

**AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the Federal Clean Water Act, as amended, (33 U.S.C. §1251 et seq.; the “CWA”),

Public Service of New Hampshire (PSNH)

is authorized to discharge from a facility located at

**Merrimack Station
97 River Road
Bow, NH 03301**

to receiving water named

Merrimack River (Hydrologic Basin Code; 01070002)

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

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

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

This permit supersedes the permit issued on June 25, 1992.

This permit consists of Part I, (29 pages), including effluent limitations and monitoring requirements, Part II (25-pages), including General Conditions and Definitions, Attachment A- Freshwater Chronic and Modified Acute Toxicity Test Procedure and Protocol (May 2007), and Attachment B - Monitoring Location Map.

Signed this day of

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

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. **Outfall 003.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge through Outfall Serial Number 003 into the Merrimack River, via the Discharge Canal, the following wastewater: Internal Outfall 003A (Slag Settling Pond, Waste Treatment Plant No. 4), and Internal Outfall 003D (Cooling Tower Blowdown). The discharge through Outfall 003 shall be limited and monitored as specified below. Samples shall be taken prior to discharge into the Merrimack River, at a point that provides a representative sample of the effluent before mixing with any river water.

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	Daily	Calculation ¹
Temperature; Discharge (°F) ²	Report	Report	Continuous	Recorder
Temperature Rise; River (°F) ³	Report	Report	Continuous	Calculation
Total Residual Chlorine; mg/l	_____	Report	1/Week (When in use)	Grab
pH Range ⁴ ; Standard Units	6.5 - 8.0 (See Part I.F.4.)		1/Day	Grab

1. Outfall 003 (continued)

Effluent Characteristic	Discharge Limitations	Monitoring Requirements	Sample Type
Whole Effluent Toxicity (WET) ⁵			
LC50; in percent	Report	1/Quarter	24-Hour Composite
C-NOEC; in percent	Report	1/Quarter	24-Hour Composite
Ammonia Nitrogen as Nitrogen; mg/l	Report	1/Quarter	24-Hour Composite
Hardness; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Cadmium; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Lead; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Copper; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Zinc; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Nickel; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Aluminum; mg/l	Report	1/Quarter	24-Hour Composite
Total Recoverable Arsenic; mg/l	Report	1/Quarter	24-Hour Composite

2. **Outfall 003A.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge effluent from the Slag Settling Pond (Waste Treatment Plant No. 4). The Slag Settling Pond discharge consists of stormwater and commingled wastewater discharge flows from Waste Treatment Plant No. 1 (Internal Outfall 003B); the Flue Gas Scrubber System (FGD) Waste Treatment Plant treated effluent (Internal Outfall 003C); the MK-1 Boiler Blowdown and Roof Drains; MK-1 and MK-2 Slag Tank Overflow and Boiler Drains; and Yard Drains. Discharges from Outfall 003A shall be limited and monitored as specified below. Samples shall be taken of Outfall 003A effluent after any and all treatment but prior to discharge into the Discharge Canal and at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation		Monitoring Requirements	
	Average Monthly	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	5.3	13.0	Continuous	Recorder ⁶
Total Recoverable Aluminum (mg/l)	1.08	Report	1/Week	24-Hour Composite
Total Recoverable Arsenic (mg/l)	0.00227	Report	1/Week	24-Hour Composite
Total Recoverable Copper (mg/l)	0.027	0.083	1/Week	24-Hour Composite
Total Recoverable Mercury (mg/l)	0.0000071	Report	1/Week	24-Hour Composite
Total Recoverable Selenium (mg/l)	0.0571	Report	1/Week	24-Hour Composite
Total Recoverable Chloride (mg/l)	Report	Report	1/Week	24-Hour Composite
Total Suspended Solids (mg/l)	30.0	100.0	1/Week	24-Hour Composite
Oil & Grease (mg/l)	15.0	20.0	1/Week	Grab
pH (Range; standard units)	Report		1/Week	Grab

3. **Outfall 003B.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge Waste Treatment Plant No. 1^{7,8}. Waste Treatment Plant No. 1 treated effluent consists of low volume waste (equipment and floor drains, chemical drains, coal pile runoff from a collection sump, stormwater from a pipe trench, flow from various tank maintenance drains, demineralizer regeneration discharges, polisher regeneration discharges, ash landfill leachate, and flows from the hydrostatic relief line; chemical and non-chemical metal cleaning effluent (MK-1 and MK-2 boilers water side boiler cleaning, gas side equipment ash wash, and precipitators); and MK-1 air preheater. No other discharge of metal cleaning effluent is allowed. The discharge from Outfall 003B shall be limited and monitored as specified below. Samples shall be taken of Outfall 003B effluent after any treatment is provided but prior to mixing with any other waste stream and prior to discharge to the Slag Settling Pond. Samples must be taken at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation		Monitoring Requirements	
	Average Monthly	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	Continuous	Recorder ⁶
Total Suspended Solids (mg/l)	Report	Report	1/Day	24-Hour Composite
Total Recoverable Iron (mg/l)	1.0	1.0	1/Day	24-Hour Composite
Total Recoverable Copper (mg/l)	1.0	1.0	1/Day	24-Hour Composite
Oil & Grease (mg/l)	Report	Report	1/Day	Grab
pH (Range; standard units) ⁹	Report		Continuous	Recorder

4. **Outfall 003C.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge treated effluent from the Flue Gas Desulfurization System Waste Treatment Plant from internal Outfall Serial Number 003C. The discharge from Outfall 003C shall be limited and monitored as specified below. Samples taken in compliance with the monitoring requirements specified below shall be taken of Outfall 003C effluent after any treatment is provided but prior to discharge to the Slag Settling Pond at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation ¹⁰		Monitoring Requirements	
	Average Monthly	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	0.07 Report	0.07 Report	Continuous	Recorder ⁶
Total Recoverable Arsenic (µg/l)	8	15	1/Week	24-Hour Composite
Total Recoverable Boron (µg/l)	Report	Report	1/Week	24-Hour Composite
Total Recoverable Cadmium (µg/l)	Report	50	1/Week	24-Hour Composite
Total Recoverable Chromium (µg/l)	Report	10	1/Week	24-Hour Composite
Total Recoverable Copper (µg/l)	8	16	1/Week	24-Hour Composite
Total Recoverable Iron (µg/l)	Report	Report	1/Week	24-Hour Composite
Total Recoverable Lead (µg/l)	Report	100	1/Week	24-Hour Composite
Total Recoverable Manganese (µg/l)	Report	3000	1/Week	24-Hour Composite
Total Recoverable Mercury (µg/l)	0.022 Report	0.055 0.014	1/Week	24-Hour Composite

Total Recoverable Selenium (µg/l)	10	19	1/Week	24-Hour Composite
Total Recoverable Zinc (µg/l)	12	15	1/Week	24-Hour Composite
BOD ₅ ¹¹ (mg/l)	Report	Report	1/Week	24-Hour Composite
Chlorides (mg/l)	Report	18,000	1/Week	24-Hour Composite
Total Nitrogen (mg/l)	Report	Report	1/Week	24-Hour Composite
Total Phosphorus (mg/l)	Report	Report	1/Week	24-Hour Composite
Total Dissolved Solids (mg/l)	Report	Report 35,000	1/Week	24-Hour Composite

5. **Outfall 003D.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge Cooling Tower Blowdown, Internal Outfall 003D. Discharges from Outfall 003D shall be limited and monitored as specified below. Samples taken in compliance with the monitoring requirements specified below shall be taken of Outfall 003D effluent prior to discharge to the discharge canal, and at a point that provides a representative sample of the effluent.

a. Non-thermal Effluent Limits

Effluent Characteristic	Discharge Limitation		Monitoring Requirements	
	Average Monthly	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	Report	1.2	Continuous	Recorder ⁶
Free Available Chlorine (mg/l) ^{12,13}	0.2 ¹⁴	0.5	1/Day	Grab
126 Priority Pollutants (Except Cr, Zn) (mg/l) ¹⁵	No Detectable Amount ¹⁵	No Detectable Amount ¹⁵	1/Year	24-Hour Composite
Total Recoverable Chromium (mg/l)	0.2	0.2	2/Month	24-Hour Composite
Total Recoverable Zinc (mg/l)	1.0	1.0	2/Month	24-Hour Composite

b. Thermal Effluent Limits

Effluent Characteristic	Effluent Limits		Monitoring Requirements	
	Monthly Total	Average Daily	Measurement Frequency	Sample Type
Temperature, °F	---	Report ¹⁶	Continuous	Recorder
Temperature Rise (ΔT), °F	---	Report ¹⁶	Daily	Calculation
Heat Load (Millions Btu) ¹⁶				
January	6846	---	Monthly	Calculation
February	5605	---	Monthly	Calculation
March	7417	---	Monthly	Calculation
April	7200	---	Monthly	Calculation
May	6156	---	Monthly	Calculation
June	4058	---	Monthly	Calculation
July	3260	---	Monthly	Calculation
August	3388	---	Monthly	Calculation
September	4389	---	Monthly	Calculation

October	5941	---	Monthly	Calculation
November	7784	---	Monthly	Calculation
December	6910	---	Monthly	Calculation

c. Annual Thermal Effluent Limits

Effluent Characteristic	Effluent Limits	Monitoring Requirements	
	Annual Total ¹⁶	Measurement Frequency	Sample Type
Heat Load (Million Btus)	94,703	Yearly	Calculation

6. **Outfall 004A.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge into the Merrimack River from Outfall Serial Number 004A¹⁷ wastewater consisting of MK-1 Screen Wash Water and MK-2 Screen Wash Water. The discharge from Outfall 004A shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (MGD)	1.72	1/Year	Estimated ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Year	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Year	Grab

7. **Outfall 004B.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge into the Merrimack River from Outfall Serial Number 004B¹⁷ wastewater consisting of Fire Protection Overflow effluent and ice dam removal spray. The discharge from Outfall 004B shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (MGD)	0.72	1/Year	Estimated ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Year	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Year	Grab

8. **Outfall 004C.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge into the Merrimack River from Outfall Serial Number 004C¹⁷ wastewater consisting of MK-1 Screenhouse Floor Sump water and MK-2 Screenhouse Floor Sump water. The discharge from Outfall 004C shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (GPD)	110	1/Year	Estimated ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Quarter	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Year	Grab

9.a. **Outfall 004D.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge into the Merrimack River from Outfall Serial Number 004D¹⁷ wastewater consisting of deicing water²⁰. The discharge from Outfall 004D shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	1.0	1/Year	Estimated ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Year	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Year	Grab

- b. During chlorination, each intake bay traveling screen shall be continuously rotated to reduce the amount of time impinged organisms are subjected to high levels of chlorine. The permittee is allowed to employ either an alternative water source that is not chlorinated for deicing waster or dechlorinate the deicing water.
- c. Use of deicing water shall meet the mixing zone requirements contained in New Hampshire Surface Water Quality Regulation Env-Wq 1707.02

10. **Outfall 005A.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge MK-1 Cooling Water Intake Structure Maintenance Sump Discharge effluent from Outfall Serial Number 005A¹⁷ into the Merrimack River. Such discharges shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (MGD)	0.3	1/Annual Outage	Total Annual Estimate ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Annual Outage	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Annual Outage	Grab

11. **Outfall 005B.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge MK-1 Cooling Water Intake Structure Maintenance Sump Discharge effluent from Outfall Serial Number 005B¹⁷ into the Merrimack River. Such discharges shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (MGD)	0.3	1/Annual Outage	Total Annual Estimate ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Annual Outage	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Annual Outage	Grab

12. **Outfall 005C.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge MK-2 Cooling Water Intake Structure Maintenance Sump Discharge effluent from Outfall Serial Number 005C¹⁷ into the Merrimack River. Such discharges shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (MGD)	0.3	1/Annual Outage	Total Annual Estimate ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Annual Outage	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Annual Outage	Grab

13. **Outfall 005D.** During the period beginning on the effective date and lasting through expiration date of this permit, the permittee is authorized to discharge MK-2 Cooling Water Intake Structure Maintenance Sump Discharge effluent from Outfall Serial Number 005D¹⁷ into the Merrimack River. Such discharges shall be limited and monitored as specified below. Samples shall be taken prior to discharge to the Merrimack River at a point that provides a representative sample of the effluent.

Effluent Characteristic	Discharge Limitation	Monitoring Requirements	
		Measurement Frequency	Sample Type
Flow (MGD)	0.3	1/Annual Outage	Total Annual Estimate ⁶
Oil & Grease (mg/l) ¹⁸	Report	1/Annual Outage	Grab
pH (Range; standard units)	6.5-8.0 ¹⁹	1/Annual Outage	Grab

EXPLANATION OF SUPERSSCRIPTS TO PART I.A.1 THROUGH I.A.13 ON PAGES 2-18

- (1) Flow at 003 shall be the sum of the flow from internal Outfall 003A and Outfall 003D.
- (2) Outfall 003 discharge temperatures shall be monitored year round at Station S-0 before mixing with any river water. See Attachment B. The discharge temperature will be recorded by appropriate instrumentation and automatically recorded. The average daily temperature shall be calculated as the 24-hour average of the hourly average (per calendar day) based upon at least twelve readings per hour (12 times per hour). The highest average daily temperature value for the month will then be reported as the daily maximum temperature in the monthly Discharge Monitoring Reports (DMRs). Similarly, the average of the average daily temperatures for the month will be reported as the average monthly temperature in the DMRs.
- (3) Open-river Merrimack River surface temperature shall be continuously monitored and reported on the monthly DMR at Station N-10 and S-4 in order to measure the thermal effect of Outfall 003. See Attachment B. The Station N-10 and S-4 temperature probes will be removed from the river and from operation in the autumn when ambient river temperature drops below 40°F and returned to the river when ambient river temperatures rise above 50°F.
- (4) This is a State of New Hampshire Certification requirement.
- (5) The permittee shall conduct chronic (and modified acute) Whole Effluent Toxicity (WET) tests *four* times per year. The chronic test may be used to calculate the acute LC₅₀ at the 48 hour exposure interval. The permittee shall test the effluent samples using Fathead Minnows (*Pimephales promelas*) and Daphnid (*Ceriodaphnia dubia*) following the protocol in Attachment A (Freshwater Chronic Toxicity Test Procedure and Protocol, dated May 2007). Toxicity test samples shall be collected and tests completed during the calendar quarters ending March 31st, June 30th, September 30th and December 31st of each year. Toxicity test results are to be submitted by the 15th day of the month following the end of the quarter sampled. For example, test results for the calendar quarter January through March are due April 15th. Reports shall include documentation of waste streams discharged during sample collection.
 - a. If there is any discharge of metal cleaning wastes during any sampling quarter, the WET samples shall be collected at times when metal cleaning waste is being discharged.
 - b. LC₅₀ (Lethal Concentration 50 Percent) is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.
 - c. The C-NOEC (Chronic-No Observed Effect Concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life-cycle or partial life-cycle test which causes no adverse effect on growth, survival, or reproduction at a specific time of observation as determined from hypothesis testing where the test results (growth, survival, and/or reproduction) exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, report the lowest concentration where there is no observable effect
 - d. For each WET test the permittee shall report on the appropriate Discharge Monitoring

Report (DMR), the concentrations of the Ammonia Nitrogen as Nitrogen, Hardness, Aluminum, Cadmium, Chromium, Copper, Lead, Nickel and Zinc found in the 100 percent effluent sample. These chemical parameters shall be determined to at least the minimum quantification level shown in Attachment A, page 6, or as amended. Also, the permittee should note that all chemical parameter results must still be reported in the appropriate toxicity report.

- e. This permit shall be modified, or alternatively, revoked and reissued to incorporate additional toxicity testing requirements, including chemical specific limits, if the results of the WET tests indicate the discharge exceeds any State water quality criterion. Results from these toxicity tests are considered "New Information" and the permit may be modified as provided in 40 CFR Section 122.62(a)(2).
 - f. If after four consecutive sampling periods, i.e., one year, one test of which must contain metal cleaning waste, no test shows a $LC_{50} < 100\%$, the permittee may request a reduction in toxicity testing. A variance from the above WET testing schedule may be allowed upon written approval by EPA with concurrence from New Hampshire Department of Environmental Services (NHDES). Until written notice is received by certified mail from the EPA indicating that the Whole Effluent Testing requirement has been changed, the permittee is required to continue testing at the frequency specified in this Permit.
- (6) Flow may be recorded based on pump curves and hours of operation.
 - (7) When treating chemical and non-chemical metal cleaning waste, the permittee is prohibited from discharging any other waste streams (including low volume) to Waste Treatment Plant No. 1.
 - (8) Weekend chemical cleaning discharge is prohibited unless provisions are made to allow the collection of a 24-hour composite sample by the EPA and NHDES.
 - (9) Report the maximum and minimum pH values for each metal cleaning waste treatment operation
 - (10) The permittee is required to use EPA approved methods that are sufficiently sensitive to measure each FGD pollutant at concentrations low enough to determine compliance. Alternative approaches to mitigate matrix interferences during the analysis of FGD wastewater can be found in EPA's draft "FGD ICP/MS Standard Operating Procedure: Inductively Coupled Plasma/Mass Spectrometry for Trace Element Analysis in Flue Gas Desulfurization Wastewaters," dated May 2011.
 - (11) The permittee shall begin BOD₅ monitoring and reporting six months after initial start-up of the FGD WWTS. After six months of sampling data has been collected, the permittee may request a reduction in BOD₅ monitoring and reporting. The permittee may submit a written request to the EPA requesting a reduction in the frequency (to not less than once per year). Until written notice is received by certified mail from the EPA indicating that the BOD monitoring requirement has been changed, the permittee is required to continue testing at the frequency specified in this permit.

- (12) Chlorine or bromine may be used as biocide. No other biocide shall be used without written permission from the EPA and NHDES. The term chlorination will include bromination, if bromine is used.
- (13) Neither free available chlorine nor bromine may be discharged from any unit for more than two hours in any one day and not more than one unit may discharge free available or total residual chlorine at any one time.
- (14) This limit is the average of an analysis made over a single period of chloride or bromine injection (< 2-hours); not an average monthly limit.
- (15) Within this permit term, for each of the 126 priority pollutants referred to in 40 C.F.R. §423.15(j)(3), the permittee may attempt to demonstrate through engineering calculations that the pollutant is not detectable in the final discharge. If this approach is taken, the cooling tower blowdown must be tested for priority pollutants at least once to confirm any engineering calculations, except that reliable information supplied by the manufacturer relative to the priority pollutants in a product may be substituted for actual tests. Dilution for such engineering calculations must be based on the lowest projected cooling tower blowdown flow. The chemical concentrations used in such engineering calculations shall be based on anticipated (or manufacturer's suggested) feed rates of cooling tower and boiler chemical additives and must take into consideration concentration within the cooling towers. Upon receipt of written approval from EPA, the permittee is not required to sample/analyze for the demonstrated pollutants. Every December Discharge Monitoring Report (DMR) thereafter, the permittee shall certify that no new chemicals or waste streams have been added and that the engineering demonstrations are still valid.
- (16) Temperature Rise (ΔT), is the difference between the discharge temperature (blowdown) and the intake temperature (makeup). The intake and discharge temperatures shall be continuously measured and recorded by instruments, data loggers or computers (thermistors) which record a minimum of 12 times per hour.

The discharge temperature shall be monitored prior to mixing with any other waste stream.

The Temperature Rise shall be calculated as a daily average, based on the hourly average intake temperature and the hourly average discharge temperature measured during the same hour.

The following procedure shall be used to calculate the daily heat load discharged to the Merrimack River:

$$Q_{\text{hour}} = (\text{Flow}_{\text{blowdown}})(\rho_{\text{water}})(T_{\text{blowdown}} - T_{\text{make-up}})(C_p)(CF_{\text{MBtu}})$$

Where:

Q_{hour}	=	Heat Load; MBtu/hour
$\text{Flow}_{\text{blowdown}}$	=	Flow rate; gallons/hour
ρ_{water}	=	Density of water; 8.344 lb/gal

T_{makeup}	=	Make-up water temperature; °F
T_{blowdown}	=	Blow-down water temperature; °F
C_p	=	Specific Heat of water; 1.0 Btu/°F lb
CF_{MBtu}	=	Conversion Factor – Btu to MBtu; $1/10^6$

The daily heat load will be calculated by adding the hourly heat load, as determined from the equation above. The hourly average values will be tabulated for each month and attached to the monthly DMR. The submitted data shall be in electronic, tabular form able to be read by a spreadsheet computer program. The electronic spreadsheet shall be in the following format:

Date (MM/DD/YY HH:MM)	Intake Temperature (°F)	Discharge Temperature (°F)	Total Discharge Flow (gph)	Hourly Heat Load (MBtu)
(MM/DD/YY 0000				
MM/DD/YY 0100				
MM/DD/YY 0200				
↓				
MM/DD/YY 1500				
MM/DD/YY 1600				
↓				
MM/DD/YY 2300				

The monthly heat load will be calculated by adding the daily heat load, as determined from the equation above. The yearly heat load will be calculated by adding the monthly heat loads for the calendar year.

- (17) A visual inspection of this outfall shall be conducted daily. A log of these inspections, including observations, shall be kept and shall be made available to EPA and NHDES inspectors on request.
- (18) In addition to yearly testing, testing for Oil and Grease shall be immediately initiated if oil sheen is observed.
- (19) The pH of the discharge shall be in the range of 6.5 to 8.0 Standard Units (s.u.) unless the upstream ambient pH in the receiving water is outside of this range and it is not altered by the facility's discharge or activities. If the permittee's discharge pH is lower than 6.5 s.u., the permittee may demonstrate compliance by showing that the discharge pH was either higher than, or no more than 0.5 s.u. lower than, the ambient upstream receiving water pH. If the permittee's

discharge pH is higher than 8.0 s.u., the permittee may demonstrate compliance by showing that the discharge pH is either lower than, or no more than 0.5 s.u. higher than, the upstream receiving water pH. For this demonstration the upstream receiving water sample must be collected on the same day as the discharge pH is measured. The location where the upstream ambient pH sample is collected shall be representative of upstream conditions unaffected by the facility's discharge(s) or activities.

- (20) No deicing water shall be discharged from the intake forebays to the Merrimack River. The permittee shall adjust the deicing water flow rates, as required, to ensure no deicing water is discharged from the intake forebays to the Merrimack River.

While deicing water is in use the intake forebays shall be inspected visually to determine whether deicing water is being discharged to the Merrimack River. If it is determined deicing water is being discharged to the Merrimack River, the permittee shall take immediate action to adjust the deicing water flow rate to stop its discharge to the Merrimack River.

A log of the daily forebay inspections shall be kept; specifically recording whether there was any adjustment to the deicing water flow. The log must be made available to EPA and NHDES inspectors on request.

A. EFFLUENT LIMITATIONS (Continued)

14. Discharges and water withdrawals from Merrimack Station shall not jeopardize or impair any Class B use of the Merrimack River and shall not cause a violation of the water quality standards of the receiving water. Pollutants which are not limited by this permit, but which have been specifically disclosed in the permit application, may be discharged at the frequency and level disclosed in the application, provided that such discharge does not violate Clean Water Act Sections 307 or 311, or applicable water quality standards.
15. All effluent discharged from Merrimack Station shall be adequately treated to insure that the surface waters remains free from pollutants in concentrations or combinations that settle to form harmful deposits, float as foam, debris, scum or other visible pollutants. All effluent discharges shall be adequately treated to insure the surface waters remain free from pollutants which produce odor, color, taste or turbidity in the receiving waters which is not naturally occurring and would render the receiving water unsuitable for its designated uses.
16. The permittee shall not discharge any pollutant or combination of pollutants in toxic amounts into the Merrimack River.
17. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Regional Administrator as soon as they know or have reason to believe (40 C.F.R. Section 122.42):
- a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - (1) One hundred micrograms per liter (100 µg/l);

- (2) Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;
 - (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 C.F.R. Section 122.21(g)(7); or
 - (4) Any other notification level established by the Regional Administrator in accordance with 40 C.F.R. Section 122.44(f) and New Hampshire regulations.
 - b. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:
 - (1) Five hundred micrograms per liter (500 µg/l);
 - (2) One milligram per liter (1 mg/l) for antimony;
 - (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR Section 122.21(g)(7); or
 - (4) Any other notification level established by the Regional Administrator in accordance with 40 CFR Section 122.44(f) and New Hampshire regulations.
 - c. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.
18. The permittee must conduct feasibility studies involving any new chemicals proposed for discharge which are not currently approved for water discharge. The permittee shall gain approval from the Regional Administrator and the Commissioner before any such studies take place. A report summarizing the results of any such studies shall be submitted to the Regional Administrator and the Commissioner regarding discharge frequency, concentration, and the impact, if any, on the indigenous populations of the receiving water. The Regional Administrator or the Commissioner may require, among other parameters, Whole Effluent Toxicity testing as part of feasibility studies.
19. The permittee shall comply with all existing federal, state, and local laws and regulations that apply to the reuse or disposal of solids. At no time shall these solids be discharged to the Merrimack River.
20. This permit may be modified in accordance with 40 C.F.R. Section 122.62(a)(3) if the standards or regulations on which the permit is based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit is issued in accordance with 40 C.F.R. Section 122.62(a)(3).
21. Water drawn from fuel oil tanks shall not be discharged into any Merrimack Station wastewater

treatment system.

23. Any thermal plume from Outfall 004D (intake de-icing water) or 003 (Discharge Canal) at Merrimack Station shall (a) not block the zone of fish passage, (b) not change the balanced indigenous population of organisms utilizing the receiving water, (c) have minimal contact with the surrounding shorelines, and (d) not cause acute lethality to swimming or drifting organisms, including those entering the discharge canal at Outfall 003.

B. MONITORING AND REPORTING

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

2. Submittal of Reports Using NetDMR

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

DMRs shall be submitted electronically to EPA no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA, including the NHDES Monthly Operating Reports (MORs), as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA or to NHDES.

3. Submittal of NetDMR Opt-Out Requests

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

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

Boston, MA 02109-3912

and

New Hampshire Department of Environmental Services
Water Division; Wastewater Engineering Bureau
Attn: Compliance Supervisor
29 Hazen Drive
P.O. Box 95
Concord, New Hampshire 03302-0095

4. Submittal of Reports in Hard Copy Form

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

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

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

New Hampshire Department of Environmental Services
Water Division
Wastewater Engineering Bureau
29 Hazen Drive
P.O. Box 95
Concord, New Hampshire 03302-0095

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

C. Biological Monitoring – Sampling and Reporting Requirements

Routine biological monitoring, except for unusual impingement events (See Part I.D. below), shall not be required at Merrimack Station.

D. Unusual Impingement Event

1. The permittee shall visually inspect the traveling screens of the cooling water intake structures for

Units 1 and 2 at least every eight hours that the each unit's water intake pumps are operated for the duration of the permit.

2. If the permittee observes on the traveling screens, or estimates, based on temporally-limited observations, 40 or more impinged fish within any 8-hour period, the permittee shall:

a. Rotate the affected traveling screens until the impingement rate decreases to less than five fish per hour.

b. Report to the Regional Administrator and the Commissioner within 24 hours by telephone as required by Part II of this permit. A written confirmation report shall be provided within five business days. These oral and written reports shall include the following information:

(1) All impinged fish shall be enumerated and recorded by species. All live fish shall then be returned to the river. Report the species, size ranges, and approximate number of organisms involved in the incident. In addition, up to 25 percent of the total of each species killed, up to a maximum of 25 individuals from each species, shall be measured to the nearest centimeter, total length.

(2) The time and date of the occurrence.

3. The operational mode of the specific system that may have caused the occurrence.

4. The opinion of the permittee as to the reason the incident occurred.

5. The remedial action that the permittee recommends to reduce or eliminate this type of incident

E. Cooling Water Intake Structure Requirements to Minimize Adverse Impacts from Impingement and Entrainment

1. Merrimack Station shall satisfy the following conditions for its cooling water intake structures (CWISs) which reflect the Best Technology Available for minimizing adverse environmental impacts:

a. Units 1 and 2 intake flow volumes shall be limited to a level consistent with operating in Closed-Cycle Cooling (CCC) mode from, at a minimum, April 1 through August 31 (3.77 MGD for Unit 1, 8.44 MGD for Unit 2)*;

* Note: that this permit's thermal discharge limits may, in effect, also require closed-cycle cooling operations from April 1 through August 31, as well as during other periods of time during the year. This permit's CWIS requirements and thermal discharge requirements must both be complied with.

2. Low-pressure (≤ 30 psi) spray wash systems shall be used for each traveling screen to remove fish prior to high-pressure washing for debris removal; Any steam used for greenhouse equipment de-icing must be used after the low-pressure wash has removed fish from the

traveling screens.

3. The location of the low-pressure spray wash systems shall be optimized to transfer fish gently to the return sluice.
4. Traveling screens shall be operated once per 8 hours.
5. A new fish return sluice with the following features shall be installed for each CWIS:
 - a. Maximum water velocities of 3-5 ft/s within the sluice;
 - b. A minimum water depth of 4-6 inches at all times;
 - c. No sharp-radius turns (i.e., no turns greater than 45 degrees);
 - d. A point of discharge to the river that is slightly below the low water level at all times;
 - e. A removable cover to prevent access by birds, etc;
 - f. Escape openings in the removable cover along the portion of the sluice that could potentially be submerged; and,
 - g. A slope not to exceed 1/16 foot drop per linear foot, unless the plant can demonstrate that this is not feasible.
6. The fish return sluice shall be in place and operational at all times.
7. All live fish and other aquatic organisms collected or trapped on the intake screens shall be returned to the river with minimal stress. All other material, except natural debris (e.g., leaves), shall be disposed of in accordance with all existing federal, state, and/or local laws and regulations that apply to waste disposal. Such material shall not be returned to the receiving waters.
8. During chlorination, each screen shall be continuously rotated to reduce the amount of time impinged organisms are subjected to high levels of chlorine, or either an alternative water source shall be used that is not chlorinated for screen washing or dechlorinate the screen wash water.

F. STATE PERMIT CONDITIONS

1. The permittee shall not at any time, either alone or in conjunction with any person or persons, cause directly or indirectly the discharge of waste into the said receiving water unless it has been treated in such a manner as will not lower the legislated water quality classification or interfere with the uses assigned to said water by the New Hampshire Legislature (RSA 485-A:12).
2. This NPDES Discharge Permit is issued by EPA under Federal and State law. Upon final issuance by EPA, the New Hampshire Department of Environmental Services-Water Division

(NHDES-WD) may adopt this permit, including all terms and conditions, as a State permit pursuant to RSA 485-A:13.

3. EPA shall have the right to enforce the terms and conditions of this Permit pursuant to federal law. NHDES-WD shall have the right to enforce the Permit pursuant to state law, if the Permit is adopted by the state. Any modification, suspension or revocation of this Permit shall be effective only with respect to the Agency taking such action, and shall not affect the validity or status of the Permit as issued by the other Agency.

4. The pH range of 6.5 to 8.0 Standard Units (S.U.) must be achieved in the final effluent unless the permittee can demonstrate to NHDES-WD: (1) that the range should be widened due to naturally occurring conditions in the receiving water or (2) that the naturally occurring receiving water pH is not significantly altered by the permittee's discharge. The scope of any demonstration project must receive prior approval from NHDES-WD. In no case, shall the above procedure result in pH limits outside the range of 6.0 - 9.0 S.U., which is the federal effluent limitation guideline regulation for pH for the Steam Electric Power Generating Point Source Category. Any demonstration may need to be delayed until after the cooling tower has been in operation long enough for Outfall 003 to only contain the wastewater from internal outfalls 003A and 003D

5. Coal pile runoff discharge to the Slag Settling Pond is prohibited unless first treated in Wastewater Treatment Plant No. 1.

G. SPECIAL PERMIT CONDITIONS

The permittee may submit a written request to the EPA-New England requesting a change in the permitted pH limit range to be not less restrictive than 6.0 to 9.0 Standard Units found in the applicable National Effluent Limitation Guideline (Steam Electric Generating Point Source Category in 40 CFR Part 423) for this facility. The permittee's written request must include the State's approval letter containing an original signature (no copies). The State's letter shall state that the permittee has demonstrated to the State's satisfaction that as long as discharges to the receiving water from a specific outfall are within a specific numeric pH range the naturally occurring receiving water pH will be unaltered. That letter must specify for each outfall the associated numeric pH limit range. Until written notice is received by certified mail from the EPA-New England indicating the pH limit range has been changed, the permittee is required to meet the permitted pH limit range in the respective permit.