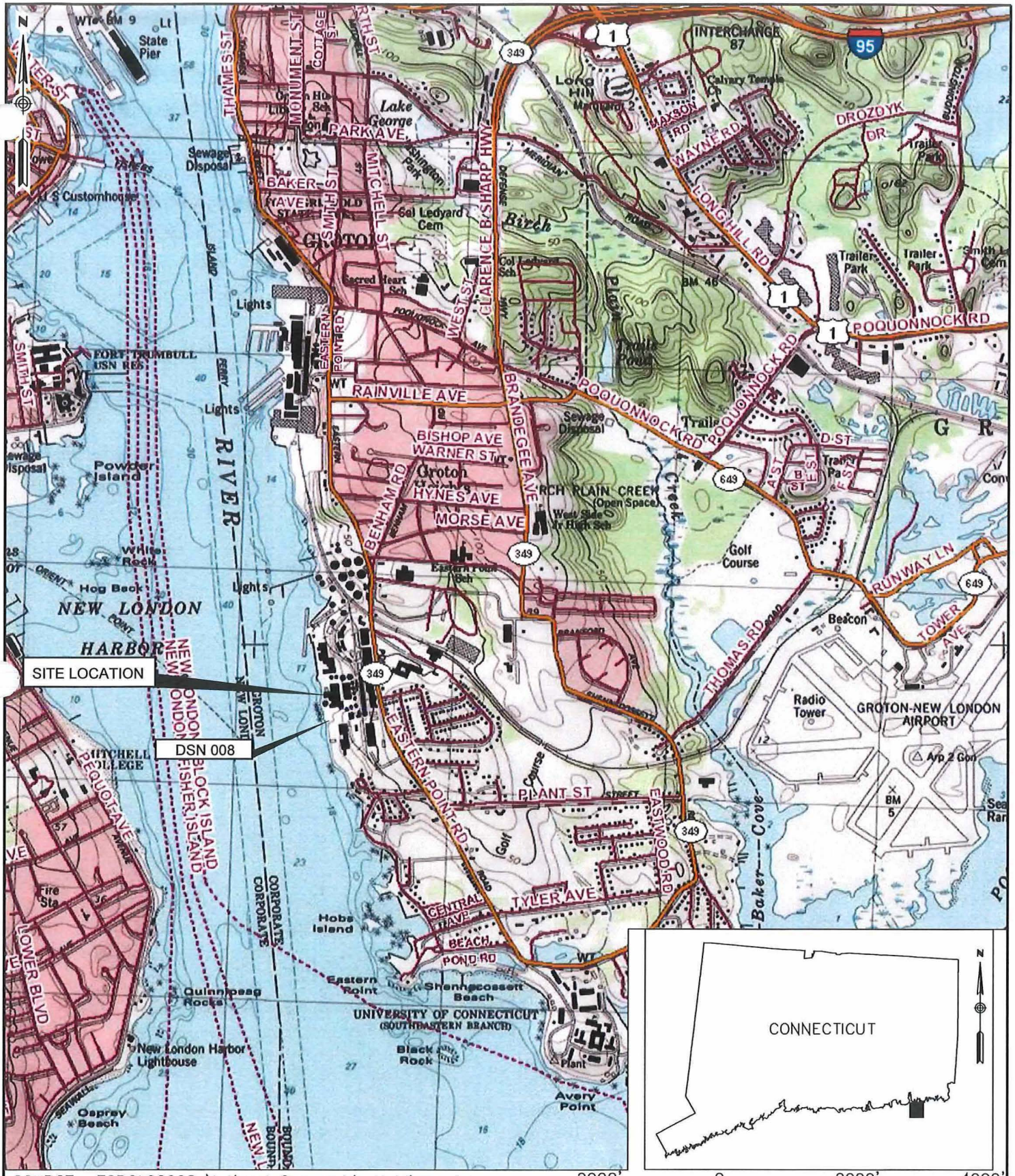
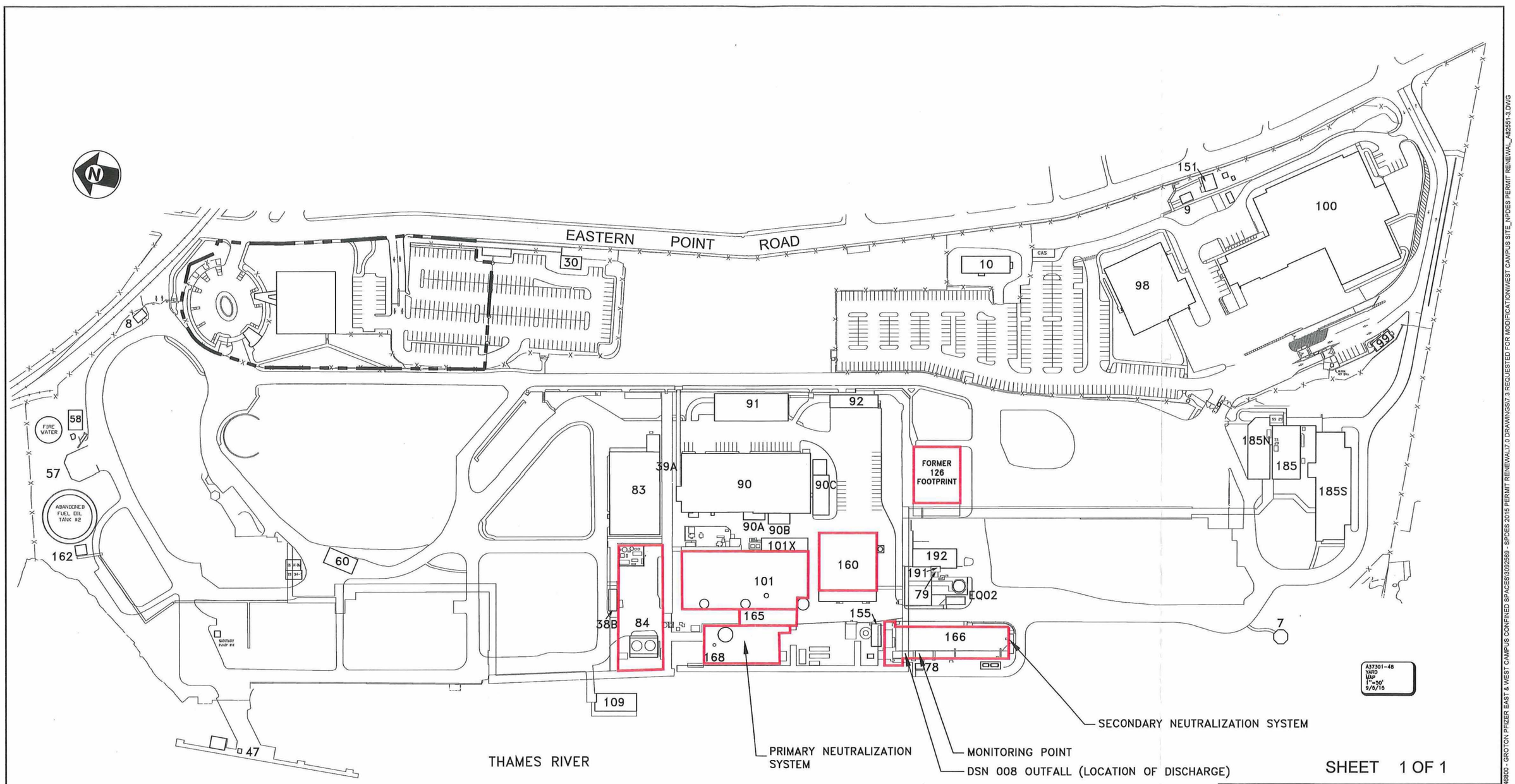
West Campus Site Map



SOURCE: TOPO!©2008 National Geographic Holdings, Inc.
New London, CT Quad Map

APPROXIMATE BAR SCALE
1" = 2000'
CHECK GRAPHIC SCALE BEFORE USING

Pfizer	USGS QUADRANGLE MAP	PFIZER 445 EASTERN POINT ROAD GROTON, CONNECTICUT	JOB NO: 206978,15 DATE: AUGUST 2015 SCALE: AS NOTED
	DESIGNED BY: DRAWN BY: SH CHECKED BY: GR Attach D USGS Map.dwg	APPLICATION FOR WASTEWATER DISCHARGES FROM MANUFACTURING, COMMERCIAL, AND OTHER ACTIVITIES	ATTACHMENT D



SHEET 1 OF 1

NOTES:

1. THIS SITE PLAN WAS PREPARED FOR PFIZER'S 2018 NPDES PERMIT RENEWAL APPLICATION.

BUILDINGS OUTLINED IN RED HAVE ACTIVITIES THAT CONTRIBUTE TO OR TREAT WASTEWATER COVERED UNDER NPDES PERMIT CT0000957.

NON PFIZER PROPERTY

REV	DATE	DESCRIPTION	BY	APPD
3	10/12/18	2018 NPDES PERMIT APPLICATION	JRK	RB
2	7/23/15	2015 NPDES PERMIT APPLICATION	JRK	RB
1	9/1/09	ISSUED TO REFLECT AS BUILT	AAA	ECW

Pfizer GROTON CONN.

WEST CAMPUS
NPDES 2018 PERMIT APPLICATION

SCALE:	NONE	PROJECT:	SPDES PERMIT
DATE:	9/1/09	FILE:	A82551
DRAWN BY:	AAA		#3092569
SIZE B	DWG No.	GGY-0-2164	REV. 3

\\DOCUMENT CONTROL DRAWINGS\GROTON\YARD\3046800 - GROTON PFIZER EAST & WEST CAMPUS CONFINED SPACES\3092569 - SPDES 2015 PERMIT RENEWAL\7.0 DRAWINGS\7.3 REQUESTED FOR MODIFICATION\WEST CAMPUS SITE_NPDES PERMIT RENEWAL_A82551-3.DWG
10/9/2018 4:17:37 PM

Attachment 3

Dilution Factors

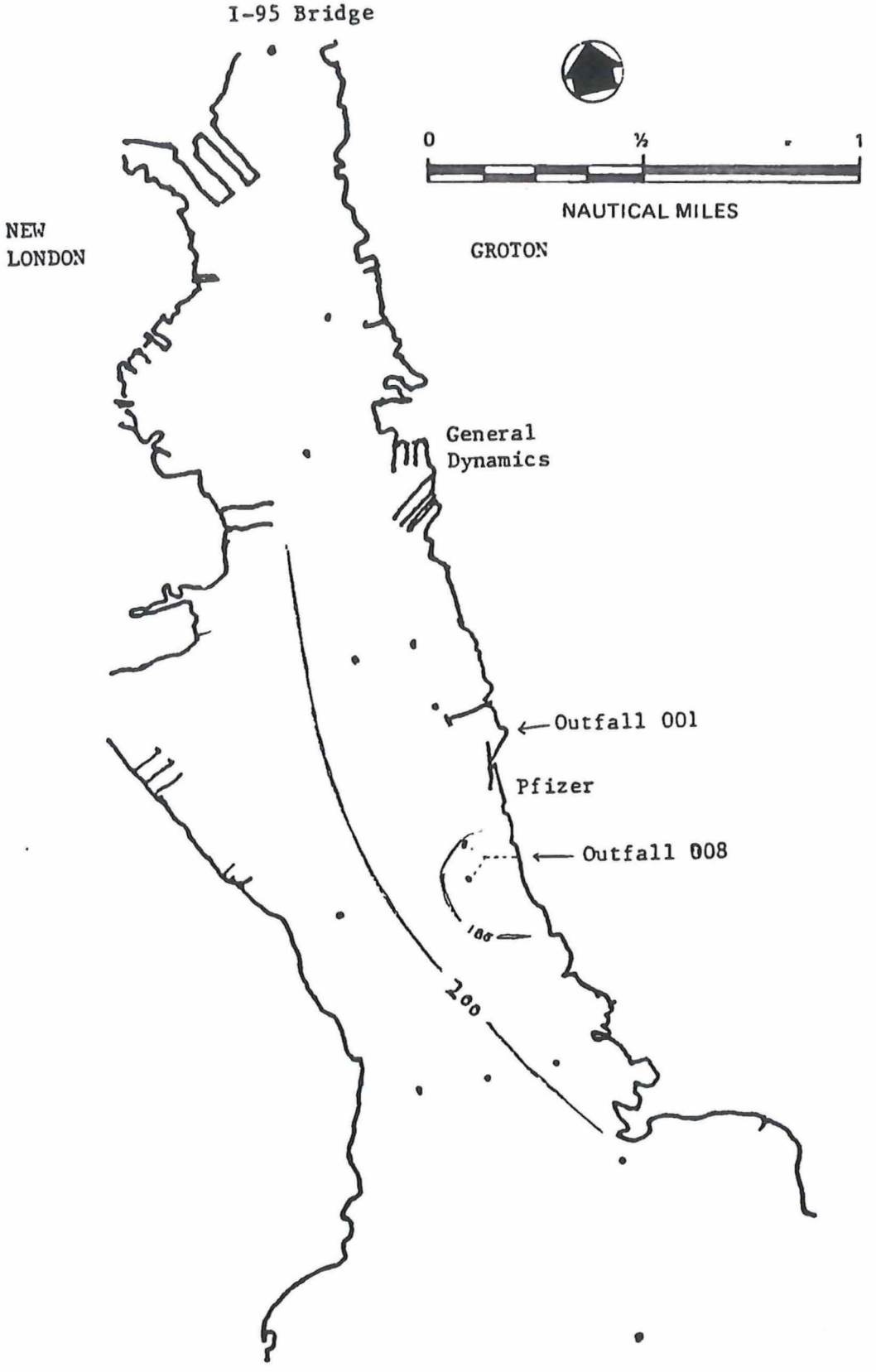


Figure 8. Dilution factors for Pfizer effluent concentration in the Thames River averaged over depth and time for four sampling periods on 24 and 25 July 1986.

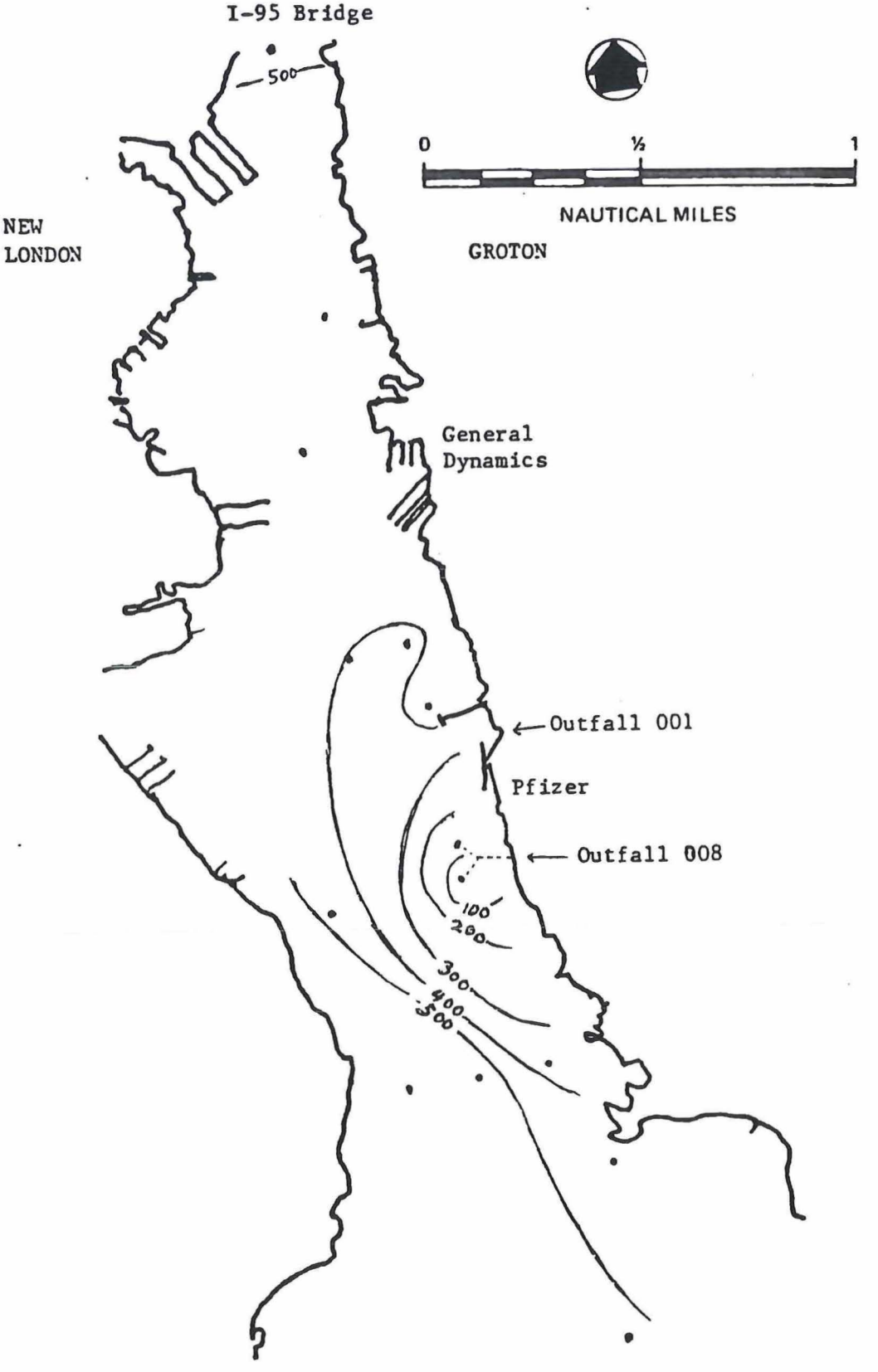


Figure 9. Dilution factors for Pfizer effluent concentration in the Thames River, Conn., averaged over depth and time for four sampling periods on 25 and 26 September 1986.