THE STATE OF NEW HAMPSHIRE

BEFORE THE

SITE EVALUATION COMMITTEE

DOCKET NO. 2015-04

PRE-FILED DIRECT TESTIMONY OF ANTHONY TROY GODFREY

APPLICATION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
D/B/A EVERSOURCE ENERGY
FOR A CERTIFICATE OF SITE AND FACILITY FOR CONSTRUCTION OF A
NEW 115 kV TRANSMISSION LINE

THE SEACOAST RELIABILITY PROJECT

April 12, 2016

Qualifications and Purpose of Testimony

Q. Please state your name, title, and business address.

A. My name is Anthony Troy Godfrey and I am the Director of Marine Engineering for Caldwell Marine International, LLC with a registered address of 1433 Route 34 South, Building B1, Farmingdale, New Jersey 07727.

Q. Briefly summarize your educational background and work experience.

A. I attended Florida Institute of Technology studying Electronics Technology from 1983-1985. I received a Bachelor of Science in Electrical Engineering from Temple University in 1991. I started working as a Chief Survey Engineer at Caldwell Marine (then Caldwell Diving) in 1993. I was later promoted to Engineering Manager and Estimator. I am now the Director of the Submarine Cable Division of Caldwell Marine International overseeing all facets of marine projects and staff. I have directed the installations of numerous high voltage submarine cable systems. Please refer to my resume, Attachment A, for further details.

Q. Have you previously testified before the Site Evaluation Committee?

A. No, I have not.

Q. What is your role in the Project?

A. I am the Director of Engineering at Caldwell Marine International, LLC ("CMI") Caldwell Marine. CMI has been retained by Public Service Company of New Hampshire to support the Project and to provide technical expertise for the permitting and marine construction of the underwater portion of the Project.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide information regarding the permitting and construction of the underwater portion of the Project.

Underwater Construction

Q. Please describe Caldwell Marine's experience installing and maintaining underwater electric transmission lines.

A. Caldwell has extensive experience in this area. Most recently, Caldwell directed the installation of PSNH's affiliate, NSTAR Electric Company's 23 kV distribution submarine cable system between Falmouth and Martha's Vineyard. Other recent major projects under our responsibility were the New York Power Authority submarine cable repair support operations, the Brooklyn to Bayonne (Hess) 345 kV cable system, and the Vancouver Island 242 kV Transmission Reinforcement Project. Full details of Caldwell Marine's history, structure, and experience can be found in the document "CMI History, Structure, Key Projects, and Personnel 2014" in Attachment B.

Q. Please describe the existing cable corridor for the Project.

A. The existing mapped cable corridor runs from West to East across Little Bay. It can be located on National Oceanographic and Atmospheric Administration ("NOAA") Chart #13285 just adjacent to Welsh Cove. For further details, please refer to the document "NOAA Chartlet Little Bay Crossing," Attachment C.

Q. Please describe the cable survey that CMI conducted.

A. Caldwell performed a dive survey of the area to determine the location and condition of existing out-of-service cables crossing Little Bay within the cable corridor. During the dive survey, divers made positive contact with all of the existing cables within the PSNH charted cable corridor in a non-invasive visual dive survey, and critically obstructive existing cable positions were verified. In all diver reported accounts, the physical condition of all existing out of service cables had been found to be structurally sound. The sediment found to be covering the cables in the inspection area trended toward soft, non-cohesive fine sands and soft mud with burial depths ranging from a maximum of 24" to areas of full exposure. Finally, divers reported that in none of the inspection sites were any of the cables found to be cemented in place by stiff sediment overburden or silt/clay accretion. Complete details can be found in the document "F107 Cable Survey Final Report (31Jul14)," Attachment D.

Q. Please describe what data was collected during the marine route survey, and describe how Caldwell Marine utilized the Marine Route Survey data that was collected by Ocean Surveys, Inc. (OSI) in the cable corridor area.

A. A Marine Route Survey (Marine Geophysical Survey) was performed April 20-23, 2013 by Ocean Surveys, Inc., (OSI) at the behest of Power Engineers, Inc. The tasks undertaken during this marine route survey were:

1) A hydrographic survey to determine water depths and record the existing topography.

2) A shallow subbottom profile survey to map shallow subsurface geology and identify buried submarine utilities.

3) Deep subbottom Profile Survey to map deeper subsurface stratigraphy and geology.

4) Side Scan Sonar survey, to map surficial sediments and obstructions as well as identify exposures of existing submarine utilities.

5) Magnetic intensity measurements, to measure the deviation in the earth's total magnetic field generated by ferrous objects on and below the bottom.

Subsequent borings were taken along the anticipated submarine cable route by Normandeau Associates Inc. Geotherm, USA, an underground and underwater substrate testing company, analyzed the cores to provide further subbottom data in terms of geomorphology and substrate plasticity to assist in determining thermal resistivity and burial feasibility.

Caldwell Marine utilized this data to determine soil characteristics, identify obstructions and assess burial feasibility.

Q. Please describe how existing sections of the inactive cables that are currently in the cable corridor will be removed.

A. Data acquired by OSI during the Marine Route Survey will be utilized by to provide rough positioning of the existing out-of-service cables. Reference positions will be entered into a navigation suite, which will act as the central navigation system of the cable removal barge.

The installer will utilize surface grapnels to hook the existing power cable bringing the end on board. Divers may be used to assist in locating the cable end and using a hand jet as needed to free the cable from the bottom.

Once a cable end is on board and a suitable length laid out on deck, it will be tied off with chain stays and sections will be cut off and prepared for onshore disposal. The barge will move along the cable and sections will be cut off until it is determined that the section of the cable corridor needed for the new cable system is clear. Should the cable snap before being entirely cleared from the route, additional grapnel runs or diver locates will be undertaken to relocate the cable and continue clearing the route.

Only sections of the existing out-of-service cables will be removed to create a clear route for the new cable system.

Q. Once the new 115 kV cables are ready for installation, how will the cables be transferred to the Project site?

A. Cable reels will be delivered by the manufacturer to a local port. At this time it is understood that the local port will either be a commercial dock in Newington, NH, or the Schiller Station which is expected to have a suitable berth and dock facilities to allow for heavy lift crane operations.

It is expected that only one power cable reel will be loaded and installed at a time. The barge will return to the storage dock between installations. Separate loading and installation operations are necessary due to the weight of the cable reels. Individual reels will be loaded between installations to allow the barge to operate with minimum draft.

Q. Please describe the jet plow.

A. The cable jet plow is a device which is laid on the seafloor and towed from the barge. Its main mechanical components are two skids which allow the sled to slide across the bottom, and an articulated blade which rotates down into the seafloor. The blade is fitted with water injectors along its leading edge which emulsify the sediment immediately ahead of the blade greatly reducing the force required to pull the plow forward. The cable is strung through the plow blade from the barge, and as the plow moves forward, the cable runs through the blade and is left embedded at a pre-determined depth underneath the seafloor.

Q. Please describe the process for making landfall on both the western and eastern sides of Little Bay.

A. The west shore of Little Bay will be the initial landing site for all three cable runs. They will terminate on the East shore. The cables will be landed into a common open-cut trench at each landing area. These trenches will extend as far seaward as practicable as can be reached by a tracked excavator at low tide. The landing trenches will be dug deep enough that a minimum of 42 inches of cover from the top of installed cables is met. The common landing trenches will be approximately 3 to 5 feet in width. Typically, personnel staffed at the beach landings will include experienced project managers familiar with cable landing operations, field supervisors, and site engineers.

A jet plow will be set as close to the shoreline as possible at high tide to minimize the amount of diver burial between the end of the open-cut landing trench, and the start of the plow launch position. The cable, strung through the plow at its initial launch position, will be hauled ashore until its end is at the position of the transition structure with a suitable amount of over-pull to allow the cable engineers to terminate the end at the transition structure. Once the cable end is secured ashore, the jet plow will start moving seaward along the planned route. This initial landing procedure will be performed for all three cable installation runs.

The Eastern shore landing will be the final landing site for all three cable runs. The jet plow will be towed as close to the shoreline as possible at high tide to minimize the amount of diver burial between the plow recovery position and the end of the open-cut landing trench. At the Eastern shore landing, the cable will be unloaded from the jet plow by divers. A sufficient amount of cable to reach the termination point will be floated from the barge and pulled to shore. This initial landing procedure will be performed for all three cable installation runs.

Q. Please describe the submarine cable installation process.

A. Submarine power cable installation will be performed from an installation barge equipped with a four point mooring system. The lay barge will be fitted with a Dynamic Global Positioning System (“DGPS”), which will allow for the precise positioning of the lay barge and towed jet plow system.

The installation plan calls for laying the submarine cables from reels in three continuous parallel runs from shore to shore. The first installation run will include one power cable segment with one externally strapped fiber optic cable segment bundled in the same trench. The second installation run will include one power cable segment with one externally strapped fiber optic cable segment bundled in the same trench. The third installation run will include one power cable segment. The cables will be installed using a jet plow.

Following each simultaneous lay/burial jet plow operation, the lay barge will be towed back to the staging port to load the next reel of cable segments.

The cable lay barge will likely be a 180’x 54’ barge fitted with a four point anchor winch system, and may also include a centrally placed pulling anchor. All anchors will be controlled by anchor winches on the barge, this will allow precise movement of the barge across Little Bay by controlling the anchor wires.

The cable lay barge is fitted with a DGPS that is capable of positioning the barge and jet plow to +/- 1.0 meter accuracy. The lay barge will be supported by a dedicated support tug boat, a crew boat to ferry crew and customer representatives to and from the barge, and several small work skiffs.

The jet plow will be controlled from the barge utilizing a program that allows for the accurate real-time measurement of cable positioning as the installation occurs, residual cable tension, and burial depth.

Cable handling will be controlled utilizing specialty linear cable engines and powered reel stands to precisely control the pay-out and hold-back of the cables during the installation operations.

Cable landfall operations will include the use of a large winch on the beach. This will be used to haul the cable end onto the beach at the beginning and the end of each cable laying and burial run. The winch will be fitted with a dynamometer to ensure the cable tension during the pull-in operation stays within manufacturers recommended ranges.

Per National Electrical Safety Code ("NESC") requirement, the minimum the submarine cable can be buried at any point is 42 inches. The 42-inch requirement will extend from the landing trench out to the start of plow burial. Once the plow progresses to the line delineating the deep water channel, the plow blade will be lowered to the 8 foot burial depth. A minimum of 30 foot separation between the cables is required in the area where jet-plow installation is taking place, as this is the minimum safe working distance of the plow from each previously installed cable section. Wherever a 42 inch burial cannot be achieved with the jet-plow, articulated concrete mattresses will be installed over the top of the submarine cables. The intent of concrete mattressing is to provide the submarine cables with robust, permanent protection from forces of external aggression such as anchors and fishing gear strikes.

Each run will have an initial cable landing on the Western shoreline, and be installed from West to East. The final landing (end being floated in) will occur from the end of plow position to the Eastern landing.

The remaining sections of cable between the open-cut trench on the shorelines and the end of the jet plow operation will be buried by divers using a hand jetting process. Prior to the start of diver burial operations at the Western shore landing area, a turbidity curtain will be deployed surrounding the entire work area. As divers bury the cable utilizing a jet hose, the deployed turbidity curtain will create a barrier to prevent suspended particulates from being allowed to migrate from the vicinity of the work area. Prior to the start of diver burial operations at the Eastern shore landing area, a turbidity curtain will be deployed around the intertidal portion of the work area. As divers bury the cable utilizing a jet hose, the deployed turbidity curtain will create a barrier to prevent suspended particulates from being allowed to migrate from the vicinity of the work area.

Q. How will PSNH ensure that the underwater segments of the Project comply with all of the requirements of the Certificate of Site and Facility when implementing the construction plan, including, the conditions set under each State and federal permit?

A. PSNH will require all contractors to comply with the requirements identified in the Certificate of Site and Facility in performance of this installation. The installer will be required to provide all as-built documentation for submittal to NOAA for the purposes of nautical charting. Per final permit requirements, it is anticipated that an environmental monitor will be on-site during the marine operations.

Q. Please describe any maintenance that is required for an underwater electric transmission line of this nature.

A. Typically, no maintenance is required on a buried submarine cable. Should a break occur due to a high voltage blowout or fault due to external aggression, the cable will be cut, raised to the surface, a section of new cable spliced in, laid on the seafloor, and diver buried and/or covered with an articulated concrete mattress.

Q. Does this conclude your testimony?

A. Yes.