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Via Hand Delivery

March 24, 2017

Todd Bianco, Coordinator
Energy Facility Siting Board
89 Jefferson Boulevard
Warwick, RI 02888

Re: The Narragansett Electric Company d/b/a National Grid
Aquidneck Island Reliability Project
Docket No. SB-2016-01

Dear Mr. Bianco:

I am enclosing for filing on behalf of The Narragansett Electric Company d/b/a National Grid an original and six (6) copies of its response to the Rhode Island Energy Facility Siting Board's First Set of Data Requests. I am sending electronic copies to the Service List and will provide a hard copy to anyone that requests it.

Sincerely,

George W. Watson III

Enclosure

Copy to: Patricia S. Lucarelli, Esq. *(via hand delivery)*
Docket SB-2016-01 Service List *(via e-mail)*

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

IN RE:	**THE NARRAGANSETT ELECTRIC COMPANY d/b/a NATIONAL GRID – AQUIDNECK ISLAND RELIABILITY PROJECT IN PORTSMOUTH AND MIDDLETOWN, RHODE ISLAND**	: : : :	**SB-2016-01**

THE NARRAGANSETT ELECTRIC COMPANY d/b/a NATIONAL GRID'S RESPONSE TO THE ENERGY FACILITY SITING BOARD'S FIRST SET OF DATA REQUESTS

EFSB DATA REQUEST NO. 1-1:

Is it possible to construct the new Jepson Substation in a totally enclosed structure on either the existing site or proposed site? Please explain the issues/concerns, e.g. footprint, EMF, height, cost, etc., associated with such.

RESPONSE NO. 1-1:

A substation totally enclosed within a structure would be referred to as an indoor substation. This type of design is not typical due to the difficulties in enclosing power transformers and high voltage equipment inside a building. The design would need to address safety, electrical clearances, installation, operation and maintenance, equipment ventilation, fire walls, fire suppression, and life safety egress. Although National Grid does have some indoor substations in its system, they are smaller distribution substations located in urban areas.

The new Jepson Substation includes both a transmission transformation function (115 kV to 69 kV) and a distribution transformation function at multiple voltages (115 kV to 23 kV and 115 kV to 13 kV). As described in Section 4.1.3 of the Environmental Report, the equipment and structures at the proposed Jepson Substation include:

1) Four (4) Power Transformers and one (1) Auto Transformer;
2) Eight (8) circuit breakers for the 115 kV air insulated substation;
3) Two (2) MCSPCC (metal clad switchgear power and control center) enclosures for the 23 kV and 13.8 kV equipment (these buildings mainly house the switchgear, control, and protection equipment with approximate dimensions of 60 feet long by 25 feet wide by 15 feet high and 50 feet long by 30 feet wide by 15 feet high;

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4) One (1) 115/69 kV control house with approximate dimensions 80 feet long by 35 feet wide by 15 feet high; and
5) Four (4) 55 feet high steel termination structures (A-frames) to terminate the incoming 61 and 62 transmission line and the outgoing 63 transmission line via the 115/69 kV transformer.

It is not feasible to enclose all of this equipment in a building. In addition, the existing overhead transmission lines are not compatible with an indoor substation.

It would be possible to enclose the eight (8) 115 kV circuit breakers in a building by switching from air insulated switchgear to Gas Insulated Switchgear (GIS). The dimensions of the new building to enclose the 115 kV GIS would be approximately 100 feet long by 50 feet wide by 35 feet high. The enclosure would not include the proposed 55 foot steel termination structures (A-frames), 115 kV and 69 kV open air interconnections to the overhead line circuits, the five (5) transformers, and some of the 115/69 kV equipment, all of which would remain outside of a building. As noted above, the proposed substation design already has the 13.8 kV and 23 kV switchgear equipment enclosed in buildings and this design would remain the same using 115 kV GIS.

The substation yard on the preferred site would still need to be large enough for the power transformers, A-frames, 13 kV switchgear building, and 23 kV switchgear building, so the 115 kV GIS would not result in a dramatic reduction of the overall substation footprint.

The same is true for the use of the front portion of the existing Jepson Substation. As previously stated in the prefiled testimony of Daniel McIntyre, the use of the front portion of the existing Jepson Substation site would require a congested electrical layout to fit in the smaller area. The 115 kV GIS building would not appreciably change that congestion and may make the construction complexities more difficult since the construction of the GIS building could not be phased and would limit where the existing feeder lines could be temporarily relocated. In addition, enclosing the 115 kV circuit breakers would not resolve the construction complexities, visual impacts, operation and maintenance challenges, and layout constraints of using the front portion of the existing Jepson Substation site.

The GIS option would increase the substation cost by at least $8 million based on the expected cost premium of using GIS equipment over air insulated equipment. It is likely this cost would be localized by ISO-New England pursuant to the cost allocation guidelines described in its Planning Procedure No. 4.[1]

Using GIS will not impact EMF as the higher EMF levels are limited to the areas where the transmission lines enter and exit the substation. These areas would not change with GIS.

[1] ISO NEW ENGLAND PLANNING PROCEDURE NO. 4 PROCEDURE FOR POOL-SUPPORTED PTF COST REVIEW specifically states the following: "The following, non-exclusive list of examples is provided for illustration of the types of Projects that would be considered to contain Localized Costs: . . . 4. The Project is a gas-insulated or covered substation when an open-air substation would be feasible and practical for lower cost."

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From a visual perspective, the mass and height of the GIS building may be more difficult to screen than the low profile air insulated equipment and the GIS design does not eliminate the taller A frame structures.

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