

Exhibit No.:
Issue: Generation Operations
Witness: F. Dana Crawford
Type of Exhibit: Supplemental Direct Testimony
Sponsoring Party: Great Plains Energy Incorporated and
Kansas City Power & Light Company
Case No.: EM-2007-0374
Date Testimony Prepared: August 8, 2007

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO.: EM-2007-0374

**SUPPLEMENTAL DIRECT TESTIMONY
PURSUANT TO THE SCHEDULING ORDER**

OF

F. DANA CRAWFORD

ON BEHALF OF

GREAT PLAINS ENERGY INCORPORATED

AND

KANSAS CITY POWER & LIGHT COMPANY

**Kansas City, Missouri
August 2007**

**Certain Schedules Attached to this Testimony Designated "HC"
Have Been Removed
Pursuant to 4 CSR 240-2.135**

SUPPLEMENTAL DIRECT TESTIMONY
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OF
F. DANA CRAWFORD
CASE NO. EM-2007-0374

1 **Q:** Are you the same F. Dana Crawford who submitted direct testimony in this
2 proceeding?

3 A: Yes, I am.

4 **Q:** What is the purpose of your testimony?

5 A: Since I submitted my direct testimony in this proceeding, additional merger-related
6 synergies and costs to achieve have been identified within my area of responsibility,
7 which is Plant Operations. The purpose of this testimony is to elaborate on those
8 synergies and costs to achieve.

9 **Q:** How were these additional merger-related synergies and costs to achieve identified?

10 A: As described in my direct testimony in this proceeding, a Plant Operations Integration
11 Team was established comprised of employees in leadership positions from both Kansas
12 City Power & Light Company (“KCPL”) and Aquila, Inc. (“Aquila”) within the
13 companies’ respective Plant Operations (Supply) divisions. These employees have met
14 regularly, and have also conducted generating site visit assessments. Through this
15 process, potential synergies were identified. Further discussions and analysis then took
16 place to determine if the potential synergies were indeed achievable. Once the team

1 determined that the savings, were achievable, economic and market analysis was
2 performed.

3 **Q: Did KCPL utilize the service of a third-party expert to assist in this process?**

4 A: Yes. KCPL retained the services of Mr. Robert F. Steinke, president of Robert F. Steinke
5 & Associates. Mr. Steinke has an extensive background reviewing the operating
6 efficiencies of generating units, as summarized in the testimony he is submitting in this
7 proceeding.

8 **Q: Can you describe the additional merger-related synergies that have been identified?**

9 A: Yes, we identified five additional synergies. The first identified merger-related synergy
10 deals with a Production/Outage optimization of Aquila's Sibley Unit 3 generating unit.
11 The Sibley Unit 3 Production/Outage optimization project includes multiple items to
12 improve the capacity factor of the unit. The unit is currently rated at 400.6 MW net
13 accredited capacity. Due to convection pass slagging, the unit cannot operate at this
14 level on a continuous basis. The unit currently operates at a normal maximum output of
15 about 360 MW net (except for relatively short periods of critical system needs). When
16 the unit operates above this level for an extended period of time, the convection pass
17 becomes fouled and the unit must be removed from service for cleaning. Another factor
18 contributing to the slagging problem is the load-following operation of the unit. If Sibley
19 Unit 3 could be base-loaded for extended periods of time and loaded/unloaded in a more
20 systematic and planned manner, the unit could be operated at an overall higher level of
21 output.

22 In addition, the addition of selective catalytic reduction ("SCR") equipment in the
23 fall of 2008 will result in a substantial increase in pressure drop in the flue gas path from

1 the boiler to the stack. This increased pressure drop is expected to result in a 40 MW
2 decrease in the unit capacity due to the forced draft (“FD”) fan limitations and the
3 boiler’s maximum draft pressure limits.

4 **Q: What improvements are you recommending for Sibley Unit 3?**

5 A: We believe the following improvements can be made to improve the operating capacity
6 of Sibley Unit 3: 1.) Include the addition of induced draft (“ID”) booster fans with the
7 SCR project. These fans will overcome the additional pressure drop caused by the SCR,
8 thereby eliminating a 40 MW derate. The fans will also improve the windbox to furnace
9 differential, which will aid combustion and help reduce slagging. 2.) Provide a more
10 consistent base-load operation by moving load-following operation to other units.
11 3.) Improve instrumentation and monitoring equipment to improve the effectiveness of
12 sootblowing. This includes furnace heat flux sensors and on-line convective pass
13 cleanliness calculations (provided as part of the performance monitor in the heat rate
14 improvement project). These systems will provide better boiler fouling information to
15 operating personnel to allow more effective cleaning. 4.) Upgrade the station’s coal
16 blending facilities to improve the consistency of the coal blend. Good combustion is
17 critically important to controlling boiler fouling. It is very difficult to tune the boiler for
18 good combustion with an inconsistent coal blend. Therefore, an improved blending
19 system is a key part of improving the unit’s capacity factor. (Also very important and
20 worth noting is maintaining a good coal grind. Aquila has addressed this concern and we
21 believe that grind is currently not a combustion issue.) 5.) Apply KCPL’s in-house
22 expertise in cyclone boiler combustion. By collaborating with Aquila engineering and
23 Sibley Station’s operations personnel, we believe that we can improve coal combustion

1 on Sibley Unit 3 by applying KCPL's combustion expertise. KCPL regained capacity on
2 LaCygne Unit 1 by applying this expertise to that coal-fired, cyclone boiler. Applying
3 the above plan, we expect to regain capacity on Sibley Unit 3. For the purpose of this
4 synergy analysis, we expect to increase the normal net full load operating limit from 360
5 MW to 370 MW in 2008. Following the SCR and booster fan installation, we expect to
6 be able to operate at 385 MW net.

7 **Q: Have you calculated the savings and cost to achieve this synergy?**

8 A: Yes. The net effect of this synergy is \$17.0 million over a 5-year time period. Please
9 refer to Schedule FDC-1 (HC) for more detail on this synergy.

10 **Q: Can you describe the second identified merger-related synergy?**

11 A: Yes. The second identified merger-related synergy deals with KCPL's Boiler Tube
12 Failure Reduction and Cycle Chemistry Improvement Program. KCPL has an aggressive
13 Boiler Tube Failure Reduction/Cycle Chemistry Improvement ("BTFR/CCI") program
14 implemented to reduce the amount of forced outage time on baseload coal units. EPRI
15 has developed an Integrated BTFR/CCI Program, supported by several state-of-
16 knowledge technology products, which have been demonstrated and proven by
17 experience, to assist utilities in substantially reducing boiler tube failure and cycle
18 chemistry corrosion and deposition problems. Using EPRI's Integrated BTFR/CCI
19 Program as a model, KCPL has elected to initiate its own formalized, comprehensive
20 integrated BTFR/CCI program. This program includes a group of trained boiler
21 engineers who document all boiler tube leaks, evaluate the root cause and recommend
22 corrective action. In addition, KCPL has a metallurgical lab and an on-staff metallurgist
23 who evaluates the majority of boiler tube failures to verify or determine the failure

1 mechanism. In addition, the boiler engineers work together to complete boiler
2 inspections and monitor boiler repairs during unit outages.

3 Aquila does not have a formal boiler tube failure reduction program. This work is
4 normally completed by the plant maintenance and operations personnel. It is challenging
5 for plant staff engineers to dedicate the time and resources necessary to make long-term
6 improvements to boiler availability. For the synergy evaluation, we only applied KCPL's
7 BTFR/CCI program to Sibley Unit 3. This program will also be applied to Sibley Units 1
8 and 2 and Lake Road Boilers 5 and 6 (Lake Road Unit 4). The benefits are calculated
9 only on Sibley 3 because it has the most potential and the largest impact. The program
10 would benefit the other baseload units also, either by improving or maintaining low
11 forced outage rates due to boiler tube failures. No capital costs were assumed in the
12 evaluation. Capital projects recommended by the boiler engineers would be justified on
13 their own merits. Expected performance improvements would be a reduction in
14 availability lost due to boiler tube failures by 1.5% beginning in the second half of 2008
15 and then maintain this level through 2012. This has been discussed with Sibley Plant
16 management and they agree that 2% is a reasonable improvement given the difference in
17 the companies' programs. We have only claimed 1.5% to account for the fact that there
18 might be some capital expenditures required to fully implement the program.

19 **Q: Have you calculated the savings and cost to achieve this synergy?**

20 A: Yes. The net effect of this synergy is \$5.6 million over a 5-year time period. Please refer
21 to Schedule FDC-2 (HC) for more detail on this synergy.

22 **Q: Can you describe the third identified merger-related synergy?**

1 A: Yes. The third synergy deals with combining the operations of the companies'
2 combustion turbine ("CT") generation fleets. Aquila and KCPL have combustion turbine
3 units that are very similar. For example, KCPL's Northeast CTs and Aquila's Greenwood
4 CTs are all GE frame 7Bs. Also, both companies have Siemens Westinghouse units that
5 have Teleperm controls system. Currently, both companies stock some of the same spare
6 parts, such as control system racks, processors, communication racks, and other system
7 replacement parts. The combined company should be able to realize savings through a
8 combined stocking program.

9 In addition, both companies utilize OEM technical support and outside craft labor for
10 various aspects of CT maintenance. The combined fleet should be able to realize savings
11 through long-term service agreement negotiations related to the control system
12 maintenance and through increased use of internal technical and craft support resources
13 for combustion inspections. Such increased use of internal resources should reduce the
14 cost associated with outside technical and craft resource assistance.

15 **Q: Have you calculated the savings and cost to achieve this synergy?**

16 A: Yes. The net effect of this synergy is \$3.1 million over a 5-year time period. Please refer
17 to Schedule FDC-3 (HC) for more detail on this synergy.

18 **Q: Can you describe the fourth identified merger-related synergy?**

19 A: Yes. The fourth identified merger-related synergy deals with Sibley Units 1 & 2. Sibley
20 Units 1 & 2 are typically scheduled for both a spring and fall outage. A major reason that
21 two outages are scheduled per year is that both units experience slagging and fouling
22 problems that require unit cleaning outages. As noted above concerning Unit 3,
23 improved fuel blending and combustion tuning can significantly reduce these problems.

1 It is anticipated that improvements noted on Unit 3 when applied to Units 1 & 2 will
2 eliminate the need for a two outages per year and will reduce overall outage time for both
3 units.

4 **Q: Have you calculated the savings and cost to achieve this synergy?**

5 A: Yes. The net effect of this synergy is \$1.6 million over a 5-year time period. Please refer
6 to Schedule FDC-4 (HC) for more detail on this synergy.

7 **Q: Can you describe the fifth identified merger-related synergy?**

8 A: Yes. The fifth identified merger-related synergy is in the area of heat rate improvement.
9 Currently, Aquila does not have data acquisition systems or performance monitors on
10 their coal-fired units. KCPL uses OSI-PI data acquisition and EndResult performance
11 monitors (PMIS) on all of its coal units. In addition, KCPL employs performance
12 engineers at each station to monitor and address heat rate issues and a defined
13 “Engineered Performance” heat rate improvement program. It has been KCPL’s
14 experience that the process of installing good instrumentation, data acquisition
15 equipment, and setting up and verifying a PMIS often yields significant improvement in a
16 unit’s heat rate. Subsequent to the installation of a PMIS, the implementation of KCPL’s
17 Engineered Performance program will allow Aquila units to maintain and improve their
18 efficiencies. This synergy will be applied to Sibley Units 1, 2 and 3 and Lake Road
19 Unit 4. These are all coal-fired steam units with cyclone boilers. Sibley personnel
20 applied an extensive heat rate improvement program to Unit 3 in the 1980s. Many of
21 these improvements are still in place, but there has not been a focused heat rate
22 improvement program at the Sibley Station for several years with the exception of some
23 recent six sigma projects. Based on the success of KCPL’s PMIS implementation, we are

1 confident that significant efficiency improvements can be made on the Aquila units. For
2 the sake of calculating synergies, modest improvements have been assumed. For Sibley
3 Units 1, 2 and Lake Road Unit 4, 0.5% improvement is expected over a five-year period.
4 For Sibley Unit 3, which has had more attention to efficiency in the past, 0.4% is
5 expected over the same period. Other areas of efficiency improvement cannot be
6 identified in advance, since issues are not identified until the process is underway.
7 However, high-potential areas include the boiler combustion process, boiler and air
8 heater cleanliness, condenser pressure and air in-leakage, and the feedwater heating
9 process. Note also that PMIS is very important in monitoring the operation of specific
10 equipment as other factors change. For example, with the installation of the Sibley Unit
11 3 SCR system in 2008, the reported net heat rate will likely increase due to increased
12 auxiliary load, regardless of other specific performance improvements. By monitoring
13 performance at the major equipment level (rather than at the unit level), real performance
14 degradation and improvements can be identified, tracked and verified. In addition to
15 capital investments, \$200k of non-fuel O&M is included in the evaluation for ongoing
16 performance engineering and periodic testing of the units and targeted equipment
17 problems.

18 **Q: Have you calculated the savings and cost to achieve this synergy?**

19 A: Yes. The net effect of this synergy is \$0.6 million over a 5-year time period. Please refer
20 to Schedule FDC-5 (HC) for more detail on this synergy.

21 **Q: What is the total net effect of these five identified synergies?**

1 A: The total net effect of these five identified synergies is \$27.9 million over a 5-year time
2 period. Please refer to Schedule FDC-6 **(HC)**, which provides the total value of these
3 five synergies.


4 **Q: Does that conclude your testimony?**

5 A: Yes, it does.

In the Matter of the Joint Application of Great Plains Energy Incorporated, Kansas City Power & Light Company, and Aquila, Inc. for Approval of the Merger of Aquila, Inc. with a Subsidiary of Great Plains Energy Incorporated and for Other Requester Relief)
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) **Case No. EM-2007-0374**
)
)
)

STATE OF MISSOURI)
) ss
COUNTY OF JACKSON)

1. My name is F. Dana Crawford. I work in Kansas City, Missouri, and I am employed by Kansas City Power & Light Company as Vice President, Plant Operations.
2. Attached hereto and made a part hereof for all purposes is my Supplemental Direct Testimony on behalf of Great Plains Energy Incorporated and Kansas City Power & Light Company consisting of nine (9) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.
3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.


F. Dana Crawford

Nicol A. Way
Notary Public

"NOTARY SEAL"
Nicole A. Wehry, Notary Public
Jackson County, State of Missouri
My Commission Expires 2/4/2011
Commission Number 07391200

SCHEDULE FDC 1-6

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