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MISSOURI PUBLIC SERVICE COMMISSION

OPERATIONAL ANALYSIS DEPARTMENT

ENGINEERING ANALYSIS UNIT

SURREBUTTAL TESTIMONY

OF

SHAWN E. LANGE

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2016-0023

*Jefferson City, Missouri
May 2016*

~~Staff~~ Exhibit No. 18
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Surrebuttal Testimony of
Shawn E. Lange

1 Asbury 1 generation. The table below shows the generation from each coal plant in Staff's
2 direct run and Empire's direct run.

3

Coal Unit	Staff MWH	Empire MWH
IATAN 1	578,592	572,300
IATAN 2	799,680	726,700
PLUM POINT	675,300	612,200
ASBURY 1	1,454,385	1,099,400

4

5 Q. Why is there a difference in generation at Asbury?

6 A. There are differences in model inputs between Staff's model and
7 Empire's model. One difference is the capacity of Asbury 1. Based on Mr. Tarter's direct
8 workpapers, Empire used a modeled maximum capacity of 186 MW. Staff used a modeled
9 capacity of 195 MW.

10 Q. What was the source of Staff's use of the 195 MW capacity value for Asbury?

11 A. Staff relied on the reports Empire provided pursuant to CSR 240-3.190 that
12 were reported after turbine upgrades were completed at Asbury 1 in February of 2015.

13 Q. Did the turbine work increase the capacity at Asbury 1?

14 A. Yes. In its reporting pursuant to CSR 240-3.190, Empire provided outage
15 reporting indicating an increase to the reported maximum capacity of Asbury 1. Empire's
16 outage information reports the amount of MWs the unit is down, which can be a partial outage
17 (at some number less than the maximum capacity) or a full outage (at the maximum capacity).
18 Therefore, when the unit is shut down for maintenance, the maximum capacity is the amount
19 of MWs the unit is down. Based on these reports, the maximum capacity of the unit changed
20 from 189 MW to 194 MW in the February 2015 time frame. In the February 2016 outage
21 reporting, Empire indicated an increase in the Asbury 1 capacity to 198 MW.

Surrebuttal Testimony of
Shawn E. Lange

1 Q. What work has Empire done at Asbury 1 in recent years?

2 A. Empire installed Air Quality Control System ("AQCS") upgrades on the
3 Asbury 1 unit. Those upgrades were completed in February 2015. At the same time, Empire
4 had some turbine work done that ultimately increased the capacity of Asbury. Asbury 1's
5 capacity, with the turbine upgrades, after parasitic loads related to the installed AQCS
6 equipment, increased by approximately 5 MW.

7 Q. Is the 195 MW Asbury 1 capacity Staff used as a model input a conservative
8 amount?

9 A. Yes. Staff's use of 195 MW is a conservative and representative capacity
10 value for Asbury 1 capacity, since Asbury 1 generated above 195 MW approximately 11.06%
11 of the time period 12 months ending September 30, 2015. This level of generation is also
12 consistent with a conservative reading of data provided by Empire pursuant to CSR 240-
13 3.190. Staff reviewed data for the 12 months ending September 30, 2015, and found that
14 during that time period, Asbury 1 generated above 186 MW 27.39% of the time.

15 Q. Is Mr. Tarter's reference at page 6 to the year 2015 as an example of historic
16 levels of generation at Asbury 1 reasonably representative of a year of "normal" generation?

17 A. No. Staff inputs a normalized level of outages for each plant as an input to the
18 fuel model. In late 2014 through late 2015, Asbury underwent an atypical level of outages
19 that is not likely to be experienced on an ongoing basis.

20 Q. What outages occurred at Asbury 1 during this time period?

21 A. Asbury was down for extended outages in late 2014 for the AQCS tie in, and
22 was down for a maintenance outage in September and October 2015. Asbury 1 was down
23 from September 12, 2014, through November 5, 2014, and September 29, 2015, through

Surrebuttal Testimony of
Shawn E. Lange

1 October 19, 2015. Once the tie in outage is complete, there usually is a testing and tuning
2 phase. This is a phase where there are typically outages due to new equipment as well as
3 testing procedures that are designed to test whether the equipment will perform as the
4 contractor illustrated.

5 Q. Was Asbury 1 the only coal plant with extensive outages in the 2014 – 2015
6 time period?

7 A. No. Although the coal units are each on a maintenance cycle, in 2014 – 2015
8 many of those cycles aligned. In the 2014 – 2015 period, all of Empire’s coal units
9 experienced a higher than normal level of both planned and forced outages. In 2014, Plum
10 Point had 2,770.82 hours of equivalent forced outage; that is more than the sum of the
11 equivalent forced outage hours for 2012, 2013, and January through September 2015
12 combined. To put that into perspective, 2,770.82 equates to the total number of hours in the
13 period of January 1, 2014, through April 26, 2014. In January through September 2015, Iatan
14 1 was down for 1,614.61 planned outage hours, which was nearly the amount of the planned
15 outage hours of the previous three years combined (1,769.85 planned outage hours). In
16 January through September 2015, Iatan 2 had the most forced outages it had ever had
17 (1,469.35 equivalent forced outage hours). In 2014, Iatan 2 had the most planned outages it
18 ever had (1,627.74 planned outage hours).

19 **Combustion Turbines**

20 Q. Do you agree with Mr. Tarter’s assertion that the level of generation associated
21 with Energy Center 1 through 4 and Stateline 1 is too low?²

² Tarter Rebuttal, page 6, line 1, through page 7, line 1.

Surrebuttal Testimony of
Shawn E. Lange

1 A. No. While the generation is low compared to Mr. Tarter's model run, at the
2 end of the day, the natural gas price tends to set the market price in peak hours. Those plants
3 typically run in peak hours. So for ratemaking purposes, the fuel and purchase power cost
4 assumes that Empire is generating at Energy Center 1-4 or Stateline 1 for minimal margin, or
5 buying market power at pennies over the cost of Empire-owned generation; the difference will
6 be minimal. For example, consider an hour when the market price of energy is \$35.00 and the
7 cost of generating at one of Empire's peaking units is \$34.99. If that unit generates 100 MWh
8 in that hour, Empire's generation at that unit would increase 100 MWh; however, Empire's
9 fuel and purchase power cost would only decrease by \$1.00, compared to the price of
10 purchased power. Similarly, if the market price for that hour fell to \$34.98, Empire's
11 generation for that unit would decrease by 100 MWh, but the reduction to Empire's fuel and
12 purchase power cost would only be \$1.00. Please see Staff witness Ms. Erin Maloney for
13 Staff's additional testimony on Market Prices.

14 Q. Are there other aspects to the calculation of fuel and purchased power costs
15 that contribute to differences between Empire's fuel model and Staff's fuel model?

16 A. Yes. For example, Staff separately analyzes Empire's activities in the
17 Southwest Power Pool ("SPP") ancillary services market outside of Staff's fuel model. These
18 ancillary service revenues and expenses are included in Staff's calculation of Empire's
19 revenue requirement, as described in Staff witness Ms. Amanda C. McMellen's testimony.

20 Stateline Heat Rate

21 Q. Is Mr. Tarter claiming that Staff modeled Stateline using an inaccurate heat
22 rate curve?

Surrebuttal Testimony of
Shawn E. Lange

1 A. No. Mr. Tarter's concern is that under Staff's model, Stateline operated at a
2 more efficient average than it did in Mr. Tarter's model. Apparently, in Mr. Tarter's model,
3 the unit turned off and on more frequently than under Staff's model; or it ran at a very high
4 level, or at a very low level. By way of analogy, if a car is operated in stop and go traffic, it
5 will use more gallons to the mile than a car that runs at highway speed. Similarly, if that car
6 is driven at 120 mph, or at 10 mph, it will probably use more gallons to the mile than the same
7 car traveling at a constant 65 mph. Mr. Tarter's criticism is that Staff's fuel run modeled the
8 Stateline units operating at a constant and efficient rate.

9 Modeling

10 Q. Mr. Tarter states "it does not appear that Staff's model has been refined
11 enough to produce reasonable results."³ Does Staff agree with that statement?

12 A. No. Staff is uncertain whether Mr. Tarter is stating the software Staff is using
13 is not refined enough, or whether the representation of Empire's system within the software
14 package is not refined to Mr. Tarter's preferred level. Therefore, I will address both points.

15 If Mr. Tarter is referring to the Plexos software, the Plexos software has been used by
16 American Electric Power ("AEP"), Westar, and the Midcontinent Independent System
17 Operator ("MISO"). MISO is currently using the Plexos software in their Clean Power Plan
18 ("CPP") modeling.

19 If Mr. Tarter is referring to the representation of Empire's system within Plexos, the
20 results of Staff's direct case, at the fuel adjustment clause base factor level, is \$25.64. Empire
21 filed a base factor of \$26.88. Below is a table showing the last two accumulation periods'
22 actual \$/MWh cost for Empire.

³ Tarter Rebuttal, page 5, lines 9-10.

Surrebuttal Testimony of
Shawn E. Lange

1

Period Ending	\$/MWh
2/28/2016	\$ 24.82
8/31/2015	\$ 26.36

2

3 The model used in Empire's direct filing included the new capacity and lower unit operational
4 fuel costs associated with the Riverton 12 Combined Cycle project. With the addition of the
5 more efficient heat recovery steam generator on Riverton 12, one would expect the base factor
6 level should be lower, not higher, than the last two accumulation periods which did not
7 include the Riverton 12 Combined Cycle project. Staff's value of \$25.64, without the
8 Riverton 12 Combined Cycle Project, is comparable to the simple average of the two
9 accumulation period's \$/MWh (\$25.59), which is also without the Riverton 12 Combined
10 Cycle Project.

11 Q. Does this conclude your surrebuttal testimony?

12 A. Yes, it does.

