Date: October 26, 2018

From: Mark Stein and Sharon DeMeo

To: Merrimack Station NPDES Permit File

Re: Memorandum Documenting September 20, 2018, Meeting Between EPA and Granite Shore Power Concerning the Merrimack Station NPDES Permit

On September 20, 2018, representatives of EPA Region 1 and Granite Shore Power LLC (GSP) met at EPA's offices in Boston to discuss the Merrimack Station permit. Mark Stein and Sharon DeMeo prepared this memorandum to document the meeting for the Administrative Record for the permit.

I. Meeting Attended By:

See attendance sign-in sheet (attached).

EPA staff: from OEP: Damien Houlihan, Thelma Murphy, Sharon DeMeo, Danielle Gaito, Eric Nelson and John Moskal; from ORC: Mark Stein and Michael Curley.

Representatives of GSP: Elizabeth Tillottson, Environmental Manager, GSP (previously in the same post with Merrimack Station's prior owner, Public Service of New Hampshire); Jim Andrews, President of GSP; and Tom DeLawrence and Stephen Gidiere of GSP's outside counsel, Balch & Bingham.

II. Agenda & Meeting Ground Rules:

EPA passed out a proposed agenda to help guide the discussion (attached) but indicated it was open to revising the agenda as the participants saw fit.

EPA explained that the meeting is not confidential and that EPA will document the meeting for the administrative record for the Merrimack Station (Merrimack) permit. EPA noted that the comment period has closed for the Merrimack permit and EPA has yet to finish considering public comments or issue the final permit, but it is, nevertheless, perfectly appropriate for EPA to communicate with GSP about the permit, just as it would be appropriate for EPA to talk to others about the permit, but that EPA makes a record of such communications for the public record. GSP expressed its understanding of these points.

EPA proposed that the meeting be conducted as a "brainstorming" session to explore issues presented by the permit and public comments and to discuss ideas for designing permit requirements that would be sufficiently protective to meet environmental requirements while also bring compatible with Merrimack Station's current mode of operations. Merrimack no longer operates as a baseload facility; it now functions as more of a "peaking plant."

EPA explained that treating the meeting as a brainstorming session means that the participants agree that no one will be held to any of the proposals or suggestions they might make during the meeting. EPA further explained that the goal of this approach is to free up participants to think creatively about possible solutions and to share ideas more openly. GSP agreed to this ground rule.

III. GSP Background Information:

GSP (primarily Jim Andrews) presented the following background information:

On Jan. 10, 2018, GSP closed on the purchase of Merrimack (and the Schiller Station and Newington Station power plants). Merrimack is no longer a baseload plant and is not expected to return to baseload operations in the future. The plant does, however, continue to fill reliability obligations for ISO. Merrimack is now a "peaking facility" that only runs when needed by the grid due to high demand, sometimes coupled with supply limitations.

Merrimack essentially no longer runs during the shoulder seasons (spring and fall). It now runs primarily in the winter when home heating needs swallow up natural gas supply, leaving insufficient gas for producing electricity despite high demand. As a result, coal-burning and oil-burning facilities are called into service.

Merrimack also runs on occasion in the summer –less frequently than in the winter – when necessary to meet periods of very high demand (*e.g.*, during extreme heat waves).

While Merrimack only runs during these winter/summer conditions, the facility bids into the system, and is paid, on an annual basis to provide generating capacity to help ensure system reliability in the event of unpredictable shortfalls in generation. Merrimack gets paid for providing system reliability even if it is not actually called upon to run. Conversely, if Merrimack is called upon to run but is unable to do so, then it will likely have to pay significant penalties to the ISO.

IV. EPA Discussion of Status of NPDES Permit:

EPA recounted that it issued the Merrimack draft permit in September 2011 and the Revised draft permit in April 2014. EPA noted that the 2014 Revised draft permit addressed changes in EPA's case-by-case, BPJ determination of the BAT for treating flue gas desulfurization (FGD) wastewater, and that the proposed revisions were based on new information about the facility's newly installed Vapor Compression Evaporation (VCE) treatment system.

EPA went on to explain that new EPA regulations and other new information prompted it to reopen the comment period in August 2017 to address a variety of issues. EPA noted that its public notice for the new comment period discussed Merrimack's reduced operations and specifically invited public comment on how, if at all, this should affect the final permit's requirements.

EPA reiterated that the reason for the meeting was to brainstorm ideas and options for how best to develop a permit with enforceable, protective requirements while also allowing the facility to operate when it wants to, recognizing that its current operational profile.

EPA explained that it estimates that it can complete a final permit (and responses to comments) by this coming winter, meaning sometime between December 2018 and March 2019. EPA underscored that this is an estimate and is subject to change based on how events unfold in relation to the permit and competing priorities for key staff. EPA also mentioned that Sierra Club has threatened to sue EPA if a new permit is not issued by September 1, 2018 – obviously the permit has not been issued by that date – and that EPA told the Sierra Club of its estimate that it could complete the permit this winter. EPA also noted that it urged the Sierra Club not to sue because, among other reasons, it would only slow down the permit process. EPA indicated that if Sierra Club does sue, then the permit could well be delayed.

GSP responded by saying, essentially, that it *wants* a new permit and that this winter seems a sensible target for issuance of a new final permit.

V. Effluent Limits Under the 2015 Steam-Electric Effluent Limitation Guidelines (ELGs):

EPA recounted that the 2015 ELGs for ***Flue Gas Desulfurization*** wastewater (FGD) and bottom ash transport water are still in effect, but are being "reconsidered" by EPA. EPA explained that the ELGs' initial compliance deadlines of 2018 have been pushed back (to 2020) by EPA but that that action is being challenged in court now. The 2015 ELGs allow for FGD limits based on a "voluntary incentives program" (VIP) under which more stringent limits apply but compliance is not due until the extended date of 2023. EPA noted that the Agency has not proposed any revisions to the effluent limitations or compliance date in the VIP provisions of the regulations. (GSP's attorneys agreed with that interpretation.)

In addition, the 2015 ELGs called for compliance with zero discharge limits for bottom ash transport water by as early as 2018, but allowed facilities until as late as 2023 to comply with the zero discharge limits if the facility provided justification for its later timeline.

For Merrimack, PSNH had opted into the VIP in light of its existing vapor compression evaporation (VCE) treatment system. Again, under these requirements, the facility would need to meet stricter limits, but would have until December 2023 to do so.

GSP indicated that it is still running the VCE and has not hauled any wastewater since becoming the new owners of Merrimack Station. EPA asked if GSP still intended to comply with the VIP requirements. GSP responded that it was not sure. It questioned the 2023 deadline based on EPA's reconsideration of the Rule.

GSP indicated that there are difficulties with running the VCE when the station runs as a peaking facility and questioned what permit limits might look like if they opted for the VIP or decided not to do so. GSP also asked whether EPA's reconsideration of the ELGs might lead to different compliance deadlines. EPA indicated that the Agency is, indeed, reconsidering the ELGs but staff in the room could not offer information about what EPA was considering. EPA further noted that it a new permit was issued by this coming winter it seemed unlikely that any new, revised ELGs would be in effect by then given that they have not even been publicly proposed yet.

> GSP asked if a new permit is issued, but less stringent limits were later finalized in new ELGs after the reconsideration, could the new permit be modified to incorporate the new less stringent limits. EPA indicated that it needed to look at the legal provisions to

confirm it, but it believed that EPA regulations would allow such a modification (i.e., that limits based on applicable regulations could be later modified if the regulations were made less stringent). EPA also indicated that if limits were based on BPJ, on the other hand, then the permit could not be modified.

Bottom ash transport water limits in the ELGs are also under reconsideration. Initially, compliance with "zero discharge limits" was due between 2018 – 2023. More precisely, compliance was due by 2018, but if written justification was provided, the compliance date could be pushed as late as December 2023. PSNH proposed in writing that it could meet the zero discharge limits by December 2022.

Jim Andrews indicated his view that perhaps the solid crystalline coal waste generated by Merrimack's boiler units should not be viewed as "bottom ash" under the regulations. He suggested that this material is different than typical bottom ash. EPA indicated its view that the material in question is covered by the ELG's bottom ash transport water provisions and that the preamble to the ELGs made this clear. (Elizabeth Tillotson seemed to concur with that view.) GSP indicated that it might apply for a "fundamentally different factors" variance from the ELGs requirements.

GSP indicated that it expects to see a new permit with limits only for TSS and O&G and perhaps a later modification that would include new limits based on the reconsidered Rule.

EPA did not agree or otherwise confirm that things would unfold in this manner.

VI. Thermal Issues (discussion includes PowerPoint slides (see attached)):

In light of how long the Steam-Electric ELG discussion took, EPA suggested advancing the discussion of thermal discharge issues ahead of the cooling water intake structure issues because the former probably required the most time. GSP agreed.

EPA then presented and discussed a series of slides (see attached) presenting data demonstrating the current, reduced operations of the facility. The Agency explained that the data also demonstrates that the level of the facility's operations directly correlates with ambient water temperatures. Reduced operations, EPA explained, correlate with reduced water temperatures in the river, whereas when the facility operates at full capacity during warm-weather months, river temperatures rise above critical acute-impact levels for sensitive life stages of fish species of concern.

EPA also indicated that the data from 2013-2016 shows that with reduced plant operations, the heat output during the shoulder months does not approach the acute or chronic impact levels at any of the sampling locations. EPA further stated, however, that more monitoring data could help to confirm this conclusion.

EPA then suggested that understanding the winter data is a bit trickier. Potential issues include "cold shock" for fish that find refuge in the heated discharge, but then could be harmed if the warm water suddenly disappeared because the facility powers down. EPA also noted that some species which might normally be killed off during the winter could potentially stay and thrive in warmer water. EPA specifically mentioned this concern with regard to the Asian clam.

According to EPA, the June through September data from 2013-2016 shows that with both Units operating, the heat output results in water temperatures at or above chronic and sometimes acute impact levels for the most sensitive species– especially at sampling station S0, which is the sampling location at the end of the discharge canal. If operating only Unit 1, however, then the temperature data indicates that water temperatures would not reach these impact levels.

EPA further explained that the species and life stages that are of most concern will likely be present in the top 3 feet of the water column because the larvae are photopositive. This is relevant because the thermal plume is buoyant.

EPA requested GSP to provide the 15-minute interval temperature data that the company has, to enable additional analysis. So far, EPA has only received data consisting of minimum averages and maximums. GSP agreed to provide the requested data in an Excel file, which will facilitate EPA's consideration of the data. Specifically, GSP agreed to send the following information for 2013 through 2016:

- 15-minute interval temperature data for all three sampling locations;

- Megawatt hour (MWh) output data;

- BTU's as waste heat to the river (for heat balance equations);

- Hours of operations (can back into these values w/clean air markets (CEM) data); and

- Condenser outlet temperatures (i.e., temperatures entering discharge canal).

Shifting the discussion a bit, EPA asked if the use of a discharge "diffuser" had been considered although the river might be too shallow for that technology. EPA explained that in some cases a diffuser can be used to take advantage of greater mixing of a discharge in the receiving water. GSP indicated that a diffuser had not been considered thus far.

GSP inquired as to whether there is another location (other than at S0) farther out in the river at which temperature could be monitored for compliance. EPA explained the different sampling points that have been used in the permit (S0, S4 and N10) and indicated that it has considered whether thermistors ought to be placed laterally across the river to evaluate how far the thermal plume extends across the river (*e.g.*, does it extend from bank to bank?), but no decisions have been made in this regard.

EPA explained that just one bad year can affect a species' survival. The Agency pointed to American shad, as an example, stating that shad have been restored to the Merrimack but are sensitive to warmer water temperatures and EPA does not want to set them up for mortality.

EPA indicated that it has been evaluating permit options in light of the current information and public comments. EPA also stated that, depending on further analysis and consideration of comments, it has been considering a variety of options, including the following:

Temperature limits based on WQS and/or a CWA 316(a) variance that would vary seasonally to address critical temperatures for local fish at different times of the year.

Limits based on only Unit 1 operating during the summer months.

Possible permit requirements include: temperature limits at certain locations within the river; effluent temperature limits; BTU thermal limits; or plant operations-oriented limits (to indirectly control thermal discharges and effects on ambient water temperatures)

GSP indicated a preference for running Unit 1 over Unit 2, when it is not operating both units, and asked about averaging periods. EPA indicated that it has been considering limits that would include certain averaging periods, but also stated that averaging periods may not be compatible with limits based on protecting against acute effects.

GSP asked if it would be possible to have tiered limits, based on ambient water temperatures. The company also suggested that a more refined discussion is needed since heat input to the river may be considered differently if, for example, there is a cool summer and high river flows. EPA indicated that it also had been considering that idea, but was concerned that it might be unworkable to address all the different potential scenarios. EPA stated that it wanted a permit that was practical to implement and comply with.

GSP indicated that Merrimack no longer operates frequently in the summer and expects that to remain the same into the future, but that it wants a permit that would not restrict its ability to operate in the summer whenever it is called upon. The company indicates that any changes that would impact its availability to generate electricity when called upon does not comport with its business plan. In other words, its plan is to be available whenever it might be needed so that it can maximize the capacity payments it receives and support the grid. If it can only bid part of its capacity to the market, then Merrimack could be "de-rated."

Therefore, any permit limit that would reduce its availability would, from the company's perspective, also need to have an exception allowing it to run when called. GSP's attorneys suggested that they know of examples of such permit conditions allowing for "emergency exceptions" to otherwise applicable effluent limits. One possible example is language in the Oyster Creek permit that allows for reliability issues. EPA asked GSP's attorneys to provide EPA with copies of these permit provisions.

EPA indicated that some of the new Normandeau data suggests that the changes in the facility's operational profile (*i.e.*, its reduced capacity factor) may possibly correlate with some improvements in fish populations. In the winter, however, it is possible that warmer water may provide a thermal refuge for Asian clams. EPA is still evaluating Asian clam-related information and comments submitted during the most recent public comment period.

EPA indicated that it was considering weekly average temperature limits in the winter coupled with monitoring to ensure the limits are protective. EPA noted that in the winter limits may need to be applied at the point of discharge due to ice in the river

EPA also asked the company to consider if helper cooling towers might be a possible approach to helping limit the thermal discharge.

VII. Cooling Water Intake Structure Discussion:

EPA indicated that the assessment of entrainment impacts may change due to the change in operational profile (i.e., less operations means less entrainment and impingement). Even when Merrimack was a baseload facility, EPA had indicated that entrainment was only a significant

concern during warm weather months based on what species and life stages were present during different years. Now with infrequent operation in those months, this should be less of a concern as water withdrawals are reduced. Nevertheless, the question remains as to how to design permit limits to ensure that?

EPA asked whether Merrimack Station runs its intake pumps (i.e., withdraws river water) when not generating electricity. GSP indicated that it does not run the cooling water intake pumps when the station is not producing electricity.

With regard to controlling impingement mortality, GSP indicated it is amenable to upgrades to existing fish return to reduce impingement mortality, but no longer interested in installing wedgewire screens for the intake structure, which PSNH had earlier proposed. GSP noted that wedgewire screens are expensive and they do not want to spend the money if it's not legally required and there are less expensive compliance alternatives.

EPA inquired if variable frequency drives are possible and asked that GSP provide flow data for the intake along with the other data requested from the company during this meeting.

GSP and EPA agree to exchange additional information and to meet again in approximately one month.