



January 10, 2011

The Northeast Utilities System

Mr. David Webster, Chief
Office of Ecosystem Protection
United States Environmental Protection Agency
NPDES Industrial Permits Branch (CIP)
5 Post Office Square
Mail Code: OEP06-1
Boston, MA 02109-3912

**Re: Public Service Company of New Hampshire
Merrimack Station, Bow, New Hampshire
NPDES Permit No. NH0001465
Supplemental Thermal Discharge Analysis Report**

Dear Mr. Webster:

Public Service Company of New Hampshire ("PSNH") is pleased to submit the enclosed report from Applied Science Associates, Inc. ("ASA") entitled *Modeling the Thermal Plume in the Merrimack River from the Merrimack Station Discharge*. PSNH hired ASA to build a model to describe the characteristics and behavior of the Station's thermal plume in the Hooksett Pool of the Merrimack River. PSNH is submitting this study to complement the set of technical reports that have been provided in support of our request to renew the existing §316(a) variance and for the U.S. Environmental Protection Agency ("EPA") to issue a draft permit that incorporates the thermal limits contained in the existing permit.

ASA employed a robust collection of various data sets to perform a three dimensional hydrothermal modeling study using their BFHYDRO Model in WQMAP, which has been successfully used in a number of other similar studies. The model reflects the physical characteristics of Hooksett Pool and was driven by actual data collected in the field and at Merrimack Station. It was successfully calibrated and validated to recreate observed upstream temperatures based upon changing environmental conditions and accurately simulated downstream temperatures based upon various levels of Station operations.

The model predicted that the Station's thermal plume is confined mostly to the western side of Hooksett Pool and tends to stratify in the upper half of the water column. These results are consistent with those reported by Normandeau Associates, Inc. ("NAI") in their 2007 report, *A Probabilistic Thermal Model of Merrimack River Downstream of Merrimack Station*. The model shows that typically the Station's thermal plume is only significant in the immediate area where the cooling canal discharges into the river (Station S0 West). The plume attenuates as it flows south to Stations S4 and S16, and is well mixed upon reaching the downstream boundary of Hooksett Pool (Station A0). Under an extreme case scenario (to include low river flows, high environmental temperatures and full load operation), the plume is shown to have mixed substantially at Station S4 with a temperature rise of 2°C (3.8°F) above ambient. Under more

typical summertime conditions the fully mixed temperature increase at Station A0 will be roughly 1.5°C (2.7°F) above ambient.

The ASA model developed for Hooksett Pool will now be used to refine the analysis presented by NAI in their 2007 Report, *Merrimack Station Fisheries Survey Analysis of 1967 through 2005 Catch and Habitat Data*. NAI is also nearing completion of a 2010 field survey report that will quantify and map the quality and spatial location of each major type of physical fish habitat found throughout Hooksett Pool. When complete, the Station's thermal plume contours will be predicted using ASA's thermal model for average and extreme conditions and superimposed on the habitat map to measure the extent of habitat expected to be at or above specific water temperatures known to be limiting to the representative important species (RIS) of fish. The habitat that each RIS fish species and life stage is predicted to be excluded from due to limiting thermal conditions, compared to the total amount of each habitat type found throughout Hooksett Pool, will be interpreted as the impact of the Station's thermal discharge on the RIS habitat.

PSNH believes the technical reports that have been submitted to date collectively demonstrate that Merrimack Station's thermal discharge into the Hooksett Pool has not caused any prior appreciable harm to the balanced indigenous populations (BIP) of shellfish, fish and wildlife that reside within, or are migratory through, the river in the vicinity of the Station. Further, we believe the information confirms that the Station's existing NPDES permit adequately assures the protection and propagation of the BIP, as required under §316(a) for renewal of the Station's existing variance. PSNH therefore asks EPA to find that these technical reports constitute a sufficient Type III demonstration that is consistent with EPA §316(a) guidance, and to renew the Station's existing §316(a) variance.

We request an opportunity to meet with EPA to review the ASA Report and to discuss this important topic further. In the meantime, please call me or Allan Palmer (603-634-2439) if you need additional information or have any questions.

Very truly yours,



William H. Smagula, P.E.
Director – Generation

WHS:scg

Enclosure

cc w/Encl: Stephen Perkins, EPA
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