Exhibit No.:
Issue(s): Weather Normalization
Witness: Dennis Patterson
Type of Exhibit: Direct
Sponsoring Party: MoPSC Staff
Case No.: EM-96-149

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

DENNIS PATTERSON

UNION ELECTRIC COMPANY

CASE NO. EM-96-149

Jefferson City, Missouri

February, 1999

DIRECT TESTIMONY

OF

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UNION ELECTRIC COMPANY

CASE NO. EM-96-149

Q. Please state your name and business address.

A. My name is Dennis Patterson and my business address is Missouri Public Service Commission, P. O. Box 360, Jefferson City, Missouri, 65102.

Q. What is your present position with the Missouri Public Service Commission (Commission)?

A. I am a Regulatory Economist in the Electric Department of the Utility Operations Division.

Q. Please review your educational background and work experience.

A. I was trained as an officer and aviator in the U.S. Army. I studied economics, math, sciences and languages, receiving a B.A. in Latin American Studies (University of Missouri, 1983) and an M.S. in Agricultural Economics (University of Missouri, 1989). I joined the Staff of the Commission in April, 1986. I established the Staff's centralized weather data base, and have continued to maintain and improve it by employing data and methods from reliable sources. I have been employed by the Commission, the Missouri Army National Guard, the University of Missouri, the U.S. Army Reserves, and the U.S. Army.

PURPOSE

Q. What is the purpose of your testimony?

A. I will sponsor Staff's corrections to Union Electric Company's (Company's) proposed adjustments to sharing period sales for the difference between sharing period (actual) weather and historical average (normal) weather.

WHY CORRECTIONS ARE NECESSARY

Q. Why was it necessary to calculate corrections to the Company's adjustments?

A. In its review of the Company's adjustments, the Staff found two potential sources of error. These sources were the Company's actual calendar month weather and normal calendar month weather. The Staff found that both differed significantly from the Staff's actual and normal calendar month weather over each of the three years of Union Electric's first experimental alternative regulation plan, namely, the three years which ended on June 30 of 1996, 1997 and 1998, respectively.

Q. What was the cause of these differences in weather data?

A. There were two causes. The first cause lies in the differences in approaches used by the Company and the Staff to maintain a consistent time series of daily temperatures for the weather station at St. Louis Lambert International Airport (STL). The second cause lies in the selection of the years of temperature data to be used to calculate weather normals.

Q. Why would the history of daily temperatures at STL be inconsistent?

A. The exposure parameters of the thermometer at a weather station would include the following properties: the type of thermometer in use, the method of calibration, the nature of the necessary shelter from direct sunlight, the exact geographic location, the elevation of the thermometer above the ground, the nature of nearby terrain features, and the time that daily observations are made. When any exposure parameter varies, the weather station experiences an "exposure change". STL has had a number of exposure changes over the years that cause temperature readings from one period to be inconsistent with temperature readings from another. The most recent occurred in May of 1996, when the modernized ASOS (Automated Surface Observing System) was commissioned at STL in an open grassy area between runways 12L and 12R, near the approach (northwest) end of these runways. Obsolete instruments had been located to the north of runway 12L, among a growing collection of buildings that protected the instruments from cold northwest winds. An adjacent asphalt parking lot was open to the afternoon sun. Over a short transition period when both sets of instruments were operating, it was not surprising to find that the former location tended to exhibit warmer temperature readings than the new one.

UNION ELECTRIC COMPANY'S APPROACH TO EXPOSURE CHANGE ADJUSTMENTS

Q. What is the Company's approach to adjusting STL temperatures for exposure changes?

A. The Company's approach was devised as a temporary measure during the Union Electric Company's rate design case, Case No. EO-96-15. The STL exposure change of May, 1996, occurred during the test year for that case. In order to address that single exposure change, the Company calculated the difference between STL daily temperatures and the average of temperatures from a group of nearby stations over the three months before May 15, 1996, and compared that difference with its equivalent over three months after that date. The Company used the results to calculate an adjustment of +2.0 degrees Fahrenheit (F) to be applied to STL temperatures from May 16, 1996 through the end of the test year. For the purposes of that rate design case only, the Staff did not object to the Company's normals period or exposure change adjustment method because, in the Staff's opinion, no better alternative could be devised within the time constraints originally envisioned for that case. In addition, there would be no revenue impact upon the customers if the Company's method were used.

Q. Has the Company updated its exposure change analysis or weather normals period since EO-96-15?

A. No, it has not. Based on the preliminary calculations, the Company continues to add a constant adjustment of +2.0 degrees F to daily temperatures at STL in the present case. The Company has not addressed any of the earlier exposure changes at STL. Finally, the Company still proposes to use the period 1930 through the present month to calculate weather normals from its adjusted temperature data base for STL.

THE STAFF'S APPROACH TO EXPOSURE CHANGE ADJUSTMENTS

Q. What is the Staff's approach to adjusting daily temperatures?

A. Since 1994, the Staff's approach to constructing a consistent time series of daily temperatures has been to adjust historical temperatures to be consistent with the current readings. This approach is taken under the logic that exposure changes are the price of progress in measurement technology, and that the most recent instrumentation is the most accurate. The Staff's approach is based on the methodology that the National Oceanographic and Atmospheric Administration (NOAA) follows when it constructs a time series of average temperatures for the calculation of normals. These time series contain different exposure change adjustments for every period where a significant change in location or type of measurement instrument has taken place. For first-order weather stations such as STL, NOAA will have evaluated a number of documented exposure changes in its calculation of adjustments to recorded temperatures over the thirty years in the current NOAA normals period of 1961 through 1990. Temperature exposure changes are evaluated by comparing temperatures before and after the changes with temperatures at nearby stations where no such exposure change occurred during the period under consideration. Since temperature differences between weather stations vary by season, NOAA usually waits until at least a full year of temperature observations are available after an exposure change occurs, before calculating adjustments.

RATE CASE HISTORY OF EXPOSURE CHANGE ADJUSTMENTS AT ST. LOUIS LAMBERT INTERNATIONAL AIRPORT

Q. Had the Staff reviewed STL exposure changes prior to the rate design case EO-96-15?

A. Yes, it had. While preparing new tariffs that were filed in December, 1995, the Laclede Gas Company (LGC) found that STL temperatures apparently contained a warming bias that had existed for several years. Prompted by LGC's concerns, the Staff conducted an analysis of STL temperatures with respect to temperatures at surrounding stations in the subsequent rate case, LGC rate case, Case No. GR-96-193. The analysis showed a significant upward shift in temperatures dating from an exposure change that occurred in the late 1980s.

Q. Had NOAA calculated an adjustment for this exposure change at STL?

A. No, it had not. Possibly because the change occurred only a year or two before the end of the current normals period in 1990, NOAA did not calculate adjustments for that exposure change when it prepared the sequential time series of monthly average temperatures upon which NOAA's STL 1961-1990 normals are based. Therefore, the Staff believed that the official STL weather data for the 1995 test year were not consistent with the 1961-1990 normals for STL, and could not be used for weather normalization in the GR-96-193 rate case.

Q. What did Staff propose for weather normalization in LGC's GR-96-193 rate case?

A. The Staff's proposed weather normalization for that case was based on the use of the St. Charles weather station (STCH).

Q. Why wasn't STCH used as the weather station in Union Electric Company's rate design case, Case No. EO-96-15?

A. The Staff initially proposed the use of STCH as the weather station for that case. Unfortunately, the Company's weather models could not be successfully "fit" to STCH weather data. Although the STL exposure changes from before 1990 and from 1996 could not be resolved within the time constraints initially envisioned for Union Electric's rate design case, the rate design analysis was to be "revenue neutral." In addition, the Staff had no acceptable solution to offer. In order that the rate design case might move forward, the Staff expressed its reservations about the Company's weather data but agreed to use the Company's long normals period and preliminary exposure change adjustments only for the purposes of the rate design case.

RESOLUTION OF EXPOSURE CHANGE ADJUSTMENTS

Q. Have the exposure change issues ever been resolved for STL?

A. Yes, they have. Sufficient temperature data had been accumulated at the new STL weather station location when LGC filed its most recent rate case, GR-98-374. For the purposes of that rate case as well as for future St. Louis area rate cases, the Staff contracted with Steve Qi Hu, PhD., to calculate adjustments for exposure changes at STL. Dr. Hu, who served as the Missouri State Climatologist at that time, sponsored the Staff's weather data for the LGC rate case, Case No. GR-98-374.

DIFFERENCES BETWEEN TEMPERATURE DATA SETS

Q. What was the source of the Company's weather data set?

A. The Company maintains its own history of STL daily temperature observations, updated each day.

Q. What was the source of the Staff's weather data set?

A. Dr. Hu provided the Staff's weather data set.

Q. How did the Company's version of actual and normal STL weather differ from the Staff's actual and normal weather from Dr. Hu's data set of STL daily temperatures?

A. The Company's weather was based on the Company's data set of STL daily temperatures dating from 1930. The Company's daily temperatures contained a constant 2.0 degrees F correction for the installation of the new ASOS thermometer, for all days after May 15, 1996. The Company made no corrections in its weather data base for thermometer changes prior to that date. When calculating calendar month normals from this data base, the company used daily data from that month over all the years, beginning with1930 and ending with the current year.

The Staff's actual and normal weather were based on Dr. Hu's daily mean temperatures for STL, dating from January 1, 1961. Dr. Hu's STL daily temperatures contained corrections for thermometer exposure changes that occurred in 1978, 1988 and 1996. The Staff's calculations of STL normals from Dr. Hu's data were based on historical averages over the 1961-1990 time period. This method follows the recommendations of Dr. Hu, and complies with the Commission's Report and Order in the Missouri Gas Energy Company rate case, Case No. GR-96-285, wherein the Commission adopted the use of the NOAA 30 year normals.

UNION ELECTRIC COMPANY'S ACTUAL DAILY TEMPERATURES AND CALCULATION OF NORMALS

Q. Did Company furnish Staff with the historical daily weather that Company used to calculate its adjustments?

A. Yes, it did. The Company furnished its version of daily STL temperatures for all days from 1 January 1930 through 30 June 1998.

Q. Did Company explain its method of calculating STL weather normals to Staff?

A. Yes, it did. The Company has informed the Staff that Company policy is to calculate weather normals with the daily temperature data that are available at the time of the calculation. For example, using the Company's temperature data, a calculation of normal heating degree-days (HDD) and cooling degree-days (CDD) for the month of April, 1998 at STL would be the average of monthly total HDD and CDD for April from the years of 1930 through 1998. This would result in HDD and CDD normals for each of the twelve calendar months that differed by small amounts in the sharing periods ending in 1996, 1997 and 1998.

Q. Did the Staff calculate sharing period actual and normal calendar month HDD and CDD from the Company's version of STL daily temperatures?

A. Yes, it did. The Staff's calculations of the Company's adjustments from actual HDD and CDD to normal HDD and CDD are shown on Schedule 1, attached to my direct testimony. The details of these calculations are included in my working papers, as are the original STL temperature data the Staff obtained from the Company.

STAFF'S ACTUAL AND NORMAL DAILY TEMPERATURES

Q. Can you briefly describe the adjustments made to temperatures for STL by Dr. Hu?

A. Yes, I can. Dr. Hu furnished corrected daily maximum and minimum STL temperatures for portions of the temperature data from January 1, 1961 through June 30, 1998, in order to make the data series consistent with the current weather instruments and station location. Dr. Hu's STL temperatures match official NOAA records for the months January, 1961 through January, 1978. They are 0.3 degrees F cooler than official records for the months February, 1978 through January, 1988. They are then 0.75 degrees F cooler than official records for the months February, 1988 through May, 1996. From June 1, 1996 forward, Dr. Hu's daily temperatures match official records. In his direct testimony, Dr. Hu describes how he calculated the adjustments to STL daily temperatures that make them consistent throughout.

Q. Does Dr. Hu testify to the time period to be used in the calculation of weather normals?

A. Yes, he does. On Page 6 of his direct testimony, Dr. Hu notes that the U.S. National Weather Service (NWS) accepts the World Meteorological Organization (WMO) standard 30-year time period for the development of climate normals. Currently, the three decades from 1961 through 1990 are the normals period used by NOAA and NWS.

Q. Has the Commission made any findings on the use of NOAA's 30-year normals period?

A. Yes, it has. The Commission's MGE Case No. GR-96-285 Report and Order states: "The Commission finds that NOAA's 30-year normals is the more appropriate benchmark ... In addition, the data upon which Staff's recommendation is based has gone through the processes established by NOAA to ensure the best data possible." Re Missouri Gas Energy, Report and Order, Case No. ER-96-285, 5 Mo. P.S.C. 3d 437, 446 (1997).

Q. Did the Staff use weather normals from the time period 1961 through 1990 to calculate corrections for the Company's adjustments?

A. Yes, it did. The Staff calculated calendar month average temperatures, HDD, and CDD over the thirty years, from Dr. Hu's STL daily temperatures. The Staff then used these calendar month averages as STL climate normals. The Staff's sharing period actual and normal calendar month HDD and CDD are included in my working papers. Dr. Hu's data set of consistent daily temperatures for STL is also included in these working papers. The Staff's adjustments from actual HDD and CDD to normal HDD and CDD are shown on Schedule 2, attached to my direct testimony.

STAFF'S CORRECTION OF UNION ELECTRIC COMPANY'S ADJUSTMENTS FROM ACTUAL TO NORMAL WEATHER

Q. Did the Company provide calendar month actual HDD and CDD, normal HDD and CDD, and the calendar month adjustments from actual to normal HDD and CDD for the revenue sharing periods?

A. No, it did not. As described previously, the Staff calculated these quantities from the Company's data set of daily temperatures, using the Company's

method of calculating new normals for each calendar month. The results are shown on Schedule 1.

Q. Did the Staff calculate corrections for the Company's adjustments of actual HDD and CDD to normal HDD and CDD for the differences between the Company's treatment of the weather data and the recommendations of Dr. Hu?

A. Yes, it did. The Staff calculated these corrections for each of the 36 calendar months of the three years of the first experimental alternative regulation plan. The Staff's corrections to the Company's adjustments, for the differences between the Company's treatment of the weather and Dr. Hu's recommendations, are shown on Schedule 3. The corrections on Schedule 3 are calculated as the Staff's weather adjustment (Schedule 2) minus the Company's weather adjustment (Schedule 1).

STAFF'S CORRECTION OF UNION ELECTRIC COMPANY'S EARNINGS SHARING ADJUSTMENTS FOR DIFFERENCES IN WEATHER

Q. Did the Company provide the calendar month billing data used to calculate earnings sharing adjustments for the difference between actual and normal weather at STL?

A. Yes, it did. The Company has provided a data set containing these adjustments for each of the 36 calendar months in the three-year earnings sharing period at issue, and for the six rate classes agreed to at Attachment A of the Stipulation and Agreement in Case No. EM-96-149 respecting Union Electric's first experimental alternative regulation plan.

Q. What steps did you follow to correct the Company's earnings sharing adjustments for the differences between the Company's treatment of STL weather and Dr. Hu's recommendations?

A. Based on the Company's adjustments, I calculated corrections in four steps:

Step 1: Classify each month as a heating, cooling or transition month.

Step 2: Calculate weather response per degree-day for heating and cooling months for each class of service, as MWh per HDD for heating months, and MWh per CDD for cooling months.

Step 3: Calculate weather response per degree-day for transition months, using average MWh per degree-day from the heating and cooling months.

Step 4: Calculate MWh corrections for differences between the Company's weather and Dr. Hu's recommendations, using the weather responses calculated in 2 and 3 above and the weather corrections shown on Schedule 3.

Q. Did any of the Company's earnings sharing adjustments receive special treatment?

A. Yes, they did. I calculated corrections differently for June, 1997, where the Company's initial MWh adjustments per CDD were extreme. I did not calculate corrections for certain transition months, where the Company's MWh adjustments were not only small but opposite in sign to the MWh per degree-day adjustment from the heating and cooling months. Finally, I made no heating month corrections for either the Large Primary or Small Primary Commercial classes, since an independent analysis showed that neither class was sensitive to changes in HDD.

Q. What are the results of your corrections?

A. The results are found on Schedule 4, attached to my direct testimony.

The details of the Staff's corrections are found in my working papers.

Q. Does this conclude your direct testimony?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the matter of the Application of Union Electric Company for an order authorizing: (1) certain merger transactions involving Union Electric Company; (2) the transfer of assets, real estate, leased property, easements and contractual agreements to Central Illinois Public Service Company; and (3) in connection therewith, certain other related transactions.	)))))))	Case No. EM-96-149

AFFIDAVIT OF DENNIS PATTERSON

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Dennis Patterson, of lawful age, on his oath states: that he has participated in the preparation of the foregoing written testimony in question and answer form, consisting of 14 pages of testimony to be presented in the above case, that the answers in the attached written testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

Dennis Patterson

Subscribed and sworn to before me this 23rd day of February, 1999.

Joyce C. Neuner
Notary Public

My commission expires

Joyce C. Neuner
Notary Public, State of Missouri
County of Osage
My Commission Exp. 06/18/2001

UNION ELECTRIC COMPANY CASE NO. EM-96-149

Staff's Calculation of
Union Electric Company's Adjustments from Actual to Normal (N-A)
Heating Degree Days (HDD) and Cooling Degree Days (CDD)
for St. Louis Lambert International Airport

	Union Electric Company Adjustments	
	HDD(N-A)	CDD(N-A)
July-95	0.23	(51.12)
August-95	1.32	(193.61)
September-95	(21.73)	36.42
October-95	68.71	3.57
November-95	(66.67)	2.99
December-95	(17.90)	0.08
January-96	(31.08)	0.04
February-96	52.04	(4.23)
March-96	(92.33)	4.61
April-96	(25.25)	17.25
May-96	27.01	(93.81)
June-96	1.16	(36.88)
Year 1	**(104.51)**	**(314.70)**

	Union Electric Company Adjustments	
	HDD(N-A)	CDD(N-A)
July-96	0.22	55.04
August-96	1.30	(59.22)
September-96	13.07	34.40
October-96	47.99	1.54
November-96	(117.89)	2.95
December-96	93.19	0.07
January-97	(52.30)	0.04
February-97	157.19	0.26
March-97	169.15	1.59
April-97	(66.75)	26.85
May-97	(12.80)	53.39
June-97	6.07	(1.36)
Year 2	**238.42**	**115.56**

	Union Electric Company Adjustments	
	HDD(N-A)	CDD(N-A)
July-97	0.22	(78.78)
August-97	1.28	(7.11)
September-97	40.96	(23.75)
October-97	3.43	(74.84)
November-97	(27.48)	2.41
December-97	76.54	0.07
January-98	244.60	0.04
February-98	269.72	0.26
March-98	5.57	(24.55)
April-98	57.41	16.60
May-98	78.54	(149.41)
June-98	(9.79)	(73.28)
Year 3	**741.01**	**(412.33)**

	Union Electric Company Adjustments	
	HDD(N-A)	CDD(N-A)
Three-year Average:	**291.64**	**(203.82)**

Schedule 1

UNION ELECTRIC COMPANY CASE NO. EM-96-149

Staff's Adjustments
from Actual to Normal (N-A)
Heating Degree Days (HDD) and Cooling Degree Days (CDD)
for St. Louis Lambert International Airport

	Staff's Adjustments	
	HDD(N-A)	CDD(N-A)
July-95	0.47	(46.99)
August-95	1.64	(198.32)
September-95	(26.32)	38.35
October-95	75.88	(2.54)
November-95	(99.71)	2.78
December-95	(1.50)	0.15
January-96	2.06	0.00
February-96	75.06	(3.75)
March-96	(121.87)	5.67
April-96	(41.26)	21.36
May-96	19.41	(59.50)
June-96	(7.33)	(8.57)
Year 1	**(123.46)**	**(251.37)**

	Staff's Adjustments	
	HDD(N-A)	CDD(N-A)
July-96	0.47	98.76
August-96	1.64	(26.07)
September-96	(12.82)	52.35
October-96	23.88	10.71
November-96	(187.21)	2.78
December-96	72.25	0.15
January-97	(58.69)	0.00
February-97	147.56	0.00
March-97	105.38	4.67
April-97	(121.51)	31.11
May-97	(48.84)	66.50
June-97	1.17	30.43
Year 2	**(76.71)**	**271.38**

	Staff's Adjustments	
	HDD(N-A)	CDD(N-A)
July-97	0.47	(35.74)
August-97	1.64	23.93
September-97	34.18	11.35
October-97	(13.62)	(60.30)
November-97	(99.71)	2.78
December-97	58.25	0.15
January-98	241.81	0.00
February-98	271.56	0.00
March-98	(49.62)	(13.83)
April-98	4.99	25.11
May-98	77.16	(105.00)
June-98	(18.33)	(46.07)
Year 3	**508.79**	**(197.62)**

	Staff's Adjustments	
	HDD(N-A)	CDD(N-A)
Three-year Average:	**102.87**	**(59.20)**

Schedule 2

UNION ELECTRIC COMPANY CASE NO. EM-96-149

Staff's Corrections to Union Electric Company's Degree-Day Adjustments from Actual to Normal (N-A) Heating Degree Days (HDD) and Cooling Degree Days (CDD) for Differences between Union Electric Company's Treatment of Weather Data and The Recommendations of Steve Qi Hu, PhD.

	Corrections (Staff - Union Electric)	
	HDD(N-A)	CDD(N-A)
July-95	0.24	4.13
August-95	0.32	(4.70)
September-95	(4.58)	1.93
October-95	7.17	(6.11)
November-95	(33.03)	(0.22)
December-95	16.41	0.07
January-96	33.14	(0.04)
February-96	23.02	0.48
March-96	(29.54)	1.06
April-96	(16.01)	4.11
May-96	(7.60)	34.32
June-96	(8.49)	28.31
Year 1	**(18.95)**	**63.34**

	Corrections (Staff - Union Electric)	
	HDD(N-A)	CDD(N-A)
July-96	0.24	43.71
August-96	0.34	33.15
September-96	(25.89)	17.95
October-96	(24.11)	9.16
November-96	(69.32)	(0.17)
December-96	(20.93)	0.07
January-97	(6.39)	(0.04)
February-97	(9.63)	(0.26)
March-97	(63.77)	3.09
April-97	(54.76)	4.26
May-97	(36.04)	13.11
June-97	(4.90)	31.79
Year 2	**(315.14)**	**155.82**

	Corrections (Staff - Union Electric)	
	HDD(N-A)	CDD(N-A)
July-97	0.25	43.04
August-97	0.36	31.04
September-97	(6.77)	35.10
October-97	(17.05)	14.54
November-97	(72.23)	0.36
December-97	(18.29)	0.07
January-98	(2.79)	(0.04)
February-98	1.84	(0.26)
March-98	(55.18)	10.72
April-98	(52.42)	8.51
May-98	(1.38)	44.42
June-98	(8.54)	27.22
Year 3	**(232.22)**	**214.72**

	Corrections (Staff - Union Electric)	
	HDD(N-A)	CDD(N-A)
Three-year Average:	**(188.77)**	**144.62**

Schedule 3

UNION ELECTRIC COMPANY CASE NO. EM-96-149

Staff's Corrections to Union Electric Company's Experimental Alternative Regulation Plan
Earnings Sharing Adjustments in MegaWatt-hours
Sums over Stipulated Rate Classes

Calendar Month	UE's Adjustment Total MWH	Staff's Correction Total MWH	Corrected MWH Adjustment
Jul-95	-124,531	10,060	-114,471
Aug-95	-437,522	-10,632	-448,154
Sep-95	50,407	892	51,299
Oct-95	17,169	-4,193	12,976
Nov-95	-32,627	-16,362	-48,989
Dec-95	-11,001	9,352	-1,649
Jan-96	-18,804	18,747	-57
Feb-96	45,792	33,503	79,295
Mar-96	-56,507	-17,839	-74,346
Apr-96	-3,981	0	-3,981
May-96	-112,392	33,346	-79,046
Jun-96	-109,527	78,509	-31,018
Year 1	**-793,524**	**135,383**	**-658,141**

Calendar Month	UE's Adjustment Total MWH	Staff's Correction Total MWH	Corrected MWH Adjustment
Jul-96	132,600	105,304	237,904
Aug-96	-121,031	67,751	-53,280
Sep-96	29,704	6,820	36,524
Oct-96	5,221	1,735	6,956
Nov-96	-58,629	-34,926	-93,555
Dec-96	53,285	-11,735	41,550
Jan-97	-36,042	-3,915	-39,957
Feb-97	81,876	-4,911	76,965
Mar-97	86,988	-32,911	54,077
Apr-97	-8,349	0	-8,349
May-97	31,649	1,046	32,695
Jun-97	-27,876	72,991	45,115
Year 2	**169,396**	**167,247**	**336,643**

Calendar Month	UE's Adjustment Total MWH	Staff's Correction Total MWH	Corrected Adjustment Total MWH
Jul-97	-201,289	109,966	-91,323
Aug-97	-16,844	73,537	56,693
Sep-97	-73,121	171,851	98,730
Oct-97	-151,754	18,947	-132,807
Nov-97	-9,043	-42,997	-52,040
Dec-97	56,798	-13,135	43,663
Jan-98	177,596	-1,979	175,617
Feb-98	175,252	1,161	176,413
Mar-98	-37,044	-4,848	-41,892
Apr-98	32,214	-6,535	25,679
May-98	-291,825	91,475	-200,350
Jun-98	-203,848	68,542	-135,306
Year 3	**-542,908**	**465,984**	**-76,924**

Years 1, 2 & 3	UE's Adjustment	+ Staff's Correction	= Corrected Adjustment
	Total MWH	**Total MWH**	**Total MWH**
3 Year Avg	**-389,012**	**256,204**	**-132,808**
	% of Avg Annual Sales	**% of Avg Annual Sales**	**% of Avg Annual Sales**
3 Year Avg	**-1.27%**	**0.84%**	**-0.43%**

Schedule 4