

Exhibit No.: _____
Issue: Riverton 11
Witness: Dr. Brian Mushimba
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Sponsoring Party: The Empire District
Electric Company
Case Nos.: EO-2022-0040; EO-2022-0193
Date Testimony Prepared: May 2022

**Before the Public Service Commission
of the State of Missouri**

Surrebuttal Testimony

of

Dr. Brian Mushimba

on behalf of

The Empire District Electric Company

May 2022



****DENOTES CONFIDENTIAL****
20 CSR 4240-2.135(2)(A)7

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THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION
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1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Dr. Brian Mushimba. My business address is 602 South Joplin Avenue,
4 Joplin, Missouri.

5 **Q. By whom are you employed and in what capacity?**

6 A. I am employed by Liberty Utilities Service Corp. as Senior Director, Generation
7 Operations - Central Region, which includes The Empire District Electric Company
8 (“Liberty” or the “Company”).

9 **Q. On whose behalf are you testifying in this proceeding?**

10 A. I am testifying on behalf of Liberty.

11 **Q. Please describe your educational and professional background.**

12 A. I have an engineering degree from the University of Arizona. I have additional
13 engineering training at the graduate level that culminated into a Ph.D. in engineering.
14 I have over 20 years of experience in electric operations, managing power generating
15 assets and working on power plant equipment to enhance reliability and availability.
16 My resume is attached as **Surrebuttal Schedule BM-1**. My resume describes my
17 career progression from the time I joined the industry as an Electrical Controls Engineer
18 at Siemens, one of the largest electro-mechanical equipment manufacturers in the
19 electricity industry, where I practiced engineering in power plants from first principles
20 for several years before being promoted to engineering management roles. I further
21 worked as a Maintenance and Engineering Manager in manufacturing plants before I

1 took on larger engineering and technical leadership roles, at a director level, overseeing
2 the effective operations of several power stations across several regions. Two years
3 ago, I joined Liberty in my current position.

4 **Q. Have you previously testified before the Missouri Public Service Commission**
5 **(“Commission”) or any other regulatory agency?**

6 A. No, however I have previously testified before the Oklahoma Corporation Commission.

7 **Q. What is the purpose of your Surrebuttal Testimony in this proceeding?**

8 A. To address the Direct Testimony of Commission Staff (“Staff”) witness Jordan T. Hull.
9 Specifically, I rebut Mr. Hull’s recommendation for disallowance of \$2,761,666.37 in
10 costs relating to operation and tuning of Riverton 11, based on his assertion that the
11 Company acted imprudently by not tuning Riverton 11 for winter temperatures. My
12 testimony summarizes the prudence standard in Missouri, describes evidence that
13 demonstrates that the Company operated Riverton 11 prudently, and explains the
14 reasons why Mr. Hull’s testimony does not warrant any disallowance in Liberty’s
15 Storm Uri securitization petition relating to Riverton 11. Particularly, I describe the
16 conditions that must exist for Riverton Unit 11 to perform unit specific tuning on
17 emergency fuel oil in extreme winter ambient conditions.

18 **II. PRUDENCE**

19 **Q. Has the Company described the standard of prudence in Missouri in this**
20 **proceeding?**

21 A. Yes. The prudence standard in Missouri is discussed in detail in the Surrebuttal
22 Testimony of Company witness John Reed.

23 **Q. Please summarize Mr. Reed’s definition of the Missouri prudence standard.**

1 A. Mr. Reed explains at p. 7 of his Surrebuttal Testimony that the standard is comprised
2 of four features. *First*, prudence relates to the analysis of the quality of a utility's
3 decisions and actions, not end results. *Second*, determinations regarding the recovery
4 of costs incurred by a utility on behalf of its customers begin with a presumption of
5 prudence. Any party recommending a disallowance of recovery on the basis of
6 prudence must overcome the burden of that presumption by identifying serious
7 concerns about the prudence of the utility's decisions or actions before a disallowance
8 can be considered. *Third*, hindsight is excluded from the analysis of prudence. The
9 reasonableness of a utility's actions or decisions can be measured only on the basis of
10 information that was available to it at the time. *Fourth*, a finding of imprudence
11 requires the definition of a range of prudent behavior that encompasses more than one
12 set of prudent actions.

13 **Q. What observations do you have in regard to Mr. Hull's assertions as they relate**
14 **to Liberty's decisions and actions?**

15 A. Mr. Hull's contention that the Company should have planned more effectively for
16 Winter Storm Uri, an extraordinary event, is predicated on the Company being able to
17 predict that it would occur, and when. Yet he fails to explain why that should be the
18 case. Similarly, Mr. Hull never defines the range of reasonable behavior by explaining
19 the reasons why the Company's failure to tune Riverton 11 was so egregious that no
20 reasonable utility would have behaved similarly. And nearly all of Mr. Hull's
21 assertions require the benefit of hindsight while his recommended disallowances are
22 calculated against a standard that would have required perfect decision-making in real
23 time.

1 **Q. Does Mr. Reed raise any other concerns about Mr. Hull’s recommended**
2 **disallowances?**

3 A. He does. At p. 19 of his Surrebuttal Testimony, Mr. Reed explains that even if
4 Mr. Hull’s Rebuttal Testimony had demonstrated imprudence, which it does not, the
5 disallowance that would follow would need to be based on a determination of the
6 difference between the costs that the Company actually incurred and the costs that it
7 would have incurred had its behavior been “minimally prudent.” In other words, the
8 extra costs that would have been incurred because of the Company’s imprudent
9 behavior (as opposed to all the costs incurred around the time of the alleged
10 imprudence).

11 **Q. Does Mr. Hull perform a calculation that includes his view of costs that Liberty**
12 **would have incurred had its behavior been “minimally prudent”?**

13 A. No.

14 **Q. What conclusion is supported in this case?**

15 A. Even if one were to ignore the extensive evidence showing that the Company’s actions
16 and decision-making during and around Storm Uri were reasonable, and also ignore the
17 factual and logical flaws that beset Mr. Hull’s assertions, both of which I describe in
18 the remainder of my testimony, no disallowance would be supported because Mr. Hull
19 fails to demonstrate that *any* of the Company’s actions or decisions were unreasonable
20 given the information that was available to Liberty.

21 **III. RIVERTON 11**

22 **Q. What type of unit is Riverton Unit 11?**

1 A. Riverton Unit 11 is a 1966 Westinghouse W191 dual fuel turbine that was purchased
2 used by The Empire District Electric Company and placed into service in 1988 at the
3 Riverton generating station in Riverton, Kansas.

4 **Q. Staff witness Hull recommends a disallowance because the Company failed to tune
5 Riverton Unit 11 at extreme cold temperatures. Can you explain what “tune
6 Riverton 11” means and how it relates to this issue?**

7 A. Tuning a generation turbine in a complex task of adjustment or modification of the
8 internal combustion of the engine of the unit to yield optimal performance and
9 efficiency at given ambient temperatures. It’s an iterative process that ensures that at a
10 given ambient temperature, the fuel-oxygen ratio and the subsequent combustion is
11 optimal and the resultant energy output is maximized while controlling undesirable
12 byproducts of the combustion, such as emissions.

13 **Q. Can Liberty tune Riverton 11 during extreme cold weather?**

14 A. Yes, so long as the unit is generating on natural gas and the Company operates within
15 the air permit restriction related to natural gas emissions. However, tuning a unit is an
16 iterative process that increases the risk of an operational trip and extreme cold weather
17 is generally not an opportune time to risk tripping a unit when generation is likely
18 needed for grid reliability.

19 **Q. Are there any governmental limitations on tuning on emergency fuel oil?**

20 A. Yes. Regarding tuning on emergency fuel oil, the Company’s air permit from the
21 Kansas Department of Health and Environment (“KDHE”) restricts any operations on
22 emergency fuel oil subject to the following two restrictions:

23 1) The natural gas delivery system must break down and the required natural gas supply
24 becomes unavailable to The Empire District Electric Company **AND** 2) The power
25 requirements from the Riverton station cannot be assumed by power generating
26 equipment other than Unit # 10 and Unit # 11.

1 These are conditions 6. a.) and 6 b.) of the Company’s Air Emission Source Class I
2 Operating Permit 0210002 (“Air Permit”). A copy of the Company’s Air Permit is
3 provided in **Surrebuttal Schedule BM-2.**

4 **Q. Does the KDHE Air Permit allow Unit 11 to operate on fuel oil for the purpose of**
5 **tuning?**

6 A. No. There is no specific provision in the air permit that allows Unit 11 to operate on
7 fuel oil for the sole purpose of tuning. The prohibitions in the Air Permit mean that the
8 only time the Company would have been permitted to tune Unit 11 while operating on
9 emergency fuel oil would have been during extreme events, such as Storm Uri. Again,
10 this is obviously problematic in the sense that tuning in preparation for extreme events
11 required such tuning to take place *during* extreme events. This particular issue is
12 identified in *FERC-NERC – Regional Entity Staff Report: The February 2021 Cold*
13 *Weather Outages in Texas and South Central United States*. “Key Recommendation”
14 7 on page 196 recommends establishing a forum consisting of state legislatures and/or
15 regulators, in cooperation with FERC, NERC, and Regional Entities to discuss,
16 amongst other things, “Whether there are barriers to dual-fuel capability that could be
17 addressed by changes in state or federal rules or regulations. Dual-fuel capability can
18 help mitigate the risk of loss of natural gas fuel supply, and issues to consider include
19 facilitating testing to run on the alternate fuel, ensuring adequate fuel supply of the
20 alternate fuel and obtaining the necessary air permits and air permit waivers.”

21 Unfortunately, the Company does not have the ability to perform fuel oil tuning
22 based on its current Air Permit. Put another way, the Company could not have
23 performed oil tuning at Riverton 11 without violating its air permit and thus violating
24 the law.

1 **Q. Does tuning the unit on natural gas improve the performance of the unit when**
2 **attempting to fire on emergency fuel oil?**

3 A. No, tuning Riverton 11 on natural gas does not improve performance of the unit on
4 emergency fuel oil. The natural gas and emergency fuel oil delivery systems are
5 completely separate on Unit 11. In particular, the control valve for natural gas delivery
6 is completely separate from the control valve for emergency fuel oil delivery. Each of
7 these control valves has unique flow characteristics that must be used during the tuning
8 process on that specific fuel type to ensure that Unit 11 operates at desired air and fuel
9 ratios. As referenced above, this is an iterative process that is temperature and fuel
10 dependent.

11 **Q. Did the Company notify the Kansas Department of Health and Environment**
12 **(“KDHE”) of the emergency conditions that would authorize burning fuel oil? If**
13 **so, when did the Company then attempt to start Riverton Unit 11?**

14 A. Yes. KDHE was notified at 10:04 AM on the morning of February 15, 2021, and the
15 Company attempted the first start of Riverton Unit 11 at 12:01 PM on February 15.
16 The Company proceeded to attempt to start the unit 26 times over the course of the next
17 28 hours.

18 **Q. What were the ambient conditions when the Company attempted to start Riverton**
19 **Unit 11?**

20 A. According to the Riverton Plant weather station, the temperature at 12:00 PM on 2-15-
21 21 was -0.7 degrees Fahrenheit.

22 **Q. Are these difficult conditions under which to start a unit?**

23 A. Yes, trying to start a turbine on #2 diesel in sub 0 degree Fahrenheit weather is very
24 difficult. This is because not only is the air coming into the turbine cold, but the #2

1 diesel is also very cold. These two conditions combine to make it extremely difficult
2 for the igniters to create ignition of the #2 diesel. As mentioned above, 26 attempts
3 were made, and every effort was exhausted in an attempt to start Unit 11 in very
4 challenging ambient conditions. Plant personnel even forced control system I/O points
5 in an attempt to operate Unit 11 outside of its normal control system parameters in an
6 attempt to start Unit 11 in these extreme conditions.

7 ** [REDACTED]

8 [REDACTED]

9 [REDACTED]

10 [REDACTED]

11 [REDACTED]

12 [REDACTED]

13 [REDACTED]

14 [REDACTED]

15 [REDACTED]

16 [REDACTED]

17 [REDACTED]

18 [REDACTED]

19 [REDACTED]

20 [REDACTED]

21 [REDACTED]

22 [REDACTED]

23 [REDACTED]

24 [REDACTED]

1 [REDACTED]

2 [REDACTED]

3 [REDACTED]

4 [REDACTED]

5 [REDACTED]

6 [REDACTED]

7 [REDACTED]

8 [REDACTED]

9 [REDACTED]

10 [REDACTED]

11 [REDACTED]

12 [REDACTED]

13 [REDACTED]

14 [REDACTED]

15 [REDACTED]

16 [REDACTED]**

17 **Q. Did the Company operate Riverton 11 imprudently during the events of Winter**
 18 **Storm Uri?**

19 A. No. Mr. Hull’s testimony does not support any disallowance relating to Riverton 11.
 20 The Company followed its Air Permit and adhered to the operational conditions
 21 relating to the Riverton facilities. The consequence of not doing these things would
 22 have been violation of applicable air permits and subsequent fines.

23 **Q. Does this conclude your Surrebuttal Testimony at this time?**

24 A. Yes.

VERIFICATION

I, Dr. Brian Mushimba, under penalty of perjury, on this 27th day of May, 2022, declare that the foregoing is true and correct to the best of my knowledge and belief.

/s/ Dr. Brian Mushimba