



National Pollutant Discharge Elimination System Permit Factsheet

NPDES Permit Summary	
Applicant	Pharmacia & Upjohn Company LLC (c/o Pfizer Inc)
Permit No.	CT0001341
Application No.	202302964
Date Application Received	April 3, 2023
Location Address	41 Stiles Ln, North Haven, CT 06473
Facility Contact (Owner + Discharge Monitoring Report Contact)	Thomas Donohue, Director, Remediation Large Sites Office Phone: 908-391-1392 Email: Thomas.Donohue@Pfizer.com
Mailing Address	Pfizer Inc. 66 Hudson Boulevard East, New York, NY 10001
Facility Contact (Operator)	Nathan Rzegocki, Plant Manager, Woodard & Curran Office Phone: 203-230-2072 Email: nrzegocki@woodardcurran.com
Secretary of State Business ID	0799035 (Pharmacia & Upjohn Company LLC) 0088341 (Pfizer Inc) 0256450 (Woodard & Curran, Inc.)
Permit Term	5 Years
Permit Category	National Pollutant Discharge Elimination System ("NPDES") Minor ("MI")
SIC & NAICS Codes	SIC 9999; NAICS 562910
Applicable Effluent Guidelines	N/A
Permit Type	Reissuance
Ownership	Privately Owned Facility
Receiving Water	DSN 001: Quinnipiac River
Waterbody Segment Id's	CT5200-00_01
Waterbody Classification	B
Discharge Locations	DSN 001: Latitude 41°22'24", Longitude 72°52'25"
Compliance Schedule	PFAS Sampling Plan
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.: DEP403325	Amount: \$1,300	Date Paid: 4/3/2023
Processing Fee	Invoice No.: DEP405884	Amount: \$13,100	Date Paid: 6/30/2023

Annual Fee:

Wastewater Category (per Regs. Conn. State Agencies Sect. 22a-430-7)	Flow Category	DSN	Annual Fee (per Regs. Conn. State Agencies Sect. 22a-430-7 and Conn. Gen. Stat. Sect. 22a-6f)
Groundwater Contamination Recovery Systems <i>(Contaminated Groundwater; Decontamination Station Wastewater; Excavation Dewatering Wastewater)</i>	---	001-1	4,337.50
Stormwater <i>(Stormwater from Equalization Tank Containment)</i>	---	001-1	2,912.50
Building Floor Drain Wastewaters <i>(Floor Wash Wastewater; Laboratory Sink Wastewaters; Air Compressor/Dryer Condensate; Pump Seal Water; Process Tank and Equipment Cleaning Wastewater; Carbon Unit Backwashing; Sand Filter Backwashing; Air Compressor/Dryer Condensate; Basket Strainer Wash Water)</i>	---	001-1	0
TOTAL			\$7,250.00

1.2 Application Submittal Information

On April 3, 2023, the Department of Energy and Environmental Protection (“DEEP”) received an application (Application 202302964) from Pharmacia & Upjohn Company LLC c/o Pfizer Inc (“the Permittee”, “the Applicant”, “the facility”) in North Haven for the renewal of its NPDES permit, Permit No CT0001341 expiring on September 30, 2023 (“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 New Haven Register on March 21, 2023. On October 23, 2023, the application was determined to be timely and administratively sufficient.

The Permittee seeks authorization for the following in Application 202302964:

DSN	Proposed Average Daily Flow (gpd)	Proposed Maximum Daily Flow (gpd)	Proposed Wastestreams	Treatment Type	Discharge To
001-1	94,000	129,600	Treated: <i>Contaminated Groundwater; Decontamination Station Wastewater; Excavation Dewatering Wastewater; Stormwater from Equalization Tank Containment; Floor Wash Wastewater; Laboratory Sink Wastewaters; Pump Seal Water; Process Tank and Equipment Cleaning Wastewater; Carbon Unit Backwashing; Sand Filter Backwashing; Air Compressor/Dryer Condensate; Basket Strainer Wash Water</i>	Equalization, Biological Treatment, Coagulation/Flocculation/Settling, Filtration, Ozone-Advanced Oxidation Process, Cyanide Treatment, Granular Activated Carbon	Quinnipiac River

1.3 Other Permits

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

- Stormwater from the site is permitted under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (GSI000143).

1.4 Description of Industrial Process

Pharmacia & Upjohn Company LLC is primarily engaged in remediation activities at the site. The SIC code provided by the permittee is 9999 (Unclassifiable Establishments) and NAICS code 562910 (Remediation and cleanup of contaminated buildings, mine sites, soil, or ground water). The treatment system is used to treat wastewater from contaminated groundwater remediation. This wastewater is discharged to the Quinnipiac River by way of DSN 001 under this proposed permit.

1.5 Facility Description

Since the mid-1800s, the site has been occupied by various industries including, a clay mine and brick yard, a chemical manufacturer, and an electrical components manufacturer. In 1962, The Upjohn Company, (“Upjohn”) Fine Chemicals Division began operating at the site, manufacturing specialty and industrial chemicals including intermediates used in the dye, pigment, perfume, cosmetic, agriculture, and pharmaceutical industries; UV coatings; polyurethane elastomers; agricultural fungicides; photo developing chemicals; and liquid sunscreen agents.

Wastewater from Upjohn's operations was treated on-site using land-based treatment units including aeration lagoons and a polishing lagoon. The treated wastewater from this system was discharged to the Quinnipiac River, as authorized by NPDES Permit CT0001341. Wastewater treatment sludges from the system and other wastes were disposed of on-site in areas known as the North Pile and the South Pile. Upjohn also operated as an interim status hazardous waste facility under Resource Conservation Recovery Act ("RCRA") (CTD001168533), used for storing, treating, and disposing of hazardous wastes that it generated from its operations in numerous other areas around the site. In 1989, the United States Environmental Protection Agency ("EPA") issued a RCRA Section 3013 Unilateral Administrative Order (RCRA Docket No. I-89-1101) to Upjohn, finding that it had released hazardous waste from the site to the environment. The order required Upjohn to assess the nature and extent of contamination at the site. Under this order, site investigations were conducted, and several interim remedial measures ("IRMs") were undertaken which included pumping and treating contaminated groundwater. Operations ceased at the site in 1993.

In 1994, EPA entered into a RCRA Section 3008(h) consent order (RCRA Docket No. I-94-1055) with Upjohn requiring it to continue to enhance IRMs, to further assess site risk, and to evaluate remedial alternatives. In 1995, Upjohn was acquired by Pharmacia Corporation. In 2003, Pfizer Inc. ("Pfizer") acquired Pharmacia Corporation. Later, Pharmacia Corporation was converted to a limited liability corporation, known as Pharmacia LLC. Pharmacia & Upjohn Company LLC, which owns the site, is a subsidiary of Pharmacia LLC. In 2010, Pharmacia & Upjohn submitted a Corrective Measures Study ("CMS") to EPA, that evaluated remediation technologies and alternatives for the impacted groundwater at the site. In March 2011, the RCRA 3008(h) Order was superseded by an updated RCRA Section 3008(h) Order (RCRA Docket No.-01-2011-0027). This order required Pharmacia & Upjohn to undertake Corrective Measures Implementation ("CMI") consistent with the CMS option selected.

The remedial work performed under the 2011 consent order resulted in changes to the sources, flows, and pollutant concentrations of the influent sent to the on-site Groundwater Treatment Facility ("GWTF"). In 2013, a vertical hydraulic barrier wall ("HBW") was installed around the perimeter of the northern, eastern, and southern sections of the property. The wall confines the migration of impacted groundwater into the Quinnipiac River and into the North and South Creeks. The HBW has also cut off river water that contributed to groundwater flows during high tide. In 2014, remedial work completed on the east side included installing a new cover system on the North Pile, consolidating and capping the South Pile and the Former Aeration Lagoon, constructing wetlands, installing a soil barrier cover in three areas on the east side, and excavating sediment from the mudflats bordering the Quinnipiac River and from the South Creek. Completion of these projects resulted in the elimination of some wastewaters that had been directed into the GWTF (e.g., South Pile consolidation water) and caused the redirection of others (i.e., stormwater runoff from the South Pile). Much of the site stormwater that had been directed into the GWTF is now directed to on-site wetlands. From May 2015 to February 2016, ISTR was used to treat the groundwater in an area known as the "former production area", which was the location of the highest concentration of contamination on-site. Through this process, organic contaminants in the groundwater were volatilized with thermal energy and loading into the GWTF was reduced.

In 2018-2019, West Side Corrective Measures ("WSCM") were completed. The primary WSCM was the ISTR project already noted. However, additional west side work consisted of the installation of a protective barrier cover system in the area, reducing infiltration. EPA issued an approval letter dated September 23, 2019, which accepted the certification of the WSCM Construction Completion Report ("CCR") and acknowledged that overall remedy construction is complete.

The Permittee submitted a Facility Wide CCR on December 17, 2019. Remaining obligations of the site are ongoing operation, maintenance and monitoring (“OM&M”). On March 9, 2021, DEEP issued Stewardship Permit No. DEEP/REM/SP/2020/01 to the Permittee for groundwater monitoring, maintenance of engineered controls, and operation of the groundwater treatment system at the site. The terms of the RCRA Order, EPA Docket No. RCRA-01-2011-0027 have been satisfactorily completed and this Order was terminated on July 23, 2025.

Groundwater at the site continues to be extracted and treated in the GWTF. Unit 1 wells, located in historic fill and shallow sand, continue to be the main source of groundwater extracted; Unit 3 wells are expected to contribute much smaller flows than the wells from Unit 1. Currently, the groundwater is extracted from seven wells installed along the northern and eastern property boundary (PW-1R, PW-2RA, PW-4R, PW-9, PW- 16A, TPW-1N) and four extraction sumps associated within the groundwater collection trenches located on the southwestern and northwestern property boundaries (S1N, S2N, S2S, S1S). Two extraction wells are not needed for hydraulic control and currently maintained offline (PW-5R and PW-10). Pollutant concentrations are highest at extraction wells in the southeastern portion of the site.

The majority of wastewater that is treated in the GWTF consists of extracted groundwater. Other wastestreams consist of those ancillary to the extraction and treatment operations, including sidestreams to the wastewater treatment system. A description of the wastewaters that comprise DSN 001-1 are as follows:

Wastestream	Description
Contaminated Groundwater	Groundwater extracted from extraction wells and groundwater collection trenches located on the site.
Decontamination Station Wastewater	Potable water used for the decontamination of drill rigs and other equipment that comes into contact with impacted soils at the site.
Excavation Dewatering Wastewater	Groundwater and stormwater collected from excavation trenches or dewatering activities associated with site remediation and maintenance activities.
Floor Wash Wastewater	Potable water used for cleaning activities (floor washing, tank rinse-outs) within the GWTF.
Stormwater from Equalization (“EQ”) Tank Containment	Stormwater that has collected in the EQ Tank containment that is pumped into one of the EQ tanks and then into the GWTF.
Lab Sink Wastewaters	Potable water, automatic sampler and grab sample process water, biodegradable lab cleaning solutions, spent reagent from total residual chlorine analysis, and miscellaneous wastewaters are rinsed down the sink and discharged into the influent sump and then intermittently to biological treatment.
Pump Seal Water	Potable water used for pump seal cooling is introduced to the recirculated wastewater being pumped to the fluidized bed reactors (“FBRs”) for treatment.
Process Tank and Equipment Cleaning Wastewater	Municipal water used for cleaning and rinsing tanks and other process equipment as part of maintenance or repair activities within the GWTF.
Carbon Unit Backwashing	Backwash wastewater from the two 5,000-pound carbon units as necessary.
Sand Filter Backwashing	Constant backwash that is recirculated to the Coagulation/Flocculation Tank for reprocessing.

Wastestream	Description
Air Compressor/Dryer Condensate	Condensate accumulated through process air compressors and dryers.
Back Strainer Wash Water	Wash water from cleaning basket strainer.

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).

On December 22, 2020, the Permittee submitted “3(i)” Application No. 202100210 to modify their GWTF. That request was approved on February 18, 2021, in which DEEP notified the Permittee that a permit modification was unnecessary. The treatment system modifications included the following changes:

- Modification of the FBR oxygenation system. The new system injects ambient air into the recycle system through a venturi injector instead of the pressurized bubble contractor that was previously used. The change reduces power requirements.
- Installation of cartridge filters. New 0.5-micron cartridge filters were installed to filter the sand filter effluent. The filters target removal of suspended solids, organics, and inorganics and improve pretreatment for the advanced oxidation system.
- Replacement of the UV/Ox system with an ozone-peroxide system.
- Installation of a cyanide destruction system. A peroxide injection system was installed to treat cyanide that remains in the effluent from the ozone-peroxide process.
- Replacement of peroxide destruction unit with dual granular activated carbon (“GAC”) adsorbers. The system operates in series and is designed to remove residual peroxide. The GAC media used is Filtrasorb 400.

On September 29, 2023, the Permittee submitted “3(i)” Application 202307310 requesting authorization to eliminate the cartridge filtration system as pretreatment to the advanced oxidation process (“AOP”). Improved quality of the sand filter effluent in practice was better than in the treatability testing that had previously been conducted under Application 202100210 (described above), so further filtration was not needed to remove oxidant scavengers that would reduce the effectiveness of the AOP system in destroying 1,4 dioxane and other organics. This modification was approved on February 27, 2024.

1.7 Treatment System Description

The GWTF consists of six major steps. Line drawings and process flow diagrams are presented in Attachment A. The GWTF is staffed by Woodard & Curran 7 days per week. The GWTF uses biological processes to treat its wastewater, so they are subject to the Wastewater Treatment Facility Operator Certification regulations at Regs. Conn. State Agencies Section 22a-416. The facility’s existing rating is Class II, and Woodard & Curran maintain two operators that are Class I certified and one operator that is Class III certified.

1.7.1 Collection System & Equalization

The site groundwater extraction system currently consists of six extraction wells (PW-1R, PW-2RA, PW-4R, PW-9, PW-16A, TPW-1N), groundwater collection trench sumps (S1N, S2N, S1S, S2S), and underground piping. Groundwater from the site-wide extraction system is pumped to one of two EQ tanks (T-101 and T-102), with a nominal capacity of 115,000 gallons. One tank provides approximately 28 hours of storage capacity at an average groundwater pumping rate of 65 gallons per minute (gpm).

1.7.2 Biological Treatment

Following equalization, wastewater is pumped to an FBR, which is an attached growth biological treatment system containing 25,000 pounds (“lb”) of GAC. The GAC serves as support media for the biomass. There are two FBR treatment trains consisting of a 29,000-gallon reactor (R-700 and R-701) and an 8,000-gallon carbon separator tank (T-701 and T-702). Only one treatment train operates at a time with the other serving as a standby. Fluidization keeps the media in suspension and is provided by one of two fluidization pumps with another pump on standby. Oxygen is provided by two pressurized bubble contactor (“PBC”) pumps. Phosphoric acid is added to provide nutrients for the biomass.

An alternate flow scheme is used when metals concentrations in the untreated wastewater would inhibit biological treatment in the FBR. In this scenario, the equalized wastewater is first pumped to the suspended solids removal treatment unit (see Section 1.7.3). The filtered wastewater would be diverted to the IPC sump and then pumped back to the EQ tanks. This metals pretreatment step is a batch process that would be used until metals concentrations are reduced to concentrations suitable for biological treatment.

1.7.3 Suspended Solids Removal

Following biological treatment, polyaluminum chloride is dosed into a coagulation tank (T-202), and then the wastewater passes through a rapid mix tank (T-203) to coagulate colloidal particles before moving to one of two inclined plate clarifiers (“IPCs”). The IPC system consists of a flash mix tank (T-204 or T-214), where an anionic polymer is added to aid in flocculation, floc mix tank (T-205 or T-215), where retention time is provided for particle aggregation, and IPC settler (T-206 or T-216). The IPCs are used alternately with one clarifier providing redundancy. Clarified effluent from the IPC flows to one of two upflow sand filters (F-228 or F-238) that provide additional removal of solids. The filters are continuously backwashed, with the backwash wastewater discharged to the sand filter reject tank (T-409) that is then pumped back to the coagulation tank (T-202). Effluent flow from both sand filters flows to a filtrate tank (T-402).

Settled solids from the IPC are periodically pumped to a sludge storage tank (T-501), where the solids are allowed to settle and thicken. Thickened sludge, approximately 3% - 7% solids, is periodically shipped off-site for disposal. Filtrate from the sludge thickening tank is manually decanted to the building sump (T-219) and then pumped back to the EQ tanks.

1.7.4 Ozone Advanced Oxidation Process (“AOP”)

Filtrate from the sand filters is pumped to the ozone-peroxide system where hydrogen peroxide is added through the first of two chemical addition points. Two ozone generators (one active and one standby) inject ozone into a recirculation loop in a 600-gallon contact tank.

Filtrate from T-402 is pumped into the 600-gallon contact tank, excess water overflows the weir and is gravity fed to T-801. The detention time in the contact tank is approximately 5 minutes. Hydrogen peroxide is dosed to maintain the required ozone: hydrogen peroxide molar ratio of 1:1 (48 mg ozone: 34 mg hydrogen peroxide). These chemical compounds form hydroxyl radicals which react in a 600-gallon contact tank (T-314) to provide increased removal of 1,4-dioxane and other organics (1-chloro-2-nitrobenzene, 2-chloroaniline, azobenzene, and bis(2-ethylhexyl) phthalate). Off-gas from the contact tank is sent through an ozone destruct system consisting of a catalyst media that converts ozone back to oxygen and then is vented outside.

1.7.5 Cyanide Treatment

Cyanide is occasionally present in the groundwater and is a potential byproduct of the AOP system. Wastewater flows from the AOP system to the cyanide treatment system by gravity. The cyanide treatment system consists of three 8,800-gallon fiber reinforced plastic (“FRP”) treatment tanks (T-801, T-811, and T-821), two 625-gallon FRP standpipes (T-811 and T-812), and two sets of feed pumps, each with a spare backup pump. The tanks operate in series as plug flow reactors. Hydrogen peroxide is dosed through the feed pumps at 30% solution and is provided a contact time of a minimum of six hours.

1.7.6 Granular Activated Carbon Adsorption

Lastly, GAC provides destruction of any residual peroxide from the cyanide treatment. This system consists of a 2,000-gallon feed tank (T-831), feed pumps, and two 5,000-lb GAC units (MME-841 and MME-842) that operate in series. The GAC units are backwashed using potable water, which occurs infrequently, when a high pressure differential is observed or when fresh GAC media is placed into service. Backwash is discharged to the EQ tanks via the IPC sump (T-219). Following the GAC treatment, monitoring is conducted at “PT-4” and then the effluent is discharged to the Quinnipiac River through a single 8-inch diameter outfall pipe.

1.8 Compliance History

A violations report is included as Attachment B.

Is the Permittee subject to an ongoing enforcement action regarding its NPDES Permit? Yes No

Did the previous permit have a compliance schedule? Yes No

Section 10(A) of the previous permit required the Permittee to conduct a study to determine a site-specific metal translator study. The final Metal Translator Study Work Plan, dated January 10, 2019, was approved by DEEP on February 19, 2019. The Metals Translator Study – Mixing Zone Sampling Results was submitted to DEEP on July 31, 2021.

Section 10(B) of the previous permit required the Permittee to document its attempts to find a laboratory that can perform EPA Methods 605 (for benzidine and 3,3'-dichlorobenzidine) and 617 (for dichloran) every six months. In documentation dated January 10, 2019, the Permittee proposed to contact four laboratories to confirm their availability to perform EPA Methods 605 and 617 every March and September and document a summary of those efforts with the associated DMR. DEEP acknowledged this proposal on February 19, 2019. The Permittee has continued to perform these actions throughout the permit term and was not able to locate a laboratory.

Section 10(C) required the Permittee to make a regular assessment of test methods available and capable of quantifying pollutants at or below the applicable Water Quality Criteria (“WQC”) to demonstrate that the discharge is not causing pollution to waters of the state. The Permittee submitted the Effluent Assessment Plan, dated November 27, 2018, in which they proposed to collect quarterly samples and analyze for polychlorinated biphenyls (“PCB”) congeners using EPA Method 1668. This method is not a CWA approved method in 40 CFR Part 136, but is able to analyze for PCB congeners with a minimum level (“ML”) of 0.0001 µg/L, compared to the EPA-approved Method 608.3 for PCBs, total Aroclors, which has a ML of 0.05 µg/L. DEEP approved the plan on December 18, 2018.

The previous permit included interim limits for 1,4-dioxane, ammonia, copper, and cyanide. Section 10(D) required the Permittee to achieve compliance with the final permit limits by submitting a comprehensive report evaluating alternative actions, propose a plan and schedule to implement the preferred alternative, and implement all actions in accordance with the approved plans and specifications. The finalized report titled *Alternative Evaluation Report* was received by DEEP on March 13, 2019. DEEP approved the proposed action and schedule on March 20, 2019, and subsequently approved the detailed description of the project, conceptual design report, proposed modifications, and updated schedule on February 22, 2021, and prescribed a final compliance date of December 1, 2022. The Permittee certified on December 14, 2022, that it was in compliance with the final effluent limits in accordance with Section 10(D)(4).

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 site is located within the coastal area/boundary as defined in Conn. Gen. Stat. 22a-94(b). However, the application is not for a new activity or a modification of an existing activity that will change the footprint of the site.

1.9.3 Endangered Species

The December 2024 *State and Federal Listed Species and Natural Communities Map* indicates that the site is within an area identified as a habitat for endangered, threatened or special concern species, however, the application is not for a new activity or a modification of an existing activity that will change the footprint of the site.

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

The site is not located within a public water supply watershed.

Section 2 Receiving Water Body Information

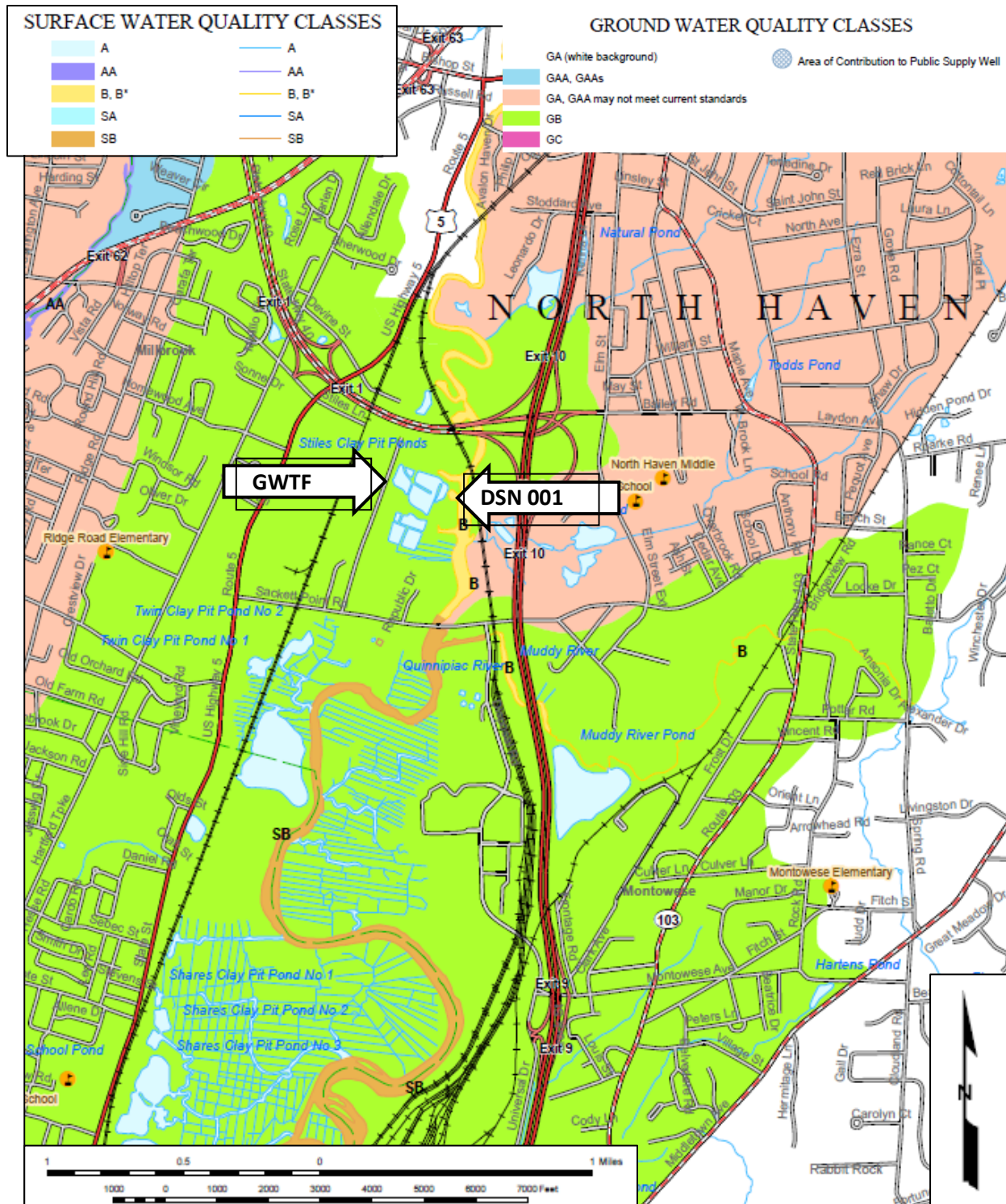
The receiving waterbody is the Quinnipiac River segment identified as CT5200-00_01, which includes the section of the river from its crossing of Sackett Point Road in North Haven to its crossing of Toelles Road on the Wallingford/North Haven border. This section of the river is classified as B (freshwater); however, this section is tidally influenced and can fluctuate in salinity from 0 to 5 parts per thousand (“ppt”). The Regs. Conn. State Agencies Section 22a-430-3(j)(7)(A)(iii)(a-c) classifies freshwater as salinity of 1 ppt or less, estuarine as between 1 ppt and 20 ppt, and marine waters as greater than 20 ppt. According to Regs. Conn. State Agencies 22a-426-4(h), the designated uses for Class B waters are: (1) habitat for fish and other aquatic life and wildlife; (2) recreation; (3) navigation; and (4) industrial and agricultural water supply.

This segment is identified in Connecticut’s 2022 *Integrated Water Quality Report* (“IWQR”) (https://portal.ct.gov/-/media/deep/water/water_quality_management/305b/2022/iwqr-final-2022.pdf?rev=b778b4aa83ad4f5cb918f84acb4aef3a&hash=1023ED08409B99FD592D0D647210DEF3) as an impaired waterbody. According to Appendix B-1 of the IWQR, the impaired designated uses are habitat for fish, other aquatic life and wildlife due to unknown causes, and recreation due to *Escherichia coli* (https://portal.ct.gov/-/media/deep/water/water_quality_management/305b/2022/final-2022-iwqr-appendix-b-1-list-of-impaired-waters-for-connecticut-epa-category-5.pdf?rev=e42a5942c34a41d69a4da35ac8153547&hash=FA92DAEDAD6BA6086A49A4462DF51F73).

A total maximum daily load (“TMDL”), titled *A Total Maximum Daily Load Analysis for the Quinnipiac River Regional Basin* was developed for *E. coli* in 2008 (<https://portal.ct.gov/-/media/deep/water/tmdl/ctfinaltmdl/quinnipiacriver>). The TMDL does not include a waste load allocation (“WLA”) for the facility.

This waterbody is also listed on Appendix C-1 of the IWQR, the Priority List of Waters for Action Plan Development 2022-2024 for phosphorus (https://portal.ct.gov/-/media/deep/water/water_quality_management/305b/2022/final-2022-iwqr-appendix-c-1-priority-list-for-action-plan-development-2022-2024.pdf?rev=f30dcfaf7b6e49b391e5ae1cfcbedef08&hash=2E92A5815D1E436104BC0AE774FF7123).

The entire state is subject 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 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. Additionally, dissolved oxygen will continue to be monitored in this permit.



Section 3 Permit Conditions and Effluent Limitations

3.1 Effluent Guidelines

The following Effluent Guidelines and Standards were reviewed to determine their applicability to the facility's discharge, DSN 001-1:

40 CFR Part 455 (Pesticide Chemicals), 40 CFR Part 414 (Organic Chemicals, Plastics, and Synthetic Fibers), and 40 CFR Part 439 (Pharmaceutical Manufacturing Point Source Category): The provisions of these regulations are applicable to process wastewater discharges. When Upjohn was in operation, its manufacturing operations would have been subject to these categorical standards, however, manufacturing operations ceased in 1993 and the Permittee is currently engaged in remediation activities at the site. Contaminated groundwater is not a process wastewater per 40 CFR 122.2 and 40 CFR 439.1(m), so these categorical standards do not apply.

40 CFR Part 450 (Construction and Development Point Source Category): The previous permit included narrative requirements to comply with the effluent guidelines at 40 CFR Part 450, which apply to discharges associated with construction activity required to obtain NPDES permit coverage pursuant to 40 CFR 122.26(b)(14)(x) and (b)(15) (i.e., clearing, grading, and excavation activities that disturb at least one acre of land. Section 1.5 – Facility Description details historical activities that have taken place at the site. These construction activities have been completed, no applicable construction activities have occurred in the last five years, and the Permittee does not expect additional activities to occur in the next five years, so this categorical standard is not applicable.

40 CFR Part 445 (Landfills Point Source Category): The North Pile and the South Pile were used for storage, treatment, and disposal of wastes associated with on-site operations only. The North Pile and South Pile units were closed, and the wastewaters associated with these units no longer discharge into the GWTF, as they have either been redirected (e.g., stormwater runoff) or have ceased being generated (e.g., South Pile pore consolidation water). There is no leachate generated or collected on-site. Contaminated groundwater in the area of the North and South piles continues to be treated and discharged; however, 40 CFR 445.1(d) specifies that the provisions of this part do not apply to discharges of contaminated groundwater, so this categorical standard does not apply.

3.2 Pollutants of Concern

The following pollutants 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
1-Chloro-2-nitrobenzene				X
1,1-Dichloroethane				X
1,1-Dichloroethylene				X
1,1,1-Trichloroethane				X
1,2-Dichlorobenzene			X	
1,2-Dichloroethane			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
1,2-trans-Dichloroethylene				X
1,2,4-Trichlorobenzene				X
1,3-Dichlorobenzene				X
1,4-Dichlorobenzene				X
1,4-Dioxane			X	
2-Chloroaniline			X	
2-Chlorophenol				X
2-Methylphenol				X
2,4-Dichlorophenol				X
2,4-Dimethylphenol				X
2,4,6-Trichlorophenol				X
3-Chloroaniline				X
3,3'-Dichlorobenzidine				X
3,3'-Dimethylbenzidine				X
3,4-Benzofluoranthene				X
3&4-Methylphenol				X
4-Chloroaniline				X
Acenaphthene				X
Acenaphthylene				X
Aluminum, Total			X	
Ammonia (as N)			X	
Aniline				X
Anthracene				X
Antimony, Total				X
Arsenic, Total				X
Azobenzene				X
Barium			X	
Benzene				X
Benzdine				X
Benzo(a)anthracene				X
Benzo(a)pyrene				X
Benzoic Acid			X	
Biochemical Oxygen Demand, 5 Day ("BOD ₅ ")			X	
Bis(2-chloroethyl) ether				X
Bis(2-ethylhexyl) phthalate			X	
Cadmium, Total				X
Carbazole				X
Carbon Disulfide				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
Chlorine, Total Residual ("TRC")			X	
Chlorobenzene				X
Chloroethane				X
Chloroform			X	
Chromium, Total				X
Chrysene				X
cis-1,2-Dichloroethene				X
Copper, Total			X	
Cyanide, Total			X	
Dibenzofuran				X
Dichloran				X
Diphenamid				X
Ethylbenzene				X
Fluoranthene				X
Fluorene				X
Formaldehyde			X	
Iron, Total			X	
Kjeldahl Nitrogen, Total			X	
Lead, Total			X	
m-Toluidine				X
Mercury, Total			X	
Methyl bromide				X
Methylene chloride				X
Methyl tert butyl ether				X
Naphthalene				X
Nickel, Total			X	
Nitrate (as N)			X	
Nitrite (as N)			X	
Nitrobenzene				X
Nitrogen, Total		X	X	
Organic Nitrogen			X	
Oxygen, Dissolved			X	
PCBs				X
pH			X	
Phenanthrene				X
Phenol				X
Phosphorus, Total			X	
Pyrene				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
Silver, Total				X
Sulfide			X	
Tetrachloroethylene				X
Toluene				X
Trichloroethylene				X
Total Suspended Solids (“TSS”)				X
Xylenes, Total				X
Vanadium, Total			X	
Vinyl chloride				X
Zinc, Total				X

3.3 Basis for Limits

Technology and water-quality based requirements are considered when developing permit limits. Technology-based effluent limits (“TBELs”) represent the minimum level of control imposed under the Clean Water Act (“CWA”). Industry-specific technology-based limits are set forth in 40 CFR Sections 405 – 471 (EPA’s Effluent Limitation Guidelines) 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 *Connecticut Water Quality Standards* (“WQS”).

3.4 Zone of Influence

A zone of influence (“ZOI”) of 69,264 gallons per hour (“gph”) is being carried over from the previous permit for meeting the chronic aquatic life criteria and human health criteria, where applicable. No ZOI was allocated for aluminum or copper. A ZOI of 0 gph is also being carried over from the previous permit, for meeting the acute aquatic life criteria. The Application requests an average daily flow of 94,000 gallons per day (“gpd”), which is similar to the average daily flow in the previous permit of 106,560 gpd.

The ZOI was determined based on a dye dilution study conducted in August 2014 during spring and neap tides and included the maximum flood, maximum ebb, high slack, and low slack points of the tidal cycle. Results were summarized in the report titled *Effluent Mixing Zone Dye Study Report Pharmacia & Upjohn Company LLC Ground Water Treatment Facility* by Hydro Data, Inc in October 2014. Modeling of the mixing zone under critical conditions was also conducted during the development of the previous permit using CORMIX1 v11.0. The depth of the water in the vicinity of the discharge is very shallow at low tide, and the discharge is not high-velocity (at least 3 meters per second); therefore, the most restrictive acute ZOI to prevent lethality to organisms drifting through the ZOI would need to be met within 2.5 feet. The modeling indicated that this condition would be met with an acute dilution of 1.0:1. This ZOI will result in chronic and human health criteria being met within 93.75 feet of the outfall, and acute criteria being met within 2.5 feet of the outfall.

The ZOI does not apply to any pollutants with a human health criteria designation of A: Class A carcinogen (known human carcinogen), C: Carcinogenic (probable or possible carcinogen), or HB: High potential to bioaccumulate or bioconcentrate. Therefore, the ZOI is not applicable to 1-chloro-2-nitrobenzene, arsenic, azobenzene, benzene, bis(2-ethylhexyl) phthalate, and PCBs.

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 WQs, 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). As the receiving water salinity fluctuates between freshwater and estuarine, both freshwater and saltwater WQS were considered when determining reasonable potential, and the more stringent of the two was utilized. Criteria are listed in Attachment D.

In the cases that all data for a pollutant of concern was non-detect, and analyses met DEEP’s required quantitation limits, that pollutant was considered not to have reasonable potential and continued monitoring was included.

Reasonable Potential Analysis Results:

A reasonable potential analysis (“RPA”) was conducted for pollutants known or suspected to be present in the discharge and which were detected in the effluent in the previous five years. The results of the analysis are provided in the table below. See Attachment D for details of the calculations. The analysis indicated that reasonable potential exists for: aluminum, arsenic, copper, and cyanide.

Reasonable Potential Analysis					
Pollutant	Maximum Observed Value (µg/L)	Projected Maximum Effluent Concentration (µg/L)	Expected Maximum Downstream Concentration (µg/L)	Criteria (µg/L)	Regulatory Limit Required
1,4-Dioxane	8	18	0.98	96	No
Aluminum, Total	86	198	198	87	YES
Ammonia (as N), summer	193	463	161	360	No
Ammonia (as N), winter	422	1224	195	360	No
Arsenic, Total	3.4	6.1	6.1	0.021	YES
Chloroform	0.620	1.49	0.0796	1410	No
Chromium, Total	3	14.1	14.1	323	No
Copper, Total	3.0	3.6	3.6	3.1	YES
Cyanide, Total	3.17	5.07	5.07	1	YES
Formaldehyde	36	43	43	846	No
Iron, Total	697	4740	621	1,000	No
Lead, Total	0.5	1.0	0.70	1.2	No
Mercury, Total	0.002	0.00416	0.0042	0.051	No
Methyl bromide	0.09	0.126	0.126	38	No
Nickel, Total	4.6	4.6	12.88	74	No
PCBs	0.0016	0.00464	0.0046	0.000064	YES
Vanadium, Total	5.6	9.5	9.5	79	No

Ammonia

In order to perform an RPA for ammonia, the instream water quality criteria had to be calculated. Regs. Conn. State Agencies 22a-426-9(a)(1) specifies that the freshwater aquatic life criteria for ammonia are dependent on the presence of salmonids, pH, and temperature of the receiving stream. Ammonia criteria were previously calculated for a stretch of the Quinnipiac River, which includes the section that Pharmacia & Upjohn discharges into. The one-hour average, four-day average, and 30-day average criteria were calculated for two periods of the year, April through October and November through March. See Attachment C for additional details.

Due to the tidal influence of this section of the Quinnipiac River, and the fluctuation in salinity, saltwater ammonia criteria were also used. The acute (35 µg/L) and chronic (233 µg/L) criteria that are applicable to Class SB surface waters need to be converted from un-ionized ammonia to total ammonia. As specified in Regs. Conn. State Agencies 22a-426-9(a)(1), this is done using the procedure described in *Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989*, EPA 440/5-88-004 (<https://19january2021snapshot.epa.gov/sites/static/files/2019-02/documents/ambient-wqc-ammonia-saltwater-1989.pdf>). This document specifies that the conversion is highly influenced by pH and temperature. Higher pH and temperature values and lower salinity values, result in more restrictive criteria.

The criteria were calculated using maximum observed pH and temperature values and minimum observed salinity value over the last five years, resulting in the protective criteria. The ambient data for temperature in Section 3.6 represent average and maximum values for summer temperatures. The most stringent acute and chronic criteria for total ammonia (as N) are 2.38 mg/L and 0.36 mg/L, respectively, which is protective of the tidally-influenced section of the Quinnipiac River at critical conditions. These criteria are more stringent than the freshwater acute or chronic, summer or winter criteria.

Temp (deg C)	pH (su)	Salinity (ppt)	Pressure (ATM)	Molal Ionic Strength (not valid if >0.85):	pKa* @ 25 deg C	% Unionized:	Unionized WQC		Total NH3		Total NH3 as N	
							Acute	Chronic	Acute	Chronic	Acute mg/L	Chronic mg/L
24.7	8.2	1.0	1.0	0.020	9.247	8.060%	0.233	0.035	2.89	0.43	2.38	0.36

Polychlorinated Biphenyls (“PCBs”)

The Permittee has been performing quarterly monitoring for PCBs using EPA Method 1668 in addition to EPA Method 608.3. Method 608.3 is an approved method in 40 CFR Part 136, but it only quantifies PCB Aroclors, and only down to a ML of 0.05 µg/L. Method 1668 can quantify individual PCB congeners down to levels as low as 0.04 ng/L, but this method has not been approved for CWA compliance in 40 CFR Part 136. Monitoring with Method 1668 has indicated the presence of PCB congeners in the effluent at levels above the human health criteria of 0.064 ng/L. In the past five years, a maximum concentration of total PCB congeners of 7 ng/L has been observed, and 1.6 ng/L has been reported since the GWTF upgrades. The human health criteria for total PCBs is 0.064 ng/L, and no ZOI is allocated for this parameter, therefore, permit limits will be included in the permit for PCBs.

Barium, Manganese

The application indicated the presence of barium and manganese in the effluent. Monitoring of these parameters will be included in the permit to collect data to further assess the levels and variability of these pollutants in the discharge.

3.6 Waterbody Ambient Conditions

The report *Flow Durations, Low-Flow Frequencies, and Monthly Median Flows for Selected Streams in Connecticut through 2005* (<https://pubs.usgs.gov/sir/2007/5270/pdf/SIR2007-5270.pdf>) specifies that the 7Q10 of the Quinnipiac River at USGS station number 01196500 is 33.6 cubic feet per second (“cfs”) for a drainage area of 115 mi². The drainage area at Pharmacia & Upjohn’s outfall location is 130 mi². Using drainage basin ratios, the estimated 7Q10 at the discharge site is approximately 38.0 cfs.

A review of the Quinnipiac River ambient data collected between March 2020 and March 2025 showed detections for the parameters in the table below. These average values represent the upstream ambient water quality conditions and were used in the reasonable potential analysis.

Quinnipiac River Background Concentrations, 2020-2025	
Parameter	Value
7Q10	38.0 cfs
Temperature (Max)	24.7 °C
pH (Max)	8.2 S.U.
Salinity (Min – Max)	0 - 5 ppt
Aluminum, Total	136 µg/L
Ammonia, as N	0.141 mg/L
Antimony, Total	0.16 µg/L
Arsenic, Total	0.1 µg/L
Chromium, Total	0.3 µg/L
Copper, Total	4.5 µg/L
Iron, Total	388 µg/L
Lead, Total	0.68 µg/L
Mercury, Total	0.0025 µg/L
Nickel, Total	0.25 µg/L
1,1-Dichloroethene	0.0075 µg/L
Bis(2-ethylhexyl) phthalate	0.0711 µg/L
cis-1,2-Dichloroethene	0.16 µg/L
Trichloroethylene	0.20 µg/L

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 current aquatic toxicity permit limits of acute $LC_{50} \geq 100\%$ and chronic $C-NOEC \geq 6.0\%$ were developed during the previous permit term based on an acute IWC of 100% and a chronic IWC of 6%, consistent with Regs. Conn. State Agencies Sections 22a-430-3(j)(7)(A)(i) and 22a-430-4(1)(5). The chronic toxicity limits only apply to the fecundity of *Americamysis bahia* and the growth of *Cyprinodon variegatus*.

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

Month	Acute (48 Hours)		Chronic (7 Days)						
	<i>Americamysis bahia</i>	<i>Cyprinodon variegatus</i>	<i>Americamysis bahia</i>				<i>Cyprinodon variegatus</i>		
	LC ₅₀	LC ₅₀	Survival LC ₅₀	Survival C-NOEC	Growth C-NOEC	Reproduction C-NOEC	Survival LC ₅₀	Survival C-NOEC	Growth C-NOEC
	%	%	%	%	%	%	%	%	%
Mar 2020	100	100	100	100	100	NE**	100	100	100
Sept 2020	100	100	100	100	100	100	100	100	100
Mar 2021	100	100		100	100	NE**		100	100
Sept 2021	100	100	100	100	100	NE**	100	100	100
Mar 2022	100	100	100	100	100	NE**	100	100	100
Sept 2022	100	100	100	100	100	NE**	100	100	100
Mar 2023	100	100	100	100	100	100	100	100	100
Sept 2023	100	100	100	100	50	NE**	100	100	100
Mar 2024	100	100	NE*	NE*	NE*	NE*	100	100	100
May 2024	100	100	100	100	100	NE**	100	100	100
Sept 2024	100	100	100	100	100	NE**	100	100	100
Mar 2025	100	100	100	100	100	NE**	100	100	100

* Not estimated. River control did not meet Test Acceptability Criteria of ≥80% survival.
** Not evaluated. Control did not meet test criteria of ≥ 50% fecundity.

To determine if the current permit limits are sufficiently protective, an RPA was conducted:

The most toxic aquatic toxicity data was C-NOEC = 50% for growth of *Americamysis bahia*.

Converting to Toxic Units:

$$TUC = \frac{100}{NOEC} = \frac{100}{50} = 2.0 TUC$$

A standard coefficient of variation of 0.6 is assumed, which corresponds to a statistical multiplier of 2.9 for n=11.

Projected TUC in the receiving water, using a dilution of 5.4% at the edge of the mixing zone:

$$Projected TUC = 2.0TUC \times 2.9 \times 0.054 = 0.31$$

The EPA's TSD recommends a chronic toxicity criterion of TUC = 1.0. The projected TUC is below this criterion, therefore, there is no reasonable potential for the discharge to cause toxicity in the receiving water, and no new limits are needed.

The previous permit required the Permittee to perform acute and chronic aquatic toxicity testing on a semi-annual basis for DSN 001-1. 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 with acute toxicity tests 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 be 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 $LC_{50} \geq 100\%$ was included in the permit consistent with Regs. Conn. State Agencies Section 22a-430-3(j)(7)(A)(i) and 22a-430-4(1)(5). Pharmacia & Upjohn is required to continue to perform acute aquatic toxicity testing on a semi-annual basis for DSN 001-1. Chronic aquatic toxicity testing is required to be performed annually. The test species to be used in the aquatic toxicity tests will be *Americamysis bahia* (formerly *Mysidopsis bahia*) and *Cyprinodon variegatus*, consistent with Regs. Conn. State Agencies 22a-430-3(j)(7)(A)(iii).

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).

WQBELs were derived for the following parameters: aluminum, arsenic, copper, cyanide, and PCBs. The permit limits for arsenic and PCBs are 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 the TSD. Abbreviated details of the WQBEL calculations are presented below. Full details of the calculations are presented in Attachment D.

WQBEL Calculations						
Pollutant	Limiting LTA (µg/L)	Governing Criteria	AML (µg/L)	MDL (µg/L)	AML (g/day)	MDL (g/day)
Aluminum, Total	46	Chronic	71	142	25	50
Arsenic, Total	0.021	Human Health	0.021	0.034	0.0074	0.012
Copper, Total	2.8	Chronic	2.9	3.4	1.0	1.2
Cyanide, Total	0.53	Acute	0.62	1.0	0.22	0.35
PCBs	0.000064	Human Health	0.000064	0.000104	0.000022	0.000037
LTA = long term average; AML = average monthly limit; MDL = maximum daily limit						

Mass limitations were calculated for applicable pollutants as required by 40 CFR 122.45(f). The limits are presented in the table above. The Permittee requested a reduction in their average monthly flow. Mass limits were recalculated for any limits in the previous permit to be representative of the current conditions.

Additionally, as described in Section 3.11, the previous permit's maximum daily limit for aluminum and average monthly limit for cyanide were more stringent than the WQBELs calculated above. Therefore, new mass limits were calculated for these limits. Mass limits were calculated from concentration limits as follows.

$$(\text{mass limit}) = (\text{concentration limit}) \times 94,000 \frac{\text{gal}}{\text{day}} \times \frac{3.785 \text{ L}}{\text{gal}} \times 10^{-6}$$

This equation results in mass limits expressed as g/day for limits expressed in µg/L and expressed as kg/day for limits expressed in mg/L.

Mass Limit Calculations				
Parameter	AML (µg/L)	MDL (µg/L)	AML (g/day)	MDL (g/day)
1-Chloro-2-nitrobenzene	10.2	17.7	3.62	6.29
1,4-Dioxane	43.3	75.0	15.4	26.6
2-Chloroaniline	37.1	64.3	13.1	22.8
4-Chloroaniline	2.83	4.90	1.00	1.74
Aluminum		136		48
Azobenzene	0.20	0.35	0.071	0.12
Benzene	51.0	88.4	18.1	31.4
Bis(2-ethylhexyl) phthalate	2.2	3.8	0.78	1.3
Cyanide	0.58		0.20	
	AML (mg/L)	MDL (mg/L)	AML (kg/day)	MDL (kg/day)
Ammonia, <i>Apr 1 – Oct 31</i>	0.902	1.745	0.320	0.620
BOD ₅	20	30	7.1	10
Total Suspended Solids	20.0	30.0	7.1	10.6

Total Nitrogen: As described in Section 2, the facility's discharge is subject to a TMDL for dissolved oxygen. 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. The facility was assigned a WLA of 113 lbs/day, as part of Zone 3. During the last permit issuance, this WLA was converted into an LTA and an AML that would ensure the WLA would not be exceeded. The TMDL was written as an annual load because dissolved oxygen is a function of the annual loading rates of nitrogen rather than shorter duration load limits. Therefore, the Permittee is required to comply with the average annual loading limit rather than an average monthly loading limit, consistent with how the TMDL expresses the WLA. Compliance with this limit will be demonstrated on an annual basis by reporting the annual loading of total nitrogen in December for the previous year.

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(1)(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 Effluent Limitation Guidelines (“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”).

TSS: Case-by-case limits of AML = 20.0 mg/L, MDL = 30.0 mg/L, and MIL = 45.0 mg/L have been incorporated for TSS based on BPJ, pursuant to Regs. Conn. State Agencies Section 22a-430-4(m) and 40 CFR Part 125.3(a). These limits are based on the State’s technology-based treatment requirements for certain industrial discharges published at Regs. Conn. State Agencies 22a-430-4(s).

BOD₅: Limits for BOD₅ have been carried over from the previous permit. These are case-by-case limits of AML = 20.0 mg/L, MDL = 30.0 mg/L, and MIL = 45.0 mg/L. They have been included in the permit since 1998. A BOD₅ limit is warranted due to the nature of the contamination and the number of organic constituents that the Permittee is treating.

3.10 Comparison of 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 WQBELs are presented in Sections 3.5 and 3.8 above and Attachment D to this document.

Parameter	Units	Limits								
		Technology / BPJ			Water Quality		Previous Permit			
		AML	MDL	MIL	AML	MDL	AML	MDL	MIL	
Acute Toxicity, <i>Americamysis bahia</i> , LC ₅₀	%							100	33.3	
Acute Toxicity, <i>Cyprinodon variegatus</i> , LC ₅₀	%							100	33.3	
Chronic Toxicity (Fecundity), <i>Americamysis bahia</i> , NOEC	%							6.0		
Chronic Toxicity (Growth), <i>Cyprinodon variegatus</i> , NOEC	%							6.0		
1-Chloro-2-nitrobenzene	µg/L						10.2	17.7	26.5	
1-Chloro-2-nitrobenzene	g/day				3.62	6.29	4.1	7.1		
1,4-Dioxane	µg/L						43.3	75.0	113	
1,4-Dioxane	g/day				15.4	26.6	17.5	30.3		
2-Chloroaniline	µg/L						37.1	64.3	96.0	
2-Chloroaniline	g/day				13.1	22.8	15.0	26.0		

Parameter	Units	Limits								
		Technology / BPJ			Water Quality		Previous Permit			
		AML	MDL	MIL	AML	MDL	AML	MDL	MIL	
4-Chloroaniline	µg/L						2.83	4.90	7.35	
4-Chloroaniline	g/day				1.00	1.74	1.1	2.0		
Aluminum, Total	µg/L				71	142	83.9	136	204	
Aluminum, Total	g/day				25	48	33.8	54.8		
Ammonia (as N), <i>Apr 1- Oct 31</i>	mg/L						0.902	1.745	2.618	
Ammonia (as N), <i>Apr 1- Oct 31</i>	kg/day				0.320	0.620	0.364	0.705		
Arsenic, Total	µg/L				0.021	0.034	---	---	---	
Arsenic, Total	g/day				0.0074	0.012	---	---	---	
Azobenzene	µg/L						0.20	0.35	0.52	
Azobenzene	g/day				0.071	0.12	0.08	0.14		
Benzene	µg/L						51.0	88.4	133	
Benzene	g/day				18.1	31.4	20.6	35.7		
BOD	mg/L						20	30	45	
BOD ₅	kg/day	7.1	10				8.07	12.1		
Bis(2-ethylhexyl) phthalate	µg/L						2.2	3.8	5.7	
Bis(2-ethylhexyl) phthalate	g/day				0.78	1.3	0.89	1.54		
Copper, Total	µg/L				2.9	3.4	5.5	9.6	14.4	
Copper, Total	g/day				1.0	1.2	2.2	3.9		
Cyanide, Total	µg/L				0.62	1.0	0.58	1.0	1.5	
Cyanide, Total	g/day				0.20	0.35	0.23	0.40		
Nitrogen, Total (Annual Loading)	lbs/day				75.0					
PCBs	µg/L				0.000064	0.000104	0.000064	0.000111	0.000166	
PCBs	g/day				0.000022	0.000037	0.000026	0.000045		
Total Suspended Solids	mg/L	20.0	30.0	45.0			30	60	90	
Total Suspended Solids	kg/day	7.1	10.6				12.1	24.2		
		Min	Max		Min	Max	Min	Max		
pH	S.U.				6.5	8.0	6.5	8.0		

BPJ = Best Professional Judgment; AML = Average Monthly Limit; MDL = Maximum Daily Limit; MIL = Maximum Instantaneous Limit; Min = Instantaneous Minimum; Max = Instantaneous Maximum

3.10.1 Compliance Levels

The MLs for the analytical test methods are 5 µg/L for 4-Chloroaniline,, 2 µg/L for Arsenic, 2 µg/L for Azobenzene, 5 µg/L for Cyanide, and 0.05 µg/L for Total PCBs. Compliance cannot be determined with the maximum daily limits, and/or instantaneous limits for these parameters because the effluent limits are below the ML of the associated analytical tests. Therefore, compliance levels equivalent to the ML of the analytical method have been included in the permit, consistent with Section 5.7.3. of EPA's TSD. Results below the compliance levels will be considered in compliance with the effluent limits.

3.11 Sampling Frequency, Type, And Reporting

Regs. Conn. State Agencies Section 22a-430-3 specifies that the minimum frequency of monitoring for “Groundwater Contamination Recovery Systems” to determine compliance with effluent limits shall be monthly, and that the additional monitoring may be required to ensure proper operational control. Sampling frequency to demonstrate compliance with an aquatic toxicity limit shall be at least quarterly, unless the permittee has demonstrated that the toxicity is relatively constant. Whole effluent toxicity limits and monitoring were discussed in Section 3.8 and showed that the toxicity is generally consistent. Acute toxicity monitoring will continue at a semi-annual frequency, and chronic toxicity monitoring will occur annually. Other sampling frequencies are provided in the following table:

Pollutants	Limit	Basis For Limit	Monitoring/Reporting Frequency	Sample Type
DSN 101-1:				
Acute Aquatic Toxicity <i>Americamysis bahia</i>	LC ₅₀ ≥ 100%	Regs. Conn. State Agencies 22a-430-4(1)(5)(A). Anti-backsliding regulations	Semiannually	Daily Composite
Acute Aquatic Toxicity <i>Cyprinodon variegatus</i>	LC ₅₀ ≥ 100%	Regs. Conn. State Agencies 22a-430-4(1)(5)(A). Anti-backsliding regulations	Semiannually	Daily Composite
Chronic Aquatic Toxicity (Survival) <i>Americamysis bahia</i>	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Chronic Aquatic Toxicity (Growth) <i>Americamysis bahia</i>	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Chronic Aquatic Toxicity (Fecundity) <i>Americamysis bahia</i>	C-NOEC ≥ 6.0%	Regs. Conn. State Agencies 22a-430-4(1)(5)(A). Anti-backsliding regulations	Annually	Daily Composite
Chronic Aquatic Toxicity (Survival) <i>Cyprinodon variegatus</i>	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Chronic Aquatic Toxicity (Growth) <i>Cyprinodon variegatus</i>	C-NOEC ≥ 6.0%	Regs. Conn. State Agencies 22a-430-4(1)(5)(A). Anti-backsliding regulations	Annually	Daily Composite
1-Chloro-2-nitrobenzene	AML = 10.2 µg/L MDL = 17.7 µg/L MIL = 26.5 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Quarterly	Daily Composite
1-Chloro-2-nitrobenzene	AML = 3.62 g/day MDL = 6.29 g/day	Conversion of WQBELs to mass limits	Quarterly	Daily Composite
1,1-Dichloroethane	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
1,1-Dichloroethylene	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
1,1,1-Trichloroethane	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
1,2-Dichlorobenzene	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
1,2-Dichloroethane	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
1,2-trans-Dichloroethylene	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
1,2,4-Trichlorobenzene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
1,3-Dichlorobenzene	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
1,4-Dichlorobenzene	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
DSN 101-1:				
1,4-Dioxane	AML = 43.3 µg/L MDL = 75.0 µg/L MIL = 113 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Twice/Month	Daily Composite
1,4-Dioxane	AML = 15.4 g/day MDL = 26.6 g/day	Conversion of WQBELs to mass limits	Twice/Month	Daily Composite
2-Chloroaniline	AML = 37.1 µg/L MDL = 64.3 µg/L MIL = 96.0 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Monthly	Daily Composite
2-Chloroaniline	AML = 13.1 g/day MDL = 22.8 g/day	Conversion of WQBELs to mass limits	Monthly	Daily Composite
2-Chlorophenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
2-Methylphenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
2,4-Dichlorophenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
2,4-Dimethylphenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
2,4,6-Trichlorophenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
3-Chloroaniline	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
3,3'-Dichlorobenzidine	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
3,3'-Dimethylbenzidine	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
3,4-Benzofluoranthene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
3&4-Methylphenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
4-Chloroaniline	AML = 2.83 µg/L MDL = 4.90 µg/L MIL = 7.35 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Monthly	Daily Composite
4-Chloroaniline	AML = 1.00 g/day MDL = 1.74 g/day	Conversion of WQBELs to mass limits	Monthly	Daily Composite
Acenaphthene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Acenaphthylene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Aluminum, Total	AML = 71 µg/L MDL = 136 µg/L MIL = 204 µg/L	WQBELs	Twice/Month	Daily Composite
Aluminum, Total	AML = 25 g/day MDL = 50 g/day	Conversion of WQBELs to mass limits	Twice/Month	Daily Composite
Ammonia (as N) <i>Apr 1 – Oct 31</i>	AML = 0.902 mg/L MDL = 1.745 mg/L MIL = 2.618 mg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Monthly	Daily Composite
Ammonia (as N) <i>Apr 1 – Oct 31</i>	AML = 0.320 kg/day MDL = 0.620 kg/day	Conversion of WQBELs to mass limits	Monthly	Daily Composite
Ammonia (as N) <i>Nov 1 – Mar 31</i>	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
Aniline	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Anthracene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Antimony, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Arsenic, Total	AML = 0.021 µg/L MDL = 0.034 µg/L	WQBELs	Monthly	Daily Composite
Arsenic, Total	AML = 0.0074 g/day MDL = 0.012 g/day	Conversion of WQBELs to mass limits	Monthly	Daily Composite

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
DSN 101-1:				
Azobenzene	AML = 0.20 µg/L MDL = 0.35 µg/L MIL = 0.52 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Monthly	Daily Composite
Azobenzene	AML = 0.071 g/day MDL = 0.12 g/day	Conversion of WQBELs to mass limits	Monthly	Daily Composite
Barium, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Benzene	AML = 51.0 µg/L MDL = 88.4 µg/L MIL = 133 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Quarterly	Grab Sample Average
Benzene	AML = 18.1 g/day MDL = 31.4 g/day	Conversion of WQBELs to mass limits	Quarterly	Calculation
Benzidine	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
Benzo(a)anthracene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Benzo(a)pyrene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Benzoic Acid	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
BOD ₅	AML = 20 mg/L MDL = 30 mg/L MIL = 45 mg/L	Anti-backsliding regulations	Monthly	Daily Composite
BOD ₅	AML = 7.1 kg/day MDL = 10 kg/day	Conversion of limit to mass limits	Monthly	Calculation
Bis(2-chloroethyl) ether	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Bis(2-ethylhexyl) phthalate	AML = 2.2 µg/L MDL = 3.8 µg/L MIL = 5.7 µg/L	Anti-backsliding regulations (the previous permit limits are WQBELs)	Monthly	Daily Composite
Bis(2-ethylhexyl) phthalate	AML = 0.78 g/day MDL = 1.3 g/day	Conversion of WQBELs to mass limits	Monthly	Calculation
Cadmium, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Carbazole	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Carbon Disulfide	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Chlorine, Total Residual;	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
Chlorobenzene	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
Chloroethane	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Chloroform	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Chromium, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Chrysene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
cis-1,2-Dichloroethene	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
Copper, Total	AML = 2.9 µg/L MDL = 3.4 µg/L	WQBELs	Twice/Month	Daily Composite
Copper, Total	AML = 1.0 g/day MDL = 1.2 g/day	Conversion of WQBELs to mass limits	Twice/Month	Calculation
Cyanide, Total	AML = 0.58 µg/L MDL = 1.0 µg/L MIL = 1.5 µg/L	WQBELs	Twice/Month	Grab Sample Average
Cyanide, Total	AML = 0.20 g/day MDL = 0.35 g/day	Conversion of WQBELs to mass limits	Twice/Month	Calculation
Dibenzofuran	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Dichloran	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
DSN 101-1:				
Diphenamid	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Ethylbenzene	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Flow Rate, Average daily	94,000 gpd	Permitted discharge flow per application	Daily	Continuous
Flow, Maximum during 24-hr period	129,600 gpd	Permitted discharge flow per application	Daily	Continuous
Fluoranthene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Fluorene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Formaldehyde	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
Iron, Total	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Lead, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
m-Toluidine	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Manganese, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Mercury, Total	Monitoring only requirement for pollutant of concern		Monthly	Daily Composite
Methyl bromide	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Methylene chloride	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Methyl tert butyl ether	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Naphthalene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Nickel, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Nitrate (as N)	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Nitrite (as N)	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Nitrobenzene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Nitrogen, Total	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Nitrogen, Total, Annual Loading	75.0 lbs/day	WQBEL based on TMDL	Annually	Calculation
Organic Nitrogen	Monitoring only requirement due to TMDL		Monthly	Daily Composite
Oxygen, Dissolved	Monitoring only requirement for pollutant of concern		Monthly	Grab
PCBs	AML=0.000064 µg/L MDL=0.000104 µg/L MIL = 0.000166 µg/L	WQBELs	Twice/Month	Daily Composite
PCBs	AML=0.000022g/day MDL=0.000037g/day	Conversion of WQBELs to mass limits	Twice/Month	Calculation
pH, Minimum	MIL = 6.5 SU	WQC	Continuous	Instantaneous
pH, Maximum	MIL = 8.0 SU	WQC	Continuous	Instantaneous
Phenanthrene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Phenol	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Phosphorus, Total	Monitoring only requirement due to Phosphorus Strategy		Monthly	Daily Composite
Pyrene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Silver, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Sulfide	Monitoring only requirement for pollutant of concern		Quarterly	Daily Composite
Tetrachloroethylene	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Toluene	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
Total Suspended Solids	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

Pollutants	Limit	Basis For Limit	Monitoring/ Reporting Frequency	Sample Type
DSN 101-1:				
Total Suspended Solids	AML = 7.1 kg/day MDL = 10.6 kg/day	Conversion of limit to mass limits	Monthly	Calculation
Trichloroethylene	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Vanadium, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite
Vinyl chloride	Monitoring only requirement for pollutant of concern		Quarterly	Grab Sample Average
Xylenes, Total	Monitoring only requirement for pollutant of concern		Annually	Grab Sample Average
Zinc, Total	Monitoring only requirement for pollutant of concern		Annually	Daily Composite

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. These values 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, the permit limit for bis(2-ethylhexyl) phthalate was lower than the ML that the Permittee was able to achieve through analyses approved under 40 CFR Part 136. Based on the lab results submitted in the previous permit term, the Permittee has been able to achieve an ML of 2.2 µg/L that is considered sufficiently sensitive. Therefore, the ML required by their permit is set as the WQC at 2.2 µg/L.

The limit for PCBs applies to total PCB congeners or total PCB Aroclors, which is consistent with the CT WQS. Compliance with the permit limit will be demonstrated using a method in 40 CFR Part 136. In the Methods Update Rule 22, the EPA has proposed to replace the methods for seven PCB Aroclors with Method 1628, which is able to quantify all PCB congeners (<https://www.epa.gov/cwa-methods/methods-update-rules>). Once this proposal is promulgated, the Permittee will be required to use the new, more sensitive, approved method for determining compliance with PCB limits.

The following MLs are unique to the Permittee’s discharge and have been incorporated into the permit for the given reasons, described below.

List of MLs Required by the Permit			
Parameter	ML	Unit	Justification
1,1-Dichloroethylene	3.2	µg/L	Equal to the lowest applicable WQC.
1,2,4-Trichlorobenzene	1	µg/L	Equal to the lowest ML of the analytical methods approved under 40 CFR part 136.
2,4,6-Trichlorophenol	4	µg/L	Equal to the lowest ML of the analytical methods approved under 40 CFR part 136.
Benzo(a)anthracene	1	µg/L	Equal to the lowest ML of the analytical methods approved under 40 CFR part 136.
Benzo(a)pyrene	1	µg/L	Equal to the lowest ML of the analytical methods approved under 40 CFR part 136.
Bis(2-ethylhexyl) phthalate	2.2	µg/L	Equal to the lowest applicable WQC.
Chrysene	1	µg/L	Equal to the lowest ML of the analytical methods approved under 40 CFR part 136.
Fluoranthene	1.28	µg/L	Equal to the lowest applicable WQC.
Mercury	0.05	µg/L	Equal to the lowest applicable WQC.
Phenanthrene	1.4	µg/L	Equal to the lowest applicable WQC.

3.12 Compliance Schedule

The permit has a compliance schedule that follows the requirements found under 40 CFR Section 122.47 and RSCA Section 22a-430-4(1)(3).

DEEP is requiring effluent monitoring for per- and polyfluoroalkyl substances (“PFAS”) in certain discharges to support further regulatory evaluations regarding the identification of contributing sources of such substances to the state’s surface waters. Historical activities that have occurred at the site include chemical manufacturing, electrical component manufacturing, production of photographic chemicals, dyes, pigments, coating and adhesive additives. Process wastes from the industrial processes were disposed on-site, and lagoons used to treat the chemical process wastes were also located on-site. This historical contamination is the source of pollutants in the groundwater now being treated by the GWTF and discharged through DSN 001-1. These types of activities have been identified as a potential source of PFAS in accordance with DEEP’s Industrial NPDES and Pretreatment PFAS Roadmap (https://portal.ct.gov/-/media/deep/water_regulating_and_discharges/industrial_wastewater/2023-09-30-wped-pfas-roadmap.pdf?rev=5c0dcefce55844b8b28fc88062061a93&hash=BA31B59EEE5E9F36CA4FE9EE08A7B28C).

As such, this permit contains a compliance schedule requiring the Permittee to develop, submit for approval, and implement a PFAS monitoring and sampling plan to ensure data is representative and undergoes proper quality control and assurance. The industrial classification has been identified as a potential source, and the effluent will be sampled to characterize the discharge.

3.13 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 Connecticut Water Quality Standards (Section 22a-426-8(b-f) of the Regulations of Connecticut 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 Connecticut Water Quality Standards, 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.

Compliance with all the terms and conditions in the new permit would ensure that existing and designated uses of surface waters and the water quality necessary for their protection are maintained and preserved.

3.14 Anti-Backsliding

The limits in this permit are in compliance with 40 CFR 122.44(l) Regs. Conn. State Agencies Section 22a-430-4(1)(4)(A)(xxiii). 40 CFR Section 122.44(1)(2)(i)(B)(1) states, permit limits may be less stringent if “Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.”

3.15 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

The Permittee requested a reduction of monitoring for aquatic toxicity, volatile organic compounds (“VOCs”), cyanide, and TRC in *NPDES Renewal Application Addendum* dated March 14, 2025. Additionally, the Permittee requested to change the sample type from grab sample average to grab sample for VOCs, cyanide, and TRC. DEEP has reviewed the submitted information, as well as past monitoring results, and has made the following monitoring changes:

- Monitoring for Barium and Manganese were added to the permit.
- Monitoring for 2-Chloroaniline, 4-Chloroaniline, and Azobenzene has been reduced from twice per month to monthly. These parameters have not been detected in the effluent, however, the ML is higher than the permit limit, so monthly monitoring will be required to determine compliance with the permit limits, which will be based on the ML. Monitoring for Bis(2-ethylhexyl) phthalate (“DEHP”) has also been reduced from twice per month to monthly. There has only been one detection of DEHP out of 72 samples, which was below the ML.
- Monitoring for Ammonia between April 1 and October 31 has been reduced from twice per month to monthly, because there was no reasonable potential for Ammonia to exceed the WQC during these months. This frequency will be consistent with other nitrogen monitoring.
- Monitoring for 1-Chloro-2-nitrobenzene and Benzene were reduced from twice per month to quarterly. All effluent monitoring indicated that these parameters have not been present.
- Monitoring for 1,1-Dichloroethylene; 1,1,1-Trichloroethane; Aniline; Carbazole; Chlorobenzene; cis-1,2-Dichloroethene; Dibenzofuran; Dichloran; Diphenamid; Sulfide; Toluene; TRC; and Vinyl Chloride have been reduced from monthly to quarterly. Monitoring for 1,2-Dichlorobenzene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; and 2-Chlorophenol have been reduced from quarterly to annually. There have been no detections of these in the past five years, with the exceptions of one detection of 1,2-Dichlorobenzene less than the ML, prior to the GWTF being modified in 2022. The sample type remains grab sample average for VOCs.
- m-Toluidine has not been detected in the effluent in the past five years, and recent influent monitoring shows no detections. There is no WQC for this parameter. Monitoring of the influent historically showed that this parameter was present, so it will continue to be monitored for, however, the frequency has been reduced to annual.
- Cyanide results indicate variability in concentrations over the course of a discharge day, justifying that a grab sample average sample type is appropriate. Additionally, there were effluent exceedances of cyanide in March 2023, June 2024, April 2025, and May 2025, so a reduction in the frequency of monitoring is not justified at this time. Monitoring for cyanide remains a grab sample average collected twice per month.
- The previous permit included semi-annual testing of chronic toxicity, which included a modified acute toxicity test. Chronic toxicity monitoring has been reduced to annual, and acute toxicity monitoring will be monitored semi-annually according to *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA-821-R-02-012), which aligns with recommendations from EPA published in *National Pollutant Discharge Elimination System Whole Effluent Toxicity Permit Writers’ Manual* (EPA-833-B-24-001). Additionally, the chronic toxicity tests shall be conducted using synthetic lab dilution water for determination of absolute toxicity and compliance with chronic toxicity limits, and additional tests shall be conducted using dilutions of 0% and 5.4% effluent with Quinnipiac River water to determine additive toxicity effects of the discharge on the receiving water.

- Annual monitoring has changed from March to September. The one occurrence of chronic effects occurred in September 2023, so annual chronic toxicity and all other annual monitoring is required to be conducted during this month of the year.

New WQBELs for aluminum (AML), cyanide (MDL), PCBs (MDL), arsenic (AML and MDL), and copper (AML and MDL) have been incorporated into the permit based on an RPA to exceed the WQC (see Section 3.5 for more details). The mass limit MDL for aluminum and the mass limit AMLs for cyanide and PCBs were recalculated for the reduced flow. Mass limits for 1-chloro-2-nitrobenzene; 1,4-dioxane; 2-chloroaniline; 4-chloroaniline; azobenzene; benzene; bis(2-ethylhexyl) phthalate; ammonia; BOD₅; and TSS have been updated to reflect the reduction of flow. See Section 3.8 for mass limit calculations.

The total nitrogen limit of 75 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*.

Compliance levels have been incorporated into the permit for 4-chloroaniline, arsenic, azobenzene, copper, cyanide, and total PCBs. The WQBELs for these parameters are below the MLs of the associated analytical tests. Therefore, compliance levels equivalent to the ML of the test method has been included in the permit.

Chemical monitoring that is required with acute and chronic 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 001-AT) and C (DSN 001-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.

New MLs have been incorporated for 1,1-Dichloroethylene; 1,2,4-Trichlorobenzene; 2,4,6-Trichlorophenol; Benzo(a)anthracene; Benzo(a)pyrene; Bis(2-ethylhexyl) phthalate; Chrysene; Fluoranthene; Mercury; and Phenanthrene. See Section 3.11.1 of this fact sheet for more details.

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.

The Permittee is required to complete a PFAS Sampling Plan as part of a compliance schedule. See Section 3.13 of this fact sheet for more details.

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. 202302964

Permit Id No. CT0001341

Interested persons may obtain copies of the application from Pharmacia & Upjohn Company LLC, 41 Stiles Ln, North Haven, CT 06473.

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 2, 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. CT0001341 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 A

NPDES #CT0001341

Line Drawings

Figure 2-1 Primary Flow Scheme

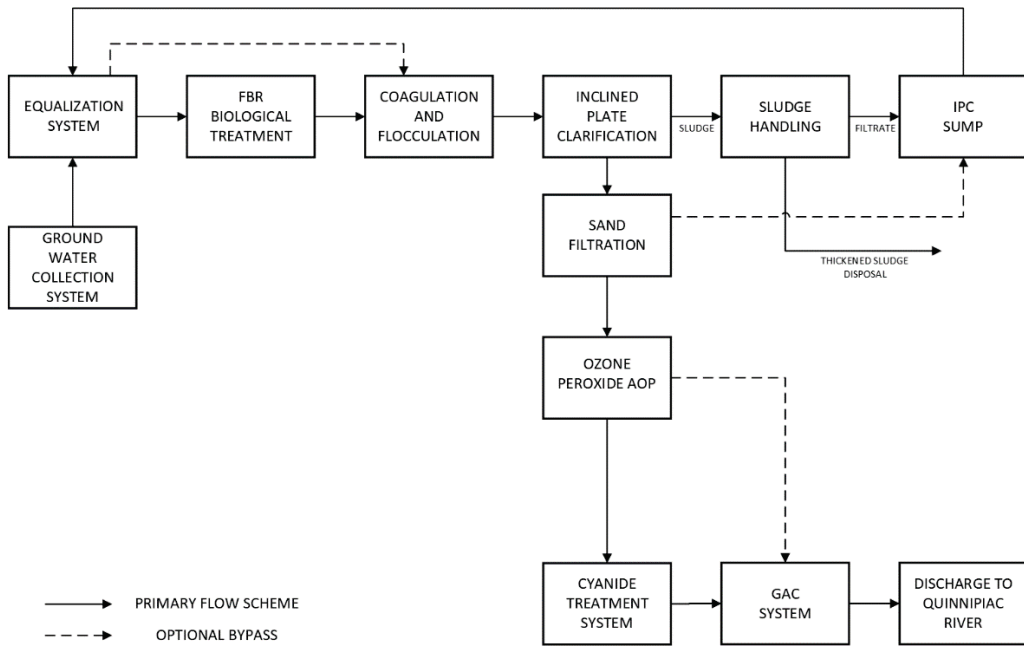
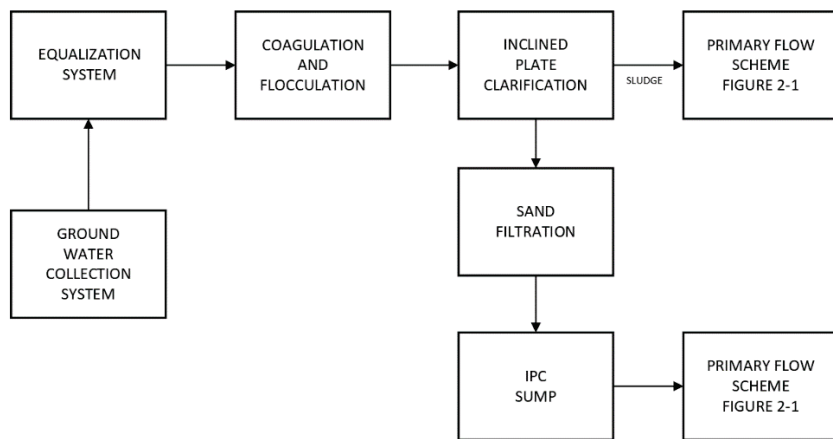
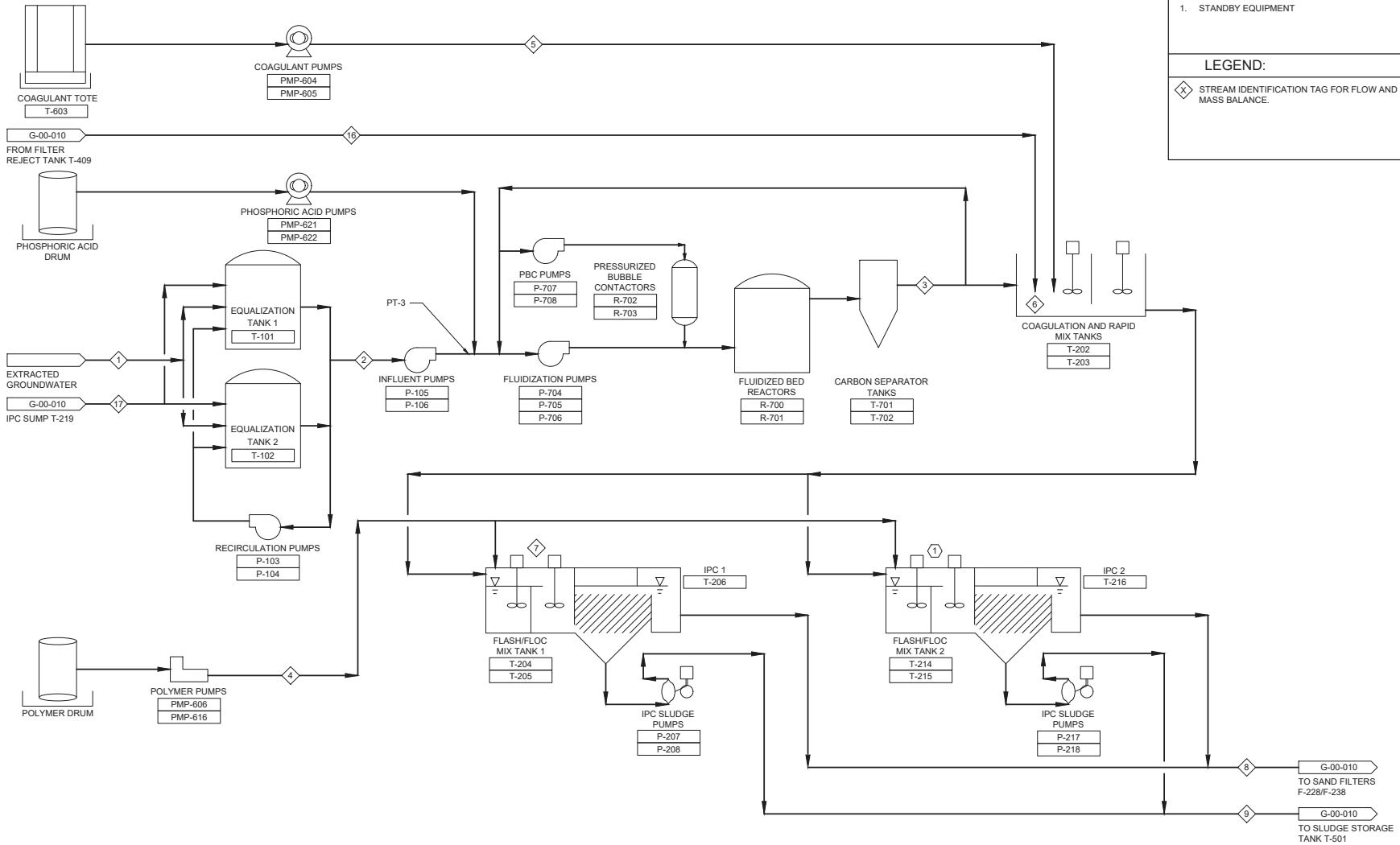


Figure 2-2 Alternate Flow Scheme



Process Flow Diagram



GENERAL NOTES

- NEW EQUIPMENT SHOWN AS BLACK.
- REFER TO DRAWING G-00-011 FOR FLOW AND MASS BALANCE.

SHEET KEY NOTES

- STANDBY EQUIPMENT

LEGEND:

◇ STREAM IDENTIFICATION TAG FOR FLOW AND MASS BALANCE.



RECORD DRAWING

THESE RECORD DRAWINGS WERE PREPARED TO THE STANDARD AND CUSTOMARY LEVEL OF DETAIL BASED ON THIRD PARTY CONSTRUCTION RECORDS. ALL DIMENSIONS AND IDENTIFICATION OF EXISTING AND NEW FEATURES SHOWN ON THE DRAWINGS SHALL BE CONSIDERED APPROXIMATE AND INDEPENDENTLY VERIFIED IN THE FIELD BEFORE RELIANCE ON INFORMATION.



PFIZER INC.
 PHARMACIA & UPJOHN
 COMPANY LLC SITE
 NORTH HAVEN, CONNECTICUT

GROUNDWATER TREATMENT FACILITY MODIFICATIONS

REVISIONS

REV	DATE	DESCRIPTION
-	8-30-23	RECORD DRAWING

LINE IS 2 INCHES AT FULL SIZE

DESIGNED: CG
 DRAWN: WS
 CHECKED: SG
 CHECKED: HF
 APPROVED: JP

FILENAME: G-00-009.DWG
 BC PROJECT NUMBER: 150668
 PFIZER PROJECT NUMBER:

GENERAL

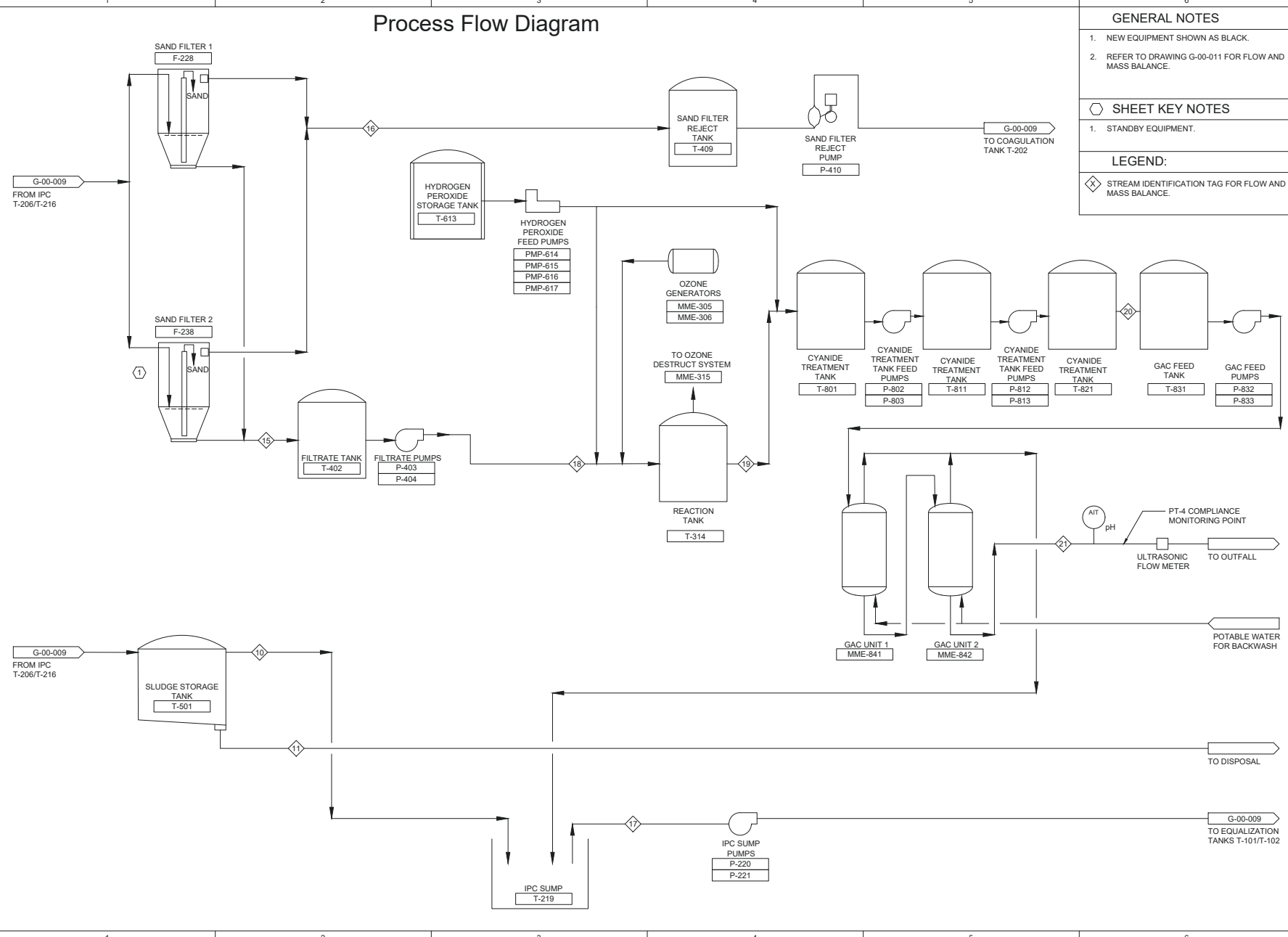
PROCESS FLOW DIAGRAM 1

DRAWING NUMBER: **G-00-009**
 SHEET NUMBER OF:

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Path: \\WOODWARDCLARK\NET\SHARED\PROJECTS\217426.01 PFIZER\N1 - MPA RENOV - YEAR 1\MPFPLAN_RDR\CONTINGENCY\2024 UPDATE - FILENAME: G-00-010-PFD.DWG PLOT DATE: 2/20/2024 7:45AM CAD USER: PATTI.FILLMORE

Process Flow Diagram



GENERAL NOTES

- NEW EQUIPMENT SHOWN AS BLACK.
- REFER TO DRAWING G-00-011 FOR FLOW AND MASS BALANCE.

SHEET KEY NOTES

- STANDBY EQUIPMENT.

LEGEND:

- ◇ STREAM IDENTIFICATION TAG FOR FLOW AND MASS BALANCE.



RECORD DRAWING

THESE RECORD DRAWINGS WERE PREPARED TO THE STANDARD AND CUSTOMARY LEVEL OF DETAIL BASED ON THIRD PARTY CONSTRUCTION RECORDS. ALL DIMENSIONS AND IDENTIFICATION OF EXISTING AND NEW FEATURES SHOWN ON THE DRAWINGS SHALL BE CONSIDERED APPROXIMATE AND INDEPENDENTLY VERIFIED IN THE FIELD BEFORE RELIANCE ON INFORMATION.

PFIZER INC.
 PHARMACIA & UPJOHN
 COMPANY LLC SITE
 NORTH HAVEN, CONNECTICUT

GROUNDWATER TREATMENT FACILITY MODIFICATIONS

REVISIONS	
REV	DESCRIPTION
-	8-30-23 RECORD DRAWING

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:	CG
DRAWN:	WS
CHECKED:	SG
CHECKED:	HP
APPROVED:	JP

FILENAME: G-00-010-PFD.DWG
 BC PROJECT NUMBER: 15666
 PFIZER PROJECT NUMBER:

GENERAL PROCESS FLOW DIAGRAM 2

DRAWING NUMBER: **G-00-010**
 SHEET NUMBER OF

Attachment B

Violation Report Majors

PHARMACIA & UPJOHN COMPANY, LLC CT0001341

0011

End Date	Param	Parameter Desc	Loc	Type	Stat	Base Code	Limit Value	DMR Value	Units	Vio Code
03/31/2021	01105	Aluminum, total [as Al]	1	C2	MO	AVG	83.9000	34.2500	ug/L	D90
03/31/2021	01105	Aluminum, total [as Al]	1	Q1	MO	AVG	33.8000	11.8600	g/d	D90
03/31/2021	82388	1,4-Dioxane	1	C2	MO	AVG	112.0000	26.3500	ug/L	D90
03/31/2021	82388	1,4-Dioxane	1	Q1	MO	AVG	45.0000	6.7090	g/d	D90
07/31/2022	71880	Formaldehyde	1	C2	MO	AVG			ug/L	D80
07/31/2022	71880	Formaldehyde	1	C3	DAILY	MX			ug/L	D80
09/30/2022	01105	Aluminum, total [as Al]	1	C2	MO	AVG	83.9000	96.2500	ug/L	E90
03/31/2023	00720	Cyanide, total [as CN]	1	C2	MO	AVG	0.8000	1.0000	ug/L	E90
03/31/2023	00720	Cyanide, total [as CN]	1	C3	INST	MAX	1.0000	19.0000	ug/L	E90
03/31/2023	00720	Cyanide, total [as CN]	1	Q1	MO	AVG	0.2300	0.2840	g/d	E90
03/31/2023	00720	Cyanide, total [as CN]	1	Q2	INST	MAX	0.4000	0.9140	g/d	E90
03/31/2023	01268	Antimony, total recoverable	1	C2	MO	AVG		0.0	ug/L	D80
03/31/2023	01268	Antimony, total recoverable	1	C3	DAILY	MX		0.0	ug/L	D80
11/30/2023	00720	Cyanide, total [as CN]	1	C2	MO	AVG	0.8000	0.0	ug/L	D90
11/30/2023	00720	Cyanide, total [as CN]	1	C3	INST	MAX	1.0000	0.0	ug/L	D90
11/30/2023	00720	Cyanide, total [as CN]	1	Q1	MO	AVG	0.2300	0.0	g/d	D90
11/30/2023	00720	Cyanide, total [as CN]	1	Q2	INST	MAX	0.4000	0.0	g/d	D90
03/31/2024	01045	Iron, total [as Fe]	1	C2	MO	AVG		6.6670	ug/L	D80
03/31/2024	01045	Iron, total [as Fe]	1	C3	DAILY	MX		10.0000	ug/L	D80
03/31/2024	TOP3E	NOEC Lethal Static Renewal 7 Day	1	C1	INST	MIN			%	D80
03/31/2024	TPP3E	NOEC Sub-Lethal Static Renewal 7	1	C1	INST	MIN			%	D80
06/30/2024	00720	Cyanide, total [as CN]	1	C2	MO	AVG	0.8000	0.9170	ug/L	E90
06/30/2024	00720	Cyanide, total [as CN]	1	C3	INST	MAX	1.0000	1.8330	ug/L	D90
06/30/2024	00720	Cyanide, total [as CN]	1	C3	INST	MAX	1.0000	1.8330	ug/L	E90
06/30/2024	00720	Cyanide, total [as CN]	1	Q2	INST	MAX	0.4000	0.4190	g/d	E90
10/31/2024	82388	1,4-Dioxane	1	C2	MO	AVG	43.3000	4.4500	ug/L	D90
10/31/2024	82388	1,4-Dioxane	1	Q1	MO	AVG	17.5000	1.0470	g/d	D90
04/30/2025	00720	Cyanide, total [as CN]	1	C3	INST	MAX	1.0000	1.1670	ug/L	E90
05/31/2025	00720	Cyanide, total [as CN]	1	C3	INST	MAX	1.0000	1.1670	ug/L	E90

Attachment C

Calculation of Ammonia Criteria for Freshwater Surface Waters

Quinnipiac River

Calculation of Freshwater Water Quality Criteria For Ammonia

- 1 Criteria for ammonia, (mg/L as N) vary in response to ambient surface water temperature (T, degrees C) and pH. Biological integrity is considered impaired when:
 - A The one-hour average concentration of total ammonia exceeds:
 $[0.275/(1+10^{(7.204-pH)})] + [39.0/(1+10^{(pH-7.204)})]$ when salmonids are present
Or
 $[0.411/(1+10^{(7.204-pH)})] + [58.4/(1+10^{(pH-7.204)})]$ when salmonids are absent
 - B The four-day average concentration of total ammonia exceeds 2.5 times the value obtained from the formula in 14.c. below.
 - C The 30-day average concentration of total ammonia exceeds:
 $[0.0577/(1+10^{(7.688-pH)})] + [2.487/(1+10^{(pH-7.688)})] \times [\text{MIN}(2.85, 1.45 \times (10^{(0.028(25-T))}))]$
when early life stages are present;
or
 $[0.0577/(1+10^{(7.688-pH)})] + [2.487/(1+10^{(pH-7.688)})] \times [1.45 \times (10^{(0.028(25-\text{MAX}(T,7))}))]$
when early life stages are absent.

Data

Used data from the USGS gage stations located on the Quinnipiac River at Wallingford, Meriden and Southington for Jan 2013- Jan 2024. Data was obtained through the EPA Water Quality Data Portal.

Data were parsed into two groups: April through October and November through March. Average, minimum, and maximum Ammonia concentrations were calculated along with the number of observations. Ammonia concentrations are expressed in mg/l.

Table 1: Measured Ambient Ammonia Concentration (mg/L)

Months	pH				Temperature, water			
	Average	Minimum	Maximum	N	Average	Minimum	Maximum	N
Apr	7.8	7.2	8.1	27	11.8	5.2	14.6	24
May	7.7	7.2	8.0	16	15.1	11.2	18.9	16
Jun	7.7	7.1	8.1	31	18.5	12.2	22.4	20
Jul	7.7	7.2	8.1	33	22.0	19.0	24.7	21
Aug	7.8	7.3	8.2	27	21.0	18.1	25.0	17
Sep	7.7	7.0	8.1	31	18.4	12.4	24.3	21
Oct	7.8	7.3	8.2	27	13.1	9.8	17.8	17
Jan	7.6	7.2	7.9	11	3.5	0.6	7.5	11
Feb	7.8	7.0	8.2	25	2.8	0.3	5.6	16
Mar	7.8	7.2	8.1	17	5.9	2.8	13.5	17
Nov	7.6	7.2	7.9	15	9.6	6.7	13.7	15
Dec	7.8	7.5	8.0	26	5.0	2.0	7.7	18

Applicable Waterbody Segments

These calculated criteria apply to the freshwater portions of the Quinnipiac River:

Table 2: Applicable Waterbody Segments

Applicable Water Segments	
CT5200-00_01	Quinnipiac River (North Haven/Wallingford)-01
CT5200-00_02	Quinnipiac River (North Haven/Meriden)-02
CT5200-00_03	Quinnipiac River (Meriden)-03
CT5200-00_04	Quinnipiac River (Cheshire/Meriden/Southington)-04
CT5200-00_05	Quinnipiac River (Southington)-05
CT5200-00_06	Quinnipiac River-06
CT5200-00_07	Quinnipiac River-07
CT5200-00-4-L2_01	Hanover Pond (Meriden)

Salmonids

Salmonids are potentially present in the Quinnipiac River

Early Life Stage Presence

Based on expected monthly conditions as follows

Table 3: Determination for Potential Presence of Early Life Stages

Months	Biological Condition	Early Life Stages Present
Apr	Habitat Forming	No
May	Clupeid Spawning	Yes
Jun	Resident Spawning	Yes
Jul	Rearing & Growth	Yes
Aug	Rearing & Growth	Yes
Sep	Rearing & Growth	Yes
Oct	Rearing & Growth	Yes
Jan	Overwinter	No
Feb	Overwinter	No
Mar	Habitat Forming	No
Nov	Salmonid Spawning	Yes
Dec	Overwinter	No

Acute Criteria Calculation

- Criteria are pH dependent
- Assumes a 1 hour exposure period
- Used highest maximum daily value for each analysis period, since hourly values were not available.

30-Day Average and 4-Day Average Criteria

- Criteria are pH and temperature dependent
- Equations considering the presence of early life stages were used based on selections above
- 30-Day average criteria were calculated for each month using the monthly average values
- 4-Day average criteria were calculated based on the 30-Day average criteria

Criteria Summary

Table 4: Calculated Ammonia Water Quality Criteria

Calculated Ammonia Criteria (mg/l)

Waterbody:		Quinnipiac River, Freshwater Segments		
Months	Acute	30 Day Average	4 Day Average	
April - October	3.83	2.10	5.24	
November - March	3.83	3.98	9.94	

Attachment D: Reasonable Potential Analysis & WQBEL Calculations

Reasonable Potential Analysis																	
Pollutant	Water Quality Criteria				Maximum Observed Value (µg/L)	Number of Results	CV	Multiplier	Ce	Acute ZOI (gph)	Chronic ZOI (gph)	Human Health ZOI (gph)	Cu (µg/L)	Cd _a (µg/L)	Cd _c (µg/L)	Cd _{hh} (µg/L)	Is A Limit Needed?
	Aquatic Life		Human Health														
	Acute (µg/L)	Chronic (µg/L)	Fish Consumption Only (µg/L)	Health Designation													
1,1-Dichloroethane	3,700	410	373	3	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
1,1-Dichloroethylene			3.2	3	0	42	0	1	0	-	-	69,264	0.0075	-	-	0.0071	NO RPA NEEDED
1,2,4-Trichlorobenzene	420.00	130	70	3	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
1,2-Dichlorobenzene			1,300	1	0	23	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
1,2-Dichloroethane	7,300	980	37	3	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
1,2-trans-Dichloroethylene			10,000	2	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
1,3-Dichlorobenzene			960	1	0	23	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
1,4-Dichlorobenzene			190	1	0	23	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
1,4-Dioxane			32	3	8	74	0.6	2.3	18.4	-	-	69,264	0	-	-	0.98	NO
1-Chloro-2-nitrobenzene			10.2	1	0	42	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
2,4,6-Trichlorophenol	39	4.9	2.4	1	0	12	0	1	0	-	69,264	-	0	0	0	0	NO RPA NEEDED
2,4-Dichlorophenol			290	2	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
2,4-Dimethylphenol	140	15	850	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
2-Chloroaniline	64.3	3.24			0	72	0	1	0	-	69,264	-	0	0	0	-	NO
2-Chlorophenol			150	2	0	23	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
2-Methylphenol	600	67	32,000	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
3&4-Methylphenol	499	55.5	32,520	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
3,3'-Dichlorobenzidine			0.028	1	0	42	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
3,3'-Dimethylbenzidine			0.02	1	0	42	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
3,4-Benzofluoranthene			0.018	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
3-Chloroaniline	8	0.87			0	42	0	1	0	-	69,264	-	0	0	0	0	NO RPA NEEDED
4-Chloroaniline	9	1	2.83	3	0	42	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Acenaphthene			6.1	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Acenaphthylene			49.2	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Aluminum, Total	750	87	3,200,000	2	86	73	0.6	2.3	198	-	-	-	136	198	198	198	YES
Ammonia (as N), Apr 1-Oct 31	2,380	360			193	19	0.6	2.4	463	-	69,264	-	144	463	161	463	NO
Ammonia (as N), winter	2,380	360			422	39	0.8	2.9	1224	-	69,264	-	137	1,224	195	1224	NO
Aniline	30	4.1	561	3	0	42	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Anthracene			4.92	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Antimony, Total			640	2	0	12	0	1	0	-	-	69,264	0.16	-	-	0.15	NO RPA NEEDED
Arsenic, Total	69	36	0.021	1	3.4	42	0.4	1.8	6.1	-	69,264	-	0.12	6.1	0.44	6.1	YES
Azobenzene			0.2	1	0	42	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED

Reasonable Potential Analysis

Pollutant	Water Quality Criteria				Maximum Observed Value (µg/L)	Number of Results	CV	Multiplier	Ce	Acute ZOI (gph)	Chronic ZOI (gph)	Human Health ZOI (gph)	Cu (µg/L)	Cd _a (µg/L)	Cd _c (µg/L)	Cd _{hh} (µg/L)	Is A Limit Needed?
	Aquatic Life		Human Health														
	Acute (µg/L)	Chronic (µg/L)	Fish Consumption Only (µg/L)	Health Designation													
Benzene			51	1	0	42	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Benzidine			0.0002	1	0	42	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Benzo(a)anthracene			0.018	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Benzo(a)pyrene			0.018	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Bis(2-chloroethyl) ether			0.53	3	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Bis(2-ethylhexyl) phthalate			2.2	1	0	73	0.1	1.2	0	-	-	-	0.071	-	-	0	NO
Cadmium, Total	1	0.125			0	12	0	1	0	-	69,264	-	0	0	0	-	NO RPA NEEDED
Carbazole	48	5.3	3.5	3	0	42	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Carbon Disulfide	130	15	161,290	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Chlorine, Total Residual	13	7.5	320,000	2	0	30	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Chlorobenzene			1600	2	0	42	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Chloroethane	10,000	1,100	860	3	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Chloroform			470	3	0.620	12	0.5	2.4	1.49	-	-	69,264	0	-	-	0.0796	NO
Chromium, Total	323	42	1,009,615	2	3	12	1.0	4.7	14.1	-	69,264	69,264	0.32	14.1	1.1	1.1	NO
Chrysene			0.018	1	0	12	0	1	0	-	-	-	0	-	-	0.00	NO RPA NEEDED
cis-1,2-Dichloroethene			149	2	0	42	0	1	0	-	-	69,264	0.16	-	-	0.16	NO RPA NEEDED
Copper, Total	4.8	3.1	1,300	2	3.0	73	0.1	1.2	3.6	-	-	-	4.5	3.6	3.6	-	YES
Cyanide, Total	1	1	140	2	3.17	71	0.3	1.6	5.07	-	69,264	69,264	0	5.07	0.403	0.403	YES
Dibenzofuran	36	4	34	2	0	42	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Dichloran	3.38				0	42	0	1	0	-	-	-	0	0	-	-	NO RPA NEEDED
Ethylbenzene			2,100	2	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Fluoranthene			1.28	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Fluorene			49.2	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Formaldehyde	846	94	64,000	2	36	42	0.1	1.2	43	-	69,264	69,264	0	43	2.3	2.3	NO
Iron, Total		1,000			697	23	2.2	6.8	4740	-	69,264	-	388	-	621	-	NO
Lead, Total	30	1.2	15	2	0.5	12	0.4	2.0	1.0	-	69,264	69,264	0.68	1	0.70	0.70	NO
Mercury, Total	1.4	0.77	0.051	1	0.0016	42	0.7	2.6	0.00416	-	69,264	-	0	0.0042	0.0002	0.0042	NO
Methyl bromide	38	16	1500	2	0.09	12	0.2	1.4	0.126	-	69,264	69,264	0	0.1260	0.0067	0.0067	NO
Methyl tert butyl ether	210,000	32,000	32,000	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Methylene chloride			590	3	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Naphthalene	170	21	20,513	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Nickel, Total	74	8.2	4,600	2	4.6	12	0.6	2.8	12.88	-	69,264	69,264	0.25	12.88	0.93	0.93	NO
Nitrobenzene	1,000	230	690	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
PCBs, Total Arochlors		0.014	0.000064	1	0.0016	11	0.6	2.9	0.00464	-	69,264	-	0	-	0.00025	0.0046	YES

Reasonable Potential Analysis																	
Pollutant	Water Quality Criteria				Maximum Observed Value (µg/L)	Number of Results	CV	Multiplier	Ce	Acute ZOI (gph)	Chronic ZOI (gph)	Human Health ZOI (gph)	Cu (µg/L)	Cd _a (µg/L)	Cd _c (µg/L)	Cd _{hh} (µg/L)	Is A Limit Needed?
	Acute (µg/L)	Chronic (µg/L)	Fish Consumption Only (µg/L)	Health Designation													
Phenanthrene	4.7	1.4	49.17	1	0	12	0	1	0	-	69,264	-	0	0	0	0	NO RPA NEEDED
Phenol			860,000	2	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Pyrene			49.17	1	0	12	0	1	0	-	-	-	0	-	-	0	NO RPA NEEDED
Silver, Total	1.02				0	12	0	1	0	-	-	-	0	0	-	-	NO RPA NEEDED
Tetrachloroethylene			3.3	2	0	12	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Toluene			15,000	2	0	42	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Trichloroethylene			30	3	0	12	0	1	0	-	-	69,264	0.20	-	-	0.19	NO RPA NEEDED
Vanadium, Total	79	27	261	2	5.6	12	0.3	1.7	9.5	-	69,264	69,264	0	9.5	0.51	0.51	NO
Vinyl chloride			2.4	3	0	42	0	1	0	-	-	69,264	0	-	-	0	NO RPA NEEDED
Xylenes, Total	240	27	37,453	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED
Zinc, Total	65	65	7,400	2	0	12	0	1	0	-	69,264	69,264	0	0	0	0	NO RPA NEEDED

Ce = Projected maximum effluent concentration; Cu = background concentration (upstream); Cd_a = expected maximum acute concentration downstream; Cd_c = expected maximum chronic concentration downstream; Cd_{hh} = expected maximum human health concentration downstream; Qu = ZOI = 69,264 gallons per hour (gph); Qe = average daily flow = 3,917 gph

QBEL Calculations																
Pollutant	Acute ZOI (gph)	Chronic ZOI (gph)	Human Health ZOI (gph)	WLA Acute (µg/L)	WLA Chronic (µg/L)	WLA Human Health (µg/L)	CV	LTA Acute	LTA Chronic	LTA Human Health	Limiting LTA	Number of Samples/ Month for Permit Limit	AML (µg/L)	MDL (µg/L)	AML (g/d)	MDL (g/d)
Aluminum, Total	0	0	0	750	87	6,400,000	0.6	241	46	6,400,000	46	4	71	142	25	50
Arsenic, Total	0	0	0	69	36	0.021	0.4	30	23	0.021	0.021	4	0.021	0.034	0.0074	0.012
Copper, Total	0	0	0	4.8	3.1	2,600	0.1	3.8	2.8	2,600	2.8	4	2.9	3.4	1.0	1.2
Cyanide, Total	0	69,264	69,264	1	19	5,229	0.3	1	13	5,229	0.53	4	0.62	1.0	0.22	0.35
PCBs	0	69,264	0	-	0.26	0.000064	0.6	-	0.14	0.000064	0.000064	4	0.000064	0.000104	0.000022	0.000037