Narragansett Electric
A National Grid Company

Thomas G. Robinson
*Deputy General Counsel*

August 2, 2004

**VIA HAND DELIVERY & BY ELECTRONIC MAIL**

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

**Re: The Narragansett Electric Company's Service Quality Plan**
**RIPUC Docket No. _____**

Dear Ms. Massaro:

Enclosed for filing on behalf of The Narragansett Electric Company ("Narragansett Electric" or "the Company") are 10 copies of the Company's proposed service quality ("SQ") plan.

The Company is making this filing pursuant to the directive of the Commission. On May 27, 2004, Executive Counsel Steven Frias held a conference call to commence procedural discussions regarding the Company's SQ plan. During this conference call, the Commission established August 2, 2004 as the filing date for the Company to make any changes to its current SQ plan.

This filing contains the direct testimony and exhibits of Robert H. McLaren, Cheryl A. Warren, and Mark N. Sorgman. The testimony of Mr. McLaren describes the SQ performance standards that the Commission approved as part of the Third Amended Stipulation and Settlement between the Company, Blackstone Valley Electric Company, Newport Electric Corporation and various parties in Docket No. 2930 ("Original SQ Plan"), the provisions relating to SQ plans contained in the proposed Distribution Rate Plan Stipulation and Settlement filed with the Commission on June 29, 2004 in Docket No. 3617 ("the 2004 Settlement"), and the SQ plan that the Company is filing herewith in compliance with the Commission's recent directive ("New SQ Plan"). The New SQ plan is attached as Exhibit RHM-1 to Mr. McLaren's testimony.

This New SQ Plan is proposed to become effective on January 1, 2005 and is quite similar to the Original SQ Plan approved in Docket No. 2930. The New SQ Plan continues to emphasize reliability and customer service performance standards so as to underscore the importance of assuring consistent, reliable electric service and high quality customer service for the benefit of customers. In the New SQ Plan, the Company is proposing certain updates and enhancements to these performance standards.

First, for all performance standards, the Company proposes to expand the historical time period used to develop the performance benchmarks to include the four most recent years (2000 through 2003) and to consistently utilize the Company's ten most recent years' performance, if available, in developing the New SQ Plan performance benchmarks. Once ten years of performance becomes available, the Company proposes to establish performance standards annually, based on a ten-year rolling average. The inclusion of more recent data and data over a longer period of time better reflects the Company's current and overall performance.

Next, the Company proposes to use the recently adopted IEEE Standard 1366-2003, *Guide for Electric Power Distribution Reliability Indices* ("IEEE Std. 1366-2003"), for calculation of SQ performance benchmarks for reliability. Mrs. Warren's testimony supports both the Company's reliability performance data and the proposed application of IEEE Std. 1366-2003 to determine the Company's SQ performance benchmarks for reliability.

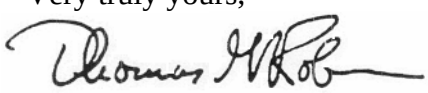
The New SQ Plan also amends the determination of the triggers for reliability penalties and penalty offsets. Specifically, because the distribution of historical reliability performance is not Gaussian (i.e., it is not represented by a "bell-shaped" curve), but rather is asymmetrical, and is reflected more accurately as a lognormal distribution, the New SQ Plan calls for the standard deviation of the historical reliability performance data to be calculated using the natural logarithm of the historical SAIDI and SAIFI values. The Company further proposes to aggregate the historical reliability performance data for the whole Company, to coincide with the fact that, subsequent to the Original SQ Plan, the Company has changed the manner in which it operates the distribution system - from a district basis (Capital and Coastal) to a total Company basis. Mrs. Warren's testimony contains a description of and support for these changes.

The New SQ Plan contains one additional proposed change to the customer service performance standard. The Company is proposing to include calls to the Voice Response Unit ("VRU") in its telephone calls answered within 20 seconds performance. In recent years, the Company has improved the services offered to customers through its VRU and, as a result, has experienced a significant increase in the number of customer calls that are handled by the VRU. Mr. Sorgman's testimony contains a complete description of this proposed change.

The Company is not proposing any changes to the allocation and/or size of the maximum penalty amount or offsets.

Thank you for your attention to this filing. Should you have any questions, please contact me at (508) 389-2877 or Laura Olton at (401) 784-7667.

Very truly yours,



Thomas G. Robinson

Enclosures

cc: Docket 3617 Service List

# The Narragansett Electric Company

# Service Quality Plan Filing

Testimony and Exhibits
of
Robert H. McLaren,
Cheryl A. Warren
and
Mark N. Sorgman

August 2, 2004

Submitted to:
Rhode Island Public Utilities Commission
R.I.P.U.C. Docket No. _____

Submitted by:

Narragansett Electric
A National Grid Company

Testimony of
Robert H. McLaren

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Robert H. McLaren

# DIRECT TESTIMONY

# OF

# Robert H. McLaren

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Robert H. McLaren

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## I. Introduction and Qualifications

Q. Please state your full name and business address.

A. Robert H. McLaren, 55 Bearfoot Road, Northborough, Massachusetts 01532.

Q. Please state your position.

A. I am Senior Vice President of the New England distribution companies of National Grid, including The Narragansett Electric Company ("Narragansett" or the "Company").

Q. Please describe your educational background and training.

A. I graduated from the University of New Hampshire in Durham with a Bachelor of Science degree, magna cum laude, in Civil Engineering in 1974. In 1984, I received a Masters in Business Administration from Clark University.

Q. Please describe your professional experience.

A. In 1975, I joined New England Power Service Company ("NEPSCo"), now National Grid USA Service Company, Inc., as an engineer in the planning and power supply group. From 1979 through 1990, I worked in various capacities in the corporate finance group. From 1990 through 1993, I was a vice president of NEPSCo, with various responsibilities including cash and risk management and revenue requirements. From 1993 to 1994, I headed up the

internal audit department. From 1994 through 1995, I was vice president of business development. From 1995 through 2000, I was vice president of supply chain management, which includes the procurement, materials management and accounts payable functions. In April 2000, I became head of the finance group for the New England distribution companies of National Grid. The distribution finance group included the regulatory services, budget and cost management, and energy procurement and supply functions. In 2001, I assumed responsibility for the business and regulatory services functions for the New England distribution companies of National Grid. In 2004, in addition to my responsibility for the regulatory services function, I again assumed responsibility for the New England distribution finance and energy procurement and supply functions at National Grid.

Q. Have you previously testified before the Rhode Island Public Utilities Commission (the "Commission")?

A. Yes I have. I previously testified in various financing dockets before the Commission and in a general rate case in Docket No. 2019.

## II. Purpose of Testimony

Q. What is the purpose of your testimony as it relates to the Company's filing?

A. My testimony describes the service quality ("SQ") performance standards that the Commission approved as part of the Third Amended Stipulation and Settlement between the Company, Blackstone Valley Electric Company, Newport Electric Corporation and various parties in Docket No. 2930 ("the 2000 Settlement"), the provisions relating to SQ plans contained in the proposed Distribution Rate Plan Stipulation and Settlement filed with the Commission on June 29, 2004 in Docket No. 3617 ("the 2004 Settlement"), and the SQ plan that the Company is filing herewith in compliance with the Commission's recent directive. The accompanying testimony of Mrs. Cheryl Warren and Mr. Mark Sorgman address in more detail the Company's historical performance under the various performance measures, and present proposed enhancements to the Company's SQ program.

## III. The 2000 Settlement and Original SQ Plan

Q. Please describe the Company's 2000 Settlement and the Original SQ Plan.

A. The Company entered into a long-term rate plan contained in the 2000 Settlement with the Department of the Attorney General, the Division of Public Utilities and Carriers, and The Energy Council of Rhode Island (collectively, the "Parties"). It was approved by the Commission in Docket

No. 2930 and provided the assurance of long-term rate stability by including a five-year distribution rate freeze. It went into effect May 1, 2000.

The 2000 Settlement coupled this five-year rate stability plan with a performance-based rate plan that was designed to ensure that both reasonable, stable delivery rates and strong service quality were maintained over the period of the rate freeze. This SQ plan (the "Original SQ Plan") compared the Company's actual annual performance in the areas of reliability and customer service to historical performance in these same areas. For performance that was well below average, the Company would accrue penalties to be returned to customers at the end of the rate freeze period. Similarly, for performance that was well above average, the plan provided that the Company would accrue penalty offsets that could be used to offset performance penalties otherwise payable under the plan. Exhibit RHM-3 contains a copy of the Original SQ Plan, formerly Exhibit 7 of the 2000 Settlement.

Q. What are the specific performance measures under the Original SQ Plan?

A. There are two customer service performance measures (customer contact and telephone calls answered within 20 seconds) and four reliability performance measures (System Average Interruption Frequency Index, or SAIFI, and System Average Interruption Duration Index, or SAIDI, for both the Capital and Coastal districts).

Q. What are the potential maximum penalties and maximum penalty offsets under the Original SQ Plan?

A. The following table (Table 1) shows the components of the maximum penalties of $2.4 million and the maximum penalty offsets of $1.8 million:

| Table 1 | | |
|---|---|---|
| Performance Measure | Maximum Penalty | Maximum Offset |
| Customer contact satisfaction | $200,000 | $150,000 |
| Calls answered within 20 seconds | $200,000 | $150,000 |
| Capital SAIFI | $500,000 | $375,000 |
| Coastal SAIFI | $500,000 | $375,000 |
| Capital SAIDI | $500,000 | $375,000 |
| Coastal SAIDI | $500,000 | $375,000 |
| Total | $2,400,000 | $1,800,000 |

Q. What percentage of the Company's distribution revenues do these maximum SQ penalties represent under the Original SQ Plan?

A. The $2.4 million maximum penalties equal about 1.1% of the Company's distribution revenues, while the potential maximum offsets represent about 0.8% of distribution revenues.

Q. How were the thresholds for accruing penalties and earning offsets determined under the Original SQ Plan?

A. The thresholds were developed based on a statistical analysis of the historical performance under each measure. More specifically, the historical performance data was analyzed for a period of years (which varied among measures based upon the amount of historical data available for each) and both a mean value and a standard deviation were derived[1]. The threshold for accruing penalties for below average performance was determined to be one standard deviation worse than average performance and the threshold for accruing penalty offsets for exemplary performance was determined to be one standard deviation better than average performance. The penalty (or penalty offset level) at this threshold is scaled or interpolated linearly between the first and second standard deviations. Performance that exceeded two standard deviations worse than average would trigger the full maximum penalty and performance that exceeded two standard deviations better than average would trigger the maximum penalty offset.

[1] The standard deviation determination—which was used to establish the performance deadbands for the various measures in the Original SQ Plan—was based on the assumption that the performance data followed a "normal," or Gaussian (i.e., bell-shaped curve) distribution. As Mrs. Warren explains in her testimony, the assumption of normal distribution for reliability performance data is not appropriate, and the Company is proposing to revise this feature in the New SQ Plan.

Q. Does the Original SQ Plan provide that penalty offsets may be used in any year other than the year in which they were earned?

A. Under the Original SQ Plan, reliability-related penalty offsets may be used in the current year or the following year. No carry forward into the following year is allowed for customer service-related penalty offsets.

Q. What penalties and penalty offsets have accrued under the Original SQ Plan?

A. The plan calls for calendar year historical benchmarks and calendar year results reporting. Through the end of 2003, the Company accrued $1,774,000 in SQ penalties, primarily for below average performance in reliability. As described in the Original SQ Plan, if there are any penalty amounts accrued at the end of the rate freeze period established in that settlement (i.e., through December 31, 2004), the entire balance is to be credited to customers in a manner to be determined by the Commission. In the 2004 Settlement, the Company has proposed to include this accrued penalty in the $22.8 million of customer shared savings to be refunded to customers beginning in the month following Commission approval of the 2004 Settlement. The customer credit would be subject to reconciliation to assure that actual SQ penalty amounts accrued through 2004 would be reflected in the amount to be credited to customers.

Q. What happens if there are several years of consistently poor performance under the Original SQ Plan?

A. If the Company experiences several years of consistently below average performance, penalties under the Original SQ Plan may be doubled. Specifically, the Original SQ Plan states that, "(i)f at any time while the Service Quality Performance Standards are in effect, the Commission finds that there is a significant and persistent deterioration in service quality (after a hearing in which the Company has been provided the right to appear and present evidence), the penalties provided in the standards shall be doubled and the Company shall be required to file a remedial plan. If after one year from such finding, the Commission finds that the Company has not carried out its remedial plan and, as a result, the significant and persistent problems with service quality have not been remediated, the Commission may suspend the right of the Company to retain a share of merger savings on a prospective basis until the Company demonstrates in a hearing before the Commission that service quality has returned at least to the levels that existed prior to the [effective date of the 2000 Settlement]."

## IV. The Company's Proposed New SQ Plan

Q. Please summarize the Company's proposed new SQ plan ("the New SQ Plan").

A. The New SQ Plan is proposed to become effective on January 1, 2005 and is similar to the Original SQ Plan. The New SQ Plan continues to emphasize reliability and customer service performance standards so as to underscore the importance of assuring consistent, reliable electric service and high quality customer service for the benefit of customers. In the New SQ Plan, the Company is proposing certain updates and enhancements to these performance standards. First, for all performance standards, the Company proposes to expand the historical time period used to develop the performance benchmarks to include the four most recent years (2000 through 2003) and to consistently utilize the most recent ten years' performance (1994 through 2003), if available, in developing the New SQ Plan performance benchmarks. Once ten years of performance becomes available, the Company proposes to establish performance standards annually, based on a ten-year rolling average. The inclusion of more recent data and data over a longer period of time better reflects the Company's current and overall performance. Next, the Company proposes to use the recently adopted IEEE Standard 1366-2003, *Guide for Electric Power Distribution Reliability Indices*, ("IEEE Std. 1366-2003") for calculation of SQ performance benchmarks for reliability. Mrs. Warren provides expert testimony in support of both the Company's reliability

performance data and the proposed application of IEEE Std. 1366-2003 to determine the Company's SQ performance benchmarks for reliability. Mr. Sorgman provides expert testimony in support of the Company's customer service performance data.

Q. Are there any other proposed changes to the reliability performance benchmarks in the New SQ Plan?

A. Yes, there are two additional proposed changes. First, the determination of the triggers for reliability penalties and penalty offsets is different from that contained in the Original SQ Plan. Specifically, because the distribution of historical reliability performance is not Gaussian (i.e., it is not represented by a "bell-shaped" curve), but rather is asymmetrical, and is reflected more accurately as a lognormal distribution, the New SQ Plan calls for the standard deviation of the historical reliability performance data to be calculated using the natural logarithm of the historical SAIDI and SAIFI values. Second, the Company proposes to aggregate the historical reliability performance data for the whole company, to coincide with the fact that, subsequent to the Original SQ Plan, the Company has changed the manner in which it operates the distribution system - from a district basis (Capital and Coastal) to a total company basis. A more complete description of, as well as support for, these changes is provided in the testimony of Mrs. Warren.

Q. Are there any other proposed changes to customer service performance standards in the New SQ Plan?

A. Yes, there is one additional proposed change. The Company is proposing to include calls to the Voice Response Unit ("VRU") in its telephone calls answered within 20 seconds performance. In recent years, the Company has improved the services offered to customers through its VRU and, as a result, has experienced a significant increase in the number of customer calls that are handled by the VRU. A more complete description of this change is provided in the testimony of Mr. Sorgman.

Q. Is the Company proposing any changes to the allocation and/or size of the maximum penalties or offset amounts?

A. No. The Company believes that the current allocation of penalties/offsets is reasonable and appropriate. We believe that customers place significant importance on the reliability of the electric service we provide. Therefore, weighting the overall reliability penalties more heavily (83% of the total maximum penalty) corresponds with this importance.

Q. Does the Company believe that the current maximum penalty amount is appropriate?

A. Yes. The maximum penalty amount represents approximately 1.1% of Narragansett's distribution service revenues. The Commission recently found this penalty proportion to be reasonable.

Q. Would it be beneficial to customers to continue to allow the Company to use penalty offsets for strong performance in one measure to offset penalties for below average performance in another?

A. Yes. The Company believes the current level and operation of offsets is reasonable and should be continued. Offsets provide an incentive for the Company to strive to exceed performance benchmarks, not just to meet them. Offsets between performance metrics also foster a great sense of "teamwork" within the Company, as exceptional performance in one function or department may help to mitigate below average performance in another area. The inclusion of penalty offsets imparts a positive result whereby it encourages the Company to strive for service quality excellence through the pursuit of continuous improvement, rather than just avoidance of penalties. The opportunity to earn penalty offsets offers tangible value in support of long-term cost-effective service quality improvements that may not otherwise be practical under a five-year rate plan in which the Company has frozen cost recovery.

For example, a situation may arise such that a new technology develops that would significantly improve a performance metric to the benefit of customers, but at an additional cost to the Company. The ability for the Company to earn penalty offsets resulting from improved service quality due to the investment in this technology may offer sufficient economic value to support the Company's up-front cost associated with the investment. Therefore, maintaining the opportunity to earn and apply penalty offsets provides both the proper signal and the potential resources to support the continuous service improvement. Moreover, because penalties may be avoided by doing business as usual, a penalty-only system (with no offset opportunity) would be less effective in terms of promoting investments in improvements in service for customers.

Q. Please describe the attachments to the Company's filing.

A. Exhibit RHM-1 contains the proposed New SQ Plan for the Company. Exhibit RHM-2 contains this New SQ Plan marked to show changes from the Original SQ Plan. Exhibit RHM-3 contains the Original SQ Plan.

Q. Does the 2004 Settlement fully incorporate this proposed New SQ Plan?

A. No. While the 2004 Settlement does not incorporate this New SQ Plan, the Parties to the 2004 Settlement (which include all the parties to the 2000 Settlement, plus the United States Navy) have nevertheless agreed that any subsequent service quality plan that might be approved by the Commission should include certain provisions. Specifically, they agreed:

1. That the provisions of the Original SQ Plan should remain in effect until the Commission completes its review of SQ Performance Standards in this docket;
2. That, through either the end of 2009 or until the next rate case, in any new SQ plan,
    a. the maximum penalty shall not be changed from that contained in the Original SQ Plan,
    b. the penalty offset mechanisms contained in the Original SQ Plan shall remain in place, and
    c. the Company's SQ Performance Standards shall continue to be derived using the Company's historical performance data.
3. To continue the provisions of the 2000 Settlement which call for (a) potential doubling of the penalties and (b) the Company to file a remedial plan if the Commission finds that there has been a significant and persistent deterioration in service. These

provisions also allow the Commission to take further steps if the Company fails to carry out its remedial plan and service problems persist.

Thus, for purposes of developing the New SQ Plan, which would be effective through December 31, 2009, the Company has maintained the maximum penalty amount and the offset mechanisms per the Original SQ Plan, and has updated the performance standards to coincide with the agreed upon provisions as part of the 2004 Settlement.

## V. Conclusion

Q. Does this conclude your testimony?

A. Yes it does.

Exhibit RHM-1

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Robert H. McLaren

# Exhibit RHM-1

# Proposed New Service Quality Plan

# THE NARRAGANSETT ELECTRIC COMPANY
# SERVICE QUALITY PLAN

The Narragansett Electric Company ("Narragansett" or the "Company") shall establish the performance standards for reliability and customer service that are set forth in this document. The standards are designed as a penalty-only approach, under which the Company would be penalized if its performance did not meet the standards, measured on a cumulative basis. The Company receives no reward for performance which exceeds the standard. However, positive performance in one category can be used to offset penalties in other categories in any given year, except that offsets earned for the two customer service standards can only be used in the year earned to offset any other standard, and offsets earned in the two reliability standards can either be used in the year earned or in the following year. If there are negative balances or penalties reflected in the cumulative balance as of December 31, 2009, the entire balance shall be credited to customers. The manner in which the penalty is credited to customers will be determined by the Rhode Island Public Utilities Commission (the "Commission") at that time.

The performance standards under this service quality plan shall be updated each year based upon the Company's ten most recent years' performance, provided that, if there are less than ten years of historical performance, then the available years of data shall be used. For example, for calendar year 2005, the reliability performance standards shall be based upon historical performance for 1995 through 2004.

The maximum penalty authorized under the standards set forth below is $2.4 million per year. The Performance Standards set forth herein shall be in effect for the calendar year 2005 and continue through 2009 or until modified by the Commission.

NOTE: When interpreting the performance standards that follow, please note that pages 6 through 8 of this Exhibit contain definitions of terms used in the standards.

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**FREQUENCY OF INTERRUPTIONS PER CUSTOMER SERVED**

| Year | SAIFI* |
|---|---|
| 2003 | 1.081 |
| 2002 | 0.984 |
| 2001 | 1.109 |
| 2000 | 0.978 |
| 1999 | 0.956 |
| 1998 | 0.890 |
| 1997 | 0.748 |
| 1996 | 0.902 |
| 1995 | 1.133 |
| 1994 | 1.131 |

| | | Log Average | -0.0164 | | |
|---|---|---|---|---|---|
| | | Log Std. Dev. | 0.1317 | | |
| | -2 Std Dev. | -1 Std Dev. | Mean | +1 Std Dev. | +2 Std Dev. |
| Log Normal | -0.280 | -0.148 | -0.016 | 0.115 | 0.247 |
| SAIFI | 0.76 | 0.86 | 0.98 | 1.12 | 1.28 |

PERFORMANCE STANDARD – SAIFI (System Average Interruption Frequency Index):

| SAIFI Company Target | (Penalty)/ Offset |
|---|---|
| More than 1.28 | ($1,000,000) |
| 1.13 – 1.28 | linear interpolation |
| 0.86 – 1.12 | $0 |
| 0.76 – 0.85 | linear interpolation |
| Less than 0.76 | $750,000 |

* The calculations are based on the IEEE Std. 1366-2003 2.5β methodology for the Company. Major Event Day results are removed from these calculations, but reported. The target bands are calculated considering the lognormal nature of the data. To do this, the lognormal mean and lognormal standard deviation are calculated and applied in lognormal space, which is done by applying the mean, 1 standard deviation, and 2 standard deviations and then converting back to normal space.

$$\text{SAIFI} = \frac{\text{Total Number of Customers Interrupted}}{\text{Total Number of Customers Served}}$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**DURATION OF INTERRUPTIONS PER CUSTOMER SERVED**

| Year | SAIDI* |
|---|---|
| 2003 | 74.86 |
| 2002 | 71.10 |
| 2001 | 68.96 |
| 2000 | 60.24 |
| 1999 | 52.25 |
| 1998 | 42.17 |
| 1997 | 40.91 |
| 1996 | 51.89 |
| 1995 | 49.09 |
| 1994 | 48.73 |

| | | Log Average | 4.0050 | | |
|---|---|---|---|---|---|
| | | Log Std. Dev. | 0.2140 | | |
| | -2 Std Dev. | -1 Std Dev. | Mean | +1 Std Dev. | +2 Std Dev. |
| Log Normal | 3.577 | 3.791 | 4.005 | 4.219 | 4.433 |
| SAIDI | 35.77 | 44.30 | 54.87 | 67.96 | 84.18 |

PERFORMANCE STANDARD – SAIDI (System Average Interruption Duration Index):

| SAIDI Company Target | (Penalty)/ Offset |
|---|---|
| More than 84.18 | ($1,000,000) |
| 67.97 – 84.18 | linear interpolation |
| 44.30 – 67.96 | $0 |
| 35.77 – 44.29 | linear interpolation |
| Less than 35.77 | $750,000 |

* The calculations are based on the IEEE Std. 1366-2003 2.5β methodology for the Company. Major Event Day results are removed from these calculations, but reported. The target bands are calculated considering the lognormal nature of the data. To do this, the lognormal mean and lognormal standard deviation are calculated and applied in lognormal space, which is done by applying the mean, 1 standard deviation, and 2 standard deviations and then converting back to normal space.

$$\text{SAIDI (minutes)} = \frac{\text{Total Customer Minutes Interrupted}}{\text{Total Number of Customers Served}}$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**CUSTOMER CONTACT SURVEY**

| Year | % Satisfied* |
|---|---|
| 2003 | 79.3% |
| 2002 | 76.0% |
| 2001 | 77.3% |
| 2000 | 83.2% |
| 1999 | 82.1% |
| 1998 | 77.8% |
| 1997 | 79.5% |
| | |
| Mean | 79.3% |
| Standard Deviation | 2.4% |

PERFORMANCE STANDARD – Customer Contact:

| % Satisfied Target | (Penalty)/ Offset |
|---|---|
| Less than 74.5% | ($200,000) |
| 74.5% – 76.8% | linear interpolation |
| 76.9% – 81.7% | $0 |
| 81.8% – 84.1% | linear interpolation |
| More than 84.1% | $150,000 |

* The calculations are based on responses from customers of Narragansett based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. Eight types of transactions are included in the survey, and the overall results are weighted based on the number of these transactions actually performed at the call center during the year.

The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven-point scale, where 1=extremely dissatisfied and 7=extremely satisfied.

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS**

| Year | Percent of Calls Answered Within 20 Secs* |
|---|---|
| 2003 | 93.3% |
| 2002 | 84.0% |
| 2001 | 50.4% |
| 2000 | 76.7% |
| 1999 | 76.9% |
| 1998 | 80.9% |
| 1997 | 76.7% |
| 1996 | 70.2% |
| | |
| Mean | 76.1% |
| Standard Deviation | 11.6% |

PERFORMANCE STANDARD – Telephone Calls Answered within 20 Seconds:

| % Calls Answ Within 20 Seconds Target | (Penalty)/ Offset |
|---|---|
| Less than 52.9% | ($200,000) |
| 52.9% – 64.4% | linear interpolation |
| 64.5% – 87.7% | $0 |
| 87.8% – 99.3% | linear interpolation |
| More than 99.3% | $150,000 |

* The percent of calls answered within 20 seconds is calculated by dividing the number of calls answered within 20 seconds by the total number of calls answered during the year. "Calls answered" include calls answered by a customer service representative ("CSR") and calls completed within the Voice Response Unit ("VRU"). The time to answer is measured once the customer makes a selection to either speak with a CSR or use the VRU. VRU calls are included beginning in the year 2000.

$$\text{Percent of Calls Answered Within 20 Seconds} = \frac{\text{Total Calls Answered Within 20 Seconds}}{\text{Total Calls Answered}}$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

DEFINITIONS OF
PERFORMANCE STANDARD
MEASUREMENTS

The following reliability definitions used in conjunction with the performance standards are in accordance with the Institute of Electrical end Electronics Engineers, Inc. ("IEEE") Std. 1366-2003. It is assumed that additional reliability-related definitions found in this standard are also implicit in the reliability calculations.

## CUSTOMER COUNT

The number of customers either served or interrupted depending on usage.

## TOTAL NUMBER OF CUSTOMERS SERVED

The average number of customers served during the reporting period. If a different customer total is used, it must be clearly defined within the report.

## TOTAL NUMBER OF CUSTOMERS INTERRUPTED

The sum of the customers losing electric service for any defined grouping of interruption events during the reporting period.

## TOTAL CUSTOMER MINUTES INTERRUPTED

The product of the number of customers interrupted and the interruption duration for any interruption event.

## MAJOR EVENT

Designates an event that exceeds reasonable design and or operational limits of the electric power system. A Major Event includes at least one Major Event Day (MED).

## MAJOR EVENT DAY

A day in which the daily system SAIDI exceeds a threshold value, $T_{MED}$. For the purposes of calculating daily system SAIDI, any interruption that spans multiple calendar days is accrued to the day on which the interruption began. Statistically, days having a daily system SAIDI greater than $T_{MED}$ are days on which the energy delivery system experienced stresses beyond that normally expected (such as severe weather). Activities that occur on major event days should be separately analyzed and reported.

i denotes an interruption event
$r_i$ = Restoration Time for each Interruption Event
CI = Customers Interrupted

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

CMI = Customer Minutes Interrupted
$N_T$ = Total Number of Customers Served for the Area

**SAIFI (System Average Interruption Frequency Index)**

The system average interruption frequency index indicates how often the average customer experiences a sustained interruption over a predefined period of time. Mathematically, this equation is given in (1).

$$SAIFI = \frac{\sum \text{ Total Number of Customers Interrupted}}{\text{Total Number of Customers Served}} \quad (1)$$

To calculate the index, use equation (2) below.

$$SAIFI = \frac{\Sigma N_i}{N_T} = \frac{CI}{N_T} \quad (2)$$

**SAIDI (System Average Interruption Duration Index)**

This index indicates the total duration of interruption for the average customer during a predefined period of time. It is commonly measured in customer minutes or customer hours of interruption. Mathematically, this equation is given in (3).

$$SAIDI = \frac{\sum \text{ Customer Interruption Durations}}{\text{Total Number of Customers Served}} \quad (3)$$

To calculate the index, use equation (4).

$$SAIDI = \frac{\Sigma r_i N_i}{N_T} = \frac{CMI}{N_T} \quad (4)$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

## CUSTOMER CONTACT SURVEY

The calculations are based on responses from customers of Narragansett, based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. The Company will maintain the same levels of statistical precision of the results as in prior surveys. Eight types of transactions are included in the survey, and the overall results are weighted based on the number of these transactions actually performed at the call center during the year. The eight types of transactions are power interruptions, meter on, meter off, meter exchange, collection, payment plan, meter reread, and meter test.

The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven-point scale, where 1=extremely dissatisfied and 7=extremely satisfied.

## TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS

The percent of calls answered within 20 seconds is calculated by dividing the number of calls answered within 20 seconds by the total number of calls answered during the year. "Calls answered" include calls answered by a customer service representative ("CSR") and calls completed within the voice response unit ("VRU"). Abandoned calls are not considered. The time to answer is measured once the customer makes a selection to either speak with a CSR or use the VRU. VRU calls are included beginning in the year 2000.

## LINEAR INTERPOLATION

(1) The actual performance or penalty each year will be calculated and the result will be scaled or interpolated linearly between the relevant two points of the results range and the relevant two points on the dollar range.

(2) The method of determining the actual penalty, or offset, of each performance standard is determined by multiplying the value of the penalty, or offset, by the absolute value of the actual performance indicator minus the value of the first standard deviation from the mean of that indicator, divided by the value of the second standard deviation of the mean of that indicator minus the value of the first standard deviation from the mean of that indicator.

$$\text{\$ Penalty or Offset} = \text{Penalty or Offset \$ Value} \times \frac{\text{Actual} - 1^{st}\text{ standard deviation}}{2^{nd}\text{ standard deviation} - 1^{st}\text{ standard deviation}}.$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

## ADDITIONAL REPORTING CRITERIA

1. Each quarter, the Company will file a report of 5% of all circuits designated as worst performing on the basis of customer frequency.

   Included in the report will be:

   1. The circuit id and location.
   2. The number of customers served.
   3. The towns served.
   4. The number of events.
   5. The average duration.
   6. The total customer minutes.
   7. A discussion of the cause or causes of events.
   8. A discussion of the action plan for improvements including timing.

2. The Company will track and report monthly the number of calls it receives in the category of Trouble, Non-Outage. This includes inquiries about dim lights, low voltage, half-power, flickering lights, reduced TV picture size, high voltage, frequently burned out bulbs, motor running problems, damaged appliances and equipment, computer operation problems and other non-Interruptions related inquiries.

3. The Company will report its annual meter reading performance as an average of monthly percentage of meters read.

4. For each event defined as a Major Event Day, the Company will prepare a report, which will be filed annually as part of the annual SQ filing, detailing the following information:

   1. Start date/Time of event.
   2. Number/Location of crews on duty (both internal and external crews).
   3. Number of crews assigned to restoration efforts.
   4. The first instance of mutual aid coordination.
   5. First contact with material suppliers.
   6. Inventory levels: pre-event/daily/post-event.
   7. Date/Time of request for external crews.
   8. Date/Time of external crew assignment.
   9. # of customers out of service by hour.
   10. Impacted area.
   11. Cause.
   12. Weather impact on restoration.
   13. Analysis of protective device operation.
   14. Summary of customers impacted.

Exhibit RHM-2

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Robert H. McLaren

# Exhibit RHM-2

# Proposed New Service Quality Plan
# Marked to Show Changes
# From Original Service Quality Plan

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

The Narragansett Electric Company ("Narragansett" or the "Company") shall establish the performance standards for reliability and customer service that are set forth in this document. The standards are designed as a penalty-only approach, under which the Company would be penalized if its performance did not meet the standards, measured on a cumulative basis. The Company receives no reward for performance which exceeds the standard. However, positive performance in one category can be used to offset penalties in other categories in any given year, except that offsets earned for the two customer service standards can only be used in the year earned to offset any other standard, and offsets earned in the two reliability standards can either be used in the year earned or in the following year. If there are negative balances or penalties reflected in the cumulative balance as of December 31, 2009, the entire balance shall be credited to customers. The manner in which the penalty is credited to customers will be determined by the Rhode Island Public Utilities Commission (the "Commission") at that time.

The performance standards under this service quality plan shall be updated each year based upon the Company's ten most recent years' performance, provided that, if there are less than ten years of historical performance, then the available years of data shall be used. For example, for calendar year 2005, the reliability performance standards shall be based upon historical performance for 1995 through 2004.

The maximum penalty authorized under the standards set forth below is $2.4 million per year. The Performance Standards set forth herein shall be in effect for the calendar year 2005 and continue through 2009 or until modified by the Commission.

NOTE: When interpreting the performance standards that follow, please note that pages 6 through 8 of this Exhibit contain definitions of terms used in the standards.

**Deleted:** Electric

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**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**FREQUENCY OF INTERRUPTIONS PER CUSTOMER SERVED**

| Year | SAIFI* |
|---|---|
| 2003 | 1.081 |
| 2002 | 0.984 |
| 2001 | 1.109 |
| 2000 | 0.978 |
| 1999 | 0.956 |
| 1998 | 0.890 |
| 1997 | 0.748 |
| 1996 | 0.902 |
| 1995 | 1.133 |
| 1994 | 1.131 |

| | | | | | |
|---|---|---|---|---|---|
| | | Log Average | -0.0164 | | |
| | | Log Std. Dev. | 0.1317 | | |
| | -2 Std Dev. | -1 Std Dev. | Mean | +1 Std Dev. | +2 Std Dev. |
| Log Normal | -0.280 | -0.148 | -0.016 | 0.115 | 0.247 |
| SAIFI | 0.76 | 0.86 | 0.98 | 1.12 | 1.28 |

PERFORMANCE STANDARD – SAIFI (System Average Interruption Frequency Index):

| Company Target | SAIFI (Penalty)/ Offset |
|---|---|
| More than 1.28 | ($1,000,000) |
| 1.13 – 1.28 | linear interpolation |
| 0.86 – 1.12 | $0 |
| 0.76 – 0.85 | linear interpolation |
| Less than 0.76 | $750,000 |

* The calculations are based on the IEEE Std. 1366-2003 2.5β methodology for the Company. Major Event Day results are removed from these calculations, but reported. The target bands are calculated considering the lognormal nature of the data. To do this, the lognormal mean and lognormal standard deviation are calculated and applied in lognormal space, which is done by applying the mean, 1 standard deviation, and 2 standard deviations and then converting back to normal space.

SAIFI = Total Number of Customers Interrupted
Total Number of Customers Served

**Deleted:** Frequency Frequency

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1998 1.05 0.80¶
1997 1.17 0.81¶

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Mean 1.21 1.05¶
Standard Deviation 0.22 0.22¶
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PERFORMANCE STANDARD – Frequency of Interruptions:¶

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Coastal (Penalty)/ Capital (Penalty)/¶
Target Offset Target Offset ¶
More than 1.65 ($500,000) More than 1.49 ($500,000)¶
1.44 – 1.65 linear interpolation 1.28 – 1.49 linear interpolation¶
0.99 – 1.43 $0 0.83 – 1.27 $0¶
0.77 – 0.98 linear interpolation 0.61 – 0.82 linear interpolation¶
Less than 0.77 $375,000 Less than 0.61 $375,000¶

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**Deleted:** data for the two proposed operating areas of the combined companies – Coastal and Capital. Interruptions from "extraordinary events" are excluded, as described in the attached criteria.

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**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**DURATION OF INTERRUPTIONS PER CUSTOMER SERVED**

| Year | SAIDI* |
|---|---|
| 2003 | 74.86 |
| 2002 | 71.10 |
| 2001 | 68.96 |
| 2000 | 60.24 |
| 1999 | 52.25 |
| 1998 | 42.17 |
| 1997 | 40.91 |
| 1996 | 51.89 |
| 1995 | 49.09 |
| 1994 | 48.73 |

| | |
|---|---|
| Log Average | 4.0050 |
| Log Std. Dev. | 0.2140 |

| | -2 Std Dev. | -1 Std Dev. | Mean | +1 Std Dev. | +2 Std Dev. |
|---|---|---|---|---|---|
| Log Normal | 3.577 | 3.791 | 4.005 | 4.219 | 4.433 |
| SAIDI | 35.77 | 44.30 | 54.87 | 67.96 | 84.18 |

PERFORMANCE STANDARD – SAIDI (System Average Interruption Duration Index):

| SAIDI Company Target | (Penalty)/ Offset |
|---|---|
| More than 84.18 | ($1,000,000) |
| 67.97 – 84.18 | linear interpolation |
| 44.30 – 67.96 | $0 |
| 35.77 – 44.29 | linear interpolation |
| Less than 35.77 | $750,000 |

* The calculations are based on the IEEE Std. 1366-2003 2.5β methodology for the Company. Major Event Day results are removed from these calculations, but reported. The target bands are calculated considering the lognormal nature of the data. To do this, the lognormal mean and lognormal standard deviation are calculated and applied in lognormal space, which is done by applying the mean, 1 standard deviation, and 2 standard deviations and then converting back to normal space.

$$\text{SAIDI (minutes)} = \frac{\text{Total Customer Minutes Interrupted}}{\text{Total Number of Customers Served}}$$



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**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**CUSTOMER CONTACT SURVEY**

| Year | % Satisfied* |
|---|---|
| 2003 | 79.3% |
| 2002 | 76.0% |
| 2001 | 77.3% |
| 2000 | 83.2% |
| 1999 | 82.1% |
| 1998 | 77.8% |
| 1997 | 79.5% |
| Mean | 79.3% |
| Standard Deviation | 2.4% |

PERFORMANCE STANDARD – Customer Contact:

| % Satisfied Target | (Penalty)/ Offset |
|---|---|
| Less than 74.5% | ($200,000) |
| 74.5% – 76.8% | linear interpolation |
| 76.9% – 81.7% | $0 |
| 81.8% – 84.1% | linear interpolation |
| More than 84.1% | $150,000 |

* The calculations are based on responses from customers of Narragansett based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. Eight types of transactions are included in the survey, and the overall results are weighted based on the number of these transactions actually performed at the call center during the year.

The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven-point scale, where 1=extremely dissatisfied and 7=extremely satisfied.

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**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS**

| Year | Percent of Calls Answered Within 20 Secs* |
|---|---|
| 2003 | 93.3% |
| 2002 | 84.0% |
| 2001 | 50.4% |
| 2000 | 76.7% |
| 1999 | 76.9% |
| 1998 | 80.9% |
| 1997 | 76.7% |
| 1996 | 70.2% |
| Mean | 76.1% |
| Standard Deviation | 11.6% |

PERFORMANCE STANDARD – Telephone Calls Answered within 20 Seconds:

| % Calls Answ Within 20 Seconds Target | (Penalty)/ Offset |
|---|---|
| Less than 52.9% | ($200,000) |
| 52.9% – 64.4% | linear interpolation |
| 64.5% – 87.7% | $0 |
| 87.8% – 99.3% | linear interpolation |
| More than 99.3% | $150,000 |

* The percent of calls answered within 20 seconds is calculated by dividing the number of calls answered within 20 seconds by the total number of calls answered during the year. "Calls answered" include calls answered by a customer service representative ("CSR") and calls completed within the Voice Response Unit ("VRU"). The time to answer is measured once the customer makes a selection to either speak with a CSR or use the VRU. VRU calls are included beginning in the year 2000.

Percent of Calls Answered Within 20 Seconds = Total Calls Answered Within 20 Seconds / Total Calls Answered

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Deleted: * The calculations are based on data for Narragansett Electric Company's Providence call center. Eastern Utilities Associates cannot separate calls between Massachusetts and Rhode Island.¶
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**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

DEFINITIONS OF
PERFORMANCE STANDARD
MEASUREMENTS

The following reliability definitions used in conjunction with the performance standards are in accordance with the Institute of Electrical end Electronics Engineers, Inc. ("IEEE") Std. 1366-2003. It is assumed that additional reliability-related definitions found in this standard are also implicit in the reliability calculations.

**CUSTOMER COUNT**

The number of customers either served or interrupted depending on usage.

**TOTAL NUMBER OF CUSTOMERS SERVED**

The average number of customers served during the reporting period. If a different customer total is used, it must be clearly defined within the report.

**TOTAL NUMBER OF CUSTOMERS INTERRUPTED**

The sum of the customers losing electric service for any defined grouping of interruption events during the reporting period.

**TOTAL CUSTOMER MINUTES INTERRUPTED**

The product of the number of customers interrupted and the interruption duration for any interruption event.

**MAJOR EVENT**

Designates an event that exceeds reasonable design and or operational limits of the electric power system. A Major Event includes at least one Major Event Day (MED).

**MAJOR EVENT DAY**

A day in which the daily system SAIDI exceeds a threshold value, $T_{MED}$. For the purposes of calculating daily system SAIDI, any interruption that spans multiple calendar days is accrued to the day on which the interruption began. Statistically, days having a daily system SAIDI greater than $T_{MED}$ are days on which the energy delivery system experienced stresses beyond that normally expected (such as severe weather). Activities that occur on major event days should be separately analyzed and reported.

j denotes an interruption event
$r_i$ = Restoration Time for each Interruption Event
CI = Customers Interrupted

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**INTERRPUTION EVENT**¶
¶
The loss of service to more than one (1) customer for more than one (1) minute.¶
¶
**INTERRUPTION DURATION**¶

**Deleted:** The period of time, measured in minutes, from the initial notification of the interruption event to the time when service has been restored to the customers.¶

**Deleted:** **NUMBER OF CUSTOMERS SERVED**¶

**Deleted:** The number of customers taking electric service within the defined reporting service area on the last day of the reporting period.¶

**Deleted:** **OF INTERRUPTION**

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The product of the number of customers interrupted and the interruption duration for any interruption event. Also, the sum of those products for any defined grouping of interruption events.¶

**Deleted:** **EXTRAORDINARY EVENTS**¶

**Deleted:** A particular interruption event will be considered extraordinary, and will not count towards the Reliability Performance Standards, if it meets one of the following criteria:¶

**Deleted:** <#>It was the result of a major weather event which causes more than 10% of a district or the total company customers to be without service at a given time.¶

**Deleted:** <#>It was due to the failure of other companies' supply or transmission to Narragansett Electric customers and restoration of service was beyond the reasonable control of the Company and its employees.¶

**Deleted:** <#>It occurred because of an extraordinary circumstance, including, without limitation, a major disaster, earthquake, wild fire, flood, terrorism, or any other event beyond the reasonable control of the Company.¶

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

CMI = Customer Minutes Interrupted
$N_T$ = Total Number of Customers Served for the Area

**SAIFI (System Average Interruption Frequency Index)**

The system average interruption frequency index indicates how often the average customer experiences a sustained interruption over a predefined period of time. Mathematically, this equation is given in (1).

$$SAIFI = \frac{\sum \text{Total Number of Customers Interrupted}}{\text{Total Number of Customers Served}} \quad (1)$$

To calculate the index, use equation (2) below.

$$SAIFI = \frac{\Sigma N_i}{N_T} = \frac{CI}{N_T} \quad (2)$$

**SAIDI (System Average Interruption Duration Index)**

This index indicates the total duration of interruption for the average customer during a predefined period of time. It is commonly measured in customer minutes or customer hours of interruption. Mathematically, this equation is given in (3).

$$SAIDI = \frac{\sum \text{Customer Interruption Durations}}{\text{Total Number of Customers Served}} \quad (3)$$

To calculate the index, use equation (4).

$$SAIDI = \frac{\Sigma r_i N_i}{N_T} = \frac{CMI}{N_T} \quad (4)$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

## CUSTOMER CONTACT SURVEY

The calculations are based on responses from customers of Narragansett, based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. The Company will maintain the same levels of statistical precision of the results as in prior surveys. Eight types of transactions are included in the survey, and the overall results are weighted based on the number of these transactions actually performed at the call center during the year. The eight types of transactions are power interruptions, meter on, meter off, meter exchange, collection, payment plan, meter reread, and meter test.

The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven-point scale, where 1=extremely dissatisfied and 7=extremely satisfied.

## TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS

The percent of calls answered within 20 seconds is calculated by dividing the number of calls answered within 20 seconds by the total number of calls answered during the year. "Calls answered" include calls answered by a customer service representative ("CSR") and calls completed within the voice response unit ("VRU"). Abandoned calls are not considered. The time to answer is measured once the customer makes a selection to either speak with a CSR or use the VRU. VRU calls are included beginning in the year 2000.

## LINEAR INTERPOLATION

(1) The actual performance or penalty each year will be calculated and the result will be scaled or interpolated linearly between the relevant two points of the results range and the relevant two points on the dollar range.

(2) The method of determining the actual penalty, or offset, of each performance standard is determined by multiplying the value of the penalty, or offset, by the absolute value of the actual performance indicator minus the value of the first standard deviation from the mean of that indicator, divided by the value of the second standard deviation of the mean of that indicator minus the value of the first standard deviation from the mean of that indicator.

$$\$ \text{ Penalty or Offset} = \text{Penalty or Offset } \$ \text{ Value} \times \frac{\text{Actual} - 1^{st} \text{ standard deviation}}{2^{nd} \text{ standard deviation} - 1^{st} \text{ standard deviation}}$$

**Deleted:** CUSTOMER CONTACT¶
¶
The calculations are based on responses from customers of Narragansett Electric Company, based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. The Company will maintain the same levels of statistical precision of the results as in prior surveys. Eight types of transactions are included in the survey, and the overall results are weighed based on the number of these transactions actually performed at the call center during the year. The eight types of transactions are power Interruptions, meter on, meter off, meter exchange, collection, payment plan, meter reread, and meter test.¶
¶
The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven-point scale, where 1=extremely dissatisfied and 7=extremely satisfied.¶
¶
Page Break
**TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS**¶
¶
The percent of calls answered within 20 seconds is calculated by dividing the number of calls answered by a customer service representative within 20 seconds by the total number of calls answered by a customer service representative during the year. A call is considered answered when it reaches a customer service representative; abandoned calls are not considered. All calls that are answered by a customer service representative are include in the measurement of percentage answered; there are no exclusions. The time to answer is measured once the customer selects the option to speak with a customer service representative and thus leaves the recordings in the Voice Response Unit.¶

**THE NARRAGANSETT ELECTRIC COMPANY**
**SERVICE QUALITY PLAN**

**ADDITIONAL REPORTING CRITERIA**

1. Each quarter, the Company will file a report of 5% of all circuits designated as worst performing on the basis of customer frequency.

   Included in the report will be:

   1. The circuit id and location.
   2. The number of customers served.
   3. The towns served.
   4. The number of events.
   5. The average duration.
   6. The total customer minutes.
   7. A discussion of the cause or causes of events.
   8. A discussion of the action plan for improvements including timing.

2. The Company will track and report monthly the number of calls it receives in the category of Trouble, Non-Outage. This includes inquiries about dim lights, low voltage, half-power, flickering lights, reduced TV picture size, high voltage, frequently burned out bulbs, motor running problems, damaged appliances and equipment, computer operation problems and other non-Interruptions related inquiries.

   **Deleted:** Narragansett

3. The Company will report its annual meter reading performance as an average of monthly percentage of meters read.

   **Deleted:** In addition, Narragansett

4. For each event defined as a Major Event Day, the Company will prepare a report, which will be filed annually as part of the annual SQ filing, detailing the following information:

   1. Start date/Time of event.
   2. Number/Location of crews on duty (both internal and external crews).
   3. Number of crews assigned to restoration efforts.
   4. The first instance of mutual aid coordination.
   5. First contact with material suppliers.
   6. Inventory levels: pre-event/daily/post-event.
   7. Date/Time of request for external crews.
   8. Date/Time of external crew assignment.
   9. # of customers out of service by hour.
   10. Impacted area.
   11. Cause.
   12. Weather impact on restoration.
   13. Analysis of protective device operation.
   14. Summary of customers impacted.

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Robert H. McLaren

# Exhibit RHM-3

# Original Service Quality Plan

# Exhibit 7 of the
# Third Amended Stipulation and Settlement
# in RIPUC Docket No. 2930

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

The Narragansett Electric Company ("Narragansett Electric" or the "Company") shall establish the performance standards for reliability and service that are set forth in this document. The standards are designed as a penalty-only approach, under which the Company would be penalized if its performance did not meet the standards, measured on a cumulative basis. The Company receives no reward for performance which exceeds the standard. However, positive performance in one category can be used to offset penalties in other categories in any given year, except that offsets earned for the two Customer Service standards can only be used in the year earned to offset any other standard, and offsets earned in the four Reliability standards can either be used in the year earned or in the following year. If there are negative balances or penalties reflected in the cumulative balance in the year following the end of the rate freeze agreed to in this settlement, the entire balance shall be credited to customers. The manner in which the penalty is credited to customers will be determined by the Commission at that time.

The maximum penalty authorized under the standards set forth below is $2.4 million per year. The Performance Standards set forth below shall remain in effect from the effective date of the settlement through the effective date of the Company's next rate case provided, however, either the Division or the Company may request modification or termination of this plan after December 31, 2004 otherwise, the plan will remain until it is modified by the Commission.

NOTE: When interpreting the performance standards that follow, please note that pages 6 through 9 of this Exhibit contain definitions of terms used in the standards.

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

**FREQUENCY OF INTERRUPTIONS PER CUSTOMER SERVED**

| Year | Frequency Coastal * | Frequency Capital * |
|---|---|---|
| 1999 | 1.34 | 0.99 |
| 1998 | 1.05 | 0.80 |
| 1997 | 1.17 | 0.81 |
| 1996 | 0.99 | 1.05 |
| 1995 | 1.59 | 1.50 |
| 1994 | 1.39 | 1.16 |
| 1993 | 0.93 | 1.05 |
| Mean | 1.21 | 1.05 |
| Standard Deviation | 0.22 | 0.22 |

PERFORMANCE STANDARD – Frequency of Interruptions:

| Frequency-Coastal Target | (Penalty)/ Offset | Frequency-Capital Target | (Penalty)/ Offset |
|---|---|---|---|
| More than 1.65 | ($500,000) | More than 1.49 | ($500,000) |
| 1.44 – 1.65 | linear interpolation | 1.28 – 1.49 | linear interpolation |
| 0.99 – 1.43 | $0 | 0.83 – 1.27 | $0 |
| 0.77 – 0.98 | linear interpolation | 0.61 – 0.82 | linear interpolation |
| Less than 0.77 | $375,000 | Less than 0.61 | $375,000 |

* The calculations are based on data for the two proposed operating areas of the combined companies – Coastal and Capital. Interruptions from "extraordinary events" are excluded, as described in the attached criteria.

$$\text{Frequency per Customer Served} = \frac{\text{Number of Customers Interrupted}}{\text{Number of Customers Served}}$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

**DURATION OF INTERRUPTIONS PER CUSTOMER SERVED**

| Year | Duration Coastal * | Duration Capital * |
|---|---|---|
| 1999 | 100.0 | 57.9 |
| 1998 | 54.4 | 32.5 |
| 1997 | 67.0 | 56.6 |
| 1996 | 56.1 | 75.3 |
| 1995 | 76.6 | 70.9 |
| 1994 | 56.9 | 55.5 |
| 1993 | 63.2 | 54.0 |
| Mean | 67.7 | 57.5 |
| Standard Deviation | 15.0 | 12.8 |

PERFORMANCE STANDARD – Duration of Interruptions:

| Duration-Coastal Target | (Penalty)/ Offset | Duration-Capital Target | (Penalty)/ Offset |
|---|---|---|---|
| More than 97.7 | ($500,000) | More than 83.1 | ($500,000) |
| 82.8 – 97.7 | linear interpolation | 70.4 – 83.1 | linear interpolation |
| 52.7 – 82.7 | $0 | 44.7 – 70.3 | $0 |
| 37.7 – 52.6 | linear interpolation | 31.9 – 44.6 | linear interpolation |
| Less than 37.7 | $375,000 | Less than 31.9 | $375,000 |

* The calculations are based on data for the two proposed operating areas of the combined companies – Coastal and Capital. Interruptions from "extraordinary events" are excluded, as described in the attached criteria.

$$\text{Duration per Customer Served (minutes)} = \frac{\text{Customer Minutes Interrupted}}{\text{Number of Customers Served}}$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

**CUSTOMER CONTACT**

| Year | % Satisfied* |
|---|---|
| 1999 | 82.1% |
| 1998 | 77.8% |
| 1997 | 79.5% |
| | |
| Mean | 79.8% |
| Standard Deviation | 1.8% |

PERFORMANCE STANDARD – Customer Contact:

| % Satisfied Target | (Penalty)/ Offset |
|---|---|
| Less than 76.2% | ($200,000) |
| 76.2% – 77.9% | linear interpolation |
| 78.0% – 81.6% | $0 |
| 81.7% – 83.4% | linear interpolation |
| More than 83.4% | $150,000 |

* The calculations are based on responses from customers of Narragansett Electric Company based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. Eight types of transactions are included in the survey, and the overall results are weighed based on the number of these transactions actually performed at the call center during the year.

The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven point scale, where 1=extremely dissatisfied and 7=extremely satisfied.

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

**TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS**

| Year | Percent of Calls Answered Within 20 Secs* |
|---|---|
| 1999 | 76.9% |
| 1998 | 80.9% |
| 1997 | 76.7% |
| 1996 | 70.2% |
| Mean | 76.2% |
| Standard Deviation | 3.8% |

PERFORMANCE STANDARD – Telephone Calls Answered within 20 Seconds:

| % Calls Answ Within 20 Sec Target | (Penalty)/ Offset |
|---|---|
| Less than 68.6% | ($200,000) |
| 68.6% – 72.3% | linear interpolation |
| 72.4% – 80.0% | $0 |
| 80.1% – 83.8% | linear interpolation |
| More than 83.8% | $150,000 |

***** The calculations are based on data for Narragansett Electric Company's Providence call center. Eastern Utilities Associates cannot separate calls between Massachusetts and Rhode Island.

$$\text{Percent of Calls Answered Within 20 Secs} = \frac{\text{Total Calls Answered Within 20 Seconds}}{\text{Total Calls Answered}}$$

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

DEFINITIONS OF
PERFORMANCE STANDARD
MEASUREMENTS

**INTERRPUTION EVENT**

The loss of service to more than one (1) customer for more than one (1) minute.

**INTERRUPTION DURATION**

The period of time, measured in minutes, from the initial notification of the interruption event to the time when service has been restored to the customers.

**NUMBER OF CUSTOMERS SERVED**

The number of customers taking electric service within the defined reporting service area on the last day of the reporting period.

**NUMBER OF CUSTOMERS INTERRUPTED**

The sum of the customers losing electric service for any defined grouping of interruption events during the reporting period.

**CUSTOMER MINUTES OF INTERRUPTION**

The product of the number of customers interrupted and the interruption duration for any interruption event. Also, the sum of those products for any defined grouping of interruption events.

**EXTRAORDINARY EVENTS**

A particular interruption event will be considered extraordinary, and will not count towards the Reliability Performance Standards, if it meets one of the following criteria:

(1) It was the result of a major weather event which causes more than 10% of a district or the total company customers to be without service at a given time.

(2) It was due to the failure of other companies' supply or transmission to Narragansett Electric customers and restoration of service was beyond the reasonable control of the Company and its employees.

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

(3) It occurred because of an extraordinary circumstance, including, without limitation, a major disaster, earthquake, wild fire, flood, terrorism, or any other event beyond the reasonable control of the Company.

## LINEAR INTERPOLATION

(1) The actual performance or penalty each year will be calculated and the result will be scaled or interpolated linearly between the relevant two points of the results range and the relevant two points on the dollar range.

(2) The method of determining the actual penalty, or offset, of each performance standard is determined by multiplying the value of the penalty, or offset, by the absolute value of the actual performance indicator minus the value of the first standard deviation from the mean of that indicator, divided by the value of the second standard deviation of the mean of that indicator minus the value of the first standard deviation from the mean of that indicator.

$$\$ \text{ Penalty or Offset} = \text{Penalty or Offset } \$ \text{ Value} \times \frac{\text{Actual} - 1^{st} \text{ standard deviation}}{2^{nd} \text{ standard deviation} - 1^{st} \text{ standard deviation}}.$$

## CUSTOMER CONTACT

The calculations are based on responses from customers of Narragansett Electric Company, based on surveys performed by an independent third party consultant. A sample of customers who have contacted the call center are surveyed in order to determine their level of satisfaction with their contact. The Company will maintain the same levels of statistical precision of the results as in prior surveys. Eight types of transactions are included in the survey, and the overall results are weighed based on the number of these transactions actually performed at the call center during the year. The eight types of transactions are power Interruptions, meter on, meter off, meter exchange, collection, payment plan, meter reread, and meter test.

The percent satisfied represents the responses in the top two categories of customer contact satisfaction under a seven-point scale, where 1=extremely dissatisfied and 7=extremely satisfied.

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

## TELEPHONE CALLS ANSWERED WITHIN 20 SECONDS

The percent of calls answered within 20 seconds is calculated by dividing the number of calls answered by a customer service representative within 20 seconds by the total number of calls answered by a customer service representative during the year. A call is considered answered when it reaches a customer service representative; abandoned calls are not considered. All calls that are answered by a customer service representative are include in the measurement of percentage answered; there are no exclusions. The time to answer is measured once the customer selects the option to speak with a customer service representative and thus leaves the recordings in the Voice Response Unit.

**THE NARRAGANSETT ELECTRIC COMPANY**
**PERFORMANCE STANDARDS**
**UNDER RETAIL ACCESS TARIFFS**

**ADDITIONAL REPORTING CRITERIA**

1. Each quarter, the Company will file a report of 5% of all circuits designated as worst performing on the basis of customer frequency.

   Included in the report will be:

   1. The circuit id and location.
   2. The number of customers served.
   3. The towns served.
   4. The number of events.
   5. The average duration.
   6. The total customer minutes.
   7. A discussion of the cause or causes of events.
   8. A discussion of the action plan for improvements including timing.

2. Narragansett will track and report monthly the number of calls it receives in the category of Trouble, Non-Outage. This includes inquiries about dim lights, low voltage, half-power, flickering lights, reduced TV picture size, high voltage, frequently burned out bulbs, motor running problems, damaged appliances and equipment, computer operation problems and other non-Interruptions related inquiries.

3. In addition, Narragansett will report its annual meter reading performance as an average of monthly percentage of meters read.

Testimony of
Cheryl A. Warren

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Cheri A. Warren

# DIRECT TESTIMONY

# OF

# Cheri A. Warren

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Cheri A. Warren

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## I. Introduction and Qualifications

Q. Please state your full name and business address.

A. Cheryl A. Warren, 1125 Broadway, Albany, NY 12204.

Q. Please state your position with the Company.

A. I am the Manager of T&D Systems Engineering in the Engineering Services Department of the Technical Services organization within the National Grid USA Service Company, Inc. The T&D Technical Services organization provides support to The Narragansett Electric Company ("Narragansett" or the "Company") on all technical and other support matters. One of my responsibilities as Manager of T&D Systems Engineering is to provide reliability assessment support.

Q. Please describe your educational background and training.

A. I received a Bachelor of Science Degree in Electrical Engineering in 1987 and a Master of Science in Engineering in 1990 from Union College in Schenectady, NY.

Q. Please describe your professional experience?

A. I was employed by Central Hudson Gas and Electric (CHG&E) from 1987 to 1989 in the System Protection Department where I was responsible for relay coordination on the

distribution system. In 1990, I accepted a position in the Distribution Engineering Group, part of the Consulting Group, with Power Technologies Inc. ("PTI"). My responsibilities included the study and analysis of distribution issues for numerous companies. My primary areas of responsibility were in power quality (PQ) and reliability studies for clients. During this timeframe, I also assisted on the Rocket Triggered Lightning project that was sponsored by EPRI and taught numerous courses on distribution systems, protection and coordination and reliability analysis. In 1995, I transferred into the Software Group at PTI and assumed leadership of its distribution power flow software package (PSS/U). In that role I was responsible for all aspects of the program including; design, implementation, testing, training, support, manual creation, sales, marketing and user groups. In 1998, I transferred back to the Consulting Group where I was largely responsible for leading distribution reliability and IT integration engagements for clients. In 1999, I accepted a position as a Senior Engagement Manager with Navigant Consulting in Albany, NY. There I led reliability and IT system integration client engagements. In August 2002, I accepted my present position with National Grid USA.

Q. Please outline your professional activities.

A. I have participated extensively in the Institute of Electrical and Electronics Engineers, Inc. ("IEEE") activities, which is the electrical engineering standards-making body in the United States. As part of IEEE, I have led the Working Group on System Design ("Working Group") since 1990. This Working Group is the author of IEEE Std. 1366-2003, the *Guide for Electric Power Distribution Reliability Indices*. I am also the IEEE Power Engineering Society Awards Chair. Previously, I served as the Vice Chair for the IEEE Distribution Subcommittee from 1999 to 2001. I have authored and co-authored twenty-six papers and spoken at numerous conferences on distribution reliability, power quality and IT integration issues.

## II. Purpose of Testimony

Q. What is the purpose of your testimony as it relates to the Company's filing?

A. My testimony describes the Company's reliability performance measures under the Service Quality ("SQ") plan adopted as part of the Third Amended Stipulation and Settlement approved in Docket No. 2930 ("Original SQ Plan"), and presents proposed enhancements to these measures.

## III. Reliability Performance Measures

Q. Please describe the Company's reliability performance measures under the Original SQ Plan.

A. The Company has four reliability performance measures under the Original SQ Plan: System Average Interruption Frequency Index ("SAIFI") and System Average Interruption Duration Index ("SAIDI") for both the Capital and Coastal districts.

Q. What changes does the Company propose to the current reliability performance standards?

A. The Company recommends the following enhancements:

1) That reliability reporting requirements be more closely aligned with the Company's actual operational practices by reporting reliability performance for all of Narragansett, as opposed to reporting based on the prior organizational structure of two separate districts, Capital and Coastal, which existed at the time of the Original SQ Plan.
2) The use of the IEEE Std. 1366-2003 to provide more meaningful information to the Rhode Island Public Utilities Commission (the "Commission"), the Division of Public Utilities and Carriers (the "Division"), and Company management. Adopting this standard is also consistent with the movement toward a national

reliability standard that could provide a common basis for assessing industry-wide reliability performance.

3) That the reliability performance target calculation period ("PTC period") be lengthened to account for the normal fluctuations in reliability metrics.

4) A recalibration of the reliability performance target bands to reflect the non-Gaussian nature of reliability data.

**A. <u>Combination of the Capital and Coastal Districts</u>**

Q. Please explain why the Company's Capital and Coastal Districts should be combined in calculating the performance standards?

A. Historically, the Company maintained two operating districts within Rhode Island: Capital and Coastal. In 2002, the Company combined these districts to operate as a single entity known as the Ocean State Division ("Ocean State") that encompasses all operations in Rhode Island. Core operational decisions, such as where to emphasize reliability improvement efforts are made on a division, or state-wide, basis. Aligning the reliability performance metrics with the actual operational structure of the Company would help to better guide the future direction of operational decisions, and enable the Company to better optimize its reliability-related actions and investments.

Q. Please describe the historical reliability performance of the Capital District, Coastal District, and the Company.

A. Figure 1 and Figure 2 below represent the historical SAIDI and SAIFI performance of the Capital and Coastal districts under the guidelines of the Original SQ Plan. In addition, the "Company" lines shown in these figures were generated by combining performance in the Capital and Coastal districts by weighting the customers served in each district (61% in the Capital district and 39% in the Coastal district). As can be seen in the graphs, the general performance trends of the districts and the Company are similar.

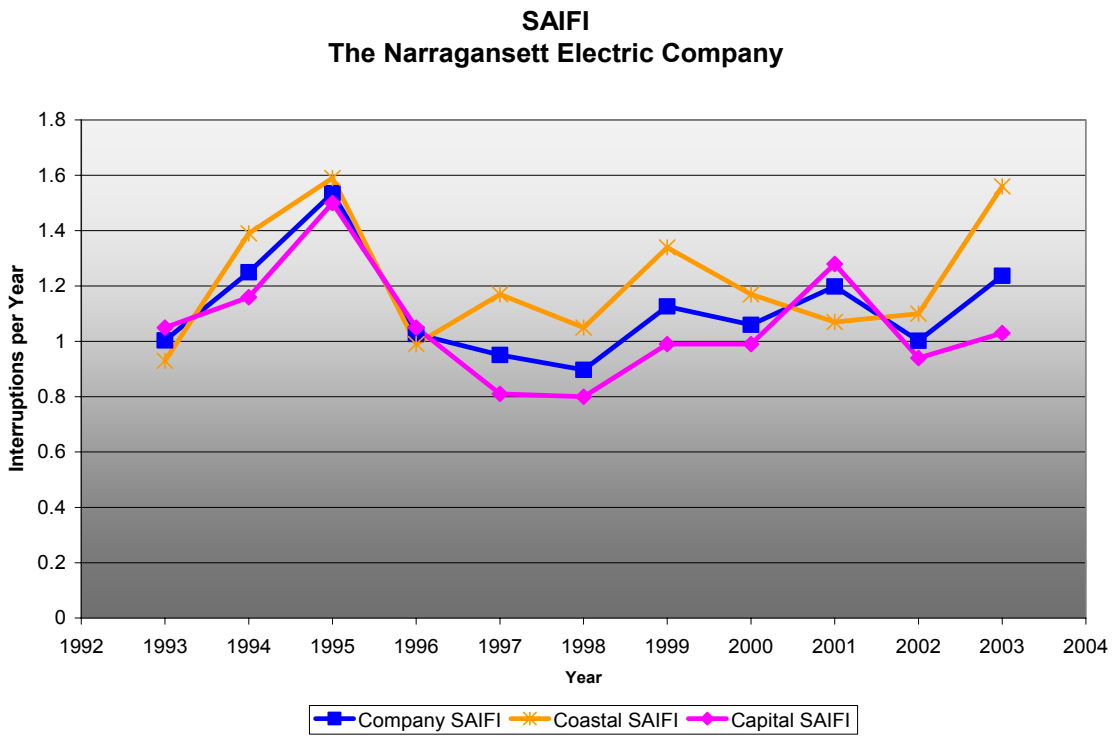


**Figure 1. SAIFI Performance under the Original SQ Plan**

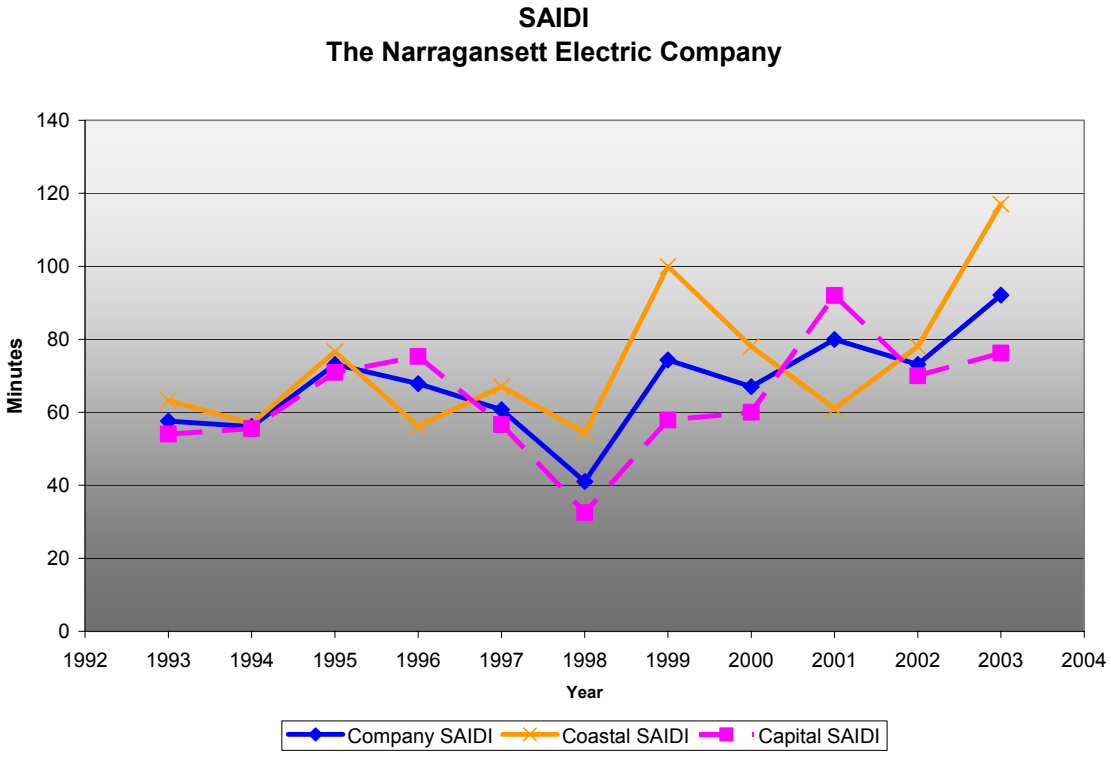


**Figure 2. SAIDI Performance under the Original SQ Plan**

Q. Please describe the SQ targets for the Capital and Coastal districts under the Original SQ Plan, and how they would change if an aggregate Company standard for each metric were established.

A. Figure 3 and Figure 4 show the existing penalty/offset bands for the Capital and Coastal districts. As illustrated in the graphs, combining district performance to create Company performance targets using the same criteria used to calculate the district targets will not materially affect the SQ target performance bands.

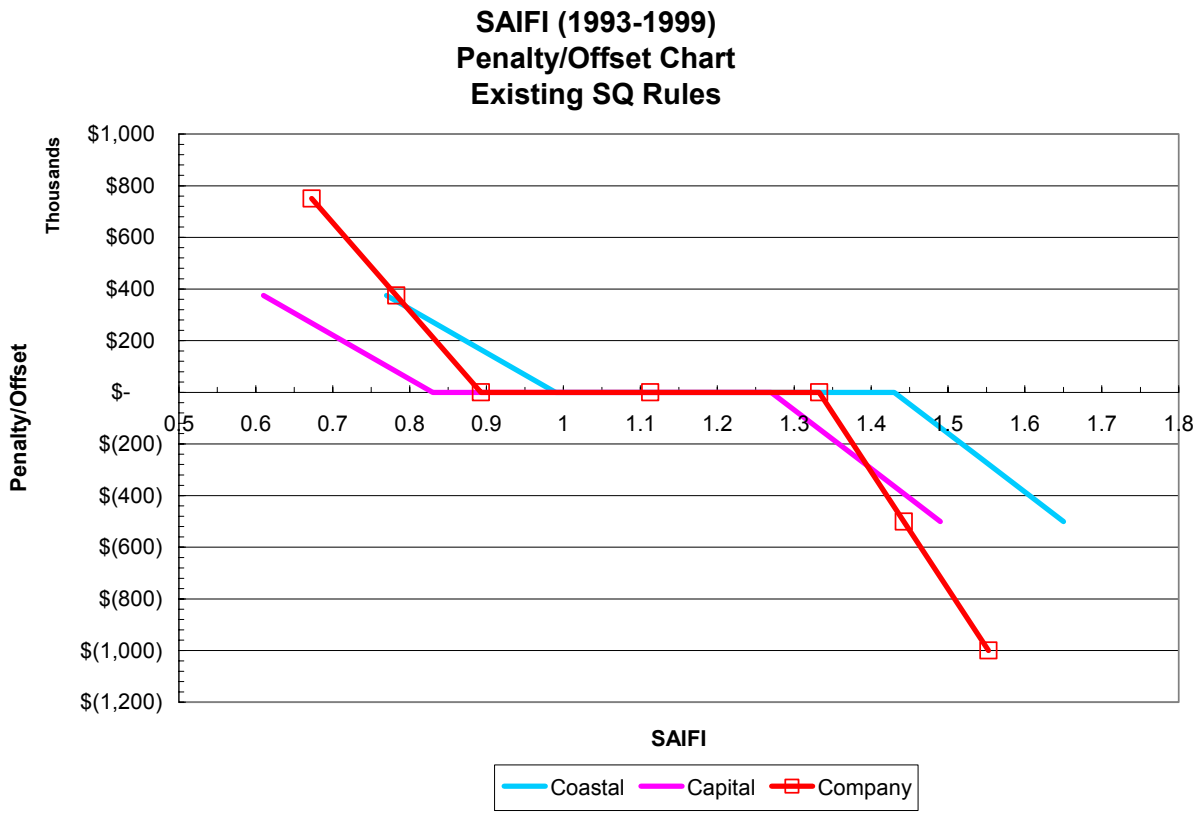


**Figure 3. Penalty/Offset Bands for SAIFI under the Original SQ Plan**

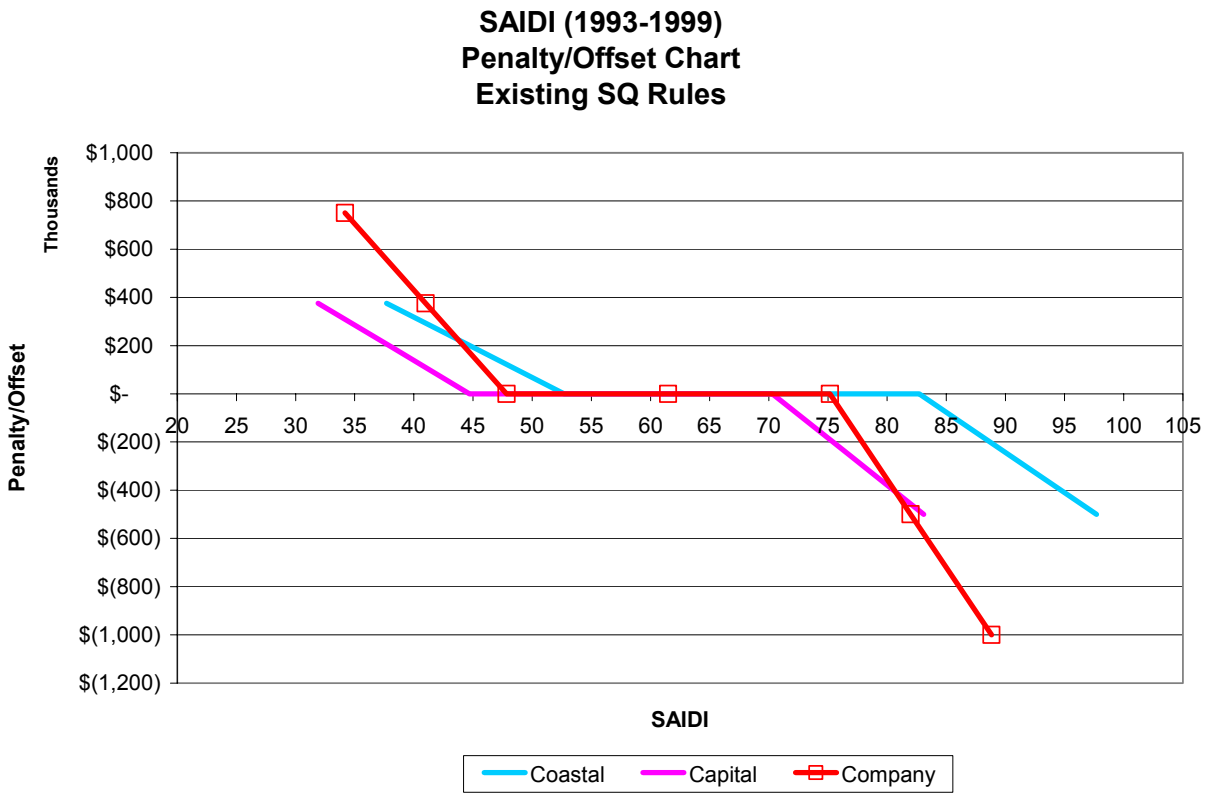


**Figure 4. Penalty/Offset Bands for SAIDI under the Original SQ Plan**

Q. Is the Company proposing that performance for Capital and Coastal be combined exactly as described above?

A. No. The Company is recommending additional enhancements to this approach that will be discussed later in this testimony.

**B. Adoption of the IEEE Std. 1366-2003**

Q. Please describe IEEE Std. 1366-2003.

A. IEEE Std. 1366-2003 is the *Guide for Electric Power Distribution Indices* and it defines the reliability indices, terms that affect the calculation of reliability indices, and the 2.5β Methodology that segments data into different operational performance groups, and also offers a short application guide. It can provide the basis for rule-making, as well as a basis for performance benchmarking. Prior to this version, the standard was published in 1998 and 2001.

Q. Please describe, at a high level, the enhancements made to IEEE Std. 1366-2003 from the prior versions in 1998 and 2001.

A. The 2003 standard includes two primary changes. First, the fundamental definitions were updated to remove any ambiguity that may have existed. Second, and more significantly, the Major Event Day ("MED") concept, or 2.5β Methodology, was developed.

Q. What is a Major Event Day?

A. A MED is a day that exceeds a pre-set SAIDI threshold. These days are days upon which either system design and/or operational limits are exceeded. Identifying these days separately from the day-to-day performance provides for better decision making

opportunities based upon a company's day-to-day performance.

Q. Why did the Working Group elect to develop the MED Concept?

A. In evaluating the breadth of SQ plans in the industry, the Working Group found that there was significant variation within the industry with regard to the criteria and definitions used to exclude reliability performance for reporting purposes. Nearly every "exclusion" definition was based on the percentage of customers interrupted over a period of time. None of these methods effectively presented the resultant trends of day-to-day operations, as noted by the wide variability in reported indices from year to year by all utilities. Thus, it was clear that a more uniform measuring stick was required and that performance had to be segregated into different components to allow for better analysis and appropriate optimization of expenditures for system improvements. The Working Group recognized that performance needed to be segmented into the two very different operational modes that all utilities face; day-to-day and crisis mode. The IEEE 2.5β Methodology effectively identifies those few days that are truly extraordinary in the operations of utilities of all sizes, locations, and system designs. Reviewing the two data sets separately brings greater clarity to reliability issues so as to enable the creation of remediation plans where required.

Q. How is reliability performance review different under the MED concept?

A. The MED concept is an approach that assists both utilities and regulators to differentiate between two very different operating conditions, namely major event/crisis performance and day-to-day performance. Historically, data from these two very different operational conditions were seldom segmented effectively thereby masking performance for both conditions. By segmenting the data into two sets, appropriate review can be performed on each set that can ultimately result in optimized spending for system improvements. The day-to-day performance can be used for target/goal setting, while the major events can be reviewed on a case by case basis. The day-to-day performance represents the operating conditions that the utility should have designed, built and operated the system to withstand and be staffed to handle. It is the performance that should be used to establish performance targets and establish plans for remediation activities. MEDs, on the other hand, by definition do not correspond to periods of normal system performance, and can therefore skew day-to-day performance results, thus producing an inaccurate picture of how a utility system actually performs on a normal day-to-day basis. MED performance represents crisis conditions that the Company should have prepared to handle by establishing plans and processes for obtaining materials and manpower to address these unique situations. By separating MEDs from day-to-day performance, the Commission, the Division, and the Company will have a clearer picture of the

Company's overall performance day-to-day, while also being able to evaluate MEDs to determine if the Company made sound decisions during crisis conditions.

Q. Please describe the mechanics of the MED calculations.

A. The MED Concept is defined by the 2.5β methodology. The following seven steps are required:

1. Collect values of daily SAIDI for five sequential years, ending on the last day of the last complete reporting period. If fewer than five years of historical data are available, use all available historical data until five years of historical data are available.
2. Only those days that have a SAIDI/Day value will be used to calculate the $T_{MED}$ (defined below; do not include days that did not have any interruptions).
3. Take the natural logarithm (ln) of each daily SAIDI value in the data set.
4. Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.
5. Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.
6. Compute the MED threshold, $T_{MED}$, using the equation:

$$T_{MED} = e^{(\alpha+2.5\beta)}$$

7. Any day with daily SAIDI greater than the threshold value $T_{MED}$ that occurs during the subsequent reporting period is classified as a Major Event Day.

Any spreadsheet program can be used to perform the calculations described above or they can be embedded directly into outage management systems. Once the threshold is determined, it is used for assessment during the current calendar year to declare and classify MEDs.

Q. Why does the MED concept, or 2.5 β Methodology, use five years of data in identifying MEDs?

A. The Working Group found, through empirical data review, that five years provided the best calculation period for determination of major events and the ability to identify the trending of reliability metric results. Fewer than five years, while still providing better results than other methods in use, caused variability in the MED threshold, and therefore in the number of MEDs and the resultant metrics. Use of more than five years did not appreciably reduce the variability or sufficiently smooth the trends of the resultant metrics.

Q. Is it possible to have a MED that is not due to weather?

A. Yes. In fact, the ability to identify major events regardless of cause, weather, number of customers impacted, or type of equipment failure, is one of the benefits of using this methodology. Events that exceed the capability of the utility to respond effectively are identified and segmented for further review. Were the utility to not handle a major event situation well, the performance will be visible, and appropriate action can be taken. On the other hand, if a utility handled a difficult situation very well, that will be easily discernable also.

Q. Did the Working Group establish any ground rules for creation of the MED concept, or 2.5β Methodology?

A. Yes. When the Working Group decided to pursue this project, the members established three key tenets: 1) the definition must be understandable by all and easy to apply, 2) it must be specific and calculated using the same process for all utilities, and 3) it must be fair to all utilities regardless of size, location, system design, or customer density.

Q. Were there any key discoveries that led to the creation of the MED concept?

A. Yes, there were two. First, that daily SAIDI is a good indicator of major events. Because it is a function of both the number of customers impacted and duration of the

impact, it shows when either system design and/or operational limits are exceeded. Since SAIDI is comprised of customer minutes interrupted divided by customers served, it was size independent. Second, the Working Group determined that reliability data is not distributed on a normal or Gaussian basis. A Gaussian, or normal distribution, is best represented by a "bell-shaped" curve. Until this work was undertaken, most people were unaware that reliability performance did not follow a bell-shaped curve. Without this understanding, it was nearly impossible to set performance targets bands appropriately.

Q. Can SAIDI performance be reviewed on a daily basis and, if so, what does such a review suggest?

A. Yes. Reviewing SAIDI on a daily basis can provide many insights into company operating practices and system design. This technique was used extensively during the creation of the MED concept, or 2.5β Methodology, to help Working Group members visualize performance. To illustrate, Figure 5 below shows one year of daily SAIDI data. Each point on the graph reflects the SAIDI accrued on one day during the year and the data has been ordered from worst to best. On most days, as can be seen on the right side of the graph, there are very few minutes of customer interruption and therefore the SAIDI value is quite low, much less than 1 minute on a system basis. As the graph is traversed from right to left, the performance gets worse until finally the day that had the worst

SAIDI performance is plotted. For the year shown in the graph, on the worst day, nine minutes of SAIDI was accumulated, clearly representing a day in which the Company is operating in a crisis mode. For this particular year, any day that accumulated more than 4.75 minutes of SAIDI was declared a major event. Days that accumulated between 1 and 3 minutes of SAIDI were significant, but not major days ("minor" days), for example, days when severe typical thunder/wind storms were present, but not extensively widespread. Reviewing data in this manner begins to reveal that reliability data is not distributed on a normal, or Gaussian basis, and instead more closely follows a lognormal distribution as described below.

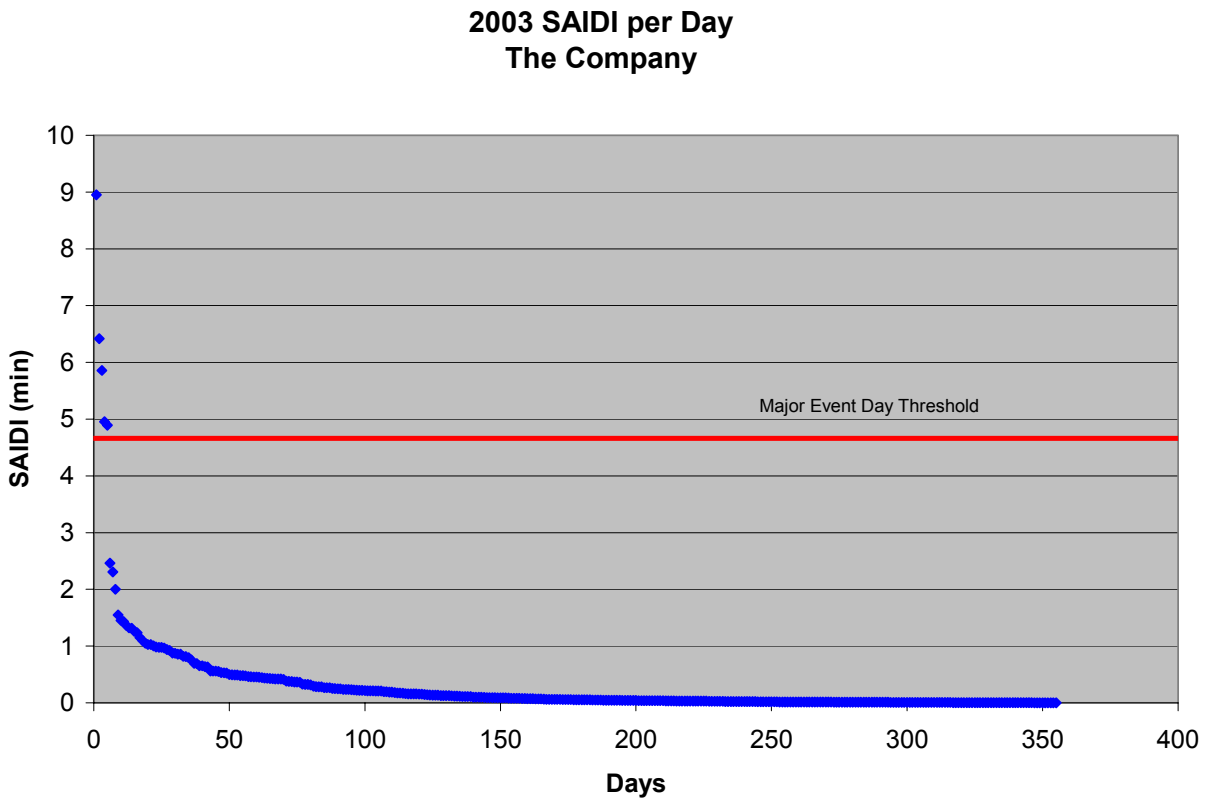


**Figure 5. Daily SAIDI Performance**

Q. What is a lognormal distribution and why is it applied to reliability data?

A. Figure 6 below, which reflects reliability data on a daily histogram basis, shows that the overwhelming majority of days had a SAIDI below 1 minute, and that there were approximately 100 days with SAIDI of approximately 0.05 minutes Understanding that most days have a very small number of events and accrue a low amount of SAIDI helps to define the day-to-day operations. Knowing the bounds of typical reliability

requirements helps utilities build, design and operate their systems.

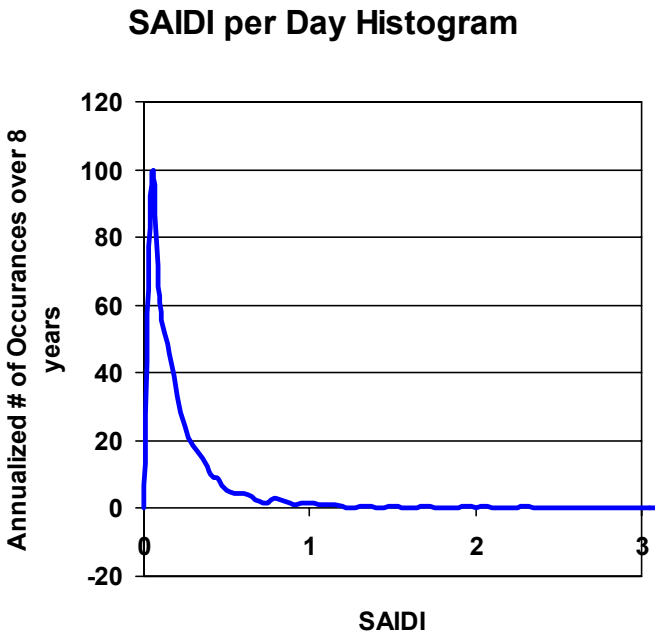


**Figure 6. Natural Log Distribution of Daily SAIDI**

Similarly, Figure 7 shows the same data, but the data has been transformed into lognormal space. Notice in this figure, the data plots a bell-shaped curve.

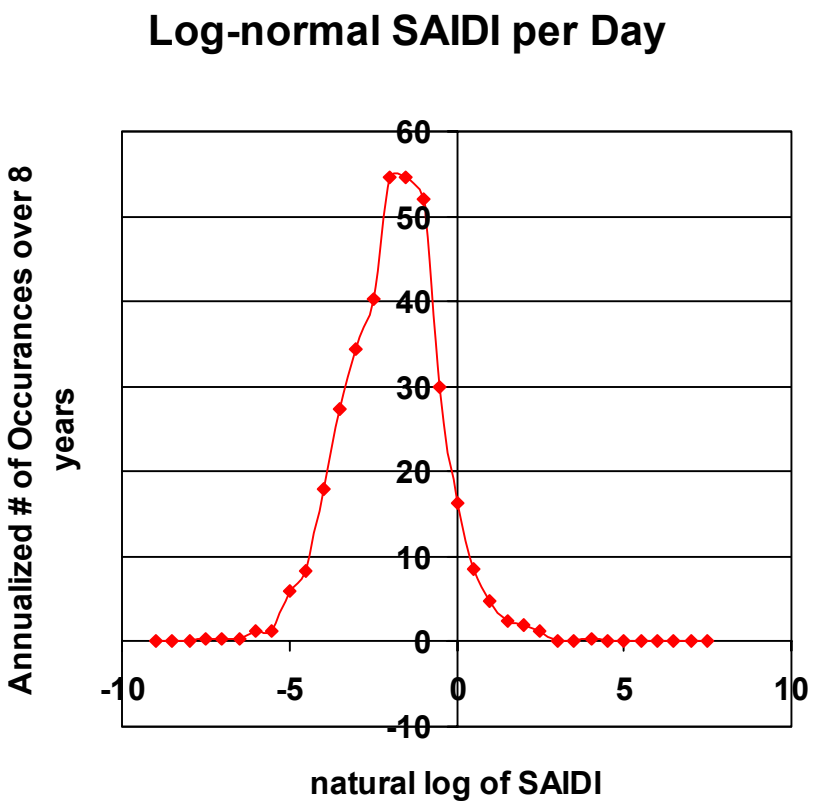


**Figure 7. Daily Performance Data in Log-Space**

In the lognormal space, the concepts of mean and standard deviation are applied in exactly the same way they are applied to Gaussian data. Therefore, transforming reliability data into lognormal space, calculating target performance bands, and transforming values back to normal space provides the appropriate approach for evaluating reliability performance and setting expectations upon which SQ performance targets can be established.

Q. What does this review suggest?

A. It strongly suggests that reliability performance be modeled as a lognormal distribution. Using data provided by the members, the Working Group tested several distributions and found that reliability data is most closely represented by the lognormal distribution. While this representation is not perfect, it has been shown to deliver excellent results in terms of identifying MEDs.

Q. If the MED concept, or the 2.5β Methodology, were used as the basis for the calculations, please describe the Company's performance for the period from 1994-2003.

A. As previously described, the 2.5β Methodology uses a five-year rolling window, a period determined to be appropriate by the IEEE Working Group, to determine $T_{MED}$. Using the 2.5β Methodology to identify and segment MEDs eliminates the variability in reliability metrics caused by those unique events that require extraordinary, crisis mode operation and provides a clear trend of day-to-day performance, as shown in Figure 8 and Figure 9. The wide variability seen in the data that includes all interruptions to customers is reduced for the day-to-day data set, thereby providing clearer trends which send the appropriate signals to companies to generate remedial action plans aimed at SQ improvement where necessary, while also allowing the appropriate review of a utility's operation during major events.

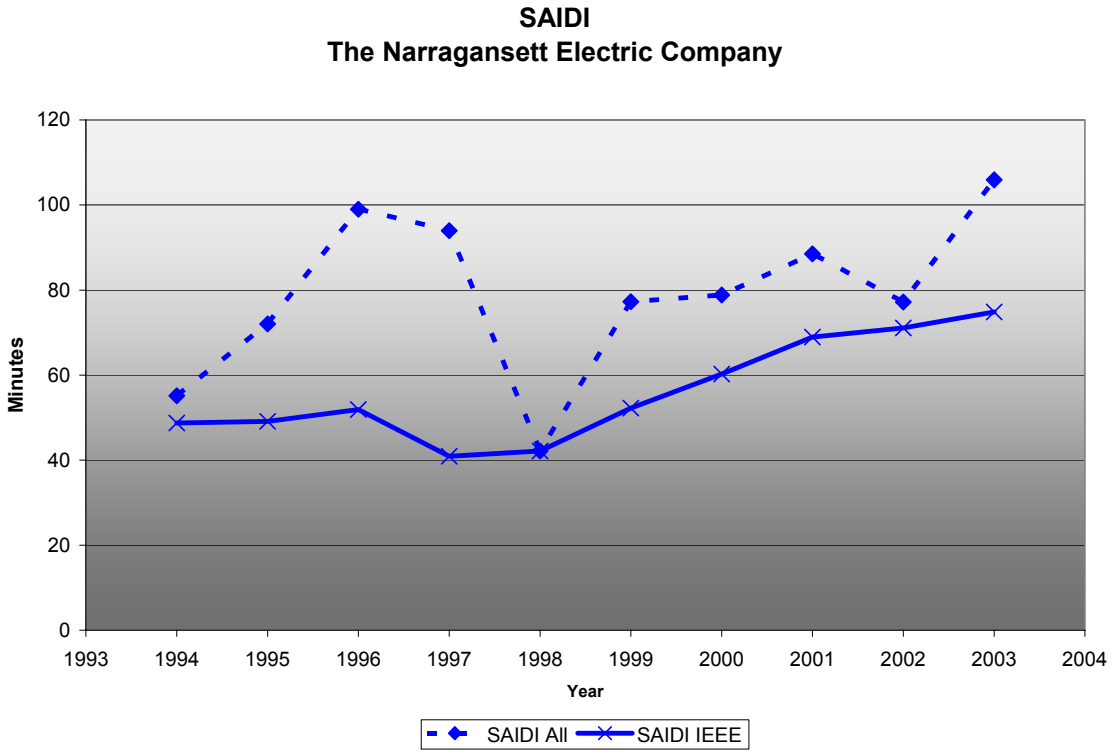


**Figure 8. IEEE SAIDI Performance**

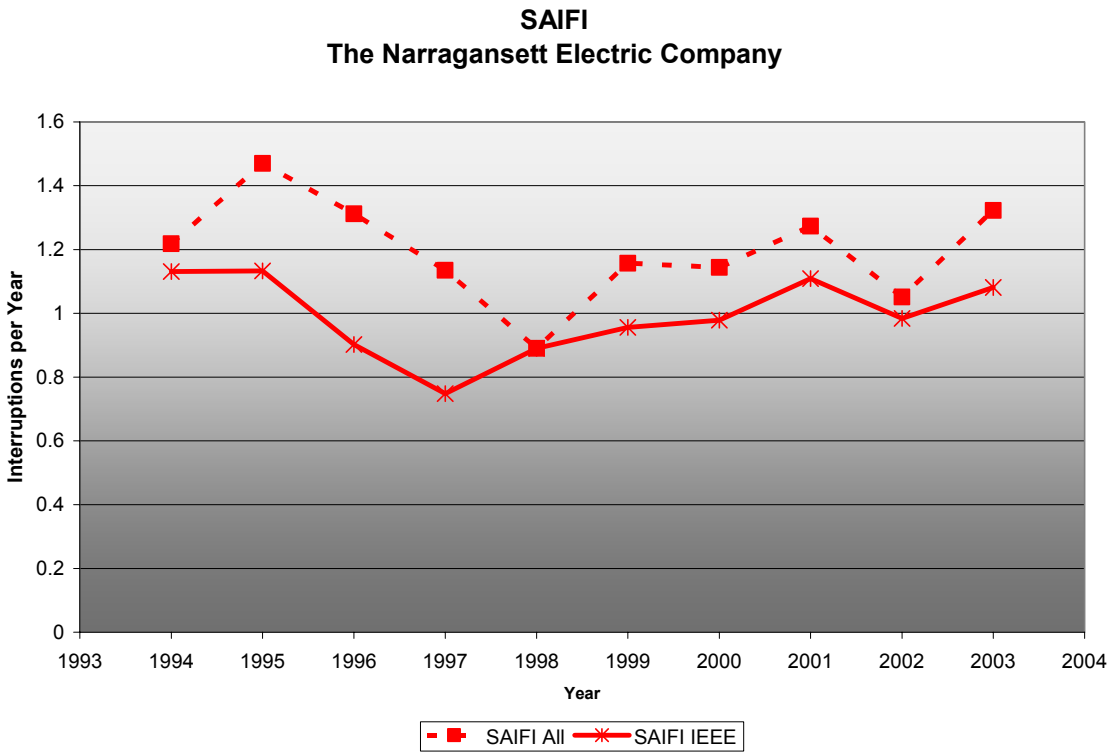


**Figure 9. IEEE SAIFI Performance**

Q. In summary, why does the Company recommend the use of the IEEE Std. 1366-2003?

A. The Company proposes adopting the use of this standard because it will provide the Company, the Division, and the Commission with a clearer understanding of the Company's reliability performance: both day-to-day and during major events. It will also allow for better optimization of expenditures to target programs/projects that truly enhance reliability where required. In addition, it has the potential to help move the Company toward a more common basis for regulatory reporting with other companies.

Applying the understandings about the nature of reliability data developed in the IEEE Std. 1366-2003, will therefore aid the Company and its regulators in establishing appropriate performance targets.

**C. <u>Lengthening of the Performance Target Calculation ("PTC") Period</u>**

Q. What is the PTC period, and what changes is the Company proposing be made?

A. The PTC period is the performance target calculation period. Under the Original SQ Plan, the PTC period was from 1993-1999, a seven-year period. Under the New SQ Plan, the Company is proposing a ten-year rolling period, starting with 1994-2003.

Q. Were there any significant changes to data collection methods during this period?

A. Yes. In 1999, the Company began using an automated data collection and reporting system, Interruption Disturbance System ("IDS"), to track interruptions. As a result of this system change, the reported metrics appear to have increased by approximately 20%. Such increases have been seen at many other companies when similar systems have been put in place.

In addition, in 2000, portions of Eastern Utilities Associates ("EUA") were merged into the Company and the former processes utilized within EUA for data collection and

reporting were converted to the Company's processes. After changing to IDS, the accuracy, completeness and level of detail of reliability data has been improved.

Q. Why does the Company recommend changing the PTC period?

A. There is a natural variation in reliability performance that occurs over time. This natural variation occurs mainly because of significant events that occur which are not major events (referred to as "minor events"), but none-the-less have an impact on the variability of reliability performance. The minor events can be seen in Figure 5, on page 18, between days six and twenty. An example of a "minor event" is an afternoon severe summer thunder/wind storm that is not very widespread.

Further, as illustrated in Figure 8 and Figure 9, on pages 222 and 23, respectively, normal variability is inherent in reliability performance over a ten-year period. Moving along the graphs, choosing any independent five-year period demonstrates that the results vary greatly, thereby directly affecting how the performance targets would be set, which indicates that a period such as five years is insufficient for performance measure target-setting purposes. Therefore, the Company proposes to use a longer time horizon for establishing the performance measure targets so as to reduce the effects of short-term variability that may exist in the data, thereby providing a truer reflection of the

Company's longer term historical performance. Extending the period to ten years also helps to reduce variability of typical weather events and when coupled with the IEEE 2.5β methodology will result in appropriate performance measure targets. As such, the Company therefore recommends that the target-setting period be lengthened to a rolling ten-year period.

**D. Recalibration of Performance Targets**

Q. Please describe how the performance measure bands would be changed if the Capital and Coastal districts were combined using data for a ten-year period from 1994-2003 under the guidelines of the Original SQ Plan.

A. The performance target bands for the combined company, under the guidelines of the Original SQ Plan, are shown in Figure 10 and Figure 11. Notice that the deadband is evenly spaced around the average value by a distance of the standard deviation. The basis for the creation of the existing SQ targets is the assumption that reliability data is Gaussian in nature.

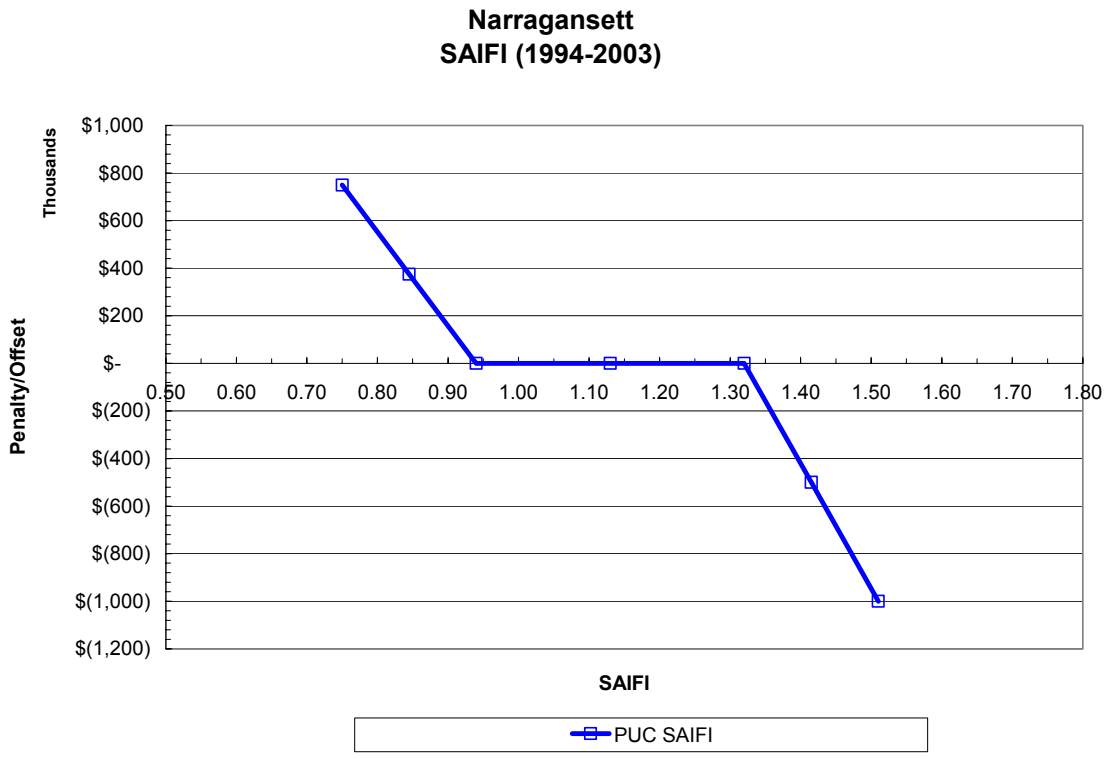


**Figure 10. Combined Narragansett SAIFI Target under the Original SQ Plan**

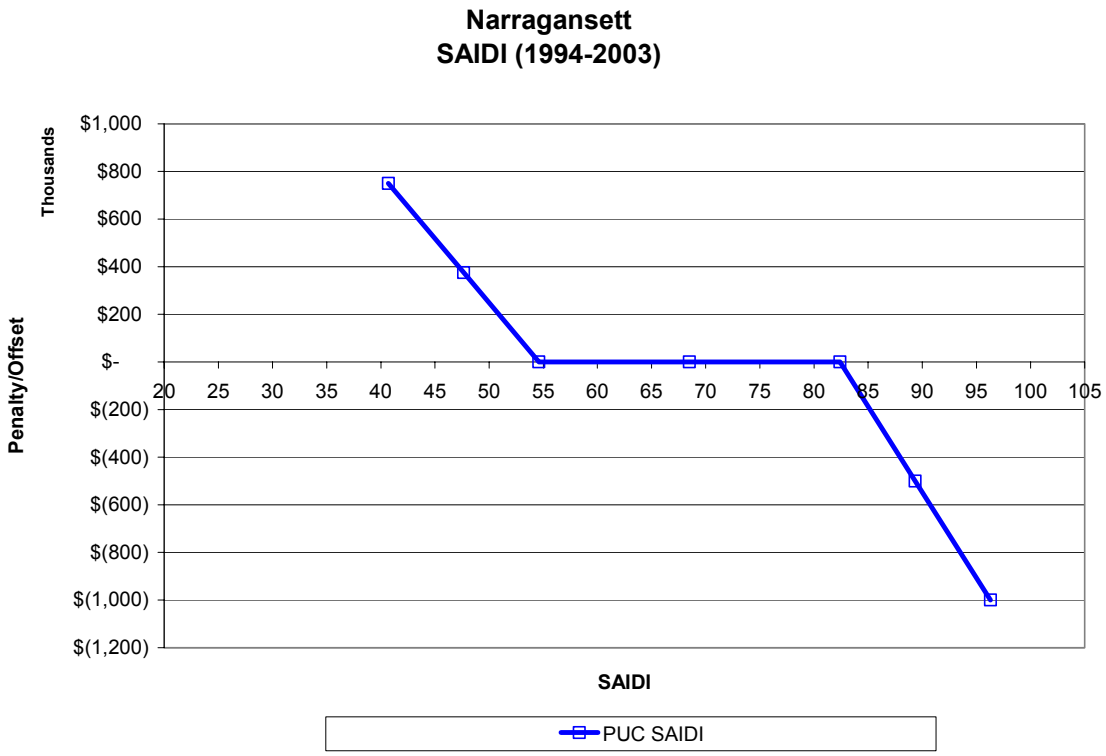


**Figure 11. Combined Narragansett SAIDI Target under the Original SQ Plan**

Q. Should reliability targets be calculated assuming a Gaussian distribution of reliability data?

A. No. As was described previously, reliability performance is not well represented by a Gaussian distribution. Therefore, the lognormal nature of the data should be taken into consideration when determining reliability performance target bands. Until IEEE Std. 1366-2003 was created, it was not common knowledge that reliability data is non-Gaussian and therefore most target bands were calculated using the assumption that the

data is Gaussian. This was the methodology used in the Original SQ Plan. Not considering the non-Gaussian nature of reliability data can result in the generation of incorrect targets that can result in suboptimal expenditures.

Q. In summary, how should the SQ targets be established?

A. The Company recommends that the performance targets for SAIFI and SAIDI be developed for day-to-day operations based on the IEEE 2.5β Methodology that identifies performance during both major events and day-to-day operations. The Company further recommends that a ten year period of historical performance be used as the target period to ensure that the normal variability of "minor" weather events is considered when setting the performance targets. In addition, the performance targets should be calculated considering the lognormal nature of the data. To do this, the lognormal mean and lognormal standard deviation must be calculated and applied in lognormal space. This is done by calculating the mean, 1 standard deviation and 2 standard deviations of the log values and then converting the resulting target levels back to normal space. Figure 12 and Figure 13 show the proposed target bands using this technique, while Tables 1 and 2 reflect the actual recalculated performance measures using this approach.

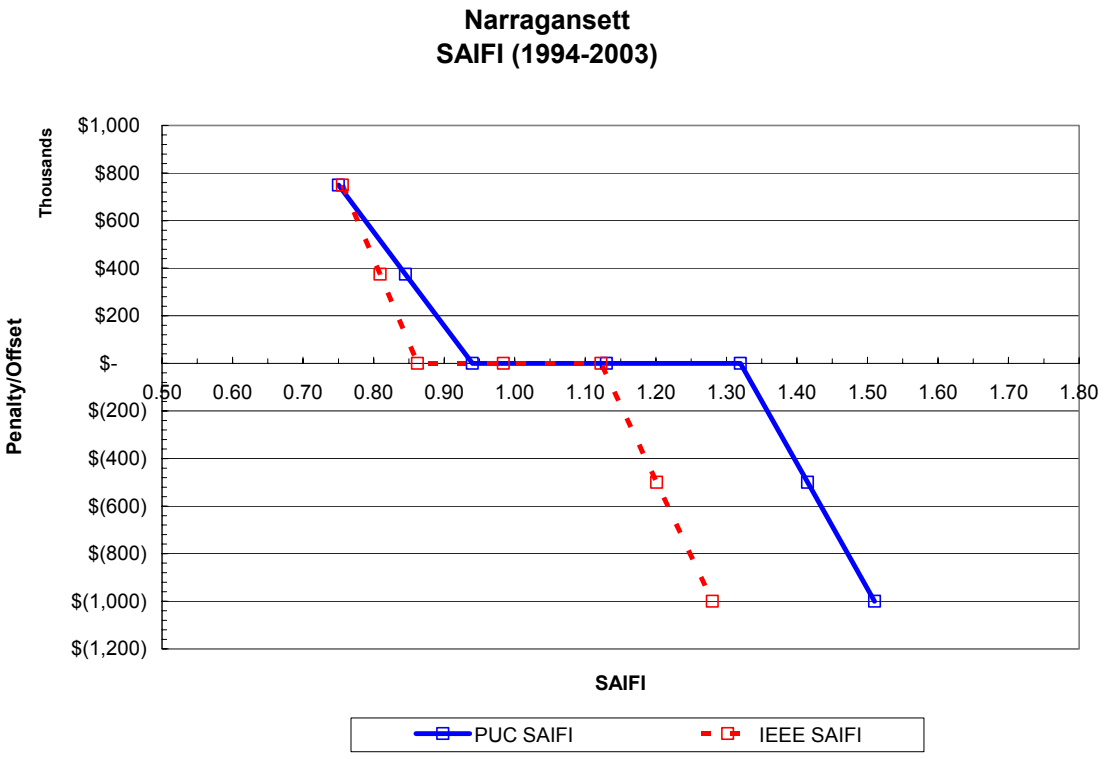


**Figure 12. Proposed SAIFI Target Bands**

**Table 1. Proposed SAIFI Targets Using IEEE 2.5β Method**

| Performance Standards – SAIFI - Frequency of Interruption | |
|---|---|
| SAIFI – RI | Penalty/Offset |
| More than 1.28 | $ (1,000,000) |
| 1.13 to 1.28 | linear interpolation |
| 0.86 to 1.12 | $ 0 |
| 0.76 to 0.85 | linear interpolation |
| less than 0.76 | $ 750,000 |

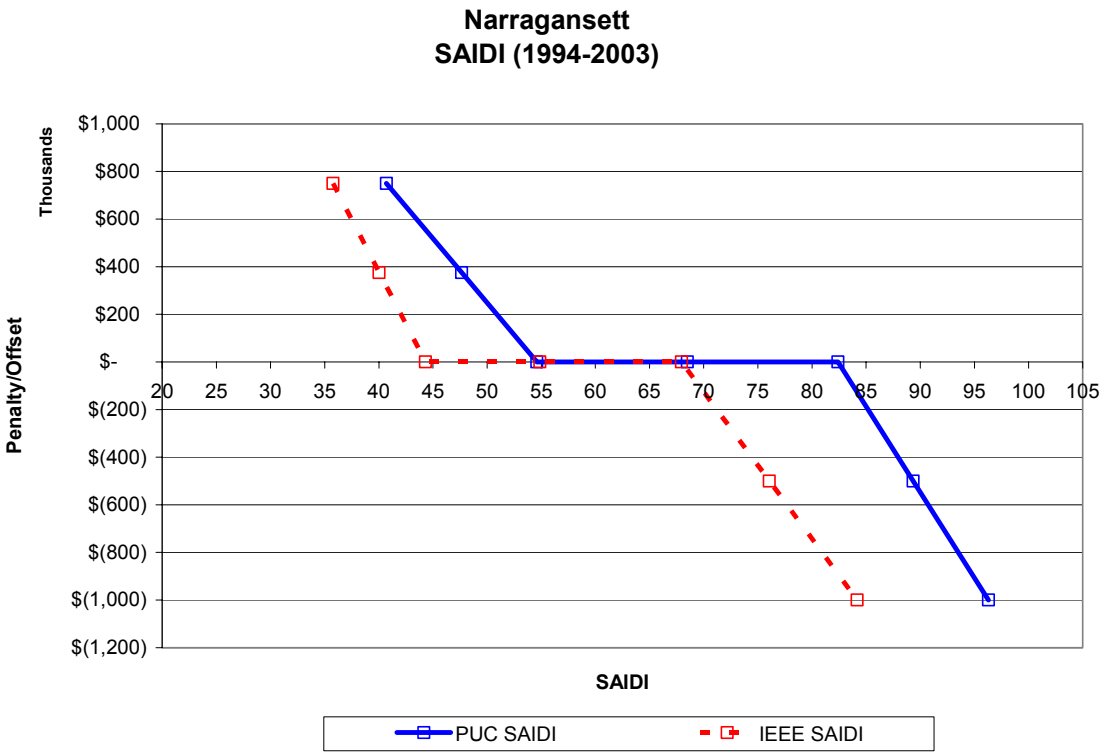


**Figure 13. Proposed SAIDI Target Bands**

**Table 2. Proposed SAIDI Targets Using the IEEE 2.5β Methodology**

| Performance Standards - SAIDI - Duration of Interruption | |
|---|---|
| SAIDI – RI | Penalty/Offset |
| More than 84.18 | $ (1,000,000) |
| 67.97 to 84.18 | linear interpolation |
| 44.30 to 67.96 | $ 0 |
| 35.77 to 44.29 | linear interpolation |
| less than 35.77 | $ 750,000 |

Thus, the effect of these proposed enhancements would be to narrow the deadband for both the SAIDI and SAIFI measures, and to lower—or tighten—the respective thresholds at which the Company would incur an offset or a penalty. Likewise, the reliability metrics under the IEEE Std. 1366-2003 are lower and should vary less so the overall impact related to probability of penalty and offset may not be changed to any appreciable degree due to the change in both the metrics and the deadband/targets. However, using this approach will reduce the impact of externalities and will provide a greater ability and incentive to the Company to focus its expenditures on the most optimal programs to improve reliability performance on a long-term basis, thereby benefiting customers.

Q. Using the IEEE 2.5β Methodology, what would the Company's performance have been during the period from 1994 to 2003 in terms of reliability penalties?

A. In 2001, 2002 and 2003, the Company would not have paid a penalty for SAIFI performance but would have paid a penalty for SAIDI performance.

Q. How does this compare with what the Company's performance would have been during the same 1994 to 2003 period, using the guidelines of the Original SQ Plan?

A. Under the Original SQ Plan, during this period the Company would have paid a penalty for SAIFI performance and the maximum penalty for SAIDI in 2003 only.

Q. Is the Company aware of any benchmark data that compares companies on the same basis?

A. Yes. Until recently there were many benchmarks, but none used data that was analyzed using the same methodology. Not using the same basis leads to the incorrect conclusions (comparing apples to oranges). The Working Group recently completed a benchmarking exercise using the MED concept to develop statistics. The Working Group obtained raw data from over 80 companies located throughout the US and Canada that ranged in size from 1,400 to 5 million customers. All raw data was analyzed by the Working Group using the 2.5β methodology and then comparisons were made.

Q. Based upon this benchmark data, in which quartiles did the Company place for the reliability measures of SAIFI, SAIDI and Customer Average Interruption Duration Index, ("CAIDI")?

A. The Company was in the first quartile for SAIDI and CAIDI and in the second quartile for SAIFI.

Q. Was any trending analysis performed to demonstrate historical reliability trends across the group?

A. Yes. Sixty of the eighty companies provided data for the years 1999-2003. Using this

data, the Working Group created trend analyses for different groups. The benchmark group was split into three groups based on size: small companies ranged in size from 1,400 to 100,000 customers; medium companies ranged in size from 100,001 to 1 million customers; and large companies were designated as companies serving 1 million customers or more. Narragansett was among twenty-eight companies categorized as a medium company for purposes of this benchmark. Thirteen of the companies were categorized as small, and nineteen as large. In Figure 14, which depicts the results of the trending analysis for Narragansett's performance versus the other companies notice that the Company's performance was much better than the average for all size groupings of other companies and that the average SAIDI for medium companies is rising on a very similar slope to the Company's performance. This trend may be indicative of improvements in data collection systems throughout the country, a worsening of weather conditions, or facility deterioration. While it is not possible to pinpoint the exact cause of the rise across the benchmark group, what is clearly discernable is that customers in the Company's service territory experience better reliability than customers of its peers.

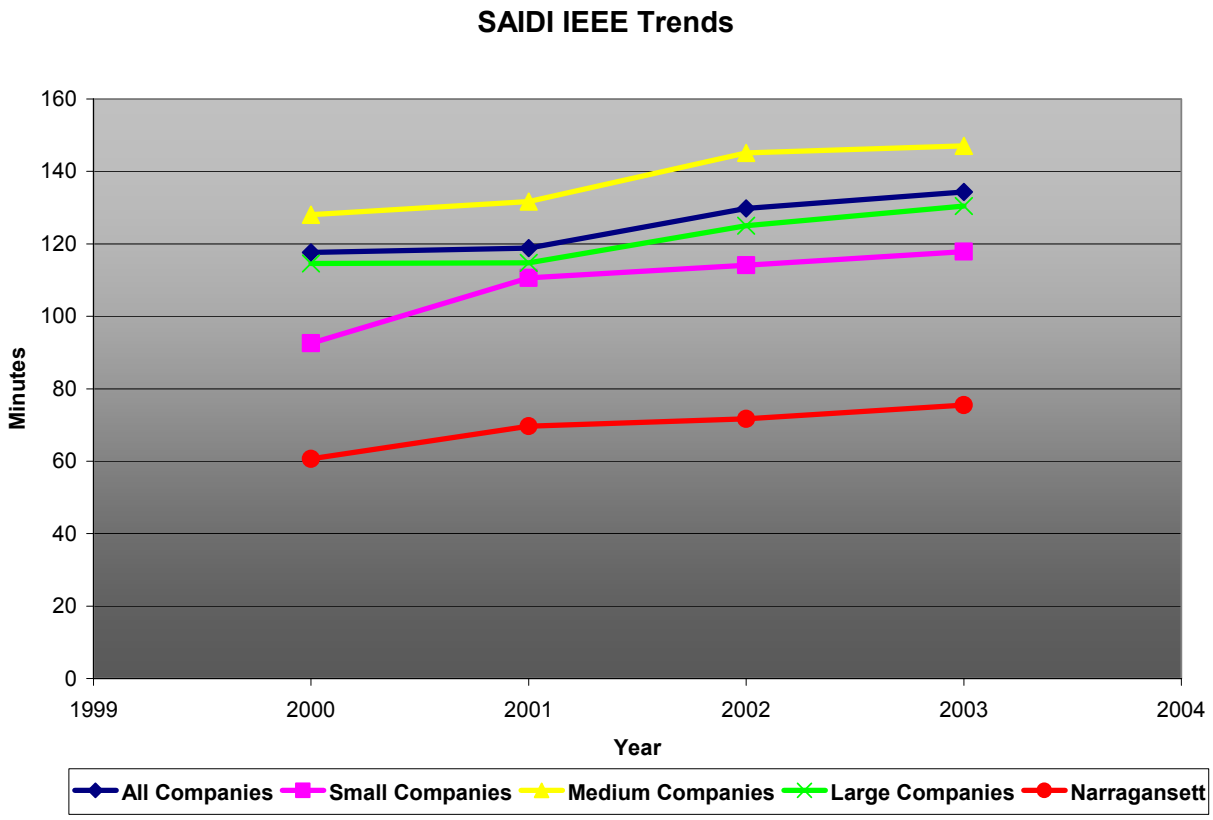


**Figure 14. Historical Performance Trends of Benchmark Companies**

Q. In summary, please describe why the Commission should consider adopting IEEE Std. 1366-2003 as the basis for the reliability performance targets under the New SQ Plan.

A. The Company proposes that the Commission consider adopting the IEEE Std.1366-2003 because doing so will provide the Company, the Division and the Commission with a clearer understanding of the Company's performance; both day-to-day and during major events. It will allow for better optimization of programs and projects that can truly enhance reliability where required and it has the potential to put the Company on a common reporting basis with other companies. Finally, using the understandings relative to the non-Gaussian nature of reliability data developed in the IEEE Std. 1366-2003 will aid the Company, the Division and the Commission in setting appropriate performance measures which are intended to ensure that strong service quality for customers is maintained.

## IV. Conclusion

Q. Does this conclude your testimony?

A. Yes it does.

Testimony of
Mark N. Sorgman

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Mark N. Sorgman

# DIRECT TESTIMONY

# OF

# Mark N. Sorgman

THE NARRAGANSETT ELECTRIC COMPANY
Service Quality Plan Filing
Witness: Mark N. Sorgman

Table of Contents

## I. Introduction and Qualifications

Q. Please state your full name and business address.

A. Mark N. Sorgman, 55 Bearfoot Road, Northborough, Massachusetts 01532.

Q. Please state your position.

A. I am Manager of Small Business Services for the New England distribution companies of National Grid USA, including for The Narragansett Electric Company ("Narragansett", "Narragansett Electric", or the "Company"). In this position, I manage a staff of professional customer service analysts at the Northborough, Massachusetts call center. The Northborough call center serves as the primary customer service center for Narragansett customers.

Q. Please describe your educational background and training.

A. I graduated from Northeastern University with a Bachelor's degree in Electrical Engineering Technology in 1975.

Q. Please describe your professional experience.

A. I joined National Grid USA in May 2000 as part of the National Grid/Eastern Utilities Associates ("EUA") merger, when I assumed my current position as Manager of Small Business Services.

Previously, I had worked for EUA since December 1979, when I joined Eastern Edison Company's Consumer Services Department as a Consumer Service Engineer. My major responsibilities were coordinating service requirements for new and existing customers, and providing technical and engineering direction to Consumer Services personnel. In January 1981, I became a Staff Engineer working on the development, implementation and maintenance of programs, policies and procedures for the Consumer Services Department. In November 1982, I joined the Rate Department as a Rate Analyst, performing rate design and analysis, load research studies, power plan performance analyses, and supporting studies for the cost-of-service studies. I was promoted to the position of Supervisor of Load Research in July 1985, where I was responsible for the design and implementation of load research programs, determination of cost-of-service allocators, and providing technical and statistical assistance in the area of conservation and load management. In January 1991, I was appointed Supervisor of Revenue Requirements, where I was responsible for preparation and coordination of rate cases, embedded and marginal cost studies, and monitoring returns of the EUA System Companies. In August 1992, I was named Supervisor of Rate Administration, and in January 1999, I assumed the position Supervisor of Retail Pricing and Rate Administration.

Before joining EUA, I was employed at Charles T. Main Inc. of Boston, Massachusetts as a Planning/Scheduling Engineer; Systematic Associate Inc. of Needham, Massachusetts as a Construction Consultant; and Stone and Webster Engineering Corporation of Boston, Massachusetts as an Assistant Engineer and Field Planning Engineer.

Q. Have you previously testified before the Rhode Island Public Utilities Commission (the "Commission")?

A. Yes.

## II. Purpose of Testimony

Q. What is the purpose of your testimony as it relates to the Company's filing?

A. My testimony describes the Company's two customer service measures under the Service Quality ("SQ") plan adopted as part of the Third Amended Stipulation and Settlement approved in Docket No. 2930 ("Original SQ Plan"), and presents proposed enhancements to these measures.

## III. Customer Service Measures

Q. Please describe the Company's customer service measures under the Original SQ Plan.

A. The Company has two customer service measures under the Original SQ Plan: (1) Customer Contact, and (2) Telephone Calls Answered within 20 Seconds ("Call Answering").

The Customer Contact measure is based on a telephone survey performed by an independent research firm. A sample of customers who recently contacted the Company's call center is surveyed during the year in order to determine their satisfaction with that contact. The annual results represent the percent of customers giving a rating of 6 or 7 to the following question: "Thinking about when you telephoned Narragansett Electric, how satisfied or dissatisfied were you with the contact you had with Narragansett Electric? We'll use a scale of 1 to 7, where 1 means 'extremely dissatisfied' and 7 means 'extremely satisfied.'" Eight types of transactions are included in the survey (power outage, meter on, meter off, meter exchange, collection, payment plan, meter read, meter test), and the overall results are weighted based on the number of these transactions actually performed at the call center during the year.

The Call Answering measure is calculated by dividing the number of calls answered by customer service representatives ("CSRs") within 20 seconds by the total number of calls answered by CSRs during the year. A call is considered answered when it reaches a CSR. The time to answer is measured once the customer selects the option to speak with a CSR and thus leaves the recordings of the Voice Response Unit ("VRU").

Q. Please describe the Company's proposed enhancements to the customer service measures.

A. For the Customer Contact measure, the Company proposes to expand the historical time period used to develop the performance benchmarks to include the four most recent years (2000 through 2003). Thus, the new benchmarks would be based on results from 1997 through 2003. Once ten years of performance becomes available, the Company proposes to establish performance standards annually, based on a ten-year rolling average. The inclusion of this additional historical performance data is shown on page 4 of Exhibit RHM-1.

Likewise, the Company is proposing to update the performance standard for Call Answering by including data from 2000 to 2003 in calculating the benchmark, as well as using a ten-year rolling average once available. The Company is also proposing to begin including calls completed in the VRU in

the Call Answering measure. There is a segment of the Company's customer base that prefers self-service, and the Company has been increasing the number of options available to customers choosing to use the VRU. For example, customers can use the VRU to establish a payment plan, report a power outage, or hear their account balance. Once a customer selects a VRU option, they reach an automated system that is the equivalent of having their request satisfied by a CSR, so these calls should also be included in the Call Answering measure. The Company is proposing to include calls completed in the VRU in the calculation of the Call Answering benchmark beginning in the year 2000, which is the first year in which the Company tracked the number of VRU calls. Including these calls has the effect of increasing the benchmark for the benefit of customers. The enhancements to the Call Answering performance standard are reflected on page 5 of Exhibit RHM-1.

## IV. Conclusion

Q. Does this conclude your testimony?

A. Yes.