PERIOD	(A) TOTAL SUN HOURS	(B) HOURS OF INSOL. ABOVE 300 W/M^2	(C) HOLIDAY HOURS WITH INSOL. ABOVE 300 W/M^2	(D) WORKING HOURS I	(D) WORKING HOURS II	(E) OVERALL SOLAR AVAIL.[1]	(F) ACTUAL SOLAR AVAIL.[2]	(G) EQUIPMENT AVAILABILITY[3] I	(G) EQUIPMENT AVAILABILITY[3] II	(H) USAGE FACTOR[4] I	(H) USAGE FACTOR[4] II
JAN.	302.65	199.30	89.68	88.42	85.10	.658	.362	1.000	.921	.807	.715
FEB.*	276.43	149.61	50.87	71.01	69.58	.541	.357	.999	.970	.718	.683
MAR.	364.33	215.08	68.18	104.81	78.13	.590	.403	.994	.962	.709	.512
APR.	389.06	184.99	73.81	89.33	98.08	.475	.285	1.000	.941	.803	.830
4 MON.	1332.47	748.98	282.36	360.52	330.89	.562	.350	.998	.948	.756	.672
MAY	433.63	212.52	73.49	108.44	123.39	.490	.320	1.000	.949	.780	.843
JUN.*	391.55	260.90	111.21	83.73	109.57	.666	.382	1.000	.962	.559	.703
JUL.	442.12	293.64	96.44	153.85	187.59	.664	.446	.986	.985	.770	.937
AUG.+	401.20	285.98	84.83	99.97	103.67	.713	.501	1.000	.997	.497	.514
4 MON.	1668.50	1053.04	366.48	453.57	524.22	.631	.411	.996	.974	.647	.743

Table 1: Operations Analysis Results - solar availability, equipment availability, and usage factor for the single-axis tracking (I) and dual-axis tracking (II) collector fields

* Only 26 out of 29 days of data were used in February and 27 out of 30 days in June because no data were taken in three days due to software changes in the Data Acquisition System.

+ One day of data was not used due to bad data.

1. $E = \frac{B}{A}$

2. $F = \frac{B - C}{A}$

3. See Equation 2 in Section 3.2

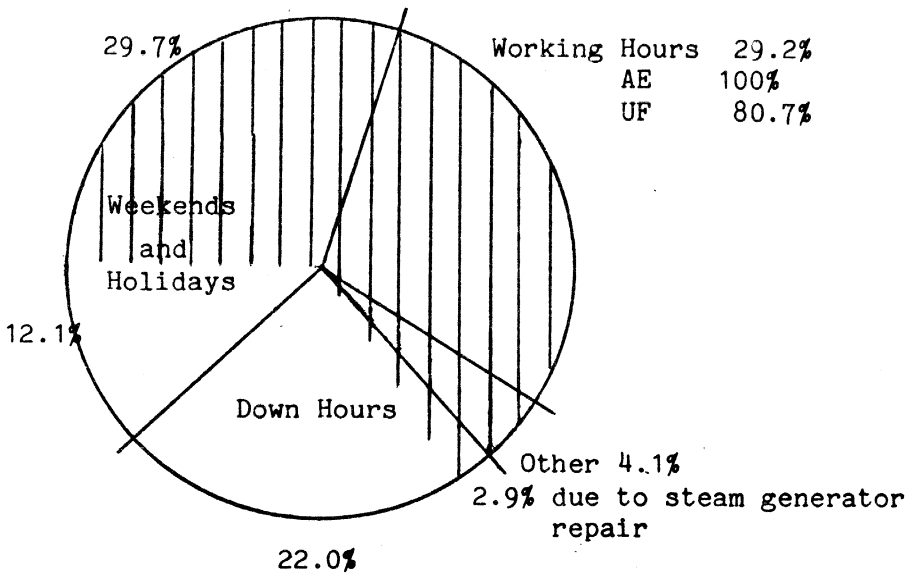
4. $H = \frac{D}{B - C} \cdot G$

PERIOD	SINGLE-AXIS TRACKING COLLECTOR SYSTEM		DUAL-AXIS TRACKING COLLECTOR SYSTEM	
	number of working days considered	$\overline{duf}$	number of working days considered	$\overline{duf}$
JAN.	14	.878	13	.869
FEB.	11	.885	10	.858
MAR.	16	.760	9	.956
APR.	11	.879	11	.964
4 MON.	52	.843	43	.909
MAY	13	.856	12	.938
JUN.	10	.796	11	.908
JUL.	20	.826	21	.940
AUG.	13	.739	11	.883
4 MON.	56	.808	55	.922

Table 2: Operations Analysis Results - average daily usage factor

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 65.9\%$$

Single-Axis Collectors



Dual-Axis Collectors

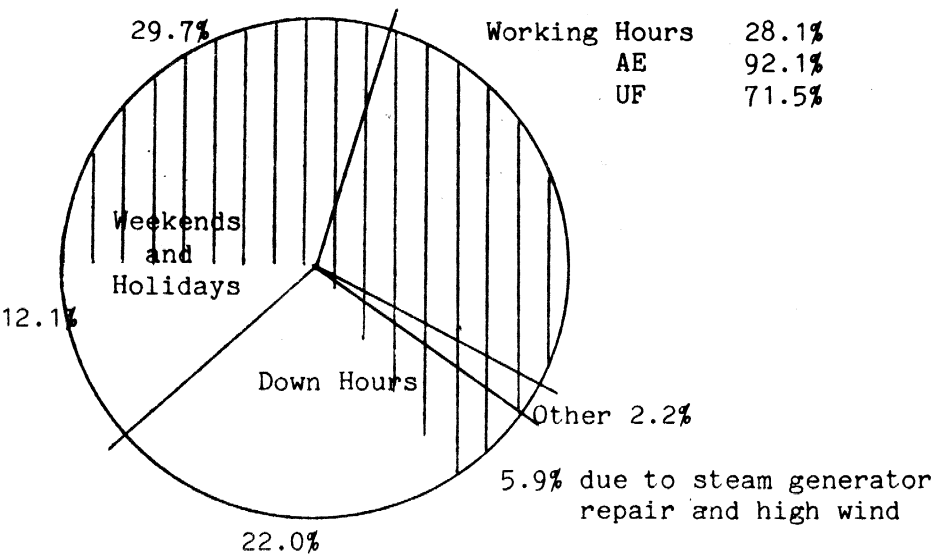
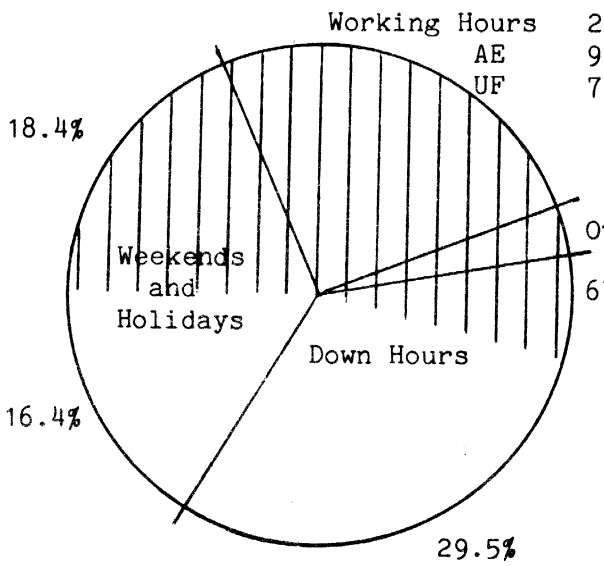


Figure 1: Total Sun Hours Usage In January

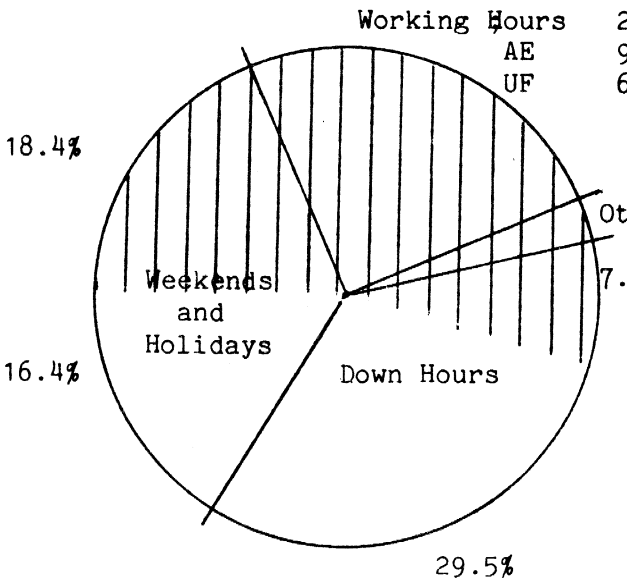
$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 54.1\%$$

Single-Axis Collectors



6.7% due to high wind and work on computer data base

Dual-Axis Collectors

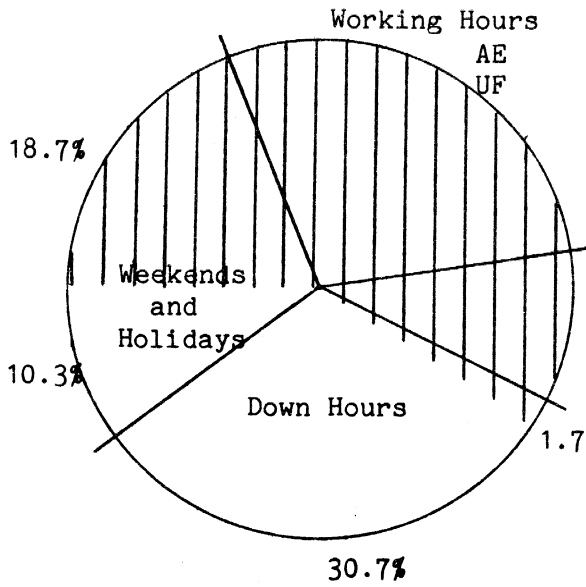


7.8% due to high wind and work on computer data base

Figure 2: Total Sun Hours Usage In February

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 59.0\%$$

Single-Axis Collectors



Dual-Axis Collectors

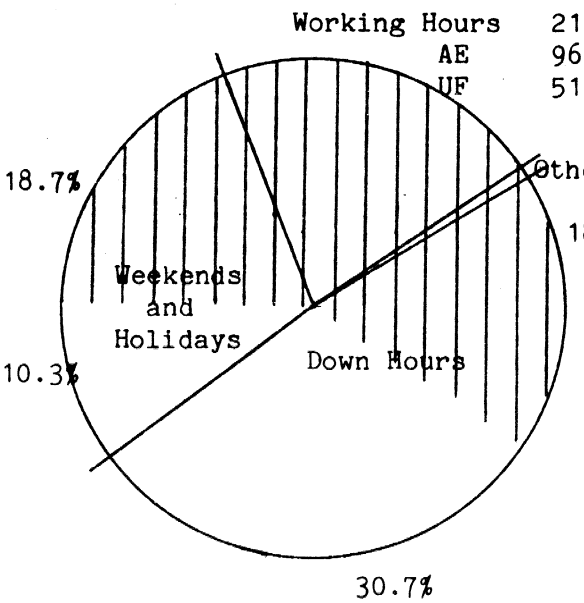
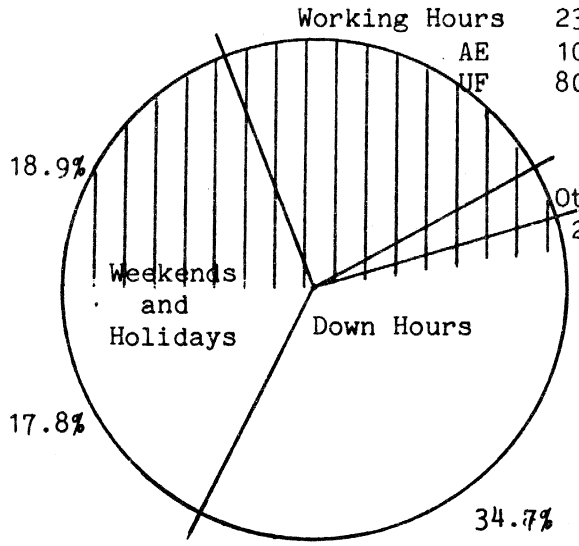


Figure 3: Total Sun Hours Usage In March

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 47.5\%$$

Single-Axis Collectors



Dual-Axis Collectors

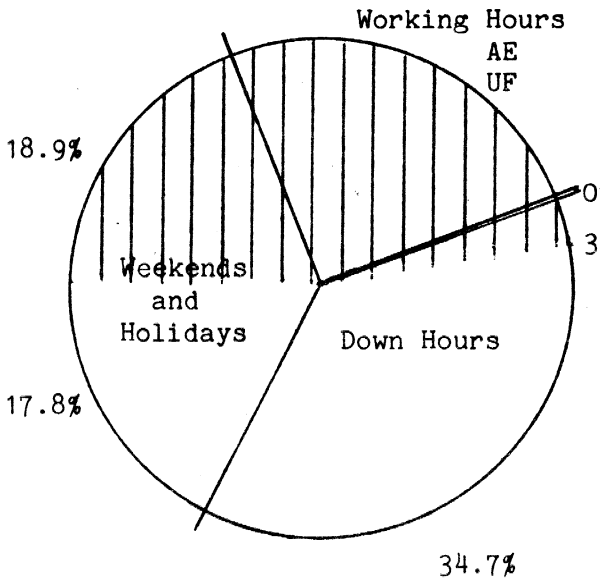
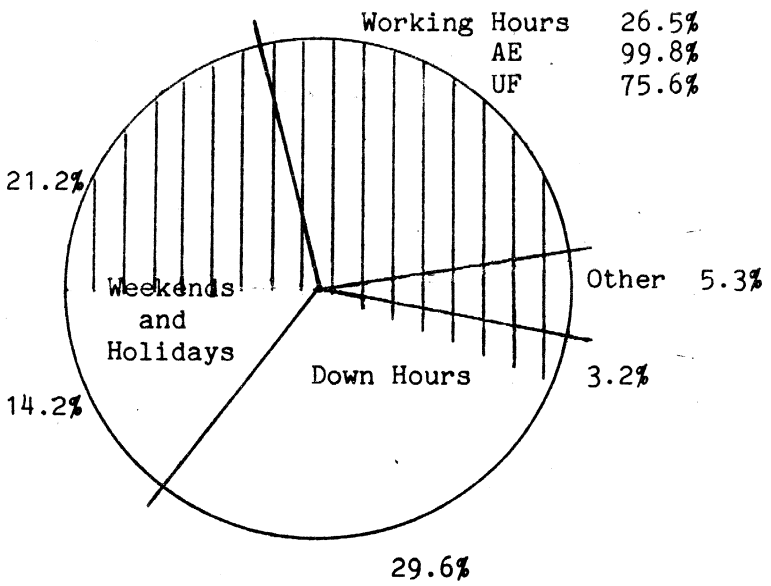


Figure 4: Total Sun Hours Usage In April

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 56.2\%$$

Single-Axis Collectors



Dual-Axis Collectors

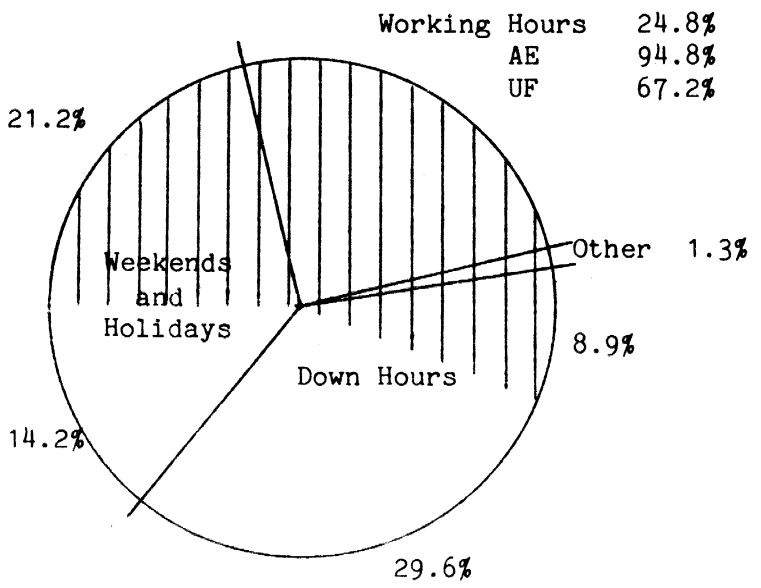
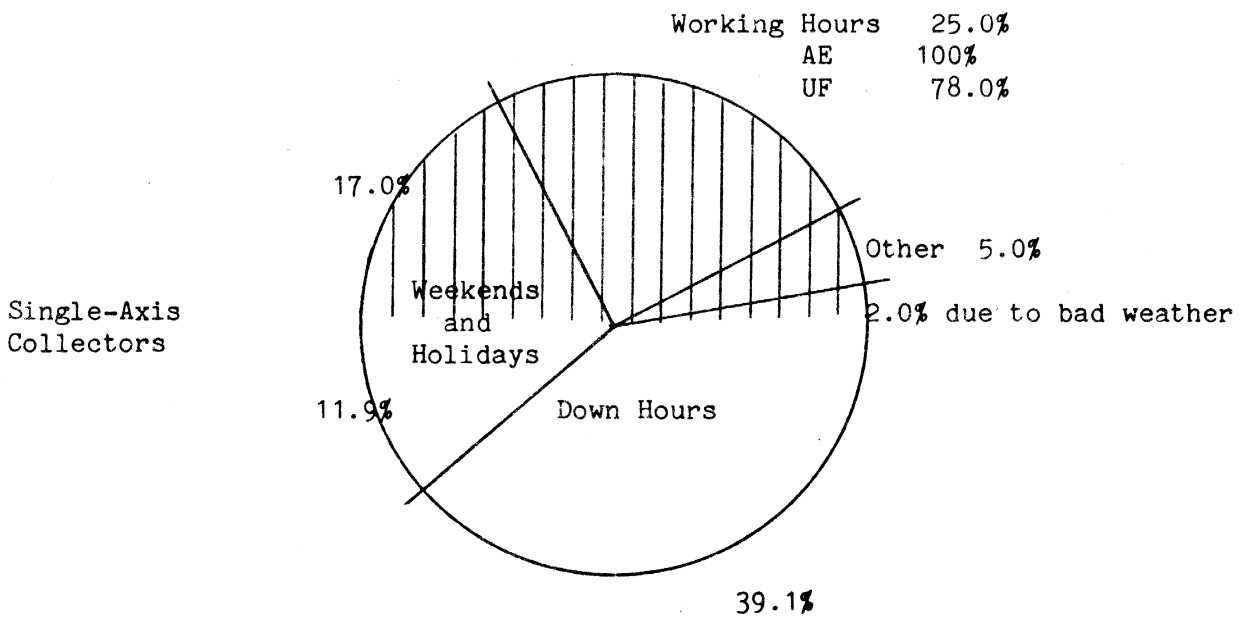


Figure 5: Total Sun Hour Usage in the First Four Months of 1984

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 49.0\%$$



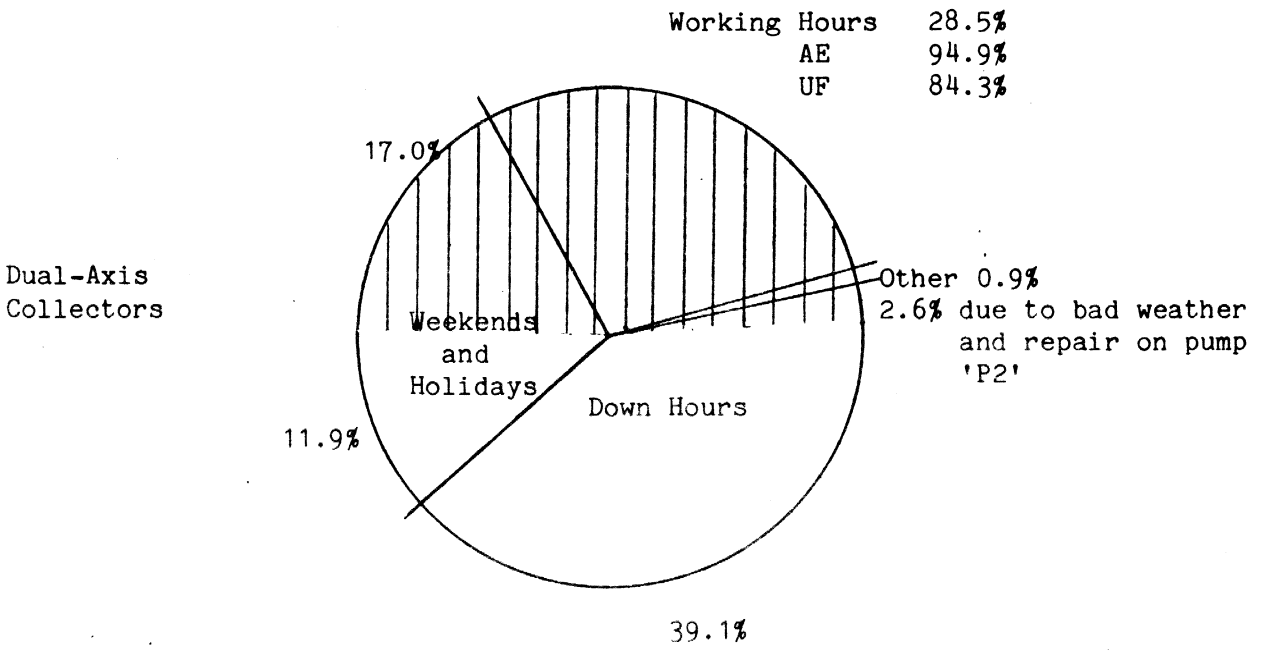
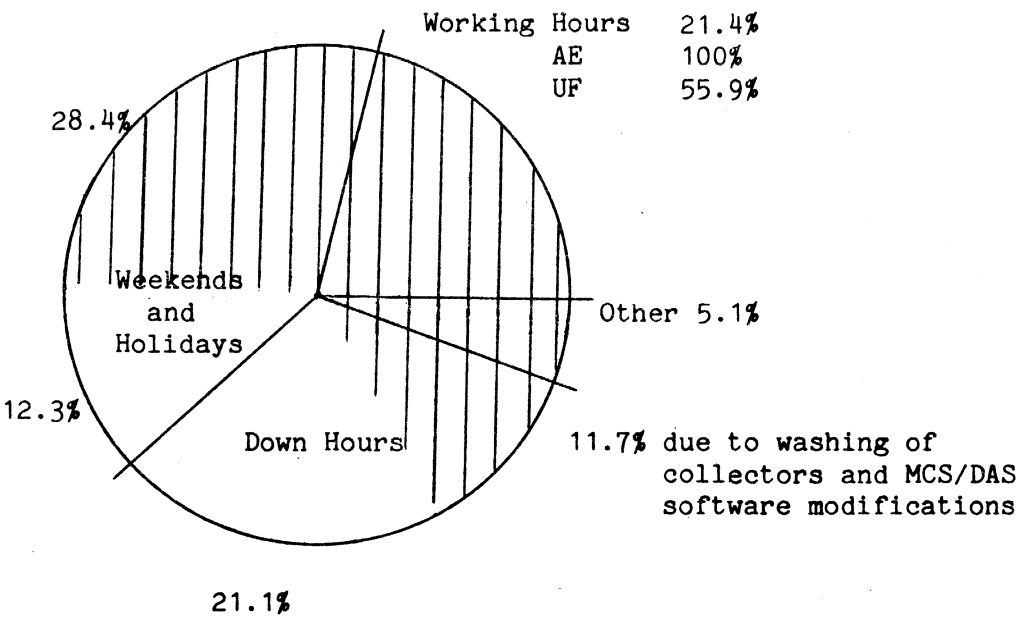


Figure 6: Total Sun Hours Usage In May

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 66.6\%$$

Single-Axis Collectors



Dual-Axis Collectors

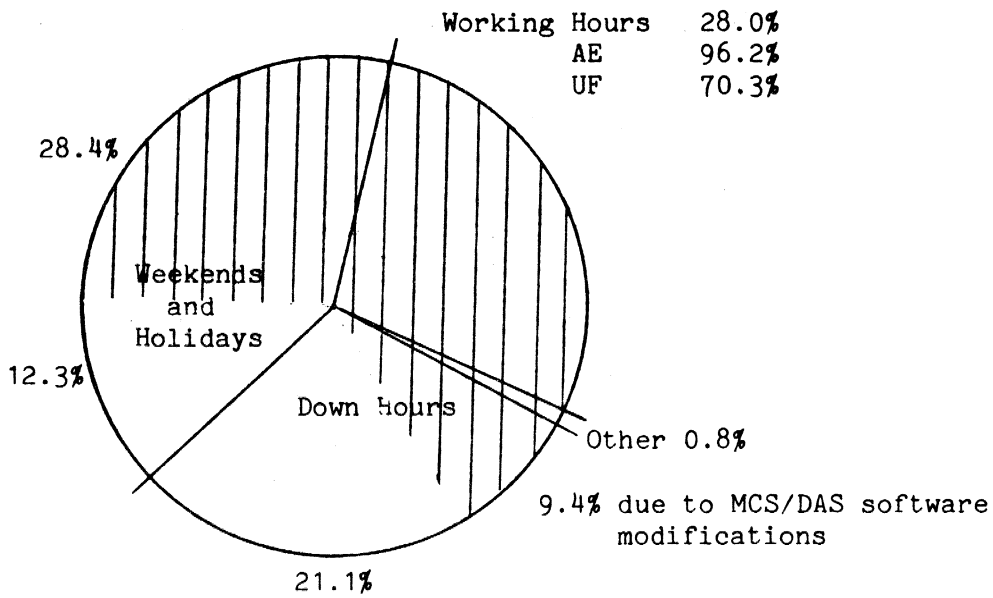
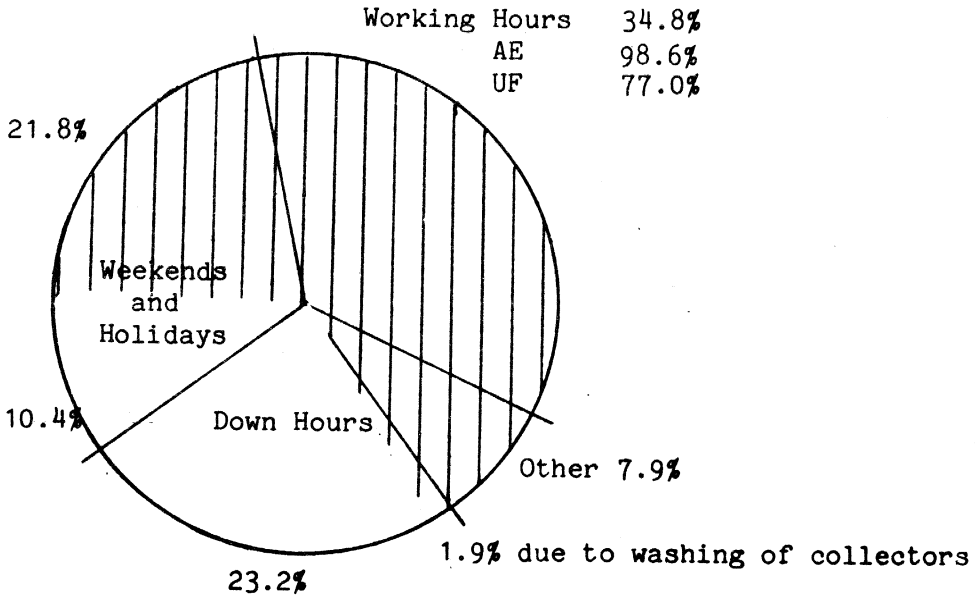


Figure 7: Total Sun Hours Usage In June

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 66.4\%$$

Single-Axis Collectors



Dual-Axis Collectors

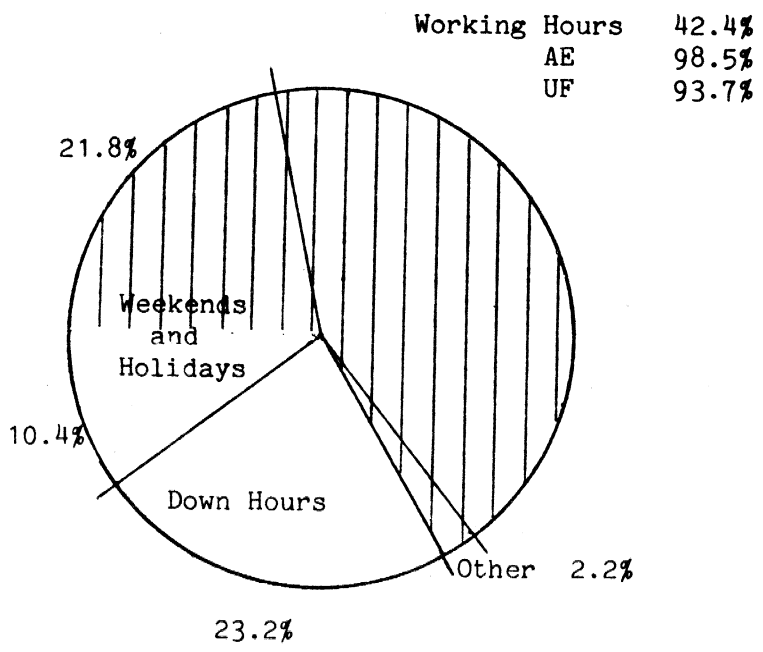
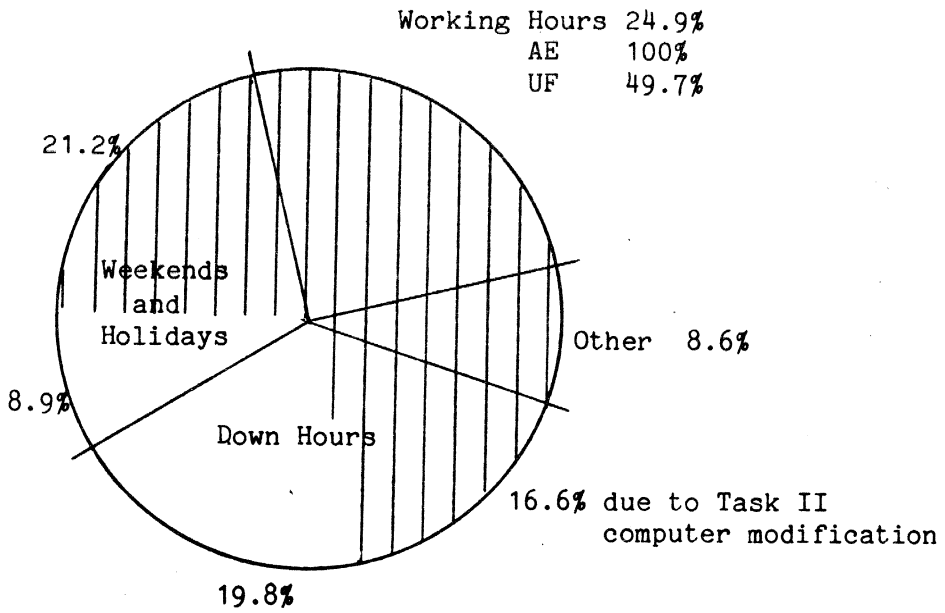


Figure 8: Total Sun Hours Usage In July

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 71.3\%$$

Single-Axis Collectors



Dual-Axis Collectors

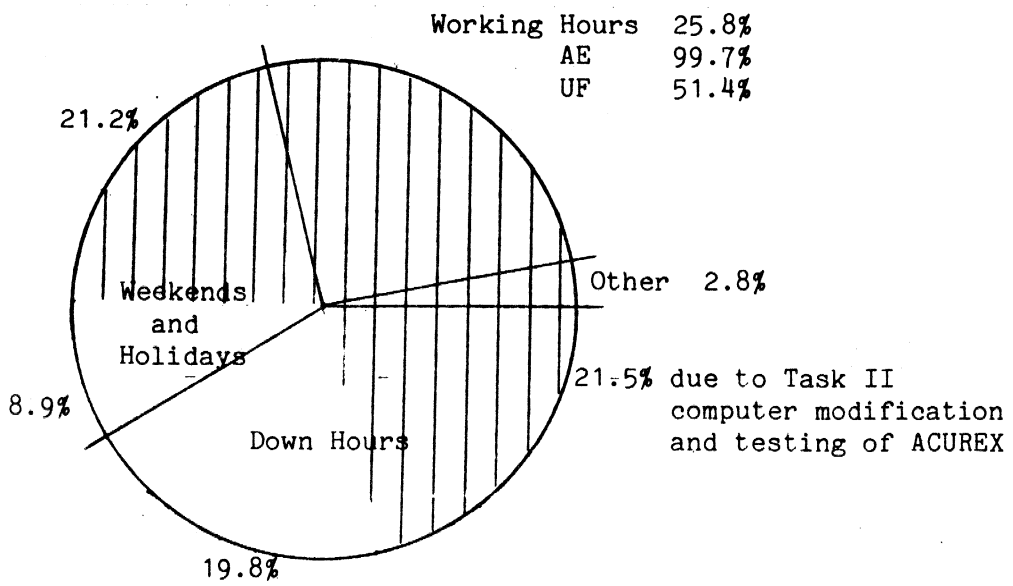
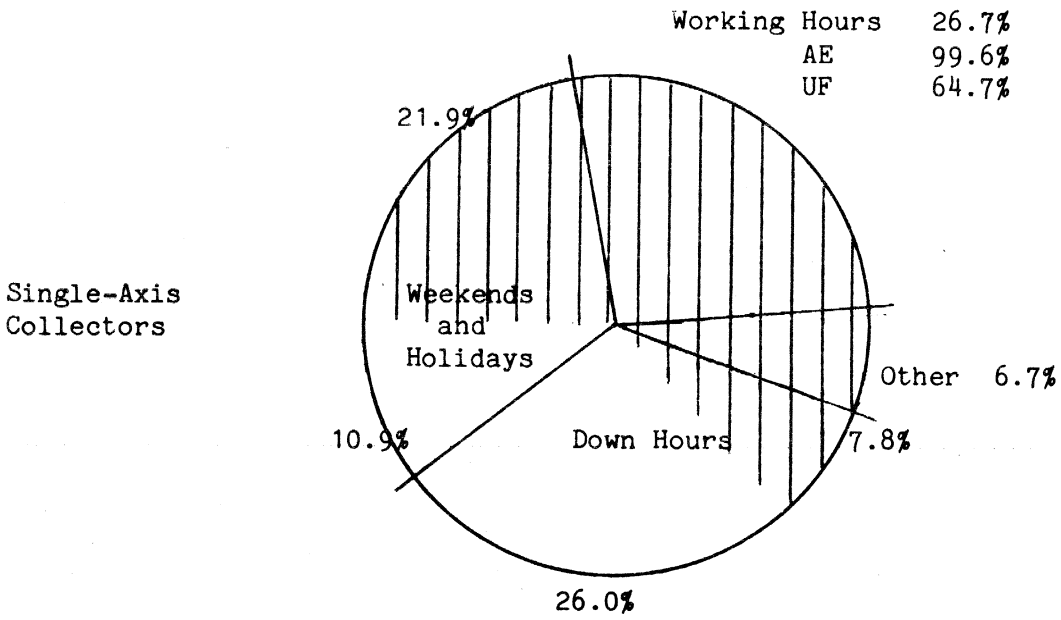
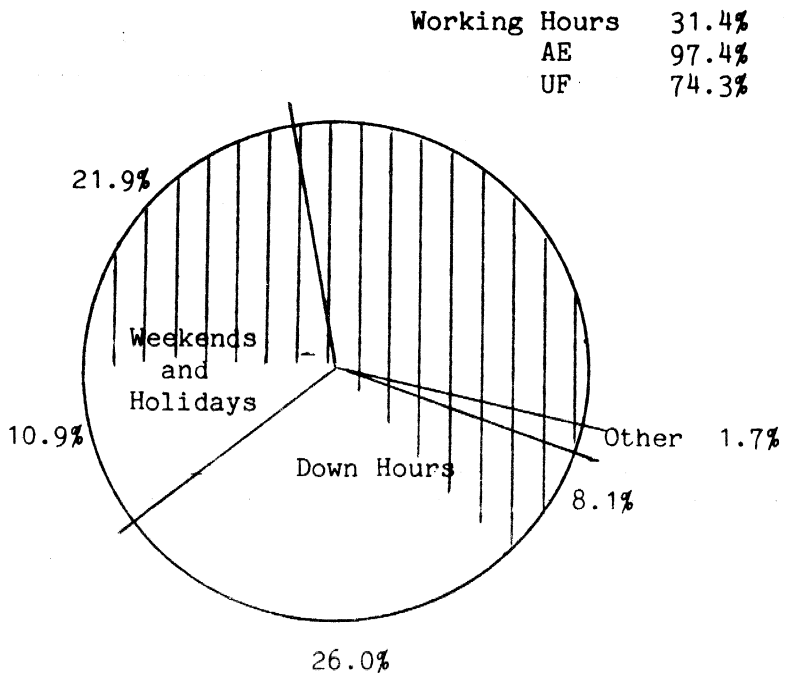


Figure 9: Total Sun Hours Usage In August

$$\frac{\text{Hours of Insolation Above 300 W/m}^2}{\text{Total Sun Hours}} = 63.1\%$$



Single-Axis Collectors



Dual-Axis Collectors

Figure 10: Total Sun Hour Usage in the Second Four Months of 1984

PERIOD	ENERGY GAIN (MWH)		EFFICIENCY (%)	
	I	II	I	II
JAN.	57.17	41.59	35.0	30.0
FEB.	29.73	27.09	28.0	24.6
MAR.	56.78	30.31	29.0	21.0
APR.	29.85	29.84	22.0	18.0
MAY	41.88	47.52	23.0	23.0
JUN.	44.49	38.27	25.0	22.0
JUL.	57.12	42.83	23.0	16.0
AUG.	43.54	31.25	25.0	18.0

Table 3: Energy Gain and Efficiency of the Single-Axis (I) and Dual-Axis (II) Collector Fields

9/1	low insolation
12/1	steam generator repair
19/1	bad solar day
23/1	low insolation
24/1	MAN I down due to high wind speed
2/2	low insolation
3/2	low insolation
14/2	bad solar day
22/2	work in computer data base
23/2	high wind, automatic stow
24/2	MAN I nonoperation due to work on computer
27/2	low insolation
5/3	ACUREX washing. MAN I down due to leakage in steam generator
6/3	MAN I down due to leakage in steam generator
7/3	MAN I down due to leakage in steam generator
13/3	bad weather
19/3	bad weather
20/3	bad weather
21/1	bad weather
22/3	bad weather
26/3	MAN I short operation, electronic card in computer malfunction
27/3	MAN I down, computer malfunction
28/3	MAN I down, computer malfunction
29/3	MAN I down, computer malfunction
30/3	MAN I down, computer malfunction
2/4	work on MCS/DAS
3/4	work on MCS/DAS
9/4	bad weather
10/4	bad weather
12/4	bad weather
23/4	short operation due to bad weather
24/4	bad weather
25/4	bad weather
2/5	low insolation
3/5	MAN I down due to repair on pump 'P2'
7/5	bad solar day
8/5	bad weather
9/5	bad weather
10/5	bad weather
16/5	bad weather
8/6	short ACUREX operation due to washing
18/6	bad weather
22/6	MCS/DAS software modification (Task II)
25/6	software modification; ACUREX field washing
26/6	software modification
17/7	ACUREX washing
9/8	low insolation
16/8	short MAN I operation due to test on ACUREX
17/8	Task II computer modification
20/8	computer modification
21/8	computer modification
22/8	computer modification
23/8	computer modification
24/8	computer modification
27/8	low insolation
28/8	MAN I nonoperation due to test on ACUREX

Table 4: Days and Reasons for System Nonoperation of the Single-Axis (ACUREX) and Dual-Axis (MAN I) Collector Subsystems

PERIOD	SINGLE-AXIS	DUAL-AXIS
JAN.	0	220
FEB.	69	127
MAR.	18	129
APR.	3	57.5
MAY	10	93
JUN.	44	124
JUL.	24	14
AUG.	9	40
TOTAL	177	804.5

Table 5: Man-Hour Requirements for the Collector Fields in 1984

PERIOD	SINGLE-AXIS	DUAL-AXIS
JAN.	0	59.02
FEB.	0.87	18.50
MAR.	4.83	28.55
APR.	0	42.07
MAY	0	37.67
JUN.	0	24.88
JUL.	10.05	10.87
AUG.	0	1.92
TOTAL	15.75	223.48

Table 6: Equivalent Outage Hours of the Collector Fields in 1984