National Pollutant Discharge Elimination System Permit Factsheet

NPDES Permit Summary	
Applicant	Plainfield Renewable Energy, LLC
Permit No.	CT0030473
Application No.	201801971
Date Application Received	February 28, 2018
Location Address	12 Mill Brook Road, Plainfield, CT 06374
Facility Contact	Mark Boucher, EHS Compliance Coordinator Office Phone: (860) 457-9307 Email: mboucher@plainfieldre.com
Mailing Address	12 Mill Brook Road, Plainfield, CT 06374
DMR Contact	Mark Boucher, EHS Compliance Coordinator Office Phone: (860) 457-9307 Email: mboucher@plainfieldre.com
Secretary of State Business ID	0853528
Permit Term	5 Years
Permit Category	National Pollutant Discharge Elimination System ("NPDES") Minor ("MI")
SIC & NAICS Code(S)	4911 & 221112 (Biomass Electric Power Generation)
Applicable Effluent Guidelines	None
Permit Type	Reissuance
Ownership	Private
Receiving Water	DSN 101: Quinebaug River DSN 102, 103 & 104: Groundwater in the Mill Brook watershed
Waterbody Segment Id's	CT3700-00_02
Waterbody Classification	DSN 101: Surface water Class B DSN 102 & 103: Ground water Class GA-Impaired DSN 104: Ground water Class GA
Discharge Locations (Latitude, Longitude)	DSN 101: 41° 39′ 35", -71° 57′ 49" DSN 102 & 103: 41° 39′ 42", -71° 55′ 28" DSN 104: 41° 39′ 56", -71° 55′ 26"
Water Intake Location (Latitude, Longitude)	Intake SN 101H: 41° 39′ 40", -71° 57′ 41"
Compliance Schedule/Actions	Yes (Thermal verification study)
Staff Engineer	Oluwatoyin Fakilede, Environmental Engineer 3 Phone: (860) 418-5986; E-Mail: Oluwatoyin.fakilede@ct.gov

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Section 1 Facility Summary

1.1 Permit Fees

1.1.1 Application Fee:

Filing Fee	Invoice No.: DEP297437	Amount: $ 1,300.00	Date Paid: 2/28/2018
Processing Fee	Invoice No.: DEP299637	Amount: $ 10,225.00	Date Paid: 4/24/2018
Processing Fee	Invoice No.: DEP310412	Amount: $ 7,350.00	Date Paid: 4/25/2018

1.1.2 Annual Fee:

Wastewater Category (per Regs. Conn. State Agencies sec. 22a-430-7)	**Fee Flow Category** Gallons per day ("gpd")	**DSN**	**Annual Fee** (per Regs. Conn. State Agencies sec. 22a-430-7 and CGS sec. 22a-6f)
Non-contact cooling water ("NCCW") from steam generating power plant	> 50,000	101	$ 8,425.00
Hydrostatic pressure testing wastewater	> 50,000	102	$ 2,290.00
Hydrostatic pressure testing wastewater	> 50,000	103	---
NCCW make up supply tank drain	> 50,000	104	
TOTAL AMOUNT			$ 10,715.00

1.2 Application Submittal Information

On February 28, 2018, the Department of Energy and Environmental Protection ("DEEP") received an application (Application No. 201801971) from Plainfield Renewable Energy, LLC ("the Permittee", "the Applicant", "the facility") located in Plainfield, CT06374, for the renewal of its NPDES permit (Permit No. CT0030473) and state permit (Permit No. SP0002464), expiring on August 29, 2018 ("the previous permits").

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 Norwich Bulletin on February 20, 2018. On April 26, 2018, the application was determined to be timely and administratively sufficient.

The Permittee seeks authorization for the following in Application No. 201801971:

DSN	**Proposed Average Daily Flow (gpd)**	**Proposed Maximum Daily Flow (gpd)**	**Proposed Waste Streams**	**Treatment Type**	**Discharge to**
101	126,103	173,571	NCCW (cooling tower blowdown)	Filtration, chlorine removal using sodium bisulfite and pH adjustment	Quinebaug River

DSN	Proposed Average Daily Flow (gpd)	Proposed Maximum Daily Flow (gpd)	Proposed Waste Streams	Treatment Type	Discharge to
102	NA	225,000	Fire pump test wastewater	No treatment	Infiltration into groundwater
103	NA	225,000	Fire hydrant test wastewater	No treatment	Infiltration into groundwater
104	NA	250,000	Make up supply tank drain	No treatment	Infiltration into groundwater

Intake	Design Intake Flow (gpd)	Intake Water Description	Source Water
001-H	893,000	Intake cooling water	Quinebaug River

This permit was previously assigned two permit numbers: Permit Nos. CT0030473 and SP0002464. Groundwater discharges from DSNs 102, 103, and 104 were associated with Permit No. SP0002464. Permit No. SP0002464 has been terminated and removed from this permit. All discharges, including DSNs 102, 103, and 104 are now covered under Permit No. CT0030473.

1.3 Other Permits

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

- Stormwater from the site is permitted under the "General Permit for Stormwater Activity Associated with Industrial Activities" (GSI002655); and
- Air compressor condensate, boiler blowdown and building maintenance wastewaters from the site are discharged to the Plainfield Publicly Owned Treatment Works ("POTW") under coverage of the "General permit for Discharges from Miscellaneous Industrial Users (MIU GP)".

The Permittee also has a water diversion permit (DIV-200603081) that authorizes the withdrawal of 893,000 gallons per day water from the Quinebaug River.

1.4 Facility Description

Plainfield Renewable Energy, LLC ("PRE") is a 37.5 MW (megawatt) wood gasification biomass power plant facility in Plainfield. The power plant is located at 12 Mill Brook Road in Plainfield, Connecticut, at the intersection of Mill Brook Road and Norwich Road. The pumphouse for the intake is located at 114 Packer Road in Canterbury, Connecticut, about two miles away from the power plant. The Permittee has maintained a NPDES permit since 2008.

The Mill Brook facility consists of two (3) separate operational units:

1. A "volume reduction plant" (VRP) where wood chips are received through a double truck scale system, unloaded into hoppers, conveyed, handled, stored in piles located in a dedicated

area (outdoors and/or under a canopy structure), screened and subsequently conveyed for gasification at the adjacent "power block facility" (PBF). The outdoor storage incorporates: a truck emergency access; a storage buffer zone; a sealed pavement; curbs; and a stormwater control system (catch basins; a pump station; and underground and above ground storage tanks);

2. A "power block facility" (PBF) housing various ancillary equipment, including: a fluidized bed gasification and boiler system designed to process biomass (wood); a bottom ash residue collection system; a fly ash residue collection system; an air pollution system; an induced (ID) fan/stack system; a storage silo for bottom and fly ash residue; steam turbine generator system; a water treatment system designed to filter, clarify and store cooling water; and a transformer connected to the electrical distribution grid; and

3. An office building that houses the system control/monitoring room.

1.5 Description of Industrial Process

When in operation, the Permittee operates for 24 hours a day. The facility is fueled solely by wood (biomass) and utilizes a fluidized bed gasification process with a single close-coupled boiler to power the steam turbine generator. Using a network of conveyors, biomass is fed into a bubbling-bed gasifier under tightly controlled, sub-stoichiometric oxygen conditions, to produce a high-quality synthetic gas ("syngas"). The syngas is combusted to transfer heat to water-filled tubes, thereby generating steam. The steam is then superheated by capturing residual thermal energy from the flue-gas stream before directing it into a steam turbine. The rotation of the turbine drives the on-site generator, producing renewable electricity that is sent to the power grid, which supports local as well as regional energy needs.

The biomass fuel comes from various sources, which includes forest management residues, land clearing debris, and waste wood from industries and construction and demolition (C&D) waste. Bio-diesel (B100) is also used to supplement the solid fuel supply during startup, refractory curing, and for process stabilization.

The following intake and discharges are associated with the electricity producing process.

1.5.1 DSN 101-1

The water withdrawn from the Quinebaug River is treated when necessary to reduce solids and then runs through a tube and shell condenser to condense the extremely pure high-pressure steam generated from the process described above. The steam is condensed back into water for reuse in the process. There is no contact between the steam and the NCCW.

The NCCW goes into a three-cell cooling tower to reduce heat by evaporation and is recycled approximately five times prior to discharge to the Quinebaug River at the pump house on Packer Road in Canterbury. Each cell includes a cooling tower bypass valve and manual isolation valve that is used during extreme cold weather months to avoid freezing in the cooling tower. During normal operations all three fans are operated. The discharge is comprised of a maximum flow of 173,571 gpd of treated cooling tower blowdown wastewater.

1.5.2 DSN 102-1
This is an intermittent discharge of 225,000 gpd of fire suppression pump test wastewater. The discharge is generated from the required annual testing of fire suppression pumps. Water pumped from the Quinebaug River is stored in an on-site service water storage tank. During testing of the fire suppression pumps, the water is discharged by infiltration into groundwater via the underground stormwater infiltration system at the power plant. No chemicals are added to the water.

1.5.3 DSN 103-1
This is an intermittent discharge of 225,000 gpd of fire hydrant test wastewater. The discharge is generated from the required annual testing of fire hydrant pumps. Water pumped from the Quinebaug River is stored in an on-site service water storage tank. During testing of the fire hydrant pumps, the water is discharged by infiltration into groundwater via the underground stormwater infiltration system at the power plant. No chemicals are added to the water.

1.5.4 DSN 104-1
This is an intermittent discharge of 250,000 gpd of make-up supply tank drain and overflow wastewaters. City water or water pumped from the Quinebaug River is stored in an on-site service water storage tank. In the event of an overflow, or draining for maintenance, the water by infiltration into groundwater via the underground stormwater infiltration system at the power plant. In recent years, the Permittee has not discharged makeup supply tank drain.

1.5.5 Intake SN 101H
The maximum intake cooling water flow is 893,000 gallons per day. Intake cooling water undergoes cylindrical wedge wire screening to minimize impingement and entrainment. Intake cooling water also undergoes neutralization, coagulation, flocculation, clarification and filtration on an as needed basis before it is used for non-contact cooling on site. The waste from the water treatment is hauled off site for disposal.

1.5.6 DSN 105-1
The demineralized water tank is now situated inside the power generating facility and overflows will discharge via floor drains to the sanitary sewer system. The discharge is covered under the "General Permit for Discharges from Miscellaneous Industrial Users (MIU GP)" and therefore has removed from the permit.

1.6 Treatment System Description

DSN 101-1 – The cooling tower blowdown undergoes filtration in two in-line 55 microns filters. Post filtration, the wastewater is dechlorinated using sodium bisulfite, and pH adjusted before discharge to the Quinebaug River. The treatment system is fully automated with continuous flow, pH, ORP and temperature monitoring. The Permittee has a preventative measure built into the logic of the wastewater control system configured to close the effluent valve at 88^{o}F and prevent it from re-opening until the measured temperature is below 88 ^{o}F. This is to ensure that the Permittee will not discharge at a temperature that is higher than the temperature limit in the permit. The temperature data is transferred to a spreadsheet during discharge events only.

The effluent monitoring is conducted at the power plant using an automatic sampler with flow proportional capacities prior to the discharge travelling about two miles to the discharge location at the pump house via underground piping system.

DSNs 102-1, 103-1 and 104-1 – There is no treatment for these wastewaters.

Intake SN 101-H – The Permittee withdraws water from Quinebaug River and treats as necessary to reduce solids to meet the water quality necessary for facility production use. The treatment of the intake water prior to use at the facility includes neutralization, coagulation, flocculation, clarification, and filtration. The waste from the water treatment is hauled off site for disposal.

1.7 Facility Changes

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

The following are a list of 3(i) determinations since the previous permit:

3(i) Application No.	Date Issued	Change Implemented
201806852	May 23, 2018	Ability to interchange intake water treatment chemicals, ChemTreat P899L with NALCO 8136, ChemTreat P813E with NALCLEAR 7766 and interchange cooling tower treatment chemicals ChemTreat CL5688 with NALCO 3DT138, ChemTreat CL-41 with NALCO Acti-brom 1338, and ChemTreat BL-1258 with NALCO 7408.
201808200	July 27, 2018	The re-use of part of the demineralized water production system effluent as partial source water for non-contact cooling. The remaining effluent from demineralized water production system will continue to discharge to the sanitary sewer and is permitted under the miscellaneous general permit, while the portion used for NCCW will be discharged to the Quinebaug River via DSN 101-1.
201904464	April 10, 2019	Replacement of the 55 microns cooling water blowdown discharge filter elements with 25 microns, to improve filtration.
202200807	April 19, 2022	In addition to the already authorized chemicals, ability to use NCCW treatment chemicals, Klaraid IC1172, Polyfloc AS 1002, E.C.O Film EF 2503, Spectrus DT 1404 and Spectrus OX 1201, supplied by GE Suez, to provide flexibility with regards to supplier's costs and product availability.

3(i) Application No.	Date Issued	Change Implemented
202306179	November 22, 2023	The use of BetzDearborn DCL30, Hypersperse MDC 714 and Optisperse ADJ5050 to improve the performance of the reverse osmosis system at the facility and Foamtrol AF3566 for defoaming in the cooling tower.

1.8 Compliance History

1.8.1 Discharge Monitoring Report Review

Based on the Permittee's Discharge Monitoring Reports ("DMR"), data evaluated from January 2020 to December 2024, the Permittee reported the following effluent violation, which has been corrected.

Table 1.8.1: Effluent violations in the past 5 years

Month/ Year	DSN	Parameter	Type of Limit	Permitted Limit	Exceedence
7/30/2021	101-1	Total Suspended Solids	MDL	30 mg/l	48 mg/l

MDL: Maximum daily limit

1.8.2 Notice of Violation

A Notice of Violation (NOV WR IN 14014) ("NOV") was issued on June 17, 2014, for the exceedance of effluent limitations at DSN 101-1 from Jan. 2014 - Mar. 2014 (see Table 1.8.2 below). The exceedances were investigated, and corrective actions were taken to prevent future recurrence. The corrective actions taken included reduction of the pore size of inline filters from 110 to 55 microns, and implementation of periodic inspections.

Table 1.8.2: DSN 101-1 NOV Effluent violations

Month/ Year	Parameter	Type of Limit	Permitted Limit	Exceedence
1/2014	Lead	AML	0.019 mg/l	0.04 mg/l
	Lead	MDL	0.019 mg/l	0.06 mg/l
	Total suspended solids	MDL	33 mg/l	30 mg/l
	Temperature	MDL	90 ºF	94 ºF
	Aluminum, total	AML	1.42 mg/l	1.51mg/l
2/2014	Lead	AML	0.019 mg/l	0.06 mg/l
	Lead	MDL	0.019 mg/l	0.06 mg/l
	Total suspended solids	AML	40.5 mg/l	20 mg/l
	Total suspended solids	MDL	114 mg/l	30 mg/l
	Aluminum, total	MDL	3.11 mg/l	2.86mg/l
3/2014	Lead	AML	0.019 mg/l	0.03 mg/l
	Lead	MDL	0.019 mg/l	0.05 mg/l
	Total suspended solids	AML	28 mg/l	20 mg/l
	Total suspended solids	MDL	65 mg/l	30 mg/l

For the temperature exceedance, the high temperature reported was not an actual exceedance because, as reported by the permittee the discharge valve was closed, and the Permittee was not discharging at that time. Rather, it was a false reading due to the temperature sensor location. The control system is now configured to close the discharge valve at 88^{o}F and prevent it from re-opening until the measured temperature is below 88 ^{o}F.

The NOV was closed on July 10, 2015.

1.8.3 Previous NPDES Permit Compliance Schedule

The previous permit issued on August 30, 2013, contained a compliance schedule that required the Permittee to submit a complete Attachment O (Part B discharge analysis of the permit application). The Permittee submitted the required Attachment O with the permit renewal application submitted on February 28, 2018.

The compliance schedule in the previous permit also required the Permittee to submit for the Commissioner's review and written approval, a scope of study and schedule for (1) performing seasonal thermal field monitoring verification of its discharge into the Quinebaug River, (2) a one-year impingement study, and (3) a two-year entrainment monitoring and evaluation of the cooling water intake structure. The studies were to be performed when the Commissioner provided written notification to the Permittee that anadromous fish population were restored in the Quinebaug River, upstream of the Aspinook Pond.

The Permittee submitted "Scopes of Study for Impingement and Entrainment Monitoring and Thermal Field Monitoring" dated February 18, 2014. The Permittee proposed not to conduct an impingement study because of the following reasons.

1. The design through screen velocity of 0.25 feet per second ("fps") should preclude the impingement of nearly all organisms with even rudimentary swimming abilities;
2. There is no practical method to collect quantitative impingement data, based on the intake structure's passive design; and
3. Previous evaluations indicate that impingement is exceedingly rare on this type of screen.

The U.S. Environmental Protection Agency ("EPA") has determined that a through screen velocity of 0.5 fps adequately reduces impingement; therefore, CT DEEP accepts the Permittee's request and is no longer requiring the impingement study (EPA. 2014. Technical Development Document for the Final Section 316(b) Existing Facilities Rule (EPA-821-R-14-002). pp 8-3).

The impingement, entrainment, and thermal verification studies were not completed because the Permittee did not receive DEEP approval of the scope of studies in advance of this permit renewal. As part of this renewal, DEEP is no longer requesting an impingement and entrainment study because of the 316(b) final rule promulgation on August 15, 2014, which shows that closed-cycle recirculating system adequately addresses entrainment (see Section 3.16 of this fact sheet). The thermal verification study will be conducted under the renewed permit and has been included as a compliance schedule.

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 activity is not located within a coastal boundary as defined in Conn. Gen. Stat. 22a-94(b).

1.9.3 Endangered Species
There are state listed species documented within the proposed discharges areas according to the June 2025 *State and Federal Listed Species and Natural Communities Map*. However, the discharges are not anticipated to have adverse impact to state listed species.

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 subject to a conservation or preservation restriction. The Permittee implements invasive plant management and monitoring on conservation easements to mitigate impact to state listed species and submits an annual report to the Natural Diversity Data Base.

1.9.6 Public Water Supply Watershed
As provided in the permit application, the site is not located within a public water supply watershed.

Section 2 Receiving Water Body Information

The receiving waterbody, Quinebaug River, is identified as CT3700-00_02. The Segment of the Quinebaug River is an un-impaired class "B" water. FINAL-2022-IWQR-Connecticut-305b-Assessment-Results-for-Rivers-and-Streams.pdf

Figure 2.1. Image of Applicable Section of 2022 Connecticut Integrated Water Quality Report

Waterbody Segment ID	Waterbody Name	Location	Miles	Aquatic Life	Recreation
CT3700-00_02	Quinebaug River (Canterbury)-02	Aspinook Pond INLET (at Butts Bridge Road crossing), US to confuence Mill Brook, Canterbury.	2.98	Insufficient Information	Fully Supporting

2.1 Designated Uses

The designated uses for Class B waters as defined in the Regulations of Connecticut State Agencies Regs. Conn. State Agencies 22a-426-4(h) are: 1) habitat for fish other aquatic life and wildlife; 2) recreation; 3) harvesting; and 4) industrial and agricultural water supply.

2.2 Applicable Total Maximum Daily Load ("TMDL")

"A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound" (December 2000) (Long Island Sound TMDL) applies to this segment of the Quinebaug River. This TMDL is based on the control of total nitrogen. The Permittee's discharge has not been assigned a waste load allocation for nitrogen as part of this TMDL. Therefore, nitrogen monitoring requirements without numeric limitations have been included in the permit.

2.2.1 Phosphorus

DEEP developed a final report, "Recommendations for Phosphorus Strategy Pursuant to PA 12-155" (February 16, 2017) (Phosphorus Strategy PA12-155), for freshwater in 2017. The Phosphorus Strategy applies to the Quinebaug River. The Permittee's discharge did not exist at the time the Phosphorus Strategy was developed; therefore, the current permit prohibited the discharge of phosphorus. Specifically, the permit prohibits the Permittee from using any chemicals that contain phosphorus in any process or activity that may result in a discharge to waters of the state.

The Quinebaug River has been identified as a priority water and is listed on the 2022-2024 priority list of waters for action plan development for phosphorus. The action plan titled "Connecticut Advance Restoration Plan For Total Phosphorus in Non-Tidal Surface Waters" (Connecticut Advance Restoration Plan for Total Phosphorus in Non-Tidal Waters) was approved on September 19, 2024. The plan carried forward the conditions that pertain to Quinebaug River in the Phosphorus Strategy PA12-155. Therefore, the prohibition of the use of phosphorus in any process or activity that may result in a discharge to the waters of the state is being carried forward in the permit renewal.

Figure 2.2. Images of discharge locations

<u>114 Packer Road, Canterbury, CT 06331: Intake and discharge to Quinebaug River</u>

<u>12 Mill Brook Road, Plainfield, CT 06374: Infiltration to groundwater</u>

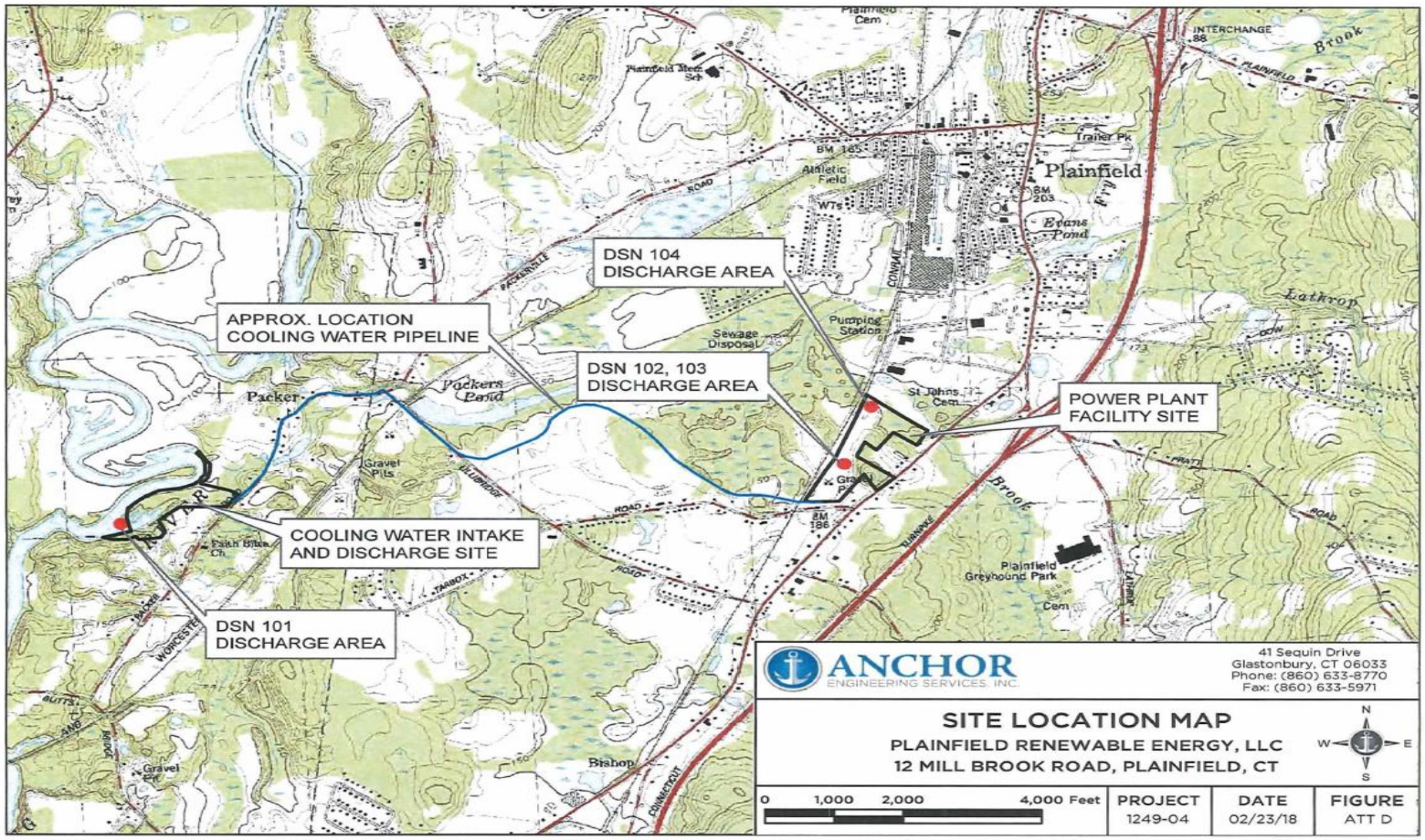


Figure 2.3. Applicable Section of 2022 Integrated Water Quality Report ("IWQR") Waterbodies with Impairments

2022-2024 IWQR Priority List of Waters for Action Plan Development (including TMDL development)					
Plan Name	**Waterbody ID**	**Waterbody ID**	**Cause**	**Plan Type**	**Status**
Interim Phosphorus Strategy	CT3700-00_02	Quinebaug River -02	Phosphorus, total	Alternative Restoration Approach	Approved September 19, 2024

final-2022-iwqr-appendix-c-1-priority-list-for-action-plan-development-2022-2024.pdf

A review of the discharge monitoring data from 1/1/2020 – 12/31/2024 showed that 2,300 µg/l of phosphorus was discharged on 11/30/2021, 2,900 µg/l was discharged on 3/31/2023, and an average daily concentration of 382 µg/l of phosphorus was discharged within the five-year period. The effluent phosphorus is likely associated with the facility's intake water. The Permittee has reviewed the cooling tower chemicals used on site and certified that none contain phosphorus.

Section 3 Permit Conditions and Effluent Limitations

3.1 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").

3.2 Pollutants of Concern

The following pollutants are included as monitoring pollutants in the permit for DSN 101-1 for the reasons noted below:

Pollutant	Reason for Inclusion		
	Pollutant with a Waste Load Allocation from a TMDL	**Pollutant Identified as Present in the Effluent Through Sampling**	**Pollutant Otherwise Expected to be Present in the Effluent**
Aluminum		✓	
Ammonia		✓	
Boron		✓	
Chlorine, Total Residual		✓	
Chromium, Total		✓	
Copper, Total		✓	
Iron, Total		✓	
Lead		✓	
Kjeldahl Nitrogen, Total (as N)		✓	
Nitrate (as N)		✓	
Nitrite (as N)		✓	
Nitrogen, Total		✓	
Phosphorus, Total		✓	
Temperature		✓	
Total Suspended Solids		✓	
Zinc		✓	
126 Priority pollutants except chromium and zinc			✓

Pollutant	Reason for Inclusion		
	Pollutant with a Waste Load Allocation from a TMDL	**Pollutant Identified as Present in the Effluent Through Sampling**	**Pollutant Otherwise Expected to be Present in the Effluent**
Acute and chronic toxicity monitoring requirements are also included in the permit consistent with Section 22a-430-3(j)(3) of the Regs. Conn. State Agencies. pH monitoring was included in the permit consistent with Section 22a-426-9(a)(1).			

The following pollutants are included as monitoring pollutants in the permit for DSN 102-1 for the reasons noted below:

Pollutant	Reason for Inclusion		
	Pollutant with a Waste Load Allocation from a TMDL	**Pollutant with a Waste Load Allocation from a TMDL**	**Pollutant with a Waste Load Allocation from a TMDL**
Aluminum		✓	
Boron		✓	
Copper, Total		✓	
Iron, Total		✓	
Lead		✓	
Phosphorus, Total		✓	
Zinc		✓	
pH monitoring is included in the permit.			

The following pollutants are included as monitoring pollutants in the permit for DSN 103-1 for the reasons noted below:

Pollutant	Reason for Inclusion		
	Pollutant with a Waste Load Allocation from a TMDL	**Pollutant with a Waste Load Allocation from a TMDL**	**Pollutant with a Waste Load Allocation from a TMDL**
Aluminum		✓	
Boron		✓	
Copper, Total		✓	
Iron, Total		✓	
Lead		✓	
Phosphorus, Total		✓	
Zinc		✓	
pH monitoring is included in the permit.			

The following pollutants are included as monitoring pollutants in the permit for DSN 104-1 for the reasons noted below:

Pollutant	Reason for Inclusion		
	Pollutant with a Waste Load Allocation from a TMDL	Pollutant with a Waste Load Allocation from a TMDL	Pollutant with a Waste Load Allocation from a TMDL
Aluminum		✓	
Boron		✓	
Copper, Total		✓	
Iron, Total		✓	
Lead		✓	
Phosphorus, Total		✓	
Zinc		✓	
pH monitoring is included in the permit.			

3.2.1 Priority Pollutant Monitoring

While the facility does not fall within the Steam Electric Power Generating Point Source Category because it uses biomass for its fuel source rather than a fossil or nuclear fuel, it meets the other criteria for classification under this industrial category. The cooling tower maintenance and operation at the facility is similar to that of fossil fuel power plants cooling towers. Therefore, a monitoring requirement for chromium and 126 priority pollutants limits, once during the term of the permit, was added the permit.

3.3 Technology Based Effluent Guidelines

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

Subpart A of 40 CFR § 125 establishes criteria and standards for the imposition of technology-based treatment requirements in permits under § 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 § 402(a)(1). EPA promulgates New Source Performance Standards ("NSPS") under CWA § 306 and 40 CFR § 401.12. *See also* 40 CFR § 122.2 (definition of "new source") and 122.29.

The Steam Electric Power Generating Point Source Category at 40 CFR § 423 was reviewed to determine its applicability to the facility's discharges. This regulation is applicable to wastewater discharges from the operation of a generating unit by an establishment whose generation of electricity is the predominant source of revenue or principal reason for operation, and whose generation of electricity results primarily from a process utilizing fossil-type fuel (coal, oil, or gas), fuel derived from fossil fuel (*e.g.*, petroleum coke, synthesis gas), or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium. The Permittee derives its

fuel from synthesis gas from wood biomass. Therefore, 40 CFR § 423 is not applicable to the facility's discharges.

In the absence of published technology-based effluent guidelines, the permit writer is authorized under CWA § 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").

3.4 Zone of Influence

A zone of influence ("ZOI") of 137,760 gallons per hour was determined on November 29, 2007, during the processing of the previous permit (see Appendix A). The previously assigned ZOI of 137,760 gallons per hour is carried forward.

3.5 Reasonable Potential Analysis

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

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

The reasonable potential analysis was conducted using procedures consistent with EPA's TSD. For each pollutant of concern, DEEP determines the project maximum concentration ("PMC") of the pollutant in the receiving stream and compares it to the applicable flow adjusted water quality criteria ("WQC"). When the PMC is lower than the flow adjusted WQC, there is no potential for the discharge to exceed the WQC. When the PMC is higher than the flow adjusted WQC, there is a potential for the discharge to exceed the WQC (and permit limits are needed).

In the reasonable potential analysis, the PMC is calculated by multiplying maximum reported concentration with a statistical multiplier. The statistical multiplier is determined using the equation $C_{99} = \exp(2.326\sigma - 0.5\sigma^2)$, where $\sigma^2 = \ln(Cv^2 + 1)$ or from Table 3-1 of the TSD for 20 data set or less.

The reasonable potential analysis indicates that limits are required for aluminum, chlorine, copper, and lead. The reasonable potential analysis results are included in Sections B2 and B4 of Appendix B.

3.6 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 Permittee's previous permit required quarterly acute toxicity testing using *Daphnia Pulex* and *Pimephales promelas* and annual chronic toxicity testing using *Ceriodaphnia dubia* and *Pimephales promelas*. The previous permit had a no observable acute effect level ("NOAEL") limit of 90% or greater survival in an undiluted effluent, consistent with Regs. Conn. State Agencies 22a-430-4(l)(5)(A). During the last permit cycle, the Permittee had no exceedances of its NOAEL acute toxicity limit. The review of DMR data (January 2020 – December 2024) for acute toxicity tests, showed a range of 98% - 100% survival of test organisms in an undiluted effluent which shows the discharge is not toxic.

A review of the Permittee's chronic toxicity testing results also showed that the discharge was not chronically toxic, because the 48-hour LC_{50} (lethal concentration 50), 7-Day $LC_{50,}$ 7-Day C-NOEC (no observed effect concentration), 7-Day C-LOEC (lowest observed effect concentration), 7-Day IC_{25} (inhibition concentration 25) were 100% in all tests conducted during the period of January 2020 and December 2024.

A reasonable potential analysis was not performed on toxicity because toxicity was not demonstrated beyond acute permit limits or in chronic tests. Consistent with Regs. Conn. State Agencies 22a-430-4(l)(5)(A), the acute toxicity limit is maintained in the permit.

3.7 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 established by DEEP for pollutants that demonstrated the reasonable potential to cause or contribute to an excursion above any water quality standard using the methodology in EPA's TSD. Wasteload allocations ("WLA") based on applicable WQC are calculated using a mass balance equation. Long-term averages ("LTA") are calculated by multiplying the WLA by a 99th percentile statistical factor, as shown below:

$$\mathrm{LTA_{acute}} = \mathrm{WLA_{acute}} \times e^{(0.5\sigma^2 - z\sigma)} \text{ and } \mathrm{LTA_{chronic}} = \mathrm{WLA_{chronic}} \times e^{(0.5\sigma_4^2 - z\sigma_4)}$$

To be protective of the most sensitive beneficial use, the most limiting of the acute, chronic or health LTA is selected and used for the effluent limits calculation.

$AML = LTA \times e^{(z\sigma_n - 0.5\sigma_n^2)}$ and $MDL = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where $\sigma^2 = \ln(CV^2 + 1)$, Z = 1.645 for 95th percentile probability basis, and

Z = 2.326 for 99th percentile probability basis and n = number of samples per month, for sampling frequency that is less than 4 times a month, use n = 4.

The calculated WQBELs are in Section B-3 of Appendix B.

3.8 Comparison of Limits

After preparing and evaluating applicable TBELs and WQBELs, the most stringent limits are applied in the permit. Pollutants of concern that only require monitoring without limits are not included in the below table.

Table 3.8.1: Comparison of Limits Based on Different Criteria

Parameters	Water Quality Limits Based on EPA/505/2-90-001	Regs. Conn. State Agencies 22a-430-4(l)(5)(A)	Previous permit limits	Case by case determination
Acute Aquatic toxicity, *Daphnia pulex*	---	NOAEL ≥ 90%	NOAEL ≥ 90%	---
Acute Aquatic toxicity, *Pimephales promelas*	---	NOAEL ≥ 90%	NOAEL ≥ 90%	---
Aluminum, total	AML = 1.768 mg/l MDL = 4.075 mg/l	---	AML = 1.420 mg/l MDL = 2.860 mg/l MIL = 4.290 mg/l Mass AML = 0.68 kg/d Mass MDL = 1.36 kg/d	---
Total Residual Chlorine	AML = 0.139 mg/l MDL = 0.331 mg/l	---	AML = 0.180 mg/l MDL = 0.360 mg/l MIL = 0.540 mg/l	MIL = 0.497 mg/l
Copper, total	AML = 0.253 mg/l MDL = 0.632 mg/l	---	AML = 0.096 mg/l MDL = 0.190 mg/l MIL = 0.280 mg/l Mass AML = 0.046 kg/d Mass MDL = 0.091 kg/d	---
Lead, total	AML = 0.026 mg/l MDL = 0.055 mg/l	---	AML = 0.019 mg/l MDL = 0.039 mg/l MIL = 0.058 mg/l Mass AML = 0.68 kg/d Mass MDL = 1.36 kg/d	---

Table 3.8.1: Comparison of Limits Based on Different Criteria				
Parameters	**Water Quality Limits Based on EPA/505/2-90-001**	**Regs. Conn. State Agencies 22a-430-4(l)(5)(A)**	**Previous permit limits**	**Case by case determination**
pH, minimum	6.5 S.U.	---	6.0 S.U.	---
pH, maximum	8.0 S.U.	---	9.0 S.U.	---
Temperature		---	90^{o}F	
Total Suspended Solids	---	---	AML = 20.0 mg/l MDL = 30.0 mg/l MIL = 45.0 mg/l	AML = 20.0 mg/l MDL = 30.0 mg/l MIL = 45.0 mg/l
Zinc, total	---	---	AML = 0.640 mg/l MDL = 1.300 mg/l MIL = 1.950 mg/l	---
Note: The highlighted numbers represent the most stringent effluent limits. AML: Average Monthly Limit, MDL: Maximum Daily Limit and MIL: Maximum Instantaneous Limit, Mass limits in kg/d = concentration limits (mg/l) X 0.126103 X 10^6 X 3.785 liter/d				

The MIL for total residual chlorine is calculated by multiplying the MDL by a factor 1.5, consistent with Regs. Conn. State Agencies Section 22a-430-4(s).

3.9 Sampling Frequency, Type, and Reporting

The permit proposes quarterly acute toxicity consistent with Regs. Conn. State Agencies Section 22a-430-3(j). The permit also proposes sampling for chronic toxicity and 126 priority pollutants except chromium and zinc, and weekly sampling for other parameters based on case-by-case determination using best professional judgement.

The proposed sample types are consistent with Regs. Conn. State Agencies Section 22a-430-4(c)(20).

3.10 Effluent Limitations and Monitoring Requirements

Table 3.10.1: Effluent Limitations and Monitoring Requirements				
Pollutants	**Limit**	**Basis for Limit**	**Monitoring /Reporting Frequency**	**Sample Type**
DSN 101-1:				
Acute Aquatic Toxicity, *Daphnia pulex*, NOAEL = 100%	≥ 90% Survival	Regs. Conn. State Agencies 22a-430-4(l)(5)(A) Anti-backsliding regulations	Quarterly	Daily Composite
Acute Aquatic Toxicity	≥ 90% Survival	Regs. Conn. State Agencies	Quarterly	

Table 3.10.1: Effluent Limitations and Monitoring Requirements				
Pollutants	**Limit**	**Basis for Limit**	**Monitoring /Reporting Frequency**	**Sample Type**
Pimephales promelas, NOAEL = 100%		22a-430-4(l)(5)(A) Anti-backsliding regulations		
Chronic Aquatic Toxicity (Survival) *Ceriodaphnia dubia*	Monitoring only requirement for pollutant of concern		Annually	
Chronic Aquatic Toxicity (Reproduction) *Ceriodaphnia dubia*	Monitoring only requirement for pollutant of concern		Annually	
Chronic Aquatic Toxicity (Survival) *Pimephales promelas*	Monitoring only requirement for pollutant of concern		Annually	
Chronic Aquatic Toxicity (Growth) *Pimephales promelas*	Monitoring only requirement for pollutant of concern		Annually	
Aluminum, Total	AML = 1.48 mg/l MDL = 2.86 mg/l MIL = 4.29 mg/l	Anti-backsliding regulations (the previous permit limits are WQBELs)	Weekly	
Aluminum, Total	AML = 0.68 kg/d MDL = 1.36 kg/d	Conversion of WQBELs to mass limits	Weekly	
Ammonia (as N)	Monitoring only requirement for pollutant of concern		Weekly	
Boron	Monitoring only requirement for pollutant of concern		Weekly	
Chlorine, Total Residual	AML = 0.139 mg/l MDL = 0.331 mg/l MIL = 0.497 mg/l	WQBELs	Weekly	Grab sample Average
Chromium, Total	Monitoring only requirement for pollutant of concern		Weekly	Daily Composite

Table 3.10.1: Effluent Limitations and Monitoring Requirements				
Pollutants	**Limit**	**Basis for Limit**	**Monitoring /Reporting Frequency**	**Sample Type**
Copper, Total	AML = 0.096 mg/l MDL = 1.90 mg/l MIL = 2.88 mg/l	Anti-backsliding regulations (the previous permit limits are WQBELs)	Weekly	
Copper, Total	AML = 0.046 kg/d MDL = 0.091 kg/d	Conversion of WQBELs to mass limits	Weekly	
Flow Rate (Average Daily)	126,103 gpd	Permitted discharge flow per application	Continuous	Total Daily Flow
Flow, Maximum during 24-hr period	173,571 gpd	Permitted discharge flow per application	Continuous	
Iron, Total	Monitoring only requirement for pollutant of concern		Weekly	Daily Composite
Kjeldahl Nitrogen, Total (as N)	Monitoring only requirement due to TMDL		Weekly	
Lead, Total	AML = 0.019 mg/l MDL = 0.039 mg/l MIL = 0.058 mg/l	Anti-backsliding regulations (the previous permit limits are WQBELs)	Weekly	
Lead, Total	AML = 0.009 kg/d MDL = 0.019 kg/d	Conversion of WQBELs to mass limits	Weekly	
Nitrate (as N)	Monitoring only requirement due to TMDL		Weekly	
Nitrite (as N)	Monitoring only requirement due to TMDL		Weekly	
Nitrogen, Total	Monitoring only requirement due to TMDL		Weekly	
pH, Minimum (Interim)	6.0	WQC	Continuous	Continuous
pH, Maximum (Interim)	9.0	WQC		
pH, Minimum (Final)	6.5	WQC	Continuous	Continuous
pH, Maximum (Final)	8.0	WQC		

Table 3.10.1: Effluent Limitations and Monitoring Requirements				
Pollutants	**Limit**	**Basis for Limit**	**Monitoring /Reporting Frequency**	**Sample Type**
Phosphorus, Total	Monitoring only requirement due to Phosphorus Strategy		Weekly	Daily Composite
Temperature, Maximum	90°F	Anti-backsliding regulations (the previous permit limits are WQBELs)	Continuous	Instantaneous
Temperature, intake/outlet differential	Monitoring only requirement due to Regs. Conn. State Agencies 22a-426-9(a)(1)		Continuous	Calculated
Total Suspended Solids	AML = 20 mg/l MDL = 30 mg/l MIL = 45 mg/l	Anti-backsliding regulations	Weekly	Daily Composite
Zinc, total	AML = 0.64 mg/l MDL = 1.30 mg/l MIL = 1.95 mg/l	Anti-backsliding regulations (the previous permit limits are WQBELs)	Weekly	
126 Priority Pollutants (resulting from chemical additives for cooling tower maintenance) except chromium and zinc	Monitoring only requirement for pollutant of concern		Once during the permit term	Grab
DSN 102-1:				
Aluminum, Total	Monitoring only requirement for pollutant of concern		Annually	Grab
Boron	Monitoring only requirement for pollutant of concern		Annually	
Copper, Total	Monitoring only requirement for pollutant of concern		Annually	
Flow, Maximum during 24-hr period	225,000 gpd	Permitted discharge flow per application	Annually	Total Daily Flow
Iron, Total	Monitoring only requirement for pollutant of concern		Annually	Grab
Lead, Total	Monitoring only requirement for pollutant of concern		Annually	

Table 3.10.1: Effluent Limitations and Monitoring Requirements				
Pollutants	**Limit**	**Basis for Limit**	**Monitoring /Reporting Frequency**	**Sample Type**
pH	6.0 – 9.0	Anti-backsliding regulations	Annually	
Phosphorus, Total	Monitoring only requirement for pollutant of concern		Annually	
Zinc, Total	Monitoring only requirement for pollutant of concern		Annually	
DSN 103-1:				
Aluminum, Total	Monitoring only requirement for pollutant of concern		Annually	Grab
Boron	Monitoring only requirement for pollutant of concern		Annually	
Copper, Total	Monitoring only requirement for pollutant of concern		Annually	
Flow, Maximum during 24-hr period	225,000 gpd	Permitted discharge flow per application	Annually	Total Daily Flow
Iron, Total	Monitoring only requirement for pollutant of concern		Annually	Grab
Lead, Total	Monitoring only requirement for pollutant of concern		Annually	
pH	6.0 – 9.0	Anti-backsliding regulations	Annually	
Phosphorus, Total	Monitoring only requirement for pollutant of concern		Annually	
Zinc, Total	Monitoring only requirement for pollutant of concern		Annually	
DSN 104-1:				
Aluminum, Total	Monitoring only requirement for pollutant of concern		Annually	Grab
Boron	Monitoring only requirement for pollutant of concern		Annually	
Copper, Total	Monitoring only requirement for pollutant of concern		Annually	
Flow, Maximum during 24-hr period	250,000 gpd	Permitted discharge flow per application	Annually	Total Daily Flow
Iron, Total	Monitoring only requirement for pollutant of concern		Annually	Grab
Lead, Total	Monitoring only requirement for pollutant of concern		Annually	

Table 3.10.1: Effluent Limitations and Monitoring Requirements				
Pollutants	**Limit**	**Basis for Limit**	**Monitoring /Reporting Frequency**	**Sample Type**
pH	6.0 – 9.0	Anti-backsliding regulations	Annually	
Phosphorus, Total	Monitoring only requirement for pollutant of concern		Annually	
Zinc, Total	Monitoring only requirement for pollutant of concern		Annually	
Intake SN101H:				
Aluminum, Total	Intake monitoring		Monthly	Grab
Boron			Monthly	
Copper, Total			Monthly	
Flow Rate (Average Daily)			Total daily flow	Total daily flow
Flow, Maximum during 24-hr period	893,000 gpd	Permitted discharge flow per application	Total daily flow	
Iron, Total	Intake monitoring		Monthly	Grab
Lead, Total			Monthly	
pH, Minimum			Monthly	Instantaneous
pH, Maximum			Monthly	
Phosphorus, Total			Monthly	Grab
Temperature			Monthly	Instantaneous
Zinc, Total			Monthly	Grab
AML: Average Monthly Limit MIL: Maximum Instantaneous Limit RP: Reasonable Potential WQBELs: Water Quality Based Effluent Limits		MDL: Maximum Daily Limit BPJ: Best Professional Judgment WQC: Water Quality Criteria		

3.10.1 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 minimum level ("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 effluent limit guidelines (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.

3.11 Other Permit Conditions

- The permit prohibits the discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid under Section 4 of the permit.
- The permit prohibits the use of any chemicals that contain phosphorus in any process or activity that may result in a discharge to the waters of the state under Section 4 of the permit (see Section 2.2.1 of this fact sheet).
- The permit requires the Permittee to operate and maintain the outdoor wood storage area in accordance with "Section A.4 Stormwater Management – Outdoor Wood Storage Area" of the response to comment report dated February 19, 2008.

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(l)(3).

- The Permittee is required to perform a thermal verification study, see Section 3.16 of this fact sheet.
- The previous permit pH limits were changed from 6.0 – 9.0 S.U. to 6.5 – 8.0 S.U. consistent with the water quality criteria for a class "B" waterbody. A review of discharge monitoring data shows the Permittee may not be able to immediately comply with the proposed limits. As such, this permit contains a compliance schedule requiring the Permittee to evaluate alternate actions to achieve compliance with the proposed pH limits.

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.

DEEP has determined that the discharges or activities are consistent with the maintenance, restoration, and protection of existing and designated uses assigned to the receiving water body by considering all relevant data. 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

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

3.15 Categorical Discharge Conditions

Consistent with 40 CFR § 423.15, the permit prohibits the discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid under Section 4.5 of the permit.

3.16 Cooling Water Intake Structure Section 316(b)

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

The federal regulations establish requirements under Section 316(b) of the CWA for existing power generating facilities and existing manufacturing and industrial facilities with a cooling water intake structure having a design intake flow greater than two million gallons per day of water from waters of the United States and use at least 25 percent of the water they withdraw exclusively for cooling purposes. 40 CFR 125.92 defines "Cooling water intake structure" as "the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. The cooling water intake structure extends from the point at which water is first withdrawn from waters of the United States up to and including the intake pumps."

The August 15, 2014, 316(b) final rule was promulgated which applies to existing facilities that withdraw more than two MGD of water and use at least 25% of the actual intake flow exclusively for cooling purposes. However, 40 CFR 125.90(b), states "Cooling water intake structures not subject to requirements under parts 125.94 through 125.99 or subparts I or N of this part must meet requirements

under Section 316(b) of the CWA established by the Director on a case-by-case, best professional judgment ("BPJ") basis."

3.16.1 Cooling Water Intake Structure ("CWIS") Description

The Permittee's intake is identified as DSN 001-H in the permit. The Permittee has a water diversion permit associated with the intake and is authorized to withdraw 893,000 gpd from the Quinebaug River. The intake structure is located on 114 Packer Road, Canterbury, about two miles from the power plant. The water withdrawn for non-contact cooling is recycled about five times using a cooling tower before it is discharged back into the Quinebaug River. The cooling tower removes heat from the hot water by evaporation and recycles the cooler water.

The intake is comprised of two pumps with maximum capacities of 1,320 gallons per minute ("gpm") but set to operate 200 - 750 gpm. The facility operates the pumps almost continuously during plant operation, which is 24 hours per day. The intake is also comprised of a horizontal intake pipe with a single cylindrical wedge-wire screen. The cylindrical wedge-wire screen is located near the river bottom approximately 100 feet from the riverbank. The Johnson Model T-12 HCE cylindrical wedge-wire screen is 12 inches in diameter and 38 inches long. It has a slot opening size of 0.125 inches (3.2 mm) and a design through screen velocity of 0.25 fps.

The screen is equipped with an air burst system to clear the screen of accumulated debris. Additionally, the CWIS is equipped with a water backflushing system which uses a reserve tank of raw river water to backflush the screen as an alternative to the air burst system.

3.17.2 Best Technology Available ("BTA") Determination on CWIS

Since the Permittee withdraws less than two MGD, DEEP has made a case-by-case BPJ determination consistent with 40 CFR 125.90(b), as follows:

Impingement mortality: The Permittee's intake has a design intake through-screen velocity below 0.5 fps. This is an acceptable means for existing units to comply with the BTA standards for impingement mortality as defined by 40 CFR 125.94(c)(2).

In addition, the Permittee operates a cooling tower, which is considered a closed-cycle recirculating system as defined by 40 CFR 125.83. To supplement this, the permit requires actual intake flows to be measured daily from DSN 001-H. The monitoring is representative of normal operating conditions, and includes measuring cooling water withdrawals, make-up water, and blowdown volume. This technology also meets BTA for impingement mortality for existing units consistent with 40 CFR 125.94(c)(2), and new units consistent with 40 CFR 125.94(e).

DEEP has determined that consistency with the federal regulations for existing and new units is an acceptable means for meeting BTA standards to reduce impingement mortality.

Entrainment: As discussed above, the Permittee employs a closed-cycle recirculating system. This technology satisfies the BTA standards for entrainment for new units at existing facilities as defined by 40 CFR 125.94(e). Consistency with the federal regulations for new units is an acceptable means for meeting BTA standards for impingement.

3.18 Variances and Waivers

The Permittee requested alternative effluent limits for thermal discharges consistent with Regs. Conn. State Agencies Section 22a-430-4(q)(2)(A)(ii) and 40 CFR 125 Subpart H.

THERMAL EVALUATION

Section 316(a) of the federal Water Pollution Control Act, U.S.C. § 1326(a) requires that the thermal component of any discharge assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the receiving water body. The segment of Quinebaug River where the discharge is located is classified as "B" under the WQS. The applicable WQS for a class “B” surface water is: "There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this class and, no case exceed 84^{o}F, or in any case raise the temperature of surface water more than 4^{o}F. (Regs. Conn. State Agencies 22a-426-9(a)(1)).

The Permittee discharges a heat load to the Quinebaug River from NCCW (DSN 101-1). The permit issued on August 30, 2013, contained a temperature limitation of 90^{o}F which is proposed to be carried forward. For the previous permit issuance, EPA’s modeling software "Visual Plumes" was used to model the characteristics of the expected thermal plume associated with the discharge of heat load to the Quinebaug River. The software generated a three-dimensional model of the geometry of the thermal plume under the assumption that the discharge and ambient flow conditions are in a steady state.

The submerged discharge pipe is six inches in diameter and has a single port diffuser, which results in the discharge favoring rapid mixing. The location of the single port outfall pipe was selected and designed so the discharge occurs at the center of the river, where the water depths are at a maximum, and located approximately 100 ft downstream from the intake pipe. This is consistent with EPA’s recommendations that cooling water systems should optimize the dissipation of heat and minimize the area affected by excessive temperatures. Furthermore, the design is consistent with EPA’s emphasis that thermal discharges should be in areas with good flushing characteristics and should minimize the addition of heat into receiving waters (U.S. Environmental Protection Agency (U.S. EPA). 2023. Thermal Discharges in NPDES Permits, Overview of Resources and Tools (EPA-833-F-23-007). pp 163, 188-189).

A review of temperature data for the past five years showed a discharge temperature range of 60.79 – 89.99^{o}F, with an average of 83.07^{o}F. The intake temperature ranged from 49.01 – 86.59^{o}F, with an average of 66.98^{o}F. The temperature difference between the intake and the discharge ranged from 7.39 – 71.94^{o}F, with an average differential temperature of 27.95^{o}F.

A new thermal model was performed using EPA’s PLUMES2.0 software, designed to simulate effluent plume dilution. The result showed the areas of modeled thermal plumes are comparable to the areas of the previously modeled thermal plumes, though a little smaller. The percentages of the cross-sectional areas of the thermal plume under low flow (84 cfs) and mean flow (1,030 cfs) conditions are less than 1% of the cross-sectional area of the receiving river, as shown in Tables 3.16.1 and 3.16.2. The CT WQS allows for a “zone of influence for assimilation of a thermal discharge shall be no greater than 25% of the cross-sectional area or volume of flow of the receiving water” (Regs.

Conn. State Agencies 22a-426-4(l)(8)). The thermal cross-sectional areas in the thermal model are well below the allowable thermal zone of influence of 25%.

The Permittee was required to conduct a thermal verification study to confirm the thermal modeling under the previous permit, but the Permittee did not receive DEEP approval of the scope of studies by the time of this permit renewal (see Section 1.8.3 of this fact sheet). The thermal modeling results from the previous permit are presented in Tables 3.16.1 and 3.16.2. They show a differential temperature (discharge – ambient) of 57.4^{o}F. As stated above, the actual differential temperatures ranged from 7.39 – 71.94^{o}F, with an average differential temperature of 27.95^{o}F.

While the cross-sectional areas of thermal plumes in the model are about 1% of the cross-sectional area of the river, the actual maximum differential temperature (intake – discharge) from discharge monitoring data is about 15^{o}F higher than the differential temperature used in the model. Therefore, it is necessary to verify that the thermal plume is representative of a higher differential temperature situation, and the discharge will not cause an increase higher than 4^{o}F outside of the thermal zone of influence. A thermal verification study is incorporated in this permit renewal as a compliance schedule, to confirm the actual thermal plume size, and ensure that the discharge is consistent with the thermal model result.

Quinebaug River Low Flow Conditions

Table 3.16.1: Thermal Plume Modeling under Quinebaug River Low Flow Conditions						
Parameter	**Scenario 1: Plume Boundary Condition of 85ºF [1]**		**Scenario 2: Plume Boundary Condition of Δ4ºF of the Ambient Temperature [1]**		**Scenario 3: Plume Boundary Condition with Ambient Temperature [2]**	
	Minimum Observed Ambient Temperature (32.6ºF)	**Maximum Observed Ambient Temperature (85.9ºF)**	**Minimum Observed Ambient Temperature (32.6ºF)**	**Maximum Observed Ambient Temperature (85.9ºF)**	**Minimum Observed Ambient Temperature (32.6ºF)**	**Maximum Observed Ambient Temperature (85.9ºF)**
River Flow (cfs)	84	84	84	84	84	84
Discharge Temp. (ºF)	90	90	90	90	90	90
River depth (ft.)	10	10	10	10	10	10
Discharge port diameter (inches)	6	6	6	6	6	6
Discharge port depth (ft.)	8	8	8	8	8	8
Maximum flow (MGD)	0.173	0.173	0.173	0.173	0.173	0.173
Temp.at the end of plume (ºF)	85	85	36.6	89.9	35.37	86.04
Plume length (ft)	0.16	---	20.9	0.2	26.48	31.73
Plume diameter (ft.)	0.54	---	2.88	0.54	3.51	4.21
Depth to center line of plume (ft.)	4.0	---	3.83	4.0	4.28	2.19
Cross-sectional Area of plume (sq ft) [3]	0.2	---	6.53	0.23	9.7	13.94
% River Width [4]	0.25%	---	1.34%	0.25%	1.63%	1.97%
% of River cross-sectional Area [5]	0.02%	---	0.45%	0.02%	0.68%	0.97%

[1] Modeled plume data are based on interpolation of the two temperature data points bounding the targeted boundary plume temperature.
[2] Data provided represents the model output closet to the river ambient temperature.
[3] Model assumed that the cross-sectional area of the plume is circular hence, area was calculated using the formula = πr^2.
[4] River width was assumed to be 215 ft. at the point of discharge.
[5] Cross-sectional area of the river was estimated to be 1435 sq ft.

Quinebaug Mean Low Flow Conditions

Table 3.16.2: Thermal Plume Modeling under Quinebaug River Mean Flow Conditions						
	Scenario 1: Plume Boundary Condition of 85ºF [1]		**Scenario 2: Plume Boundary Condition of Δ4ºF of the Ambient Temperature [1]**		**Scenario 3: Plume Boundary Condition with Ambient Temperature [2]**	
	Minimum Observed Ambient Temperature (32.6ºF)	**Maximum Observed Ambient Temperature (85.9ºF)**	**Minimum Observed Ambient Temperature (32.6ºF)**	**Maximum Observed Ambient Temperature (85.9ºF)**	**Minimum Observed Ambient Temperature (32.6ºF)**	**Maximum Observed Ambient Temperature (85.9ºF)**
River Flow (cfs)	1030	1030	1030	1030	1030	1030
Discharge Temp. (ºF)	90	90	90	90	90	90
River depth (ft.)	10	10	10	10	10	10
Discharge port diameter (inches)	6	6	6	6	6	6
Discharge port depth (ft.)	8	8	8	8	8	8
Maximum flow (MGD)	0.173	0.173	0.173	0.173	0.173	0.173
Temp.at the end of plume (ºF)	85	85	36.6	89.9	35.16	86.05
Plume length (ft)	0.17	---	22.89	0.06	30.22	32.61
Plume diameter (ft)	0.53	---	2.71	0.51	3.39	3.86
Depth to center line of plume (ft)	8.0	---	7.8	8.0	- 8.29	- 6.34
Cross-sectional Area of plume (sq ft) [3]	0.22	---	5.75	0.2	9.04	11.67
% River Width [4]	0.25%	---	1.3%	0.2%	1.58%	1.79%
% of River cross-sectional Area [5]	0.02%	---	0.4%	0.01%	0.63%	0.81%

[1] Modeled plume data are based on interpolation of the two temperature data points bounding the targeted boundary plume temperature.
[2] Data provided represents the model output closet to the river ambient temperature.
[3]Model assumed that the cross-sectional area of the plume is circular hence, area was calculated using the formula = πr^2.
[4] River width was assumed to be 215 ft. at the point of discharge.
[5] Cross-sectional area of the river was estimated to be 1435 sq ft.

3.19 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 following changes were made from the previous permit:

- This permit was previously assigned two permit numbers: Permit Nos. CT0030473 and SP0002464. Groundwater discharges from DSNs 102, 103, and 104 were associated with Permit No. SP0002464. Permit No. SP0002464 has been terminated and removed from this permit. All discharges, including DSNs 102, 103, and 104 are now covered under Permit No. CT0030473.
- DSN 105 – The demineralized water tank is now situated inside the power generating facility and overflows will discharge via floor drains to the sanitary sewer system. The discharge is covered under the "General Permit for Discharges from Miscellaneous Industrial Users (MIU GP)", and therefore removed from the permit.
- Monitoring requirements for chromium were added for DSN 101-1 because chromium is present in the wastewater.
- A one-time monitoring requirement for 126 priority pollutants, except chromium and zinc, was added for DSN 101-1 because the 126 priority pollutants include contaminants potentially contained in chemicals added for cooling tower maintenance. Routine chromium and zinc monitoring are required on a weekly basis and therefore not included in this priority pollutant scan.
- Monitoring tables for acute and chronic toxicity testing (DSN 101-AT and DSN 101-CT) have been added to the permit. This table does not change the testing requirements, rather it changes the way the acute and chronic toxicity monitoring data is reported by the Permittee. The Permittee is now required to electronically report toxicity results and paired chemical and receiving water data through NetDMR with the monthly DMR report.
- Monitoring requirements for aluminum at DSN 103-1 were added because the water discharged is the same quality as DSN 102-1, and aluminum is a pollutant of concern.
- With the exception of chlorine, mass limits were included for aluminum, copper and lead because a reasonable potential analysis showed that water quality-based limits are needed for these pollutants.
- Turbidity monitoring requirement was removed from the permit because the average turbidity was 2.84 Nephelometric Turbidity Unit ("NTU"), showing that the discharge is not exceeding 5 NTU over ambient levels and not exceeding levels necessary to protect and maintain all designated uses, consistent with CT WQS (Regs. Conn. State Agencies 22a-426-9(a)(1).
- Effluent limits where applicable are expressed in Table A, while Table B now contains toxicity limits and monitoring requirements (without limits) for other pollutants.
- A compliance schedule to perform a thermal verification study was added to the permit.
- Section 5(A)(5) of the permit that required the Permittee to construct, operate and maintain the cooling water intake structure in accordance with the submitted mitigation and monitoring plan has been removed. This is because the Permittee completed the required mitigation and monitoring in December 2021.
- The effluent limits for pH were changed from 6.0 – 9.0 S.U. to 6.5 – 8.0 S.U. consistent with the water quality criteria for a class "B" waterbody.
- A compliance schedule requiring the Permittee to evaluate alternate actions to achieve compliance with the proposed pH limits was added to the permit.

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. 201801971 Permit No. CT0030473

Interested persons may obtain copies of the application from Mark Boucher, Plainfield Renewable Energy, LLC, 12 Mill Brook Road, CT 06374.

The application is available for inspection by contacting Oluwatoyin Fakilede at Oluwatoyin.fakilede@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 Oluwatoyin Fakilede, Environmental Engineer 3, 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. CT0030180 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.

Appendix A: Zone of Influence Determination Memo

Interoffice Memo

Date: November 29, 2007

To: Charles Nezianya, Sanitary Engineer III

Cc: Traci Iott, Supervising Enviromental Analyst

From: Rosemary Gatter-Evarts, Environmental Analyst III

RE: Plainfield Renewable Energy...Permit Application

Charles,

I have reviewed the application for Plainfield Renewable Energy's proposed discharges. There are five discharges listed in their permit application. The cooling tower effluent will discharge to the Quinebaug River. Two discharges of fire protection wastewater and an emergency cooling water back up drain will discharge into the onsite stormwater system. This storm water system should eventually discharge to Mill Brook and not to any onsite wetlands or vernal pools. The last proposed discharge is demineralization wastewater, which will be directed to Mill Brook in Plainfield

The cooling tower effluent is to discharge into the Quinebaug River downstream of Kitts Brook and Mill Brook in Plainfield Connecticut. The 7Q10 for the Quinebaug River is 84.4 cfs. The maximum dilution available for any discharge into a river this size would be either 1/4 of the 7Q10 or 100:1 which ever is stricter. In some situations, especially where a 100:1 dilution could be expected, a dye study is required after the discharge is initiated to validate or confirm the zone of influence. This dye study would have to conform to the requirements set forth in Section 22a-430-4(C) 21 of the Regulations of Connecticut State Agencies.. The dye study would be conducted at low flow conditions for freshwater streams and dilution contours from 100% to 1% would be delineated in a detailed site plan.

Discharge101consists of cooling tower blowdown and is the only discharge which enters the Quinebaug River directly. The flow listed in the permit application is approximately 174,000 gpd or 7250 gph. A simulated sample of effluent for DSN 101 was analyzed for toxicity, metals and phosphorus. This simulated effluent was non-acutely toxic and contained minimal concentrations of metals. Based on this information submitted in the application a portion of the Quinebaug River will need to be allocated to assimilate this discharge. In order to accommodate a small margin of safety I recommend an allocated zone of influence equivalent to an IWC of 5%. This zone of influence is more restrictive than the maximum IWC of 1.4% (See September 17 memo). This zone of influence can be calculated as follows:

IWC= 0.05 =(7250 gph eff)/(7250 gph eff+ ZOI gph stream)

0.05(ZOI)= 7250- .05(7250)

.05(ZOI)=7250-362.5 or 6887.5 gph

ZOI= 137750 gph

1

Please see the attached spreadsheet for proposed limits on copper, lead, zinc total residual chlorine. The discharge should also be limited for aquatic toxicity, total suspended solids, aluminum (treatment chemical), iron, ammonia, and boron. The aquatic toxicity limit for this discharge should be an NOAEL of 100% based on the simulated effluent and performance based data for other power plants.

The discharge did contain high concentrations of phosphorus from the chemical additives the whole effluent toxicity limit for Plainfield Renewable Energy would be. As stated in a previous memo the addition of phosphorus to the Quinebaug River would not be acceptable. I have reviewed the phosphorus data for the Quinebaug River from the USGS gages at both Putnam and Jewett City/ Hard phosphorus limits could be included in the permit based on the long-term average of phosphate in the Quinebaug River and the coefficient of variation for those values. Utilizing this data and assuming the actual average equal to the LTA, average monthly and maximum daily limits can be calculated.

The long-term average for phosphorus at the Quinebaug River in Putnam is 0.051 mg/l. The coefficient of variation is 0.48. The multiplication factor associated with one sample a month, a coefficient of variation of 0.48 and a probability of 95% from Table 5-2 of the Technical *Support Document for Water Quality Based Toxics Control* (EPA/505/2-90-001) is 1.96.

The proposed AML would be the 0.051 mg/l (LTA) * 1.96 or 0.099 mg/l assume a 5X concentration and the average monthly limit for P = 0.495 mg/l.

The Maximum Daily Limit = 0.051 * 2.68 = 0.136 * assume a 5 X concentration = 0.683 mg/l

The long term average for phosphorus at the Quinebaug River in Jewett City is 0.081 mg/l. The coefficient of variation is 0.8. The multiplication factor associated with one sample a month, a coefficient of variation of 0.80and a probability of 95% from Table 5-2 of the Technical *Support Document for Water Quality Based Toxics Control* (EPA/505/2-90-001) is 2.68

The proposed AML would be the 0. 081 mg/l (LTA) * 2.68 or 0.217 mg/l . If we assume a 5X concentration then an appropriate average monthly limit for P = 1.08 mg/l.

The Maximum Daily Limit = 0.081mg/l * 4.01= 0.324 assume a 5 X concentration = 1.62 mg/l

Alternatively, PRE would have to certify annually that they do not and will not add any compounds containing phosphorus. The intake should be monitored for phosphorus and the effluent limit not to exceed 5x the influent concentration.

This discharge also has the potential to discharge a thermal loading into the Quinebaug River. According to their thermal study the discharge will be exiting the cooling tower during the summer at 84°F. The effluent will then discharge approximately two miles via an underground stormwater drainage system before entering the Quinebaug through a single port diffuser. The thermal study submitted with their application indicates that the thermal impacts will be minimal during summer low flow conditions with the discharge complying with ambient temperatures within 22 feet of the discharge location. The discharge plume will be larger in the winter months because more of the stream will be needed to assimilate heat to return the discharge to a lower ambient temperature. This thermal plume analysis should be verified as a compliance step in their NPDES permit. This confirmation step should include a detailed site plan of the discharge location as specified in Section 22a-430-4(C)(21) in the Regulations of Connecticut State Agency. Thermal isopleths delineating the temperature at point of discharge and then (delta)) 2° F intervals s should be clearly outlined on this map instead of effluent dilution concentrations The area encompassed by the (delta)) 4°. F above ambient and the point at which it returns to ambient conditions should be emphasized.

DSN 102 contains 225,000 gpd of fire protection water this discharge should be sampled annually for Aquatic toxicity, total suspended solids, total residual chlorine, boron, iron, manganese, copper, lead zinc and aluminum. This discharge should be directed away from any vernal pools on the property.

DSN 104 contains 250,000 gallons of Non contact cooling water make up and tank drain. This discharge should be monitored on a per event basis for cooling water parameters and aquatic toxicity. If this discharge contains biocides and chlorines the emergency discharge should be directed away from any vernal pools or wetlands in the area.

DSN 105 contains 10,000 gpd of demineralization wastewater that will discharge into a tributary of mill brook. This type of discharge is generally non acutely toxic and contains low levels of contaminants. Annual monitoring for toxicity, total suspended solids, total dissolved solids, total residual chlorine, dissolved oxygen, aluminum, copper, lead and zinc, these are the same parameters listed in another NPDES discharge for this type of effluent.

Rosemary

Appendix B: Reasonable Potential Analysis and Water Quality Based Limits Calculations

Section B1: Facility Information

Instructions & Abbreviations | Facility Information | Reasonable Potential Report | WQ Limit Report | WQC | Reasonable Potential | WQBLs

Facility Information

Discharger	Plainfield Renewable Energy	
Permit Number	CT0030473	
DSN	101-1	
	Select Water Type	Select Segment
Receiving Water	River	CT3700-00_02
Average Flow per Day (gpd)	126,103	
Avg Hours of Discharge (hrs/d)	16	
Allocated ZOI (gph)	137,760	
Date of Analysis (mm/dd/yyyy)	2/26/2025	
IWC % (1 Hour)	5.411535093	
IWC % (24 Hours)	3.673962655	
Average Dshg Flow (gph)	7881.4375	
CT Site Specific Copper (Y/N)	No	

Segment Map ArcGIS

Receiving Water Details

Segment Name
Quinebaug River (Canterbury)-02

Salinity Regime Freshwater

Water Class B

Fish and wildlife habitat, recreational use, agricultural and industrial supply and other legitimate uses including navigation.

Return: Facility Info - Included Chemicals

Chemical Type	Chemical Name	CASRN	Maximum Value	Number of results >20=20	Coefficient of Variance	Number of Samples / Month for Permit Limit
Metals & Inorganics	Aluminum	7429905	1100	20	0.9	4
Metals & Inorganics	Ammonia	7664417	7700	20	2	4
Metals & Inorganics	Boron	7440428	1100	20	0.9	4
Metals & Inorganics	Chlorine	7782505	360	20	1	4
Metals & Inorganics	Copper	7440508	190	20	1.4	4
Metals & Inorganics	Lead	7439921	24	20	0.7	4
Metals & Inorganics	Zinc	7440666	180	20	0.6	4

Section B2: Reasonable Potential Analysis Result

Return to: Reasonable Potential Report

Chemical Type	Chemical Name	CASRN	Estimated Maximum Concentration in Effluent	Waste Load Allocation	Limit Needed?	Governing WLA
Metals & Inorganics	Aluminum	7429905	3,520	2,368	Yes	Chronic
Metals & Inorganics	Ammonia	7664417	52,360		WQ Group	
Metals & Inorganics	Boron	7440428	3,520	195,974	No	Chronic
Metals & Inorganics	Chlorine	7782505	1,260	299	Yes	Chronic
Metals & Inorganics	Copper	7440508	912	131	Yes	Chronic
Metals & Inorganics	Lead	7439921	62	33	Yes	Chronic
Metals & Inorganics	Zinc	7440666	414	1,201	No	Acute
Metals & Inorganics	Iron	7439896	16,960	27,219	No	Chronic

Section B3: Water Quality Based Limits

Return to: Water Quality Limit Report

Chemical Type	Chemical Name	CASRN	Governing Criteria	AML (ug/L)	MDL (ug/L)	AML (kg/d)	MDL (kg/d)
Metals & Inorganics	Aluminum	7429905	Chronic	1,768	4,075	1	2
Metals & Inorganics	Boron	7440428	Chronic	146,283	337,211	70	161
Metals & Inorganics	Chlorine	7782505	Acute	139	331	0	0
Metals & Inorganics	Copper	7440508	Acute	253	632	0	0
Metals & Inorganics	Lead	7439921	Chronic	26	55	0	0
Metals & Inorganics	Zinc	7440666	Acute	599	1,182	0	1
Metals & Inorganics	Iron	7439896	Chronic	20,317	46,835	10	22

Section B4: Reasonable Potential Analysis for Ammonia

Section 22a-426-9 of the Regs. Conn. State Agencies specifies water quality criteria for ammonia based on the presence or absence of salmonids. Upstream of the Permittee's discharge is Moosup River. The Moosup River discharges to Quinebaug River and is under the Trout Management Area. Therefore, salmonids may be present in the Quinebaug River. The criteria for ammonia when salmonids are present is used below.

Criteria for ammonia, (mg/L as Nitrogen) vary in response to ambient surface water temperature (T in ^{o}C) and pH. Biological integrity is considered impaired when:

A) One-hour average concentration of total ammonia exceeds:
$\left(\left[\frac{0.275}{1+10^{7.204-\mathrm{pH}}}\right]+\left[\frac{39}{1+10^{\mathrm{pH}-7.204}}\right]\right)$ when salmonids are present or

$\left(\left[\frac{0.411}{1+10^{7.204-\mathrm{pH}}}\right]+\left[\frac{58.4}{1+10^{\mathrm{pH}-7.204}}\right]\right)$ when salmonids are absent.

B) Four-day average concentration of total ammonia exceeds: 30-day average x 2.5

C) 30-day average concentration of total ammonia exceeds:

$\left[\frac{0.0577}{1+10^{7.688-\mathrm{pH}}}\right]+\left[\frac{2.487}{1+10^{\mathrm{pH}-7.688}}\right]$ x $\left\lceil \mathrm{MIN}\left(2.85, 1.45 \text{ x } \left(10^{0.028(25-\mathrm{T})}\right)\right)\right\rceil$ when early life stages are present, or

$\left[\frac{0.0577}{1+10^{7.688-\mathrm{pH}}}\right]+\left[\frac{2.487}{1+10^{\mathrm{pH}-7.688}}\right]$ x $\left\lceil 1.45 \text{ x } \left(10^{0.028(25-\mathrm{MAX}(\mathrm{T},7))}\right)\right\rceil$ when early life stages are absent.

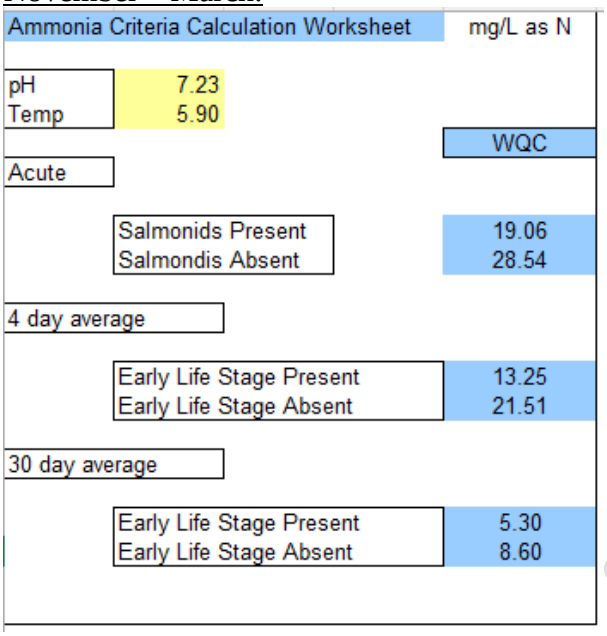
Ambient monitoring data collected by the US Geological Survey for the Quinebaug River at Jewett City (USGS-01127000) for the period of January 2020 – December 2024 was used to calculate the water quality criteria at the Quinebaug River. (How's My Waterway - Water Monitoring Report)

Table B4.1: Ambient data for pH and Temperature

Parameter	Months	Average	Minimum	Maximum
pH (S.U.)	April - October	7.4	7.1	7.8
	November - March	7.26	7.0	7.5
Temperature (^{o} Celsius)	April - October	20.8	13.6	28.2
	November - March	5.9	1.1	14.6

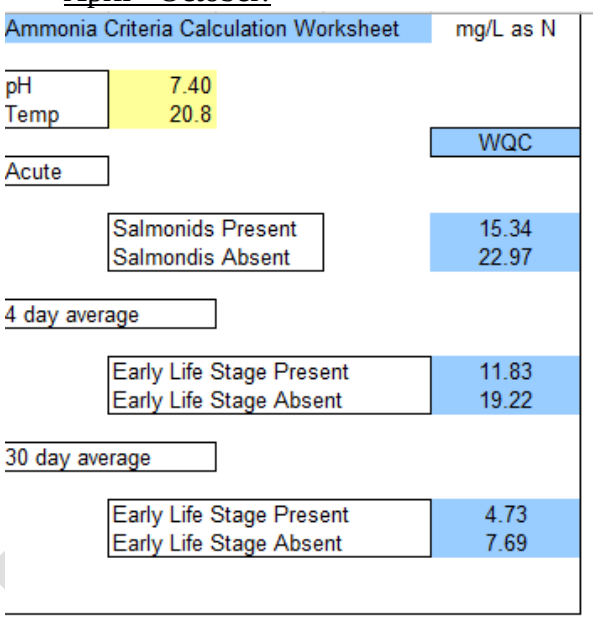
Spawning can occur in the spring, summer or fall depending on the salmon species. Therefore, the criteria for early stages are used for the reasonable potential analysis.

November – March:



Ammonia Criteria Calculation Worksheet		mg/L as N
pH	7.23	
Temp	5.90	
		WQC
Acute		
	Salmonids Present Salmondis Absent	19.06
		28.54
4 day average		
	Early Life Stage Present Early Life Stage Absent	13.25
		21.51
30 day average		
	Early Life Stage Present Early Life Stage Absent	5.30
		8.60

April - October:



Ammonia Criteria Calculation Worksheet		mg/L as N
pH	7.40	
Temp	20.8	
		WQC
Acute		
	Salmonids Present Salmondis Absent	15.34
		22.97
4 day average		
	Early Life Stage Present Early Life Stage Absent	11.83
		19.22
30 day average		
	Early Life Stage Present Early Life Stage Absent	4.73
		7.69

Table B4.2: Ammonia Criteria Summary			
Months	**Acute**	**30 Day Average**	**4 Day Average**
November - March	19.06 mg/l	5.3 mg/l	13.25 mg/l
April - October	15.34 mg/l	4.73 mg/l	11.83 mg/l

The maximum reported total ammonia from November – March is 7,700 µg/l. The maximum reported total ammonia from April – October is 7,000 µg/l. The coefficient of variance was calculated to be 2.0.

Table B4.3: Reasonable Potential Evaluation

(This analysis compares the projected maximum concentration (PMC) in the receiving stream with the applicable water quality criteria (WQC). When the PMC is lower than the WQC, there is no potential for the discharge to exceed the WQC. When the PMC is higher than the WQC, there is a potential for the discharge to exceed the WQC and permit limits are therefore needed.)

Q = Flow, C = Concentration, $(QC)_u$ = Upstream data, $(QC)_d$ = Downstream data, $(QC)_e$ = Effluent data, $Q_d = Q_u + Q_e$. $Q_{e,ac}$ = 126,103 gpd ÷ 16 = 7,881 gph, $Q_{e,ch}$ = 126,103 gpd ÷ 24 = 5,254 gph, $Q_{u,}$ = 137,750 gph, $Q_{d,\,ac,}$ = 145,631 gph and $Q_{d,\,ch,}$ = 143,004 gph

Pollutants	PMC in effluent = Maximum measured concentration X multiplier in Table 3-1 of the TSD	PMC in the waterbody $C_d = \frac{(QC)_u + (QC)_e}{Q_d}$ (µg/l)	Connecticut Water Quality Criteria (WQC) (Freshwater)		Is there potential to exceed WQC?
			Aquatic Life (Acute) (µg/l)	Aquatic Life (Chronic) (µg/l)	
Ammonia (Nov.– Mar.)	7,700 X 7.1 = 54,670	Acute: 2,959 Chronic: 2,008	19,060	5,300	No
Ammonia (Apr. – Oct.)	7,000 X 6.8 = 47,600	Acute: 2,576 Chronic: 1,749	15,340	4,730	No