

## **NOTE**

**Only the cover page of this document is being provided/posted on the EPA Region 1's Merrimack Station NPDES Draft Permit Web page.**

**For further viewing, the full document is available at EPA Region 1.**

**The full document may contain a Table of Contents, Executive Summary, List of Figures, List of Tables, etc.**



Public Service  
of New Hampshire

706  
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Manchester, NH 03105-0330  
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The Northeast Utilities System

December 21, 2007

**By Federal Express**

Mr. John Paul King, Environmental Scientist  
U.S. Environmental Protection Agency  
One Congress Street  
Suite 1100 (Mailcode CIP)  
Boston, MA 02114-2023

**Re: Public Service Company of New Hampshire  
Merrimack Station  
National Pollutant Discharge Elimination System Permit No. NH0001465  
Response to Information Request in Support of NPDES Permit Reissuance**

Dear Mr. King:

Public Service Company of New Hampshire ("PSNH") hereby provides the enclosed affidavits in support of its response to the July 3, 2007 information request from the United States Environmental Protection Agency ("EPA") (the "Letter") for inclusion in EPA's administrative record for the above-referenced permit:

1. Affidavit of Mark T. Mattson, Normandeau Associates, Inc. ("Normandeau"), dated November 2, 2007;
2. Affidavit of Mark L. Hutchins, Normandeau, dated November 8, 2007; and
3. Affidavit of Sam R. Beaver, Enercon Services, Inc. ("Enercon"), dated November 1, 2007.

The Letter directed PSNH to provide certain information regarding PSNH's Merrimack Station in Bow, New Hampshire (the "Station"), to assist EPA in its renewal of the above-referenced permit, including renewal of the Station's existing Clean Water Act §316(a) variance pursuant to EPA regulations governing such renewals. PSNH submitted a response to the Letter, within the time frame provided by EPA, consisting of correspondence from William H. Smagula of PSNH to John Paul King of EPA dated November 1, 2007 and two reports, *Response to United States Environmental Protection Agency CWA § 308 Letter, PSNH Merrimack Station Units 1 & 2, Bow, New Hampshire* prepared by PSNH, Enercon and Normandeau dated October 2007 (the

Mr. John Paul King, Environmental Scientist  
December 20, 2007  
Page 2


“Report”), and *Entrainment and Impingement Studies Performed at Merrimack Generating Station from June 2005 through June 2007* prepared by Normandeau dated October 2007. As the Report notes, Enercon and Normandeau are leading experts, respectively, in the fields of power plant engineering and biological assessment. In particular, Mr. Beaver from Enercon and Mr. Mattson and Mr. Hutchins from Normandeau have the education, expertise and experience regarding engineering and biological assessment aspects of power plant operations, installations and modifications that are critical to the proper evaluation of the Station’s existing cooling water intake structure and cooling system technologies and operational practices and those technologies and practices that EPA directed PSNH to evaluate in the Letter.

Please be advised that PSNH maintains the positions it has previously stated, in correspondence to and discussions with EPA Region 1 staff, with respect to EPA’s interpretation and application of certain aspects of EPA’s regulations implementing CWA §316(b) (“Phase II Regulations”). While EPA has suspended the Phase II Regulations pending further rulemaking, PSNH understands that challenges to the *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2nd Cir. 2007) decision continue. PSNH respectfully reserves its rights with respect to the application of CWA §316, including CWA §316(b), as well as the interpretation and application of the Phase II Regulations, to the Station.

In addition, please confirm in writing that EPA Region 1 has included the enclosed affidavits in the administrative record for the above-referenced permit. You may direct this confirmation to my attention.

Thank you for your prompt attention to this matter, and do not hesitate to contact me (603-634-2851) or Allan Palmer (603-634-2439) with any questions or concerns you or your staff may have.

Very truly yours,

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

Enclosures

cc: Linda T. Landis, Esq., PSNH  
Alan Palmer, PSNH  
Elise N. Zoli, Esq.

**Public Service Company of New Hampshire,  
Merrimack Station, NPDES No. NH0001465,  
Response to Information Request in Support of  
NPDES Permit Reissuance**

Affidavit of Sam R. Beaver

**AFFIDAVIT OF SAM R. BEAVER  
IN SUPPORT OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE'S  
RESPONSE TO INFORMATION REQUEST  
IN SUPPORT OF NPDES PERMIT REISSUANCE**

I, Sam R. Beaver, do hereby depose and say on the basis of personal knowledge and my professional opinion that:

**BACKGROUND AND QUALIFICATIONS**

1. I am a Senior Project Manager with Enercon Services, Inc. ("Enercon"), a professional engineering design firm that provides engineering, environmental, technical and management services to electrical power generation, transmission and distribution clients for large-scale commercial nuclear and fossil fuel power plant projects. My expertise is in the design, construction, start-up and testing of power plant technology installations and modifications, including the design (including evaluation of the feasibility and estimated costs) of condenser cooling technologies and cooling water intake structure ("CWIS") technologies. I have supervised or participated in more than fifty (50) power plant technology installation or modification projects over the past 33 years, including fourteen (14) condenser cooling technology studies, installations or modifications and four (4) CWIS studies, installations or modifications. In particular, I have supervised and participated in numerous Clean Water Act ("CWA") §316(a) and CWA §316(b) CWIS-related studies
2. I hold a Bachelor of Science degree in Mechanical Engineering from the University of Tennessee. I am an active member of the Cooling Technologies Institute, which is the primary professional organization relating to the design, operation, and maintenance of cooling towers and other evaporative heat rejection equipment used in the air-conditioning, industrial, process and power industries. I completed the Vertical Pump and Pump Systems Design Training Seminar offered by Johnston Pump Company (now part of Sulzer Pumps Ltd.), a leading manufacturer of, and the largest service provider for, vertical pumps and related equipment. I have a certification in air and hydronic balancing from Environmental Engineering Consultants, Oak Ridge, TN, and have received extensive training in vibration analysis, diagnostic equipment operation and analysis techniques. In addition, I am a Certified Level III Test Engineer in accordance with NRC Regulatory Guide 1.58, ANSI N45.2.6 and ASME Boiler and Pressure Code, Section III, Division 1 and 2 and Section IX. My curriculum vitae is attached hereto as **Exhibit 1**.

- a. While retrofitting with closed-cycle cooling technology is rare and in some sectors simply has never been performed, I have extensive experience in (a) evaluating the site-specific feasibility of, (b) developing conceptual and final design plans for, (c) preparing detailed estimates of the design, procurement, construction, operations and maintenance and energy-related costs (including both costs associated with construction downtime and "power penalty" -related costs such as increased production costs, costs attributable to reduction in generation capacity, lost energy efficiency costs and auxiliary energy costs) associated with, and (d) identifying, evaluating and quantifying the environmental and plant performance and operational impacts (including reduced generation capacity and lost energy efficiency) reasonably expected to result from, converting a steam electric power generating plant from once-through condenser cooling to closed-loop cooling.
3. My extensive experience in the design, construction, start-up and testing of power plant technology also includes the following:
    - a. I was the Chief Construction Engineer for plant modifications at Browns Ferry Nuclear Plant, Unit 3, near Decatur, Alabama. In this position, I was responsible for activities associated with design and construction completion of modifications required for Unit 3 restart, and initiated design changes as required for implementation of these required modifications. In addition, I acted as coordinator between the Stone and Webster Engineering Corporation Design/Modifications organization and the Technical Support/Systems Engineering Group and Plant Operations Group within the Browns Ferry Nuclear Plant operational structure.
    - b. I was a System Engineer in the Technical Support/Systems Engineering Unit at Browns Ferry Nuclear Plant, Units 2 and 3. In this position, I was responsible for the initiation, review and approval of associated operational procedures and upgrades for systems including the Main Steam system, including the high and low pressure steam turbines and the condenser.
    - c. I was the Technical Support Representative to the Restart Operations Center at Browns Ferry Nuclear Plant, Unit 2. In this position, I attended the Plan of the Day Meetings for the Technical Support/Systems Engineering Group superintendent, interfaced with senior plant management to provide status of ongoing activities, and received and responded to action items.
    - d. I was a Design Engineer in the Electrical Systems/Controls Group at Browns Ferry Nuclear Plant, Unit 2. In this position, I was responsible for the electrical design and procurement activities associated with assigned modifications required for Unit 2 restart.

- e. I was a Test Engineer at Browns Ferry Nuclear Plant, Unit 2. In this position, I was responsible for generation of system test specifications and restart test procedures for assigned HVAC Systems. In addition, I had responsibilities in the Technical Support/Systems Engineering Group pertaining to HVAC systems, special tests, operational/in-service procedures, and design upgrades.
- f. I was a Principal Engineer for Ebasco Plant Services, assigned to the Preoperational Test Unit. In this position, I was responsible for review and evaluation of systems post-modification configuration and operational readiness for power ascension and unit startup.
- g. I was Principal Engineer and Site Balancing Coordinator at Shearon Harris Nuclear Plant, Unit 1, in New Hill, North Carolina. In this position, I directed engineers and utility technicians in the performance of preoperational testing and flow balancing of HVAC and emergency air filtration systems, initial ASME N510 testing of air cleanup systems on site, preparation of preoperational tests and flow balancing procedures, test performance, and review and approval of test results.
- h. I was a Principal Engineer at Stone and Webster Engineering Corporation. In this position, I was responsible for supervision and technical direction of test engineers in the Nuclear Steam Supply Systems Group engaged in nuclear power plant startup, testing, and initial equipment operation. I was also responsible for review of construction test procedures and approval of test data and results. Following the completion of the preoperational test program, I was assigned to the Site Maintenance Work Control Group during unit power ascension for operational impact review of maintenance work packages prior to implementation.
- i. I was the Startup and Testing Unit Supervisor at the Tennessee Valley Authority's Watts Bar Nuclear Plant near Spring City, Tennessee. In this position, I was responsible for organization and supervision of engineers, associates and aides engaged in plant startup, construction testing, initial equipment operation and turnover of permanent plant systems, structures, and features for a twin 1177-megawatt (electric) unit power plant (i.e., a Westinghouse pressurized water reactor).
- j. I was a Mechanical Engineer at the Tennessee Valley Authority's Bellefonte Nuclear Plant, Units 1 and 2, in Jackson County, Alabama. In this position, I was responsible for the design of HVAC and air filtration installations, equipment and systems. In particular, I was responsible for initial design criteria and calculations, and physical drawings as required for final design and associated procurement activities.

4. I am a principal author of the Public Service Company of New Hampshire's ("PSNH's") response to the United States Environmental Protection Agency's ("EPA's") July 3, 2007 information request under Clean Water Act ("CWA") §308 (the "Letter") for PSNH's Merrimack Station electrical generating facility, consisting of two independent units, in Bow, New Hampshire (the "Station"), entitled *Response to United States Environmental Protection Agency CWA § 308 Letter, PSNH Merrimack Station Units 1 & 2, Bow, New Hampshire*, prepared by PSNH, Enercon and Normandeau Associates, Inc. dated October 2007 (the "Response").
  
5. Based upon my education and training, expertise and professional judgment, the principles and methods used to obtain the data in the Response, and to perform the analyses and draw the conclusions presented in the Response, are tested and accepted within the disciplines of steam power plant engineering, mechanical engineering and electrical engineering, and comport with current industry standards. Moreover, the work undertaken to prepare the Response reliably applied such principles and methods to these data. Furthermore, the data and methods used in the Response were evaluated through rigorous quality assurance/quality control assessments that meet or exceed current industry standards. Therefore, I have the highest confidence in the Response and its conclusions.

Signed under seal this 15 day of November, 2007.

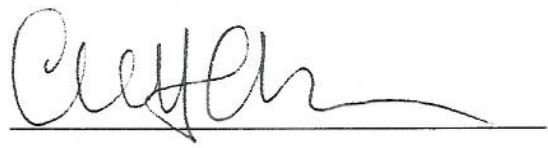


Sam R. Beaver

Enercon Services, Inc.

Senior Project Manager

On this 15 day of November, 2007, the foregoing Sam R. Beaver personally appeared before me and acknowledged the foregoing to be his true and accurate statement and his free act and deed.



Notary Public

My commission expires:



**Exhibit 1**

Curriculum Vitae of Sam R. Beaver

Sam R. Beaver  
5639 Forkwood Drive  
Acworth, GA 30101  
(770) 656-3523  
sbeaver@enercon.com

### **Experience Summary**

- Senior Level Project Manager with over 33 years of experience in many large scale, multi-disciplined commercial powerplant projects.
- Project Manager for Dry Fuel Storage (ISFSI) projects at FPL's – Turkey Point Units 3 & 4, Entergy's Riverbend Station, and Entergy's Grand Gulf Nuclear Station.
- Previous large scale modification projects include cooling tower additions, Instrument/Service Air System upgrades, NUREG-0700 Main Control Room upgrades, and Service Water and Plant Service Water pump replacement projects.
- Extensive multi-disciplined experience in plant modifications, design, technical support/systems engineering, construction, start-up, and testing.

### **Experience Description**

#### **Enercon Services, Inc. – October 1996 to present**

Mr. Beaver is assigned to Enercon's Atlanta office staff as a Senior Project Manager. He is currently responsible for large scope modification projects at FPL's Turkey Point Nuclear Plant (ISFSI), and at PG&E's Diablo Canyon Power Plant (intake upgrade modifications).

Mr. Beaver was responsible for Enercon's ISFSI work at Entergy's River Bend Station, and the modification coordinator for the ISFSI installation at Entergy's Grand Gulf Nuclear Station. Mr. Beaver was the project manager for NUREG-0700 Main Control Room upgrade projects at FENOC's Beaver Valley 1&2 and at Entergy's River Bend Station, and managed the civil/structural analysis efforts associated with the upgrade of FPL's St. Lucie 1&2 Main Control Rooms.

Mr. Beaver was the Project Manager and Technical Lead for a comprehensive EPA-CWA Section 316b required study identifying the costs and feasibility of converting the Entergy-NE Indian Point Nuclear Power Plant, Units 2 and 3, from once-through condenser cooling to closed loop cooling. The study included assessment of impacts to plant performance and operation, identification and quantification of associated environmental benefits, detailed cost estimates for the required design, procurement, and construction activities, and development of a detailed level III schedule of the conversion activities from finalized conceptual design through post-modification testing and return-to-service. He is currently involved with 316b efforts at Entergy's Fitzpatrick and Pilgrim Stations.

Prior to this, Mr. Beaver was the project manager for the \$30 million cooling tower addition project at Entergy's Grand Gulf Nuclear Station (GGNS). The GGNS project was a very successful "cradle-to-grave" scope of work, from preparing the initial scoping study and cost benefit analysis for evaluation of the auxiliary mechanical draft cooling tower, to completion of numerous design change/modification packages. The cooling tower addition project considered and addressed all aspects of increased circulating water system performance, including modifications/enhancements to existing natural draft towers, sizing and siting of the additional tower, optimum distribution of load between the existing and auxiliary tower, hydraulic and electrical interface with plant systems, and control systems to maximize efficiency and minimize operational costs.

Previously, Mr. Beaver has managed several large scope projects at Entergy's River Bend and Grand Gulf facilities, including replacement of the Plant Service Water and Standby Service Water pumps at Grand Gulf Nuclear Station and cooling tower upgrade assessments associated with extended power uprate (EPU) at River Bend Station. Additionally, Mr. Beaver finalized the conceptual design and served as the Project Manager on a large scope, multi-disciplined modification project (Main Steam and Primary Containment Isolation Valve Leakage Control systems deletion) at River Bend.

He was Project Manager for several modifications at Illinois Powers' Clinton Power Station (CPS) including numerous fire protection related modifications. Previous ENERCON assignments include managing major instrument/service air system upgrades at FENOC's Beaver Valley 1&2, and serving as ECCS Suction Strainer Test Group Test Director for the BWROG ECCS Suction Strainer quarter-scale testing.

**Haliburton NUS Corporation - June 1994 through January 1996**

Mr. Beaver was assigned to the Watts Bar Nuclear Plant, Unit 1. As Shift Manager in the plant Organizational Work Center (OWC), Mr. Beaver was responsible for activity prioritization, restraint identification and resolution, work statusing, and schedule coordination as required to support the project schedule for fuel load and unit startup.

As Lead Engineer in the Unit 1 Start-up Test Group, Mr. Beaver was responsible for generation and performance of test instructions. He was also responsible for HVAC air flow balancing and initiation of design changes required to achieve proper system air flow.

**Stone & Webster Engineering Corporation - May 1991 through June 1994**

Mr. Beaver was assigned to the Browns Ferry Nuclear Plant, Unit 3. While assigned to the Browns Ferry plant, Mr. Beaver held the position of Chief Construction Engineer in the site modifications organization. He was responsible for activities associated with design and construction completion of modifications required for Unit 3 restart. Mr. Beaver initiated design changes as required for implementation of assigned modifications. Additionally, Mr. Beaver acted as coordinator between the SWEC Design/Modifications organization and the Technical Support and Operations plant organizations.

From May 1991 through July 1993, Mr. Beaver was assigned to the Browns Ferry Nuclear Plant, Units 2&3 as a System Engineer in the Technical Support / Systems Engineering Unit. He was responsible for initiation, review and approval of associated operational procedures and upgrades. Systems included HVAC, Main Steam, and Reactor Water Cleanup. Additional duties included direction of all HVAC flow verification and flow balancing activities.

**Bechtel Corporation - March 1990 through May 1991**

Mr. Beaver was assigned to the Browns Ferry Nuclear Plant, Unit 2. As Technical Support representative to the Restart Operations Center, Mr. Beaver attended the Plan of the Day Meetings for the Technical Support superintendent, interfaced with senior plant management to provide status of ongoing activities, and received and responded to action items.

As Design Engineer in the Electrical Systems/Controls Group, Mr. Beaver was responsible for the electrical design and procurement activities associated with assigned modifications (ECNs/DCNs) required for Unit 2 restart.

**Stone and Webster Engineering Corporation - August 1987 through February 1990**

Mr. Beaver assigned to the Browns Ferry Nuclear Plant, Unit 2, in the position of Test Engineer. His duties included generation of system test specifications and restart test procedures for assigned

HVAC Systems. He was also assigned additional responsibilities in the System Engineering Group pertaining to HVAC systems, special tests, operational/in-service procedures, and design upgrades.

**Ebasco Plant Services - December 1985 through August 1987**

Mr. Beaver was employed as Principal Engineer, assigned to the Preoperational Test Unit. Duties included review and evaluation of systems post modification configuration and operational readiness for power ascension and unit startup.

While at the Shearon Harris Nuclear Plant, Unit 1, Mr. Beaver held the position of Principal Engineer and Site Balancing Coordinator, responsible for the direction of engineers and utility technicians in the performance of preoperational testing and flow balancing of HVAC and emergency air filtration systems. Mr. Beaver was responsible for initial ASME N510 testing of all air cleanup systems on site. Duties included writing preoperational tests and flow balancing procedures, test performance, and test results review and approval.

**Stone and Webster Engineering Corporation - November 1983 through December 1985**

Mr. Beaver was employed as Principal Engineer and was responsible for supervision and technical direction of test engineers in the NSSS Group engaged in nuclear power plant startup, testing, and initial equipment operation. Mr. Beaver was also responsible for review of construction test procedures and approval of test data and results.

Following the completion of the preoperational test program, Mr. Beaver was assigned to Site Maintenance Work Control Group during unit power ascension for operational impact review of maintenance work packages prior to implementation.

**Tennessee Valley Authority - April 1973 through November 1983**

From July 1976 through November 1983, Mr. Beaver was employed at Watts Bar Nuclear Plant. As the Startup and Testing Unit Supervisor, Mr. Beaver was responsible for organization and supervision of engineers, associates, and aides engaged in nuclear power plant start up, construction testing, initial equipment operation, and turnover of permanent plant systems, structures, and features for a twin 1177-MWE unit power plant (Westinghouse PWR).

From April 1973 through July 1976, Mr. Beaver was employed at Bellefonte Nuclear Plant Design Project, Unit 1 & 2. Mr. Beaver held the position of Mechanical Engineer. His main responsibilities included the design of HVAC and air filtration installations, equipment, and systems. He was responsible for initial design criteria and calculations, and physical drawings as required for final design and associated procurement activities.

**Education and Certifications**

B.S., Mechanical Engineering, University of Tennessee, 1972

Member, Cooling Technologies Institute (CTI)

Vertical Pump and Pump Systems Design Training Seminar (Johnston Pump Co.)

Certified Level III Test Engineer in accordance with NRC Regulatory Guide 1.58. ANSI N45.2.6 and ASME Boiler and Pressure Code, Section III, Division 1 and 2 and Section IX.

Certified in air and hydronic balancing

Extensive training in vibration analysis, diagnostic equipment operation and analysis techniques.

**Public Service Company of New Hampshire,  
Merrimack Station, NPDES No. NH0001465,  
Response to Information Request in Support of  
NPDES Permit Reissuance**

Affidavit of Mark L.  
Hutchins.

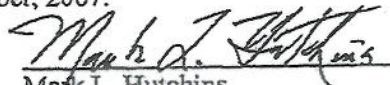
**AFFIDAVIT OF MARK L. HUTCHINS  
IN SUPPORT OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE'S  
RESPONSE TO INFORMATION REQUEST  
IN SUPPORT OF NPDES PERMIT REISSUANCE**

I, Mark L. Hutchins, do hereby depose and say on the basis of personal knowledge and my professional opinion, that:

1. I am a Senior Water Resources Engineer with Normandeau Associates, Inc. ("Normandeau"). Water resources engineering involves the application of scientific principles and mathematical and statistical techniques to the planning, design and management of water resource projects. As a water resources engineer, I use applied mathematics, probability and statistics, surface water hydrology, hydrodynamics and fluid mechanics to quantify the properties of, and describe the distribution and movement of, water in the environment. My expertise is in surface waters, particularly water quality and quantity issues relating to lakes, rivers, streams and estuaries, and my project experience includes wastewater discharge plume modeling and assessment of water quality impacts from various types of commercial, industrial and residential development. I have contributed to numerous projects that involved licensing, relicensing, compliance monitoring, and water quality monitoring efforts associated with hydroelectric and steam generating facilities, especially relating to National Pollutant Discharge Elimination System permitting and Clean Water Act ("CWA") §316 requirements, over the past 30 years.
2. I hold a Masters of Science degree in Civil Engineering/Water Resources from the University of Maine, and a Bachelor of Arts degree in Geological Sciences from the University of Maine. I was retained by Public Service Company of New Hampshire ("PSNH") between 1995 and 1997, and subsequently from 2005 to the present, and have been directly involved with, and frequently supervised, water resources components of studies at PSNH's Merrimack Station electrical generating facility, consisting of two independent units, in Bow, New Hampshire (the "Station"), as part of Normandeau's biological monitoring program at the Station. In particular, I have participated in the CWA §316(a)-related work that Normandeau performed at the Station from 1995 to 1997 and subsequently from 2004 to the present. In the course of this work, I gained considerable knowledge of the Hooksett Pool and upper Amoskeag Pool reaches of the Merrimack River, in the vicinity of the Station. My curriculum vitae, including a list of my relevant project experience, is attached hereto as **Exhibit 1**.

3. In particular, I was the Project Manager for a probabilistic evaluation of the thermal environment in the Merrimack River upstream and downstream of the Station, and a co-author (with Mark T. Mattson) of the resulting report entitled *A Probabilistic Thermal Model of the Merrimack River Downstream of Merrimack Station* dated April 2007. For this report, I developed predictive methods for estimating Merrimack River water temperatures at one monitoring station located at the Station's cooling canal discharge, one monitoring station in lower Hooksett Pool downstream from the cooling canal discharge, and one monitoring station in upper Amoskeag Pool during the open water season, and compiled the resulting predicted data in time-correlated "probability of occurrence" tables and graphs to compare the thermal environments among the three monitoring stations over time. To the best of my knowledge, while neither CWA §316(a) nor its implementing regulations require a permittee to make a predictive demonstration to support a CWA §316(a) variance renewal request, Normandeau prepared this report for PSNH to submit, along with *Merrimack Station Fisheries Survey Analysis of 1967 through 2005 Catch and Habitat Data* dated April 2007 and *Merrimack Station Thermal Discharge Effects On Downstream Salmon Smolt Migration* dated December 2006, in support of PSNH's CWA §316(a) variance renewal request for the Station.
4. In addition, I was a contributor to the study design, analysis and interpretation of a thermal impact evaluation at the Station in the mid-1990s, and senior technical reviewer of the resulting report prepared by Normandeau entitled *Merrimack Station Thermal Discharge Modeling Study* dated October 1996. This 1996 report took a similar empirical approach for predicting downstream temperature in the Merrimack River as the 2007 report, by developing a multiple regression equation that correlated river water temperature in the Hooksett Dam tailwaters to ambient river water temperature, river flow and Station electrical output.
5. To the best of my knowledge, both of these reports (the "Reports") were provided to EPA and the New Hampshire Department of Environmental Services.
6. Based upon my education and training, expertise, first-hand experience and professional judgment, the Reports contain data that are sufficient to support the conclusions drawn in those reports. In addition, the principles and methods used to obtain these data and to perform the analyses and draw the conclusions presented in the Reports are consistent with data collection and evaluation methods, including statistical methods (such as multiple linear regression analysis), accepted within the discipline of water resource engineering as of the time they were used. Moreover, the work undertaken to prepare the Reports reliably applied such principles and methods to these data, and was state-of-the-art at the time it was performed. Furthermore, the data and methods used in the Reports were evaluated through quality assurance/quality control assessments that met or exceeded industry standards at the time of such assessments. Therefore, I have the highest confidence in the Reports and their conclusions.

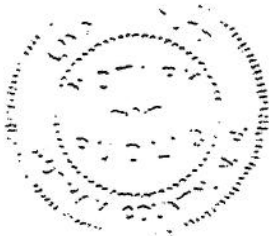
Signed under seal this 8 day of November, 2007.

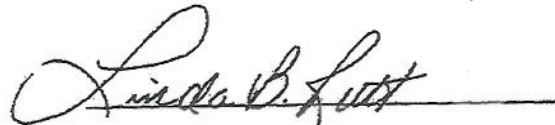
  
Mark L. Hutchins

Normandeau Associates, Inc.

Senior Water Resources Engineer

On this 8 day of November, 2007, the foregoing Mark L. Hutchins personally appeared before me and acknowledged the foregoing to be his true and accurate statement and his free act and deed.





Notary Public

My commission expires: 9-14-08

**Exhibit 1**

Curriculum Vitae of Mark L. Hutchins



**MARK L. HUTCHINS**  
**Senior Water Resources Engineer**

Mr. Hutchins has been involved with water resource issues for more than 30 years. His expertise focuses on surface waters - lakes, rivers, streams, estuaries - and includes most aspects of water quality and quantity. Project experience includes input/output modeling to predict lake trophic state, DO/BOD modeling in rivers and streams, waste discharge plume modeling in estuaries and assessment of water quality impacts from various types of commercial, industrial and residential development. Mr. Hutchins has been involved with the ski industry for more than 20 years. Activities have included wastewater discharge permitting, water quality impact assessments, water supply studies for snowmaking and minimum flow issues. Most recently, Mr. Hutchins has managed broad-based environmental documentation efforts to comply with NEPA regulations (EISs/EAs) and state permitting requirements associated with ski resorts located on National Forests, most of which has been related to snowmaking/minimum streamflow issues. Mr. Hutchins has particular expertise in licensing/relicensing/compliance monitoring and water quality modeling efforts associated with hydroelectric and steam generating facilities, having been involved in more than a dozen of these types of projects, and especially as related to NPDES and 316 permitting requirements.

**EDUCATION**

M.S. 1977, Civil Engineering/Water Resources, University of Maine  
B.A. 1973, Geological Sciences, University of Maine

**PROFESSIONAL EMPLOYMENT HISTORY**

2002-Present Normandeau Associates, Inc.  
2002-Present Hutchins Consulting Services

1997-2002 Sno.engineering, Inc., SE GROUP  
1985-1997 Normandeau Associates, Inc.  
1982-1985 Maine Department of Environmental Protection  
1973-1982 University of Maine, Environmental Studies Center, Land and Water Resources Center

**SELECTED PROJECT EXPERIENCE**

Appalachian Power Company, VA (2007-Present) – Will be compiling, collecting and analyzing water quality data in support of FERC relicensing of the Claytor Hydroelectric Project.

New Hampshire Department of Environmental Services (2005-Present) – Participating in a pilot study to determine the minimum flows necessary to protect flow dependent instream uses, outstanding characteristics and other resources of the Lamprey River, NH.

Public Service Company of New Hampshire (2005-Present) – Prepared a probabilistic evaluation of the thermal environment in the Merrimack River upstream and downstream of Merrimack Station, a coal-fired, steam electric generating plant.

Public Service Company of New Hampshire (2005-Present) – Participating in the preparation of technical documents that evaluate compliance of Merrimack Station's cooling water intake with Phase II 316b rules.

Vermont Yankee, VT (2005-Present) – Participating in the preparation of technical documents that evaluate compliance of Vermont Yankee's cooling water intake with Phase II 316b rules.

**MARK L. HUTCHINS**  
Senior Water Resources Engineer

**SELECTED PROJECT EXPERIENCE**  
(Continued)

New Hampshire Department of Environmental Services (2004-Present) (subcontractor to University of New Hampshire) – Participating in a pilot study to determine the minimum flows necessary to protect flow dependent instream uses, outstanding characteristics and other resources of the Souhegan River, NH.

Verizon Communications, NH (Hutchins Consulting Services with Normandeau Associates, Inc. as subcontractors to Engineers Construction, Inc.) (2003-Present) - Providing federal and state environmental permitting services for a proposed underground fiber optic cable through Pinkham Notch in the White Mountain National Forest. Project Manager.

Vermont Yankee, VT (2002-Present) - Participating in the preparation of 316a documents that evaluate potential impacts to the Connecticut River of an increased thermal discharge resulting from a proposed power upgrade at Vermont Yankee.

Waterville Valley Ski Resort, NH (Sno.engineering, Hutchins Consulting Services with Normandeau Associates, Inc.) (1999-present) - Coordinating state and federal permitting for a new snowmaking pond at Waterville Valley in the White Mountain National Forest. Project Manager.

CDM/U.S. Army Corps of Engineers – New England Division, MA (2006-2007) – Collected river transect data and sediment samples for grain size and nutrient flux analysis in support of a water quality modeling effort on the Assabet River, MA.

Attitash/Bear Peak, NH (Sno.engineering, SE Group) (2000-2002) – Represented

Attitash/Bear Peak's interests in proposed minimum flow regulation before the NH Department of Environmental Services and Legislative Committee hearings. Prepared formal responses to proposed regulations and proposed alternative minimum flow regulations. Project Manager.

Solitude Ski Resort, UT (Sno.engineering as 3<sup>rd</sup> party contractors to the U.S. Forest Service) (2000-2001) - Coordinated environmental studies and prepared a Draft and Final Environmental Impact Statement for a variety of proposed ski area upgrades at Solitude Ski Resort in the Wasatch-Cache National Forest. Project Manager.

Mount Snow Ski Area, VT (Sno.engineering with Normandeau Associates, Inc. as 3<sup>rd</sup> party contractors to the U.S. Forest Service) (1999-2001) - Coordinated environmental studies and prepared an Environmental Assessment for expanded mountain biking and selected tree island clearing at Mount Snow in the Green Mountain National Forest. Project Manager.

Wildcat Ski Area, NH (Sno.engineering with Normandeau Associates, Inc. as 3<sup>rd</sup> party contractors to the U.S. Forest Service) (1999-2001) - Coordinated environmental and archaeological work to support the preparation of an Environmental Assessment for a variety of proposed actions at Wildcat Ski Area in the White Mountain National Forest. Project Manager.

Cannon Mountain Ski Area, NH (Sno.engineering with Normandeau Associates, Inc. as 3<sup>rd</sup> party contractors to the U.S. Forest Service) (1999) - Began the NEPA process for a proposed land exchange between U.S. Forest Service, White Mountain National Forest, and State of New Hampshire related to ski area expansion. Project was terminated by the State of New Hampshire. Project Manager.

**MARK L. HUTCHINS**  
**Senior Water Resources Engineer**

**SELECTED PROJECT EXPERIENCE**  
**(Continued)**

Great Northern Paper Company, ME  
(Sno.engineering) (1998-2002) - Providing water quality consulting services to GNP relative to water quality modeling of the Penobscot River. Project Manager.

Mount Snow Ski Area, VT (Sno.engineering with Normandeau Associates as 3<sup>rd</sup> party contractors to the U. S. Forest Service) (1997-1999) - Coordinated environmental studies and prepared a Draft Environmental Impact Statement for snowmaking expansion at Mount Snow in the Green Mountain National Forest. Project Manager.

Attitash/Bear Peak Ski Resort, NH  
(Sno.engineering with Pioneer Environmental Services as 3<sup>rd</sup> party contractor to the U.S. Forest Service) (1997-1999) - Prepared an Environmental Assessment for a new trail and an extension of an alpine slide at Attitash/Bear Peak in the White Mountain National Forest. Project Manager.

Round Top, VT (Sno.engineering) (1997-1998) - Prepared a draft Needs and Alternatives Analysis for snowmaking at Round Top Ski Area. Project Manager.

New England Power Company, VT, NH (1996-1997) - Water quality studies - Fifteen mile Falls Hydroelectric Relicensing Project. Project Manager.

Killington Ltd., VT (Normandeau Associates, Sno.engineering) (1996-1999) - Hydrologic analyses and biological evaluation of Woodward Reservoir in support of proposed snowmaking withdrawals; Act 250 compliance. Project Manager.

Vermont Yankee, VT (as a Normandeau Associates employee and later as a subconsultant to Normandeau) (1996-1998) - Thermal compliance evaluation for Project SAVE at Vermont Yankee. Principal Investigator.

Pease Development Authority, NH  
(subconsultant to Underwood Engineers) (1996-1997) - Plume modeling using CORMIX to support a new wastewater outfall design. Project Manager.

Waterville Valley Ski Resort, NH  
(Normandeau Associates, Inc., subconsultant to Sno. Engineering, as 3<sup>rd</sup> party contractors to the U.S. Forest Services) (1995-1998) - Conducted environmental studies and prepared a Draft and Final Environmental Impact Statement for proposed snowmaking ponds at Waterville Valley in the White Mountain National Forest. Project Manager.

Public Service Company of New Hampshire, NH (1994-1997) - Merrimack Station thermal impact evaluation. Project Manager.

City of Norwalk, CT (subconsultant to Tetra Tech) (1993-1997) - Norwalk harbor water quality. Project Manager.

International Paper Co., ME (1995-1996) - Androscoggin River water quality. Project Manager.

Town of Dartmouth, MA (subconsultant to Woodard and Curran, Inc.) (1995-1996) - Paskamanset River minimum flows. Project Manager.

City of Saco, ME (subconsultant to DeLuca Hoffman) (1994-1996) - Municipal tidewater wastewater outfall evaluation. Project Manager.

**MARK L. HUTCHINS**  
Senior Water Resources Engineer

**SELECTED PROJECT EXPERIENCE**  
(Continued)

City of Saco, ME (subconsultant to DeLuca Hoffman) (1992-1996) - Saco River wasteload allocation. Project Manager.

Pease Development Authority and Town of Newington, NH (1995) - Piscataqua River effluent dispersion studies. Project Manager.

Sugarbush, VT (Normandeu Associates, Inc., subconsultant to Sno.engineering, as 3<sup>rd</sup> party contractors to the U.S. Forest Service) (1994-1995) - Sugarbush snowmaking EIS. Project Manager.

Sebago Lake Water Quality Investigations (ME) (1992-1994) - Portland Water District. Program Manager/Senior Investigator.

Connecticut Department of Environmental Protection, CT (1992-1993) - Farmington River minimum flow. Principal Investigator.

Killington, Ltd., VT (1992) - Ottauquechee River minimum flow. Principal Investigator.

New England Power Co., MA, VT, NH (1991-1992) - Preparation of NPDES permit applications for 15 hydroelectric stations. Project Manager.

Central Maine Power Co., ME (1990-1991) - Moxie Stream minimum flow. Principal Investigator.

Central Hudson Gas & Electric Co., NY (1988-1991) - Danskammer groundwater monitoring. Program Manager.

Maine Turnpike Authority, ME (subconsultant to HNTB) (1988-1991) - Maine turnpike widening EIS. Principal Investigator.

Town of Seabrook (NH) (subconsultant to Stearns & Wheeler) (1987-1991) - Wastewater discharge/plume dispersion evaluation. Principal Investigator.

The Upjohn Company, CT (1987-1990) - Wastewater discharge dispersion study. Project Manager/Principal Investigator.

Killington LTD., VT (1985-1990) - Wastewater discharge modeling/permitting. Project Manager/Principal Investigator.

Niagara Mohawk Power Corp., NY (1988-1989) - Thermal plume evaluation for Huntley Generating Station (NY). Project Manager.

James River Corporation, NH (1987-1989) - Water quality modeling. Project Manager - Principal Investigator.

Dictar Associates, ME (1986-1988) - Wastewater discharge/plume modeling for a condominium development on Great Diamond Island. Principal Investigator.

Swift River/Hafslund, ME (1987) - Biomass boiler electric generating facility. Project Manager/Principal Investigator.

Great Northern Paper Co., ME (1985) - Wastewater discharge relicense. Project Manager/Principal Investigator.

Maine Public Service Co., ME (1985) - Wastewater discharge relicense. Project Manager/Principal Investigator.

Great Northern Paper Company, ME (1985) - Hydroelectric development. Participating Investigator.

Messalonskee Stream Study, ME (1984-1985) - Project Manager/Principal Investigator.

**MARK L. HUTCHINS**  
Senior Water Resources Engineer

**SELECTED PROJECT EXPERIENCE**  
(Continued)

Georgia-Pacific Paper Company, ME (1983-1985) - Wastewater discharge relicense and wasteload allocation. Project Manager/Principal Investigator.

Boise-Cascade Corp. and International Paper Company, ME (1982-1985) - Wastewater discharge relicenses and wasteload allocations. Assistant Engineer.

Maine Energy and Recovery Company, ME (1984) - Waste discharge license. Principal Investigator.

Central Maine Power Company, ME (1984) - Hydroelectric development. Participating Investigator.

Lake Ecosystem Research (1982) - Principal Investigator.

Lake Biomanipulation (1980-1982) - Co-Principal Investigator.

Simplified Marine Water Quality Modeling (1980) - Principal Investigator.

Lake Input/Output Nutrient Models (1976-1980) - Assistant Investigator.

**SPECIAL TRAINING**

Stream Restoration Techniques and their Applications, Field Geological Services, 2005

Micro-computers and Engineering Applications, MIT, 1984

EPA Waste Discharge Screening Techniques, Boston, 1984

Water Quality Modeling with Qual IIe, Tufts, 1983

**Public Service Company of New Hampshire,  
Merrimack Station, NPDES No. NH0001465,  
Response to Information Request in Support of  
NPDES Permit Reissuance**

Affidavit of Mark T.  
Mattson, Ph.D.

**AFFIDAVIT OF MARK T. MATTSON, PH.D.  
IN SUPPORT OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE'S  
RESPONSE TO INFORMATION REQUEST  
IN SUPPORT OF NPDES PERMIT REISSUANCE**

I, Mark T. Mattson, do hereby depose and say on the basis of personal knowledge and my professional opinion, and for Normandeau Associates, Inc. ("Normandeau") on the basis of my authority as a corporate officer, as evidenced by the Secretary's Certificate attached hereto as **Exhibit 1**, that:

1. I am a Vice President and Principal Aquatic Ecologist with Normandeau, a professional consulting firm that specializes in ecological, environmental and natural resources management services. My expertise is in aquatic ecology, particularly fisheries, and the application of field sampling design and analytical methods to evaluate anthropogenic influences on population and community dynamics of aquatic ecosystems. I have supervised at least twelve (12) site-specific assessments of potential impacts from power plant thermal discharges or cooling water intakes on aquatic ecosystems, and have participated in at least thirty (30) such assessments performed by Normandeau, over the past 28 years, mostly in the northeastern United States. I have particular expertise in riverine and estuarine ecosystems.
2. I hold Master of Science and Ph.D. degrees in Zoology from the University of New Hampshire, and a Bachelor of Arts degree in Biology from the University of Connecticut. I am an active member of the American Society of Limnology<sup>1</sup> and Oceanography, the International Limnology Society, and the American Fisheries Society. My most recent curriculum vitae, including a list of my peer-reviewed scientific publications and professional society presentations, is attached hereto as **Exhibit 2**. Many of my peer-reviewed publications relate to aquatic species, ecosystems or methodologies relevant to the work I have performed on behalf of Public Service Company of New Hampshire ("PSNH") for its Merrimack Station electrical generating facility, consisting of two independent units, in Bow, New Hampshire (the "Station").
3. Normandeau has been managing the biological monitoring program at the Station since 1970 and continues to do so. As a result, I have been retained by

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<sup>1</sup> Limnology is the study of the ecology of inland waters (specifically, lakes, ponds, and rivers), including their biological, physical, chemical, and hydrological aspects. It is the freshwater analog of oceanography.

PSNH, and have been directly involved with, and frequently supervised, studies at the Station since 1995. In particular, I have supervised and participated in the Clean Water Act ("CWA") §316(a) and CWA §316(b) cooling water intake structure ("CWIS")-related studies that Normandeau has performed at the Station since 2004. In the course of these various studies, I have become familiar with the aquatic communities and the aquatic ecosystem found in the Hooksett Pool and upper Amoskeag Pool reaches of the Merrimack River, in the vicinity of the Station.

4. I was a co-author of PSNH's response to the United States Environmental Protection Agency's ("EPA's") July 3, 2007 information request under CWA §308 for the Station, entitled *Response to United States Environmental Protection Agency CWA § 308 Letter, PSNH Merrimack Station Units 1 & 2, Bow, New Hampshire*, prepared by Enercon Services, Inc. and Normandeau dated October 2007.
5. I was the project technical director, with primary responsibility for the sampling design and the field, laboratory and analytical methods, results and interpretation, for, and a co-author and the editor of, the report prepared by Normandeau evaluating fisheries data collected during entrainment and impingement studies conducted at the Station from June 2005 through June 2007, entitled *Entrainment and Impingement Studies Performed at Merrimack Generating Station from June 2005 through June 2007* dated October 2007. This report was prepared by Normandeau in support of PSNH's response to EPA's July 3, 2007 information request under CWA §308 for the Station.
6. I was the project technical director for, and the corporate technical reviewer, with primary responsibility for the sampling design, analytical methods, data interpretation and results, and editor of, a report entitled *Merrimack Station Fisheries Survey Analysis of 1967 through 2005 Catch and Habitat Data* dated April 2007, prepared by Normandeau in support of PSNH's CWA §316(a) variance renewal request for the Station.
7. I was the corporate technical reviewer and editor of a report prepared by Normandeau entitled *Merrimack Station Thermal Discharge Effects On Downstream Salmon Smolt Migration* dated December 2006, prepared by Normandeau in support of PSNH's CWA §316(a) variance renewal request for the Station.
8. I am a co-author and the editor of a report prepared by Normandeau entitled *A Probabilistic Thermal Model of Merrimack River Downstream of Merrimack Station* dated April 2007. While it is my understanding that neither CWA §316(a) nor its implementing regulations require a permittee to make a predictive demonstration to support a CWA §316(a) variance renewal request, Normandeau prepared this report for PSNH to submit, along with *Merrimack Station Fisheries Survey Analysis of 1967 through 2005 Catch and Habitat Data* dated April 2007 and *Merrimack Station Thermal Discharge Effects On*

*Downstream Salmon Smolt Migration* dated December 2006, in support of PSNH's CWA §316(a) variance renewal request for the Station.

9. I am the author of a report, prepared by Normandeau in response to a December 30, 2004 information request to PSNH from EPA, entitled *Proposal for Information Collection to Address Compliance with the Clean Water Act §316(b) Phase II Regulations at Merrimack Station, Bow, New Hampshire* dated April 2005.
10. The above-referenced reports are several of the many which Normandeau has prepared for PSNH regarding the Station, and which have been provided to EPA and the New Hampshire Department of Environmental Services ("NHDES"). I have been the principal author, co-author or editor of and supervised the preparation of, or substantially worked on, every report that Normandeau has prepared for PSNH regarding the Station, and that has been provided to EPA and NHDES, from 1994 to present, a full list of which is attached hereto as **Exhibit 3**.
11. Based upon my education and training, expertise, first-hand experience and professional judgment, the reports listed in **Exhibit 3** contain data that are sufficient to support the conclusions drawn in the reports. The study designs and methods used to obtain these data, and to perform the analyses and draw the conclusions presented in the reports listed in **Exhibit 3**, represent those accepted within the disciplines of aquatic ecology, field sampling design, aquatic ecosystem population and community dynamics, and limnology, and comported with industry standards, all as of the time they were used. Moreover, my understanding is that the work undertaken to prepare the reports listed in **Exhibit 3** reliably applied such principles and methods to these data, and was state-of-the-art at the time it was performed. Furthermore, to the best of my knowledge, the data and methods used in the reports listed in **Exhibit 3** were evaluated through quality assurance/quality control assessments that met or exceeded industry standards at the time of such assessments. Therefore, I have the highest confidence in the reports listed in **Exhibit 3** and their conclusions.
12. In addition to the reports listed in **Exhibit 3**, Normandeau has prepared numerous other reports for PSNH regarding the Station that have been provided to EPA and NHDES and/or its predecessor(s), including without limitation the New Hampshire Water Supply and Pollution Control Commission. A full list of such reports prepared prior to 1997 is attached hereto as **Exhibit 4**.
13. Based upon my education and training, expertise and professional judgment, and in my capacity as a corporate officer for Normandeau, the reports listed in **Exhibit 4** contain data that are sufficient to support the conclusions drawn in the reports. To the best of my knowledge, the principles and methods used to obtain these data, and to perform the analyses and draw the conclusions presented in the reports listed in **Exhibit 4**, represent those accepted within the disciplines of aquatic ecology, field sampling design, aquatic ecosystem



population and community dynamics, and limnology, and conformed with industry standards, all as of the time they were used. Moreover, to the best of my knowledge, the work undertaken to prepare the reports listed in **Exhibit 4** reliably applied such principles and methods to these data, and was state-of-the-art at the time it was performed. Furthermore, to the best of my knowledge, the data and methods used in the reports listed in **Exhibit 4** were evaluated through quality assurance/quality control assessments that met industry standards at the time of such assessments. Therefore, I have the highest confidence in the data and results of the reports listed in **Exhibit 4** and their conclusions.

Signed under seal this 2<sup>nd</sup> day of November, 2007.

*Mark T. Mattson*

Mark T. Mattson, Ph.D.

Normandeau Associates, Inc.

Vice President & Principal Aquatic  
Ecologist

On this 2<sup>nd</sup> day of November, 2007, the foregoing Mark T. Mattson, Ph.D.  
personally appeared before me and acknowledged the foregoing to be his true and  
accurate statement and his free act and deed.

*Susan M Sanborn*

Notary Public

My commission expires:



**Exhibit 1**

**Secretary's Certificate**



**NORMANDEAU ASSOCIATES, INC.**

**Secretary's Certificate**

I, Susan M. Sanborn, hereby certify that I am the Secretary/Treasurer of Normandeu Associates, Inc. a corporation duly organized and existing under the laws of the State of New Hampshire (the "Corporation").

I hereby certify that the following is a true copy of a resolution duly adopted by the Board of Directors of said Corporation by unanimous written consent dated July 7, 2000:

**RESOLVED:** That the officers of the Corporation be, and they hereby are, authorized to perform such actions in furtherance of the management of the Corporation as may be set forth in the Bylaws of the Corporation or delegated by the Board of Directors or the President of the Corporation from time to time on behalf of the Corporation; and

**RESOLVED:** That the officers of the Corporation be, and they hereby are, authorized to sign contracts on behalf of the Corporation.

I hereby certify that said vote has not been amended, modified or rescinded and remains in full force and effect on the date hereof, and that Mark T. Mattson is a duly appointed Vice President of the Corporation.

WITNESS the seal of the Corporation, and the signature of the undersigned, which is dated on November 2, 2007.

(Seal)



Susan M. Sanborn  
Susan M. Sanborn  
Secretary/Treasurer

**Exhibit 2**

**Curriculum Vitae of Mark T. Mattson, Ph.D.**

**MARK T. MATTSON, Ph.D.**  
**Vice President/Principal Aquatic Ecologist**

Dr. Mattson is a Vice President and Principal Aquatic Ecologist at Normandeau who has supervised or conducted more than 45 fisheries and aquatic ecology projects over the past 28 years. He is a specialist in aquatic ecology/ fisheries field sampling design and in the application of population and community level statistics to measure anthropogenic effects on aquatic ecosystems. Dr. Mattson has also presented testimony on the development and application of periphyton and benthic macroinvertebrate community biocriteria to narrative water quality classification for several projects in Maine and Connecticut.

**EDUCATION**

- Ph.D. 1979, Zoology (Limnology), University of New Hampshire  
M.S. 1975, Zoology, University of New Hampshire  
B.A. 1973, Biology, University of Connecticut

**PROFESSIONAL EMPLOYMENT HISTORY**

- 1981-Present Normandeau Associates, Inc.  
1979-1981 Texas Instruments Inc.,  
Ecological Services

**PROFESSIONAL AFFILIATIONS**

- American Society of Limnology and Oceanography  
International Limnological Society  
American Fisheries Society

**SELECTED PROJECT EXPERIENCE**

Entergy Nuclear Northeast, Inc. (2006-Present)  
– Provided technical assistance in the areas of fisheries and aquatic ecology for the Nuclear Regulatory Commission (NRC) Environmental Report and Environmental Site Audit for the re-

licensing of the James A. FitzPatrick Nuclear Power Plant located on Lake Ontario (NY).  
Project Manager.

Entergy Nuclear Northeast, Inc. (2006-Present)  
– Provided technical assistance in the areas of fisheries and aquatic ecology for the Nuclear Regulatory Commission (NRC) Environmental Report and Environmental Site Audit for the re-licensing of the Indian Point Nuclear Power Plant located on the Hudson River (NY).  
Project Manager.

Entergy Nuclear Northeast, Inc. (2005-Present)  
- Preparation of a Clean Water Act Section 316(b) Proposal for Information Collection (PIC) and Comprehensive Demonstration Study (CDS) in compliance with the Phase II Rule regulating the cooling water intake structure at the James A. FitzPatrick Nuclear Power Plant located on Lake Ontario (NY). Project Manager and Report Author.

Entergy Nuclear Vermont Yankee, Inc. (2005-Present) - Preparation of a Clean Water Act Section 316(b) Proposal for Information Collection (PIC) and Comprehensive Demonstration Study (CDS) in compliance with the Phase II Rule regulating the cooling water intake structure at the Vermont Yankee Nuclear Power Generating Station located on the Connecticut River (VT). Project Manager and Report Author.

Entergy Nuclear Northeast, Inc. (2005-Present)  
- Preparation of a Clean Water Act Section 316(b) Proposal for Information Collection (PIC) and Comprehensive Demonstration Study (CDS) in compliance with the Phase II Rule regulating the cooling water intake structure at the Pilgrim Nuclear Power Station located on the Atlantic Ocean (Cape Cod Bay) (MA).  
Project Manager and Report Author.

**MARK T. MATTSON, Ph.D.**  
**Vice President/Principal Aquatic Ecologist**

**SELECTED PROJECT EXPERIENCE**  
**(Continued)**

Public Service Company of New Hampshire, Inc. (2005-Present) - Preparation of a Clean Water Act Section 316(b) Proposal for Information Collection (PIC) and Comprehensive Demonstration Study (CDS) in compliance with the Phase II Rule regulating the cooling water intake structure at Merrimack Station located on the Merrimack River (NH). Report Author.

Public Service Company of New Hampshire, Inc. (2005-Present) - Preparation of a Clean Water Act Section 316(b) Proposal for Information Collection (PIC) and Comprehensive Demonstration Study (CDS) in compliance with the Phase II Rule regulating the cooling water intake structure at Newington Station located on the Piscataqua River (Great Bay Estuary) (NH). Report Author.

Public Service Company of New Hampshire, Inc. (2005-Present) - Preparation of a Clean Water Act Section 316(b) Proposal for Information Collection (PIC) and Comprehensive Demonstration Study (CDS) in compliance with the Phase II Rule regulating the cooling water intake structure at Schiller Station located on the Piscataqua River (Great Bay Estuary) (NH). Report Author.

Public Service Company of New Hampshire (1994-1996; 2003-Present) - Bow Station hydrothermal demonstration in support of NPDES requirements for accessing potential impacts on yellow perch, American shad and Atlantic salmon. Project Biologist.

Entergy Nuclear Vermont Yankee, Inc. (2002-Present) - Preparation of a Clean Water Act Section 316(a) Demonstration in support of a request for increased discharge temperatures at the Vermont Yankee Nuclear Power Generating

Station (VT). Project Manager and Report Author.

Entergy Nuclear Vermont Yankee, Inc. (2002-Present) - Environmental support services for NPDES, indirect discharge, solid waste and biological monitoring programs at the Vermont Yankee Nuclear Power Generating Station (VT). Project Manager.

Entergy Nuclear Operations, Inc. (2001-Present) - Hudson River Striped Bass Program (NY). Project Manager.

Entergy Nuclear Operations, Inc. (2001-Present) - Hudson River Atlantic tomcod Program (NY). Project Manager.

Entergy Nuclear Operations, Inc. (2001-Present) - Hudson River Ichthyoplankton and Juvenile Fish Surveys field and laboratory services (NY). Corporate Officer.

New York Department of Environmental Conservation (NY) (1998-2006) - Hudson River Herring Spawning Stock Assessment. Technical Director.

Covanta Mid-Connecticut, Inc. (2003-2005) - Connecticut Resource Recovery Authority generating station evaluation of existing and proposed new Clean Water Act Section 316(b) rules for existing facilities - an entrainment and impingement evaluation (CT). Project Manager.

Somerset Operations (MA) (2001-2004) - Two-year evaluation of impingement, entrainment and the thermal plume at this existing generating station. Corporate Officer.

**MARK T. MATTSON, Ph.D.**  
**Vice President/Principal Aquatic Ecologist**

**SELECTED PROJECT EXPERIENCE**  
**(Continued)**

New York Power Authority (NY) (2001-2003)  
– Charles Poletti Power Plant Effects of Entrainment and Impingement Program. Ichthyoplankton, Juvenile Fish Trawl Surveys; Cunner and Tautog Mark-Recapture Program in Long Island Sound, New York Harbor, and the Hudson River. Project Manager and Technical Director.

Pratt and Whitney East Hartford (CT) (2000 - 2003) – Two-year evaluation of impingement, entrainment and the thermal plume at the Wilgoos facility on the Connecticut River (CT). Project Manager.

Bridgeport Energy LLC Facility (CT, Bridgeport Harbor) (2000 - 2003) – Two-year evaluation of impingement, entrainment and the thermal plume at this new generating station. Corporate Officer.

Vermont Yankee Nuclear Power Corporation (VT) (1996-2002) - Environmental support services for NPDES, indirect discharge, solid waste and biological monitoring programs at the Vermont Yankee Nuclear Power Generating Station. Project Manager.

Shering-Plough Corporation (NJ) (1999-2001) - Biological assessment of the endangered Dwarf Wedge Mussel (*Alasmidonta heterodon*) in the Paulins Kill River (Sussex Co., NJ). Project Manager.

New York Department of Environmental Conservation (NY) (1999-2001) - Aquatic Biological sample collections for contaminants analysis from New York Harbor and the Hudson River. Corporate Officer.

New York Power Authority (1984-1994; 1997-2001) - Hudson River Striped Bass Stock Assessment Program (NY). Project Manager.

New York Power Authority. (1982-1994; 1997-2001) - Hudson River Atlantic Tomcod Spawning Stock Survey (NY). Project Manager.

Consolidated Edison Company of New York, Inc. (1988-1989, 1991-2001) - Hudson River Ichthyoplankton Laboratory Program (NY). Corporate Officer.

Consolidated Edison Company of New York, Inc. (1984-1989, 1991-2001) - Hudson River Ichthyoplankton and Juvenile Surveys (NY). Corporate Officer.

Pratt and Whitney Middletown (CT) (2000) – Cooling water intake screen evaluation to determine applicability of Best Management Practices (BMP) to demonstrate the use of Best Technology Available (BTA) with respect to impingement and entrainment at the Middletown manufacturing facility on the Connecticut River (CT). Project Manager.

Public Service Electric & Gas Company (1996-2000) - Salem Station (NJ) Delaware Bay-wide monitoring fisheries studies for the Estuarine Enhancement Program. Corporate Officer.

Public Service Electric & Gas Company (1996-1998) - Hudson Station (NJ) supplemental 316(a) and 316(b) biological studies. Project Manager.

Eckenfelder, Inc. (1995-1998) - Phase II RFI studies for adjacent surface water sediments AOC for the Ciba-Geigy site located on the Hudson River in Glens Falls (NY). Project Manager.



**MARK T. MATTSON, Ph.D.**  
**Vice President/Principal Aquatic Ecologist**

**SELECTED PROJECT EXPERIENCE**  
**(Continued)**

Wisconsin Public Service Corporation (1996) - Oconto Electric Hydroelectric Project (WI) Fish Entrainment and Turbine Mortality Study. Project Manager.

Dairyland Power Reservoir Productivity Study (1995-1996) - Reservoir productivity study in support of hydropower relicensing on the Flambeau River (WI). Project Manager.

Wisconsin Public Service Corporation (1994-1995) - Wausau Hydroelectric Project (WI) Fish Entrainment and Turbine Mortality Studies. Project Manager.

Wisconsin Public Service Corporation (1992-1994) - Grand Rapids Hydroelectric Project (WI) Fish Entrainment and Turbine Mortality Studies. Project Manager.

Great Northern Paper Co. (1986-1992) - Penobscot Mills and Ripogenus Dam Hydropower Relicensing Projects (ME). Project Aquatic Ecologist.

Empire State Electric Energy Research Corp. (1990-1991) - Demonstration of an Acoustic Fish Deterrence System at the James A. Fitzpatrick Nuclear Power Plant Cooling Water Intake (NY). Project Manager.

Niagara Mohawk Power Corp. (1990-1991) - Fish Guidance Study at Albany Steam Station (NY). Project Manager/Technical Advisor.

Central Hudson Gas and Electric Corp. (1989-1991) - Roseton and Danskammer Point Stations Impingement Monitoring Program (NY). Project Manager.

Consolidated Edison Company of New York, Inc. (1984-1986, 1989-1991) - Indian Point Impingement Studies (NY). Project Manager.

Consolidated Edison Company of New York, Inc. (1985-1991) - Indian Point Nuclear Generating Station Ristroph Screen Impingement Mitigation Study (NY). Project Manager.

Wisconsin Public Service Corporation (1990) - Nine Hydroelectric Facilities (WI) Fish Turbine Entrainment/Mortality Study Plans. Project Manager.

New York Power Authority (1990) - Indian Point Unit 3 Nuclear Power Plant Zebra Mussel Monitoring Project. Project Manager.

Central Hudson Gas & Electric Corp. (1990) - Zebra Mussel Monitoring at Roseton and Danskammer Point Stations. Project Manager.

Central Hudson Gas & Electric Corp. (1990) - Survey of Hudson River Marinas for the Presence of Zebra Mussels. Project Manager.

The Upjohn Company (1982, 1987-1990) - Quinnipiac River Study (CT). Project Aquatic Ecologist.

New York Power Authority (1986-1990) - Indian Point Fish Deterrence Studies (NY). Corporate Officer/Technical Reviewer.

Consolidated Edison Company of New York, Inc. (1989) - Relative Probability of Entrainment Study for Indian Point Station (NY). Project Manager.

Consolidated Central Hudson Gas and Electric Corp. (1986-1988) - Danskammer Point Station Fine Mesh Fish Impingement Studies (NY). Project Manager.

**MARK T. MATTSON, Ph.D.**  
**Vice President/Principal Aquatic Ecologist**

**SELECTED PROJECT EXPERIENCE**  
**(Continued)**

Consolidated Edison Company of New York, Inc. (1986-1987) - Special Studies to Examine Fish Abundance in Unsampled Areas of the Hudson River (NY). Project Manager.

Consolidated Edison Company of New York, Inc. (1986-1987) - Indian Point Entrainment Abundance Studies (NY). Technical Advisor.

Consolidated Edison Company of New York, Inc. (1984-1985) - 1982 and 1983 Year Class Reports for the Hudson River Monitoring Program (NY). Technical Reviewer.

Orange and Rockland Utilities, Inc. (1983-1985) - Hudson River White Perch Stock Assessment Study (NY). Project Manager.

Great Northern Paper Company (1981-1985) - Hydroelectric Development Project (ME). Project Aquatic Ecologist.

New York Power Authority (1980-1985) - Hudson River Gear Evaluation Studies (NY). Project Manager.

Bangor Hydro Basin Mills Hydroelectric Project (ME) (1983-1984) - Project Aquatic Ecologist.

Consolidated Edison Company of New York, Inc. (1981-1984) - Sampling Design Evaluation for Indian Point Fish Impingement Programs (NY). Project Manager.

Metropolitan District Commission (1982-1983) - Water Supply Alternatives (MA). Project Aquatic Ecologist.

Bangor Hydro Telos Dam Reconstruction Project (ME) (1982) - Project Aquatic Ecologist.

Consolidated Edison Company of New York, Inc. (1981-1982) - Indian Point Juvenile Fish Entrainment Study (NY). Project Manager.

Chicopee Falls Hydropower Project (MA) (1981) - Project Aquatic Ecologist.

Town of Concord (MA) (1981) - Water Supply Study. Project Aquatic Ecologist.

**SPECIAL TRAINING**

U.S. Fish and Wildlife Instream Flow Incremental Methodology Negotiations and Strategies, 1981; Conducting Field Studies, 1984

NAUI Certified SCUBA diver

**SELECTED PRESENTATIONS AND PUBLICATIONS**

Dunning, D.J., J.R. Waldman, Q.E. Ross and M.T. Mattson. 2006. Dispersal of age 2+ striped bass out of the Hudson River. Pages 287-294 in J.R. Waldman, K.E. Limburg, and D.L. Strayer, editors. Hudson River fishes and their environment. American Fisheries Society, Symposium 51. Bethesda, Maryland.

Dunning, D.J., Q.E. Ross, M.T. Mattson, and D.G. Heimbuch. 2006. Distribution and abundance of bay anchovy eggs and larvae in the Hudson River and nearby waterways. Pages 215-226 in J.R. Waldman, K.E. Limburg, and D.L. Strayer, editors. Hudson River fishes and their environment. American Fisheries Society, Symposium 51. Bethesda, Maryland.

**MARK T. MATTSON, Ph.D.**  
Vice President/Principal Aquatic Ecologist

**SELECTED PRESENTATIONS AND PUBLICATIONS (Continued)**

- Smith, J.D., M.T. Mattson, and V. Thompson. 2006. Using computational fluid dynamics to determine the hydraulic zone of influence for ichthyoplankton and juvenile fish sampling areas in the vicinity of the James A. FitzPatrick Plant cooling water intake structure in Lake Ontario. Presentation at the EPRI and UWAG conference on 316(b) issues, to be held in Atlanta, Georgia, 6-7 September 2006.
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In addition, Dr. Mattson has contributed to over 30 technical reports in the areas of aquatic ecology and sampling design.

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