

ORIGINAL



Your Touchstone Energy® Cooperative 

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

In the Matter of:

ELECTRONIC APPLICATION OF)	Case No. 2020-00183
BIG RIVERS ELECTRIC CORPORATION)	
FOR APPROVAL OF SOLAR POWER CONTRACTS)	

**Response to the Office of the Attorney General's
Second Request for Information
dated August 28, 2020**

FILED: September 10, 2020

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BIG RIVERS ELECTRIC CORPORATION
ELECTRONIC APPLICATION OF
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VERIFICATION

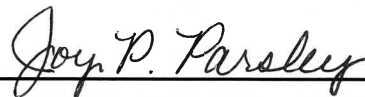
I, Michael W. (Mike) Chambliss, verify, state, and affirm that the information request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.



Michael W. (Mike) Chambliss

COMMONWEALTH OF KENTUCKY)
COUNTY OF HENDERSON)

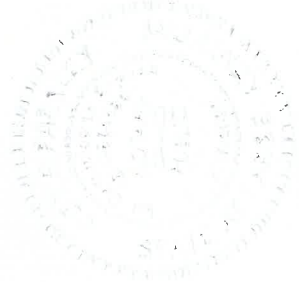
SUBSCRIBED AND SWORN TO before me by Michael W. (Mike) Chambliss
on this the 9th day of September, 2020.



Notary Public, Kentucky State at Large

My Commission Expires _____

Notary Public, Kentucky State-At-Large
My Commission Expires: July 10, 2022
ID: 604480



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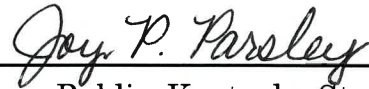
I, Mark J. Eacret, verify, state, and affirm that the information request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.



Mark J. Eacret

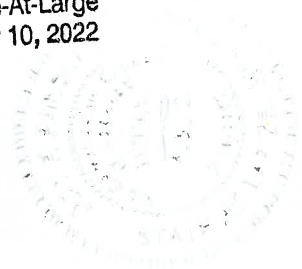
COMMONWEALTH OF KENTUCKY)
COUNTY OF HENDERSON)

9th SUBSCRIBED AND SWORN TO before me by Mark J. Eacret on this the
_____ day of September, 2020.



Notary Public, Kentucky State at Large
My Commission Expires _____

Notary Public, Kentucky State-At-Large
My Commission Expires: July 10, 2022
ID: 604480



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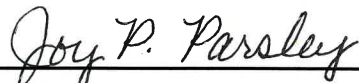
I, Paul G. Smith, verify, state, and affirm that the supplemental data request responses filed with this verification for which I am listed as a witness are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.



Paul G. Smith

COMMONWEALTH OF KENTUCKY)
COUNTY OF HENDERSON)

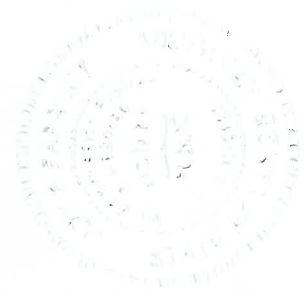
9th SUBSCRIBED AND SWORN TO before me by Paul G. Smith on this the
day of September, 2020.



Notary Public, Kentucky State at Large

My Commission Expires _____

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1 Item 1) *Reference the news article that Argus Media published on April*
2 *28, 2020, at the below link. The article states that Nucor Corporation*
3 *("Nucor") is delaying investments in two mills in Kentucky because of*
4 *uncertainty in the steel market surrounding impacts of the Covid-19*
5 *pandemic. Specifically, the article states that Nucor will delay some*
6 *investments in its new state of the art steel plate mill in Brandenburg,*
7 *Kentucky.*

8 <https://www.argusmedia.com/en/news/2100575-nucor-to-delay-kentucky-investments-update>

9 a. *Provide a detailed update as to whether Nucor is still delaying*
10 *investment in the two mills in Kentucky due to the Covid-19*
11 *pandemic.*

12 b. *Specifically, explain what is meant by "some investments" in the*
13 *Brandenburg mill will be delayed.*

14 c. *If Nucor is still delaying investment, provide an updated timeline*
15 *for the proposed Nucor mill project.*

16 d. *Explain in detail whether there are safeguards in the electric*
17 *service agreement with Nucor that protect BREC and Meade County*

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1 *Rural Electric Cooperative Corporation's ("RECC") customers from*
2 *paying for any costs associated with Nucor potentially delaying*
3 *investment in the Brandenburg mill.*

4
5 **Response)**

- 6 a. According to the Nucor Corporation Form 10-Q filed with the Securities and
7 Exchange Commission on August 14, 2020, "We have made the decision to
8 reaccelerate our investment in the Brandenburg, Kentucky plate mill and
9 the expansion and modernization of our Gallatin, Kentucky sheet mill. We
10 are taking this step after a thorough review of these projects and their
11 compelling projected economic returns as well as our strong cash flow
12 performance in the first half of 2020. We expect these projects, as well as
13 the flex galvanizing line at Nucor Steel Arkansas and the micro mill
14 greenfield expansion in Frostproof, Florida, will have the largest capital
15 expenditures in 2020."
- 16 b. No longer applicable.
- 17 c. No longer applicable.

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1 d.

[REDACTED]

2

[REDACTED]

3

[REDACTED]. Service Commencement Date delays will increase the portion of the contract term that will be served at the higher tariff-based rates.

4

5

6

 If a delay caused Nucor to cancel the project and terminate the retail agreement in breach of the agreement, Nucor would be required to pay Big Rivers a termination charge under Section 2.11 of the agreement, which charge is designed to reimburse Big Rivers for its transmission infrastructure expenses.

7

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13 **Witness)** Mark J. Eacret

14

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1 **Item 2) *Refer to BREC's response to the Attorney General's First Request***
2 ***for Information ("Attorney General's First Request"), Item 1(e), in which***
3 ***BREC asserts that it has 120 kW of solar demonstration/education projects***
4 ***spread across seven sites. Four are located at BREC's Member offices, plus***
5 ***one each at a middle school, a high school, and a public park. BREC further***
6 ***states that there is another 2,613 kW owned by individual retail members of***
7 ***BREC's member-owners spread across 190 sites.***

8 ***a. Explain whether the costs associated with the 120 kW solar***
9 ***demonstrations/education projects are paid for by the customers in***
10 ***the base rates. If not, explain who pays for the costs.***

11 ***b. Explain in detail who owns the 2,613 kW of solar energy spread***
12 ***across 190 sites.***

13 ***c. Generally explain how the location of the 190 sites was decided***
14 ***upon, or alternatively, whether the 2,613 kW of solar capacity is***
15 ***privately owned.***

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- 1 *d. Explain whether the costs associated with the additional 2,613 kW*
2 *of solar energy are paid for by the customers in base rates. If not,*
3 *explain who pays for the costs.*
- 4 *e. Explain how many of the owners of the additional 2,613 kW of solar*
5 *energy are net metering customers, and provide the monetary*
6 *amounts paid to the customers for the solar energy. Identify also the*
7 *tariff sheet(s) setting forth BREC's net metering rates.*

8

9 **Response)**

- 10 a. No, the costs associated with the seven Solar Education Sites totaling 120
11 kW are not paid for by customers in the base rates. Big Rivers received a
12 United States Department of Agriculture Rural Energy for America
13 Program (REAP) Grant to cover 25% of the project, and Big Rivers covered
14 the remainder of the costs with its cash reserves. The Commission reviewed

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- 1 the Solar Education Facilities and approved them as ordinary extensions of
2 existing systems in the usual course of business in Case No. 2016-00409.¹
- 3 b. Residential and commercial retail members of Big Rivers' Member-Owners
4 own the 2,613 kW solar generating facilities spread across one hundred
5 ninety (190) sites. An example of such facilities would be solar panels that
6 a residential retail member installs on his or her roof.
- 7 c. The one hundred ninety (190) sites, on which the solar generating facilities
8 are located, are privately owned by retail members of Big Rivers' Member-
9 Owners.
- 10 d. The retail members who own the generation pay for the cost of the
11 distributed generation.
- 12 e. All but one of the distributed generation sites are net metered. The
13 remaining site is owned by the Commonwealth of Kentucky and is defined

¹ See *In the Matter of: Application of Big Rivers Electric Corporation for an Order Declaring the Construction of Seven Solar Power Facilities to be Ordinary Extensions of Existing Systems in the Usual Course of Business* – Case No. 2016-00409. Application filed November 28, 2016. Commission Order dated March 30, 2017.

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1 as a Qualifying Facility under PURPA² and sells excess power to Big Rivers
2 under the Big Rivers' Standard Rate, QFP – Cogeneration/Small Power
3 Production Purchase Tariff – Over 100 kW, Sheet Nos. 39-41 of Big Rivers'
4 Current Tariff on file with the Commission.

5 Because Big Rivers does not provide retail electric service, Big Rivers
6 has no net metering tariff. The applicable tariffs for net metered generation
7 are managed by Big Rivers' Member-Owners.

8

9

10 **Witness)** Mark J. Eacret

11

² PURPA = Public Utility Regulatory Policies Act of 1978.

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- 1 **Item 3)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 2(b), in which BREC asserts that the entire benefit of the solar contracts*
3 *will flow to the member-owners, either through the Fuel Adjustment Clause*
4 *or the margin-sharing mechanism recently approved in Case No. 2020-00064.*
- 5 *a. Based upon the above-referenced response, is BREC unsure which*
6 *mechanism the benefits will flow through to the member-owners?*
- 7 *b. Explain in detail, which mechanism the entire benefit of the solar*
8 *contracts will flow through to the member-owners.*

9

10 **Response) .**

- 11 a. The economic benefits of the solar energy will flow through the Fuel
12 Adjustment Clause. Economic benefits related to solar capacity and/or
13 solar renewable energy certificates will flow through the New TIER Credit
14 mechanism approved by the Commission in Case No. 2020-00064.¹

¹ See *In the Matter of: Electronic Application of Big Rivers Electric Corporation for Approval to Modify Its MRSM Tariff, Cease Deferring Depreciation Expenses, Establish Regulatory Assets, Amortize Regulatory Assets, and Other Appropriate Relief* – Case No. 2020-00064. Application filed February 28, 2020. Commission Order dated June 25, 2020.

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1 b. See response to subpart a. above.

2

3

4 **Witness)** Paul G. Smith

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1 **Item 4)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 2(c), in which BREC states that it would be entering into solar*
3 *agreements even without the Nucor contract, but the timing would be*
4 *different. Explain in detail why BREC states that the timing would be*
5 *different.*

6

7 **Response)** As noted in Big Rivers' response to Item 2c of the Attorney General's
8 First Request, the concept of using solar as part of the Nucor contract structure
9 started in the spring of 2019 and led to Big Rivers' solar RFP in June 2019. Had the
10 Nucor negotiations not progressed as they did, Big Rivers would not have identified
11 the value of the current solar pricing until its 2020 Integrated Resource Plan process
12 and an RFP would not have been issued until sometime between the spring and fall
13 of 2020.

14

15

16 **Witness)** Mark J. Eacret

17

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1 **Item 5)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 5, in which it states that there are 22 National Renewables Cooperative*
3 *Organization ("NRCO") members, and BREC's annual dues are \$33,800.*
4 *Explain whether the other NRCO members pay the same monetary amount of*
5 *annual dues that BREC does, and if not, explain why not.*

6

7 **Response)** No, the other NRCO members do not pay the same monetary amount of
8 annual dues that Big Rivers does. Some pay more and some pay less. NRCO member
9 Fees are currently calculated based on the size of each NRCO member relative to the
10 other NRCO members, measured by native load sales in MWs (sales to the NRCO
11 members' Member-Owners). This aligns higher costs with those NRCO members
12 most likely to realize higher benefits.

13

14

15 **Witness)** Mark J. Eacret

16

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1 **Item 6)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 9. BREC asserts that the economic analysis of BREC building and*
3 *operating a 100 MW solar facility indicates that it would not be profitable,*
4 *and not competitive with the other resource options. Explain why BREC*
5 *would not be able to build and operate a solar facility that would be a least*
6 *cost resource, but Henderson Solar, LLC ("Henderson Solar Facility"), Meade*
7 *County Solar, LLC ("Meade Solar Facility"), and McCracken County Solar,*
8 *LLC ("McCracken Solar Facility") can build and operate profitable solar*
9 *facilities while providing a least cost resource.*

10

11 **Response)** Big Rivers does not know the cost assumptions made by Geronimo and
12 Community Energy Solar in developing the prices in their bids. Big Rivers assumes
13 that most of the cost difference between the self-build approach versus the PPA
14 approach would be related to tax strategies available to Geronimo and Community
15 Energy Solar that are not available to Big Rivers, including, as described in my
16 testimony, the 30% Investment Tax Credit for which both Geronimo and Community
17 Energy Solar are eligible. Also, it is logical to assume that both Geronimo and

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1 Community Energy Solar receive a cost advantage as a result of having significant
2 experience in renewable energy project development (as described in Big Rivers'
3 responses to Items 22 and 27 of the Attorney General's First Request for Information)
4 and organizations designed to facilitate that development.

5

6

7 **Witness)** Mark J. Eacret

8

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1 **Item 7) *Refer to BREC's response to the Attorney General's First Request,***

2 ***Item 10(a).***

3 ***a. What percentage of BREC's total annual energy production will the***
4 ***260 MW of solar energy represent?***

5 ***b. What percentage of BREC's total annual energy production will***
6 ***energy associated with natural gas represent?***

7 ***c. What percentage of BREC's total annual energy production will***
8 ***energy associated with coal represent?***

9 ***d. What percentage of BREC's total annual energy production will***
10 ***energy associated with wind represent?***

11 ***e. What percentage of BREC's total annual energy production will***
12 ***energy associated with hydroelectric power represent?***

13 ***f. Provide any and all remaining types of energy production not***
14 ***aforementioned, along with the percentage of BREC's total annual***
15 ***energy production that the energy represents.***

16

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1 **Response)**

- 2 a. Assuming 2019 actual generation and Year 1 solar generation as provided
3 in Big Rivers' Response to Item 10a of the Attorney General's First Request,
4 solar generation would represent 10.3% of annual energy production from
5 owned and contracted resources.
- 6 b. Assuming 2019 actual generation and Year 1 solar generation as provided
7 in Big Rivers' Response to Item 10a of the Attorney General's First Request,
8 natural gas generation would represent .1% (a tenth of 1%) of annual
9 energy production from owned and contracted resources.
- 10 c. Assuming 2019 actual generation and Year 1 solar generation as provided
11 in Big Rivers' Response to Item 10a of the Attorney General's First Request,
12 coal generation would represent 86.0% of annual energy production from
13 owned and contracted resources.
- 14 d. Big Rivers has no owned or contracted wind resources.
- 15 e. Assuming 2019 actual generation and Year 1 solar generation as provided
16 in Big Rivers' Response to Item 10a of the Attorney General's First Request,

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1 hydroelectric generation would represent 3.6% of annual energy production
2 from owned and contracted resources.

3 f. There are no other types of generating resources in the Big Rivers portfolio.

4

5

6 **Witness)** Mark J. Eacret

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1 **Item 8)** *Refer to BREC's response to the Attorney General's First Request,*

2 *Item 10(b).*

3 *a. Explain in detail why the MWh production at the solar sites will*
4 *degrade annually.*

5 *b. State what the electrical output of each solar facility will be by year*
6 *20.*

7

8 **Response)**

9 a. Electricity output from solar panels will degrade over time for a number of
10 reasons. According to National Renewable Energy Laboratory ("NREL"),
11 individual modules within a panel can fail or degrade due to conditions such
12 as thermal cycling, damp heat, humidity freeze and UV exposure. Thermal
13 cycling can cause solder bond failures and cracks in solar cells. Damp heat
14 has been associated with delamination of encapsulants and corrosion of
15 cells. Humidity freezing can cause junction box adhesion to fail. UV
16 exposure contributes to discoloration and backsheet degradation. NREL
17 continuously studies and evaluates the causes of and potential measures to

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1 minimize degradation. These impacts are mitigated as failing parts are
2 replaced to maintain output. The owner-operators will also overbuild the
3 panel capacity slightly and use inverter clipping, so as the panel output
4 degrades, the DC (Direct Current) output is still higher than the inverter
5 capacity.

6 b. Per Revised Exhibit 15 to my direct testimony, the projected electrical
7 output in year twenty is [REDACTED]

8 [REDACTED].

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11 **Witness)** Mark J. Eacret

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1 **Item 9)** *Refer to BREC’s response to the Attorney General’s First Request,*
2 *Item 10(c). The answer provided was nonresponsive. As originally requested,*
3 *explain what ancillary services BREC will receive under the solar contracts.*

4

5 **Response)** All three solar contracts define the term “Ancillary Services” as “any of
6 the services identified by the System Operator or the [MISO] Tariff as ‘Ancillary
7 Services,’” except that the Henderson solar contract excludes from the definition costs
8 recovered under a FERC-filed reactive power rate. The MISO Tariff defines
9 “Ancillary Services” as “[t]hose services that are necessary to support Capacity and
10 the transmission of Energy from Resources to Loads while maintaining reliable
11 operation of the Transmission System in accordance with Good Utility Practice.” The
12 MISO Tariff includes reactive power, regulation, and operating reserves as Ancillary
13 Services. Of those, only reactive power could potentially be produced by the solar
14 facilities under that tariff. However, as discussed in Big Rivers’ response to Item
15 21b of the Commission Staff’s Initial Information Requests, Big Rivers does not
16 consider this to be a significant source of value and assigned no benefit to it in our
17 economic analysis.

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3 **Witness)** Mark J. Eacret

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1 **Item 10)** *Refer to BREC's response to the Attorney General's First Request,*

2 *Item 10(e).*

3 *a. BREC cites to an April 2, 2019 New York Times article that discusses*
4 *carbon pricing efforts unfolding at the state level, including*
5 *Northeastern states, California, and potentially Virginia and New*
6 *Jersey. Explain whether there are carbon pricing efforts in the state*
7 *of Kentucky.*

8 *b. Explain why carbon credits were not included in BREC's base*
9 *economic analysis of the solar contracts, but BREC did include*
10 *carbon credits in some of the scenario analysis.*

11 *c. Identify which scenario analyses included carbon credits.*

12

13 **Response)**

14 a. Big Rivers is not aware of any carbon pricing efforts in the Commonwealth
15 of Kentucky.

16 b. Big Rivers was evaluating the solar contracts to determine if they provided
17 a least-cost option. Carbon taxes or credits were not included in the base

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1 case because there is so much uncertainty about if, how, and when the
2 carbon taxes or credits would be implemented. However, carbon scenarios
3 are worthy of study because they can significantly affect the value of solar
4 resources versus carbon-based generation resources.

5 c. Please see Exhibit Eacret-12 to my direct testimony, the last question on
6 page 2, "What sensitivities were run on the LT Plan model?" The fifth bullet
7 thereunder identifies the two carbon price/tax sensitivities (IHS carbon tax
8 and ACES carbon tax). These same two sensitivities were run on the ST
9 Plan model as outlined on Exhibit Eacret-12 on page 3.

10

11

12 **Witness)** Mark J. Eacret

13

14

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1 **Item 11)** *Refer to BREC's responses to the Attorney General's First*
2 *Request, Items 12(i), 13(j), and 14(i). Explain in detail why BREC will be*
3 *paying for the Henderson Solar Facility's property taxes through the*
4 *contracted rates, but will not be paying for the Meade Solar Facility or*
5 *McCracken Solar Facility's property taxes through rates.*

6

7 **Response)** Under all three agreements, the owner-operator is responsible for
8 paying the property taxes. Big Rivers is not required to make any other payments
9 related to property taxes.

10

11

12 **Witness)** Mark J. Eacret

13

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1 **Item 12)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 16. BREC contends that it will sell the renewable energy certificates*
3 *("RECs") and pass the proceeds through to its members. BREC further states*
4 *that if a member wants solar energy, then that member would be required to*
5 *purchase the RECs at market prices and other members will still receive that*
6 *benefit. Fully explain in detail the entire process of obtaining and selling*
7 *the RECs, as well as how the proceeds will flow to the members.*

8

9 **Response)** The process of REC monetization is outlined below.

- 10 1. Register Company or Project in one of many available Tracking Systems,
11 such as NARR, M-RETS, and PJM GATS.
- 12 a. Once registered, the project will be established in the tracking system
13 to create RECs from meter data uploaded from Independent System
14 Operator (ISO) settlements or by the metering entity.
- 15 b. RECs are created generally in a two-month lag from the operating
16 month.

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- 1 2. Define for which programs the project is eligible (Green-e, PJM Programs,
2 state programs, *etc.*). Eligibility is defined in the tracking system.
- 3 3. Specify details needed for the transaction with a counterparty.
- 4 a. Program eligibility;
- 5 b. Vintages and volumes of RECs available for sale;
- 6 c. When the tracking system transfer will occur; and
- 7 d. Payment/delivery terms (payment before delivery or vice versa, within
8 *X* number of business days of contract execution).
- 9 4. Confirmation with counterparty.
- 10 a. Vintage: months of generation;
- 11 b. Volume: Volume you are buying/selling;
- 12 c. Program eligibility, *e.g.*, Green-e eligible;
- 13 d. Payment timeline: Usually involves prepayment or “payment from
14 buyer to seller within *X* business days of contract execution;”
- 15 e. Transfer timeline: Usually transfers after payment or “transfer from
16 seller to buyer within *X* business days of payment.”
- 17 5. Negotiation of contract.

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- 1 a. Initiate agreement and update/send to counterparty.
- 2 i. Many counterparties have their own template.
- 3 b. Negotiation.
- 4 c. Execution of accepted agreement.
- 5 d. Contract negotiations, on average taking 3–4 weeks.
- 6 6. Transfer of Payment after Contract Execution.
- 7 7. Transfer of RECs after Contract Execution.
- 8 8. Once contract execution and transfer/payment are complete, Seller will no
- 9 longer hold title or claim to any environmental attributes covered by the
- 10 RECs sold in transaction.
- 11 a. “Environmental Attributes” means any credits, benefits, emissions
- 12 reductions, environmental air quality credits, and emissions reduction
- 13 credits, offsets, and allowances, howsoever entitled, resulting from the
- 14 avoidance of the emission of any gas, chemical, or other substance
- 15 deemed to be harmful to the environment, including greenhouse gas,
- 16 and attributable to the generation of electricity from identified
- 17 renewable resources, whether any of the foregoing arises pursuant to

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1 existing or future energy generation disclosure and tracking laws and
2 regulations, or any existing or future certification, certification
3 program, trading market or exchange, but specifically excluding state
4 and federal production tax credits, investment tax credits, incentives
5 or grants and any other tax credits, incentives or grants applicable to
6 the Project(s).

7 b. "Renewable Energy Certificate" or "REC" means all rights, title and
8 interest in and to the Environmental Attributes associated with the
9 generation of one megawatt-hour "MWh" (equivalent to 1000 kilowatt-
10 hours) of electric energy from renewable resources, including the REC
11 Reporting Rights.

12 Please see Big Rivers' response to Item 3a of Commission Staff's Supplemental
13 Information Requests for a description of the process through which Big Rivers'
14 Members receive the benefit of the REC sales.

15

16

17 **Witness)** Mark J. Eacret

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- 1 **Item 13)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 17, in which BREC asserts that "[t]he model results show the maximum*
3 *allowed solar PPA amount is added in all the sensitivities except when power*
4 *prices (LMP Prices) are higher and natural gas delivered prices are lower."*
- 5 *a. Provide clarification of the above-referenced sentence.*
- 6 *b. Explain what percentage of the time the modeling showed that the*
7 *solar contracts were the least cost resource.*
- 8 *c. Explain why the solar purchase power agreement amount is not*
9 *added in the sensitivities when power prices are higher.*
- 10 *d. Identify what BREC deems as higher power prices.*
- 11 *e. Explain why the solar purchase power agreement amount is not*
12 *added in the sensitivities when natural gas delivered prices are*
13 *lower.*
- 14 *f. Identify what BREC deems as lower natural gas prices.*

15
16

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1 **Response)**

- 2 a. In Big Rivers’ response to Item 17 of the Attorney General’s First Request,
3 Big Rivers was referring to Exhibit Eacret 12 and the least-cost analysis
4 that was performed. As stated in the response, “However, these
5 sensitivities which only move a single variable are intended to show “break
6 points” to give one an idea of how much a single variable needs to move to
7 change the outcome. For example, if NG prices go down then power LMP
8 prices are most likely to go down and if LMP prices go up, then NG prices
9 are most likely to go up.” The break points for the NGCC unit to become
10 more economic than the two Solar PPA options were when the NG prices
11 were 20% to 30% lower than base forecast and when LMP prices were 20%
12 to 30% higher than base forecast. Please see the comments on Page 1 of
13 Exhibit Eacret 12A.
- 14 b. The solar purchase power agreements were included as a least-cost
15 resource in 24 of the 30 LT Plan Model runs (Base and 29 sensitivities).
16 While the solar power purchase agreements are more profitable at higher

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1 power prices, the NGCC unit has the advantage to dispatch at much higher
2 capacity factors.

3 c. While the solar power purchase agreements are still profitable when
4 natural gas prices fall, their value is unchanged from the base case at the
5 lower natural gas prices, but the natural gas combined cycle unit has the
6 advantage of dispatching at much higher capacity factors.

7 d. Big Rivers ran scenarios at 10% increments up to 50% above the power
8 prices in the base forecast. As noted above, "higher power prices" in Big
9 Rivers' analysis would be an increase of 20% to 30% from the base.

10 e. Big Rivers ran scenarios at 10% increments down to 50% lower natural gas
11 delivered prices. As noted above, "lower NG prices" would be 20% to 30%
12 below the base forecast.

13

14

15 **Witness)** Mark J. Eacret

16

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1 **Item 14)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 21, in which BREC asserts that the solar contracts contain guaranteed*
3 *minimums at 90% of expected generation over two years.*

4 *a. Explain in detail what happens if the solar contracts do not produce*
5 *a minimum of 90% of expected generation over two years*

6 *b. Is BREC referring to the initial two years of the contract?*

7 *c. Why are there only guaranteed minimums for two years, instead of*
8 *for the full 20-year contract term?*

9

10 **Response)**

11 a. Section 6.12 in all three contracts describes how the Output Guarantees
12 work. The Output Guarantee for any consecutive two-year period
13 beginning with third Contract Year is equal to 90% of the average of the
14 Expected Energy for the two-year period, reduced by generation shortfalls
15 beyond the control of the owner-operator (Seller Uncontrollable Minutes).
16 If net generation for the two-year period is short of the Output Guarantee,
17 the difference is referred to as an Output Shortfall.

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1 For purposes of calculating damages, the Output Shortfall is
2 multiplied by the Buyer’s Cost to Cover. The Buyer’s Cost to Cover is the
3 difference between the average of the Day-Ahead Locational Marginal
4 Prices (“DALMP”) over the two–year period plus the replacement cost of the
5 Renewable Energy Certificates that would have been received and the
6 Contract Price. If the Output Shortfall and the Buyer’s Cost to Cover are
7 both positive, the Buyer will receive damages.

8 “Output Guarantee”, “Contract Year”, “Expected Energy”, “Seller
9 Uncontrollable Minutes”, “Output Shortfall”, “Buyer’s Cost to Cover”,
10 “DALMP”, and “Contract Price” are all defined terms in the contracts.

- 11 b. The Output Guarantee applies to years three through twenty.
- 12 c. Please see Big Rivers’ response to Item 14b. of the Attorney General’s
13 Second Request for Information.

14

15

16 **Witness)** Mark J. Eacret

17

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1 **Item 15)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 28(a). BREC asserts that the estimated cost for each 69 kV connection*
3 *is \$300,000. Confirm that under the contract terms it appears BREC will be*
4 *responsible to pay for all 69 kV connection costs.*

5

6 **Response)** No, per Exhibit 5.1 of the McCracken and Meade solar contracts and as
7 noted in Big Rivers' response to Item 28b of the Attorney General's First Request, the
8 Seller is responsible for all interconnection costs up to \$300,000. Big Rivers is
9 responsible only for the difference between total interconnection costs and \$300,000.

10

11

12 **Witness)** Mark J. Eacret

13

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1 **Item 16)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 28(b). Will there be any interconnection costs below \$300,000 that*
3 *Community Energy, Inc. will be responsible for in the Meade and McCracken*
4 *solar contracts?*

5

6 **Response)** Please see Big Rivers' response to Item 15 of the Attorney General's
7 Second Request for Information.

8

9

10 **Witness)** Mark J. Eacret

11

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1 **Item 17)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 38. Explain in detail how retaining RECs under all three solar*
3 *contracts is advantageous to BREC's member-owners.*

4

5 **Response)** Big Rivers' response to Item 38 of the Attorney General's First Request
6 noted that Big Rivers is entitled to all Renewable Energy Certificates associated with
7 the output of the three solar facilities. Big Rivers' financial analysis presented in
8 Revised Exhibit 15 to my testimony places a value on those RECs of between [REDACTED]
9 [REDACTED], depending on the forward curve assumed. This value is
10 the advantage to Big Rivers' Member-Owners. Please see Big Rivers' response to
11 Item 12 of the Attorney General's Second Request for Information for an explanation
12 of the process of obtaining and selling REC's, and to Item 3a of the Attorney General's
13 Second Request for Information for an explanation of how the proceeds will flow to
14 Big Rivers' Members.

15

16

17 **Witness)** Mark J. Eacret

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1 **Item 18)** *Refer to BREC's response to the Attorney General's First Request,*
2 *Item 42. BREC avers that the solar contracts will cause BREC to incur MISO*
3 *market fees for administrative and other minor changes. Explain why*
4 *entering into the solar contracts will cause MISO to charge additional fees.*

5

6 **Response)** Generation in MISO pays a fee that allows MISO to recover its cost of
7 market administration. Inevitable differences between day-ahead forecasts of solar
8 generation and actual solar generation could result in Revenue Sufficiency Guarantee
9 (RSG) charges. As noted in its response to Item 42 of the Attorney General's First
10 Request, Big Rivers expects these charges to average less than \$0.50/MWh (50¢ per
11 MWh).

12

13

14 **Witness)** Mark J. Eacret

15

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1 **Item 19) Refer to BREC's response to the Commission Staff's First Request**
2 **for Information ("Commission Staff's First Request"), Item 18, wherein BREC**
3 **states that issues could arise if MISO is saturated with high levels of**
4 **renewable generation of 50% or higher. BREC further contends that**
5 **currently, the renewable generation on the MISO system in BREC's Zone is**
6 **not anywhere close to high levels of renewable generation.**

7 **a. Explain what issues could arise if renewables penetration in MISO**
8 **reaches the levels of 30%, 40% and 50% or higher. Include in your**
9 **response a discussion of: (i) what, if any measures or system**
10 **enhancements MISO may have to initiate to reduce the risk of load**
11 **interruptions, curtailments, load shedding or rolling blackouts,**
12 **based on the assumptions of a renewables penetration at 30%, 40%,**
13 **or 50% or higher; and (ii) the potential roles that dynamic support**
14 **capabilities, synchronous condensers, and HVDC lines could play, if**
15 **applicable.**

16 **b. Provide the current percentage of renewable generation in the MISO**
17 **system.**

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1 **Response)**

2 a. MISO has initiated a Renewable Integration Impact Assessment (“RIIA”).
3 According to MISO, the overall goal of the RIIA is to better understand the
4 impacts of renewable energy growth in MISO over the long term, to give
5 MISO and its stakeholders specific areas around which to focus effort, to
6 illustrate specific areas of system weakness, show when those weaknesses
7 could become problematic and identify potential means to address them.
8 The MISO RIIA assessment should trigger broader conversations about
9 renewable integration impacts on the reliability of the electric system. This
10 ongoing assessment will evaluate milestones set at 10% increments along
11 an increasing renewable penetration arc. While assessment details can be
12 found on the MISO website, a summary of key concerns follows.

13 MISO RIIA workshop reports have indicated integration complexity
14 increases sharply beyond 30% renewable penetration. Based on MISO’s
15 workshop reports, a *partial* list of complexities includes:

16 1. risk of losing load compresses into a small number of hours and
17 shifts into the evening;

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- 1 2. existing infrastructure becomes inadequate for fully accessing the
2 diverse resources across the MISO footprint;
- 3 3. regional energy transfer increases in magnitude leading to a need
4 for increased extra-high-voltage line thermal capabilities;
- 5 4. power deliveries from low short circuit areas may need
6 transmission technologies equipped with dynamic support
7 capabilities; and
- 8 5. frequency response is stable up to 60% penetration but may
9 require additional planned headroom beyond.

10 Specific mitigating measures could include expansions of the
11 transmission network including the addition of HVDC; the addition of
12 Flexible AC transmission system (“FACTS”) devices such as Static Var
13 Compensators (“SVCs”) and static synchronous compensators
14 (“STACOMS”); the addition of synchronous condensers; additional energy
15 storage or hybrid technology (solar and battery storage); and increased
16 operating reserves.

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1 b. According to information on MISO's website, the current penetration of
2 renewable generation in the MISO system is approximately 18%.

3 See: <https://www.misoenergy.org/about/media-center/corporate-fact-sheet/>.

4

5

6 **Witness)** Michael W. Chambliss

7

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1 **Item 20)** *Refer to the Application generally. If BREC relies on the delivery*
2 *of solar power under the solar contracts is BREC putting its members at risk*
3 *for load interruptions, curtailments, load shedding or rolling blackouts as*
4 *is currently the case in California where renewable energy is unable to meet*
5 *demand? Please explain in detail how this would or would not be the case.*

6

7 **Response)** Big Rivers operates within the MISO market. MISO is currently at
8 approximately 18% renewable energy. Rather than target a specific renewable
9 penetration level, MISO has initiated a Renewable Integration Impact Assessment
10 (RIIA). The overall goal of the RIIA is to better understand the impacts of renewable
11 energy growth in MISO over the long term, to give MISO and its stakeholders specific
12 areas around which to focus effort, to illustrate specific areas of system weakness,
13 show when those weaknesses could become problematic and identify potential means
14 to address them.

15

16

17 **Witness)** Michael W. Chambliss

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1 **Item 21)** *Reference the Direct Testimony of Mark Eacret, page 28, wherein*
2 *he references utilizing Plexos 8.2 R01, which he states is BREC's in-house*
3 *production cost model. Reference also BREC's response to Commission*
4 *Staff's First Request, Item 31. Explain whether this is the same cost model*
5 *that BREC uses for IRP purposes. Identify all other models BREC utilizes for*
6 *IRP purposes.*

7

8 **Response)** Yes, Plexos is the same model Big Rivers uses to prepare its IRPs.
9 Plexos provides upgrades and enhancements, usually three or four times each year,
10 to its model. Big Rivers will utilize Plexos 8.2 R01 for its 2020 IRP and used Plexos
11 7.4 R02 for its 2017 IRP. Plexos is the only model Big Rivers utilizes for IRP purposes.
12 In Big Rivers' response to Item 31 of Commission Staff's First Request, the LT Plan
13 (capacity planning simulation model) and ST Plan (dispatch simulation model) are
14 explained and are included within the Plexos model.

15

16

17 **Witness)** Mark J. Eacret

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1 **Item 22)** *Reference the response to Commission Staff's First Request, Item*
2 *32. If the Commission should approve the instant application, explain*
3 *whether such a ruling could in any manner influence the credit rating*
4 *agencies' decisions regarding whether to upgrade BREC to an investment*
5 *grade rating, and if so, how.*

6

7 **Response)** Big Rivers expects Commission approval of the application in this case
8 to be viewed favorably by the rating agencies. Big Rivers believes such favorable
9 reception will enhance the rating agencies' review of the Big Rivers credit profile, and
10 will favorably influence the decision to upgrade Big Rivers to investment grade.

11

12

13 **Witness)** Paul G. Smith

14