Exhibit No.:	
Issues:	Weather Normalization
Witness:	Edward L. Spitznagel, Jr.
Exhibit Type:	Direct
Sponsoring Party:	Missouri-American Water Company
Case No.:	WR.2007.XXXX, SR.2007.XXXX
Date:	December 15, 2006

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. WR.2007.XXXX
SR.2007.XXXX

DIRECT TESTIMONY

OF

EDWARD L. SPITZNAGEL, JR.

ON BEHALF OF

MISSOURI-AMERICAN WATER COMPANY

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

IN THE MATTER OF MISSOURI-AMERICAN WATER COMPANY FOR AUTHORITY TO FILE TARIFFS REFLECTING INCREASED RATES FOR WATER AND SEWER SERVICE	)))))	**CASE NO. WR-2007-XXXX CASE NO. SR-2007-XXX**

AFFIDAVIT OF EDWARD L. SPITZNAGEL, JR.

Edward L. Spitznagel, Jr., being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony entitled "Direct Testimony of Edward L. Spitznagel, Jr."; that said testimony and schedules were prepared by him and/or under his direction and supervision; that if inquires were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge.

Edward L. Spitznagel, Jr.

State of Missouri
County of St. Louis
SUBSCRIBED and sworn to
Before me this 12 **day of** December **2006.**

Notary Public

My commission expires: 04/11/2010

DIRECT TESTIMONY
EDWARD L. SPITZNAGEL, JR.
MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR.2007.XXXX
SR.2007.XXX

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DIRECT TESTIMONY

EDWARD L. SPITZNAGEL, JR.

WITNESS INTRODUCTION

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND EMPLOYER.

A. My name is Edward L. Spitznagel, Jr., and my business address is Campus Box 1146, One Brookings Drive, St Louis, Missouri 63130. I am employed by Washington University.

Q. WHAT IS YOUR PRESENT POSITION?

A. I am Professor of Mathematics in the College of Arts and Sciences at Washington University. I also hold a joint appointment in the Division of Biostatistics of the Washington University School of Medicine.

Q. Please review your educational background and work experience.

A. I hold a Bachelor of Science, summa cum laude, in mathematics, awarded in 1962 by Xavier University, Cincinnati, Ohio. I hold a Master of Science (1963) and Ph.D. (1965) in mathematics awarded by the University of Chicago. I have served on the Faculty of Arts and Sciences of Washington University since 1969. I have held a joint appointment in the Division of Biostatistics since 1978. From 1965 to 1969, I was on the faculty of Northwestern University.

Attached to my testimony is Schedule ELS-1, which provides a more detailed listing of my education and qualifications in the area of mathematics and statistics.

PURPOSE AND SCOPE

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS CASE?

A. I have been employed by Missouri-American Water Company to make weather-normalized predictions of water utilization for the period January 2007 to December 2007.

Q. WHAT IS WEATHER NORMALIZATION?

A. From one year to the next, variations in temperature and precipitation lead to changes in water consumption. More water will generally be used during hotter, drier periods. The regulatory question is how to reflect those weather-related differences when setting rates.

For ratemaking purposes, revenues need to be set at as "normal" a level as possible, factoring out the potential or actual results of unusual weather conditions. This can be accomplished by building statistical models that predict water utilization from meteorological data and other possible predictors. An estimate of future utilization can then be made by using a long-term average of meteorological data and known values of the other predictors.

Q. WHAT ARE EXAMPLES OF THESE OTHER NON-METEOROLOGICAL PREDICTORS?

A. One is the year itself. Due to gradual introduction of water-conserving plumbing fixtures and appliances, in many regions use of water appears to be slowly declining over time. In other regions where the growth has led to new homes with expansive lawns and/or larger commercial establishments, the use of water can increase over time.

Another is the month of the year. While water utilization increases during the warmer, drier summer months, analysis of variance shows that month as a categorical variable is a powerful predictor even after temperature and moisture have been included in the model.

Q. WHAT MODEL FOR WATER UTILIZATION DID YOU EMPLOY?

A. In a previous case before the Public Service Commission of the Commonwealth of Kentucky (1997), I screened a large number of candidate predictors by examining data from fourteen different operating systems in five states: Kentucky, Missouri, Ohio, Tennessee, and Virginia. Five of these fourteen operations were located in Missouri: Brunswick, Cottleville (St. Charles), Mexico, Parkville, and Warrensburg. I also received data from two other Missouri operations: Joplin and St. Joseph. These two systems billed on a quarterly basis but could not provide records on the numbers of customers billed in each billing cycle, so it was not possible to compute monthly consumption on a per-customer basis.

I used as candidate predictors only those variables that correlated consistently with utilization for most or all of these operating companies.

Q. WHAT WERE SOME OF THE VARIABLES THAT MET THIS CRITERION?

A. For heat, both mean temperature and cooling degree days correlated strongly with utilization. For moisture, the Palmer Drought Severity Index correlated strongly with utilization. Rainfall and the available soil moisture index used in Missouri at that time did not correlate nearly as well.

I then fitted the surviving candidates in a multivariate model to predict utilization. I found that calendar month was a strong predictor even in the presence of heat and moisture variables. Therefore, I included month as a categorical variable. With month included, I tested drought severity index, temperature, and calendar year as potential numeric predictors. I found that temperature was not a useful predictor in the presence of the other variables, so from that point onward, I did not use it.

For the months of January through April, there was no evidence that moisture predicted utilization. For the months of May through December, there was evidence of moisture predicting utilization, being a weak predictor in the months of May, June, November, and December and a strong predictor for the months of July through October.

Month was a very strong predictor, both as a main effect and interacting with the drought severity index. Because of this, I estimated twelve separate predictive models, one for each month of the year.

Q. WERE ANY CHANGES TO YOUR METHODS REQUIRED IN THE PRESENT CASE?

A. From 2003 onward, a new accounting closing schedule called 4-4-5 was introduced. The idea behind this method is to provide the company with accounting closing periods based on four quarters of year, since the thirteen weeks of the 4-4-5 reporting corresponds to one-fourth of a year minus one day. Due to some non-uniformities in this new billing method, I was unable to make accurate estimates of monthly consumption. As a consequence, I found it necessary to use annual consumption rather than monthly consumption. I also skipped over the year 2003, because the changeover to the 4-4-5 billing method caused this year to be short by nine days. I added the year 1995 to the consumption data so I would have ten years of consumption data to estimate the effects of weather.

Q. HOW DID YOU ADAPT THE MEASURE OF DROUGHT SEVERITY TO MAKING ESTIMATES ON AN ANNUAL RATHER THAN A MONTHLY BASIS?

A. Since the monthly predictions of my previous method were combined linearly to obtain daily consumption averaged over a year, I calculated the average value of the Palmer Drought Severity Index over the eight weather-sensitive months of May through December and used this average value in an annual prediction equation.

This effectively produces the same prediction, just with the computations done in a different order. The computations can be found in Schedule ELS-2. Both Type I (sequential) and Type III (partial) sums of squares and F-tests are given. The selection criterion for retaining a term in the model was based on its Type III sum of squares and F-test. If the drought severity index was not statistically significant, it was removed from the model. If the year since 1990 was not statistically significant, it was removed from the model.

Q. ONCE YOU HAD ESTIMATED THE COEFFICIENTS IN THESE MODELS, HOW DID YOU PROJECT UTILIZATION FOR JANUARY 2007 THROUGH DECEMBER 2007?

A. In fitting each model, I added an additional line of data with years since 1990 set equal to 17, to correspond to the year 2007. I set the Palmer Drought Severity Index to the thirty-year average from 1976 to 2005 for the months of April through December, for the climate region in which the water company is located. I left the daily consumption missing so the regression coefficients would not be affected by the addition of this line of data. I then asked for the predicted value to be calculated, and I printed it out as the estimated average daily consumption for 2007. This produces the same result as if I had evaluated the regression equation with the values of 17 for year since 1990, and the average regional PDSI value, but with no risk of computational error.

Q. WHAT ARE YOUR PROJECTIONS OF DAILY UTILIZATION UNDER AVERAGE WEATHER BY DISTRICT FOR ST LOUIS COUNTY, ST. CHARLES, ST. JOSEPH AND JOPLIN FOR RESIDENTIAL AND COMMERCIAL CUSTOMER CLASSES, IN GALLONS PER CUSTOMER PER DAY?

A. They are:

	Residential	Commercial
St Louis County Quarterly	260.681	1214.18
St Louis County Monthly	N/A	14,448.09
St Charles	270.755	1215.55
St Joseph	158.307	833.223
Joplin	185.770	960.654

Q. YOUR TABLE ABOVE INDICATES THAT YOU ARE NOT PROVIDING THE SAME WATER UTILIZATION ANALYSIS FOR ALL THE DISTRICTS OF THE COMPANY. WHY WERE THE OTHER DISTRICTS EXCLUDED?

A. Based on discussions with the Company, the use of average utilization over the last few years would be incorporated into the Company's filing. I was asked to perform my analysis for the four largest districts which represents over 94% of the customer base for the Company.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Edward L. Spitznagel, Jr.

Born: Cincinnati, Ohio, September 4, 1941.

Education:

Xavier University, 1959-1962
Awarded Bachelor of Science Degree (Summa Cum Laude), 1962
University of Chicago, 1962-1965
Awarded Master of Science Degree, 1963
Awarded Ph.D. in Mathematics, 1965

Scholarships and Fellowships:

Xavier University, 1959-1962
Honorary Woodrow Wilson Fellow, 1962-1963
National Science Foundation Fellow, 1962-1965

Positions:

Assistant Professor of Mathematics,
Northwestern University, 1965-1969
Associate Professor of Mathematics,
Washington University, 1969-1980
Professor of Mathematics,
Washington University, 1980-present
Joint appointment,
Division of Biostatistics, Washington University School of Medicine, 1978-present

Consulting Experience:

Litton Industries (USACDCEC, Fort Ord, CA)
Price Waterhouse (Advanced Auditing Methods, NY)
Mallinckrodt, Inc.
St. Louis County Juvenile Court
Monsanto Company
American Red Cross
Carboline Corporation
Regional Justice Information Service
Harris-Stowe State College
University of Missouri, Columbia
Equal Employment Opportunity Commission
American Optometric Association
Petrolite Corporation
U.S. Army Atmospheric Sciences Laboratory (White Sands, NM)
St. Louis County Water Company
Gateway Medical Research, Inc.
Simmons Market Research Bureau
MasterCard
Capital City Water Company

Missouri American Water Company
Kentucky American Water Company
Tennessee American Water Company
New Jersey American Water Company
Iowa American Water Company
Partek Corporation
Nestle Purina Company
Solae Company
Anheuser-Busch, Inc.
Santa Clara County Mental Health Administration (San Jose, CA)
and many law firms

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Program to weather-normalize utilization for St. Louis County quarterly-billed customers

```
title "St. Louis County projections for quarterly billed customers";

options nodate nonumber ps=66 ls=80 formchar='|----|+|---';

PROC PRINTTO PRINT='H:\C\missouri-american\2006\st_louis\project1.lst' NEW;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m _ pdsi _ _ _ _
           _ prcp _ _ _ _
           _ temp _ _ _ _;
   output;
end;
drop m _ prcp temp;

data palmer; set palmer; if 1990<=year<=2005;

data palmer; set palmer; by year;
array p(*) pdsi1-pdsi12; retain pdsi1-pdsi12;
if first.year then i=0;
i+1;
p(i) = pdsi;
if last.year then output;
keep year pdsi1-pdsi12;
run;

data palmer; set palmer;
pdsi_ham = (1*pdsi5 + 2*pdsi6 + 3*pdsi7 + 4*pdsi8 + 4*pdsi9 + 4*pdsi10 + 2*pdsi11 +
1*pdsi12) / 20;
pdsi5_12 = mean(of pdsi5-pdsi12);
pdsi9_12 = mean(of pdsi9-pdsi12);

data water; infile 'h:\c\missouri-american\2006\st_louis\stl-qtrly.dat' lrecl=300
truncover;
input year ?? @; list;
if 1990<=year<=2005 then do; input @1 year w1-w12; output; end;
else input;
run;

data resuse(keep=year total)
     comuse(keep=year total)
     rescust(keep=year average)
     comcust(keep=year average); set;
total = sum(of w1-w12);
average = mean(of w1-w12) * 3;  /*Because St Louis County bills on a quarterly
basis*/

if 01<=_n_<=16 then output resuse;
if 17<=_n_<=32 then output comuse;
if 33<=_n_<=48 then output rescust;
if 49<=_n_<=72 then output comcust;

data use;  merge resuse(rename=(total=resuse)) comuse(rename=(total=comuse));
```

```
data cust; merge rescust(rename=(average=rescust)) comcust(rename=(average=comcust));

data combo; merge use cust;
resdaily = 1000/(365+(mod(year,4)=0)) * resuse/rescust;
comdaily = 1000/(365+(mod(year,4)=0)) * comuse/comcust;

data combo; merge combo palmer;
IF YEAR IN (1995 1996 1997 1998 1999 2000 2001 2002 2004 2005);
since_90 = year-1990;
run;

proc reg; model resdaily = pdsi5-pdsi12 since_90 pdsi_ham pdsi5_12 pdsi9_12 /
selection=stepwise;

proc reg; model comdaily = pdsi5-pdsi12 since_90 pdsi_ham pdsi5_12 pdsi9_12 /
selection=stepwise;

proc reg; model comdaily = since_90 pdsi5_12; run;


run;


proc corr; var pdsi5-pdsi12 pdsi_ham pdsi5_12 pdsi9_12 since_90;
with resdaily comdaily;
run;

/* CONCLUSIONS:  USE PDSI5_12 TO PREDICT RESIDENTIAL.  NO EVIDENCE OF A TIME TREND.
                 USE SINCE_90 AND PDSI5_12 TO PREDICT COMMERCIAL. */
options nodate nonumber ps=66 ls=80;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m _ pdsi _ _ _ _
           _ prcp _ _ _ _
           _ temp _ _ _ _;
   output;
end;
drop m _ prcp temp;

data palmer; set palmer; if 1990<=year<=2005;

data palmer; set palmer; by year;
array p(*) pdsi1-pdsi12; retain pdsi1-pdsi12;
if first.year then i=0;
i+1;
p(i) = pdsi;
if last.year then output;
keep year pdsi1-pdsi12;
run;

data palmer; set palmer;
pdsi_ham = (1*pdsi5 + 2*pdsi6 + 3*pdsi7 + 4*pdsi8 + 4*pdsi9 + 4*pdsi10 + 2*pdsi11 +
1*pdsi12) / 20;
pdsi5_12 = mean(of pdsi5-pdsi12);
pdsi9_12 = mean(of pdsi9-pdsi12);
```

```
data water; infile 'h:\c\missouri-american\2006\st_louis\stl-qtrly.dat' lrecl=300
truncover;
input year ?? @; list;
if 1990<=year<=2005 then do; input @1 year w1-w12; output; end;
else input;
run;

data resuse(keep=year total)
     comuse(keep=year total)
     rescust(keep=year average)
     comcust(keep=year average); set;
total = sum(of w1-w12);
average = mean(of w1-w12) * 3;  /*Because St Louis County bills on a quarterly
basis*/

if 01<=_n_<=16 then output resuse;
if 17<=_n_<=32 then output comuse;
if 33<=_n_<=48 then output rescust;
if 49<=_n_<=72 then output comcust;

data use;  merge resuse(rename=(total=resuse)) comuse(rename=(total=comuse));
data cust; merge rescust(rename=(average=rescust)) comcust(rename=(average=comcust));

data combo; merge use cust;
resdaily = 1000/(365+(mod(year,4)=0)) * resuse/rescust;
comdaily = 1000/(365+(mod(year,4)=0)) * comuse/comcust;

data combo; merge combo palmer;
IF YEAR IN (1995 1996 1997 1998 1999 2000 2001 2002 2004 2005);
since_90 = year-1990;
run;


data year2007; infile 'h:\c\missouri-american\2006\avg-pdsi.out';
input since_90 _ pdsi5_12;  /*REGION 2*/
run;

data combo; set combo year2007;

proc reg data=combo; model resdaily = since_90 pdsi5_12;
output out=predicted p=p;
proc print; id since_90; var resdaily p;
run;

proc reg data=combo; model comdaily = since_90 pdsi5_12;
output out=predicted p=p;
proc print; id since_90; var comdaily p;
run;


/* USE SINCE_90 AND PDSI5_12 TO PREDICT RESIDENTIAL.
   USE SINCE_90 AND PDSI5_12 TO PREDICT COMMERCIAL. */
```

Program to weather-normalize utilization for St. Louis County monthly-billed commercial customers

```
title "St. Louis County projections for monthly billed commercial customers";

options nodate nonumber ps=66 ls=80 formchar='|----|+|---';

PROC PRINTTO PRINT='H:\C\missouri-american\2006\st_louis\project2.lst' NEW;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m _ pdsi _ _ _ _
           _ prcp _ _ _ _
           _ temp _ _ _ _;
   output;
end;
drop m _ prcp temp;

data palmer; set palmer; if 1990<=year<=2005;

data palmer; set palmer; by year;
array p(*) pdsi1-pdsi12; retain pdsi1-pdsi12;
if first.year then i=0;
i+1;
p(i) = pdsi;
if last.year then output;
keep year pdsi1-pdsi12;
run;

data palmer; set palmer;
pdsi_ham = (1*pdsi5 + 2*pdsi6 + 3*pdsi7 + 4*pdsi8 + 4*pdsi9 + 4*pdsi10 + 2*pdsi11 +
1*pdsi12) / 20;
pdsi5_12 = mean(of pdsi5-pdsi12);
pdsi9_12 = mean(of pdsi9-pdsi12);

data water; infile 'h:\c\missouri-american\2006\st_louis\stl-monthly.dat' lrecl=300
truncover;
input year ?? @; list;
if 1990<=year<=2005 then do; input @1 year w1-w12; output; end;
else input;
run;

data resuse(keep=year total)
     comuse(keep=year total)
     rescust(keep=year average)
     comcust(keep=year average); set;
total = sum(of w1-w12);
if 62<=_n_<=64 then w12 = w11;  /*BECAUSE OF ALMOST NO BILLS IN THOSE DECEMBERS*/
average = mean(of w1-w12);


if 01<=_n_<=16 then output resuse;
if 17<=_n_<=32 then output comuse;
if 33<=_n_<=48 then output rescust;
if 49<=_n_<=64 then output comcust;
```

```
data use;  merge resuse(rename=(total=resuse)) comuse(rename=(total=comuse));
data cust; merge rescust(rename=(average=rescust)) comcust(rename=(average=comcust));

data combo; merge use cust;
resdaily = 1000/(365+(mod(year,4)=0)) * resuse/rescust;
comdaily = 1000/(365+(mod(year,4)=0)) * comuse/comcust;

data combo; merge combo palmer;
IF YEAR IN (1995 1996 1997 1998 1999 2000 2001 2002 2004 2005);
since_90 = year-1990;
run;


data year2007; infile 'h:\c\missouri-american\2006\avg-pdsi.out';
input since_90 _ pdsi5_12;  /*REGION 2*/
run;

data combo; set combo year2007;

PROC PRINT; ID YEAR SINCE_90; VAR COMUSE COMCUST COMDAILY PDSI5_12; RUN;

/*
proc reg data=combo; model resdaily = since_90 pdsi5_12;
output out=predicted p=p;
proc print; id since_90; var resdaily p;
run;
*/

proc reg data=combo; model comdaily = pdsi5_12;
output out=predicted p=p;
proc print; id since_90; var comdaily p;
run;


/* DO NOT PREDICT RESIDENTIAL BECAUSE OF SUDDEN REMOVAL OF MISTAKEN COMMERCIAL
ACCOUNTS.
   USE PDSI5_12 TO PREDICT COMMERCIAL. */
```

Program to weather-normalize utilization for St. Charles customers

```
title "St. Charles projections";

options nodate nonumber ps=66 ls=80 formchar='|----|+|---';

PROC PRINTTO PRINT='H:\C\missouri-american\2006\st_charles\project1.lst' NEW;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m _ pdsi _ _ _ _
           _ prcp _ _ _ _
           _ temp _ _ _ _;
   output;
end;
drop m _ prcp temp;

data palmer; set palmer; if 1989<=year<=2005;

data palmer; set palmer; by year;
array p(*) pdsi1-pdsi12; retain pdsi1-pdsi12;
if first.year then i=0;
i+1;
p(i) = pdsi;
if last.year then output;
keep year pdsi1-pdsi12;
run;

data palmer; set palmer;
pdsi_ham = (1*pdsi5 + 2*pdsi6 + 3*pdsi7 + 4*pdsi8 + 4*pdsi9 + 4*pdsi10 + 2*pdsi11 +
1*pdsi12) / 20;
pdsi5_12 = mean(of pdsi5-pdsi12);
pdsi9_12 = mean(of pdsi9-pdsi12);

data water; infile 'h:\c\missouri-american\2006\st_charles\st_charles.dat' lrecl=300
truncover;
input year ?? @; list;
if 1989<=year<=2005 then do; input @1 year w1-w12; output; end;
else input;
run;

data resuse(keep=year total)
     comuse(keep=year total)
     rescust(keep=year average)
     comcust(keep=year average); set;
total = sum(of w1-w12);
average = mean(of w1-w12);

if 01<=_n_<=17 then output resuse;
if 18<=_n_<=34 then output comuse;
if 35<=_n_<=51 then output rescust;
if 52<=_n_<=78 then output comcust;

data use;  merge resuse(rename=(total=resuse)) comuse(rename=(total=comuse));
data cust; merge rescust(rename=(average=rescust)) comcust(rename=(average=comcust));
```

```
data combo; merge use cust;
resdaily = 1000/(365+(mod(year,4)=0)) * resuse/rescust;
comdaily = 1000/(365+(mod(year,4)=0)) * comuse/comcust;

data combo; merge combo palmer;
IF YEAR IN (1995 1996 1997 1998 1999 2000 2001 2002 2004 2005);
since_90 = year-1990;
run;

data year2007; infile 'h:\c\missouri-american\2006\avg-pdsi.out';
input since_90 _ pdsi5_12;  /*REGION 2*/
run;

data combo; set combo year2007;

proc reg data=combo; model resdaily = pdsi5_12;
output out=predicted p=p;
proc print; id since_90; var resdaily p;
run;

proc reg data=combo; model comdaily = since_90;
output out=predicted p=p;
proc print; id since_90; var comdaily p;
run;


/* USE PDSI5_12 TO PREDICT RESIDENTIAL.  NO EVIDENCE OF A TIME TREND.
   USE SINCE_90 TO PREDICT COMMERCIAL.  NO EVIDENCE OF WEATHER DEPENDENCE. */
```

Program to weather-normalize utilization for St. Joseph customers

```
title "St. Joseph projections";

options nodate nonumber ps=66 ls=80 formchar='|----|+|---';

PROC PRINTTO PRINT='H:\C\missouri-american\2006\st_joseph\project1.lst' NEW;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m pdsi _ _ _ _ _
           prcp _ _ _ _ _
           temp _ _ _ _ _;
   output;
end;
drop m _ prcp temp;

data palmer; set palmer; if 1989<=year<=2005;

data palmer; set palmer; by year;
array p(*) pdsi1-pdsi12; retain pdsi1-pdsi12;
if first.year then i=0;
i+1;
p(i) = pdsi;
if last.year then output;
keep year pdsi1-pdsi12;
run;

data palmer; set palmer;
pdsi_ham = (1*pdsi5 + 2*pdsi6 + 3*pdsi7 + 4*pdsi8 + 4*pdsi9 + 4*pdsi10 + 2*pdsi11 +
1*pdsi12) / 20;
pdsi5_12 = mean(of pdsi5-pdsi12);
pdsi9_12 = mean(of pdsi9-pdsi12);

data water; infile 'h:\c\missouri-american\2006\st_joseph\st_joseph.dat' lrecl=300
truncover;
input year ?? @; list;
if 1989<=year<=2005 then do; input @1 year w1-w12; output; end;
else input;
run;

data resuse(keep=year total)
     comuse(keep=year total)
     rescust(keep=year average)
     comcust(keep=year average); set;
total = sum(of w1-w12);
average = mean(of w1-w12);

if 01<=_n_<=17 then output resuse;
if 18<=_n_<=34 then output comuse;
if 35<=_n_<=51 then output rescust;
if 52<=_n_<=78 then output comcust;

data use;  merge resuse(rename=(total=resuse)) comuse(rename=(total=comuse));
data cust; merge rescust(rename=(average=rescust)) comcust(rename=(average=comcust));
```

```
data combo; merge use cust;
resdaily = 1000/(365+(mod(year,4)=0)) * resuse/rescust;
comdaily = 1000/(365+(mod(year,4)=0)) * comuse/comcust;

data combo; merge combo palmer;
IF YEAR IN (1995 1996 1997 1998 1999 2000 2001 2002 2004 2005);
since_90 = year-1990;
run;

data year2007; infile 'h:\c\missouri-american\2006\avg-pdsi.out';
input since_90 pdsi5_12;  /*REGION 1*/
run;

data combo; set combo year2007;

proc reg data=combo; model resdaily = since_90 pdsi5_12;
output out=predicted p=p;
proc print; id since_90; var resdaily p;
run;

proc reg data=combo; model comdaily = ;
output out=predicted p=p;
proc print; id since_90; var comdaily p;
run;


/* USE PDSI5_12 AND SINCE_90 TO PREDICT RESIDENTIAL.
   NO EVIDENCE OF WEATHER DEPENDENCE OR A TIME TREND FOR COMMERCIAL. */
```

Program to weather-normalize utilization for Joplin customers

```
title "Joplin projections";

options nodate nonumber ps=66 ls=80 formchar='|----|+|---';

PROC PRINTTO PRINT='H:\C\missouri-american\2006\joplin\project1.lst' NEW;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m _ _ _ pdsi _ _
         _ _ _ prcp _ _
         _ _ _ temp _ _ ;
   output;
end;
drop m _ prcp temp;

data palmer; set palmer; if 1989<=year<=2005;

data palmer; set palmer; by year;
array p(*) pdsi1-pdsi12; retain pdsi1-pdsi12;
if first.year then i=0;
i+1;
p(i) = pdsi;
if last.year then output;
keep year pdsi1-pdsi12;
run;

data palmer; set palmer;
pdsi_ham = (1*pdsi5 + 2*pdsi6 + 3*pdsi7 + 4*pdsi8 + 4*pdsi9 + 4*pdsi10 + 2*pdsi11 +
1*pdsi12) / 20;
pdsi5_12 = mean(of pdsi5-pdsi12);
pdsi9_12 = mean(of pdsi9-pdsi12);

data water; infile 'h:\c\missouri-american\2006\joplin\joplin.dat' lrecl=300
truncover;
input year ?? @; list;
if 1989<=year<=2005 then do; input @1 year w1-w12; output; end;
else input;
run;

data resuse(keep=year total)
     comuse(keep=year total)
     rescust(keep=year average)
     comcust(keep=year average); set;
total = sum(of w1-w12);
average = mean(of w1-w12);

if 01<=_n_<=17 then output resuse;
if 18<=_n_<=34 then output comuse;
if 35<=_n_<=51 then output rescust;
if 52<=_n_<=78 then output comcust;

data use;  merge resuse(rename=(total=resuse)) comuse(rename=(total=comuse));
data cust; merge rescust(rename=(average=rescust)) comcust(rename=(average=comcust));
```

```
data combo; merge use cust;
resdaily = 1000/(365+(mod(year,4)=0)) * resuse/rescust;
comdaily = 1000/(365+(mod(year,4)=0)) * comuse/comcust;

data combo; merge combo palmer;
IF YEAR IN (1995 1996 1997 1998 1999 2000 2001 2002 2004 2005);
since_90 = year-1990;
run;

data year2007; infile 'h:\c\missouri-american\2006\avg-pdsi.out';
input since_90 _ _ _ pdsi5_12;  /*REGION 4*/
run;

data combo; set combo year2007;

proc reg data=combo; model resdaily = since_90;
output out=predicted p=p;
proc print; id since_90; var resdaily p;
run;

proc reg data=combo; model comdaily = since_90;
output out=predicted p=p;
proc print; id since_90; var comdaily p;
run;


/* USE SINCE_90 TO PREDICT RESIDENTIAL AND COMMERCIAL
   NO EVIDENCE OF WEATHER DEPENDENCE FOR EITHER. */
```

Palmer Drought Severity Index data for the six climate regions of Missouri (plus precipitation and temperature data, not used in this study)

1976													6	6	6	6	6	6
01	-1.73	-1.34	-0.30	-0.45	-0.57	-0.22	0.58	0.72	0.78	0.53	0.98	2.56	25.60	26.40	29.40	31.60	30.20	34.00
02	-1.71	-1.33	-0.60	-1.11	-1.13	-0.24	1.29	1.71	1.41	0.91	1.42	3.89	39.90	41.60	44.50	46.40	44.80	46.50
03	-1.17	-0.70	-0.19	-1.12	-1.42	-0.37	3.47	4.56	4.28	3.43	3.18	4.98	43.90	46.80	48.60	49.80	50.70	53.90
04	-0.66	-1.05	-0.15	0.34	-1.82	-1.13	4.62	2.67	3.97	5.28	2.47	1.72	56.00	56.20	56.50	57.20	56.60	59.40
05	-0.57	-0.98	-0.17	0.21	-1.85	0.08	4.05	3.64	4.04	3.86	3.32	4.58	59.70	59.80	59.70	59.50	59.70	62.70
06	-0.92	-1.52	-0.61	0.14	-1.60	1.31	3.08	1.91	2.46	4.03	3.81	7.59	70.70	71.20	70.30	69.70	69.80	73.30
07	-1.61	-2.13	-1.22	0.94	-0.97	1.94	1.23	1.54	1.08	5.56	4.33	5.30	77.70	78.30	77.60	75.90	75.80	78.80
08	-2.37	-2.53	-1.96	1.00	-1.13	-0.08	1.62	2.05	1.17	2.89	1.98	1.69	75.00	73.70	75.80	73.80	72.30	75.00
09	-2.82	-2.95	-2.71	-0.43	-1.61	-0.53	2.19	1.78	1.05	1.73	1.17	1.31	66.80	66.70	68.40	68.10	66.50	69.10
10	-2.26	-2.00	-2.05	-0.39	-1.27	-0.23	3.74	4.70	4.94	3.00	3.33	3.30	49.00	49.60	51.00	51.70	50.70	53.80
11	-2.76	-2.35	-2.38	-0.95	-1.88	-0.80	0.30	0.70	0.83	0.59	0.57	1.00	34.00	35.40	36.50	38.20	37.00	40.00
12	-3.41	-2.88	-2.96	-1.40	-2.46	-1.55	0.18	0.58	0.30	0.95	0.94	1.05	25.90	27.10	30.60	33.50	31.60	34.60
1977													7	7	7	7	7	7
01	-3.48	-2.87	-3.02	-1.46	-2.61	-1.89	1.06	1.43	1.26	1.34	1.64	1.95	12.40	13.00	16.20	19.00	17.30	20.80
02	-3.89	-2.87	-3.11	-1.49	-2.43	-2.30	0.40	1.22	1.19	1.73	2.33	1.58	31.90	32.30	35.50	37.70	35.40	38.40
03	-3.65	-1.97	-2.97	-1.14	-0.97	1.16	3.40	4.91	2.87	4.42	8.43	10.11	46.30	47.60	48.40	49.70	49.90	53.10
04	-3.94	-2.72	-3.43	-1.68	-1.62	0.68	2.13	1.55	1.92	2.61	2.21	3.73	57.80	59.20	59.70	60.30	59.80	62.50
05	-3.70	-2.99	0.09	-2.03	-2.33	0.07	4.97	3.53	6.16	3.61	2.45	3.33	68.10	68.80	68.70	68.80	68.40	72.60
06	-3.52	-2.92	0.93	0.78	0.45	0.15	4.27	3.64	8.58	8.04	5.85	4.40	74.00	73.40	73.80	75.10	74.00	77.30
07	-3.30	-3.14	0.45	0.45	-0.48	0.01	3.26	2.57	1.86	2.41	2.12	3.39	79.00	79.70	79.10	79.20	78.70	81.20
08	1.33	0.55	0.24	0.81	0.64	0.75	7.90	5.38	3.23	4.81	5.72	5.63	73.70	74.40	76.60	77.30	76.20	78.30
09	2.42	1.05	0.58	1.93	1.14	1.93	7.76	5.65	5.93	8.89	5.58	8.29	68.20	69.00	70.10	70.70	70.10	73.00
10	3.59	1.81	0.96	1.58	1.01	-0.20	6.41	5.14	4.73	2.17	2.63	1.53	53.80	54.40	56.10	57.40	55.40	57.10
11	3.69	2.14	0.94	1.39	1.15	-0.16	2.27	3.16	2.26	2.73	4.13	3.41	41.50	43.60	45.60	47.40	46.50	50.10
12	3.16	2.03	0.63	1.34	1.45	-0.10	0.73	1.89	1.09	2.46	4.09	3.76	27.30	28.40	32.30	34.70	33.30	35.60
1978													8	8	8	8	8	8
01	2.56	1.61	0.34	1.00	-0.26	-0.11	0.44	0.84	0.78	1.21	1.53	3.32	15.70	18.30	19.30	21.80	22.50	24.70
02	2.50	1.38	0.13	0.61	-0.67	-0.75	1.35	1.34	1.17	1.27	1.29	1.24	17.50	18.90	21.80	25.00	24.40	25.80
03	2.23	1.78	0.63	1.30	-0.03	-0.47	1.88	3.82	3.92	5.40	5.45	5.37	35.10	36.00	38.60	41.40	40.10	42.80
04	3.07	1.88	0.70	1.03	-0.65	-0.91	6.14	4.47	4.33	3.98	2.36	3.08	53.70	54.80	56.70	58.40	57.70	61.20
05	3.12	2.18	0.88	1.28	-0.88	-0.89	5.22	5.55	5.73	6.17	3.56	4.23	61.60	61.80	62.30	63.70	63.40	66.20
06	2.43	1.71	-0.52	0.89	-1.24	-1.04	3.58	3.39	2.56	3.69	2.32	2.81	73.20	72.80	73.20	72.80	72.00	75.90
07	2.46	2.15	-0.29	1.13	0.67	0.62	4.58	5.46	4.43	4.66	5.53	5.54	77.60	77.20	80.10	80.70	77.90	80.30
08	2.56	1.76	-0.20	1.19	1.03	1.67	4.80	2.38	3.94	3.88	4.49	6.08	74.50	74.10	76.30	76.60	75.30	77.00
09	2.43	1.28	-0.88	-0.29	-0.69	0.81	4.78	2.87	2.04	3.37	1.20	0.59	71.20	71.20	73.20	73.20	70.80	72.70
10	1.73	0.92	-1.30	-0.88	-0.89	0.65	1.19	2.17	1.99	1.55	2.17	2.43	53.20	53.90	55.70	56.60	54.10	55.90
11	2.27	1.19	0.65	0.55	0.47	1.48	3.96	4.14	5.66	5.95	5.93	8.02	41.70	44.70	45.80	47.80	47.60	50.80
12	1.97	1.23	0.55	0.53	0.71	2.65	0.92	2.21	1.62	2.35	3.70	8.56	28.40	31.40	33.70	35.50	34.90	37.80
1979													9	9	9	9	9	9
01	2.33	1.65	1.22	0.75	0.89	2.51	2.24	2.71	3.14	2.53	3.19	3.96	10.90	13.60	16.00	18.80	19.40	23.50
02	2.00	1.29	-0.20	0.64	1.08	2.96	0.80	1.06	1.13	1.93	3.22	5.74	17.80	20.00	23.30	27.70	27.10	29.60
03	2.28	1.26	-0.36	0.50	1.61	3.06	3.47	3.17	2.50	3.25	6.12	6.53	40.20	42.00	44.40	46.20	45.50	47.40
04	-0.01	1.77	-0.21	0.84	2.42	4.24	2.86	5.00	3.85	5.18	7.18	9.69	50.00	50.90	53.30	54.90	54.10	56.60
05	-0.65	-0.66	-0.32	1.22	2.55	4.42	2.76	2.13	4.24	6.56	5.89	6.82	62.90	62.80	63.30	63.30	62.70	64.90
06	-0.60	-1.03	0.20	1.39	1.79	-0.53	4.78	2.80	5.51	5.46	2.07	1.77	71.90	72.40	71.80	71.00	71.30	75.40
07	0.54	-0.96	0.49	2.26	2.85	0.42	5.02	3.66	3.87	6.12	6.97	4.90	75.20	75.70	75.90	75.60	75.60	78.70
08	0.57	-0.99	0.50	2.56	2.95	0.40	3.68	3.18	3.18	4.12	4.00	2.99	74.30	74.70	75.10	74.50	74.20	76.50
09	-0.65	-1.86	0.07	2.07	-0.43	0.54	1.45	0.47	2.26	1.92	1.27	3.86	66.80	66.40	67.30	66.90	65.70	68.40
10	-0.46	-1.96	0.06	1.90	-0.64	-0.39	3.51	2.49	3.69	3.56	2.25	1.71	56.50	56.00	58.10	59.10	57.30	59.50
11	-0.16	-2.16	0.37	2.13	-0.42	-0.09	2.49	2.21	3.46	4.21	4.09	5.51	39.80	41.00	42.20	42.70	42.70	46.40
12	-0.55	-2.49	-0.29	-0.37	-0.48	-0.11	0.35	1.54	1.00	1.24	2.52	3.64	33.90	35.10	36.30	38.80	37.10	38.60
1980													0	0	0	0	0	0
01	0.21	-2.73	-0.43	-0.65	-0.82	-0.52	1.52	0.96	0.90	0.95	1.09	1.81	27.80	28.20	31.30	34.20	32.60	36.70
02	0.17	-2.97	0.01	-0.58	-1.01	-0.89	0.94	1.00	1.59	2.02	1.73	2.01	24.50	25.00	28.10	31.30	29.50	32.10
03	0.58	-2.33	0.48	-0.18	-0.73	-0.69	3.11	3.66	3.90	4.20	4.18	4.96	37.10	37.70	40.20	42.20	40.60	42.70
04	-0.81	-2.58	-0.56	-0.60	-1.17	-0.96	1.04	1.99	1.80	2.51	2.23	2.99	52.60	52.30	53.70	54.40	53.70	56.40
05	-1.79	-2.85	-1.38	-1.01	-1.58	-1.29	1.97	2.69	1.66	3.10	2.77	2.87	63.90	64.00	64.10	64.10	63.80	66.80
06	-2.35	-3.03	-1.99	-1.47	-2.11	-1.47	2.82	2.73	2.08	2.99	1.67	2.70	74.20	73.20	75.30	75.20	73.40	76.20
07	-3.06	-3.13	-3.06	-2.44	-2.73	-2.19	2.25	3.43	0.89	0.83	2.24	1.81	83.50	83.00	85.80	84.30	83.10	85.20
08	-2.74	-3.14	-2.94	-3.07	-3.08	-2.91	5.39	3.73	5.01	2.42	3.21	1.81	79.30	80.50	81.60	82.30	80.80	82.90
09	-2.80	-2.96	-3.55	-3.82	-3.16	-2.97	3.66	3.74	1.86	1.63	3.23	3.14	68.50	69.30	71.80	73.40	71.50	73.60
10	-2.50	-2.72	-3.14	-3.47	-2.82	-2.51	3.28	2.86	4.31	4.31	3.66	3.82	52.90	53.10	54.80	56.30	54.00	56.70
11	-3.09	-3.22	-3.50	-3.85	-3.24	-2.63	0.70	1.04	1.24	1.32	1.97	3.11	42.70	43.40	44.50	45.60	43.80	47.00
12	-2.42	-3.37	-3.77	-4.17	-3.87	-3.16	3.30	1.85	1.37	1.39	0.82	1.44	31.50	33.00	35.70	37.40	35.40	37.90
1981													1	1	1	1	1	1
01	-2.78	-3.84	-4.15	-4.46	-4.31	-3.58	0.12	0.27	0.47	0.59	0.75	1.08	29.00	28.50	31.20	33.10	31.00	33.80
02	-2.77	-3.88	-4.15	-4.39	-4.47	-3.39	0.91	1.59	1.70	1.93	2.35	3.42	31.90	33.20	35.30	38.10	37.00	40.50
03	-3.02	-4.20	-4.38	-4.49	-4.46	-3.54	1.48	1.71	1.57	2.02	2.60	2.96	43.80	43.60	45.40	46.60	44.60	47.70
04	-3.26	0.01	-4.52	-4.61	-4.67	-3.73	2.73	4.47	2.77	3.13	2.82	3.32	60.60	60.90	62.10	62.60	62.20	64.50
05	1.11	1.56	1.29	0.36	1.25	0.67	6.98	8.47	8.64	5.77	8.65	6.80	59.90	59.10	60.00	60.60	59.60	63.20
06	1.56	2.46	2.85	1.17	1.65	0.95	6.99	7.66	12.18	7.97	5.92	4.98	73.50	73.50	73.60	74.00	73.60	76.90
07	3.20	4.75	3.36	1.32	2.77	2.09	9.12	11.24	5.79	4.04	6.86	6.86	77.20	76.70	78.60	78.80	77.70	80.20
08	2.88	4.41	3.17	1.70	2.82	1.89	3.02	2.79	3.17	4.41	3.52	2.01	72.80	73.00	74.10	74.00	73.60	76.30
09	2.33	3.77	2.41	0.98	2.22	-0.45	2.58	2.24	1.80	1.28	1.47	1.28	66.80	66.20	67.90	68.20	66.00	68.00
10	2.40	3.69	2.86	1.80	2.60	-0.16	3.56	3.42	5.62	6.78	4.58	3.55	54.10	54.10	55.60	55.90	54.60	57.20
11	2.64	3.96	2.87	1.54	2.43	-0.62	2.71	4.04	3.10	2.59	2.94	2.21	44.40	45.90	47.10	47.90	47.50	51.00
12	2.50	3.61	2.37	1.16	1.93	-0.92	1.37	1.76	1.08	1.49	1.89	2.73	27.30	26.10	31.20	33.20	32.60	36.30
1982													2	2	2	2	2	2
01	2.91	4.10	2.80	2.11	3.23	1.22	2.47	3.47	3.02	4.74	7.22	8.31	16.80	19.00	23.50	26.50	25.30	28.40
02	2.59	3.57	2.14	-0.54	2.71	-0.52	0.92	1.25	0.74	0.62	1.96	1.71	26.20	27.70	30.60	33.20	31.10	34.00
03	2.71	3.32	2.05	-1.01	1.87	-1.29	3.20	3.16	3.43	2.10	2.41	2.03	40.00	41.80	45.80	48.60	47.90	51.30
04	1.96	2.76	1.53	-1.10	1.56	-1.13	1.55	2.46	2.32	3.01	3.16	4.11	49.20	49.50	51.20	52.00	50.70	54.50
05	3.41	2.63	1.92	0.06	1.19	-1.49	9.11	5.27	7.02	5.55	4.58	3.38	64.70	67.20	66.50	66.90	67.90	71.60
06	3.48	3.03	1.84	0.33	1.41	-1.14	5.64	5.67	4.67	5.02	4.60	4.20	67.30	67.70	68.20	68.20	68.50	73.10
07	3.17	3.53	1.63	-0.43	0.89	-1.38	3.56	5.90	3.02	1.73	2.00	2.35	77.30	77.20	78.40	78.30	77.40	80.70
08	4.96	4.67	2.96	1.18	2.80	-0.82	9.83	6.63	8.47	7.36	9.14	4.50	72.70	72.60	74.60	76.40	73.60	76.30
09	4.29	4.64	2.72	-0.48	2.71	-1.06	2.42	3.83	3.13	1.25	2.89	2.19	65.40	65.40	66.90	67.00	65.80	69.00
10	4.01	4.32	2.38	-0.61	2.72	-1.45	2.91	2.71	2.51	2.84	3.09	1.57	55.00	55.60	56.10	56.50	55.80	59.10
11	4.01	4.41	2.41	0.53	2.93	0.37	2.13	3.22	2.86	5.17	4.15	6.39	41.30	44.10	45.00	45.20	45.60	48.30

12	5.38	6.12	4.20	2.40	5.57	1.87	5.14	7.35	7.02	8.29	12.82	9.79	34.40	38.10	38.60	40.60	41.40	44.50
1983													3	3	3	3	3	3
01	4.71	5.12	3.44	1.78	4.46	-0.65	0.77	0.46	0.52	0.76	0.63	0.85	29.50	30.40	32.00	33.70	32.80	34.20
02	3.99	4.20	2.60	1.07	3.25	-1.32	0.60	0.77	0.67	0.86	0.65	1.25	34.50	36.20	37.60	38.90	38.40	41.00
03	3.86	3.69	2.40	0.71	2.54	-1.74	3.09	2.75	3.10	2.61	2.72	2.73	42.00	42.30	43.80	45.10	44.90	47.50
04	4.55	4.60	3.90	2.34	4.02	1.20	5.31	6.45	8.33	8.66	9.14	8.03	45.80	47.40	47.80	49.60	49.20	51.50
05	4.48	4.70	3.77	-0.05	3.86	2.01	5.04	5.54	5.25	4.28	5.32	8.03	59.60	59.90	60.90	61.20	61.90	64.10
06	-0.08	3.91	-0.29	-0.23	-0.33	-0.05	4.38	3.14	3.35	3.61	2.64	3.33	71.50	72.30	71.60	70.40	71.20	74.50
07	-0.81	2.82	-0.96	-0.20	-0.88	-1.02	1.36	1.89	1.18	3.14	1.88	0.54	79.70	80.40	80.00	78.00	79.00	82.50
08	-1.98	1.50	-1.99	-0.92	-1.92	-2.06	1.55	1.91	1.32	1.61	1.37	1.22	81.90	81.70	82.70	81.50	81.10	82.80
09	-2.47	0.74	-2.46	-1.43	-2.25	-2.84	2.47	2.34	2.48	2.39	2.44	0.65	68.30	68.70	69.80	69.30	68.90	72.00
10	0.23	1.08	0.41	0.85	0.64	0.35	4.32	4.91	5.92	7.43	6.10	4.94	56.00	57.70	59.10	58.80	57.90	60.40
11	1.18	2.27	1.73	1.65	1.91	1.32	5.41	7.07	7.41	6.19	8.45	6.54	44.20	45.90	47.00	47.20	47.00	49.30
12	1.41	2.56	1.86	1.54	2.01	1.63	1.93	2.94	2.41	2.33	3.69	5.18	13.20	16.70	17.50	20.40	21.70	27.30
1984													4	4	4	4	4	4
01	0.88	1.96	1.29	1.08	1.36	-0.45	0.18	0.54	0.39	0.92	0.92	1.60	24.50	26.10	27.70	28.60	28.20	28.30
02	0.77	2.09	1.51	1.25	1.30	-0.47	1.20	2.46	2.73	3.17	3.04	3.59	38.40	38.60	40.90	41.50	40.60	42.70
03	1.52	2.75	2.63	2.08	1.72	0.06	3.97	4.58	5.89	6.01	5.38	4.83	34.40	34.50	38.20	41.30	40.20	43.40
04	2.41	3.40	3.21	2.26	1.81	0.19	5.62	5.81	6.02	4.95	4.76	4.66	49.80	50.90	52.20	52.90	53.20	55.90
05	2.06	3.21	2.36	-0.25	-0.11	0.68	3.65	4.33	2.69	3.57	3.90	6.30	59.30	60.30	61.60	61.60	61.20	64.20
06	2.43	2.63	1.84	-0.83	-0.71	-0.63	7.07	3.67	3.85	2.59	2.12	1.82	73.50	75.10	74.60	74.20	74.80	78.50
07	-0.07	1.98	1.62	-0.98	-0.88	-0.60	2.99	2.17	3.01	2.56	2.60	3.56	75.20	74.80	75.60	75.60	74.80	77.70
08	-1.23	0.65	0.80	-1.41	-1.14	-0.97	0.39	0.63	1.60	1.92	2.68	2.01	77.10	77.40	77.90	76.60	75.10	77.30
09	-1.42	1.37	0.78	0.06	1.11	0.36	3.09	6.37	4.55	4.67	7.27	4.77	64.80	65.70	66.40	66.90	66.10	68.30
10	0.92	2.19	1.70	1.13	2.72	2.35	6.12	5.80	7.07	7.69	8.38	9.96	55.70	57.80	57.60	58.20	58.80	62.20
11	1.06	2.81	1.94	1.53	3.63	2.91	2.30	4.06	3.25	4.44	6.43	5.75	42.10	43.00	44.50	44.60	43.70	46.30
12	1.75	3.34	2.58	2.56	3.94	3.84	2.92	3.90	4.03	6.12	5.36	8.55	33.70	37.70	39.40	42.10	41.80	44.40
1985													5	5	5	5	5	5
01	1.66	3.20	2.68	2.56	3.65	3.15	1.22	1.85	2.24	2.51	2.75	2.25	18.10	19.80	22.00	24.00	22.80	25.80
02	2.35	4.09	4.10	3.42	4.09	2.83	2.57	4.12	5.39	4.97	4.65	3.42	24.10	26.80	28.10	30.20	29.80	33.50
03	2.06	3.97	4.15	3.92	4.38	2.68	2.62	4.10	4.58	5.44	6.68	5.95	46.10	47.00	48.40	49.70	48.90	52.10
04	1.03	3.02	3.24	3.44	3.82	2.74	1.53	2.56	2.62	4.14	4.18	6.12	56.70	58.20	58.50	58.30	58.40	61.40
05	0.82	2.45	3.30	3.14	3.49	2.34	4.66	3.69	6.32	5.19	5.03	4.32	64.80	64.90	65.20	64.80	64.70	68.20
06	0.75	3.40	3.94	3.62	4.69	2.27	4.33	7.57	8.56	7.26	9.02	4.15	68.60	69.40	69.50	70.20	70.10	75.20
07	0.86	3.23	3.14	2.70	3.76	1.87	3.91	3.80	1.72	1.29	1.69	2.53	76.20	76.00	77.70	77.40	76.40	79.90
08	1.54	3.87	3.99	3.62	4.34	2.37	5.46	5.37	7.49	7.33	6.15	5.11	70.80	71.80	73.70	75.00	73.90	76.60
09	2.21	3.25	3.43	3.09	3.42	1.75	6.20	2.10	2.81	2.60	1.36	1.89	66.00	67.60	69.00	68.20	67.40	70.20
10	3.14	3.01	3.26	2.99	3.14	1.99	5.72	3.09	3.92	4.34	3.57	4.72	55.10	57.20	58.00	58.70	58.90	61.20
11	4.08	5.35	4.95	4.64	4.48	2.18	4.06	9.59	8.23	9.79	9.39	5.53	36.30	41.00	42.50	45.80	47.00	50.80
12	3.85	5.46	5.20	4.48	-0.11	-0.49	1.51	3.29	3.55	3.13	2.33	1.71	20.50	23.40	25.40	28.20	27.70	31.80
1986													6	6	6	6	6	6
01	2.99	4.35	4.11	-0.68	-0.82	-1.15	0.01	0.04	0.06	0.03	0.11	0.61	32.40	32.40	35.30	37.00	35.10	35.80
02	2.90	4.82	4.65	-0.50	-0.57	-0.97	1.37	3.46	3.83	2.58	3.15	3.92	28.90	31.20	35.40	39.10	39.20	41.30
03	1.99	3.40	3.43	-1.10	-1.20	-1.40	1.31	1.13	1.41	1.84	2.05	3.00	46.90	47.50	48.80	50.10	48.40	49.30
04	1.53	2.09	2.19	-0.76	-1.30	-1.34	3.00	1.44	3.34	5.10	3.82	4.53	56.80	58.60	59.10	58.30	58.90	61.10
05	1.61	1.83	2.59	-1.05	0.42	0.76	5.39	4.61	5.43	3.66	6.51	8.05	64.80	65.60	66.20	65.40	65.80	68.90
06	0.89	1.16	1.62	-1.16	0.14	0.83	3.20	3.06	2.25	4.19	3.43	4.46	75.50	75.90	76.50	75.00	75.00	78.20
07	1.71	0.99	1.44	-1.69	0.02	-0.07	6.90	4.09	4.20	1.55	3.49	3.34	78.50	80.00	81.50	81.10	80.30	83.60
08	1.52	0.58	1.42	0.02	0.08	-0.07	3.02	2.32	4.10	3.67	3.42	2.98	70.30	71.30	73.20	73.30	72.00	75.50
09	2.97	2.12	3.10	1.38	0.19	-0.67	9.72	9.23	11.86	10.28	4.35	1.82	70.00	70.40	71.20	71.10	71.20	74.50
10	3.52	3.20	5.18	2.04	0.87	-0.51	4.84	6.08	10.69	5.49	5.51	3.74	55.20	56.20	57.20	56.80	56.90	60.40
11	3.29	3.03	4.92	1.87	-0.07	-0.77	1.15	1.79	2.54	2.52	2.42	3.04	36.60	38.50	40.10	41.30	42.10	45.60
12	3.47	2.85	4.50	1.36	-0.35	-1.05	2.24	1.98	1.91	1.28	1.81	2.89	32.70	33.90	35.20	35.90	35.10	38.10
1987													7	7	7	7	7	7
01	3.01	2.78	4.17	1.34	-0.58	-1.50	0.80	1.92	1.67	2.12	1.52	1.24	28.20	28.30	30.00	32.20	32.00	35.40
02	2.63	-0.50	0.00	1.82	-0.43	-1.16	1.08	0.64	1.86	3.96	2.95	4.34	38.20	38.00	39.70	40.60	39.40	42.20
03	2.64	-0.69	0.03	-0.02	-0.83	-1.62	3.40	2.69	3.31	3.58	2.82	2.99	45.40	46.20	47.40	47.90	48.20	50.90
04	1.96	-1.18	-0.57	-0.73	-1.35	-2.01	2.40	2.11	2.04	1.82	2.14	2.37	55.10	55.10	55.80	55.70	55.50	57.80
05	1.26	-1.83	-1.20	-1.02	-2.02	-2.55	3.99	2.70	3.39	4.52	2.69	2.65	68.40	69.10	69.80	69.80	69.60	73.60
06	0.64	-2.27	-1.46	-1.20	-1.98	-2.49	3.41	2.71	3.56	3.76	3.78	3.77	74.70	75.80	75.30	73.70	74.80	78.50
07	0.91	0.33	0.37	0.26	0.58	-1.75	5.01	5.39	4.90	4.08	5.35	5.41	77.70	78.90	78.50	77.30	77.20	79.30
08	1.78	0.63	0.77	0.51	-0.18	-2.16	6.74	4.72	5.29	4.32	3.14	1.76	74.50	76.50	77.40	78.10	77.70	80.30
09	1.42	-0.42	0.46	0.29	-0.57	-2.37	2.74	2.20	2.94	3.07	2.13	2.33	65.60	67.10	67.00	66.90	67.40	71.70
10	1.02	-0.76	0.08	0.36	-0.63	-2.42	1.48	1.55	2.01	3.49	2.54	1.87	49.80	50.60	51.60	52.00	51.40	53.80
11	1.38	0.20	0.44	1.19	0.04	-2.03	3.24	4.10	4.21	6.31	4.38	5.80	45.00	46.40	46.50	46.60	47.60	51.50
12	1.81	1.52	1.48	2.79	1.64	-0.71	2.40	5.64	4.47	7.45	8.39	8.26	33.20	34.60	35.70	36.70	36.70	40.40
1988													8	8	8	8	8	8
01	-0.07	1.45	1.11	2.18	1.33	-0.90	0.87	1.57	0.80	0.89	1.92	2.32	24.80	26.10	27.90	29.10	28.80	32.10
02	-0.08	1.74	1.14	2.02	1.23	-0.83	0.94	2.42	1.91	2.19	2.54	3.43	25.30	27.40	30.00	33.00	32.20	36.60
03	-0.52	1.92	1.44	2.58	1.57	-0.69	1.25	3.87	4.03	5.72	5.46	5.22	42.00	42.70	43.90	44.80	44.60	47.90
04	-1.03	-0.79	1.60	-0.12	-0.73	-1.23	1.63	1.36	4.60	3.54	1.75	2.21	52.20	54.10	54.50	54.60	55.60	58.10
05	-2.09	-1.63	-0.95	-0.79	-1.12	-1.66	1.97	1.86	1.91	2.42	3.31	2.50	66.60	65.90	66.00	64.90	64.80	68.10
06	-3.08	-2.46	-1.81	-1.46	-1.86	-2.44	1.30	1.54	1.31	2.29	1.08	0.82	75.50	75.00	75.80	74.20	73.30	77.20
07	-3.51	-2.88	-1.39	0.48	0.45	1.05	2.28	2.49	4.93	5.23	5.19	7.57	77.10	78.30	77.00	76.00	76.40	78.50
08	-3.55	-2.93	-1.30	0.75	-0.49	0.51	3.93	3.82	4.24	4.67	2.60	2.20	77.70	79.30	78.40	77.40	78.30	80.20
09	-3.38	-3.42	-1.27	1.15	0.46	1.47	4.05	1.76	4.19	5.83	5.34	7.35	67.10	68.80	68.60	67.60	68.10	70.00
10	-3.81	-3.57	-1.72	0.89	0.50	1.91	0.55	1.51	1.41	2.14	2.90	3.81	49.40	50.50	51.80	51.80	51.70	53.30
11	-3.79	-2.95	-1.39	1.71	1.26	3.20	2.56	4.78	4.07	6.23	6.33	8.62	42.40	44.10	46.00	46.20	46.00	48.20
12	-4.10	-2.71	-1.04	1.80	1.09	2.48	0.95	2.46	2.78	3.09	2.70	2.27	32.20	33.70	36.00	36.60	36.50	38.90
1989													9	9	9	9	9	9
01	-4.06	-2.51	-1.01	1.70	0.96	2.48	1.28	1.63	1.39	2.19	2.56	4.78	35.30	37.80	38.90	38.30	39.20	42.00
02	-4.17	-2.34	-0.90	1.99	1.99	4.41	0.83	1.27	1.58	3.24	5.51	10.62	20.30	23.30	25.00	27.00	29.40	33.40
03	-4.41	-2.22	-0.96	1.98	1.91	4.25	1.54	2.64	2.60	3.95	4.42	6.07	41.70	42.20	44.70	44.70	45.40	47.00
04	-4.82	-2.51	-1.78	-1.20	1.04	3.50	1.45	2.17	1.02	0.44	1.98	3.36	54.10	54.50	56.30	56.70	56.10	58.50
05	-4.44	-2.19	-1.82	-1.34	0.64	2.73	4.29	4.09	4.39	4.81	3.46	2.68	60.80	60.70	62.70	62.80	62.20	65.10
06	-4.21	-2.32	-1.76	0.06	1.10	3.48	3.71	2.72	3.94	4.45	5.50	7.05	69.60	70.60	70.70	69.80	70.40	74.20
07	0.00	-2.06	0.53	0.87	1.31	-0.07	3.56	3.64	4.71	5.39	3.82	2.45	76.30	76.70	76.70	74.50	75.30	78.30
08	1.06	-1.36	1.37	1.15	1.60	-0.20	6.98	4.67	6.12	3.58	4.15	2.40	73.40	74.20	75.00	74.20	74.80	77.70
09	1.44	-1.35	-0.14	1.27	-0.10	-0.40	4.59	2.54	2.24	3.55	2.29	2.37	61.60	63.50	63.80	63.40	64.40	68.40
10	1.59	-1.79	-0.54	-0.53	-0.54	-0.61	3.21	1.44	1.95	1.23	1.53	2.28	55.40	57.60	58.80	58.80	58.10	59.20
11	1.04	-2.49	-1.26	-1.20	-1.28	-1.37	0.03	0.52	0.18	0.58	1.05	1.45	40.60	43.50	45.70	46.40	46.00	48.80
12	0.67	-3.04	-1.76	-1.75	-1.95	-2.10	0.58	0.91	0.66	0.66	1.00	1.39	19.10	20.70	22.90	25.10	24.50	28.00
1990													0	0	0	0	0	0
01	0.83	-3.23	-1.69	0.81	0.11	0.02	1.65	1.53	1.91	4.65	3.78	5.17	36.20	38.90	40.10	40.90	40.70	42.90
02	1.37	0.64	0.81	1.90	1.23	1.52	2.22	3.99	3.72	5.50	5.93	8.91	35.20	38.30	40.40	42.20	41.90	45.70

03	1.91	1.00	1.73	2.84	1.16	1.23	4.32	4.36	5.84	7.14	4.48	4.80	44.50	46.30	46.90	47.90	48.40	51.50
04	1.76	0.70	1.63	2.52	1.19	1.42	3.17	2.88	3.85	3.87	4.46	5.43	51.50	52.90	54.40	55.00	54.30	56.80
05	2.86	2.37	3.15	4.36	2.57	1.69	7.28	9.18	10.03	12.54	9.80	5.89	58.90	60.10	60.70	61.50	61.70	63.90
06	2.98	2.40	3.22	3.77	1.85	-0.57	6.40	5.19	6.70	4.35	2.49	1.90	73.30	73.70	74.50	74.40	73.60	77.50
07	3.05	2.47	3.45	3.21	1.69	-0.89	4.51	4.28	4.83	2.47	3.55	2.68	76.10	76.70	77.20	76.70	76.60	79.80
08	2.89	2.23	-0.01	2.63	1.39	-1.11	3.81	2.86	2.85	2.61	3.08	2.46	74.80	75.00	75.70	76.10	74.30	76.70
09	-0.80	1.31	-0.79	2.36	1.00	-1.16	1.22	1.44	1.14	4.84	3.10	3.50	70.10	70.60	71.90	72.10	70.90	73.10
10	-0.89	1.30	-0.81	2.37	1.34	1.01	2.42	3.31	3.29	4.44	4.61	6.42	54.10	54.70	55.40	55.10	54.10	56.60
11	-0.68	1.09	-1.10	1.89	1.22	0.75	3.08	3.02	2.30	2.78	3.88	3.21	48.20	49.90	52.00	52.00	50.50	53.30
12	-0.62	1.99	-0.89	2.98	2.62	2.52	1.50	4.61	2.52	6.10	7.82	10.58	28.40	31.70	33.10	34.90	35.30	39.80
1991													1	1	1	1	1	1
01	-0.38	-0.01	-0.60	3.02	0.00	2.41	1.40	1.35	1.84	2.75	2.38	4.04	21.80	24.90	26.70	29.80	29.40	33.20
02	-0.86	-0.59	-1.27	-0.66	-0.62	-0.23	0.21	0.44	0.26	0.73	1.13	3.02	37.40	37.90	40.70	42.30	40.50	42.50
03	0.15	-0.80	-1.90	-1.25	-0.89	-0.76	3.15	2.75	1.42	1.77	3.24	3.09	46.30	47.50	49.00	49.60	48.90	51.10
04	0.81	-0.78	-1.55	-0.63	-0.10	0.67	5.40	3.82	4.53	5.91	6.85	7.37	56.30	57.50	57.90	58.30	58.70	61.60
05	0.79	-0.40	-1.45	-0.99	-0.34	0.88	5.38	6.04	5.41	4.10	4.72	6.47	67.70	69.20	69.00	69.40	69.90	71.50
06	-0.61	-1.32	-2.06	-1.76	-0.89	-0.19	2.93	1.48	1.90	1.84	2.22	3.30	75.10	76.00	75.90	75.20	74.90	78.10
07	-0.65	0.52	-2.20	-1.84	-1.28	-1.06	3.60	5.76	2.78	3.08	2.32	0.98	77.50	77.60	79.30	78.30	77.80	81.50
08	-1.49	-0.51	-2.69	-2.15	-1.38	-1.47	1.42	2.07	1.85	2.37	3.30	2.31	75.20	75.70	77.80	77.40	76.20	78.40
09	-1.80	-0.51	-2.51	-1.87	-1.38	-1.40	2.84	3.62	4.28	4.79	3.40	3.69	66.70	67.50	67.70	67.30	68.10	70.80
10	-1.68	0.41	-2.62	-1.77	0.57	0.41	3.19	4.48	2.86	3.71	5.61	4.99	55.20	56.90	58.20	58.80	58.30	60.70
11	0.46	0.89	-2.00	-1.11	0.99	0.32	3.55	3.80	4.23	4.91	4.83	3.86	34.60	38.40	39.70	41.50	40.20	44.90
12	0.63	0.98	-1.49	-0.59	0.98	0.58	2.02	2.24	2.82	3.68	3.22	5.08	33.20	37.00	37.20	40.30	38.40	40.20
1992													2	2	2	2	2	2
01	0.52	-0.31	-1.69	-0.91	-0.37	-0.33	0.97	0.66	0.58	0.85	1.27	2.19	33.90	34.30	36.50	37.40	35.70	37.30
02	0.84	-0.19	-1.51	-0.93	-0.65	-0.43	1.91	1.97	1.95	2.25	2.06	3.57	38.30	39.00	41.10	43.50	42.40	45.70
03	1.15	-0.27	-1.60	-1.35	-1.04	-0.76	3.72	2.99	2.62	2.12	2.67	3.63	45.70	45.70	47.60	48.50	47.30	49.30
04	1.47	-0.38	-1.73	-1.57	-0.98	-1.04	4.18	3.18	2.78	3.05	4.10	3.12	51.40	53.90	54.90	56.80	56.40	58.00
05	-1.07	-1.17	-2.30	-1.60	-1.14	-1.47	1.46	1.50	2.08	3.90	3.55	2.29	61.70	62.10	62.50	62.30	62.30	66.00
06	-1.59	-1.95	-2.42	0.28	-1.29	0.05	2.35	1.11	2.88	5.17	2.67	3.73	68.90	70.20	69.60	69.30	69.90	73.40
07	2.05	-1.32	1.49	1.53	0.49	0.55	10.24	5.41	8.26	6.98	4.72	4.97	73.70	75.80	75.90	75.70	76.80	79.50
08	1.75	-1.33	1.36	1.42	0.28	0.60	2.31	2.70	2.29	2.18	2.24	2.72	68.70	69.90	70.00	69.90	70.50	73.00
09	2.02	-1.16	1.56	2.32	0.72	0.55	4.79	3.60	4.61	7.11	4.76	3.14	64.20	65.60	66.60	66.50	66.40	68.70
10	1.53	-1.68	1.04	1.65	0.28	0.53	1.43	1.20	1.63	1.18	1.45	2.93	54.50	55.60	56.40	57.10	55.70	57.90
11	3.33	1.59	3.44	3.23	1.50	0.80	6.11	7.85	9.92	8.94	7.84	5.30	38.40	41.40	42.30	43.60	44.00	47.70
12	3.99	1.93	4.06	3.65	1.42	-0.38	3.34	2.92	4.17	4.53	3.02	2.21	31.40	33.00	35.70	36.40	35.10	37.00
1993													3	3	3	3	3	3
01	4.06	2.46	4.12	3.88	2.05	-0.01	2.04	3.13	2.52	3.44	4.90	4.83	24.30	28.30	29.10	32.20	32.50	36.20
02	3.89	2.46	3.86	3.68	1.81	-0.29	1.44	2.02	1.95	2.58	2.38	2.59	26.20	28.60	31.60	33.60	32.50	37.00
03	3.66	2.24	3.27	3.15	1.35	-0.55	2.51	2.73	2.21	2.68	2.80	3.58	37.90	38.40	41.20	42.50	41.80	45.20
04	3.96	2.84	3.26	2.89	1.35	0.12	4.54	5.52	4.30	3.79	4.17	4.39	48.80	50.90	51.40	51.60	52.10	54.30
05	3.97	2.47	3.13	2.89	1.15	0.13	5.51	4.07	5.46	5.78	4.40	4.72	62.50	63.80	63.60	62.50	63.20	67.00
06	4.06	3.10	2.90	3.55	1.57	0.65	6.38	6.92	5.17	8.01	5.75	5.45	70.90	72.00	72.80	71.60	72.10	75.60
07	7.36	4.51	5.29	3.69	1.77	-0.75	15.04	8.79	12.05	4.80	4.38	0.95	75.40	78.00	78.80	78.70	79.90	83.80
08	6.72	5.17	4.88	3.51	1.97	-0.91	3.70	5.94	3.43	3.55	4.38	3.06	76.20	77.30	78.60	77.80	77.40	79.50
09	8.26	7.54	6.88	6.12	4.27	0.80	10.59	11.43	12.86	14.85	11.06	6.40	60.50	62.40	63.50	64.40	64.40	68.00
10	7.29	6.80	6.02	5.48	4.17	1.19	1.69	2.11	1.98	2.30	2.97	3.93	52.10	52.90	54.00	53.50	53.50	56.70
11	6.97	6.95	6.10	5.49	5.12	1.99	2.02	3.90	4.05	4.45	6.99	6.51	38.90	40.50	42.90	41.80	42.40	43.30
12	6.35	6.18	5.50	4.75	4.41	1.69	1.34	1.55	1.75	1.82	2.22	3.34	33.90	34.90	35.00	38.00	36.30	38.50
1994													4	4	4	4	4	4
01	5.46	5.44	4.76	4.21	4.11	1.80	0.52	1.12	0.90	1.63	2.87	4.55	22.30	23.30	27.60	29.90	28.30	30.10
02	5.45	5.08	4.55	3.73	3.51	1.51	2.00	1.91	2.22	1.98	2.08	3.27	26.80	30.30	32.20	35.60	35.70	39.40
03	4.21	3.84	3.41	3.24	2.77	1.10	0.75	1.30	1.39	3.26	2.81	3.92	43.00	44.00	46.50	47.40	46.10	47.60
04	5.25	5.58	6.51	4.68	4.38	1.73	7.12	9.61	14.35	9.67	10.54	7.36	53.00	54.50	54.80	56.60	56.60	59.70
05	3.81	4.54	5.39	3.70	3.45	-0.67	1.96	2.54	3.11	2.68	2.62	1.58	62.10	61.40	62.60	62.00	61.60	65.10
06	2.98	3.70	4.44	2.74	3.10	-0.60	3.63	3.30	3.45	2.94	4.29	4.33	73.70	75.00	75.60	75.20	75.10	78.40
07	2.55	2.67	3.97	2.72	2.84	-0.53	3.22	1.59	3.14	4.19	3.26	3.57	74.00	75.50	75.80	75.20	75.10	78.50
08	2.10	2.14	3.73	2.94	2.81	-0.60	3.37	3.01	4.20	4.77	3.93	2.62	73.10	73.90	75.00	73.80	73.00	75.20
09	1.44	1.37	3.13	2.33	2.37	-0.63	2.46	1.97	3.05	2.35	2.52	2.93	65.20	66.00	66.10	65.60	64.80	67.80
10	1.10	0.99	2.87	2.18	2.00	-0.77	2.80	2.82	4.06	4.16	2.85	2.64	56.70	57.60	58.40	58.60	57.80	60.50
11	1.44	1.50	3.83	3.30	2.97	-0.33	4.01	5.59	6.89	8.27	8.20	6.50	44.90	47.80	48.40	49.60	50.00	53.20
12	1.39	1.18	3.16	2.65	2.42	-0.18	1.75	1.71	1.13	1.50	2.21	4.32	35.30	37.10	38.40	40.20	40.30	42.50
1995													5	5	5	5	5	5
01	1.51	2.17	3.44	3.18	2.64	-0.16	1.59	4.06	2.85	4.02	3.91	3.55	25.20	25.90	29.20	33.50	32.00	36.90
02	1.32	1.86	2.88	2.46	2.19	-0.44	0.93	1.32	1.24	1.25	2.12	2.59	33.60	33.20	36.90	39.20	37.10	39.20
03	0.72	1.14	1.73	1.66	1.66	-1.10	1.34	1.87	0.91	1.91	3.24	2.57	43.20	45.00	46.30	47.60	47.70	51.60
04	1.11	1.49	2.45	2.62	1.59	-1.07	4.18	4.63	6.27	7.47	4.43	4.24	50.80	52.10	53.40	54.90	55.20	59.00
05	3.95	3.54	4.70	3.25	2.41	0.14	11.55	10.65	12.65	7.95	8.06	5.23	57.90	60.10	59.90	61.40	62.60	67.10
06	3.62	3.04	4.48	3.89	2.64	0.65	4.94	3.63	5.79	7.89	5.41	5.33	71.30	72.20	71.90	70.40	71.20	75.00
07	3.86	2.79	4.04	-0.33	2.67	1.35	5.31	3.71	3.10	1.93	3.87	5.10	76.90	77.40	78.00	76.90	76.40	78.50
08	3.59	3.13	3.77	-0.91	-0.49	-0.19	4.07	5.55	4.43	1.87	2.09	1.99	78.70	79.80	80.30	80.30	80.00	81.80
09	-0.10	-0.34	-0.58	-1.35	-0.72	-0.50	2.96	1.84	1.50	2.16	2.28	1.83	63.50	63.50	66.00	65.60	64.60	67.50
10	-0.65	-0.56	-1.28	-1.97	-0.96	-0.52	1.09	2.30	1.37	1.55	2.42	2.95	55.50	56.90	58.20	58.00	57.30	59.90
11	-0.71	-0.89	-1.86	-2.57	-1.35	-0.59	1.59	1.51	1.07	1.22	2.32	3.62	37.90	39.20	41.70	42.90	41.10	43.20
12	-1.04	-1.24	-2.18	-2.48	-1.12	-0.91	0.67	1.34	1.61	3.21	3.93	2.55	30.70	30.60	33.40	35.10	33.90	36.90
1996													6	6	6	6	6	6
01	-0.76	-0.78	-1.92	-1.98	-0.77	-0.82	1.65	2.59	2.36	3.00	3.12	3.43	23.30	25.90	27.40	30.80	30.40	34.30
02	-1.02	-1.10	-2.35	-2.46	-1.40	-1.42	0.33	0.62	0.41	0.43	0.71	1.34	31.80	33.10	35.70	38.10	37.30	38.90
03	-0.93	0.09	0.01	-2.32	0.07	-1.43	1.91	2.72	2.57	2.62	3.73	3.86	35.70	36.30	38.30	39.70	39.20	42.10
04	-1.25	0.65	0.16	0.41	0.98	0.28	1.86	4.84	3.90	5.11	6.78	5.00	50.70	51.20	52.90	53.80	52.40	54.40
05	1.76	1.55	0.47	-0.29	1.05	0.11	9.13	7.36	6.34	4.23	5.77	4.54	62.90	64.20	66.60	67.00	66.90	70.10
06	1.77	1.31	0.14	-0.50	0.78	0.36	5.47	3.81	3.58	3.66	3.37	4.51	72.30	71.90	73.30	72.30	72.30	75.70
07	2.48	1.40	1.42	-0.23	1.07	1.29	5.92	3.83	7.30	3.65	4.10	5.77	74.20	74.10	75.40	75.10	74.80	78.00
08	2.46	1.24	1.47	-0.49	0.59	0.67	3.77	2.96	3.33	2.11	2.10	0.79	73.50	74.60	75.20	75.10	75.20	77.80
09	2.56	1.18	2.03	1.17	1.78	1.38	4.23	3.32	5.87	8.40	7.34	6.02	63.30	64.30	64.90	65.10	64.90	68.40
10	2.42	0.79	1.89	1.34	1.86	1.49	2.64	2.10	3.01	3.67	3.11	3.19	54.60	56.10	56.90	56.80	56.50	58.40
11	2.97	1.35	2.51	2.82	3.06	2.34	2.83	4.25	4.15	8.05	6.84	6.82	36.00	36.60	38.90	39.70	39.10	42.50
12	2.28	0.87	1.82	2.10	2.46	2.22	0.22	0.75	0.57	1.03	1.88	4.20	29.30	32.00	34.50	37.80	36.20	40.10
1997													7	7	7	7	7	7
01	2.04	1.12	1.74	1.75	2.38	1.83	1.00	2.19	1.61	1.39	2.94	2.78	22.30	23.30	26.60	29.70	29.00	32.20
02	3.35	2.26	3.01	2.33	2.60	1.76	3.82	4.27	4.99	4.32	4.00	4.21	32.90	35.30	37.30	40.10	40.00	43.30
03	2.55	-0.30	2.46	2.15	2.35	2.05	1.43	2.47	2.54	3.81	4.35	7.10	44.20	45.40	46.70	48.00	48.20	50.60
04	3.08	0.11	2.11	1.64	2.05	2.47	4.74	3.30	2.86	2.60	3.30	6.12	47.80	49.00	50.20	51.00	50.30	53.20
05	2.96	0.35	2.55	1.62	2.27	2.71	4.25	4.45	6.40	4.91	5.70	6.22	57.80	59.10	59.80	60.20	60.00	64.00
06	2.30	-0.30	2.18	1.40	2.41	2.77	3.38	3.02	4.17	4.07	4.98	4.56	71.70	71.30	71.90	70.30	70.50	73.80

07	1.58	-1.01	1.54	1.28	2.03	2.34	2.08	1.31	1.75	3.12	2.70	2.57	76.90	77.50	78.50	77.30	77.30	80.50
08	1.16	-0.76	1.85	1.68	2.04	2.55	3.23	4.11	5.35	4.64	3.74	4.37	73.20	73.70	74.50	73.00	73.60	76.60
09	0.88	-1.16	1.31	1.64	1.93	-0.27	3.85	2.35	2.84	4.17	3.53	2.30	67.60	68.20	69.20	68.30	67.40	70.00
10	1.25	-1.20	1.20	1.44	1.67	-0.28	4.58	2.84	3.94	3.18	2.78	2.88	55.60	56.40	57.60	57.00	56.30	58.60
11	1.28	-1.17	1.06	1.17	1.34	-0.64	2.20	2.84	2.56	2.39	2.75	2.56	39.30	40.10	42.30	43.10	42.10	45.00
12	1.69	-1.19	1.41	1.32	1.14	-0.90	2.47	2.11	3.03	3.03	2.75	3.09	31.50	33.20	34.80	35.30	35.40	38.90
1998													8	8	8	8	8	8
01	1.58	0.31	1.36	1.71	1.32	-0.76	1.15	2.32	1.65	3.40	3.51	3.87	31.50	33.60	34.80	37.80	37.60	41.00
02	1.70	1.05	1.44	1.87	1.33	-0.68	1.83	3.54	2.41	3.24	3.29	3.98	39.70	40.80	41.00	40.90	42.20	45.60
03	2.77	1.99	2.46	2.76	2.22	-0.66	5.14	5.37	5.78	6.48	7.15	4.75	36.60	40.30	40.70	42.30	42.90	47.50
04	2.84	2.15	2.33	2.19	1.93	0.77	4.01	4.49	3.97	3.00	3.87	7.19	51.90	53.20	54.20	54.30	54.80	57.80
05	1.47	1.43	0.99	1.57	1.18	0.39	2.43	3.43	2.03	4.07	3.49	4.27	68.10	68.40	69.70	68.50	68.90	72.30
06	2.28	2.49	1.69	1.23	1.88	1.42	8.47	8.04	8.69	4.29	7.01	7.67	71.10	72.50	73.70	74.50	74.40	78.20
07	2.70	2.90	2.92	2.00	3.31	3.08	5.44	5.42	7.79	6.18	7.84	8.62	76.80	77.00	78.70	78.90	77.50	81.00
08	2.37	2.19	2.41	1.60	-0.26	3.17	3.24	1.57	2.15	2.17	1.99	3.22	76.10	76.80	77.70	76.90	76.20	78.20
09	2.90	2.01	2.97	1.49	-0.61	2.08	6.90	4.10	7.58	4.87	2.39	0.46	71.60	72.50	73.70	74.20	73.00	76.00
10	3.97	2.45	3.87	1.84	-0.27	2.93	6.53	4.96	6.93	5.49	4.21	6.86	56.90	57.40	58.90	58.30	58.20	62.30
11	4.69	2.56	3.60	1.82	-0.59	2.39	4.28	3.39	2.69	3.63	2.33	2.34	46.20	47.50	49.00	49.60	49.20	51.70
12	4.33	2.19	3.19	1.34	-0.88	2.04	1.40	1.44	1.64	1.42	1.96	3.43	33.80	35.50	36.50	37.80	37.50	41.20
1999													9	9	9	9	9	9
01	4.30	2.83	3.54	1.72	0.81	2.50	1.92	3.45	3.00	3.25	5.01	6.23	25.90	27.30	30.50	34.40	33.10	37.70
02	4.12	2.91	3.13	1.33	0.88	-0.60	1.79	2.67	1.97	2.05	3.37	1.99	39.70	40.70	43.10	44.60	43.20	45.70
03	3.56	2.53	2.65	1.36	0.67	-0.82	1.99	2.60	2.45	3.74	3.36	3.59	40.80	40.50	43.10	43.40	42.20	44.90
04	4.23	2.68	3.08	1.93	1.24	-0.53	6.04	4.98	6.09	6.53	6.53	5.66	54.00	56.30	56.80	57.70	57.80	61.50
05	4.15	-0.28	3.12	2.13	-0.41	-0.74	5.34	3.44	6.03	6.20	3.21	3.73	62.40	63.80	64.00	62.80	63.70	68.20
06	3.94	-0.28	3.22	2.35	-0.44	-0.42	5.42	4.02	6.54	6.14	3.70	4.60	71.30	72.30	72.70	71.80	72.80	76.40
07	-0.45	-0.76	-0.62	-0.39	-0.96	-1.04	2.18	2.28	1.35	1.93	1.90	1.34	79.30	80.30	80.90	78.80	79.50	82.00
08	-1.09	-1.40	-0.95	-0.78	-1.16	-1.90	1.84	1.65	2.70	2.15	2.93	0.82	74.10	74.70	76.80	77.30	75.20	78.50
09	-0.73	-1.69	-1.15	-1.15	-1.81	-2.64	4.95	2.44	3.11	2.43	1.16	0.59	64.60	66.40	66.10	66.20	67.10	70.80
10	-1.37	-2.11	-1.90	-1.84	-2.12	-2.28	0.74	1.67	1.15	1.29	2.13	3.83	54.70	56.20	57.00	57.80	57.10	59.00
11	-2.04	-3.19	-2.76	-2.56	-3.20	-3.12	1.23	0.71	1.22	1.65	1.04	1.05	50.10	51.50	53.70	53.90	52.00	53.80
12	-2.06	-3.12	-2.39	-1.79	-2.96	-2.76	1.94	3.17	3.81	5.47	4.67	5.34	34.00	35.20	37.80	39.20	38.10	40.60
2000													0	0	0	0	0	0
01	-2.42	-3.47	-2.67	-1.78	-2.96	-2.15	0.45	0.88	0.89	1.46	2.20	5.12	30.60	31.00	33.60	35.50	33.90	36.80
02	-2.16	-3.25	-2.28	-1.81	-2.54	-1.66	1.98	2.71	2.90	2.03	3.33	4.80	39.00	40.80	42.10	44.10	43.30	44.80
03	-2.33	-3.32	-2.34	-1.87	-2.68	-1.73	2.00	2.49	2.55	2.97	2.92	4.43	45.80	46.10	48.10	48.80	47.90	51.90
04	-2.90	-3.69	-2.99	-2.62	-3.30	-2.05	1.07	1.52	0.90	1.02	1.05	2.46	52.80	53.60	54.80	55.00	54.30	56.70
05	-3.41	0.18	-2.95	-2.68	-3.56	-1.53	3.00	5.30	4.94	4.67	3.50	6.30	66.20	66.40	67.40	66.80	67.30	69.70
06	0.80	1.22	-2.00	0.95	-2.49	-0.99	7.75	7.27	7.34	7.85	6.27	4.89	70.40	70.40	71.20	70.40	71.10	75.30
07	1.07	1.35	-1.48	1.55	-2.10	-0.88	4.36	3.96	4.02	5.16	3.29	2.79	75.50	75.40	77.10	76.10	75.40	78.50
08	0.80	1.99	-1.89	-0.82	-2.22	-1.38	3.28	5.24	1.76	0.35	2.45	1.51	78.40	77.50	81.60	80.80	78.90	80.70
09	0.54	1.63	-2.17	-1.17	-2.31	-1.57	3.38	2.49	2.75	3.01	2.45	2.50	67.90	67.60	70.00	69.90	68.10	70.70
10	0.46	1.51	-2.28	-1.46	-2.51	-2.20	3.09	3.12	3.25	3.07	2.26	1.12	57.90	58.50	60.50	60.80	59.90	62.70
11	0.41	1.45	-2.40	-1.25	-2.33	-1.89	1.71	2.26	1.97	3.87	3.82	5.28	36.60	39.20	40.00	40.90	40.90	45.40
12	0.14	1.10	-2.77	-1.38	-2.48	-1.89	0.91	1.08	0.94	1.82	1.94	3.24	17.50	19.00	21.70	23.90	23.10	27.10
2001													1	1	1	1	1	1
01	0.61	1.40	0.06	0.11	-2.50	-2.22	2.12	2.38	2.20	2.06	1.47	1.35	26.60	27.70	29.50	31.20	30.60	33.50
02	2.18	2.41	1.33	1.17	-1.55	-1.49	4.02	3.95	4.48	5.02	4.53	5.38	28.30	31.80	34.40	38.00	37.90	42.00
03	2.09	1.74	0.83	-0.74	-2.03	-1.67	2.32	1.60	1.74	0.85	1.55	3.35	36.60	38.20	40.70	42.10	41.40	44.40
04	1.77	1.29	0.55	-1.53	-2.56	-2.42	3.66	3.52	3.86	2.10	2.40	1.90	58.60	59.80	60.90	61.30	60.80	63.80
05	2.32	1.44	0.90	-1.55	-2.44	-2.72	6.74	5.42	6.62	4.88	4.66	3.23	65.10	65.40	66.80	65.60	65.70	69.70
06	3.19	1.69	1.70	0.34	0.18	-2.84	8.55	5.20	8.56	5.83	4.44	2.54	70.50	70.80	72.30	72.20	71.70	74.90
07	3.69	1.57	2.40	0.60	0.73	-2.26	6.21	3.56	6.22	4.16	4.87	5.16	78.70	77.80	80.10	79.20	78.30	80.70
08	3.43	1.77	2.12	0.22	0.53	-2.47	3.67	4.14	2.88	2.06	2.82	2.20	75.90	76.10	78.00	78.10	77.40	79.60
09	3.40	1.65	1.76	0.02	0.49	-2.28	4.41	3.23	3.10	3.33	3.14	3.34	64.50	65.30	67.20	67.10	66.10	69.00
10	3.28	2.14	2.13	0.36	0.85	0.85	3.00	4.59	5.25	4.91	4.28	5.97	54.00	54.60	56.80	56.20	55.30	57.80
11	2.50	1.88	-0.25	0.22	0.93	1.38	0.60	2.29	1.72	3.14	4.03	6.39	50.80	51.20	51.60	51.30	50.80	53.20
12	1.99	1.76	-0.46	0.57	1.43	2.53	0.83	1.99	1.29	3.55	4.90	8.65	36.80	37.70	39.70	39.70	39.00	42.40
2002													2	2	2	2	2	2
01	2.15	2.16	0.44	0.90	1.60	2.51	1.82	2.85	2.49	2.94	3.51	4.56	32.60	34.80	35.10	36.10	35.80	38.90
02	1.83	1.69	-0.43	0.50	1.30	2.17	0.88	1.09	0.77	1.40	2.25	3.44	35.20	36.20	37.60	38.00	37.40	41.40
03	1.26	1.41	-0.82	0.68	2.14	2.79	1.04	2.40	1.50	3.82	6.69	8.09	37.70	38.70	39.70	41.70	41.20	45.30
04	1.42	1.72	0.09	0.69	2.14	2.34	4.20	5.11	4.34	4.73	5.28	4.37	54.60	55.50	57.90	59.20	58.80	61.80
05	2.96	3.30	1.68	2.37	3.91	3.15	8.44	9.26	9.78	11.24	11.64	8.73	59.90	60.70	61.30	61.80	62.30	65.60
06	-0.76	-0.29	-0.55	-0.44	-0.43	2.95	2.41	3.47	2.70	3.11	2.63	4.34	75.10	74.50	75.10	73.50	74.00	78.00
07	-1.21	-0.71	-0.64	-0.22	-0.48	-0.31	2.59	2.44	3.25	3.94	3.40	2.43	79.40	79.00	79.70	77.60	78.60	81.50
08	-1.27	-0.52	-1.07	-0.29	-0.04	-0.43	3.96	4.26	2.46	3.16	4.98	3.09	75.70	76.40	78.30	77.30	76.90	79.20
09	-2.27	-1.15	-1.74	-0.95	-0.39	-0.24	0.84	1.76	1.99	1.85	2.57	4.58	69.90	69.90	72.00	71.30	70.10	73.50
10	-1.75	-0.67	-1.70	-1.06	-0.19	-0.12	3.79	4.19	3.20	2.82	3.57	3.35	50.00	52.10	52.90	54.40	53.80	57.90
11	-2.38	-1.26	-2.30	-1.74	-0.82	-0.67	0.37	0.72	0.89	0.66	1.32	2.00	40.30	41.50	43.00	44.00	43.70	45.80
12	-3.13	-1.50	-2.77	-1.62	-0.42	-0.01	0.18	1.66	1.56	3.35	4.85	7.28	34.70	34.60	36.10	35.90	36.70	40.20
2003													3	3	3	3	3	3
01	-3.52	-1.81	-3.16	-1.98	-0.91	-0.56	0.41	0.82	0.79	0.40	0.51	0.69	25.10	25.20	28.00	29.10	29.10	31.50
02	-3.71	-1.68	-3.18	-1.37	-0.33	0.87	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
03	-4.13	-1.56	-2.92	-1.44	-0.80	-0.81	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
04	-3.52	0.15	-2.55	-1.60	-0.88	-0.87	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
05	-3.27	0.28	-2.22	-1.54	0.18	0.69	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
06	-2.67	0.94	-2.08	0.19	0.68	1.37	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
07	-3.06	0.58	-2.38	0.07	0.58	1.71	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
08	-3.01	0.07	-2.22	0.31	0.81	2.21	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
09	-2.37	1.22	0.66	0.47	1.21	2.76	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
10	-2.61	1.08	0.40	0.20	1.09	2.49	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
11	-2.40	1.53	0.46	0.39	1.91	2.80	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
12	0.58	2.05	1.28	0.77	1.86	-0.13	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
2004													4	4	4	4	4	4
01	0.54	2.21	1.58	1.16	1.80	-0.42	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
02	0.40	1.63	1.00	0.56	1.16	-0.86	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
03	1.19	1.98	1.74	1.14	1.28	-1.15	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
04	-0.65	1.28	1.31	1.47	1.11	0.11	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
05	0.93	1.78	1.24	0.96	1.02	0.35	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
06	1.03	1.19	1.09	0.67	0.73	0.03	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
07	1.83	1.61	1.90	1.84	1.63	0.66	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
08	3.04	3.03	2.59	1.74	2.03	0.92	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
09	2.52	2.33	2.01	0.84	1.07	0.01	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
10	2.66	2.82	2.25	1.19	1.53	0.46	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90

11	2.90	3.73	3.45	2.25	2.49	1.34	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
12	2.42	3.34	2.86	1.74	1.97	1.28	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
2005													5	5	5	5	5	5
01	2.89	5.01	4.38	3.12	2.63	1.55	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
02	3.49	4.63	4.22	2.86	-0.11	-0.36	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
03	-0.50	-0.61	-0.68	-0.51	-0.60	-0.67	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
04	-0.60	-0.88	-0.91	-0.66	-0.73	-0.78	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
05	-0.86	-1.58	-1.65	-1.20	-1.41	-1.53	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
06	-0.44	-1.73	-1.48	-1.47	-1.85	-1.97	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
07	-0.74	-2.33	-1.92	-1.49	0.26	-0.97	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
08	0.93	-1.85	-0.63	-1.43	0.58	-0.73	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
09	-0.45	-1.78	-0.72	-1.45	1.05	-0.77	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
10	-0.31	-2.02	-1.30	-2.12	-0.60	-1.65	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
11	-0.61	-2.05	-1.74	-2.05	0.64	-2.06	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90
12	-0.68	-2.46	-2.32	-2.65	-0.59	-2.93	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-99.90	-99.90	-99.90	-99.90	-99.90	-99.90

Program to obtain thirty-year average of Palmer Drought Severity Index data for four Missouri climate regions

```
options nodate nonumber nocenter ps=66 ls=100;

data palmer; infile 'h:\c\missouri-american\2006\pdsiprcptemp.dat';
input year 1-4;
do month=1 to 12;
   input m pdsi1-pdsi4;
   if month>4 then output;
end;
drop m;

data palmer; set palmer; if 1976<=year<=2005;

proc sort; by month;

proc means; var pdsi1-pdsi4;
output out=means mean=pdsi1-pdsi4;
run;

proc print; var pdsi1-pdsi4;
run;
```

The resulting thirty-year average PDSI values, transferred to the single-line file avg-pdsi.out, for use in weather normalization programs:

Obs	pdsi1	pdsi2	pdsi3	pdsi4
1	0.92525	0.76163	0.71108	0.61508

Utilization data for St. Louis County quarterly-billed customers

Missouri-American Water Company
S Louis Operation (Quarterly Accounts)
History of Water Sales
(Thousand Gallons)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL			
Residential Sales																
1990	2310666	1959383	1915281	2104307	1780437	1887362	2611821	2269766	2966263	3707972	2143770	2122546	27779574			
1991	2279491	1901959	1932400	2134183	1826508	2158698	3155438	2489100	3409781	3876413	2232388	2180057	29576416			
1992	1970310	2456828	2225259	1928554	2071391	2459078	2925430	2992185	3175901	2813543	2344136	2236841	29599456	207158	29806614	
1993	2043591	2068434	1976664	1816666	1968746	2274657	2375116	*2523278*	*2619224*	*2418424*	2193521	*2069187*	*26337508*	191588	26529096	
1994	1997241	2071593	2079467	1904342	2084034	2423694	2821671	3058737	3331571	3208528	2446288	2302690	29729856	230274	29960130	
1995	2130665	2178817	2111847	1936942	2011514	2196418	2489528	2707528	3108923	3072349	2494281	2332713	28771525	248018	29019543	
1996	2210507	2186606	2137303	2043896	2057603	2230799	2608138	2808573	3235621	3182944	2356223	2192723	29250936	265485	29516421	
1997	2164826	2118740	2060187	1966623	2059829	2248601	2619644	3028473	3259549	3413917	2408720	2349191	29698300	272001	29970301	
1998	*2219809*	2117111	*1994802*	*1820798*	2009170	2251005	2668411	2630858	2784560	3049533	2359287	2249210	28162554	314140	28476694	
1999	2189083	2045483	1999463	2015941	1973324	2322815	2659833	2968610	3599057	3783954	2685281	2517662	30760506	314290	31074796	
2000	2401875	2197909	2094402	1953477	2034033	2389124	2645654	2968610	2895876	3035497	2522891	2371661	29511009	308416	29819425	
2001	2276864	2130513	2011642	1954361	2176424	2495627	2830387	3041164	3329697	3255512	2853414	2011863	30367468	320458	30687926	
2002	2105616	1979932	2418835	1657728	2238794	2225859	2722460	3464740	3747921	3582936	2827798	2482253	31454872	93846	31548718	
2003	1841628	2068724	2511204	1735079	1592089	2477068	2190814	2370350	3987059	3122720	2571422	1421356	27889513			
2004	3449097	2164789	2603927	1877222	1529530	2559419	2313651	*2525685*	*3430686*	*3017140*	*2322466*	*1689084*	*29482896*			
2005	2853810	2178284	2624387	1821257	2091024	2748445	2942532	2937048	4074239	3507264	2578831	1706112	32063233			

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL			
Commercial Sales																
1990	573445	*313192*	*346046*	*538074*	*324316*	*355145*	*680815*	437756	552871	879597	424668	433734	5849659			
1991	627366	327271	375374	537116	334917	428353	782020	434045	613988	933054	455761	400347	6249612			
1992	344774	557768	378682	310966	440351	429383	487034	611400	527939	510468	523521	426838	5549124	2391099	7940223	
1993	360071	423636	347542	322413	389859	413049	436651	570272	496784	465074	520063	408203	5153617	1787147	6940764	
1994	378395	417873	366237	325470	413934	403572	460085	601984	518821	530038	522427	400443	5339279	2396576	7735855	
1995	354423	432335	333261	330216	399994	390552	417565	580823	528736	545655	520278	409992	5243830	2436038	7679868	
1996	375149	410601	364190	356054	403790	387023	459509	590291	539064	550479	509332	400782	5346264	2313050	7659314	
1997	366889	429395	344624	360514	414806	386150	480499	628326	563404	623819	533729	420871	5543026	2445342	7988368	
1998	413979	420590	356606	312311	435527	441067	450520	680135	588123	511811	588068	464456	5663193	2132073	7795266	
1999	346040	480757	376535	356802	464427	487686	454310	748546	667230	585907	690098	473472	6131810	2349194	8481004	
2000	392501	475814	407416	344281	472279	459578	475207	736493	606019	541850	656173	481663	6049274	2059046	8108320	
2001	374662	482122	370491	379774	*498904*	*527229*	*452534*	*753784*	*667531*	*575736*	*750674*	*412735*	*6246176*	2248082	8494258	
2002	424288	473805	419321	289603	488559	506490	607904	863925	711985	794484	733346	562845	6876553	2442859	9319413	
2003	478354	293627	615261	454349	370413	563406	617505	622496	851384	829415	565412	439788	6701409			
2004	898972	344515	626180	447332	280935	686041	624537	500051	979525	801174	576610	485047	7250920			
2005	660544	354502	703159	480742	382284	682931	687827	561385	1162804	852908	532978	650839	7712902			

Missouri-American Water Company
S Louis Operation (Quarterly Accounts)
History of Bills

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL		
Residential Bills															
1990	94686	86354	90297	93817	87249	90699	95016	87582	90832	95693	87307	91473	1091005	279.0396815	
1991	95161	87289	91006	95379	88809	91931	96400	88155	92139	96114	87977	92490	1102850	293.8977258	
1992	91377	87352	97880	92144	88447	98496	93284	89696	97983	93262	88185	97796	1115902	290.6864581	
1993	*92994*	*89012*	*98020*	*93348*	*87585*	*100152*	*94899*	*90425*	*98359*	*94113*	*89985*	*98670*	1127562	255.9772542	
1994	95027	88057	100210	94226	90122	100769	95286	90883	99787	95749	88909	99863	1138888	286.0743472	
1995	95113	89067	99873	96172	88434	100133	97256	90521	99696	97698	89076	98732	1141771	276.1537853	
1996	98233	87866	100072	98426	89437	100538	99885	90179	100587	99641	88385	100797	1154046	277.7689995	
1997	99401	87725	100739	99403	89115	101977	100770	89777	101731	100335	88328	101923	1161224	280.2739367	
1998	99301	88457	98769	95580	88323	101911	103204	90152	100707	102800	88735	100182	1158121	266.4926452	
1999	102505	87925	101628	102153	88999	102178	103119	90374	*101642*	*102622*	*89483*	*100493*	*1173121*	*287.3543622*	
2000	101700	89701	102083	102318	90035	101705	103019	90374	101243	102929	90631	101405	1177143	274.7400425	
2001	102443	88961	102052	102888	90255	103139	104036	91003	102907	102182	102148	91610	1183624	281.165448	
2002	101440	87040	120354	101091	107006	108726	113872	101441	107590	112873	98510	110614	1270557	271.3069382	
2003	92277	115004	129381	98226	103436	124094	100438	105136	125448	96359	105284	60573	1255656		
2004	*172737*	*92046*	*134395*	*100790*	71988	121213	97314	104315	120966	103052	101757	62951	1283524		
2005	135363	107124	125501	98338	105685	120220	99600	104368	117317	105656	105028	61186	1285386		

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Bills													
1990	5807	3815	4277	6007	3961	4369	6058	4008	4417	6103	4111	4532	57465
1991	6280	4024	4489	5994	4257	4549	6221	3982	4586	6047	4158	4550	59137
1992	4632	5389	4923	4664	5332	4908	4753	5341	4963	4685	5376	4906	59872
1993	4770	5391	4895	4709	5052	5121	4865	5375	4896	4606	5394	4785	59859
1994	4730	5241	4817	4647	5296	4818	4734	5519	4909	4913	5450	4940	60014
1995	4892	5472	4924	4921	5345	4927	4886	5402	4888	5060	5440	4833	60990
1996	5022	5439	4900	4958	5482	4884	5037	5470	4879	5040	5388	4896	61395
1997	5046	5420	4930	5083	5395	4935	5034	5493	4918	5070	5382	4973	61679
1998	5107	5379	4918	4429	5454	5166	4699	5747	5119	4626	5779	5099	61522
1999	4677	5777	5167	4565	5826	5147	4631	5834	5194	4617	5808	5103	62346
2000	4647	5870	5189	4700	5776	5083	4627	5834	5110	4710	5799	5130	62475
2001	4688	5723	5178	4709	5624	5249	4681	5701	5248	4675	6763	4663	62902
2002	4951	5800	5878	5387	6398	5690	5847	6304	5580	5761	6019	5884	69499
2003	5559	5314	8751	5860	5883	7381	6102	6111	8566	5854	5789	4187	75357
2004	8495	5186	7015	5537	3726	7312	5385	4953	7460	5742	5310	4481	70602
2005	6608	4622	8185	5602	5063	6912	5683	4804	7319	5835	5002	4891	70526

Utilization data for St. Louis County monthly-billed customers

Missouri-American Water Company
St Louis Operation (Monthly Accounts)
History of Water Sales
(Thousand Gallons)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Residential Sales													
1990	38403	31781	36914	32084	33770	31661	36208	35780	27481	35474	30778	34339	404673
1991	32954	32141	32770	31413	31389	33079	31956	42179	31505	33488	30912	23176	386962
1992	16284	15364	15902	15054	17045	17762	17573	17772	23226	19700	15568	15908	207158
1993	14361	12011	18868	16391	14834	14825	20231	14735	15552	17945	15918	15917	191588
1994	20697	16098	15774	18908	15709	18754	23334	20216	21238	22184	17325	20037	230274
1995	21076	18589	17283	21308	16797	22549	21935	20504	24188	21566	20909	21314	248018
1996	23447	20224	19849	20373	19751	23637	23438	24534	25792	20877	22907	20656	265485
1997	21985	21290	19838	19163	20883	22768	23856	27194	24996	23425	25833	20770	272001
1998	26888	24670	21247	25097	23744	24899	28946	31593	28803	27026	27281	23946	314140
1999	28817	22922	23128	27179	24125	25838	29084	28546	29987	26489	24422	23753	314290
2000	26644	22596	22505	24984	21661	26472	28481	28546	31292	24431	25257	25547	308416
2001	25184	24479	23193	24952	24029	29188	29668	29537	32540	24460	28387	24841	320458
2002	10764	6868	6086	6497	7376	7471	7981	8594	10403	7511	7829	6468	93846
2003	6856	6488	5962	5540	6068	6847	6670	8349	8189	7133	7027	4390	79518
2004	7030	5080	4719	4748	5722	7339	7701	7055	7706	6639	6928	0	70665
2005	11031	4967	5099	5549	5500	6976	8051	7202	7511	6215	5709	38	73847

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Sales													
1990	101414	95839	90699	90682	99116	112287	206316	200450	225626	169785	115741	114088	1622043
1991	96128	92927	93725	108622	112119	183248	239877	253474	216841	158315	137393	266460	1959129
1992	139363	146039	147445	139949	198882	241964	312599	288693	258816	209483	176779	131087	2391099
1993	112906	96898	94290	121660	127443	164510	255898	191213	230171	156894	124825	110439	1787147
1994	101726	105344	98859	158415	142985	245729	349541	330760	301442	265020	167972	128783	2396576
1995	142836	131904	129410	175388	150419	213542	286505	290344	346188	241208	182890	145404	2436038
1996	126895	135614	131980	140772	154025	213128	288303	299669	330515	191708	175043	125398	2313050
1997	136089	132777	124734	128834	180029	227159	309223	405272	293006	230546	163134	114539	2445342
1998	119045	112781	108456	137542	152729	206949	253828	275829	281183	204051	157427	122253	2132073
1999	125213	108367	104072	142433	143232	218449	261558	356259	353087	228527	171817	136180	2349194
2000	115999	100552	109077	137578	159368	218300	236993	230664	296366	187999	150739	115411	2059046
2001	106187	102065	96371	116609	196129	247138	294320	282268	339695	195798	147920	123582	2248082
2002	119597	133644	118657	126380	168185	224308	372867	313067	344635	235549	162541	123430	2442859
2003	123886	129687	131847	140769	151249	182994	263935	333363	283901	220158	158318	41711	2161819
2004	203558	116090	113945	145650	181279	197055	261322	271033	268440	250302	148220	-6428	2150466
2005	252780	109819	108913	148923	172527	270339	356787	318592	289223	194708	158958	2471	2384040

Missouri-American Water Company
St Louis Operation (Monthly Accounts)
History of Bills

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Residential Bills													
1990	579	567	551	516	504	491	493	501	492	495	491	492	6,172
1991	489	484	487	490	490	491	485	491	483	486	484	31	5,391
1992	29	30	31	31	31	31	30	30	30	32	31	31	367
1993	27	27	30	29	29	28	29	29	28	30	30	30	346
1994	32	31	31	31	32	34	36	38	37	39	39	40	420
1995	40	40	40	40	38	40	39	39	38	38	38	39	469
1996	40	40	41	40	40	42	43	41	41	41	41	41	491
1997	41	45	46	46	45	45	45	45	45	44	45	45	537
1998	46	46	46	46	47	47	47	47	47	47	47	47	560
1999	47	47	47	46	46	46	46	47	46	46	46	46	556
2000	46	46	46	51	51	52	51	57	51	51	55	52	609
2001	51	52	58	52	52	52	52	52	52	52	54	52	631
2002	31	22	21	22	23	23	22	23	23	22	23	24	279
2003	21	24	23	21	22	25	23	26	26	24	25	15	275
2004	24	23	23	22	26	26	24	25	25	22	25	0	265
2005	22	22	22	21	23	23	22	23	24	23	24	1	250

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL

Commercial Bills

1990	642	563	515	478	456	444	455	452	442	449	449	459	5804
1991	459	463	463	462	469	451	443	474	457	466	464	415	5486
1992	411	412	412	414	412	413	418	411	412	414	413	416	4958
1993	385	397	401	405	399	390	402	398	398	396	392	393	4756
1994	408	408	412	436	452	463	482	484	484	486	454	455	5424
1995	472	474	471	474	477	478	478	475	477	476	478	468	5698
1996	470	465	459	463	462	459	463	461	460	463	464	441	5530
1997	451	448	455	448	456	452	454	449	452	416	410	417	5308
1998	418	419	418	419	416	411	400	401	400	402	397	405	4906
1999	404	405	408	407	407	407	406	406	407	403	400	408	4868
2000	413	411	396	393	394	400	398	406	397	395	398	400	4801
2001	393	389	396	395	397	418	417	418	414	419	429	430	4915
2002	444	451	451	450	450	451	441	453	444	446	444	446	5371
2003	451	448	452	449	445	458	454	452	446	440	440	172	5107
2004	441	439	443	445	444	447	445	444	440	441	442	8	4879
2005	442	437	438	435	437	436	442	441	440	441	441	5	4835

Utilization data for St. Charles customers

Missouri-American Water Company
St Charles Operation (Monthly Customers)
History of Water Sales
(Thousand Gallons)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Residential Sales												
1989	116541	100416	98111	109317	126587	165707	206210	218470	160260	130371	132089	118819
1990	122822	109199	103046	106430	114935	122179	187160	135624	176781	171941	116344	117151
1991	112660	123338	113458	115487	121119	159993	238376	207176	193493	154734	124118	119215
1992	119685	100444	131936	113931	137977	175593	230900	210776	193131	157185	113517	126452
1993	106837	124423	106196	118695	124848	147846	162644	167384	159512	144884	121755	127779
1994	127647	129532	126774	123984	138506	186751	243769	219088	213700	199359	146605	155294
1995	157458	134634	150627	144720	139582	173129	243848	231947	261810	202112	158592	148044
1996	146896	132153	130763	139940	149778	186410	263003	251932	289941	192220	150148	145636
1997	147248	142226	134433	143225	163289	201779	276309	352609	234340	212501	165777	146938
1998	163387	139802	138982	156976	168459	216227	231209	254534	279604	206023	165424	154153
1999	170507	137606	135630	160523	163621	235240	263468	357675	355249	250955	184462	176465
2000	173840	149823	147576	167008	190714	242670	263353	268062	280266	216928	166392	167922
2001	166255	149173	147890	156328	227848	249076	283949	329215	285821	206978	168120	158533
2002	174991	153243	145593	165571	174283	217906	368613	381716	316812	230973	168993	169005
2003	133238	146285	144526	188702	166809	222873	265200	300134	350912	202528	165816	113481
2004	279903	141391	174769	156741	137591	247494	252633	322258	329490	262942	173546	108082
2005	230041	160496	176052	154769	186235	346665	374575	374160	368913	234017	183080	116381

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Commercial Sales												
1989	21706	17629	18466	20022	19695	26148	29245	29914	26574	25604	23212	22309
1990	24365	21144	19376	19995	20594	22814	28694	31541	31553	33253	23236	24692
1991	20221	23764	21811	20278	23916	26882	35270	33377	32827	25105	27926	23786
1992	24177	22181	25078	22684	25362	28263	35817	33668	31021	28157	22675	23035
1993	24619	24445	21405	23427	24314	27540	29903	30368	29506	33287	24661	26489
1994	25602	26204	25332	26930	27980	32763	42384	42157	41647	21947	15172	13112
1995	12773	11253	13400	22798	22091	23484	30339	33350	39878	32837	29437	27631
1996	26434	24330	24593	25679	25020	30286	35850	37076	42305	30998	29536	24867
1997	24511	25252	22424	24906	26175	31615	39930	50247	42741	34305	34313	18839
1998	26416	22636	23655	25219	26590	34208	37922	40614	39385	34633	29038	25647
1999	27513	25358	24399	28129	29494	33524	35618	46509	47957	38150	31832	29530
2000	27443	25450	25546	27438	30267	36801	38556	43131	42087	36117	31606	28455
2001	34382	30371	28255	28920	34275	40739	41805	44838	45595	35776	30925	28730
2002	27825	24803	26259	27976	29470	35044	43770	51292	44723	37135	30103	28419
2003	25542	26094	29174	31612	26671	36496	34293	42646	44041	36827	46109	22380
2004	39310	29694	43185	23210	23819	40896	36022	39827	61787	38196	37269	21467
2005	43545	29696	29205	31142	29244	38468	47655	46575	45493	35535	32154	21422

Missouri-American Water Company
St Charles Operation (Monthly Customers)
History of Customers

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Residential Customers												
1989	16277	16310	16352	16409	16420	16464	16499	16501	16583	16644	16704	16707
1990	16756	16799	16832	16874	16912	16955	17017	17081	17129	17197	17238	17269
1991	17296	17343	17358	17385	17448	17498	17546	17593	17624	17708	17774	17788
1992	17815	17858	17901	17960	18006	18054	18123	18196	18257	18303	18425	18458
1993	18499	18548	18572	18644	18704	18749	18795	18764	18796	18982	19082	19082
1994	19160	19252	19319	19380	19468	19521	19593	19687	19779	20083	20298	20509
1995	20711	20775	20784	20833	20897	21017	21108	21197	21179	21252	21354	21448
1996	21499	21586	21698	21790	21899	21985	22047	22177	22276	22354	22409	22514
1997	22549	22635	22723	22814	22895	23034	23106	23232	23380	23457	23510	23636
1998	23688	23745	23859	23932	24047	24125	24211	24242	24356	24428	24473	24582
1999	24638	24687	24747	24809	24844	24935	25002	25087	25157	25202	25256	25274
2000	25340	25439	25416	25458	25534	25558	25591	25669	25690	25746	25763	25806
2001	25830	25855	25871	25913	25900	25959	25983	26042	26052	26110	26139	26186
2002	26194	26230	26261	26279	26321	26367	26377	26449	26468	26516	26498	26535
2003	26554	26533	26555	26572	26605	26656	26671	26720	26763	26791	26803	26804
2004	26862	26885	26953	27024	27043	27113	27174	27200	27241	27307	27353	27394
2005	27454	27485	27496	27520	27580	27624	27672	27705	27751	27783	27794	27799

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Commercial Customers												
1989	589	584	590	595	596	598	600	605	606	609	609	611
1990	612	612	613	615	613	617	615	619	622	628	628	624
1991	630	632	623	627	633	634	637	639	645	647	642	641
1992	644	645	645	643	648	654	654	653	655	653	654	654
1993	651	650	651	652	651	671	669	760	823	822	835	837
1994	846	844	854	880	885	885	893	907	925	718	607	577
1995	455	453	556	574	562	566	568	570	685	688	686	680

1996	680	680	683	687	696	698	701	705	708	716	721	721
1997	724	730	742	750	755	754	755	756	752	758	760	762
1998	761	761	764	775	781	784	785	786	785	784	786	788
1999	794	792	791	796	800	804	807	810	814	817	820	827
2000	829	831	831	840	845	841	846	847	846	851	852	850
2001	854	854	857	856	903	908	907	907	907	914	890	885
2002	884	894	896	899	900	902	906	889	887	886	893	890
2003	894	919	942	957	962	949	950	934	933	927	930	931
2004	927	929	931	924	924	928	925	927	925	930	926	933
2005	932	931	933	931	929	934	933	937	937	930	935	932

Utilization data for St. Joseph customers

Missouri-American Water Company
St Joseph Operation
History of Water Sales
(Thousand Gallons)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Residential Sales													
1989	160642	81070	129482	150223	87380	153461	217040	109187	173142	222298	89358	132710	1705993
1990	165385	85175	133829	146434	81673	138569	192111	103213	164127	216704	96643	130919	1654782
1991	162460	85728	130139	147198	85999	143290	207315	117854	174747	241795	101496	130477	1728498
1992	159100	85923	131950	148740	88539	146628	203320	135476	149737	185309	118928	129772	1683422
1993	156803	115930	132985	150470	113797	138793	183360	127198	146598	173385	121784	129979	1691082
1994	153105	112339	132888	152831	120140	147171	194892	155718	160322	207992	132448	130954	1800800
1995	155472	118486	136128	149915	118860	142622	185855	150042	159068	209795	134096	132459	1792798
1996	160594	118151	136687	162179	130107	140236	173856	141943	154616	197415	135805	133564	1785153
1997	161939	119646	135454	154238	118198	138233	203798	158447	160438	215744	140782	135279	1842196
1998	163712	117655	129804	147728	118746	140830	189348	148177	149662	194997	131207	131119	1762985
1999	162350	121391	130842	148910	112397	131483	192382	122967	155390	227849	143133	137052	1786146
2000	170195	123342	129670	149608	119222	144213	202891	144162	148086	209860	287667	137062	1965978
2001	133915	121736	127849	120950	128543	142076	153209	155311	154840	127780	140244	114744	1621197
2002	131565	128468	143139	113365	136614	153968	188727	199712	181341	153193	124932	130061	1785085
2003	111893	115254	107738	158640	143020	173938	161804	175354	232626	129638	114814	91447	1716166
2004	217782	116141	144031	122117	95945	169676	129995	151865	207789	135330	111744	79824	1682239
2005	184589	131605	146487	112790	122767	174847	146274	173276	182826	136427	115942	94960	1722790

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Sales													
1989	74972	66143	53384	70501	73647	63511	94273	99700	76560	88127	73608	58301	892727
1990	74535	65097	56382	64818	67888	63377	93296	87886	83542	96311	74310	59628	887070
1991	73254	65699	57367	74808	72170	72949	115877	105952	93897	104972	80638	61478	979061
1992	77683	66820	56147	74050	70362	73155	96928	89097	82377	95370	74769	59096	915854
1993	76995	64485	56371	76504	72240	68974	95870	76996	85067	87340	76752	60617	898211
1994	77582	64005	55321	79138	71229	73211	104945	97836	90666	98220	77261	60775	950189
1995	79612	62838	54807	78847	69190	61326	99857	100085	92632	102457	82125	56960	940736
1996	80757	63693	57749	79675	77951	62172	100757	96882	87486	92350	76990	58454	934916
1997	75863	66447	59492	73037	73376	75461	105542	109963	86392	103608	78306	59313	966800
1998	74670	68253	54337	71705	72816	74066	97109	102258	88220	98276	80255	59830	941795
1999	78009	69695	61863	77723	70157	72428	97387	104759	90667	118693	92776	66897	1001054
2000	85309	71296	58830	80078	79041	87287	105790	87523	95695	109944	100963	65330	1027086
2001	76085	65400	65009	68225	70999	154790	77235	92777	106478	77872	74838	73656	1003364
2002	62760	66681	70958	68203	72771	78955	97623	105995	106888	86002	71571	65836	954243
2003	46541	61112	58230	82375	66961	97218	85335	92060	121711	89615	55267	44614	901039
2004	110155	53446	68217	55809	41307	92786	67093	86079	118598	75080	49976	41629	860175
2005	85542	58175	80511	46736	59314	88057	74119	87848	102252	73380	66520	46524	868978

Missouri-American Water Company
St Joseph Operation
History of Customers

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Residential Customers													
1989	23960	23973	24013	24036	24032	24039	24091	24104	24113	24153	24147	24131	
1990	24129	24156	24179	24210	24179	24199	24223	24240	24225	24194	24191	24189	
1991	24173	24147	24157	24191	24206	24242	24246	24269	24297	24269	24254	24273	
1992	24273	24279	24299	24332	24342	26068	26102	26117	26144	26132	26141	26118	
1993	26131	26148	26170	26218	26284	26327	26313	26333	26365	26356	26364	26362	
1994	26362	26346	26361	26370	26389	26418	26449	26489	26495	26517	26525	26513	
1995	26519	26486	26524	26557	26574	26670	26714	26745	26760	26795	26748	26747	
1996	26724	26707	26768	26804	26796	26821	26841	26844	26869	26827	26860	26899	
1997	26908	26873	26865	26894	26901	26972	26984	26994	27028	27025	27024	27025	
1998	27026	27024	27080	27080	27121	27114	27112	27127	27166	27135	27125	27152	
1999	27142	27118	27157	27170	27189	27237	27271	27322	27338	27306	27364	27380	
2000	27404	27425	27446	27514	27595	27642	27663	27656	27715	27691	27682	27670	
2001	27677	24683	27726	27751	27778	27787	27755	27802	27798	27755	27724	27697	
2002	27695	27747	27704	27777	27766	27832	27893	27881	27914	27917	27883	27854	
2003	27895	27873	27873	27882	27965	28015	28018	28040	27990	28002	27986	27944	
2004	27965	28005	28055	28131	28139	28174	28152	28136	28135	28158	28143	28142	
2005	28146	28175	28199	28208	28241	28311	28312	28202	28204	28178	28202	28168	

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Customers													
1989	3118	3123	3134	3137	3145	3143	3155	3164	3153	3148	3123	3109	
1990	3100	3091	3108	3117	3123	3129	3133	3141	3148	3132	3114	3110	
1991	3098	3131	3139	3164	3162	3165	3170	3159	3151	3143	3126	3123	
1992	3110	3117	3134	3149	3160	3204	3210	3210	3224	3212	3187	3171	
1993	3161	3165	3175	3192	3208	3205	3202	3200	3199	3190	3165	3156	
1994	3148	3139	3150	3168	3181	3189	3194	3195	3199	3196	3173	3164	

1995	3173	3171	3187	3199	3211	3208	3210	3206	3197	3194	3167	3162
1996	3150	3149	3160	3189	3192	3194	3181	3185	3186	3177	3155	3144
1997	3132	3118	3132	3161	3153	3175	3185	3176	3168	3154	3121	3118
1998	3123	3124	3133	3147	3170	3169	3177	3187	3190	3169	3144	3135
1999	3130	3117	3131	3156	3175	3186	3188	3200	3206	3186	3175	3161
2000	3157	3164	3147	3180	3195	3201	3199	3200	3196	3178	3144	3141
2001	3139	3134	3149	3159	3172	3169	3176	3189	3183	3152	3136	3111
2002	3100	3095	3099	3118	3132	3151	3153	3142	3143	3125	3104	3095
2003	3087	3073	3073	3084	3108	3099	3085	3084	3067	3030	3007	2985
2004	2969	2954	2955	2978	2982	2977	2967	2959	2959	2942	2918	2920
2005	2913	2908	2927	2956	2974	2988	2985	2985	2972	2951	2929	2906

Utilization data for Joplin customers

Missouri-American Water Company
Joplin Operations
History of Water Sales
(Thousand Gallons)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Residential Sales													
1989	83467	87745	77174	83341	83975	90226	103584	107639	100959	97632	94737	82596	1093075
1990	89441	87874	80806	78720	80159	81749	91037	109376	110503	116676	107511	84350	1118202
1991	86848	89670	82337	85281	85279	86628	111853	145442	124921	128819	112451	85008	1224537
1992	89452	87739	77800	81200	90804	84388	96458	109617	93601	100298	107404	81904	1100665
1993	87749	92766	76546	82303	92014	82085	90888	106947	100368	104084	111585	80493	1107828
1994	86440	95759	83916	94815	90142	94023	118412	154028	120489	113866	121094	82349	1255333
1995	86691	97092	83455	86168	99968	87574	98916	136270	124655	131936	159648	91620	1283993
1996	87081	107666	91941	95266	113896	85830	116619	159768	118897	116083	133643	88872	1315562
1997	93723	103645	88773	83935	101043	96064	103978	150010	115158	126042	199121	119964	1381456
1998	99414	83935	83419	91339	103126	127386	149064	131849	143010	114716	93891	90334	1311483
1999	102613	93799	81428	95770	93195	106824	108547	183495	149048	120001	108174	99576	1342470
2000	99129	85374	92946	89415	102780	128733	130306	152208	200447	127205	100905	98711	1408159
2001	105300	94413	89679	93437	113310	120004	143766	169410	151829	109448	94075	90435	1375106
2002	99487	84841	84377	92619	99050	113173	140655	153845	153663	136137	89027	93607	1340481
2003	74983	86026	83730	102017	96787	119562	125742	152963	167642	102136	88102	68713	1268403
2004	144756	81714	103361	83786	74956	132766	111458	152595	175091	138951	102424	62285	1364143
2005	142987	97962	98821	88744	95090	147160	150352	161159	178024	131792	-25122	68927	1335896

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Sales													
1989	61847	57116	59380	66686	65845	67953	74367	74192	70810	71387	63178	62447	795208
1990	63833	55922	60733	61102	60346	62658	74660	74616	73557	73862	58827	58091	778207
1991	63839	56256	55556	64606	61030	66050	85805	75790	74483	76876	58935	57191	796417
1992	61334	55569	57891	61763	57424	66822	73199	66127	72065	68772	59125	63145	763236
1993	58527	60810	70381	67003	61058	74024	72304	75539	77086	72287	62989	67594	819602
1994	62446	59068	58219	60245	62497	67979	88106	75637	89003	83113	76795	69838	852946
1995	64183	64482	70012	63407	66028	76432	80225	93683	94701	83415	76475	67443	900486
1996	71551	69953	67125	73869	75311	77904	91315	90599	85902	82517	76569	68222	930837
1997	72086	71794	66425	73281	74759	81260	88742	92074	92096	84475	87329	81092	965413
1998	73992	66279	69689	74983	52356	90123	100545	95002	96482	89113	75708	72870	957142
1999	77367	67989	69958	76952	76891	81635	89884	105358	100902	80349	79712	76793	983790
2000	74042	66707	83361	65926	77008	91038	88667	99399	109865	92347	81681	74521	1004562
2001	70109	73687	67579	69559	79055	84111	91679	104130	95634	87749	67512	75101	965905
2002	76977	71109	80440	88008	122995	80219	91415	98795	94799	88445	73658	67852	1034712
2003	56773	64860	60574	75261	70274	92385	80665	81934	113724	67991	69918	58621	892980
2004	104423	73317	80719	64786	29571	97897	72339	75720	126752	91121	63162	55844	935651
2005	89738	73924	73671	65008	72466	96232	88028	94710	103214	90517	74933	61761	984202

Missouri-American Water Company
Joplin Operations
History of Customers

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Residential Customers													
1989	15868	15867	15909	15898	15938	15972	15960	15975	15974	16017	16008	16022	191408
1990	16067	16110	16143	16170	16093	16093	16130	16154	16166	16179	16190	16205	193700
1991	16223	16231	16236	16252	16243	16272	16310	16359	16389	16435	16435	16439	195824
1992	16427	16477	16486	16563	16584	16577	16699	16727	16754	16843	16891	16902	199930
1993	16892	16916	16976	16991	17018	17001	17050	17085	17087	17136	17141	17166	204459
1994	17217	17212	17229	17233	17245	17282	17351	17383	17392	17418	17483	17513	207958
1995	17549	17585	17663	17720	17695	17736	17693	17738	17772	17810	17816	17812	212589
1996	17840	17837	17841	17872	17905	17922	17934	17976	18023	18006	18037	18031	215224
1997	17998	18000	18032	18054	18090	18099	18140	18151	18152	18121	18154	18102	217093
1998	18147	18138	18207	18232	18226	18251	18220	18356	18365	18361	18312	18323	219138
1999	18303	18307	18404	18424	18449	18453	18502	18516	18508	18572	18563	18497	221498
2000	18527	18539	18554	18570	18585	18598	18611	18667	18681	18724	18741	18717	223514
2001	18746	18783	18800	18814	18839	18850	18854	18899	18929	18925	18930	18971	226340
2002	18955	18977	19002	19017	19044	19044	19047	19111	19152	19093	19332	19335	229109
2003	19343	17314	19300	19374	19403	19388	19381	19366	19378	19346	19382	19349	230324
2004	19410	19437	19517	19549	19602	19687	19687	19739	19818	19861	19865	19826	235998
2005	19824	19890	19943	19964	19983	19973	19958	19947	19942	19954	19980	19980	239338

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Customers													
1989	2376	2362	2363	2365	2365	2371	2368	2375	2376	2377	2369	2369	28436
1990	2380	2390	2400	2410	2412	2410	2412	2430	2413	2412	2405	2401	28875
1991	2389	2395	2398	2406	2403	2405	2408	2408	2401	2391	2377	2382	28763
1992	2371	2373	2388	2422	2488	2489	2506	2509	2512	2528	2532	2532	29650
1993	2524	2539	2548	2554	2556	2571	2580	2583	2582	2606	2611	2617	30871
1994	2613	2630	2666	2681	2734	2742	2748	2784	2790	2798	2793	2788	32767
1995	2780	2766	2774	2774	2847	2849	2881	2890	2892	2894	2906	2919	34172

1996	2914	2922	2927	2943	2959	2968	2976	2977	2986	2996	3000	3025	35593
1997	3060	3074	3084	3098	3100	3097	3105	3110	3121	3111	3117	3108	37185
1998	3114	3107	3111	3132	3123	3106	3097	3114	3109	3108	3090	3078	37289
1999	3078	3065	3077	3077	3075	3078	3085	3120	3124	3134	3133	3114	37160
2000	3111	3110	3107	3117	3120	3122	3113	3121	3103	3117	3118	3123	37382
2001	3116	3112	3117	3120	3117	3102	3123	3132	3124	3122	3119	3115	37419
2002	3110	3122	3130	3135	3141	3135	3136	3145	3146	3130	2985	2979	37294
2003	2970	2955	2958	2966	2961	2932	2915	2902	2899	2883	2877	2846	35064
2004	2827	2818	2789	2792	2790	2782	2784	2772	2765	2759	2737	2740	33355
2005	2734	2736	2743	2748	2729	2722	2751	2747	2733	2726	2727	2726	32822

Output of weather-normalization program for St. Louis County quarterly-billed customers

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	10
Number of Observations Used	10

Stepwise Selection: Step 1

Variable pdsi11 Entered: R-Square = 0.4524 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	395.17533	395.17533	6.61	0.0331
Error	8	478.35024	59.79378		
Corrected Total	9	873.52557			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	274.52561	2.46084	744138	12445.1	<.0001
pdsi11	-2.94796	1.14671	395.17533	6.61	0.0331

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable pdsi9 Entered: R-Square = 0.7000 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	611.44582	305.72291	8.17	0.0148
Error	7	262.07975	37.43996		
Corrected Total	9	873.52557			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	273.25794	2.01743	686887	18346.3	<.0001

pdsi9	13.16477	5.47750	216.27049	5.78	0.0472
pdsi11	-12.32757	4.00670	354.41897	9.47	0.0179

Bounds on condition number: 19.498, 77.991

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	pdsi11		1	0.4524	0.4524	.	6.61	0.0331
2	pdsi9		2	0.2476	0.7000	.	5.78	0.0472

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	10
Number of Observations Used	10

Stepwise Selection: Step 1

Variable since_90 Entered: R-Square = 0.9326 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	54059	54059	110.69	<.0001
Error	8	3907.04829	488.38104		
Corrected Total	9	57967			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	826.28803	22.53656	656517	1344.27	<.0001
since_90	23.23908	2.20883	54059	110.69	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable pdsi5 Entered: R-Square = 0.9648 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	55926	27963	95.92	<.0001
Error	7	2040.65090	291.52156		
Corrected Total	9	57967			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	853.75526	20.51857	504712	1731.30	<.0001
pdsi5	-9.82796	3.88416	1866.39739	6.40	0.0392
since_90	21.59385	1.82622	40759	139.81	<.0001

Bounds on condition number: 1.1452, 4.5807

Stepwise Selection: Step 3

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Stepwise Selection: Step 3

Variable pdsi11 Entered: R-Square = 0.9789 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	56742	18914	92.65	<.0001
Error	6	1224.91478	204.15246		
Corrected Total	9	57967			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	846.06686	17.59625	471980	2311.90	<.0001
pdsi5	-7.52955	3.44779	973.66832	4.77	0.0717
pdsi11	-4.50703	2.25472	815.73612	4.00	0.0926
since_90	22.22098	1.56012	41415	202.87	<.0001

Bounds on condition number: 1.2885, 10.843

Stepwise Selection: Step 4

Variable pdsi6 Entered: R-Square = 0.9943 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	57634	14409	216.85	<.0001
Error	5	332.22114	66.44423		
Corrected Total	9	57967			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	806.36254	14.76850	198082	2981.18	<.0001
pdsi5	-11.90986	2.30152	1779.26721	26.78	0.0035
pdsi6	15.68163	4.27827	892.69363	13.44	0.0145
pdsi11	-10.24562	2.02625	1698.81425	25.57	0.0039
since_90	25.63729	1.28875	26295	395.74	<.0001

Bounds on condition number: 5.2914, 49.47

Stepwise Selection: Step 5

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Stepwise Selection: Step 5

Variable pdsi8 Entered: R-Square = 0.9972 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	57806	11561	287.46	<.0001
Error	4	160.87311	40.21828		
Corrected Total	9	57967			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	795.18008	12.70317	157591	3918.38	<.0001
pdsi5	-11.18247	1.82494	1510.07896	37.55	0.0036
pdsi6	25.84857	5.94483	760.35776	18.91	0.0122
pdsi8	-9.77709	4.73676	171.34804	4.26	0.1080
pdsi11	-8.14490	1.87643	757.76094	18.84	0.0122
since_90	26.66498	1.11947	22818	567.36	<.0001

Bounds on condition number: 17.214, 215.13

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	since_90		1	0.9326	0.9326	.	110.69	<.0001
2	pdsi5		2	0.0322	0.9648	.	6.40	0.0392
3	pdsi11		3	0.0141	0.9789	.	4.00	0.0926
4	pdsi6		4	0.0154	0.9943	.	13.44	0.0145
5	pdsi8		5	0.0030	0.9972	.	4.26	0.1080

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	10
Number of Observations Used	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	55688	27844	85.53	<.0001
Error	7	2278.74650	325.53521		
Corrected Total	9	57967			

Root MSE	18.04259	R-Square	0.9607
Dependent Mean	1051.70711	Adj R-Sq	0.9495
Coeff Var	1.71555		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	838.02302	19.13309	43.80	<.0001
since_90	1	22.50861	1.83270	12.28	<.0001
pdsi5_12	1	-8.51734	3.80834	-2.24	0.0604

St. Louis County projections for quarterly billed customers

The CORR Procedure

2 With Variables: resdaily comdaily
12 Variables: pdsi5 pdsi6 pdsi7 pdsi8 pdsi9 pdsi10 pdsi11 pdsi12 pdsi_ham pdsi5_12 pdsi9_12 since_90

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
resdaily	10	273.81515	9.85182	2738	251.04123	287.35436
comdaily	10	1052	80.25414	10517	942.23037	1198
pdsi5	10	1.17100	1.56802	11.71000	-1.58000	3.54000
pdsi6	10	0.83400	1.46091	8.34000	-1.73000	3.04000
pdsi7	10	0.68100	1.76152	6.81000	-2.33000	2.90000
pdsi8	10	0.88200	1.85160	8.82000	-1.85000	3.13000
pdsi9	10	0.26800	1.64421	2.68000	-1.78000	2.33000
pdsi10	10	0.31500	1.86135	3.15000	-2.11000	2.82000
pdsi11	10	0.24100	2.24777	2.41000	-3.19000	3.73000
pdsi12	10	-0.02500	2.16024	-0.25000	-3.12000	3.34000
pdsi_ham	10	0.55995	1.73233	5.59950	-2.05950	2.62550
pdsi5_12	10	0.54588	1.60491	5.45875	-1.97500	2.47875
pdsi9_12	10	0.19975	1.96605	1.99750	-2.52750	3.05500
since_90	10	9.70000	3.33500	97.00000	5.00000	15.00000

Pearson Correlation Coefficients, N = 10
Prob > |r| under H0: Rho=0

	pdsi5	pdsi6	pdsi7	pdsi8	pdsi9	pdsi10
resdaily	-0.26078	-0.19782	-0.31442	-0.50024	-0.54244	-0.59793
	0.4668	0.5838	0.3763	0.1409	0.1052	0.0679
comdaily	-0.51152	-0.63265	-0.55606	-0.40610	-0.16575	-0.09576
	0.1307	0.0496	0.0951	0.2442	0.6472	0.7924

Pearson Correlation Coefficients, N = 10
Prob > |r| under H0: Rho=0

	pdsi11	pdsi12	pdsi_ham	pdsi5_12	pdsi9_12	since_90
resdaily	-0.67260	-0.64816	-0.54253	-0.55259	-0.62522	-0.45235
	0.0331	0.0427	0.1052	0.0976	0.0532	0.1893
comdaily	-0.09408	-0.09589	-0.31836	-0.33702	-0.11055	0.96571
	0.7960	0.7922	0.3700	0.3409	0.7611	<.0001

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	540.47658	270.23829	5.68	0.0342
Error	7	333.04899	47.57843		
Corrected Total	9	873.52557			

Root MSE	6.89771	R-Square	0.6187
Dependent Mean	273.81515	Adj R-Sq	0.5098
Coeff Var	2.51911		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	292.30820	7.31461	39.96	<.0001
since_90	1	-1.68058	0.70064	-2.40	0.0476
pdsi5_12	1	-4.01448	1.45593	-2.76	0.0282

St. Louis County projections for quarterly billed customers

since_90	resdaily	p
5	276.154	279.153
6	277.010	277.362
7	280.274	283.776
8	266.493	269.721
9	287.354	283.621
10	273.989	270.268
11	281.165	266.847
12	271.307	273.546
14	251.041	258.829
15	273.364	275.028
17	.	260.681

St. Louis County projections for quarterly billed customers

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	55688	27844	85.53	<.0001
Error	7	2278.74650	325.53521		
Corrected Total	9	57967			

Root MSE	18.04259	R-Square	0.9607
Dependent Mean	1051.70711	Adj R-Sq	0.9495
Coeff Var	1.71555		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	838.02302	19.13309	43.80	<.0001
since_90	1	22.50861	1.83270	12.28	<.0001
pdsi5_12	1	-8.51734	3.80834	-2.24	0.0604

St. Louis County projections for quarterly billed customers

since_90	comdaily	p
5	942.23	940.48
6	951.69	962.76
7	984.87	1002.44
8	1008.78	998.69
9	1077.82	1054.26
10	1058.22	1052.00
11	1088.22	1070.82
12	1084.33	1111.11
14	1122.42	1132.03
15	1198.49	1192.47
17	.	1214.18

Output of weather-normalization program for St. Louis County monthly-billed commercial customers

St. Louis County projections for monthly billed commercial customers

year	since_90	comuse	comcust	comdaily	pdsi5_12
1995	5	2436038	474.833	14055.62	1.18375
1996	6	2313050	460.833	13713.87	1.21125
1997	7	2445342	442.333	15145.97	-0.80500
1998	8	2132073	408.833	14287.72	2.27750
1999	9	2349194	405.667	15865.61	-1.60375
2000	10	2059046	400.083	14061.59	1.30375
2001	11	2248082	409.583	15037.55	1.73750
2002	12	2442860	447.583	14953.12	-0.35000
2004	14	2150466	442.750	13270.67	2.47875
2005	15	2384040	439.250	14869.93	-1.97500
.	17	.	.	.	0.76163

St. Louis County projections for monthly billed commercial customers

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	3035541	3035541	9.97	0.0134
Error	8	2434879	304360		
Corrected Total	9	5470420			

Root MSE	551.68819	R-Square	0.5549
Dependent Mean	14526	Adj R-Sq	0.4993
Coeff Var	3.79789		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	14724	185.33284	79.44	<.0001
pdsi5_12	1	-361.86450	114.58338	-3.16	0.0134

St. Louis County projections for monthly billed commercial customers

since_90	comdaily	p
5	14055.62	14295.34
6	13713.87	14285.39
7	15145.97	15015.00
8	14287.72	13899.55
9	15865.61	15304.04
10	14061.59	14251.92
11	15037.55	14094.96
12	14953.12	14850.35
14	13270.67	13826.73
15	14869.93	15438.38
17	.	14448.09

Output of weather-normalization program for St. Charles customers

St. Charles projections

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	775.49170	775.49170	27.65	0.0008
Error	8	224.40777	28.05097		
Corrected Total	9	999.89947			

Root MSE	5.29632	R-Square	0.7756
Dependent Mean	272.00280	Adj R-Sq	0.7475
Coeff Var	1.94716		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	275.16005	1.77923	154.65	<.0001
pdsi5_12	1	-5.78384	1.10002	-5.26	0.0008

St. Charles projections

since_90	resdaily	p
5	279.424	268.313
6	270.354	268.154
7	275.466	279.816
8	258.165	261.987
9	284.332	284.436
10	259.996	267.619
11	266.647	265.111
12	277.114	277.184
14	260.527	260.823
15	288.002	286.583
17	.	270.755

St. Charles projections

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	19719	19719	18.32	0.0027
Error	8	8612.10288	1076.51286		
Corrected Total	9	28332			

Root MSE	32.81026	R-Square	0.6960
Dependent Mean	1318.01378	Adj R-Sq	0.6580
Coeff Var	2.48937		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1454.15904	33.45938	43.46	<.0001
since_90	1	-14.03559	3.27939	-4.28	0.0027

St. Charles projections

since_90	comdaily	p
5	1397.00	1383.98
6	1394.00	1369.95
7	1371.11	1355.91
8	1288.19	1341.87
9	1352.91	1327.84
10	1274.30	1313.80
11	1311.77	1299.77
12	1246.96	1285.73
14	1280.61	1257.66
15	1263.30	1243.63
17	.	1215.55

Output of weather-normalization program for St. Joseph customers

St. Joseph projections

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	699.34331	349.67165	7.70	0.0170
Error	7	317.75699	45.39386		
Corrected Total	9	1017.10030			

Root MSE	6.73750	R-Square	0.6876
Dependent Mean	177.40075	Adj R-Sq	0.5983
Coeff Var	3.79790		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	209.06326	8.34514	25.05	<.0001
since_90	1	-2.77608	0.73025	-3.80	0.0067
pdsi5_12	1	-3.85113	1.62413	-2.37	0.0495

St. Joseph projections

since_90	resdaily	p
5	184.284	189.156
6	181.905	183.405
7	187.223	183.324
8	178.198	174.959
9	179.583	183.910
10	194.677	180.912
11	161.547	167.069
12	175.784	180.473
14	163.503	161.856
15	167.303	168.943
17	.	158.307

St. Joseph projections

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	9	8948.58800	994.28756		
Corrected Total	9	8948.58800			

Root MSE	31.53233	R-Square	0.0000
Dependent Mean	833.22345	Adj R-Sq	0.0000
Coeff Var	3.78438		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	833.22345	9.97140	83.56	<.0001

St. Joseph projections

since_90	comdaily	p
5	807.844	833.223
6	805.343	833.223
7	841.034	833.223
8	817.659	833.223
9	865.838	833.223
10	883.811	833.223
11	871.090	833.223
12	837.557	833.223
14	794.883	833.223
15	807.175	833.223
17	.	833.223

Output of weather-normalization program for Joplin customers

Joplin projections

The REG Procedure
Model: MODEL1
Dependent Variable: resdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	262.39838	262.39838	8.04	0.0219
Error	8	260.98773	32.62347		
Corrected Total	9	523.38611			

Root MSE	5.71170	R-Square	0.5013
Dependent Mean	197.58879	Adj R-Sq	0.4390
Coeff Var	2.89070		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	213.29369	5.82470	36.62	<.0001
since_90	1	-1.61906	0.57088	-2.84	0.0219

Joplin projections

since_90	resdaily	p
5	198.568	205.198
6	200.411	203.579
7	209.209	201.960
8	196.758	200.341
9	199.261	198.722
10	206.560	197.103
11	199.739	195.484
12	192.357	193.865
14	189.519	190.627
15	183.506	189.008
17	.	185.770

Joplin projections

The REG Procedure
Model: MODEL1
Dependent Variable: comdaily

Number of Observations Read	11
Number of Observations Used	10
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	11063	11063	13.89	0.0058
Error	8	6371.80373	796.47547		
Corrected Total	9	17435			

Root MSE	28.22190	R-Square	0.6345
Dependent Mean	883.90869	Adj R-Sq	0.5889
Coeff Var	3.19285		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	781.93267	28.78025	27.17	<.0001
since_90	1	10.51299	2.82078	3.73	0.0058

Joplin projections

since_90	comdaily	p
5	866.353	834.498
6	857.451	845.011
7	853.559	855.524
8	843.886	866.037
9	870.392	876.550
10	881.078	887.063
11	848.654	897.576
12	912.156	908.089
14	919.715	929.115
15	985.843	939.628
17	.	960.654