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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
5 POST OFFICE SQUARE – SUITE 100
BOSTON, MASSACHUSETTS 02109-3012

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

JAN 20 2010

William H. Smagula, P.E., Director-PSNH Generation
Public Service of New Hampshire
P.O. Box 330
Manchester, NH 03305-0330

Re: Information Request for NPDES Permit Re-issuance, NPDES Permit No: NH0001465

Dear Mr. Smagula:

The New England Regional office of the United States Environmental Protection Agency (EPA or Agency) is continuing to work on developing a new draft National Pollutant Discharge Elimination System (NPDES), Permit No. NH0001465, for Public Service of New Hampshire's (PSNH or the Company) Merrimack Station electrical generating facility in Bow, New Hampshire (Merrimack Station). In support of this work, EPA is sending PSNH this information request letter pursuant to Section 308(a) of the Clean Water Act (CWA), 33 U.S.C. §1318(a).

CWA § 308(a) provides, in pertinent part, as follows:

> [w]henever required to carry out the objective of this chapter, including but not limited to (1) developing or assisting in the development of any effluent limitation, or other limitation, prohibition, or effluent standard, pretreatment standard, or standard of performance under this chapter; . . . (3) any requirement established under this section; or (4) carrying out section[ ] . . . 1342 . . . of this title –
>
> (A) the Administrator shall require the owner or operating of any point source to . . . (ii) make such reports, . . . and (v) provide such other information as he may reasonably require . . ..

33 U.S.C. § 1318(a). Failure to comply with an EPA information request sent under CWA § 308(a) could subject the recipient of the request to an EPA enforcement action under CWA § 309, 33 U.S.C. § 1319.

On July 3, 2007, EPA sent an information request letter to PSNH under CWA § 308(a) requesting that Merrimack Bow provide, among other things, information to assist in determining appropriate NPDES permit limits related to Merrimack Station's thermal discharge. Specifically, Item No. 4 of EPA's information request directed PSNH to evaluate certain technologies that could potentially be used to decrease or eliminate Merrimack Station's the thermal discharge. Specifically, Item No. 4 of EPA's information request letter stated as follows:

4. *Please describe the engineering aspects or considerations pertinent to considering the application of the following technologies at Merrimack Station:*

a. *Mechanical draft cooling towers for use in a recirculating (or "closed-cycle") cooling system for both generating units at Merrimack Station. The analysis must specify the number of cooling tower cells required based on the facility's heat balance, and a discussion of the major components that would need to be added, and the major modifications to the facility that would need to be undertaken, to retrofit Merrimack Station with this technology.*

b. *Mechanical draft cooling towers for use in a recirculating (or "closed-cycle") cooling system for only one of the generating units at Merrimack Station. The analysis must specify the number of cooling towers required based on the unit's heat balance, and a discussion of the major components that would need to be added, and the major modifications to the facility that would need to be undertaken, to retrofit Merrimack Station with this technology.*

c. *Mechanical draft cooling towers for use in a "helper tower" or "chiller" configuration that would not result in a recirculating (or "closed-cycle") cooling system, but could contribute to reducing thermal discharges by Merrimack Station. The analysis must specify the number of cooling towers required based on the facility's thermal discharges, and a discussion of the major components that would need to be added, and the major modifications to the facility that would need to be undertaken, to retrofit Merrimack Station with this technology."*

Additionally, Item No. 5 of EPA's request directed PSNH to further evaluate each of the technologies in Item No. 4. Specifically, Item 5 provided, in pertinent part, that:

5. *For each of the technologies evaluated under Item No. 4 above, please provide:*

. . .

b. An estimate of the most stringent thermal discharge limits that Merrimack Station would be able to comply with utilizing the technology in question.

c. An estimate of the most stringent cooling water withdrawal flow and thermal load limits that the facility would be able to comply with utilizing the technology in question.

After review of PSNH's response, dated November 2007 (PSNH's November 2007 Response), and several conversations among your staff and EPA staff, and having considered your most recent letter to EPA dated January 5, 2010, EPA has determined that PSNH did not adequately respond to items 5.b and 5.c, above. Specifically, the Company did not estimate the most stringent thermal discharge limits that Merrimack Station would be able to comply with by utilizing the various specified technology options.

Therefore, EPA is again requesting information for the purposes of developing, or assisting in the development of, effluent limits for Merrimack Bow's new NPDES permit and for carrying out section 402 of the CWA, 33 U.S.C. §1342. In some cases, this letter simply restates what EPA previously requested, while in other cases EPA has added additional items to be doubly certain that the information sought and the manner in which it should be presented is clear. In addition, EPA is also requesting information regarding certain assumptions and/or calculations that the Company

used as the basis for the information it provided in PSNH's November 2007 Response. EPA has concluded that it needs this information to better understand and assess both PSNH's submissions and relevant considerations under the CWA.

EPA requires PSNH to submit the information described below within thirty days of the Company's receipt of this letter.

The Agency also wishes to assure PSNH that it carefully considered the Company's letter of January 5, 2010, in which PSNH questions whether EPA has the authority to request the type of information at issue here. EPA is confident that it does, in fact, have such authority under CWA § 308(a). The Agency understands that PSNH has applied for renewal of Merrimack Station's thermal discharge variance under CWA § 316(a), 33 U.S.C. § 1326(a), and EPA is giving detailed consideration to this application and the issues raised by it. EPA is also, however, evaluating questions related to possible thermal discharge limits under technology-based requirements and water quality-based requirements. The Agency has not yet decided whether the thermal discharge limits for the new permit should be based on a CWA § 316(a) variance or on the otherwise applicable technology-based and water quality-based requirements. EPA also notes that some of the requested information is relevant to the evaluation of potential permit limits under CWA § 316(b), 33 U.S.C. § 1326(b). Thus, the information requested by EPA is needed to assist in the development of limits for the new Merrimack Station permit. Finally, EPA also wants to assure PSNH that the Agency does not lightly decide to send an information request to a permittee. That said, the Agency will do so when it needs information from the permittee, as it does here, to effectively develop permit limits.

Information Requested

1. On pages 34 and 35 of PSNH's November 2007 Response, the Company states that the range and gpm is fixed by the heat load, and that it selected cooling towers with a design approach of 8 °F because PSNH determined that a cooling tower designed with an 8 °F approach provided the optimum trade-off between total capacity and performance, and size, initial cost, and operation costs.

Please confirm that the cooling tower design PSNH put forth is capable of removing a heat load of 9,337,930 British thermal units (Btu) per minute for Unit 1, and 26,356,120 Btu/min from Unit 2; and that the total heat load that the cooling towers must eject, at full station power output, is 35,694,050 Btu/min. If PSNH does not agree that the specified heat loads are correct, please provide the heat load, in Btu/min, that PSNH contends must be removed in order to condense the exhaust steam from both Merrimack Station's generating unit turbines at full power.

2. On page 34 of its 2007 Response, PSNH states that ". . . the 84 °F condenser inlet water would only occur at maximum ambient conditions, . . ."

Confirm that by the phrase "maximum ambient conditions," PSNH is referring to the wet bulb inlet temperature of 76 °F and that 84 °F would represent the maximum temperature of the discharge (blowdown) from Merrimack Station using the closed-cycle cooling tower design provided on page 35 of the Company's 2007 response. If PSNH cannot confirm this, then please explain the meaning of the term "maximum ambient conditions" as used by the Company in the 2007 response, and

provide the maximum temperature that the discharge will reach using the cooling tower design provided on page 35 of the Company's 2007 response.

3. On page 18 of PSNH's November 2007 Response, the Company states that "[t]he Station's normal operating mode is to operate both units at or near full power. When both units are operating, the maximum operating discharge flow rate is as follows: Unit 1: 48,000 gpm; Unit 2: 130,000 gpm … This value is shown on the Merrimack Station Water Distribution Diagram … and is also reported on the Discharge Monitoring Reports (DMR) under normal CWIS conditions. It is also the value that will be used to size the thermal discharge canal cooling tower requested to be evaluated by the EPA."

On page 35 of PSNH's November 2007 Response, it states that "Based on a load/capacity assessment provided by SPX Cooling Technologies, the following tower configuration and size was evaluated to support a closed cycle cooling configuration for the Merrimack Station site: … Unit 1 Flow = 59,000 gpm … Unit 2 Flow = 140,000 gpm …"

Please explain why PSNH chose to evaluate cooling towers designed with the higher flows (59,000 gpm versus 48,000 gpm for Unit 1; 140,000 gpm versus 130,000 gpm for Unit 2).

4. On page 40 of PSNH's November 2007 Response, the Company states that "Evaporation $_{\text{Wet Summer}}$ can be approximated as Water Flow $_{\text{Total}}$ x 0.0167"

Please define the term "Evaporation $_{\text{Wet Summer}}$" as used in PSNH's November 2007 Response. Please also provide the corresponding wet bulb temperature(s) during "Evaporation $_{\text{Wet Summer.}}$"

Please explain the basis of the 0.0167 multiplying factor. Please also explain why the factor of 0.0008 was not applied separately for each cooling tower, using the different tower flow rates and different tower range values in order to approximate the evaporation rate.

5. On page 41 of PSNH's November 2007 Response, the Company states that the "Plant makeup from the River, wet mode tower operation would hence equal Unit 1 M_{wet} = 1232 gpm, and Unit 2 $_{Wet}$ = 2923 gpm.

Please explain and/or define the term "wet mode tower operation" as used in PSNH's November 2007 Response. Also, please confirm whether the total value of 4155 gpm represents the maximum value of make-up water necessary.

6. On page 100 of PSNH's November 2007 Response, the Company states that "Complete closed loop conversion, as described in Section 6, would effectively eliminate all thermal discharges to the Merrimack River and is therefore assumed to represent a complete thermal reduction (i.e., river water temperature unaltered by the Station operation)."

Please explain how it would be possible to "effectively eliminate all thermal discharges to the Merrimack River" or to achieve "a complete thermal reduction" using wet cooling towers, given that using that technology, the Station will still have a thermal discharge from the towers in the form of cooling tower "blowdown", based on 5 cycles of concentration.

Please explain what assumptions or analyses went into the above-referenced statement that a complete thermal reduction could be achieved by converting to closed-loop cooling using wet cooling towers.

Please confirm whether it is PSNH's position that a NPDES thermal limit derived from closed cycle cooling for Merrimack Bow would properly be zero (0.0) Btus. Given that any thermal limit would be monitored by determining the temperature difference between the intake water and the temperature of the blowdown (delta T), multiplied by the mass of blowdown, using the standard value heat capacity of water of 1.0 Btu/°F· lb, please explain whether, and how, PSNH concludes that Merrimack Station would be able to comply such an NPDES thermal permit limit.

If PSNH determines that the thermal discharge would not actually be completely eliminated through the use of wet cooling towers, then please provide an accurate, estimated monthly thermal discharge (in Btu/month) that would be discharged from Merrimack Station as a result of conversion to closed-loop cooling using wet cooling towers as discussed and evaluated in PSNH's November 2007 Response (sum of daily: blowdown flow rate x 8.33 x (intake temperature – discharge temperature). Please also provide a separate estimated Btu discharge for each month of the year.

7. On page 20 of PSNH's November 2007 Response, the Company states that "Five years (2002-2006) of Merrimack River water temperatures in discrete 15 minute intervals were provided by PSNH … and the remaining values averaged into 1 hour intervals to be consistent with National Weather Service (NWS) data used in further analysis. The resulting hourly average river water temperatures were then reviewed … The table below displays the number of hours per month, and the percentage of measured hours per month that the Station achieved the evaluated 5 °F Station N10 – Station S4 temperature differential during 2002 – 2006."

Please provide:

(a) the equation(s) that were used to develop the table on page 21;
(b) the inputs for the calculations, including the heat load in Btu/hr, the discharge temperature, the ambient river temperature, the discharge volume, the wet bulb temperature, and any other relevant parameters that were used to determine the Station N10 – Station S4 temperature differential; and
(c) the actual Station N10 – Station S4 temperature differential that was used to determine the percentages provided in the table.

8. On page 100 of PSNH's November 2007 Response, the Company states that "… Unit 1's 48,000 gpm of discharge heated by operation of 120 MWe would be recirculated and thus not discharged to the Merrimack River." On page 40 of PSNH's November 2007 Response, the Company calculates that the blowdown for Unit 1 equals 245.7 gpm (using the 59,000 gpm value for Unit 1 flow).

Please explain whether and, if so, why PSNH believes that the residual heat contained in the blowdown stream for Unit 1 can be ignored in this evaluation. Also, please confirm whether it is PSNH's position that a NPDES permit limit of zero (Btu's) would be appropriate for a closed-cycle system for Unit 1.

9. On page 100 of PSNH's November 2007 Response, the Company states that "Under this scenario, the ambient river water temperature at Station S0 would be calculated as a function of the electrical output of Unit 2, Station N10 river water temperature, and dry bulb temperature."

Please explain how dry bulb temperature was considered in the evaluation presented in the table on page 101.

Please also provide:

a) the equation(s) that were used to develop the table on page 101;

b) the inputs for the calculations, including the heat load, in Btu/hr, the electrical output of Unit 2, the discharge temperature, the discharge volume, the dry bulb temperature, and any other relevant parameters that were used to determine the Station N10 – Station S4 temperature differential; and

c) the actual Station N10 – Station S4 temperature differential that was used to determine the percentages provided in the table.

10. On page 101 of PSNH's November 2007 Response, the Company states that "... conversion of Unit 2 would remove 130,000 gpm of discharge heated by operation at 350 MWe from the Merrimack River. Likewise, under this scenario, the Station S4 river water temperature would be calculated as a function of the electrical output of Unit 1, Station N10 river water temperature, dry bulb temperature, and river water flow rate." On page 40, PSNH calculates that the Blowdown for Unit 2 equals 583.1 gpm (using the 140,000 gpm value for Unit 2 flow).

Please explain whether and, if so, why PSNH believes the residual heat contained in the Unit 2 blowdown stream can be ignored in this evaluation. Also, please confirm whether it is PSNH's position that a NPDES permit limit of zero (Btu's) would be appropriate for Unit 2 with a closed-cycle system utilizing wet cooling towers.

Please also explain how dry bulb temperature was considered in the evaluation presented in the table on page 102.

In addition, please provide:

a) the equation(s) that were used to develop the table on page 102;

b) the inputs for the calculations, including the heat load, the electrical output of Unit 1, in Btu/hr, the discharge temperature, the discharge volume, the dry bulb temperature, and any other relevant parameters that were used to determining the Station N10 – Station S4 temperature differential; and

c) the actual Station N10 – Station S4 temperature differential that was used to determine the percentages provided in the table.

11. The heading to the tables on pages 101 and 102 of PSNH's November 2007 Response contain the phrase "Merrimack Station Current PSM and Discharge Canal Performance"

Please explain why the tables are labeled this way and confirm whether or not the performance of the Power Spray Module (PSM) is reflected in the results presented in the tables.

12. Figure D in Attachment 5 of PSNH's November 2007 Response shows that some Unit 1 and Unit 2 intake water is for equipment cooling, and that that water is ultimately discharged to the cooling canal and out outfall 003 to the River.