

May 11, 2010

**VIA HAND DELIVERY & ELECTRONIC MAIL**

Luly E. Massaro, Commission Clerk  
Rhode Island Public Utilities Commission  
89 Jefferson Boulevard  
Warwick, RI 02889

**RE: Docket 4149**  
**2011 Standard Offer Service Procurement Plan**  
**2011 Renewable Energy Standard Procurement Plan**  
**Responses to Division Data Requests – Sets 1 and 2**

Dear Ms. Massaro:

Enclosed please find ten (10) copies of National Grid's<sup>1</sup> responses to the Division's First and Second Set of Data Requests issued on April 22, 2010 in the above-captioned proceeding. This filing is also accompanied by a request for protective treatment in accordance with Rule 1.2(g) of the Commission's Rules of Practice and Procedure and R.I.G.L. §38-2-2(4)(i)(B). The Company seeks protection from public disclosure an attachment to its response to Division Data Request 1-2(a). That attachment is a supplier survey, which was conducted on the condition that the survey would be kept confidential. This market survey is already the subject of a motion for protective treatment filed on March 1, 2010. Nevertheless pursuant to Commission rules, the Company is once again providing the Commission with one copy of the confidential materials for its review, and has otherwise included redacted copies of the survey.

Concerning the Company's responses to Division 1-10 and Division 1-14, the Company has provided its attachments associated with these responses in Excel format via e-mail. Additionally, the Company is providing four (4) DVD's which contain attachments associated with Division Data Requests 2-4, 2-5, 2-10, 2-13, 2-17 and 2-21. The Company has also sent a copy of the DVD via overnight mail to LaCapra Associates, the Division's consultant.

Thank you for your attention to this transmittal. If you have any questions, please feel free to contact me at (401) 784-7667.

Sincerely,



Thomas R. Teehan

Enclosure

cc: Leo Wold, Esq.  
Steve Scialabba, Division

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<sup>1</sup> The Narragansett Electric Company d/b/a National Grid ("National Grid" or "Company")

Certificate of Service

I hereby certify that a copy of the cover letter and/or any materials accompanying this certificate were electronically submitted and/or mailed to the individuals listed below. Ten (10) copies were hand delivered to the Commission.



\_\_\_\_\_  
Joanne M. Scanlon  
National Grid

May 11, 2010  
Date

**Docket No. 4149 National Grid – 2011 SOS and RES Procurement Plans  
Service List updated 3/19/10**

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<b>File an original &amp; nine (9) copies w/:</b> Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02888	<a href="mailto:Lmassaro@puc.state.ri.us">Lmassaro@puc.state.ri.us</a>	401-780-2017
	<a href="mailto:Cwilson@puc.state.ri.us">Cwilson@puc.state.ri.us</a>	401-941-1691
	<a href="mailto:Nucci@puc.state.ri.us">Nucci@puc.state.ri.us</a>	
	<a href="mailto:Anault@puc.state.ri.us">Anault@puc.state.ri.us</a>	

Division Data Request 1-1

Request:

Please provide a copy of any appropriate Protective Agreement that NGRID wishes to use in order to allow the Division and its consultants access to Confidential Information.

Response:

The Company has forwarded to the Division for review a draft Protective Agreement.

Prepared by or under the supervision of: Legal Department

Division Data Request 1-2

Request:

Regarding the “supplier survey” referenced in Schedule MMJ-2 and on page 9 of 42 of Ms. Janzen’s testimony, please provide:

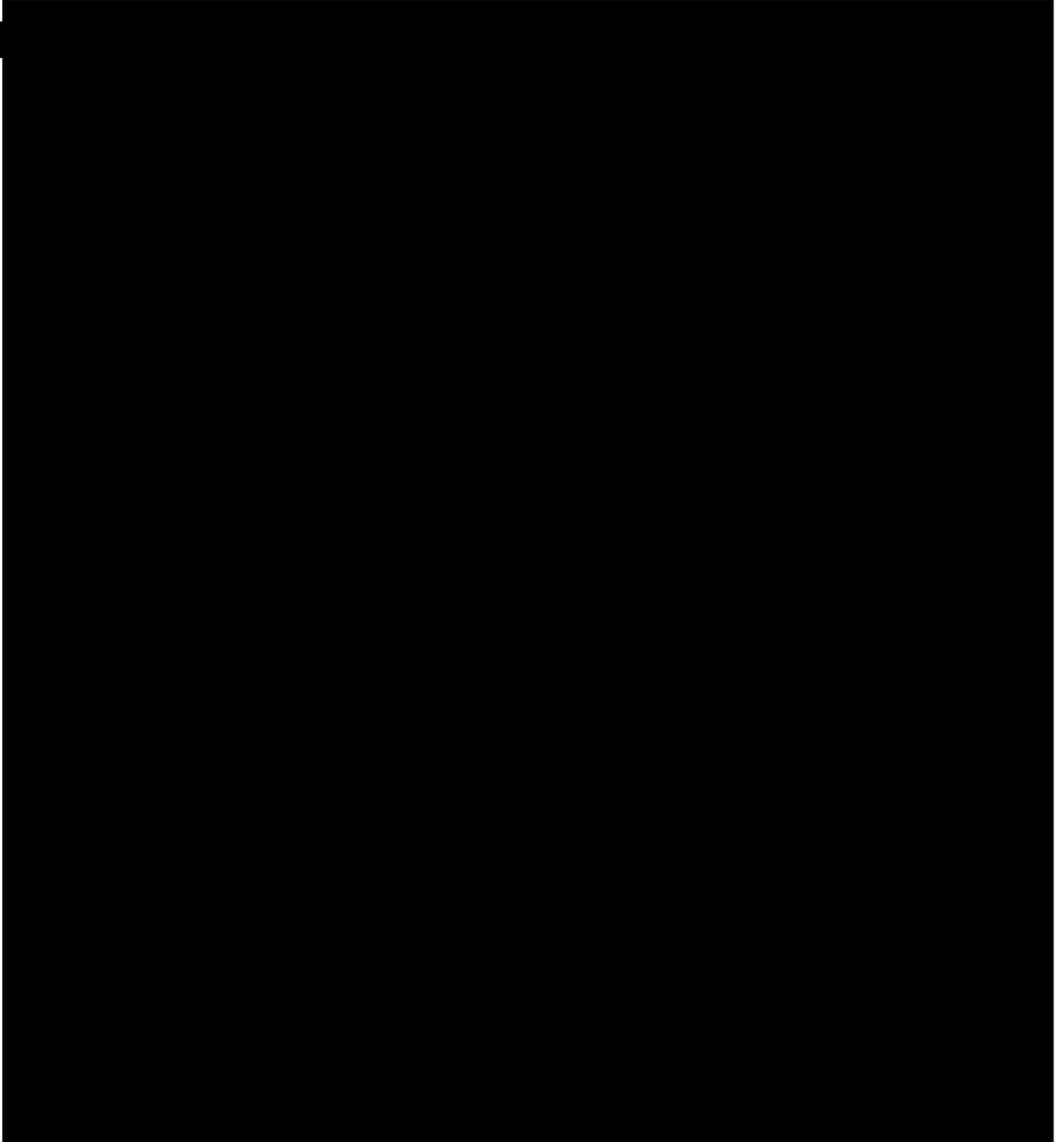
- (a) copies of the initial survey instrument or questions asked;
- (b) a list of suppliers to whom this survey was sent;
- (c) a description of the survey medium used (*i.e.*, paper copy, email, telephone call, etc.);
- (d) the raw results from the survey including but not limited to responses received from suppliers, and
- (e) an un-redacted copy of Schedule MMJ-2.

Response:

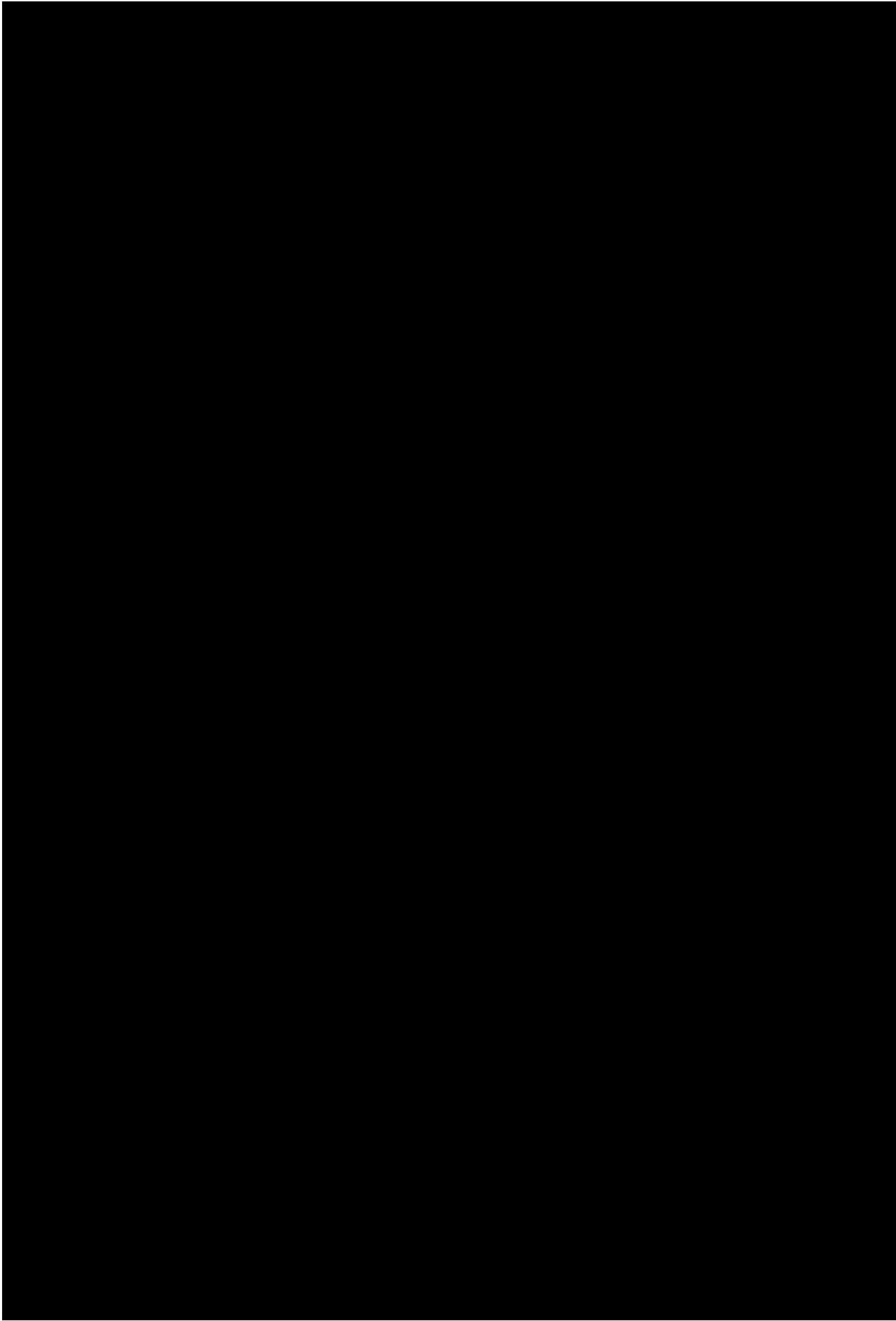
- (a) Please see the attached survey (filename: “1-2a Supplier Survey.doc”).
- (b) The attached survey was emailed to fourteen full requirement service (FRS) suppliers who have participated in National Grid’s New England FRS RFPs within the last twelve months.
- (c) The survey file was emailed to the suppliers.
- (d) Ten suppliers submitted responses to the survey. In exchange for participation in the survey, National Grid agreed to only provide a consensus opinion to regulators and keep all individual responses confidential.
- (e) Please see the attached un-redacted copy of Schedule MMJ-2, which will be subject to the provisions of a confidentiality agreement between the Company and the Division. An un-redacted copy of Schedule MMJ-2 has already been filed with the Commission subject to a motion for protective treatment.



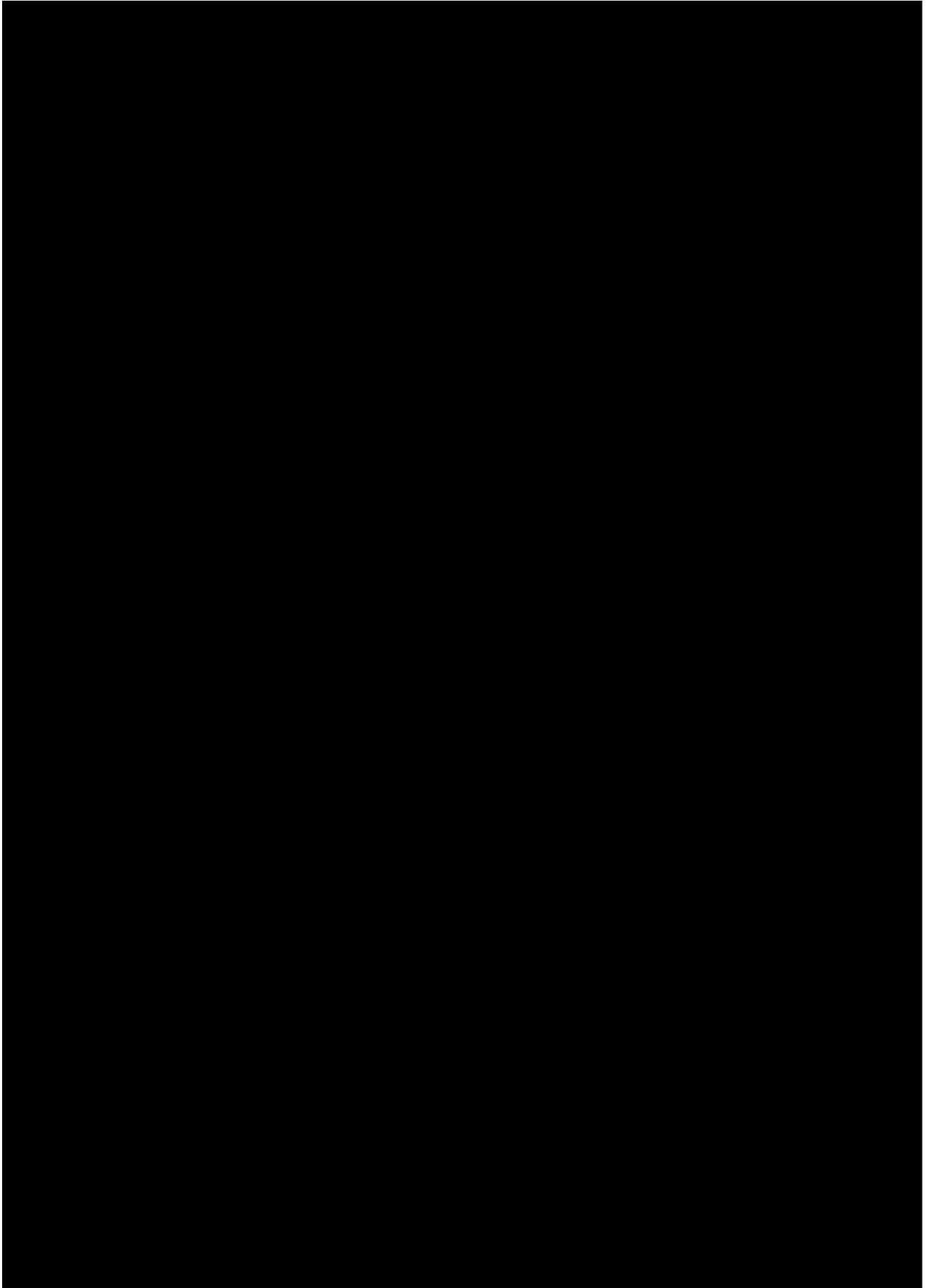
## **Supplier Survey to Improve Load Following Contract Process**



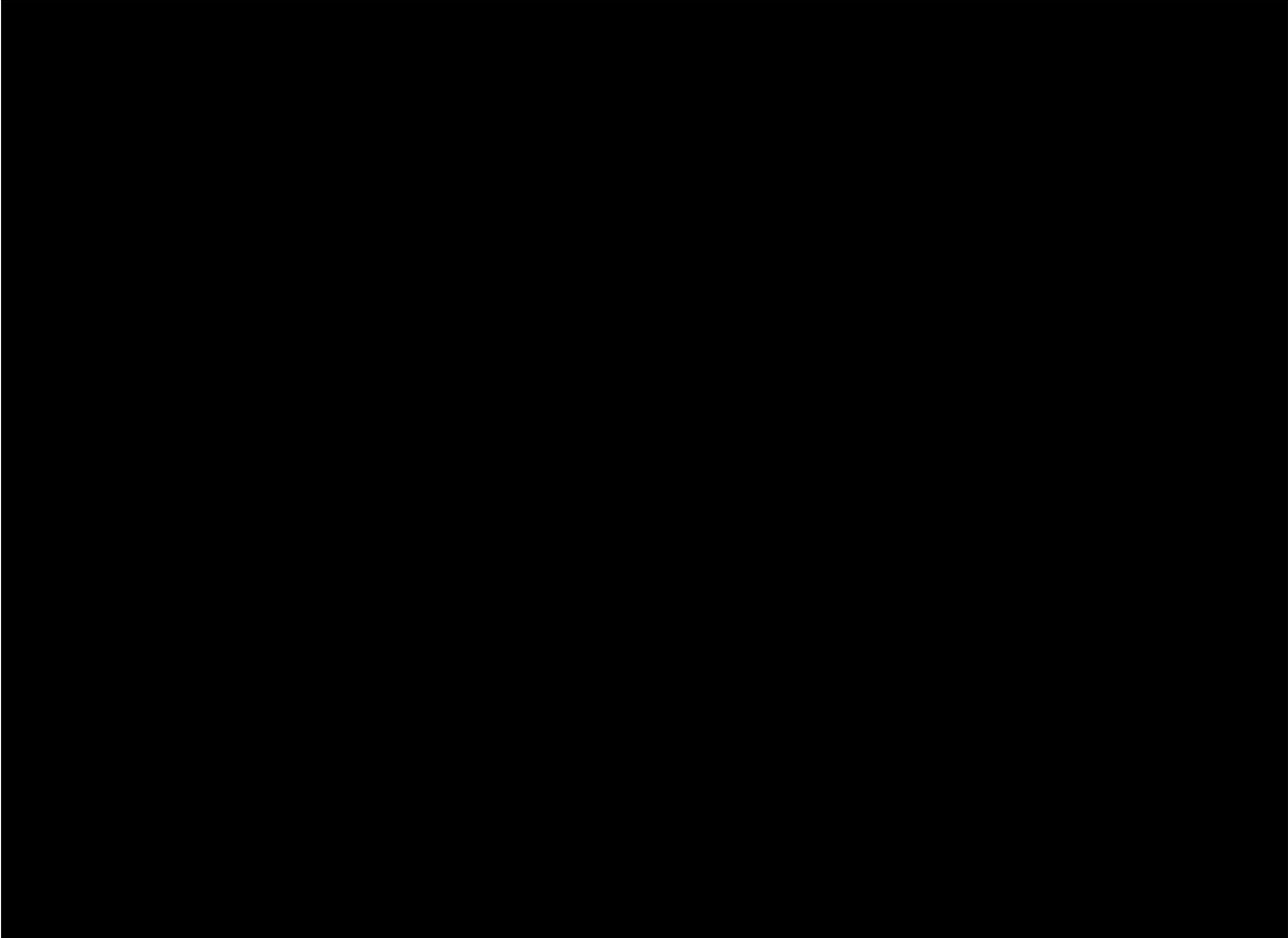
**REDACTED**



**REDACTED**



**REDACTED**



NARRAGANSETT ELECTRIC COMPANY  
d/b/a NATIONAL GRID  
R.L.P.U.C. DOCKET NO. 4041  
STANDARD OFFER SUPPLY PROCUREMENT PLAN  
WITNESS: MARGARET M. JANZEN  
PAGE 29 OF 43

Schedule 2 Supplier Survey Results

Supplier Survey Results

1 Rank on a scale of 1 to 5, the preferred duration of the load blocks for residential customers. Please rank each duration listed below as: 1 = Important (or Preferred) and 5 = Low Importance (or Not Preferred)

	Average	# of Most Preferred	# of Not Preferred
3 months	4.3	1	7
6 months	3.1	3	3
9 months	3.4	1	3
12 months	1.7	7	1
18 months	2.6	3	1
24 months	2.2	2	1
greater than 24 months	3.3	1	3

2 Rank on a scale of 1 to 5, the preferred duration of the load blocks for commercial (not including industrial) customers. Please rank each duration listed below as: 1 = Important (or Preferred) and 5 = Low Importance (or Not Preferred)

	Average	# of Most Preferred	# of Not Preferred
3 months	3.1	2	3
6 months	2.0	4	0
9 months	2.9	3	2
12 months	1.7	6	1
18 months	3.9	1	4
24 months	4.1	1	6
greater than 24 months	4.4	0	6

3 What is the ideal size of the load blocks in MW? (assuming a 50% load factor)

	Average MW	Min MW	Max MW
preferred MW	47	25	100
minimum MW	23	10	50
maximum MW	131	50	250

4 Should the length of the load blocks be designed around other factors (yes or no)?

	Yes	No
Calendar Year	7	3
Capability Periods	5	5
Seasons	7	3

(i.e. Jan & Feb and/or Jul & Aug should not be separated)

4B Rank on a scale of 1 to 5, the preferred design of load blocks around key factors. Please rank each factor listed below as: 1 = Important (or Preferred) and 5 = Low Importance (or Not Preferred)

	Average	# of Most Preferred	# of Not Preferred
Calendar Year	1.2	5	0
Capability Periods	2.8	1	1
Seasons	2.3	3	1
Does not matter	3.9	2	5

5 Currently National Grid issues the RFP notice approximately 30 days prior to Final Bids due. Please enter your preferred and minimum notice periods from issuance of RFP to Final Bids Due.

	Average Days	Min Days	Max Days
Preferred Days	39	30	60
Minimum Days	27	20	30

6 Currently National Grid has "Indicative Prices" due one week prior to Final Bids. Please rank the preferred requirement for Indicative Pricing (1 = Preferred and 4 = Least Preferred).

	Average	# of Most Preferred	# of Not Preferred
1 week prior	2.1	4	1
2 days prior	2.8	1	3
1 day prior	3.1	1	4
Should be eliminated	2.4	4	3

7 Currently National Grid has "Final Bids" due at 10:00 am. Would Suppliers like a chance to refresh bids at noon (only bidders that provided bids at 10:00 would be allowed to refresh bids)?

	Count
Yes	6
No	3

8 Would Suppliers like a chance to refresh bids at noon if the lowest overall load block bid prices provided at 10:00 am were available to those bidders that provided Final Bids?

	Count
Yes	4
No	4

Division Data Request 1-3

Request:

Schedules 3A, 3B, and 3C contain procurement activities for SOS purchases to be delivered after December 31, 2011. Is the Company seeking approval now for such 2012 procurement activities? Could the Company implement its 2011 SOS procurement plan if the Commission approved only those activities for purchases to be delivered prior to January 1, 2012? Please fully explain the basis for the Company's response.

Response:

The Company is seeking approval of all procurement activities that occur during the first three (3) quarters of the calendar year 2011. In short, the white boxes on Schedules 3A, 3B, and 3C refer to solicitations for which the Company is seeking approval in this docket.<sup>1</sup> Some of these FRS solicitations would result in contract awards to serve customer loads during the calendar year 2012.

The Company could not fully implement its 2011 SOS procurement plan if the Commission approved only those activities for purchases to be delivered prior to January 1, 2012. The Company's proposal contains a repeating solicitation schedule for various contract durations, which is important in reducing customer rate volatility. Without having received approval for additional solicitations that occur in 2011 for deliveries after January 1, 2012, the Company would not be able to implement its plan to layer in multiple FRS contracts. Thus, as depicted on Schedules 3A, 3B, and 3C, the Company is seeking approval for certain solicitations that are planned to occur during 2011 for delivery during 2012.

Prepared by or under the supervision of: Margaret M. Janzen

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<sup>1</sup> Please note that there is an Industrial group procurement for the fourth quarter of 2011 that was inadvertently highlighted in white. That procurement should have instead been highlighted in gray.

Division Data Request 1-4

Request:

Please describe how NGRID defines ISO-NE spot prices. Are these prices from the Day Ahead Market or the Real Time Market?

Response:

The Company defines ISO-NE Spot prices as the market prices the Company would pay for energy, capacity and ancillary services through bidding energy into the Day Ahead market and incurring real time market prices for the actual load imbalances, which are the difference between the Day Ahead load bids and the Real Time load. Per the ISO-NE procedure of settlement, the Real Time prices would apply to the ISO true up process that occurs at a future date. Additionally, per ISO-NE procedures, the Company would incur costs for capacity and ancillary services.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-5

Request:

Regarding page 12 of 42 of Ms. Janzen's testimony, please provide all data and information in the possession of NGRID and / or Northbridge regarding the 40 different solicitations.

Response:

Please see the response to Division Data Requests 2-1 and 2-4.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-6

Request:

On page 12 of 42 of Ms. Janzen’s testimony, it states that the proposed procurement plan using a combination of FRS and spot purchases was “based in part” on the Northbridge study. Please describe what other information besides the Northbridge study NGRID relied upon in making this determination.

Response:

As part of the development of the proposed procurement plan combining FRS and spot purchases, the Company took into consideration the importance of developing and maintaining energy industry expertise. This direct involvement in the power markets also allows the Company to retain the ability to purchase replacement power in the event of a supplier default. The Company also considered the balance between the key goals associated with Standard Offer Service, including rate stability and low rate level, as discussed in the pre-filed testimony of Margaret M. Janzen.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-7

Request:

NGRID's 2010 Program for the Small Customer Group includes 5% spot purchases. According to schedules 3B and 3C of Ms. Janzen's testimony, the proposed 2011 Program for the Commercial and Residential groups appears to use 10% spot purchases starting in January 2012. Please explain why NGRID proposes the change to 10% from 5%, and provide any analyses performed by or in the possession of NGRID that evaluated the level of spot purchases.

Response:

The initial spot purchase level of 5% for 2010 was required per the RIPUC Order in Docket 4041. The 10% spot purchases from the ISO-NE starting in January 2012 are part of the overall procurement plan to layer in multiple FRS contracts over time. The Company proposed the increase to 10% in 2012 to introduce a favorable impact on price without significantly diluting management of the volatility of customer electric supply costs. Additionally, including spot purchases in the procurement plan allows the Company to have a significant direct involvement in the spot market.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-8

Request:

Please explain how the inclusion of spot market prices will allow customers to respond to short-term market signals.

Response:

As described in Ms. Janzen's testimony on page 12 of 42, the inclusion of spot-based pricing will begin the process of allowing customers to respond to short-term market signals. To the extent that the spot portion of the portfolio is increased and rates are adjusted more frequently, this will allow customers to respond to changes in short-term market price levels, since the inclusion of spot prices in supply mix will allow rates to reflect short-term market prices as rates change.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-9

Request:

Please explain the significance of the gray, yellow, and blue boxes shown in the Rate Calculation section of Schedules 3A, 3B, and 3C.

Response:

In the Rate Calculation sections, the gray box is a header that signifies the duration of the rate period. The yellow and blue boxes signal which portions of the overall electric supply, for the specified Rate Period, are known prices or are estimated prices for the basis of calculating the customer fixed commodity rates. The yellow boxes signify which portion of the overall electric supply contribute a known fixed price, while the blue boxes signal which portion of the overall electric supply would have to be estimated.

Prepared by or under the supervision of Margaret M. Janzen

Division Data Request 1-10

Request:

How does the Company propose to forecast the cost of spot market purchases in calculating the rates for the Commercial and Residential groups? Please provide a sample calculation showing what data would be used and the formulae or calculations.

Response:

The Company's overall methodology to calculate customer rates will not change. An estimated monthly ISO-NE spot market price will be included in the determination of the overall wholesale monthly price. An estimate of the ISO-NE spot market purchase price will be made from available NYMEX New England Internal Hub forward market prices, Forward Capacity Market prices (FCM) and historical ancillary services prices. The Company has provided an EXCEL file electronically via e-mail (identified as "1-10 RateDesignExample.xls"), which shows the calculation of the wholesale ISO-NE spot market price. This file shows the complete rate calculation methodology used to calculate the actual Small Customer Group rate for the period January 2010 through September 2010.

Prepared by or under the supervision of Margaret M. Janzen

Division Data Request 1-11

Request:

Did NGRID consider different procurement plans, specifically the length and the mix of FRS contracts, for the Commercial and Residential groups? If so, please describe these alternative plans and explain why the Company selected the plan that they propose.

Response:

Yes, the Company did evaluate other combinations of FRS contracts based on the following factors:

1. the percentage of load being acquired in each contract;
2. the length of time from the solicitation to the start of contract delivery;
3. the length of each contract;
4. the number of contracts in any delivery month to provide price diversity;
5. the desired Rate Period (start month and duration of approved rate period)

Although other procurement plans were considered during the process, the Company believes the proposed procurement plans best address all the above factors while maintaining the SOS objective to supply customers with appropriately stable commodity rates at low cost. Also, please see responses to Division Data Requests 1-6 and 1-12.

Prepared by or under the supervision of Margaret M. Janzen

Division Data Request 1-12

Request:

Please explain how the Company determined the specific combination of the length (*i.e.*, 6 to 24 months) and timing of the contracts procured for the Residential group.

Response:

The Company balanced several competing objectives. First, the Company wanted to provide rate stability for residential and small commercial customers with few competitive options. This was accomplished with the use of longer-term products (e.g. up to 24 months in duration) and buying electricity at different points in time. Second, the Company wanted customer rates to reflect market conditions and avoid rates becoming significantly out of line with future market price levels. This was accomplished by including spot purchases and short-term contracts (e.g., six month and annual delivery contracts.) Third, the Company wanted to mitigate credit concerns by relying on relatively short-term contracts and believes that 24 month contracts would be the longest duration that would be reasonable when evaluating its contribution to rate stability and credit risks. Thus a portfolio of FRS contracts with durations between six months and 24 months would offer the best mix of the factors described in DR 1-11. In addition, the Company tried to maintain all contracts durations in multiples of 6 months to for ease of layering the FRS contracts. Also see response to Division Data Request 1-11.

Division Data Request 1-13

Request:

Please provide a copy of schedule 2 referenced on page 16 of 42 of Ms. Janzen's testimony.

Response:

The testimony reference to Schedule 2 on page 16 should have referenced Schedule 3.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-14

Request:

For the customer groups referenced in schedule 4, does the Company have hourly load data? If so, please provide such hourly load data in an excel file.

Response:

Yes, the Company does have hourly load data for the customer groups noted in Schedule 4

The Company has provided an EXCEL file electronically via e-mail (identified as “1-14 Load Data.xls”).

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 1-15

Request:

Regarding the testimony of Ms. Lloyd, please explain why the Company selected the variable price option, as opposed to the fixed six month price option, as the default or customary option.

Response:

As described on pages 3 through 5 of Ms. Lloyd's testimony, the proposed Commercial Group will be able to choose either a variable price option or a fixed price option, with the variable price option being the customary option.<sup>2</sup>

Customers in the Commercial Group, consisting of those customers receiving service on Rates C-06, G-02, S-06, S-10 and S-14, have more competitive options available to them than do customers in the Residential Group. Prices under the variable price option will better reflect actual market prices and will communicate more accurate price signals to customers who are considering their competitive options. In addition, customers who remain on variable pricing will avoid a billing adjustment should they choose to leave Standard Offer prior to the end of the six-month pricing period.

Since the prices billed to customers under the variable price option will reflect the underlying monthly supply contract prices, there will be a closer alignment of cost incurrence and revenue collection for customers who choose this pricing option than for customers who choose to pay a fixed price for the six-month period. Therefore, for customers in the Commercial Group who choose the variable price option, the potential for significant over- or under-collection of expenses will be mitigated. Once a customer is placed on the variable pricing option initially, it is likely that he/she will remain on the variable price option since it will be necessary for the customer to affirmatively choose to switch to the fixed price option. Therefore, the Company expects that the majority of customers in the class will remain on variable pricing throughout their stay on Standard Offer Service, thereby lessening the potential for significant deferrals.

Prepared by or under the supervision of: Jeanne A. Lloyd

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<sup>2</sup> Customers who choose the fixed price option will be subject to a billing adjustment should they leave Standard Offer Service to take service from a competitive supplier prior to the end of the Standard Offer pricing period.

Division Data Request 1-16

Request:

The Company allows Commercial customers a one-time choice to select the variable or fixed price option to avoid gaming the system. Would the Company consider allowing such a choice to be made more than once, but infrequent enough to avoid gaming? For example, would the Company allow Commercial customers to change between fixed and variable options every two years, with the effective date of the selection being coincident with the start of a new rate period? Please explain the basis for the response.

Response:

The Company would consider allowing customers in the Commercial Group to switch between pricing options more frequently than once during an uninterrupted stay on Standard Offer Service, but would recommend that switching occur only at the beginning of each pricing period. However, allowing customers to switch pricing options more than once will increase the administrative burden by requiring the Company to track each customer's movements between pricing options, either manually or through a required enhancement to the billing system, and will increase the administrative cost to customers of providing Standard Offer Service.

Prepared by or under the supervision of: Jeanne A. Lloyd

Division Data Request 1-17

Request:

In Docket No. 4041, NGRID provided certain excel spreadsheets analyzing bids received for FRS and Financial Swap contracts. Please provide copies of any such additional analyses.

Response:

The Company has performed no additional analyses comparing FRS contracts and Financial Swap contracts.

Prepared by or under the supervision of Margaret M. Janzen

Division Data Request 2-1

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Regarding page 4, please provide all data on FRS procurements solicited or completed in the last five years for the 20 utilities.

Response:

The NorthBridge Group (“NorthBridge”) relied upon publicly available data on recent FRS solicitations held by utilities over a two-year period to complete its study for National Grid. This data is provided in response to Division Data Request 2-4. NorthBridge did not rely on data on FRS procurements solicited or completed in the last five years for the 20 utilities listed on page 4 of National Grid Exhibit 1, outside of the data provided in response to Division Data Request 2-4.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-2

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Regarding page 5, please list any utilities that have relied upon a managed portfolio approach to procure SOS power supplies in the last five years. Provide any available data of SOS power supply costs for these utilities.

Response:

NorthBridge relied upon publicly available data regarding forward energy block solicitations held by utilities over a two-year period to complete its study for National Grid. This data is provided in response to Division Data Request 2-4. NorthBridge is generally aware that utilities in New York and Illinois, and some utilities in Pennsylvania, have relied upon a managed portfolio approach to procure all or a portion of their SOS power supplies. All available historical data of SOS power supply costs that NorthBridge relied upon is provided in response to Division Data Request 2-4.

Division Data Request 2-3

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. For what classes of NGRID customers has Northbridge evaluated FRS and managed portfolio approaches to procuring power supplies?

Response:

NorthBridge’s evaluation is based on Narragansett Electric Company Small Customer Group Load, which includes all Standard Offer Services (SO1, SO2, SO11/12) and Last Resort Service Loads for the Residential and Small Commercial Customers.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 2-4

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. For the model described on pages 7 and 8, please list all inputs variables, and provide the values of the inputs used for both the FRS and managed portfolio approaches. For any input variable whose value was derived from historical actual data, provide that historical data, its source, and any calculations and work papers that support its derivation. Specifically include any input variables which are represented by probability distributions.

Response:

The attached DVD includes a list of all input variables, the values of the inputs used for both the FRS and managed portfolio approaches, historical actual data relied upon, and their sources. Calculations and work papers are also provided. Please also refer to the response to Division Data Request 2-6. Pursuant to an agreement with the Division, the proprietary Scenario Generator software package referenced in the response to Division Data Request 2-6 is not provided, but the inputs and outputs of this software are provided, equations that characterize the calculations performed by the Scenario Generator can be found on page 25 of National Grid Exhibit 1, and a description of the Scenario Generator can be found in the response to Division Data Request 2-6.

Division Data Request 2-5

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Please list all variables and parameters calculated by the model and describe how and for what period of time they are calculated. Include an example of sample calculation of each output variable.

Response:

Please refer to pages 9 and 22 of National Grid Exhibit 1 for a listing of variables and parameters calculated by the model. Please refer to pages 34-40 of National Grid Exhibit 1, the responses to Division Data Requests 2-8 and 2-17, and the attached DVD for calculations of variables and parameters, as well as descriptions of how they are calculated. The table below describes for what periods of time they are calculated.

<b>Output</b>	<b>Time Period Pertaining to Calculation*</b>
SOS Rate Level	2014
Supply Cost Surprise**	Actual 2014 supply cost as compared to forecasted 2014 supply cost as of beginning of October 2013
Deferral Account Balance	End-of-year 2014
Annual Rate Movement	2014 vs. 2013
Coefficient of Variance	2014
Mark-to-Market Exposure	The mark-to-market exposure during the month in 2014 in which the average top decile mark-to-market exposure is greatest
Customer Switching	First six months of 2014

\* 2014 time period is used for the outputs because it allows for assessment of steady-state performance of approaches

\*\* For \$MM Supply Cost Surprise calculation, Supply Cost Surprise refers to {[actual supply cost in \$/MWh] – [forecasted supply cost in \$/MWh]} x [actual load]

Division Data Request 2-6

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Describe the time period(s) over which the model performs its Monte Carlo simulations. Also describe any software used.

Response:

The model used by NorthBridge to prepare the referenced document utilizes a Monte Carlo simulation approach to develop 2,000 scenarios encompassing the period beginning January 1, 2010 and ending December 31, 2014. The scenarios are derived based on actual historical data, in a manner that captures the volatilities and correlations of the market observed historically.

NorthBridge utilized a proprietary software package (“Scenario Generator”) to generate the scenarios, which are characterized by monthly on-peak and off-peak energy prices (including conditional forward prices), loads, and load-weighting gross-up factors. The Scenario Generator applies sophisticated statistical sampling techniques to develop potential future outcomes and conditional forecasts pertaining to prices, loads, and load-weighting gross-ups, and the logic in the software is based on concepts used in the financial community to forecast uncertainty surrounding commodity prices.

The specific technique implemented in NorthBridge’s software is a specialized form of Monte Carlo simulation known as “Mean Reverting Random Walk with Stochastic Volatility.” In this approach, the value of an uncertain variable (e.g. energy price) can vary from period to period in each scenario, and also may exhibit mean reversion. Mean reversion is the tendency of unexpected movements in a variable’s realized value to fade over time. Spot energy prices, loads, and load-weighting gross-ups generally demonstrate mean reversion. Forward prices for energy cannot be expected to exhibit mean reversion because forward prices already incorporate all available information about future price levels. The software also incorporates an observed aspect of uncertainty known as stochastic volatility. By incorporating stochastic volatility, the software reflects the real-world degree to which there are periods of higher volatility and periods of lower volatility. Equations that characterize the calculations performed by the Scenario Generator can be found on page 25 of National Grid Exhibit 1.

Division Data Request 2-6 (cont.)

The monthly on-peak and off-peak energy prices (including conditional forward prices), loads, and load-weighting gross-ups that characterize the scenarios are calculated in the software through a multi-step process. First, volatilities, rates of mean reversion, and correlations (i.e., process parameters) are derived from actual historical data. Some process parameters pertain to prices, some to loads, and some to load-weighting gross-ups. Next, scenario values for multipliers are simulated using the process parameters. The multipliers are applied to the current forecasts for the appropriate variables (e.g., prices, loads, load-weighting gross-ups) in order to calculate the values for these variables, which characterize the scenarios. The software generates a set of multipliers for both spot outcomes (e.g. spot energy prices, actual loads, etc.) and conditional forecasts (e.g., the March 2014 on-peak forward price as of January 1, 2012, etc.). These multipliers are stored in Microsoft Access databases due to the large volume of data involved, and each database contains the multipliers for 200 of the 2,000 scenarios modeled. These databases are provided along with other data in response to Division Data Request 2-4.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-7

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Provide the model output for both the FRS and managed portfolio approaches using a single set of input assumptions where the input variables are set to their expected values. Show the calculations of each output variable in detail.

Response:

The requested analysis was not performed. A key purpose of the NorthBridge study presented in National Grid Exhibit 1 was to assess relative costs and risks given market dynamics, and the requested analysis would not capture actual market risks.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-8

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Describe in detail how the model accounts for customer migration, including all formulae.

Response:

Customer migration (i.e., the degree to which customers switch to and from competitive retail suppliers) is reflected by applying a relationship between retained load level and a characterization of the difference between the forecasted SOS rate level and a market price proxy. In each of the 2,000 scenarios used by the model, changes in retained load levels are calculated twice annually, on January 1 and July 1.

The determination of customer migration for each semiannual period in each scenario involves a series of steps: 1) characterize the difference between the forecasted SOS rate level and the market price proxy, 2) determine whether a migration-facilitating event occurs, 3) identify the long-term retained load target level consistent with the characterized difference between the forecasted SOS rate level and the market price proxy, and 4) determine the retained load for the period. The following text describes each of these steps in more detail:

1) Characterize the Difference Between the Forecasted SOS Rate Level and the Market Price Proxy

The characterization of the difference between the forecasted SOS rate level and the market price proxy is defined by the following formula, calculated as of the beginning of each six-month period in each scenario and applicable for the immediate six-month period:

$$\text{Difference} = \frac{\left( \frac{\text{Forecasted Base Case SOS Rate}}{\text{Forecasted Base Case SOS Rate}} - \text{Market Price Proxy} \right)}{\text{Forecasted Base Case SOS Rate}}$$

where:

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Division Data Request 2-8 (cont.)

$$\text{Forecasted Base Case SOS Rate} = \frac{\left[ \begin{array}{l} \text{Costs from Full} \\ \text{Requirements Products} \end{array} + \begin{array}{l} \text{Mark to Market on} \\ \text{Existing Block Purchases} \end{array} + \begin{array}{l} \text{Forecasted Cost of} \\ \text{Non – FRS Volume at Spot} \end{array} + \begin{array}{l} \text{Scheduled Deferral} \\ \text{Balance Recovery} \end{array} \right]}{\text{Forecasted Retained SOS Load}}$$

$$\begin{array}{l} \text{Costs from Full} \\ \text{Requirements Products} \end{array} = \sum_{i=1}^6 \sum_{j=1}^{\text{NFR}} \text{FR}\%_{ij} \times (\text{PL}_i + \text{OL}_i) \times \text{FP}_{ij}$$

$$\begin{array}{l} \text{Mark to Market on} \\ \text{Existing Block Purchases} \end{array} = \sum_{i=1}^6 \sum_{j=1}^{\text{NP}} \text{PBlockV}_{ij} \times (\text{BlockP}_{ij} - \text{PP}_i) + \sum_{i=1}^6 \sum_{j=1}^{\text{NOP}} \text{OBlockV}_{ij} \times (\text{BlockO}_{ij} - \text{OP}_i)$$

$$\begin{array}{l} \text{Forecasted Cost of} \\ \text{Non – FRS Volume at Spot} \end{array} = \sum_{i=1}^6 \left[ \left( 1 - \sum_{j=1}^{\text{NFR}} \text{FR}\%_{ij} \right) \times (\text{PP}_i \times \text{PL}_i \times (1 + \text{PG}_i) + \text{OP}_i \times \text{OL}_i \times (1 + \text{OG}_i) + (\text{C}_i + \text{REC}_i + \text{A}_i) \times (\text{PL}_i + \text{OL}_i)) \right]$$

$$\begin{array}{l} \text{Scheduled Deferral} \\ \text{Balance Recovery} \end{array} = \sum_{k=1}^{i-1} \text{D}_{ki}$$

$$\text{Forecasted Retained SOS Load} = \sum_{i=1}^6 (\text{PL}_i + \text{OL}_i)$$

$$\text{Market Price Proxy} = \frac{\left[ \sum_{i=1}^6 \text{PP}_i \times \text{PL}_i \times (1 + \text{PG}_i) + \sum_{i=1}^6 \text{OP}_i \times \text{OL}_i \times (1 + \text{OG}_i) + \sum_{i=1}^6 \text{AD}_i \times (\text{PL}_i + \text{OL}_i) + \sum_{i=1}^6 (\text{PL}_i + \text{OL}_i) \times (\text{C}_i + \text{REC}_i + \text{A}_i) \right]}{\sum_{i=1}^6 (\text{PL}_i + \text{OL}_i)}$$

NP = Number of Completed On - Peak Block Solicitations  
NOP = Number of Completed Off – Peak Block Solicitations  
NFR = Number of Completed Full Requirements Solicitations

PP<sub>i</sub> = Conditional Forecast of On – Peak Block Price for Delivery Month<sub>i</sub>  
OP<sub>i</sub> = Conditional Forecast of Off – Peak Block Price for Delivery Month<sub>i</sub>  
PL<sub>i</sub> = Conditional On – Peak Retained Load Expectation for Delivery Month<sub>i</sub>  
OL<sub>i</sub> = Conditional Off – Peak Retained Load Expectation for Delivery Month<sub>i</sub>  
PG<sub>i</sub> = Conditional Forecast of On – Peak Gross – Up for Delivery Month<sub>i</sub>  
OG<sub>i</sub> = Conditional Forecast of Off – Peak Gross – Up for Delivery Month<sub>i</sub>

where,

PL<sub>i</sub> = Conditional Forecast of Total Eligible On - Peak Load in Period<sub>i</sub> × % of Total Load Retained in Prior Period  
OL<sub>i</sub> = Conditional Forecast of Total Eligible Off - Peak Load in Period<sub>i</sub> × % of Total Load Retained in Prior Period

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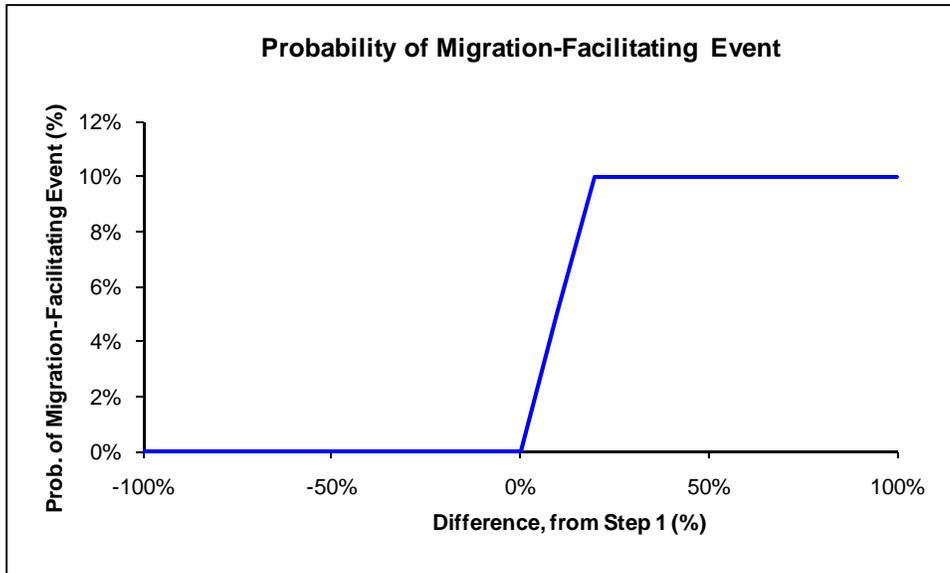
PBlockV<sub>ij</sub> = On – Peak Block Volume Procured in Completed Solicitation <sub>j</sub> for Delivery Month <sub>i</sub>  
BlockP<sub>ij</sub> = Price of On – Peak Block Procurement <sub>j</sub> for Delivery Month <sub>i</sub>  
OBlockV<sub>ij</sub> = Off – Peak Block Volume Procured in Completed Solicitation <sub>j</sub> for Delivery Month <sub>i</sub>  
BlockO<sub>ij</sub> = Price of Off – Peak Block Procurement <sub>j</sub> for Delivery Month <sub>i</sub>  
FR%<sub>ij</sub> = Percentage of Retained Load Procured in the Form of Full Requirements Product in Completed Solicitation <sub>j</sub> for Delivery Month <sub>i</sub>  
FP<sub>ij</sub> = Price of Full Requirements Product for Delivery Month <sub>i</sub> from Completed Solicitation <sub>j</sub> (includes energy, capacity, REC, ancillary services)

D<sub>ki</sub> = Deferral Recovery Scheduled for Delivery Month <sub>i</sub> Due to Cost Over/Under Recovery during Month <sub>k</sub>  
AD<sub>i</sub> = Administrative Adder for Delivery Month <sub>i</sub>  
C<sub>i</sub> = Capacity Price for Delivery Month <sub>i</sub> (expressed in \$/MWh)  
REC<sub>i</sub> = REC Price for Delivery Month <sub>i</sub>  
A<sub>i</sub> = Price of Ancillary Services for Delivery Month <sub>i</sub>

## 2) Determine Whether a Migration-Facilitating Event Occurs

The model calculates retained load levels in two alternate states of the world, one in which a migration-facilitating event (e.g., opt-out customer aggregation and/or customer referral programs become prominent, etc.) has not occurred, and one in which such an event has occurred. The initial assumption in each scenario is that a migration-facilitating event has not occurred, and has a zero probability of occurring until 2014. However, starting in 2014, each time migration levels are recalculated, the model ascribes some probability that a migration-facilitating event occurs; that probability is a function of the difference (between the forecasted SOS rate level and the market price proxy) calculated in step (1). The relationship between the probability of a migration-facilitating event occurring and the difference from step (1) is illustrated in the following chart:

Division Data Request 2-8 (cont.)

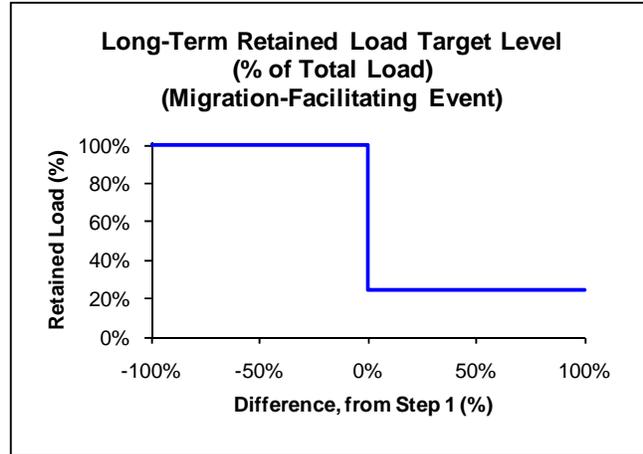
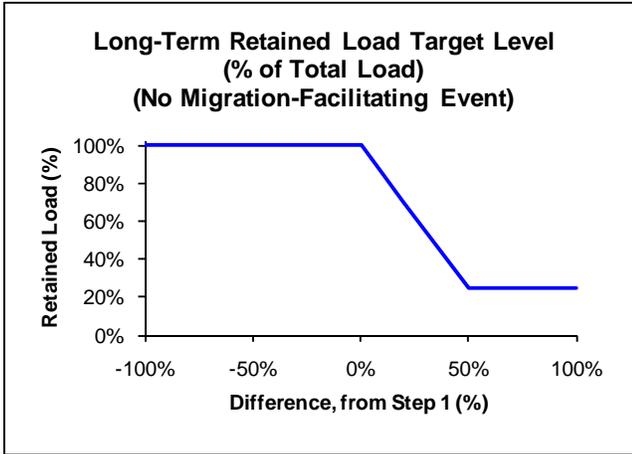


The data supporting the chart shown above is included in the response to Division Data Request 2-4.

3) Identify the Long-Term Retained Load Target Level

The characterized difference (between the forecasted SOS rate level and the market price proxy) from step (1) also affects the long-term retained load target level, which is used as an input to the determination of the actual retained load. The target level is also dependent upon whether or not a migration-facilitating event has occurred:

Division Data Request 2-8 (cont.)



The target level is used as an input for the next step in the calculation and does not directly represent the final retained load. The data supporting the charts shown above is included in the response to Division Data Request 2-4.

4) Determine Retained Load for Period

The retained load for a given six-month period is calculated as a function of both the trailing period retained load and the long-term retained load target level. In all scenarios, for each six-month period, the actual retained load is equal to ½ times the retained load in the prior six-month period plus ½ times the current long-term retained load target level.

$$\text{Retained Load Level} = \frac{1}{2} \times \text{Retained Load Level During Trailing Period} + \frac{1}{2} \times \text{Long - Term Retained Load Target Level}$$

Please refer to the response to Division Data Request 2-4 for any related input assumptions, and please refer to the response to Division Data Request 2-5 for related customer switching outputs from the model.

Division Data Request 2-9

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. If any of the input variables are assumed to be correlated, either positively or negatively, provide those correlations and describe the basis for them. Provide any underlying historical data used in developing these correlations and any work papers and calculations.

Response:

The requested correlations are not sufficiently defined. Multiple types of correlations could be calculated from both the 2,000 scenarios used in the NorthBridge analysis, and from the historical data that served as the basis for generating those scenarios.

The correlations utilized by NorthBridge to generate the 2,000 scenarios used in the NorthBridge analysis are provided in the response to Division Data Request 2-4, as is the underlying historical data used by the Scenario Generator (referenced in the response to Division Data Request 2-6) to develop those correlations.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-10

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled "Analysis of Standard Offer Service Approaches for Mass Market Customers" by Northbridge. Describe in detail the components of the managed portfolio were determined. Specifically describe how the sizes of the block products were determined and provide an example or sample calculation. Also show the assumed duration of each block purchase.

Response:

As page 10 of National Grid Exhibit 1 indicates, many different managed portfolios were analyzed, but the representative managed portfolio described on page 10 of National Grid Exhibit 1 was used to convey the findings of the analysis in the main body of National Grid Exhibit 1.

The representative managed portfolio discussed in National Grid Exhibit 1 consists of a mixture of block energy products (i.e., products with volumes that are fixed at the time of purchase) and spot market purchases. The portfolio's target composition is 25% four-year products with  $\frac{1}{4}$  of these products procured each year, 25% two-year products with  $\frac{1}{2}$  of these products procured each year, 25% six-month products procured twice annually, and 25% spot procurement. Solicitations are modeled to occur twice per year. The four-year, two-year, and the first of the six-month products are modeled to be procured on October 1 of each year for delivery beginning the following January 1. The second six-month product is modeled to be procured on March 1 for delivery beginning the following July 1.

Procurement volumes for each product are calculated within the model on the basis of retained load forecasts in each scenario at the time of each solicitation. Therefore, the MWh volumes procured vary from scenario to scenario. Each time a solicitation for a specific product is conducted, the volume to be procured is calculated by comparing the target MWh hedge level for each monthly on-peak/off-peak period to the volume of existing hedges for each monthly on-peak/off-peak period. The target MWh hedge level is calculated as the product of the target hedge level percentage and the conditional retained load forecast (as of the time of the solicitation), and these forecasts are unique to each solicitation date in each scenario. Because the managed portfolio product mix is defined in terms of target hedge levels, the volume solicited in each scenario is adjusted in response to changing load forecasts and volumes previously procured in that scenario. Volumes procured vary across monthly on-peak/off-peak periods, based on the different retained load forecasts for these periods.

Division Data Request 2-10 (cont.)

Please refer to the attached DVD for a detailed example of the calculation that would be performed by the model at the time of a hypothetical solicitation.

Prepared by or under the supervision of: Margaret Janzen and The NorthBridge Group

Division Data Request 2-11

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled "Analysis of Standard Offer Service Approaches for Mass Market Customers" by Northbridge. Provide the calculations and / or model outputs that yielded the figures contained on page 11.

Response:

Please refer to the response to Division Data Request 2-5.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 2-12

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Provide the inputs, calculations, and / or model outputs that yielded the figures contained on page 14.

Response:

As noted on page 14 of National Grid Exhibit 1, the requested values are illustrative. The values and calculations are as follows:

<b>Component</b>	<b>Value</b>
(a) Reported Bid Price	105
(b) Definitional Adjustments	5
(c) Adjusted Winning Bid	$100 = (a)-(b)$
(d) Around-the-Clock Energy at Liquid Trading Hub	65
(e) Basis Differential	5
(f) Load Shaping	7
(g) Capacity	14
(h) Ancillary Services	3
(i) Effect of Credit Allocations	-2
(j) Residual Compensation (covers other costs/risks)	$8 = (c)-(d)-(e)-(f)-(g)-(h)-(i)$

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-13

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled "Analysis of Standard Offer Service Approaches for Mass Market Customers" by Northbridge. Provide the inputs, calculations, and / or model outputs that yielded the figures contained on page 15.

Response:

Please refer to the attached DVD.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-14

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled "Analysis of Standard Offer Service Approaches for Mass Market Customers" by Northbridge. Provide the inputs, calculations, and / or model outputs that yielded the figures contained on page 16.

Response:

Please refer to the response to Division Data Request 2-5.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-15

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Provide the inputs, calculations, and / or model outputs that yielded the figures contained on page 17.

Response:

Please refer to the response to Division Data Request 2-5.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-16

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Provide the inputs, calculations, and / or model outputs that yielded the figures contained on page 18.

Response:

Please refer to the response to Division Data Request 2-5.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-17

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Please provide the information on pages 29, 30, 34, 35, 37, and 39 in an Excel file with all formulae intact.

Response:

Please refer to the attached DVD.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-18

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Using its model, has Northbridge analyzed the exact procurement plan that NGRID has proposed in this proceeding for its Residential and Commercial customer groups? If so, please provide the model inputs and outputs for that analysis.

Response:

NorthBridge did not analyze the exact procurement plan that National Grid has proposed in this proceeding for its Residential and Commercial customer groups. The NorthBridge study was performed prior to the development of National Grid’s plan.

Prepared by or under the supervision of: Margaret M. Janzen

Division Data Request 2-19

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. The hypothetical schedule provided on page 28 shows procurements for tranches of SOS load where the start and end of the delivery periods is staggering or laddered. In Schedule 3A and 3B, the Company’s plan has the same start and end date for the delivery periods. Which of these two approaches does Northbridge believe will produce the best outcome for customers? Provide the basis for that belief.

Response:

The hypothetical schedule provided on page 28 of National Grid Exhibit 1 is illustrative. Whether or not having the same start and end dates for the delivery periods of the products procured will produce “the best outcome for customers” is dependent upon the type of customers, their specific circumstances and needs (such as their tolerance for risk and their ability to respond to market price signals), and other aspects of a given plan. Other aspects that may affect the determination of whether an approach provides “the best outcome for customers” include the types of products procured, the times between solicitation dates and deliveries, the timing of rate adjustments, and other factors.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-20

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Please provide any other evaluations of the FRS and managed portfolio approaches performed by Northbridge in the last five years. Include any comparisons of the cost of FRS products versus block products.

Response:

Pursuant to an agreement with the Division, the scope of this request is limited to filed public reports, testimony, and other documents produced by NorthBridge in public proceedings in the last five years that evaluate the FRS and managed portfolio approaches to SOS procurement. Please refer to the response to Division Data Request 2-21.

Prepared by or under the supervision of: The NorthBridge Group

Division Data Request 2-21

Request:

The following question pertains to Grid Exhibit 1, a January 2010 document entitled “Analysis of Standard Offer Service Approaches for Mass Market Customers” by Northbridge. Provide any reports, testimony, or other documents produced by Northbridge in the last five years that evaluate the FRS and managed portfolio approaches to SOS procurement.

Response:

Pursuant to an agreement with the Division, the scope of this request is limited to filed public reports, testimony, and other documents produced by NorthBridge in public proceedings in the last five years that evaluate the FRS and managed portfolio approaches to SOS procurement. In response, the attached DVD contains all of the testimony, of which NorthBridge is aware, filed in the last five years by NorthBridge employees in public proceedings on behalf of clients related to FRS and managed portfolio procurement.

Prepared by or under the supervision of: The NorthBridge Group