COMMONWEALTH OF KENTUCKY

BEFORE THE KENTUCKY STATE BOARD ON ELECTRIC GENERATION AND TRANSMISSION SITING

IN THE MATTER OF:

THE ELECTRONIC APPLICATION OF THOROUGHBRED SOLAR, LLC FOR A CERTIFICATE TO CONSTRUCT A 50 MEGAWATT MERCHANT SOLAR ELECTRIC GENERATING FACILITY IN HART COUNTY, KENTUCKY PURSUANT TO KRS 278.700, ET SEQ. AND 807 KAR 5:110, ET SEQ.	)	CASE NO. 2022-00115

APPLICANT THOROUGHBRED SOLAR, LLC'S WITNESS LIST

Comes now Applicant Thoroughbred Solar, LLC ("Thoroughbred"), by and through counsel, pursuant to 807 KRS 5:001, Section 6(2) and other applicable law, and hereby gives notice of its intent to make the following witnesses available for examination at the hearing for this matter scheduled for February 21, 2023.

Patrick Walsh, Senior Development Associate at Leeward Renewable Energy, LLC ("LRE") and lead developer for the Thoroughbred Solar Project ("Project"), will be available to provide testimony generally in sponsorship of Thoroughbred's Application (filed October 12, 2022) and responses to the Electric Generation and Transmission Siting Board ("Siting Board") Staff's first and second requests for information (filed on December 5, 2022 and January 23, 2023, respectively, and supplemented on February 6, 2023). He will also be available to provide testimony more specifically regarding Application Exhibits 1-11, as well as portions of Exhibit 12 (Site Assessment Report, "SAR") in combination with other listed witnesses.

Kevin Adelman, Senior Director, Project Development at LRE, will be available to provide testimony generally on topics related to development, design, and layout of solar projects, LRE corporate information, solar project construction practices, and other solar industry areas.

Lynn Gresock, Principal at Haley & Aldrich and lead consultant for the Project, will be available to provide testimony regarding the Project's site plan and layout; all environmental assessments; wetland delineation; listed species review; glare; landscape and lighting; the traffic study; potential air, waste and water permits; FAA review standard; cumulative environmental assessment; other anticipated permits; and compatibility with scenic surroundings (SAR Attachments A-B, E-F, H-I, K-L, and N).

Isaac Old, Senior Consultant – Acoustics at Resource Systems Group, Inc., will be available to provide testimony regarding the projected construction and operational sound associated with the Project and regarding SAR Attachment G (Noise Report).

Andrew Lines, Principal – Valuation at CohnReznick, will be available to provide testimony regarding potential impacts or the lack thereof on property values as a result of the Project, as well as in sponsorship of SAR Attachment J (Property Value Impact Study).

Matthew Hildreth, Water Resources Engineering Manager at Westwood Professional Services, will be available to provide testimony regarding stormwater management relative to Project construction and operation, including regarding the Preliminary Stormwater Management Plan (SAR Attachment M).

Mohamed Alrowaimi, Ph.D., P.E., Geostructural Engineer at LRE, will be available to provide testimony regarding LRE's geotechnical analysis regarding constructability of the Project, including the Geotechnical Report (SAR Attachment C) and Karst Considerations (SAR Attachment D).

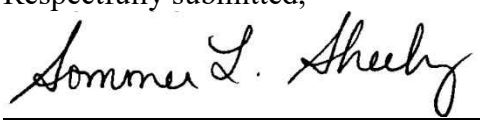
Lee Czor, East Region Business Development Manager at Geotechnology Inc., will be available to provide testimony regarding constructability and technical engineering that the Project will require, including considerations for construction in karst and geotechnical mapping (SAR Attachments C-D).

Taylor Gosman, Senior Director of Project Management at LRE, will be available to provide testimony regarding construction processes and considerations, road use and traffic issues, and other aspects of the construction project management for solar projects such as the Project.

Each above-listed witness can also provide testimony regarding data request responses and proposed mitigating measures in their listed subject areas.

Attached hereto are the curriculum vitae of Thoroughbred's third-party expert witnesses, Lynn Gresock., Isaac Old, Lee Czor, Matthew Hildreth, and Andrew Lines.

Respectfully submitted,



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LYNN GRESOCK

Principal Consultant

EDUCATION

B.S., Environmental Design (Landscape Architecture and Regional Planning), University of Massachusetts

Lynn has more than 38 years of experience in regulatory issues as they relate to environmental permitting and compliance for a wide range of projects. She specializes in permitting and support of merger and acquisition activities for projects in the energy sector. Her project experience includes obtaining environmental approvals for almost 30,000 megawatts (MW) of electric generation capacity for a wide range of facilities, including fossil fuel-fired power facilities and renewable energy facilities. Lynn has also provided permitting services for electric transmission lines, natural gas pipelines, and other types of energy facilities. She has experience supporting project development from early definition phases, through obtaining licensing approvals, construction oversight, and operational compliance support. Many of her projects require expert witness testimony and/or active stakeholder engagement. As a result of her experience, Lynn has the knowledge and exposure to a broad range of associated issues, and a track record of facilitating project success. She brings a unique perspective to her projects based not only with her extensive track record in permitting energy projects, but also due to her former experience as chair of her local wetland Conservation Commission and her prior position as a corporate environmental permitting specialist. Lynn's ability to facilitate projects is enhanced through her understanding of stakeholder perspectives and her skill in consensus building.

RELEVANT PROJECT EXPERIENCE

Representative Solar and Battery Storage Energy Experience

Confidential Client, Solar and Battery Storage Facility Evaluation, Illinois. Provided critical issues assessments for three potential reuse sites for which either battery storage or solar/battery storage may be proposed. In addition to the range of site characteristics and potential permitting issues, prior use of the properties and community expectations were factors for consideration. Additional support is anticipated to be provided as the projects progress.

Leeward Renewable Energy, South Branch Solar, Ohio. Lead environmental consultant supporting the Ohio Power Siting Board (OPSB) process and other permitting requirements for this proposed solar energy facility. This includes completion of full environmental studies including wetland delineation, noise assessment, visual impact evaluation, cultural resources review, and listed species issues. Stakeholder coordination and addressing issues such as historic wells and other features have also been key elements of project support to date.

Leeward Renewable Energy, Union Ridge Solar, Ohio. Addressed cultural resource issues associated with a proposed solar energy facility, including both archaeological investigations and historic structure inventory. Coordinated regarding additional visual mitigation for one resource in relative proximity to the project to obtain agency concurrence of no effect.

Leeward Renewable Energy, Thoroughbred Solar, Kentucky. Lead environmental consultant supporting environmental permitting, including through the Kentucky Siting Board. Activities have included wetland delineation, Phase I Environmental Site Assessment, ambient noise measurements, cultural resource review, and other layout considerations. Support will include stakeholder engagement as well as preparation of key documents.

Confidential Client, Battery Storage Portfolio, Eastern Massachusetts. Supported early feasibility, permit plan development, and permitting activities associated with several battery storage projects that will require comprehensive environmental review and consideration of Environmental Justice issues.

Confidential Client, Battery Storage Facility, West Texas. Prepared permitting plan for potential facility, and conducted preliminary site screening activities. Support is anticipated to continue as the project progresses.

Vesper Energy, Confidential Project, Pennsylvania. Conducted a comprehensive critical issues assessment and provided a permitting plan for a potential solar energy facility located in northwestern Pennsylvania. Formal wetland delineation activities and initial cultural resource review were also provided to support project feasibility assessment and prepare a framework for project layout.

Brookfield Renewable, Battery Storage, Ohio. Provided a Phase I Environmental Site Assessment associated with potential acquisition of an operating battery storage facility.

Vesper Energy, Kingwood Solar, Ohio. Lead environmental consultant supporting the OPSB process and other permitting requirements for this proposed solar energy facility. This includes completion of full environmental studies including wetland delineation, noise assessment, visual impact evaluation, cultural resources review, and listed species issues. Ongoing support of the adjudicatory process continues.

Confidential Client, Solar Facilities, Missouri. Prepared critical issues assessment and permitting review for two separate solar energy facility projects located in central Missouri.

Confidential Client, Battery Storage Facility Project, Connecticut. Lead environmental consultant for full Connecticut Siting Council (CSC) permitting, including natural resources, cultural resources, and other necessary documentation.

Confidential Client, Solar Facilities, Virginia and Maryland. Provided permitting plans for proposed facilities. Support is anticipated to continue as projects progress.

Nestlewood Solar I LLC, Clermont and Brown Counties, Ohio. Full environmental licensing of a proposed 80-MW photovoltaic solar energy facility. Prepared OPSB documentation and mapping; wetland and species activities; cultural resources; visual assessment; and related outreach. Ongoing activities include OPSB obligation review and preparation for construction.

Hecate Energy, Coeymans Solar and Greene County Solar, Albany County and Greene County, New York. Principal-in-charge for Article 10 permitting associated with two solar energy facilities. Full environmental studies, negotiation of stipulations, application documentation, and associated outreach and support of related issues.

Pine Gate Renewables, LLC, Five Solar Energy Facilities in Rhode Island. Environmental consulting services to support five approximately 1-MW solar facilities in locations throughout Rhode Island including environmental review to support National Environmental Policy Act (NEPA) review associated with USDA funding; bat monitoring; and archaeological surveys.

Wallingford Renewable Energy, LLC, Wallingford Renewable Energy, Wallingford, CT. Lead environmental consultant for permitting an approximately 20-MW solar project. Portions of the project will be located on a capped landfill, while the remaining arrays will be located on an adjacent parcel. Prepared the CSC Petition Approval; CSC approval was received within 3 months of submittal. In addition to the broad topics required in the CSC Petition. Provided support for layout, stormwater, wetland, vernal pool, listed species, geotechnical, and site cleanup issues.

Representative Power Plant and Transmission Permitting Experience

Confidential Client, Combined Cycle Electric Generating Facility, West Texas. Provided preliminary site evaluation for several potential locations, including Phase I Environmental Site Assessment, preliminary natural resources review, floodplain evaluation, air permitting consideration, and identification of overall permitting requirements and strategy. Permitting support is anticipated to continue as the project progresses.

Harrison Power, Harrison County, Ohio. Provided permitting support for this previously permitted facility in order to address lapsing approvals and prepare the project for financial close. Activities have included focus on OPSB obligations, wetland permitting, air permitting, Federal Aviation Administration review, wastewater discharge permitting, and other support, as needed.

Confidential Client, Combined Cycle Electric Generating Facility, Southern Michigan. Conducted critical issues assessment for a broad area within the target county. Following site selection, wetland delineation (and formal jurisdictional review), ambient noise measurement, and preliminary air permitting support has been provided. Permitting support is anticipated to continue as the project progresses.

Confidential Client, Combined Cycle Electric Generating Facility, Indiana. Provided critical issues assessment for multiple potential counties, followed by a refined assessment once a specific site had been selected. Additional services provided includes wetland delineation, preliminary air permitting support, and consideration of water sources. Permitting support is anticipated to continue as the project progresses.

Confidential Client, Simple Cycle Electric Generating Facility, Southeastern Michigan. Provided pollution control evaluation based on three equipment options to determine the ability to streamline permitting requirements through project configuration.

Advanced Power NA, Oak Meadow Energy, Cook County, Illinois. Full environmental licensing of a proposed 1,250-MW natural gas-fired combined cycle facility to be located in Glenwood, Illinois. Work included an air permit application; wetland and species activities; cultural resources; well feasibility and development; noise assessment; public outreach; and other activities associated with environmental permitting.

Confidential Project – Connecticut. Full environmental licensing of a proposed 375-MW simple cycle peaking facility located at an existing generating facility site. Work included preparation of a Petition for Declaratory Ruling for filing with the CSC; support of an air permit application; noise assessment; visual assessment; other agency consultation; and related outreach and testimony.

Ohio River Partners Shareholder LLC, Hannibal Port Power, **Monroe County, Ohio.** Full environmental licensing of a proposed 485-MW natural gas-fired combined cycle facility located on an existing industrial site. Work included preparation of OPSB documentation and mapping; a Prevention of Significant Deterioration (PSD) air permit application; and other required resource permits and outreach.

Clean Energy Future-Trumbull, Trumbull Energy Center, Village of Lordstown, OH. Full environmental licensing of a proposed 800-MW natural gas-fired combined cycle facility located in Trumbull County, Ohio. Work included preparation of OPSB documentation and mapping; a PSD air permit application; wetland and species activities; cultural resources; water and wastewater feasibility review; and related resource permits and outreach.

Advanced Power NA, South Field Energy, Columbiana County, Ohio. Full environmental licensing of a proposed 1,105-MW natural gas-fired combined cycle facility (with ultra-low sulfur distillate backup). Work has included preparation of OPSB applications for the generating facility, natural gas pipeline interconnection and electric transmission interconnection; documentation and mapping; a PSD air permit application; wetlands; noise; cultural

resources; and activities associated with water use and wastewater discharge alternatives. Activities included a full National Pollutant Discharge Elimination System (NPDES) permit associated with wastewater discharge into the Ohio River. Also provided community outreach support.

Clean Energy Future, LLC, Lordstown Energy Center, Village of Lordstown, OH. Full environmental licensing of a proposed 800-MW natural gas-fired combined cycle facility. Work included preparation of OPSB documentation and mapping; a PSD air permit application; and related resource permits and outreach.

CPV Towantic, LLC, CPV Towantic Energy Center, Oxford, CT. Project manager and lead environmental consultant for permitting of the CPV Towantic Energy Center, an approximately 800-MW combined cycle electric generating facility. Responsibilities have included environmental documentation associated with a Petition for Changed Conditions before the CSC and a Permit Application for Stationary Sources of Air Pollution, as well as providing outreach support and focus on the full range of considered environmental and community issues. Project support continued throughout construction.

Clean Energy Future-Oregon, Oregon Energy Center, Oregon, OH. Full environmental licensing of a proposed 800-MW natural gas-fired combined cycle facility. Work included preparation of OPSB documentation and mapping; a PSD air permit application; and related resource permits and outreach.

Apex Power Group, LLC/Caithness Energy L.L.C., Guernsey Power Station, Guernsey County, Ohio. Full environmental licensing of a proposed 1,650-MW natural gas-fired combined cycle facility located in Guernsey County, Ohio. Work included preparation of OPSB documentation and mapping; a Prevention of Significant Deterioration (PSD) air permit application; and related resource permits, including support for grouting historic mines.

Confidential Client, Generating Facility Initial Permitting Support, Southwestern Pennsylvania. Project manager and technical lead for review of key issues associated with a proposed site for an electric generating facility, including air permitting and other environmental constraints. Agency meetings were also supported during this early stage of project development.

Confidential Client, Generating Facility Feasibility and Initial Permitting, Northeastern Illinois. Project manager and technical lead for evaluation of a complete feasibility assessment for two potential sites to identify key issues and inform siting of a proposed combined cycle electric generating facility. Upon selection of a site, additional support continues to be provided.

Confidential Client, Generating Facility Feasibility and Initial Permitting, Northeastern Tennessee. Project manager and technical lead for evaluation of a complete feasibility assessment to identify key issues and inform siting of a proposed combined cycle electric generating facility. Agency pre-application meetings and additional technical evaluation of air quality, water and wastewater issues were also provided.

Confidential Client, Generating Facility Feasibility and Initial Permitting, Northeastern Illinois. Project manager and technical lead for evaluation of a complete feasibility assessment for three potential sites to identify key issues and inform siting of a proposed combined cycle electric generating facility. Constraints identification and permitting strategy were identified.

NTE Connecticut, LLC, Killingly Energy Center, Killingly, CT. Project manager and lead environmental consultant for permitting of the Killingly Energy Center, an approximately 650-MW combined cycle electric generating. Responsibilities have included environmental documentation associated with CSC documentation, a Permit Application for Stationary Sources of Air Pollution, as well as for other key environmental permits and approvals. Support of the Environmental Justice and CSC process included development of and support of an EJ Plan and other local engagement, including active participation in community meetings.

NTE Ohio II, LLC, Pickaway Energy Center, Pickaway County, Ohio. Environmental licensing of a proposed 1,000-MW natural gas-fired combined cycle facility located in Pickaway Township, Ohio. Work has included wetlands; cultural resources; and water/wastewater feasibility review. As the project progresses, full OPSB mapping, documentation and support will be provided for the generating facility and its interconnections, including technical focus on specific environmental disciplines.

NTE Ohio, LLC, Middletown Energy Center, Butler County, Ohio. Full environmental licensing of a proposed 525-MW natural gas-fired combined cycle facility located in Middletown, Butler County, Ohio. Work included preparation and support of the OPSB process, wetlands and species review, noise, and cultural resources. Due to the site's former ownership, consideration of historic contamination was necessary. Phase I and Phase II Environmental Site Assessments were completed to document that recognized environmental concerns were appropriately addressed. Work continued throughout construction, with regular inspections and reporting as well as on-call support of issues as requested.

Advanced Power NA, Carroll County Energy, Carroll County, Ohio. Full environmental licensing of a proposed 750 MW natural gas-fired combined cycle facility located in Carroll County, Ohio. Work has included initial feasibility review, preparation of OPSB assessments, documentation and mapping, a Prevention of Significant Deterioration air permit application, wetlands, noise, cultural resources, and activities associated with water use and wastewater discharge alternatives. Support of the project has continued through project construction, including several OPSB amendments and other as-needed support.

Oregon Clean Energy, North American Project Development, Oregon, OH. Managed the full environmental licensing of a proposed 800 – 940-MW natural gas-fired combined cycle facility. Work included preparation of OPSB documentation and mapping (including several amendments), a Prevention of Significant Deterioration air permit application, wetlands and stormwater permits, and permits related to wastewater discharge to the local treatment plant.

Cricket Valley Energy Project, Advanced Power North America, Dover, NY. Environmental licensing for a 1,000-MW combined cycle project requiring an Environmental Impact Statement (EIS) through the State Environmental Quality Review Act (SEQR) process as well as federal, state, and local permits. The project's location on an industrial property, portions of which have been in use for many years, requires consideration of potential site contamination and cleanup, as well as building demolition issues. Other project issues include air quality; wetland and endangered species issues associated with the site's proximity to the Swamp River; development of an on-site groundwater supply; stormwater management; and other potential community concerns such as noise, visual, traffic and effect on services. Supported outreach through public open house and topical Working Group meetings. Prepared remediation/closure plan, and supported preparation of the project for construction, including associated with its proposed electric transmission interconnection.

Fremont Energy Center, Calpine Corporation, Sandusky County, Ohio. Managed full environmental licensing for a proposed 700-MW combined cycle facility located near Fremont. The project's wet cooling system utilized city water supplies, and the project infrastructure utilized the adjacent rails-to-trails corridor. Work included preparation of an OPSB documentation and mapping, a Prevention of Significant Deterioration air permit application, and permits related to wastewater discharge to the local treatment plant.

Lawrence Energy Center, Calpine Corporation, Lawrence County, Ohio. Full environmental licensing for a proposed 2,200-MW combined cycle facility. The site's location on the shores of a major surface water body required consideration of cultural resources, wetland and floodplain issues. The project's proposed withdrawal and discharge of surface water required NPDES authorization as well as review by the U.S. Army Corps of Engineers in that regard. Complex terrain immediately proximate to the site resulted in the need for interactive source air quality modeling. Stack height optimization required consideration of a nearby airport as well. In addition to the resource permits noted,

an OPSB application was prepared and approved, and a Memorandum of Agreement developed to protect cultural resources at the site.

Hyperion Power Project, Delta Power, Allen County, Ohio. Managed the preparation of the OPSB application for an approximately 750-MW combined cycle facility located in Fort Shawnee Township. Issues included avoidance of underground piping systems associated with the adjacent tank farms, and coordination with the project team of consultants responsible for a variety of technical issues.

Washington Energy Facility, Duke Energy North America, Washington County, Ohio. Managed environmental licensing for a 620-MW combined cycle facility utilizing wet cooling. Prepared documentation and mapping for the OPSB review and the air permit application. Issues included archaeological resources and water issues associated with the proposed intake and discharge into the Muskingum River.

Madison Generating Station, Duke Energy North America, Butler County, Ohio. Managed environmental licensing for a 640-MW simple cycle peaking facility consisting of eight General Electric (GE) 7EA units. Environmental support included documentation and mapping for the OPSB review, preparation of air permitting documentation, evaluation of the site for environmental and cultural resources, and documentation of construction stormwater management systems. The project began construction within six months of the initial permit application filing; this expedited review involved continual agency interaction and close coordination with the project's development and construction team.

Energy Facility Expansion Projects, Confidential Client, Ohio and Pennsylvania. Evaluated the feasibility and permitting requirements associated with expansion of existing energy facilities. Considerations included existing facility compliance history, site constraints, air quality modeling and regulatory issues, water demand strategies, wastewater discharge options, and permitting complexity.

Lake Erie Link Project, Lake Erie, TransÉnergieUS, Ltd., Nanticoke, Ontario to Ashtabula, Ohio and East Springfield, Pennsylvania. Managed environmental licensing efforts associated with an underground direct current electric cable proposed to connect the Canadian and United States electrical grids. Work included environmental assessments in support of route selection and converter station site selection; in-lake field program direction; wetland delineations; noise assessments; cultural resource review; and local support. An Environmental Assessment associated with the required Presidential Permit was completed. Other potential permits for which initial support was provided included Army Corps of Engineers licensing; Great Lakes Commission review; and state and local licensing in both Pennsylvania and Ohio.

Bayonne Energy Center, Energy Resources, Bayonne, NJ. Project manager for environmental permitting associated with a proposed 512 megawatt (MW) natural gas and oil-fired simple cycle electric generating facility. Issues included air quality, coastal consistency review, historical site contamination issues, water supply alternatives evaluation, and coordination associated with the proposed underwater electric cable proposed to provide project output to meet New York City energy needs.

Heritage Station, Sithe, Oswego, NY. Managed environmental licensing for an 800-MW combined cycle project on the 190-acre Independence Station cogeneration facility site. The project required review under the Article X process. As a part of this process, detailed stipulations were developed as a scope for the environmental evaluation. The resulting seven-volume application was confirmed by the Department of Public Service to have completely responded to the stipulation requirements and was approved under an expedited settlement process. Key issues included the use of Lake Ontario water in the proposed wet cooling system, and potential cumulative effects associated with the project and the adjacent cogeneration facility. The full range of environmental disciplines was examined for the project.

Cogeneration Facility, U.S. Generating Company, Rotterdam, NY. Successfully obtained environmental permits for a 230-MW generating facility. Prepared a multidisciplinary EIS under SEQR, Army Corps of Engineers wetlands permits,

state wetland permits, air permits, water discharge permits, and Public Service Commission documentation for the proposed electrical interconnections. Continual environmental design input and strategic management enabled the project to meet an aggressive schedule for obtaining environmental approvals.

Cogeneration Facility, U.S. Generating Company, Guilderland, NY. Managed environmental permitting for a 230-MW independent power production facility. Prepared a multidisciplinary EIS under SEQR, Army Corps of Engineers wetlands permits, air permits, and Public Service Commission approvals for proposed natural gas and electrical interconnections. Early environmental screening and involvement in project design enabled the client to develop a site plan meeting applicable environmental standards.

Cogeneration Facility, Boston Thermal Cogeneration Corp., Boston, MA. Developed the strategy for and managed the permitting of a gas and oil-fired cogeneration facility providing steam to the existing Boston Thermal distribution system and electricity to Boston Edison's power network. Permits were required from all levels of government, including a comprehensive Massachusetts Environmental Policy Act Environmental Impact Report. Issues including remediation of existing site contamination, air quality impacts, health risk concerns, traffic, and noise. The location of the site on filled tidelands required compliance with coastal regulatory standards as well. Continuous interaction with community groups and regulatory agencies was an important component of the permitting strategy.

Manchester Street Station, New England Power Service Co., Providence, RI. Prepared a full-scope Environmental Assessment and environmental permit applications for repowering the Narragansett Electric Company's existing Manchester Street Station and associated new electric transmission system. Analyzed baseline environmental conditions to identify the projected impact, and developed mitigation to minimize identified impacts. Key issues included air quality, thermal discharges into the Providence River, and the preparation of state wetland applications.

Expansion and Development Site Review, International Power America, Connecticut and Massachusetts. Provided critical issues assessment documentation to review five potential sites in Connecticut and Massachusetts for potential new development or expansion projects. Detailed regulatory and issue review, development of milestone scheduling to demonstrate the potential for licensing feasibility in a timely manner, and identification of key tasks were provided to support the client’s selection of projects for development. Several sites included consideration of historic site contamination issues. Environmental permitting support was provided for two projects selected for development.

Medway Station Expansion Project, Sithe, Medway, MA. Managed environmental licensing efforts for a 540-MW natural gas fired peaking project proposed to augment existing on-site peaking capability. As the first simple-cycle peaking project proposed in Massachusetts in recent history, this project involved new applications for existing environmental standards, and additional documentation to support the appropriateness of technology selection. Issues included air quality, noise, and local concern with regard to regional power plant development. Massachusetts Energy Facilities Siting Board approval, including expert witness testimony, was required for the project. In addition to technical permit applications at the state level, comprehensive environmental documentation was required through the Massachusetts Environmental Policy Act process. Early involvement in the project allowed for optimal siting and design to best minimize impacts of the proposed facility, and allow for mitigation of existing facility impacts, to assure regulatory officials and the local community that impacts associated with the proposed expansion were acceptable.

Peabody Power Facility, Peabody Power, Peabody, MA. Obtained full environmental licensing for a 99-MW peaking facility to be operated on natural gas with oil backup. Documentation that Energy Facilities Siting Board review was not required was obtained via a formal jurisdictional advisory opinion process. Massachusetts Environmental Policy Act Certification for the project was received following review of the Environmental Notification Form, with no Environmental Impact Report required. Other environmental issues included consideration of site remediation requirements, air permitting, noise impact analysis, and work within wetland buffer zones.

Terrapin Power Project, Competitive Power Ventures, L.P., Savannah, GA. Full environmental licensing for a proposed 800-MW combined cycle facility utilizing natural gas with low sulfur fuel oil backup. Its location proximate to the Savannah River required consideration of wetland and floodplain issues. The site was also located within an industrially zoned area with a long history of industrial uses; a detailed site investigation was undertaken, including coordination with the United States Environmental Protection Agency (EPA) and Georgia Environmental Protection Division to identify remedies that would return the site to a useful purpose. The site's proximity to Wolf Island, a Class I area, required a detailed assessment of the project's potential effect on visibility in that area. The project proposed to utilize reclaimed water from an adjacent publicly owned treatment works for its wet cooling system.

Port City Power Project, Sithe/Exelon, Waukegan, IL. Full environmental licensing for an approximately 900-MW natural gas fired combined cycle facility on an industrial site near Lake Michigan. Air quality impact analysis, noise assessment, ecological evaluation, consideration of site remediation needs, and visual impact assessment were all conducted for this project.

Big River Power Project, Competitive Power Ventures, L.P, Screven County, GA. Prepared an air permit application, including consideration of Class I impacts, for this 800-MW combined cycle facility. Adjacent to the Savannah River, the project proposed the use of surface water in a wet cooling system and discharge to a nearby agricultural facility in order to maximize water recycling. Environmental site assessment, cultural resource investigations and wetland delineations were conducted for the project.

Audrain Generating Station and Bollinger Generating Station, Duke Energy North America, MO. Managed environmental licensing for two separate 640-MW simple cycle peaking facilities consisting of eight GE 7EA units. Environmental approvals for the Audrain Generating Station were received on an expedited schedule. Issues included air permitting, cultural resources, Indiana bat habitat review, stormwater management and wastewater discharge authorization. The Bollinger Generating Station involved similar issues. In addition, the Bollinger site's proximity to a Class I area involved consultation and review by the Federal Land Manager, including a CALPUFF analysis to address the potential for visibility and regional haze issues.

Marshall County Generating Station, Duke Energy North America, Kentucky. Managed environmental licensing for a 640-MW simple cycle peaking facility consisting of eight GE 7EA units. In addition to air licensing, this project involved wetland delineation and avoidance, permits for work within mapped floodplain, Indiana bat habitat issues, stormwater management plan development and testing of groundwater to develop a water source for the project.

Vermillion Generating Station, Duke Energy North America, Vermillion County, IN. Managed environmental licensing for a 640-MW simple cycle peaking facility consisting of eight GE 7EA units. Environmental support included evaluation of the site for environmental and cultural resources, preparation of air permit documentation, and preparation of an Erosion Control Plan to identify construction stormwater management systems. An on-site groundwater well development program was also successfully completed for this project. The project began construction within six months of the initial permit application filing; this expedited review involved continual agency interaction and close coordination with the project's development and construction team.

DeSoto Generating Station, Duke Energy North America, DeSoto, IN. Managed environmental licensing for a 640-MW simple cycle peaking facility consisting of eight GE 7EA units. Environmental conditions at the site were evaluated, and an air permit application prepared and submitted. An on-site groundwater well development program was also required at this site.

Lee County Generating Station, Duke Energy North America, Lee County, Illinois. Assisted client in initial site screening stage, assessing site for critical issues. Numerous other Illinois sites were also evaluated for this analysis. Following site selection, managed environmental licensing for a 640-MW simple cycle peaking facility. Air permitting issues included the proximity of a nearby power plant proposal, and the agency's need to understand the potential for

cumulative impacts. Water needs at the site were to be served through development of a groundwater well. Site rezoning was required to accommodate the proposed use.

ANP Bellingham Power Project, American National Power, Bellingham, MA. Managed environmental permitting efforts associated with a proposed two-unit 580-MW natural gas fired facility. Comprehensive environmental documentation for both Energy Facilities Siting Board and Massachusetts Environmental Policy Act review was completed, in addition to preparation of environmental applications. A key issue for this project was the number of similar projects proposed in the area, and the resulting need for cumulative impact assessment for air quality and water use. The use of dry cooling technology was incorporated to significantly limit facility water demand; proximity to the Charles River and the presence of on-site wetlands were also factors in the project's design and permitting. Coordination with Algonquin Gas Transmission Company was required to address impacts associated with a proposed natural gas pipeline interconnect crossing the Charles River.

Milford Power Project, Power Development Company, Milford, CT. Managed full-service environmental permitting for a two-unit 540-MW facility located in the coastal zone proximate to the Housatonic River. As one of the first merchant power proposals in Connecticut, coordination with regulatory agencies was necessary to define appropriate levels of assessment to facilitate an expedient review. The use of wastewater treatment plant effluent for demand reduction on the public water supply, the use of a single stack of less than good engineering practice (GEP) height to minimize visual intrusion on the surrounding community, and the selection of a site that would minimize impact on environmental features and eliminate the need for extensive off-site interconnects were key elements of the project's design. Activities included preparation of Siting Council documentation, air quality permitting, water and wastewater permitting, and coordination with the local community for environmental review of such issues as traffic and noise.

Millennium Power Project, U.S. Generating Company, Charlton, MA. Managed full-service environmental permitting for the 360-MW Millennium Power project. This included preparation of comprehensive environmental documentation for both the Energy Facilities Siting Board and for Massachusetts Environmental Policy Act review. Issues included air quality; potential effects of water withdrawal on the Quinebaug River; wetland impact; and archaeological resource avoidance. In addition to site development, the project also included offsite improvements; these piping corridors were also included in the permitting effort. Permit applications were prepared to meet federal, state and local requirements, and environmental support provided. Wetlands and salamander habitat creation were elements of project mitigation for which plans were developed and oversight provided.

Cataula Generating Project, U.S. Generating Company, Harris County, Georgia. Managed environmental permitting for the Cataula Generating Project, a proposed natural gas fired peaking project consisting of one to four units. The need to be prepared to meet potential future market demands required strategic involvement in presenting project information; the goal was to obtain permits with maximum flexibility while providing regulators with a level of comfort to allow their issuance of project approvals in a timely manner. Air permit applications, Army Corps of Engineers' wetland approval, and NPDES permitting were required. In addition, a comprehensive Environmental Assessment was prepared to support local permitting efforts, and local approvals (such as for the proposed on-site septic system) were overseen. A series of environmental analysis were performed to support project financing, including a site assessment for site contamination potential, and protected species and cultural resource screening.

Coal Fired Cogeneration Facility, Air Products and Chemicals, York County, Pennsylvania. Managed the preparation of an Environmental Information Volume (EIV) for the Department of Energy (DOE) for a proposed coal fired cogeneration facility. The project had obtained a grant from DOE under the Clean Coal Technologies program, thereby requiring multidisciplinary review under the NEPA. Project activities included strategic consultation with DOE to establish protocols for preparation of the EIV, site reconnaissance, the full range of environmental analyses, EIV documentation, and response to agency and public comment arising from the public scoping meeting. An additional

responsibility was coordination with DOE and its third-party consultant to facilitate preparation of an EIS for the York County project.

Coal Gasification Generating Facility, Duke Energy Company, Camden, NJ. Project manager for multidisciplinary environmental permitting efforts associated with a proposed integrated gasification combined cycle (IGCC) coal fired generating facility. Upon award of a Clean Coal grant, DOE negotiation and preparation of an EIV was initiated.

L'Energia, Biodevelopment Incorporated, Lowell, MA. Managed the regulatory strategy and permit preparation for an 85-MW gas powered cogeneration facility proposed to supply steam to the Prince Company and electricity to Boston Edison. Major issues included air emissions, noise generation, discharge of stormwater into wetland resources, steam line construction impacts, and the proximity of the site to a known hazardous waste containment area.

Coal-Fired Cogeneration Facility, Cogentrix, Inc., Mayaguez, Puerto Rico. Managed the preparation of EIS and other permit applications on both a federal and commonwealth level for a 300-MW coal fired cogeneration facility on the coast of Mayaguez, Puerto Rico. Major issues included coordination of the joint regulatory process; in-field air monitoring, modeling, and control technology analysis for a federal and commonwealth Environmental Quality Board (EQB) air permit application; risk assessment associated with projected air quality emissions; comprehensive aquatic data collection in conjunction with NPDES and EQB discharge permit preparation; and Army Corps of Engineers permitting for construction of the proposed coal handling conveyance to be constructed in the Mayaguez Bay.

Peak Combustion Turbines, South Carolina Electric and Gas, Canadys, SC. Managed the preparation of an Environmental Assessment in support of an application before the Public Service Commission to permit an oil or natural gas fired peaking facility. A range of environmental issues were examined, including a wetland delineation using Army Corps of Engineers methodology. Special issues related to the facility's proximity to the existing coal fired power plant; the extent to which existing services could be used at the proposed facility was also determined.

Critical Issues Assessment, Confidential Client, Southwestern Connecticut. Completed critical issues assessment in a phased manner to support a potential 200-MW simple cycle generating facility proposed in southwestern Connecticut. In addition to issues identification and development of a permitting plan, air dispersion modeling was completed to support stack height optimization and feasibility assessment.

Upson Generating Project, Sonat, Upson, GA. Managed the preparation of air permit documentation for a proposed peaking power facility. Dispersion modeling was completed along a compressed timeline, including addressing issues pertaining to terrain impacts in the project's vicinity.

Peaking Units, U.S. Generating Company, Harris County, Georgia. Managed environmental permitting for the Cataula Generating Project, a proposed natural gas fired peaking project consisting of one to four units. The need to be prepared to meet potential future market demands required strategic involvement in presenting project information; the goal was to obtain permits with maximum flexibility while providing regulators with a level of comfort to allow their issuance of project approvals in a timely manner. Air permit applications, Army Corps of Engineers' wetland approval, and NPDES permitting were required. In addition, a comprehensive Environmental Assessment was prepared to support local permitting efforts, and local approvals (such as for the proposed on-site septic system) were overseen. A series of environmental analysis were performed to support project financing, including a site assessment for site contamination potential, and protected species and cultural resource screening.

Midwest Site Review, Confidential Client. Managed site selection effort for a four-state area of the Midwest (Missouri, Tennessee, Illinois and Indiana). In addition to a review of regulatory programs and issues for each state, site issues were reviewed through a combination of GIS computer overlays and windshield site reconnaissance. Specific sites and regions were evaluated to facilitate client evaluation of potential development areas.

Midwest Water Availability Assessment, Confidential Client, Six States. Conducted a comprehensive screening level evaluation of locations within six states. Within each state, corridors were identified with proximate natural gas pipeline and electric transmission lines. In such areas, potential for water resource availability was assessed for a range of options, including groundwater, surface water, treated effluent and other industrial users.

Representative Wind Energy Facility and Transmission Experience

Offshore Wind Support, Confidential Client. Provided environmental feasibility review to evaluate potential environmental permitting issues associated with eight offshore wind blocks available for lease within the Bight area in order to support client focus for bidding. This included background review of available documents, mapping evaluation, and consideration of potential differences between potential areas.

sPower, Seneca Wind, Seneca County, Ohio Lead environmental consultant for OPSB permitting and related analyses associated with a proposed 212-megawatt (MW) wind energy facility. Work included preparation of OPSB documentation and mapping; wetland and species activities; visual impact assessment; cultural resources; and related outreach.

Hog Creek I and II, Renewable Energy Systems Americas Inc., Hardin County, Ohio. Supported preparation of OPSB Amendment applications for both projects incorporating updated technology and the most current agency requirements.

Scioto Ridge Transmission Line, Hardin Wind LLC, Hardin County, Ohio. Prepared and submitted an OPSB Amendment application for adjustments to a proposed above-ground 345 kV electric transmission corridor that would provide interconnection for a wind energy facility to the existing electrical grid.

Glacier Ridge Wind Farm, E.ON Climate & Renewables, Ohio. Prepared critical issues assessment and permitting plan for a 200-MW wind project. Provided permitting support, including wetland identification, avian and other species consultation and surveys, noise analyses and other activities that will be necessary for project risk evaluation and permitting needs. Drafted OPSB application and represented the project at the local public meeting. Supported agency communications and preparation of a Habitat Conservation Plan in support of application for an Incidental Take Permit for the Indiana bat.

Sheldon Wind Power Project, E.ON Climate & Renewables, Iroquois County, Illinois. Prepared critical issues assessment and permitting plan to evaluate a 150 – 500-MW wind project and potential 30-mile transmission line. Provided permitting support for proposed 150-MW at the site, including conducting avian and other species surveys and consultation, wetland identification, noise analysis, environmental site assessment, coordination of cultural resources review, and other activities to support county approval of the project and other permits necessary for project construction.

Paxton Wind Power Project, E.ON Climate & Renewables, Iroquois and Ford County, Illinois. Prepared critical issues assessment and permitting plan for a 150-MW wind project. Provided permitting support, including wetland identification, avian and other species consultation and surveys, noise analyses and other activities that will be necessary for project risk evaluation and permitting needs. Currently supporting agency communications and preparation of a Habitat Conservation Plan in support of application for an Incidental Take Permit for the Indiana bat.

Offshore Wind Project, Neptune Wind, LLC, Massachusetts, Rhode Island and Maine. Supporting early development activities for potential offshore wind projects, including regulatory strategy, site selection, evaluation of alternatives, and support of applications to the Bureau of Ocean Management, Regulation and Enforcement. As project development progresses, environmental and engineering support will continue to be provided.

Wildcat Wind Power Project, E.ON Climate & Renewables, Several Phases, Indiana. Prepared critical issues assessment and permitting plan for a 200-MW wind project as well as expansion into additional phases. Provided permitting support for Phase I and Phase II, including avian and other species consultation and surveys, noise analyses, cultural resources assessment and other activities that will be necessary for project risk evaluation and permitting needs. Currently supporting agency communications and preparation of a Habitat Conservation Plan in support of application for an Incidental Take Permit for the Indiana bat.

Offshore Wind Demonstration Project, Confidential Client, North Carolina. Environmental consulting services for a proposed offshore wind demonstration project in Pamlico Sound. In addition to providing environmental consulting associated with project design, functioned as third-party environmental contractor on behalf of the U.S. Army Corps of Engineers for the project.

Offshore Technology Assessment, Confidential Client. Evaluated potential environmental, engineering, regulatory, and timeline issues associated with the feasibility of installing developing offshore wind foundation technology.

Kibby Wind Power Project, TransCanada Energy Ltd., Franklin County, Maine. Manager of environmental licensing for a 132-MW wind energy facility near the Canadian border, and its associated 27-mile 115 kilovolt transmission line. The initial project phase involved identification of potential licensing requirements and community issues. A detailed application for installation of eight meteorological towers was prepared and submitted. Initial review included consideration of a potential transmission line that could extend to the north, interconnecting the proposed facility with the Canadian electrical grid. Detailed applications have been prepared and submitted to the Land Use Regulation Commission, Department of Environmental Protection, and the U.S. Army Corps of Engineers, and significant coordination and outreach has occurred with other regulatory agencies and environmental stakeholders, as well as the local community. Key issues include avian and bat studies, visual issues, recreational uses, and development in a protected mountain district.

Offshore Wind Energy Project, Fishermen's Energy, New Jersey. Provided support associated with site selection, environmental assessment, engineering management, and document coordination for a proposed 350-MW offshore wind project, proposed to be implemented in phases. The resulting documentation, incorporating contributions from a broad consortium of team members, was submitted to the New Jersey Bureau of Public Utilities for review and selection of a pilot offshore wind project. As a pilot project, extensive monitoring for impact assessment was required, and detailed protocols for a range of environmental issues were prepared for inclusion in the submittal.

Glebe Mountain Wind Project, Catamount Energy Corporation, Londonderry and Windham, Vermont. Supported preparation of § 248 filings for a proposed wind energy project. In addition to providing expert witness documentation for several topics, assisted Catamount in coordination of specialty contractors involved with ecological, community and engineering issues.

Offshore Technology Assessment, Confidential Client. Evaluated potential environmental, engineering, regulatory and timeline issues associated with the feasibility of installing developing offshore wind foundation technology.

Wind Energy Project Critical Issues Evaluation and Licensing, CPV Wind, Texas, Michigan, Illinois, Pennsylvania. Evaluated potential issues associated with development of five wind energy facilities (one in Texas, one in Michigan, two in Illinois, one in Pennsylvania). Issues included review of ecological factors (avian, bats, protected species, wetlands); cultural resources (historical, archaeological and tribal), and community issues (proximity of sensitive receptors and uses, land use planning issues). Based upon a review of secondary data and a site reconnaissance, critical issues were identified and a permitting plan developed.

Cape Wind EIS, U.S. Army Corps of Engineers, Nantucket Sound, MA. Principal-in-charge for a contract with the U.S. Army Corps of Engineers to provide third-party EIS support for a proposed 420-MW wind park proposed to be located offshore in Horseshoe Shoal. Provided technical review and comment for sections focused on alternatives analysis, as well as baseline and impact evaluations for the full range of environmental disciplines.

Permitting Plan Development for a Wind power Facility, Confidential Client, New York. Prepared information outlining the licensing requirements associated with project development in upstate New York, including the SEQR Act process. Provided oversight for preliminary licensing activities.

Madison Wind Due Diligence Evaluation, Confidential Client, Madison County, New York. Conducted due diligence review of an 11-MW wind farm located on approximately 145 acres in Madison County, New York for potential asset acquisition. Evaluated environmental licensing files, reviewed environmental site condition reports, and interviewed staff associated with the asset sale to identify potential environmental issues and opportunities associated with the project. Provided input to support the acquisition bid process for this and other assets in the fleet under consideration.

Representative Natural Gas/Liquid Natural Gas Facility Permitting Experience Somerset

Renewable Diesel and Gas-to-Liquids Facility, Confidential Client, OH. Advised and provided permitting consulting in association with key topics for development within a previously disturbed property. The unique combination of technologies involved close coordination for appropriate definition of anticipated configuration in order to establish the appropriate permitting framework and consider the need for integrated mitigation.

LNG Facility, Somerset, MA. Project manager for proposed liquid natural gas (LNG) import terminal co-located with the Brayton Point generating facility in Somerset, Massachusetts. Coordinated engineering studies for facility layout and design; conducted introductory meetings with regulatory agencies, community members and other key decision-makers; directed preparation of information for Federal Energy Regulatory Commission (FERC) resource reports for the full range of environmental issues; and initiated activities with the U.S. Army Corps of Engineers regarding a potential federal dredging project to support the proposed facility.

Pipeline Permitting, Tenneco, New England. Coordinated a long-term project involving supervision of surveying, deed researching and permitting for approximately 103 miles of natural gas pipeline in Massachusetts, New Hampshire and Connecticut. Scheduled, field work and permit applications; and performed quality control review of final product for submittal.

Avoca Natural Gas Storage Project, U.S. Generating Company, Avoca, New York. Assisted in permitting a proposed underground natural gas storage facility in upstate New York. As a part of this effort, permit review was performed to identify outstanding tasks to be completed for full compliance throughout all phases of project construction and operation. In addition, peer review was provided for several permit submittals, and assistance was provided during project due diligence efforts.

Wallkill Natural Gas Pipeline, U.S. Generating Company, New York and New Jersey. Managed FERC environmental submittals and related permits associated with a proposed 24 mile natural gas pipeline extending from the site of a propose electric generating facility in Wallkill New York to an existing Tennessee Gas Pipeline Company compressor station in Wantage, New Jersey. Issues included concerns associated with potential impact to wetlands, a protected plant species, archaeological resources, a protected easement of the Appalachian Trail, and cold-water fisheries. Community concerns were also addressed, including construction impact and effects of the proposed installation and clearing on nearby business owners.

Gas Pipeline Extension, International Paper and Niagara Mohawk Power Corp., Oswego, NY. Managed preparation and submittal of an Article VII application to the New York Public Service Commission describing a proposed gas pipeline extension to serve a cogeneration facility. Conducted environmental resource field surveys, literature reviews, agency and community contact, coordination of color graphics, text preparation, direct testimony in support of the document, and participation in interrogatory proceedings.

Representative Energy Facility Transactional Due Diligence/Audit Experience

Permitting Evaluation, Confidential Client. Conducted a review of a portfolio of 29 renewable energy projects in 7 states throughout the U.S. All projects were in early stages of development, planned within a variety of site types (previously developed, greenfield, urban, rural). Desktop evaluation reviewed available information to determine permitting requirements, potential issues, and general feasibility.

Due Diligence and Audit Evaluations, Confidential Clients. Conduct due diligence and audit review of numerous energy assets, including fossil-fired and renewable generating facilities, as well as LNG terminals. Frequently manage multi-staff teams to conduct an evaluation of environmental licensing files, review environmental site condition reports, and interview staff associated with the asset sale to identify potential environmental issues and opportunities associated with the project. Provide input to support the acquisition bid process, and frequently provide transition support following successful bids.

Due Diligence Evaluation, Goldman Sachs, Nationwide. Conducted due diligence review to support the Goldman Sachs acquisition of the Cogentrix and NEGT IPP assets. Both coal and natural gas fired facilities were evaluated. Evaluated facilities were located in Colorado, the Dominican Republic, Florida, Idaho, Louisiana, Massachusetts, Minnesota, Mississippi, North Carolina, New Jersey, New York, Oklahoma, Oregon, Pennsylvania, Virginia, and Wisconsin. This effort included fielding multiple teams to conduct site inspections; review of environmental permitting and compliance material; interviews with corporate and plant staff responsible for environmental, health and safety compliance; and preparing follow-up questions to allow identification of material issues for each facility. Environmental support for these assets continues on an as-needed basis.

Madison Wind Due Diligence Evaluation, Confidential Client, Madison County, NY. Conducted due diligence review of an 11-MW wind farm located on approximately 145 acres in Madison County, New York for potential asset acquisition. Evaluated environmental licensing files, reviewed environmental site condition reports, and interviewed staff associated with the asset sale to identify potential environmental issues and opportunities associated with the project. Provided input to support the acquisition bid process for this and other assets in the fleet under consideration.

Fossil Facility Audits, Constellation Generation Group, Nationwide. Principal-in-charge for multidisciplinary environmental audits at eight fossil fuel fired generating facilities representing a range of technologies. Facility audits considered federal and state regulatory programs (within the five states where facilities were located), as well as compliance with environmental management system programs. Recommendations were made for each finding. Collaborated closely with the client to refine findings categories and work towards a standardized evaluation and reporting procedure acceptable to all involved internal resources.

Confidential Nuclear Facility Audit, Constellation Generation Group. Principal-in-charge for conducting a resource-limited environmental audit at a nuclear generating facility. Findings were presented, along with regulatory citations and recommendations, to ensure both regulatory compliance and implementation of best management practices for the facility.

Other Representative Project Experience

Environmental Permitting Specialist, U.S. Generating Company, Nationwide. As a member of the corporate environmental department, primary responsibilities included: management of permitting efforts, both for new projects and for existing operational facilities; direction of all Title V operating permit applications, company-wide; review of potential acquisitions to identify critical issues and determine appropriate actions; assessment of proposed greenfield or retrofit projects to identify opportunities and constraints, and to develop permitting plans; and strategic support for international development efforts.

Salt Processing Facility, Cargill, Inc., White Marsh, MD. Performed a critical flaw analysis associated with the planned expansion of a salt processing facility. A review of a wide range of environmental issues identified both benefits and constraints related to the on- site expansion of the existing facility. Regulatory implications of expansion at that site were also reviewed and presented for use in Cargill's decision-making process.

Coal Technology Review, ABB Power Generation, Inc., Nationwide. Managed an environmental review of pressurized fluidized bed combustion (PFBC) technology. The study identified environmental differences between PFBC and competing available technologies and made conclusions regarding the permit-ability of power generating projects utilizing PFBC. The project involved consultation with engineers to develop comparable data for each technology under consideration, a review of regulatory requirements in three representative locations in the United States, and an environmental screening to identify potential permitting concerns. The review concluded that, from a permitting standpoint, PFBC is a viable technology that does not pose significantly different permitting issues than other coal-fired technologies.

Semiconductor Facility Siting, Confidential Client, Nationwide. Managed field data in a nationwide search for the ideal location to construct a semiconductor facility. Preformed demographic, climatic, and regional research; text writing and editing; production staff management; and presentation of the document to clients.

Medical Waste Incinerators, Merck, Inc. and Hoffmann-La Roche, Inc., NJ. Managed the preparation of two separate Environmental and Health Impact Statements (EHIS) as a part of solid waste permitting required for proposed medical waste incinerators within existing company complexes in New Jersey. The proposed facilities represent state-of-the-art replacements for existing incineration procedures. Through the EHIS documentation, environmental improvement over existing conditions was demonstrated.

Pulp Mill Expansion, Cloquet, Potlatch Corporation, MN. Managed preparation of technical report documents and performed a detailed land use characterization for the proposed modernization and expansion of an existing pulp mill. The nine reports generated for use by the state in the compilation of a project Environmental Impact Statement addressed the following issues: air quality, health risk assessment, water quality, solid and hazardous wastes, transportation, noise, public services, and timber resources.

Industrial Site Redevelopment, Zampell1 Properties, Inc., Rockport, MA. Collaborated with a local Citizens Advisory Committee (CAC) and State agencies to guide the redevelopment of an industrial site on Pigeon Cove in Rockport, Massachusetts. Presentations to the CAC identified and explained the various permits involved with site development to create a common basis for decision- making through the design process. Special issues relating to construction on former tidelands required particular consideration. Other areas of analysis included on-site wetland resources, traffic, drainage and utilities.

Conservation Commission Workshop, Department of Environmental Protection, Massachusetts. Over a period of 5 years, developed and conducted training workshops designed to guide Conservation Commission members through the regulatory process. The training was designed to simulate project review and sought to provide an objective and realistic framework relevant to the diverse experience of Commissioners throughout Massachusetts.

Boathouse Construction, Northeastern University, Brighton, MA. Successfully completed regulatory consulting for the construction of a new boathouse facility on the Charles River. Early input in project design reduced environmental impacts to facilitate the permitting process. Permits obtained included MEPA approval, Wetlands Protection Act permit, Chapter 91 license, Army Corps of Engineers Section 10 Permit, and Water Quality Certification.

Town of Shirley Conservation Commission, Chairman/Member, Massachusetts. Served 5 years on the local Conservation Commission with responsibility for implementing state wetland regulations; chaired the Commission for 2 of those years.

Land Use Planning, Shirley, Town of Shirley, MA. Chair of public hearings to identify community goals for land acquisition, conservation, and development as recreational resources and to incorporate action elements in an update of a 5-year plan. Authored the revised report, coordinated graphics, and presented findings for approval at Special Town Meeting.

Environmental Impact Reports, Multiple Clients, Massachusetts. Senior project manager for the preparation and submittal of multidisciplinary Environmental Impact Reports under MEPA. Numerous projects managed for a wide variety of clients in locations throughout Massachusetts.

ISAAC OLD

Senior Consultant

EXPERIENCE | 12 Years

EDUCATION | MS, Architectural Acoustics, Rensselaer Polytechnic Institute
BS, Physics, Centre College

BIO

Isaac Old is an acoustician, specializing noise assessments for environmental sound sources, and consultation on architectural spaces. For environmental noise, he is involved in pre- and postconstruction sound level measurement, sound propagation, design, and project management. For architectural acoustics, he is involved with design, room-acoustics modeling, and sound insulation modeling. Isaac has worked in many different industries including renewable energy, electrical transmission, academia, parks and tourism, and residential developments.

PROJECT EXPERIENCE

Wind Power Projects

Wind Turbine Vibration Analysis performed vibration modeling of a proposed wind power project. The goal was the see if the vibration was in a range that was theorized to have an impact on an endangered insect. Results were also compared with other sources of ground-borne vibration. (2018)

Three Waters Wind Performed preconstruction sound level monitoring for a proposed wind power project in southern Minnesota. Monitoring was performed consistent with Minnesota Department of Commerce guidelines. (2019)

Highland Wind Summarized sound level monitoring and sound propagation modeling results in a report that was submitted as part of the project's Maine Department of Environmental Protection (Maine DEP) permit application. (2010)

Sugar Creek Wind Performed sound propagation modeling for a proposed Illinois. Assessed project sound emissions relative to Illinois Pollution Control Board (IPCB) octave band sound level limits. Summarized modeling results in a report that was submitted as part of the permit application. (2018)

Northwest Ohio Wind Prepared a noise assessment of the proposed Northwest Ohio Wind power project, located in northwestern Ohio. Performed background sound level monitoring to characterize the soundscape of the project area. Analyzed sound level measurements to derive the Ohio Power Siting Board (OPSB) sound level limit. Constructed a sound propagation model to predict sound levels due to the project in the surrounding areas. (2013)

Cattle Ridge Wind Performed preconstruction background sound level monitoring for a wind power project located in eastern South Dakota. The purpose of monitoring was to characterize the existing sound environment in the project area. (2016)

Wildflower Green Energy Farm Analyzed monitoring data and prepared a sound propagation model for a proposed combined solar and wind power project, located in California. (2011)

Green River Wind Performed preconstruction sound level monitoring for the proposed Green River Wind power project in Northern Illinois. (2016)

Emerson Creek Wind Conducted long-term sound level monitoring for the proposed Emerson Creek wind power project in Ohio. Analyzed data consistent with Ohio Power Siting Board (OPSB) precedent to derive the project sound level limit. (2018)

Deerfield Wind Provided support during the post-permitting design phase of the Deerfield Wind power project. Performed sound propagation modeling of proposed project layouts and assessed likely compliance of those layouts with exterior and interior sound level limits. After project construction, provided review and supervision of operational compliance monitoring performed by other consultants. (2010 to 2016)

MIT Wind Turbine Noise Literature Review Assisted with a review of scientific literature concerning wind turbine noise. Performed a search of relevant literature and drafted the section of the review relating to sound generation of wind turbines and measurements. (2013)

Georgia Mountain Community Wind Performed operational compliance monitoring of the Georgia Mountain Community Wind (GMCW) power project to assess compliance with permit conditions. This included performing Outdoor Indoor Transmission Loss (OITL) testing of a neighboring residence, to assess consistency with the indoor sound level limit. (2012 and 2013)

Dairy Air Wind Prepared a preconstruction noise impact assessment for a proposed wind power project, located in northern Vermont. Performed preconstruction long-term sound level monitoring to characterize the existing sound environment. Performed sound propagation modeling of the proposed project configuration consistent with Vermont Public Utilities Commission (PUC) regulations. Summarized results in a report the submitted as part of the permit application. Attended a public meeting for the project to answer acoustics questions. (2016 to 2019)

Oakfield Wind Monitoring Review – Provided review of operational compliance monitoring of the Oakfield Wind power project for the Town of Oakfield, Maine. Reviewed monitoring data and reports to assess consistence between agreements and regulations and how the monitoring

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was carried out. Assessed compliance of the project with Maine DEP regulations and permit conditions. (2016 to 2019)

Tuscola III Wind Prepared a noise modeling study for a proposed wind power project in Michigan. Performed sound propagation modeling to assess compliance of the project with three different sound level ordinances, one for each township the project was located in. Summarized modeling results in a report that was submitted as part of the permit application. (2016)

Kidder Hill Wind Prepared a noise impact assessment for a proposed wind power project in northern Vermont. Conducted long-term background sound level monitoring to characterize the existing sound environment and performed sound propagation modeling of proposed turbine arrays. Summarized findings in a noise study. (2015)

DeKalb Wind Performed preconstruction background sound level monitoring for a proposed wind power project in northern Illinois. Analyzed information submitted during county-level development of a sound level ordinance. (2018)

Crocker Wind Performed week-long background sound level monitoring for a proposed wind power project in South Dakota. Also assisted in answering South Dakota Public Utility Commission (SDPUC) questions about the noise study that was prepared for project permitting. (2016 and 2017)

DTE Local Michigan Sound Ordinance Consultation Provided advice to a project developer on existing and proposed wind turbine noise ordinances in Michigan. Provided analysis of existing ordinances and advice on how to improve proposed ordinances. Provided on-site presentations to municipalities where new ordinances were proposed. Analyzed literature submitted in rulemaking proceedings. (2015 to 2020)

Texas Turbine Sound Emissions Test Performed an IEC 61400-11 sound emissions test of a turbine at a wind farm in Texas. The purpose of the test was to check the consistency of turbine sound emission with manufacturer guarantees and characterize an abnormality in the sound produce by the turbine. Prepared a report summarizing findings. (2019)

Pisgah Mountain Wind Compliance Monitoring Assisted with operational sound level compliance monitoring for a wind power project located in downeast Maine. Monitoring occurred over a period of several weeks at five locations and followed the procedures of the Town of Clifton, Maine. Assisted in preparing a report that summarized monitoring results. (2017)

Record Hill Wind Compliance Monitoring Performed operational compliance monitoring of the Record Hill Wind power project in Maine. Monitoring was performed over multiple seasons at four locations, according to Maine Department of Environmental Protection (Maine DEP) procedures. (2011 and 2012)

Hoosac Wind Compliance Monitoring Performed operational compliance monitoring over a period of several weeks for the Hoosac Wind power project, located in western Massachusetts. Monitoring was performed consistent with Massachusetts Department of Environmental Protection (Mass DEP) requirements. Prepared a report summarizing monitoring results.

Republic Wind Prepared a noise assessment for a wind power project in Ohio. Preformed background sound level monitoring that was used to derive the Ohio Power Siting Board (OPSB) precedent sound level limit. Performed operational sound propagation modeling of a variety of turbine arrays and turbine models. Summarized monitoring and modeling in a report that was submitted for OPSB permitting. Provided written and live testimony during the hearing phase. (2016 to 2020)

Golden West Wind Conducted sound propagation modeling for a proposed 250 MW wind power project in Colorado. Studied compliance of the project with the area's property line noise standard, as well as impact on the surrounding structures. (2011)

Saddleback Ridge Wind Conducted sound propagation modeling for a proposed wind power project in Maine. Assessed compliance of the project with the Maine DEP noise standard. Aided in preparing a report comparing modeled impacts of construction and operation of the project to existing sound levels of the area. Performed post-construction monitoring to assess compliance with the Maine DEP noise standards. (2015)

Black Fork Wind Conducted sound propagation modeling for a proposed wind power project in Ohio. Helped to develop a turbine arrangement that complies with the Ohio Power Siting Board's (OPSB) precedent sound level limit. (2011)

Massachusetts Wind Power Project Prepared noise impact assessment for a proposed wind power project in Massachusetts. Performed analysis on monitored sound pressure level and wind speed data. Used measured data to compare modeled noise impacts with existing background sound levels and wind speed. Demonstrated in the report the probability of the proposed project exceeding Massachusetts' noise limit and precedents. Worked with developer to determine the financial impact of possible sound mitigation strategies. (2011)

Minden Wind Modeled noise impacts of a proposed 35 MW wind power project in the "thumb" of Michigan. Worked with the client to develop an array that would meet state and local ordinances, taking into account additional impacts of a neighboring wind power project owned by a different developer. (2011)

Beaver Ridge Wind Worked with the project owner to model mitigation measures for complainants of an existing wind power project in Maine. Measured existing sound insulation of a home and modeled mitigation measures that included strategically placed exterior building additions and sound insulation reinforcement. Worked with owner to select and obtain suitable building materials for the improvements. Later performed monitoring to assess compliance of the wind farm with Maine DEP standards Chapter 375(10). (2011 and 2013)

Canton Wind Prepared noise modeling report for a proposed wind power project in Maine. Performed sound propagation modeling in accordance with Maine Department of Environmental Protection (DEP) regulations and prepared the report to directly address concerns of the Maine DEP. After the project was constructed, performed compliance monitoring in conformance with Maine DEP requirements and wrote a report summarizing findings of the measurements. (2013 and 2018)

Spruce Mountain Compliance Monitoring Wrote a spreadsheet macro to analyze compliance sound level data from Spruce Mountain Wind to

determine valid monitoring compliance periods in accordance with Maine DEP regulations. Wrote five annual reports outlining monitoring results, to fulfill Maine DEP permit conditions. (2016)

Scioto Ridge Wind Prepared a noise impact assessment for a proposed wind power project in Hardin County, Ohio. Conducted long-term monitoring to determine background sound levels across the project area. Used monitoring data to determine the project sound level limit according to Ohio Power Siting Board (OPSB) precedent. Conducted sound propagation modeling to assess project compliance with that sound level limit. Summarized monitoring and modeling results in a report that was submitted for OPSB permitting. (2012)

GMP Vergennes Net Metering Turbine Conducted compliance monitoring of net metering wind turbine near Vergennes, Vermont. Measured sound levels over several days, coinciding with periodic turbine curtailments. Analyzed data to determine compliance with Vermont Public Service Board permit conditions. (2012)

Kingdom Community Wind Compliance Monitoring Helped prepare a noise impact assessment for a wind power project in northern Vermont. The assessment included long- and short-term modeling, analyses of amplitude modulation potential, and background sound level monitoring results. After project construction, conducted preliminary compliance monitoring of proposed wind power project to determine the feasibility of a proposed compliance monitoring method. Collected data at four primary monitoring sites and four background monitoring sites and conducted correlations to determine degree of agreement between sites. This was followed by comprehensive operational compliance monitoring at four sites, once each season, for two years. (2011 to 2014)

Michigan Wind 2 Compliance Monitoring Performed operational sound level compliance monitoring for the Michigan Wind 2 wind power project in the "thumb" of Michigan. Monitored at nine locations over a period of 10 days to measure operational and background sound levels. Analyzed the measured data to assess compliance with permit-specified limits. Wrote a report summarizing applicable sound level limits, monitoring procedures, and results. (2012)

Massachusetts Research Study on Wind Turbine Acoustics Conducted background sound level monitoring and analysis for a research study on wind turbine sound. Study includes data collection from five wind projects in New England and quantitative analysis of factors such as infrasound, amplitude modulation, sound pressure levels, and sound propagation modeling. Assisted in developing data analysis procedures for summarizing the resulting data. (2016)

Walnut Ridge Wind Prepared a noise modeling study of the proposed Walnut Ridge Wind power project in Bureau County, Illinois. Modeled the proposed wind turbine array at nearby receivers and evaluated compliance of the project with Illinois Pollution Control Board (IPCB) octave band standards and Bureau County, Illinois ordinances. Summarized findings in a report that was submitted as part of the project's conditional use permit application. (2014)

Blazing Star I Wind Helped prepare a noise impact assessment of proposed wind power project in Minnesota. Performed pre-construction sound level monitoring and monitoring data analysis in accordance with Minnesota's guidance for performing noise assessments (2016)

Cassadaga Wind Prepared a noise impact assessment for the Cassadaga wind power project, in accordance with New York Article X guidelines and stipulations made between the project developer and the State of New York Department of Public Service. Project work included two seasons of background sound level monitoring, annualized sound propagation modeling, analyses of monitoring accuracy, and extensive literature reviews of literature concerning wind turbine noise. After permit application submittal, provided support for written testimony and briefs during hearings. (2018)

Baron Wind Prepared a noise impact assessment for the Baron Wind power project, located in Steuben County, New York. Noise impact assessment was performed in accordance with New York Article X guidelines. The impact assessment included two seasons of monitoring, a literature review on wind turbine noise, percent highly annoyed estimates, short- and long-term term operational modeling, and extensive construction noise modeling. Participated in negotiating stipulations with the New York Department of Public Service. Provided assistance with written testimony and briefs. (2019)

Jordan Creek Wind Performed sound propagation modeling for a proposed 400 megawatt wind power project proposed for Warren and Benton County, Indiana. Services included sound propagation modeling, documentation, and hearing support. Hearing support included reviews of literature submitted by intervenors and local authorities. (2016)

Environmental Noise

Orion Misenheimer Solar Performed sound propagation modeling of a proposed solar power project in North Carolina. Provided in-person testimony for the local permitting hearing of the project. (2018 and 2019)

Craftsbury Outdoor Center Biathlon Range Prepared a noise study in preparation for permitting of a proposed biathlon range. Performed sound level measurements of a biathlon-specific firearm along with measurements in the surrounding area during firearm discharge. Construed a sound propagation model to determine the effect of the range on the surrounding area. This model was calibrated with site-measured data. Prepared a report summarizing monitoring and modeling results, that was submitted as part of a Act 250 permit application. (2018)

Sportsmen Inc. Performed sound level monitoring of a private shooting club that had been the subject of noise complaints. Developed mitigation options for the club and summarized the results in a report. (2017)

GMP Haystack Substation Prepared a preconstruction noise assessment of a substation proposed near Dover, Vermont. Performed background sound level measurements to characterize the existing soundscape. Constructed a sound propagation model of proposed equipment to prediction sound levels due to the equipment in the surrounding area. Prepared a report summarizing monitoring and modeling results that was submitted as part of the Vermont Section 248 permit application. (2015)

CCTA Bus Monitoring Performed sound level monitoring at a bus facility near Burlington, Vermont to assess the contribution bus backup alarms at nearby residences. (2010)

GMP Jay Synchronous Condenser Performed postconstruction operational monitoring of a Synchronous condenser located at Green Mountain Power's (GMP's) Jay substation in northern Vermont. Monitoring included long term monitoring to assess the influence of the condenser in the surrounding area and short-term attended measurements to allow comparison of actual sound emissions with manufacturer specifications. (2012 to 2013)

Vermont State Driver Training Facility Performed sound level monitoring and sound propagation modeling for a driver training facility proposed by the State of Vermont. Performed sound level measurements of several types of vehicles with sirens and/or in evasive maneuvers to characterize sound emissions of the vehicles that would likely be used. Performed sound propagation modeling of the facility at its proposed location to assess sound levels in the surrounding area. (2013)

VELCO New Haven Shunt Reactor Project Performed long-term sound level monitoring in preparation for permitting of a shunt reactor proposed for VELCO's New Haven substation. (2011)

GMP Wallingford Substation Prepared a preconstruction noise impact assessment for renovations of the Green Mountain Power (GMP) Wallingford substation. Performed preconstruction long-term measurements and short-term measurements of existing equipment. Performed sound propagation modeling of proposed substation equipment and compared existing sound levels with proposed sound levels. Prepared a report that was submitted as part of the project's Vermont Section 248 permit application. (2015)

VELCO Gorges Performed operational sound level monitoring of a recently-constructed substation near Burlington, Vermont. Monitoring included setup of long-term monitors and measurement of individual equipment. Results were compared with preconstruction modeling results and summarized in a report. (2011)

VELCO Georgia Prepared a noise assessment for renovations of the VELCO Georgia substation. Summarized sound level measurements and performed sound propagation modeling of proposed substation renovations. Summarized monitoring and modeling results in a report that was submitted as part of Vermont's Section 248 permitting process.

GMP Woodstock Performed postconstruction operational monitoring of the GMP Woodstock substation near Woodstock, Vermont. Performed long-term sound level measurements and equipment sound emissions measurements to assess the influence of the substation on the soundscape in the surrounding area and to verify equipment sound emissions. Summarized measurement results in a report. (2013)

VTrans Centerline Rumble Strip Study Performed Long-term monitoring near roads with a rumble strip in the centerline of the road at several locations throughout Vermont. Analyzed the data to isolate periods where cars ran over the rumble strips. The purpose of the monitoring was to determine the influence of different rumble strip shapes on sound emissions. (2014)

Grafton Gravel Pit Prepared a noise assessment for the proposed Grafton Gravel Pit, located near Grafton, Vermont. Performed preconstruction background sound level monitoring to characterize the existing soundscape in the project area. Performed sound propagation modeling of proposed sound sources. Summarized monitoring and modeling results in a report that was submitted as part of the project's Act 250 permit application. (2012)

Green Mountain Power Waterbury Substation Prepared a noise assessment in preparation for permitting of the Green Mountain Power (GMP) Waterbury substation in Waterbury, Vermont. Performed preconstruction long-term sound level monitoring to characterize the existing soundscape in the area. Constructed a sound propagation model to predict sound levels from proposed equipment on the surrounding area. Summarized results in a report was the submitted as part of Vermont's Section 248 permitting process. (2014)

NCHRP 25-52 Provided support on a research project assessing the effect of meteorology on roadway noise. Programmed a script, estimating the effect of ground impedance on sound propagation. (2016)

VELCO Ascutney Prepared a preconstruction noise assessment in preparation for permitting of relocating VELCO's Ascutney, Vermont substation. Performed modeling of existing and proposed sound sources in the new substation location and prepared a report summarizing monitoring and modeling results. After construction, conducted short-term and long-term monitoring to assess compliance with permit conditions. (2011 and 2013)

VELCO Essex Performed background sound level monitoring near the VELCO Essex substation to assess contribution to the local sound environment. Performed equipment-specific sound emissions monitoring to assess consistency with manufacturer specifications. (2014 and 2018)

Hannaford Hinesburg – Performed a noise study for a proposed s Hannaford supermarket in Hinesburg, Vermont. Performed preconstruction sound level monitoring. Modeled sound sources form the facility and compared these levels to monitoring results to assess the project relative to Hinesburg's audibility-based sound level limit. (2011)

Republic Transmission Line Prepared a noise impact assessment for the transmission line associated with the Republic Wind project. Performed additional background sound level monitoring to derive a sound level limit consistent with Ohio Power Siting Board (OPSB) precedent. Performed construction and operational sound propagation modeling summarized results in a report that was submitted to the OPSB as part of the permit application. (2018 to 2020)

Middlebury Airport Sound Monitoring Assisted with long-term sound monitoring of the Middlebury Airport, located in central Vermont. The purpose of the monitoring was to characterize the acoustical impact of the airport on surrounding neighborhoods. (2015)

BMH Operating Room Expansion Prepared a noise study in preparation for permitting of an expansion to Brattleboro Memorial Hospital in Brattleboro, Vermont. Performed backgrounds sound level monitoring of existing conditions and sound propagation modeling of proposed sound sources. Summarized findings in a report that was submitted as part of the Act 250 permit application. (2017 to 2018)

VT Mulch Prepared a noise study for a proposed wood grinding operation in southern Vermont, in preparation for Act 250 permitting. Constructed a sound propagation model of project components and prepared a report

summarizing modeling results. After construction, performed short-term compliance monitoring to assess compliance with permit conditions. (2012 and 2013)

VELCO Connecticut River Valley Project Prepared a series of three noise studies in preparation for permitting of updates to VELCO's electrical transmission infrastructure in central Vermont. Background sound level and equipment-specific monitoring was performed at three substations. Three separate reports were prepared, including sound propagation modeling of proposed changes. Modeling included estimates of the relative sound level increase or decrease at nearby residences from proposed equipment. Provided feedback to VELCO regarding vendor submittals on proposed equipment. Performed postconstruction monitoring to assess equipment performance relative to sound specifications. (2014 to 2019)

Susquehanna-Roseland Transmission Line Conducted pre-construction monitoring along sections of the Appalachian Trail that pass through the Delaware Water Gap National Recreation Area, in preparation for permitting of the Susquehanna-Roseland transmission line. Performed sound propagation modeling of the proposed transmission line to determine the line's impact on the Appalachian Trail and surrounding areas. Assisted preparation of the Environmental Impact Statement outlining findings of the monitoring and modeling. (2010)

Yosemite National Park Noise Model Helped build and run a calibrated sound propagation model, estimating hiker exposure to transportation noise in all areas of Yosemite National Park. (2011)

Essex Junction Bypass Modeled sound from a proposed road addition in Essex Junction, Vermont based upon predicted traffic volume. Showed the likely increase in sound level caused by the addition in comparison to the existing condition. (2011)

Wells, Vermont Emergency Generator Prepared a noise assessment for a proposed emergency generator for Vermont's emergency communications network. Measured existing background sound levels and compared them with modeled sound pressure levels due to the proposed generator, determining the noise impact on a nearby home. (2010)

Meldahl Transmission Line Prepared a noise impact assessment for a proposed transmission line and substation in the Ohio Valley in response to an Ohio Power Siting Board (OPSB) interrogatory. Measured existing background sound levels over a period of 10 days and analyzed the data to identify existing sound sources, including an existing transmission line. Performed sound propagation modeling of the proposed substation and transmission line, as well as FHWA RCNM modeling of the expected construction sound sources. (2011)

Champlain Oil Company Ferrisburgh Prepared a noise impact assessment for a proposed gas station in Ferrisburgh, VT. Performed long-term monitoring, along with ISO 9613-2, and Monte Carlo modeling to assess the impact of a proposed gas station on the surrounding area. (2011)

Pike Industries New Haven Asphalt Plant, New Haven, Vermont Performed modeling of Pike Industries' New Haven, VT Asphalt Plant to determine the effects that modifications of the plant would have on surrounding residents. Prepared memorandum to for Act 250 submittal outlining the findings. After project completion, performed postconstruction monitoring and compared the results to permit conditions. (2011 and 2019)

Mount Rainier National Park Data Analysis, Washington Performed analysis of sound level and weather data collected at five sites within Mount Rainier National Park consistent with National Park Service (NPS) procedures. Wrote a report for the NPS outlining results from the analysis, including identification of sound sources audible during the monitoring period. (2011)

US Route 2 & 7 Upgrades, Colchester, VT Performed short and long term monitoring for a noise impact assessment for the Vermont Agency of Transportation's (VTRANS) upgrades to US Route 2 & 7 in Colchester, Vermont. Performed long term measurements to determine the hour of peak sound level and then conducted short term sound level measurements and traffic count measurements during that hour. (2015)

Hammond Cove Shooting Range Worked with the Vermont Fish and Wildlife Department to develop mitigation solutions for a shooting range in Hartland, Vermont in response to community complaints. Measured existing sound emissions at both the shooting range and nearby residences and performed sound propagation modeling to develop mitigation solutions. Attended an informational meeting to answer questions about proposed mitigation measures. (2015)

VELCO Newport Substation Upgrades Performed a preconstruction noise impact assessment in preparation for permitting of proposed upgrades to VELCO's Newport, Vermont substation. Conducted short-term measurements of existing equipment within the existing substation and long-term measurements at nearby residences. Modeled the existing substation and the substation with proposed changes, highlighting relative sound level differences at residences between the existing and proposed configurations. Summarized monitoring and modeling results in a report that was submitted as part of Vermont's Section 248 permitting process. (2014)

TDI New England Ludlow Converter Station Performed a pre-construction noise impact assessment of TDI New England's proposed High Voltage DC to AC converter station in Ludlow, Vermont. Modeled multiple proposed configurations of the converter substation, to advise the client on a configuration that minimized impacts on nearby residences. Summarized modeling results along with long-term sound level measurements to demonstrate impacts of the converter station on nearby residences. The report has been submitted as part of as part of Vermont's Section 248 permitting process. (2013)

Stafford Hill Solar Performed sound propagation modeling of a proposed solar power project located in Rutland, Vermont. Modeled multiple solar array sources including: transformers, heat exchangers, and air-conditioning units. Summarized results in a memo that was submitted as part of Vermont's Section 248 permitting process. (2014)

Otter Valley Solar Performed a noise assessment of the Otter Valley Solar power project, located near Pittsford, VT. Performed sound propagation modeling of equipment associated with the proposed solar array and summarized results in a memo that was submitted to the Vermont Public Service Board. During permitting, provided pre-filed testimony in support of the project. (2016)

Grand Isle Solar Performed sound propagation modeling for a proposed five-megawatt solar farm, located in Grand Isle, Vermont. Services included modeling of project string inverters and transformer, and summarization of results in a memo for Vermont Public Service Board submission. (2015)

Architectural Acoustics

Burlington Floor Construction Testing Performed sound transmission and impact isolation testing of two different floor constructions in apartments located in Burlington, Vermont. The purpose of the monitoring was to compare results of the two similar constructions to inform a developer's selection of one construction over the other. (2017)

Ward 4 Acoustics Performed room acoustics testing of a hospital ward that had been the subject of complaints due to excessive sound levels and reverberation. Developed mitigation to reduce reverberation, addressing requirements that included cleanability, durability, and a lack of ligature points. (2017)

SoundToys Office Renovations Assisted an architect in designing office renovations for a musical effect company. Client requirements included high levels of sound insulation between office and lab spaces, while meeting specific aesthetic requirements. Performed testing of several spaces after construction was completed. (2016 to 2019)

St. Albans City Hall Gymnasium Acoustics Performed a study of a gymnasium located in the city hall of St. Albans, Vermont. The gymnasium has a variety of uses including large meetings and there were complaints of excessive sound levels and insufficient speech intelligibility by users. We performed preconstruction reverberation testing of the gym to assess current condition. Constructed a three-dimensional reverberation time model of the gym to test a variety of mitigation options. Assisted with a report compiling measurement and modeling results. (2014)

Dartmouth West Gymnasium Performed Reverberation Time estimations to determine proper surface treatment for the renovation of a multipurpose gymnasium at Dartmouth College. Worked with facilities management to determine the particular uses of the space. (2011)

Jay Peak Condominiums Worked with a modular home company and Jay Peak resorts to develop suitable party wall constructions for proposed condominiums. (2011)

Lyme Inn Conducted measurements to address acoustical shortcomings of a recently renovated inn in Lyme, New Hampshire. Performed analysis of the shortcomings and wrote a report determining the source of the acoustical shortcomings as well as recommending improvements with minimal cost. Prepared a post-renovation report to discuss the improvements provided by the renovations. (2011)

Showcase Lab, Lebanon, NH Designed the construction of a showcase lab which will be used to demonstrate the abilities of equipment to potential clients even though the equipment emits considerable sound. Client specification was to be able to discuss benefits of particular metal cutting equipment during equipment demonstrations. Sound emissions were up to 120 dB in some bands. Collaborated with the architect and owner to determine the owner's wants and needs. (2011)

Burlington Country Club Grill Room, Burlington, Vermont Worked with the client to develop a noise mitigation plan for a restaurant in response to member complaints about decreased speech intelligibility and increased sound levels in a restaurant following a recent renovation. (2012)

Colchester High School Auditorium, Colchester, Vermont Worked with the project architect to improve room acoustics of a multi-use high school auditorium. Specific concerns were insufficient sound levels for un-amplified speech and insufficient intelligibility of both instruments and speech. (2016)

Lebanon High School Band Room, Lebanon, New Hampshire Worked with facilities staff of the Lebanon School District to improve sound insulation between the high school's band room and an adjacent classroom. (2015)

Seventh Generation Office Renovation Helped develop the acoustics of an office renovation in Burlington, Vermont. The purpose of the renovation was to adapt the office to a more open layout. This required consistent reduction of reverberation and overall sound levels within the office. Materials were selected with a focus on sustainability building materials. (2019)

PUBLICATIONS

Old, Isaac. "Wind Turbine Sound Quality Rating." 9th International Conference on Wind Turbine Noise. Remote. 18-21 May 2021.

Old, I. "Human Health Hazard – The Shirley Wind Story." 8th International Conference on Wind Turbine Noise. Lisbon, Portugal: 12-14 June 2019.

Old, I. and Kaliski, K. "Wind Turbine Noise Dose Response – Comparison of Recent Papers." 7th International Conference on Wind Turbine Noise. Rotterdam, Netherlands: 2-5 May 2017.

Old, I. and Duncan, E., High Transmission Loss Glass Wall Design. Noisecon 2013. Denver, Colorado: 26-28 August 2013.

Kaliski, K., Old, I. and Blomberg, L., Sound Emissions from a Plug-in Electric Vehicle. Internoise 2012. New York, New York: 19-22 August 2012.

Old, I. Sound Transmission Loss Measurement: A Scale Model Approach. Rensselaer Polytechnic Institute, 2010.

PRESENTATIONS

Old, I., Eros, E., and Duncan, E., Wind Turbine Noise Ordinances: A Review of Selected State and Local Regulations, 161st Meeting of the Acoustical Society of America, May 2011.

LICENSES, CERTIFICATIONS, MEMBERSHIPS, AND AFFILIATIONS

- Associate, Acoustical Society of America
- Member, Institute of Noise Control Engineering
- Board Certified, Institute of Noise Control Engineering
- FHWA Transportation Noise Model 2.5 Certified

Andrew R. Lines, MAI

Principal – Real Estate Valuation, Valuation Advisory Services

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Andrew R. Lines is a principal in CohnReznick's Valuation Advisory Services group where he specializes in Real Estate, Affordable Housing, Cannabis and Renewable Energy. Andrew leads a group of appraisers across the country performing valuations on a wide variety of real estate property types including residential, commercial, industrial, hospitality and special purpose properties: landfills, waste transfer stations, marinas, hospitals, universities, self-storage facilities, race tracks, Senior Housing, CCRCs, and railroad corridors. Affordable Housing experience includes Market Studies, Rent Compatibility Studies and Feasibility Analysis for LIHTC and mixed-income developments. Cannabis assignments have covered cultivation, processing and dispensaries in 15 states, including due diligence for mergers and acquisitions of multi-state operational and early stage companies. Renewable Energy assignments have included preparation of impact studies and testimony at local zoning hearings in 10 states.

He is experienced in the valuation of leasehold, leased fee and partial interest and performs appraisals for all purposes including financial reporting (GAAP, IFRS, IRC), litigation (including Eminent Domain), and gift/estate planning. Andrew has held State Certified General Real Estate Appraiser licensure in the states of Illinois, Indiana, Maryland, Georgia, Florida, Ohio, New York, New Jersey, Arizona, Kentucky, Pennsylvania, California and the District of Columbia.

Before joining CohnReznick, Andrew was with Integra Realty Resources-Chicago Metro, starting as analyst support in 2002 and leaving the firm as a director in late 2011. His real estate experience also includes administration for the residential multifamily REIT Equity Residential Properties Trust (ERP), in the transaction department, where he performed due diligences associated with the sale and acquisition of multi-family properties and manufactured home communities.

Education

- Syracuse University: Bachelor of Fine Arts
- MAI Designation (Member of the Appraisal Institute)

Professional Affiliations

- Chicago Chapter of the Appraisal Institute
  - Alternate Regional Representative (2016 – 2018)
  - MAI Candidate Advisor (2014 – 2019)
- International Real Estate Management (IREM)
- National Council of Real Estate Investment Fiduciaries (NCREIF)
- National Council of Housing Market Analysts (NCHMA)

Community Involvement

- Syracuse University Regional Council – Active Member
- Syracuse University Alumni Association of Chicago, Past Board member
- Chicago Friends School – Former Treasurer & Former Board Member

Court Cases – Expert Witness Testimony

- IDOT vs. Wegeilnik, Elk Grove Village, Cook County, IL Circuit Court Trial Date: July 2013
- IDOT vs. BMO Harris Bank, Homer Glen, Will County, IL Circuit Court Trial Date: July 2014
- IDOT vs. Itasca Bank & Trust #10237, Itasca, DuPage County, IL Circuit Court Trial Date: November 2017
- Multi-Housing Tax Credit Partners XXX v. Alexander Dairy Associates, LLC, Federal Court – Richmond, VA Trial Date: April 2021

Court Cases – Depositions/Mediation Meetings/Filings

- IDOT vs. BMO Harris Bank, Machesny Park, Winnebago County, IL – October 2015
- IRS vs. Phoenix Bond & Indemnity, Cook County, IL – December 2016
- SDOT vs. Garrison Forest Plaza (Utility Pipeline Case), Owings Mills, MD – July 2016
- CTA vs. Thomas Investors, Chicago, Cook County, IL – May 2017
- IDOT vs. Itasca Bank & Trust #10237, DuPage County, IL – July 2017
- IRS vs. the Estate of Tamir Sapir, New York, NY – July 2018
- District of Columbia vs. VEDEM, LLC, District of Columbia – January 2020
- Multi-Housing Tax Credit Partners XXX v. Alexander Dairy Associates, LLC, Federal Court – Richmond, VA Deposition Date: February 2021

Zoning Hearings – List of Counties Accepted as Expert

- Illinois – Cook, City of Chicago, Grundy, McHenry, Ogle, Lee, Champaign, Kankakee, Livingston, Peoria, DeKalb, Boone
- Indiana – Jasper, Clinton
- Michigan – Menominee, Cheboygan, Eaton
- Ohio – Ohio Power Siting Board (Columbus) – Multiple Projects
- New York – Onondaga
- Colorado – Logan
- Pennsylvania – Adams, Franklin, Montour
- Hawaii – Maui
- Kentucky – Fleming
- Wisconsin – Sheboygan

Presentations/Panels

- "Planning for Year 15" NCHMA Fall 2020 Virtual Summit – December 2020
- "Public vs. Private Cannabis REIT Opportunities" NCIA Cannabis Business Cyber Summit – November 2020
- "Valuation and Forecasting Strategies During a COVID Crises" CRE Finance Council- July 2020
- "Cannabis and Its Impact on Associated Real Estate" Sacramento-Sierra Chapter 2019 Conference; Lake Tahoe, CA – October 2019
- "Cannabis & Real Estate – The Ripple Effects of Legalization & Regulation" National Appraisal Institute Conference; Denver, CO - July 2019
- "How Deals Are Getting Done: Capital Markets and Multifamily Finance" Bisnow Multifamily Annual Conference Midwest; Chicago, IL - October 2018
- "Valuations/Financial Reporting" IMN – CFO (west) Private Equity Conference; Carlsbad, CA – May 2015
- "Fair Value and ASC 805", Masters of Accounting Seminar, Georgetown University – October 2013
- "Fair Value and ASC 805", Internal CohnReznick Audit Training, Los Angeles, CA – November 2014

- "Fair Value and ASC 805", Internal CohnReznick Audit Training, Bethesda, MD – September 2014

Valuation Impact Studies

- Landfills
- Big Box Retail Developments
- Truck Terminals
- Electric Power Transmission Lines
- Solar Farms
- Wind Farms
- Environmental Stigma
- View Amenities

Appraisal Institute Classes Completed

- 15-Hour National USPAP (2005); 7-Hour National USPAP (2009; 2011; 2013; 2014; 2016; 2018; 2020; 2022)
- Basic Appraisal Principles (2005)
- Basic Appraisal Procedures (2005)
- Basic Income Capitalization (2006)
- Eminent Domain and Condemnation (2006)
- General Applications (2007)
- Residential Sales Comparison and Income Approaches (2007)
- Advanced Income Capitalization (2008)
- Capital Market Conditions and its Impact on Real Estate (2008)
- General Appraisal Market Analysis and Highest and Best Use (2008)
- Associated Guidance Leadership Program (2008)
- Online Supervising Appraisal Trainees (2008)
- Report Writing and Valuation Analysis (2009)
- Advanced Sales Comparison & Cost Approaches (2009)
- Advanced Applications (2009)
- Business Practices & Ethics (2009)
- Appraisal Curriculum Overview (2-day general) (2011)
- Analyzing Distressed Real Estate (2011)
- General Demonstration Report – Capstone Program (2012)
- General Demonstration Report Writing (2012)
- Candidate for Designation Program (2013)
- Appraising the Appraisal: Appraisal Review – General (2013)
- Advanced Internet Search Strategies (2013)
- FHA and The Appraisal Process (2013)
- Legislative Session (2013)
- Candidate for Designation Program- Advisor (2013)
- 2014 Illinois Supervisor/Trainee Seminar (2014)
- Illinois Appraisers Seminar (2014)
- Data Verification Methods (2015)
- The Discounted Cash Flow Model: Concepts, Issues and Apps. (2015)
- Appraisal Convenience Stores (2016)
- Rates and Ratios: Making Sense of GIMs, OARs, and DCF (2016)
- Uniform Appraisal Standards for Federal Land Acquisitions: Practical Applications (2017)
- Review Case Studies – General (2017)
- Residential & Commercial Valuation of Solar (2018)
- Supervisory Appraiser/Trainee Appraiser Course (2018)
- Review Theory – General (2020)

Clientele Served

- FDIC
- Amtrak, Metra
- Churchill Downs
- BMO Harris
- Commonwealth Edison/Exelon
- Water Reclamation District of Greater Chicago
- DePaul University
- Hartz Mountain, Inc.
- Paramount Properties
- American Healthcare Investors, Inc.
- Ventas/Lillibridge
- Advocate Healthcare
- CBS Radio/Outfront Media
- Ross & Hardies
- Mayfair Development Group
- First Washington Realty
- DuPage County Forest Preserve
- NIPSCO
- Related Companies
- Preferred Apartment Communities
- Lowe Enterprises
- Carl M. Freeman Companies
- Cortland Partners
- Tierpoint
- 365 Data Centers
- PNC Bank
- Innovative Industrial Properties REIT
- Washington Metropolitan Area Transit Authority
- The John Buck Company
- ADP
- Foulger-Pratt
- Chevy Chase Land Company
- BF Saul & Co.
- Quadrum Global
- Walton Development USA
- Skanska USA
- Magnetar Capital
- USAA
- Burroughs and Chapin
- GTIS Partners
- Toll Brothers
- The Pal Group (Palumbo)
- Urban Development Group
- Neal and Leroy
- The Village of LaGrange
- The Village of Lake Zurich
- The City of Des Plaines
- The City of Barrington
- The City of Chicago
- Pathway Senior Living
- The Gencom Group
- SL Industries
- Moduslink Global
- Empire Petroleum
- Other developers, attorneys, banks, individuals, et al.

Notable Assignments Completed

- Willis Tower
- The Aman Hotel & Residences, NYC
- McCormick Place Expansion Projects
- The Arlington Park Race Track Complex
- Carson Pirie Scott – State Street Chicago
- United Technologies (RTX) Corporation Headquarters (Farmington, CT)
- United Technologies (RTX) – Windsor Locks Manufacturing Campus (Windsor Locks, CT)
- The Chicago Board of Options Exchange
- Hartz Mountain Portfolio (Hotels and Distribution Centers)
- DePaul University's Lincoln Park Campus
- Ritz-Carlton Hotels in Florida and California
- Morris Airport Expansion Project
- The Sedgebrook CCRC (Erickson)
- Drake Hotel, Chicago
- Estrella Mountain Ranch Master Planned Community
- Westphalia Master Planned Community

- 11 Madison Avenue
- Trump Tower (NYC) Penthouse Condominium
- Icon Tower – Las Olas
- Former Kraft Corporate Headquarters (Northbrook, IL)
- ComEd/Exelon Corporate Headquarters (Oakbrook, IL)
- Rochelle Community Hospital
- Bayonne Community Hospital
- Hoboken Community Hospital
- Watsonville Community Hospital
- Idaho Waste Systems Landfill
- DeWitt County - Clinton Landfill
- Rochelle Landfill
- Silver Spring Metro Center
- Rockville Metro Center
- Park Potomac Buildings D, E & G
- Mid-Town Athletic Club (Chicago)
- Wilmette Harbor Marina
- Racine County Marina
- Potomac Yards and Waterfront Station
- Port Covington – Sangamore Development Land

Westwood

Matthew Hildreth, PE
Water Resources Engineering Manager

Overview

Matt is a water resources project manager who joined Westwood in 2016. He manages and works primarily on hydrology studies, hydraulic studies, and drainage design for wind and solar projects. Matt has experience using many hydraulic, hydrologic, and geospatial software's, utilizing them to perform tasks ranging from preliminary scoping and flood mapping to detailed final crossing structure design. In previous consulting for the public sector Matt worked on flood control projects for watershed districts and state agencies.

Westwood's water resources group consists of people focused on the science of stormwater modeling and providing simple solutions to complex problems. Matt has completed and/or supervised hundreds of stormwater designs including water quantity, quality, scour analysis, erosion control, hydraulics and all other aspects of stormwater design. In addition, since many development projects impact wetlands, we are constantly working with agencies to quantify wetland extents, impacts, restoration opportunities and mitigation requirements. Matt is an expert in all major software packages including HEC-HMS, HEC-RAS, 2-D Modeling Software's, HydroCAD and many others. We have completed regional flood assessments in support of FEMA map revisions and work closely with agencies throughout the nation.

Experience

WIND

78 Turbine Wind Project, Williams County, North Dakota **–** Provided all aspects of hydrologic design support for construction of access roads, substations and wind turbines. The primary issues associated with the site were standing water at turbine locations due to the prairie pothole landscape and stream crossings. FLO-2D was used to identify areas of inundation under a variety of storm and snowmelt events. This method assured designers that turbine locations would be accessible under wet conditions.

214 Turbine Wind Project, Benton County, Washington – Provided all aspects of hydrologic design support for construction of access roads, substations and wind turbines. Channelized flows and scour in the area were a primary concern related to turbine placement. The water resources team worked closely with the civil designers and client to help optimize the layout to best fit the challenges based on land ownership and environmental regulations.

114 Turbine Wind Project, Torrance County, New Mexico – Provided all aspects of hydrologic design support for construction of access roads, substations and wind turbines. Performed detailed final design of crossing structures, which involved a great deal of innovation to size crossings in compliance with client-specific specifications. Overall, crossing sizing methodologies were implemented within the project, utilizing a combination of HydroCAD, and Culvertmaster software's to show in-depth calculations supporting the design of each crossing.

SOLAR

120 MW Solar Array, Upton County, Texas – Conducted a hydrology study of a proposed solar array in Upton County, TX. The offsite portion of this project utilized a FLO-2D model to estimate 100-year flow onto the site. This analysis also utilized HydroCAD to size basins and drainage channels within the project to assist in flow reduction onsite.

86 MW Solar Array, Jeff Davis County, Georgia – Conducted a 2-D hydrology study of a proposed solar array in Jeff Davis County, GA. Additional HydroCAD was utilized to determine pre vs post construction runoff rates and volumes within the project to meet both county and states regulations.

500 MW Solar Array, Riverside County, California – Conducted a hydrology study of a proposed solar array in Riverside County, CA. The offsite portion of this project encompassed around 1,000 sq. miles flowing into an alluvial floodplain near the project location. A FLO-2D model was utilized to estimate 100-year flow onto the site. This analysis also utilized HydroCAD to size basins and large drainage channel within the project to meet assist in project layout and design.

ADDITIONAL EXPERIENCE

Battery Storage, Tarrant County, Texas – Conducted a stormwater management study of a proposed battery storage facility array in Fort Worth, TX. This analysis utilized HydroCAD to size basins and onsite channels within the project to meet both city and county regulations

Upper Maple River Dam, Steele County, ND – Matt was the onsite field engineer overseeing the construction of the earth dam.This dam will reduce flood damages over more than 20,000 acres in portions of Steele, Barnes and Cass counties where the river can widen to two miles during floods. The dam protects local farmland in the area prone to frequent inundation and infrastructure immediately downstream of the dam. The dam has a flood peak reduction of 86 percent in a 100-year, 24-hour rainfall and 58 percent in a 100-year snowmelt. The floodplain protected by the project is 22,365 acres.

Hydrology and Hydraulic (H&H) Studies – Conducted a large variety of H&H studies throughout the United States. These studies vary from a desktop review and preliminary due diligence to complete detailed construction documents, site visits and permitting of project site. Analysis areas have ranged from small scale stormwater design to over 100 square miles. The typical project will determine flood hazards through multiple modeling techniques (2D modeling, Curve Number, Regression, Green-Ampt, HEC-RAS) and review of public data sets (FEMA, USGS, Local Jurisdiction). This data is used to update maps, determine buildable land and design infrastructure. The following is a selected list of locations we have completed H&H studies: Texas (35+ Counties), California (15+ Counties), Minnesota (30+ Counties), Oklahoma, Nevada, Arizona, Iowa, Wisconsin, Illionois, Ohio, West Virginia, Oregon, North Dakota, South Dakota, Hawaii, Alabama, South Carolina, New York and Maine.

Hurricane Harvey Hydrologic Analysis – Conducted analysis of the impact of Hurricane Harvey on development impacts to ranchland southeast of Houston in the days following the storm. Project included statistical rainfall analysis, hydrologic modeling of the “Hurricane Harvey Precipitation Event”, and analysis of drone-based mapping to determine damage.

FEMA Reviews (multiple states and counties) – Reviewed FEMA Flood Insurance Rate Maps and Flood Insurance Studies to assess accuracy of delineated floodplain. Conducted third-party hydrologic and hydraulic modeling of flood source to verify flood hazard area boundaries and recommend course of action to amend, revise or accept existing floodplain.

1000 Square Mile Hydrology Model, Oklahoma – Provided a hydrology study for an over 1,000 square mile area in Oklahoma to provide design support for construction of a wind project and transmission line. Utilized a combination of Global Mapper, StreamStats, 2-D Modeling and HEC-RAS to analyze culvert crossings, FEMA and inflow hydrographs.

Education

North Dakota State University – Fargo, BS Civil Engineering
Norwich University – Vermont, Masters of Civil Engineering: Water Resources and Environmental Engineering

Certifications

Professional Engineer: Minnesota, Colorado

Chronology

Westwood Professional Services, March 2016 – Present
Moore Engineering, May 2014 – March 2016