Exhibit No.:	
Issues:	Transmission
Witness:	Edward C. Pfeiffer
Sponsoring Party:	Union Electric Company d/b/a AmerenUE
Type of Exhibit:	Direct Testimony
Case No.:	EA-2005-0180
Date Testimony Prepared:	December 20, 2004

MISSOURI PUBLIC SERVICE COMMISSION

Case No. EA-2005-0180

DIRECT TESTIMONY

OF

EDWARD C. PFEIFFER

ON

BEHALF OF

UNION ELECTRIC COMPANY
d/b/a AmerenUE

St. Louis, Missouri
December 20, 2004

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

Application of Union Electric Company for a Certificate of Public Convenience and Necessity authorizing it to construct, install, own, operate, control, manage and maintain electric plant, as defined in § 386.020(14), RSMo. to provide electric service in a portion of New Madrid, County, Missouri, as an extension of its existing certificated area	)	Case No. EA-2005-0180

AFFIDAVIT OF EDWARD C. PFEIFFER

STATE OF MISSOURI)
) **ss**
CITY OF ST. LOUIS)

Edward C. Pfeiffer, being first duly sworn on his oath, states:

1. My name is Edward C. Pfeiffer. I work in St. Louis, Missouri, and I am employed by Ameren Services Company as Manager of the Electric Planning Department.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony consisting of 12 pages, and Schedules ECP-1 through ECP-2, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

Edward C. Pfeiffer

Subscribed and sworn to before me this 20th day of December, 2004.

Mary Hoyt
Notary Public

My commission expires: 4-1-2006

MARY HOYT
Notary Public - Notary Seal
STATE OF MISSOURI
Jefferson County
My Commission Expires: April 1, 2006

DIRECT TESTIMONY

OF

EDWARD C. PFEIFFER

CASE NO. EA-2005-0180

Q. Please state your name and business address.

A. My name is Edward C. Pfeiffer. My business address is One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

I. INTRODUCTION

Q. Please describe your background and by whom, and in what capacity, you are currently employed.

A. After receiving Bachelor of Science and Master of Science degrees in Electric Systems and Science Engineering from Southern Illinois University in Carbondale, I began my career with Union Electric Company (now d/b/a AmerenUE) in 1978. I worked for AmerenUE as an Engineer in the Transmission Planning Department for approximately 20 years. I am a registered professional engineer in the State of Missouri.

I am currently employed by Ameren Services Company ("Ameren Services") as the Manager of the Electric Planning Department. Among other responsibilities, our department is responsible for both operational and expansion planning for the AmerenUE transmission system.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe the transmission and distribution facilities that will be used in order for AmerenUE to provide electric service to Noranda Aluminum, Inc ("Noranda"). I also address the impact on these facilities as a result of incorporating the Noranda load into the AmerenUE service territory as requested in AmerenUE's Application. I will show that there will not be any adverse impact from a transmission or distribution perspective either to AmerenUE or to its customers as a result of AmerenUE serving Noranda.

II. DESCRIPTION OF FACILITIES USED TO SERVE NORANDA

Q. Please describe AmerenUE's transmission system.

A. The AmerenUE transmission system consists of approximately 3,000 miles of transmission facilities operated at or above 100 kV which are predominately located in the eastern one-half of the state of Missouri. The highlighted area in Missouri on the attached map of facilities in the Mid-America Interconnected Network ("MAIN") provides a good indication of AmerenUE's Missouri service territory and transmission facilities. This map is marked as Schedule ECP-1.

AmerenUE owns and operates all of these transmission facilities. However, functional control of the AmerenUE transmission system was transferred to the Midwest Independent Transmission System Operator, Inc. ("MISO") on May 1, 2004, pursuant to this Commission's approval of AmerenUE's participation in the MISO in Case No. EO-2003-0271. As a result, effective May 1, 2004, the MISO became the transmission provider under whose Open Access Transmission Tariff ("OATT") all transmission service provided over the AmerenUE transmission system, and other

transmission systems in the MISO's footprint, is administered. Transmission service under the MISO OATT is subject to the jurisdiction of the Federal Energy Regulatory Commission ("FERC").

Q. Are AmerenUE's facilities the only transmission facilities located throughout the AmerenUE service territory?

A. No. Associated Electric Cooperative, Inc. ("AECI") and its member cooperatives have service territories and transmission facilities that are interspersed throughout the AmerenUE service territory. Similarly, AmerenUE has transmission facilities which traverse the AECI service territory and which serve load that is surrounded by AECI service territory. To allow for the efficient use of their overlapping transmission systems, AmerenUE and AECI many years ago entered into an Interchange Agreement which enables each to use the other's facilities and thereby avoids the construction of duplicate and redundant facilities.

Q Does AmerenUE currently use the AECI transmission system to serve its bundled retail load in Missouri?

A. Yes. The AmerenUE service territory is not homogeneous or contiguous. In particular, certain parts of AmerenUE's service area are not directly connected to other parts. For example, AmerenUE's service area involving Excelsior Springs in western Missouri is not directly connected to its service area in central and eastern Missouri involving St. Louis County and adjacent areas. Instead, AmerenUE relies on AECI's transmission facilities to deliver power to Excelsior Springs and other similar locations.

Q. Please describe the transmission and distribution facilities that currently serve Noranda.

A. As more particularly described in AmerenUE's Application and the attachments thereto, Noranda is located in New Madrid County, Missouri. This is an area where AECI owns, operates and maintains transmission and generation facilities. Noranda owns its own distribution substation which is supplied by a series of radial 161 kV feeders which it also owns. These radial lines originate from the AECI New Madrid Substation complex. AECI's New Madrid Substation complex consists of 161 kV, 345 kV, and 500 kV substations which are connected to five 161 kV lines (in addition to the Noranda 161 kV feeders noted above), two 345 kV lines, one 500 kV line, and two AECI-owned generators each of which is greater than 600 MW. In contrast, the AmerenUE 345/161 kV substation at Kelso is the closest AmerenUE facility capable of supplying a load of this magnitude. The Kelso Substation is approximately 40 miles from New Madrid/Noranda.

Q. Please describe the electrical generation that is located in the area.

A. From an electrical standpoint, Noranda is surrounded by significant amounts of base load generation. This includes the following generation: the above-mentioned 1,200 MW of AECI generation at New Madrid; Arkansas Power & Light Company's 1,600 MW Independence Plant; AmerenUE's 1,200 MW Rush Island Plant; Electric Energy Inc's 1,000 MW Joppa Plant; and Tennessee Valley Authority's 1,500 MW Shawnee Plant.

All of this generation has been in service for a number of years, and is expected to remain in service for the foreseeable future. As mentioned, all of it is base load

generation which means that it is typically producing electricity in large quantities on a sustained basis.

Q. Is the fact that Noranda is surrounded by all of this base load generation significant for purposes of AmerenUE's Application?

A. Yes. From an electrical standpoint, the power from these existing base load generating plants is used by, and sinks in, Noranda's aluminum plant because of Noranda's close electrical proximity to these plants. Because of the laws of physics and regardless of which supplier is authorized to serve Noranda, whether by contract or regulatory order, local generation will serve local load. In other words, power will tend to flow directly from these base load units which are constantly running to Noranda which is constantly consuming power produced by them. If Noranda were to cease operations, the power from these surrounding generating sources would flow to a new sink and destination. This could create significant amounts of congestion in the area until additional outlet capacity could be built. It is unlikely that normal load growth would add new loads to substitute for that of a disappearing Noranda absent a replacement large-load customer. Thus, Noranda's continued operation is important to avoid congestion on the AmerenUE and AECI transmission systems.

Q. Have AmerenUE's and AECI's transmission systems been used to deliver power to Noranda in the past?

A. Yes. The interconnected transmission systems of AmerenUE and AECI have for many years been used to supply Noranda's electrical needs. From an electrical standpoint, not only do the laws of physics dictate that essentially the same generating plants will continue to physically supply the power Noranda consumes, but also the

same transmission system (and Noranda's own distribution assets) will continue to be used to deliver that power to Noranda.

Q. From what generation source does Noranda's current supplier obtain or purchase electrical supply?

A. To the best of my knowledge, Noranda load is not served by any designated generating resources. It is my understanding that the agent for Noranda secures energy from the market to serve the load. This affected how we analyzed the impact of AmerenUE serving the Noranda load. In power flow modeling an explicit source for each load is required. As a result, the source which has been used in regional power flow models to supply the Noranda load has been the incremental dispatch of AECI generation. Consequently, to analyze the effect on power flows of transferring the Noranda load into AmerenUE's service territory we reduced the output of the "last on/first off" AECI generation and increased the available AmerenUE generation. The results are discussed below.

Q. What overall impact, if any, is there on the AmerenUE system and on the AECI system once AmerenUE begins to serve Noranda instead of Noranda purchasing from the market?

A. As mentioned above, the inclusion of the Noranda load in the AmerenUE service territory does not represent an incremental increase in the load attached to the transmission system at the AECI New Madrid Substation and there should be little or no change in the generation dispatch of the base load units to which the Noranda load is in close electrical proximity. Therefore, the transfer of the Noranda load into the

AmerenUE service territory should result in little or no change on any of the local flows in and around Noranda.

Q. Has AmerenUE performed any modeling or analysis to verify the impact on power flows on the AmerenUE and AECI transmission systems as a result of AmerenUE beginning to serve the Noranda load?

A. Yes. We have performed a power flow analysis that verified that there will not be any significant change to the flows on the transmission systems of AECI and of AmerenUE. The results are attached as Schedule ECP-2.

Q. Is the AmerenUE transmission system capable of supplying Noranda?

A. Yes. As stated before, there should be little or no change in the flows in eastern Missouri as there will be no incremental change in the load or close by generation due to the transfer of Noranda into the AmerenUE service territory. The impact on the AmerenUE transmission system would be from the dispatch of additional resources to meet the increased demand on generation due to the transfer. These generating resources are dispersed across the AmerenUE system and there are no known constraints associated with full output from any of the AmerenUE generating units.

III. ARRANGEMENTS FOR TRANSMISSION SERVICE TO SERVE NORANDA

Q. What transmission facilities will be used in order for AmerenUE to supply electricity to Noranda?

A. If our Application is granted and Noranda becomes a native bundled load customer of AmerenUE, the Noranda load would be included in AmerenUE's Network Integration Transmission Service ("NITS") under the MISO OATT. This is the same transmission service that is used to serve all of AmerenUE's other bundled retail

native load. The fact that Noranda is not contiguous with the rest of the AmerenUE service territory does not affect the need for NITS service, nor does it affect this service in any way.

As previously noted, the AmerenUE service territory is currently not contiguous or homogenous. As a result, AmerenUE has other bundled retail native load customers (the Excelsior Springs example noted earlier) who use NITS service under the MISO OATT in the same fashion. Because of the lack of contiguity and homogeneity, AmerenUE and AECI have over time developed the Interchange Agreement I mentioned earlier which addresses the fact that each has pockets of load in isolated service territories that are not contiguous to their respective transmission systems. This physical relationship has resulted in the creation of Delivery Points. A Delivery Point is a connection at which the load of one party is directly connected to the transmission of the other. This arrangement allows for the load to be served reliably without the need to build duplicate transmission facilities.

In the case of Noranda, a new Delivery Point will be defined as the point at which the customer owned substation will be directly connected to the AECI New Madrid Substation via a series of 161 kV feeders. The Delivery Point for Noranda will include notice and termination provisions which will be consistent with the notice and termination provisions in the Agreement between AmerenUE and Noranda, which is attached as an exhibit to Mr. Craig Nelson's testimony.

Q. Has AmerenUE contacted the MISO about Delivery Point arrangements for Noranda?

A. Yes. AmerenUE contacted the MISO to determine how this Delivery Point would be treated under the MISO OATT. The MISO took the position that, since this Delivery Point connection was being established under the terms of a grandfathered agreement (namely, the AmerenUE-AECI Interchange Agreement), that the Noranda load would be supplied via NITS service under the MISO OATT and would not be subject to the MISO's regional through and out rates. Further, the use of a Delivery Point under the AmerenUE-AECI Interchange Agreement brings the Noranda load into the MISO energy market consistent with the policy of MISO and the FERC for the development of regional energy markets. In summary, the MISO has verified that it will provide NITS service to the Noranda load via a Delivery Point under the AmerenUE-AECI Interchange Agreement.

Q. Is the Noranda Delivery Point provision between AmerenUE and AECI subject to regulatory approval?

A. Yes. The new Delivery Point is being filed with the FERC and is subject to FERC approval.

Q. What would happen if FERC did not approve the Delivery Point service for Noranda?

A. In the event that AmerenUE and AECI were, for whatever reason, not allowed by FERC to use the Interchange Agreement to serve Noranda, the Midwest ISO has indicated that AmerenUE would have to secure additional Point to Point transmission service to deliver the power outside of the MISO footprint to the Noranda load. (MISO's tariff does not allow NITS service to be used for power that is transmitted

outside of its footprint.) This Point to Point service also is likely to include a charge under the MISO's regional through and out rates.

Q. Who would be responsible for the additional transmission costs if FERC does not allow the use of Delivery Point service for Noranda?

A. Noranda would be responsible for the costs of any alternate transmission arrangements. In particular, Noranda would be responsible for the costs of any Point to Point transmission service that AmerenUE would have to secure from the MISO to take the power outside of the MISO footprint. As a result, the LTS tariff provides that if MISO imposes charges based on the fact that Noranda is not connected to AmerenUE's system, such charges are the responsibility of Noranda.

Q. Would Noranda pay for transmission service on the AECI system?

A. Yes. It is my understanding that Noranda will pay AECI for transmission service on the AECI system for the power delivered by AmerenUE when AmerenUE starts serving Noranda as of June 1, 2005. As a result, the LTS tariff provides that it is Noranda's responsibility to secure and pay for firm transmission service if necessary for service outside of AmerenUE's control area (that is, on AECI's system).

IV. EFFECT ON THE AMERENUE SYSTEM

A. UPGRADES

Q. Are any upgrades required to the AmerenUE system in order for AmerenUE to serve Noranda?

A. No. The transfer of the Noranda load into the AmerenUE service territory does not represent an incremental change in the load connected to the transmission system and as such does not require any upgrades.

B. OPERATIONS

Q. What is the effect of serving Noranda on AmerenUE's transmission operations?

A. The transfer of the Noranda load to the AmerenUE service territory would not create any significant change in system operations. AmerenUE and AECI have each added Delivery Points over the last several years so the addition of a Noranda Delivery Point would not be a major change to the operation of the system. The 470 MW Noranda load has a very high load factor and as such is not a difficult load to follow as compared to an arc furnace or other highly variable load which would introduce operational issues. The inclusion of the Noranda load in the AmerenUE control area can also be an operational benefit with respect to minimum generation dispatch requirements during off peak conditions.

Q. Would loss of the Noranda load affect transmission operations?

A. Yes, from a reliability perspective, it is in the overall best interest of the transmission system that the load at Noranda remain in service. If for example, Noranda were to cease operations, the net effect of the removal of the Noranda load from the transmission system would be the rough equivalent of adding a 470 MW generating unit at New Madrid. Although not explicitly studied, the addition of the equivalent of a 470 MW unit at New Madrid without some additional generation transmission outlet capacity could result in congestion along the AmerenUE interface to TVA and Entergy

V. CONCLUSION

Q. Please summarize your testimony.

A. The AmerenUE transmission system is fully capable of allowing AmerenUE to supply Noranda's electrical needs in a reliable manner for the foreseeable future. AmerenUE would do so under the MISO OATT for delivery of the power from AmerenUE's generators to Noranda as part of AmerenUE's bundled retail native load in conjunction with the Delivery Point provisions of the AmerenUE-AECI Interchange Agreement. No network upgrades are required due to the transfer of the Noranda load to the AmerenUE service territory. Further, there would be no adverse impact to the transmission system or any transmission related harm to AmerenUE or its other customers. No AmerenUE distribution facilities will be involved in serving Noranda, and so there could be no adverse impact to such facilities.

Q. Does that conclude your testimony?

A. Yes, it does.

Mid-America Interconnected Network, Inc.

Principal Power Supply Facilities Existing and Authorized - April 2004

Revised 08/09/04

Electric Transmission Lines

115 KV and Above

- DC Line*
- 765 KV
- 500 KV
- 345 KV
- 230 KV
- 115-161 KV
- Authorized**

* Voltage noted on map.
** Scheduled in service this year unless otherwise designated.
(External to MAIN last updated 01/01/03)

Electric Generating Plants

- Fossil Fuel
- Nuclear
- Hydro
- Pumped Storage
- Wind
- Synchronous Condenser
- Transmission Stations

Scale in Miles: 25 0 25

Regular Members

Allegheny Energy Supply Co., LLC
Alliant Energy Corporate Services
Ameren
American Transmission Company, LLC
Central Iowa Power Cooperative
City Water, Light and Power
Columbia (Missouri) Water & Light
Commonwealth Edison Co.
Constellation Power Source, Inc.
Coral Power, LLC
Duke Energy North America, LLC
Edison Mission Marketing and Trading
Electric Energy, Inc.
El Paso Merchant Energy
Illinois Municipal Electric Agency
Illinois Power Co.
LG&E Energy Marketing, Inc.
Madison Gas & Electric Co.
Midwest ISO
Mirant Americas, Inc.
Northern Indiana Public Service Co.
NRG Energy, Inc.
PG&E Corp.
PJM Interconnection, LLC
PPL EnergyPlus, LLC
Sempra Energy Trading
Tractebel Energy Marketing, Inc.

Regular Members

Southern Illinois Power Cooperative
Soyland Power Cooperative, Inc.
Tenaska Power Services Co.
Williams Energy Services Co.
Wisconsin Electric Power Co.
Wisconsin Public Power Inc.
Wisconsin Public Service Corp.

Associate Members

BP Energy Company
Cargill Power Markets, LLC
Cinergy Corp.
Entergy-Koch Trading L.P.
First Energy Solutions Corp.
GridAmerica, LLC
TXU Energy Trading Co.

This map is published by:
Mid-America Interconnected Network, Inc.
939 Parkview Boulevard
Lombard, IL 60148-3267

MAIN
MID-AMERICA INTERCONNECTED NETWORK, INC.

Schedule ECP-1

Sullivan, John E Attachment 1

From: Sullivan, John E
Sent: Monday, November 29, 2004 9:31 AM
To: Pfeiffer, Edward C
Subject: Flow Changes with Change in Noranda Supply

Sensitivity: Private

comparison.doc (40 KB)

The attached Word document contains PTI PSS/E output comparing two powerflow cases. One case, shown as the 'working case', is a 2005 Summer model, with Ameren and Associated Electric generation shifted to show Ameren generation supplying the Noranda load. The second case, shown as the 'saved case', is the same 2005 Summer model, but without the generation shift between Ameren and Associated Electric for the Noranda load.

The Ameren generation shift was made by increasing generation at Pinckneyville and Venice, with the Associated Electric generation shift coming from the following facilities:

St. Francis Unit 1	31 MW	Missouri bootheel
St. Francis Unit 2	31 MW	Missouri bootheel
Holden Unit 1	90 MW	near Kansas City, Missouri
Holden Unit 2	90 MW	near Kansas City, Missouri
Nodaway Unit 1	70 MW	Northwest Missouri
Essex	80 MW	Southeast Missouri
Chouteau Unit 1	22 MW	eastern Oklahoma
Chouteau Unit 2	22 MW	eastern Oklahoma
Chouteau Unit 3	24 MW	eastern Oklahoma
Total:	460 MW	

Two tabulations of line flow comparisons are included in the attachment. One covers flow changes between the cases where branch flows changed by 50 MW or greater. The second covers flow changes where branch flows changed by 100 MW or greater.

In comparing the two powerflow cases, the greatest flow changes were on facilities near the Pinckneyville and Venice Plants, where the Ameren generation shift was modeled for this comparison. Other facilities with appearing in the 50 MW flow change tabulation, such as the Montgomery-McCredie-Overton 345 kV line (Montgomery-Overton-5) would appear to be in the list because of the generation pattern change, rather than having anything specific to do with Noranda load. The Montgomery-McCredie 345 kV line section showed an increase of 94.3 MW over the base case because of a generation reduction at Holden, in the Kansas City area, of 180 MW, and a 70 MW reduction at Nodaway in northwest Missouri. The Lutesville-Essex 345 kV flow increased 59.8 MW because of the reduction of generation at Essex by 80 MW.

****
John E. Sullivan, Engineer
Ameren Services
JSullivan@ameren.com
(314) 554-3833
****

```
     PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E      WED, NOV 24 2004  16:28
COMPARISON OF THE WORKING CASE AND THE SAVED CASE C:\AECI\05s-final.sav

WORKING CASE:
         2004 MMWG, 2005 SUMMER - GEN SHIFT FOR NORANDA
         AMEREN AND AMERENCILCO DETAIL

SAVED CASE C:\AECI\05s-final.sav:
         2004 MMWG, 2005 SUMMER
         AMEREN AND AMERENCILCO DETAIL

BUSES FROM THE TWO CASES ARE CONSIDERED TO BE THE
SAME BUS WHEN THEY HAVE THE SAME BUS NUMBER AND NAME

WORKING CASE SUBSYSTEM BUSES OMITTED FROM BUS COMPARISON LIST:
BUS # X-NAME-X  BASE KV
STAR POINT BUSES OF  733 THREE-WINDING TRANSFORMERS


C:\AECI\05s-final.sav SUBSYSTEM BUSES OMITTED FROM BUS COMPARISON LIST:
BUS # X-NAME-X  BASE KV
STAR POINT BUSES OF  733 THREE-WINDING TRANSFORMERS

WORKING CASE CONTAINS 45210 BUSES AND 60228 BRANCHES
 1703 BUSES IN SELECTED SUBSYSTEM

C:\AECI\05s-final.sav CONTAINS 45210 BUSES AND 60228 BRANCHES
 1703 BUSES IN SELECTED SUBSYSTEM

 1598 BUSES TO BE COMPARED

 1752 BRANCHES IN COMPARE LIST

    0 MULTI-SECTION LINES IN COMPARE LIST
```

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E WED, NOV 24 2004 16:34
COMPARISON OF THE WORKING CASE AND THE SAVED CASE C:\AECI\05s-final.sav

BUSES WITH MW GENERATION DIFFERING BY MORE THAN 0.0 MW:

	IN WORKING CASE		IN C:\AECI\05s-final.sav					
X------ BUS -------X	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31400 [OSAGE 138]	140.0	117.9	189.4	99.6	49.4	35.3	-18.2	15.5
31504 [PICKVL 413.8]	44.0	-0.4	0.0	0.0	-44.0	100.0	0.4	100.0
31505 [PICKVL 513.8]	72.0	-0.5	0.0	0.0	-72.0	100.0	0.5	100.0
31506 [PICKVL 613.8]	72.0	-0.5	0.0	0.0	-72.0	100.0	0.5	100.0
31882 [VENICE3 15.0]	165.0	75.0	0.0	0.0	-165.0	100.0	-75.0	100.0
31883 [VENICE4 15.0]	165.0	75.0	0.0	0.0	-165.0	100.0	-75.0	100.0
96002 [1THLG2 22.0]	187.6	44.8	189.8	46.8	2.2	1.2	2.1	4.6
96010 [1STFRG1 16.0]	189.0	80.8	220.0	77.9	31.0	16.4	-2.9	3.6
96011 [1STFRG2 16.0]	189.0	19.1	220.0	22.8	31.0	16.4	3.7	19.6
96012 [1HOLDEN113.8]	0.0	0.0	90.0	8.4	90.0	999.9	8.4	999.9
96013 [1HOLDEN213.8]	0.0	0.0	90.0	8.4	90.0	999.9	8.4	999.9
96025 [1NDWYG1 13.8]	0.0	0.0	70.0	43.6	70.0	999.9	43.6	999.9
96029 [1ESSEXG 13.8]	0.0	0.0	80.0	37.3	80.0	999.9	37.3	999.9
96031 [1CHOTCT113.8]	138.0	14.0	160.0	17.5	22.0	15.9	3.5	25.4
96032 [1CHOTCT213.8]	138.0	14.0	160.0	17.5	22.0	15.9	3.5	25.4
96033 [1CHOTST313.8]	144.0	14.0	168.0	17.5	24.0	16.7	3.5	25.4

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E WED, NOV 24 2004 16:28
COMPARISON OF THE WORKING CASE AND THE SAVED CASE C:\AECI\05s-final.sav

BRANCHES WITH FROM BUS END FLOWS DIFFERING BY MORE THAN 50.0 MW OR MVAR:

					IN WORKING CASE		IN C:\AECI\05s-final.sav					
FROM BUS		TO BUS		CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
30045	[ASHLEY 2 138]	30046	[ASHLEY 3 138]	1	6.8	28.6	-75.1	-3.9	-81.9	999.9	-32.5	113.8
30045	[ASHLEY 2 138]	31825	[TRIGENMO 138]	1	-59.4	-20.2	7.7	5.4	67.1	113.0	25.7	126.9
30046	[ASHLEY 3 138]	30215	[CAHOK 1 138]	1	-5.1	29.1	-87.2	-3.6	-82.1	999.9	-32.7	112.3
30102	[BELLEAU 345]	30535	[ENON 345]	1	40.9	-90.7	-34.5	-85.8	-75.4	184.5	4.9	5.4
30102	[BELLEAU 345]	31747	[SIOUX 345]	1	-324.9	14.3	-251.8	11.2	73.1	22.5	-3.1	21.8
30154	[BLAND 345]	30886	[LABADIE 345]	1	-309.5	-33.7	-246.1	-36.1	63.3	20.5	-2.4	7.2
30154	[BLAND 345]	96041	[7FRANKS 345]	1	594.5	96.7	530.2	89.8	-64.2	10.8	-6.8	7.1
30216	[CAHOK 3 138]	31592	[RIDGE 138]	1	28.7	-3.1	83.1	9.1	54.4	189.5	12.2	396.4
30249	[CAMBEL T 345]	30265	[CAMPBELL 345]	1	254.3	36.9	314.1	63.7	59.8	23.5	26.8	72.6
30249	[CAMBEL T 345]	31651	[ROXFORD 345]	1	-83.0	-86.7	-181.7	-114.3	-98.7	118.8	-27.7	32.0
30265	[CAMPBELL 345]	30266	[CAMPBELL 138]	1	254.2	37.8	314.0	64.3	59.8	23.5	26.5	70.1
30266	[CAMPBELL 138]	31273	[MSD 138]	1	-3.7	18.4	75.5	42.7	79.2	999.9	24.3	132.1
30266	[CAMPBELL 138]	31877	[VENICE 2 138]	1	-20.3	6.1	31.2	25.9	51.5	253.6	19.7	323.5
30535	[ENON 345]	31230	[MONTGMRY 345]	1	-253.2	-98.7	-318.5	-92.9	-65.3	25.8	5.8	5.9
30886	[LABADIE 345]	31230	[MONTGMRY 345]	1	263.4	7.5	213.3	8.7	-50.2	19.0	1.2	15.8
30974	[LUTESVIL 345]	96038	[7ESSEX 345]	1	307.4	-5.2	247.6	-3.5	-59.8	19.5	1.7	33.6
31051	[MASON 13 345]	31747	[SIOUX 345]	1	38.1	58.3	88.5	57.9	50.4	132.1	-0.4	0.7
31088	[MCCREDIE 345]	31230	[MONTGMRY 345]	1	-292.5	-39.6	-198.2	-49.2	94.3	32.2	-9.6	24.3
31088	[MCCREDIE 345]	31408	[OVERTON 345]	1	340.8	39.6	275.7	41.8	-65.1	19.1	2.2	5.7
31273	[MSD 138]	31876	[VENICE 1 138]	1	-102.5	-0.8	-8.5	28.7	94.0	91.7	29.5	999.9
31320	[N COULTR 230]	31500	[PICKNYVL 230]	1	-233.1	5.6	-153.4	-6.2	79.7	34.2	-11.8	211.1
31500	[PICKNYVL 230]	31505	[PICKVL 513.8]	1	-71.9	6.1	0.0	0.0	71.9	100.0	-6.1	100.0
31500	[PICKNYVL 230]	31506	[PICKVL 613.8]	1	-71.9	6.1	0.0	0.0	71.9	100.0	-6.1	100.0
31500	[PICKNYVL 230]	31785	[STJOHNAM 230]	1	84.6	-33.3	-22.5	-20.2	-107.1	126.6	13.1	39.2
31592	[RIDGE 138]	31877	[VENICE 2 138]	1	-56.0	-20.3	0.5	-1.5	56.5	100.9	18.8	92.8
31651	[ROXFORD 345]	31747	[SIOUX 345]	1	412.3	-82.3	302.6	-93.4	-109.7	26.6	-11.1	13.5
31785	[STJOHNAM 230]	31924	[W.FRKFT 230]	1	14.3	-16.4	-82.4	-3.5	-96.7	675.5	12.9	78.5
31825	[TRIGENMO 138]	31877	[VENICE 2 138]	1	-52.4	-20.4	14.7	5.3	67.1	128.1	25.7	125.7
31876	[VENICE 1 138]	31877	[VENICE 2 138]	1	-201.2	-82.5	-46.4	-30.5	154.8	76.9	51.9	63.0
31877	[VENICE 2 138]	31882	[VENICE3 15.0]	1	-165.0	-58.4	0.0	0.0	165.0	100.0	58.4	100.0
31877	[VENICE 2 138]	31883	[VENICE4 15.0]	1	-165.0	-58.4	0.0	0.0	165.0	100.0	58.4	100.0
31924	[W.FRKFT 230]	31925	[W.FRKFT 138]	1	153.7	31.9	91.2	34.8	-62.5	40.7	2.9	9.0
96012	[1HOLDEN113.8]	96124	[5HOLDEN 161]	1	0.0	0.0	90.0	8.4	90.0	999.9	8.4	999.9
96013	[1HOLDEN213.8]	96124	[5HOLDEN 161]	1	0.0	0.0	90.0	8.4	90.0	999.9	8.4	999.9
96025	[1NDWYG1 13.8]	96104	[5NODWAY 161]	1	0.0	0.0	70.0	43.6	70.0	999.9	43.6	999.9
96029	[1ESSEXG 13.8]	96075	[5ESSEX 161]	1	0.0	0.0	80.0	37.3	80.0	999.9	37.3	999.9
96071	[5CLINTN 161]	96124	[5HOLDEN 161]	1	0.1	6.2	-82.2	9.2	-82.3	999.9	3.0	48.6
96110	[5PITTSV 161]	96124	[5HOLDEN 161]	1	17.1	-14.5	-64.6	-9.2	-81.7	477.0	5.2	36.0

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E WED, NOV 24 2004 16:28
COMPARISON OF THE WORKING CASE AND THE SAVED CASE C:\AECI\05s-final.sav

BRANCHES WITH FROM BUS END FLOWS DIFFERING BY MORE THAN 100.0 MW OR MVAR:

					IN WORKING CASE		IN C:\AECI\05s-final.sav					
X---- FROM BUS ----X	X----- TO BUS -----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31500 [PICKNYVL 230]	31785 [STJOHNAM 230]	1	84.6	-33.3	-22.5	-20.2	-107.1	126.6	13.1	39.2
31651 [ROXFORD 345]	31747 [SIOUX 345]	1	412.3	-82.3	302.6	-93.4	-109.7	26.6	-11.1	13.5
31876 [VENICE 1 138]	31877 [VENICE 2 138]	1	-201.2	-82.5	-46.4	-30.5	154.8	76.9	51.9	63.0
31877 [VENICE 2 138]	31882 [VENICE3 15.0]	1	-165.0	-58.4	0.0	0.0	165.0	100.0	58.4	100.0
31877 [VENICE 2 138]	31883 [VENICE4 15.0]	1	-165.0	-58.4	0.0	0.0	165.0	100.0	58.4	100.0

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing was served via e-mail, to the following parties on the 20th day of December, 2004.

Office of the General Counsel
Missouri Public Service Commission
Governor Office Building
200 Madison Street, Suite 100
Jefferson City, MO 65101
gencounsel@psc.state.mo.us

Office of the Public Counsel
Governor Office Building
200 Madison Street, Suite 650
Jefferson City, MO 65101
opcservice@ded.state.mo.us

Stuart W. Conrad, Esq.
Attorney for Noranda Aluminum, Inc.
Finnegan, Conrad & Peterson, L.C.
1209 Penntower Office Center
3100 Broadway
Kansas City, Missouri 64111
stucon@fcplaw.com

/s/**James B. Lowery**
James B. Lowery