

Exhibit No.: _____
Issues: Reliability
Witness: Bier
Type of Exhibit: Rebuttal
Sponsoring Party: KCPL
Case No.: EC-99-553

FILED³

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Missouri Public
Service Commission

REBUTTAL TESTIMONY

OF

MICHAEL E. BIER

ON BEHALF OF

KANSAS CITY POWER & LIGHT COMPANY

1 Q. **PLEASE STATE YOUR NAME, BUSINESS AFFILIATION AND BUSINESS**
2 **ADDRESS.**

3 A. My name is Michael E. Bier. I am employed by Kansas City Power & Light
4 Company (KCPL) as a Manager of Transmission and Substations. My business
5 address is 4400 E. Front Street, Kansas City, Missouri.

6 Q. **PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**
7 **EXPERIENCE.**

8 A. I graduated from the University of Missouri at Columbia in 1972 with a B.S. in
9 Electrical Engineering. In 1977 I received a M.S. in Electrical Engineering from
10 the University of Missouri. I was first employed by KCPL in 1973 as an Electrical
11 Engineer in the Substation Department. I have held supervisory positions in
12 various areas including Iatan Generating Station and the System Control Center.
13 I was promoted to my current position during 1991.

14 Q. **WOULD YOU PLEASE DESCRIBE YOUR CURRENT DUTIES AT KCPL?**

15 A. My responsibilities include design, construction, operation and maintenance of
16 KCPL's substations, relay and protection systems, and design of KCPL's
17 transmission lines.

18 Q. **WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

19 A. In the direct testimony submitted by Mr. Jerry Ward, GST Steel Company
20 ("GST"), claims that equipment failures on that portion of KCPL's distribution
21 system that serves GST constitute a reliability problem. GST testimony is flawed
22 in several important respects. First, it appears that Mr. Ward's testimony
23 regarding the reliability of KCPL's distribution system is based entirely on Mr.

1 Ronald Lewonski's affidavit, which is attached to GST's complaint as Exhibit G.
2 Mr. Ward's heavy reliance on an affidavit that was produced to support GST's
3 allegations explains the second flaw in Mr. Ward's testimony regarding reliability
4 issues. Mr. Ward's testimony mischaracterizes the overall quality of electric
5 service provided by KCPL by failing to discuss the complexities involved in
6 providing electric service to GST, selectively discussing outages related to
7 KCPL's distribution system, and failing to discuss the actions taken by KCPL to
8 resolve the distribution-related problems that have caused outages at GST.

9 **Q. PLEASE DESCRIBE THE COMPLEXITIES INVOLVED IN PROVIDING GST**
10 **WITH ELECTRIC SERVICE.**

11 **A.** One of the factors effecting the quality of service to GST is the number of
12 electrical delivery points involved in providing service to its facility. Due to the
13 physical arrangement of its plant site and the size of the loads involved, multiple
14 electrical feeds are required. Seven large 161 kV transformers and nine 13 kV
15 distribution circuits are required to provide electric service to GST. A problem on
16 or near any of these facilities may effect GST's processes. GST's internal
17 processes also cause power quality problems. For example, the original design
18 of GST's Melt Shop substation utilized a 20 MVA transformer fed from its 24 kV
19 bus to feed power to internal plant processes. GST disconnected this
20 transformer for many years because the power quality it provided was causing
21 problems with plant equipment. It now serves less critical processes. GST is
22 now utilizing a 13.2 kV feed from Circuit 9613 to serve processes that are more
23 critical. Another complexity of providing service to GST is other large industrial

1 customers fed from Blue Valley substation. Praxair, Inc. ("Praxair") is one of the
2 world's largest producers of industrial and specialty gases. Praxair operates a
3 separation plant in Kansas City. This plant is located next to GST. GST uses
4 gases produced by Praxair's Kansas City facility in its steel making process.
5 Praxair began supplying gases to GST's predecessor-in-interest, Armco Steel, in
6 1968. The operations at GST and Praxair have been intricately connected since
7 1968. Until recently, this interdependence extended to the shared use of KCPL's
8 circuit feeds (#1 and #2 buses) from the Blue Valley Substation. Consequently,
9 operational procedures, and/or the installation of equipment at one facility had
10 the potential of adversely affecting the other. This interconnectivity has been in
11 existence for at least thirty years. Praxair recently completed an expansion
12 project. This expansion accompanied with the failure of Blue Valley #12
13 transformer required increased coordination of operations between GST, KCPL
14 and Praxair.

15 **Q. HAVE GST AND PRAXAIR MADE UPGRADES TO THEIR FACILITIES THAT**
16 **HAVE CAUSED KCPL TO INCREASE THE LEVEL OF RELIABILITY THAT**
17 **GST RECEIVES?**

18 **A.** Over the years GST and Praxair have upgraded their facilities by computerizing
19 the manufacturing process, installing large motors, and increasing the production
20 capacity of their facilities. For example, in 1998, Praxair completed a \$30 million
21 upgrade at its Kansas City facility. In 1968, Praxair's Kansas City operation
22 could produce 80 tons of gas per day. After the 1998 upgrades, the same facility
23 could produce 640 tons per day. Since 1968, Praxair's production capacity has

1 increased by a factor of eight. GST has also upgraded its facility. For example,
2 GST upgraded its Rod Mill. The upgraded mill enabled GST to produce 21/2
3 through 41/4 rounds and round-cornered squares. Prior to the early 1990's,
4 GST's manufacturing process was not computerized. During the early 1990's,
5 GST installed equipment that uses computers, programmable logic controllers
6 and auto-speed drives. This new equipment is especially sensitive to voltage
7 fluctuations.

8 The confluence of these upgrades over time increased the burden on that
9 section of KCPL's distribution system that served GST and Praxair. Eventually,
10 KCPL decided that these upgrades at GST's and Praxair's facilities, and the
11 associated reliability issues required separate circuit feeds for GST and Praxair.

12 **Q. DID GST EXPERIENCED ANY OUTAGES DURING 1998 THAT WERE**
13 **CAUSED BY THE FAILURE OF EQUIPMENT OWNED BY KCPL OR GST?**

14 **A.** Yes. During 1998, GST experienced several outages due to equipment failures
15 at KCPL's Blue Valley Substation. While he refers to a KCPL document dated
16 December 15, 1998 that acknowledges the outages that occurred in 1998
17 (December 15th Document), Mr. Ward fails to discuss or acknowledge those
18 portions of the December 15th Document that describe the actions that KCPL
19 took to improve the reliability of GST's load fed from the Blue Valley Substation.
20 A copy of December 15th document is attached to Mr.'s Ward's direct testimony
21 as Exhibit 7. The December 15th Document lists most of the corrective actions
22 that KCPL had already taken to improve GST's electric service, as well as
23 planned improvements.

1 Q. PLEASE BRIEFLY DISCUSS SOME OF THE STEPS KCPL TOOK TO
2 REDUCE THE NUMBER OF GST OUTAGES CAUSED BY MALFUNCTIONING
3 EQUIPMENT ASSOCIATED WITH THE BLUE VALLEY SUBSTATION.

4 A. As stated earlier, GST and its neighbor Praxair shared circuit feeds from KCPL's
5 Blue Valley Substation. For almost three decades, both GST and Praxair have
6 shared these feeds without any significant reliability problems. Since GST and
7 Praxair both used the #1 and #2 buses, faults on cables feeding Praxair
8 sometimes would cause an outage or fluctuation in voltage at GST. To insure
9 that Praxair's operation did not interfere with GST's operation, and to insure that
10 faults on cables feeding Praxair did not affect GST, KCPL moved the normal
11 feed to Praxair off of the #1 and #2 buses. This is discussed in the December
12 15th Document.

13 Another improvement that relates to the isolation of GST on the #1 and #2
14 buses is the installation of an additional transformer to supply Praxair's recently
15 acquired 16,000 horsepower motor. Prior to the installation of this additional
16 transformer, switching had to be performed at the Blue Valley Substation to
17 prevent voltage fluctuations when Praxair started its 16,000 horsepower motor.
18 This switching had to be coordinated between GST, KCPL and Praxair.
19 Sometimes this coordination could delay GST's production process. The
20 installation of the additional transformer increases the reliability of service
21 provided to GST.

22 The December 15th Document also discusses cable faults that may have
23 caused eight outages at GST during 1998. Two of the eight cable faults

1 occurred on cables owned by GST. In the December 15th Document, KCPL
2 suggests that the cable faults were caused by a number of factors, including
3 increased cable heating caused by Praxair's increased load, and mechanical
4 fatigue caused by the movement of the Blue River Bridge. KCPL took steps to
5 reduce the number of cable faults by reducing cable duct temperatures,
6 inspecting all of the cables in the four manholes on the Blue River Bridge, and
7 repairing or replacing any damaged cable. KCPL has invested in excess of \$1
8 million in its efforts to improve the electric service that GST receives.

9 **Q. IS GST AWARE OF THE STEPS TAKEN BY KCPL TO IMPROVE GST'S**
10 **ELECTRIC SERVICE?**

11 **A.** As recently as February, 1999, representatives from GST and KCPL met to
12 discuss GST's concerns over reliability issues, and possible remedies. During
13 this meeting KCPL committed itself to make certain improvements to GST's
14 electric service. Shortly after this meeting, one of KCPL's senior vice presidents
15 sent GST a letter that outlined the steps that KCPL had taken to improve GST's
16 electric service, as well as planned upgrades (February Letter). A copy of the
17 February Letter is attached hereto as Schedule MEB-1. Most, if not all, of the
18 reliability issues identified in Mr. Ward's testimony were resolved prior to the date
19 GST filed its complaint case with the Missouri Public Service Commission.

1 Q. DO YOU KNOW OF ANY EVIDENCE THAT REBUTS MR. WARD'S
2 SUGGESTION THAT GST IS DISSATISFIED WITH KCPL'S PERFORMANCE
3 REGARDING ITS MAINTENANCE OF ITS DISTRIBUTION SYSTEM?

4 A. Yes. In 1998, the KCPL Substation department was asked to assist GST during
5 their maintenance outage. Assistance was given in the areas of, air circuit
6 breaker maintenance in the sub 30 switchgear, microhm and travel time testing
7 of all oil circuit breakers, air circuit breaker testing of the West Motor Room
8 Switchgear, air circuit breaker maintenance in the South Plant, insulator cleaning
9 in Sub 30 and leak repair of the 20MVA transformer.

10 KCPL conducted training classes for GST electricians during 1996 and
11 1997. In late 1998, GST expressed interest in continuing the training of their
12 electricians. Three-day classes were conducted at the KCPL Pin Oaks training
13 facility from July 1999 through October 1999. A total of 32 GST employees were
14 involved. During October, KCPL was asked by the GST electrical foreman if
15 KCPL could assist once again in a upcoming outage. The request was to provide
16 GST with KCPL employees in a supervisory role in breaker maintenance in the
17 west motor room. KCPL refused the request because of this pending complaint
18 case.

19 Q. IS GST'S DISCUSSION OF "NUMEROUS POWER DELIVERY PROBLEMS"
20 CONTAINED IN ITS PETITION ACCURATE?

21 A. Paragraph 20 & 21 of GST's Petition for Investigation accuses KCPL of
22 unreliable maintenance of facilities and failing to be proactive in its approach to
23 reliability and replacement of antiquated equipment. These statements are

1 inaccurate. Since 1996 KCPL has been actively upgrading equipment directly or
2 closely involved in serving GST. Some of the items completed since 1996
3 include replacement of six 161 kV circuit breakers with new SF6 circuit breakers
4 and 18 -161 kV disconnect switches with new switches at the Hawthorn
5 Substation. Also at Hawthorn the controls for switchgear #2 have been
6 upgraded and standardized. A larger 161 kV breaker has been installed at the
7 Melt Shop Substation. One older 161 kV breaker at Blue Valley Substation has
8 been replaced with a new SF6 breaker and another Blue Valley breaker is
9 scheduled for replacement in 2000. Circuit Switchers have been installed on
10 Blue Valley transformers #12 and #78. Installation of the circuit switchers allow
11 switching of transformer 12 or 78 without requiring switching of the Hawthorn –
12 Blue Valley lines, Blue Valley – Swope line or opening the 161 kV ring bus at the
13 substation. The circuit switchers also minimize the amount of 161 kV equipment
14 that must be isolated when a transformer trips. All of these changes improve the
15 reliability to GST. To say that KCPL has not been proactive is a
16 misrepresentation.

17 **Q. ARE THE FAILURES ASSOCIATED WITH THE #12 TRANSFORMER IN ANY**
18 **WAY RELATED TO KCPL'S MAINTENANCE PRACTICES?**

19 **A.** The failures of #12 transformer were not related to KCPL maintenance practices
20 but rather to manufacturing defects during the transformer rebuild. The
21 transformer 1A LTC trip referred to in Mr. Lewonski's affidavit and Mr. Ward's
22 testimony was not due to maintenance practices. The transformer 1A LTC
23 inspection and maintenance interval recommended by the transformer

1 manufacturer is after 500,000 operations. The LTC had only operated 140,000
2 times since the last inspection when the contact problem occurred, well within
3 the manufacturer's recommended inspection interval. I am unaware of any
4 outages to GST that were caused by unreliable maintenance practices.

5 **Q. DOES LEWONSKI'S AFFIDAVIT AND WARD'S TESTIMONY CONTAIN**
6 **ADDITIONAL ERRORS?**

7 **A.** Mr. Lewonski indicated that GST suffered a power loss at its Rod Mill on August
8 14, 1998 causing a 210 minute delay. KCPL records indicate this power loss
9 was due to the failure of a GST owned cable and not KCPL equipment. GST
10 asked KCPL to repair the cable for them, which we completed the following day.
11 Mr. Lewonski and Mr. Ward discuss problems with KCPL's transformer 1A from
12 mid-September 1998 through the beginning of November 1998. They indicated
13 to their knowledge no action was taken by KCPL. This is incorrect. KCPL
14 personnel checked the voltage and reset the regulating relay on the same day
15 the problem was reported. GST reported occasional voltage spikes a day or two
16 later and KCPL again dispatched personnel to the station. The KCPL substation
17 supervisor worked with GST personnel and they determined the voltage spikes
18 were due to unexpected opening/closing of one of GST's capacitor banks. To my
19 knowledge, no other voltage spike incidents were reported between this time and
20 when the tap changer locked out in November. Since transformers 1A and 1B
21 operate in parallel it is extremely unlikely that the problem with the LTC contact
22 that caused the outage in November was the cause of the voltage spikes. They
23 state in their testimony GST suffered 545 minutes of production delay. This

1 seems excessive since service was restored through transformer 1B within two
2 hours after the 1A transformer trip.

3 Mr. Lewonski states that on November 1, 1998, a power dip on feeder
4 #5312 attributable to KCPL caused GST's South Plant and Rod Mill to shut
5 down. KCPL records indicate this outage was caused by the failure of the GST
6 owned feeder cable on circuit #5312 and not due to KCPL equipment.

7 Mr. Lewonski indicated GST suffered production delays due to a power
8 fluctuation on February 6, 1999. This occurrence gives some indication of how
9 sensitive GST's production equipment is to voltage disturbances. The power
10 fluctuation was caused by the failure of a transformer at Forest Substation. The
11 Forest substation is 4 substations removed from the Blue Valley substation and
12 over 14 line miles away. There have been other occasions when GST has
13 indicated problems when disturbances were on a neighboring utility's system
14 southeast of Kansas City.

15 Mr. Lewonski discusses the configuration of KCPL's delivery system as it
16 relates to starting Praxair's large compressor motor. He states that KCPL's initial
17 method for dealing with the problem was to place the burden on GST. This is a
18 misrepresentation of the system design. The original system designed to serve
19 the Praxair expansion was two new breakers and feeder positions. The normal
20 feed was from Blue Valley transformer #3 and the emergency feed was from
21 Blue Valley transformer #12. To start Praxair's large motor, the B.V. switchgear
22 #3 would be switched to the tie with switchgear #8 and the Praxair motor started.
23 This switching operation prevented KCPL customers from seeing a voltage dip

1 during the motor start. Once the motor was started switchgear #3 would be
2 switched back to transformer #3. Praxair had indicated to KCPL the large motor
3 would run continuously and only require starting several times a year making this
4 type of switching operation acceptable. This could all be accomplished without
5 effecting GST or requiring any action on their part. During 1998, the failure of
6 Blue Valley transformer #12 and the frequent starting of Praxair's large motor (up
7 to several times per week compared to several times a year Praxair had
8 indicated to KCPL for the system design) required extra coordination between
9 GST, KCPL and Praxair. To help eliminate the interaction between GST and
10 Praxair even under contingency conditions, KCPL installed an additional
11 transformer to serve Praxair in the fall of 1999.

12 We have no record of any equipment problems or system operations that
13 would have caused the voltage fluctuation on May 2, 1999, mentioned in Mr.
14 Lewonski's testimony.

15 **Q. DOES THIS COMPLETE YOUR TESTIMONY?**

16 **A.** Yes it does.

AFFIDAVIT

STATE OF MISSOURI)
) ss.
COUNTY OF JACKSON)

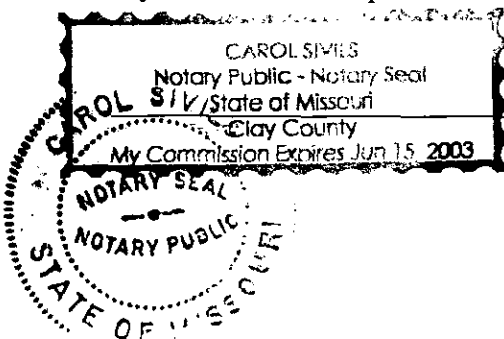
On the 23rd day of February, 2000, before me appeared Michael E. Bier, to me personally known, who, being by me first duly sworn, states that he is the Manager of Transmission and Substations for Kansas City Power & Light Company, and that he has participated in the preparation of the foregoing written testimony, in question and answer form, and believes that the statements therein are true and correct to the best of his knowledge, information and belief.

Michael E. Bier
MICHAEL E. BIER

Subscribed and sworn to before me this 23rd day of February, 2000.

Carol Sives
Notary Public

My Commission Expires:





JOHN J. DeSTEFANO
SENIOR VICE PRESIDENT
BUSINESS DEVELOPMENT

February 25, 1999

Mr. Mark G. Essig
President & Chief Executive Officer
1901 Roxborough Road
Suite 200
Charlotte, North Carolina 28211

RE : Kansas City GST Steel Facility

Dear Mr. Essig:

This letter is intended to follow up our meeting this week. At that meeting we committed to you that we would provide you with information concerning steps Kansas City Power & Light Company is taking to improve electric service to the your Kansas City facility. This letter will outline those steps.

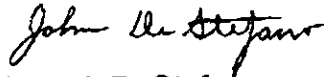
1. In order to reduce the possibility of voltage sags interrupting production in the rod mill, KCPL has removed all other customers from the #12 transformer which serves the rod mill.
2. In order to maintain this isolation of service for the rod mill in the #12 transformer even in times when emergency backup is needed, we are purchasing and will be installing an additional transformer at the substation. This work should be completed by the fall of 1999.
3. In order to improve backup service to the melt shop in the event of a voltage fluctuation, we are installing additional relay instrumentation to reduce the likelihood of lost production. This work should be completed in the spring of 1999.
4. We have worked with GST plant personnel to decrease communication problems between personnel of the two companies by reestablishing the joint GST-KCPL Operating Committee.
5. We are assisting GST in evaluating your own high voltage underground electrical system. Much of this system is 40 plus years old and is a major concern of GST maintenance personnel.
6. KCPL is assisting GST to determine which production interruptions are internally generated.

KANSAS CITY POWER & LIGHT COMPANY
1201 WALNUT P.O. BOX 418679 KANSAS CITY, MO 64141-9679 • 816-556-2200

Through all of the listed ways KCPL is upgrading the service to GST, assisting GST in evaluating your own problems, and in solving those problems. To this end KCPL is investing in excess of \$1 million and has committed large numbers of staff hours. We believe that this joint effort will prove beneficial to GST.

If you need additional information regarding the steps being taken to improve electric service to your Kansas City facility, please feel free to contact me.

Sincerely,



John J. DeStefano
Senior Vice President, Business Development

JJD:gcb