COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

JOINT APPLICATION OF LOUISVILLE GAS AND ELECTRIC COMPANY AND KENTUCKY UTILITIES COMPANY FOR CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF A COMBINED CYCLE COMBUSTION TURBINE AT THE GREEN RIVER GENERATING STATION AND A SOLAR PHOTOVOLTAIC FACILITY AT THE E.W. BROWN GENERATING STATION	)	**CASE NO. 2014-00002**

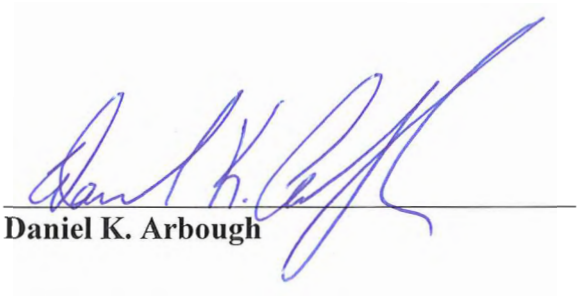
RESPONSE OF
LOUISVILLE GAS AND ELECTRIC COMPANY
AND KENTUCKY UTILITIES COMPANY
TO THE COMMISSION STAFF'S SECOND INFORMATION REQUEST
DATED APRIL 10, 2014

FILED: APRIL 24, 2014

VERIFICATION

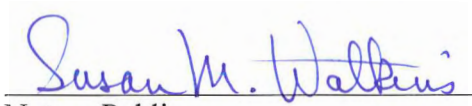
COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF JEFFERSON)

The undersigned, **Daniel K. Arbough**, being duly sworn, deposes and says that he is Treasurer for Louisville Gas and Electric Company and Kentucky Utilities Company and an employee of LG&E and KU Services Company, and 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.



Daniel K. Arbough

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 23rd day of April 2013.



Notary Public (SEAL)

My Commission Expires:

SUSAN M. WATKINS
Notary Public, State at Large, KY
My Commission Expires Mar. 19, 2017
Notary ID # 485723

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF JEFFERSON)

The undersigned, **David S. Sinclair**, being duly sworn, deposes and says that he is Vice President, Energy Supply and Analysis for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and 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.

David S. Sinclair

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 23rd day of April 2014.

Notary Public (SEAL)

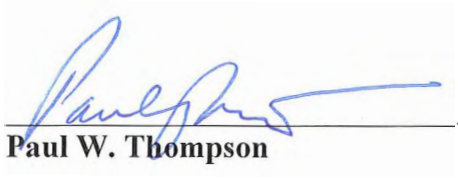
My Commission Expires:

SUSAN M. WATKINS
Notary Public, State at Large, KY
My Commission Expires Mar. 19, 2017
Notary ID # 485723

VERIFICATION

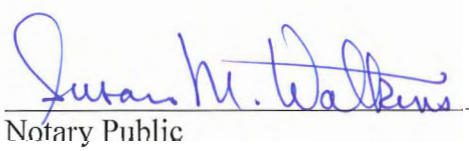
COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF JEFFERSON)

The undersigned, **Paul W. Thompson**, being duly sworn, deposes and says that he is Chief Operating Officer for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and 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.



Paul W. Thompson

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 23rd day of April 2014.



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Notary ID # 485723

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 23rd day of April 2014.

Notary Public (SEAL)

My Commission Expires:

SUSAN M. WATKINS
Notary Public, State at Large, KY
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Notary ID # 485723

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 1

Witness: David S. Sinclair

Q-1. Refer to the response to Item 18 of Commission Staff's Initial Information Request ("Staff's First Request"). The Companies clarify that having excess capacity and energy is often viewed negatively by Commissions. Specifically, they note that regulators are reluctant to allow excess capacity costs to be included in rates for the reason that the capacity is not considered used and useful and thus, would unnecessarily increases customers' costs. Refer also to the response to Item 16 of Staff's First Request that shows Reserve Margin Excesses (at the 15 percent reserve margin) into the 2023/2024 timeframe, assuming the Green River natural gas combined cycle ("NGCC") and Brown solar projects are approved.

a. Clarify this dichotomy.

b. If the Commission accepts the capacity as filed, will the planned solar capacity exacerbate the increase to customers cost as discussed above?

A-1.

a. Mr. Sinclair raised the issue of excess capacity in his testimony (page 22, lines 14-21) to explain why the Companies did not evaluate a "High" load forecast case. As he states on page 22, lines 14-16, "…the Companies were being conservative in their analysis of potential resource options." This comment was not meant to imply that should capacity be greater than a certain reserve margin level in a given year that such capacity should be considered "excess." It is not uncommon for a new unit that is acquired to serve load for 30-50 years to create a "lumpy addition" problem for the first few years after it comes on-line.

In this case, the response to KPSC 1-16 shows the amount of capacity above the <u>minimum</u> economic reserve margin range (that would perfectly optimize the cost of capacity and the cost of unserved energy (i.e., blacking out customers)) for the first few years after Green River NGCC and Brown Solar Facility come on line. Indeed, the addition of these resources will result in a reserve margin of approximately 20 percent in 2018 through 2020. However,

as shown in the 2014 Integrated Resource Plan, according to the loss of load event analysis ("LOLE"), a reserve margin of 21 percent would be consistent with the industry standard of 1 day in 10 year loss of load for the Companies' system.[1] Thus, there is an argument from a reliability perspective, that there is no lumpy addition issue in this case.

Furthermore, the Companies evaluated a smaller 1x1 NGCC (332 MW) that would have resulted in a lower reserve margin in 2018. As can be seen in Table 19 on page 25 of Exhibit DSS-1, the PVRR of the Green River 1x1 option is $132 million more expensive than the Green River 2x1 option across all scenarios. The Green River 1x1 option is even more expensive in the weighted average of the Low Load scenarios by $116 million PVRR as compared to the Green River 2x1 option (see Table 22 on page 28 of Exhibit DSS-1). These cases demonstrate that attempting to reduce the potential for "lumpy" additions in 2018-20 result in higher costs for customers over time.

b. Section 4.6 of Exhibit DSS-1 discusses the impact on PVRR of the Brown Solar Facility.

[1] See Section 5.1 beginning on page 21 of the report titled *2014 Reserve Margin Study* (Volume III, Technical Appendix).

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 2

Witness: David S. Sinclair

Q-2. Refer to the response to Item 26 of Staff's First Request. The Companies state that in staying consistent with past resource assessments, they assume no access to energy from the market and no off-system sales as they plan generation. With access to the PJM and MISO markets, is it in the best interest of the Companies' ratepayers to construct excess generation? Correlate this response with the response to Item 1 above.

A-2. No. Including potential margins from off-system sales in the evaluation of future resource options would expose customers to higher costs should those margins not materialize. The selection of the optimal resource to meet customers' long-term energy needs should not require customers to "bet" on future hourly spot electricity prices. To further increase the size of the bet by deliberately procuring more capacity than is appropriate to reliably serve customers would further increase the financial risk to customers.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 3

Witness: David S. Sinclair

Q-3. Refer to the response to Item 28 of Staff's First Request. The Companies state that the amount of solar energy received in central Kentucky is below the average for the continental United States. Given such, have the Companies performed any studies which compare purchasing solar power to generating solar power?

a. If so, provide the studies/comparisons.

b. If not, explain why such studies were not performed?

A-3.

a. The Companies have not performed this study.

b. Based on the proximity of Kentucky to regions with more favorable solar irradiance, the cost of transmission for solar power generated in these regions would reduce the value of any solar efficiency gains.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 4

Witness: David S. Sinclair

Q-4. Refer to the Attachment to the response to Item 34.a. of Staff's First Request. The chart shows capacity factors for different scenarios. Explain the significant decline in the capacity factor from 2018 to 2042 in the first and seventh scenarios presented.

A-4. The decline in capacity factors for these scenarios is driven primarily by the assumed widening of the spread between natural gas and coal prices. This assumption favors coal resources over natural gas resources.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 5

Witness: John N. Voyles, Jr.

Q-5. Provide the useful life of a solar facility like the one proposed at the Brown Station.

A-5. PV solar panels are typically guaranteed to produce 80 percent of their rated capacity for 20 years.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 6

Witness: John N. Voyles, Jr.

Q-6. Refer to the response to Item 69 of the Attorney General's Initial Request for Information ("AG's First Request"). The response states that there are 66 full-time KU employees and 13 contractors that perform maintenance at the Brown Station. Reconcile the numbers provided here with those provided in the response to Item 7.b. of Staff's First Request.

A-6. At Brown Station, there are 149 KU full-time employees inclusive of the 66 full-time maintenance employees referenced in AG 1-69. Likewise, the 43 contracted employees include the 13 contracted maintenance employees from AG 1-69.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 7

Witnesses: David S. Sinclair

Q-7. Refer to the response to Item 130 of the AG's First Request. The response states that "[c]ompared to the Green River unit, total fixed and non-fuel operating costs are assumed to be lower for the Cane Run unit." Explain the reasons for this.

A-7. Operating cost assumptions for Cane Run 7 (including the cost of its long-term service agreement) reflect the expected cost of operating the equipment that will comprise Cane Run 7. The operating cost estimates for Green River NGCC are somewhat generic since the equipment manufacturer has not been determined. Regardless, because operating costs for Green River NGCC are assumed to be higher than operating costs for Cane Run 7, the Companies' valuation of Green River NGCC is not advantaged by the ability to displace power from Cane Run 7, a unit that the Companies are only in the process of building.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 8

Witness: David S. Sinclair

Q-8. Refer to the response to Item 198.h. of the AG's First Request. Explain why the Companies did not make a counteroffer.

A-8. As can be seen in Table 20 of Exhibit DSS-1, both of these assets have significantly greater PVRR in the Mid CO_2 scenario as compared to Green River NGCC, ranking last and next to last compared to all other options evaluated.

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 9

Witness: David S Sinclair/ Daniel K. Arbough

Q-9. Refer to the public comments filed by Big Rivers Electric Corporation ("Big Rivers") on April 4, 2014 ("Comments").

a. Refer to page 3 of the Comments, lines 3-15. Explain why excluding off-system sales opportunities from the Companies' analyses would not "introduce a systematic bias that penalizes coal resources."

b. Refer to page 6 of the Comments, lines 1-5. Explain whether the Companies believe it is accurate that "natural gas prices at the low level paired with mid carbon is much less likely than natural gas prices at the mid or high levels paired with mid carbon."

c. Refer to page 6 of the Comments, lines 21-26, and the graph provided on page 7. Big Rivers states that, according to the United States Energy Information Administration, carbon price scenarios are expected to correspond to higher natural gas prices and that, had the Companies adjusted the probabilities or the natural gas prices for this relationship in their analyses, "the Green River NGCC would have been a less favorable option." Explain why the Companies did not adjust for this relationship in their analyses and describe how their analyses would have been affected if they had adjusted for it.

d. Refer to pages 7-9 of the Comments, which argue that the imputed debt adjustment used by the Companies overstates the impact of the imputed debt adjustment because it includes only the cost of additional equity needed to balance capitalization, but not a corresponding reduction in debt when the additional equity is applied to reduce overall debt.

1. Explain how the Companies' imputed debt adjustment does not overstate the impact of the imputed debt adjustment as asserted by Big Rivers.

2. Provide the risk factor used for calculating the imputed debt associated with purchase power agreements in the Companies' analyses and explain how it was determined.

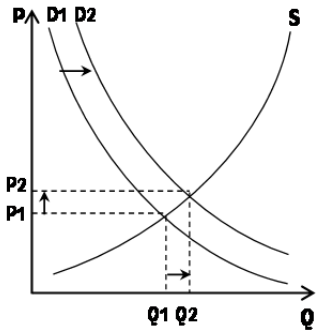
e. Refer to page 11 of the Comments, lines 23-25. Explain whether the Companies believe it is accurate that "[s]ince the Applicants give equal weighting to each natural gas price scenario (probability 0.333), the probability that gas prices are mid or high (and that deferral is preferable) is 67%." If not, provide an explanation.

f. Refer to page 12 of the Comments, lines 2-5. Explain whether the Companies believe it is accurate that "the Applicants should have gone further and considered the added benefit of waiting to learn more information about the three key uncertain factors identified by the Applicants: load growth, natural gas prices and carbon policy." If not, provide an explanation.

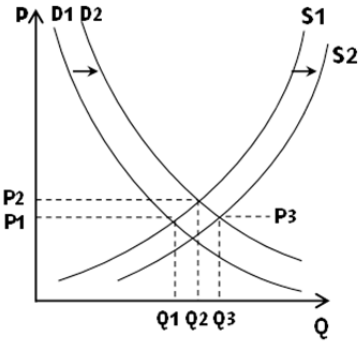
A-9.

a. Depending on gas prices and CO_2 regulations, it is unclear if excluding off-system sales "penalizes" coal or NGCC units. Regardless, the Companies do not believe that customers should be put in a position of speculating on the market price of electricity for long-term resource decisions. See the response to Question No. 2.

b. All other things equal, the Companies would expect that CO_2 regulations would increase the quantity of gas demanded and the price for natural gas would rise. This is displayed in the graph below, where: D1=initial demand curve for natural gas, D2= the demand curve for natural gas resulting from CO_2 regulations, S=supply of natural gas, Q1=initial quantity of natural gas demanded, Q2= increased quantity of natural gas demanded after CO_2 regulations, P1=initial price of natural gas, P2=increased price of natural gas after CO_2 regulations.



However, in the longer-term, not all things are equal. The increased natural gas price will create incentives for gas suppliers to advance technology and develop new reserves to increase the supply of natural gas. When that happens, the supply curve would shift to S2 as shown in the graph below supporting a new lower price (P3) than P2 (the initial price resulting from CO2 regulations). Price P3 may even be equal to or lower than P1, depending on how far to the right S2 shifts.



c. An explanation for why the Companies did not adjust the likelihood of Low gas prices in the Mid CO_2 scenario is included in the response to Question No. 9(b). Regardless, considering the uncertainty surrounding load and greenhouse gas regulations, the Green River 2x1 alternative is the least-cost alternative on average in any gas price scenario (see Table 21 on page 27 of Exhibit DSS-1).

d. 1. The Companies recognize that their imputed debt adjustment does have an overstated impact, but not in a way that affects any of the recommendations the Companies have made in this case. The size of the impact is directly related to the size of the capacity payment and the length of the proposed PPA. This has little effect on short-term PPAs.

2. The risk factor used in calculating the imputed debt is 50%. S&P typically applies a 50% risk factor to PPA's where the fixed cost portion of the contract is recovered pursuant to a general rate case rather than through a specific cost recovery mechanism such as the Fuel Adjustment Clause. This is comparable to the Companies' situation. Therefore, the 50% risk factor was used.

e. In their public comments, Big Rivers correctly assessed the assumed likelihood that natural gas prices will be at or above the Mid gas price scenario (67 percent), but they misinterpreted the Companies' comments related to deferring the Green River NGCC. On page 11 of their public

comments, lines 17-20, Big Rivers quoted the following sentence from page 41 of Exhibit DSS-1:

If the Companies knew that gas prices were going to be at or above the Mid gas price scenario, deferring the Green River unit would be least-cost.

This sentence does not pertain to all twelve scenarios evaluated. Instead, this sentence pertains only to the Mid CO_2 scenarios and specifically, the four Mid CO_2 scenarios with Mid or High gas prices. The sentence immediately preceding this sentence on page 41 of Exhibit DSS-1 states that, "[t]he 2018 Green River 2x1 alternative is least-cost in all of the Zero CO_2 scenarios and the two Mid CO_2 scenarios with low gas prices."

Building the Green River NGCC in 2018 is the least-cost alternative in eight of the twelve scenarios considered as well as each set of CO_2, gas, and load scenarios (see Table 32 and Table 33 on pages 42-43 of Exhibit DSS-1). Furthermore, the least-cost deferral alternative includes a PPA for SCCT capacity, not coal capacity.

f. The Companies do not believe that is an accurate statement. The Companies' analysis in Exhibit DSS-1 evaluated all of the resource options (and various combinations of options) over a 30-year period and over a wide range of possible natural gas prices and load forecasts. Waiting a few more years to make a resource decision is unlikely to provide any meaningful information about either of these variables over the long-term.

The Companies acknowledge that the EPA has stated that it will release its proposed regulations on GHG for existing power plants in June 2014. Regardless of the specific nature of those regulations and the timing for compliance, the regulation of GHG is not likely to favor coal-fired generation over NGCC technology. Furthermore, the Green River NGCC will be required to meet all New Source Performance Standards for GHG and will be an important asset in a carbon constrained environment. As shown in the 2014 Integrated Resource Plan, even with the addition of Green River NGCC, the Companies would likely need additional NGCC capacity by 2020 to meet a CO_2 mass emissions standard.[2]

[2] See Section 4.3 beginning on page 41 of the *2014 Resource Assessment* (Volume III, Technical Appendix).

LOUISVILLE GAS AND ELECTRIC COMPANY
KENTUCKY UTILITIES COMPANY

Response to the Commission Staff's Second Information Request
Dated April 10, 2014

Case No. 2014-00002

Question No. 10

Witness: Paul W. Thompson

Q-10. Refer to the response to Item 6 of the Kentucky Industrial Utility Customers, Inc.'s Initial Information Request, which was filed with a petition for confidential treatment.

a. Refer to the second and fourth bullet points on page 23 of 232, the fourth and sixth bullet points on page 30 of 232, and the first bullet point on page 31 of 232. Explain why the Companies are not proposing to defer construction of the NGCC to the later date shown in these bullet points.

b. Refer to the fifth bullet point on page 30 of 232. With the risk of carbon regulations being a critical component of the Companies' proposal to build the Green River NGCC and Brown solar facility, explain why it would not be beneficial for the Companies to delay a decision on the proposed construction until they have more information on carbon regulations.

A-10.

a. As discussed on page 41 of Exhibit DSS-1, the Companies are not proposing to defer the Green River NGCC because the due diligence associated with the only least-cost deferral option identified a number of major risks that, should they have materialized, would have jeopardized the ability to reliably serve customers. See Appendix C of Exhibit DSS-1 for a full discussion of these risks.

Note that the document on page 30 of 232 is dated June 18, 2013. Based on the state of the analysis at that time, it appeared promising that deferring the construction of a NGCC was possible. Note that on page 31 of 232, which is part of the same document, the Companies identified the "Next Steps" required to further the analysis process. One of these items required Generation Planning and Transmission Planning to ensure a "complete understanding" of the analysis and assumptions used to evaluate the options under consideration.

CONFIDENTIAL INFORMATION REDACTED

The document on page 23 of 232 is dated July 24, 2013. By that point in the analysis process, the Companies had identified the [redacted] proposal as being a potential least-cost option that would defer the construction of an NGCC. However, as stated above, the due diligence on this option resulted in it being deemed not a viable option. As stated in the fifth bullet on page 23 of 232, should a PPA with [redacted] not materialize, building a CCGT in 2018 is the next preferred option.

b. See the response to Question No. 9(f).