

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**In the Matter of:**

**THE 2014 JOINT INTEGRATED RESOURCE )  
PLAN OF LOUISVILLE GAS AND ELECTRIC )  
COMPANY AND KENTUCKY UTILITIES ) CASE NO. 2014-00131  
COMPANY )  
)**

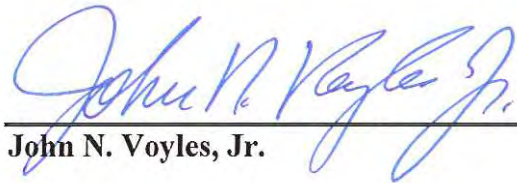
**RESPONSE OF  
LOUISVILLE GAS AND ELECTRIC COMPANY  
AND KENTUCKY UTILITIES COMPANY  
TO THE COMMISSION STAFF'S THIRD REQUESTS FOR INFORMATION  
DATED FEBRUARY 3, 2015**

**FILED: FEBRUARY 18, 2015**

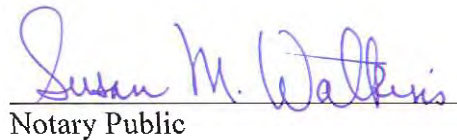
VERIFICATION

COMMONWEALTH OF KENTUCKY )  
 ) SS:  
COUNTY OF JEFFERSON )

The undersigned, **John N. Voyles, Jr.**, being duly sworn, deposes and says that he is the Vice President, Transmission and Generation Services for Louisville Gas and Electric Company and Kentucky Utilities Company and an employee of LG&E and KU Services Company, that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

  
\_\_\_\_\_  
**John N. Voyles, Jr.**

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 18<sup>th</sup> day of February 2015.

 (SEAL)  
\_\_\_\_\_  
Notary Public

My Commission Expires:

**SUSAN M. WATKINS**  
Notary Public, State of Large, KY  
My Commission Expires Mar. 16, 2017  
Notary ID # 486723

**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Commission Staff's Third Requests for Information**

**Dated February 3, 2015**

**Case No. 2014-00131**

**Question No. 1**

**Witnesses: John N. Voyles, Jr.**

- Q-1. Refer to the response to Item 7 of Commission Staff's Second Request for Information ("Staff's Second Request").
- a. The first sentence of the response states, "The purpose of the chemical additive testing conducted at E.W. Brown Station was to identify alternatives for the E.W. Brown Units 1 and 2 to comply with mercury emissions standards and any operational limitations required to maintain compliance." Explain whether the testing was also indicative of the units' being compliant with limits other than for mercury that are prescribed by the Mercury and Air Toxic Standards ("MATS").
  - b. The second sentence of the response states, "The completed test results...indicate the ability to attain mercury compliance...with some operational limitations during peak summer conditions." Specifically identify the type of peak summer conditions referenced in the response and describe the "operational limitations" to which the response refers.
  - c. The last sentence of the response states, "The Companies do not plan to retire the units as a result of the Mercury and Air Toxic Standards." Based on compliance being attained using chemical additives, provide the current expectations for the number of years Brown Units 1 and 2 should continue to operate.
- A-1.
- a. The chemical additive testing conducted at E.W. Brown Station was intended only to evaluate unit compliance with mercury emissions standards. The existing air quality controls (ESP-Electrostatic Precipitator and WFGD-Wet Flue Gas Desulfurization) on the units provide compliance with the other emission limits required by the MATS rule.
  - b. The 'peak summer conditions' referenced are simultaneous high load demand on both Brown Units 1 and 2 and for an extended duration. Under these conditions and in conjunction with variability of coal mercury content it is conceivable that hourly mercury emissions may gradually increase and exceed the limits. The operational

adjustments which could be required to avoid exceedances might be load limits and/or slower or less load following operation.

- c. Attaining compliance through the use of chemical additives does not affect the Companies' Response to Commission Staff's Initial Data Request Question No. 7. The Companies do not have an estimate for the remaining life of Brown Units 1 and 2. The 2014 IRP describes scenarios that would result in the potential retirement of Brown Units 1 and 2, as well as scenarios that would result in their continued operation. The Companies continually monitor developments related to the EPA's regulations, including the proposed Clean Power Plan, to ensure that decisions will result in minimizing customer costs while maintaining reliability. However, in the absence of developments that result in uneconomic operation, the Companies believe Brown Units 1 and 2 can operate through the period studied, and even longer, with the Companies continuing their good operating and maintenance practices.

**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Commission Staff's Third Requests for Information**

**Dated February 3, 2014**

**Case No. 2014-00131**

**Question No. 2**

**Witness: John N. Voyles, Jr.**

- Q-2. Refer to the January 8, 2015 Platts Megawatt Daily article ("Platts article"), attached as the Appendix to this request for information.
- a. Refer to the last paragraph on page 1, which states that recent test results show the two units can reduce mercury emissions sufficiently to meet MATS.
    - (1) Describe in detail the testing procedures used to measure the reduction in mercury emissions for Brown Units 1 and 2.
    - (2) For Brown Units 1 and 2, provide the mercury emissions levels: (a) prior to testing the chemical additives; (b) during the testing of the chemical additives; and (c) expected after installation of the permanent injection system.
  - b. The paragraph beginning at the bottom of the left column on page 16 of the Platt's article and continuing to the top of the right column indicates that two chemical additives were tested at Brown Units 1 and 2. Identify the two additives and indicate which is "applied before the coal-burning process."
  - c. The first paragraph under the heading, "Installing injection systems is 'less expensive,'" states, "The companies currently are installing a permanent injection system at Brown to control the use of both additives."
    - (1) Provide the expected cost of the injection system and the estimated completion date of its installation.
    - (2) Provide the estimated monthly or annual cost of operating the injection system, including the costs of the chemical additives.
    - (3) Explain whether the Companies believe a Certificate of Public Convenience and Necessity is required for the injection system.

A-2.

a.

- (1) The testing procedures used to measure the reduction in mercury emissions for Brown is described below.

EWB Test Procedure

All three units at the Brown Station emit through a common Wet Flue Gas Desulfurization (WFGD) Unit to a common stack. The effectiveness of mercury capture is dependent on the amount of mercury oxidized during the combustion process and subsequent flow of flue gas through the air quality system controls. E.W. Brown units 1 and 2 have no Selective Catalytic Reduction Unit (SCR) to facilitate mercury oxidation therefore levels of oxidation of mercury for capture in the WFGD needed to be determined. Initially, short duration tests in 2012 were designed to provide an indication of the baseline emissions. Subsequent tests evaluated the efficacy of combining coal and WFGD additives to assess compliance. Speciation of oxidized, elemental and total mercury was measured using USEPA Test Method 30B (Appendix K sorbent traps) at Brown Units 1 and 2 before entering the WFGD and at the stack. Specifically, the measurements were taken at the following locations by these instruments:

- Brown Units 1 and 2 Inlet to WFGD – Ohio Lumex sorbent traps and an Apogee mercury Continuous Emission Monitor System (CEMS).
- Stack – Ohio Lumex sorbent traps and an Apogee mercury CEMS.

Each test campaign was completed with only one unit operating through the common stack. LG&E/KU Environmental Affairs confirmed test results using portable 30B Sorbent Traps. Mercury analysis was performed for the following samples during the testing: coal, fly ash, and scrubber solids. Unit operating process parameters were also collected during the tests.

Chemical additive injection rates were optimized using 30B Sorbent Trap data and direct measurement of ORP (oxidation reduction potential) in the WFGD slurry.

- (2) The Table below summarizes attachments provided in part to the previous response to Wallace McMullen and Sierra Club's Supplemental Data Request Question No. 2.16a and describes the Brown 1 and 2 mercury emissions levels (a) prior to testing the chemical additives (b) during the testing of the chemical additives; and (c) expected emissions levels after installation of the permanent injection system. Please note that the emission limit for mercury under the MATS rule is < 1.2 lbs/TBtu on a rolling 30-day average.

	(a) Baseline (Uncontrolled) Mercury Emissions @ Stack		(b) Mercury Emissions During Additives Testing	(c) Mercury Emissions Expected after Installation of Permanent Injection System @ Stack
	Emission Rate Range	Emission Rate Average	Units 1 & 2 Combined @ Stack	30 day rolling average
	(lbs/TBtu)	(lbs/TBtu)	(lbs/TBtu)	(lbs/TBtu)
E.W. Brown Unit 1	0.1 - 2.3	0.93	0.98	<1.2
E.W. Brown Unit 2	1.3-2.55	1.68		<1.2

- b. Specifically, during the Nalco testing at E.W. Brown Station Nalco MerControl® 7895 (calcium bromide) was applied to the coal before the coal-burning process in conjunction with Nalco MerControl® 8034 injection in the WFGD.

Please refer in part to the previous response to Wallace McMullen and Sierra Club’s Supplemental Data Request Question No. 2.16 c

- c. (1) Capital cost to install a chemical injection system on E.W. Brown Units 1 and 2 is approximately \$2.4M and will be installed by May 1, 2015.

Please refer in part to the previous response to Wallace McMullen and Sierra Club’s Supplemental Data Request Question No. 2.16 b.

- (2) Please see table below and refer in part to the previous response to Wallace McMullen and Sierra Club’s Supplemental Data Request Question No. 2.16 b.

2015 - 2019 E.W. Brown Station Business Plan Mercury Injection System O&M
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Unit	2015	2016	2017	2018	2019
E.W. Brown Unit 1	\$288,396	\$323,954	\$329,820	\$280,347	\$257,359
E.W. Brown Unit 2	\$585,540	\$657,401	\$669,636	\$578,732	\$566,319
Total:	\$873,936	\$981,355	\$999,456	\$859,079	\$823,678

The Companies do not believe a Certificate of Public Convenience and Necessity (“CPCN”) is required for the injection system because it is a relatively small addition (a total capital cost of approximately \$2.4 million) to already certificated facilities (i.e., Brown Units 1 and 2) on existing generating station property owned by the Companies. The injection system is therefore an extension in the ordinary course of business as defined in 807 KAR 5:001 §15(3).