RIPDES Permit No. RIG2500**

AUTHORIZATION TO DISCHARGE UNDER THE
RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM

NON-CONTACT COOLING WATER GENERAL PERMIT

In compliance with the provisions of Chapter 46-12 of the Rhode Island general Laws, as amended, except as provided in Part I.B.3 of the permit, owners of non-contact cooling water discharges located in the State of Rhode Island are authorized to discharge in accordance with the conditions and requirements set forth herein.

Owners and operators of non-contact cooling water discharges who intend to be authorized by this general permit must submit a complete Notice of Intent in accordance with Part III of this permit. Authorization to discharge shall be granted in accordance with Part I.C of this permit. Owners and operators of non-contact cooling water discharges who fail to submit a Notice of Intent in accordance with Part I.C. of this permit are not authorized to discharge under this permit.

This general permit shall become effective on May 1, 2025.

The general permit and the authorization to discharge expire at midnight, five years from the effective date, or April 30, 2030.

This permit supersedes the general permit issued on March 1, 2019.

Signed this 27th day of February 2025.

Joseph B. Haberek, P.E.
Administrator of Surface Water Protection
Office of Water Resources
Rhode Island Department of Environmental Management
Providence, Rhode Island

Rhode Island Pollutant Discharge Elimination System
General Permit for Non-Contact Cooling Water Discharges

Effective Date: May 1, 2025

Expiration Date: April 30, 2030

Rhode Island Department of Environmental Management
Office of Water Resources
RIPDES Program

RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM
GENERAL PERMIT FOR NON-CONTACT COOLING WATER DISCHARGES

I. GENERAL COVERAGE UNDER THIS PERMIT

A. Permit Coverage. This permit may cover all areas of the State of Rhode Island.

B. Wastewater Type

(1) Eligibility. Except for non-contact cooling water discharges identified under Part I.B.(3), this permit covers the discharge of non-contact cooling water. Non-contact cooling water is defined as water that is used to reduce temperature and which does not come into direct contact with any raw materials or intermediate, final, or waste product (other than heat).

(2) Allowable discharges. Other discharges not comprised of non-contact cooling water are allowed under this permit but are limited to the following: steam condensate that does not contain any treatment chemicals; air conditioner condensate that does not contain any treatment chemicals; hydrostatic test water that does not contain any treatment chemicals; potable water line flushings; and uncontaminated groundwater. If any of these discharges may reasonably be expected to be present and to be mixed with non-contact cooling water discharges, they must be specifically identified in the Notice of Intent (NOI).

(3) Limitations on Coverage. This permit does not authorize the following non-contact cooling water discharges:

a. Non-contact cooling water discharges with a total average daily flow of one (1.0) million gallons per day (MGD) or greater;

b. Non-contact cooling water discharges that contain any water treatment chemicals; other than those in the incoming public water supply.

c. Non-contact cooling water discharges from facilities with an existing RIPDES individual permit, which was issued in accordance with Part IV.W of this permit;

d. Non-contact cooling water discharges that the Director of the Department of Environmental Management has found to be or may reasonably be expected to be contributing to a violation of water quality standards;

e. Non-contact cooling water discharges into the terminal reservoir of a public drinking water supply;

f. Non-contact cooling water discharges that may adversely affect a listed, or a proposed to be listed, endangered or threatened species or its critical habitat;

g. Non-contact cooling water which is co-mingled with discharges that are not an allowable discharge under this permit;

h. Non-contact cooling water which uses ground water, that is impacted by a release of a toxic or hazardous material; and

i. Non-contact cooling water which is contaminated from failing or leaking heat exchangers or process equipment being cooled.

j. Non-contact cooling water that uses surface water as its source.

(4) Impaired Waters. Discharges to waterbodies that are listed as impaired for one or more designated uses on the most recent EPA approved 303(d) list of waters must demonstrate that the discharge meets applicable water quality standards for listed pollutants causing impairment.

C. Authorization. To be covered under this general permit, owners or operators of non-contact cooling water discharges must submit to the Director a standardized Notice of Intent (NOI) form. All NOIs must be submitted to the Director by hard copy (See Part III.B), unless an electronic reporting tool becomes available during the period covered under this permit that DEM implements (See 40 CFR 127.26(h)). Discharges of non-contact cooling water from three-family or smaller residential buildings, are authorized to discharge upon the effective date of this permit and are not required to submit a NOI form. Upon review of an NOI, the Director may deny coverage under this permit at any time and require submittal of an application for an individual or an alternative general permit.

(1) *Deadlines for Requesting Authorization*

a. Facilities discharging non-contact cooling water which were authorized under the previous general permit dated March 1, 2019, that intend to obtain coverage under this general permit; shall submit a NOI within thirty (30) days of the effective date of this permit.

b. Facilities that propose to discharge non-contact cooling water and were not authorized under the previous general permit dated March 1, 2019, must submit a NOI at least ninety (90) days prior to the commencement of such discharge.

(2) *Granting of Authorization*

a. Facilities that were authorized under the previous general permit dated March 1, 2019 that have submitted a complete NOI within thirty (30) days of the effective date of this permit, shall be automatically granted authorization to discharge upon departmental receipt of a complete NOI. Unless notified by the Director to the contrary, owners or operators who submit such notification are authorized to discharge under the terms and conditions of this permit. As indicated in Part II.H.(1), monitoring shall begin on the first day of the quarter immediately following the date of authorization.

b. For facilities which commence the discharge of non-contact cooling water after the effective date of this permit and which were not authorized under the previous general permit dated March 1, 2019, authorization will be granted ninety (90) days after the submittal of a complete NOI, unless otherwise notified by the Director in writing. Regardless of whether the NOI was actually reviewed by this department, or it became approved because of this department's failure to act within the designated timeframe, the permittee is still responsible for upholding all permit conditions and any other applicable state or federal regulations. As indicated in Part II.H.(1), monitoring shall begin on the first day of the quarter immediately following the date of authorization.

c. Discharges of non-contact cooling water from three-family or smaller residential buildings, shall automatically be granted authorization to discharge on the effective date of this permit. The permittee is still responsible for upholding all permit conditions and any other applicable state or federal regulations.

(3) Continuation of this Permit. If this permit is not re-issued or replaced prior to the expiration date, it will be administratively continued in accordance with Title 250 RICR-150-10-1 § 1.13 and remain fully effective and enforceable. If the discharges from the facility were authorized to discharge under this permit prior to the expiration date, any discharges authorized under this permit will automatically remain covered by this permit until the earliest of:

a. The authorization for coverage under a reissued permit or a replacement of this permit following the timely and appropriate submittal of a complete NOI requesting authorization to discharge under the new permit and compliance with the requirements of the new permit; or

b. The submittal of a Notice of Termination; or

c. Issuance or denial of an individual permit for the facility's discharges; or

d. A formal permit decision by the Director not to reissue this general permit, at which time the Director will identify a reasonable time period for covered dischargers to seek coverage under an alternative general permit or an individual permit. Coverage under this permit will cease at the end of this time period.

D. Termination of Coverage. Owners and/or operators of facilities must notify the Director in writing when discharge(s) of non-contact cooling water no longer occur at the facility. At that point, coverage under this permit is terminated. At a minimum, the following information is required to terminate coverage under this permit:

(1) Owner's name, mailing address, and telephone number.

(2) Operator's name, mailing address, and telephone number.

(3) Name and location of the facility.

(4) RIPDES non-contact cooling water permit number.

(5) Certification that non-contact cooling water discharge no longer occurs.

E. Failure to Notify. Owners or operators, who fail to notify the Director of their intent to be covered under a general permit in accordance with Part I.C. and discharge to waters of the State or to a separate storm sewer system without a RIPDES permit, are in violation of Chapter 46-12 of the Rhode Island General Laws and the Clean Water Act and are subject to legal action.

II. PERMIT CONDITIONS

A. Definitions in this Section. Definitions of terms found in this permit, including "Freshwater", "Saltwater", "Habitat", and more, can be found in the Rhode Island Water Quality Regulations (See 250-RICR-150-05 §1.4). Waterbody classifications and fishery designations (e.g., Warm Water vs. Cold Water) can be found in 250-RICR-150-05 §1.25.

B. The discharge shall not cause visible discoloration of the receiving waters.

C. The discharge shall contain neither a visible oil sheen, foam, nor floating solids.

D. The permittee must develop and implement appropriate best management practices to ensure that discharges of non-contact cooling water are not contaminated by failing/leaking heat exchangers. Appropriate best management practices may include but not be limited to; material inventory, preventative maintenance and equipment replacement, testing of equipment (dye testing, eddy current testing, pressure testing), routine visual observations of equipment and discharge, or sampling of the discharge for an indicator pollutant. The permittee must prepare an annual self-certification report, documenting that the discharge is not contaminated, by January 15th of each year for the previous calendar year. The self-certification report must summarize the selected best management practices used to determine that the discharge is not contaminated and include the dates of all inspections, testing, maintenance/equipment replacement; the results of all inspections and testing; the personnel performing inspections, testing and maintenance; and any actions taken

in response to the inspections and testing. The statement must also identify incidents where discharges have been contaminated by failing/leaking heat exchangers. The statements shall be maintained on site for a minimum period of five (5) years and must be certified in accordance with Part IV.I of the permit. These reports are subject to DEM review. If at any time the DEM requests that these reports be submitted, the permittee shall submit these reports to the DEM in accordance with the DEM's request.

E. Monitoring Requirements and Limitations. During the period beginning on the effective date and lasting through permit expiration, the permittee is authorized to discharge non-contact cooling water. Each outfall discharging non-contact cooling water shall be limited and monitored by the permittee as specified below, in accordance with the receiving water classification, when indicated. Monitoring for each outfall is conducted and reported in accordance with Part II.H and Part IV.R.

Effluent Characteristic	Dilution Factor[1]	Discharge Limitations		Monitoring Requirements	
		Average Monthly	Maximum Daily	Monitoring Frequency	Sample Type
Flow					
All Discharges	NA	-----	[2]	1/Week	Calculated[3]
Temperature					
Discharge to Freshwater Warm Water Habitat	<15 (Fifteen)[1] or Temperature Impaired	-----	83°F[4]	1/Week	Grab or Continuous[5]
	≥15 (Fifteen)[1]	-----	92°F[4]	1/Week	Grab or Continuous[5]
Discharge to Freshwater Cold-Water Habitat	<15 (Fifteen)[1] or Temperature Impaired	-----	68°F[4]	1/Week	Grab or Continuous[5]
	≥15 (Fifteen)[1]	-----	92°F[4]	1/Week	Grab or Continuous[5]
Discharge to Saltwater Habitat	NA	-----	83°F[6]	1/Week	Grab or Continuous[5]
pH					
Discharge to Freshwater Habitat	NA	6.5 s.u. (min)	9.0 s.u. (max)	1/Week	Grab or Continuous[5]
Discharge to a Saltwater Habitat	NA	6.5 s.u.[7] (min)	8.5 s.u.[7] (max)	1/Week	Grab or Continuous[5]
Total Residual Chlorine					
Municipal Water Supply and Discharge to Freshwater Habitats (except Lakes or Ponds)	See Part II.F.	See Part II.F.	See Part II.F.	1/Quarter	Grab[5]
Municipal Water Supply and Discharge to Lakes or Ponds or Saltwater Habitats	NA	0.02 mg/L[8]	0.02 mg/L[8]	1/Quarter	Grab[5]

Sampling shall be performed on a typical operating day.
----- Signifies a parameter which must be monitored, and data must be reported; no limit has been established at this time.
[1] See NCCW NOI Instructions for dilution factor calculations.
[2] Limit based upon the maximum non-contact cooling water design flow in the applicant's NOI.

[3] Flow shall be either calculated using a flow totalizer or estimated using the cooling water pumping rate. Reported flow is the flow which occurs over the course of a normal operating day when discharge is occurring. Monthly average flow is to be calculated by dividing the total flow discharged for a given month by the number of days in which there was a discharge during the month (i.e., if a given month had 30 days, but the facility only discharged on 25 days, the monthly average flow would be determined by dividing the total volume discharged during the month by 25 days). Since the reporting period consists of more than one month (i.e., quarterly reporting), the monthly average flow to be reported on the DMR is the highest monthly average flow for all the months in the reporting period. The daily maximum flow is the highest daily flow observed during the reporting period.
[4] In no case shall the discharge cause the temperature of the receiving water to be raised more than 4.0°F.
[5] Compliance with these limitations shall be determined by taking a minimum of four (4) grab samples equally spaced over the course of a normal operating day that captures a discharge event. The maximum value to be reported is the highest individual measurement obtained during the monitoring period. The minimum value to be reported is the lowest individual measurement obtained during the monitoring period. Continuous monitoring devices may be used to measure effluent water body temperature and pH. When required, the maximum temperature and monthly average temperature shall be reported based on the continuous dataset.
[6] In no case shall the discharge cause the temperature of the receiving water to be raised more than 4.0 °F (from October 1 through June 15) or more than 1.6 °F (from June 16 through September 30).
[7] In no case shall the discharge cause the pH of the receiving water to be more than 0.2 s.u. outside the normally occurring range.
[8] The limit at which compliance/noncompliance determinations will be based is the Quantitation Limit which is defined as 0.02 mg/L for TRC. These values may be reduced by permit modification as more sensitive methods are approved by EPA and the State. The following methods may be used to analyze the grab samples: (1) Low Level Amperometric Titration, Standard Methods (18th Edition) No. 4500-Cl E; (2) DPD Spectrophotometric, EPA No. 330.5 or Standard Methods (18th Edition) No. 4500-Cl G.

F. <u>Total Residual Chlorine</u> (Facilities Using Municipal Water Only).

(1) *Facilities Discharging to Flowing Freshwater Receiving Bodies Excluding Lakes or Ponds*

Any facility using municipal water as their source of non-contact cooling water is required to limit and monitor the amount of Total Residual Chlorine (TRC) in their effluent. The maximum daily and average monthly concentration of TRC allowed in the effluent are based on the appropriate water quality criterion and the available dilution of the receiving water. This is expressed in the following equation:

Effluent Limit = (Dilution Factor) x (Water Quality Criteria)

Note that the permittee's TRC effluent limits will be no greater than 1.0 mg/L, regardless of the dilution factor of the receiving water (See fact sheet). The appropriate water quality criteria for the calculation are shown below:

Freshwater acute = 0.019 mg/L (19 ug/l); use for daily maximum
Freshwater chronic = 0.011 mg/L (11 ug/l); use for average monthly

The dilution factor will be based on the same 7Q10 flow the permit applicant determines for effluent temperature limits, as written in the NOI.

(2) *Facilities Discharging to Saltwater Receiving Bodies, or Lakes and Ponds*

Any facility using municipal water as their source of non-contact cooling water is required to limit and monitor the amount of Total Residual Chlorine (TRC) in their effluent. The maximum daily and average monthly concentration of TRC allowed in the effluent is 0.02 mg/L.

TRC concentrations are required to be measured (analyzed) within 15 minutes of collection of the sample per 40 CFR 136. Given the TRC limits of this permit, sampling methods require that TRC detection limits be at least 0.02 mg/L. The following methods may be used to analyze the grab samples: (1) Low Level Amperometric Titration, Standard Methods (18th Edition) No. 4500-Cl E; (2) DPD Spectrophotometric, EPA No. 330.5 or Standard Methods (18th Edition) No. 4500-Cl G.), all data below the detection level of 0.02 mg/L shall be reported as a zero (0) in accordance with the *2023 Rhode Island Pollutant Discharge Elimination System (RIPDES) Discharge Monitoring Report (DMR) Instructions.*

(3) *Exemptions*

Facilities may be exempt from TRC sampling requirements if:

a. When discharging to a freshwater body the point of discharge from the facility is at least 2100 feet from the receiving water body (i.e. the discharge is to a stormwater system that conveys the NCCW discharge to the receiving water), or;

b. When discharging to a saltwater body the point of discharge from the facility is at least 2400 feet from the receiving water body, or;

c. If the facility has four consecutive quarters of non-detection for TRC the facility may request a waiver from DEM to be exempt from TRC requirements for the remainder of the permit period or until DEM determines there is a reason to resume sampling.

If the facility meets the requirements for at least one of these exemptions, the facility must submit a written request to DEM (See Part III.B for where to submit). The exemption is only granted upon approval by DEM. If granted approval, the facility may be exempt from TRC monitoring for the effective period of the permit, unless DEM determines there is a reason to resume testing.

G. Monitoring Requirements and Limitations for Three-Family or Smaller Residential Geothermal Discharges. Discharges from residential geothermal heat exchangers at three-family or smaller residential buildings do not have any specific reporting requirements. However, discharges from these facilities into saltwater receiving waters shall not cause the temperature of the receiving water be raised more than 4.0°F (from October 1 through June 15) or more than 1.6°F (from June 16 through September 30) and shall not cause the pH of the receiving water to be more than 0.2 s.u. outside of the normally occurring range. Discharges from these facilities into freshwater receiving waters shall not cause the receiving water's temperature to be raised more than 4.0°F or the pH to be outside of the range of 6.5 – 9.0 s.u. DEM may require sampling to confirm that the above limits are being met on a case-by-case basis.

H. Monitoring and Reporting

(1) Monitoring

All monitoring required by this permit shall begin on the first day of the quarter immediately following authorization and shall be done in accordance with sampling and analytical testing procedures specified in Federal Regulations (40 CFR Part 136).

(2) Submittal of DMRs Using NetDMR

Monitoring results obtained during the previous calendar quarter shall be summarized and reported to DEM in discharge monitoring reports (DMRs) submitted electronically using the NetDMR reporting tool (https://netdmr/epa.gov). When the permittee submits DMRs using NetDMR, it is not required to submit hard copies of DMRs to DEM.

The first report is due for the calendar quarter immediately following the date in which the facility obtained coverage under this general permit. Testing shall be reported as follows:

Quarter Testing to be Performed	Report Due No Later Than	Results Submitted on DMR for
January 1 – March 31	April 15	January 1 – March 31
April 1 – June 30	July 15	April 1 – June 30
July 1 – September 30	October 15	July 1 – September 30
October 1 – December 31	January 15	October 1 – December 31

(3) Submittal of Reports as NetDMR Attachments

Unless otherwise specified in this permit, the permittee must submit electronic copies of documents in NetDMR that are directly related to the DMR. These include the following:

- DMR Cover Letters
- Below Detection Limit summary tables

All other reports should be submitted to DEM as a hard copy via regular US mail (See Part II.H.(4) below).

(4) Submittal of Requests and Reports to DEM

The following requests, reports, and information described in this permit shall be submitted as hard copy to the DEM.

a. Transfer of Permit notice
b. Request for changes in sampling location
c. Request for termination
d. Written notifications required under Part II
e. Notice of unauthorized discharges

These reports, information, and requests shall be submitted to DEM by hard copy mail to the address listed at Part III.B.

(5) Verbal Reports and Verbal Notifications

Any verbal reports or verbal notifications, if required in Parts I - IV of this permit, shall be made to the DEM. This includes verbal reports and notifications required under Part IV.G General Requirements. Verbal reports and verbal notifications shall be made to DEM at (401) 222-4700 or (401) 222-3070 at night.

I. Failure to Comply. Failure to meet the monitoring requirements under this part of the permit constitutes a violation of Chapter 46-12 of Rhode Island General Laws and the Clean Water Act; and may be subject to legal action.

III. NOTICE OF INTENT REQUIREMENTS

A. Contents of Notice of Intent

(1) The owner's name, mailing address, telephone number, ownership status, and status as a Federal, State, private, public, or other entity.

(2) The operator's name, address, telephone number, ownership status and status as a Federal, State, private, public, or other entity.

(3) Up to four (4) digit SIC code that best represents the principal products or activities provided by the facility;

(4) The location of each outfall, including the latitude and longitude of the approximate center of the outfall to the nearest 15 seconds, for which the NOI is being submitted.

(5) The name of the receiving water(s) or if the discharge is through a municipal separate storm sewer, the name of the operator of the storm sewer system and the ultimate receiving water(s);

(6) The type of receiving water (e.g., Saltwater, Warm Water Freshwater Habitat, or Cold-Water Freshwater Habitat);

(7) A topographic map of the area extending at least extending one (1) mile beyond the property boundaries of the facility that clearly shows the legal boundaries of the facility and the location of each intake structure and each outfall.

(8) A list of any allowable discharges, as described in Part I.B.(2) of this permit, that are known or are reasonably expected to be present at the site;

(9) A line drawing of the facility that shows both the non-contact cooling water and the allowable discharge water flow through the facility from intake to discharge and describes any treatment that the water receives.

(10) An identification of the source of the non-contact cooling water.

(11) A description of the average frequency (days/week), duration (hours/day), and flow (gallons per minute) of the non-contact cooling water discharge.

(12) For discharges of non-contact cooling water that commence after the effective date of this permit, the NOI must indicate the anticipated date on which the facility will begin to discharge.

(13) Any additional information that may be required by the Department to be included as part of the NOI, if the Director determines that such information is reasonably necessary to determine whether or not to authorize the discharge under this permit; and

(14) For discharges to freshwater and for facilities using a municipal water supply as their source for non-contact cooling water, calculate the approximate instream dilution factor based on an aquatic low-flow analysis. See the NOI instructions to determine how to calculate an instream dilution factor.

B. Where to Submit. A completed and signed NOI, in accordance with Part IV.I, must be submitted to the following address unless an electronic reporting tool becomes available during the period covered under this permit.

Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, Rhode Island 02908

C. Deficient NOI. If any portion of the NOI does not meet one or more of the minimum requirements of this part, then the applicant will be notified by a deficiency letter at any point within the review period. It is the responsibility of the applicant to make all required changes and resubmit the NOI. The review period will recommence upon the receipt of the revised NOI.

IV. GENERAL REQUIREMENTS

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit non-compliance constitutes a violation of Chapter 46-12 of the Rhode Island General Laws and the CWA and is grounds for enforcement action which may include permit termination, revocation and reissuance, modification, or for the denial of a permit renewal application. and the imposition of penalties.

(1) The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(2) Section 309 of the CWA provides significant penalties for any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318 or 405 of the CWA or any permit condition or limitation implementing any such sections in a permit issued under Section 402 of the CWA. Any person who violates any condition of this permit is subject to a civil penalty of up to $25,000 per day of such violation, as well as any other appropriate sanctions provided by Section 309 of the CWA. Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of up to $10,000 or by imprisonment of not more than two (2) years, or by both.

(3) Chapter 46-12 of the Rhode Island General Laws provides that any person who violates a permit condition is subject to a civil penalty of not more than $25,000 per day of such violation. Any person who willfully or negligently violates a permit condition is subject to a criminal penalty of not more than $25,000 per day of such violation or imprisonment for not more than five (5) years, or both. Any person who knowingly makes any false statement in connection with the permit is subject to a criminal penalty of not more than $5,000 for each instance of violation or by imprisonment for not more than thirty (30) days, or both.

B. Continuation of the Expired General Permit. Provided the permittee has re-applied in accordance with paragraph C below, an expired general permit continues in force and effect until a new general permit is issued. Only those facilities previously authorized to discharge under the expired permit are covered by the continued permit.

C. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain authorization as required by the new permit once the Department issues a new permit.

D. Need to Halt or Reduce Activity Not a Defense. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment.

F. Change in Discharge. All discharges authorized herein shall be consistent with the terms and conditions of this permit. Discharges which cause a violation of water quality standards are prohibited. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new RIPDES application at least 90 days prior to commencement of such discharges or is such changes will not violate the effluent limitations specified in this permit, by notice, in writing, to the Director of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously listed.

Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by the permit constitutes a violation.

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G. Reporting Requirements

(1) Planned changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

(2) Anticipated noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with the permit requirements.

(3) Transfers. This permit is not transferable to any person except after written notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under State and Federal law.

(4) Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(5) Twenty-four hour reporting. The permittee shall immediately report any noncompliance which may endanger the health or the environment by calling DEM at (401) 222-4700 or (401) 222-3070 at night.

A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The following information must be reported immediately:

a. Any unanticipated bypass which causes a violation of any effluent limitation in the permit; or

b. Any upset which causes a violation of any effluent limitation in the permit; or

c. Any violation of a maximum daily discharge limitation for any of the pollutants specifically listed by the Director in the permit.

The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

(6) Other noncompliance. The permittee shall report all instances of noncompliance not reported under paragraphs (1), (2), and (5), of this section, at the time monitoring reports are submitted. The reports shall contain the information required in paragraph (G)(5) of this section.

(7) Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Director, they shall promptly submit such facts or information.

H. Duty to Provide Information. The permittee shall furnish to the Department, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking, and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, any copies of records required to be kept by this permit.

I. Signatory Requirements. All Notices of Intent, reports, certifications or information either submitted to the Director, or that this permit requires to be maintained by the permittee, shall be signed and certified in accordance §1.12 of the RIPDES regulations (See 250-RICR-150-10 §1.12). Rhode Island General Laws, Chapter 46-12 provides that any person who knowingly makes a false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of up to $5,000 per violation, or by imprisonment for not more than thirty (30) days per violation, or by both.

J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA.

K. Release in Excess of Reportable Quantities. If a release in excess of reportable quantities occurs, the permittee must notify the Office of Water Resources immediately. This permit does not relieve the permittee of the reporting requirements of 40 CFR 117 and 40 CFR 302.

L. Property Rights. The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

M. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

N. Transfers. This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under State and Federal law.

O. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law.

P. Other Laws. The issuance of a permit does not authorize any injury or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

Q. Proper Operations and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operations of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

R. Monitoring and Records

(1) Samples and measurements taken for the purpose of monitoring shall be representative of the volume and nature of the discharge over the sampling and reporting period.

(2) The permittee shall retain records of all monitoring including all calibration and maintenance records and all original strip chart recordings from continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

(3) Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements.

b. The individual(s) who performed the sampling or measurements.

c. The date(s) analyses were performed.

d. The individual(s) who performed the analyses.

e. The analytical techniques or methods used; and

f. The results of such analyses.

(4) Monitoring must be conducted according to test procedures approved under 40 CFR 136 and applicable Rhode Island regulations, unless other test procedures have been specified in this permit.

(5) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall upon conviction, be punished by a fine of not more than $10,000 per violation or by imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. Chapter 46-12 of the Rhode Island General Laws also provides that such acts are subject to a fine of up to $25,000 per violation, or by imprisonment for not more than thirty (30) days per violation, or by both.

(6) Monitoring results must be reported on a Discharge Monitoring Report (DMR)

(7) If the permittee monitors any pollutants more frequently than required by this permit, using test procedures approved under 40 CFR 136, applicable State regulations, or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

S. Bypass. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(1) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (2) and (3) of this section.

(2) Notice

a. *Anticipated Bypass.* If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten (10) days before the date of the bypass.

b. *Unanticipated Bypass.* The permittee shall submit a notice of an unanticipated bypass as required in 250-RICR-150-05 §1.14(R) of the RIPDES Regulations.

(3) Prohibition of Bypass.

a. Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

i. The bypass was unavoidable to prevent loss of life, personal injury or severe property damage, where "severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in productions.

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee should have installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

iii. The permittee submitted notices as required in paragraphs IV.S.(2) above.

b. The Director may approve an anticipated bypass after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph (4).a of this section.

T. Upset Conditions. "Upset" means an exceptional incident in which there in unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

(1) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph (2) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

(2) Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the permittee can identify the causes(s) of the upset;

b. The permittee facility was at the time being properly operated;

c. The permittee submitted notice of the upset as required in 250-RICR-150-05 §1.14(R); and

d. The permittee complied with any remedial measures required under 250-RICR-150-05 §1.14(E).

(3) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

U. Inspection and Entry. The permittee shall allow the Director or an authorized representative of DEM, upon presentation of credentials and other documents as may be required by law, to:

(1) Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

(2) Have access to and copy at reasonable times; any records that must be kept under the conditions of this permit;

(3) Inspect at reasonable times any facilities, equipment, (including monitoring and control equipment), practices or operations regulated or required under this permit; and

(4) Sample or monitor any substances or parameters at any location, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA or Rhode Island General Law.

V. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause, including but not limited to: (1) Violation of any terms or conditions of this permit; (2) Obtaining the permit by misrepresentation or failure to disclose all relevant facts; or (3) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

W. Requiring an Individual Permit or an Alternative General Permit

(1) The Director of the Department of Environmental Management (DEM) may require any owner or operator authorized to discharge under this permit to apply for and obtain either an individual or an alternative RIPDES general permit. Any interested person may petition the Director to take action under this paragraph. The Director may determine at his or her own discretion that an individual or an alternative general permit is required.

(2) Any owner or operator authorized to discharge by this permit may request to be excluded from coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application with reasons supporting the request to the Director. The request may be granted by issuance of an individual permit or an alternative general permit, if the reasons cited by the owner or operator are adequate to support the request. The Director shall notify the permittee within a timely fashion as to whether or not the request has been granted.

(3) If a facility requests or is required to obtain coverage under an individual or an alternative general permit, then authorization to discharge non-contact cooling water under this permit shall automatically be terminated on the date of issuance of the individual or the alternative general permit. Until such time as an alternative permit is issued, the existing general permit remains fully in force.

X. Reopener Clause. The Director reserves the right to make appropriate revisions to this permit in order to incorporate any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA or State Law. In accordance with 250-RICR-150-10-1.16 and 250-RICR-150-10-1.24 of the RIPDES Regulations, if any effluent standard or prohibition, or water quality standard is promulgated under the CWA or under State Law which is more stringent than any limitation on the pollutants in the permit, then the Director may promptly reopen the permit and modify or revoke and reissue the permit to conform to the applicable standard.

Y. Availability of Reports. Except for data determined to be confidential under Part Z below, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the DEM at 235 Promenade Street, Providence Rhode Island 02908. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA and under section 46-12-14 of the Rhode Island General Laws.

Z. Confidentiality of Information

(1) Any information submitted to DEM pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of the submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, DEM may make the information available to the public without further notice.

(2) Claims of confidentiality for the following information will be denied:

a. The name and address of any permit application or permittee;

b. Permit applications, permits and any attachments thereto; and

c. RIPDES effluent data.

AA. Right to Appeal. Within thirty (30) days of receipt of notice of final authorization, the permittee or any interested person may submit a request to the Director for an adjudicatory hearing to appeal the decision to be covered under the general permit. The request for a hearing must conform to the requirements of See 250-RICR-150-10 §1.50of the RIPDES Regulations.)

RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES) GENERAL PERMIT FOR NON-CONTACT COOLING WATER DISCHARGES

NOTICE OF INTENT (NOI)

DEM USE ONLY
Date Received
Amount Received $
RIPDES# **RIG**
Approval Date
Data Entry Date
Data Entry Initials
Data Group Number: G2A, G2B, G3A

I. OWNER

Formal Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
Contact Person:		Title:	
Email address of Owner:			

II. OPERATOR (if different from Owner)

Formal Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
Facility Contact Person:		Title:	
Email address of Facility Contact Person:			

III. FACILITY INFORMATION

Facility Name:	
Physical Address:	
Latitude of facility (in decimal degrees):	Longitude (in decimal degrees):
Facility Type of Ownership: ☐ Federal ☐ State ☐ Tribal ☐ Private ☐ Other (specify):	
Primary SIC Code:	Type of Business:
Secondary SIC Code:	Type of Business:

IV. DISCHARGE INFORMATION

Attach a topographic map of the facility including Property Boundaries of the Facility and the Location of Each Intake and Outfall Structure. If more than two outfalls, please attach separate sheet with additional outfalls and required information.

Outfall #:	Latitude (in decimal degrees)		Longitude (in decimal degrees)
Is this an Existing Discharge: ☐ Yes ☐ No		If No, Anticipated Discharge Date:	
Frequency of Discharge:	Days/Week:	Hours/Day:	Gallons/Min:
Outfall #:	Latitude (in decimal degrees)		Longitude (in decimal degrees)
Is this an Existing Discharge: ☐ Yes ☐ No		If No, Anticipated Discharge Date:	
Frequency of Discharge:	Days/Week:	Hours/Day:	Gallons/Min:

V. RECEIVING WATER INFORMATION

If the facility has more than one outfall and outfalls discharge to different receiving water bodies, please attach separate sheet with required information.

Receiving Water Habitat Type: ☐ Saltwater ☐ Warm Water Freshwater ☐ Cold Water Freshwater

a. Identify the discharge pathway: ☐ Direct, ☐ Indirect, ☐ Storm Drain, ☐ River/brook, ☐ Wetlands,

☐ Other (describe): _____

b. Provide a narrative description of the discharge pathway, including the names of the receiving waters:

c. Attach a detailed map(s) indicating the site location and location of the outfall to the receiving water:

1. For multiple discharges, number the discharges sequentially.

2. For indirect discharges, indicated the location of the discharge to the indirect conveyance and the discharge to surface waters. The map should include the location and distance to the nearest sanitary sewer.

d. Provide the Water Quality Classification of the receiving water: _____.

e. If the proposed discharge is to freshwaters, provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water for the point of discharge in cubic feet per second (cfs): _____. Attach any calculation sheets used to support stream flow and dilution calculations.

f. Is the receiving water a listed 303(d) water quality impaired or limited water? ☐ Yes ☐ No, If yes for which pollutant(s)?:

g. Is there a TMDL? ☐ Yes ☐ No If Yes, for which pollutants?

VI. NON-CONTACT COOLING WATER SYSTEM INFORMATION

Attach a line drawing of the non-contact cooling water flow through the facility including: Source of the intake water; all allowable discharges (see Section VIII); a flow schematic of the facility depicting all major processes that use non-contact cooling water and all sources of allowable discharges; the method of discharge (i.e., separate storm sewer system or surface water); the name of the receiving water; any control equipment (i.e., flow meters, valves, etc.); and the sample location.

Source of intake water: ☐ Private well water ☐ Municipal water supply

Is there an Existing RIPDES Permit for this Discharge: ☐ Yes ☐ No	If Yes Permit #:

Is the site/facility covered by any other DEM permit including: 1. Multi-sector storm water general permit, 2. Individual RIPDES Permit, if so please list them: _____

VII. DILUTION FACTOR (DISCHARGE TO FLOWING FRESHWATER ONLY)

Note: Attach Dilution Worksheet as well as StreamStats Report if used to determine dilution factor.

Receiving Water 7Q10 (cfs) at the point of discharge:

Total Combined System Design Flow (cfs):	Dilution Factor:

VIII. ALLOWABLE DISCHARGE INFORMATION

Types of Allowable Discharges that are Discharged:

☐ Steam Condensate that does not contain Treatment Chemicals

☐ Hydrostatic Test Water that does not contain Treatment Chemicals

☐ Air Conditioner Condensate that does not contain Treatment Chemicals

☐ Potable Water Line Flushings

☐ Uncontaminated Groundwater

☐ Non-Contact Cooling Water only

IX. CHEMICAL ADDITIVE CERTIFICATION

I certify under penalty of law that chemical additives are not used in the non-contact cooling water treatment system nor are any treatment chemicals added to any of the allowable discharges identified as being present in Section VIII of this NOI.

Print Name _____

Print Title _____

Signature _____ Date _____

X. OWNER/OPERATOR CERTIFICATION

I certify under penalty of law that I have read and understood all terms and conditions of the above referenced General Permit. I also certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Owner Name _____

Print Owner Title _____

Signature _____ Date _____

Print Operator Name _____

Print Operator Title _____

Signature _____ Date _____

INSTRUCTIONS FOR THE RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES)
NOTICE OF INTENT (NOI) - GENERAL PERMIT FOR NON-CONTACT COOLING WATER DISCHARGES

Who Must File a Notice of Intent (NOI) Form
Discharges of non-contact cooling water to Waters of the State are prohibited without a Rhode Island Pollutant Discharge Elimination System (RIPDES) permit. The owner/operator of a facility that has such a discharge must submit a Notice of Intent (NOI) and obtain coverage under the RIPDES General Permit prior to discharge. If you have questions about whether you need a permit, contact the RI Department of Environmental Management, RIPDES Program at 401-222-4700. An originally signed NOI form must be sent to:

RIDEM - Office of Water Resources
RIPDES Program
235 Promenade Street
Providence, Rhode Island 02908

Please be sure to keep a copy for your files.

Section I - Owner Information
Give the legal name of the person, firm, public (municipal) organization, or any other entity that owns the facility described in this application (RIPDES Regulations 250-RICR-150-10 §1.4 & §1.12). The name of the owner may or may not be the same as the name of the facility. Do not use a colloquial name. Enter the complete address, email address, and telephone number of the owner.

Section II - Operator Information
If the operator is the same as the owner, enter "Same as Owner". Give the legal name of the person, firm, public (municipal) organization, or any other entity that operates the facility described in this application (RIPDES Regulations 250-RICR-150-10 §1.4 and & §1.12). The name of the operator may or may not be the same as that of the facility. The operator is the entity that controls the day-to-day operation of the facility. Do not use a colloquial name. Enter the complete address, email address, and telephone number of the operator.

Section III – Facility Information
Enter the name and physical address of the facility which is being permitted. Also include the latitude and longitude of the facility (not the outfalls) in decimal degrees using the WGS84 map datum.

i. For example, DEM's location at 235 Promenade Street would be 41.828745, -71.419282.

Enter the type of ownership that describes the facility using the provided check boxes. Enter the facility's primary and secondary four-digit Standard Industrial Classification (SIC) Codes that best represent the products produced or activities provided by the facility.

Section IV – Discharge Information
Attach a topographic map, which extends at least one (1) mile beyond the property boundaries of the facility that clearly shows the legal boundaries of the facility and the location of each intake and outfall structure. The NOI must also list the latitude and longitude, in decimal degrees, of the center of each outfall structure. Enter the frequency of non-contact cooling water discharge, the flow in gallons per minute and, for new discharges, the date on which the facility anticipates initiating discharge. Additional outfalls should be included on a separate sheet if there are more than two.

Section V - Receiving Water Information
The receiving water habitat type, water quality classification, 303(d) listings, and TMDL status can be determined by following these steps:

- Step 1: Go to: https://dem.ri.gov/online-services/data-maps
- Step 2: Select Environmental Resource Map.
- Step 3: Select the "Surface Water" Folder listed under the LAYERS heading.
- Step 4: Input the facility address in the search bar in the upper left-hand corner of the screen. This will zoom to the facility area, and the permittee may select (click on) the relevant water body section from there. Alternatively, select the Zoom from icons listed on the left-hand legend and zoom in to the area in the vicinity of the discharge and the ultimate receiving water body. After selecting the receiving water, a pop-up box will appear with the name of the selected waterbody, the waterbody ID, what impairments the waterbody may be listed for, any TMDLs that the waterbody may be listed for, and the Water Quality Standard (Classification, warm vs. cold). Note that you may need to click on the three dots in the box to the right and select attribute table to retrieve this info.

Also identify the discharge pathway (part a of Section V), whether the discharge is directly to the receiving water body, indirectly discharging, discharging to a storm drain, etc. Also provide a narrative description of the discharge pathway, briefly stating the path the discharge takes from the facility to the receiving water body.

Section VI - Non-Contact Cooling Water System Information
If the source of non-contact cooling water is from a private well, check the "Private well water" box.

If the facility uses municipal well water for non-contact cooling water, check the "Municipal water supply" box. Note that if the municipal water supply box is checked, the facility is required to monitor for Total Residual Chlorine and must also:

i. Complete the dilution worksheet, if discharging to a

Freshwater body (See Section VII).

Attach a line drawing of the facility that identifies the flow of non-contact cooling water through the facility from intake to discharge. The line drawing must clearly identify the source of the non-contact cooling water. Also attach a description (i.e., a brief narrative and cut sheets/ drawings) of the type of equipment that the non-contact cooling water is used for.

Section VII - Dilution Factor

NOTE: Section VII must be completed by **all** facilities discharging to flowing Freshwater bodies. Discharges to saltwater bodies, lakes, ponds, and wetlands are given a dilution factor of one (1).

Complete the attached worksheet to determine the 7-day 10-year (7Q10) flow at the point of discharge and the dilution factor. The worksheet includes information on StreamStats, used to determine the relevant information for obtaining the 7Q10 of a given waterbody. Enter the 7Q10 in the box labeled "Receiving water 7Q10". Enter the dilution factor and the total combined system design flow in the appropriate boxes. The total combined treatment system design flow is the sum of the non-contact cooling water flows and the allowable discharge water flows for all outfalls. Please note that DEM shall use a dilution factor of one (1) for all discharges to saltwater bodies, lakes, ponds, and wetlands. DEM also reserves the right to specify the dilution factor to be used in a given watershed.

If a point of discharge is located in a watershed without a USGS gage that StreamStats doesn't compile a report for, then one of the following methods may be used to estimate the 7Q10:

1. USGS Report 95-4299, *Low-Flow Characteristics of Selected Streams in Northern Rhode Island.*
This report uses an equation based on statistical methods to estimate the 7Q10 flow of selected streams with partial record stations. Flow data from an index station is required.

2. USGS Report 93-4046, *Low-Flow Characteristics of Selected Streams in Rhode Island.*
This report provides an equation to estimate the 7Q10 flow at ungauged sites based on the drainage area and the distribution of geologic materials in the drainage area. The areas of the drainage basin underlain by coarse-grained stratified drift and underlain by till-covered bedrock are required to use this method.

3. USGS Report 93-4092, *Effects of Surficial Geology, Lakes and Swamps, and Annual Water Availability of Low Flows of Streams in Central New England and Their Use in Low-Flow Estimation.*
This report contains equations to estimate the 7Q10 flow using information regarding surficial geology, area of swamps and lakes, mean basin elevation, mean runoff, mainstream length channel, and drainage basin area.

These reports can be obtained by contacting the USGS at: U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver Federal Center, Denver, CO, 80225.

Section VIII – Allowable Discharge Information

Identify any allowable discharges that are discharged from the facility.

Section IX – Chemical Additive Certification

Provide certification that no chemical additives are added to the discharge. Note: If chemical additives are used, the discharge is not eligible for coverage under the General Permit.

Section X - Owner/Operator Certification

State and Federal statutes provide for severe penalties for submitting false information on this application form and require this application to be signed as follows (RIPDES Regulations 250-RICR-150-10 §1.12):

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor.

For a Municipality, State, Federal or other public facility: by either a principal executive officer or ranking elected official.

Dilution Determination Worksheet for use with the RIPDES General Permit for Non-Contact Cooling Water Discharges

Dilution Factor (DF)

A DF for sites that discharge to freshwater receiving waters in Rhode Island is calculated using the procedures as noted below. Alternate calculation methods for DFs may be acceptable if approved by the DEM. A DF for sites that discharge to saltwater receiving waters or non-flowing freshwater bodies (ponds or lakes) in Rhode Island is assumed to be 1:1, unless otherwise approved on a case-by-case basis by the DEM.

- **Determine 7Q10 (7 Day 10 Year Low Flow) using the 'RIPDES 7Q10 Policy':**

When determining the 7Q10 for calculating water quality-based effluent limits in a RIPDES permit, the following order of operations is required:

1. Determine if the discharge is to a stream with an active, inactive, or partial record USGS gauge station. This includes streams with impoundments or that are affected by groundwater pumping.
    a. If the stream has an active, inactive, or partial record gauge, use the list below to find the 7Q10.

USGS Station no.	Station Name	Water Year	7Q10 (cfs)	Drainage Area (sq. miles)
ACTIVE STATIONS				
01109403	Ten Mile River @ East Providence	1988-2018	9.7	53.1
01111300	Nipmuc River Near Harrisville	1965-2018	0.05	16
01111500	Branch River @ Forestdale	194-20181	11.48	91.2
01112500	Blackstone River @ Woonsocket	1930-2018	83.9	416
01113895	Blackstone River at Roosevelt Street @ Pawtucket, RI	2004-2018	84.3	474
01114000	Moshassuck River @ Providence	1965-2018	4.1	23.1
01114500	Woonasquatucket River @ Centerdale	1943-2018	6.1	38.3
01115098	Peeptoad Brook at Elmdale Rd. near North Scituate, RI	1995-2018	0.039	4.96
01115170	Moswansicut Stream near North Scituate, RI	2009-2018	0.08	3.25
01115187	Ponaganset River at South Foster, RI	1994-2018	0.062	14.4
01115265	Hemlock Brook at King Road near Foster, RI	2009-2018	0.04	8.72
01115276	Westconnaug Stream at Plainfield Pike, RI	2009-2018	1.2	5.18
01115630	Nooseneck River @ Nooseneck	2007-2018	1.3	8.23
01116000	South Branch Pawtuxet River @ Washington	1942-2018	16.1	63.8

USGS Station no.	Station Name	Water Year	7Q10 (cfs)	Drainage Area (sq. miles)
01116500	Pawtuxet River @ Cranston	1941-2018	59.9	200
01116905	Hunt River, 250 ft downstream of Fry Brook at Frenchtown, RI	2007-2018	1.5	16
01117000	Hunt River Near East Greenwich	1942-2018	1.5	23
01117350	Chipuxet River @ West Kingston	1973-2018	0.82	9.99
01117370	Queen River at Liberty Rd. at Liberty, RI	2007-2018	2.5	19.6
01117420	Usquepaug River Near Usquepaug	1975-2018	5.8	36.1
01117430	Pawcatuck River at Rt. 2 at Kenyon, RI	2007-2018	7.9	72.7
01117468	Beaver River Near Usquepaug	1976-2018	1.8	8.87
01117500	Pawcatuck River @ Wood River Junction	1942-2018	21.9	100
01117800	Wood River Near Arcadia	1965-2018	6.7	35.2
01118000	Wood River @ Hope Valley	1942-2018	17.8	72.4
01118500	Pawcatuck River @ Westerly	1942-2018	58	295
DISCONTINUED STATIONS				
01106000	Adamsville Brook at Adamsville, RI	1941-1978	0.06	8.01
01111400	Chepachet River at Chepachet, RI	1966-1972	2.28	17.4
01115630	Nooseneck River @ Nooseneck	1965-1981	1.32	8.23
01115770	Carr River Near Nooseneck	1965-1979	1.32	6.73
01117600	Meadow Brook Near Carolina	1967-1974	0.11	5.53
01126200	Bucks Horn Brook @ Greene	1967-1974	0.5	5.52
PARTIAL GAUGE STATIONS				
01111330	Clear River at Oakland, RI* (Burrillville WWTF)	1993-2003	2.4	45.4

* Note that the gauge station was downstream of the WWTF, the 7Q10 was calculated from upstream of the WWTF.

b. Use the 7Q10 from the list and the drainage area ratios between the gauge station and the point of discharge to determine the 7Q10 for WQBEL calculations (to get the dilution factor).

This would be done with the following equation:

$$7Q10_{At\ your\ facility} = \left(\frac{Drainage\ Area_{At\ your\ facility}}{Drainage\ Area_{At\ your\ gauge}}\right) * 7Q10_{At\ the\ gauge}$$

For example, if your facility was located on the Woonasquatucket River near Centerdale, and the drainage area for the watershed upstream of your facility was found to be 30 square miles, the 7Q10 would be calculated as follows:

$$7Q10_{At\ your\ facility} = \left(\frac{30\ Sq.Mi.}{38.3\ sq.Mi.}\right) * 6.1\ cfs$$

Which is equal to 4.8 cfs.

c. If a facility with significant flow is upstream of the gauging station, subtract the average flow from the facility from the 7Q10 value calculated in Step 1.b.

For example, the Smithfield WWTF is located on the Woonasquatucket River, just upstream of the Centerdale gauge. Therefore, the average WWTF flow is subtracted from the value at the gauge. In this case, the average WWTF flow is 3.2 cfs, making the 7Q10 flow at your facility 1.6 cfs.

If there is no facility impacting the 7Q10 of the gauge, then the 7Q10 value from step 1.b does not need to be adjusted to account for this, and step 1.c is skipped.

2. If the stream is ungauged and/or not included on the list above, use StreamStats per the procedure below to determine the 7Q10 flow.

3. The above active gauge station 7Q10s are current including data through water year 2018. RIPDES policy states these values shall be updated every 10 years. Therefore, this list must be updated for more recent 7Q10 values in 2029, when data through water year 2028 becomes available.

    a. In addition to updating the list for 7Q10 values, the USGS website should be consulted for the most up-to-date list of continuous active gauges in Rhode Island. Some gauges may now have at least 10 years of data to be included in this list that had been excluded previously.

- **<u>Determine 7Q10 using StreamStats:</u>**

1. Using StreamStats: This online application is appropriate for determining drainage area ratios for nearby gages and uses the 7Q10s for available gages from the U.S. Geological Gazetteer reports (1984 Wandle et al.). StreamStats is available at:

   http://water.usgs.gov/osw/streamstats

2. Follow the instructions in StreamStats. The location chosen must be where the NCCW discharges to the receiving water body. When the location has been chosen and the basin delineated, select the "Low-Flow Statistics" for the Regression Based Scenario. Then click Continue. This will bring up the Build a Report section. Again, click Continue.

3. Include a printout or otherwise attach the StreamStats Report with the NOI. An example StreamStats Report is included on the following page. The report should contain the 7 Day 10 Year Low Flow value for the selected location.

- **<u>Calculate the Dilution Factor:</u>**

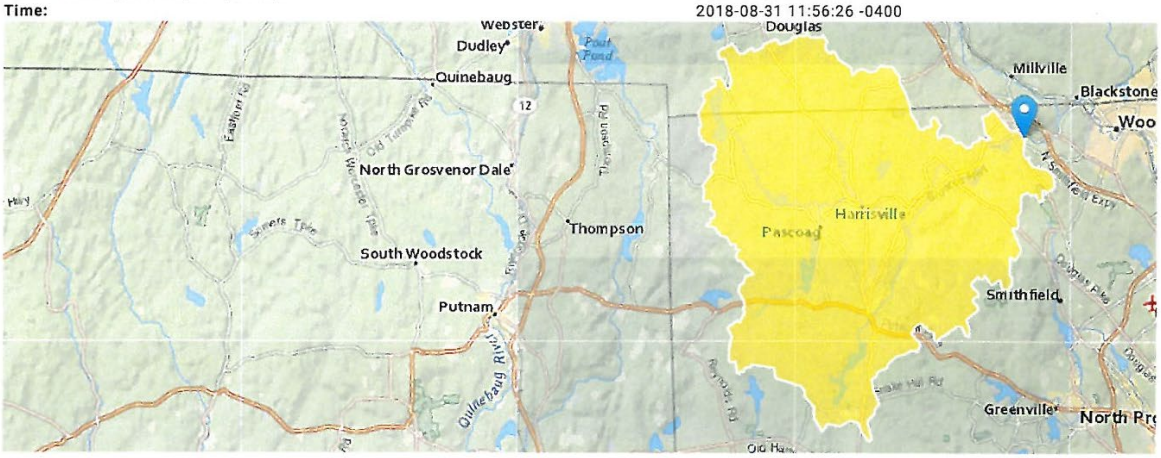
1. Calculate the dilution factor. The 7Q10 was calculated in equation 1,b above using the RIPDES 7Q10 Policy or as printed on the StreamStats Report. Use the following formula:

$$DF = \frac{\{(7Q10) + (\text{Total Combined System Design Flow})\}}{\{\text{Total Combined System Design Flow}\}} =$$

EXAMPLE STREAMSTATS REPORT

StreamStats Report

Region ID:	RI
Workspace ID:	RI20180831155611140000
Clicked Point (Latitude, Longitude):	41.99838, -71.57297
Time:	2018-08-31 11:56:26 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	89.8	square miles
STRDENED	Stream Density -- total length of streams divided by drainage area, edited from NHD	2.21	miles per square mile

Low-Flow Statistics Parameters [100 Percent (89.8 square miles) Statewide Low Flow 2014 5010]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	89.8	square miles	0.52	294
STRDENED	Stream Density Edited	2.21	miles per square mile	0.94	3.49

Low-Flow Statistics Flow Report [100 Percent (89.8 square miles) Statewide Low Flow 2014 5010]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu
7 Day 2 Year Low Flow	18.9	ft^3/s	4.08	87.4
7 Day 10 Year Low Flow	9.15	ft^3/s	1.17	71.3

Low-Flow Statistics Citations

Bent, G.C., Steeves, P.A., and Waite, A.M.,2014, Equations for estimating selected streamflow statistics in Rhode Island: U.S. Geological Survey Scientific Investigations Report 2014–5010, 65 p. (http://dx.doi.org/10.3133/sir20145010)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES)
Non-Contact Cooling Water General Permit (NCCW GP)

NOTICE OF TERMINATION (NOT)

(revised 02/25)

DEM USE ONLY
Date Received
Amount Received $
RIPDES# **RIG**
Approval Date
Data Entry Date
Data Entry Initials

I. General Site Information. Please provide the following information about the site:

a. Name of Facility/Site:

b. Facility/Site address:

c. RIPDES Permit Number:

d. Photos documenting the capping or elimination of piping connecting the discharge to the receiving water, or other documentation that the treatment system has been removed from the site, must be provided as an attachment in order to process this permit termination request.

II. Owner Information

Legal Name:

City: State: Zip: Phone: ( )

Contact Person: Title:

Email Address of Contact Person:

III. Operator Information

Legal Name:

City: State: Zip: Phone: ( )

Contact Person:

Email Address of Contact Person:

IV. OWNER/OPERATOR CERTIFICATION

I certify under penalty of law that all discharges from the identified facility that are authorized by the "RIPDES Non-Contact Cooling Water General Permit" have been terminated. I understand that by submitting this Notice of Termination (NOT), I am no longer authorized to discharge waters covered by the RIPDES Non-Contact Cooling Water General Permit and that discharging pollutants from the activity covered by the RIPDES Non-Contact Cooling Water General Permit is unlawful under Rhode Island Laws and Regulations where the discharge is not authorized by another permit. I also understand that the submission of this NOT does not release an owner/operator from liability for any prior violation of the RIPDES Non-Contact Cooling Water General Permit or applicable Laws or Regulations.

Print Owner's Name: _____

Print Owner's Title: _____

Signature: _____ Date: _____

Print Operator's Name: _____

Print Operator's Title: _____

Signature: _____ Date: _____

RHODE ISLAND POLLUTANT DISCHARGE ELIMINATION SYSTEM (RIPDES)
NON-CONTACT COOLING WATER GENERAL PERMIT (NCCW)
NOTICE OF TERMINATION (NOT)

INSTRUCTIONS

In accordance with Part I.D. of the NCCW permit, operators of facilities and/or operations authorized under this permit shall notify the DEM of the termination of discharge(s) authorized under the general permit. The NOT must be completed and submitted within thirty (30) days of the end of discharge(s).

A. Instructions for the NOT – The NOT requires the following information:

I. General Site Information

a. Name of the facility.
b. Address of the facility or site for which the notification is submitted.
c. RIPDES Permit Number assigned in which the NOT is being submitted.
d. Photos or other documentation that the piping connecting the discharge to the receiving water has been capped or eliminated, or the treatment system has been removed from the site. If this information is not received, your Termination application/ request will not be processed.

II. Owner Information

a. Legal name of owner.
b. Address of owner which includes the City, State, and Zip.
c. Phone number of owner.
d. The name of the contact person including their title.
e. Email address of the contact person.

III. Operator Information

a. Legal name and address of the entity who operates the facility.
b. Contact name, title, address, telephone number and email address of the operators who runs the facility for the permit in which termination is being submitted.

IV. Owner/Operator Certification

Signature of the above responsible parties, owner and operator, submitting the NOT claiming that discharging activities are no longer taking place. Signing the NOT does not release the owner/operator from liability for any violation of the RIPDES Remediation General Permit or the Clean Water Act.

The original NOT must be sent by hard copy to 'RIDEM - Office of Water Resources – RIPDES Program – 235 Promenade Street, Providence, RI 02908', unless an electronic reporting tool becomes available during the period covered under this permit. If DEM implements an electronic reporting tool, then all NOTs shall be submitted electronically using the system that DEM implements.

Rhode Island Pollutant Discharge Elimination System (RIPDES)
General Permit for Non-Contact Cooling Water Discharges
Permit Fact Sheet

Rhode Island Department of Environmental Management
Office of Water Resources
February 2025

Table of Contents

1. Background 3
2. Summary of Changes 3
3. Permit Limit Development 4
   Technology-Based Effluent Limitations 5
   BPJ-Based Effluent Limitations 5
   Water Quality-Based Effluent Limitations 5
      Temperature 5
      pH 6
      Total Residual Chlorine 7
      Flow 8
   Antibacksliding and Antidegradation 9
   Geothermal Systems at Three-Family or Smaller Residential Buildings 9
4. Final Permit Limitations 10
5. Limitations on Coverage 10
6. Permit Limit Summary 10
7. Comment Period, Hearing Requests, and Procedures for Final Decisions 12
8. DEM Contact 13
Attachment A Existing Non-Contact Cooling Water Permittees 14
Attachment B Chlorine Dissipation from NCCW in Storm Drains 15

FACT SHEET
RHODE ISLAND PERMIT DISCHARGE ELIMINATION SYSTEM (RIDPES)
2024 NON-CONTACT COOLING WATER GENERAL PERMIT

1. BACKGROUND

The Rhode Island Pollutant Discharge Elimination System (RIPDES) regulations found under the Rhode Island Code of Regulations (See 250-RICR-150-10 §1.11), which were adopted pursuant to Chapters 46-12, 42-17.1 and 42-35 of the General Laws of Rhode Island, specifies that the discharge of pollutants is unlawful except in accordance with a valid RIPDES permit. In order to issue permits to specific categories of discharges, Rhode Island is authorized to issue "general permits" (See 250-RICR-150-10 §1.33).

The RIPDES permit program is authorized to issue a general permit if there are a number of point sources operating in a geographic area that:

1. Involve the same or substantially similar types of operations;
2. Discharge the same types of wastes;
3. Require the same effluent limitations or operating conditions;
4. Require the same or similar monitoring requirements; and
5. are more appropriately controlled under a general permit than under individual permits.

This general permit is for facilities located in Rhode Island that discharge non-contact cooling water to a receiving water located in Rhode Island. Section 4 of the RIPDES Regulations define “Non-contact cooling water” as “water used to reduce temperature for the purpose of cooling. Such waters do not come into direct contact with any raw material, intermediate product (other than heat) or finished product.” Therefore, even though a single industrial category or point source does not generate them, non-contact cooling water discharges involve substantially similar types of process operations, have similar types of waste, and require the same limitations and monitoring requirements.

Due to these similarities, the Rhode Island Department of Environmental Management (DEM) has decided to develop this general permit. This permit will enable facilities to maintain compliance with State and Federal requirements and will extend environmental and regulatory controls to a number of discharges. The issuance of this general permit is warranted by the similarity of (a) environmental conditions, (b) regulatory requirements applicable to the discharges and receiving waters, and (c) pollution control technologies employed.

Attachment A includes a list of facilities that currently discharge non-contact cooling water into Rhode Island waters under the 2013 non-contact cooling water general permit, their current permit number, their addresses, their receiving streams, and the receiving streams corresponding habitat and dilution category.

2. SUMMARY OF CHANGES

A summary of changes is provided below at each bullet point, with wording taken from the permit italicized for emphasis:

A. Clarified in Part I.B.(3)b that non-contact cooling water discharges that contain any water treatment chemicals; *other than those in the incoming public water supply* are not authorized under this permit.

B. Addition of Part I.B.(4) Impaired Waters. Discharges to waterbodies that are listed as impaired for one or more designated uses on the applicable state’s most recent EPA approved 303(d) list of waters must demonstrate that the discharge meets applicable water quality standards for listed pollutants causing impairment.

C. Addition of Part I.C.(3) which accounts for the continuation of the permit authorization if this general permit is administratively continued in the case that is not reissued or replaced prior to its

termination date. Facilities would automatically retain authorization to discharge under this permit until the earliest of several conditions occurs.

D. The Monitoring Frequency Requirements in Part II.E of once per week for flow, pH, and temperature applies to all dischargers regardless of their permitted flow. Previously permitted flows of less than or equal to 50,000 gallons per day required once per month monitoring for these parameters. Total Residual Chlorine monitoring requirements remain unchanged at once per quarter for all permittees.

E. Added an effluent limit in Part II.E for facilities that discharge to temperature-impaired waters with dilution limits greater than or equal to fifteen must meet applicable temperature water quality criteria at the point of discharge.

F. Changed the pH effluent limit Table in Part ll. E. for facilities that use a municipal water supply as its source water. Compliance for pH will now be determined by a range of 6.5 s.u.(min) to 9 s.u.(max) for freshwater and 6.5 s.u.(min) to 8.5 s.u.(max) for saltwater. Previously permittees were required to meet a pH limit where the effluent did not change more than 0.5 s.u. from the pH of the influent source water.

G. Clarified in a footnote in Part II.E how to calculate and report average monthly and maximum daily flow.

H. Clarified in a footnote in Part II.E that compliance with limits shall be determined by taking a minimum of four grab samples spaced equally over a normal operating day *that captures a discharge event.*

I. Added a note to III.B that NOI must be submitted in hard copy unless an electronic reporting tool becomes available during the period covered under this permit.

J. Modified General Condition IV.C regarding the Duty to Reapply to be consistent with other DEM general permits.

Explanations for changes to effluent limits and monitoring requirements can be found in the Permit Limit Development section below.

3. PERMIT LIMIT DEVELOPMENT

Section 301(a) of the Clean Water Act (CWA), 33 U.S.C. 1311(a), makes it unlawful to discharge pollutants to waters of the United States without a permit. Section 402 of the CWA, 33 U.S.C. 1342, authorizes EPA to issue NPDES permits allowing discharges that will meet certain requirements, including CWA sections 301, 304, and 401 (33 U.S.C. 1331, 1314, and 1341). Those statutory provisions state that NPDES permits must include effluent limitations requiring authorized discharges to: (1) meet standards reflecting specified levels of technology-based treatment requirements; (2) comply with State Water Quality Standards; and (3) comply with other state requirements adopted under authority retained by states under CWA Section 510, 33 U.S.C. 1370. Since Rhode Island has been delegated NPDES permitting authority, the RIPDES permit serves as the NPDES permit and is the mechanism used to implement technology and water quality based effluent limitations and other requirements including monitoring and reporting.

Development of RIPDES permit limitations is a multi-step process consisting of the following steps: determining the applicable technology-based allowable discharge levels; determining necessary best professional judgment (BPJ) allowable discharge levels; calculating the water quality-based allowable discharge levels using in-stream criteria, background data and available dilution; comparing these three allowable discharge levels and taking the most stringent as the final allowable discharge level; conducting an antibacksliding/antidegradation analysis; and assigning final discharge limits.

Technology-Based Effluent Limitations

A technology-based limit is a numeric limit, which is determined by examining the capability of a treatment process to reduce or eliminate pollutants. Technology-based limits are identified in Federal Effluent Limitation Guidelines. However, Effluent Limitation Guidelines have not been promulgated for non-contact cooling water discharges. Therefore, technology-based allowable discharge levels were not assigned.

BPJ-Based Effluent Limitations

The DEM has limited the maximum Total Residual Chlorine (TRC) concentrations that may be discharged to 1.0 mg/L for discharges with large available dilution based on BPJ. Details regarding the requirement can be found in the Total Residual Chlorine section of this fact sheet.

Water Quality-Based Effluent Limitations

Water quality criteria are comprised of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by EPA or States for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal.

Allowable water quality-based discharge levels are established on the basis of acute and chronic aquatic life criteria and human health criteria using the following: available in-stream dilution; an allocation factor; and background concentrations when available and/or appropriate. The aquatic life and human health criteria are specified in the Rhode Island Water Quality Regulations, as amended. Aquatic life criteria have been established to ensure the protection and propagation of aquatic life. Human health criteria represent the pollutant levels that would not result in a significant risk to public health from the ingestion of aquatic organisms or the direct ingestion of water *(Class AA receiving waters only)*.

When evaluating the need for water quality-based permit limits, the DEM first determines if there is “reasonable potential” for the discharge to cause an exceedance of the water quality criteria. The “reasonable potential” analysis is performed on a pollutant-by-pollutant basis. If it is determined that the pollutant in question has “reasonable potential”, a limit is included in the permit.

By definition, non-contact cooling water discharges do not come into contact with raw materials, intermediate products, finished products, or process wastes. Therefore, the DEM has determined that these discharges do not have “reasonable potential” to contain pollutants from raw materials, intermediate products, finished products, or process wastes. However, since non-contact cooling water is used to remove excess heat, the DEM has determined that the discharges do have a “reasonable potential” to exceed the water quality criteria for temperature. Additionally, since the discharges may use well water as its source water, which may have a low pH, the DEM has determined that the discharge of non-contact cooling water has the “reasonable potential” to cause an exceedance of the in-steam water quality criteria for pH. Because some facilities may use municipal drinking water as a source of non-contact cooling water, the DEM has determined that the discharge of non-contact cooling water from such facilities has the “reasonable potential” to cause an exceedance of the in-stream water quality criteria for TRC. Therefore, water quality standards applicable to non-contact cooling water discharges covered by this general permit include temperature, pH, and TRC and are elaborated below.

Temperature

When establishing water quality-based limits for temperature, the DEM used a tiered limit structure for discharges to Saltwater and Freshwater (Warmwater Habitats and Coldwater Habitats) receiving waters. Specifically, limits were established for facilities with dilutions less than 15 and for facilities with dilutions of 15 or greater. To determine its dilution, each facility must complete and submit a dilution calculation with its Notice of Intent (NOI). DEM recommends facilities use the USGS application StreamStats to calculate the 7Q10 flow for dilution calculations.

Temperature impacts in freshwater, caused by heated discharges, are limited in the Rhode Island Water Quality Regulations such that the receiving water will not exceed 83 degrees Fahrenheit (°F) for warm water habitats and such that "Heated discharges into designated Cold-Water habitats (See § 1.25 of this Part for cold-water designated waters) shall not raise the temperature above 68 degrees F outside an established thermal mixing zone. In no case shall the temperature of the receiving water be raised more than 4 degrees F" (250-RICR-150-05 §1.10(D)). Based on this criteria, the maximum temperature limits for discharges with a dilution less than 15 was set equal to the water quality criteria (68° F into cold-water habitats and 83° F into warm-water habitats). This will ensure that the instream temperature will not exceed the water quality criteria because of the discharge. In this permit, discharges into a temperature-impaired freshwater from dischargers with a dilution equal to or greater than 15 were assigned a permit limit equal to the applicable warm-water or cold-water water quality criteria. This will ensure that these discharges do not impair the waters. Dischargers into freshwaters with no temperature impairment and a dilution equal to or greater than 15, were assigned a temperature limit of 92° F. The resultant change in temperature is calculated by the equations listed below:

Summer Conditions
Summer Temp = 70°F Wastewater Temp = 92°F Dilution = 15

$$\frac{\text{Wastewater Temp} + (\text{Dilution} - 1) * \text{Summer Temp}}{\text{Dilution}} - \text{Summer Temp} = \text{Temp Change} = 1.5°\text{F}$$

Winter Conditions River Winter Temp = 32°F

$$\frac{\text{Wastewater Temp} + (\text{Dilution} - 1) * \text{Winter Temp}}{\text{Dilution}} - \text{Winter Temp} = \text{Temp Change} = 4.0°\text{F}$$

Since the in-stream temperature changes are less than or equal to those allowed by the Rhode Island Water Quality Regulations (4.0°F), it has been determined that a temperature limit of 92°F would be protective of the water quality criteria. Therefore, this limit has been applied. The summer and winter conditions were selected based on available data from USGS stream gages with water temperature data, to determine a winter water condition of 32°F.

Temperature increases in saltwater, caused by heated discharges, is limited in the Rhode Island Water Quality Regulations as "none except where the increase will not exceed the recommended limit on the most sensitive receiving water use and in no case exceed 83 degrees F nor raise the normal temperature more than 1.6 degrees F, 16 June through September and not more than 4 degrees F from October through 16 June". Based on this criteria, the maximum temperature limits for discharges to saltwater was set equal to the water quality criteria (83°F) with a maximum in-stream temperature change of 1.6°F (June 16 – September 30) and 4.0°F (October 1 - June 16). This will ensure that the in-stream temperature will not exceed the water quality criteria as a result of the discharge.

pH

The Rhode Island Water Quality Regulations establishes water quality criteria for both freshwater and saltwater discharges (See 250-RICR-150-05 §1.10(D) and §1.10(E)). The pH criteria for freshwater discharges is "6.5 [standard units] – 9.0 [standard units] or as naturally occurs". The pH criteria for saltwater discharges is "6.5 [standard units] – 8.5 [standard units] but not more than 0.2 units outside of the normally occurring range". In the previous permit, pH permit limits for discharges of non-contact cooling water were determined based on whether the non-contact cooling water source water source was private well water or municipal drinking water supply.

This permit requires that all facilities meet the applicable pH water quality criteria for the receiving water in their effluent. The DEM has assigned a pH limit that is equivalent to the water quality criteria for the receiving water (e.g., either 6.5 S.U. – 9.0 S.U. for freshwater or 6.5 S.U. – 8.5 S.U.

for saltwater). By placing pH limitations on the discharge, which are equivalent to the water quality criteria, the DEM is ensured that the discharge will not cause the receiving waters to violate the applicable water quality criteria.

Previously, the DEM assigned permit limits for facilities that used a municipal water supply as the source water for non-contact cooling based on the change in pH from the influent to effluent. The DEM limited the pH change (effluent – influent) of the non-contact cooling water to 0.5 S.U. The DEM has qualitatively reviewed the data collected over the last five years and discussed with the permitees a change to require that the permittees meet the water quality criteria. The data and the permittees both indicate that the facilities can meet the water quality criteria in their effluent.

Total Residual Chlorine

The Non-Contact Cooling Water General Permit will establish TRC monitoring requirements for permittees and will limit the allowable discharge TRC concentration. This will ensure that discharges comply with water quality standards for chlorine. Potable water sources typically are chlorinated to minimize or eliminate pathogens. Regulations at 40 CFR § 141.72 require that a public water system's residual disinfection concentration cannot be less than 0.2 mg/l for more than 4 hours. Therefore, the discharge of chlorinated drinking water has the potential to exceed water quality standards for chlorine. Since the permit does not cover discharges that add chemicals, discharges from facilities using other water sources are not likely to contain chlorine in concentrations sufficient to exceed water quality standards.

The TRC limits and associated monitoring requirements only apply to facilities that use municipal drinking water as a source of non-contact cooling water. The permittee may not add chlorine or any other biocide to non-contact cooling water used at the facility (See Part I.B.(3).)

The Rhode Island Water Quality Regulations at 250-RICR-150-05 §1.20, states that in all surface waters, existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected, and is applicable to any new, reissued, or modified RIPDES permits. Establishing TRC monitoring requirements for permittees and limiting the allowable discharge TRC concentration is consistent with EPA Region 1 NCCW permitting practices; wherein the maximum effluent concentration of chlorine shall not exceed 1.0 mg/l TRC. In Rhode Island the TRC limits established for discharges with high dilution factors will be capped at 1.0 mg/l based on this policy. This upper TRC effluent limit will adequately protect aquatic organisms from toxic amounts of chlorine.

The dilution factor and applicable chlorine limits will be approved by DEM during review of the facilities' NOI. The permittee will be provided with these limits when notified of permit coverage.

Limits

Rhode Island has narrative criteria in the Rhode Island Water Quality Regulations that prohibit toxic discharges in toxic amounts (See 250-RICR-150-05 §1.26). The listed limits on chlorine will ensure that chlorine is not discharged in toxic amounts. The State of Rhode Island also has numeric water quality criteria for chlorine (See 250-RICR-150-05 §1.26(J)), which are the same as the recommended federal water quality criteria. DEM will base chlorine effluent limits on these water quality criteria for discharges to flowing freshwater bodies, which are listed below.

- Freshwater acute – 19 µg/l (0.019 mg/l); use for daily maximum
- Freshwater chronic – 11 µg/l (0.011 mg/l); use for average monthly

TRC effluent limits will be based on the following equation:

Effluent Limit = (Dilution Factor) x (Water-Quality Criterion)

The dilution factor will be based on the same 7Q10 flow the permit applicant determines for effluent temperature limits, as written in the NOI. The accompanying dilution factor worksheet details the use of StreamStats, a USGS application for determining values such as 7Q10 for where the permit applicant discharges into the receiving stream.

For any facility using municipal water as their source of non-contact cooling water and discharging to a saltwater habitat, or to non-flowing freshwater bodies such as lakes or ponds, the maximum daily and average monthly concentration of TRC allowed in the effluent is 0.02 mg/L. This limit is based upon the quantitation limits of available methods approved by EPA as detailed in 40 CFR 136. Because lakes and ponds do not flow, DEM has assigned these freshwater bodies a dilution factor of 1 (one). Therefore, these non-flowing freshwater bodies will have the same effluent limits as saltwater bodies, also given a dilution factor of 1 (one). By limiting the TRC concentration such that the discharge will be below the quantitation limit the DEM will be assured that chlorine criteria will not be exceeded.

TRC concentrations are required to be measured (analyzed) within 15 minutes of collection of the sample per 40 CFR 136. The following methods may be used to analyze the grab samples: (1) Low Level Amperometric Titration, Standard Methods (18th Edition) No. 4500-Cl E; (2) DPD Spectrophotometric, EPA No. 330.5 or Standard Methods (18th Edition) No. 4500-Cl G.), all data below the detection level of 0.02 mg/L shall be reported as non-detect.

Dilution Factors for discharges to Freshwater

The available dilution shall be reviewed by DEM using the equations that can be found in the 2024 Final Dilution Worksheet and described in Section VII of the 2024 NOI Instructions. Both the dilution factor and applicable chlorine limits will be reviewed by DEM during review of the facility's NOI. The permittee will be provided with these limits when notified of permit coverage.

Exemptions

The following dischargers are exempt from the TRC testing requirements of this rule unless DEM determines that there is a need for testing based on the nature, location, or circumstances of an individual discharge.

a. When discharging to a freshwater body the point of discharge from the facility is at least 2100 feet from the receiving water body (i.e. the discharge is to a stormwater system that conveys the NCCW discharge to the receiving water), or;
b. When discharging to a saltwater body the point of discharge from the facility is at least 2400 feet from the receiving water body, or;
c. If the facility has four consecutive quarters of non-detection for TRC the facility may request a waiver from DEM to be exempt from TRC requirements for the remainder of the permit period or until DEM determines there is a reason to resume sampling.

If the facility meets the requirements for at least one of these exemptions, the facility may be exempt from TRC monitoring for the effective period of the permit, unless DEM determines there is a reason to resume testing.

The distance-based exemptions are based on calculations for chlorine dissipation from non-contact cooling water while traveling through storm-sewer systems (See Attachment B of this fact sheet) adapted from "Chlorine Dissipation from NCCW in Storm Drains" (Knutson, 2015) by Jason Knutson, P.E. at the Wisconsin Department of Natural Resources.

Flow

A flow limit will be established for each facility based on the information contained in the NOI. The flow limit will ensure that the dilution does not fall below that which was listed in the NOI. This will guard against a facility increasing its flow to a point where adverse temperature impacts will be seen in the receiving waters. Additionally, to prevent any water quality impacts from large non-

contact cooling water flows, facilities with flows greater than 1.0 Million Gallons per Day (MGD) are not eligible to obtain coverage under this general permit. These facilities must apply for an individual permit.

Antibacksliding and Antidegradation

The Antibacksliding Provision of the Clean Water Act (found in section 402(o) and repeated in 40 CFR 122.44(l)) prohibits issuing a permit containing less stringent effluent limits than the comparable limits from the previous permit. In terms of a RIPDES permit, an increased discharge is defined as an increase in any limitation, which would result in an increased mass loading to a receiving water. The baseline for this comparison would be the monthly average mass loading established by the previous permit. It would be inappropriate to use the daily maximum mass loading since the Policy is not applicable to short-term changes in water quality. Since none of the limits in the existing non-contact cooling water general permit are more stringent than the limits in this non-contact cooling water general permit, antibacksliding regulations are being met.

Antidegradation is intended to protect current water quality by preventing increases in the discharge of pollutants to surface waters. This general permit will not apply to any new or increased discharge unless it can be determined that such discharges will not result in significant effects to the receiving waters. This determination shall be made in accordance with the Rhode Island Antidegradation Policy prior to issuing a general permit.

Geothermal Systems at Three-Family or Smaller Residential Buildings

This permit establishes a separate category for groundwater discharges from geothermal systems at three-family and smaller residential buildings. These buildings typically use “Open loop” geothermal systems that use well water pumped into the heat pump unit where the heat is extracted and the water is then discharged into a surface water. Typical water requirements are approximately three gallons per minute of well water per ton of cooling capacity. As a result, a 3,000-square-foot, well-insulated home would typically require 10 to 15 gallons per minute.

A. Discharges from residential geothermal heat exchangers at three-family or smaller residential buildings are not required to submit monitoring results to the DEM, however, they are required to comply with appropriate water quality-based limits. The temperature limits chosen for this category are equivalent to the maximum temperature changes from the Rhode Island Water Quality Regulations for either freshwater discharges (receiving water’s temperature not to be raised more than 4.0°F) or for saltwater discharges (the receiving water’s temperature not to be raised more than 4.0°F from October 1 through June 15 or more than 1.6°F from June 16 through September 30). Since this category only authorizes discharges from geothermal systems at three-family or smaller homes that use private well water, the DEM’s concern is that the pH of the well water may be changed as a result of a leak in the system. Therefore, the permit also includes pH limits for this category based on the pH limits from the Rhode Island Water Quality Criteria. Discharges from these facilities into saltwater receiving waters shall not cause the pH of the receiving water to be more than 0.2 s.u. outside of the normally occurring range and discharges from these facilities into freshwater receiving waters shall not cause the receiving water’s pH to be outside of the range of 6.5 – 9.0 s.u. DEM may require sampling to confirm that the above limits are being met on a case-by-case basis.

Discharges of non-contact cooling water from geothermal systems at three-family and smaller residential buildings shall be automatically granted authorization to discharge on the effective date of this permit. Any discharges from geothermal systems that are not associated with a three-family or smaller residential buildings cannot get coverage under this section. However, these discharges are eligible for coverage under the other sections of the general permit.

4. Final Permit Limitations

It is only necessary to establish permit limits for those pollutants in the discharge which have the reasonable potential to cause or contribute to the exceedance of in-stream criteria. Based on the analysis presented above, permit limits are required for Temperature, pH, TRC, and Flow.

5. Limitations on Coverage

As previously indicated, to prevent any water quality impacts from large non-contact cooling water flows, facilities with flows greater than 1.0 Million Gallons per Day (MGD) are not eligible to obtain coverage under this general permit.

Also, to prevent water quality impacts from treatment chemicals, facilities that add water treatment chemicals to their non-contact cooling water are not eligible to obtain coverage.

Facilities that have been determined to be a potential cause of a water quality violation or have been determined that they may adversely impact a listed, endangered, or threatened species cannot obtain coverage under this general permit.

In accordance with 250-RICR-150-05 §1.25 of the Rhode Island Water Quality Regulations, discharges into the terminal reservoir of a public water supply cannot obtain coverage under this general permit.

Facilities that have non-contact cooling water, which uses ground water that is impacted by a release of a toxic or hazardous material, and/or non-contact cooling water that is contaminated from failing or leaking heat exchangers or process equipment cannot obtain coverage under this general permit. All permittees are required to perform annual testing of its cooling water system to verify that it is not leaking and maintain such records on site for a minimum period of five (5) years to be made available upon request.

Any owner or operator authorized by a general permit may request to be excluded from coverage of a general permit by applying for an individual permit. This request may be made by submitting a NPDES permit application together with reasons supporting the request. The Director may also require any person authorized by a general permit to apply for and obtain an individual permit. Any interested person may petition the Director to take this action. However, individual permits will not be issued for sources discharging non-contact cooling water covered by this general permit unless it can be clearly demonstrated that inclusion under the general permit is inappropriate. The Director may consider the issuance of individual permits when:

A. The discharger is not in compliance with the terms and conditions of the general permit;
B. A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;
C. Effluent limitations guidelines are subsequently promulgated for the point sources covered by the general NPDES permit;
D. A Water Quality Management plan or Total Maximum Daily Load (TMDL) containing requirements applicable to such point sources is approved;
E. Circumstances have changed since the time of the request to be covered so that the discharger is no longer appropriately controlled under the general permit, or either a temporary or permanent reduction or elimination of the authorized discharge is necessary; or
F. The discharge(s) is a significant contributor of pollution.

In accordance with 40 CFR 122.28(b)(3)(iv), the applicability of the general permit is automatically terminated on the effective date of the individual permit.

6. Permit Limit Summary

Each outfall authorized to discharge non-contact cooling water shall be limited and monitored by the permittee as specified below, in accordance with the receiving water classification, when indicated.

		Discharge Limitations	Monitoring Requirements

Effluent Characteristic	Dilution Factor[1]	Average Monthly	Maximum Daily	Monitoring Frequency	Sample Type
Flow					
All Discharges	NA	-----	[2]	1/Week	Calculated[3]
Temperature					
Discharge to Freshwater Warm Water Habitat	<15 (Fifteen)[1] or Temperature Impaired	-----	83°F[4]	1/Week	Grab or Continuous[5]
	≥15 (Fifteen)[1]	-----	92°F[4]	1/Week	Grab or Continuous[5]
Discharge to Freshwater Cold-Water Habitat	<15 (Fifteen)[1] or Temperature Impaired	-----	68°F[4]	1/Week	Grab or Continuous[5]
	≥15 (Fifteen)[1]	-----	92°F[4]	1/Week	Grab or Continuous[5]
Discharge to Saltwater Habitat	NA	-----	83°F[6]	1/Week	Grab or Continuous[5]
pH					
Discharge to Freshwater Habitat	NA	6.5 s.u. (min)	9.0 s.u. (max)	1/Week	Grab or Continuous[5]
Discharge to a Saltwater Habitat	NA	6.5 s.u.[7] (min)	8.5 s.u.[7] (max)	1/Week	Grab or Continuous[5]
Total Residual Chlorine					
Municipal Water Supply and Discharge to Freshwater Habitats (except Lakes or Ponds)	See Part II.F.	See Part II.F.	See Part II.F.	1/Quarter	Grab[5]
Municipal Water Supply and Discharge to Lakes or Ponds or Saltwater Habitats	NA	0.02 mg/L[8]	0.02 mg/L[8]	1/Quarter	Grab[5]

Sampling shall be performed on a typical operating day.

----- Signifies a parameter which must be monitored, and data must be reported; no limit has been established at this time.

[1] See NCCW NOI Instructions for dilution factor calculations.

[2] Limit based upon the maximum non-contact cooling water design flow in the applicant's NOI.

[3] Flow shall be either calculated using a flow totalizer or estimated using the cooling water pumping rate. Reported flow is the flow which occurs over the course of a normal operating day when discharge is occurring. Monthly average flow is to be calculated by dividing the total flow discharged for a given month by the number of days in which there was a discharge during the month (i.e., if a given month had 30 days, but the facility only discharged on 25 days, the monthly average flow would be determined by dividing the total volume discharged during the month by 25 days). Since the reporting period consists of more than one month (i.e., quarterly reporting), the monthly average flow to be reported on the DMR is the highest monthly average flow for all the months in the reporting period. The daily maximum flow is the highest daily flow observed during the reporting period.

[4] In no case shall the discharge cause the temperature of the receiving water to be raised more than 4.0°F.

[5] Compliance with these limitations shall be determined by taking a minimum of four (4) grab samples equally spaced over the course of a normal operating day that captures a discharge event. The maximum value to be reported is the highest individual measurement obtained during the monitoring

period. The minimum value to be reported is the lowest individual measurement obtained during the monitoring period. Continuous monitoring devices may be used to measure effluent water body temperature and pH. When required, the maximum temperature and monthly average temperature shall be reported based on the continuous dataset.

[6] In no case shall the discharge cause the temperature of the receiving water to be raised more than 4.0 °F (from October 1 through June 15) or more than 1.6 °F (from June 16 through September 30).

[7] In no case shall the discharge cause the pH of the receiving water to be more than 0.2 s.u. outside the normally occurring range.

[8] The limit at which compliance/noncompliance determinations will be based is the Quantitation Limit which is defined as 0.02 mg/L for TRC. These values may be reduced by permit modification as more sensitive methods are approved by EPA and the State. The following methods may be used to analyze the grab samples: (1) Low Level Amperometric Titration, Standard Methods (18th Edition) No. 4500-Cl E; (2) DPD Spectrophotometric, EPA No. 330.5 or Standard Methods (18th Edition) No. 4500-Cl G.

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

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the Rhode Island Department of Environmental Management, Office of Water Resources, 235 Promenade Street, Providence, Rhode Island, 02908-5767. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to the Rhode Island Department of Environmental Management. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Director finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Director will respond to all significant comments and make these responses available to the public at DEM's Providence Office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Director will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within 30 days following the notice of the final permit decision any interested person may submit a request for a formal hearing to reconsider or contest the final decision. Requests for formal hearings must satisfy the requirements of 250-RICR-150-10 §1.50 of the Regulations for the Rhode Island Pollutant Discharge Elimination System.

8. DEM Contact

Additional information concerning the permit may be obtained between the hours of 8:30 a.m. and 4:00 p.m., Monday through Friday, excluding holidays from:

Madison Heller
Rhode Island Department of Environmental Management
RIPDES Program
235 Promenade Street
Providence, Rhode Island, 02908
Telephone: (401) 537-4197
E-mail: madison.heller@dem.ri.gov

05 DEC 2024
Date

Heidi Travers
Heidi Travers, P.E.
Environmental Engineer IV
Office of Water Resources
Department of Environmental Management

ATTACHMENT A EXISTING NON-CONTACT COOLING WATER PERMITTEES

Permit Number	Facility	Facility Location	Mailing Address	Receiving Water	Habitat	Dilution	Source Water
RIG250004	The Original Bradford Soap Works, Inc.	200 Providence St West Warwick, RI	200 Providence St West Warwick, RI 02893	South Branch Pawtuxet River	Warm	>15	Private Well
RIG250019	Leonard Valve Company	1360 Elmwood Ave. Cranston, RI	1360 Elmwood Ave. Cranston, RI 02910	Fenner Pond	Warm	<15	Municipal
RIG250026	New England Union Company	107 Hay Street, West Warwick, RI	107 Hay Street West Warwick, RI 02893	South Branch Pawtuxet River	Warm	<15	Municipal

ATTACHMENT B CHLORINE DISSIPATION FROM NCCW IN STORM DRAINS

Chlorine Dissipation from Non-Contact Cooling Water (NCCW) in Storm Drains
Adapted from "Chlorine Dissipation from NCCW in Storm Drains" (Knutson, 2015) by Jason Knutson, P.E. at Wisconsin Department of Natural Resources

Purpose:
The purpose of this calculation is to calculate the travel distance within storm drains required for chlorine to dissipate from concentrations typically found in drinking water (0.2 mg/L – see 40 CFR § 141.72) to Rhode Island's Water Quality Standards listed below.

- Freshwater acute – 19 µg/l (0.019 mg/l); use for daily maximum
- Freshwater chronic – 11 µg/l (0.011 mg/l); use for average monthly
- Saltwater acute – 13 µg/l (0.013 mg/l); use for daily maximum
- Saltwater chronic – 7.5 µg/l (0.0075 mg/l); use for average monthly

The nature of this calculation is intentionally conservative in that it neglects two significant sinks of chlorine during transport: (1) dissipation during the wastewater's drop into the storm drain and (2) degradation of chlorine due to contact with organic material within the storm drain. It only considers dissipation of chlorine during laminar flow through the storm drain.

Summary:
Chlorine levels in non-contact cooling water (NCCW) will be reduced to Rhode Island's Water Quality standards for acute toxicity by the time the NCCW travels 1950 feet within storm sewers for discharges to saltwater bodies and 1700 feet for discharges to freshwater bodies. Dischargers covered under Rhode Island's NCCW General Permit who are situated greater than the above listed distances from the receiving body they discharge to may be exempted from compliance requirements for chlorine, so long as chlorine concentrations within their discharge are not above the typical concentration in potable water (0.2 mg/L).

Inputs and Justifications:
- **Flow rate (Q) = 1.0 MGD (1.547 fps)**. This effluent flow rate is the maximum allowable effluent flow rate for NCCW General Permit holders in the state. It was selected as the Q for conservative purposes.
- **Manning Coefficient (n) = 0.013.** Concrete pipes typically have Manning coefficients between 0.012 and 0.014 (Munson et al 569). The 0.013 value was confirmed by the DEM's stormwater engineers as the typical for storm drain calculations.
- **Slope of storm drains (S) = 1%**. DEM's stormwater engineers concurred that a typical slope for storm drains is around 1%, and cited the Rhode Island Stormwater Design Manual minimum slope criteria.
- **Storm drain pipe diameter (D) = 1.5 feet**. The typical minimum size for storm drains is 12" diameter. However, size increases with proximity to the receiving water, so storm drain outfalls less than 18" in diameter are uncommon. Because the calculations in this model are focused on the final few thousand feet before the outfall, a size of 18" was used as an input.
- **Concentration of chlorine (C_o) = 0.2 mg/L**. The concentration of chlorine within typical potable water, at the point of use, is 0.2 mg/L.
- **Rhode Island's Water Quality Standard for Chlorine (C) = 0.019 mg/L for freshwater acute and 0.013 mg/L for saltwater acute.**
- **Molecular Weight of O_2 = 32.0 g/mol**

- **Molecular Weight of Cl_2 = 70.9 g/mol**
- **K = 1.49.** This is the correction factor for use of British Units in the Manning equation.

Equations used:

Manning equation	$V = \frac{K}{n} R_h^{\frac{2}{3}} S^{\frac{1}{2}}$	(1)	(V [ft/s], K [ ], n [ ], R_h [ft], S[])
or	$Q = \frac{K}{n} A R_h^{2/3} S^{1/2}$	(2)	(Q [ft^3/s], K [ ], n [ ], A [ft^2], R_h [ft], S [ ])
Area under a chord	$A = \frac{D^2 (\theta - \sin\theta)}{8}$	(3)	
Wetted Perimeter	$P = \frac{D\theta}{2}$	(4)	
Hydraulic Radius	$R_h = \frac{A}{P} = \frac{D (\theta - \sin\theta)}{4\theta}$	(5)	
Depth of Flow	$d = \frac{D}{2}(1 - \cos\left(\frac{\theta}{2}\right))$	(6)	
from Thin Film Theory:	$\frac{k_{Cl_2}}{k_{O_2}} = \frac{\sqrt{MW_{Cl_2}}}{\sqrt{MW_{O_2}}}$	(7)	
Reaeration Equation (Owens et al)	$k_{O_2} = \frac{23.2\, V^{0.73}}{d^{1.75}}$	(8)	(k_{O2} [d^{-1}], V [ft/s], d [ft])
First Order Decay	$C = C_0\, e^{-k_{Cl2}\, t}$	(9)	

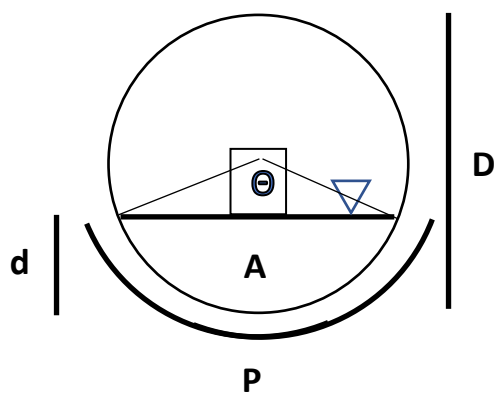

Figure 1: Cross-section of a pipe, for use with equations (3) – (5).

A = Cross-sectional area of flow
d = depth
D = Diameter
P = Wetted Perimeter
R_h = Hydraulic Radius
t = time
V = Average velocity of NCCW in storm drain
Θ = Angle from pipe center to NCCW surface

Calculation:

Step 1: Calculate depth of flow in storm drain

Substitute the Area Under Chord equation (3) and the Hydraulic Radius equation (5) into the Manning equation (2) for *A* and R_h:

$$Q = \frac{K}{n} (A) (R_h)^{2/3} S^{1/2}$$

$$Q = \frac{K}{n} \left(\frac{D^2 (\theta - \sin\theta)}{8}\right) \left(\frac{D (\theta - \sin\theta)}{4\theta}\right)^{2/3} S^{1/2}$$

$$Q = \frac{K}{n} \frac{D^{8/3}}{2^{13/3}} \frac{(\theta - sin\theta)^{5/3}}{\theta^{2/3}} S^{1/2}$$

Solving this equation for θ, using the inputs stated above, gives:

$$\theta = 2.1357\ radians$$

Plug this into the Depth of Flow equation:

$$d = \frac{D}{2}(1 - \cos\left(\frac{(2.1357)}{2}\right))$$

$$\boldsymbol{d = 0.38849\ feet}$$

Step 2: Calculate the average velocity of NCCW in the storm drain

Find the submerged cross-sectional area using θ and the Area Under Chord equation (3):

$$A = \frac{D^2\ ((2.1357) - sin(2.1357))}{8}$$

$$A = 0.36310$$

Divide the Flow Rate by the cross-sectional Area to find the average flow velocity:

$$V = \frac{Q}{A} = \frac{2.47557\ ft^3/s}{.50841\ ft^2}$$

$$\boldsymbol{V = 4.2612\ feet/second}$$

Step 3: Calculate the distance required for sufficient dissipation of chlorine
The Owens, et al. reaeration equation is an empirical equation used to model the rate at which oxygen is exchanged between air and water (the reaeration rate or gas exchange rate for O_2):

$$k_{O_2} = \frac{23.2\ V^{0.73}}{d^{1.75}}$$

According to the Thin Film Theory, the ratio of the square roots of molecular weights of two gases is equal to the ratio of their gas exchange coefficients. Solve for the gas exchange rate for Cl_2 by substituting in the Owens, et al. equation:

$$\frac{k_{Cl_2}}{k_{O_2}} = \frac{\sqrt{MW_{Cl_2}}}{\sqrt{MW_{O_2}}}$$

$$k_{Cl_2} = k_{O_2} * \frac{\sqrt{MW_{Cl_2}}}{\sqrt{MW_{O_2}}}$$

$$k_{Cl_2} = \frac{23.2\ V^{0.73}}{d^{1.75}} * \frac{\sqrt{MW_{Cl_2}}}{\sqrt{MW_{O_2}}}$$

Assuming that the concentration of Chlorine in the air is negligible, the following first-order decay equation represents the dissipation of chlorine from water:

$$C = C_0\, e^{-k_{Cl2}\, t}$$

Solve it for time:

$$t \;=\; \frac{\ln\,(C/C_0)}{-k_{Cl2}}$$

Multiply by velocity to solve for distance the water must travel for chlorine to dissipate:

$$distance \;=\; \frac{\ln\,(C/C_0)}{-k_{Cl2}} * V$$

Factor in a correction of units:

$$distance \;=\; \frac{\ln\left(\frac{C}{C_0}\right)[\,]}{-k_{Cl2}\,[d^{-1}]} * V\,[ft/s] * \frac{60*60*24\,s}{1\,day}$$

Substitute the derived equation for k_{Cl2} into this equation, and solve for distance:

$$distance \;=\; -\,\frac{\ln\left(\frac{C}{C_0}\right) * d^{1.75}\sqrt{MW_{O_2}}}{23.2\;*\sqrt{MW_{Cl_2}}} * V^{0.27} * \frac{86{,}400\,s}{1\,day}$$

Substitute either a) 0.019 mg/L for concentration (C) to get the distance for dischargers to freshwater bodies or b) 0.013 mg/L for concentration (C) for dischargers to saltwater.

a) $$distance \;=\; -\,\frac{\ln\left(\frac{0.019}{0.2}\right)*(0.38849\,ft)^{1.75}\sqrt{32.0\frac{g}{mol}}}{23.2\,*\sqrt{70.9\frac{g}{mol}}} * \left(4.2612\,\frac{ft}{s}\right)^{0.27} * \frac{86{,}400s}{1\,day}$$

b) $$distance \;=\; -\,\frac{\ln\left(\frac{0.013}{0.2}\right)*(0.38849\,ft)^{1.75}\sqrt{32.0\frac{g}{mol}}}{23.2\,*\sqrt{70.9\frac{g}{mol}}} * \left(4.2612\,\frac{ft}{s}\right)^{0.27} * \frac{86{,}400s}{1\,day}$$

a) $\boldsymbol{distance = 1700\,feet}$
$\boldsymbol{required\ for\ dissipation\ of\ chlorine\ to\ freshwater\ acute\ WQS}$

b) $\boldsymbol{distance = 1950\,feet}$
$\boldsymbol{required\ for\ dissipation\ of\ chlorine\ to\ saltwater\ acute\ WQS}$