THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

SEC DOCKET NO. 2019-02

APPLICATION OF CHINOOK SOLAR, LLC FOR A CERTIFICATE OF SITE AND FACILITY FOR THE CHINOOK SOLAR PROJECT IN FITZWILLIAM, NEW HAMPSHIRE

PREFILED TESTIMONY OF MARC C. WALLACE
ON BEHALF OF
CHINOOK SOLAR, LLC
OCTOBER 14, 2019

Qualifications of Marc C. Wallace

Q. Please state your name and business address.

A. My name is Marc C. Wallace. My business address is Tech Environmental, 303 Wyman Street, Suite 295, Waltham, Massachusetts 02451.

Q. Who is your current employer and what position do you hold?

A. I am the Vice President of Tech Environmental. Tech Environmental is a company with over 30 years of experience addressing air quality and noise concerns in New England. Our staff is a mixture of scientists, engineers, and technicians, many of whom hold advanced degrees in support of a specialized professional focus. Since 1984, Tech Environmental has provided expert air quality and sound services and studies in the form of hundreds of environmental impact statements, environmental notification forms, and environmental impact reports for commercial real estate development.

Q. Please describe your responsibilities at Tech Environmental, including those that relate to the Chinook Solar Project that is the subject of this docket.

A. I am an air quality and sound consultant for Tech Environmental. As the Vice

President I am also responsible for many administrative aspects of our company. Tech Environmental was engaged by Chinook Solar, LLC ("Chinook Solar") to conduct an acoustic study for the proposed 30MW Chinook Solar Project in Fitzwilliam, New Hampshire ("the Project"). As a result of all of these activities, I am very familiar with the proposed Project and the results of the acoustic study for this Project which has been referred to in the Application and has been marked as Appendix 16B to the Application, which we prepared for Chinook Solar ("the Sound Study").

Q. What are your background and qualifications?

A. I have over 32 years of experience as a sound consultant, providing permitting assistance, strategic planning, monitoring, modeling and impact assessment to municipalities, government agencies, and industry on projects in the transportation, energy, wastewater, solid waste, and industrial market sectors. I have been with Tech Environmental since 2008. Prior to that I was with Camp Dresser and McKee, and prior to that with Metcalf & Eddy. I am a Qualified Environmental Professional and a member of the Institute of Noise Control. I have associations with a number of related associations, societies and institutes. I have extensive experience in performing ambient and sound-source compliance monitoring over the course of my career, and I have conducted acoustic studies, peer review of noise studies, and operational and construction noise impact analyses for a wide variety of state, municipal and private industry clients. I have a B.S. in meteorology from Lyndon State College and an M.S. in Environmental Studies from the University of Massachusetts, Lowell. More detail on my background

and experience is included in my resume, which is included as Attachment A to this testimony.

Q. Have you previously testified before this Committee and/or any other state permitting agencies?

A. I have not testified before the New Hampshire Site Evaluation Committee ("SEC" or "Committee"), but I have testified in many public forums in the course of my career.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide the Committee with the results of the Acoustic Study for the Project, which included both baseline sound monitoring and acoustic modeling of the Project's sound impacts.

Site Information

Q. Please describe the location and basic characteristics of the proposed Project site.

A. The Project is proposed to be located in Fitzwilliam, New Hampshire. Specifically, the Project footprint is proposed to be located on approximately 110 acres of private lands which are currently under either an option to purchase or an option to lease agreement between Chinook Solar and each of five landowners. The total amount of land subject to these agreements is in excess of 500 acres of land, though as noted above the footprint of the proposed Project and thus the amount of land that will be cleared for the Project is a much smaller portion of the land under agreement. The Project is a 30MW

electric generating facility, with the electricity to be generated through the use of solar panels. In general, the Project site is one which has been actively forested for a number of years. The Project as proposed would include ground-based solar panels, 15 inverters for converting Direct Current ("DC") to Alternating Current ("AC"), and one substation with an 18/24 MVA power transformer to step-up the voltage of power delivered to the transmission grid. The inverters will only operate in the daytime when electricity is produced by the solar panels. The substation will operate both during the daytime and nighttime. More information about the location and characteristics of the Project site and surrounding area is contained in the Application.

Tech Environmental's Acoustic Study of the Project

Q. Did you and others with whom you work at Tech Environmental prepare the Acoustic Study for this Project?

A. Yes. In conjunction with others at Tech Environmental, I prepared the Acoustic Study for this Project.

Q. Why did Tech Environmental conduct the Acoustic Study?

A. The reason for conducting the Acoustic Study was to determine whether the Project would comply with SEC rules, which require that an application include "an assessment of operational sound associated with the proposed facility" and whether it would "involve the use of equipment that might reasonably be expected to increase sound by 10 decibel A-weighted (dBA) or more over background levels." Admin. Rules Site 301.08(d)(1). The Acoustic Study was also necessary to determine whether the Project

would meet the Town of Fitzwilliam's zoning code provision which establishes a maximum allowable incremental noise increase of 10 dBA above ambient. That provision also establishes maximum allowable one-hour daytime noise limits of 40dBA and 48dBA for Residential Districts and the Town Center respectively, and nighttime maximums of 34 dBA and 35 dBA, respectively. The Town limits may also be lowered by up to 5 dBA if the source is producing either tonal, low frequency or infrasound sounds. Both the SEC rule and the Town provision require measurement at the L90(t) sound level, which is a statistical descriptor of the sound level exceeded 90% of the time of the measurement period (t).

Q. Please describe how the study was conducted.

A. As noted in the June 28, 2019 letter to Dana Valleau, which contains the results of our Acoustic Study, we conducted ambient sound monitoring and collected sound monitoring data at the site for the Project. The sound analyzer was set up in the approximate center of the site and the ambient sound level measurements were collected using a Larson Davis 831 real-time sound level analyzer. More specifications for how the equipment was set up at the site are included in my report. The analyzer was set up to collect 24 hours of unattended ambient sound monitoring data from 7AM on May 8, 2019 to 6AM on May 9, 2019. Weather conditions were favorable for ambient monitoring with clear skies, light winds and temperatures ranging from 34 degrees to 63 degrees Fahrenheit. The acoustic modeling included 51 residential receptors, which are residences in locations surrounding the site. Future sound levels from the Project, when

it is producing maximum electrical power, were calculated with the Cadna/A acoustic model, a standard industry model utilized for studies of this nature. This is a three-dimensional model for sound propagation and attenuation based on International Standard ISO 9613. Digital terrain data for the Project area were analyzed to obtain terrain heights. The model conservatively assumes the most-favorable sound propagation conditions, as occur in downwind conditions or during ground-based temperature inversion on a clear night. The study was also conservative in that the sound analyzer estimating ambient conditions was set up in the approximate center of the site, not on the property boundaries of the proposed facility as allowed by the SEC rule. We obtained the manufacturer's specifications and sound level ratings for the inverters and the transformer and reviewed the plans for the Project which include the proposed locations of the transformer and the inverters. Inverters do not operate during the night and the transformer will operate at a lower load during the night. For the purposes of our study, however, we assumed that the transformer would operate at its maximum load at night, which was another conservative aspect of our study.

Q. What were the results of the Acoustic Study?

A. The results of the Acoustic Study showed that the operation of the 15 inverters and one substation will comply with the SEC and Town sound limits. The predicted change in sound levels as a result of the Project would range from 0 to 6 dBA above the existing baseline ambient L90 daytime and nighttime sound levels and there would be no tonal sounds predicted at the residential receptors.

Q. Are you familiar with the Eversource transformer that is located in Fitzwilliam that has been the source of complaints from Town residents over the years?

A. I have been provided with information about the Eversource transformer and some basic information about complaints of nearby Town residents pertaining to the sound that was emanating from that transformer.

Q. Do you know how that existing transformer compares with the transformer that will be used for this Project?

A. The transformer that is located in Fitzwilliam now is a much larger transformer with significantly different manufacturer's specifications and sound level ratings than the one which is proposed for this Project, which would indicate that any issues with sound emanating from the existing transformer would be quite different from the sound that will emanate from the transformer that is proposed for this Project. In addition, since this Project involves a solar generating facility that does not operate during the night and the transformer for this Project will be operating at a lower load during the night, any transformer-generated sound from the Project at night is likely to be less noticeable than sound emanating from the Eversource transformer.

Conclusion

Q. In your opinion, will the Project have an unreasonable adverse effect on public health as a result of the sound that it is anticipated it will generate?

A. No. Based upon the information set forth in our Acoustic Study and in my testimony above, I believe that the Project will not have an unreasonable adverse effect upon public health as a result of the sound it is anticipated to generate.

Q. Does this conclude your testimony?

A. Yes, this concludes my testimony at this time, though I reserve the right to file supplemental testimony in accordance with the Committee's procedural schedule.

ATTACHMENT A

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

Marc C. Wallace, QEP, INCE
Vice President

Education
B.S. Meteorology
Lyndon State College, 1987

M.S. Environmental Studies
University of Massachusetts, Lowell, 1994

Certification
Qualified Environmental Professional (#07020014)

Institute of Noise Control Engineering Full Member

Affiliations
Acoustical Society of America

Air and Waste Management Association

American Council of Engineering Companies of Massachusetts

American Meteorological Society

Environmental Business Council

Institute of Noise Control Engineering

Northeast Energy & Commerce Association
Environmental Committee

Mr. Wallace has 32 years of experience as a noise consultant, providing permitting assistance, strategic planning, monitoring, modeling and impact assessment to municipalities, government agencies, and industry on projects in the transportation, wastewater and solid waste disposal and industrial market sectors.

Mr. Wallace's noise experience spans multiple decades and versions of acoustic models. He started with the original FHWA models, such as STAMINA/OPTIMA, that were limited to one direction and single roadways. At the time, it was very important to understand how one could piece these model runs together to truly assess potential impacts from multi-roadway projects. Mr. Wallace applies his knowledge gleaned from the early models to today's models such as the FHWA-approved Traffic Noise Model (TNM2.5) and Roadway Construction Noise Model (RCNM). As required, Mr. Wallace has used the results from these models in a more sophisticated three-dimensional model to fully understand the potential cumulative sounds and incremental sound variations for a project.

Mr. Wallace has extensive experience in performing ambient and sound-source compliance monitoring over his career.

Mr. Wallace often presents the results in public forums and his multi-decade experience allows him to present detailed and sophisticated results in a simple and easy to understand format.

Select Project Experience

Expert Noise Testimony for the Wex-Tuck Realty, LLC. Mr. Wallace performed baseline sound and sound source monitoring, and acoustic modeling analyses to assess potential noise impacts at the site property boundary and three adjacent residential properties from a proposed Firestone Complete Auto Care Center in Newington, CT on behalf of Wex-Tuck Realty. Mr. Wallace provided expert testimony in Judicial Court in Stamford, Connecticut.

Expert Noise Testimony on the Woburn 38 Development. Mr. Wallace performed baseline sound monitoring and acoustic modeling analyses to assess potential construction noise impacts from the construction of a 40B residential development in Woburn, Massachusetts. He prepared a sound study report, and reviewed and commented on the City of Woburn Zoning Board of Appeals noise consultant's sound study as part of his pre-file

testimony. Mr. Wallace provided expert testimony at the Housing Appeals Committee as well as post-file written testimony as part of his final testimony.

Site Assignment Testimony for the TLA Holbrook Solid Waste Transfer Station. Mr. Wallace performed air quality and noise analyses performed for the TLA Holbrook proposed 1,000 ton per day Solid Waste Transfer Station. Mr. Wallace provided expert testimony at a public hearing in behalf of TLA Holbrook.

Site Assignment Testimony for the North Andover Board of Health. For the Town of North Andover, Mr. Wallace review the air quality analysis performed for the TBI proposed 600 ton per day Solid Waste Transfer Station. Mr. Wallace provided expert testimony at a public hearing in behalf of the Town's Board of Health.

Public Testimony for the Cohasset Public Health Department. For the Town of Cohasset, Mr. Wallace reviewed the noise impact assessment prepared by the proponent, Cohasset Heights Limited for expansion of the Cohasset Heights Landfill. Mr. Wallace provided expert testimony at a public hearing on behalf of the Town's Public Health Department.

Public Testimony on the GLSD Wastewater Treatment Plant Upgrade. Mr. Wallace prepared a non-major Comprehensive Plan Approval application for the installation of digester gas boilers and emergency flare for the Greater Lawrence Sanitation District (GLSD) wastewater treatment plant upgrade. Mr. Wallace also testified at the Town of North Andover Department of Public Health public hearings on the project.

Regulatory Testimony on Outdoor Wood Furnaces. For the leading manufacturer of outdoor wood furnaces offering renewable energy appliances to residential and commercial users, Mr. Wallace provided emissions and air dispersion modeling analyses, regulatory and compliance consulting assistance and expert testimony at a public hearing at the Connecticut General Assembly.

Expert Noise Testimony for a CVS Pharmacy. Mr. Wallace performed a sound study to determine if the proposed CVS pharmacy in Winchester, Massachusetts will comply with the Massachusetts Department of Environmental Protection (MassDEP) Noise Policy. The major exterior sources of noise associated with the pharmacy will include five roof top air handling units (RTUs). Both noise monitoring and modeling analyses were performed and demonstrated that the RTUs will comply with the MassDEP Noise Policy at the nearest residences. Mr. Wallace provided expert testimony at the Housing Appeals Committee as well as post-file written testimony as part of his final testimony.

Public Testimony for Interstate 12 Noise Abatement Study. Mr. Wallace managed a noise abatement study for the Interstate 12 in Baton Rouge, Louisiana for the Louisiana Department of Transportation and Development (DOTD). The study involved conducting noise monitoring and modeling analyses to evaluate installing noise barriers along an existing highway. The Federal Highway Administration (FHWA) approved highway noise model (STAMINA 2.0/OPTIMA) was used to determine impacts and design cost-effective noise walls for a FHWA Type 2 project. Mr. Wallace participated in a public hearing to present the results of the study and address issues and concerns from the adjacent residential and commercial neighbors.

Board of Health, Andover, Massachusetts. Mr. Wallace was retained by the Andover Board of Health to provide technical support and peer review of sound compliance monitoring being performed by a contractor building a new assisted living facility in Town. Neighbors complained about noise from rock blasting and crushing operations. The contractor hired a sound consultant to perform site perimeter sound monitoring. Mr. Wallace peer reviewed documents and observed the sound monitoring. He also provided the Town with recommendations to minimize construction noise particularly with hoe ram operations.

Devens Enterprise Commision, Devens, Massachusetts. As the Sound Consultant to the Devens Enterprise Commission (DEC), Mr. Wallace provided technical assistance in resolving noise complaints from residences in Harvard, MA that are adjacent to the Evergreen Solar (EGS) manufacturing plant in Devens, MA. Sound sources at the plant exceeded the Devens Industrial Performance Standards for Noise at site property boundaries, and at times, at the nearest residences. Mr. Wallace reviewed previous documentation, continous monitoring data reports and noise protocol prepared by EGS' sound consultant and worked closely with the DEC staff, their previous sound consultant and EGS' sound consultant to develop a resolution to reduce sound levels from EGS cooling towers and VOC scrubber system. Mr. Wallace prepared presentations and documentation presented at several DEC Board meetings indicating that lower sound limits from EGS's sound source monitors were necessary to show compliance with the IPS the majority of the time. The final documents approved by the Board were a new sound monitoring protocol and compliance document, which provided the procedures for determining EGS' compliance with the Devens IPS for Noise.

TLA Pond View Recycling Facility, East Providence, Rhode Island. Mr. Wallace conducted noise monitoring and modeling analyses for the expansion of a solid waste recycling facility. The proposed expansion would include tripling the daily recycling throughput from 500 tons per day to 1,500 tons per day and increasing its hours of operation into the evening. Mr. Wallace conducted sound testing of recycling and mobile source equipment and ambient noise monitoring at the nearest residences. An acoustic noise was used to demonstrate that the proposed expansion would be in compliance with the East Providence noise ordinance.

Pinard Waste Systems Sound Compliance Study, Raymond, New Hampshire. Mr. Wallace performed a compliance sound monitoring study for Pinard Waste Systems, Inc. in Raymond, NH. The facility performs maintenance on an existing truck fleet, repairs roll-off dumpsters, and processes waste materials. The facility operates from 3:00 a.m. to 11:00 p.m., but the majority of the vehicles accessing the site occur between 6:00 a.m. and 6:00 p.m. The results of the compliance test revealed that the current Pinard Waste Systems operations are in compliance with the Town of Raymond noise limits.

Truck Storage & Maintenance Facility, Norton, Massachusetts. Mr. Wallace completed a peer review of the noise study prepared by the acoustic consultant for Waste Management Inc. for their new Truck Storage & Maintenance Facility. The noise study focused on the potential noise impacts from truck back-up alarms on nearby residences approximately 600 and 1,000 feet away. The noise study also assessed the potential sound reduction capabilities of 10-, 16- and 20-foot high sound wall options, and made a recommendation to install a 20-foot high sound wall. Mr. Wallace examined the noise modeling calculations to verify their accuracy and completeness. Mr. Wallace also reviewed the recommended sound wall designs and their potential to reduce back-up sound levels. Mr. Wallace recommended replacing existing backup alarms with white noise backup alarms on all vehicles and install a 10-foot

high sound wall screen adjacent neighbors from the cumulative impacts of the trucking operation of the facility.

Noise Peer Review of New Parker Elementary School. Mr. Wallace conducted a peer review of the noise study for the new Parker Elementary School in Billerica, Massachusetts prepared by another acoustical engineering firm. The noise study was conducted to assess the potential noise impacts associated with mechanical rooftop HVAC equipment to be installed above the first and third floors of the building, and examined its compliance with the Billerica Noise By-Law. The noise study also assessed the potential sound reduction capabilities of proposed 10-foot-high plywood sound screens, and provided recommendations to modify them. Mr. Wallace examined the noise modeling calculations to verify its accuracy and completeness. He also reviewed the recommended modifications to the sound screens and their potential to reduce predicted sound levels below the Noise Bylaw sound limits.

Noise Study for Plymouth Rock Studios. Mr. Wallace managed and prepared an operational and construction noise impact analysis the proposed Plymouth Rock Studios as part of the Expanded Environmental Notification Form (EENF). The proposed project would include a film and TV production studio featuring 14 sound stages, a back lot, a multi-purpose theater, along with a hotel, office buildings, and an educational campus. A field noise monitoring program was conducted to establish baseline conditions and an acoustic model was used to estimate future operational and temporary construction sound levels. Mr. Wallace presented the results of the monitoring and modeling analyses at Plymouth Planning Board.

Aggregate Industries, Littleton, Massachusetts. Aggregate Industries owns and operates a nonmetallic mineral processing/crushing plant in Littleton, Massachusetts. Mr. Wallace prepared a non-major Comprehensive Plan Approval (nmCPA) application to reconfigure and upgrade their existing crushing plant to improve overall crushing operations and to obtain access to future reserves of rock deposit onsite. As part of the application, Mr. Wallace conducted a detailed noise impact analysis to assess potential impacts of relocating the plant closer to the northeast of the site during peak rock crushing activities. The analysis included a number of sound mitigation measures that included installing earth berms and sound walls and rearranging stockpiles to reduce noise from the loudest sound sources. Mr. Wallace demonstrated that the relocated plant would meet the MassDEP Noise Policy and Littleton Noise Bylaw.

General Electric Transportation, Schenectady, New York. Mr. Wallace completed a noise impact analysis for a new battery production plant in Schenectady, New York as part of a New York State Department of Environmental Conservation (NYSDEC) application. Mr. Wallace performed the noise monitoring and acoustic modeling analyses to assess the potential impacts on a nearby residential neighborhood.

General Electric Aircraft Engine Test Cells, Lynn, Massachusetts. Mr. Wallace performed sound monitoring and acoustic modeling for the MassDEP's approval of the Air Plan Approval application for the modification of three existing aircraft engine test cells 5, 109 and 110 (Test Cells) at the General Electric Company (GE) Aviation facility in Lynn, MA. Mr. Wallace performed acoustic modeling to simulate worst-case (maximum load) operating conditions of the three engine Test Cells. All incremental changes in existing ambient sound levels were below the 10-dBA incremental limit allowed

by the MassDEP Noise Policy at the site property boundaries and nearest residences. Thus, Mr. Wallace concluded that the Test Cells will fully comply with the MassDEP Noise Policy.

Norumbega Reservoir Noise Impact Study, Weston Massachusetts. For the MWRA Norumbega Reservoir Environmental Impact Report (EIR), Mr. Wallace conducted a noise impact study evaluating the construction and operational noise impacts of siting a 115-mg water storage tank at the reservoir in Weston, Massachusetts. The construction of the tank would last approximately four years. Construction activities at the site would include approximately one year of rock blasting and excavation. The tasks involve a comprehensive ambient noise monitoring, construction noise impact modeling analyses, and proposing construction noise mitigation measures, such as noise barriers.

Wastewater Treatment Plant Noise Impact Study, New Bedford, Massachusetts. Mr. Wallace conducted a noise impact study for a 30-mgd secondary wastewater treatment facilities in New Bedford, Massachusetts. The tasks consist of a comprehensive ambient noise monitoring and operational noise impact modeling analyses to determine potential noise impacts from odor control fans at a residential neighborhood located only 300 feet from the site property boundary. Mr. Wallace evaluated appropriate noise silencer equipment and barriers, and conducted ambient noise monitoring after noise mitigation measures were installed to determine the total ambient noise reduction.

Wastewater Treatment Plant Noise Impact Study, Salem Massachusetts. Mr. Wallace conducted a noise impact study for the South Essex Sewerage District (SESD) design of a 28-mgd secondary wastewater treatment facilities and residuals processing plant in Salem, Massachusetts. The tasks consisted of a comprehensive ambient noise monitoring, and operational noise impact modeling analyses, and coordination with design engineers to develop noise mitigation recommendations. Mr. Wallace conducted construction and rock blasting noise field studies to assist in the evaluation of construction noise impacts on neighborhood residents only 100 feet from the site property boundary.

Southbridge Landfill Air Permitting, Southbridge, Massachusetts. Mr. Wallace prepared the Massachusetts Department of Environmental Protection (MassDEP) Non-Major Comprehensive Air Plan Approval and Title V Permit applications for the Southbridge, MA landfill operated by Casella Waste Systems. Mr. Wallace performed a federal and state regulatory review, developed emissions estimates for the landfill gas (LFG) collection system, two internal combustion engines, enclosed flare and backup open flare and performed site-specific and cumulative an dispersion modeling analyses.

Various Landfill Gas Collections and Flares, Massachusetts. Mr. Wallace prepared MassDEP non-major Comprehensive Plan Approval applications for landfill gas collection and flare systems for the Gardner Street Landfill in West Roxbury, Town of Yarmouth Landfill and Town of North Attleboro Landfill. He conducted landfill gas emissions modeling using the U.S. EPA-approved LandGEM model to determine potential fugitive volatile organic compound (VOCs) emissions from proposed landfill gas collection system and potential controlled VOCs emissions from the flares.

Various Title V Operating Permits for Landfills. Mr. Wallace completed Title V Operating Permits for several landfills in North Carolina, South Carolina, and Florida. The operating permits focused on the existing or planned active gas collection and flare system. These landfills included Berkley County, South Carolina; North Wake County, North Carolina; Indian River County; and St. Lucie County in Florida. He conducted landfill gas emissions modeling using the U.S. EPA-approved LandGEM model

to determine potential fugitive volatile organic compound (VOCs) emissions from proposed landfill gas collection system and potential controlled VOCs emissions from the flares.

Solid Waste Authority of Palm Beach County, West Palm Beach, Florida. Mr. Wallace performed an air quality impact analysis for the Solid Waste Authority of Palm Beach County, Florida for the installation of a 600-wet ton per day biosolids heat dryer plant. The air quality impact analysis was part of an air permit application filed with the Florida Department of Environmental Protection (FDEP). He performed air emissions calculations and air dispersion modeling analysis using the U.S. EPA-approved Industrial Source Complex Short-Term (ISCST) model to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and FDEP ambient air quality standards.

Wastewater Treatment Plant Emergency Generators, Brockton, Massachusetts. Mr. Wallace prepared a non-major Comprehensive Plan Approval application for the installation of two 2000-kilowatt emergency generators at the Brockton Wastewater Treatment Plant. Mr. Wallace was involved in preparation of the application including conducting noise impact assessment.

Employment History

2016 to present	Tech Environmental, Inc., Waltham, Massachusetts Vice President
2014 to 2016	Tech Environmental, Inc., Waltham, Massachusetts Principal
2008 to 2014	Tech Environmental, Inc., Waltham, Massachusetts Associate
1991 to 2008	Camp Dresser and McKee, Cambridge, Massachusetts Senior Environmental Scientist
1987 to 1991	Metcalf & Eddy, Wakefield, Massachusetts Environmental Scientist