STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

North Shore Gas Company	:	
	:	No. 14-____
Proposed General Increase	:	
In Rates For Gas Service	:	

Direct Direct Testimony of

KEVIN R. KUSE

Senior Load Forecaster
Integrys Business Support, LLC

On Behalf of
North Shore Gas Company

TABLE OF CONTENTS

Page

I. INTRODUCTION AND BACKGROUND

A. Identification of Witness

Q. Please state your name and business address.

A. My name is Kevin R. Kuse. My business address is Integrys Energy Group, Inc. ("Integrys"), 700 North Adams Street, P.O. Box 19001, Green Bay, WI 54307-9001.

Q. By whom are you employed and in what capacity?

A. I am a Senior Load Forecaster in the Budgets and Forecasts Department of Integrys Business Support, LLC ("IBS"), a wholly-owned subsidiary of Integrys.

Q. For whom are you providing testimony?

A. I am providing testimony for North Shore Gas Company ("North Shore" or "NS"), which is a wholly-owned indirect subsidiary of Integrys.

B. Purpose of Testimony and Summary of Conclusions

Q. Mr. Kuse, what is the purpose of your testimony?

A. The purpose of my testimony is to present North Shore's customer demand forecast for the 2015 test year, and to explain how that forecast was derived. I will also compare North Shore's forecasted 2015 test year demand to its actual weather normalized demand in its last comparative year, which consists of 2013 actual weather normalized demand from January 2013 to June 2013 and forecasted demand from July 2013 to December 2013 (hereinafter referred to as "comparative year 2013"). Based on its analyses, North Shore forecasts a 2015 total demand, including company use, of 34.0 billion cubic feet ("Bcf") of natural gas as compared to 34.9 Bcf in comparative year 2013, a decrease of approximately 0.9 Bcf or about 2.6%.

C. Background and Experience

Q. Please briefly outline your educational background.

A. I hold a Bachelor of Arts Degree in Economics and a Master of Science Degree in Administrative Science, both from the University of Wisconsin – Green Bay.

Q. Please summarize your business experience.

A. In February 1993, I was hired by St. Norbert College in De Pere, Wisconsin as the Director of Research and Records in the Office of Institutional Advancement. In September 1996, I was hired as a Business Evaluation Analyst by the Development Division of the Oneida Indian Tribe of Wisconsin. In September 1999, I was hired by Wisconsin Public Service Corporation, a wholly-owned subsidiary of Integrys, as a Customer Research Analyst in the Market Research Department. From September 1999 to July 2007, I developed customer insights by gathering and interpreting data from primary survey research and secondary data sources. During that period, I also performed two short term assignments as the Leader of the Market Research department. In July 2007, I became a Senior Load Forecaster in the Budgets and Forecasts Department of IBS.

Q. What are your current duties and responsibilities?

A. As a Senior Load Forecaster, my duties include the performance of various aspects of short-term and long-term electric and gas forecasts.

Q. Have you previously testified before any regulatory agency?

A. Yes, I have. I testified before the Illinois Commerce Commission ("Commission" or "ICC") in Docket Nos. 12-0511/12-0512 (cons.), and Docket Nos. 11-0280/11-0281

(cons.), which were North Shore's last two general rate cases. I have also testified before the Michigan Public Service Commission in Case No. U-16166, which was the 2011 test year rate case of Upper Peninsula Power Company, another Integrys subsidiary.

II. GAS SALES FORECAST METHODOLOGY

A. Forecast of Customer Demand

Q. In general, how did North Shore forecast customer demand for the 2015 test year?

A. North Shore did so by performing regression analyses for each Service Classification ("S.C.") to measure each customer segment's sensitivity to certain explanatory variables (e.g., weather, price, estimated efficiency improvements, and socioeconomic trends) that affect the segment's natural gas usage.

Q. What are North Shore's current Service Classifications?

A. North Shore's customers are currently divided among three Service Classifications. The customers in S.C. No. 1 (Small Residential Service) and S.C. No. 2 (General Service) are classified as "firm general." For test year 2015, North Shore forecasts 158,718 firm general customers. The 26 customers in S.C. No. 4 (Large Volume Demand Service) are classified as "large volume customers."

Q. How did North Shore determine its forecasted total demand?

A. North Shore's forecasted total demand is comprised of forecasts of its large volume customer demand and its firm general demand.

Q. What methodology did North Shore use to determine the large volume customer demand forecast for the 2015 test year?

A. There were a number of steps in the forecast process for large volume customer demand. First, monthly demands for S.C. Nos. 4 and above were summed[1]. Second, adjustments were made to the demand totals based on customer movement between Service Classifications. This ensured that the historical data and current large volume customer demand were comparable. Finally, a regression analysis was performed to forecast the long-term trend in large volume customer total demand.

Q. What methodology did North Shore use to determine the firm general demand forecast for the 2015 test year?

A. This analysis also had a number of steps. Demand was first divided into S.C. No. 1 and S.C. No. 2 demand. Each of these two classifications was further divided into demand by non-heating customers and demand by heating customers. Adjustments were then made to demand based on customer movement between Service Classifications in order to ensure that the historical data and current firm general customer demand were comparable. Finally, demand was divided into number of customers and usage per customer. This disaggregation of firm general demand provided the following eight components, which were forecasted independently on a monthly basis:

1) Usage per non-heating S.C. No. 1 customer
2) Number of non-heating S.C. No. 1 customers
3) Usage per heating S.C. No. 1 customer
4) Number of heating S.C. No. 1 customers
5) Usage per non-heating S.C. No. 2 customer
6) Number of non-heating S.C. No. 2 customers

[1] S.C. No. 3 was re-numbered S.C. No. 4 in 2013.

7) Usage per heating S.C. No. 2 customer

8) Number of heating S.C. No. 2 customers

The firm general demand was divided into these various components because various economic, demographic and weather factors affect each component of firm general demand differently. By examining each of the eight components, and relating them to those factors, a greater understanding is gained of how these factors affect firm general demand.

Q. Can you explain the S.C. No. 1 Heating forecast model in more detail?

A. Yes. The S.C. No. 1 Heating forecast uses two regression models, a number-of-customers model and a use-per-customer model. Both are monthly models and each was run with historical monthly data from January 2004 and January 2003 respectively to May 2013. The use-per-customer model is a regression using multiplicative variables developed by Itron[2] representing Heating and Other gas usage. Itron calls this a Statistically Adjusted End-Use ("SAE") model. This model makes use of billing heating degree days ("HDD"), appliance saturation and efficiencies, home size (people per household), trends based on U.S. Energy Information Administration ("EIA") data, real personal income, and real price to the customer.

The number-of-customers model is based on the trend in the number of customers by S.C. and monthly binary variables. The total S.C. No. 1 Heating sales forecast is a combination of the use-per-customer model and the number-of-customer forecasts.

[2] Itron is a technology provider to energy and water industries worldwide that developed both the multiplicative variables and the SAE regression models in the forecast. Itron provides measurement and control technology, communications systems, software and professional services to nearly 8,000 utilities in more than 100 countries. The Itron Forecasting Group develops and supports MetrixND – Itron's statistical forecasting software tool used for short-term and long-term energy and demand forecasting. Itron's MetrixND has more than 700 users from 170 utilities and energy companies around the world.

Q. Please explain in more detail how the SAE models are used in the use-per-customer models.

A. Using the S.C. No. 1 Heating forecast model as an example, the model design considers billing sales, price, structural changes, and appliance saturation and efficiencies trends. It then imposes a model structure through the SAE specification.

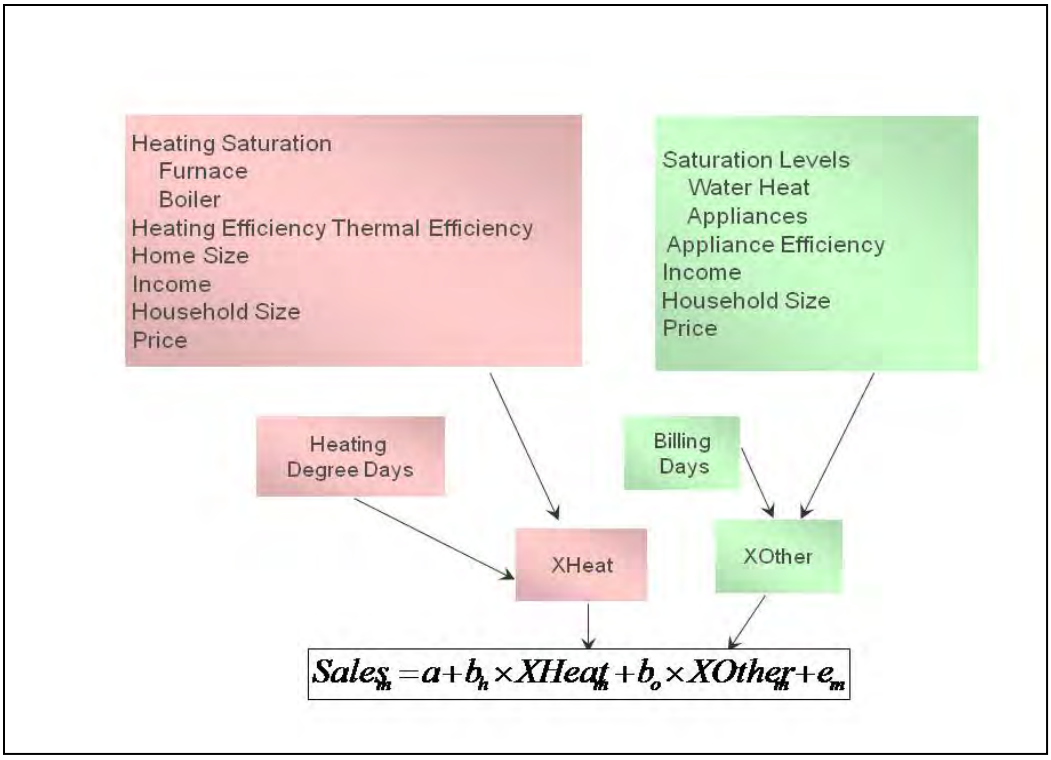
Instead of constructing a regression model with many explanatory variables, this approach constructs a model with two high-level end-use variables: Heating and Other Use. The model structure then embeds forecast drivers into these two constructed variables. The forecast drivers include HDD, price, income, household size (people per household), and end-use saturation and efficiency trends.

The estimated average use per customer regression model using the constructed end-use variables is:

$$AvgUse_t = B_0 + B_1 XHeat_t + B_2 XOther_t + e_t$$

The SAE model structure incorporates elasticity of demand, which is customers' behavior in response to changes in various explanatory variables, such as price, heating, cooling, income, etc. Customer behavior is based on research performed by Itron. By focusing on such customer behavior, North Shore can capture the appropriate impacts of changes in economic conditions and how they interrelate with end-use variables.

The graphic below explains in more detail the economic and various end-use saturation and efficiency variables, developed from the EIA energy efficiency forecasts, which make up the main explanatory variables:



The XHeat variable has two components:

$$XHeat_{y,m} = HeatIndex_{y} \times HeatUse_{y,m}$$

HeatIndex is expanded below:

$$HeatIndex_y = Structural\ Index_y \times \sum_{Type} Weight^{Type} \times \frac{\left(Sat_y^{Type} / Eff_y^{Type} \right)}{\left(Sat_{01}^{Type} / Eff_{01}^{Type} \right)}$$

HeatUse is expanded below:

$$HeatUse_{y,m} = \left(\frac{HDD_{y,m}}{HDD_{01}} \right) \times \left(\frac{HHSize_{y,m}}{HHSize_{01}} \right)^a \times \left(\frac{Income_{y,m}}{Income_{01}} \right)^b \times \left(\frac{\Pr ice_{y,m}}{\Pr ice_{01}} \right)^c$$

Factors impacting Heat Use or XHeat are:

1. Non-weather-sensitive end-use saturation and efficiency trends,
2. Number of heating degree days,

3. Household size and income, and

4. Prices.

Q. Has North Shore used this model in the past to forecast firm general demand?

A. Yes, North Shore has used this model in each of its last four rate cases.

Q. How has the model performed historically?

A. The model has performed well historically. The two types of equations – use per customer and number of customers – have different characteristics and their statistical reliability is quite high.

B. <u>Use-Per-Customer Equations</u>

Q. How do you determine the statistical reliability of the use-per-customer equations?

A. The statistical reliability of the use-per-customer equations is first measured with the coefficient of determination, or R^2. The R^2 measures the proportion or percentage of the total variation in use per customer that is explained by the regression model. The following table shows the R^2 for each equation along with the percentage of actual demand in 2012. Approximately 96 percent of the total variation in North Shore's use per customer is explained by the regression models.

NS Use/Customer (S.C. Nos. 1-2) and Total Demand (S.C. No. 4)		
	Adjusted R-squared	**Percentage of Demand**
S.C. No. 1 Heating	99.6%	53.5%
S.C. No. 1 Non-heating	90.1%	0.1%
S.C. No. 2 Heating	99.1%	26.5%
S.C. No. 2 Non-heating	86.0%	0.7%
S.C. No. 4 (Total Demand)	83.2%	19.2%
Weighted Average	96.2%	100.0%

C. Number-of-Customers Equations

Q. How do you determine the statistical reliability of the number-of-customers equations?

A. The statistical reliability of the number-of-customers equations is first measured with the R^2. The following table shows the R^2 for each equation along with the percentage of actual demand in 2012. Approximately 95 percent of the total variation in North Shore's number of customers is explained by the regression models.

NS Number of Customers Equations		
	Adjusted R-squared	**Percentage of Demand**
S.C. No. 1 Heating	96.4%	53.5%
S.C. No. 1 Non-heating	99.6%	0.1%
S.C. No. 2 Heating	98.4%	26.5%
S.C. No. 2 Non-heating	95.4%	0.7%
S.C. No. 4	85.2%	19.2%
Weighted Average	94.8%	100.0%

Q. What general assumptions were made in developing the total demand forecast?

A. The following assumptions were made:

- For S.C. Nos. 1 and 2 Heating, normal weather based on the twelve-year period 2001-2012 for Chicago, O'Hare weather station was used.[3] This equals 6,031 HDD for non-leap years and 6,054 HDD for leap years.
- Economic information is from the June 2013 Moody's Analytics forecast for North Shore.

[3] The HDD using a 12 year normal was required by the Commission's Final Order in ICC Docket Nos. 07-0241/07-0242 (cons.). North Shore Gas Company used a 12-year normal in its three subsequent rate cases, and this has been uncontested.

- EIA forecasts of efficiency and saturation were provided by Itron.
- Price information was from NYMEX Short-Term Forecast dated June 13, 2013.

Q. Based on these analyses, what level of customer demand does North Shore forecast for test year 2015?

A. North Shore forecasts firm general demand of 27.3 Bcf and large volume customer demand of 6.7 Bcf, for a customer demand of 34.0 Bcf in test year 2015.

Q. Was the demand forecast further allocated?

A. Yes. The five classifications from the forecast of annual firm general demand volumes and customers were further divided into the following customer categories by month for volume blocking and revenue forecasting purposes. This approach determined monthly and annual volumes by Service Classification, revenue class (residential, commercial, and industrial), heating / non-heating, and sales type (retail and transport). The subgroups were:

Service Classification No. 1 Heating Forecast			
S.C. No. 1	Heating	Retail	Residential
S.C. No. 1	Heating	Transport	Residential

Service Classification No. 1 Non-heating Forecast			
S.C. No. 1	Non-heating	Retail	Residential
S.C. No. 1	Non-heating	Transport	Residential

Service Classification No. 2 Heating Forecast			
S.C. No. 2	Heating	Retail	Residential
S.C. No. 2	Heating	Transport	Residential
S.C. No. 2	Heating	Retail	Commercial
S.C. No. 2	Heating	Transport	Commercial
S.C. No. 2	Heating	Retail	Industrial
S.C. No. 2	Heating	Transport	Industrial

Service Classification No. 2 Non-heating Forecast			
S.C. No. 2	Non-heating	Retail	Residential
S.C. No. 2	Non-heating	Transport	Residential
S.C. No. 2	Non-heating	Retail	Commercial
S.C. No. 2	Non-heating	Transport	Commercial
S.C. No. 2	Non-heating	Retail	Industrial
S.C. No. 2	Non-heating	Transport	Industrial

Service Classification No. 4 Forecast			
S.C. No. 4	Heating	Transport	Industrial

Q. What was the basis of the allocation to the subgroups?

A. The basis was historical sales by subgroup from 2012 actual sales volumes ("allocation base period"). The sales forecast was allocated based on the allocation base period percentages.

Q. Were there any further allocations of the sales volume forecast?

A. Yes. Sales volumes for S.C. Nos. 1 and 2 were allocated to the rate blocks (set amount or block of usage) using the monthly ogive curves (cumulative line graphs) developed from the billed frequency data for each of these customer classifications. These data were stored in the Revenue Forecasting Model ("RFM"), which blocked each month's volumes individually for all S.C. No. 1 and S.C. No. 2 sub-groups by using the corresponding sub-group and months' ogive curves from the allocation base period.

III. COMPUTATION OF REVENUES BASED ON FORECAST

Q. Did North Shore use any other billing determinants besides volumes for revenue forecasting?

A. Yes.

Q. Please identify these other billing determinants and discuss how they were determined.

A. The other billing determinants are as follows:

- Billing Periods: Base time period (January through December 2012) ratio of the number of billing periods to the number of customers × the forecasted number of customers. S.C. No. 2 billing periods were further allocated to small, medium and large meter classes based on the allocation of base time period's monthly meter classes.

- Demand Volume: Analysis of two most recent months' demand volumes. S.C. No. 4 only.
- Standby Demand Volume: Most recent month's standby demand volume. Transportation only.
- Standby Commodity Volume: Three year average of the monthly standby commodity volume percentage times transportation volume forecast. Transportation pool/contract only.
- Storage Gas Charge Volume: The storage gas charge monthly volume used in the forecast was calculated by looking at the most recent storage gas charge volume actuals.
- Storage Banking Charge Volume: Analysis of transportation customers' storage capacity.
- Demand Devices: Most recent month's demand device units. S.C. No. 2 transportation only.
- Number of 2nd Pulse Units: Analysis of the two most recent months' 2nd pulse units.
- Number of Transportation Contract Accounts: Most recent month's number of transportation contract accounts. Transportation only.
- Number of Transportation Pool Accounts: Most recent month's number of transportation pool accounts and adjusted monthly for changes in number of transportation pool accounts. Transportation only.
- Number of Pools: Most recent month's number of pools. Transportation only.
- Number of Trades: Analysis of the base period trade count. Transportation pool/contract only.

- Number of Supplier Billing Option Credit Units: Most recent two months' average.
- Storage and Balancing Volume: Contract volume. Transportation pool/contract only.

Q. What was done next?

A. Revenues were calculated in the RFM.

Q. How does the RFM calculate revenues?

A. The RFM applies applicable rates to each billing determinants to calculate various revenues by month for all sub-groups. Specific revenue items, applicable billing determinants and rates are as follows:

- Customer Charge = number of billing periods × applicable customer charge rates.
- Demand Charge = demand volumes × demand rate.
- Storage Service Charge = retail sales volumes × storage service charge rate.
- Storage Banking Charge = transportation storage banking charge volume × storage banking charge rate.
- Demand Device Charge = number of demand devices × demand device rate.
- Distribution Charge = volumes in each block × applicable distribution charge rates.
- Volume Balancing Adjustment (Rider VBA) Charge = volumes × forecasted Rider VBA rates.
- Uncollectible Expense Adjustment Gas Cost (Rider UEA-GC) = retail gas charge revenue × Rider UEA-GC uncollectible factors.
- Franchise Cost Adjustment (Rider FCA) Charge = number of billing periods × forecasted Rider FCA rate.
- 2nd Pulse Device Charge = number of 2nd pulse devices × 2nd pulse rate.

- Transportation Contract Administrative Charge = number of transportation contract accounts × transportation contract administrative charge rate.
- Transportation Pool Administrative Charge = number of transportation pool accounts × applicable transportation pool account administrative charge rates, plus number of transportation pools × transportation pool administrative charge rate.
- Transportation Trade Charge = number of trades × trade charge rate.
- Supplier Billing Option (Rider SBO) Credit = number of accounts forecast for supplier billing option × supplier billing option rate.
- Storage and Balancing Base Rate Revenue = storage and balancing volume × storage and balancing rates.
- Environmental Activities (Rider 11) Charge = volumes × forecasted Rider 11 rates.
- Uncollectible Expense Adjustment (Rider UEA) Charge = number of billing periods × forecasted Rider UEA rates.
- Energy Efficiency and On-bill Financing (Rider EOA) Charges = volumes × forecasted Rider EOA rates.
- Renewable Energy Resources Fund Charge = number of billing periods × applicable rates.
- Low Income Energy Assistance Fund Charge = number of billing periods × applicable rates.
- Retail Gas Charge Revenue = Retail gas sales volume × forecasted retail gas charge rates.
- Storage and Balancing Gas Charge = Storage and balancing volume × storage and balancing gas charge rates.

- Standby Demand Gas Charge Revenue = Standby demand volume × forecasted standby demand gas charge rates.
- Standby Commodity Gas Charge Revenue = Standby commodity volume × forecasted standby commodity gas charge rates.
- Storage Gas Charge Revenue = Storage Gas Charge volume × forecasted Storage Gas Charge rates.
- Add-on Revenue Taxes = Taxable revenue × applicable add-on tax rates.
- Gas Use Taxes = Transportation volume × taxable therm percentage × applicable gas use tax rates.

Q. How were the various rates determined?

A. The North Shore tariff provided the rates for many of the base rate revenues and Regulatory Services provided the forecasted rates for various riders and gas charge revenues based on forecasted billing determinants and/or forecasted costs or revenues.

IV. COMPARISON OF COMPARATIVE YEAR DEMAND AND FORECASTED DEMAND

Q. Please compare the 2015 test year demand forecast to the comparative year 2013 (6 months of actual and 6 months forecast) demand.

A. The comparative year 2013 demand is based on actual weather normalized demand (based on 6,031 HDD) January 2013 to June 2013 and forecasted demand for July through December 2013. The forecasted demand for 2013 is based on 6,126 normal heating degree days.

NSG Test Year Ending December 31, 2015 (Therms)

Line No	Present Rate Classification	Fiscal Year 2013	Weather Adjustments	Normalized 2013	Test Year 2015	Difference	Annualized % Change	Line No
	(A)	(B)	(C)	(D)	(E)	(F) (E-D)	(G) (F/D)/2	
1	**Retail and Transportation**							1
2	Company Use	223,000	0	223,000	242,000	19,000	4.3%	2
3	S.C. No. 1	194,328,000	-6,168,000	188,160,000	179,537,000	-8,623,000	-2.3%	3
4	S.C. No. 2	98,743,000	-3,412,000	95,331,000	93,669,000	-1,662,000	-0.9%	4
5	S.C. No. 4	65,642,000	0	65,642,000	66,954,000	1,312,000	1.0%	5
6	**Total Volumes**	**358,936,000**	**-9,580,000**	**349,356,000**	**340,402,000**	**-8,954,000**	**-1.3%**	6

297

298 A. The declining annualized percent change from 2013 to 2015 for S.C. Nos. 1 and 2 is due
299 primarily to declining usage due to the energy efficiency gains documented by EIA
300 projections.

301 **Q. Does this conclude your direct testimony?**

302 A. Yes, it does.