

THE NARRAGANSETT ELECTRIC COMPANY

RIPUC Dkt. No. 3732

Testimony of

Alan T. LaBarre, P.E.

April 14, 2006

Prefiled Testimony of Alan T. LaBarre, P.E.

1 INTRODUCTION

2 Q. Please state your name and business address.

3 A. My name is Alan T. LaBarre. My business address is 55 Bearfoot Road, Northboro,
4 Massachusetts 01532.

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

6 A. I am employed by National Grid USA Service Company as Manager of Network
7 Planning and Reliability in the Distribution Reliability Engineering and Asset
8 Management Department.

9 Q. What are your responsibilities as Manager of Network Planning and Reliability?

10 A. I am responsible for assigning, prioritizing, reviewing, and approving the work performed
11 by engineers whose principal function is assessing the performance and planning the
12 development of National Grid's electrical distribution infrastructure. My functional
13 responsibility in this regard includes the entire United States service territory of National
14 Grid.

15 Q. Please describe your education, training and experience.

16 A. I have a Bachelor of Science Degree in Electrical Engineering from the University of
17 Rhode Island. I am also a graduate of the Worcester Polytechnic Institute's School of
18 Industrial Management. I am a registered Professional Engineer in the State of Rhode
19 Island. I have 18 years of professional experience in the area of electrical distribution
20 infrastructure planning at National Grid. During the first 12 years of this experience
21 (1988 – 2000) I was directly responsible for the execution of area distribution planning
22 studies within the central and southeastern portions of National Grid's Massachusetts

1 service territory. Over the remaining 6 years (2000 – present), I have managed
2 engineering groups either responsible for the completion of area distribution planning
3 studies or the development of tools and analysis procedures used by planning engineers.
4 These managerial positions were; Manager of District Engineering for the Southeast
5 District of Massachusetts Electric from 1/2000 – 5/2002, Manager of Distribution
6 Planning and Engineering for The Narragansett Electric Company from 5/2002 - 4/2004,
7 Manager of System Planning and Engineering for National Grid USA Service Company
8 from 4/2004 - 4/2005, and Manager of Network Planning and Reliability for National
9 Grid USA Service Company from 4/2005 – present.

10 Q. Are you familiar with Narragansett Electric’s Southern Rhode Island Transmission
11 Project (the “Project”)?

12 A. Yes, I am familiar with the project and in particular, the proposed development of a new
13 substation on Tower Hill Road in North Kingstown to be supplied by the 115kV L-190
14 line. When I held the position of Manager of Distribution Planning and Engineering for
15 The Narragansett Electric Company, I was the manger responsible for the South County
16 East Area Supply and Distribution Study.

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

18 A. In my testimony, I will summarize the planning process by which National Grid identifies
19 a need for electrical distribution system infrastructure development and describe the
20 distribution study on which the Project need is based. A more detailed description is
21 contained in Chapter 3.0 of the Environmental Report and the South County East Area
22 Supply and Distribution Study, October, 2004 (“October 2004 Distribution Study”),
23 which is Appendix B to the ER.

1 Q. Please describe the process by which National Grid determines that distribution system
2 improvements are necessary.

3 A. Planning studies are the primary means used to identify existing and long range needs of
4 the distribution system and to recommend infrastructure development solutions that will
5 provide reliable and economic electric delivery service to National Grid customers.
6 Planning studies review the electric infrastructure within specific geographic areas (Study
7 Areas). A typical study will look out ten years from the year in which the study is being
8 performed.

9 When conducting a study, Power Supply Area (PSA) forecasts, published by the
10 National Grid Planning and Financial Analysis Department, are used to project annual
11 loads in the Study Area for the study period. To complement the PSA forecasts, the Study
12 Area historical annual load growth rate is calculated and anticipated large spot loads are
13 identified. Taking all these variables into consideration, a projected annual load growth
14 rate is developed for the Study Area.

15 After the projected annual load growth rate is developed, diagnostic analysis of
16 equipment loading, system voltage performance, and service reliability is performed to
17 identify existing and anticipated problems. If the existing infrastructure is inadequate or
18 will become inadequate before the end of the study period, infrastructure improvement
19 plans are developed to resolve the area problems. The plans that are developed consider
20 the establishment of new facilities and/or the expansion of existing facilities.

21 The cost of each plan is calculated and a sensitivity analysis is performed to
22 determine if changes in expected load growth or other factors have a significant impact
23 on plan cost. A preferred plan is then recommended for implementation based upon cost,

1 reliability, system performance (equipment loading, voltage, etc.), and environmental
2 impact.

3 Q. What geographic area was studied in the October 2004 Distribution Study and why was
4 the study conducted?

5 A. The October 2004 Distribution Study encompassed the towns of North Kingstown, South
6 Kingstown, Narragansett and sections of East and West Greenwich, Exeter, Richmond
7 and Charlestown. The study covered the ten-year period from 2004 - 2013. The Study
8 Area has approximately 50,000 customers with a 2003 peak load of 131 MW. The study
9 was required to address existing feeder, transformer, and distribution supply line loading
10 issues as well as to recommend alternatives to serve projected load growth in the Study
11 Area.

12 Q. What need was identified in the October 2004 Distribution Study?

13 A. The October 2004 Distribution Study identified a number of supply and distribution
14 problems in the Study Area for the ten year period 2004-2013. The problems in the
15 Study Area consist of the following:

- 16 • Loading on the Peacedale substation transformers is above the summer emergency
17 ratings for loss of either transformer or a supply line during peak load periods.
- 18 • Loading on the 3312 distribution supply line section to Lafayette and Hunt River
19 substations is above summer emergency rating for loss of the 84T3 line during peak
20 load periods.
- 21 • Loading on the Peacedale 59F1 and 59F2 VIR reclosers is above summer emergency
22 ratings for loss of either 12 kV bus.

- 1 • In 2004, six of the nineteen distribution feeders in the study area were projected to
2 exceed the Feeder Design Criteria (FDC) of 20 MWH interruption for a single
3 contingency.
- 4 • In 2005, one distribution feeder in the study area was projected to exceed 100% of its
5 summer normal rating and an additional six feeders were projected to exceed 90% of
6 their summer normal rating.
- 7 • In 2005, contingency loading on the Peacedale 59F3 and 59F4 reclosers was
8 projected to be above summer emergency ratings for loss of either 12 kV bus.
- 9 • In 2007, contingency loading on the West Kingston T1 transformer is projected to be
10 above summer emergency rating for loss of the T2 transformer or the 1870N line.
- 11 • In 2010, contingency loading on the 84T3 distribution supply line section to Bonnet
12 substation is projected to be above summer emergency rating for loss of normal
13 supply.
- 14 • In 2013, twelve of the eighteen 12.47 kV distribution feeders in the study area are
15 projected to exceed 100% of their summer normal ratings.

16 Q. What does this mean for customers?

17 A. Maximum loading of electrical equipment is determined by National Grid and expressed
18 as normal ratings or normal capabilities. This is the maximum loading considered
19 acceptable for the equipment under normal operating conditions. Emergency ratings or
20 capabilities are the maximum equipment loading considered acceptable during system
21 contingency operations. These ratings are applied for relatively short periods of time,
22 generally less than 24 hours.

1 The concerns identified above indicate that electric system equipment loading is
2 approaching normal capabilities and exceeds emergency capabilities during system
3 contingencies at many locations. If equipment loading above capability is left
4 unaddressed, it can lead to customer service interruptions resulting from equipment
5 failure. To prevent equipment failure due to load in excess of capability, system
6 operators may be required to interrupt service to certain customers during peak system
7 load periods. In addition, heavily loaded equipment also reduces the flexibility system
8 operators have to rearrange the distribution system during outages resulting from other
9 causes such as tree contact with overhead lines, wind storm damage, motor vehicle pole
10 hits, etc. When system operators cannot rearrange the distribution system to bypass
11 damaged facilities, customer service restoration must wait until system repairs are made.
12 Restoration of service via system rearrangement can typically be completed within 2-4
13 hours while restoration that must wait for system repairs can often take between 4-24
14 hours. It is also important to note that with equipment loading approaching normal
15 capabilities it becomes more difficult to serve new customers in a timely, economic, and
16 reliable manner.

17 Q. What solution did the study identify for these problems?

18 A. The study identified a need for new supply and distribution capacity. Two plans were
19 developed to provide supply and distribution capacity to address both existing area
20 problems and to provide for future needs. The preferred plan recommends the
21 development of a new 115/12.47 kV substation at Tower Hill Road. The preferred plan
22 is technically superior to the alternate plan, has a lower cost, and provides greater
23 flexibility to supply the projected load growth in the study area.

1 Q. What alternatives were considered in the study?

2 A. The October 2004 Distribution Study developed two plans that provide new supply and
3 distribution capacity to address existing area problems and to provide for future needs
4 within the study time horizon.

5 Plan 1 consisted of the development of a new 115/12.47 kV substation at Tower
6 Hill Road in North Kingstown, a site owned by Narragansett Electric adjacent to an
7 electric transmission right of way. The substation would be initially equipped with a
8 single transformer and three feeders. The ultimate layout of the substation would provide
9 for two transformers and eight feeders.

10 Plan 2 consisted of the conversion of the 34.5/12.47 kV Lafayette substation to a
11 115/12.47 kV substation. The new Lafayette substation would initially be equipped with
12 a single transformer and three feeders. The ultimate layout of the substation would
13 provide for two transformers and six feeders. In addition, Plan 2 recommends replacing
14 the West Kingston substation 115/34.5 kV T1 transformer, rebuilding Peacedale
15 34.5/12.47 kV substation, and upgrading the Wakefield 17F2 modular feeder position.

16 Q. What is the conclusion of the Study's analysis?

17 A. Plan 1, the development of a new 115/12.47 kV substation at Tower Hill Road in North
18 Kingstown, is the recommended plan. Plan 1 is technically superior to Plan 2. Plan 1
19 introduces new distribution capacity in a central location where the load is developing
20 and where there is ready access to the existing distribution system. For reference,
21 Attachment 1 shows the existing Old Baptist Road, Lafayette, Bonnet, Peacedale, and
22 Wakefield area substations proximity to one another and Attachment 2 shows how the
23 new Tower Hill Road substation is positioned to serve load in the area along with these

1 existing substations. Plan 1 provides much needed capacity to relieve heavily loaded
2 distribution and supply circuits and improves customer service reliability in this area of
3 North Kingstown. In addition, Plan 1 is approximately 25% lower in cost compared to
4 Plan 2, \$7.55 million versus \$10.75 million.

5 Plan 2 adds supply and distribution capacity only on the fringes of the load center
6 that is in need of relief. Significant residential and commercial growth is occurring along
7 Tower Hill Road, south of Lafayette substation and north of Peacedale substation. It
8 would be difficult and costly to serve this load from a new substation at Lafayette or from
9 Peacedale substation. In addition, Plan 2 only delays the need for new supply and
10 distribution capacity in the vicinity of Tower Hill Road. The Company would have to
11 return in the future with a new proposal to serve the area around the proposed Tower Hill
12 Road substation.

13 Q. Does this complete your testimony?

14 A. Yes, it does.

The Narragansett Electric Company

R.I.P.U.C. Dkt. No. 3732

Witness: Alan T. LaBarre, P.E.

ATTACHMENTS

Attachment 1 South County East Area Substations without Tower Hill Substation

Attachment 2 South County East Area Substations with Tower Hill Substation



