

201 Third Street P.O. Box 24 Henderson, KY 42419-0024 270-827-2561 www.bigrivers.com

November 13, 2019

VIA FedEx Overnight Delivery

Ms. Gwen R. Pinson Executive Director Public Service Commission 211 Sower Boulevard, P.O. Box 615 Frankfort, Kentucky 40602-0615

REED

NOV 1 4 2319 PUBLIC CENSOR COMMISSION

Re: In the Matter of: Application of Big Rivers Electric Corporation for a Certificate of Public Convenience and Necessity to Construct a 161 kV Transmission Line, and a 345 kV Transmission Line in Meade County, Kentucky – Case No. 2019-00270

Dear Ms. Pinson:

Enclosed for filing on behalf of Big Rivers Electric Corporation ("Big Rivers") are an original and six (6) copies of: (i) Big Rivers' responses to Commission Staff's First Request for Information dated November 4, 2019, and (ii) a Motion for Deviation for two files provided on CD in response to Item 14a of the requests for information.

Please confirm the Commission's receipt of these responses by placing the Commission's filestamp on the indicated documents and returning them to Big Rivers in the pre-addressed, postage paid envelop provided.

Please feel free to contact me if you have any questions.

Sincerely,

Tyson Kamuf Corporate Attorney Big Rivers Electric Corporation <u>tkamuf@bigriverson.com</u>

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NOV 1 4 2019

PUBLIC GERVICE COMMISSION

Your Touchstone Energy® Cooperative K

COMMONWEALTH OF KENTUCKY BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY

Case No. 2019-00270

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Response to Commission Staff's First Request for Information dated November 4, 2019

ORIGINAL

FILED: November 14, 2019

RECEIVED

NOV 1 4 2019

1 2 3	COMMONWEALTH OF KENTUCKY BEFORE THE PUBLIC SERVICE COMMISSION OF KENTUCKY COMMISSION						
4 5	In the Matter of:						
6 7 8 9 10 11 12 13	APPLICATION OF BIG RIVERS ELECTRIC)CORPORATION FOR A CERTIFICATE OF)PUBLIC CONVENIENCE AND NECESSITY TO)CONSTRUCT A 161 KV TRANSMISSION LINE,)2019-00270AND A 345 KV TRANSMISSION LINE IN)MEADE COUNTY, KENTUCKY)						
14 15	MOTION FOR DEVIATION						
16 17	Big Rivers Electric Corporation ("Big Rivers") hereby moves the Kentucky Public						
18	Service Commission ("Commission") for a deviation from the requirement in the Commission's						
19	Staff's First Request for Information to Big Rivers requiring that Big Rivers file an original and						
20	six copies of its responses to the information requests in paper medium. Big Rivers is filing with						
21	this motion a hardcopy original and six paper copies of its responses to the Commission Staff's						
22	First Request for Information, except that Big Rivers is providing the attachments to its response						
23	to Item 14a electronically on a public CD attached to the original and each copy of the responses.						
24	The attachments are two maps, which are being providing electronically in order to provide the						
25	detail and resolution requested.						
26	WHEREFORE, Big Rivers respectfully requests that the Commission enter an order						
27	granting a deviation to Big Rivers from the requirements to file paper copies of the attachments						
28	to its responses to Item 14a of the Commission Staff's First Request for Information.						
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Respectfully submitted,

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Tyson Kamuf Corporate Attorney Big Rivers Electric Corporation 201 Third Street P.O. Box 24 Henderson, Kentucky 42419-0024 Phone: (270) 827-2561 Facsimile: (270) 844-6417 tyson.kamuf@bigrivers.com

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

VERIFICATION

I, Michael W. ("Mike") Chambliss, verify, state, and affirm that the 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.

Michael W. ("Mike") Chambliss

COMMONWEALTH OF KENTUCKY) COUNTY OF HENDERSON)

SUBSCRIBED AND SWORN TO before me by Michael W. ("Mike") Chambliss on this the 13th day of November, 2019.

Notary Public, Kentucky State at Large

My Commission Expires

10.31.2020

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

- 1 Item 1) Refer to the application, paragraph 2, regarding Projects A & B.
- a. Explain whether the new 161-kV line for Project A and the 345-kV
 transmission line for Project B will require a widening of the
 existing 69-kV Right-Of-Way (ROW).
- b. If the existing ROW does require widening, explain whether there
 are any environmental impacts that must be mitigated and, if so,
 what steps BREC has taken.
- 8 c. Explain the steps BREC will take to take down the existing 69-kV
 9 lines and poles and construct the new proposed 69/161-kV line and
 10 the 69/345-kV line.
- 11 d. Provide a description of the existing 69-kV transmission structures.
- 12

13 **Response**)

- a. The existing 69 kV transmission line ROW is sufficient for the new 161 kV
 transmission line for Project A and for the 345 kV transmission line for
 Project B.
 The existing transmission ROW does not require widening. Therefore, this
- 18 question is N/A.
- 19c.The 69 kV transmission line that is proposed to be overbuilt with the 16120kV transmission line was recently reconductored. Therefore, with that

Case No. 2019-00270 Response to PSC 1-1 Witness: Michael W. Chambliss Page 1 of 2

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

transmission line, Big Rivers expects to replace one structure at a time, moving the 69 kV conductor over as the structure is replaced.

3 The 69 kV transmission line that is proposed to be overbuilt with the 345 kV transmission line has about 6.1 miles of very old and smaller 4 conductor. Therefore, with that transmission line, Big Rivers expects to 5 6 work an entire dead-ended section at a time, removing the 69 kV conductor in that section, replacing those structures, and finally stringing the new 7 8 conductor. The proposed 345 kV transmission line will also overbuild about 9 2.6 miles of relatively new 69 kV line. For this newer section, Big Rivers 10 proposes to reuse the existing conductor, replacing one structure at a time 11 similar to the 161 kV construction method.

- d. The existing 69 kV transmission structures are mostly RUS standard TS-1
 structures. These are wooden monopoles utilizing two wood crossarms and
 porcelain bell insulators.
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- 16
- 17 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-1 Witness: Michael W. Chambliss Page 2 of 2

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1	Item 2)	Refer to the application, paragraph 2, regarding Project D.
2	<i>a</i> .	There is not a 345-kV line in the immediate area. Explain whether
3		the substation will step up the voltage from 161 kV to 345 kV.
4	b.	Explain whether the land and ROW have been acquired for
5		construction and, if not, BREC's progress to date.
6	с.	Explain whether there are any environmental impacts that must be
7		mitigated and, if so, what steps BREC has taken.
8		· ·
9	Respons	se)
10	a.	The Project D substation (Otter Creek) will require a 161 kV to 345 kV $$
11		transformer.
12	b.	Big Rivers has secured an option to buy the land for this substation. The
13		option also includes the needed ROW at this location that will be acquired
14		from this same property owner.
15	c.	Big Rivers has hired Burns & McDonnell to prepare an Environmental
16		Assessment ("EA") for all seven transmission projects. If the EA identifies
17		any environmental impacts, Big Rivers will work to mitigate these issues.
18		
19		
20	Witness)	Michael W. Chambliss
21		

Case No. 2019-00270 Response to PSC 1-2 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 3) Refer to the application, paragraph 3.

- a. Provide the expected load and load factor for the new Nucor steel
 plate manufacturing mill (Nucor Facility).
- 4 b. Identify any other sources for new load in the Meade County area
 5 that BREC has become aware of since the filing of the application.
 6 Consider this an ongoing request throughout this proceeding.
- c. Explain how the proposed transmission construction will also
 enhance reliability to the retail customers of BREC's distribution
 cooperative members.
- 10

11 **Response**)

a. Based on information provided by Nucor, Big Rivers expects Nucor load to
be approximately 200 megawatts, with a load factor of approximately 60
percent.

15 b. Big Rivers is not aware of any additional sources of new load at this time.

16 c. This 345 kV interconnection and Project D (Otter Creek Substation) will
17 provide an additional 161 kV source to the existing Meade County
18 Substation. This will make outages less likely during maintenance periods.
19 Also, Big Rivers has long envisioned the addition of a transmission
20 substation in the extreme eastern Meade County RECC service territory.
21 This would break up long 69 kV transmission line circuits into shorter

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO **CONSTRUCT A 161 KV TRANSMISSION LINE, AND** A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4. 2019

November 14, 2019

1 segments. More circuits of shorter distances would result in forced outages impacting fewer customers. However, a greenfield substation has been hard to justify due to the projected costs of the substation and the interconnecting transmission lines. Otter Creek Substation will provide the substation infrastructure and the interconnecting transmission lines needed to later add 161 kV to 69 kV transformers.

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Michael W. Chambliss <u>9</u>. Witness)

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 4) Refer to the application, paragraph 15.

- a. Provide a breakdown of the total capital cost of the five proposed
 3 projects.
- b. Provide a breakdown of the annual operation and maintenance
 5 expense by account number.
- 6

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7 Response)

a. The capital cost of these five capital projects is as follows:

- 9 i. Project A An 8.8 mile, 161 kV transmission line circuit will be
 10 added from Meade County Substation to Otter Creek Substation.
 11 This circuit will be built above the existing 69 kV Garrett
 12 transmission line. Total capital cost \$7,000,000.
- ii. Project B An 8.6 mile, 345 kV transmission line circuit will be
 added from Otter Creek Substation to Brandenburg Steel Mill
 ("<u>BSM</u>") Substation. This circuit will be built above the existing 69
 kV transmission lines extending from Garrett Substation to
 Buttermilk Falls Substation. Total capital cost \$17,000,000.
- iii. Project C A 161 kV line terminal will be constructed completely
 within the existing Meade County Substation. Total capital cost –
 \$800,000.

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

iv. Project D – The greenfield 345/161 kV Otter Creek Substation will
be built north of the intersection of Joe Prather Highway (KY-313)
and Garrett Road (KY 1238). Total capital cost – \$14,000,000.
v. Project E – The greenfield 345/34.5 kV BSM Substation will be built
adjacent to, and will serve as the delivery point for the new Nucor
steel mill. Total capital cost – \$26,000,000.
b. Please see the table below.

Big Rivers Electric Corporation Annual O&M Expense Breakdown by Account				
Account Number	An	nount		
562	\$	4,960		
563		17,360		
566		19,840		
569		2,480		
570		34,720		
571		119,040		
573		49,600		
Total	\$	248,000		

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10 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-4 Witness: Michael W. Chambliss Page 2 of 2

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

Item 5) Refer to the application, paragraph 16. Provide a schedule
 showing the permits that will be required for the construction of the proposed
 transmission facilities, the timeline for each permit, and the current status
 of each permit request.

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6 **Response)** Big Rivers will be submitting highway crossing permit applications to 7 the Kentucky Transportation Cabinet. Seven crossing permit applications will be 8 submitted by Big Rivers for the 161 kV transmission line. In addition, six crossing 9 permits will be required for the 345 kV transmission line. Big Rivers intends to 10 submit the applications in mid-2020 and it typically takes approximately one month 11 to receive the permits. Big Rivers has not yet identified any other required permits 12 for the transmission lines or substations.

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15 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-5 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 6) Refer to the application, paragraphs 18 & 19.

a. State whether BREC has received any responses to the notice that
mailed to affected property or from the notice that was published in
the Brandenburg-Meade County Messenger. If so, provide a
summary of those response(s) or, if the response(s) were in written
format, provide a copy of the written response(s). Consider this an
ongoing request throughout this proceeding.

8 b. Explain whether BREC has held any local town hall meetings to 9 explain the projects and answer questions. If so, provide a copy of 10 any handout materials and the attendance sign-in sheet from the 11 meeting(s).

12

13 **Response**)

14a. Big Rivers received three telephone calls from Meade County residents in15response to the notice to property owners and the notice in the16Brandenburg-Meade County Messenger newspaper. One person said he17owned property near the entrance to Fort Knox. He inquired about the18location of the transmission lines, but expressed no concern when told that19the lines were at least eight miles from his property.

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1		Two other property owners requested more information regarding							
2		the overbuild on existing transmission lines on their respective property.							
3		Both property owners expressed understanding and had no complaints.							
4		Additionally, the attached editorial appeared in the Thursday,							
5		November 7, 2019, edition of the Brandenburg-Meade County Messenger.							
6	b.	Big Rivers has not held any local town hall meetings with regard to these							
7		projects. However, several meetings have been held with public officials in							
8		the area including Brandenburg Mayor Ronnie Joyner, Meade County							
9	Judge-Executive Gerry Lynn, State Representative Nancy Tate, and State								
10		Senator Steve Meredith. The proposed transmission line routes and							
11		locations of the proposed substations were discussed and reviewed in each							
12		of the meetings.							
13									
14									
15	Witness)	Michael W. Chambliss							
16									

Case No. 2019-00270 Response to PSC 1-6 Witness: Michael W. Chambliss Page 2 of 2

fight in a far away land

for the greater good of

our nation, they must

now watch as their

county "drafts" their

property for a deal that

has already cost them so

much, long before, "Da-

vid Pace, Gerry Lynn

and Nancy Tate get to

stick their golden shov-

els in the ground that

ty Cooperative Extension

AGRICULTURE

A grab for power: Nucor deal now forcing farmers to hand over their land

Editorial **CHAD HOBBS**

6A

Messenger Staff

Because deer

come out of

When driving south is another set of much on HWY 313 towards larger poles that run Meade County's south- perpendicular to the set ern border, it's hard to on the main road, runmiss Hager Farms. As ning across the whole the ground rises ap- farm. A huge metal line proaching the back of poles also run just slopes of Bee Knob Hill, beyond J.J. and his wife, there in lies the Hager Rhonda's, house that home place setting high to the land

to find along most any road. Down below Mrs. Hager's house, there ago, officials from Big age for those. Rivers Electric, Meade ing to build an electrial autotation right out

NOWHERE

that one would expect tion or miscalculation, der to power lights and in Garrett with power ed by their country to it's hard to tell but re- motors at the substagardless, local farm- tion because the LG&E ers can tell you it's not line they were tying into quite true. Not that long carried too much volt-

County RECC's elec- new fight started," Hagtric supplier, paid Hager er said. "We didn't want Farms a visit. J.J. says anymore poles and we built across land all the the gist of the meeting made that clear." Evenwas Big Rivers was go- tually it was agreed that they would run the line ingerschunder Thorn Rive thange to REGGE's the will acrondon the bome day, Nov. 18 at 6 p.m. at youth, ages 9-18.

the Extension Office. North District 5 4-H Teen Council: Teens. ages 14-18! Your leadership skills can help to "Make the Best Better" not just for our county and district but for Kentucky 4-H! Our next event will be on Monday, Nov. 18, we will all meet in Taylor County for a day of fun,

lines eventually crossing several farms in between the Hager and Hobbs farms, linking the two substations. At Hobbs' "So, then a whole farm two lines will T out from that substation with one line being way to the Nucor site and another line will be built crossing farms all

4-H Officer Training: Service.



University of Kentucky College of Agriculture. Food and Environment **Cooperative Extension Service**

meade.ca.uky.edu **4-H YOUTH DEVELOPMENT EDUCATION**

Deana K. Reed Meade County Extension Agent

Meade County Extension Homemakers, Meade County Farmer's Market, & Meade County Chamber of Commerce & Tourism



Attachment for Response to PSC 1-6a Witness: M Michael W. Chambliss Case No. Page 1 2019-00270

Livestock Reports 11-04-2019

United Producers Livestock Market, Irvington, KY

Cows Bulls	Headage 187 23		Low 40.00 55.00		High 51.00 77.00	
Year	ling Steers:	Steer Calves		Feeder Bulls:		
600-700	95.00-131.50	300-400	104.00-154.00	250-400	92.00-148.00	
700-800	105.00-135.00	400-500	103.00-149.00	400-600	85.00-152.00	
100 000		500-600	105.00-140.00	600-800	80.00-113.00	
Year	ling Heifers:	Heifer Calves:				
600-700	85.00-118.50	300-400	80.00-135.00			
700-800	80.00-120.00	400-500	93.00-132.00			
		500-600	84.00-126.00			

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

Item 7) Refer to the application, paragraph 24. Explain why the need to
 request authority to move the substations from the locations shown on the
 maps filed with the application.

4

5 Response) Much of the eastern Meade County landscape is dotted with sinkholes.
6 Having obtained an option to purchase the needed real estate for the Otter Creek
7 Substation, Big Rivers is conducting geotechnical borings. In the event that these
8 field investigations uncover unsuitable subgrade conditions, Big Rivers would need
9 to make minor adjustments to the exact location.

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12 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-7 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

Item 8) Refer to the application, Exhibit A, the direct testimony of
 Michael W. Chambliss (Chambliss Testimony), pages 3-4. regarding the seven
 transmission system improvement projects.

- a. Confirm that the primary driver for these seven transmission
 5 projects is the new Nucor steel plate manufacturing mill.
 - b. State whether the proposed transmission projects would be needed absent the new Nucor steel mill.
- 8 c. State whether Project F (the proposed Greenfield 345-kV 9 Redmon Road Switching Station) and Project G (the 2.5-mile, 10 345-kV transmission line from the Redmond Road Switching 11 Station to the Otter Creek Substation) is part and parcel of 12 Projects A through E to provide electric service to the new Nucor 13 steel mill.
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15 **Response**)

16a.The primary driver for these seven transmission projects is the new Nucor17steel mill; however, the design presented to the Commission leveraged the18new Nucor steel mill to enhance the east side of Big Rivers' transmission19system. These enhancements will provide significant current and future20benefit to Meade County RECC. Additional information is outlined in Big21Rivers' response to Item 3c. of these information requests ("PSC 1-3c").

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APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

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November 14, 2019

b. The proposed transmission system projects were needed absent the new
 Nucor steel mill; however, absent the new steel mill, the projects were cost
 prohibitive. Please see Big Rivers' response to PSC1-3c.

- c. Yes. Projects F and G are part and parcel of Projects A through E.
- 5 6

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7 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-8 Witness: Michael W. Chambliss Page 2 of 2

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

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November 14, 2019

Item 9) Refer to the Chambliss Testimony, page 5, lines 1-5.
 Provide the anticipated increase in transmission revenues that will result
 from the proposed projects.

4

5 Response) Big Rivers estimates it will earn approximately \$2 million per year in
6 additional transmission revenue. Approximately \$1 million of the \$2 million will
7 flow back to its Members through Big Rivers' Member Rate Stability Mechanism
8 defined in Section 2 of Big Rivers' tariff.

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11 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-9 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 10) Refer to the Chambliss Testimony, page 5, lines 10 - 13. Provide

2 the desired Nucor construction timeline.

3 . . .

4 **Response)** Nucor has requested electrical service for no later than first quarter 5 2022.

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8 Witness) Michael W. Chambliss

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Case No. 2019-00270 Response to PSC 1-10 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 11) Refer to the Chambliss Testimony, page 6, lines 8-10.

a. Explain how the \$3.5 million cap was determined to be a reasonable amount for Nucor to reimburse BREC in the event the electric service agreements are not approved and consummated.

b. Explain why there is not a similar provision to address the scenario in which Nucor would not be able to complete the construction of its new mill.

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9 Response)

10 Big Rivers attempted to project expenditures and commitments that would a. 11 be made during the estimated time required to negotiate a retail agreement 12 between Nucor and Meade County RECC, and also the time needed to allow the Commission to issue an order on the retail agreement. Based on those 13 projections and assumptions, Big Rivers believed a cap of \$3.5 million was 14 15 appropriate, with the understanding the cap would be modified in the event 16 Big Rivers' expenditures were approaching that amount prior to 17 consummation of the retail agreement.

b. Under Nucor's initial agreement, Nucor agreed to reimburse Big Rivers for
its expenditures in the event Nucor and Meade County RECC were not able
to agree to a retail agreement or the retail agreement did not receive all
necessary approvals. If the retail agreement receives those approvals (in

Case No. 2019-00270 Response to PSC 1-11 Witness: Michael W. Chambliss Page 1 of 2

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 particular, the approval of the Commission and the Rural Utilities Service $\mathbf{2}$ of the United States Department of Agriculture), the retail agreement protects Big Rivers in the event that Nucor does not complete construction 3 4 of the new mill or the agreement otherwise terminates prior to the end of $\mathbf{5}$ the term (see Sections 2.11 (Termination Charge), 2.12 (Credit Support for Termination Charge), and 11.01 (Term and Service Commencement Date) 6 7 of the retail agreement, which was filed with the Commission in Case No. 2019-00365.1 8

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11 Witness) Michael W. Chambliss

12

Case No. 2019-00270 Response to PSC 1-11 Witness: Michael W. Chambliss Page 2 of 2

¹ In the Matter of: Joint Electronic Application of Louisville Gas and Electric Company, Meade County Rural Electric Cooperative Corporation, and Big Rivers Electric Corporation for Approval of an Agreement Modifying an Existing Territorial Boundary Map and Establishing Meade County RECC as the Retail Electric Supplier for Nucor Corporation's Proposed Steel Plate Mill in Buttermilk Falls Industrial Park in Meade County, Kentucky.

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 12) Refer to the Chambliss Testimony, pages 6, line19 through page

2 7, line 2. Explain when BREC will make a final determination regarding the

3 financing of the proposed transmission projects.

4

5 Response) Big Rivers has included the Nucor projects in its current construction
6 work plan (CWP), which has been approved by the United States Department of
7 Agriculture's Rural Utilities Service ("RUS"). Big Rivers intends to apply for a loan
8 from RUS to fund the projects.
9

10

11 Witness) Michael W. Chambliss

12

Case No. 2019-00270 Response to PSC 1-12 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

Item 13) Refer to the Chambliss Testimony, page 7, lines 5-7. Explain
 whether any of the construction costs associated with the proposed
 transmission projects will be ultimately borne by the retail customers of
 BREC's distribution cooperative members.

5

6 Response) Big Rivers does not expect that any of the construction costs will be
7 borne by its retail members. Although debt service, depreciation, and O&M costs for
8 these projects will be included in any future rate proceedings that occur after 2022,
9 the net revenues received from Nucor, plus increased transmission revenues more
10 than offsets these costs.

11

12

13 Witness) Michael W. Chambliss

14

Case No. 2019-00270 Response to PSC 1-13 Witness: Michael W. Chambliss Page 1 of 1

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

1 Item 14) Refer to the application, Exhibit D, page 3 of 3.

a. Provide a more detailed, higher resolution map showing nearby
structures and other land features such as cemeteries, wetlands,
etc., that may be affected by the higher transmission line structures
or expanded ROW.

- b. Explain whether the illustrated route of the 345-kV line and
 substation that corresponds to Projects F and G on page 2 of the
 application, is tentative, how and why the exact route was selected,
 and whether any ROW has been acquired.
- 10

11 **Response**)

12a.In addition to the map contained in Exhibit D, Big Rivers has prepared two,13more detailed, higher resolution maps. These maps have a scale of 1 inch14equals 1000 feet, identical to the maps filed with the ORIGINAL version15of Big Rivers' application. Digital copies of these two, more detailed, higher16resolution maps are provided on the electronic media accompanying these17responses.

Also, attached to this response is the Routing Study as prepared by
Team Spatial. The study examined structures within the ROW and in close
proximity to the line routes. The results of this analysis is contained on
pages 43 and 44 in the Built section of Figures 39 and 40. The Natural

Case No. 2019-00270 Response to PSC 1-14 Witness: Michael W. Chambliss Page 1 of 2

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

section of these same figures contain a summary of the wetland acres
 impacted.

3 The Exhibit D illustrated route and location for Projects F and G are as b. 4 currently proposed. These two projects will be addressed in a second 5 Certificate of Public Convenience and Necessity ("CPCN"). Big Rivers currently expects to file this CPCN application in early 2020. A completed 6 7 route study will be filed with that second CPCN application. The route 8 study identifies the existing 345 kV transmission line from Mill Creek to 9 Hardin County and pinpoints its closest point of approach to the 10 Brandenburg Steel Mill. This point was selected to minimize costs and to 11 avoid impacts to the community. Along this 2.7-mile route there are nine 12 parcels. Big Rivers has obtained an option for an easement on one of the 13 nine parcels. Big Rivers is negotiating with two property owners and has 14 contacted one other property owner to begin discussions.

- 15
- 16

17 Witness) Michael W. Chambliss

18

Case No. 2019-00270 Response to PSC 1-14 Witness: Michael W. Chambliss Page 2 of 2 345 & 161 kV Transmission Lines Brandenburg Steel Mill Routing Study by Team Spatial – November 7, 2019 [CN 2019-00270 – PSC 1-14a Attachment]





345 & 161 kV Transmission Lines Brandenburg Steel Mill Routing Study

Project Report

Prepared by: Jesse Glasgow and Nicholas Arjona, Team Spatial Date: November 7, 2019



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Project Overview

Big Rivers Electric Corporation plans to construct three transmission lines that connect the proposed Brandenburg Steel Mill Substation, proposed Otter Creek Substation, proposed Redmon Road Substation, and Meade County Substation.

The project involves constructing one 2.58 mile 345 kV transmission line northwestward out of the proposed Redmon Road Substation. The northwestern end point for this proposed transmission line will terminate at the proposed Otter Creek Substation.

From the proposed Otter Creek Substation, a second 345 kV line will extend to the north approximately 8.79 miles to the proposed steel mill.

A 161 kV transmission line will extend 8.52 miles eastward from the existing Meade County Substation at the intersection of KY-79 and Guston Road. The eastern terminal will be the proposed Otter Creek Substation.

In support of this project, Team Spatial performed a siting study to help the Big Rivers team identify the preferred routes to construct the new lines. The siting study considered the natural environment and people as well as cost and engineering concerns. The route selection process is described in this report.

Study Area Description

The Brandenburg Steel Mill project is in Meade County, Kentucky. Meade County is home to about 28,000 residents and has a population density of about 85 people per square mile.

The study area is mainly agricultural with some forested land in the northwest and an urban portion in the center. The terrain is relatively flat with the Ohio River serving as a northern border to the county. There is a park in the southern center of the study area with special areas such as schools and churches near the urban portion.





Figure 1 Study Area Map

5



Siting Methodology Overview

The EPRI (Electric Power Research Institute) - GTC (Georgia Transmission Corporation) Siting Methodology¹ and the Kentucky Siting Model² was used on this project. The methodology uses a data driven objective process that leverages external stakeholder input from representative organizations to help calibrate the Alternative Corridor model using the Analytical Hierarchy and the Modified Delphi processes. It relies on routing experts to identify alternate routes using the Alternative Corridors as a guide. The method leverages internal experts to calibrate the Alternative Route Evaluation Model and uses the Alternative Route Evaluation Model to help identify the top routes. Finally, the Expert Judgment Model is used to select the preferred route.

The Methodology is analogous to a funnel used to process information. Into the funnel goes geographic information which is calibrated with community concerns, natural concerns, and engineering considerations. Each phase of the process is like a filter in the funnel which is used to reduce the area of consideration. As the area of focus is reduced, users are able to invest more effort into studying the area at a greater level of detail. More detailed information are collected as one proceeds through the funnel. The bottom of the funnel results a preferred route for the transmission line.



¹ https://www.epri.com/#/pages/product/1013080/?lang=en-US

² https://www.epri.com/#/pages/product/1016198/?lang=en-US



Alternative Corridors

Engineering Environment		Natural Environment		Built Environment			
Linear Infrastructure	86.2%	Floodplain	5.6%	Proximity to Buildings	17.5%	Land Use	37.3%
Parallel Existing Transmission Lines	1.0	Background	1.0	Background	1.0	Commercial/Industrial	1.0
Rebuild Existing Transmission Lines (good)	2.3	100 Year Floodplain	9.0	900-1200	3.4	Agriculture (crops)	3.5
Background	4.6	Streams/Wetlands	35.4%	600-900	5.7	Agriculture (other livestock)	4.6
Parallel Interstates ROW		Background	1.0	300-600	8.0	Silviculture	100-00
Parallel Roads ROW	5.6	Streams < 5cf+Regulatory Buffer	6.2	0-300	9.0	Other (forest)	6.7
Parallel Pipelines	5.8	Streams > 5cf+Regulatory Buffer		Building Density	8.7%	Equine Agri-Tourism	-
Future DOT Plans		Wetlands + 30'Buffer	8.7	0 - 0.05 Buildings/Acre	1.0	Residential	9.0
Parallel Railway ROW	6.4	Outstanding State Resource Waters	9.0	0.05 - 0.2 Buildings/Acre	3.1	Proximity to Eligible Historic and Archeological Sites	32.3%
Road ROW	7.5	Public Lands		0.2 - 1 Buildings/Acre	5.9	Background	1.0
Rebuild Existing Transmission Lines (bad)	9.0	Background	-	1 - 4 Buildings/Acre	9.0	900-1200	4.6
Scenic Highways ROW	-	WMA + Not State Owned	-	>4 Buildings/Acre	-	600-900	7.9
Slope	13.8%	USFS (proclamation area)	-	Proposed Development		0-300	8.6
Slope 0-15%	1.0	Other Conservation Land		Background	-	300-600	9.0
Slope 15-30%	4.0	USFS (actually owned)	-	Proposed Development	-	Areas of Least Preference	2
Slope 30-40%	6.7	State Owned Conservation Land	- VA	Spannable Lakes and Ponds	4.2%	Listed Archaeology Sites and Districts	
Slope >40%	9.0	Land Cover	24.1%	Background	1.0	Listed NRHP Districts and Buildings	
Areas of Least Preference		Developed Land	1.0	Spannable Lakes and Ponds	9.0	Day Care Parcels	
Non-Spannable Waterbodies		Agriculture	4.6			City and County Parcels	5
Mines and Quarries (Active)		Forests	9.0			Cemetery Parcels	
Buildings		Wildlife Habitat	34.9%			School Parcels (K-12)	
Airports		Background	1.0			Church Parcels	
Military Facilities		Species of Concern Habitat	9.0				
Center Pivot Irrigation		Areas of Least Preference		_			
		EPA Superfund Sites					
		State and National Parks					
		USFS Wilderness Area					
		Wild/Scenic Rivers					

Wildlife Refuge State Nature Preserves Designated Critical Habitat Figure 3 Alternate Corridor Model


The above model is the Kentucky Siting Model that was developed with input from subjectmatter experts and stakeholders. Each perspective (Built, Engineering, and Natural) represent the three groupings of considerations in the model. Within the perspectives, there are layers like Linear Infrastructure that further specify the groups. Finally, there are features that lie in the layers that tie to specific features such as Road ROW.

Each feature is given a value 1-9 depending on the relative suitably for a potential transmission line to intersect with said feature. 1 being the most suitable and 9 being the least. At the layer level, all of the layers within a perspective are given a weight and all of the weights have to equal 100%. The features and layers that are not present in this project are grayed out in the table above.



Areas of Least Preference

Figure 4 Areas of Least Preference



Built Criteria

The Built portion of the Alternate Corridor Model considers places where people live, work, and play. The Built Environment contains six layers: Building Density, Building Proximity, Proposed Development, Spannable Lakes and Ponds, Land Use, and Proximity to Eligible Historic and Archaeological Sites.



Figure 5 Built Source Data

The above map shows the source data in the Built Environment. We aren't aware of proposed developments within the study area.





Figure 6 Building Density Suitability Grid

The Building Density layer is classified by the number of buildings per acre. The higher the density, the less suitable that location is for a potential transmission line. *Note: The legend of the following maps illustrates the categories from the Kentucky model, and the relative suitability values. Within each layer the number 1 represents the most suitable place for a transmission line (in that layer) and the number 9 represents the least suitable place.*





Figure 7 Building Proximity Suitability Grid

For the Building Proximity layer, the most suitable location for a potential transmission line is beyond 1,200 feet from a building. These areas are shown in dark green in the map above. The least suitable areas are within 300 feet of a building.





Figure 8 Spannable Lakes and Ponds Suitability Grid

The Spannable Lakes and Ponds suitability grid is characterized by two options, either the location is within a spannable lake and pond or the location is not. The areas that are not in a spannable lake or pond are more suitable for a potential transmission line. A maximum span distance of 800' was used for this analysis





Figure 9 Land Use Suitability Grid

According to the Kentucky Model, from a Built Perspective the most suitable land use classification for a potential transmission line is an area with a commercial or industrial land use. While the least suitable classification is residential areas. An area with an Agricultural land use classification is the second most suitable, while any other land use classification would be the third most suitable area. In this case "other" consist of areas with trees.





Figure 10 Proximity to Historic Sites Suitability Grid

The Proximity to Historic Sites and Archaeological layer is meant to protect the Historic and Archaeological sites in or near the study area. This is done by making the areas near the sites to be the least suitable, while the farthest away from the sites is the most suitable location for a potential transmission line. There was no Archaeological sites within the study area that were classified as "eligible" in their status.





Figure 11 Built Suitability Grid

The suitability grids for each perspective are created by multiplying the values of the individual layer grids by the weights in the model and combining to create a weighted average suitability grid.



Figure 12 Source Data for the Natural Perspective

The Natural Perspective considers rivers and streams throughout the study area with a 100year floodplain near an Outstanding State Resource Water in the eastern portion of the study area. The land cover is also considered when assessing the natural suitability of a potential transmission line in the area. The Wildlife Habitat was modeled utilizing a combination of forested lands and rivers. Public Lands were also considered with the Natural Perspective, however, none are present in the study area.





Figure 13 Floodplain Suitability Grid

The most suitable areas are not within a 100-year floodplain.





Figure 14 Streams and Wetlands Suitability Grid

Outstanding State Resource Waters, plus a 30-foot buffer, are the least suitable area within the Streams and Wetlands layer. Wetlands are the next least suitable location for a potential transmission line. The most suitable areas do not contain wetlands or streams/rivers.





Figure 15 Land Cover Suitability Grid

The land cover is classified by developed land, agriculture, and forest. From a Natural Perspective, forested land is the least suitable area for a potential transmission line. Developed land is the most suitable area and agriculture land is rated near the middle.





Figure 16 Wildlife Habitat Suitability Grid

The wildlife habitat within the study area considered the following species: Northern Long-Eared Bat, Clubshell, Gray Bat, Indiana Bat, Ring Pink, and Rough Pigtoe. The habitats for these species are modeled based off the U.S Forest and Wildlife descriptions of their habitats. The Northern Long-Eared Bats and Indiana Bats are found in forested areas. The Clubshell and Rough Pigtoe species are found in rivers and streams. The Gray Bat is found near the Ohio River, so the Ohio River was buffered by one mile to model the potential habitat. The Ring Pink species are found in open waterbody coastlines, therefore the boundaries of the Doe Valley Lake were buffered by 30 feet and other waterbodies modeled as the habitat. Forested land, open water, and surrounding areas, were used to model potential wildlife habitat of the threatened and endangered species.





Figure 17 Overall Natural Suitability Grid



Engineering Criteria



Figure 18 Engineering Perspective Source Data

The Engineering Perspective of the Alternate Corridor Model considers existing linear infrastructure and slope.





Figure 19 Linear Infrastructure Suitability Grid

The Linear Infrastructure layer considers co locating with roads, railroads, and transmission lines. The least suitable is an existing transmission line ROW which can not be leveraged for this new line construction (AKA rebuild existing transmission line bad). Parallel or rebuilding existing transmission lines are considered the most suitable areas within this layer. The existing 69kV line owned by Big Rivers and running from Brandenburg Substation to Garrett Substation was considered as an opportunity for rebuilding with a new double circuit line. Also, the existing 2.7-mile 69 kV transmission line running radially into Buttermilk Falls Substation was considered as an opportunity for rebuilding with a new double circuit line, as well as, the existing 69kV line owned by Big Rivers and running from Meade County Substation to Garrett Substation was considered an opportunity for rebuilding with a double circuit line.





Figure 20 Linear Infrastructure Suitability Grid





Figure 21 Slope Suitability Grid

The slope layer assesses the suitability in regards to the degree slope of the land with the higher the slope being the least suitable location. Most of the study area has a slope less than 15%, which is the most suitable location for a transmission line.





Figure 22 Engineering Suitability Grid





Figure 23 Built Suitability Grid

The Built suitability grid is created by putting emphasis (5x) on the built perspective while taking into consideration the other two perspectives (1x).





Figure 24 Built Suitability Grid with the Alternate Corridor

The Built Alternate Corridor was created by calculating the top 3% of routes between the Meade County Substation, Proposed Otter Creek Substation, Brandenburg Steel Mill Substation, and Proposed Redmon Road Substation.





Figure 25 Built Alternate Corridor



Figure 26 Natural Suitability Grid

The Natural suitability grid is created by putting emphasis (5x) on the natural perspective while taking into consideration the other two perspectives (1x).





Figure 27 Natural Suitability Grid with the Alternate Corridor

The Natural Alternate Corridor was created by calculating the top 3% of routes between the Meade County Substation, Proposed Otter Creek Substation, Brandenburg Steel Mill Substation, and Proposed Redmon Road Substation.





Figure 28 The Natural Alternate Corridor





Figure 29 Engineering Suitability Grid

The Engineering suitability grid is created by putting emphasis (5x) on the engineering perspective while taking into consideration the other two perspectives (1x).





Figure 30 Engineering Suitability Grid with the Alternate Corridor



The Engineering Alternate Corridor was then created by calculating the top 3% of routes between the Meade County Substation, Proposed Otter Creek Substation, Brandenburg Steel Mill Substation, and Proposed Redmon Road Substation.



Figure 31 Engineering Alternate Corridor





Figure 32 Simple Suitability Grid

The Simple suitability grid is created by putting equal emphasis on the Built, Natural, and Engineering perspectives.





Figure 33 Simple Suitability Grid with the Alternate Corridor

The Simple Alternate Corridor is then created by taking the least cost path between the Big Meade County Substation, Proposed Otter Creek Substation, Brandenburg Steel Mill Substation, and Proposed Redmon Road Substation.





Figure 34 Simple Alternate Corridor



Composite Alternative Corridors Endpoints Classified Buildings



Figure 35 All Alternate Corridors



Preferred Routes



Figure 36 Alternate Routes with the Alternate Corridors

The Preferred Routes were created using the alternate corridors as guidelines to go from the Meade County Substation to Proposed Otter Creek Substation. The preferred route will rebuild the existing 69kV in the existing ROW.

The preferred route from Brandenburg Steel Mill Substation to Proposed Otter Creek Substation will rebuild the existing 69kV and expand the existing ROW by 12.5 feet on both sides.

The alternative routes developed from the proposed Otter Creek Substation to the Proposed Redmon Road Substation are described in the next section.



Figure 37 Brandenburg Steel Mill to Otter Creek Preferred Route with the Alternate Corridors



Figure 38 Meade County to Otter Creek Preferred Route with the Alternate Corridors



	Route A
Built	
Residences Within the ROW	3
Residences Within 300' of the Centerline	31
Commercial Buildings within 300' of the Centerline	5
Industrial Buildings within 300' of the Centerline	0
Agricultural Buildings within 100' of the Centerline	0
School, Daycare, Church, Cemetery, & Park within 50' of the ROW	0
Historic structures within 600' of the Centerline	0
Natural	
Tree Clearing (Acres)	7.78
Stream / River Crossings	3
Wetlands (Acres)	0
Engineering	
% Rebuild of Existing Transmission Lines	91%
% Parallel with Existing Transmission Lines	0%
% Parallel Roads	38%
Total Project Costs	\$17,184,205
Construction Cost (\$1.7M/mile)	\$14,943,000
Land Acquisition Cost (\$6,271/acre)	\$226,195
Major Angle	\$1,980,000
0-45° Angle (\$90K)	8
45-90° Angle (\$240K)	4
>90° Angle (\$300K)	1
Clearing Cost (\$4.5K/Acre)	\$35,010
Length (Miles)	8.79
Approximate new ROW required (Acres)	36

Figure 39 Route Data Brandenburg Steel Mill Substation to Otter Creek Substation


	Route A
Built	
Residences Within the ROW	1
Residences Within 300' of the Centerline	14
Commercial Buildings within 300' of the Centerline	0
Industrial Buildings within 300' of the Centerline	0
Agricultural Buildings within 100' of the Centerline	1
School, Daycare, Church, Cemetery, & Park within 50' of the ROW	0
Historic structures within 600' of the Centerline	0
Natural	
Tree Clearing (Acres)	0
Stream / River Crossings	0
Wetlands (Acres)	0.04
Engineering	
% Rebuild of Existing Transmission Lines	95%
% Parallel with Existing Transmission Lines	1%
% Parallel Roads	0%
Total Project Costs	\$7,808,353
Construction Cost (\$820K/mile)	\$6,986,400
Land Acquisition Cost (\$6,271/acre)	\$41,953
Major Angle	\$780,000
0-45° Angle (\$90K)	6
45-90° Angle (\$240K)	1
>90° Angle (\$300K)	0
Clearing Cost (\$4.5K/Acre)	\$0
Length (Miles)	8.52
Approximate new ROW required (Acres)	7

Figure 40 Route Data Meade County Substation to Otter Creek Substation



Alternate Routes



Figure 41 Redmon Road to Otter Creek Alternate Routes with Composite Corridors





Figure 42 Redmon Road to Otter Creek Alternate Routes with Composite Corridors





Figure 43 Redmon Road to Otter Creek Alternate Routes

The Alternate Route Evaluation Model leverages weighted metrics to compare the Alternate Routes. The first step of the process is to compile data for each route. The metrics are grouped into three categories: Built, Natural, and Engineering.

The route data (Figure 32) are normalized on a scale from 0 to 1 with 0 being the best and 1 being the worst in each category. This allows comparisons of metrics in different units such as counts, acreage and dollars. The percent colocation with roads and existing distribution lines are inverted since the higher the number, the better it is for an alternate route.

The criteria are assigned weights based on their relative importance to the siting process. The weight for each criterion is represented by percentages such as 50% residences and 20% special areas. The weights within a perspective (built, natural, engineering) must total 100%.

The Alternate Route Evaluation Model places 5 times emphasis on each perspective to produce Built, Natural, and Engineering Emphasis Models. In addition, a Simple Average Model is implemented which places equal emphasis on the three perspectives.



	Route A East	Route B West
Built		
Residences Within the ROW	0	0
Residences Within 300' of the Centerline	4	2
Commercial Buildings within 300' of the Centerline	0	0
Industrial Buildings within 300' of the Centerline	0	0
Agricultural Buildings within 300' of the Centerline	1	0
School, Daycare, Church, Cemetery, & Park within 50' of the ROW	0	0
Historic structures within 600' of the Centerline	0	0
Natural	Red BERNAR	
Tree Clearing (Acres)	1.03	4.9
Stream / River Crossings	0	0
Wetlands (Acres)	0	0
Engineering		
% Rebuild of Existing Transmission Lines	0%	0%
% Parallel with Existing Transmission Lines	0%	0%
% Parallel Roads	8%	34%
Total Project Costs	\$5,627,023	\$5,315,721
Construction Cost (\$1.7M/mile)	\$4,386,000	\$4,216,000
Land Acquisition Cost (\$6,271/acre)	\$246,388	\$237,671
Major Angle	\$990,000	\$840,000
0-45° Angle (\$90K)	3	4
45-90° Angle (\$240K)	3	2
>90° Angle (\$300K)	0	0
Clearing Cost (\$4.5K/Acre)	\$4,635	\$22,050
Length (Miles)	2.58	2.48
Approximate new ROW required (Acres)	39.29	37.9

Figure 44 Route Data Redmon Road Substation to Otter Creek Substation



Built	Route A East	Route B West
Residences Within the ROW	0.0	0.0
Normalized		
Residences Within 300' of the Centerline	4.0	2.0
Normalized	1.0	0.0
Commercial Buildings within 300' of the Centerline	0.0	0.0
Normalized		
Industrial Buildings within 300' of the Centerline	0.0	0.0
Normalized		
Agricultural Buildings within 300' of the Centerline	1.0	0.0
Normalized	1.0	0.0
School, Daycare, Church, Cemetery, & Park within 50' of the ROW	0.0	0.0
Normalized		
Historic structures within 600' of the Centerline	0.0	0.0
Normalized	ene lenne - sene	Second Second
Natural		
Tree Clearing (Acres)	1.0	4.9
Normalized	0.0	1.0
Stream / River Crossings	0.0	0.0
Normalized		https://www.
Wetlands (Acres)	0.0	0.0
Normalized		
Engineering		
% Rebuild of Existing Transmission Lines	0.00	0.00
Normalized		
Inverted		
% Parallel with Existing Transmission Lines	0	0
Normalized		terstering - Contract
Inverted	the spectrum of	
% Parallel Roads	0.08	0.34
Normalized	0.0	1.0
Inverted	1.0	0.0
Total Project Costs	\$ 5,627,023	\$ 5,315,721
Normalized	1.0	0.0

Figure 45 Normalized Data Redmon Road Substation to Otter Creek Substation



Built	72%	Route A East	Route B West
Feature		Unit	Unit
Residences Within the ROW	0.0%		-
Weighted	Contraction said		
Residences Within 300' of the Centerline	95.0%	1.00	0.00
Weighted		0.95	0.00
Commercial Buildings within 300' of the Centerline	0.0%	-	-
Weighted	Production of the second	-	
Industrial Buildings within 300' of the Centerline	0.0%	-	-
Weighted	and the second second	and the states	-
Agricultural Buildings within 300' of the Centerline	5.0%	1.00	0.00
Weighted		0.05	0.00
		-	
School Davcare Church Cemetery & Park within 50' of the ROW	0.0%		
Weighted	0.070	1	
Historic structures within 600' of the Centerline	0.0%	-	
Weighted	0.070		
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.72	0.00
Natural	14%	1	Contraction Contraction
Tree Clearing (Acres)	100.0%	0.00	1.00
Weighted	Sector Sector Sector	0.00	1.00
Stream / River Crossings	0.0%	-	-
Weighted		Constant and Constant	
Wetlands (Acres)	0.0%	-	_
Weighted	States and states	100-000	1000-2000
TOTAL	100.0%	0.00	1.00
WEIGHTED TOTAL		0.00	0.14
Engineering	14%		
% Rebuild of Existing Transmission Lines	0.0%	-	and the second
Weighted		-	1
% Parallel with Existing Transmission Lines	0.0%	-	-
Weighted	Sector Property in	-	And a second
% Parallel Roads	20.0%	1.00	0.00
Weighted	Participation of the second	0.20	0.00
Total Project Costs	80.0%	1.00	0.00
Weighted		0.80	0.00
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.14	0.00
SUM OF WEIGHTED TOTALS		0.86	0.14

Figure 45 Built Emphasis Redmon Road Substation to Otter Creek Substation



Built	14%	Route A East	Route B West
Feature		Unit	Unit
Residences Within the ROW	0.0%	-	
Weighted			
Residences Within 300' of the Centerline	95.0%	1.00	0.00
Weighted		0.95	0.00
Commercial Buildings within 300' of the Centerline	0.0%	-	-
Weighted		(Burther-schules)	
Industrial Buildings within 300' of the Centerline	0.0%	-	-
Weighted	Courses and a course of	-	
Agricultural Buildings within 300' of the Centerline	5.0%	1.00	0.00
Weighted		0.05	0.00
School, Daycare, Church, Cemetery, & Park within 50' of the ROW	0.0%	· · · · ·	1000 C
Weighted		•	
Historic structures within 600' of the Centerline	0.0%	-	-
Weighted		12000-1000	
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.14	0.00
Natural	72%	a standard a	
Tree Clearing (Acres)	100.0%	0.00	1.00
Weighted		0.00	1.00
Stream / River Crossings	0.0%		-
Weighted	Complete States and States	I south the second	House ward
Wetlands (Acres)	0.0%	-	-
Weighted	And the second second		VE MERCENSK
TOTAL	100.0%	0.00	1.00
WEIGHTED TOTAL		0.00	0.72
Engineering	14%		
% Rebuild of Existing Transmission Lines	0.0%	-	
Weighted			Participant and a
% Parallel with Existing Transmission Lines	0.0%		-
Weighted	Contract Name of State		
% Parallel Roads	20.0%	1.00	0.00
Weighted		0.20	0.00
Total Project Costs	80.0%	1.00	0.00
Weighted		0.80	0.00
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.14	0.00
SUM OF WEIGHTED TOTALS		0.28	0.72

Figure 46 Natural Emphasis Redmon Road Substation to Otter Creek Substation



Built	14%	Route A East	Route B West
Feature		Unit	Unit
Residences Within the ROW	0.0%	-	-
Weighted		3 3 0 - E C	
Residences Within 300' of the Centerline	95.0%	1.00	0.00
Weighted		0.95	0.00
Commercial Buildings within 300' of the Centerline	0.0%		
Weighted	Contraction of the local distance	-	Conte della
Industrial Buildings within 300' of the Centerline	0.0%		-
Weighted	1 - Contraction of the second	1 1	ANTEN - STORE
Agricultural Buildings within 300' of the Centerline	5.0%	1.00	0.00
Weighted		0.05	0.00
School, Davcare, Church, Cemetery, & Park within 50' of the ROW	0.0%		-
Weighted		-	-
Historic structures within 600' of the Centerline	0.0%	-	
Weighted			-
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.14	0.00
Natural	14%	e	17. 1 Table
Tree Clearing (Acres)	100.0%	0.00	1.00
Weighted	Sold and a set of the set	0.00	1.00
Stream / River Crossings	0.0%		-
Weighted		1	
Wetlands (Acres)	0.0%	-	
Weighted	and the second se	dente and	Internet and second
TOTAL	100.0%	0.00	1.00
WEIGHTED TOTAL		0.00	0.14
Engineering	72%		
% Rebuild of Existing Transmission Lines	0.0%	-	
Weighted			Inter entered
% Parallel with Existing Transmission Lines	0.0%	-	-
Weighted			-
% Parallel Roads	20.0%	1.00	0.00
Weighted	Internet and the second	0.20	0.00
Total Project Costs	80.0%	1.00	0.00
Weighted	Partie Manager (1997)	0.80	0.00
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.72	0.00
SUM OF WEIGHTED TOTALS		0.86	0.14

Figure 47 Engineering Emphasis Redmon Road Substation to Otter Creek Substation



Built	33%	Route A East	Route B West
Feature		Unit	Unit
Residences Within the ROW	0.0%	-	
Weighted	all shares and a second	where every	NEW ALL AND
Residences Within 300' of the Centerline	95.0%	1.00	0.00
Weighted		0.95	0.00
Commercial Buildings within 300' of the Centerline	0.0%	-	-
Weighted	States and the second	Construction of	
Industrial Buildings within 300' of the Centerline	0.0%	-	-
Weighted		-	100 - 100 P
Agricultural Buildings within 300' of the Centerline	5.0%	1.00	0.00
Weighted		0.05	0.00
in cigineo			
School Davcara Church Comptony & Park within 50' of the POW	0.0%		
Maighted	0.070	teres and	Noningeneration of
Historia structures within 600' of the Conterline	0.0%		
Historic structures within 600 of the centernite	0.076	The second second	The second s
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL	100.070	0.33	0.00
Natural	33%		1000
Tree Clearing (Acres)	100.0%	0.00	1.00
Weighted	Sector Sector	0.00	1.00
Stream / River Crossings	0.0%	-	Contraction and the
Weighted	Internet and the second second	(CO	lines - carry
Wetlands (Acres)	0.0%		
Weighted			Contraction of the
TOTAL	100.0%	0.00	1.00
WEIGHTED TOTAL		0.00	0.33
Engineering	33%		
% Rebuild of Existing Transmission Lines	0.0%		-
Weighted		Service (Service)	these entropy
% Parallel with Existing Transmission Lines	0.0%		-
Weighted		-	Summer Star Star
% Parallel Roads	20.0%	1.00	0.00
Weighted	Salar and Salar	0.20	0.00
Total Project Costs	80.0%	1.00	0.00
Weighted		0.80	0.00
TOTAL	100.0%	1.00	0.00
WEIGHTED TOTAL		0.33	0.00
SUM OF WEIGHTED TOTALS	1.1	0.67	0.33

Figure 48 Simple Average Redmon Road Substation to Otter Creek Substation





Figure 49 Alternate Route Graph

Route B scores the lowest (most suitable) from a Built perspective. This is due to the fact that Route B does not have any agricultural buildings with 300 feet of the route and less residences within 300 feet. While Route A has more residences and agricultural buildings within 300 feet of the route.

The Natural perspective is dictated by the tree clearing difference in both routes. Route A necessitates about 1 acre of tree clearing, while Route B would need about 5 acres of tree clearing making it less suitable.

In the Engineering perspective, Route B has the lowest score with the lowest cost being the main factor. The cost is lower since there is one less 45-90 degree angle in the route compared to Route A. Route B also has a higher percentage of colocation with roads when compared to Route A.

Route B has the lowest Simple Average score which is logical given the fact that it was either the most suitable in two of the three perspectives.

It should be noted that the Alternate Route Evaluation Model is commonly used to evaluate a larger number of routes for the purpose of identifying the top routes to carry on to the Expert Judgement model. There are usually more data in the model as well. For example, in the Natural criteria the only measured difference between these routes are less than 4 acres of tree clearing. One of the disadvantages of using this model to evaluate only two routes, that are very similar, is that the differences between the routes are exaggerated. This model is not used to select the preferred route. However, it was used on this project to help evaluate the route alternatives.



Preferred Route Selection

The Expert Judgment Model is used by the transmission line experts on the project team to select the preferred route. The team determined the high-level siting criteria and assigned weights to represent the relative importance. Cost was weighed the most at 40% followed by Construction/Maintenance Accessibility at 30%, Community Considerations at 20%, and Schedule Delay Risk at 10%.

Next the experts ranked each route for each of the criteria. Finally, the weights are applied, and the preferred route has the lowest total score. Both Route A and B were considered in the Expert Judgement analysis.

For the Community criteria, Route A was given the best score since the route goes on the outside of a property near the proposed Redmon Road substation. Route B also may affect by a possible new apartment complex mentioned by the landowner, while Route A would not affect the possible apartment.

Route A has a lower risk of a schedule delay when compared to Route B because there are less trees and seasonal clearing restrictions due to the sensitive bat.

Route A has a slightly better score than Route B in terms of reliability due to the fact that Route A has less angles.

For the Natural Environment Considerations, Route A scores better because Route B has more tree clearing and is in proximity to a cave which may be bat habitat.

Both Route A and Route B scored the same when it comes to Accessibility.

Route B scores slightly better in terms of Cost according to the Alternate Route Evaluation Model estimation.

In consideration of all of these factors, Route A was selected as the preferred route.

1	2
TEAM	SPATIAL

Criteria	Weight	Route A East	Route B West
Community Issues	30%	1.0	1.5
Weighted		0.3	0.5
Schedule Delay Risk	15%	1.0	1.5
Weighted		0.2	0.2
Reliability	5%	1.0	1.2
Weighted		0.1	0.1
Natural Environment Considerations	10%	1.0	1.5
Weighted		0.1	0.2
Construction/Maintenance Accessibility	5%	1.0	1.0
Weighted		0.1	0.1
Cost	35%	1.1	1.0
Weighted		0.4	0.4
TOTAL	100%	1.02	1.29

Figure 50 Expert Judgement Model



Preferred Routes Description

Route A comes out of the Proposed Otter Creek Substation to the southwest. The route then goes to the southeast to parallel Brandenburg Road and continues to go southeast until the route goes east to avoid a series of residences along Osborne Road. Then the route goes south into the Proposed Redmon Road Substation.



Figure 51 Redmon Road to Otter Creek Preferred Route



The preferred route for the Proposed Brandenburg Steel Mill to the Proposed Otter Creek Substation is a rebuild of the two existing Big Rivers transmission lines.



Figure 52 Brandenburg Steel Mill to Otter Creek Preferred Route



The preferred route for the Meade County Substation to the Proposed Otter Creek Substation is rebuilding the existing Big Rivers transmission line.



Figure 53 Meade County to Otter Creek Preferred Route



Source Data Appendix A

Build Fridden Transisterion Lines	Die Divers	
Parallel Existing Transmission Lines	Big Rivers	
Rebuild Existing Transmission Lines (good)	Big Rivers	
	Manda County DVA	
Parallel Roads ROW	National Dipoling Manning	
Parallel Pinelines	System	
Future DOT Plans	Kentucky Transportation Cabinet	
Parallel Pailway POW	Kentucky Transportation Cabinet	
	Maada County PVA	
Robuild Existing Transmission Lines (had)	Pig Pivore	
Coopie Lichways DOW	Kontucky Transportation Cabinat	
Scenic Highways ROW	Kentucky Transportation Cabinet	
Slope	lunce	
Slope 0-15%		
Slope 15-30%		
Slope 30-40%	USGS	
Slope >40%	USGS	
Areas of Least Pr	eference	
Non-Spannable Waterbodies	Aerial Interpretation	
Mines and Quarries (Active)	Kentucky Geological Survey	
Buildings	Aerial Interpretation	
Airports	Aerial Interpretation	
Military Facilities	USGS	
Center Pivot Irrigation	Aerial Interpretation	
Natural Perspective		
Floodplai	n	
100 Year Floodplain FEMA		
Streams/Wetlands		
Streams < 5cf+Regulatory Buffer	USGS	
Streams > 5cf+Regulatory Buffer	USGS	
Wetlands + 30'Buffer	USGS	
	Kentucky Energy and	
Outstanding State Resource Waters	Environment Cabinet	
Public Lan	ds	
WMA + Not State Owned	Aerial Interpretation	
USFS (proclamation area)	USFS	
Other Conservation Land	Aerial Interpretation	
USFS (actually owned)	USFS	
State Owned Conservation Land	Kentucky FWS	
Land Cover		
Developed Land	Aerial Interpretation	
Agriculture	Aerial Interpretation	



Forests	Aerial Interpretation		
Wildlife Hab	pitat		
Species of Concern Habitat	USFWS and Kentucky FWS		
Areas of Least Pr	eference		
EPA Superfund Sites	EPA		
State and National Parks	NPS and Kentucky State Parks		
USFS Wilderness Area	USFS		
	National Wild and Scenic Rivers		
Wild/Scenic Rivers	System		
Wildlife Refuge	USFWS		
State Nature Preserves	Kentucky State Parks		
Designated Critical Habitat	USFWS		
Built Perspec	ctive		
900-1200	Aerial Interpretation		
600-900	Aerial Interpretation		
300-600	Aerial Interpretation		
0-300	Aerial Interpretation		
Building Density			
0 - 0.05 Buildings/Acre	Aerial Interpretation		
0.05 - 0.2 Buildings/Acre	Aerial Interpretation		
0.2 - 1 Buildings/Acre	Aerial Interpretation		
1 - 4 Buildings/Acre	Aerial Interpretation		
>4 Buildings/Acre	Aerial Interpretation		
Proposed Development			
Proposed Development	Big Rivers		
Spannable Lakes a	and Ponds		
Spannable Lakes and Ponds Aerial Interpretation			
Land Use			
Commercial/Industrial	Aerial Interpretation		
Agriculture (crops)	Aerial Interpretation		
Agriculture (other livestock)	Aerial Interpretation		
Silviculture	Aerial Interpretation		
Other (forest)	Aerial Interpretation		
Equine Agri-Tourism	Aerial Interpretation		
Residential	Aerial Interpretation		
Proximity to Eligible Historic and Archeological Sites			
	Kentucky Office of Archaeology		
Background	and Kentucky Heritage Council		
	Kentucky Office of Archaeology		
900-100	and Kentucky Heritage Council		
	Kentucky Office of Archaeology		
600-900	and Kentucky Heritage Council		



0-300	Kentucky Office of Archaeology and Kentucky Heritage Council
300-600	Kentucky Office of Archaeology and Kentucky Heritage Council
Areas of Least Pro	eference
Listed Archaeology Sites and Districts	Kentucky Office of Archaeology
Listed NRHP Districts and Buildings	Kentucky Heritage Council
Day Care Parcels	Meade County PVA
City and County Parcels	Meade County PVA
Cemetery Parcels	Meade County PVA
School Parcels (K-12)	Meade County PVA
Church Parcels	Meade County PVA

BIG RIVERS ELECTRIC CORPORATION

APPLICATION OF BIG RIVERS ELECTRIC CORPORATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT A 161 KV TRANSMISSION LINE, AND A 345 KV TRANSMISSION LINE IN MEADE COUNTY, KENTUCKY CASE NO. 2019-00270

Response to Commission Staff's First Request for Information dated November 4, 2019

November 14, 2019

Item 15) Explain whether MISO will require any transmission system
 2 upgrades in order to support the additional load from the new steel plant
 3 and any additional development that may occur in the future. If so, provide
 4 a brief description.

5

6 Response) MISO has identified no necessary transmission system upgrades
7 beyond the service plan proposed by Big Rivers.

8

9

10 Witness) Michael W. Chambliss

11

Case No. 2019-00270 Response to PSC 1-15 Witness: Michael W. Chambliss Page 1 of 1