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Callaway Outages  
Witness: Randall J. Irwin  
Sponsoring Party: Union Electric Company  
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**MISSOURI PUBLIC SERVICE COMMISSION**

**CASE NO. ER-2010-0036**

**REBUTTAL TESTIMONY**

**OF**

**RANDALL J. IRWIN**

**ON**

**BEHALF OF**

**UNION ELECTRIC COMPANY  
d/b/a AmerenUE**

**St. Louis, Missouri  
February, 2010**

**NP**

1 **REBUTTAL TESTIMONY**

2 **OF**

3 **RANDALL J. IRWIN**

4 **CASE NO. ER-2010-0036**

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

6 A. My name is Randall J. Irwin. My business address is One Ameren Plaza, 1901  
7 Chouteau Avenue, St. Louis, MO 63103.

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

9 A. I am employed by Union Electric Company d/b/a AmerenUE (“AmerenUE” or  
10 the “Company”) as Supervising Engineer, Fuel Cycle Management in Nuclear Generation.

11 **Q. Please describe your employment history and the nature of your duties with**  
12 **AmerenUE.**

13 A. I was employed by Union Electric Company in January 1973. In July 1973, I was  
14 assigned to the nuclear group. My primary duties since that time have involved the procurement,  
15 design, fabrication, and management of nuclear fuel for the Callaway Nuclear Plant.

16 **Q. Please describe your current duties and responsibilities as Supervising**  
17 **Engineer.**

18 A. I am responsible for the procurement of nuclear fuel goods and services to support  
19 the operation of the Callaway Nuclear Plant. In this regard, I am responsible for the  
20 determination of nuclear fuel requirements, development of nuclear fuel procurement strategies,  
21 negotiation and administration of the various nuclear fuel-related contracts, monitoring the  
22 nuclear fuel markets, and maintaining business relations with the numerous suppliers in the  
23 nuclear fuel industry. In addition, I am responsible for the preparation of fuel cycle economic

1 studies and projections of nuclear fuel costs. I previously had responsibility for reactor core fuel  
2 management activities necessary to support reload design, licensing, and plant operation.

3 **Q. Please describe your educational background.**

4 A. I graduated from the University of Oklahoma in 1972, receiving a Bachelor of  
5 Science Degree in Engineering Physics. I have also taken graduate courses in nuclear  
6 engineering from the University of Missouri – Rolla. I am a registered professional engineer in  
7 the State of Missouri.

8 **Q. Have you previously filed written testimony concerning nuclear fuel costs**  
9 **before this Commission?**

10 A. Yes, I have submitted testimony in prior AmerenUE rate cases which involved the  
11 Callaway Nuclear Plant and nuclear fuel costs. Most recently, I submitted testimony in Case No.  
12 ER-2008-0318, AmerenUE's last rate case.

13 **Q. What is the purpose of your rebuttal testimony?**

14 A. The purpose of my rebuttal testimony is to discuss the appropriateness of using  
15 nuclear fuel costs that will actually be incurred by AmerenUE during the time that rates to be set  
16 in this case will be in effect, and, more specifically, to respond to the Staff's failure to include  
17 known and measurable nuclear fuel costs that will be incurred during such time in its production  
18 cost modeling. I will also address the similar exclusion of these known and measurable nuclear  
19 fuel costs as discussed in the direct testimony of Missouri Industrial Energy Consumers  
20 ("MIEC") witness James R. Dauphinais. Finally, I will provide a correction for the improper  
21 inclusion of Westinghouse credits in nuclear fuel costs and respond to Mr. Dauphinais's  
22 arguments related to the length of planned Callaway outages that were used in the production

1 cost modeling completed by AmerenUE witness Timothy D. Finnell and by the Staff. Mr.  
2 Finnell also addresses the Callaway outage length issue in his rebuttal testimony.

3 **Q. What nuclear fuel costs did the Staff and Mr. Dauphinais use in their direct**  
4 **cases?**

5 A. The Staff has used nuclear fuel costs for the period November 2008 through  
6 September 2009 (54.87 cents per MMBtu), which are not representative of the nuclear fuel costs  
7 that will be incurred when rates to be set in this case take effect in June 2010. Mr. Dauphinais  
8 indicated that he used actual and projected nuclear fuel costs for the period February 2009  
9 through January 2010 (which at the time he filed his testimony in December 2009 would be  
10 approximately 55.04 cents per MMBtu).<sup>1</sup> Again, these nuclear fuel costs will not be reflective of  
11 costs when rates in this case are in effect.

12 **Q. How are nuclear fuel costs determined?**

13 A. The Callaway Plant undergoes a refueling every 18 months. During each  
14 refueling, about one-half of the fuel assemblies in the reactor core are removed and a similar  
15 number of new assemblies are added. Fuel costs for the subsequent cycle are based on both the  
16 unamortized value of the fuel assemblies remaining in the reactor and the original cost of the  
17 new fuel assemblies added. The cost of the new fuel assemblies typically has increased when  
18 compared to the original cost of the assemblies currently in the reactor.

19 **Q. In view of that process what nuclear fuel cost will be most reflective of actual**  
20 **nuclear fuel costs when rates from this case take effect?**

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<sup>1</sup> As I address further below, Mr. Dauphinais has also incorrectly included in the nuclear fuel costs used in his production cost modeling credits the Company receives due to a settlement with Westinghouse. Because those credits are accounted for separately as an accounting adjustment, they were not included in either the Company's or the Staff's production cost modeling, which causes the nuclear fuel costs used by Mr. Dauphinais in his modeling to be somewhat of an "apples to oranges" comparison to the numbers used by Staff and the Company.

1           A.     The nuclear fuel cost that best reflects the costs that the Company will be  
2     incurring when rates take effect from this case is \*\*\_\_\_\_\_\*\* cents per MMBtu. This fuel cost  
3     incorporates the cost of the new fuel assemblies that will be loaded into the Callaway Plant  
4     reactor during Refuel 17. That refueling outage will start on April 17, 2010, and is scheduled to  
5     be complete well before the operation of law date in this case of June 21, 2010.

6           **Q.     Please explain how the \*\*\_\_\_\_\_\*\* cents per MMBtu figure was determined.**

7           A.     As I described generally above, nuclear fuel costs in 2010 are based on two major  
8     components: 1) the unamortized cost of nuclear fuel in the reactor as of December 31, 2009, and  
9     2) the cost of the new fuel assemblies that will be loaded into the reactor in April 2010 during  
10    Refuel 17. The unamortized cost of the fuel assemblies currently in the reactor is known. In  
11    addition, the cost of the new fuel assemblies to be loaded into the reactor in April 2010 is also  
12    known because the fuel and fuel assemblies have been purchased and are on-site at the Callaway  
13    Plant. Consequently, the costs which form the basis for the 2010 nuclear fuel expense, both  
14    before and after the April refueling, are known and measurable as of January 2010.

15          **Q.     The fuel assemblies for Refuel 17 will not be loaded into the reactor until**  
16    **April 2010. Why should the costs for such fuel be included now as a component of net fuel**  
17    **costs?**

18          A.     It is my understanding that the rationale for setting rates is to establish rates that  
19    reflect, as closely as possible, the revenue and expense levels that can be expected when rates are  
20    actually in effect from a rate case. The nuclear fuel assemblies on-site at the Callaway Plant are  
21    a highly engineered and specifically designed product for use at Callaway. Those assemblies  
22    have been bought and paid for by the Company. There is no nuclear fuel that can be  
23    manufactured and available for use at Callaway in Refuel 17 other than those fuel assemblies

1 currently on-site. The use of the known costs for such fuel assemblies in the determination of  
2 nuclear fuel costs represents the most accurate reflection of the operating costs of the Callaway  
3 Plant for the period immediately subsequent to this rate case. Failure to use these known and  
4 measurable costs will, with certainty, understate the Company's fuel costs which will necessitate  
5 greater adjustments through the Company's fuel adjustment clause ("FAC"). An important  
6 aspect of re-basing the Company's net base fuel costs in a rate case is to minimize, to the extent  
7 possible, the magnitude of adjustments customers will experience through later FAC rate  
8 adjustments. The Company and the Staff are using the best information available (as of January  
9 31, 2010) regarding other fuel costs and power prices, in order to rebase the fuel costs as  
10 accurately as possible. Those same considerations support including the known level of nuclear  
11 fuel costs after Refuel 17 is completed. As I noted earlier, the refueling will be completed before  
12 rates to be set in this case take effect.

13 **Q. What nuclear fuel costs did the Company use when it filed its direct case in**  
14 **July 2009?**

15 A. As discussed in the direct testimony of Mr. Finnell, AmerenUE used projected  
16 nuclear fuel costs for the period June 2010 to October 2011. At the time Mr. Finnell filed his  
17 direct testimony, that projection estimated the nuclear fuel costs for that period would be 72.40  
18 cents per MMBtu.

19 **Q. You noted that the known and measurable cost is now lower, \*\* \_\_\_\_ \*\* cents**  
20 **per MMBtu. What changed?**

21 A. During late summer 2009 as part of the Company's annual fuel budget process,  
22 updated reactor core physics information was developed and utilized. This new physics  
23 information more accurately reflects the current and expected operating parameters of the

1 Callaway Plant. As a result of this change, along with routine updates of economic and market  
2 parameters that have occurred since the summer of 2009, nuclear fuel costs for the period June  
3 2010 to October 2011 have decreased to **\*\* \_\_\_\_ \*\*** cents per MMBtu. In response to the Staff's  
4 Data Request No. 0065, the Company has been routinely providing updated nuclear fuel cost  
5 information on a monthly basis as this case has progressed.

6 **Q. How do we know that the **\*\* \_\_\_\_ \*\*** cents per MMBtu cost won't change in**  
7 **the future?**

8 A. We know that this cost won't change because the fuel assemblies have been  
9 manufactured and delivered to the Callaway Plant site. The cost of these fuel assemblies is now  
10 known and measurable.

11 **Q. How does the annual nuclear fuel expense using the Company's **\*\* \_\_\_\_ \*\*****  
12 **cents per MMBtu figure compare to the annual nuclear fuel expense using the Staff's cost of**  
13 **54.87 cents per MMBtu and MIEC's cost of 55.04 cents per MMBtu?**

14 A. Assuming a normalized level of generation for the Callaway Plant of 9,371 giga-  
15 watt hours ("GWhr"), the actual nuclear fuel costs, post-the April 2010 refueling, will be  
16 approximately \$10 million higher than if either the Staff's historical number through September  
17 2009 or the MIEC's historical/projected number through January 2010 is used. In other words,  
18 failure to use the **\*\* \_\_\_\_ \*\*** cents per MMBtu nuclear fuel cost will result in a rebase of net fuel  
19 costs which is both non-representative and understated by approximately \$10 million.

20 **Q. You noted earlier that Mr. Dauphinais incorrectly included Westinghouse**  
21 **credits in the nuclear fuel costs he used in his production cost modeling. Please explain.**

22 A. As part of a settlement with Westinghouse regarding steam generator performance  
23 at the Callaway Plant, the Company receives certain discounts on fuel fabrication related

1 services. The total dollar value of these discounts is credited to fuel costs, on a cycle specific  
2 basis. The credits are reflected in fuel costs as a fixed dollar amount per month and are  
3 independent of Callaway generation. Because of this process, it is inappropriate to consider the  
4 Westinghouse credits in the same manner as fuel costs that are subject to generation related  
5 factors. Consequently, these credits are taken into account by AmerenUE witness Gary S. Weiss  
6 in his calculation of the Company's net base fuel costs (and accounted for in the same way by the  
7 Staff), but are not included in the production cost modeling conducted by either the Staff or the  
8 Company.

9 **Q. What impact does the inclusion of the Westinghouse credits have on the**  
10 **nuclear fuel costs presented by Mr. Dauphinais?**

11 A. During the period February 2009 to January 2010, Mr. Dauphinais has included  
12 approximately \$1.97 million of Westinghouse credits in his calculation of nuclear fuel costs.  
13 This recognition of the credits results in an understatement of the nuclear fuel costs that should  
14 have been used in his production cost modeling by \$1.97 million.

15 **Q. Mr. Dauphinais also had an issue with the length of the Callaway Plant**  
16 **refueling outages used by Mr. Finnell and by the Staff in its production cost modeling. Mr.**  
17 **Dauphinais proposes to use a Callaway Plant refueling outage duration of 28 days,**  
18 **reflective of the length of Refuel 16, rather than a normalized outage duration as used by**  
19 **the Staff and Mr. Finnell. Can you provide any background information related to Refuel**  
20 **16 and its duration of 28 days?**

21 A. Yes. Refuel 16 (which occurred in the Fall of 2008) at the Callaway Plant was  
22 somewhat unique in its scope. With the recent replacement of the steam generators and main  
23 turbine (in 2005), maintenance on these major components was not yet needed. However, the



1 period of no maintenance is past and future outages will contain work scope on both the steam  
2 generators and the main turbine. In addition, the number of plant modifications performed  
3 during Refuel 16 was at a reduced level. Subsequent refueling outages will have an increased  
4 number of plant modifications. Taking all this into consideration, subsequent outages will have  
5 durations longer than 28 days. As Mr. Finnell's rebuttal testimony shows, refueling outages  
6 vary considerably in length over time, which is why the Company uses a normalized level of  
7 outages in its production cost modeling.

8 **Q. Does this conclude your rebuttal testimony?**

9 **A.** Yes, it does.