Exhibit No.:	
Issue:	Steam Production Cost Modeling
Witness:	Timothy M. Nelson
Type of Exhibit:	Direct Testimony
Sponsoring Party:	Aquila, Inc. dba KCP&L Greater Missouri Operations Company
Case No.:	HR-2009-____
Date Testimony Prepared:	August 1, 2008

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO.: HR-2009-____

DIRECT TESTIMONY

OF

TIMOTHY M. NELSON

ON BEHALF OF

AQUILA, INC. dba
KCP&L GREATER MISSOURI OPERATIONS COMPANY

Kansas City, Missouri
September 2008

Certain Schedules Attached To This Testimony Designated "(HC)"
Have Been Removed
Pursuant To 4 CSR 240-2.135.

DIRECT TESTIMONY

OF

TIMOTHY M. NELSON

CASE NO. HR-2009-_____

Q. Please state your name and business address.

A. My name is Tim M. Nelson. My business address is 1201 Walnut, Kansas City, Missouri 64106.

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

A. I am employed by Kansas City Power & Light Company ("KCP&L") and as Resource Planning Engineer.

Q. What are your responsibilities as Resource Planning Engineer?

A. I am responsible for providing research and analysis in support of the long range resource planning needs including identifying the timing and technology mix of the Company's future resource requirements for KCP&L and Aquila, Inc., dba KCP&L Greater Missouri Operations Company's ("GMO" or the "Company"). GMO includes the former Missouri Public Service territory ("GMO-MPS") and the former St. Joseph Light and Power territory ("GMO-L&P") and the industrial steam sales system ("GMO-Steam").

Q. Please briefly describe your education, work experience, and participation in professional associations.

A. In 1993 I received a Bachelor of Science degree in Mechanical Engineering from Iowa State University - Ames. Since graduation from Iowa State the majority of my work has been in the field of electric utility power supply and delivery. In 1994 I joined St. Joseph

Light & Power Company as a production engineer at the Lake Road Generating Station. In that position I was responsible for engineering projects concerning electric and steam production. As Results Engineer, I was responsible for all plant operating and performance data for six boilers, four steam turbines, three combustion turbines, and external steam customers. In 2001, St. Joseph Light & Power Company was acquired by Aquila, Inc. (formerly UtiliCorp United Inc). My last position at Aquila, Inc. was as Senior Electric Systems Analyst where I was responsible for developing and running production cost fuel and purchase power models and for preparing the fuel and purchase power budgets for two electric systems and a steam system.

Q. What is the purpose of your testimony in this case before the Missouri Public Service Commission ("Commission")?

A. The purpose of this testimony is to present the RealTime® production cost model used to calculate the fuel expense for the production and sale of continuous process steam from the Lake Road Generating Facility for GMO-Steam.

Q. How is your testimony organized?

A. My Direct Testimony is organized as follows:

I. Lake Road Generating Station Operating Description;

II. Production Modeling Description;

III. Natural Gas Pricing; and

IV. Steam Sales Load Forecast.

Q. Are you sponsoring any schedules?

A. Yes. I am sponsoring the following schedules:

Schedule TMN-1: Lake Road 900# Steam System Diagram;

Schedule TMN-2: Missouri Steam/Electric Production Model Process; and

Schedule TMN-3(HC): Lake Road Natural Gas Burner Tip Calculation.

I. Lake Road Generating Station Operating Description

Q. Please describe the Lake Road generating facilities.

A. The plant is located in south St. Joseph, Missouri, on the east bank of the Missouri River. The plant consists of four steam turbine-generators, three combustion turbines, and six steam boilers. The plant's generating units have a net electric generating capability of 268.8 MW. In addition to generating electricity, the plant also supplies steam in the form of continuous process steam for sale to industrial steam customers. The steam sales are provided at a nominal pressure of 150-PSI. Steam sales are also provided to one customer at a nominal pressure of 850-PSI. When I refer to PSI, as in 150-PSI, I mean pressure measured in pounds per square inch.

Q. Please explain the Lake Road steam system.

A. The 900-PSI steam header operates at a nominal steam pressure of 900 PSI and is used to provide steam for the 900-PSI turbine-generators (Turbines 1 and 2), one industrial steam customer, and to the 200-PSI headers. The 900-PSI header is fed by Boilers 1, 2, 4 & 5. The 200-PSI headers are fed by Boilers 3 and 8, the 900-PSI header, and by Turbine 1 extraction. The 200-PSI headers provide steam for Turbine 3 and the industrial steam sales.

Boilers 1, 2, 3, 4, and 8 burn natural gas as their primary fuel. Boilers 1, 2, 4, and 8 use #2 fuel oil as a back-up fuel. Much of the 900-PSI system energy is produced by Boiler 5, which burns coal for its primary fuel, and natural gas for its back-up fuel.

Therefore, in the 900-PSI system there are multiple boilers providing steam to a common header system which in turn can drive three turbine-generators (1, 2, and 3) and also supply steam for industrial steam sales.

Q. Which fuels and production systems are dedicated to providing services to the steam customers?

A. There is no dedicated fuel source and there are no dedicated production systems for these customers. The configuration of this plant has common facilities used for both electric and steam production. Schedule TMN-1 entitled "Lake Road 900# Steam System Diagram," is attached. By inspection of this diagram, it is evident that the 900-PSI system is common to multiple inputs and produces steam for multiple turbines as well as the steam customers. The 200-PSI system also has multiple steam sources and delivers steam to a turbine and steam customers.

II. Production Modeling System

Q. For modeling purposes, what method is used to allocate Lake Road's operating costs between the electric and steam customers?

A. GMO uses production costing modeling software to simulate the electric system and steam customer loads. Schedule TMN-2 entitled "Missouri Steam/Electric Production Model Process" is a diagram that describes the process flow for the calculation method.

Q. What is a production costing model?

A. GMO uses the production costing model, RealTime®, to perform an hour-by-hour chronological simulation of the Company's electric system, where the generators are

"dispatched" to meet the hourly system electric load, to determine the energy costs and fuel consumption.

Q. What is meant by "hour-by-hour chronological simulation"?

A. RealTime® solves each hour's demand chronologically before moving onto the next hour. Using this methodology, RealTime® can more accurately simulate real world operating conditions and constraints.

Q. How are the fuel expenses associated with the operation of the 900-PSI and 200-PSI systems allocated between GMO-L&P and GMO-Steam?

A. GMO allocates fuel expense between GMO-L&P and GMO-Steam using the allocation methodology used in Case No. HR-2005-0450.

Q. What was the fuel expense adjustment for GMO-Steam?

A. Please see Schedule RAK-4 in the Direct Testimony of GMO witness Ronald Klote.

Q. Please describe the steam/electric fuel and purchase power expense model used by GMO.

A. GMO created two models in RealTime®, one for electric and one for steam, and two Microsoft Excel® spreadsheets to determine the annualized fuel and purchase power expense costs for the electric system. The RealTime® "electric" model is used first to dispatch the electric system to meet the system load.

After the electric model has been run, the 900-PSI electric turbines' hourly MW load is exported to a text file. This text file is then imported into the "Unit 123 to Steam" spreadsheet where the steam input necessary for each of the three generators is calculated using the respective unit heat rate curves. In this spreadsheet, the total steam required for

the turbines is calculated and then exported to a comma separated value ("CSV") file. The CSV file is imported into the RealTime® steam model as another steam load for the steam system.

In the RealTime® steam model the electric turbine steam input from above is combined with the hourly steam sales loads to produce 900-PSI boiler hourly steam load input to the model. Boilers 1, 2, 3, 4, and 8 are modeled as burning natural gas and Boiler 5 burns coal as its base fuel. Boiler 5 can also burn natural gas as a supplemental fuel. The RealTime® steam model is then run using these steam loads to determine the total fuel burn and fuel cost for the Lake Road 900-PSI boilers.

After running the RealTime® steam model the fuel allocation is performed on a daily basis in the "Steam electric model" spreadsheet. To perform the allocation several inputs are required. From the steam model: 1) daily fuel quantity burned, by fuel type, 2) daily fuel cost by fuel type, and, 3) industrial steam sales mmBtu. From the electric model: 1) daily MW generated by the 900-PSI electric turbines, and, 2) the 900-PSI electric turbines steam mmBtu from the "Unit to Steam" spreadsheet.

The fuel allocation is performed on a daily basis as is done in actual operations at the Lake Road Generating Station. Fuel expense is allocated based on the following equations:

$$F_S = [S / (E + S)] \times F$$

$$F_E = F - F_S$$

Where,

F is total 900-PSI boiler fuel

F_S is 900-PSI boiler fuel allocated to industrial steam sales

F_E is 900-PSI boiler fuel allocated to the electric turbines

S is industrial steam sales steam mmBtu from boilers

E is 900-PSI electric turbine steam mmBtu from boilers

The remaining fuel not allocated to the industrial steam sales system in the first equation is allocated to the electric system as shown in the second equation. Because the variable "F" shown above includes fuel burned for Lake Road plant auxiliary steam, fuel consumed for that purpose is properly allocated between the electric and industrial steam sales systems.

Q. Has the significant increase in steam load caused fuel costs charged to steam to change?

A. Yes.

Q. Why?

A. The steam capacity from Boiler 5 that burns coal for it fuel source has reached its maximum output. Boilers 1, 2, 3, 4 and 8, which use gas as the primary fuel, have to be used to supply any additional steam load. Steam from Boilers 1, 2, 3, 4 and 8 cost per mmBtu is significantly higher than Boiler 5 causing the cost of service to increase.

III. Natural Gas Pricing

Q. What does GMO propose as the price of natural gas?

A. Attached is Schedule TMN-3(HC). This schedule shows the 3-Month average of the 2009 strip of NYMEX contract month prices for the period from January 1, 2008 to

March 31, 2008. GMO proposes to use this average of actual market settlements as the estimate for market prices.

Q. Does the NYMEX price include basis or transportation charges to bring the gas to the generating plant?

A. No. The NYMEX price reflects the market price for the commodity only of that delivered to Henry Hub. For this reason, the burner tip price, which is the price delivered to the plant, is also shown in schedule TMN-3.

Q. Does the burner tip price include adjustments for GMO's hedging program?

A. No. For a discussion of GMO's hedging program, please refer to the Direct Tstimony of H. Davis Rooney.

IV. Steam Sales Load Forecast

Q. Please describe the methodology used in creating the hourly Steam Load Forecast.

A. The Steam Load Forecast is based on the original 2008 Budget Forecast. This provides the expected monthly steam mmBtu usage for each customer. The monthly steam mmBtu is then distributed over the hours in each month using an hourly load shape for each customer.

Q. Please explain the process used to create the monthly steam load forecast.

A. The starting point for the monthly steam load forecast is the 2008 budget forecast. Several steam customers' usage levels increased significantly in January 2008, therefore some adjustment of the forecast is necessary. For the months available at the time, 2008 actuals were used. Actuals were available for January, February, and March. For the remaining months, April through December, the steam customers' energy usage mmBtu's

were estimated based on 2007 actuals. For those customers that increased their usage levels recently, the new steam load was estimated consistent with those increases. The new steam load forecast was then reviewed for reasonableness and compared to the customers historical usages. The steam load forecast was also reviewed by GMO's steam customer representative.

Q. Please describe the basis for the hourly load shape.

A. The hourly load shape used is the hourly pattern from the 12-month period ending April 30, 2008. This was the most recent 12-month period available at the time. Customer specific hourly load shapes were used since each customer has their own pattern of usage.

Q. Does this conclude your direct testimony?

A. Yes.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Aquila, Inc. dba KCP&L Greater Missouri Operations Company to Modify Its Steam Tariffs to Effectuate a Rate Increase	)))	Case No. HR-2009-____

AFFIDAVIT OF TIMOTHY M. NELSON

STATE OF MISSOURI	)	
	)	**ss**
COUNTY OF JACKSON	)	

Timothy M. Nelson, being first duly sworn on his oath, states:

1. My name is Timothy M. Nelson. I work in Kansas City, Missouri, and I am employed by Kansas City Power & Light Company as Resource Planning Engineer.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Aquila, Inc. dba KCP&L Greater Missouri Operations Company consisting of nine (9) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.

3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.

Timothy M. Nelson

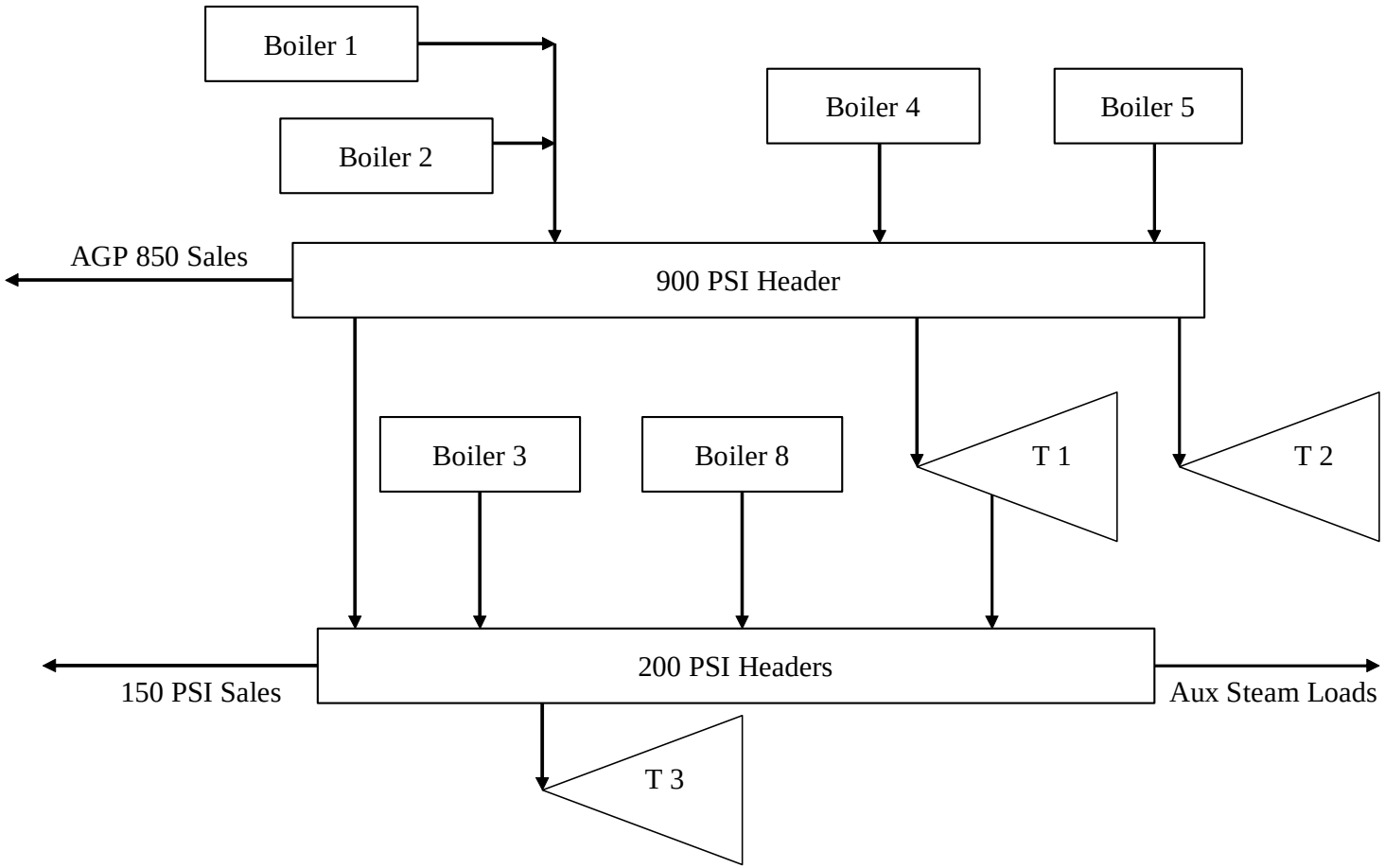
Subscribed and sworn before me this 5th day of September 2008.

Notary

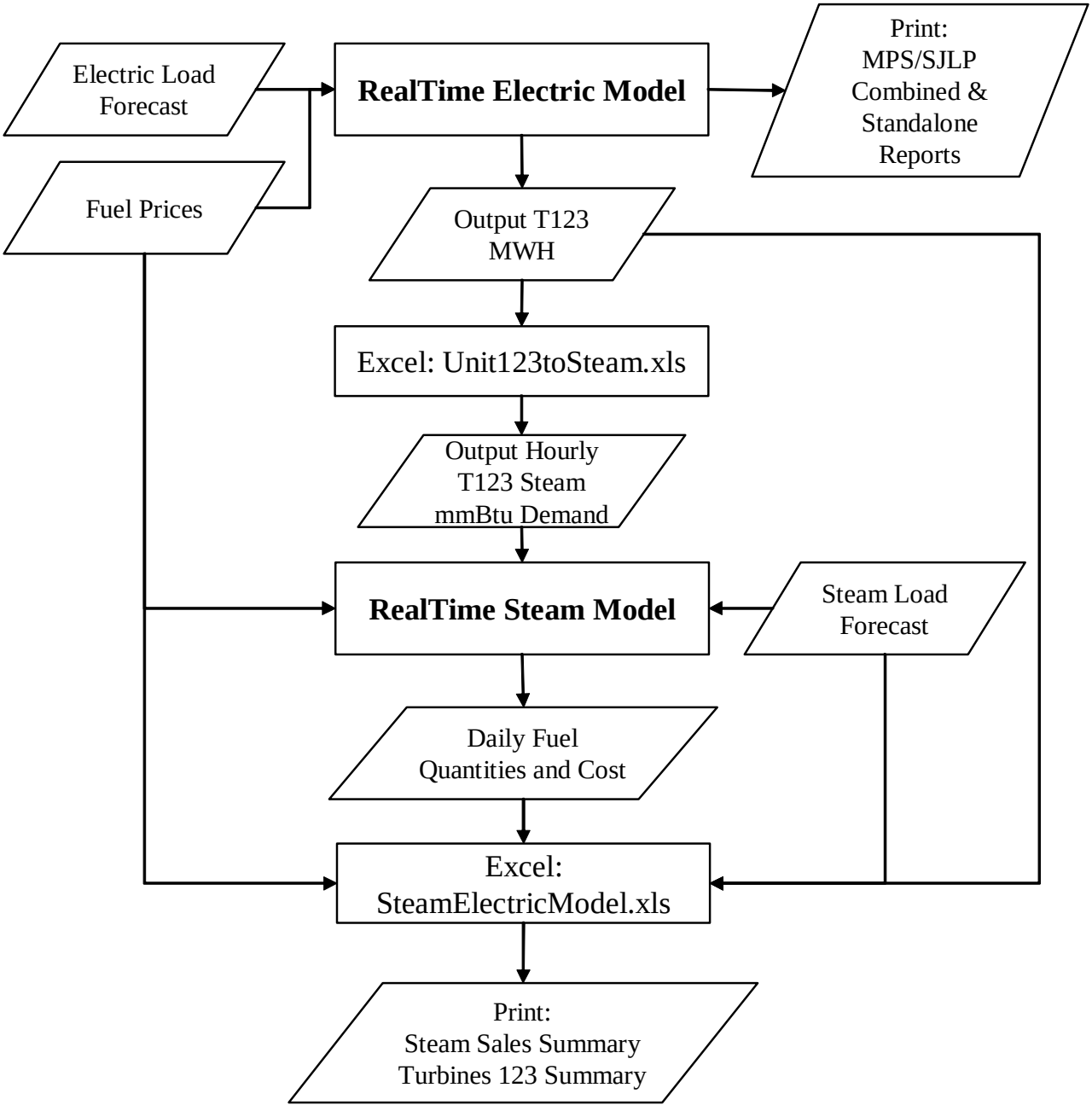
My commission expires: Feb 4 2011

" NOTARY SEAL "
Nicole A. Wehry, Notary Public
Jackson County, State of Missouri
My Commission Expires 2/4/2011
Commission Number 07391200

TMN-1: Lake Road 900# Steam System Diagram



TMN-2: Missouri Steam/Electric Production Model Process



SCHEDULE TMN-3

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