

# **FORT BLISS WATER DISTRIBUTION SYSTEM**

**Fort Bliss  
El Paso, Texas**

## **ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)**

**February, 1993**

**DISTRIBUTION STATEMENT A**  
Approved for public release  
Distribution Unlimited

**Prepared by:**

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**Fort Worth, Texas 76102**  
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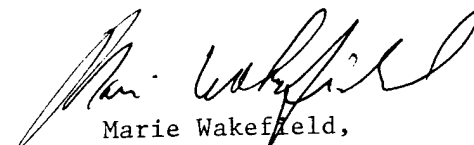


DEPARTMENT OF THE ARMY  
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS  
P.O. BOX 9005  
CHAMPAIGN, ILLINOIS 61826-9005

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Marie Wakefield,  
Librarian Engineering

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# **ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP) for FORT BLISS WATER DISTRIBUTION SYSTEM EEAP**

## **I. NARRATIVE**

### **A. Purpose**

The purpose of this study is to analyze the existing system and two alternate methods of peak electrical demand shaving for the water distribution system at Fort Bliss, Texas. The existing system will be referred to as Alternative #1 throughout the report. Alternative #2 includes the addition of water storage capacity in order to allow the well and booster pumps to operate only during non-peak electrical periods. Alternative #3 includes the use of natural gas powered electric generators at each well and booster pumping station. These generators would be utilized during the peak electrical periods.

This report is prepared in accordance with the detailed scope of work for Contract No. DACA63-91-D-0048, Delivery Order 0005 (Refer to Appendix J for complete scope of work). The blast Life Cycle Cost In Design (LCCID) program with the ECIP option was used to determine the Life Cycle Cost (LCC) and Savings to Investment Ratio (SIR) for the analyzed retrofit for a 25 year study life.

### **B. System Description**

The existing water distribution system consists of 17 well pumps and 5 booster pumping stations. The desert field well and booster pumps were not included in this study due to their remote location. The well and booster pumps provide water supply to several ground elevated storage tanks located across the reservation (Refer to Appendix K for map indicating general locations). These storage tanks are located to provide three pressure zones. The upper

pressure zone is maintained by a one million gallon tank. The intermediate pressure zone is maintained by a 0.6 million gallon tank. Pressure in the lower zone is maintained by three (3) elevated storage tanks.

### **C. Analysis Of Present Energy Consumption**

In order to establish the energy consumption of the existing water distribution system, El Paso Electric supplied 30-minute measured KW demand values as well as utility bills for the entire base for the period from September 1991 through August 1992 (Refer to Appendix B for this data). This data was used to determine the peak electrical demand day for the entire base which El Paso Electric utilizes for billing purposes each month. Next, the Williams Electric Automated Control System was utilized to download the pump run-time data for each pump, for each of the peak days during the 12-month period previously identified (Refer to Appendix E for this data). Using the run-time data and the KW demand for each pump, the total pumping system electrical demand was calculated and subtracted from the base electrical demand and plotted with the total base demand (Refer to Appendix C for these graphs). These graphs represent the maximum demand savings possible through modification of the water distribution system. These graphs were then used to determine the maximum peak shaving potential, and the most advantageous operating period for the peak shaving methods. Example energy calculations along with a narrative description are included in Appendix D. The total peak shaving potential for the pumping system was determined to be 3,158 KW/YR (Refer to Appendix E for calculations). The most advantageous period for peak shaving is between 10:00 a.m. and 3:00 p.m. daily (Refer to Appendix C).

### **D. Analysis Of Previous Studies**

The previous studies below, were referenced and evaluated in the preparation of this report.

- |               |    |   |
|---------------|----|---|
| Reference No. | 1. | Fort Bliss Water Distribution System Analysis and System Operations, prepared by Wesley P. James and Veronica Morgan, Department of Civil Engineering, Texas A&M University, College Station, TX 77843. |
| Reference No. | 2. | Energy Savings Opportunity Survey, Fort Bliss, Texas, Water Distribution Study, prepared by Williams E. Evers, Jr., P.E., EDM Engineering, St. Louis, MO 63101.   |

Reference No. 1 was conducted to ensure that the existing water distribution system is adequate to maintain acceptable pressures during peak hour operation plus fire demand. The report concluded that a minimum pressure of 27 psi would occur during the peak day plus fire demand.

Reference No. 2, which is similar to this study. Analyzed methods of peak shaving as follows;

- 1) Addition of diesel pump sets to be utilized during on-peak periods.
- 2) Addition of 7-8 million gallons of storage capacity to allow for off-peak pumping only.

This report concluded that neither option was feasible and both resulted in savings to investment ratio's of less than 1.0. However, this study used demand charges of \$16.03 per kilowatt (KW) for the first 10,000 KW and \$15.72/KW thereafter. The current electrical demand charge for Fort Bliss (ECO'S) is \$21.50/KW for all KW.

#### E. Analysis Of Energy Conservation Opportunities (ECO's)

##### 1. Increase Storage Capacity (Alternative #2)

The addition of 6.6 million gallons of storage tank capacity was analyzed. The existing storage capacities for all of the tanks at Fort Bliss are listed in Appendix F. The size and location of the new storage tanks were based on the Reference No. 2 study previously mentioned and are as follows;

Biggs Army Airfield:	0.5 MG
WBAMC:	1.0 MG
	2.0 MG
Main Post	2.0 MG
Tobin Field:	<u>1.1 MG</u>
Total	6.6 MG

This additional storage capacity would allow the well and booster pumps to be shut-off during on-peak utility periods. The existing Williams Electric Control system would be utilized to disable the pumps during specified peak periods. Software changes only would be required to accomplish the added functions using the existing control system.

2. Addition of Natural Gas Generator Sets (Alternative #3)

The following booster stations and wells were identified to receive generator sets due to high utilization (See Appendix E for pump run time data):

Well Pumps	Booster Stations
Well #7	1318
Well #9	4318
Well #1A	7094
Well #2A	7242
	11171

Each booster station includes multiple pumps but will only require one generator set. These generator sets are sized for the largest pumps in each booster station. The addition of generator sets along with the required controls changes would allow the pumps to be driven by these generators during on-peak demand periods. The controls changes are considered minor due to the existence of the Williams Electric Control System. It is anticipated that only software and minor hardware changes would be required.

**F. Life Cycle Cost Calculations**

The Life Cycle economic feasibility of the existing system in comparison with the two peak shaving methods was calculated using the Blast, Life Cycle Cost In Design (LCCID) program. This program with the ECIP option utilized the energy consumption calculated and included in Appendix C and E. Data for the LCCID Feasibility study are as follows:

1. Construction Cost Estimate

The probable construction cost estimates for the two ECO alternatives are as follows:

Alternative	Investment
1 - Existing System	-0-
2 - Additional Storage	\$3,234,119
3 - Addition of Generators	\$1,083,286

Refer to Appendix G for the detailed probable cost estimate.

2. Maintenance Cost Estimate

The Maintenance Cost difference with Alternative #1 as the baseline for the two ECO alternatives are as follows:

Alternative	Annual Maintenance Cost
1 - Existing System	-0-
2 - Additional Storage	\$2,792.60
3 - Addition of Generators	\$18,615

Refer to Appendix H for Maintenance Cost Calculations.

3. Replacement Cost Estimate

The Replacement Cost Estimate assumes the concurrent salvage value is zero (\$0.00).

a. Tank Replacement Costs

Tank life is expected to be a minimum of 40 years based on numerous existing steel tanks which were constructed between 1910-1954 which are still in use; therefore, the replacement

cost for the additional tanks is assumed to be zero dollars (\$0.00).

b. Generator Set Replacement Costs

The generator sets require routine maintenance and overhauls at regular intervals. However, the expected equipment life for a generator set operating 5 hours per day, 365 days per year is approximately 32 years based on two major overhauls during its equipment life; therefore, generator sets replacement costs are assumed to be zero dollars (\$0.00). All overhaul and maintenance costs have been included as maintenance and repair costs.

4. Final Salvage Value

The Final Salvage Value for all systems is assumed to be zero dollars (\$0.00).

5. Utility Rates

Utility Type	Utility Cost	Site Cost
Electricity Usage	\$.00764/KWH	\$2.24/MBTU
Electrical Demand	\$21.50/KW	-
Natural Gas	\$2.58/KCF	\$2.50/MBTU

The utility costs were furnished by El Paso Electric and Southern Union Gas. The site cost was obtained using a Conversion Factor of .003413 MBTU/KWH and 1.031 MBTU/KCF.

6. Refer to Appendix I for the ECIP Life Cycle Cost Analysis Summary Sheets for Alternatives 2 and 3.

## **G. Conclusions**

The results of this study indicate that increased storage capacity and/or the addition of generators for the Fort Bliss Water Distribution System cannot be justified. Both peak shaving methods result in an SIR of less than 1.0, a simple payback greater than 33 years and a negative Adjusted Internal Rate of Return (AIRR).

Fort Bliss, in the last five years, has undergone a significant effort to conserve water. This effort has been very successful and has decreased the peak electrical demand for the pumping system by approximately 420 KW per month (based on previous Study, Reference No. 2).

## **H. Recommendations**

The recommendation resulting from this study is for Fort Bliss to investigate the possibility of making software changes to the Williams Electric Controls system to ensure that all pumps are scheduled off during the hours between 10:00 a.m. and 3:00 p.m. In studying the pumping data, it appears that this could be accomplished for most of the pumps resulting in a low cost change which could save approximately \$60,000 per year.

The main reason this analysis did not meet ECIP guidelines is due to the cost of additional storage tanks. By reducing the quantity of tanks, this analysis may have met the ECIP guidelines for an acceptable project. Based on the data analyzed and interviews with Fort Bliss personnel, the most critical area regarding storage capacity appears to be the William Beaumont Army Medical Center (WBAMC). Additional storage capacity at WBAMC would improve the chances of having the capability to schedule all of the pumps off from 10:00 a.m. to 3:00 p.m.

In order to verify that a reduction in additional storage capacity is a viable option, a detailed dynamic water system simulation analysis would be required. This analysis would require tank level switching information as well as the water demand of all major water users on the base.

## **I. Criteria**

1. OCE Architectural and Engineering  
Instructions Design Criteria  
November 20, 1990

2. Memorandum CEHSC-FU-M  
Energy Conservation Investment Program (ECIP)  
Guidance  
November 4, 1992
  
3. TM 5-802-1  
Economic Studies for Military construction Design Applications  
December 1986

## **APPENDIX A - Utility Rate Schedules**

P. 02  
PUBLIC UTILITY COMMISSION OF TEXAS  
APPROVED

MAR 9 '92 DOCKET 9945 -  
CONTROL # 10463  
TARIFF CLERK

**EL PASO ELECTRIC COMPANY**

**SCHEDULE NO. 31**  
**MILITARY RESERVATION SERVICE RATE**

**APPLICABILITY**

Available to United States Army for Fort Bliss Main Post Area for a minimum contract capacity of 10,000 kilowatts. All service will be taken at the point of delivery designated by the Company.

**TERRITORY**

El Paso County, Texas

**TYPE OF SERVICE**

Service will be alternating current 60 hertz, three phase at the transmission voltage of 115,000 volts.

**MONTHLY RATE**

Demand Charge

\$21.50 per kilowatt for the first 10,000 kilowatts or less of Demand ( )

\$21.50 per kilowatt for all additional kilowatts of Demand ( )

Energy Charge

\$0.00764 per kilowatt-hour for all kilowatt-hours ( )

**MONTHLY MINIMUM**

Demand charge for the Minimum Contract Capacity of 10,000 kilowatts or the applicable minimum demand charge, whichever is greater.

**DETERMINATION OF DEMAND**

Maximum demand will be defined as the highest measured thirty (30) minute average kilowatt load determined by measurement. The measured demand will be adjusted for billing when the metering adjustment clause is applicable. (T)

The demand used for billing shall never be less than 75% of the highest measured on-peak demand (adjusted for metering adjustment) established during billing months May through October in the twelve (12) month period ending with the current month, nor less than the minimum contract capacity, whichever is greater. The exception to this will occur when the 1/2 on-peak - 1.2 off-peak provision is invoked. At that time, the measured billing demand shall be used for the purpose of this paragraph.

When the demand established during the off-peak period exceeds the demand established during the on-peak period, the demand used for billing will be 1/2 the on-peak period demand plus 1.2 the off-peak period demand.

On-peak period shall be from 10:00 A.M. to 8:00 P.M. Mountain Standard Time for weekdays of Monday through Friday. Off-peak period shall be all other hours of the week not covered in the on-peak period.

Section Number 1  
Sheet Number 18  
Page 1 of 2

Revision Number 4  
Effective with energy consumed on or  
after                      Page 10

**EL PASO ELECTRIC COMPANY**

**SCHEDULE NO. 31**  
**MILITARY RESERVATION SERVICE RATE**

**RATING PERIOD SELECTION OPTION**

Upon written request by the customer and approval by the Company, a customer may shift his 10-hour peak period for billing purposes by two (2) hours around the normally defined on-peak period. The customer may exercise this option twice during a twelve (12) month billing period.

**METERED ADJUSTMENT**

- A. El Paso Electric Company metering equipment is installed on the low voltage (14.4 KV) side of substation transformation, therefore, for billing purposes, (1) the metered kilowatt demands shall be increased by 1.035% and (2) the metered kilowatt-hour usages shall be increased by 0.825%. For purposes of this adjustment, the Ben Milam School kilowatt demand and kilowatt-hour usage shall be subtracted from the Fort Bliss kilowatt demand and kilowatt-hour usage before the adjustment.
- B. Ben Milam School. Ben Milam School is located within the Fort Bliss Military Reservation but is a school of the El Paso Independent School District. Presently, Ben Milam School is serviced through Fort Bliss facilities. To compensate Fort Bliss for this usage, El Paso Electric Company shall deduct from Fort Bliss' demand billing Ben Milam's actual measured demand and energy each month.

**POWER FACTOR ADJUSTMENT**

If the power factor at the time of the highest measured thirty (30) minute interval kilowatt demand for the entire plant is below 90% lagging, a charge of \$0.0700 per KVAR will be made for each KVAR by which customer's computed KVAR demand exceeds 48.432% of the measured kilowatt demand. If the power factor is greater than or equal to 90%, then no power factor adjustment will be made.

(T)

**FIXED FUEL FACTOR**

The above rates are subject to the provisions of Company's Tariff Schedule No. 98 entitled Fixed Fuel Factor.

**TERMS OF PAYMENT**

The due date of the bill for utility service shall not be less than sixteen (16) days after issuance. A bill becomes delinquent if not received at the Company by the due date.

**TERMS AND CONDITIONS**

The Company's Rules and Regulations apply to service under this schedule. The Term of Contract under this schedule shall not be less than ten (10) years.

PUBLIC UTILITY COMMISSION OF TEXAS	
APPROVED	
MAR 9 '92 DOCKET	9945 #
CONTROL #	10963
TARIFF CLERK	

Section Number 1  
 Sheet Number 18  
 Page 2 of 2

Revision Number 4  
 Effective with energy consumed on or  
 after Page 11



El Paso Electric Company  
P.O. Box 982  
El Paso, Texas 79960  
(915) 543-5711

January 20, 1993

Mr. Scott Clark  
Carter & Burgess Engineering  
1100 Macon St.  
Ft. Worth, Texas 76102

Dear Scott:

As of the present time, El Paso Electric Company does not have any firm rebate programs in place with the exception of Thermal Energy Storage.

Presently, there are incentive (rebate) programs being developed by El Paso Electric Company and we should have more specifics on these around April, 1993. These rebates may be customized towards energy efficient lighting and energy efficient motors for example.

As soon as more details and specifics are known I will be happy to pass them on to you. But for now, T.E.S. is the only incentive program being offered by El Paso Electric Company.

I hope that the enclosed materials will satisfy your needs. If you should have any further questions please feel free to call me at (915) 543-5809.

Sincerely,

A handwritten signature in cursive script that reads "John D. Armstrong".

John D. Armstrong  
Commercial Utilization Specialist



Southern Union Gas

Requested Transmittal Time: \_\_\_\_\_  
Transmitted by: \_\_\_\_\_

Date Aug 14 1992

# GASFAX

To: Sect. Chief

Company/Region: \_\_\_\_\_

FAX No. 817-877-5646 Phone No. \_\_\_\_\_

From: John R. Quil

Message: Rate Schedule 1A. Cost of gas adj  
is expected to increase by .01 next  
month. or 10¢/MCF.

This facsimile consists of 4 pages including this form letter.  
If you do not receive all the pages of this transmission, PLEASE  
CONTACT OUR TELECOPIER OPERATOR IMMEDIATELY.

**Southern Union Gas**  
West Texas Region - El Paso  
P. O. Box 2040  
El Paso, TX 79976-2040  
(915) 544-6300  
FAX: (915) 521-4560

**SOUTHERN UNION GAS COMPANY**

Rate Sheet

EL PASO, TEXAS

Texas Tariff - West Texas

Section 3

Rate Schedule No. E5

SERVICE AREA \_\_\_\_\_

DGM 782-701 8-78

**FORT BLISS RATE****APPLICABILITY**

Applicable to the United States Government for all purposes at Fort Bliss, William Beaumont General Hospital, Biggs Field, Logan Heights, The First Cavalry Brigade Area, the Station Hospital, Permanent Troop Housing and Supporting Facilities and AFF Board No. 4 and Guided Missile Group and Training Facilities located east of Jeb Stuart Road.

**RATE**

During each monthly billing period the sum of items 1 and 2 below:

**1. Cost of Service Charge:**

All Gas @ \$.0258 per Ccf @ 14.9 PSIA.

**2. Cost of Gas Charge:** In addition to the Cost of Service set forth above, Ft. Bliss billing shall include an amount equal to the Cost of Gas per billing month as determined in accordance with Rate Schedule No. 1-1. Cost per Ccf will be determined at 14.9 PSIA and multiplied by total Ccf consumed during the billing month.**CONDITIONS**

1. In case of shortage of natural gas supply, or any other emergency not due to fault of the contractor, deliveries of gas hereunder may be curtailed in accordance with contractor's program of curtailment applicable to its consumers in the City of El Paso and Environs.
2. Volume of gas shown by meter readings will be corrected to 14.9 pounds per square inch absolute. Atmospheric pressure is agreed to be 12.8 pounds.
3. Subject to existing contract.

Supersedes same sheet dated 08/01/90

Deliveries On and After  
August 1, 1991

AUTHORITY \_\_\_\_\_

DATE EFFECTIVE \_\_\_\_\_ Page 14

**SOUTHERN UNION GAS COMPANY****Rate Sheet**

Texas Tariff - West Texas

Section 3

Rate Schedule No. 1A

SERVICE AREA El Paso

FORM 752-701 8-78

**ADJUSTMENTS TO BASIC RATE**  
**City of El Paso, Texas and El Paso Environs**

The following adjustments shall be applied to the price for each Ccf delivered to customers served by the West Texas Region in the El Paso County rate area (including the towns of Anthony, Vinton and Clint, Texas), under the basic rate schedules indicated below:

<u>Basic Rate Schedules</u>	<u>Basic Rate Effective Date</u>	<u>Customer Class</u>	<u>Previous Adjustment</u>	<u>Change In Adjustment</u>	<u>Total Present Adjustment</u>
10	01/15/92	Residential Service Rate	\$ .1362	\$ .0000	\$ .1362
20	01/15/92	Commercial Service Rate	\$ .1362	\$ .0000	\$ .1362
21	01/15/92	Commercial Air Conditioning Service	\$ .1362	\$ .0000	\$ .1362
25	01/15/92	Public Authority Rate	\$ .1362	\$ .0000	\$ .1362
26	01/15/92	Public Authority Air Conditioning Service	\$ .1362	\$ .0000	\$ .1362
27	01/15/92	Municipal Water Pumping Rate	\$ .1362	\$ .0000	\$ .1362
30	01/15/92	Irrigation Rate	\$ .1362	\$ .0000	\$ .1362
40	01/15/92	Industrial Service Rate	\$ .1362	\$ .0000	\$ .1362
41	01/15/92	Industrial Air Conditioning Service	\$ .1362	\$ .0000	\$ .1362
1Z	04/01/91	Residential Service - El Paso Environs	\$ .1362	\$ .0000	\$ .1362
2Z	04/01/91	Commercial Service Rate El Paso Environs	\$ .1362	\$ .0000	\$ .1362
2A	04/01/91	Commercial Air Conditioning Environs	\$ .1362	\$ .0000	\$ .1362

Supersedes Same Sheet Dated 04/29/92

Meters Read On and After  
 May 29, 1992

**SOUTHERN UNION GAS COMPANY**  
**Rate Sheet**

 Texas Tariff - West Texas  
 Section 3  
 Rate Schedule No. 1A

 SERVICE AREA El Paso

RM 752-701 8-78

**ADJUSTMENTS TO BASIC RATE**  
 City of El Paso, Texas and El Paso Environs  
 (Continued)

2E	04/01/91	Public Authority Rate El Paso Environs	\$ .1362	\$ .0000	\$ .1362
2F	04/01/91	Public Authority Air Conditioning Environs	\$ .1362	\$ .0000	\$ .1362
2G	04/01/91	Municipal Water Pumping Rate-El Paso Environs	\$ .1362	\$ .0000	\$ .1362
3Z	04/01/91	Irrigation Rate El Paso Environs	\$ .1362	\$ .0000	\$ .1362
4Z	04/01/91	Industrial Service Rate-El Paso Environs	\$ .1362	\$ .0000	\$ .1362
4A	04/01/91	Industrial Air Conditioning Environs	\$ .1362	\$ .0000	\$ .1362
C1	08/07/86	Electrical Cogeneration Energy Conservation	\$ .1362	\$ .0000	\$ .1362
E5	08/01/90	Fort Bliss	\$ .1493	\$ .0000	\$ .1493

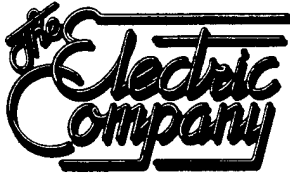
Supersedes same sheet dated 04/29/92

 Meter Read On and After  
 May 29, 1992

AUTHORITY

DATE EFFECTIVE Page 16

# **APPENDIX B - Fort Bliss Base Utility Bills**



El Paso Electric Company  
P.O. Box 982  
El Paso, Texas 79960  
(915) 543-5711

September 18, 1992

RECEIVED  
CARTER & BURGESS, INC.

SEP 21 1992

Mr. Scott Clark  
Carter & Burgess Engineering  
1100 Macon St.  
Ft. Worth, Texas 76102

Dear Scott:

Enclosed are the materials that you had requested regarding Ft. Bliss. I have provided you 20 months of billing information and 18 months of load data.

The load data are provided in four separate files. These files are named Bliss1, Bliss2, Bliss3 and Bliss4 with the .WK3 extension and are described by the following:

1. Bliss1.Wk3 - March 1, 1991 to June 30, 1991 on 30 minute intervals.
2. Bliss2.Wk3 - July 1, 1991 to December 31, 1991 on 30 minute intervals.
3. Bliss3.Wk3 - January 1, 1992 to April 31, 1992 on 30 minute intervals.
4. Bliss4.Wk3 - May 1, 1992 to August 31, 1992 on 30 minute intervals.

Also, there is an accompanying sheet providing the times and dates of system peak information. Demands occurring at these times for Ft. Bliss would be the facility's coincident peak demands.

I hope that the enclosed materials will satisfy your needs. If you should have any further questions please feel free to call me at (915) 543-5809.

Sincerely,

John D. Armstrong  
Commercial Utilization Specialist



DEPARTMENT OF THE ARMY  
DIR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$114,450.85

610,279.00  
~~\$650,299.00~~  
\$382.98

\$215,868.69

941,001.52  
\$914,001.52

MAIN SERVICE: 14,980,478 KWH @ \$0.00764/KWH  
ADJUSTED KWH = (14,868,000 - 10,100) x 1.00825

BILLING DEMAND: 28,386 KW @ \$21.50/KW  
POWER FACTOR ADJUSTMENT BASED ON 19,128 KVAR

FUEL ADJUSTMENT: 14,980,478 KWH @ \$0.01441/KWH

TOTAL

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	TO	DATE	SERVICE ADDRESS	ACCOUNT NUMBER
2146-1500-01	31	83	28198	28386	7-31-92	8-31-92		FORT BLISS	2146150001
METER NUMBER	DATE	PRESENT	READING	DATE	PREVIOUS	READING	DIFFERENCE	CONSTANT	KWH.
086242738	8-31		04387	7-31		03913	474	16800	7,963,200
086243002	8-31		03566	7-31		03155	411	16800	6,904,800
080082295	8-31		00352	7-31		00352	0	8400	0
084629428	8-31		00113	7-31		00012	101	100	10,100
N PEAK KW =	28198				OFF PEAK KW =	27958			

DEPARTMENT OF THE ARMY  
DIR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

CURRENT SERVICE \$941,001.52  
DOCKET NO 7460 \$31,022.00  
DOCKET NO 9945 \$9,448.00

TOTAL AMOUNT DUE \$981,471.52

CURRENT CHARGES OF \$981,471.52 ARE DUE BY 9/23/92.

STATE OF TEXAS UTILITY GROSS RECEIPTS ASSESSMENT EQUALS 1/6 OF 1%.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960

PO BOX 20982  
EL PASO, TEXAS 79960  
PHONE (915) 543-5711



DEPARTMENT OF THE ARMY  
DIR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$117,083.59  
\$614,018.50  
\$399.25  
\$220,834.36

MAIN SERVICE: 15,325,077 KWH @ \$0.00764  
ADJUSTED KWH = 1.00825 x (15,204,000 - 4320)

BILLING DEMAND: 28559 KW @ \$21.50/KW  
POWER FACTOR ADJUSTMENT BASED ON 19405 KVAR

FUEL ADJUSTMENT: 15,325,077 KWH @ \$0.01441/KWH

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	DATE	TO	SERVICE ADDRESS	ACCOUNT NUMBER
2146-1500-01	31	82	28290	28559	6-30-92	7-31-92		FORT BLISS	2146150001
<b>TOTAL</b>									\$952,335.70

METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DIFFERENCE	CONSTANT	K.W.H.
3086242738	7-31	03913	03429	484	16800	8,131,200
3086243002	7-31	03155	02734	421	16800	7,072,800
3080082295	7-31	00352	00352	0	8400	0
3084492746	7-31	03807	03729	78	40	3,120
3084629428	7-31	00012	00000	12	100	1,200
IN PEAK KW =	28290	OFF PEAK KW = 27898				

DEPARTMENT OF THE ARMY  
DIR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$952,335.70  
\$31,022.00  
\$9,448.00

CURRENT ELECTRIC SERVICE  
DOCKET NO 7460 RATE CASE EXPENSE  
DOCKET NO 9945 RATE CASE EXPENSE

CURRENT SERVICE  
DOCKET NO 7460  
DOCKET NO 9945

\$952,335.70  
\$31,022.00  
\$9,448.00

TOTAL AMOUNT DUE

\$992,805.70

TOTAL AMT DUE \$992,805.70

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

CURRENT CHARGES OF \$992,805.70 ARE DUE BY 8/24/92. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960

P.O. BOX 20982  
EL PASO, TEXAS 79960  
PHONE (915) 543-5711



DEPARTMENT OF THE ARMY  
DIR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$110,222.35  
\$593,378.50  
\$321.25  
\$207,893.20

MAIN SERVICE: 14,427,009 KWH @ \$0.00764/KWH  
ADJUSTED KWH = 1.00825 x (14,313,600 - 4,640)  
BILLING DEMAND: 27,599 KW @ \$21.50/KW  
POWER FACTOR ADJUSTMENT BASED ON 17851 KVAR  
FUEL ADJUSTMENT: 14,427,009 KWH @ \$0.01441/KWH

ACCOUNT NUMBER	RATE	POWER FACTOR	DEMAND MEASURED	BILLING DATE	FROM DATE	TO DATE	TOTAL	SERVICE ADDRESS	SERVICE ADDRESS	ACCOUNT NUMBER
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	DIFFERENCE	K.W.H.				
W58794905	6-30	03429	02974	5-29	455	16800				
W59585215	6-30	02734	02337	5-29	397	16800				
S80082295	6-30	00352	00352	5-29	0	8400				
S84492746	6-30	03729	03613	5-29	116	40				
ON PEAK KW =	27382		OFF PEAK KW =	26536		4,640				

DEPARTMENT OF THE ARMY  
DIR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

CURRENT ELECTRIC SERVICE \$911,815.30  
DOCKET NO 7460 RATE CASE EXPENSE \$31,022.00  
DOCKET NO 9945 RATE CASE EXPENSE \$9,448.00

CURRENT SERVICE \$911,815.30  
DOCKET NO 7460 \$31,022.00  
DOCKET NO 9945 \$9,448.00

TOTAL AMOUNT DUE \$952,285.30  
TOTAL AMT DUE \$952,285.30

CURRENT CHARGES OF \$952,285.30 ARE DUE BY 7/23/92. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960



EL PASO ELECTRIC COMPANY  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960  
 PHONE (915) 543-5711

DEPARTMENT OF THE ARMY  
 DIR OF INSTAL SUPPORT  
 ATTN:ATZC-ISE-N BLDG1288  
 FT BLISS TX 79916

\$87,641.38  
 \$532,469.00  
 \$199.39  
 \$165,302.66

MAIN SERVICE: 11,471,385 KWH @ \$0.00764/KWH  
 ADJUSTED KWH = 1.00825 x (11,390,400 - 12,880)  
 BILLING DEMAND: 24,766 KW @ \$21.50/KW  
 POWER FACTOR ADJUSTMENT BASED ON 14,755 KVAR  
 FUEL ADJUSTMENT: 11,471,385 KWH @ \$0.01441/KWH

TOTAL \$785,612.43

ACCOUNT NUMBER	RATE	POWER FACTOR	DEMAND MEASURED	BILLING	FROM	TO	SERVICE ADDRESS	ACCOUNT NUMBER
2146-1500-01	31	86	24584	24766	4-30-92	5-29-92	FORT BLISS	214615000
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	DIFFERENCE	K.W.H.		
W58794905	5-29	02974	02604	4-30	370	16,800		
W59585215	5-29	02337	02029	4-30	308	16,800		
S80082295	5-29	00352	00352	4-30	0	8,400		
S84492746	5-29	03613	03291	4-30	322	40		
ON PEAK KW =	24584	OFF PEAK KW = 23936						

DEPARTMENT OF THE ARMY  
 DIR OF INSTAL SUPPORT  
 ATTN:ATZC-ISE-N BLDG1288  
 FT BLISS TX 79916

CURRENT ELECTRIC SERVICE \$785,612.43  
 DOCKET NO 7460 RATE CASE EXPENSE \$31,022.00  
 DOCKET NO 9945 RATE CASE EXPENSE \$9,448.00  
 PREVIOUS UNPAID BALANCE \$1,000.00

TOTAL AMT DUE \$827,082.43

CURRENT CHARGES OF \$826,082.43 ARE DUE BY 6/23/92.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
 ATTN: REVENUE PROCESSING  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960



PO BOX 20982  
EL PASO, TEXAS 79960  
PHONE (915) 543-5711



DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG1288  
FORT BLISS TX 79916

\$93,686.01

MAIN SERVICE: 12,195,227 @ \$0.007682187/KWH  
ADJUSTED KWH = 1.00825 x (12,112,800 - 17,360)

BILLING DEMAND: 22355 KW @ \$21.50/KW

FUEL ADJUSTMENT: 12,195,227 KWH @ \$0.01441/KWH

*Handwritten:* 480,632.50  
175,733.22  
TOTAL \$750,051.73

TOTAL \$750,051.73

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	DATE	TO	SERVICE ADDRESS	ACCOUNT NUMBER
1146-1500-01	31	91	22182	22355	2-28-92	3-31-92		FORT BLISS	2146150001
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	DIFFERENCE	K.W.H.			
158794905	3-31	02238	01869	2-28	369	6,199,200			
159585215	3-31	01719	01382	2-28	337	5,661,600			
80082295	3-31	00352	00322	2-28	30	252,000			
84492746	3-31	02932	02498	2-28	434	17,360			
ON PEAK KW	=	22182	OFF	PEAK KW	=	21924			

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG1288  
FORT BLISS TX 79916

\$750,051.73

CURRENT ELECTRIC SERVICE  
DOCKET NO 7460 RATE CASE EXPENSES  
DOCKET NO 9945 RATE CASE EXPENSES

CURRENT SERVICE  
DOCKET NO 7460  
DOCKET NO 9945

*Handwritten:* Add 4000.00

TOTAL AMT DUE \$790,521.73

\$790,521.73

CURRENT CHARGES OF \$790,521.73 ARE DUE BY 4/23/92. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960



**EL PASO ELECTRIC COMPANY**  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960  
 PHONE (915) 543-5711

**EL PASO ELECTRIC COMPANY**

DEPARTMENT OF THE ARMY

MAIN SERVICE: 11,158,666 KWH @ \$0.00779  
 ADJUSTED KWH = 1.00825 x (11,088,000 - 20,640)  
 BILLING DEMAND: 23054 KW @ \$21.50  
 FUEL ADJUSTMENT: 11,158,666 KWH @ \$0.01441

\$86,926.01  
 DIR OF INSTAL SUPPORT  
 ATTN:ATZC-ISE-N BLDG 1288  
 FT BLISS TX 79916  
 495,661.00  
 160,796.38  
 TOTAL \$743,383.39

TOTAL

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	DATE	FROM	TO	SERVICE ADDRESS	ACCOUNT NUMBER	
										DATE
2146-1500-01	31	91	22906	23054	1-31-92	1-31-92	2-28-92	FORT BLISS	21461500	
W58794905	2-28	01869		1-31	01517	01517	352	16,800		
W59585215	2-28	01382		1-31	01074	01074	308	16,800	5,913,600	
S80082295	2-28	00322		1-31	00322	00322	-0-	8,400	5,174,400	
S84492746	2-28	02498		1-31	01982	01982	516	40	0	
ON-PEAK KW = 22906								OFF-PEAK KW = 22576	20,640	

DEPARTMENT OF THE ARMY  
 DIR OF INSTAL SUPPORT  
 ATTN:ATZC-ISE-N BLDG 1288  
 FT BLISS TX 79916

CURRENT ELECTRIC SERVICE \$743,383.39  
 DOCKET NO. 7460 RATE CASE EXPENSE 31,022.00  
 TOTAL AMOUNT DUE \$774,405.39

CURRENT SERVICE \$743,383.39  
 DOCKET NO. 7460 31,022.00  
 TOTAL DUE \$774,405.39

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
 ATTN: REVENUE PROCESSING  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960

CURRENT CHARGES OF \$774,405.39 ARE DUE BY 3/24/92. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

EL PASO TEXAS 79960  
PHONE (915) 543-5711



DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS, TX 79916

\$ 97,484.03

510,496.00

180,326.68

TOTAL \$788,306.71

MAIN SERVICE: 12,513,996 KWH @ \$0.00779  
ADJUSTED KWH = 1.00825 X (12,432,000 - 20,400)

BILLING DEMAND: 23744 KW @ \$21.50/KW

FUEL ADJUSTMENT: 12,513,996 KWH @ \$0.01441/KW

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND	BILLING	FROM	TO	SERVICE ADDRESS	ACCOUNT NUMBER
2146-1500-01	31	91	23603	23744		12-31-91	1-31-92	FORT BLISS	2146150001
METER NUMBER	DATE	PRESENT READING	DATE	PREVIOUS READING	DIFFERENCE	CONSTANT	K.W.H.		
W58794905	1-31	01517	12-31	01100	417	16,800	7,005,600		
W59585215	1-31	01074	12-31	00751	323	16,800	5,426,400		
S80082295	1-31	00322	12-31	00322	0	8,400	0		
S84492746	1-31	01982	12-31	01472	510	40	20,400		
			ON PEAK KW = 23602		OFF PEAK KW = 23603				

TOTAL SERVICE \$788,306.71  
DOCKET NO. 7460 31,022.00  
DOCKET NO. 8588 42,962.41

CURRENT ELECTRIC SERVICE \$788,306.71  
DOCKET NO. 7460 RATE CASE EXPENSES 31,022.00  
DOCKET NO. 8588 FUEL REFUND 42,962.41

TOTAL AMT DUE \$776,366.30

TOTAL AMOUNT DUE \$776,366.30

PLEASE RETURN THIS PORTION WITH  
YOUR PAYMENT TO

CURRENT CHARGES OF \$776,366.30 ARE DUE BY 2/24/92. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
PO. BOX 20982  
EL PASO, TEXAS 79960



DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$70,689.39  
478,548.46  
186,361.98  
46,368.42

*Nov 14 33 99.57*

MAIN SERVICE: 12,932,823 KWH @ \$0.00546589/KWH  
ADJUSTED KWH = 1.00825 X (12,843,600 - 16,600)  
BILLING DEMAND: 23411 KW @ \$20.4418/KW  
FUEL ADJUSTMENT: 12,932,823 KWH @ \$0.01441/KWH

BONDED RATE INCREASE:

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	DATE	FROM	TO	SERVICE ADDRESS	ACCOUNT NUMBER
2146150001	31	91	23254	23411	11-27-91	11-27-91	12-31-91	FORT BLISS	2146150001
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	DIFFERENCE				
W58794905	12-31	01100	11-27	11-27	418				
W59585215	12-31	00751	11-27	11-27	303				
S80082295	12-31	00322	11-27	11-27	87				
S84492746	12-31	01472	11-27	11-27	415				
		ON PEAK KW = 23254			OFF PEAK KW = 23044				
					TOTAL				\$781,968.25

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

TOTAL ELECTRIC SERVICE \$781,968.25  
DOCKET NO 7460 RATE CASE EXPENSE 31,022.00  
DOCKET NO 8588 FUEL REFUND 42,962.41CR  
PREVIOUS CREDIT BALANCE 1.00CR  
TOTAL AMOUNT DUE \$770,026.84

CURRENT CHARGES OF \$770,026.84 ARE DUE BY 01/24/92.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO  
EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960



EL PASO, TEXAS 79960  
PHONE (916) 543-6711

MAIN SERVICE: 10,614,412 KWH @ \$0.00340/KWH  
ADJUSTED KWH = 1,00825 X (10,542,000 - 14,440)

BILLING DEMAND: 23056 KW @ \$19.50/KW

FUEL ADJUSTMENT: 10,614,412 KWH @ \$0.01439/KWH

BONDED RATE INCREASE:

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATTN ATZC-ISE-N BGL1288  
FORT BLISS TX 79916

\$36,089.00  
449,592.00  
152,741.39  
84,994.18

TOTAL \$723,416.57

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	DATE	FROM	TO	SERVICE ADDRESS	ACCOUNT NUMBER
2146150001	31	91	22894	23056	10-31-91	10-31-91	11-27-91	FORT BLISS	2146150001
MEIER NUMBER	DATE	PRESENT	READING	DATE	PREVIOUS	READING	DIFFERENCE	CONSTANT	K.W.H.
W58794905	11-27		00682	10-31		00302	380	16800	6,384,000
W59585212	11-27		00448	10-31		00201	247	16800	4,149,600
S80082295	11-27		00235	10-31		00234	1	8400	8,400
S84492746	11-27		01057	10-31		00696	361	40	14,440

ON PEAK KW = 22894

OFF PEAK KW = 22774

TOTAL ELECTRIC SERVICE \$723,416.57

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATTN ATZC-ISE-N BGL1288  
FORT BLISS TX 79916

DOCKET NO 7460 RATE CASE EXPENSE 31,022.00  
DOCKET NO 9165 RATE CASE EXPENSE 5,802.00  
DOCKET NO 8588 FUEL REFUND 42,963.41CR

TOTAL SERVICE \$723,416.57  
DOCKET NO 7460 31,022.00  
DOCKET NO 9165 5,802.00  
DOCKET NO 8588 42,961.41CR

TOTAL AMOUNT DUE \$717,279.16

TOTAL AMT DUE \$717,279.16  
PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

CURRENT CHARGES OF \$717,279.16 ARE DUE BY 12/24/91. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
PO. BOX 20982  
EL PASO, TEXAS 79960

*Handwritten:* Aug 10 9778 98

*Handwritten:* ADV 36804

EL PASO, TEXAS 79960  
PHONE (915) 543-5711



DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$41,539.47  
469,267.50  
144.73  
175,809.68  
89,416.55

MAIN SERVICE: 12,217,490 KWH @ \$0.00340/KWH  
ADJUSTED KWH = 1.00825 X (12,129,000 - 12,080)  
BILLING DEMAND: 24065 KW @ \$19.50/KW  
POWER FACTOR ADJUSTMENT BASED ON 13637 KVAR

FUEL ADJUSTMENT: 12,217,490 KWH @ \$0.01439/KWH

BONDED RATE INCREASE:

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	DATE	FROM	TO	TOTAL		SERVICE ADDRESS	ACCOUNT NUMBER
								DATE	TO		
2146150001	31	87	23888	24065	9-30-91	9-30-91	10-31-91	\$776,177.93	\$776,177.93	FORT BLISS	2146150001
86242738	10-31	PRESENT	READING	DATE	PREVIOUS	READING	DIFFERENCE			FORT BLISS	
W58794905	10-9	00302	07827	10-9	00000	00000	302			FORT BLISS	
G86243002	10-31	07957	00201	10-9	00000	00000	130			FORT BLISS	
W59585251	10-9	00201	01535	9-30	01446	01446	201			FORT BLISS	
S80082295	10-31	00234	00234	9-30	00234	00234	89			FORT BLISS	
S84492746	10-31	00696	00394	9-30	00394	00394	0			FORT BLISS	
							302			FORT BLISS	
								TOTAL ELECTRIC SERVICE			
								\$776,177.93		TOTAL SERVICE	\$776,177.93

12/4/68

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

DOCKET NO 7460 RATE CASE EXPENSE 31,022.00  
DOCKET NO 9165 RATE CASE EXPENSE 5,802.00  
DOCKET NO 8588 FUEL REFUND 42,962.41CR

TOTAL AMOUNT DUE \$770,039.52

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960

CURRENT CHARGES OF \$770,039.52 ARE DUE BY 11/21/91. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

*Handwritten notes:*  
135892  
11/21/91  
135892

EL PASO, TEXAS 79960  
PHONE (915) 543-5711



DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG1288  
FORT BLISS TX 79916

MAIN SERVICE: 14,249,557 KWH @ \$0.00340/KWH  
ADJUSTED KWH = 1.00825 X (14,145,600 - 12,640)

BILLING DEMAND: 29,061 KW @ \$19.50/KW  
POWER FACTOR ADJUSTMENT BASED ON 18,549 KVAR

FUEL ADJUSTMENT: 14,249,557 KWH @ \$0.01439/KWH

BONDED RATE INCREASE:

\$48,448.49  
566,689.50  
320.82  
205,051.13  
97,919.49

TOTAL \$918,429.43

ACCOUNT NUMBER	RATE	POWER FACTOR	DEMAND MEASURED	BILLING DATE	PREVIOUS READING	READING	DATE	FROM	TO	DIFFERENCE	SERVICE ADDRESS	ACC. NUM.	
													CONSTANT
2146150001	31	84	28836	29061	8-30	07314	8-30-91	8-30-91	9-30-91	513	FORT BLISS	214615	
W58794905					8-30	07827				16,800	FORT BLISS		
W59585215					8-30	01446				16,800	FORT BLISS		
S80082295					8-30	00234				8,400	FORT BLISS		
S84492746					8-30	00394				40	FORT BLISS		
ON PEAK KW = 28,836					OFF PEAK KW = 27,970								
TOTAL ELECTRIC SERVICE											\$918,429.43	TOTAL SERVICE	\$918,429.
DOCKET NO 9165 RATE CASE EXPENSE											5,802.00	DOCKET NO 9165	5,802.
DOCKET NO 8588 FUEL REFUND											42,962.41CR	DOCKET NO 8588	42,962.

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG1288  
FORT BLISS TX 79916

TOTAL AMOUNT DUE \$881,269.02

TOTAL SERVICE \$918,429.  
DOCKET NO 9165 5,802.  
DOCKET NO 8588 42,962.

CURRENT CHARGES OF \$881,269.02 ARE DUE BY 10/22/91. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960

*Handwritten notes:*  
71337830  
16088722  
16088991  
16088995  
B (568714)  
F (1558486)  
A (95824)  
B (568714)  
A (95824)





**EL PASO ELECTRIC COMPANY**  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960  
 PHONE (915) 543-5711

MAIN SERVICE: 16,434,757 KWH @ \$0.00340/KWH  
 ADJUSTED KWH = 1.00825 X (16,304,400 - 4120)

BILLING DEMAND: 29,395 KW @ \$19.00/KW  
 POWER FACTOR ADJUSTMENT BASED ON 18,228 KVAR

FUEL ADJUSTMENT: 16,434,757 @ \$0.01653/KWH

**EL PASO ELECTRIC COMPANY**

DEPARTMENT OF THE ARMY

DIRECTOR OF INSTAL SUPPORT

ATZC-ISE-N-BLDG1288

FORT BLISS TX 79916

\$55,878.17

558,505.00  
288.72

271,666.53

*Handwritten notes:*  
 6/14/78  
 18.11.19  
 50.0035  
 5570.82  
 50.0035  
 5570.82  
 50.0035  
 5570.82

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	DATE	TO	SERVICE ADDRESS	SERVICE ADDRESS	ACCOUNT NUMBER
2146150001	31	85	29120	29395	6-28-91	7-31-91		FORT BLISS	FORT BLISS	2146150001
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	READING	DIFFERENCE	K.W.H.			
W58794905	7-31	06764	06191	6-28	06191	573	9,626,400			
W59585215	7-31	00757	00360	6-28	00360	397	6,669,600			
S80082295	7-31	00234	00233	6-28	00233	1	8,400			
S41975145	7-31	04819	04716	6-28	04716	103	4,120			
ON PEAK KW =		29,120	TOTAL ELECTRIC SERVICE		OFF PEAK KW =		28,970			
							\$886,338.42			

DEPARTMENT OF THE ARMY  
 DIRECTOR OF INSTAL SUPPORT  
 ATZC-ISE-N BLDG1288  
 FORT BLISS TX 79916

TOTAL SERVICE \$886,338.  
 DOCKET NO 9165 5,802.  
 DOCKET NO 8588 42,962.  
 TOTAL AMT DUE \$849,178.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO  
 EL PASO ELECTRIC COMPANY  
 ATTN: REVENUE PROCESSING  
 P.O. BOX 20982  
 EL PASO, TEXAS 79

CURRENT CHARGES OF \$849,178.01 ARE DUE BY 08/22/91.





EL PASO, TEXAS 79960  
PHONE (915) 543-5711



MAIN SERVICE: 12,437,570 KWH @ \$0.00340/KWH  
ADJUSTED KWH = 1.00825 x (12,348,000 - 12,200)

BILLING DEMAND: 22,226 KW @ \$19.50/KW  
POWER FACTOR ADJUSTMENT BASED ON 10895 KVAR

FUEL ADJUSTMENT: 12,437,570 KWH @ \$0.01653/KWH

\$42,287.74

\$433,407.00  
\$29.61

\$205,593.03

TOTAL \$681,317.38

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG1288  
FORT BLISS TX 79916

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	DATE	TO	SERVICE ADDRESS	SERVICE ADDRESS	ACCOUNT NUMBER
2146150001	31	89	21599	22226	3-28-91	4-30-91		FORT BLISS	FORT BLISS	2146150
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	DIFFERENCE	K.W.H.				
W58794905	4-30	05234	04796	3-28	438	7,358,400				
W59585215	4-30	09729	09432	3-28	297	4,989,600				
S80082295	4-30	00224	00224	3-28	0	0				
S41755145	4-30	04220	03915	3-28	305	12,200				
ON PEAK KW = 21576				OFF PEAK KW = 21622		12,348,000				
TOTAL ELECTRIC SERVICE										\$681,317.38

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG1288  
FORT BLISS TX 79916

TOTAL SERVICE \$681,317.38  
DOCKET NO 9165 \$5,802.00  
DOCKET NO 8588 \$46,962.4  
TOTAL AMT DUE \$644,156.9

CURRENT CHARGES OF \$644,156.97 ARE DUE BY 05/22/91. CURRENT CHARGES NOT PAID BY DUE DATE ARE SUBJECT TO A 5 PERCENT LATE PAYMENT PENALTY.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
PO. BOX 20982  
EL PASO, TEXAS 79960

*Handwritten notes:*  
Paid 4/27/91  
4/27/91  
5802.00  
46962.40  
644156.97  
6/15/91  
6/15/91

PO BOX 20982  
EL PASO, TEXAS 79960  
PHONE (915) 543-5711



MAIN SERVICE: 10,351,904 KWH @ \$0.00340/KWH  
ADJUSTED KWH = 1,008,25 X (10,281,600 - 14,400)

BILLING DEMAND: 22226 KW @ \$19.50/KW

FUEL ADJUSTMENT: 10,351,904 KWH @ \$0.01653/KWH

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

\$35,196.47  
\$433,407.00  
\$171,116.97

TOTAL \$639,720.44

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	DATE	TO	SERVICE ADDRESS	SERVICE ADDRESS	ACCO NUMBER
2146150001	31	92	21440	22226	2-28-91	3-28-91		FORT BLISS	FORT BLISS	214615
METER NUMBER	DATE	READING	DATE	READING	DATE	DATE	DATE			
W58794905	3-28	04796	2-28	04441	2-28-91	3-28-91	3-28-91	FORT BLISS	FORT BLISS	
W59585215	3-28	09432	2-28	09175	2-28-91	3-28-91	3-28-91	FORT BLISS	FORT BLISS	
S80082295	3-28	00224	2-28	00224	2-28-91	3-28-91	3-28-91	FORT BLISS	FORT BLISS	
S41975145	3-28	03915	2-28	03555	2-28-91	3-28-91	3-28-91	FORT BLISS	FORT BLISS	
								CONSANT	K.W.H.	
								16,800	5,964,000	
								16,800	4,317,600	
								8,400	0	
								40	14,400	

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC-ISE-N BLDG 1288  
FORT BLISS TX 79916

TOTAL ELECTRIC SERVICE \$639,720.44  
DOCKET NO 9165 RATE CASE EXPENSE \$5,802.00  
DOCKET NO 8588 FUEL REFUND \$42,962.41CR

TOTAL AMT DUE \$602,560.03

TOTAL SERVICE \$639,720.44  
DOCKET NO 9165 \$5,802.00  
DOCKET NO 8588 \$42,962.41CR

TOTAL AMT DUE \$602,560.03

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
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PO. BOX 20982  
EL PASO, TEXAS 79960

*Handwritten notes:*  
16660317  
50000  
128188  
1380000  
128188  
1380000



EL PASO, TEXAS 79960  
PHONE (915) 543-5711

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC - ISE - N BLG 1288  
FORT BLISS TX 79916

\$34,047.26  
\$433,407.00  
\$165,529.75

MAIN SERVICE: 10,013,899 KWH @ \$0.00340  
ADJUSTED KWH = 1.00825 X (9,945,600 -13,640)  
BILLING DEMAND: 22,226 KW @ \$19.50/KW  
FUEL ADJUSTMENT: 10,013,889 KWH @ \$0.01653/KWH

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	DATE FROM	DATE TO	DIFFERENCE	SERVICE ADDRESS	ACCOUNT NUMBER
2146150001	31	93	20,504	22,226	1-31-91	2-28-91		FORT BLISS	2146150001
TOTAL								\$632,984.01	
METER NUMBER	DATE	PRESENT READING	PREVIOUS READING	DATE	FROM	TO	DIFFERENCE	CONSTANT	K.W.H.
W58794905	2-28	04441	04105	1-31	1-31-91	2-28-91	336	16,800	5,644,800
W59585215	2-28	08919	09175	1-31	1-31-91	2-28-91	256	16,800	4,300,800
S80082295	2-28	00224	00224	1-31	1-31-91	2-28-91	0	8,400	0
S41975145	2-28	03214	03555	1-31	1-31-91	2-28-91	341	40	13,640
ON PEAK KW = 20,504								OFF PEAK KW = 20,332	

9959,240

DEPARTMENT OF THE ARMY  
DIRECTOR OF INSTAL SUPPORT  
ATZC - ISE - N BLG 1288  
FORT BLISS TX 79916

TOTAL ELECTRIC SERVICE \$632,984.01  
DOCKET NO 9165 RATE CASE EXPENSE \$5,802.00  
DOCKET NO 8588 FUEL REFUND \$42,962.41CR

TOTAL SERVICE \$632,984.01  
DOCKET NO 9165 \$5,802.00  
DOCKET NO 8588 \$42,962.41CR

TOTAL AMT DUE \$595,823.60

CURRENT CHARGES OF \$595,823.60 ARE DUE BY 03/22/91.

PLEASE RETURN THIS PORTION WITH YOUR PAYMENT TO

EL PASO ELECTRIC COMPANY  
ATTN: REVENUE PROCESSING  
P.O. BOX 20982  
EL PASO, TEXAS 79960

Handwritten notes: "Pay to the order of El Paso Electric Co", "Account No 12356789", "Date 1/22/91", "By [Signature]"



**EL PASO ELECTRIC COMPANY**  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960  
 PHONE (915) 543-5711

**EL PASO ELECTRIC COMPANY**

MAIN SERVICE: 11,067,439 KWH @ \$0.00340  
 ADJUSTED KWH = 1,00825 x (10,987,200 - 10,320)

\$37,629.29

DEPARTMENT OF THE ARMY  
 DIRECTOR OF INSTAL SUPPORT

BILLING DEMAND: 22,226 KW @ \$19.50/KW

\$433,407.00

ATZC-ISE-N BLG1288

FUEL ADJUSTMENT: 11,067,439 KWH @ \$0.01653/KWH

\$182,944.77

FORT BLISS TX 79916

**TOTAL \$653,981.06**

ACCOUNT NUMBER	RATE	POWER FACTOR	MEASURED	DEMAND BILLING	FROM	DATE	TO	SERVICE ADDRESS	SERVICE ADDRESS	ACCOUNT NUMBER	
2146150001	31	93	20,773	22,226	12/31/90	01/31/91		FORT BLISS	FORT BLISS	21461500	
								CONSTANT	K.W.H.		
W58794905			04105	12/31	03734	371		16,800	6,232,800		
W59585215			08919	12/31	08636	283		16,800	4,754,400		
S80082295			00224	12/31	00224	0		8,400	0		
S41975145			03214	12/31	02956	258		40	10,320		
		ON PEAK KW = 20,772		OFF PEAK KW = 20,774							
									TOTAL ELECTRIC SERVICE	\$653,981.06	
									DOCKET NO 9165 RATE CASE EXPENSE	\$5,802.00	
									DOCKET NO 9165	\$5,802.00	
									TOTAL AMOUNT DUE	\$659,783.06	
									TOTAL SERVICE	\$653,981.06	
									TOTAL AMOUNT DUE	\$659,783.06	

10/17/90

DEPARTMENT OF THE ARMY  
 DIRECTOR OF INSTAL SUPPORT  
 ATZC-ISE-N BLG1288  
 FORT BLISS TX 79916

TOTAL SERVICE \$653,981.06  
 DOCKET NO 9165 \$5,802.00  
 TOTAL AMOUNT DUE \$659,783.06

CURRENT CHARGES OF \$659,783.06 ARE DUE BY 02/22/91.

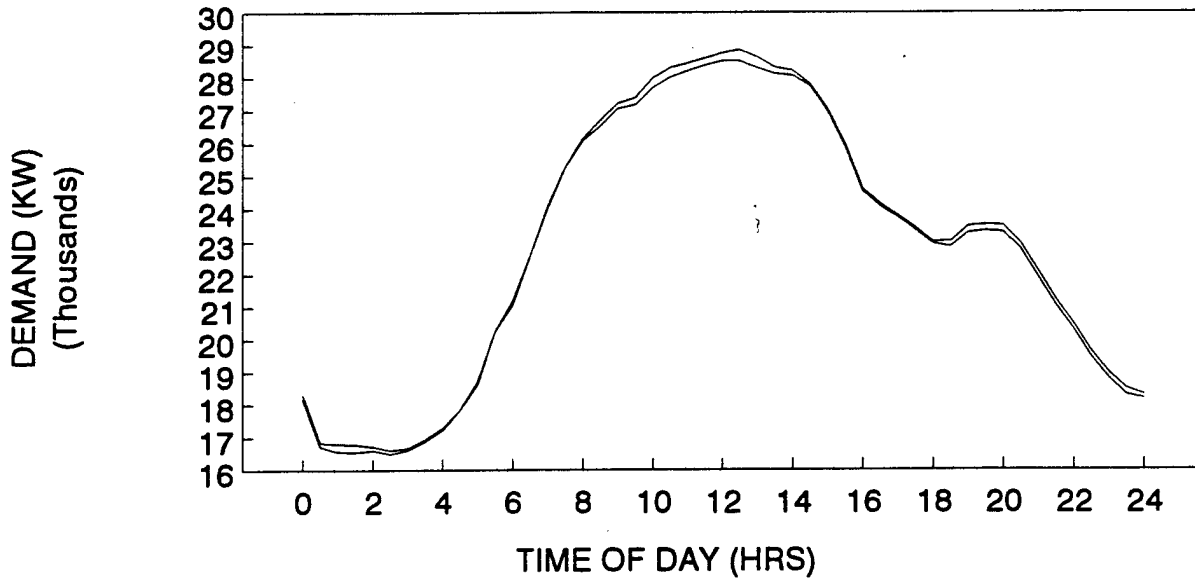
PLEASE RETURN THIS PORTION WITH  
 YOUR PAYMENT TO

**EL PASO ELECTRIC COMPANY**  
 ATTN: REVENUE PROCESSING  
 P.O. BOX 20982  
 EL PASO, TEXAS 79960

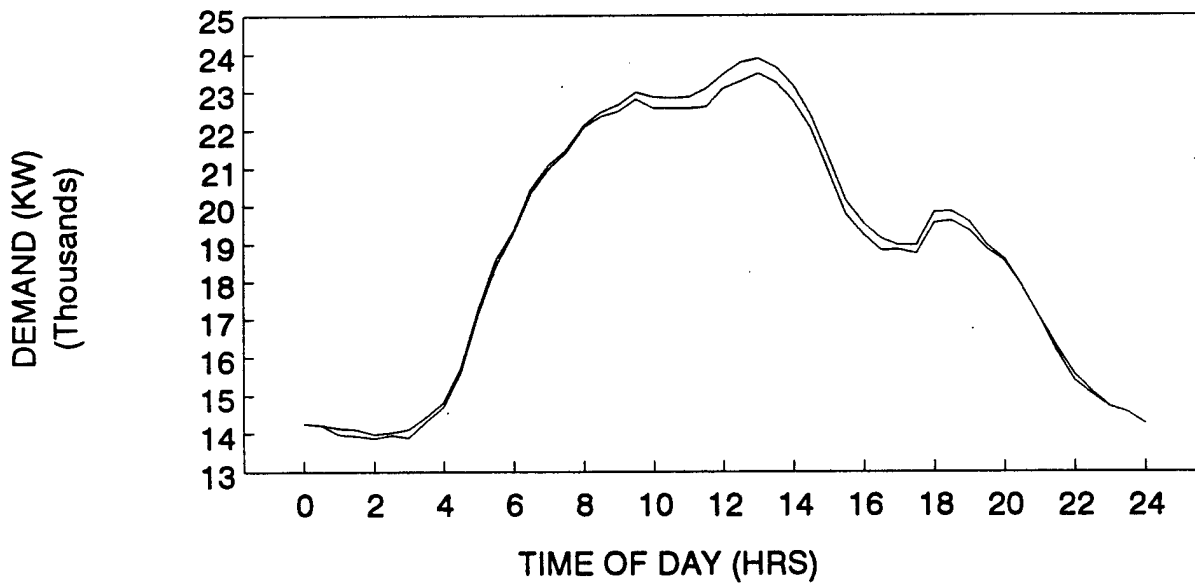
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 10/17/90  
 10/17/90

## **APPENDIX C - Peak Demand Profiles**

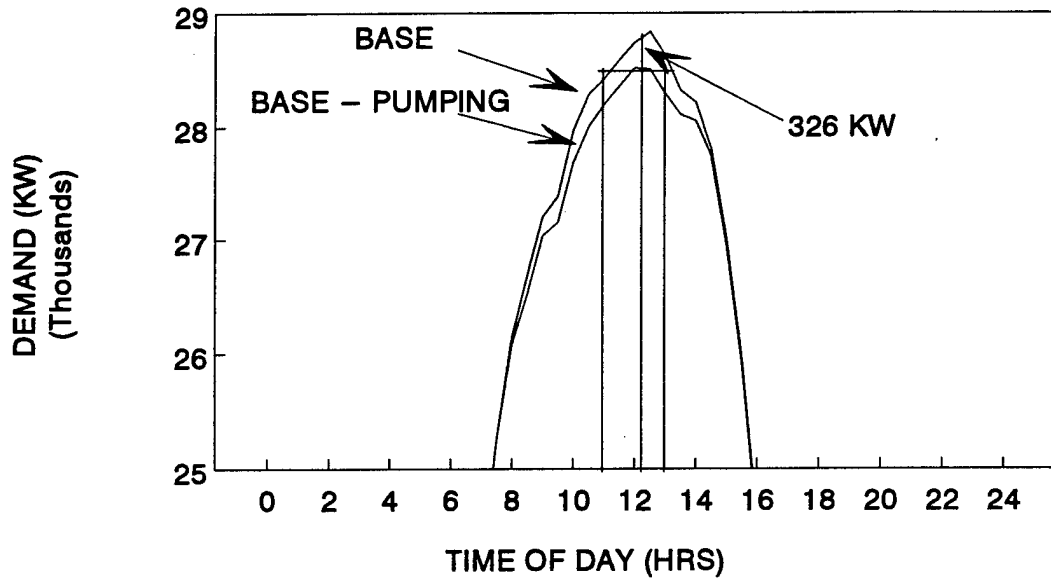
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03-SEP-91



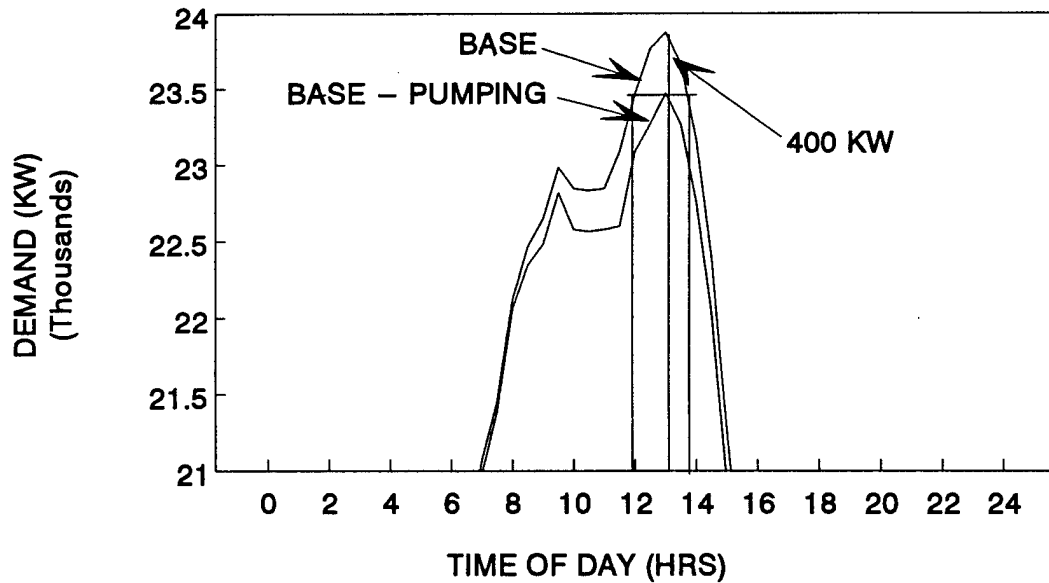
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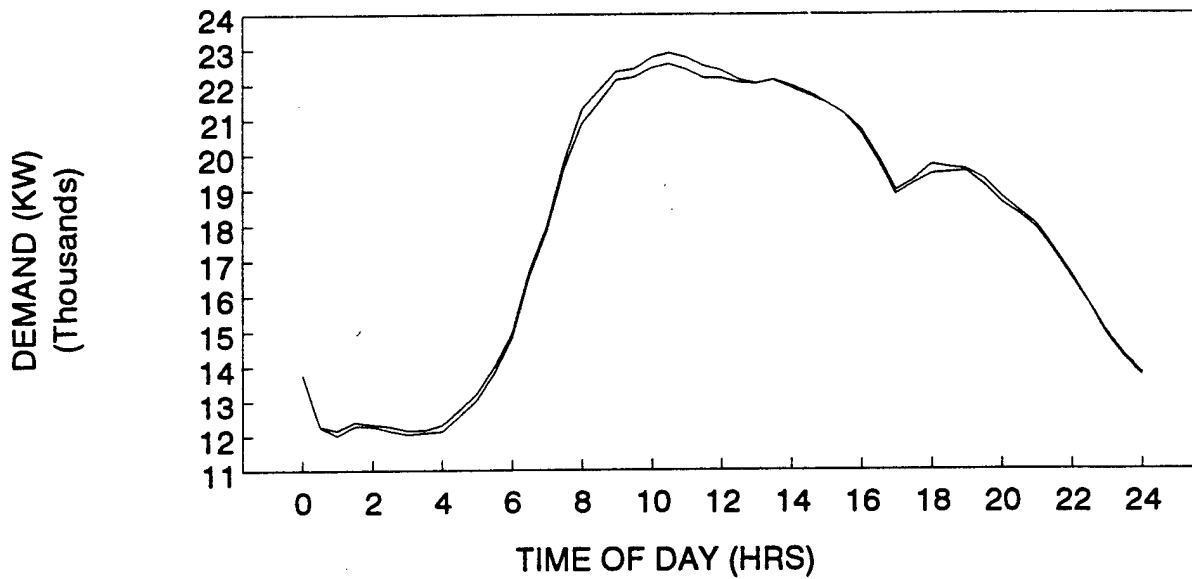
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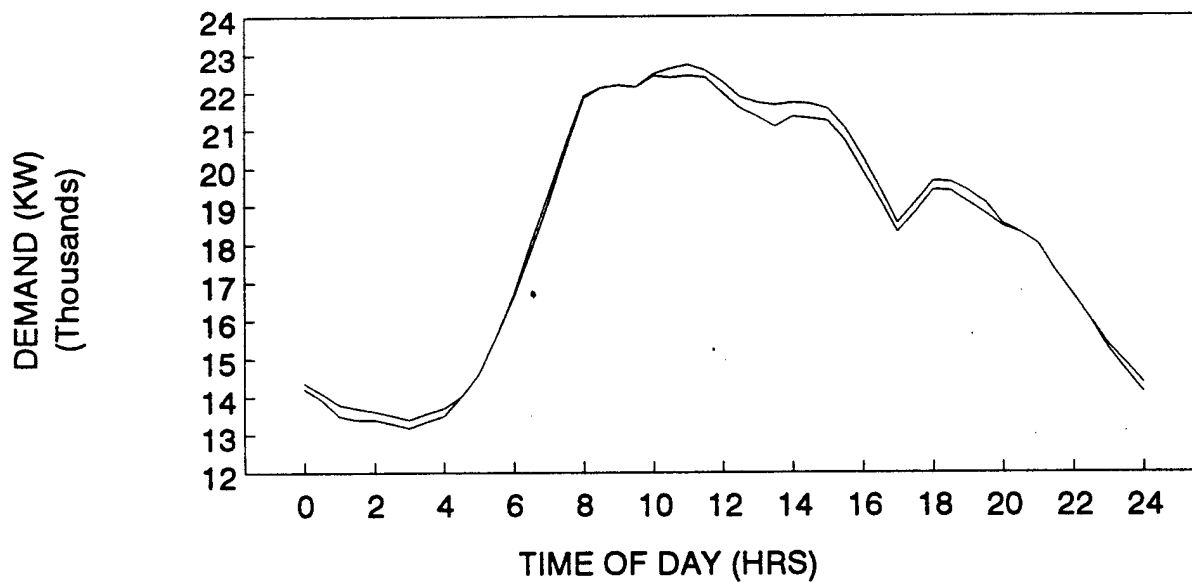
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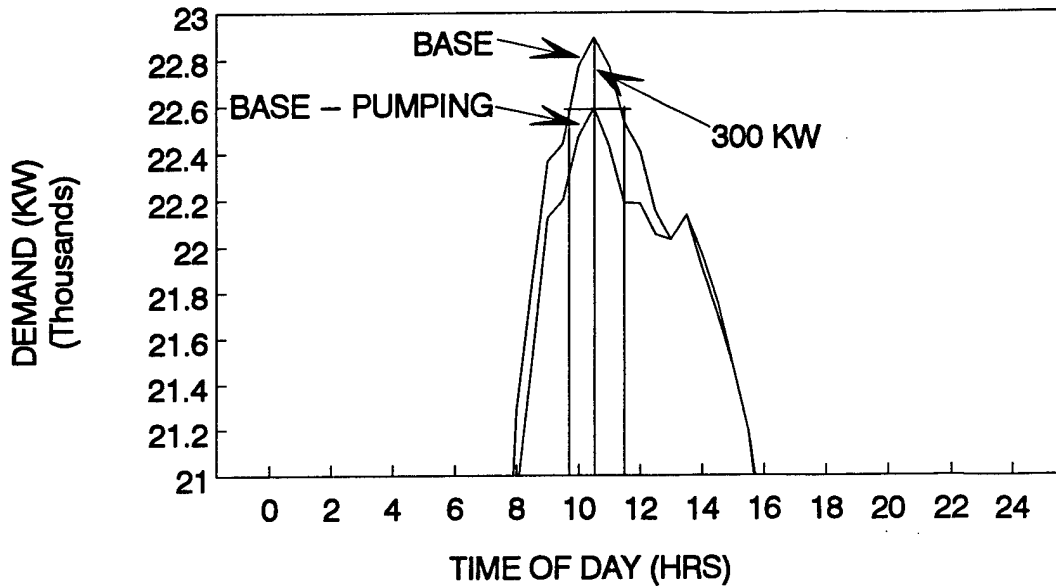
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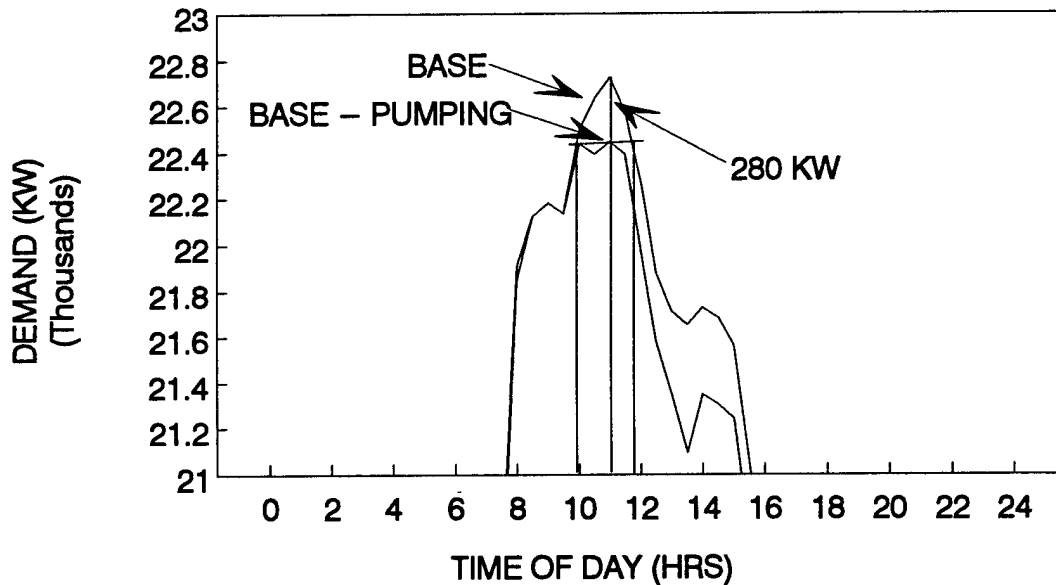
DEMAND PROFILE  
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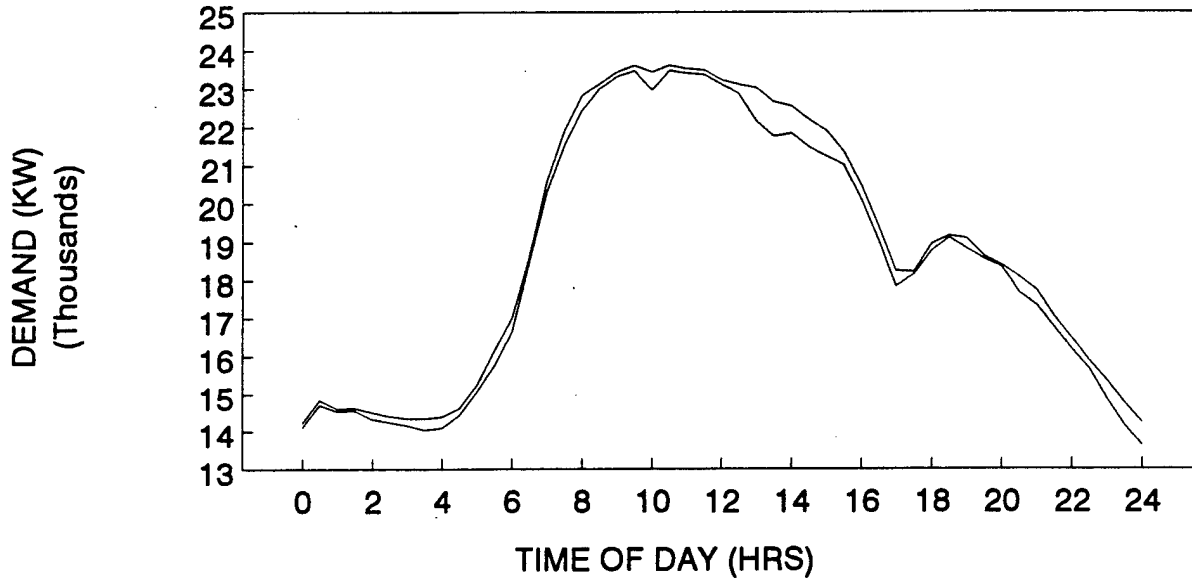
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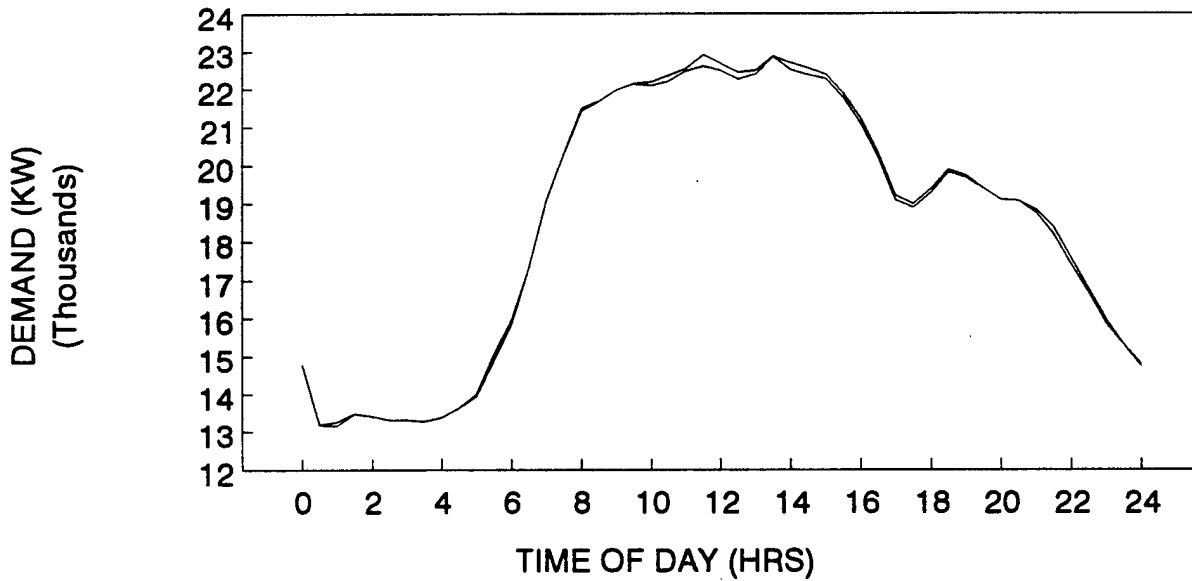
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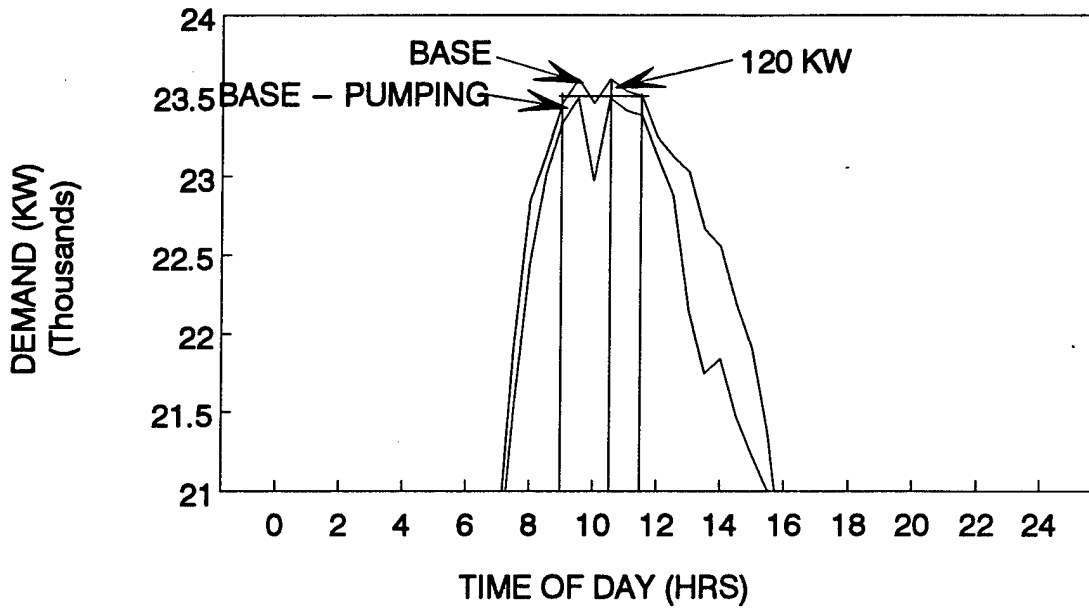
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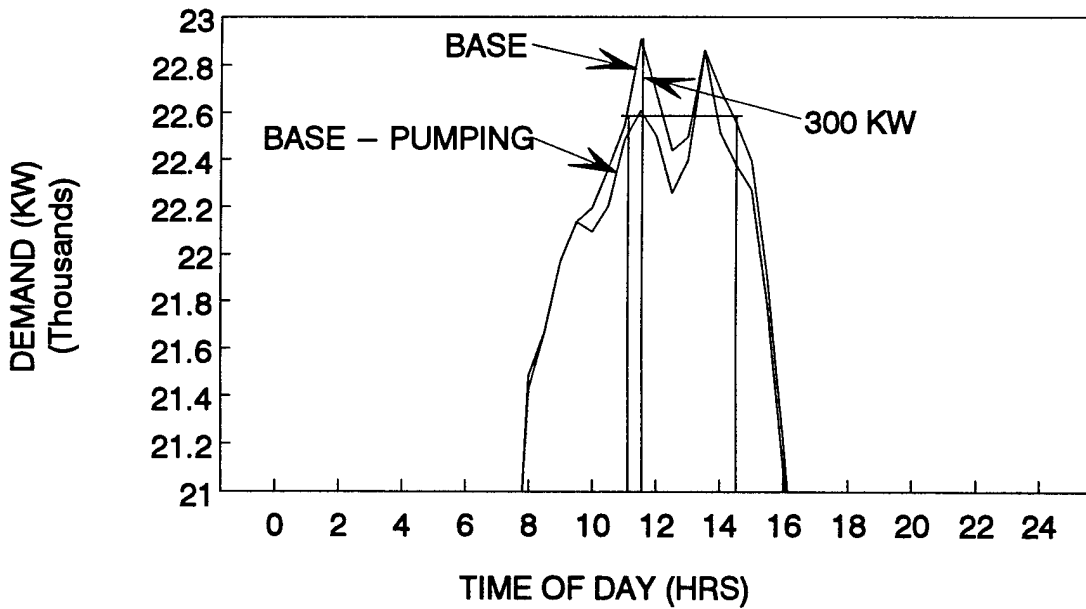
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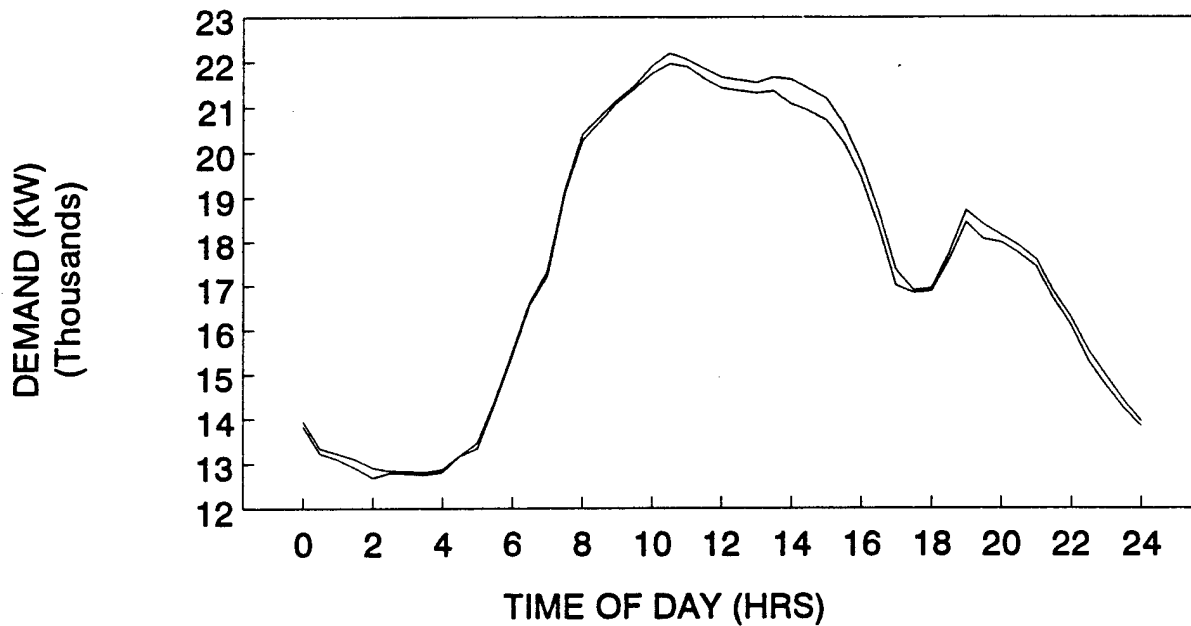
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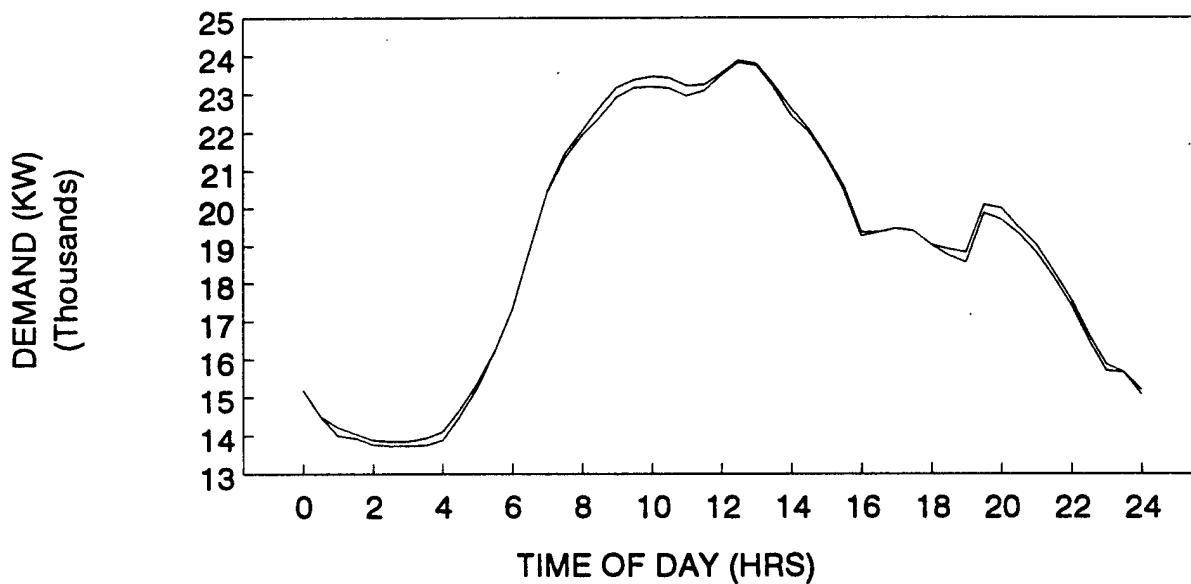
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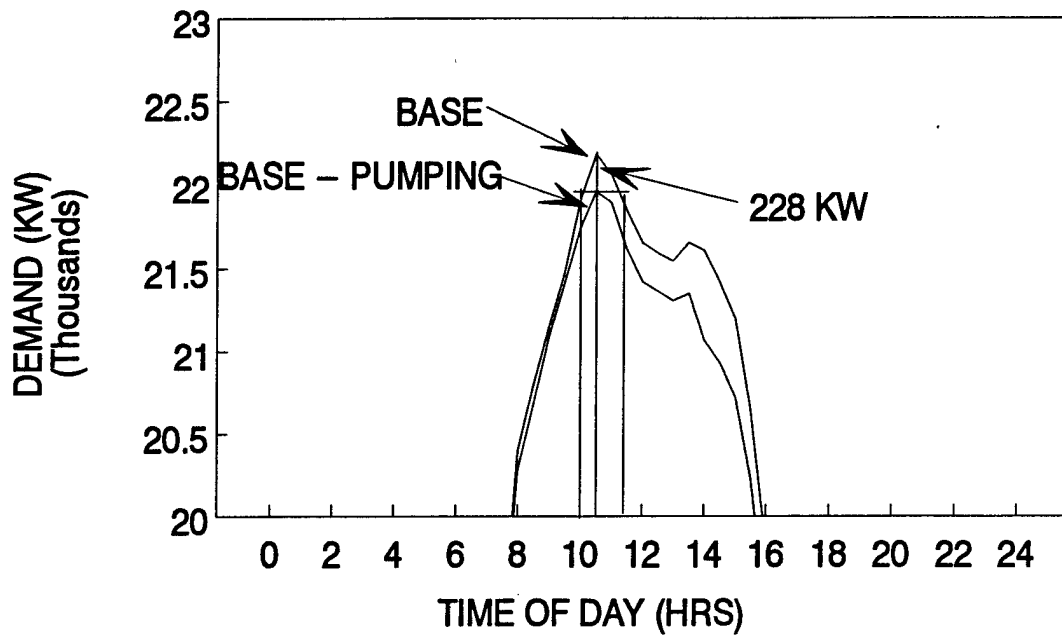
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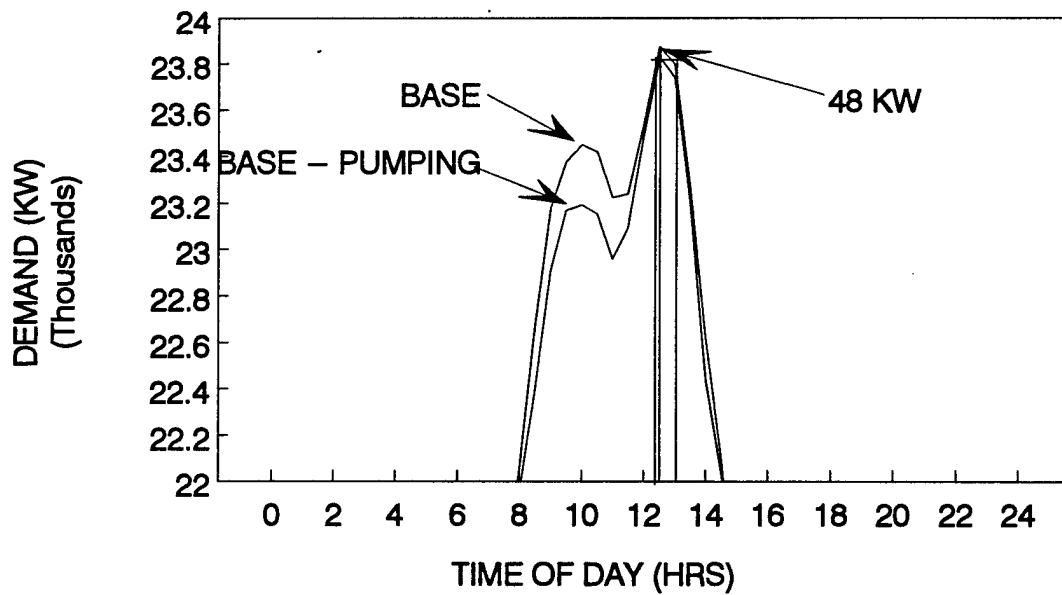
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30-APR-92



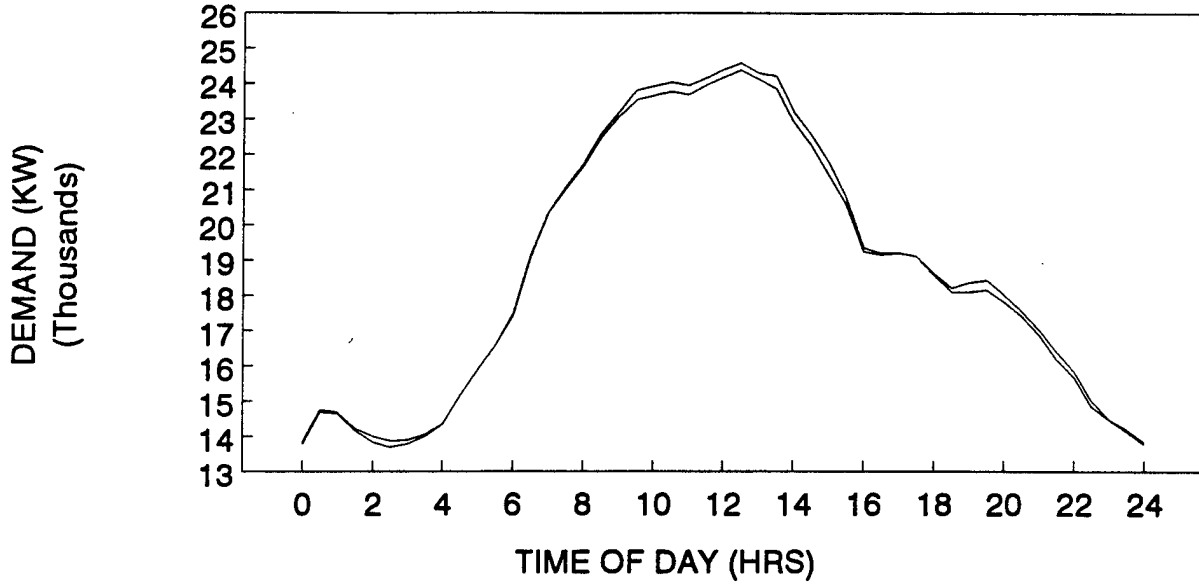
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04-MAR-92



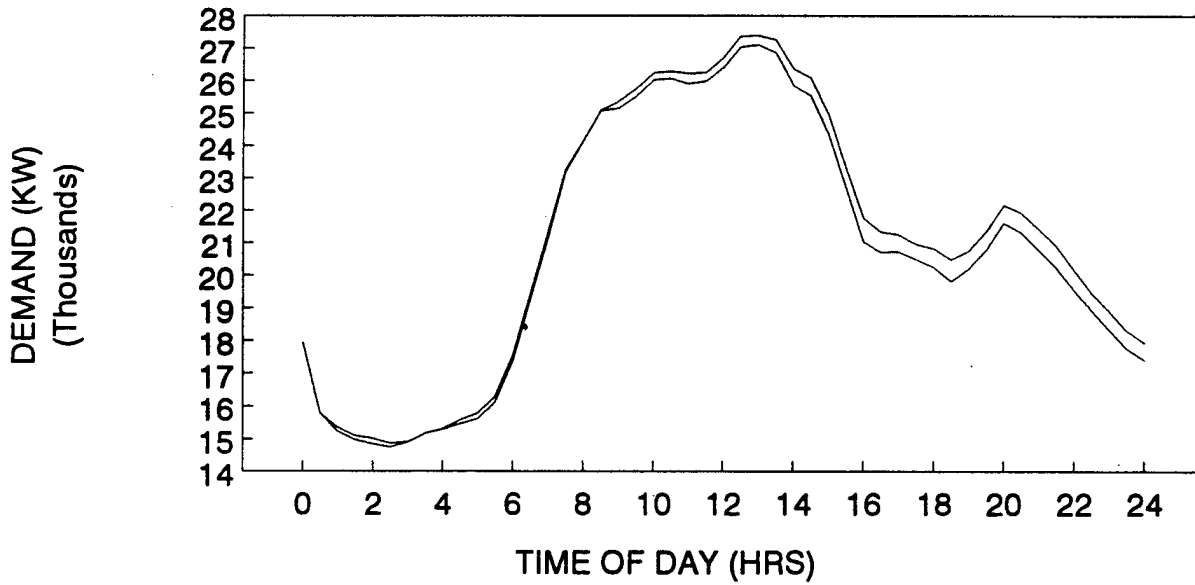
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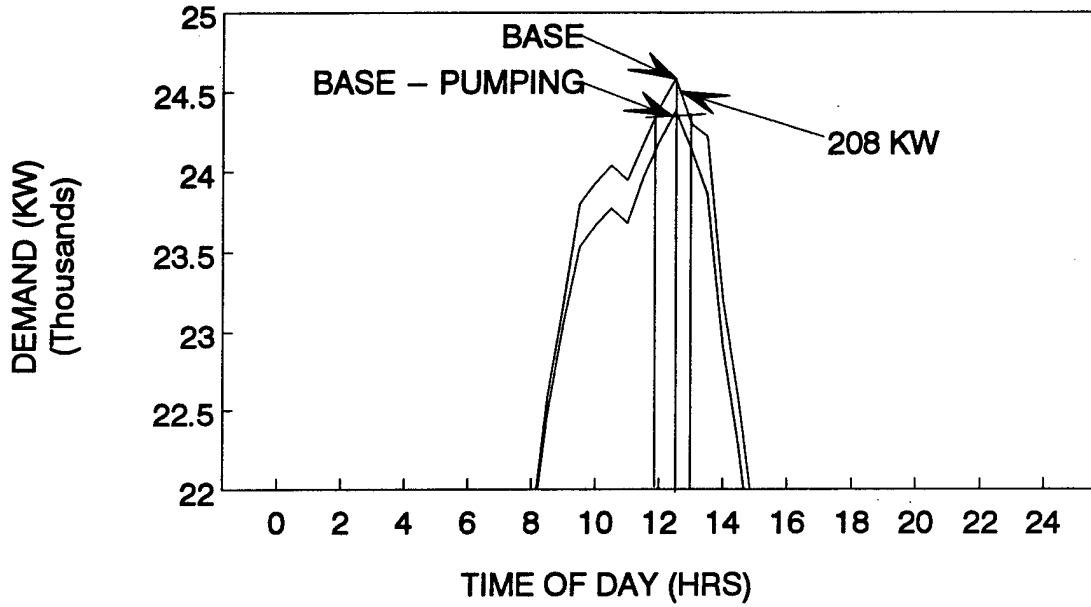
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13-MAY-92



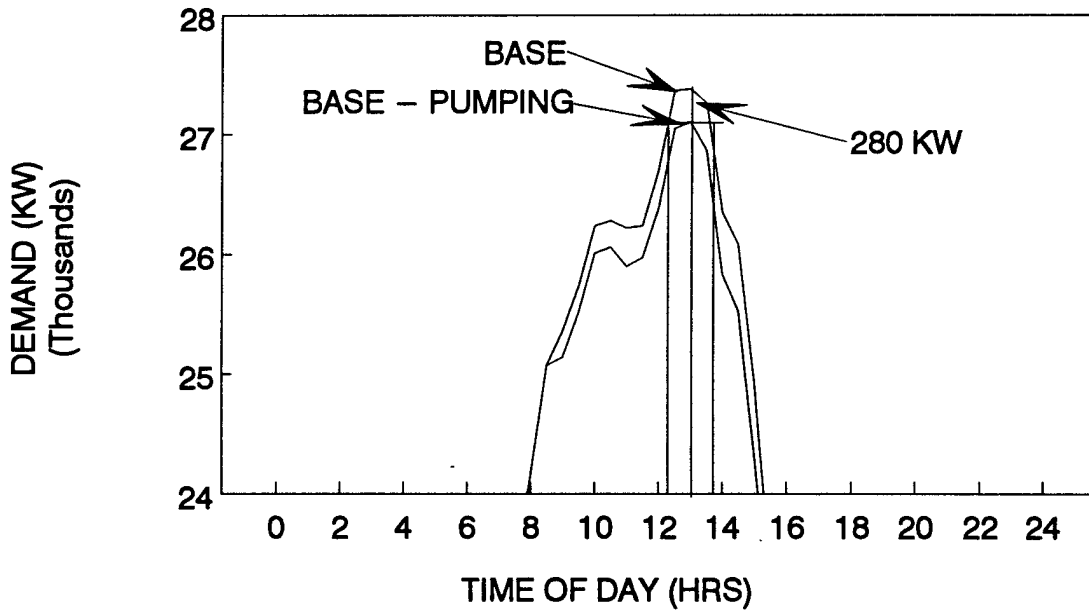
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18-JUN-92



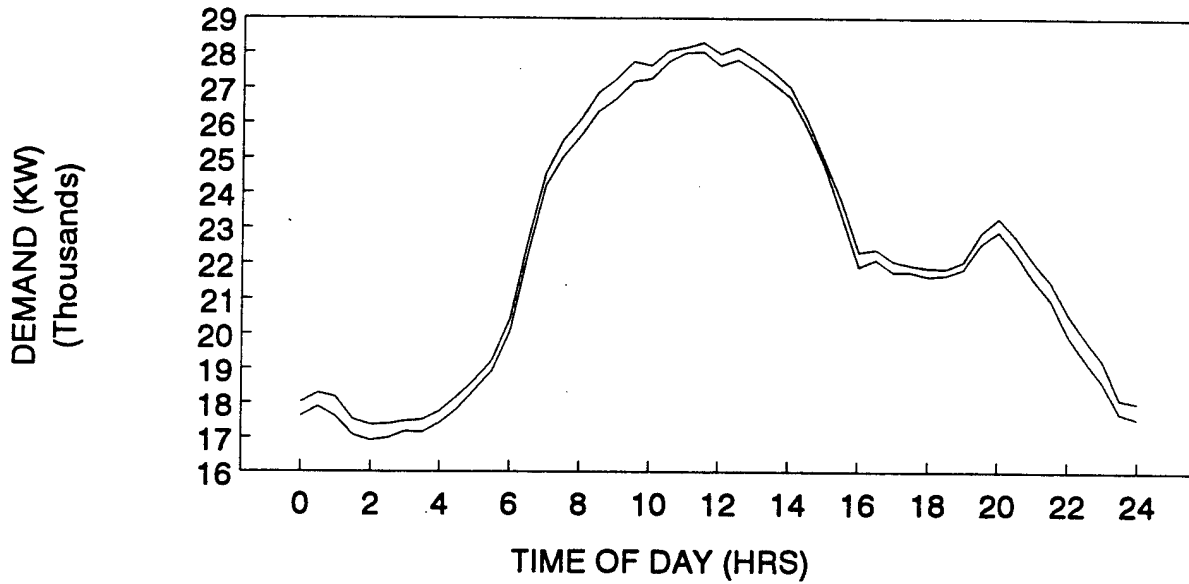
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13-MAY-92



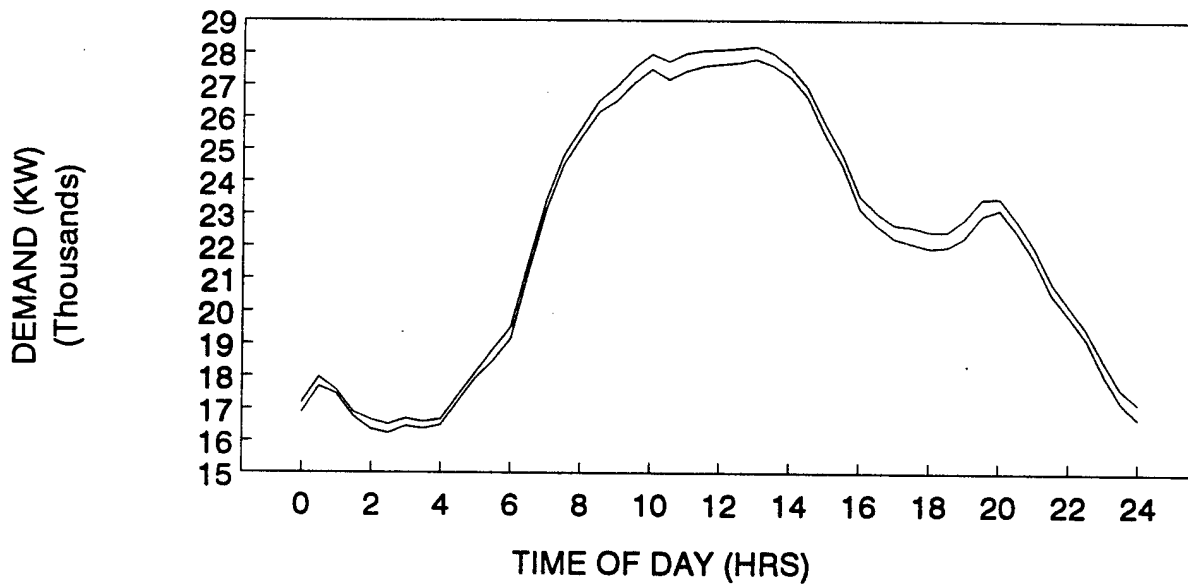
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18-JUN-92



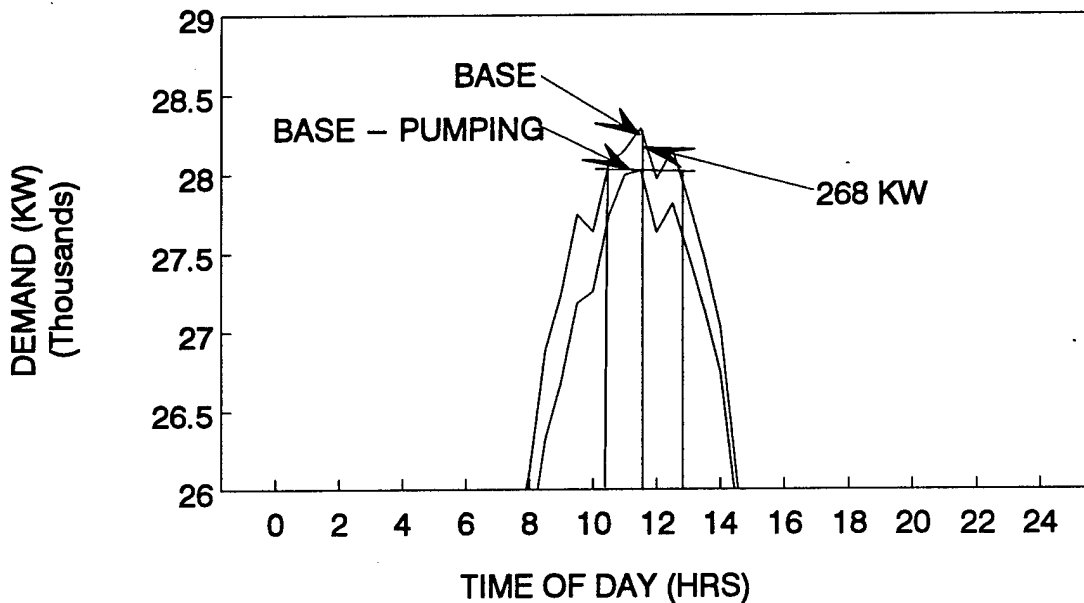
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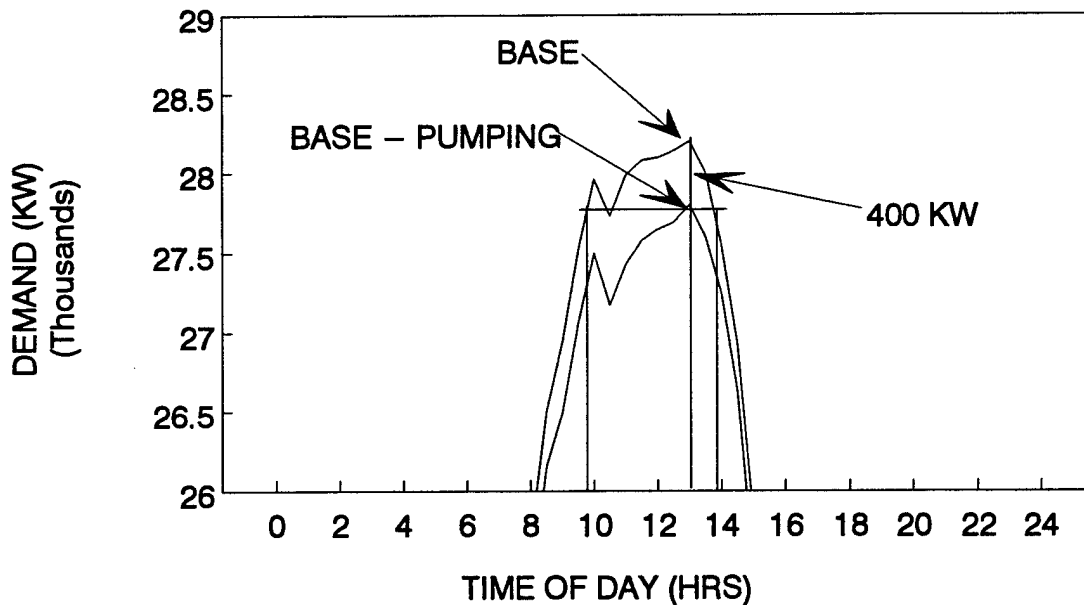
DEMAND PROFILE  
06-AUG-92



DEMAND PROFILE  
23-JUL-92



DEMAND PROFILE  
06-AUG-92



# **APPENDIX D**

## **Example Energy Calculations**

## EXAMPLE ENERGY CALCULATIONS

### Daily Pump Report Summary

1. Using the Williams Electric Control System data, and the peak demand pump KW listed in Row B, the daily pump report summaries were created for each of the peak days during the 12-month period.
2. The summation of the total pumping KW for each peak day at 30-minute intervals was calculated and is listed in Column A.
3. Next, the daily run-times were calculated (Row C) and multiplied by the pump KW (Row B) to determine the daily KWH consumption (Row D).
4. Next, the daily KWH consumption for Alternative #3 (Row F) was calculated by subtracting the run-time between 10:00 a.m. and 3:00 p.m. from the total run-time (Row C) and multiplying the result (Row E) by the pump KW (Row B).

### Alternative Energy Use Summary

5. The peak pumping KW which occurred between 10:00 a.m. and 3:00 p.m. was determined from Column A from the Daily Pump Report Summary for each of the peak days during the 12-month period. These values are listed in Column G.
6. Next, the approximately monthly KWH usage was determined by multiplying the total daily usage (Row D) by 30 days per month. These values are listed in Columns H and J.
7. The peak demand for Alternatives 2 and 3 is zero (Column I and K) due to the pumps being scheduled off between 10:00 a.m. to 3:00 p.m.
8. Next, the approximate monthly KWH usage (Column L) for Alternative 3 was calculated by multiplying the total daily usage (Row F) by 30 days per month.
9. The power required to be provided by the generator (Column M) was calculated by subtracting the existing usage (Column H) from the usage for Alternative 3 (Column L).
10. Using the generator set efficiencies the output power to the generator produced by the engine (Column N) was calculated.
11. Using the fuel efficiencies of the generator set and the required engine output power (Column N) the fuel requirements (Column O) for the engine were determined.
12. The annual utility requirements for each alternative (Row P) were calculated by summing the 12 monthly values.

# EXAMPLE DAILY PUMP REPORT SUMMARY

SEPTEMBER 03, 1991

PUMP BUILDING

TIME (MIN)	W5 1170	W6 1252	W7 2451	W9 1998	B1 1318	B2 1318	B3 1318	B4 1318	B1 4318	B2 4318	B1 7094	B2 7094	B1 7242	B2 7242	W1A 11241	W2A 11180	B1 11171	B2 11171	B3 11171	TOTAL KW
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	120
1:00	0	0	0	0	0	0	0	0	0	0	0	0	60	0	120	0	60	0	0	240
1:30	0	0	0	0	0	0	0	0	0	0	48	0	60	0	120	0	0	0	0	228
2:00	0	0	0	0	0	0	0	0	0	0	48	0	60	0	0	0	0	0	0	108
2:30	0	0	0	0	0	0	0	0	0	0	48	0	60	0	0	0	0	0	0	108
3:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	48
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
5:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	60	0	0	108
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
8:30	0	0	0	0	0	0	0	0	0	0	48	0	60	0	0	0	60	0	0	168
9:00	0	0	0	0	0	0	0	0	0	0	48	0	60	0	0	0	60	0	0	168
9:30	0	0	0	0	0	0	0	0	0	0	48	0	60	0	120	0	0	0	0	228
10:00	0	0	0	0	0	0	0	0	0	0	48	0	60	0	120	0	60	0	0	288
10:30	0	0	0	0	0	0	0	0	0	0	48	0	60	0	120	0	60	0	0	288
11:00	0	0	0	0	0	0	0	0	0	0	48	0	60	0	120	0	60	0	0	228
11:30	0	0	0	0	0	0	0	0	0	0	48	0	60	0	120	0	60	0	0	228
12:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	120	0	60	0	0	228
12:30	0	0	0	0	0	0	0	0	100	0	48	0	0	0	120	0	60	0	0	328
13:00	0	0	0	0	0	0	0	0	100	0	48	0	0	0	120	0	60	0	0	328
13:30	0	0	0	0	0	0	0	0	100	0	48	0	0	0	0	0	60	0	0	208
14:00	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	60	0	0	160
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	180
24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0	120
<b>B KW</b>	120	120	120	120	60	100	100	100	100	100	48	100	60	80	120	100	60	60	100	
<b>C HRS</b>	0	0	0	0	0	0	0	0	2	0	8	0	5.5	0	11.5	0	17.5	0	0	
<b>D KWH</b>	0	0	0	0	0	0	0	0	200	0	384	0	330	0	1380	0	1050	0	0	3344
<b>E HRS</b>									0	4		2			6.5		13			
<b>F KWH</b>									0	192		120			780		780			1872

# EXAMPLE ALTERNATIVE ENERGY USE SUMMARY

MONTH	G H I J K L M N O		ALTERNATIVE # 1		ALTERNATIVE # 2		ALTERNATIVE # 3		
	PEAK KW	USAGE KWH	PEAK KW	USAGE KWH	PEAK KW	USAGE KWH	GENER. KWH	ENGINE KWH	ENGINE KCF
SEP 91	328	100,320	0	100,320	0	56,160	44,160	46,986	537
OCT 91	400	169,942	0	169,942	0	106,392	63,550	67,617	772
NOV 91	300	97,800	0	97,800	0	72,000	25,800	27,451	313
DEC 91	280	137,020	0	137,020	0	90,520	46,500	49,476	565
JAN 92	120	164,610	0	164,610	0	112,840	51,770	55,083	629
FEB 92	300	50,460	0	50,460	0	27,840	22,620	24,068	275
MAR 92	228	106,764	0	106,764	0	64,170	42,594	45,320	518
APR 92	48	90,900	0	90,900	0	69,180	21,720	23,110	264
MAY 92	208	100,006	0	100,006	0	55,118	44,888	47,761	545
JUN 92	280	248,700	0	248,700	0	188,100	60,600	64,478	736
JUL 92	268	281,666	0	281,666	0	232,934	48,732	51,851	592
AUG 92	400	268,770	0	268,770	0	195,548	73,222	77,908	890
<b>P TOTALS</b>	<b>3,160</b>	<b>1,816,958</b>	<b>0</b>	<b>1,816,958</b>	<b>0</b>	<b>1,270,802</b>	<b>546,156</b>	<b>581,110</b>	<b>6,636</b>

## **APPENDIX E - Pump Run Time Data**

# ALTERNATIVE ENERGY USE SUMMARY

MONTH	ALTERNATIVE # 1		ALTERNATIVE # 2		ALTERNATIVE # 3				
	PEAK KW	USAGE KWH	PEAK KW	USAGE KWH	PEAK KW	USAGE KWH	GENER. KWH	ENGINE KWH	ENGINE KCF
SEP 91	326	100,320	0	100,320	0	56,160	44,160	46,986	537
OCT 91	400	169,942	0	169,942	0	106,392	63,550	67,617	772
NOV 91	300	97,800	0	97,800	0	72,000	25,800	27,451	313
DEC 91	280	137,020	0	137,020	0	90,520	46,500	49,476	565
JAN 92	120	164,610	0	164,610	0	112,840	51,770	55,083	629
FEB 92	300	50,460	0	50,460	0	27,840	22,620	24,068	275
MAR 92	228	106,764	0	106,764	0	64,170	42,594	45,320	518
APR 92	48	90,900	0	90,900	0	69,180	21,720	23,110	264
MAY 92	208	100,006	0	100,006	0	55,118	44,888	47,761	545
JUN 92	280	248,700	0	248,700	0	188,100	60,600	64,478	736
JUL 92	268	281,666	0	281,666	0	232,934	48,732	51,851	592
AUG 92	400	268,770	0	268,770	0	195,548	73,222	77,908	890
TOTALS	3,158	1,816,958	0	1,816,958	0	1,270,802	546,156	581,110	6,636

# DAILY PUMP REPORT SUMMARY

JANUARY 16 1992

TIME (MIN)	W5 1170	W6 1252	W7 2451	W9 1998	B1 1318	B2 1318	B3 1318	B4 1318	B1 4318	B2 4318	B1 7094	B2 7094	B1 7242	B2 7242	W1A 11241	W2A 11180	B1 11171	B2 11171	B3 11171
1:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	60	0
4:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	60	0
4:30	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	0	0	0	120	60	0	0	0	0	0	100	0	0	0	0	0	0	0	0
6:00	0	0	0	120	60	0	0	0	0	0	100	0	0	0	0	0	0	0	0
6:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
10:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	120	100	0	0	0
14:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KW	120	120	120	120	60	100	120	20	100	100	48	100	60	80	120	100	60	60	100
HRS	0	0	0	0	20	11	0	0	2.5	0	0	5.5	0	4.5	5	0.5	0	6.5	0.5
KWH	0	0	0	0	2400	660	0	0	250	0	0	550	0	360	600	50	0	390	50
HRS	0	0	0	0	14.5	11	0	0	2.5	0	3	3	0	3	2	0	0	3.5	0
KWH	0	0	0	0	1740	660	0	0	250	0	300	300	0	240	240	0	0	210	0

# DAILY PUMP REPORT SUMMARY

FEBRUARY 03 1992

TIME (MIN)	W5 1170	W6 1252	W7 2451	W9 1998	B1 1318	B2 1318	B3 1318	B4 1318	B1 4318	B2 4318	B1 7094	B2 7094	B1 7242	B2 7242	W1A 11241	W2A 11180	B1 11171	B2 11171	B3 11171
:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	60	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
11:30	0	0	0	120	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	60	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
KW	120	120	120	120	60	100	120	20	100	100	48	100	60	80	120	100	60	60	100
HRS	0	0	0	0.5	0	0	0	0	0	0	0	7.5	0	3	3.5	0	4.5	0	0
KWH	0	0	0	60	0	0	0	0	0	0	0	750	0	240	420	0	270	0	0
HRS	0	0	0	0	0	0	0	0	0	0	0	4.5	0	1.5	2	0	2.5	0	0
KWH	0	0	0	0	0	0	0	0	0	0	0	450	0	120	240	0	150	0	0

# DAILY PUMP REPORT SUMMARY

MARCH 04 1992

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	7094	7094	7242	B2	7242	W1A	11241	W2A	11180	B1	11171	B2	11171	B3	11171				
0:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	0	120			
KW	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120		
HRS	0	0	3.5	3.5	3	0	0	0	0	1.5	10.5	0	4	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0		
KWH	0	0	420	420	180	0	0	0	0	150	504	0	240	0	0	0	0	0	0	0	960	0	0	0	0	0	0	0	0	0	0	0	
HRS			2	2	0.5					1.5	7.5		2.5							4	480												
KWH			240	240	30					150	360		150								480												

# DAILY PUMP REPORT SUMMARY

APRIL 30 1992

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	B1	B2	W2A	B1	B2	B3
	1170	1252	2451	1998	1318	1318	1318	1318	4318	4318	7094	7094	7094	7242	7242	11180	11171	11171	11171	11171
:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	120	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
1:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	0	0	0	120	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0
4:00	0	0	0	120	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
4:30	0	0	0	120	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0
5:00	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
8:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
8:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	60	60	0	0
9:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	60	60	0	0
9:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	100	60	0	0	100	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	60	60	0	0
11:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	60	60	0	0
11:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0
15:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
16:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	60	0	0
19:00	0	0	0	0	0	0	0	0	100	0	48	0	0	0	0	0	0	60	0	0
19:30	0	0	0	0	0	0	0	0	100	0	48	0	0	0	0	0	0	60	0	0
20:00	0	0	0	0	0	0	0	0	100	0	48	100	60	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	60	0	0
21:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	60	60	0	0
21:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	100	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	60	60	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KW	120	120	120	120	60	100	120	20	100	100	48	100	48	60	60	100	120	60	60	100
HRS	0	0.5	0	4.5	0	0	0	0	2	0	12.5	1	5.5	0	6	10	0	10	0	0
KWH	0	60	0	540	0	0	0	0	200	0	600	100	330	0	600	600	0	600	600	3030
HRS	0	0	0	4.5	0	0	0	0	2	0	9.5	0.5	4	0	4	7	0	7	0	2306
				540					200		456	50	240		400	420		420		



# DAILY PUMP REPORT SUMMARY

JUNE 18 1992

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	B1	B2	W2A	W1A	W2A	B1	B2	B3
	1170	1252	2451	1998	1318	1318	1318	1318	4318	4318	7094	7094	7242	7242	11241	11180	11171	11171	11171	11171	11171	11171
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KW	120	120	120	120	60	100	120	20	100	100	48	100	60	80	120	100	60	100	60	60	60	100
HFS	0	0	10.5	12.5	7	6	0	0	3.5	0	0	14.5	10	0	7.5	5.5	11	0	0	0	0	0
KWH	0	0	1260	1500	420	600	0	0	350	0	0	1450	600	0	900	550	660	0	0	0	0	0
HFS	0	0	9	9	7	1.5	0	0	3.5	0	0	11.5	8	0	5.5	4.5	7.5	0	0	0	0	0
KWH	0	0	1080	1080	420	150	0	0	350	0	0	1150	480	0	660	450	450	0	0	0	0	0

# DAILY PUMP REPORT SUMMARY

JULY 23 1992

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B3	B4	B1	B2	B3	B4	B1	B2	B3	B4	7094	7242	7242	W1A	W2A	B1	B2	B3
3:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
4:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
5:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
6:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
7:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
8:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
9:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
10:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
11:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
12:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
13:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
14:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
15:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
16:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
17:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
18:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
19:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
20:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
21:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
22:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
23:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
24:00	0	0	0	120	1318	1318	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
KW	120	120	120	120	60	100	120	20	100	100	100	20	100	100	100	48	100	60	80	120	100	60	60	60	100	60	60	100
HFS	0	0	12	22	15	0	0	8	2.5	0	9.5	7.5	9	0	0	0	0	0	0	0	12	12.5	0	0	0	0	0	0
KWH	0	0	1440	2640	900	0	0	160	250	0	456	750	540	0	0	0	0	0	0	0	0	0	0	0	1200	750	0	0
HFS	12	18.5	11					6.5	2.5		8	6.5	8.5								7	9.5			7	9.5		
KWH	1440	2220	660					130	250		384	650	510								700	570			700	570		

# DAILY PUMP REPORT SUMMARY

AUGUST 06 1992

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	B1	B2	W1A	W2A	B1	B2	B3
:30	1170	1252	2451	1998	1318	1318	1318	1318	4318	4318	7094	7094	7094	7242	7242	11241	11180	11171	11171	11171	11171
1:00	0	0	0	0	0	0	0	20	0	0	48	0	0	60	0	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	20	0	0	48	0	0	60	0	0	0	0	0	0	0
2:00	0	0	0	120	0	0	0	20	0	0	0	100	0	60	0	0	0	0	0	0	0
2:30	0	0	0	120	60	0	0	0	0	0	0	100	0	60	0	0	0	0	0	0	0
3:00	0	0	0	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
3:30	0	0	0	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
6:00	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
6:30	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	120	120	0	0	0	0	0	0	48	0	0	60	0	0	0	0	0	0	0
9:00	0	0	120	120	0	0	0	0	0	0	48	100	60	60	0	0	0	0	0	0	0
9:30	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
10:00	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
10:30	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
11:00	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
11:30	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
12:00	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
12:30	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
13:00	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
13:30	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
15:30	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
16:00	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	120	120	60	0	0	0	0	0	48	0	0	60	0	0	0	0	0	0	0
18:00	0	0	120	120	60	0	0	0	0	0	48	0	0	60	0	0	0	0	0	0	0
18:30	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
19:00	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
19:30	0	0	120	120	60	0	0	0	0	0	0	100	60	60	0	0	0	0	0	0	0
20:00	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
20:30	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
21:00	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
21:30	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
22:00	0	0	120	120	60	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0
22:30	0	0	120	120	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	120	120	60	0	0	0	0	0	48	0	0	60	0	0	0	0	0	0	0
23:30	0	0	120	120	60	0	0	0	0	0	48	0	0	60	0	0	0	0	0	0	0
24:00	0	0	120	120	60	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0
KW	120	120	120	120	60	100	120	20	100	100	48	100	60	80	120	100	60	60	60	60	100
HRS	0	0	19	23	21	0	0	1.5	7	0	0	6.5	8.5	0	0	0	0	0	0	0	
KWH	0	0	2280	2760	1260	0	0	30	700	0	180	650	510	0	0	0	0	0	0	0	8670
HRS	0	0	13.5	17.5	15.5	0	0	1.5	3.5	0	8.5	4.5	7	0	0	0	0	0	0	0	6308
KWH	0	0	1620	2100	930	0	0	30	350	0	408	450	420	0	0	0	0	0	0	0	6308

# DAILY PUMP REPORT SUMMARY

SEPTEMBER 03, 1991

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	B1	B2	B1	B2	W1A	W2A	B1	B2	B3	TOTAL KW	
	1170	1252	2451	1998	1318	1318	1318	1318	4318	4318	7094	7094	7242	7242	11241	11180	11171	11171	11171	11171	11171	11171	11171	11171	
:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	0	0	0	120	
1:00	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	120	0	60	0	0	240	
1:30	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	120	0	0	0	0	228	
2:00	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	108	
2:30	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	108	
3:00	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	48	
3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	108	
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	168	
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	168	
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	228	
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	228	
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	288	
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	288	
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	228	
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	228	
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	328	
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	328	
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	208	
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	160	
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	60	
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	180	
24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	120	
KW	120	120	120	120	60	100	120	20	100	100	48	100	80	100	100	100	60	80	120	100	60	60	100		
HRS	0	0	0	0	0	0	0	0	2	0	8	0	5.5	0	11.5	0	17.5	0	0	0	0	0	0		
KWH	0	0	0	0	0	0	0	0	200	0	384	0	330	0	1380	0	1050	0	0	0	0	0	0	3344	
HRS									0	0	4	2			6.5		13								
KWH									0	0	192	120			780		780							1872	

# DAILY PUMP REPORT SUMMARY

OCTOBER 02 1991

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B3	B1	B2	B3	B1	B2	B3	W2A	W1A	B2	B1	B2	B3
	1170	1252	2451	1998	1318	1318	1318	1318	4318	7094	7094	7242	7242	7242	11171	11171	11171	11180	11241	11171	11171	11171	11171
1:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
3:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
4:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
4:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
5:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
5:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
6:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
6:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
7:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
7:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
8:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
8:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
9:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
9:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
10:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
10:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
11:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
11:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
12:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
12:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
13:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
13:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
14:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
14:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
15:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
15:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
16:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
16:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
17:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
17:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
18:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
18:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
19:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
19:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
20:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
20:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
21:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
21:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
22:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
22:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
23:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
23:30	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
24:00	0	0	0	0	60	0	0	0	0	48	0	0	0	0	0	0	0	0	120	0	0	0	0
KW	120	120	120	120	60	100	100	20	100	100	100	100	100	100	60	60	100	100	120	80	60	60	100
HRS	0	0	0	7	13.5	0	0	0	1.5	0	9	0	5	0	8.5	0	4	0	17	0	0	0	0
KWH	0	0	0	840	810	0	0	0	150	0	432	0	300	0	510	0	400	0	2040	0	0	0	0
HRS	0	0	0	4	8	0	0	0	6.5	0	3	0	3	0	7	0	0	13	0	0	0	0	0
KWH	0	0	0	480	480	0	0	0	312	0	180	0	180	0	420	0	0	1560	0	0	0	0	0

# DAILY PUMP REPORT SUMMARY

NOVEMBER 12 1991

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	B1	B2	B1	B2	W7A	W2A	B1	B2	B3
	1170	1252	2451	1998	1318	1318	1318	1318	7094	4318	7094	7094	7242	7242	11171	11180	11171	11171	11171	11171	11171	11171	11171
:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0
3:00	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0
3:30	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24:00	0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KW	120	120	120	120	60	100	120	20	100	100	48	100	60	80	100	100	60	60	120	100	60	60	100
HRS	0	0	0	8.5	5.5	0	0	0	2.5	0	0	7	4	0	0	0	0	3	0	0	0	6	0
KWH	0	0	0	1020	330	0	0	0	250	0	0	700	240	0	0	0	0	360	0	0	0	360	0
HRS	0	0	0	6	5.5	0	0	0	2.5	0	5	2	0	0	0	0	0	2	0	0	0	4	0
KWH	0	0	0	720	330	0	0	0	250	0	500	120	0	0	0	0	0	240	0	0	0	240	0

# DAILY PUMP REPORT SUMMARY

DECEMBER 04 1991

TIME (MIN)	W5	W6	W7	W9	B1	B2	B3	B4	B1	B2	B1	B2	B1	B2	B1	B2	W2A	W2A	B1	B2	B3
	1170	1252	2451	1998	1318	1318	1318	1318	4318	4318	7094	7094	7094	7094	7242	7242	11241	11180	11171	11171	11171
:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	120	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30	0	0	120	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	120	120	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0
2:30	0	0	120	120	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	120	120	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0
3:30	0	0	120	120	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
11:00	0	0	0	0	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
11:30	0	0	0	0	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
12:00	0	0	0	120	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
12:30	0	0	0	120	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
13:00	0	0	0	120	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
13:30	0	0	0	120	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
14:00	0	0	0	120	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
14:30	0	0	0	120	60	60	60	60	0	0	0	0	0	0	0	0	120	0	0	0	0
15:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
24:00	0	0	120	120	0	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0
KW	120	120	120	120	60	100	100	100	100	100	48	100	60	60	60	80	120	100	60	60	100
HRS	0	0	7	9	5	1	0	0	2.5	0	0	6.5	5.5	0	0	3.5	0	0	0	7.5	0
KWH	0	0	840	1080	300	100	0	0	250	0	650	330	0	0	0	420	0	0	0	450	0
HRS	0	0	7	6.5	0.5	0.5	0	0	2.5	0	4	4	0	0	0	0	0	0	0	5.5	0
KWH	0	0	840	780	30	50	0	0	250	0	400	240	0	0	0	0	0	0	0	330	2920

# **APPENDIX F - Existing Storage Capacities**

# EXISTING WATER TANK DATA

Structure No.	Type	Capacity In Gallons	Year Built	Elevation	Location
129	Elevated Tank (steel)	150,000	1910		Fort Bliss
493	Elev Wtr Tank (steel)	500,000	1941	3883.10	Fort Bliss
1318	Gnd Stor Reserv (conc)	558,000	1917		Fort Bliss
1319	Gnd Stor Tank (conc)	500,000	1959	3875.77	Fort Bliss
3690	Gnd Stor Tank (steel)	1,500,000	1978		Desert Field
3691	Gnd Stor Tank (steel)	194,000	1954	3890.00	Desert Field
3692	Gnd Stor Tank (steel)	194,000	1954	3890.00	Desert Field
3790	Elev Tank (steel)	100,000	1961		Tobin Wells
3794	Elev Tank (steel)	150,000	1972		Tobin Wells
4317	Gnd Stor Reserv (conc)	500,000	1940	3986.00	Logan Hts
4899	Gnd Stor Tank (steel)	712,000	1941	4200.40	Logan Hts
5300	Elevated Tank (steel)	1,500,000	1967		Fort Bliss
7088	Gnd Stor Tank (steel)	1,000,000	1932	3968.20	WBAMC
7090	Gnd Stor Tank (steel)	1,500,000	1959	3964.20	WBAMC
7241	Gnd Stor Tank (steel)	600,000	1930		WBAMC
7775	Gnd Stor Tank (steel)	1,000,000	1971	4137.90	WBAMC
11262	Elevated Tank (steel)	200,000	1949		Biggs
11146	Elevated Tank (steel)	750,000	1955	3915.17	Biggs
11172	Elevated Tank (steel)	600,000	1943		Biggs
11313	Elevated Tank (steel)	300,000	1967		Biggs

## **APPENDIX G - Probable Cost Estimates**

COST ESTIMATING ANALYSIS PROJECT: WATER DISTRIBUTION SYSTEM				INVITATION/CONTRACTOR		DRAWING NO:		SHEET OF	
LOCATION: FORT BLISS, TEXAS ALTERNATIVE #2-ADDITIONAL STORAGE				CODE:		ESTIMATOR:		DATE PREPD: 21-Jan-93 CHECKED BY:	
				100%		RBS			

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIALS		TOTAL
	NO/UN	UNIT	MH UN	HRS	UN PRICE	COST	UN PRICE	COST	UN PRICE	COST	COST
<b>STORAGE TANKS</b>											
<b>FOUNDATION:</b>											
EXCAVATE 5' EARTHWORK	10857	CY.			2.84	30833.88	1.84	19976.88	0.00	0.00	50810.76
LOAD & HAUL EARTH	10857	CY.			1.03	11182.71	3.71	40279.47	0.00	0.00	51462.18
FOUNDATION BACKFILL	3190	CY.			0.19	606.10	0.22	701.80	0.00	0.00	1307.90
COMPACTION	3190	CY.			0.40	1276.00	0.59	1882.10	6.00	19140.00	22298.10
DRILLED PIERS	173	EA.			69.97	12104.81	55.00	9515.00	119.10	20604.30	42224.11
12" CONC. SLAB ON GRADE	31561	SF.			5.55	175163.55	0.20	6375.32	4.58	144549.38	326088.25
<b>TANKS:</b>											
.5 MIL. GAL. WATER TANK	1	EA.				50600.00		23000.00		110400.00	184000.00
1 MIL. GAL. WATER TANK	2	EA.				152900.00		69500.00		333600.00	556000.00
2 MIL. GAL. WATER TANK	2	EA.				286000.00		130000.00		624000.00	1040000.00
<b>CONTROLS:</b>											
SOFTWARE CHANGES	1	LS									5000.00

<b>SUBTOTAL</b>						\$720,667		\$301,231		\$1,252,294	\$2,279,191
MEANS MODIFIED(93.3%)											\$2,126,485
SUB. O & P(15%)											\$318,973
GC O & P(15%)											\$366,819
CONTINGENCY(15%)											\$421,842
<b>Total ADDITIONAL STORAGE Costs</b>											<b>\$3,234,119</b>

COST ESTIMATING ANALYSIS  
PROJECT: WATER DISTRIBUTION SYSTEM

INVITATION/CONTRACTOR

DRAWING NO:

SHEET OF

LOCATION: FORT BLISS, TEXAS  
ALTERNATIVE # 3 - GENERATOR SETS

CODE:  
100%

ESTIMATOR:  
CLARK

DATE PREPD:  
28-Oct-92  
CHECKED BY:  
YOUNG

TASK DESCRIPTION	QUANTITY		LABOR				EQUIPMENT		MATERIALS		TOTAL
	NO/UN	UNIT	MH UN	HRS	UN PRICE	COST	UN PRICE	COST	UN PRICE	COST	COST
<b>GENERATOR SETS</b>											
115 KW GENERATOR	1	EA			3220.00	3220.00			49450.00	49450.00	52670
150 KW GENERATOR	4	EA			3400.00	13600.00			71250.00	285000.00	298600
170 KW GENERATOR	4	EA			3570.00	14280.00			85000.00	340000.00	354280
ELECTRICAL(WIRE/COND.)	9	EA			200.00	1800.00			250.00	2250.00	4050
<b>CONTROLS</b>											
CONTROLS CHANGES	1	LS									25500
<b>PIPING</b>											
GAS PIPING(400')	3600	LF			1.23	4428.00			0.62	2232.00	6660
1-1/4" POLYETHYLENE											
TRENCHING	3600	LF			0.59	2124.00	0.18	648.00			2772
BACKFILL	3600	LF			1.07	3852.00	0.43	1548.00		0.00	5400
<b>MISC.</b>											
CONCRETE PADS	9	EA			350	3150.00		0.00	250	2250.00	5400
<b>SUBTOTAL</b>											
					46454				681182		755332
MEANS MODIFIED(94.3%)											712278
SUB. O & P(15%)											106842
GC O & P(15%)											122868
CONTINGENCY											141298
<b>TOTAL GENERATOR SET COSTS</b>											<b>\$1,083,286</b>

## **APPENDIX H - Miscellaneous Calculations**

# MAINTENANCE COSTS

## ALTERNATIVE #2 – ADDITION OF STORAGE COST

### A. PAINTING OF NEW TANKS EVERY 10 YEARS

DESCRIPTION	QUANTITY		LABOR		MATERIAL		TOTAL
	NO	UNIT	UNIT	TOTAL	UNIT	TOTAL	
NEW TANKS	\$68,730	SF	\$0.18	\$12,371	\$0.13	\$8,935	\$21,306

### B. ANNUAL CONTROLS MAINTENANCE (I.E. LEVEL SWITCHES, VALVES, ETC.)

DESCRIPTION	QUANTITY		LABOR		MATERIAL		TOTAL
	NO	UNIT	UNIT	TOTAL	UNIT	TOTAL	
LABOR	\$16	HR	\$25.75	\$412	\$0	\$0	\$412
MATERIALS	\$1	LS	\$0.00	\$0	\$250	\$250	\$250
TOTAL							\$662

### C. TOTAL ANNUAL COST

$$\text{TOTAL} = \$21,306 / 10 \text{ YEARS} + \$662 / \text{YEAR}$$

$$\text{TOTAL} = \$2,792.60 / \text{YR}$$

# MAINTENANCE COSTS

## ALTERNATIVE #3 – ADDITION OF GENERATORS

MAINTENANCE TYPE	OCCURANCE (HOURS)	COST (\$)	UNIT COST (\$/HR)
ROUTINE	250	125	0.5
TOP END OVRHL	15000	5000	0.333
MAJOR OVRHL	30000	9000	0.3
TOTAL			1.133

### A. TOTAL ANNUAL COST

$$\text{TOTAL} = (5 \text{ HRS/DAY}) \times (365 \text{ DAYS/YR}) \times (9 \text{ GENERATORS}) \times (\$1.133/\text{HR})$$

$$\text{TOTAL} = \$18,615 / \text{YR}$$

# **APPENDIX I - Life Cycle Cost Calculations**

# LCCID INPUT DATA

DESCRIPTION	ALT #1	ALT #2	ALT #3
INITIAL INVESTMENT	BASE	\$3,234,119.0	\$1,083,286.0
ENERGY:			
ELECT. USAGE (MBTU)	BASE	0	1864
NAT. GAS (MBTU)	BASE	0	-6842
DEMAND SAVINGS(KW)	BASE	3158	3158
*DEMAND SAVINGS(\$)	BASE	\$67,897.0	\$67,897.0
M & R COST	BASE	\$2,792.6	\$18,615.0
SALVAGE VALUE	BASE	\$0.0	\$0.0

LIFE CYCLE COST ANALYSIS SUMMARY  
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

LOCATION: FORT BLISS, TEXAS REGION NO. 3 PROJECT NO. 91109905F  
 PROJECT TITLE: FORT BLISS WATER DISTRIBUTION SYSTEM FISCAL YEAR 1993  
 DISCRETE PORTION NAME: ALTERNATIVE 2 - ADDITIONAL STORAGE CAPACITY  
 ANALYSIS DATE: 02/06/93 ECONOMIC LIFE 20 PREPARER S. P. CLARK

1. INVESTMENT COSTS:

A. CONSTRUCTION COST	<u>\$3,234,119</u>	
B. SIOH	<u>\$177,877</u>	
C. DESIGN COST	<u>\$194,047</u>	
D. TOTAL COST (1A+1B+1C)	<u>\$3,606,043</u>	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	<u>\$0</u>	
F. PUBLIC UTILITY COMPANY REBATE	<u>\$0</u>	
G. TOTAL INVESTMENT (1D-1E-1F)		<u>\$3,606,043</u>

2. ENERGY SAVINGS (+)/COST(-):

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS: OCTOBER 1992

ENERGY SOURCE	COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELEC	<u>\$2.24</u>	<u>0</u>	<u>\$0</u>	<u>14.65</u>	<u>\$0</u>
B. DIST			<u>\$0</u>	<u>17.70</u>	<u>\$0</u>
C. RESID			<u>\$0</u>	<u>20.99</u>	<u>\$0</u>
D. NG	<u>\$2.50</u>	<u>0</u>	<u>\$0</u>	<u>20.60</u>	<u>\$0</u>
E. PPG			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
F. COAL			<u>\$0</u>	<u>16.32</u>	<u>\$0</u>
G. SOLAR			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
H. GEOTH			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
I. BIOMA			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
J. REFUS			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
K. WIND			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
L. OTHER			<u>\$0</u>	<u>13.59</u>	<u>\$0</u>
M. DEMAND SAVINGS			<u>\$67,897</u>	<u>13.59</u>	<u>\$922,720</u>
N. TOTAL		<u>0</u>	<u>\$67,897</u>		<u>\$922,720</u>

3. NON ENERGY SAVINGS (+) OR COST (-):

A. ANNUAL RECURRING (+/-)	<u>-\$2,792.6</u>	
1. DISCOUNT FACTOR (TABLE A)		<u>13.59</u>
2. DISCOUNTED SAVINGS/COST (3A X 3A1)		<u>-\$37,951</u>

LIFE CYCLE COST ANALYSIS SUMMARY  
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

B. NON RECURRING SAVINGS (+) OR COST(-)

ITEM	SAVINGS(+) COST(-)(1)	YEAR OF OCCUR.(2)	DISCOUNT FACTOR(3)	DISCOUNTED SAV- INGS(+)-COST(-)(4)
a.	\$0	1	0.96	\$0
b.	\$0	2	0.92	\$0
c.	\$0	3	0.89	\$0
d.	\$0	4	0.85	\$0
e.	\$0	5	0.82	\$0
f.	\$0	6	0.79	\$0
g.	\$0	7	0.76	\$0
h.	\$0	8	0.73	\$0
i.	\$0	9	0.7	\$0
j.	\$0	10	0.68	\$0
k.	\$0	11	0.65	\$0
l.	\$0	12	0.62	\$0
m.	\$0	13	0.6	\$0
n.	\$0	14	0.58	\$0
o.	\$0	15	0.56	\$0
p. TOTAL	\$0			\$0

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (3A2 + 3Bp4) -\$37,951

4. SIMPLE PAYBACK  $1G/(2N3+3A+(3Bp1/ECONOMIC\ LIFE))$ : 55.4 YEARS

5. TOTAL NET DISCOUNTED SAVINGS (2N5+3C): \$884,769

6. SAVINGS TO INVESTMENT RATIO (SIR)  $5/1G$ : 0.25

7. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -3.1%

LIFE CYCLE COST ANALYSIS SUMMARY  
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

LOCATION: FORT BLISS, TEXAS REGION NO. 3 PROJECT NO. 91109905F  
 PROJECT TITLE: FORT BLISS WATER DISTRIBUTION SYSTEM FISCAL YEAR 1993  
 DISCRETE PORTION NAME: ALTERNATIVE 3 - ADDITION OF GENERATOR SETS  
 ANALYSIS DATE: 02/06/93 ECONOMIC LIFE 20 PREPARER S. P. CLARK

1. INVESTMENT COSTS:

A. CONSTRUCTION COST		<u>\$1,083,286</u>	
B. SIOH		<u>\$59,581</u>	
C. DESIGN COST		<u>\$64,997</u>	
D. TOTAL COST (1A+1B+1C)		<u>\$1,207,864</u>	
E. SALVAGE VALUE OF EXISTING EQUIPMENT		<u>\$0</u>	
F. PUBLIC UTILITY COMPANY REBATE		<u>\$0</u>	
G. TOTAL INVESTMENT (1D-1E-1F)			<u>\$1,207,864</u>

2. ENERGY SAVINGS (+)/COST(-):

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS: OCTOBER 1992

ENERGY SOURCE	COST \$/MBTU(1)	SAVINGS MBTU/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELEC	\$2.24	1864	\$4,175	14.65	\$61,169
B. DIST			\$0	17.70	\$0
C. RESID			\$0	20.99	\$0
D. NG	\$2.50	-6842	-\$17,105	20.60	-\$352,363
E. PPG			\$0	13.59	\$0
F. COAL			\$0	16.32	\$0
G. SOLAR			\$0	13.59	\$0
H. GEOTH			\$0	13.59	\$0
I. BIOMA			\$0	13.59	\$0
J. REFUS			\$0	13.59	\$0
K. WIND			\$0	13.59	\$0
L. OTHER			\$0	13.59	\$0
M. DEMAND SAVINGS			\$67,897	13.59	\$922,720
N. TOTAL		-4978	\$54,967		\$631,526

3. NON ENERGY SAVINGS (+) OR COST (-):

A. ANNUAL RECURRING (+/-)		<u>-\$18,615.0</u>	
1. DISCOUNT FACTOR (TABLE A)			<u>13.59</u>
2. DISCOUNTED SAVINGS/COST (3A X 3A1)			<u>-\$252,978</u>

LIFE CYCLE COST ANALYSIS SUMMARY  
ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

B. NON RECURRING SAVINGS (+) OR COST(-)

ITEM	SAVINGS(+) COST(-)(1)	YEAR OF OCCUR.(2)	DISCOUNT FACTOR(3)	DISCOUNTED SAVINGS(+)COST(-)(4)
a.	\$0	1	0.96	\$0
b.	\$0	2	0.92	\$0
c.	\$0	3	0.89	\$0
d.	\$0	4	0.85	\$0
e.	\$0	5	0.82	\$0
f.	\$0	6	0.79	\$0
g.	\$0	7	0.76	\$0
h.	\$0	8	0.73	\$0
i.	\$0	9	0.7	\$0
j.	\$0	10	0.68	\$0
k.	\$0	11	0.65	\$0
l.	\$0	12	0.62	\$0
m.	\$0	13	0.6	\$0
n.	\$0	14	0.58	\$0
o.	\$0	15	0.56	\$0
p.	TOTAL			\$0

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (3A2 + 3Bp4) -\$252,978

4. SIMPLE PAYBACK 1G/(2N3+3A+(3Bp1/ECONOMIC LIFE)): 33.2 YEARS

5. TOTAL NET DISCOUNTED SAVINGS (2N5+3C): \$378,548

6. SAVINGS TO INVESTMENT RATIO (SIR) 5/1G: 0.31

7. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -1.9%

## **APPENDIX J - Scope of Work**

A basic reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0187), Washington, DC 20503. Please DO NOT RETURN this form to either of these addresses. Send your completed form to the procurement official identified in item 6.

**DUPLICATE ORIGINAL**

1. CONTRACT / PURCH ORDER NO <b>DACA63-91-D-0048</b>		2. DELIVERY ORDER NO <b>0005</b>		3. CERTIFIED FOR THE NATIONAL DEFENSE UNDER DAVIS REG.	
4. ISSUED BY <b>.S. ARMY ENGINEER DISTRICT, FORT WORTH P.O. BOX 17300 FORT WORTH, TEXAS 76102-0300</b>		7. ADMINISTERED BY (if other than 6)		8. DELIVERY PCB <input checked="" type="checkbox"/> DEST <input type="checkbox"/> OTHER <small>(See Schedule for other)</small>	
9. CONTRACTOR <b>CARTER AND BURGESS, INC. P. O. BOX 2973 FORT WORTH, TEXAS 76113-2973</b>		10. DELIVER TO FOB POINT BY Date/ <b>SEE SCOPE OF WORK</b>		11. MARK IF BUSINESS <input type="checkbox"/> SMALL N/A <input type="checkbox"/> SMALL DISADVANTAGED <input type="checkbox"/> WOMEN-OWNED	
14. SHIP TO <b>SEE BLOCK 6</b>		15. PAYMENT WILL BE MADE BY <b>DISBURSING OFFICER U.S. ARMY ENGINEER DISTRICT, FORT WORTH P.O. BOX 17300 FORT WORTH, TEXAS 76102-0300</b>		13. MAIL INVOICES TO <b>SEE BLOCK 6, ATTN: CESWF-ED-M</b>	

16. TYPE OF ORDER: DELIVERY  PURCHASE  This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract. Reference your ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

17. ACCOUNTING AND APPROPRIATION DATA / LOCAL USE  
212 2020 08 8073 P722984 2572 284 EO3910048 S41443 (QE) QE20332200A0489 \$15,342.00

ITEM NO.	19. SCHEDULE OF SUPPLIES / SERVICE	20. QUANTITY ORDERED / ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
1	ENERGY STUDY ON WATER STORAGE CAPACITY VS GAS ENGINE GENERATORS AND RETROFIT LIGHTING TO HEADQUARTERS BUILDING #2, FORT BLISS, TX  See attached Scope of Work consisting of 3 Pages  Reviewed for legal sufficiency (AFARS 1-6901) <i>WAD</i>	JOB	-	-	\$15,342.00

**FUNDS ARE AVAILABLE**  
JUL 28 1992  
*[Signature]*  
For R. T. Geiger, F&A Officer

26. QUANTITY IN COLUMN 20 HAS BEEN <input type="checkbox"/> INSPECTED <input type="checkbox"/> RECEIVED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED		27. SHIP NO.		28. D.O. VOUCHER NO.		25. TOTAL \$15,342.00	
DATE _____ SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE _____		<input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		32. PAID BY		29. DIFFERENCES	
36. I certify this account is correct and proper for payment. DATE _____ SIGNATURE AND TITLE OF CERTIFYING OFFICER _____		31. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		33. AMOUNT VERIFIED CORRECT FOR		30. INITIALS	
17. RECEIVED AT		38. RECEIVED BY		39. DATE RECEIVED		40. TOTAL CONTAINERS	
41. SR ACCOUNT NUMBER		42. SR VOUCHER NO		34. CHECK NUMBER		35. BILL OF LADING NO.	

DD Form 1155, MAY 90

Previous editions are obsolete.

**RECEIVED**  
CARTER & BURGESS, INC.

AUG 11 1992  
Page 85

*RAC DJV R. Diver-cr.*

DETAILED SCOPE OF WORK  
CONTRACT NO. DACA63-91-D-0048  
DELIVERY ORDER NO. 0005

1. The Architect-Engineer (A-E) shall furnish all services, material, supplies, plant, labor, equipment, investigations, studies, superintendence and travel as required in connection with the below identified project for studies in accordance with the original basic contract and this Detailed Scope of Work. Appendix "A" of the basic contract shall be followed for performance requirements for A-E services. Where this Detailed Scope of Work conflicts with Appendix "A", this Detailed Scope of Work shall govern.

INSTALLATION

PROJECT TITLE

Fort Bliss, TX

Energy Study on Water Storage Capacity vs. Gas Engine Generators and Retrofit Lighting to Headquarters Building #2

2. The work, design, related data and services required in accordance with this Delivery Order shall be accomplished within the limitation of cost on subject project stated above and scope of work described in paragraph 3. The schedule for delivery of data to the Contracting Officer is in calendar days as follows:

INDEFINITE  
DELIVERY DELIVERY  
CONTRACT SCHEDULE

- |   |   |  |
|---|---|--|
| a. Preliminary Submittal(s) and Related Data or Studies (10 copies) | * | 60 calendar days (after receipt of signed D.O.)              |
| b. Final Submittal(s) (10 copies)                                   | * | 60 calendar days after approval of the Preliminary Submittal |

3. The items of work included in this delivery order shall be in accordance with criteria furnished at the Scoping Conference held at Fort Bliss, 13 June 1992. The services to be provided shall include, but not be limited to, the following:

a. Items of Work:

- (1) Determine a method of peak electric demand shaving
- (2) Provide additional ground storage capacity located at a higher elevation to allow the pumps to run at non-peak periods. The increased storage capacity would then be able to

serve the installation through gravity during the peak demand period as determined by El Paso Electric.

(3) Provide natural gas powered electric generators at each well pumping station. These generators would only run during the peak demand period.

(4) Analyze the natural gas generators, in lieu of diesel, due to environmental impact of diesel fuel storage.

(5) Analyze pump motor horsepowers and the proposed ground storage tanks, capacities and locations. (Pump motors and tanks to be identified by installation personnel.)

(6) Monitor the KW demand, KW demand meters were indicated as a request for recommendation in the analysis for each pumping station.

(7) The preferred method of peak shaving is utilizing the additional ground storage capacity. (Recommended by installation personnel.)

b. The headquarters building (Building #2) requires a complete lighting retrofit. Generally, this 3 story building includes general office space and a large auditorium. This building is comprised of the following components:

- (1) Basement
- (2) A Wing - 46595 Square feet
- (3) B Wing - 15487 Square feet - 2 story auditorium
- (4) C Wing - 66570 Square feet
- (5) D Wing - 66570 Square feet
- (6) E Wing - 66570 Square feet

(a) The scope of this study would include all exterior and interior lighting.

(b) The goal of this study is to recommend primarily fluorescent lighting with energy efficient ballast and lamps. Some incandescent lighting may be necessary in areas with specific requirements.

(c) Various remodeling have occurred over the years and several types of lights and ceilings exist.

(d) The average ceiling height is 12' to 14'.

c. Government Furnished Items.

- (1) As-built drawings as available.
- (2) Statistical data and related documents.
- (3) Guide Specifications as required.

(4) Access to facilities for the as-built work.

d. Special Requirements - Distribution of submittal documents are as follows:

(1) Three copy of all documents shall be mailed to:

Commander  
U.S. Army Engineer District, Fort Worth  
819 Taylor Street/P.O. Box 17300  
ATTN: CESWF-ED-M/Richard Champagne  
Fort Worth, TX 76102-0300

(2) Seven copies of all documents shall be mailed to:

Commander  
USAADCENFB  
ATTN: ATZC-ISE-N(Mr. J. Mattis)  
Fort Bliss, TX 79916-0058

CONTRACT NO. DACA63-91-D-0048

DELIVERY ORDER NO. 0005

PROJECT/LOCATION ENERGY STUDY ON WATER STORAGE CAPACITY VS  
GAS ENGINE GENERATORS AND RETROFIT LIGHTING TO  
HEADQUARTERS BUILDING #2, FORT BLISS, TX

CONTRACTOR: CARTER & BURGESS, INC.  
P.O BOX 2973  
FORT WORTH, TX 76113-2973

Request you acknowledge receipt hereof by completing the endorsement below and returning the original to:

U.S. ARMY ENGINEER DISTRICT, FORT WORTH  
ATTN: CESWF-ED-M (CHAMPAGNE)  
P.O. BOX 17300  
FORT WORTH, TEXAS 76102-0300

ENDORSEMENT

Acceptance of the fee and terms of this Delivery Order is hereby denoted by my signature below.

This document was received (DATE) Aug 11, 1992  
BY Russell A Kan  
TITLE VICE PRESIDENT

CESAM-EN-CC

November 1991

GENERAL SCOPE OF WORK

FOR A

LIMITED ENERGY STUDY

Performed as part of the

ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)

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**SCOPE OF WORK  
FOR A  
LIMITED ENERGY STUDY**

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- 1. BRIEF DESCRIPTION OF WORK**
- 2. GENERAL**
- 3. PROJECT MANAGEMENT**
- 4. SERVICES AND MATERIALS**
- 5. PROJECT DOCUMENTATION**
  - 5.1 ECIP Projects**
  - 5.2 Non-ECIP Projects**
  - 5.3 Nonfeasible ECOs**
- 6. DETAILED SCOPE OF WORK**
- 7. WORK TO BE ACCOMPLISHED**
  - 7.1 Review Previous Studies**
  - 7.2 Perform a Limited Site Survey**
  - 7.3 Reevaluate Selected Projects**
  - 7.4 Evaluate Selected ECOs**
  - 7.5 Combine ECOs into Recommended Projects**
  - 7.6 Submittals, Presentations and Reviews**

**ANNEXES**

- A - DETAILED SCOPE OF WORK**
- B - EXECUTIVE SUMMARY GUIDELINE**
- C - REQUIRED DD FORM 1391 DATA**

**1. BRIEF DESCRIPTION OF WORK: The Architect-Engineer (AE) shall:**

**1.1 Review the previously completed Energy Engineering Analysis Program (EEAP) study which applies to the specific building, system, or energy conservation opportunity (ECO) covered by this study.**

**1.2 Perform a limited site survey of specific buildings or areas to collect all data required to evaluate the specific ECOs included in this study.**

**1.3 Reevaluate the specific project or ECO from the previous study to determine its economic feasibility based on revised criteria, current site conditions and technical applicability.**

**1.4 Evaluate specific ECOs to determine their energy savings potential and economic feasibility.**

**1.5 Provide project documentation for recommended ECOs as detailed herein.**

**1.6 Prepare a comprehensive report to document all work performed, the results and all recommendations.**

**2. GENERAL**

**2.1 This study is limited to the evaluation of the specific buildings, systems, or ECOs listed in Annex A, DETAILED SCOPE OF WORK.**

**2.2 The information and analysis outlined herein are considered to be minimum requirements for adequate performance of this study.**

**2.3 For the buildings, systems or ECOs listed in Annex A, all methods of energy conservation which are reasonable and practical shall be considered, including improvements of operational methods and procedures as well as the physical facilities. All energy conservation opportunities which produce energy or dollar savings shall be documented in this report. Any energy conservation opportunity considered infeasible shall also be documented in the report with reasons for elimination.**

**2.4 The study shall consider the use of all energy sources applicable to each building, system, or ECO.**

**2.5 The "Energy Conservation Investment Program (ECIP) Guidance", described in letter from CEHSC-FU, dated 28 June 1991 and the latest revision from CEHSC-FU establishes criteria for ECIP**

projects and shall be used for performing the economic analyses of all ECOs and projects. The program, Life Cycle Cost In Design (LCCID), has been developed for performing life cycle cost calculations in accordance with ECIP guidelines and is referenced in the ECIP Guidance. If any program other than LCCID is proposed for life cycle cost analysis, it must use the mode  
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of calculation specified in the ECIP Guidance. The output must be in the format of the ECIP LCCA summary sheet, and it must be submitted for approval to the Contracting Officer.

2.6 Computer modeling will be used to determine the energy savings of ECOs which would replace or significantly change an existing heating, ventilating, and air-conditioning (HVAC) system. The requirement to use computer modeling applies only to heated and air-conditioned or air-conditioned-only buildings which exceed 8,000 square feet or heated-only buildings in excess of 20,000 square feet. Modeling will be done using a professionally recognized and proven computer program or programs that integrate architectural features with air-conditioning, heating, lighting and other energy-producing or consuming systems. These programs will be capable of simulating the features, systems, and thermal loads of the building under study. The program will use established weather data files and may perform calculations on a true hour-by-hour basis or may condense the weather files and the number of calculations into several "typical" days per month. The Detailed Scope of Work, Annex A, will list programs that are acceptable to the Contracting Officer. If the AE desires to use a different program, it must be submitted for approval with a sample run, an explanation of all input and output data, and a summary of program methodology and energy evaluation capabilities.

2.7 Energy conservation opportunities determined to be technically and economically feasible shall be developed into projects acceptable to installation personnel. This may involve combining similar ECOs into larger packages which will qualify for ECIP, MCA, or PCIP funding, and determining in coordination with installation personnel the appropriate packaging and implementation approach for all feasible ECOs.

2.7.1 Projects which qualify for ECIP funding shall be identified, separately listed, and prioritized by the Savings to Investment Ratio (SIR).

2.7.2 All feasible non-ECIP projects shall be ranked in order of highest to lowest SIR.

2.7.3 At some installations Energy Conservation and Management (ECAM) funding will be used instead of ECIP funding. The criteria for each program is the same. The Director of Engineering and Housing will indicate which program is used at this installation. This Scope of Work mentions only ECIP, however, ECAM is also meant.

### 3. PROJECT MANAGEMENT

**3.1 Project Managers.** The AE shall designate a project manager to serve as a point of contact and liaison for work required under this contract. Upon award of this contract, the individual shall be immediately designated in writing. The AE's designated project manager shall be approved by the Contracting Officer prior to commencement of work. This designated individual shall be

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responsible for coordination of work required under this contract. The Contracting Officer will designate a project manager to serve as the Government's point of contact and liaison for all work required under this contract. This individual will be the Government's representative.

**3.2 Installation Assistance.** The Commanding Officer or authorized representative at the installation will designate an individual to assist the AE in obtaining information and establishing contacts necessary to accomplish the work required under this contract. This individual will be the installation representative.

**3.3 Public Disclosures.** The AE shall make no public announcements or disclosures relative to information contained or developed in this contract, except as authorized by the Contracting Officer.

**3.4 Meetings.** Meetings will be scheduled whenever requested by the AE or the Contracting Officer for the resolution of questions or problems encountered in the performance of the work. The AE's project manager and the Government's representative shall be required to attend and participate in all meetings pertinent to the work required under this contract as directed by the Contracting Officer. These meetings, if necessary, are in addition to the presentation and review conferences.

**3.5 Site Visits, Inspections, and Investigations.** The AE shall visit and inspect/investigate the site of the project as necessary and required during the preparation and accomplishment of the work.

### **3.6 Records**

**3.6.1** The AE shall provide a record of all significant conferences, meetings, discussions, verbal directions, telephone conversations, etc., with Government representative(s) relative to this contract in which the AE and/or designated representative(s) thereof participated. These records shall be dated and shall identify the contract number, and modification number if applicable, participating personnel, subject discussed and conclusions reached. The AE shall forward to the Contracting Officer within ten calendar days, a reproducible copy of the records.

**3.6.2** The AE shall provide a record of requests for and/or receipt of Government-furnished material, data, documents, information, etc., which if not furnished in a timely manner, would significantly impair the normal progression of the work under this contract. The records shall be dated and shall identify the contract number and modification number, if applicable. The AE shall

forward to the Contracting Officer within ten calendar days, a reproducible copy of the record of request or receipt of material.

3.7 Interviews. The AE and the Government's representative shall conduct entry and exit interviews with the Director of Engineering and Housing before starting work at the installation

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and after completion of the field work. The Government's representative shall schedule the interviews at least one week in advance.

**3.7.1 Entry.** The entry interview shall describe the intended procedures for the survey and shall be conducted prior to commencing work at the facility. As a minimum, the interview shall cover the following points:

- a. Schedules.
- b. Names of energy analysts who will be conducting the site survey.
- c. Proposed working hours.
- d. Support requirements from the Director of Engineering and Housing.

**3.7.2 Exit.** The exit interview shall briefly describe the items surveyed and probable areas of energy conservation. The interview shall also solicit input and advice from the Director of Engineering and Housing.

**4. SERVICES AND MATERIALS.** All services, materials (except those specifically enumerated to be furnished by the Government), plant, labor, supervision and travel necessary to perform the work and render the data required under this contract are included in the lump sum price of the contract.

**5. PROJECT DOCUMENTATION.** All energy conservation opportunities which the AE has considered shall be included in one of the following categories and presented in the report as such:

**5.1 ECIP Projects.** To qualify as an ECIP project, an ECO, or several ECOs which have been combined, must have a construction cost estimate greater than \$200,000, a Savings to Investment Ratio greater than one and a simple payback period of less than eight years. For ECAM projects, the \$200,000 limitation may not apply; in such cases, the AE shall check with the installation for guidance. The overall project and each discrete part of the project shall have an SIR greater than one. All projects meeting the above criteria shall be arranged as specified in paragraph 2.7.1 and shall be provided with programming documentation. Programming documentation shall consist of a DD Form 1391, life cycle cost analysis (LCCA) summary sheet(s) (with necessary backup data to verify the numbers presented), and a Project Development Brochure (PDB). A life cycle cost analysis summary sheet shall be developed for each ECO and for the overall project when more than one ECO are combined. The energy savings for projects consisting of multi-

ple ECOs must take into account the synergistic effects of the individual ECOs. [For projects and ECOs reevaluated from previous studies, the backup data shall consist of copies of the original calculations and analysis, with new pages revising the original calculations and analysis. In addition, the backup data shall include as much of the following as is available: the increment  
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of work under which the project or ECO was developed in the previous study, title(s) of the project(s), the energy to cost (E/C) ratio, the benefit to cost (B/C) ratio, the current working estimate (CWE), and the payback period. The purpose of this information is to provide a means to prevent duplication of projects in any future reports.]

5.2 Non-ECIP Projects. Projects which do not meet ECIP criteria with regard to cost estimate, payback period, or non-energy (75%) qualification test, but which have an SIR greater than one shall be documented. Projects or ECOs in this category shall be arranged as specified in paragraph 2.7.2 and shall be provided with the following documentation: the life cycle cost analysis (LCCA) summary sheet completely filled out, a description of the work to be accomplished, backup data for the LCCA, ie, energy savings calculations and cost estimate(s), and the simple payback period. The energy savings for projects consisting of multiple ECOs must take into account the synergistic effects of the individual ECOs. In addition these projects shall have the necessary documentation prepared, as required by the Government's representative, for one of the following categories:

a. Quick Return on Investment Program (QRIP). This program is for projects which have a total cost greater than \$3,000 but less than \$100,000 and a simple payback period of two years or less.

b. Productivity Enhancing Capital Investment Program (PE-CIP). This program is for projects which have a total cost of greater than \$3,000 but less than \$100,000 and a simple payback period of four years or less.

c. OSD Productivity Investment Funding (OSD PIF). This program is for projects which have a total cost of more than \$100,000 and a simple payback period of four years or less.

The above programs and the required documentation forms are all described in detail in AR 5-4, Change No. 1.

d. Regular Military Construction Army (MCA) Program. This program is for projects which have a total cost greater than \$200,000 and a simple payback period of four to twenty-five years. Documentation shall consist of DD Form 1391 and a Project Development Brochure.

e. Low Cost/No Cost Projects. These are projects which the Director of Engineering and Housing (DEH) can perform using his resources. Documentation shall be as required by the DEH.

5.3 Nonfeasible ECOs. All ECOs which the AE has considered but which are not feasible, shall be documented in the report with reasons and justifications showing why they were rejected.

6. DETAILED SCOPE OF WORK. The Detailed Scope of Work is contained in Annex A.

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## **7. WORK TO BE ACCOMPLISHED.**

**7.1 Review Previous Studies.** Review the previous EEAP study which applies to the specific building, system, or ECO covered by this study. This review should acquaint the AE with the work that has been performed previously. Much of the information the AE may need to develop the ECOs in this study may be contained in the previous study.

**7.2 Perform a Limited Site Survey.** The AE shall obtain all necessary data to evaluate the ECOs or projects by conducting a site survey. However, the AE is encouraged to use any data that may have been documented in a previous study. The AE shall document his site survey on forms developed for the survey, or standard forms, and submit these completed forms as part of the report. All test and/or measurement equipment shall be properly calibrated prior to its use. ←

**7.3 Reevaluate Selected Projects.** The AE shall reevaluate the projects and ECOs listed in Annex A. These are projects and ECOs that the previous study has identified but that have not been accomplished or only parts have been accomplished. If the project or ECO is acceptable as is, that is, there are no changes to the basic project or ECO, the energy savings shown in the previous project may be accepted as accurate but the energy cost and construction cost estimates shall be updated based on the most current data available. With the above information the project shall then be analyzed based on current ECIP criteria. If the project or ECO is basically acceptable but some of the buildings in the original project have been deleted or new buildings can be added, the necessary changes shall be made to the energy savings, the energy costs and construction costs shall be updated, and the revised project or ECO shall then be analyzed using current ECIP guidance. If the original project or ECO has had numerous changes made to it so that all of the numbers are suspected of being inaccurate, but the project or ECO is still considered feasible, the AE shall develop the project from the beginning and analyze it with the current ECIP guidance. These projects shall be separately listed in the report.

**7.4 Evaluate Selected ECOs.** The AE shall analyze the ECOs listed in Annex A. These ECOs shall be analyzed in detail to determine their feasibility. Savings to Investment Ratios (SIRs) shall be determined using current ECIP guidance. The AE shall provide all data and calculations needed to support the recommended ECO. All assumptions and engineering equations shall be clearly stated. Calculations shall be prepared showing how all numbers in the ECO were figured. Calculations shall be an orderly step-by-step progression from the first assumption to the final

number. Descriptions of the products, manufacturers catalog cuts, pertinent drawings and sketches shall also be included. A life cycle cost analysis summary sheet shall be prepared for each ECO and included as part of the supporting data.

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**7.5 Combine ECOs Into Recommended Projects.** During the Interim Review Conference, as outlined in paragraph [7.6.1], the AE will be advised of the DEH's preferred packaging of recommended ECOs into projects for implementation. Some projects may be a combination of several ECOs, and others may contain only one. These projects will be evaluated and arranged as outlined in paragraphs 5.1, 5.2, and 5.3. Energy savings calculations shall take into account the synergistic effects of multiple ECOs within a project and the effects of one project upon another. The results of this effort will be reported in the Final Submittal per par [7.6.2].

**7.6 Submittals, Presentations and Reviews.** The work accomplished shall be fully documented by a comprehensive report. The report shall have a table of contents and shall be indexed. Tabs and dividers shall clearly and distinctly divide sections, subsections, and appendices. All pages shall be numbered. Names of the persons primarily responsible for the project shall be included.

→ The AE shall give a formal presentation of the interim submittal to installation, command, and other Government personnel. Slides or view graphs showing the results of the study to date shall be used during the presentation. During the presentation, the personnel in attendance shall be given ample opportunity to ask questions and discuss any changes deemed necessary to the study. A review conference will be conducted the same day, following the presentation. Each comment presented at the review conference will be discussed and resolved or action items assigned. It is anticipated that the presentation and review conference will require approximately one working day. The presentation and review conference will be at the installation on the date agreeable to the Director of Engineering and Housing, the AE and the Government's representative. The Contracting Officer may require a re-submittal of any document(s), if such document(s) are not approved because they are determined by the Contracting Officer to be inadequate for the intended purpose.

**7.6.1 Interim Submittal.** An interim report shall be submitted for review after the field survey has been completed and an analysis has been performed on all of the ECOs. The report shall indicate the work which has been accomplished to date, illustrate the methods and justifications of the approaches taken and contain a plan of the work remaining to complete the study. Calculations showing energy and dollar savings, SIR, and simple payback period of all the ECOs shall be included. The results of the ECO analyses shall be summarized by lists as follows:

a. All ECOs eliminated from consideration shall be grouped into one listing with reasons for their elimination as discussed in par 5.3.

b.All ECOs which were analysed shall be grouped into two listings, recommended and non-recommended, each arranged in order of descending SIR. These lists may be subdivided by building or area as appropriate for the study.

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The AE shall submit the Scope of Work and any modifications to the Scope of Work as an appendix to the report. A narrative summary describing the work and results to date shall be a part of this submittal. At the Interim Submittal and Review Conference, the Government's and AE's representatives shall coordinate with the Director of Engineering and Housing to provide the AE with direction for packaging or combining ECOs for programming purposes and also indicate the fiscal year for which the programming or implementation documentation shall be prepared. The survey forms completed during this audit shall be submitted with this report. The survey forms only may be submitted in final form with this submittal. They should be clearly marked at the time of submission that they are to be retained. They shall be bound in a standard three-ring binder which will allow repeated disassembly and reassembly of the material contained within.

- 7.6.2 Final Submittal. The AE shall prepare and submit the final report when all sections of the report are 100% complete and all comments from the interim submittal have been resolved. The AE shall submit the Scope of Work for the study and any modifications to the Scope of Work as an appendix to the submittal. The report shall contain a narrative summary of conclusions and recommendations, together with all raw and supporting data, methods used, and sources of information. The report shall integrate all aspects of the study. The recommended projects, as determined in accordance with paragraph 5, shall be presented in order of priority by SIR. The lists of ECOs specified in paragraph [7.6.1] shall also be included for continuity. The final report and all appendices shall be bound in standard three-ring binders which will allow repeated disassembly and reassembly. The final report shall be arranged to include:

a. An Executive Summary to give a brief overview of what was accomplished and the results of this study using graphs, tables and charts as much as possible (See Annex B for minimum requirements).

b. The narrative report describing the problem to be studied, the approach to be used, and the results of this study.

c. Documentation for the recommended projects (includes LCCA Summary Sheets).

d. Appendices to include as a minimum:

- 1) Energy cost development and backup data
- 2) Detailed calculations

3) Cost estimates

4) Computer printouts (where applicable)

5) Scope of Work

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## **ANNEX A**

### **GUIDE TO THE PREPARATION OF THE DETAILED SCOPE OF WORK**

1. This annex will contain the detailed scope of work for this energy study. The information presented below is to be used as a guide in preparing the detailed scope of work. This statement and the statements below should not appear in the final contract documents.
2. The generalized scope of work and the detailed scope of work must combine to form a clear and concise statement of the requirements for the study. They must be reviewed carefully and edited as necessary to eliminate mutual conflicts and to provide needed detail. For example:

  - a. In the generalized scope of work there are several references to previous studies and reevaluations of previously-recommended projects. The detailed scope of work should include the previous study in the list of government furnished documents and should cite the specific projects to be reevaluated. However, if there was no previous study, or if there are no previously-recommended projects to be reviewed, these references should be deleted from the generalized scope of work, the paragraphs should be renumbered, and references to numbered paragraphs should be revised as needed.
  - b. For studies involving boilers, chillers, or industrial equipment, project managers are encouraged to borrow material from the guides to the detailed scopes of work for Boiler / Chiller or Industrial Facility studies. These can be found in the EEAP Procedures Manual. Careful editing will be required when integrating this material.
  - c. Boilers smaller than 3.5 MBTU per hour, if they fall within the scope of the study, should be investigated. See paragraph 10 of this guide for additional guidance that should be added to the scope of work.
3. The project manager will schedule a meeting at the installation with the Director of Engineering and Housing (DEH) and the Energy Officer. This meeting should be scheduled after these individuals have received the general Scope of Work and have had an opportunity to review it and prepare their input for the detailed scope of work. The MACOM should be invited to this meeting. The above offices should be notified a minimum of three weeks in advance of this meeting. The purpose of this meeting will be to

inform the installation what this energy survey is to accomplish, to discuss the general Scope of Work, answer any questions pertaining to it, and to develop the detailed Scope of Work. The following information is necessary when developing the detailed Scope of Work; and the Director of Engineering and Housing should be prepared to provide it at this meeting:

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a. Buildings, areas, equipment, distribution systems, or industrial processes that should be included in this energy study. Separately identify temporary buildings. Provide building names and numbers, type of building, whether building is typical of any others, etc.

b. Specific energy conservation opportunities (ECOs) by building that should be investigated in this study.

c. Which projects or ECOs from the previous study should be reevaluated as part of this study and the extent of reevaluation required.

4. Each detailed Scope of Work will include, but not be limited to, the following:

a. The study requirements developed from paragraph 3 above.

b. The schedule for completion of the study including milestone dates or time allowed, measured in calendar days from the notice to proceed, for each submittal.

c. The number of copies of each submittal required and the complete mailing addresses of those who are to receive the submittals.

d. An itemized list of Government-furnished information to be provided to the AE. As a minimum, this list should include:

(1) Final reports of previously completed studies performed under the Energy Engineering Analysis Program (EEAP).

(2) Latest copies of other energy studies performed since the previous EEAP study.

(3) ETLs 1110-3-254, Use of Electric Power for Comfort Space Heating (if applicable), and 1110-3-282, Energy Conservation

(4) Architectural and Engineering Instructions.

(5) Energy Conservation Investment Program (ECIP) Guidance, dated 28 June 1991 and the latest revision with current energy prices and discount factors for life cycle cost analysis.

(6) TM 5-785, Engineering Weather Data, TM 5-800-2, General Criteria Preparation of Cost Estimates.

(7) AR 5-4, Change No. 1, Department of the Army Productivity Improvement Program.

(8) AR 415-15, 1 Jan84, Military Construction, Army (MCA)  
Program Development

(9) The latest MCP Index.

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5. When developing the detailed scope of work, the buildings, systems, and/or ECOs to be studied shall be limited to those which are compatible with the scope of the EEAP directive for the study.

6. When listing projects or ECOs from previous studies, new ECOs that need to be evaluated, or buildings or areas that need to be investigated, list each under one of the following headings:

a. Projects or ECOs from previous studies.

b. New ECOs (specific ECOs for specific buildings or systems).

As the work required for each of the above is different from the others, this list will indicate to the AE the amount of work required under a particular heading.

7. The detailed scope of work will list those buildings or facilities which will be included in the study. If temporary building(s) are to be included in this energy study with the intent of developing ECIP projects incorporating them, a letter is required stating that there is a continuing need for the building(s) for a ten year period after the retrofit or the life of the retrofit. The continuing need must be based on the installation's annual real property utilization survey (AR 405-70). This letter must be signed by the Base Commander and be ready no later than at the prenegotiation meeting or the temporary building(s) will be removed from the list of buildings to be included in the study. This letter is not required if temporary buildings are to be included in low cost/no cost or non-ECIP projects only.

8. The Director of Engineering and Housing should designate a coordinator to serve as the point of contact and liaison for all work required under this contract. This individual should be identified in the detailed scope of work.

9. If it is known that the buildings in this study will not be subject to the computer modeling requirements of paragraph 2.6 of the general scope of work, then paragraph 2.6 should be deleted. If it is possible that the buildings in this study will be subject to the computer modeling requirements of paragraph 2.6, then the simulation programs acceptable to the office doing the technical review should be listed in the detailed scope of work. Some acceptable simulation programs follow:

a. Building Loads and System Thermodynamics (BLAST) \*

b. DOE 2.1B \*

c. Carrier E20 or Hourly Analysis Program (HAP) \*\*

d. Trane Air-Conditioning Economics (TRACE) \*\*

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- \* Very accurate, but requires a lot of time for input; therefore it is rather expensive for straightforward projects.
- \*\* Adequate for load determination, equipment selection, and energy performance for most projects.

This list may be expanded, contracted, or revised to include programs with which the reviewers are familiar provided such programs comply with Chapter 28, "Energy Estimating Methods" of the ASHRAE Handbook of Fundamentals.

10. If small boilers (less than 3.5 MBtu per hour) are to be included in this Scope of Work, the following paragraphs should be added to the general Scope of Work:

"1.5 Determine the efficiency of the boilers by appropriate tests. Determine if efficiency can be improved or fuel saved by the repair, addition, or modification of equipment, control systems, or maintenance practices; and recommend improvements."

(Existing paragraphs 1.5 and 1.6 will have to be renumbered.)

"7.3 Determine Boiler Efficiency. The efficiency of the boilers shall be determined by field testing. The AE shall provide equipment and perform the tests to establish the efficiency of the boilers. The tests are intended to determine the efficiency of the boilers as they are actually being operated. The combustion efficiency may be determined from an Orsat analysis of the flue gases. Based on the results of the tests, any indicated areas of improvement or equipment modifications shall be fully analyzed. The analysis shall evaluate boiler loading profiles versus boiler capacity and shall establish boiler efficiency and boiler operating baselines. The Government will furnish fuel, utilities and other consumables and provide personnel as needed to operate the boilers during the test. All test and measurement equipment shall be properly calibrated prior to its use."

(Existing paragraphs 7.3 through 7.6 will have to be renumbered.)

11. The following is provided and should be included in the detailed Scope of Work for the AE's benefit: "A computer program titled Life Cycle Costing in Design (LCCID) is available from the BLAST Support Office in Urbana, Illinois for a nominal fee. This computer program can be used for performing the economic calculations for ECIP and non-ECIP ECOs. The AE is encouraged to obtain and use this computer program. The BLAST Support Office can be contacted at 144 Mechanical Engineering Building, 1206 West Green Street, Urbana, Illinois 61801. The telephone number is (217) 333-3977 or (800) 842-5278."

## ANNEX B

### EXECUTIVE SUMMARY GUIDELINE

1. Introduction.
2. Building Data (types, number of similar buildings, sizes, etc.)
3. Present Energy Consumption of Buildings or Systems Studied.

- o Total Annual Energy Used.
- o Source Energy Consumption.

Electricity - KWH, Dollars, BTU  
Fuel Oil - GALS, Dollars, BTU  
Natural Gas - THERMS, Dollars, BTU  
Propane - GALS, Dollars, BTU  
Other - QTY, Dollars, BTU

4. Reevaluated Projects Results.
5. Energy Conservation Analysis.
  - o ECOs Investigated.
  - o ECOs Recommended.
  - o ECOs Rejected. (Provide economics or reasons)
  - o ECIP Projects Developed. (Provide list)\*
  - o Non-ECIP Projects Developed. (Provide list)\*
  - o Operational or Policy Change Recommendations.

\* Include the following data from the life cycle cost analysis summary sheet: the cost (construction plus SIOH), the annual energy savings (type and amount), the annual dollar savings, the SIR, the simple payback period and the analysis date.

6. Energy and Cost Savings.
  - o Total Potential Energy and Cost Savings.
  - o Percentage of Energy Conserved.

**o Energy Use and Cost Before and After the Energy Conservation Opportunities are Implemented.**

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## ANNEX C

### REQUIRED DD FORM 1391 DATA

To facilitate ECIP project approval, the following supplemental data shall be provided:

- a. In title block clearly identify projects as "ECIP."
- b. Complete description of each item of work to be accomplished including quantity, square footage, etc.
- c. A comprehensive list of buildings, zones, or areas including building numbers, square foot floor area, designated temporary or permanent, and usage (administration, patient treatment, etc.).
  - (1) If a specific building, zone, or area is used for sample calculations, identify building, zone or area, category, orientation, square footage, floor area, window and wall area for each exposure.
  - (2) Identify weather data source.
  - (3) Identify infiltration assumptions before and after improvements.
  - (4) Include source of expertise and demonstrate savings claimed. Identify any special or critical environmental conditions such as pressure relationships, exhaust or outside air quantities, temperatures, humidity, etc.
- e. Claims for boiler efficiency improvements must identify data to support present properly adjusted boiler operation and future expected efficiency. If full replacement of boilers is indicated, explain rejection of alternatives such as replace burners, nonfunctioning controls, etc. Assessment of the complete existing installation is required to make accurate determinations of required retrofit actions.
- f. Lighting retrofit projects must identify number and type of fixtures, and wattage of each fixture being deleted and installed. New lighting shall be only of the level to meet current criteria. Lamp changes in existing fixtures is not considered an ECIP type project.

g. An ECIP life cycle cost analysis summary sheet as shown in the ECIP Guidance shall be provided for the complete project and for each discrete part included in the project. The SIR is applicable to all segments of the project. Supporting documentation consisting of basic engineering and economic calculations showing how savings were determined shall be included.

h. The DD Form 1391 face sheet shall include, for the complete project, the annual dollar and MBTU savings, SIR, simple amortization period and a statement attesting that all buildings and retrofit actions will be in active use throughout the amortization period.

i. The calendar year in which the cost was calculated shall be clearly shown on the DD Form 1391.

j. For each temporary building included in a project, separate documentation is required showing (1) a minimum 10-year continuing need, based on the installation's annual real property utilization survey, for active building retention after retrofit, (2) the specific retrofit action applicable and (3) an economic analysis supporting the specific retrofit.

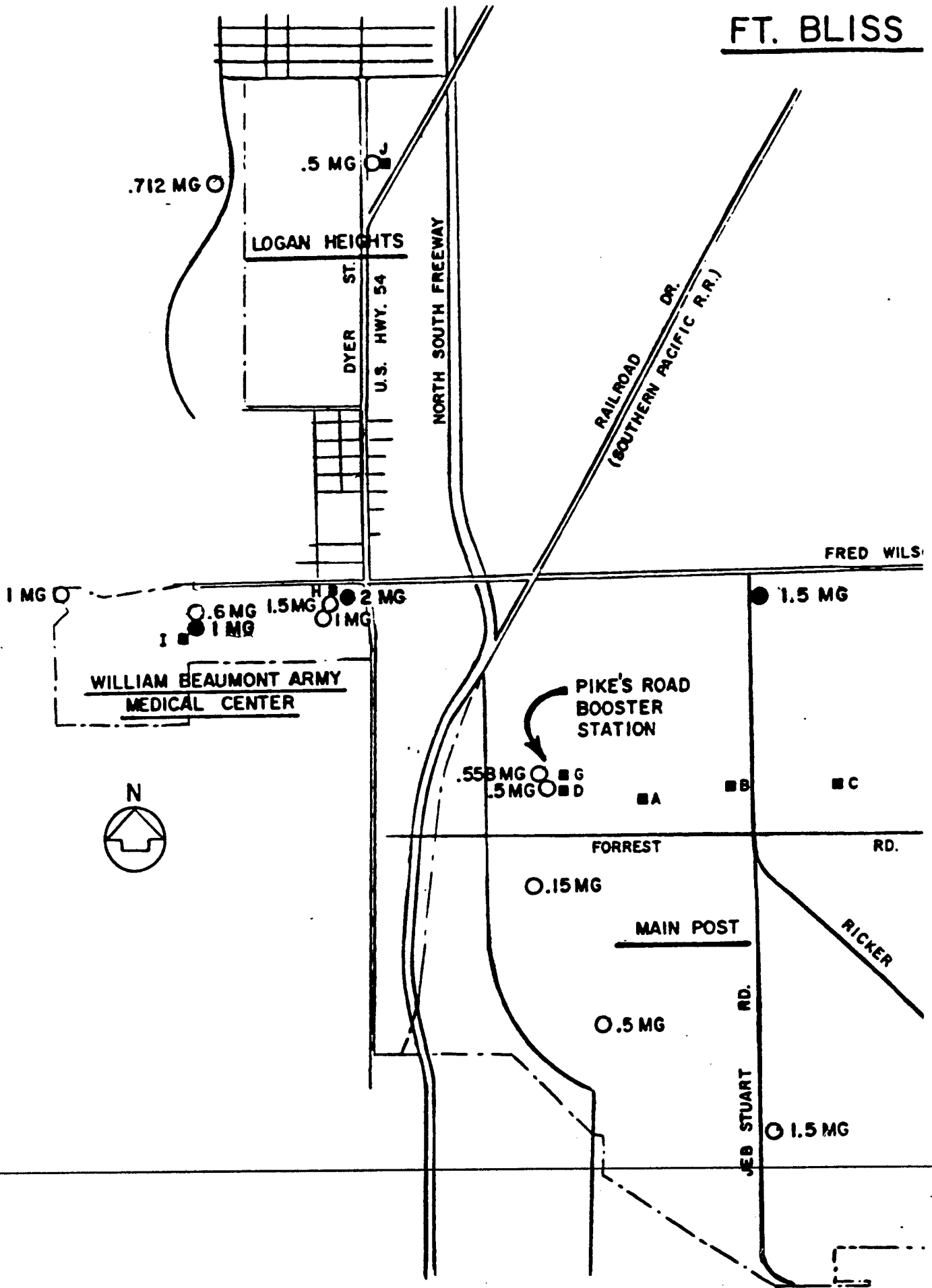
k. Nonappropriated funded facilities will not be included in an ECIP project without an accompanying statement certifying that utility costs are not reimbursable.

l. Any requirements required by ECIP guidance dated 25 April 1988 and any revisions thereto. Note that unescalated costs/savings are to be used in the economic analyses.

m. The five digit category number for all ECIP projects except for Family Housing is 80000. The category code number for Family Housing projects is 71100.

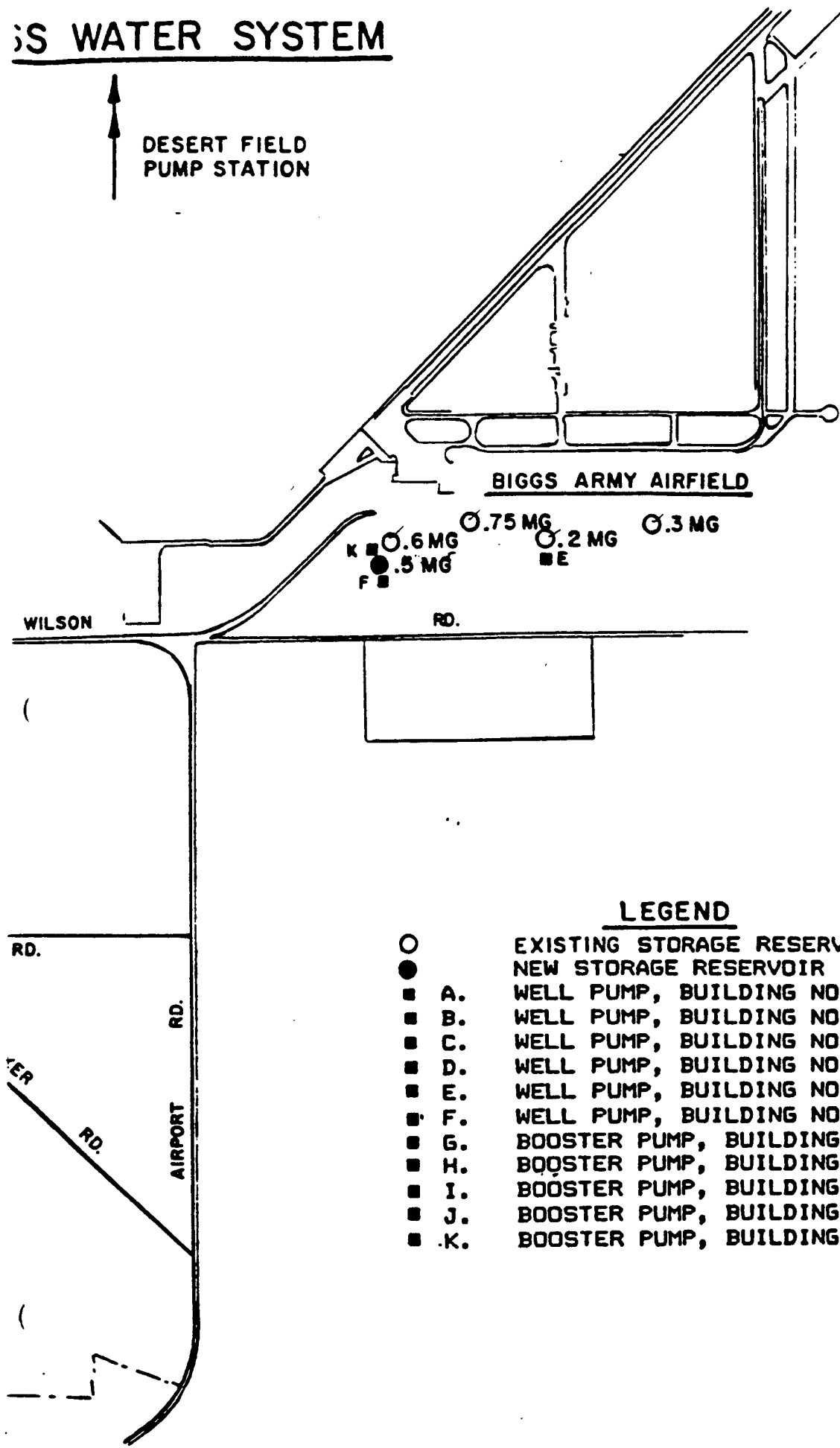
## **APPENDIX K - Map**

# FT. BLISS



# IS WATER SYSTEM

↑  
DESERT FIELD  
PUMP STATION



**BIGGS ARMY AIRFIELD**

WILSON

RD.

RD.

RD.

AIRPORT

KER

RD.

## LEGEND

- EXISTING STORAGE RESERVOIR
- NEW STORAGE RESERVOIR
- A. WELL PUMP, BUILDING NO. 1170
- B. WELL PUMP, BUILDING NO. 1252
- C. WELL PUMP, BUILDING NO. 2451
- D. WELL PUMP, BUILDING NO. 1998
- E. WELL PUMP, BUILDING NO. 11241
- F. WELL PUMP, BUILDING NO. 11180
- G. BOOSTER PUMP, BUILDING NO. 1318
- H. BOOSTER PUMP, BUILDING NO. 7094
- I. BOOSTER PUMP, BUILDING NO. 7242
- J. BOOSTER PUMP, BUILDING NO. 4318
- K. BOOSTER PUMP, BUILDING NO. 11171

## **APPENDIX L - Symbols, Abbreviations and Conversion Factors**

## **SYMBOLS AND ABBREVIATIONS**

<b>KW</b>	- Kilowatt (1,000 watts)
<b>KWH</b>	- Kilowatt-Hour (1,000 watt-hours)
<b>CF</b>	- Cubic Feet
<b>KCF</b>	- 1,000 Cubic Feet
<b>MCF</b>	- 1,000,000 Cubic Feet
<b>BTU</b>	- British Thermal Unit
<b>KBTU</b>	- 1,000 BTUs
<b>MBTU</b>	- 1,000,000 BTUs

## **CONVERSION FACTORS**

<b>1 KWH</b>	<b>= .003413 MBTU</b>
<b>1 KCF</b>	<b>= 1.031 MBTU</b>