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Via Hand Delivery

June 28, 2016

Luly E. Massaro
Commission Clerk
Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

Re: The Narragansett Electric Company d/b/a National Grid
Aquidneck Island Reliability Project
PUC Docket No. 4614

Dear Ms. Massaro:

I am enclosing for filing on behalf of The Narragansett Electric Company d/b/a National Grid five (5) copies of prefiled testimony of the following witnesses in PUC Docket No. 4614:

1. Endrit Fiku, P.E.
2. Carlos A. Perez-Perez

We are sending electronic copies to the Service List and will provide a hard copy to anyone that requests it. Please acknowledge receipt of this filing on the enclosed copy of this letter and return it with my messenger. Thank you for your cooperation.

Sincerely,

Peter V. Lacouture

Enclosures

Copy to: Cynthia Wilson-Frias, Esq. *(via hand delivery)*
PUC Docket No. 4614 Service list *(via e-mail)*

The Narragansett Electric Company

d/b/a National Grid (Aquidneck Island Reliability Project)

RIPUC Dkt. No. 4614

Testimony of

Endrit Fiku, P.E.

June 28, 2016

INTRODUCTION

Q. Please state your name and business address.

A. My name is Endrit Fiku. My business address is 40 Sylvan Road, Waltham, Massachusetts 02451.

Q. By whom are you employed and in what position?

A. I am employed by National Grid USA Service Company as a Lead Project Manager in the Complex Project Management Department.

Q. What is National Grid USA Service Company?

A. National Grid USA Service Company (the "Service Company") is a wholly owned subsidiary of National Grid USA, an energy company specialized in the transmission and distribution of electricity and natural gas. The Service Company provides administrative and technical services (such as engineering, accounting and legal services) to the other subsidiaries of National Grid USA, including The Narragansett Electric Company d/b/a National Grid ("National Grid" or the "Company").

Q. What are your responsibilities as Project Manager?

A. As Project Manager I am responsible for managing all aspects of assigned projects, including developing and gaining approval for project scope, cost estimation, project schedule, project budget and resourcing, compliance with environmental and safety standards and policies, project licensing and permitting, project communications, engineering and design, procurement, construction and commissioning.

Q. Please describe your education, training and experience.

A. I have a B.S. and a M.S Degree in Electrical Engineering from University of Massachusetts Lowell, located in Lowell, Massachusetts. I also have a M.S. Degree in Power System Management from Worcester Polytechnic Institute, located in Worcester, Massachusetts. I am a licensed professional engineer in Massachusetts and Vermont. Once I graduated from college in May 2008, I start working at National Grid USA Service Company as a Protection Engineer in the Protection Engineering Department where I was responsible for performing electrical system short circuit studies and development of relay settings. I served on this role until January 2014. In January 2014, I joined Black & Veatch as a Project Engineer. Black & Veatch is a consulting engineering firm with headquarters in Kansas City. As a project engineer at Black & Veatch, I was responsible for managing design teams in the substation design development and managing project budgets and scope. I served in this position until March 2016, when I returned to National Grid USA Service Company as a Lead Project Manager.

Q. Are you familiar with National Grid's Aquidneck Island Reliability Project (the "Project")?

A. Yes. I am the Project manager and am responsible for leading the Project team in the development of engineering and design, Project licensing and permitting, and Project execution and monitoring. Other responsibilities include, managing Project budget, schedule, scope of work and identifying and mitigating risks.

SCOPE OF TESTIMONY

Q. What is the scope of your testimony in this proceeding?

A. In my testimony, I will provide an overview of the Project, explain Project details

including Project cost, and address alternatives to the Project.

Q. Are you familiar with National Grid's Energy Facility Siting Board (the "Siting Board") Application dated December, 2016 for the Project, including the Environmental Report ("ER") prepared by Vanasse Hangen Brustlin, Inc. ("VHB")?

A. Yes.

DESCRIPTION OF PROJECT

Q. Please describe the components of the Project.

A. The Project includes the following improvements to the existing transmission system in Portsmouth and Middletown: rebuild and upgrade the existing 69 kV 61 and 62 Lines to 115 kV between Dexter Substation and Jepson Substation; replace the existing Jepson Substation at Jepson Lane in Portsmouth with a new substation facility on the west side of Jepson Lane in Middletown which requires the relocation of a segment of the 63 Line; decommission the old Jepson Substation; and, reconfigure Dexter Substation by adding 115 kV load break switches, new dead end structures, and circuit switcher and removing the 115/69 kV transformation and the associated 69 kV equipment.

ALTERNATIVES

Q. Please discuss the alternatives to the Project's proposed transmission line and substation improvements that National Grid considered.

A. We reviewed the Project, which is known as the 115 kV Alternative, together with a no build alternative, a no wires alternative ("NWA"), and a 69 kV alternative. For the reasons summarized in Section 5.2 of the ER, National Grid concluded that the 115 kV Alternative is preferred alternative.

The No Build Alternative was dismissed because it would not address the reliability and asset condition issues identified in Section 3 of the ER.

National Grid was unable to identify a viable NWA to address either the reliability or the asset condition issues identified in Section 3, consistent with the Rhode Island Public Utilities Commission's System Reliability Procurement Standards.

The 69 kV Alternative could address the reliability and asset condition issues identified in Section 3, but it is less robust than the preferred option. Under this alternative, National Grid would need to implement a variant of the 115 kV Alternative in the future, including additional work on the 61 and 62 Line right-of-way ("ROW"), to address load growth on the island. This alternative would result in additional environmental impacts and costs.

The 115 kV Alternative is the preferred alternative because it provides a longer term solution to the needs identified in Section 3, with comparable environmental impacts.

Q. Did you consider alternative configurations for the 61 and 62 Lines?

A. Yes. In addition to reusing the ROW, National Grid considered routing lines overhead along West Main Road (Route 114) and East Main Road (Route 138). However, due to limited width along the roads, the lines would have to be constructed along one side of the road on tall double circuit steel pole structures supported on concrete foundations. In addition, the East Main Road option presented challenges with airport clearance requirements that would require an underground dip to comply with height restrictions. For these reasons, the reuse of the existing ROW was selected as the preferred option.

Q. Did you consider alternative locations for the new Jepson Substation?

A. Yes. National Grid reviewed the reuse of the existing location, a hybrid substation configuration with equipment on both sides of Jepson Lane, locating the substation on the far west side of the proposed location, and locating the substation on neighboring agricultural land that is for sale. The reuse of the existing Jepson Substation property was rejected due to size constraints which make it impossible to build the substation in the open space between the existing substation and Jepson Lane. The hybrid option was not considered a viable option because of the operational and maintenance complications of having equipment located on both sides of Jepson Lane. The hybrid option also posed challenges for mitigating the visual impacts on both sides of Jepson Lane. Both the hybrid option and the reuse of the existing location were also rejected because National Grid wanted to move the substation out of the Sisson Pond watershed. Locating the substation to the west of its proposed location was rejected because of the challenge of crossing the Mother of Hope Brook and the challenge of mitigating the visual impact to a densely populated residential neighborhood to the south of that location. Finally, at the request of the Town of Middletown, the team reviewed two agricultural parcels in Portsmouth. These locations were rejected because they are subject to Agricultural Land Preservation Restrictions with the Rhode Island Agricultural Lands Preservation Commission that requires the demonstration of "extreme need" and the "lack of any viable alternative" before the restriction could be lifted.

ESTIMATED PROJECT COSTS

Q. What is the estimated cost of the Project?

A. National Grid has prepared study grade estimates of the costs associated with the Project.

Study grade estimates are prepared prior to detailed engineering and are based upon historical cost data, data from similar projects, and other stated assumptions. The accuracy of study estimates is expected to be +50/-25 percent. Estimated costs include costs of materials, labor and equipment. The estimated capital cost of the Project is $63.90 Million (see Section 4.6.2 of the ER).

CONSTRUCTION PRACTICES AND SCHEDULE

Q. Please explain the construction practices that National Grid will use in constructing the Project.

A. Our construction practices and process are described in Sections 4.2 and 4.3 of the ER. Once all necessary permits and licenses have been obtained for the work, National Grid will commence construction of the new transmission lines. The first activities to take place will be vegetation mowing/clearing within the ROW as necessary, and the installation of appropriate erosion and sedimentation control devices. These activities are detailed in Sections 4.2.1 and 4.2.2 of the ER. The next step in the construction sequence is to perform access road and work pad construction and maintenance, including the construction of temporary swamp mat access roads where required. Improving the access along the ROW, which is described in Section 4.2.3 of the ER, will allow construction personnel and equipment to reach work locations in a safe, efficient and environmentally sensitive manner. After access has been improved along the corridor, the next step is the installation of foundations and pole structures as described in Section 4.2.4 of the ER. Following the erection of transmission pole structures, insulators will be installed on the structures and the existing wires will be transferred to the new structure. The existing

structures will then be removed and disposed of properly. The existing wires will be used to pull new shield wires and conductors using stringing blocks and tensioning equipment. ROW restoration efforts, including final grading and stabilization of disturbed areas, will be completed following the construction operations. Throughout the entire construction process, National Grid will retain the services of an environmental monitor whose primary responsibility will be to ensure compliance with all federal, state and local permit requirements and National Grid company policies.

Q. Please summarize the process for construction of the new Jepson Substation.

A. The sequence is described in detail in Section 4.3 of the ER. Briefly, the site would be surveyed and prepared, the new substation yard will be graded to create a level surface and filled with gravel and aggregate, and the yard will be fenced. The next step is to install foundations for the electrical equipment, foundation for the new control house, and underground duct work for distribution lines. Once the foundations are prepared, installation of the electrical equipment and the control building will take place.

Q. What is the schedule for the Project?

A. We expect to commence construction of the Project in late 2018 and to have the facilities in service by Spring 2020.

Q. Does this complete your testimony?

A. Yes, it does.

The Narragansett Electric Company

d/b/a National Grid (Aquidneck Island Reliability Project)

RIPUC Dkt. No. 4614

Testimony of

Carlos A. Perez-Perez

June 28, 2016

Q. Mr. Perez-Perez, please state your name and business address.

A. My name is Carlos A. Perez-Perez. My business address is 40 Sylvan Road, Waltham, Massachusetts 02451.

Q. By whom are you employed and in what position?

A. I am employed as a Transmission Planning Engineer by National Grid USA Service Company, Inc. d/b/a National Grid ("National Grid") in the Transmission Planning Department.

Q. What are your responsibilities in that position?

A. As a Transmission Planning Engineer I am responsible for transmission system planning, including determination of need for reinforcement of the transmission supply system, evaluation of alternative solutions, and selection of the most satisfactory solution.

Q. Please describe your education, training and experience.

A. I am a graduate of Wentworth Institute of Technology, Boston MA, holding a Bachelor of Science in Electronics Engineering Technology. I am also a graduate of Worcester Polytechnic Institute, holding a Master of Science degree in Electrical and Computer Engineering. I have 7 years of experience in power system planning and analysis.

Q. Mr. Perez-Perez, are you familiar with the Aquidneck Island Reliability Project (the "Project")?

A. Yes. I prepared the Newport Area (Aquidneck Island) Transmission Solution Study Report which is dated April 2015 ("2015 Study"). The 2015 Study identified areas of improvement to the transmission system on Aquidneck Island to reduce the chance of long-term outages under certain contingencies. The 2015 Study is provided as Appendix

A to the Environmental Report ("ER") submitted with National Grid's application to the Energy Facility Siting Board (the "Siting Board").

Q. Mr. Perez-Perez, are you familiar with National Grid's Energy Facility Siting Board Application, including the ER prepared by Vanasse Hangen Brustlin, Inc. ("VHB") for the Project?

A. Yes, I prepared the description of the need for the Project in the ER.

Q. What is the Project?

A. The Project includes rebuilding and upgrading the existing 69 kV transmission lines to 115 kV, constructing a new Jepson Substation and removing the old substation, and reconfiguring the Dexter Substation. Once completed the Project will improve reliability of the transmission system on Aquidneck Island and will help to serve additional distribution improvements on Aquidneck Island, which includes the decommissioning of four (4) substations. The Project will improve the reliability of electric supply to the area by increasing the loading capability of the transmission system and replacing the aging Jepson Substation with modern equipment on a nearby site. The need for upgrades to Aquidneck Island were first identified in National Grid's 2007 Greater Rhode Island Transmission Reinforcement Study, which addressed transmission systems needs between 2007 and 2020 in the State of Rhode Island and select areas in southeastern Massachusetts.

Q. What is the scope of your testimony in this proceeding?

A. I will describe the transmission planning studies which have been conducted and address several alternatives which were examined as part of the process. A more detailed

description is contained in Chapter 3.0 of the ER and in the studies listed above.

Q. Please describe the process by which National Grid determined that these transmission system improvements were necessary.

A. National Grid routinely undertakes transmission planning studies to determine whether new or upgraded transmission facilities are needed within a specified timeframe (typically ten years) to maintain reliable electric power within a specific geographic area. These studies are conducted using a "what-if" approach that tests the loading of each piece of equipment under a range of reasonably stressed system conditions. National Grid's transmission planning guidelines, which are based on the ISO New England, Inc. (ISO-NE) and New England Power Pool (NEPOOL) standards, the Northeast Power Coordinating Council (NPCC) criteria, and the North American Electric Reliability Corporation (NERC) standards (the Transmission Planning Documents), identify the range of conditions which need to be considered in a particular transmission planning study. The capability of the system under these conditions is studied using computer simulations which model the electrical parameters of the system. The transmission system is analyzed under "normal" conditions, and also under contingencies involving the loss of one or more transmission system facilities. The contingency analysis is carried out for various system generation dispatches and system transfer levels in order to ensure that the area of interest is tested under conditions that reasonably maximize the electrical stress to the area.

Contingency analysis involves two levels of study. The first level is single contingency analysis (commonly referred to as N-1 analysis). It involves testing all possible single

contingencies that could impact the area of interest. A single contingency represents a "single event", such as a single transmission line, transformer or generator outage, or the failure of a breaker or double-circuit tower. The contingency is simulated and the effects of the contingency on the power system are studied. The resulting system loadings and voltage levels are assessed to see if they meet criteria following the contingency event. The second level of study is second contingency analysis (commonly referred to as N-1-1 analysis). This analysis test combinations of two initiating events that occur close together in time. The first initiating event involves taking out of service a key element within the area of interest, such as a 345 kV line, a 345/115 kV transformer, a 115 kV line, or a generator. Following the first event, the system generation and power flows can be adjusted in preparation for the next initiating event. Generation and power flow adjusted through the use of generators capable of ten-minute reserve, generation tripping, use of transformer load tap changers, switching of series and shunt capacitors, and switching of reactors is then performed. Single contingency analysis (N-1 analysis) is then performed on the adjusted power system.

Once the computer modeling is complete, the results of each N-1 and N-1-1 contingency are analyzed to determine whether any piece of equipment is carrying more electric current than the equipment is rated for, based on the assumed ambient temperatures. Voltage levels are checked to determine that they are within appropriate ranges. The effect of future loads is reviewed. System stability, grounding, fault current levels, operability, and ability to maintain the system are also considered. As a result of this analysis, transmission planners can identify elements of the transmission system that need

to be reinforced in order to continue to provide reliable electric service within the study area.

After identifying problems that could occur within the study area under expected electrical loads and possible contingency situations, plans are developed to resolve the problems. The plans are developed and evaluated based on the reliability criteria as described in the Transmission Planning Documents. Other factors used to evaluate proposed plans include equipment standards and specifications, relaying practices, operational and maintenance considerations, safety, environmental impacts, and economics. The evaluation of electrical alternatives leads to a recommended plan that is summarized in a report. The assumptions, analyses, and results are described in detail in Sections 3.3.1 and 3.3.2 of the ER.

Q. What did you conclude as a result of these analyses?

A. The 2015 Study demonstrates that the existing transmission facilities on Aquidneck Island are inadequate to meet National Grid, NERC, NPCC, and ISO-NE reliability standards and criteria for the projected load and generation conditions in this area. Without the Project, under certain conditions during summer peak loading conditions, electric service to customers would have to be dropped to repair/replace out of service equipment. In addition, the Jepson Substation Asset Condition Studies demonstrate the need for a replacement as the existing equipment is either aging or obsolete and replacement parts are difficult to obtain.

Q. Does this complete your testimony?

A. Yes, it does.