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July 7, 2016

VIA E-MAIL
VIA FIRST CLASS MAIL

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Re: **Public Service Company of New Hampshire
Merrimack Station, Bow, New Hampshire
Draft NPDES Permit No. NH0001465
Final Effluent Limitation Guidelines Voluntary Incentives Program for Flue Gas
Desulfurization Wastewater – Technical Submission**

Dear Mr. Webster, Attorney Stein, and Ms. DeMeo:

Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH” or the “Company”) provides this letter and the enclosed confidential report from Enercon Services, Inc. (“Enercon Report”), in support of the Company’s March 23, 2016, letter opting-into the Voluntary Incentives Program (“VIP”) for the regulation of flue gas desulfurization (“FGD”) wastewater at Merrimack Station.¹ Since submitting its August 18, 2014, Comments addressing the Environmental Protection Agency’s (“EPA”) Revised Draft National Pollutant Discharge Elimination System (“NPDES”) Permit No. NH 0001465 (“Draft Permit”) for Merrimack Station (“2014 Comments”), PSNH has continued to optimize its state-of-the-art FGD wastewater treatment system, comprised of the physical/chemical treatment system with its Enhanced Mercury and Arsenic Removal System (jointly, the primary wastewater treatment system or “PWWTS”), and its softening, evaporation, and

¹ Effective January 4, 2016, EPA established the VIP as part of the final Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (“ELGs”).

crystallization technology (the secondary wastewater treatment system or “SWWTS”). Although PSNH is extremely proud of its progress in pioneering this state-of-the-art technology, there are multiple variables within Merrimack Station’s operations that complicate the modification of the SWWTS from a system designed for volume reduction to one that can reliably and consistently achieve the evaporative limits set forth in the VIP. While the SWWTS is extremely successful in doing its intended job of volume reduction, it does not achieve zero liquid discharge—nor was it designed to do so—and it continues to operate with a purge stream.

In addition, as described in PSNH’s 2014 Comments, there continue to be operational challenges with the SWWTS that can result from any variation in the complex chemical and equipment sequential series of balances that comprise the upstream power production process. See *e.g.*, 2014 Comments at 36. The SWWTS cannot at this time consistently achieve the evaporative limits set forth in the VIP, particularly during periods of high demand, and, as a result, during this interim period, PSNH must have the flexibility to discharge directly from the PWWTS to the treatment pond and discharge canal when SWWTS operations are interrupted or the SWWTS is not available. As stated in our 2014 Comments, PSNH’s PWWTS, with the addition of the enhanced filtration system, cost effectively and consistently removes identified constituents of concern and satisfies water quality standards established by the New Hampshire Department of Environmental Services (“NHDES”).

PSNH hopes the information included in this letter and the attached report will be helpful to EPA, as Merrimack Station remains one of the few plants in the world with experience in managing the many challenges of this developing technology.

EPA Established the VIP to Allow Steam Electric Generating Plants Until December 31, 2023 to Meet Evaporative Based FGD Effluent Limits

For plants willing to opt-into the VIP, the ELGs established evaporative based limits that apply “as of December 31, 2023, to FGD wastewater generated on and after December 31, 2023.” 80 Fed. Reg. 67,838, 67,858 (Nov. 3, 2015). Until such time, facilities opting into the VIP are subject to the Best Available Technology Economically Achievable (“BAT”) total suspended solids (“TSS”) effluent limitations, equal to Best Practicable Control Technology Currently Available for TSS, set forth at 40 C.F.R. § 423.12(b)(11). EPA recognized the necessity that plants opting-into the VIP be given until the conclusion of 2023 to “use the period in advance of this date to research, engineer, design, procure, construct, and optimize systems capable of meeting the limitations based on evaporation.” *Id.* at 67,858-59.² EPA was unequivocal in its direction to permitting agencies in this regard—“[w]here a discharger chooses to participate in the voluntary incentives program and be subject to effluent limitations for FGD wastewater based on evaporation, the permitting authority must allow the plant up

² “Steam electric power plants agreeing to meet BAT limitations for FGD wastewater based on evaporation must comply with those limitations on arsenic, mercury, selenium, and TDS in FGD wastewater. For such plants, the BAT limitations based on evaporation apply as of December 31, 2023, to FGD wastewater generated on and after December 31, 2023. Plants opting to participate in the voluntary program can use the period in advance of this date to research, engineer, design, procure, construct, and optimize systems capable of meeting the limitations based on evaporation.” 80 Fed. Reg. at 67,858-59 (footnote omitted).

to December 31, 2023, to meet those limitations; again, the permit must make clear that the plant must meet the final limitations by December 31, 2023.” *Id.* at 67,883 (emphasis added).

Thus, the ELGs reflect EPA’s recognition and judgment that significantly more time is needed for steam electric generating plants to implement and optimize evaporative technology. As discussed below and throughout the Enercon Report, PSNH’s Merrimack Station and the industry as a whole require more experience before EPA’s aspirational goals can be achieved. The Electric Power Research Institute (“EPRI”) is researching new wastewater treatment and conservation technologies under its Program 185. The 2016 research plan has a \$3.0MM budget for this year and will address the treatment of selenium, mercury, arsenic, and nutrients in FGD blowdown as well as other constituents such as boron and bromide. According to EPA’s Technical Development Document,³ only three plants in the United States have installed or are installing an evaporation system to treat FGD wastewater, Merrimack Station being one of them. There are significant variations in the few vapor evaporative systems that are currently in operation with no two systems identical.

Appropriately, EPA has recognized that evaporative technology has optimization challenges ahead of it—or at least in terms of what EPA wants this technology to achieve. Through the VIP, EPA sought to “accelerate the research into and demonstration of controls and processes intended to prevent, reduce, and eliminate pollution because, under it, plants will opt to employ control and treatment strategies to significantly reduce discharges of pollutants found in FGD wastewater.”⁴ The agency’s selection of the 2023 compliance date as an industry-wide option is a recognition of the work that remains to be done in developing, understanding, and optimizing this new technology before compliance with evaporative limits can be met.

The ELGs Allow PSNH to Opt-Into the VIP In Order to Optimize its SWWTS and Achieve Evaporative Limits by 2023

As EPA acknowledged in its response to public comments concerning the ELGs, the fact that PSNH already has installed its SWWTS makes it no different than other steam electric generating plants subject to the rule. Specifically, EPA “has not excluded any plants from the ability to opt into the [VIP], and . . . plants that already use evaporation technology to treat their FGD wastewater may opt into the [VIP] . . .” EPA, Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA’s Response to Public Comments; Part 8 of 10, at 8-3 (September 2015). The VIP assures that true pioneers of evaporative technologies like PSNH have the time needed to optimize and engineer their wastewater treatment systems to consistently and reliably meet the ELGs’ evaporative limits. The 2023 compliance date is a must for Merrimack Station for the many reasons stated in PSNH’s 2014 Comments and the Enercon Report attached to this letter.

As EPA is aware from PSNH’s 2014 Comments, the Draft Permit’s limitations are impossible for PSNH to meet at this time (and therefore are arbitrary and capricious). But as a threshold matter, given EPA’s promulgation of the ELGs before issuance of a final NPDES permit, the Draft Permit’s FGD effluent limitations based on EPA’s “best professional judgment” (“BPJ”) are now a nullity.

³ EPA, Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, at 7-14 (Sept. 2015).

⁴ 80 Fed. Reg. at 67,858.

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Region 1 is obligated to apply the uniform, technology-based final limits set out in the ELGs to regulated entities within the steam electric power generating industry, including Merrimack Station. EPA can no longer use its BPJ to establish a permit limit for Merrimack Station's FGD wastewater effluent.

Courts, the Environmental Appeals Board, and EPA have uniformly confirmed that the Clean Water Act ("CWA") does not allow for permit limits based on the agency's BPJ once national guidelines are established. See e.g., *NRDC v. EPA*, 859 F.2d 156, 200 (D.C. Cir. 1988) (further providing that CWA section 402(a)(1) "preclude[s] the establishment of BPJ permit limits once applicable effluent guidelines are in place"); *NRDC v. EPA*, 822 F.2d 104, 111 (D.C. Cir. 1987) (noting that a state or permit writer may set limitations utilizing its BPJ authority only when there is no national standard that has been promulgated for a point-source category); *Riverkeeper, Inc. v. EPA*, 358 F.3d 174, 203 (2d Cir. 2004) ("It is, of course, true that once the EPA promulgates applicable standards, regulation of those facilities subject to those standards on a [BPJ] basis must cease . . ."); *Citizens Coal Council v. EPA*, 447 F.3d 879, 891 n.11 (6th Cir. 2006) (noting that BPJ applies only when "EPA has not promulgated an applicable guideline"); Letter from Jim Hanlon, Director, Office of Wastewater Management, to Water Division Directors Regions 1-10, Att. A, at 1 (June 7, 2010) (commonly referred to as the "Hanlon Memorandum") (acknowledging that BPJ-based limits are only to be included in permits "until such time [as the ELGs are] promulgated"); see also H.R. Rep. No. 92-911, at 126 (1972), *reprinted in* A Legislative History of the Water Pollution Control Act Amendments of 1972 at 813 (1973) (providing that permits with BPJ limits may be issued only "prior to" the promulgation of nationally applicable effluent guidelines).

Because EPA now has established ELGs (including the VIP and its 2023 compliance date for achieving the evaporative based limits), these provisions must be included in any final permit issued for Merrimack Station. *In re: Certainteed Corporation*, NPDES Appeal No. 15-01, 2015 WL 10091224, at *1 (EAB May 7, 2015) ("If EPA has developed industrial category-wide (or subcategory-wide) effluent limitations—referred to as 'effluent limitation guidelines' []—such limits must be included in that facility's permit.") (citing 40 C.F.R. § 125.3(c)(1) & *E.I. du Pont de Nemours & Co. v. Train*, 430 U.S. 112 (1977)); 80 Fed. Reg. at 67,883 ("[T]he permitting authority must allow the plant up to December 31, 2023, to meet those limitations . . ." (emphasis added)). The ELGs reflect EPA's judgment that facilities, like PSNH, seeking to develop, implement, and optimize evaporative systems require additional time to achieve the limits set forth in the ELGs. And if PSNH's Merrimack Station—with its solid head-start on the industry, state-of-the-art system, and team of dedicated and talented engineers—cannot reach a zero liquid discharge on a consistent basis, then it is a fair assumption that no other utility can do so either at this time.

PSNH Must Be Permitted to Discharge Directly From its PWWTS During Optimization of its Wastewater Treatment System

As detailed in the Enercon Report and throughout PSNH's August 18, 2014, Comments to the Draft Permit, the SWWTS installed at Merrimack Station does not and cannot at this time reduce FGD wastewater to zero liquid or effluent that meets the evaporative limits set forth in the ELGs. These limitations on the SWWTS are not surprising, given it was not designed to be a so-called "zero liquid discharge" system. The vapor compression evaporative technology is first and foremost a volume reduction system. In attempting to maximize the system's volume reduction capabilities, PSNH continues to experience the optimization and operational issues detailed in the Enercon Report,

resulting from the necessarily complex array of equipment and chemical processes and reactions, all of which is made even more challenging by sporadic plant operations.

Continued optimization, equipment adaptation, and greater operational experience, as well as time for each of these activities to occur, are essential for PSNH to meet the proposed limits set forth in the VIP by 2023. During optimization, PSNH must be able to discharge directly from the PWWTS to its treatment pond and discharge canal when the SWWTS shuts down or is otherwise unavailable. As discussed below, EPA can be confident that discharges from the PWWTS satisfy the ELGs' interim TSS limits allowed under the VIP through 2023. Indeed, the PWWTS, with the addition of the enhanced filtration system, is an extremely effective and dependable FGD wastewater treatment system.

The PWWTS removes the overwhelming majority of constituents of concern from the FGD waste stream generated by the scrubber.⁵ In particular, with the addition of the Enhanced Mercury and Arsenic Removal System, the PWWTS removes 99.997 percent of the already small amounts of mercury present in the FGD waste stream, as well as 98 percent of selenium and arsenic. EPA itself has recognized that these resulting mercury levels are "low" and represent "a tiny fraction . . . of the total mercury previously released to the atmosphere" prior to the scrubber installation.⁶ EPA likewise has recognized the efficiency, effectiveness and long-standing success of chemical precipitation at reducing suspended solids and dissolved solids, including metals. See EPA, Steam Electric Power Generating Point Source Category: Final Detailed Study Report, at 4-50 (Oct. 2009) (noting that the "data show that chemical precipitation is an effective means for removing many metals from the FGD wastewater").

Furthermore, the NHDES, following a comprehensive anti-degradation review of both the Merrimack River and PSNH's FGD wastewater, determined that effluent from the PWWTS satisfied applicable water quality standards that assure protection of human health and the environment. Water quality-based limits are developed by states and primarily focus on the potential impact every proposed surface water discharge may have on the quality of the receiving water. States establish water quality-based limits for pollutants at levels that ensure the safety of individuals who drink from the waterway, fish in it, and/or recreate on it. Accordingly, NHDES's determination that effluent from the PWWTS at Merrimack Station satisfied applicable water quality standards necessarily means these effluent discharges do not detrimentally impact the Merrimack River.

In sum, while optimizing the system as necessary to achieve the evaporative based limits by the end of 2023, PSNH must be able to discharge directly from its highly effective PWWTS to its treatment pond and discharge canal when SWWTS operations are interrupted or the SWWTS is not available. To ignore the industry-wide challenges facing steam electric generating plants using

⁵ See 2014 Comments at i-iv (Executive Summary), 72-79 (excerpts attached); see also Comments of PSNH on EPA's 2011 Draft NPDES Permit for Merrimack Station, at 149-153 (Feb. 28, 2012). William Kennedy, P.E., a respected expert on wastewater treatment within the industry and one of PSNH's consultants, corroborates the fact that the PWWTS at Merrimack Station is one of the best in the country. Mr. Kennedy's Comments Regarding the Proposed NPDES Permit for Public Service of New Hampshire's Merrimack Station are included as Exhibit 6 to PSNH's 2014 Comments.

⁶ See EPA's 2014 Fact Sheet to the Draft Permit at 34.

evaporative systems, or more specifically, to ignore the operating realities at Merrimack Station detailed in PSNH's 2014 Comments and the attached Enercon Report, would be the quintessence of arbitrary and capricious decision-making.

Conclusion

As demonstrated in PSNH's 2014 Comments concerning the Draft Permit, and as explained in the attached Enercon Report, PSNH and the industry must overcome many challenges to successfully achieve the evaporative based limits set forth in the ELGs. PSNH is continuing to optimize its wastewater treatment systems at Merrimack Station to achieve the best possible environmental end result, while maintaining safe plant operations and providing reliable power to its customers.

In order to successfully optimize and adapt its wastewater treatment systems to meet the evaporative-based limits by December 31, 2023, PSNH must have the flexibility to discharge its FGD effluent directly from the PWWTS subject to the interim limits established in the VIP. Region 1 should include in the final NPDES permit for Merrimack Station the following standards set out in the ELGs for the VIP:

- 1) BAT TSS effluent limitations for FGD wastewater generated at the facility prior to December 31, 2023, equal to Best Practicable Control Technology Currently Available for TSS at 40 C.F.R. § 423.12(b)(11);⁷ and
- 2) BAT effluent limitations set out in the table following 40 C.F.R. § 423.13(g)(3)(i) for FGD wastewater generated at the facility on or after December 31, 2023.⁸

The VIP's interim limits are essential for PSNH to perform the necessary optimization, adaption, and adjustments to its wastewater treatment system to achieve the evaporative-based limits in 2023.

We appreciate the opportunity to provide the attached Enercon Report updating EPA concerning the status of PSNH's optimization efforts. PSNH hopes this information is helpful to EPA, and respectfully requests and expects this correspondence and enclosed Enercon Report will be included as part of the administrative record for the pending NPDES permit reissuance for Merrimack Station. Further, because the Enercon Report includes proprietary information concerning PSNH's wastewater treatment system, the report should be treated as Confidential Business Information and not released to third-parties.

⁷ See 40 C.F.R. § 423.13(g)(3)(ii).

⁸ See *id.* § 423.13(g)(3)(i).

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Very truly yours,



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**FLUE GAS DESULFURIZATION -
WASTEWATER TREATMENT SYSTEM -
PSNH MERRIMACK STATION UNITS 1 & 2 -
BOW, NEW HAMPSHIRE: -
OPERATIONS AND MAINTENANCE
CHALLENGES -**

**Prepared for: -
PUBLIC SERVICE COMPANY OF NEW
HAMPSHIRE -
D/B/A EVERSOURCE ENERGY -**

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July 2016 -

**THIS DOCUMENT CONTAINS PROPRIETARY,
COMPANY CONFIDENTIAL -
INFORMATION SUBJECT TO BUSINESS
CONFIDENTIALITY CLAIM UNDER 40 C.F.R. -
PART 2 AND COMPARABLE STATE LAW -**

Comments of Public Service Company of New Hampshire

on

EPA's Revised Draft National Pollutant Discharge Elimination System

Permit No. NH 0001465

for

Merrimack Station



**Public Service
of New Hampshire**

A Northeast Utilities Company

Submitted to the U.S. Environmental Protection Agency

August 18, 2014

EXECUTIVE SUMMARY

The United States Environmental Protection Agency-Region 1's ("EPA") April 18, 2014 revised draft National Pollutant Discharge Elimination System ("NPDES") permit for Public Service Company of New Hampshire's ("PSNH") Merrimack Station cannot be issued as proposed. EPA's determination that zero liquid discharge limits for flue gas desulfurization ("FGD") waste water using softening, evaporation, and crystallization technology (i.e. PSNH's secondary waste water treatment system ("SWWTS")) is achievable and, therefore, is "best available technology" ("BAT") is simply wrong.¹ In fact, both findings are unsupported and unfounded. The SWWTS installed at Merrimack Station does not and cannot at this time reduce FGD waste water to zero liquid. Likewise, the SWWTS, although a workable and necessary technology at Merrimack Station under the circumstances, does not meet the legal definition of BAT when applying well-established factors.

EPA rushed to judgment in issuing this latest draft permit. In its rush, EPA made decisions based on limited, incomplete, unreliable, and often unverifiable data. EPA's own Fact Sheet shows that it does not have an appreciation for the complexities of running volume-reducing technology like that employed by Merrimack Station's SWWTS. For example, EPA failed to mention, much less recognize, that: the design for each system is different; the equipment itself is different; the chemistry is different; the fuel is different; the influent is different—the list could go on. Rather than address these differences, EPA simply declared that, because a few systems in the world using "similar" technology may or may not be capable of

¹ PSNH's statements in these comments are included solely to address the legal "best available technology" test or analysis EPA is required to complete, pursuant to the Clean Water Act, to lawfully establish technology-based effluent limits for point-source dischargers. The BAT test is a unique one that focuses on a finite set of factors established and perfected through decades of jurisprudence. Words and phrases have very precise meanings within this regulatory framework. PSNH's comments must be reviewed within this regulatory context and may not permissibly be construed and/or excerpted for any other purpose.

eliminating end-of-pipe discharges for FGD waste waters due to exigent factors, Merrimack station could do the same. This is the definition of arbitrary and capricious agency action and ignores the actual, undisputed operational experience at Merrimack Station.

By implication, EPA again got it wrong in deciding that PSNH's primary waste water treatment system—the physical/chemical treatment system with its Enhanced Mercury and Arsenic Removal System (jointly the "PWWTS")—is not BAT, even though that system cost effectively removes a significant amount of the constituents of concern and is the only system that satisfies the legal definition of BAT. In fact, a review of the well-established factors shows that the PWWTS is the BAT for Merrimack Station, and EPA should amend its draft NPDES Permit to reflect limits achievable using this technology.

Any final NPDES permit for Merrimack Station must address the issues raised in these comments. Specifically:

- EPA's draft NPDES permit is a rush to judgment on PSNH's SWWTS considering how little the agency knows about its operations and effectiveness.
- PSNH did not voluntarily install its SWWTS. Instead, it was compelled to do so in order to bring a technologically advanced scrubber on line as required by law, coupled with EPA's unwillingness to issue PSNH a new or modified permit. Since installation and operation of the scrubber in September 2011, Merrimack Station has become one of the cleanest coal burning plants in the nation, reducing mercury volumes by approximately 95 percent and reducing sulfur dioxide emissions by over 90 percent. EPA's suggestion that PSNH could simply wait on an NPDES permit and ignore the clear statutory mandate to commence operation of the scrubber as soon as possible and no later than July 1, 2013, is wrong.
- The phrase "zero liquid discharge" or ZLD is a buzz word that is often mistakenly interchanged with actual technologies. ZLD is not a technological option; rather, it is an effluent limit. EPA and industry alike have misused this term throughout the years – so much so that it is now even used to identify systems that do not actually achieve ZLD – like Merrimack Station's SWWTS. The SWWTS at Merrimack Station is not able to meet a zero limit.
- PSNH's PWWTS is BAT. The PWWTS cost effectively and consistently removes approximately 90 percent of all toxic weighted pound equivalents ("TWPE") from FGD waste waters and satisfies water quality standards

established by the New Hampshire Department of Environmental Services (“NHDES”).

- Both EPA’s identification of PSNH’s SWWTS as BAT and the agency’s corresponding belief that PSNH’s SWWTS achieves ZLD are arbitrary and capricious.
- While described as a “site-specific, case-by-case determination based on the facts at Merrimack Station,” EPA’s BAT determination ignores the actual, undisputed facts concerning Merrimack Station and instead relies on secondary sources, cursory research, and superficial interviews of companies whose plants and systems differ greatly from Merrimack Station and its FGD waste water treatment system.
- PSNH’s SWWTS does not achieve ZLD and must have a purge stream. This purge stream, plus ongoing operational challenges associated with the treatment system, force PSNH to continue to transport FGD effluent to local publicly owned treatment works (“POTWs”).
- PSNH cannot eliminate its purge stream or FGD waste waters by mixing them with fly-ash because of the design of Merrimack Station’s wet-bottom boilers and the fact that they do not generate enough fly-ash.
- It is unlawful for EPA to rely solely upon the POTW compliance option in establishing a legally permissible BAT standard for any waste stream. Furthermore, additional treatment of Merrimack Station’s FGD waste water by a POTW provides little material benefit to the environment, given that the waste stream already satisfies water quality standards. Separately, continued shipments to POTWs in the future will be dictated by many factors and, thus, may not be available to PSNH for the entirety of the permit term; therefore, this cannot be included as a legally permissible compliance option for PSNH’s final permit for Merrimack Station.
- EPA wrongly compares the volume reduction technology used at a few other facilities to that at Merrimack Station and assumes all are the same. They are not. Each facility and its associated technology is unique due to differences in coal burned, boiler design, FGD design, FGD waste water treatment technological design, and the overall fuel/boiler/FGD waste water chemistries.
- An analysis of the BAT factors confirms PSNH’s SWWTS is not BAT, and EPA’s ZLD effluent limit is not achievable.
- EPA correctly abandoned its previous identification of biological treatment technologies as BAT for PSNH’s Merrimack Station.
- EPA’s decision to utilize its “best professional judgment” authority is unlawful because (a) national effluent guidelines already exist for this waste stream; (b)

revised national effluent guidelines are forthcoming in the immediate future; and/or (c) of public policy concerns, not the least of which is that EPA's current BAT determination would impose effluent limits that are more stringent than at any other facility in the country.

PSNH offers the following detailed comments to support each of its above-referenced assertions.

1. The PWWTS is BAT for Merrimack Station

Merrimack Station's existing PWWTS for the treatment of FGD waste waters is BAT. It is one of the most effective treatment systems in the country and removes the overwhelming majority of constituents of concern from the FGD waste stream generated by the scrubber.⁴² This, in turn, means that effluent from the FGD PWWTS is some of the cleanest in the country. In fact, NHDES specifically determined that discharges from the treatment system satisfy applicable water quality standards. The technology has a proven track record of treating FGD waste waters. It is adaptive and, unlike other contemplated technologies, is not saddled with myriad concerns relating to the sensitivity of its operations and the corresponding effects those sensitivities can have on plant operations and/or system reliability. A thorough and reasonable analysis of all relevant factors and considerations confirms this fact. EPA's rejection of this technology as BAT is therefore arbitrary and capricious.

a. The BAT Factors Confirm that the PWWTS is BAT for Merrimack Station

The factors EPA is legally required to evaluate bolster the fact that the PWWTS is BAT for Merrimack Station. Those factors include a consideration of the age of the equipment and facilities involved; the process employed and process changes; the engineering aspects of the application of various types of control techniques; the cost of achieving such effluent reduction; and non-water quality environmental impacts (including energy requirements). *See* 40 C.F.R. § 125.3(d)(3)(i)–(vi). While each component of this analysis must be studied, the key factors the

⁴² William Kennedy, a renowned expert on waste water treatment within the industry and one of PSNH's consultants, corroborates the fact that the PWWTS at Merrimack Station is one of the best in the country. *See* William Kennedy, P.E., *Comments Regarding the Proposed NPDES Permit for Public Service of New Hampshire's Merrimack Station* (August 2014) at 6-9 (hereinafter "Kennedy Report"), attached hereto as Exhibit 6.

agency typically relies upon in making its BAT determinations are: (1) technical feasibility; (2) the cost to install, operate, and maintain the technology; and (3) the amount of pollutants removed annually by the system, which is usually assessed as a factor of pounds and TWPE.

The PWWTS is technically feasible, as PSNH has installed and runs the system with little to no complications or operational constraints. It is both the cost and relative effectiveness of the PWWTS that sets it apart from any other potentially available technology and demonstrates that this treatment system is BAT for the treatment of Merrimack Station’s FGD waste waters. PSNH paid \$19.3 million dollars to install its PWWTS. Annual operation and maintenance (“O&M”) costs for the system are approximately \$1.8 million. As for the benefits (i.e. pollutant removals), the Electric Power Research Institute (“EPRI”) and the Utility Water Act Group (“UWAG”) analyzed influent and effluent data from PSNH’s PWWTS and determined that the PWWTS consistently removes approximately 90 percent of the relevant pollutants (expressed in TWPE). *See* EPRI Comments on the Revised Draft Determination of Technology-based Effluent Limits for the Flue Gas Desulfurization Wastewater at Merrimack Station in Bow, New Hampshire at 1 (Aug. 18, 2014) (“EPRI 2014 Comments”); UWAG Comments on Revised NPDES Permit for the Merrimack Station, Attachment 1 (Aug. 18, 2014) (“UWAG 2014 Comments”).

Based on these numbers, EPRI and UWAG reached the following conclusions as to the overall cost-effectiveness of PSNH’s PWWTS:

	TWPE Removed	TWPE Remaining	Capital Costs (\$M) 2011	O&M (\$M/yr) 2011	Total Annualized (\$M/yr) 2011	Total Annualized (\$M/yr) 1981	Cost-Benefit (\$/TWPE) 2011	Cost-Benefit (\$/TWPE) 1981
UWAG	4,168	555	19.3	1.84	3.96	1.54	\$970	\$370
EPRI	4,307	478				1.4		\$324

See EPRI 2014 Comments at 1; UWAG 2014 Comments, Att. 1.

EPA has used this cost-effectiveness analysis in this context as a litmus test since at least the late 1970s. At no point has the agency exceeded a cost per TWPE of \$404 in 1981 dollars:

A review of approximately 25 of the most recently promulgated or revised BAT limitations shows BAT cost-effectiveness ranging from less than \$1/lb-eq (Inorganic Chemicals) to \$404/lb-eq (Electrical and Electronic Components), in 1981 dollars.

78 Fed. Reg. at 34,504. Typically the cost has been less than \$200. See 68 Fed. Reg. 25,686, 25,701 (May 13, 2003). EPA has largely relied upon this cost-effectiveness analysis to determine a technology is not BAT, as well. See 68 Fed. Reg. 25,686, 25,701-02 (May 13, 2003) (providing in a rulemaking for the Metal Products and Machinery category that a particular technology was not BAT when it had a cost of \$1000/TWPE because this was “substantially greater” than what EPA had typically imposed for BAT technology in other industries). Both EPRI’s and UWAG’s calculations of the cost-effectiveness of PSNH’s PWWTS provide clear and objective support that this technology is BAT for Merrimack Station. A comparison of the relative cost-effectiveness of the other technologies EPA has proposed for Merrimack Station, discussed herein, *infra*, further corroborate that PSNH’s PWWTS is BAT.

A review of what EPA has identified as the key constituents of concern in the FGD waste stream provides similar support for labeling the PWWTS as BAT. While EPA has in the past expressed concerns to the industry that physical/chemical treatment systems do not significantly treat dissolved constituents of concern in the FGD waste stream, this is simply not the case at Merrimack Station. Instead, the facility’s physical/chemical treatment system, coupled with its additional polisher (EMARS), consistently removes the overwhelming majority of mercury and other constituents of concern. Specifically, the PWWTS at Merrimack Station removes 99.997 percent of the already small amounts of mercury present in the FGD waste stream, as well as 98

percent of selenium and arsenic from that influent.⁴³ EPA itself recognized that these resulting mercury levels are “low” and represent “a tiny fraction . . . of the total mercury previously released to the atmosphere prior to the scrubber installation.” Fact Sheet at 34. Therefore, the overwhelming majority of regulated pollutants of concern are fixed and removed with the solids in the PWWTS prior to even entering the SWWTS at Merrimack Station.

In the end, the PWWTS at Merrimack Station employs unit processes that are standard in the water and waste water treatment industry with a long history of successful operation. Its additional EMARS polishing step makes the PWWTS at Merrimack Station one of the most effective systems in the country at removing constituents of concern from FGD waste waters and should be studied and promoted as a model technology for the NELGs. PSNH is constantly updating and/or modifying its PWWTS to optimize its effectiveness. Operation and necessary maintenance is accomplished by trained, experienced individuals. The process is tuned to maximize the reduction of suspended solids and dissolved solids, including metals, which are usually present in FGD waste water and is incredibly effective at this task. EPA has in the past recognized the efficiency and longstanding success of this technology. *See* 2009 Detailed Study Report, at 4–50 (noting that the “data show that chemical precipitation is an effective means for removing many metals from the FGD waste water”).

Based on the BAT factors, the PWWTS is the appropriate technology for Merrimack Station. Most important, the system is an available, proven, effective, and operationally efficient technology. Similar systems are utilized at power plants around the country and enjoy a proven and impressive track record, and Merrimack Station’s particular system is more effective than

⁴³ *See* The Air Compliance Group, LLC, *Performance Test Report for FGD Wastewater Treatment System of Units 1 and 2 at the PSNH Merrimack Station in Bow, New Hampshire* (June 1, 2012), attached hereto as Exhibit 7; *see also* GZA GeoEnvironmental, Inc., *Summary of Historic Stream A Analytical Results* (January 2012 to February 2013), attached hereto as Exhibit 8.

most. In light of the relevant statutory factors, EPA's rejection of this technology as BAT is therefore arbitrary and capricious and must be revisited prior to the issuance of any final permit for Merrimack Station.

b. Waste Water Effluent from the PWWTS at Merrimack Station
Complies with Water Quality Standards Established by NHDES

Effluent from Merrimack Station's PWWTS complies with the water quality-based limits established by NHDES following a comprehensive antidegradation review of both the Merrimack River and PSNH's FGD waste waters. Irrespective of the BAT factors, this should satisfy EPA's technological BAT determination and complete the § 402 analysis, as water quality standards have historically been the more demanding limits to meet. Water quality-based limits are developed by states and primarily focus on the potential impact every proposed surface water discharge may have on the quality of the receiving water. States establish water quality limits for pollutants at levels that ensure the safety of individuals who drink from the waterway, fish in it, and/or recreate on it. Accordingly, NHDES's determination that effluent from the PWWTS at Merrimack Station satisfies applicable water quality standards necessarily means these effluent discharges do not detrimentally impact the safety of individuals who drink from, fish in, and/or recreate on the Merrimack River. EPA's decision to reject these water quality-based limits in lieu of unachievable technology-based limits based on unproven and/or developing technologies for immeasurable benefits to water quality is arbitrary and capricious.

As discussed at length in Section II.D.1., above (and in PSNH's 2012 Comments) it was EPA back in 2009 that: (1) directed PSNH to consult NHDES in the first place in order to develop the aforementioned water quality limits; and (2) implied that it would adopt whatever water quality standards were eventually set by NHDES when determining BAT for Merrimack Station, which has been standard practice in the past on NPDES permit topics such as these.

Specifically, an April 8, 2009 email from an EPA representative communicated the following message to NHDES:

Allan Palmer, PSNH Senior Engineer, also ask[sic] whether the thrust of the meeting will be discussing limits, treatment, or both. I request your input on the agenda of the meeting. My thoughts are that *as representatives of the regulatory agencies our emphasis is deriving effluent limits that are protective of the water quality standards of New Hampshire. I recommend the meeting, therefore, concentrate on the parameters contained in the scrubbers effluent and what effluent limits PSNH can expect.*

Email from John King, EPA Permit Writer, to Stergios Spanos, NHDES, April 8, 2009, 8:22 a.m. (“AR #437) (emphasis added).⁴⁴ Immediately following this email, an NHDES engineer responded to that same email stating that NHDES would start looking at antidegradation requirements and impairment status based on the content of the discharge.

EPA was consulted throughout this lengthy dialogue with NHDES and never once suggested that the water quality limits established by NHDES would be insufficient to meet EPA’s technology standards. Trusting in, and relying on, this collaborative process, PSNH reasonably decided to install the PWWTS at Merrimack Station, given this robust treatment system would unquestionably meet the water quality-based standards established by NHDES. Only after this installation was under construction did EPA interject the possibility that it was considering technology-based limits that could be more stringent than the limits established by NHDES, despite the fact that EPA had numerous earlier opportunities to do so. EPA’s actions in this regard are inappropriate and the agency should be equitably estopped from taking these inconsistent actions, given PSNH’s reliance on the agency’s previous communications, actions, and acquiescence in deciding to invest substantial funds in PWWTS.

⁴⁴ The above-quoted email from EPA’s Region 1 representative, John King, clearly indicates that he understood the purpose of the meeting with NHDES was to set effluent limits *that PSNH could expect*. PSNH reasonably understood this to include *all* effluent limits—both water quality and technology based.

Perhaps more egregious, EPA has abandoned the primary focus of technology-based limits. Rather than focusing on what a given receiving water body can properly receive based on water chemistry and science, technology-based limits focus on the capabilities of available pollution control equipment and what a facility can achieve using these treatment technologies. Such limits were created by Congress to achieve the maximum removal of pounds of constituents of concern from a particular waste stream in a cost-effective manner, usually expressed in pounds per liter of waste water (lb./L).⁴⁵

EPA has erroneously ignored this Congressional directive in this draft permit. It is an unavoidable structural reality of all cost-benefit analyses that insubstantial marginal benefits do not justify substantial marginal costs. If 90 percent of the TWPE from a discharge stream can be removed for a certain cost, the removal of the remaining percentage is only justified if the corresponding additional cost is also very small. As explained above, so few TWPEs remain following treatment of FGD waste waters in the PWWTS at Merrimack Station that it would be impossible for EPA to even attempt to peddle as reasonable and/or justified the additional costs associated with another treatment to eliminate those few remaining TWPEs in the PWWTS effluent. The fact that NHDES has determined this PWWTS effluent satisfies water quality standards subjects EPA's attempts to require additional treatment prior to discharge to further scrutiny. Specifically, because the agency tasked with protecting the Merrimack River (and those who drink from it and/or recreate in it) has already determined that these discharges will not cause harm to human health and the environment, EPA would have to put forth a very compelling case (in this instance, a technology that can eliminate the remaining TWPEs by and through the investment of very little additional funds) in order for the agency, the Environmental

⁴⁵ See, U.S. EPA's NPDES Permit Writer's Manual, at 5.2.1.2 (Sept. 2010); available at: http://cfpub.epa.gov/npdes/writermanual.cfm?program_id=45.

Appeals Board, and/or a reviewing court to even fathom affirming any NPDES permit requiring the technology in order to satisfy BAT and the CWA. No such technology exists at this time, meaning PSNH's PWWTS must be BAT. EPA's contrary conclusions are erroneous.

2. EPA's Zero Discharge Limitation Based on an Evolving SWWTS is Arbitrary, Capricious, and Without Rational Basis
 - a. EPA's Belief that PSNH's SWWTS Achieves a "No Discharge" Effluent Limitation and is Therefore BAT is Erroneous

PSNH's SWWTS at Merrimack Station does not and cannot achieve a zero discharge limitation at this time. EPA's assertions to the contrary are erroneous and based on a perfunctory patchwork of incomplete and/or unreliable information. Seemingly recognizing the weakness in its assertion, EPA has provided PSNH with three purported options to comply with the zero discharge limit established in the draft permit in hopes that doing so will allow its flawed conclusions and corresponding permit limits to skirt by the tenets of the CWA for establishing BAT. As stated earlier, these "scenarios" include the following: (1) operate its "SWWTS as a true ZLD system that eliminates waste water discharges by enabling reuse of the distillate in the FGD scrubbers;" (2) continue to haul "waste water for disposal at municipal waste water treatment plants;" or (3) use "treated FGD waste water for ash conditioning prior to landfilling." Fact Sheet at 50. Two of the three options EPA proposed are simply not viable at this time; and the third option, although currently viable: (a) cannot alone legally satisfy Section 402 of the CWA; (b) provides little to no additional benefit to the environment and subjects PSNH to unnecessary expenditures; and (c) places PSNH in a position of relying entirely upon the actions and/or discretions of one or more third parties (e.g. EPA, NHDES, POTWs, etc.), meaning this compliance option could potentially be eliminated at any time. What follows is a discussion of the fallacies of each of the three compliance "scenarios" EPA has set out in the Fact Sheet to its draft permit.