nationalgrid

**Laura S. Olton**
General Counsel
Rhode Island

March 20, 2008

**VIA HAND DELIVERY & ELECTRONIC MAIL**

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

**RE: Docket 3789 – Long Range Gas Supply Plan**
**Responses to Division Data Requests – Set 2**

Dear Ms. Massaro:

Enclosed please find ten (10) copies of National Grid's responses to the Division's second set of data requests issued on January 30, 2008 in the above-captioned proceeding.

This filing contains the responses to the remaining Division Data Requests 2-4, 2-11, 2-12, and 2-17 through 2-23. This transmittal concludes the Company's responses to the Division's second set of data requests in this proceeding.

Thank you for your attention to this filing. If you have any questions, please feel free to contact Tom Teehan who will be taking over my responsibilities in Rhode Island at (401) 784-7667.

Very truly yours,

Laura S. Olton

Laura S. Olton

Enclosures

cc: Docket 3789 Service List

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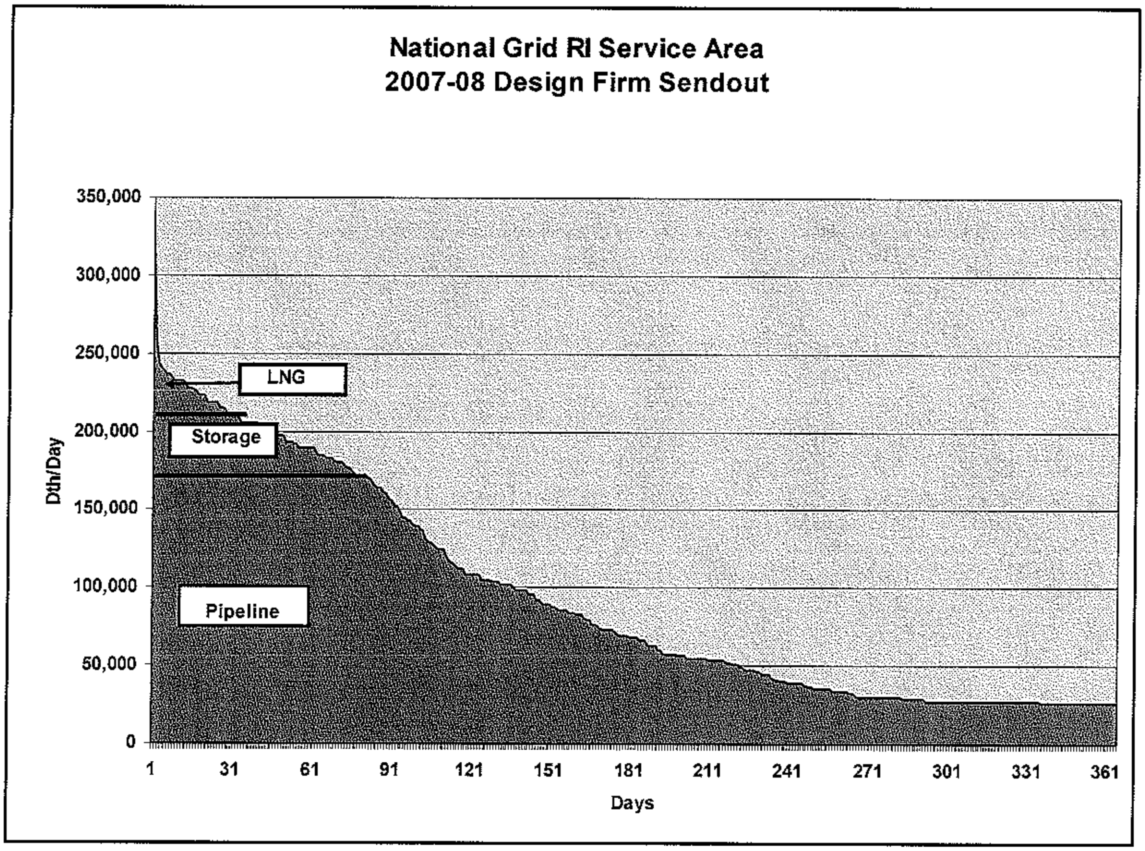
Division Data Request 2-4

Request:

With respect to design winter requirement, please provide a load duration curve for the Company's forecasted design winter requirements showing the number of days that each level of loading experienced by the Company during a design winter would be expected to endure.

Response:




Prepared by or under the supervision of: Gary Beland

Division Data Request 2-11

Request:

Please provide the data, assumptions and analyses upon which the Company relies to assess the relationship between wind speeds and send-out requirements during periods of extreme cold temperatures.

Response:

The Company frequently observes the relationship between wind-speed and send-out as it tries to understand and explain deviations from expected supply requirements forecasted for the day. Wind impacts are difficult to model because they are highly correlated to temperature impacts. That is, the colder it is, the greater the effect of the wind. Other problems with the modeling have also arisen. Extreme cold days are rare events in themselves and the frequency of days with very high wind speeds in combination with severe cold temperatures is lower still. This limits the validity of any statistically derived inference or conclusion drawn from the analysis. High winds combined with severe cold may result in school cancellations and other behavioral anomalies that change loads. High winds tend to be inconsistent and their effect may be spread across multiple gas days. System operating changes such as the packing and drafting of the gas system or parts of the gas system as severe cold spells pass further complicate the analysis.

Gas system modeling problems aside, the modeling of heat loss in residential structures indicates that older homes experience as much as 25% to 35% of their total heat loss through air infiltration. The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) publishes (proprietary) standards for air infiltration loads in houses.

The assumption is that wind causes a pressure gradient across the home, higher pressure upwind and lower pressure downwind, that is capable of moving significant amounts of cold air into a house, air that must then be heated. This is consistent with the simple observation that drafts from windows can be felt during periods of high winds.

Prepared by or under the supervision of: Gary Beland

## Division Data Request 2-12

Request:

Please provide the data, assumptions and analyses upon which Company relies to support its assessment that high wind speeds in conjunction with extreme cold temperatures could increase sendout requirements on a design day by as much as 10%.

Response:

The comment is based on past experience. On a day when extreme winds occurred in conjunction with exceptional cold, the sendout for the day exceeded the forecast by close to 10%. Winds on that day were consistently above 30 MPH for the entire day, an unusal event. Unfortunately, the data is unavailable and the observation was made a number of years ago at a different Company.

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-17

Request:

Please provide the data and analyses upon which the Company relies to support the assertion that "Experience has shown that marginal use per heating degree day is noticeably higher than the average."

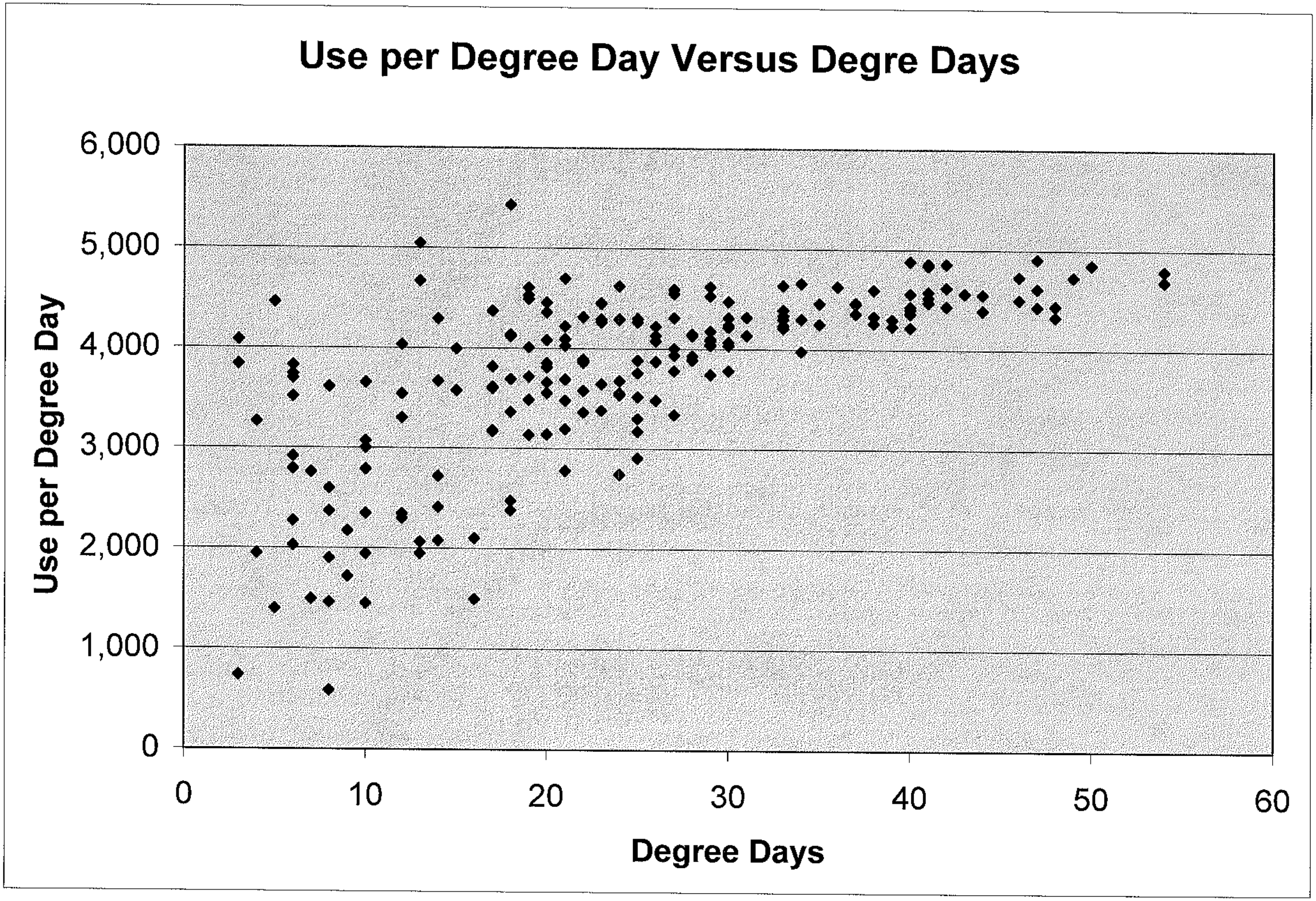
Response:

Attached is an X-Y plot of calculated use per degree day against degree days for the day for the period November 2006 to May 2007. Use per degree day was calculated by subtracting an estimated Baseload derived from the average daily use in July and August 2007. Observations with less than 3 degree days were eliminated because, depending on the day of the week or prior day's weather, they yielded negative use per DD estimates or unusually high estimates.

Below is a table showing average use per degree day in ten degree increments. It relies on the same data set as the plot described above.

| Degree Days | Average Use per Degree Day |
|---|---|
| 0 to 9 | 2,607 |
| 10-19 | 3,315 |
| 20-29 | 3,909 |
| 30-39 | 4,310 |
| 40-49 | 4,570 |
| 50-59 | 4,779 |

Prepared by or under the supervision of: Gary Beland


Use per Degree Day Versus Degre Days
Use per Degree Day
6,000
5,000
4,000
3,000
2,000
1,000
0
0
10
20
30
40
50
60
Degree Days

Division Data Request 2-18

Request:

Please provide the data and analyses upon which the Company relies to support the assessment that mid-winter marginal use per degree day has increased longer-term."

Response:

Longer term studies utilizing Rhode Island data to illustrate this phenomenon are unavailable because the current Rhode Island service territory is made up of 6 different gas companies that have been combined over the last 20 to 25 years. The data series only goes back to 2002 with the combination of Providence Gas and Valley Resources.

The conclusion is corroborated by the known long term changes in building practices and effects of improvements in heating equipment efficiency. As the building heat loss is reduced, the various heat gains from lighting, appliances and solar radiation reduce spring and fall heating use disproportionately. In addition, a significant portion of the improvement in heating equipment's efficiency is from a reduction in cycling losses. Cycling losses are highest in the spring and fall when long periods between furnace runs allow all the heat in the furnace to be lost. Vent dampers, reduced vent temperatures and improved heat exchangers reduce such losses.

As the long term drop in use per customer continues, the mid-winter months are becoming a larger proportion of the total annual use as the mid-winter loads of existing customers are reduced by proportionately less conservation than the shoulder months. As the Company continues to add customers, some of which are in newly built structures where this effect is even more pronounced, the new customers add disproportionately to the peak season loads.

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-19

Request:

Please identify each instance in the last 10 years in which the occurrence of "severe cold" has occurred on a weekend day or holiday, and provide the date, average temperature, and average wind speed on each day identified.

Response:

Based on the list of cold spells identified in response to Division data request 2-14, the day of the week is as follows:

| Date | | HDD | Wind Speed - MPH | |
|---|---|---|---|---|
| 2007 | | | | |
| | March 6 | 54 | 15.3 | Tuesday |
| | March 7 | 48 | 7.8 | Wednesday |
| | March 8 | 49 | 14.4 | Thursday |
| | February 4 | 47 | 12.6 | Sunday |
| | February 5 | 50 | 14.0 | Monday |
| | February 6 | 47 | 10.4 | Tuesday |
| | February 7 | 46 | 11.3 | Wednesday |
| | February 15 | 47 | 18.8 | Thursday |
| | January 25 | 48 | 11.9 | Thursday |
| | January 26 | 54 | 12.6 | Friday |
| 2005 | | | | |
| | January 17 | 48 | 13.5 | Monday |
| | January 18 | 57 | 11.1 | Tuesday |
| | January 20 | 47 | 11.4 | Thursday |
| | January 21 | 59 | 10.3 | Friday |
| | January 22 | 47 | 17.9 | Saturday |
| | January 23 | 56 | 19.4 | Sunday |
| | January 24 | 47 | 11.1 | Monday |
| | January 26 | 47 | 18.0 | Wednesday |
| | January 27 | 56 | 11.3 | Thursday |
| | January 28 | 52 | 6.9 | Friday |

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-19 (continued)

| Date | | HDD | Wind Speed - MPH | |
|---|---|---|---|---|
| 2004 | | | | |
| | December 20 | 54 | 12.8 | Monday |
| | December 27 | 48 | 12.1 | Monday |
| | January 8 | 50 | 11.4 | Thursday |
| | January 9 | 60 | 12.8 | Friday |
| | January 10 | 58 | 11.5 | Saturday |
| | January 13 | 46 | 17.6 | Tuesday |
| | January 14 | 59 | 9.9 | Wednesday |
| | January 15 | 64 | 15.4 | Thursday |
| | January 16 | 53 | 14.1 | Friday |
| | January 19 | 46 | 12.9 | Monday |
| | January 20 | 46 | 13.8 | Tuesday |
| | January 23 | 51 | 11.4 | Friday |
| | January 24 | 56 | 12.3 | Saturday |
| | January 25 | 53 | 9.3 | Sunday |
| | January 26 | 48 | 10.3 | Monday |
| | January 29 | 46 | 16.4 | Thursday |
| | January 30 | 46 | 14.4 | Friday |

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-20

Request:

Please document and explain the manner in which the Company arrived at 4,400 HDD as a new standard for design winter conditions.

Response:

The Company chose 4,400 as the new standard for a design winter primarily because:

(1) Dr. Crawford of Weather Services recommended it as an appropriate level based on his assessment of climate conditions.

(2) The Company's judgement that use of a value near the highest value experienced in the last 30 years, 4,417 HDD, is more appropriate than the 4,583 HDD previously used.

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-21

Request:

Please document the analyses relied upon to convert the Company's forecasted load requirement by month under normal weather for each forecast year included in the Long Range Gas Supply Plan to design weather planning load.

Response:

The conversion of the forecasted load requirement to design planning load is done in several steps. The information in the attachments covers the calculation for the November 2007 to October 2008 as an example.

1. A profile by calendar month for the sales and FT-2 load was calculated using 4 years of weather normalized historical sendouts. Attachment 1 is a spreadsheet which shows the actual sendout each month, the weather normalization of the actual sendout by month, the calculation of the average for each month of the year over the four years and the resulting profile which shows the percentage of the annual sendout expected for each individual month.

2. The percentage profile calculated above is applied to the forecast of annual billed sales and FT-2 quantities, after adjusting the forecast for distribution system losses. Attachment 2 shows the resulting monthly sendout forecast and the forecast of non-capacity exempt FT-1 sendout. Because FT-1 non-capacity exempt transportation is billed on a calendar month basis and thus coincides with measured sendout, the forecast for that rate class is used directly after adjusting for distribution system losses.

3. The sendout requirements needed to serve forecasted sales load and non-exempt transportation load under normal weather calculated above are next stepped up to design conditions in order to estimate the minimum projected sendout the portfolio must be able to provide. This is done separately for sales and non-exempt transportation using the same heatload/baseload methodology used in weather normalization. This calculation is shown in Attachment 3.

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-22

Request:

Please provide the data and analyses the Company has relied upon to compute measure of average sendout for the month of July that was used in its determination of "non-heat based load."

Response:

The process used to calculate the forecasted July sendout used as the "non-heat base load" is described in the response to Data Request Div 2-21. Essentially, it is based on the relationship between July's actual sendout over the last four years and the total average annual sendout for the last four years adjusted to reflect normal weather.

Prepared by or under the supervision of: Gary Beland

Division Data Request 2-23

Request:

Please explain why the Company's development of "non-heat based load" is based on average sendout for the month of July as opposed to average sendout for two or more summer months, and reconcile that methodology with the assumptions and methods used to develop the Company's most recent forecast of loads under normal weather conditions.

Response:

There are a couple of considerations for use of July sendout as the "non-heat based load" factor in the supply planning process. First, sendout is reflective of just the calendar month which is in contrast to forecasts of billed loads which incorporate 21 different billing cycles and reflects days from both the prior and current month. Second, the average sendout per day in July is somewhat lower than the average of July and August. When this value is subtracted from the total use in each month to obtain the heat load, it yields a slightly higher heat load and, it follows, a slightly higher use per degree day. Using the lower base-load value produces a more conservative estimate of design conditions.

Prepared by or under the supervision of: Gary Beland

**Docket 3789 – National Grid – Long-Range Energy Plans**
**Service List as of 3/06/08**

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