

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

| | | |
|---|---|----------------------------|
| ELECTRONIC JOINT APPLICATION OF |) | |
| KENTUCKY UTILITIES COMPANY AND |) | |
| LOUISVILLE GAS AND ELECTRIC |) | |
| COMPANY FOR CERTIFICATES OF PUBLIC |) | CASE NO. 2022-00402 |
| CONVENIENCE AND NECESSITY AND |) | |
| APPROVAL OF A DEMAND SIDE |) | |
| MANAGEMENT PLAN AND APPROVAL OF |) | |
| FOSSIL FUEL-FIRED GENERATING UNIT |) | |
| RETIREMENTS |) | |

RESPONSE OF
KENTUCKY UTILITIES COMPANY
AND
LOUISVILLE GAS AND ELECTRIC COMPANY
TO
FOURTH DATA REQUEST OF JOINT INTERVENORS METROPOLITAN
HOUSING COALITION, KENTUCKIANS FOR THE
COMMONWEALTH, KENTUCKY SOLAR ENERGY SOCIETY AND
MOUNTAIN ASSOCIATION'S
DATED JUNE 27, 2023

FILED: JULY 7, 2023

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Christopher M. Garrett**, being duly sworn, deposes and says that he is Vice President, Finance and Accounting, for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, 220 West Main Street, Louisville, KY 40202, 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.

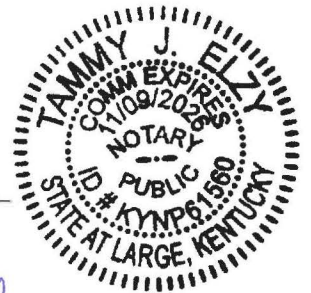
Christopher M. Garrett

Christopher M. Garrett

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 5th day of July 2023.

Tammy J. Ely

Notary Public
Notary Public ID No. KYNP61560



My Commission Expires:

November 9, 2026

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Philip A. Imber**, being duly sworn, deposes and says that he is Director – Environmental and Federal Regulatory Compliance for LG&E and KU Services Company, 220 West Main Street, Louisville, KY 40202, 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.

Philip A. Imber
Philip A. Imber

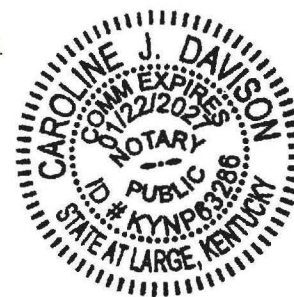
Subscribed and sworn to before me, a Notary Public in and before said County and State, this 30th day of June 2023.

Caroline J. Davison
Notary Public

Notary Public ID No. KYNP63286

My Commission Expires:

January 22, 2027



VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
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, 220 West Main Street, Louisville, KY 40202, 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

David S. Sinclair

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 5th day of July 2023.

Caroline J. Davison

Notary Public

Notary Public ID No. KYNPL63286

My Commission Expires:

January 22, 2027



**KENTUCKY UTILITIES COMPANY
AND
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**Response to Fourth Data Request of Joint Intervenors Metropolitan Housing
Coalition, Kentuckians for the Commonwealth, Kentucky Solar Energy
Society and Mountain Association
Dated June 27, 2023**

Case No. 2022-00402

Question No. 4.1

Responding Witness: Lonnie E. Bellar / David S. Sinclair

- Q-4.1. Please refer to the Companies' response to JI Request 3-3(a), which refers to the Companies' response to Attorney General and Kentucky Industrial Utility Customers, Inc. ("AG-KIUC") joint request 3-12. Please explain how Companies' response regarding curtailment is responsive to the original question or provide a direct response to JI request 3-3(a) by explaining whether Companies anticipate having the capability to operate their solar panels in downward dispatch or full flexibility operating mode.
- A-4.1. As explained in the response to AG-KIUC 3-12, solar inverters have the capability to respond to curtailment requests. The terminology used in question JI 3-3(a) are various applications of that curtailment capability. Even if the Companies are able to implement all of their solar proposals, the Companies do not anticipate needing to operate their proposed owned solar facilities in either downward dispatch or full flexibility operating mode; rather, they anticipate dispatching all available solar energy because the level of solar penetration likely will not require solar curtailments. That notwithstanding, the Companies could implement the capability to operate their owned solar in downward dispatch or full flexibility operating mode if it is economically prudent to do so at some point in the future, and Companies will evaluate whether to implement this capability at that time.

With regard to the PPAs, the agreements contain detailed definitions and provisions for curtailment. Section 8.2 of each PPA, along with the following defined terms, describe the responsibilities of the owner and the Companies:

| PPA | Applicable Defined Term(s) |
|-----------------------------|---------------------------------------|
| Clearway Song Sparrow | Buyer Curtailment Order |
| BrightNight Gage GGSO | Buyer Curtailment Order |
| iBV Nacke Pike/Grays Branch | Emergency Condition, Curtailed Energy |

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Case No. 2022-00402

Question No. 4.2

Responding Witness: Lonnie E. Bellar / Charles R. Schram

Q-4.2. Please refer to Companies' response to JI Request 3-3(c), which provides the capability of the proposed NGCCs and Cane Run 7 to follow load in units of MW per minute and refers to the capabilities of solar facilities in units of MW.

- a. Please confirm that units of MW is not usually considered a metric for measuring load-following capability. If anything but confirmed, please explain your response.
- b. Please explain how Companies response to JI request 3-3(c) is responsive to the original question or provide a direct response.
- c. The Companies' response to AG-KIUC joint request 3-6(a) indicates that solar generation's "ramp rate is almost instantaneous with changes in solar irradiance." Is solar generation's ramp rate also almost instantaneous when curtailing or re-dispatching such assets?

A-4.2.

- a. PJM defines load-following as the "Ability of a resource to adjust its output to follow fluctuations in system demand throughout the day."¹ PJM defines ramp rate as "The rate, expressed in megawatts per minute, at which a generating unit can change output level."² The Companies cannot locate the cited reference to "the capabilities of solar facilities in units of MW" in the response to JI 3-3(c). The response noted that the solar facilities' ramp rates depend on irradiance levels and "will vary up to each unit's nameplate capacity of 120 MW." This is meant to convey that the ramp rate could reach 120 MW per minute. For example, the speed of the movement of clouds over

¹ <https://pjm.com/-/media/library/reports-notice/special-reports/2021/20210311-reliability-in-pjm-today-and-tomorrow.ashx>, page 5

² https://www.pjm.com/Glossary#index_R

a solar facility could result in a relatively fast or slow change in output correlated to the rate of change in irradiance.

To clarify the prior response relating ramp rate to load-following, the Companies' response to JI 3-3(c) used ramp rate as a proxy for potential load-following capability. In the case of solar, while the ramp rate may be instantaneous as noted in the Companies' response to AG-KIUC 3-6(a), it is not possible to forecast a) when this instantaneous ramp rate will be available or b) what the ramp rate will be at a future point in time. Therefore, solar would not have complete load-following capability per the definition provided above.

- b. See the response to part (a).
- c. Yes.

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Question No. 4.3

Responding Witness: Lonnie E. Bellar

- Q-4.3. Please refer to Companies' response to JI request 3-6. Please provide a comprehensive summary of the services provided by TVA related to reliability coordination. While the referenced agreements are appreciated, please provide a summary if one exists (for example, for training of management reference purposes) or state that no such summary exists.
- A-4.3. No such summary exists.

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Question No. 4.4

Responding Witness: Lonnie E. Bellar

Q-4.4. Please refer to Companies' response to SC request 3-4(b), which states that TVA, acting as the reliability coordinator for LG&E-KU, "did not direct or coordinate specific actions . . . during Winter Storm Elliot." According to Attachment A to the Reliability Coordinator Agreement, Part II.A(c), TVA shall perform the function of "curtailment of transmission service or energy schedules, redispatch of generation and load shedding as necessary to alleviate facility overloads and abnormal voltage conditions, and other circumstances that affect interregional bulk power reliability."

- a. Please state whether during Winter Storm Elliot there was any curtailment of transmission service or energy schedules, redispatch of generation, or load shedding. If so, please provide a brief summary of such actions.
- b. If the response to Part (a) includes any such actions, please explain why TVA did not direct or coordinate those actions, and how the direction and coordination of those actions conformed to the Reliability Coordinator Agreement.
- c. If the answer to Part (a) includes any such actions, please provide any documents that summarize those actions and their results, such as reports to management or communications to relevant parties, such as TVA in its role as reliability coordinator, or to PJM or other parties as relevant to the Congestion Management Process referenced in the Reliability Coordinator Agreement.

A-4.4.

- a. In reference to Attachment A of the RC Agreement, there was no curtailment of transmission service or energy schedules, redispatch of generation, or load shedding during Winter Storm Elliott to alleviate facility overloads or abnormal voltage conditions on the LG&E/KU system. However, the

LG&E/KU Balancing Authority (“BA”) did implement load shed to mitigate a capacity and energy emergency during Winter Storm Elliott and this action was coordinated with the TVA RC in accordance with the NERC Reliability Standards.

- b. In accordance with NERC Reliability Standard EOP-011-1, the TVA RC is responsible for reviewing operating plans developed by the LG&E/KU BA to mitigate capacity and energy emergencies. The LG&E/KU BA is responsible for implementing load shed plans (if necessary) to mitigate a capacity and energy emergency and notifying the TVA RC of such actions. The RC agreement does not require the TVA RC to direct load shed to mitigate capacity and energy emergencies.
- c. No such actions were taken during Winter Storm Elliott as relevant to the Congestion Management Process. Load shed was implemented by the LG&E/KU BA to mitigate a capacity and energy emergency, not to mitigate an issue related to congestion on the transmission system.

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Case No. 2022-00402

Question No. 4.5

Responding Witness: Lonnie E. Bellar

- Q-4.5. Please refer to Attachment A to the Reliability Coordinator Agreement, Part III.B(a)-(b), which provides that LG&E-KU are responsible for providing outages, facility ratings, and operational data for all generators, and according to Part V.B(b), are responsible for providing generator unit performance characteristics and capabilities. Please provide such information provided to TVA in its role as reliability coordinator for each of the units proposed for retirement in Case No. 2023-00122 related to the June 1, 2018 to May 31, 2023 period.
- A-4.5. Generation Dispatch submits all outages, derates, and planned outages for the LG&E and KU units to the TVA generation outage portal up to 24 months in advance. The data consists of the unit name, start and stop dates/times of the outage, a comment regarding the reason for the outage or derate, and the amount the unit is available to produce for derates. The data is entered directly into the TVA portal. Outages roll off of the portal after the stop date/time is reached. The Companies do not have the ability to access and provide historical entries. See the attachment being provided in a separate file. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

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Question No. 4.6

Responding Witness: Lonnie E. Bellar

- Q-4.6. Please refer to Attachment A to the Reliability Coordinator Agreement, Part V.A(a)-(b), which provides that TVA as the Reliability Coordinator is responsible for integrating system models to ensure resource adequacy and applying methodologies and tools to assess and analyze resource adequacy plans. Similar responsibilities are described in Attachment B to the Reliability Coordinator Agreement, Parts 3.1, 3.2, and 3.3. Please provide any results from TVA's models, methodologies and tools that provide information regarding the resource adequacy of (a) LG&E/KU's current system and (b) the system with the proposed unit retirements and resource additions. If no such information exists, please explain why not.
- A-4.6. TVA has not informed LG&E/KU of any resource adequacy concerns related to the current system or the proposed unit retirements and resource additions.

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Case No. 2022-00402

Question No. 4.7

Responding Witness: Lonnie E. Bellar

- Q-4.7. Please provide the Independent Transmission Operator's most recent review, evaluation, comments, and approval of LG&E/KU's Base Case Model and Annual Plan as referenced in Attachment B to the Reliability Coordinator Agreement, Parts 2.2 and 2.6.
- A-4.7. See the attachment being provided in a separate file. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

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Case No. 2022-00402

Question No. 4.8

Responding Witness: Stuart A. Wilson

Q-4.8. Please refer to the Companies' response to JI request 3-7(d), which states that "the RTO concept of capacity accreditation for thermal resources is not applicable to the Companies or this proceeding." However, Companies' response to JI-3-7(b)(i) states that "the Companies model seasonal capacity ratings for their thermal units."

- a. Please explain how seasonal capacity ratings differ from capacity accreditation.
- b. If the response to subpart (a) above is that there is not a meaningful difference, please provide an updated response to JI request 3-7.

A-4.8.

- a. Seasonal capacity ratings reflect a unit's net output ("ICAP") in a given season. Any differences between seasons are generally due to seasonal differences in average ambient air temperatures. Resource adequacy studies are completed using seasonal ratings, and the Companies' resource adequacy modeling is similar to that of an RTO. For example, in the analysis completed by Astrape Consulting and referenced in JI 3-7(c) and (d), resources were modeled based on their seasonal ICAP ratings and not UCAP. Then, observations from this analysis were applied to the capacity accreditation process. After an RTO determines a capacity need based on a resource adequacy study, capacity accreditation determines how much of that need a given resource is credited for meeting. In an RTO, capacity accreditation for thermal resources is typically based on UCAP, and the Astrape paper suggests updates to this process. However, the capacity accreditation process is not applicable to the Companies in these proceedings.
- b. Not applicable.

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Case No. 2022-00402

Question No. 4.9

Responding Witness: Lonnie E. Bellar / Christopher M. Garrett

- Q-4.9. Please refer to JI request 3-9(a), which requested supporting evidence that tax advantages for renewable generation resources inure completely to the benefit of customers, precluding the possibility that a substantial portion of those tax advantages are captured in the form of transaction costs or retained by the solar developer or owner. The response refers to Staff request 1-47, which provided information regarding how the Companies assessed the tax implications of RFP responses for purposes of assessing the revenue requirements.
- a. Please confirm that the response is based on the assumption or understanding that tax advantages would inure completely to the benefit of customers via a reduction in the revenue requirement. If confirmed, please provide supporting evidence of that assumption or understanding. If not confirmed, please explain.
 - b. The response to JI request 3-9(a) states, “This evidence precludes any tax benefits associated with the four PPAs.” Please explain this statement.
 - c. The responses to JI request 3-9(b)(i) and (iii) state that tax advantages related to coal purchases inure completely to customers in the form of lower fuel costs or tax expense. Please provide evidence or the Companies’ reasoning for its belief supporting this statement. For example, such savings could inure partially to customers as stated in each response and partially to the fuel suppliers as support for higher prices since non-Kentucky suppliers do not benefit from this tax advantage.
- A-4.9.
- a. Confirmed as it relates to the two proposed Companies’ owned solar projects, one in Mercer County and one in Marion County. The response to PSC 1-47 presents the Companies plan to pass the benefits of the production tax credits

on to customers in the form of lower revenue requirements in future rate proceedings.

- b. The Companies are unaware of the extent the tax incentives associated with the four solar PPAs impacted pricing or were retained by the solar developer.
- c. The Companies' position with regards to the response to JI 3-9(b)(i) is based on the fact that the Companies do not pay sales and use tax on coal purchases regardless of where the coal is procured. As for the response to JI 3-9(b)(iii), KU included approximately \$1.2 million and LG&E included approximately \$0.3 million of Kentucky Clean Coal Incentive tax benefits as part of their forecasted revenue requirements in Case Nos. 2020-00349 and 2020-00350. The Companies are unaware to the extent the Kentucky Clean Coal Incentive impacts pricing from its Kentucky suppliers.

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Case No. 2022-00402

Question No. 4.10

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

- Q-4.10. Please refer to Companies' response to Staff request 4-12(a), which states, "The Companies assumed that forced outage rates are not affected by the addition of SCR." Please provide supporting evidence for this statement. If the Companies do not possess any supporting evidence, please state whether in the Companies' best professional judgement, it is more likely that:
- a. An SCR would result in an overall increase in forced outage rates by some amount due to the introduction of additional points of failure;
 - b. An SCR would result in an overall decrease in forced outage rates because the unit would be dispatched less often due to higher variable operating costs; or
 - c. It is not possible to forecast the net impact on forced outage rates because multiple factors need to be considered and no such study has been done.
- A-4.10. The Companies have not performed an analysis to determine the effect of adding an SCR on a unit's forced outage rate. All other things equal, the additional point of failure may increase the unit's forced outage rate, but the Companies would not expect any increase to be material. In the Companies' experience, whether a unit has an SCR is not a significant factor in explaining differences in unit outage rates. The Companies' analysis considered material impacts to the units' operations from adding SCR (see the response to AG-KIUC 3-25). The Companies also note that increasing the forced outage rates for Mill Creek 1, Mill Creek 2, and Ghent 2 in scenarios where SCRs are added to these units would only increase their overall costs and would not change the recommended portfolio.

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Case No. 2022-00402

Question No. 4.11

Responding Witness: Stuart A. Wilson

- Q-4.11. Please refer to the Companies' response to Staff request 4-13 which states, "Note also that there is no reason to expect that either of the Companies' NGCCs will have a 20-year service life." Please state what service life the Companies expect for the proposed NGCCs and provide an explanation for the response.
- A-4.11. See the response to LFUCG METRO 2-4. The Companies assumed a service life equal to the book depreciation life of 40 years for NGCC units.

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Question No. 4.12

Responding Witness: Lonnie E. Bellar

- Q-4.12. Please state the number and size (MW) of requests to the Companies for demand for energy from new extra-large energy users (e.g., users with over 10 MW in demand) who need consistently high levels of energy 24/7/365, such as data centers, in each of the last five years (2019-2023 to-date).
- a. Are the Companies preparing for or anticipating the possibility of limiting future commitments to projects that do not already have signed agreements or firm commitments for service? Please explain.
 - b. Are the Companies aware of any other electric utilities preparing for or anticipating the possibility of limiting future commitments to projects that do not already have signed agreements or firm commitments to service? If so, please identify those utilities and explain the relevant circumstances, as understood by the Companies.
 - c. If the Companies were faced with requests for as much as 1 GW of new service, how long would it take to develop and build new generation and transmission infrastructure to serve that scale of load? Please explain.
- A-4.12. From 2019 to the present, the Companies have received approximately 110 large load requests ranging from 10MW to 1.5GW. In most cases, a specific load profile was either preliminary or unknown. Several of these requests were related to cryptocurrency mining, which typically involves 24/7/365 operation. Other than such operations or requests related to electric vehicle battery production, most large load requests are typically for manufacturing loads that do not always operate 24/7/365.
- a. No. The Companies have an obligation to serve customers in their service territory. Therefore, they have no plans to limit future commitments to projects that do not already have signed agreements for service.

- b. The Companies are not aware of any other electric utilities preparing for or anticipating the possibility of limiting future commitments to serve projects.

- c. The time required would be depend on a number of factors, including site location, proximity to transmission infrastructure, availability of rights of way to build new infrastructure, if necessary, analysis of the load and possible generation resources needed to cost effectively and reliably serve the load, availability to permit any and all construction related activities, and obtaining any necessary Commission and other governmental approvals. It could be a multi-year process, but it is not possible to provide a definitive answer to this hypothetical request.

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Question No. 4.13

Responding Witness: Lonnie E. Bellar

Q-4.13. Please refer to Attachment 1 provided in response to KCA request 2-19, and answer the following requests.

- a. Please explain the Companies' intended meaning of "top down cost estimates" as used in the above-referenced attachment at page 10 of 232 ("Engineer shall provide the following services: . . . Top down cost estimates . . .").
- b. To the Companies' knowledge, did HDR use its prior Green River NGCC feasibility study to inform its feasibility study for the proposed Mill Creek and Brown NGCCs? Please explain.
- c. To the Companies' knowledge, what methodology did HDR employ in order to estimate labor costs to build the proposed NGCCs? Please explain.
- d. To the Companies' knowledge, what data sources did HDR consider in order to estimate labor costs to build the proposed NGCCs? Please explain.
- e. To the Companies' knowledge, what methodology did HDR employ in order to estimate turbine costs for the proposed NGCCs? Please explain.
- f. To the Companies' knowledge, what data sources did HDR consider in order to estimate turbine costs for the proposed NGCCs? Please explain.

A-4.13.

- a. Top-down estimating is a method of evaluating a project or budget as a whole and then separating it into smaller components. With a top-down approach, an overall plan or budget is created for a project without defining the particulars.

- b. Yes, the Green River NGCC feasibility study was referenced during the feasibility study for the Mill Creek and Brown NGCCs. However, the Mill Creek and Brown NGCC feasibility study was developed using current OEM technologies and today's costs.
- c. The HDR cost estimates are quantity based with direct labor cost developed through unit installation man-hour rates, composite crew wage rates, and productivity factor adjustments. The indirect construction labor cost is estimated based on the non-manual labor staffing level planned, construction duration, and direct labor hours. The direct and indirect construction man-hours generated through the quantity-based buildup were calibrated to recent HDR supported project actual quantities. The HDR cost estimates labor hours were derived from quantity driven units of measure based on historical project data as well as total project labor hour comparisons. The wage rates were developed based on RS Means, and in-house labor rates for the Kentucky project locations. Productivity adjustments are included for fifty (50) work weeks, central US winter weather, and a EPC obligation schedule.
- d. See response to part (c).
- e. HDR requested current performance data and costs from the three OEMs.
- f. See response to part (e).

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Case No. 2022-00402

Question No. 4.14

Responding Witness: Lonnie E. Bellar / Christopher M. Garrett

- Q-4.14. Please provide the most recent Handy-Whitman Index for public utility construction costs in the Companies' possession.
- A-4.14. See attachments being provided in separate files. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

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Question No. 4.15

Responding Witness: Lonnie E. Bellar

- Q-4.15. Please refer to JI 1.9 Attachment 1 and to the HDR “New Generation Options Feasibility Study” filed in Docket No. 2014-0002. Please explain why the current HDR study concluded that a Siemens 9000HL would have a cost of \$1,068 to \$1,129 per kW (June 2022 cost basis) while the HDR study filed in Docket No. 2014-0002 would have a cost of \$1,162 per kW (February 2013 cost basis).
- A-4.15. The cost per kW filed in Case No. 2014-0002 was based on Siemens SGT6-8000H combustion turbine. The cost referenced in the response to JI 1.9, Attachment 1, is based on Siemens SGT6-9000HL combustion turbine. The 9000HL is a larger more efficient combustion turbine when compared to the 8000H combustion turbine.

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Question No. 4.16

Responding Witness: Lonnie E. Bellar

- Q-4.16. Please refer to Companies' response to JI request 3-17(b). Have the Companies' estimated the costs required for anticipated upgrades and modifications that will be necessary to accommodate hydrogen? If so, please explain and provide any supporting workpapers. If not, please explain why not.
- A-4.16. No. See the response to PSC 5-2. While the three original equipment manufacturers ("OEM") have similar hydrogen capabilities presently, those capabilities continue to evolve, and the level of upgrade that each OEM requires from base model to attain a given level of hydrogen co-firing varies substantially. The RFP was issued so that responses will include OEM-specific quantification of on-site costs to attain defined bands of co-firing.

CONFIDENTIAL INFORMATION REDACTED

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Case No. 2022-00402

Question No. 4.17

Responding Witness: Charles R. Schram

- Q-4.17. Please refer to Companies' response to JI request 3-27. If there are no workpapers supporting the Company's firm gas transportation costs, please explain how the costs given in response to KCA request 1-51 were derived?
- A-4.17. There are no workpapers for the firm transportation costs since the estimates are obtained via the simple calculations below.

For the Mill Creek NGCC, the assumed cost in 2022 dollars was calculated as the TGT FT max rate of \$0.1810/MMBtu/day plus an estimated meter infrastructure adder of [REDACTED]/MMBtu/day, yielding [REDACTED]/MMBtu/day. Multiplied by 100,000 MMBtu/day for 365 days results in [REDACTED] per year. The annual cost was escalated at one percent each year for the attachment to the response to KCA 1-51.

For the Brown NGCC, the assumed cost in 2022 dollars was based on the TETCO 12/1/2022 tariff FT-1 M2-M2 Reservation Charge max rate of \$8.2510/MMBtu/month plus the corresponding Reservation Charge Adjustment of \$0.2712/MMBtu/month, plus a [REDACTED] percent premium reflecting the assumption that the capacity may be purchased from a marketer currently holding the capacity. This results in a total of [REDACTED]/MMBtu/month. Multiplied by 100,000 MMBtu for 12 months results in [REDACTED] per year. The annual cost was escalated at one percent each year for the attachment to the response to KCA 1-51. Subsequently, Tennessee Gas Pipeline discussed a potential FT rate of [REDACTED] MMBtu/day, which would result in an annual cost of [REDACTED]. The Companies continue to have discussions with TETCO and Tennessee Gas Pipeline to determine the preferred transport option for the Brown NGCC.

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Question No. 4.18

Responding Witness: Lonnie E. Bellar / Stuart A. Wilson

Q-4.18. Please refer to Companies' responses to JI request 3-28 and to AG request 1-49(a). Are the SERVVM adjustments to Cane Run 7 capacity consistent with the "partial advantage of the capacity improvement" described in the response to AG request 1-49(a)? If not, what capacity improvement in summer and winter will be experienced in the absence of the engineering evaluation described?

A-4.18. Yes.

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Question No. 4.19

Responding Witness: Lonnie E. Bellar

Q-4.19. Please refer to Companies' response to JI request 2-70 which states, the "contracting approach for the NGCC projects is an Original Equipment Manufacturer ("OEM") lead Engineering, Procurement, and Construction ("EPC") Agreement."

- a. What language in the documents provided in the supplemental response to KCA request 2-51 indicate a preference for this contracting approach?
- b. Would the Companies count proposals from joint ventures such as the consortium of Mitsubishi Power, Sargent & Lundy, and TIC as an OEM lead approach?
- c. To the Companies' knowledge, what other power plant projects recently constructed or planned have utilized or will utilize an OEM lead EPC agreement?

A-4.19.

- a. The documents provided in the supplemental response to KCA 2-51 do not indicate the contracting approach. The contracting approach was discussed with the OEM's prior to issuing the RFP and the RFP was only issued to the OEM's.
- b. If Mitsubishi Power was the signatory for the theoretical consortium of Mitsubishi Power, Sargent & Lundy, the Companies would classify the theoretical consortium as OEM lead.
- c. Based on publicly available information, the following projects are OEM lead EPC agreements.

Alabama Power Barry 8

<https://www.nenergybusiness.com/projects/james-m-barry-electric-generating-plant-expansion/>

Entergy Orange County Advance Power Station

<https://www.energynewsroom.com/news/entergy-texas-breaks-ground-on-orange-county-advanced-power-station/>

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Question No. 4.20

Responding Witness: Lonnie E. Bellar

- Q-4.20. Please refer to Companies' response to Staff request 1-58(a), which states in part that "The changes TGT describes in its letter are in addition to the pipeline system changes TGT will make to accommodate the addition of the Mill Creek NGCC."
- a. Please explain how this sentence can be reconciled with the claim that no upgrades to the interstate pipeline would be needed to facilitate the NGCC as stated in response to JI request 3-27(e).
 - b. Are the "pipeline system changes TGT will make" changes to lateral(s) supplying the site?
 - c. Please give the cost of the pipeline system changes TGT will make to accommodate the addition of the Mill Creek NGCC.

A-4.20.

- a. To accommodate the addition of the Mill Creek NGCC, a new gate station is required. The gate station is new infrastructure that allows TGT to supply natural gas to the Companies and not an upgrade to the interstate pipeline.

The Companies understand from discussions with TGT that other changes to the pipeline would not be characterized as "upgrades" that exceed the FERC Blanket Certificate Automatic project cost limit.

- b. See the response to part (a).
- c. The cost for the gate station is estimated at \$7.8M.

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Question No. 4.21

Responding Witness: Lonnie E. Bellar

- Q-4.21. Please refer to Companies' response to JI request 1-11(a).
- a. Please provide the "recent project data and current OEM indicative costs" referenced in the response.
 - b. What specific projects supported the estimate?
 - c. What steps were taken to make the "recent project data and current OEM indicative costs" reflect the Mill Creek and Brown NGCC project costs? Please provide the documents that support your response.
- A-4.21.
- a. The Feasibility Study Report and associated cost estimates included in Appendix E incorporate applicable recent project experience and OEM indicative costs. See the response to JI 1-9(e).
 - b. HDR Owners Engineer experience includes regulated utility DTE Energy Blue Water Energy Center and Alliant Energy West Riverside Energy Center, and independent power producer ("IPP") advanced class combined cycle projects; Lackawanna Energy Center, Birdsboro Power and Hill Top Energy Center.
 - c. The Feasibility Study documents the site-specific scope of the application for each site which is reflected in the cost estimates. The quantity-based estimates include site specific adjustments for site prep/grading, utility relocation, utilization/integration of existing infrastructure, transportation related field vs. shop fabrication, and commercial operation date for example. See the response to JI 4-13(b) and JI 1-9(e).

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Question No. 4.22

Responding Witness: Lonnie E. Bellar

- Q-4.22. Please refer to Companies' response to Staff request 1-58(a), which states in part that "The curtailed output of the Cane Run Unit 7 combined cycle unit and the Trimble County simple cycle peaking units on December 23 was caused by a drop in pressure on the Texas Gas Transmission ("TGT") system due primarily to the failure of certain compressor equipment. TGT has identified and is implementing upgrades to their equipment and operating procedures to address the issue as described in the attached letter from TGT to the Companies."
- a. Do the Companies contend that, but for the referenced compressor failures, natural gas wellhead freeze-ins during Winter Storm Elliott would have had no impact on the ability of Cane Run 7 and Trimble County CTs to perform during this event? Please explain.
 - b. Has Texas Gas offered the Companies any fiduciary guarantees related to future performance of its compressor equipment? If so, provide the document supporting your response.
 - c. Has Texas Gas offered the Companies any fiduciary guarantees related to future delivery of natural gas during extreme weather events? If so, provide the document supporting your response.
 - d. Do the Companies contend that the loss of pipeline compression in Ohio and Pennsylvania during Winter Storm Elliott had no impact on the availability of Cane Run 7 and the Trimble County CTs?
 - e. Provide all documents that support your responses to subparts a – d above.
 - f. To the Companies' knowledge, is the Slaughters compressor station, the only compressor station being upgrade by TGT?

A-4.22.

- a. Yes. The Companies secured adequate natural gas supply for generation during Winter Storm Elliott and those gas volumes were not cut by suppliers. See the response to AG 1-13.
- b. No. The Companies are not aware of any interstate pipeline offering such guarantees in a FERC jurisdictional agreement.
- c. See the response to part b. The Companies have firm transportation services on TGT; unlike interruptible service, firm services are not interruptible due to extreme weather, consistent with FERC requirements.
- d. The Companies are not aware of the referenced issues occurring on the Texas Gas Transmission pipeline in Ohio. The Companies do not believe the TGT pipeline operates in Pennsylvania.
- e. No gas volumes were cut by suppliers; therefore, the Companies do not have responsive documents for gas supply cuts. Furthermore, the gas purchased under NAESB agreements typically has provisions for liquidated damages in the absence of force majeure events. See response to KCA 2-20 for the Cane Run 7 gas transport agreement. Also see the following link for the Trimble County winter transport agreement:

https://psc.ky.gov/PSC_WebNet/FuelContracts/Kentucky%20Utilities%20Company%20-%20KU/Texas%20Gas%20Transmission%208-23-21_02.pdf
- f. See the response to PSC 1-58. TGT noted “site-specific” improvements; TGT did not limit their review to one site. See the attachment being provided in a separate file.

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Question No. 4.23

Responding Witness: Tim A. Jones

Q-4.23. Please provide in spreadsheet format the temperature series used to derive the hourly load modeled in SERVIM as provided in “JI DR2 LGE KU Attach to Q60(c) – 20230420_LGELoad2028” for 1973 through 2021.

A-4.23. See attachment being provided in a separate file.

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Question No. 4.24

Responding Witness: Lonnie E. Bellar

Q-4.24. Please provide an updated project schedule for the proposed NGCCs.

A-4.24. See attachments being provided in separate files.

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Question No. 4.25

Responding Witness: Lonnie E. Bellar

Q-4.25. Please refer to the Companies' supplemental response to Kentucky Coal Association's ("KCA") request 2-51 and accompanying attachments, and answer the following requests.

- a. Please confirm that the attachments produced on June 26, 2023, include all documents transmitted and made available to potential RFP respondents. If anything but confirmed, please produce all such documents.
- b. Did the Companies provide any additional cover documents when transmitting the RFP to interested parties? If so, please produce such documents.

A-4.25.

- a. Confirmed.
- b. No additional cover documents were provided.

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Question No. 4.26

Responding Witness: Lonnie E. Bellar

Q-4.26. Please refer to the supplemental response to KCA request 2-51.

- a. How many unique bidders have requested a site walkdown to date?
- b. How many unique bidders attended the pre-proposal meeting on May 8th, 2023?
- c. What is the current proposal due date?
- d. How many OEM firms attended the pre-proposal meeting on May 8th, 2023?
- e. Please explain why the release of the RFP documents and award of the contract was accelerated from the schedule given in response to JI 1-16.
- f. Do the Companies intend to issue a separate RFP for the OEM? If so, when?

A-4.26.

- a. Three.
- b. See the response to part (a).
- c. August 28, 2023.
- d. See the response to part (a).
- e. The referenced schedule developed in August 2022 assumed a multi-step bid process wherein the first step identified a chosen OEM technology and the second identified a chosen EPC to install that technology. The OEM lead bid strategy requires only a one step bid process. This change pushed the RFP issuance back for the Mill Creek NGCC. The Brown NGCC is accelerated to

the Mill Creek NGCC to minimize duplication of effort and associated cost inefficiencies.

- f. See the response to part (e).

CONFIDENTIAL INFORMATION REDACTED

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Question No. 4.27

Responding Witness: Lonnie E. Bellar

Q-4.27. Please refer to the iSource Portal provided in response to KCA 2.51.

- a. [REDACTED] Please explain.
- b. [REDACTED]

A-4.27.

- a. The referenced iSource Portal screen shot indicates the screen from which each bidder would 1) access the instructional information and 2) provide general organizational information indicated by the file "BR12-MC-5 NGCC ITB as issued 4-25-2023.doc" included in the Companies' response to KCA 2.51.
- b. See the attachment being provided in a separate file. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

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Question No. 4.28

Responding Witness: Lonnie E. Bellar

Q-4.28. Please provide an updated response to JI request 1-10.

A-4.28. No new or additional information is available to supplement the Companies response to JI 1-10.

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Question No. 4.29

Responding Witness: Lonnie E. Bellar

- Q-4.29. Please state the lowest achievable NO_x emission rate for each of Mill Creek Unit 2 and Ghent Unit 2.
- A-4.29. At full load, Ghent Unit 2 can generally achieve a NO_x emissions rate around 0.33 lb/MMBtu. At full load, Mill Creek Unit 2 can generally achieve a NO_x emissions rate around 0.29 lb/MMBtu. Operating in lower NO_x emissions rate regimes results in operational issues (e.g., increased slagging, boiler tube reliability, etc.).

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Question No. 4.30

Responding Witness: Stuart A. Wilson

Q-4.30. Please refer to the forecasted NO_x credit costs provided in response to Sierra Club (“SC”) request 1.25b, Exhibit SAW-2 at \\06_ModelInputs\CommodityPriceForecasts\CONFIDENTIAL_Price_Forecast_Emissions.xlsx, and answer the following requests.

- a. Please identify the source or author(s) for the referenced attachment.
- b. Please state the approximate date when the referenced NO_x credit cost forecast was developed (e.g., month and year).
- c. Please list and explain in full the assumptions and calculations used to derive the referenced NO_x credit cost forecast.

A-4.30.

- a. See Exhibit SAW-1, Section 7.7.4 Emission Allowance Prices, p. 61.
- b. See Exhibit SAW-1, Section 7.7.4 Emission Allowance Prices, p. 61.
- c. The emissions allowance price forecast is the proprietary product of a third-party consultant. The requested supplemental information is not available.

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Question No. 4.31

Responding Witness: Stuart A. Wilson

Q-4.31. Do the Companies have a forecast for NO_x credit costs under the EPA's Final Good Neighbor Plan, 88 Fed. Reg. 36,654 (June 5, 2023)?

- a. If yes, please produce each such forecast and answer the following questions:
 - i. Please identify the source or author(s) for each forecast.
 - ii. Please state the approximate date when each forecast was developed.
 - iii. Please list and explain in full the assumptions and calculations used to derive each forecast.
- b. If no, please explain why the Companies have not re-forecast NO_x credit costs under the final Good Neighbor Plan.

A-4.31. The Companies do not have an updated long-term forecast of emissions allowance prices that reflects the final Good Neighbor Plan. See the response to Question No. 4.30. However, the current market price ozone-season NO_x emissions allowances may be used as a proxy for the near term. As of July 5, 2023, 2022-vintage Group 3 ozone-season NO_x emissions allowances had a bid-ask spread of \$6,500 to \$11,000 per allowance with a midpoint of \$8,750 per allowance.

- a. See the response to part (a) regarding the market price of allowances.
 - i. ICAP Energy, LLC.
 - ii. July 5, 2023.
 - iii. The market prices are based on actual trading transactions. Further details are not available.

- b. The third-party consultant that provides the long-term emissions allowance price forecast has not yet developed an updated forecast since the Good Neighbor Plan was recently finalized.

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Question No. 4.32

Responding Witness: Philip A. Imber

- Q-4.32. Please confirm that Mr. Imber participated in at least one of two EPA stakeholder outreach sessions, held on May 31st from 11am-12:30pm (EDT) and Thursday, June 1st from 11am-12:30pm (EDT), concerning the development of a new proposed rulemaking that would add an allowance auction mechanism for power plants to the CSAPR NO_x Ozone Season Group 3 trading program under the Good Neighbor Plan for the 2015 Ozone NAAQS.³ If confirmed, please answer the following requests:
- a. As understood by Mr. Imber, what are the EPA's reasons for developing the new proposed rule referenced above?
 - b. Does Mr. Imber have any concerns about the EPA's development of the new proposed rule referenced above? If so, please explain those concerns.
 - c. To the extent that the Companies will continue to engage in the new proposed rulemaking referenced above, please explain the Companies' goal(s).
- A-4.32. Confirmed, Mr. Imber virtually attended the May 31st session.
- a. As understood by Mr. Imber, the EPA is interested in supplemental rulemaking that addresses generation reliability concerns perceived by stakeholders. Generation reliability concerns are based on uncertain allocation market conditions resulting from bank recalibration and dynamic budgeting.
 - b. Yes, Mr. Imber has concerns about whether meaningful relief will be provided through a supplemental rulemaking. First, a proposed rulemaking

³ EPA, *Stakeholder Outreach Sessions on Upcoming GNP EGU Allowance Auction Rule* (last updated May 24, 2023), <https://www.epa.gov/csapr/stakeholder-outreach-sessions-upcoming-gnp-egu-allowance-auction-rule>.

is not certain. EPA has suggested publication of a proposed rulemaking in the fourth quarter of 2023. As a result of uncertainty for the quantity of allocation in an auction, the timing of an auction(s), and applicability/access to an auction, a supplemental rulemaking does not factor into today's compliance decisions for control technologies that need to be implemented by Companies as early as 2027. Second, an auction does not address the foundational reliability concerns for market instability, dynamic budgeting, and bank recalibration. Third, adding additional allocations to the market negatively impacts the attainment modeling. As a result, an auction could inject further legal, environmental justice, and attainment obstacles. However, a supplemental rulemaking and resulting auction are tools being contemplated as a bridge for reliability only; the EPA does not intend to design and implement an auction to displace the long-term need for implementing controls.

- c. The Companies will continue to engage in new rulemakings to drive planning certainty, to ensure system reliability, and advocate for stability and affordability of the allocation market.

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Question No. 4.33

Responding Witness: Lonnie E. Bellar

- Q-4.33. Please refer to Attachment 4 provided in response to Joint Intervenors' ("JI") Request 1-1(c). Page 7 (of 7) in Attachment 4 lists Reference Documents. Please produce the "Black & Veatch, 2017, NOx Reduction Study" and the "Generation Engineering, 2020, Mill Creek Unit 1&2 Gas Co-Firing" reference documents.
- A-4.33. See attachments being provided in separate files.

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Question No. 4.34

Responding Witness: Lonnie E. Bellar

Q-4.34. Please refer to the Companies' response to JI Request 1-1 and accompanying attachments, and answer the following requests:

- a. Is the current gas supply to Mill Creek Station able to provide adequate gas conditions and flow rate if only Mill Creek 2 were converted to gas? If not, please explain what changes would be required and provide cost estimates for those changes, if known.
- b. Please provide a cost estimate for a CO catalyst at Mill Creek Unit 2, with supporting documentation, if any.
- c. Please provide a cost estimate for a VOC catalyst at Mill Creek Unit 2, with supporting documentation, if any.

A-4.34.

- a. No. The current Mill Creek gas supply pipeline is sized to pass a maximum flow of 1,327 MCFH, which currently supports start-up and stabilization for Mill Creek 1-4. Converting Mill Creek 2 alone to natural gas would consume over 3,000 MCFH at maximum load. Supporting full load operations of a gas-fired Mill Creek 2 in addition to the start-up and stabilization needs of Mill Creek 3-4 would require incremental pipeline capital at Mill Creek, estimated at approximately \$12 million in 2023 dollars.
- b.-c. The most cost-effective way to install CO/VOC catalyst is to install the catalyst layer into an existing SCR. Since Mill Creek 2 does not have an SCR, the structure to contain the CO/VOC catalyst would have to be constructed. Note that this technology is exclusively designed for natural gas fired units and currently not available for coal fired or co-fired units. No studies have been performed for the installation of CO/VOC catalyst on Mill Creek 2.