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Witness: Blake Mertens
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**Before the Public Service Commission
of the State of Missouri**

Surrebuttal Testimony

Of

Blake A. Mertens

November 2004

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OF
BLAKE A. MERTENS
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION

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SURREBUTTAL TESTIMONY
OF
BLAKE A. MERTENS
THE EMPIRE DISTRICT ELECTRIC COMPANY
BEFORE THE
MISSOURI PUBLIC SERVICE COMMISSION
CASE NO.

1 **INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. Blake A. Mertens. My business address is 602 Joplin Street, Joplin, Missouri.

4 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

5 A. The Empire District Electric Company (“Empire” or “Company”), as Planning
6 Engineer - Energy Supply.

7 **Q. ARE YOU THE SAME BLAKE A. MERTENS WHO PREVIOUSLY FILED**
8 **DIRECT TESTIMONY AND REBUTTAL TESTIMONY IN THIS CASE ON**
9 **BEHALF OF THE COMPANY?**

10 A. Yes.

11 **Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY IN**
12 **THIS CASE BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION**
13 **(“COMMISSION”)?**

14 A. In this testimony, I will rebut the rebuttal testimony of Commission Staff (“Staff”)
15 witness Leasha Teel concerning the operation and maintenance (“O&M”) expenses
16 Staff has proposed to not include in base rates for the Company’s generating units.
17 Specifically, I will address the Staff’s refusal to include costs relating to
18 maintenance and inspections for Empire’s recently installed new generating units,
19 Energy Center Units 3 & 4, and for generator inspections for ten (10) of Empire’s
20 generating units. These two items represent more than \$700,000 of O&M expenses
21 that I have to assume the Staff believes are unwarranted in order to provide safe and
22 reliable operation of Empire’s generating units. I will also address Staff’s apparent
23 lack of knowledge concerning the different parts of generating units and how
24 electricity is actually generated. I believe this lack of knowledge is the root cause
25 as to why Staff is not allowing expenses relating to the aforementioned items.

GENERATOR INSPECTION VERSUS TURBINE INSPECTION

Q. PLEASE EXPLAIN IN SIMPLE TERMS HOW A COMBUSTION TURBINE PRODUCES ELECTRICITY.

A. There are two basic parts to an electric generator that utilizes combustion turbine technology. The first is the turbine itself. In simple terms, this is basically a windmill. Air is compressed and then heated during a combustion process (burning of natural gas or fuel oil) to cause it to expand. The heated and rapidly expanding air is forced through the turbine which turns a shaft. The shaft has a magnet attached to one end of it. This rotating magnet is utilized in the second part of the electric generating unit, the generator. The generator consists of the magnet spinning inside a stationary coil of wire. The rotating magnet creates a magnetic field that moves across the stationary coils of wire and creates an electrical current.

Q. DOES EACH PIECE OF EQUIPMENT YOU MENTIONED ABOVE REQUIRE SEPARATE MAINTENANCE ACTIVITIES?

A. Yes. These two pieces of equipment are quite distinct from one another and require different maintenance on different schedules. To provide an analogy, the turbine can be thought of as the engine of a car. An engine requires the oil to be changed, belts to be attended to, spark plugs to be inspected, and other items that require relatively regular maintenance and inspection. Similarly, the turbine requires oil to be added and changed in different pumps and motors, combustion parts to be inspected, and other wear and tear items to be inspected relatively frequently. The generator on the other hand could be thought of as the wheels of the car. The wheels of a car may require some sporadic maintenance like air to be added to the tires or the brakes to be inspected, but for the most part their maintenance is not as regular and the tires or brakes only have to be changed in total once in a great while unless something out of the ordinary occurs. Likewise, the generator may require some minor maintenance every once in awhile, but significant maintenance and inspection is only required once in a great while unless something out of the ordinary occurs. An engine in a car is worthless without the wheels (i.e. the car won't be able to move) and a turbine in an electric generating unit is worthless without a generator (i.e. the unit won't produce any electricity). However, in either

1 case, the maintenance of one of the pieces of equipment is not directly dependent on
2 the maintenance of the other piece of equipment.

3 **Q. PLEASE EXPLAIN WHY THIS DISTINCTION IS IMPORTANT IN THIS**
4 **CASE.**

5 A. In this case, Empire has asked for an adjustment to annual O&M expenses of
6 \$500,000 for future generator inspections relating to 10 generators in its system
7 (namely Energy Center Units 1, 2, 3 and 4, Riverton Units 7 & 8, State Line Unit 1,
8 and State Line Combined Cycle Unit 2-1, 2-2, and 2-3). The original equipment
9 manufacturers recommendations call for inspections to occur nominally every 5
10 years. (Please refer to my Direct Testimony, pages 7-8, for further explanation.)
11 Additionally, Empire has requested an adjustment of \$221,400 to annual O&M
12 expenses relating to annual inspections (\$82,900) and long-term maintenance
13 (\$138,500) for the turbines and associated auxiliary equipment for the newly
14 installed Energy Center Units 3 & 4.

15 **Q. DO YOU BELIEVE STAFF UNDERSTANDS COMPANY'S REQUEST?**

16 A. No.

17 **Q. WHY DO YOU SAY THIS?**

18 A. In Staff witness Leasha Teel's rebuttal testimony on page 1, lines 19-21, she states
19 "Company witness Blake Mertens is recommending to the Commission that
20 \$589,000 be included in the cost of service for annual generator inspections." This
21 is an incorrect statement.

22 **Q. WHY?**

23 A. Again, Company is recommending \$500,000 for annual generator inspections. The
24 other \$89,000 that Staff has included as a generator inspection cost is actually part
25 of the recommended annual turbine inspection and maintenance costs for the
26 recently installed Energy Center Units 3 & 4.

27 Further, as part of the response to the question "Has the Staff examined the
28 generator inspections the Company has performed in the past ten years to gauge the
29 regularity of the inspections?", Miss Teel states on page 3 of her rebuttal testimony
30 "Energy Center Units 3 and 4 were inspected in 2003, but this inspection was also

1 under warranty and performed at no cost to Empire.” This response is also
2 incorrect.

3 **Q. WHY?**

4 A. The Energy Center 3 & 4 inspections she is referring to are turbine inspections and
5 not generator inspections. Company agrees that the costs of these inspections were
6 completed under warranty but they relate to the \$82,900 Company has
7 recommended for annual turbine inspections of these units which will occur on an
8 ongoing basis beginning in 2005 and not covered under warranty.

9 **Q. DOES STAFF’S LACK OF KNOWLEDGE CONCERNING**
10 **MAINTENANCE OF COMBUSTION TURBINES CONCERN YOU?**

11 A. Quite frankly, yes. If Staff can not differentiate between the types of maintenance
12 that are required for a generating unit, how can the Staff be expected to determine
13 the appropriate cost related to such maintenance activities?

14 **GENERATOR INSPECTION FREQUENCY**

15 **Q. PLEASE BRIEFLY STATE EMPIRE’S REASONING FOR ADJUSTING**
16 **ANNUAL O&M EXPENSES TO ACCOUNT FOR A SINGLE GENERATOR**
17 **INSPECTION.**

18 A. A generator inspection did not occur during the Company’s test year for this case
19 (2003). Empire currently has 10 regularly operating units that have recommended
20 generator inspection intervals of nominally 5 years. A single inspection, only one-
21 half of that expected to occur based on the number of generators and the
22 recommended inspection interval, is obviously a conservative estimation.

23 **Q. DOES STAFF RECOGNIZE THAT ON AVERAGE AN ANNUAL**
24 **GENERATOR INSPECTION WILL BE NEEDED?**

25 A. Staff witness Leasha Teel states on page 3, lines 16 -17 that “only nine inspections
26 were performed in ten years”. Again, this is an incorrect statement because two of
27 the nine inspections she included were turbine inspections on Energy Center Units 3
28 and 4. This would change Staff’s reasoning to 7 inspections in 10 years. While
29 Company will admit that this does not average one inspection per year exactly, this
30 estimation does not include generator inspections for State Line Combined Cycle
31 generators 2-1 and 2-3 and Energy Center Units 3 and 4 because they are still less

1 than five years old. SLCC unit 2-2 was installed in 1997 and then incorporated into
2 the State Line Combined Cycle unit in 2001. State Line Combined Cycle became
3 commercially operational in the summer of 2001 and Energy Center Units 3 & 4
4 became commercially operational in the spring of 2003. SLCC unit 2-3 did undergo
5 a limited crawl-through inspection while under warranty in 2002. Generator
6 inspections for units 2-1 and 2-2 are due in 2006 with unit 2-3 following in 2007.

7 **Q. HAS COMPANY DEVIATED FROM THE RECOMMENDED**
8 **GENERATOR INSPECTION INTERVAL IN THE PAST?**

9 A. Yes, there have been instances when Empire has deviated from the recommended
10 generator inspection interval. Staff witness Leasha Teel points out two such
11 deviations on page 2, lines 16-19, of her rebuttal testimony “Also in 2003, the
12 Company did not perform generator inspections on production units Riverton 8 and
13 Energy Center 1 even though the company claimed these units were due for
14 inspections.”

15 **Q. WHY ARE THERE DEVIATIONS FROM INSPECTION INTERVALS?**

16 A. Please let me revert back to my analogy comparing a generator to a car wheel.
17 Most tires for an automobile come with a “mileage life”. Let us assume that an
18 automobile has a tire with a 50,000 mile life. Does this mean the exact instant a tire
19 rolls 50,000 miles we have to buy a new one? The obvious answer is “No”. It is
20 going to depend on how well the driver maintained the tire, what kind of driving
21 conditions the tire was put under, and basically an assessment by the driver of the
22 condition of the tire. If the tire was maintained well, it’s possible that the driver can
23 get more life out of the tire. However, continuing to drive it past 50,000 miles
24 probably increases the risk of that tire failing. The same is true for a generator. If
25 it is maintained well and not subjected to a continuous stop and start cycle, it is
26 possible to operate the generator past the recommended inspection date; but again,
27 this is done while increasing the risk of failure. Empire’s plant operating staffs
28 must assess the risk of failure and determine whether extending the inspection
29 interval is worthy of that risk.

30 Further, there are instances when the original equipment manufacturer provides
31 guidance or recommendations concerning inspection intervals. Such is the case for

1 Riverton Unit 8. Based on Unit 8's operating profile, a base load unit with minimal
2 starting and stopping, the original equipment manufacturer has allowed an
3 additional five (5) years before its next generator inspection will be required. The
4 possibility of such an extension by the original equipment manufacturer for base
5 load operating units, which would include Riverton Units 7 and 8, is another reason
6 why Empire has only requested the estimated cost of a single generator inspection
7 to be included in its annual cost of service (instead of 2 per year as the number of
8 generators and recommended inspection interval would dictate).

9 **Q. ARE THERE ANY OTHER FACTORS THAT ARE CONSIDERED BY**
10 **EMPIRE THAT MAY CAUSE DEVIATIONS FROM THE INSPECTION**
11 **INTERVALS?**

12 A. Yes. Empire has requested for generator inspection costs to be included in its cost
13 of service in previous rate cases (See Brad P. Beecher Direct Testimony dated
14 February 25, 2002 in case ER-2002-424). While the 2002 case was settled without
15 direct ruling on the generator inspection, Staff opposed including generator
16 inspection costs in the 2002 case, as shown by its non-inclusion of an adjustment
17 relating to generator inspection costs in Case No. ER-2002-424. While Empire
18 believes strongly in its commitment to provide safe and reliable power to its
19 customers, Empire does have a certain amount of financial motivation to extend the
20 inspection interval as far apart as it can since the costs of such inspections are not
21 being paid for by the customer. Again referring to my analogy, if a tire reaches
22 50,000 miles of usage and the driver has no money in his or her checkbook, that tire
23 is not going to get replaced until there are sufficient funds to pay for it. Similarly,
24 Empire must prioritize operating and maintenance activities at its plants and
25 perform and pay for those items while balancing its financial condition.

26 **Q. WILL YOU PERFORM ANY GENERATOR INSPECTIONS IN 2005?**

27 A. Yes. The generator for Energy Center 1 is scheduled to be inspected in 2005 at an
28 estimated cost of \$500,000.
29

ENERGY CENTER UNITS 3 & 4

Q. CAN YOU BRIEFLY RESTATE WHAT THE \$221,400 ADJUSTMENT FOR O&M EXPENSES RELATED TO THE RECENTLY INSTALLED ENERGY CENTER UNITS 3 & 4 REPRESENTS?

A. As stated in my Direct Testimony on pages 13 and 14, Energy Center Units 3 & 4 “must regularly undergo annual inspections, the cost of which inspections are not reflected in twelve-month-ending December 2003 O&M expenses. Additionally, long-term maintenance of these units includes a hot-path inspection once the units reach 25,000 hours of operation.” The original equipment manufacturer estimates that the cost of the annual turbine inspections is \$41,450 per unit or \$82,900 in total for two units annually. Again, I believe Staff witness Leasha Teel is incorrectly categorizing these costs as \$89,000 (the value in itself is incorrect) per year in generator inspection costs. The original equipment manufacturer also estimates (please note that it is not Empire that estimated the cost of these inspections as Miss Teel states in her rebuttal testimony on page 4, line 7) the cost of the long-term maintenance to be \$1,385,000 per unit. Empire recommends amortizing this cost over 20-years, the length of time that Empire estimates (using its production cost model) that it will take to reach the 25,000 hours of operation milestone. Amortizing the cost over twenty years equates to \$69,250 per unit or \$138,500 in total for two units per year.

Q. HAS STAFF RECONGNIZED ANNUAL O&M EXPENSES FOR THE RECENTLY INSTALLED ENERGY CENTER UNITS 3 & 4?

A. No. Staff seems to agree that there will be increased costs related to these units (see response by Staff Witness Mr. Steve Rackers to Company Data Request 472 attached as Surrebuttal Schedule BAM - 1) but, since there is no history of these costs, Staff concludes that costs can not be included in the Company’s cost of service. The question becomes “How can there be any history when the units are new and such costs have yet to occur?” Company has tried to answer this question by supplying to Staff reasonable estimation of these costs provided to Empire by the original equipment manufacturer and frankly believes that the amount of \$221,400 (\$82,900 for annual turbine inspections plus \$138,500 representing long-term

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turbine maintenance costs) for annual O&M costs related to two generating units representing 100 MW of generation is conservative.

Q. WOULD YOU PLEASE SUMMARIZE YOUR SURREBUTTAL TESTIMONY?

A. I believe I have presented in my Direct Testimony and Rebuttal Testimony, as well as through responses to Data Requests by the Staff and through verbal conversations with Staff, sufficient information to show the difference between generator inspections, turbine inspections, and increased costs relating to the recently installed Energy Center Units 3 & 4. However, it does not appear Staff has been able to differentiate these costs when I view the testimonies of Staff Witness Leasha Teel in this case. Clearly we will have on-going annual turbine inspection and maintenance costs for Energy Center Units 3 and 4. We have provided evidence which supports \$221,400 in expenses. Staff witness Teel's position of including \$0 is not credible and is arbitrary especially considering she doesn't appear to recognize the different components of a combustion turbine. Additionally, we must perform generator inspections in order to continue to provide safe and reliable service to our customers. Even Staff is not suggesting that we not perform inspections. According to Staff witness Teel, we have performed 9 (7 after correcting her error) inspections in the last 10 years. Her arbitrary position that we should include zero dollars is particularly disconcerting considering 4 of our generators are less than 5 years old and that 2 of these at the State Line Combined Cycle plant are rapidly approaching the first inspection due in 2006. Staff provides no evidence that including zero in the cost of service calculation can support continued reliable operation.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.