

Exhibit No.:
Issue: Hawthorn 5 SCR
Witness: Darrel L. Hensley
Type of Exhibit: Rebuttal Testimony
Sponsoring Party: Kansas City Power & Light Company
Case No.: ER-2012-0174
Date Testimony Prepared: September 5, 2012

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO.: ER-2012-0174

REBUTTAL TESTIMONY

OF

DARREL L. HENSLEY

ON BEHALF OF

KANSAS CITY POWER & LIGHT COMPANY

**Kansas City, Missouri
September 2012**

KCP&L Exhibit No. 27
Date 10-24-12 Reporter RF
File No. ER-2012-0174

REBUTTAL TESTIMONY

OF

DARREL L. HENSLEY

Case No. ER-2012-0174

1 **Q: Please state your name and business address.**

2 A: My name is Darrel L. Hensley. My business address is 1200 Main Street, Kansas City,
3 Missouri 64105.

4 **Q: By whom and in what capacity are you employed?**

5 A: I am employed by Kansas City Power & Light Company (“KCP&L” or the “Company”)
6 as Senior Director, Generation.

7 **Q: What are your responsibilities?**

8 A: My responsibilities include oversight of Generation and Safety departments for the
9 Supply division. I also have oversight responsibilities for the Central Machine Facility
10 which manufactures and repairs metal parts for KCP&L’s generating stations, Operations
11 Maintenance Department, and Apprenticeship training programs.

12 **Q: Please describe your education, experience and employment history.**

13 A: I received an Associate of Applied Science degree in Electronics in 1987 from DeVry
14 University. I received a Bachelor of Science degree in Technical Management from
15 DeVry University in 1999, followed by a Masters in Business Administration degree
16 from the University of Missouri Kansas City in 2008. I began working at KCP&L in
17 1995 as a Continuous Emissions Monitor Supervisor for the Supply division. In 1997, I
18 became the Hawthorn Station Electrical Supervisor and then progressively moved
19 through management positions at Hawthorn—Results Supervisor (1999), Operations

1 Superintendent (2003), and Maintenance Superintendent (2005)—until 2007 when I
2 became the Superintendent of Maintenance Programs for KCP&L’s Supply division
3 working on divisional maintenance initiatives. In 2009, I moved back to Hawthorn when
4 I was promoted to Plant Manager of the Station. I served in this role until 2011 when I
5 was promoted to Director of Supply Services. In June 2012 I was promoted to my
6 current role of Senior Director, Generation.

7 **Q: Have you previously testified in a proceeding before the Missouri Public Service**
8 **Commission (“Commission” or “MPSC”) or before any other utility regulatory**
9 **agency?**

10 A: No, I have not testified before the MPSC or any other utility regulatory agency.

11 **Q: What is the purpose of your Rebuttal Testimony?**

12 A: The purpose of my Rebuttal Testimony is to respond to certain adjustments that the
13 Missouri Public Service Commission Staff (“Staff”) has proposed related to the
14 Hawthorn 5 Selective Catalytic Reduction System (“SCR”). Specifically, I will address
15 claims by Staff that KCP&L’s customers have paid and will continue to pay for higher
16 capital costs and operations and maintenance (“O&M”) expenses directly due to the
17 Hawthorn 5 SCR.

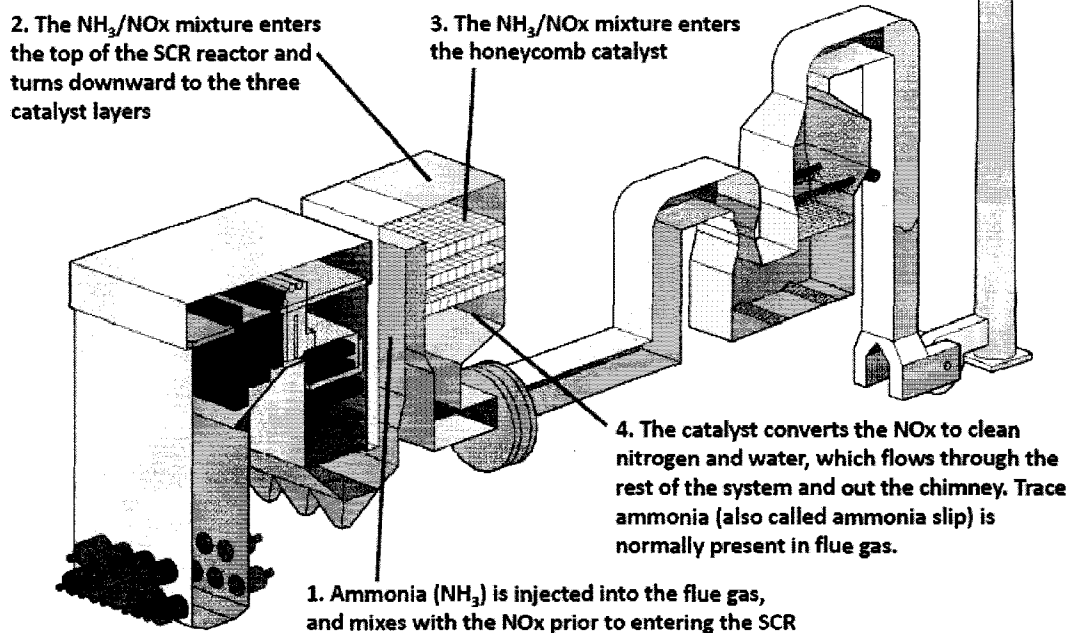
18 **Q: What is an SCR and what does it do?**

19 A: The SCR process utilizes the SCR reactor, which is a large box located at the outlet of the
20 coal-fired boiler before the air heater. All of the gases generated by the combustion of
21 the coal in the boiler pass through this box. This reactor can contain up to three layers of
22 catalyst. Ammonia is sprayed into the flue gas stream and the ammonia/flue gas mixture
23 passes through the catalyst. A chemical reaction takes place which results in the nitrogen

1 oxide (“NO_x”) emissions being reduced by 50% to 90% depending on the system design.

2 (See diagram below.)

Selective Catalytic Reduction (SCR) Process



3

4 **Q: What are the major cost components of an SCR?**

5 A: Ammonia and the catalyst are the major cost components associated with operating an
6 SCR. The ammonia is a consumable and is considered an ongoing O&M expense. Over
7 time, the SCR catalyst is “used up” and the chemical reaction becomes less efficient
8 requiring the use of more and more ammonia. Eventually, NO_x emissions compliance
9 cannot be maintained and the catalyst must be cleaned (also called rejuvenated),
10 regenerated (the addition of catalyst to what is already there), or replaced.
11 Cleaning/Rejuvenation have traditionally been an O&M expense, while regeneration or
12 replacement has been treated as a capital expense.

1 **Q: What is the average useful life of a layer of catalyst?**

2 A: The average useful life of a layer of catalyst varies depending on many factors some of
3 which include type of coal burned, combustion process of the boiler (*i.e.*, pulverized or
4 cyclone-fired), ash pluggage, and many other operational considerations. We monitor the
5 reactor's overall ability to efficiently reduce NO_x (known as reactor "potential"). Each
6 layer of catalyst contributes to reactor potential. A catalyst layer is added/replaced as
7 necessary to maintain the reactor potential above a minimum threshold determined by
8 operating conditions and emission reduction requirements.

9 **Q: What is Staff recommending in this case regarding the Hawthorn 5 SCR?**

10 A: Staff has or will propose adjustments to reduce or exclude what they believe are
11 excessive capital costs related to the SCR, ammonia costs that KCP&L has incurred and
12 has adjusted outages directly related to the Hawthorn SCR, which in effect, reduces
13 Staff's ongoing fuel expense level in this rate case. KCP&L witness Burton Crawford
14 will address the outage issue.

15 **Q: Please provide background information on the Hawthorn 5 SCR installation
16 project?**

17 A: In February 1999, an explosion occurred at Hawthorn 5 which entirely destroyed the
18 boiler. The Environmental Protection Agency ("EPA") permit for the reconstruction of
19 the Unit 5 boiler island required the installation of Best Available Control Technology
20 ("BACT") which included the addition of an SCR.

21 Babcock and Wilcox ("B&W") and KCP&L entered into an engineering,
22 procurement, and construction agreement ("Agreement") for the construction of the
23 Hawthorn 5 boiler island and included the installation of the SCR. Under the Agreement,

1 B&W guaranteed specific performance standards, including ammonia slip tests. After
2 the SCR was placed in service in 2001, the SCR failed the ammonia slip tests.

3 From 2002 through 2004, KCP&L and B&W attempted to enhance the SCR
4 performance by doing additional work on the SCR, but were unsuccessful. Because of
5 the failure to meet the ammonia slip test, KCP&L has had to replace catalysts more often
6 and has used more ammonia than was in B&W's original design model.

7 **Q: Do you agree with Staff's position that the Hawthorn 5 SCR has incurred excess**
8 **costs because it is not performing as originally designed?**

9 A: No, I do not.

10 **Q: Please explain.**

11 A: Prior to the installation of the Hawthorn 5 SCR, KCP&L had no prior experience with
12 this type of environmental equipment. Moreover, industry knowledge with respect to
13 SCRs in the United States was in its infancy on units burning Powder River Basin coal.
14 The SCR at Hawthorn 5 was the first installation of an SCR on a Powder River Basin
15 pulverized-coal burning boiler in the United States. As part of the Agreement, B&W was
16 responsible for the modeling and made the determination of the necessary design and
17 equipment needed for the boiler island construction to meet compliance with the EPA
18 permit requirement of the installation of BACT.

19 As stated earlier, the actual performance of an SCR depends upon several
20 variables including the type of fuel burned, the combustion process of the boiler, ash
21 pluggage as well as operational variables. Because of the limited industry knowledge of
22 the use of SCRs with pulverized Powder River Basin coal in the United States at the time
23 of the design of the Hawthorn 5 SCR, actual performance of the SCR has been below

1 what the B&W original design model represented. It is KCP&L's position that it is more
2 accurate to judge the performance of the SCR after the unit was placed in service in 2001
3 rather than a design model based upon several variables with which the US industry had
4 limited experience at the time.

5 **Q: Do you believe KCP&L has incurred increased capital costs and O&M costs since**
6 **the Hawthorn 5 SCR was placed in service?**

7 A: O&M and capital costs have increased with the additional equipment to maintain. The
8 cost increases year-over-year are related to routine industry inflationary price increases.

9 **Q: Please explain.**

10 A: There has not been degradation in the performance of the SCR since it was placed in
11 service. Additionally, KCP&L continues to seek performance efficiency increases and
12 cost reduction opportunities in the operation of the Hawthorn 5 SCR. As the SCR
13 industry knowledge has grown since the Hawthorn 5 SCR was designed, technology and
14 design advances have been made which include the potential to rejuvenate and/or
15 regenerate rather than purchase new catalyst. When B&W designed the SCR, it was not
16 anticipated that the catalyst could be rejuvenated or regenerated, which KCP&L has done
17 at Hawthorn 5. Thus, the ratepayers have benefited and will continue to benefit from
18 reduced costs (versus purchasing new catalysts). It is unreasonable to attempt to hold
19 KCP&L accountable for the original design specifications on an installation that was the
20 first of its kind for the industry. Furthermore, Staff's position does not take into
21 consideration the benefits of technology advances that were not also part of the original
22 design.

1 Q: Does that conclude your testimony?

2 A: Yes, it does.

