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July 1984

Industrial Process Heat Data Analysis and Evaluation

Allan Lewandowski
Randy Gee
Kenneth May

Solar Energy Research Institute
A Division of Midwest Research Institute

1617 Cole Boulevard
Golden, Colorado 80401

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PREFACE

The Solar Energy Research Institute (SERI) has modeled seven of the Department of Energy (DOE) sponsored solar Industrial Process Heat (IPH) field test experiments and has generated thermal performance predictions for each project. Additionally, these predictions have been compared with actual performance measurements taken at the projects. This work was in support of the solar IPH project task being managed for DOE by Sandia National Laboratory, Albuquerque (SNLA).

This document consists of two volumes. Volume I contains the main body of work and includes an introduction, objectives, a description of the model, site configurations, model results, comparisons with reported data, and a summary. Volume II contains complete performance prediction results (both tabular and graphic output) and computer program listings.

The authors would like to especially thank Ed Harley of SNLA for funding this work and for his unwavering support of and confidence in the results presented in this report. We are grateful to Jerry Greyerbiehl of DOE Headquarters and George Pappas of the DOE Albuquerque Operations Office for their support. This document was improved considerably by the review process and we would like to acknowledge those people for their constructive technical contributions: Danny Deffenbaugh, Southwest Research Institute; Mitch Garber, Foster Wheeler Development Corp.; Ed Harley, SNLA; John Hoopes, Jacobs Engineering; David Kearney, Insights West; William Stine, California State Polytechnic University at Pomona; Lee Wilson, Energetics; and Meir Carasso, Chuck Kutscher, and John Thornton, SERI.

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SUMMARY

Objective

To model seven of the solar IPH field test experiments, generate performance predictions, and compare those predictions with reported data.

Discussion

Since 1977, DOE has funded a series of field tests of solar energy in industry. Several IPH applications have been utilized for these field tests, including hot water, hot air, low temperature (100°-175°C) steam, and intermediate temperature (175°-290°C) steam. Both small-scale and large-scale (up to 4680 m^2) systems have been built and monitored. In general, the earlier systems did not exhibit high levels of performance and reliability. The latest systems have fared better, but still have not met expectations. This is especially true in the area of energy delivery. In all cases, original performance predictions have been consistently overestimated due to a combination of inadequate weather data, optimistic component performance models, and low system reliability.

SERI has utilized its modeling capability to provide more realistic predictions of performance for seven of these field tests. The hour-by-hour simulation code, SOLIPH, was used to generate the performance predictions. Input data for each site was prepared and SOLIPH was coded with appropriate component subroutines to provide a complete system configuration. TMY solar irradiance and weather data were used to drive the simulations. Output for each site include annual and monthly summaries and monthly clear day data in both tabular and graphic form.

The performance predictions generated by SOLIPH were compared with the available measured data reported monthly by the seven site contractors. Comparisons were made on a system efficiency basis since long-term consistent data were rarely available for an entire month. Data gaps resulted primarily from solar system downtime and data acquisition system malfunctions. The comparisons produced an identification of the areas of field operation that were less than adequate and a recommendation of repairs or changes that might correct the problems. Also, as a result of the modeling effort certain design goals were generated which may help designers to improve system performance.

Conclusions

The SOLIPH code was shown capable to predicting performance for the seven solar IPH systems studied. When compared with the reported data from the field experiments, it appears that SOLIPH generally overpredicts slightly the system performance. However, the relatively low reliability and consistency of system operation in the field makes comparisons difficult. For the one system where high reliability and availability existed, SOLIPH predicted performance very well. Several areas within SOLIPH could be improved to provide a more accurate modeling tool. These include the effect of dust/dirt on

collector surface optical properties, transient system performance due to cloud cover, and the use of actual solar irradiance and other weather data. In addition to SOLIPH modifications, to improve predictive capabilities, changes in the field tests can improve the actual energy delivery of the systems. Most of these changes are related to the reduction of both heat losses and thermal capacitance. Many of the field experiments have initiated these design modifications to increase system performance. We hope future efforts can incorporate the field experiences and the modeling capabilities into improved solar IPH system designs that can provide industry with reliable systems delivering as much energy as designers predict.

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SECTION 1.0

SOLIPH OUTPUT

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	960.9	1278.8	748.1	348.7	46.6	289.9	24.9	33.7	38.8	7.2
FEBRUARY	1257.7	1460.8	1029.0	521.0	50.6	459.8	30.4	30.0	44.7	8.8
MARCH	1934.5	1848.2	1473.3	807.9	54.8	728.1	38.1	41.8	49.4	10.9
APRIL	2596.2	2488.9	2213.9	1273.7	57.5	1181.2	49.2	43.1	53.4	14.0
MAY	3236.4	3020.2	2878.7	1686.0	58.6	1585.4	59.1	41.5	55.1	16.9
JUNE	3188.1	2857.5	2717.1	1628.4	59.9	1534.5	53.3	40.6	56.5	15.2
JULY	3133.3	2915.9	2747.3	1640.4	59.7	1545.2	53.4	42.6	56.2	15.4
AUGUST	3003.5	3024.9	2824.4	1643.3	58.2	1540.6	58.0	43.9	54.5	16.9
SEPTEMBER	2290.8	2472.4	2124.6	1228.1	57.8	1141.1	45.6	42.2	53.7	13.5
OCTOBER	1732.6	2081.3	1526.9	822.3	53.9	738.5	40.0	43.2	48.4	11.9
NOVEMBER	1091.1	1539.0	942.1	454.4	48.2	383.7	30.1	40.7	40.7	8.9
DECEMBER	914.9	1464.6	842.2	368.6	43.8	298.4	32.1	38.1	35.4	9.4
TOTALS/AVERAGES	25340.2	26452.5	22067.5	12422.7	56.3	11426.4	514.1	481.4	51.8	149.1

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY: HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY: DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY: COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM: OPERATING LOSSES GJ	SYSTEM: NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	44.5	86.2	50.9	22.4	44.1	18.6	1.8	1.2	36.5	.5
2	1/ 2	44.7	86.5	51.2	22.4	43.8	18.9	1.8	1.7	36.9	.5
3	1/ 3	11.6	.9	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
4	1/ 4	43.0	78.2	46.1	20.1	43.5	16.1	1.8	1.4	35.0	.5
5	1/ 5	19.1	3.8	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
6	1/ 6	20.5	5.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
7	1/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
8	1/ 8	46.5	89.2	53.4	24.1	45.1	20.1	1.8	1.4	37.6	.5
9	1/ 9	23.9	7.7	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
10	1/10	32.4	30.4	14.9	6.0	40.1	2.1	.9	2.3	14.2	.3
11	1/11	19.6	2.8	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
12	1/12	26.3	15.6	7.8	2.8	35.2	.3	.4	1.4	3.2	.1
13	1/13	47.5	88.0	53.0	24.5	46.2	21.0	1.8	1.7	39.7	.5
14	1/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
15	1/15	24.0	5.7	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
16	1/16	12.8	1.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
17	1/17	46.2	75.3	43.6	20.9	47.8	17.2	1.5	1.4	39.3	.4
18	1/18	15.0	1.2	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
19	1/19	23.0	3.8	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
20	1/20	40.6	54.6	31.4	14.6	46.7	11.3	1.1	1.3	36.1	.3
21	1/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
22	1/22	50.8	88.6	54.9	26.2	47.7	22.3	1.7	1.4	40.6	.5
23	1/23	51.9	91.0	56.7	27.1	47.9	23.7	1.7	1.7	41.8	.5
24	1/24	54.0	96.0	60.1	29.1	48.5	25.7	1.7	1.7	42.9	.5
25	1/25	44.3	60.4	35.5	17.1	48.1	14.2	1.1	1.8	40.0	.3
26	1/26	55.2	96.6	60.9	29.6	48.6	26.1	1.8	1.7	42.8	.5
27	1/27	54.2	92.7	58.5	28.3	48.4	24.8	1.8	1.7	42.4	.5
28	1/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
29	1/29	45.2	57.9	34.4	16.7	48.5	13.5	1.1	1.4	39.1	.3
30	1/30	45.4	58.0	34.8	16.9	48.6	14.0	1.1	1.8	40.3	.3
31	1/31	18.9	1.6	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
TOTALS/AVERAGES		960.9	1278.8	748.1	348.7	46.6	289.9	24.9	33.7	38.8	7.2

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	24.1	3.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
33	2/ 2	54.4	79.1	50.7	24.9	49.2	21.0	1.8	1.3	41.5	.5
34	2/ 3	52.6	70.6	44.1	22.0	50.0	18.8	1.5	1.7	42.7	.4
35	2/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
36	2/ 5	22.5	2.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
37	2/ 6	22.7	2.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
38	2/ 7	25.8	3.3	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
39	2/ 8	28.7	4.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
40	2/ 9	48.2	50.3	29.2	15.2	52.1	12.0	1.1	1.4	41.0	.3
41	2/10	45.5	51.1	33.0	16.7	50.7	13.8	1.1	1.7	41.9	.3
42	2/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
43	2/12	27.3	3.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
44	2/13	43.7	34.2	18.3	9.0	49.2	6.2	.6	1.3	33.8	.2
45	2/14	68.7	106.0	77.0	37.7	48.9	33.8	2.2	1.6	43.9	.6
46	2/15	67.6	100.6	70.5	35.6	50.5	32.0	2.0	1.7	45.4	.6
47	2/16	68.7	102.2	75.1	36.8	49.0	32.9	2.2	1.6	43.8	.6
48	2/17	60.9	74.6	53.8	26.3	48.8	22.6	2.0	1.7	42.1	.6
49	2/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
50	2/19	18.7	.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
51	2/20	69.9	97.0	69.5	35.8	51.5	31.7	2.0	1.4	45.5	.6
52	2/21	73.6	107.8	81.5	40.9	50.1	37.0	2.2	1.6	45.3	.6
53	2/22	75.3	110.9	84.1	42.5	50.5	38.7	2.2	1.6	46.0	.6
54	2/23	76.2	111.4	85.0	43.1	50.8	39.3	2.2	1.6	46.2	.6
55	2/24	70.3	88.6	65.6	34.2	52.2	30.6	2.0	1.7	46.7	.6
56	2/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
57	2/26	57.4	46.2	27.1	14.9	55.0	11.9	.9	1.5	44.0	.3
58	2/27	76.3	103.4	80.4	41.4	51.5	37.4	2.2	1.5	46.6	.6
59	2/28	78.6	107.9	84.3	43.9	52.1	40.1	2.2	1.6	47.6	.6
TOTALS/AVERAGES		1257.7	1460.8	1029.0	521.0	50.6	459.8	30.4	30.0	44.7	8.8

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	76.6	98.4	77.5	39.9	51.4	36.1	2.2	1.6	46.5	.6
61	3/ 2	79.7	105.1	83.2	43.2	52.0	39.4	2.2	1.6	47.4	.6
62	3/ 3	62.7	56.5	42.7	21.7	50.8	18.5	1.5	1.8	43.4	.4
63	3/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
64	3/ 5	85.0	113.3	90.7	48.0	52.9	43.7	2.2	1.3	48.1	.6
65	3/ 6	82.5	101.9	80.5	44.0	54.7	40.4	2.0	1.6	50.2	.6
66	3/ 7	83.0	101.5	80.5	44.2	54.9	40.6	2.0	1.6	50.4	.6
67	3/ 8	70.5	71.2	53.8	29.0	54.0	25.9	1.3	1.7	48.2	.4
68	3/ 9	74.0	73.7	55.6	30.0	54.0	26.8	1.5	1.7	48.2	.4
69	3/10	42.0	13.8	7.3	3.6	49.8	1.4	.4	1.9	19.4	.1
70	3/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
71	3/12	34.8	3.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
72	3/13	45.1	10.3	2.6	1.3	48.0	-1.1	.2	1.4	-43.3	.1
73	3/14	89.8	107.6	89.2	48.7	54.6	44.8	2.2	1.5	50.2	.6
74	3/15	55.5	38.7	29.4	15.6	53.2	13.1	.9	1.9	44.7	.3
75	3/16	41.6	7.9	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
76	3/17	95.1	116.6	97.3	54.1	55.6	49.7	2.2	1.3	51.1	.6
77	3/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
78	3/19	89.8	97.6	81.4	44.8	55.0	40.5	2.2	1.3	49.7	.6
79	3/20	57.1	36.5	27.9	15.2	54.5	12.8	.9	1.9	45.8	.3
80	3/21	69.9	52.0	41.2	22.4	54.2	19.2	1.3	1.6	46.5	.4
81	3/22	45.2	5.7	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
82	3/23	85.7	82.5	65.1	37.0	56.7	33.3	1.5	1.3	51.2	.4
83	3/24	102.5	125.3	106.5	60.4	56.7	56.5	2.3	1.6	53.0	.6
84	3/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
85	3/26	83.5	71.3	56.3	33.5	59.5	30.1	1.3	1.5	53.4	.4
86	3/27	103.9	123.0	105.5	60.3	57.1	56.3	2.3	1.5	53.3	.6
87	3/28	52.0	21.3	15.2	7.5	49.1	5.0	.6	1.8	32.8	.2
88	3/29	104.3	121.7	104.8	59.7	57.0	55.8	2.3	1.6	53.2	.6
89	3/30	29.1	1.1	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
90	3/31	93.8	90.6	79.0	43.9	55.5	39.5	2.3	1.3	50.0	.6
TOTALS/AVERAGES		1934.5	1848.2	1473.3	807.9	54.8	728.1	38.1	41.8	49.4	10.9

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
92	4/ 2	57.7	18.8	9.8	5.5	56.0	3.0	.4	1.6	30.4	.1
93	4/ 3	109.6	125.7	109.0	62.7	57.5	58.6	2.3	1.5	53.7	.6
94	4/ 4	77.5	54.2	39.6	21.9	55.3	19.1	1.1	1.9	48.3	.3
95	4/ 5	56.9	31.4	23.4	12.5	53.2	9.9	.7	1.7	42.2	.2
96	4/ 6	107.6	115.0	100.6	57.8	57.5	53.9	2.3	1.6	53.6	.6
97	4/ 7	111.1	123.5	108.1	62.6	57.9	58.7	2.3	1.6	54.3	.6
98	4/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
99	4/ 9	84.6	54.0	41.4	24.2	58.5	20.8	1.3	1.5	50.2	.4
100	4/10	113.6	124.3	109.8	64.3	58.5	60.4	2.2	1.6	55.0	.6
101	4/11	94.0	79.1	59.2	34.4	58.1	31.3	1.3	1.8	52.9	.4
102	4/12	72.3	42.0	25.2	13.8	54.8	11.3	.6	1.8	45.0	.2
103	4/13	104.3	98.1	86.8	49.6	57.2	45.8	2.2	1.6	52.8	.6
104	4/14	113.3	118.4	104.7	61.1	58.3	57.2	2.3	1.6	54.6	.6
105	4/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
106	4/16	118.9	130.5	119.1	68.7	57.6	64.1	2.5	1.3	53.8	.7
107	4/17	64.4	21.6	13.0	6.7	51.4	4.2	.6	1.8	32.5	.2
108	4/18	121.2	134.5	123.3	71.3	57.8	67.2	2.5	1.5	54.5	.7
109	4/19	120.7	131.5	120.6	69.8	57.9	65.8	2.5	1.5	54.5	.7
110	4/20	117.5	121.9	112.8	65.1	57.8	61.1	2.4	1.5	54.2	.7
111	4/21	118.1	122.2	113.2	65.4	57.8	61.4	2.5	1.5	54.3	.7
112	4/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
113	4/23	106.3	88.0	77.6	45.9	59.1	41.8	2.0	1.3	53.9	.6
114	4/24	121.3	129.4	123.2	69.6	56.5	65.4	2.7	1.5	53.1	.8
115	4/25	125.6	138.2	131.7	75.0	57.0	70.8	2.7	1.5	53.7	.8
116	4/26	126.1	138.5	132.3	75.6	57.2	71.5	2.7	1.5	54.0	.8
117	4/27	122.4	128.3	122.7	70.1	57.1	65.9	2.6	1.5	53.7	.8
118	4/28	119.6	119.2	111.7	65.5	58.7	61.7	2.2	1.6	55.2	.6
119	4/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
120	4/30	111.7	100.6	94.9	54.6	57.5	50.3	2.2	1.2	53.0	.6
TOTALS/AVERAGES		2596.2	2488.9	2213.9	1273.7	57.5	1181.2	49.2	43.1	53.4	14.0

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	129.1	138.1	132.8	76.5	57.6	72.4	2.6	1.5	54.5	.8
122	5/ 2	129.6	138.3	133.1	76.8	57.7	72.7	2.6	1.5	54.6	.8
123	5/ 3	124.2	124.7	120.1	68.6	57.1	64.4	2.7	1.5	53.7	.8
124	5/ 4	111.4	91.1	83.4	49.8	59.7	46.2	2.0	1.7	55.4	.6
125	5/ 5	40.4	2.7	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
126	5/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
127	5/ 7	99.0	74.0	66.3	38.0	57.3	34.2	1.6	1.2	51.6	.4
128	5/ 8	124.1	119.0	113.3	66.3	58.5	62.3	2.5	1.5	55.0	.7
129	5/ 9	132.5	138.8	134.4	77.7	57.8	73.5	2.7	1.5	54.7	.8
130	5/10	132.8	138.5	134.1	77.8	58.0	73.6	2.7	1.5	54.8	.8
131	5/11	133.8	140.5	136.1	79.3	58.2	75.1	2.6	1.5	55.2	.8
132	5/12	134.1	140.6	136.4	79.7	58.5	75.6	2.6	1.5	55.5	.8
133	5/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
134	5/14	130.2	131.0	127.1	73.8	58.1	69.2	2.6	1.2	54.4	.8
135	5/15	124.6	116.8	111.4	66.0	59.2	62.1	2.2	1.6	55.8	.6
136	5/16	63.8	12.5	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
137	5/17	131.5	132.8	129.0	74.9	58.0	70.1	2.7	1.2	54.4	.8
138	5/18	135.8	139.9	136.0	79.3	58.3	75.1	2.7	1.5	55.2	.8
139	5/19	112.6	91.3	85.8	50.1	58.4	46.4	2.2	1.7	54.1	.6
140	5/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
141	5/21	125.2	115.3	110.1	65.5	59.5	61.2	2.2	1.2	55.6	.6
142	5/22	137.9	143.4	139.4	81.7	58.6	77.5	2.7	1.5	55.6	.8
143	5/23	106.9	84.6	79.6	46.3	58.2	42.9	1.8	1.7	53.8	.5
144	5/24	129.3	122.4	116.9	69.7	59.6	65.8	2.3	1.6	56.3	.6
145	5/25	129.5	122.4	116.9	69.8	59.7	66.0	2.3	1.6	56.4	.6
146	5/26	108.0	85.4	80.6	47.2	58.5	43.7	1.8	1.7	54.2	.5
147	5/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
148	5/28	131.9	125.9	120.0	71.9	59.9	67.6	2.3	1.2	56.3	.6
149	5/29	139.9	145.3	141.2	83.3	59.0	79.1	2.7	1.5	56.0	.8
150	5/30	128.8	118.4	113.2	68.0	60.0	64.1	2.3	1.6	56.6	.6
151	5/31	109.4	86.5	81.6	48.0	58.9	44.6	1.8	1.7	54.6	.5
TOTALS/AVERAGES		3236.4	3020.2	2878.7	1686.0	58.6	1585.4	59.1	41.5	55.1	16.9

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	108.2	80.9	74.3	45.3	61.0	42.1	1.6	1.8	56.7	.4
153	6/ 2	64.3	9.2	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
154	6/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
155	6/ 4	140.5	143.5	139.5	83.1	59.5	78.2	2.6	1.2	56.1	.8
156	6/ 5	127.9	116.5	111.1	66.6	60.0	62.8	2.2	1.6	56.6	.6
157	6/ 6	127.8	116.1	110.9	66.5	59.9	62.7	2.2	1.6	56.5	.6
158	6/ 7	133.5	126.4	120.4	72.5	60.2	68.7	2.2	1.6	57.0	.6
159	6/ 8	141.7	146.0	141.7	84.4	59.6	80.3	2.6	1.5	56.6	.8
160	6/ 9	141.8	146.2	141.8	84.7	59.7	80.6	2.6	1.5	56.8	.8
161	6/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
162	6/11	111.9	90.1	84.9	50.4	59.3	46.6	1.8	1.3	54.8	.5
163	6/12	132.3	123.2	117.2	70.8	60.4	67.0	2.2	1.6	57.1	.6
164	6/13	141.5	144.1	140.1	83.6	59.7	79.4	2.7	1.5	56.7	.8
165	6/14	111.5	88.2	83.5	49.8	59.7	46.4	1.8	1.6	55.6	.5
166	6/15	125.3	106.9	101.3	62.2	61.4	58.6	2.0	1.7	57.9	.6
167	6/16	74.7	28.8	21.5	11.5	53.8	8.9	.9	1.7	41.4	.3
168	6/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
169	6/18	138.8	136.8	131.0	79.3	60.5	74.8	2.5	1.3	57.1	.7
170	6/19	56.2	6.2	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
171	6/20	125.3	106.9	101.4	62.2	61.3	58.0	2.0	1.3	57.2	.6
172	6/21	111.6	89.0	84.0	49.9	59.4	46.4	1.8	1.6	55.2	.5
173	6/22	130.4	118.9	114.0	69.0	60.5	65.1	2.3	1.6	57.1	.6
174	6/23	107.0	82.1	76.9	45.3	58.9	41.9	1.8	1.7	54.4	.5
175	6/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
176	6/25	142.2	147.6	143.2	85.4	59.6	80.7	2.7	1.2	56.3	.8
177	6/26	136.8	135.9	129.6	78.2	60.3	74.1	2.5	1.6	57.2	.7
178	6/27	142.0	147.7	143.3	85.5	59.7	81.3	2.7	1.5	56.7	.8
179	6/28	141.9	147.7	143.3	85.5	59.7	81.3	2.7	1.5	56.8	.8
180	6/29	141.7	147.6	143.3	85.3	59.5	81.1	2.7	1.5	56.6	.8
181	6/30	131.5	125.0	118.9	71.5	60.1	67.6	2.3	1.6	56.8	.6
TOTALS/AVERAGES		3188.1	2857.5	2717.1	1628.4	59.9	1534.5	53.3	40.6	56.5	15.2

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
183	7/ 2	104.6	75.3	69.6	42.4	61.0	38.8	1.5	1.3	55.8	.4
184	7/ 3	123.9	111.0	106.1	63.4	59.7	59.5	2.2	1.6	56.1	.6
185	7/ 4	133.0	128.4	122.2	73.8	60.4	70.0	2.2	1.6	57.3	.6
186	7/ 5	140.7	147.3	143.1	85.3	59.6	81.2	2.7	1.5	56.7	.8
187	7/ 6	131.2	126.8	120.6	72.7	60.2	68.8	2.2	1.6	57.1	.6
188	7/ 7	129.4	122.8	116.9	70.4	60.2	66.6	2.2	1.6	57.0	.6
189	7/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
190	7/ 9	139.5	146.1	142.1	84.4	59.4	79.7	2.7	1.2	56.1	.8
191	7/10	129.7	124.6	118.6	71.3	60.1	67.5	2.2	1.6	56.9	.6
192	7/11	132.4	132.4	128.8	76.3	59.3	72.2	2.6	1.5	56.1	.8
193	7/12	138.7	145.7	141.7	84.2	59.4	80.1	2.7	1.5	56.5	.8
194	7/13	107.2	87.9	81.9	48.3	59.0	44.9	1.8	1.6	54.9	.5
195	7/14	83.3	52.8	43.9	24.9	56.7	22.1	1.1	1.7	50.3	.3
196	7/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
197	7/16	130.3	127.7	121.4	72.9	60.0	68.6	2.2	1.2	56.5	.6
198	7/17	137.4	145.4	141.4	83.8	59.3	79.7	2.6	1.5	56.4	.8
199	7/18	137.1	145.1	141.1	83.9	59.4	79.8	2.6	1.5	56.6	.8
200	7/19	136.7	144.8	140.9	83.4	59.2	79.3	2.6	1.5	56.3	.8
201	7/20	130.5	129.8	125.2	74.7	59.6	70.6	2.5	1.5	56.4	.7
202	7/21	129.7	128.7	124.1	73.9	59.6	69.9	2.5	1.5	56.3	.7
203	7/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
204	7/23	75.0	32.5	12.4	7.3	58.9	4.8	.4	1.4	38.7	.1
205	7/24	122.7	114.0	105.9	64.6	61.0	60.9	2.0	1.6	57.5	.6
206	7/25	127.2	125.4	119.0	71.1	59.7	67.2	2.2	1.6	56.5	.6
207	7/26	127.1	126.0	119.5	71.3	59.7	67.5	2.2	1.6	56.5	.6
208	7/27	126.7	125.8	119.2	71.0	59.6	67.2	2.2	1.6	56.4	.6
209	7/28	77.5	39.3	29.8	17.7	59.5	15.3	.9	1.9	51.4	.3
210	7/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
211	7/30	122.7	118.3	112.1	67.2	59.9	62.9	2.2	1.2	56.1	.6
212	7/31	59.0	12.1	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
TOTALS/AVERAGES		3133.3	2915.9	2747.3	1640.4	59.7	1545.2	53.4	42.6	56.2	15.4

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	131.4	141.7	137.5	80.2	58.3	75.5	2.6	1.2	54.9	.8
214	8/ 2	123.4	123.0	116.2	69.0	59.4	65.2	2.2	1.6	56.1	.6
215	8/ 3	103.3	89.8	83.6	48.6	58.1	45.2	1.8	1.7	54.0	.5
216	8/ 4	123.5	124.9	117.9	69.9	59.3	66.2	2.2	1.6	56.1	.6
217	8/ 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
218	8/ 6	128.7	139.7	135.2	78.7	58.2	74.1	2.6	1.2	54.8	.8
219	8/ 7	128.2	139.3	134.7	78.0	57.9	73.8	2.6	1.5	54.8	.8
220	8/ 8	127.1	137.6	132.9	77.0	57.9	72.8	2.6	1.5	54.8	.8
221	8/ 9	127.0	138.5	133.6	77.1	57.7	73.0	2.6	1.5	54.6	.8
222	8/10	118.8	119.8	112.5	66.4	59.0	62.6	2.2	1.6	55.6	.6
223	8/11	95.8	79.3	69.7	41.7	59.8	38.5	1.5	1.7	55.3	.4
224	8/12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
225	8/13	98.8	87.3	80.5	46.3	57.5	42.5	1.8	1.2	52.8	.5
226	8/14	118.4	122.2	114.0	67.0	58.7	63.2	2.2	1.6	55.4	.6
227	8/15	123.5	135.7	130.0	74.4	57.3	70.3	2.6	1.5	54.1	.8
228	8/16	112.7	112.1	106.3	62.1	58.4	58.2	2.4	1.5	54.8	.7
229	8/17	122.3	134.7	128.6	73.7	57.4	69.7	2.6	1.5	54.2	.8
230	8/18	121.7	134.1	127.8	72.9	57.0	68.8	2.6	1.5	53.8	.8
231	8/19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
232	8/20	95.8	85.4	78.1	44.6	57.0	40.8	1.7	1.2	52.2	.5
233	8/21	95.3	85.0	77.7	44.3	57.0	40.9	1.7	1.6	52.7	.5
234	8/22	94.8	84.5	77.1	43.8	56.9	40.5	1.8	1.6	52.5	.5
235	8/23	112.2	115.2	105.9	62.0	58.5	58.2	2.2	1.5	55.0	.6
236	8/24	110.5	114.4	103.0	60.7	58.9	57.0	2.2	1.6	55.3	.6
237	8/25	114.0	120.6	112.5	65.2	57.9	61.2	2.4	1.5	54.4	.7
238	8/26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
239	8/27	115.9	128.5	118.1	68.3	57.9	63.9	2.4	1.2	54.1	.7
240	8/28	110.4	115.5	102.2	61.1	59.8	57.6	2.0	1.7	56.3	.6
241	8/29	112.5	121.5	109.2	64.2	58.8	60.4	2.2	1.6	55.3	.6
242	8/30	49.8	20.3	15.3	8.8	57.2	6.5	.6	1.9	42.5	.2
243	8/31	87.7	74.0	64.2	37.4	58.3	34.1	1.5	1.5	53.1	.4
TOTALS/AVERAGES		3003.5	3024.9	2824.4	1643.3	58.2	1540.6	58.0	43.9	54.5	16.9

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY: HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY: DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY: COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM: OPERATING LOSSES GJ	SYSTEM: NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	112.6	127.0	113.2	66.5	58.8	62.8	2.2	1.6	55.5	.6
245	9/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
246	9/ 3	92.9	88.0	76.1	44.8	58.8	41.1	1.5	1.3	54.0	.4
247	9/ 4	110.3	124.8	111.0	64.9	58.4	61.1	2.2	1.6	55.0	.6
248	9/ 5	109.5	124.0	110.3	64.4	58.4	60.6	2.2	1.6	55.0	.6
249	9/ 6	104.8	114.1	101.2	60.3	59.6	56.7	2.0	1.6	56.0	.6
250	9/ 7	99.5	103.4	90.4	53.8	59.5	50.4	1.7	1.7	55.7	.5
251	9/ 8	106.7	119.9	106.4	62.1	58.4	58.4	2.2	1.6	54.9	.6
252	9/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
253	9/10	81.2	71.3	60.7	35.2	58.0	31.9	1.3	1.3	52.5	.4
254	9/11	104.3	117.9	104.1	60.4	58.1	56.7	2.2	1.6	54.5	.6
255	9/12	101.8	111.7	97.2	57.5	59.2	53.9	2.0	1.6	55.5	.6
256	9/13	83.4	70.9	56.7	34.1	60.3	31.2	1.3	1.7	55.0	.4
257	9/14	90.9	95.4	84.0	48.0	57.1	43.9	1.9	2.0	52.3	.6
258	9/15	101.1	115.6	101.3	58.3	57.5	54.5	2.2	1.6	53.8	.6
259	9/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
260	9/17	69.7	49.0	37.3	22.3	60.0	19.4	.9	1.6	52.1	.3
261	9/18	25.4	.8	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
262	9/19	77.6	70.7	59.7	34.2	57.3	30.6	1.5	1.3	51.3	.4
263	9/20	92.9	104.8	90.3	51.3	56.8	47.5	2.2	1.6	52.7	.6
264	9/21	96.5	114.4	98.3	56.0	56.9	52.2	2.2	1.6	53.1	.6
265	9/22	93.8	110.7	94.9	53.7	56.6	50.0	2.1	1.6	52.7	.6
266	9/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
267	9/24	84.7	91.5	76.0	43.8	57.7	40.0	1.7	1.3	52.7	.5
268	9/25	91.5	107.9	88.2	50.9	57.7	47.4	1.9	1.6	53.7	.6
269	9/26	92.2	112.6	94.9	53.3	56.2	49.6	2.1	1.6	52.3	.6
270	9/27	91.4	112.2	94.2	52.8	56.0	49.1	2.1	1.6	52.1	.6
271	9/28	90.5	111.8	93.4	52.2	55.9	48.5	2.1	1.6	51.9	.6
272	9/29	85.9	102.2	85.0	47.2	55.6	43.6	2.1	1.6	51.3	.6
273	9/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
TOTALS/AVERAGES		2290.8	2472.4	2124.6	1228.1	57.8	1141.1	45.6	42.2	53.7	13.5

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	81.0	93.4	73.8	41.8	56.6	38.0	1.7	1.3	51.5	.5
275	10/ 2	82.2	101.0	82.9	45.1	54.4	41.4	2.2	1.6	49.9	.6
276	10/ 3	85.6	110.9	90.6	49.7	54.9	46.0	2.1	1.5	50.8	.6
277	10/ 4	84.7	110.4	89.8	49.1	54.7	45.4	2.1	1.6	50.6	.6
278	10/ 5	82.5	107.0	86.7	46.8	54.0	43.1	2.2	1.6	49.7	.6
279	10/ 6	79.4	100.1	80.5	43.4	53.9	39.6	2.2	1.6	49.2	.6
280	10/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.8	0.0	0.0
281	10/ 8	65.4	69.5	52.2	28.2	54.0	24.6	1.5	1.3	47.2	.4
282	10/ 9	80.2	106.4	84.3	45.1	53.5	41.3	2.2	1.6	49.0	.6
283	10/10	66.9	74.6	57.3	30.8	53.8	27.5	1.7	1.6	48.0	.5
284	10/11	79.0	106.9	84.0	44.8	53.3	41.1	2.1	1.6	49.0	.6
285	10/12	78.2	106.4	83.1	43.9	52.9	40.2	2.2	1.6	48.3	.6
286	10/13	42.0	13.7	2.8	1.4	49.6	-.6	.2	1.9	-19.8	.1
287	10/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
288	10/15	19.5	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
289	10/16	69.0	87.0	62.3	34.2	54.9	30.4	1.7	1.3	48.8	.5
290	10/17	71.8	97.9	71.7	37.9	52.9	34.2	2.0	1.6	47.8	.6
291	10/18	72.3	100.2	70.1	38.3	54.7	34.9	1.8	1.7	49.8	.5
292	10/19	72.6	102.7	71.5	39.1	54.6	35.6	1.8	1.7	49.8	.5
293	10/20	71.8	102.2	71.0	38.6	54.4	35.1	1.8	1.7	49.5	.5
294	10/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
295	10/22	45.5	35.0	22.1	11.9	53.8	8.9	.8	1.5	40.3	.3
296	10/23	31.1	4.8	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
297	10/24	34.7	12.6	3.5	1.3	38.5	-1.0	.2	1.3	-27.9	.1
298	10/25	63.9	86.3	58.0	31.4	54.1	28.2	1.5	1.7	48.7	.4
299	10/26	33.9	12.2	3.4	1.2	36.8	-.8	.2	1.8	-24.7	.1
300	10/27	46.7	46.4	28.5	14.9	52.2	12.3	.9	1.7	43.3	.3
301	10/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
302	10/29	65.0	98.0	66.2	34.8	52.5	30.9	1.7	1.4	46.7	.5
303	10/30	64.2	97.6	65.7	34.5	52.6	31.1	1.7	1.7	47.4	.5
304	10/31	63.5	97.2	65.2	34.0	52.2	30.6	1.7	1.7	47.0	.5
TOTALS/AVERAGES		1732.6	2081.3	1526.9	822.3	53.9	738.5	40.0	43.2	48.4	11.9

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	28.2	4.6	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
306	11/ 2	39.9	31.2	14.8	7.7	52.4	5.2	.4	1.6	35.2	.1
307	11/ 3	40.1	37.5	23.8	11.7	49.3	9.0	.9	1.8	38.0	.3
308	11/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
309	11/ 5	60.2	96.2	63.4	32.3	51.0	28.5	1.7	1.4	45.0	.5
310	11/ 6	54.0	79.4	51.4	26.8	52.0	23.5	1.5	1.8	45.8	.4
311	11/ 7	54.5	80.8	51.9	27.1	52.1	23.8	1.5	1.7	45.8	.4
312	11/ 8	15.0	.8	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
313	11/ 9	24.5	9.6	4.8	1.6	34.0	-.7	.2	1.3	-13.8	.1
314	11/10	21.1	3.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
315	11/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
316	11/12	48.8	70.9	44.7	22.4	50.1	18.8	1.5	1.3	42.1	.4
317	11/13	52.5	85.6	54.7	26.8	49.0	23.4	1.7	1.7	42.7	.5
318	11/14	20.4	2.9	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
319	11/15	27.8	25.7	16.6	7.7	46.5	5.0	.6	1.4	30.2	.2
320	11/16	50.8	83.2	52.4	25.1	47.8	21.7	1.7	1.7	41.3	.5
321	11/17	51.8	88.2	55.5	26.7	48.2	23.3	1.7	1.7	42.0	.5
322	11/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
323	11/19	28.0	16.7	7.1	3.5	49.2	1.2	.2	1.5	16.5	.1
324	11/20	50.9	89.3	55.7	26.6	47.9	23.2	1.7	1.6	41.7	.5
325	11/21	50.7	89.3	55.5	26.4	47.6	23.0	1.7	1.7	41.5	.5
326	11/22	49.5	87.3	54.1	25.4	47.0	22.0	1.7	1.7	40.7	.5
327	11/23	47.9	81.9	50.3	23.6	46.8	20.1	1.7	1.7	40.0	.5
328	11/24	40.3	58.9	34.4	16.2	46.9	13.3	1.1	1.8	38.6	.3
329	11/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
330	11/26	48.3	86.3	52.6	24.7	47.0	20.9	1.7	1.4	39.7	.5
331	11/27	48.0	86.6	52.7	24.6	46.6	21.2	1.7	1.7	40.2	.5
332	11/28	47.4	85.6	52.0	24.1	46.3	20.7	1.7	1.7	39.7	.5
333	11/29	47.2	85.9	52.0	23.9	46.0	20.4	1.7	1.7	39.3	.5
334	11/30	43.4	71.7	41.7	19.5	46.8	16.2	1.5	1.8	38.9	.4
TOTALS/AVERAGES		1091.1	1539.0	942.1	454.4	48.2	383.7	30.1	40.7	40.7	8.9

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY: HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY: DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY: COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM: OPERATING LOSSES GJ	SYSTEM: NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	16.4	1.5	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
336	12/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
337	12/ 3	44.2	79.4	47.4	21.4	45.1	17.5	1.7	1.3	36.8	.5
338	12/ 4	16.0	1.5	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
339	12/ 5	11.6	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
340	12/ 6	32.5	45.5	26.0	11.4	43.9	8.2	1.1	1.3	31.4	.3
341	12/ 7	41.1	69.3	38.8	17.7	45.7	14.5	1.5	1.7	37.5	.4
342	12/ 8	35.8	51.5	30.3	12.4	40.8	8.7	1.5	2.1	28.7	.4
343	12/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
344	12/10	41.7	75.2	44.1	19.5	44.3	15.8	1.7	1.4	35.8	.5
345	12/11	40.6	69.4	38.7	17.3	44.7	14.1	1.5	1.7	36.4	.4
346	12/12	40.6	71.6	39.4	17.8	45.1	14.6	1.5	1.7	36.9	.4
347	12/13	19.5	2.7	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
348	12/14	39.0	65.2	36.0	16.0	44.3	12.4	1.5	1.4	34.4	.4
349	12/15	42.5	81.7	48.2	20.9	43.4	17.5	1.8	1.7	36.3	.5
350	12/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
351	12/17	43.2	83.8	49.2	21.4	43.4	17.5	1.8	1.4	35.6	.5
352	12/18	42.5	82.1	48.3	20.9	43.2	17.4	1.8	1.7	36.1	.5
353	12/19	42.7	82.0	47.9	20.8	43.3	17.3	1.8	1.7	36.1	.5
354	12/20	19.3	2.7	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
355	12/21	43.1	83.8	49.1	21.5	43.8	17.7	1.7	1.4	36.1	.5
356	12/22	42.2	79.6	46.3	20.0	43.3	16.6	1.8	1.7	35.8	.5
357	12/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
358	12/24	42.2	80.5	47.2	20.4	43.2	16.5	1.8	1.4	35.1	.5
359	12/25	19.4	2.8	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
360	12/26	43.4	84.5	49.6	21.7	43.7	17.8	1.8	1.4	35.9	.5
361	12/27	42.7	81.7	47.9	20.8	43.5	17.4	1.8	1.7	36.2	.5
362	12/28	41.9	77.8	45.4	19.6	43.3	16.2	1.8	1.7	35.6	.5
363	12/29	26.5	22.2	11.9	4.7	39.4	2.3	.7	2.0	19.6	.2
364	12/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
365	12/31	44.2	85.8	50.6	22.4	44.3	18.6	1.7	1.4	36.7	.5
TOTALS/AVERAGES		914.9	1464.6	842.2	368.6	43.8	298.4	32.1	38.1	35.4	9.4

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

26 JANUARY (DAY 26)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	7.2	0.00	0.00	0.00	9.2	9.2	0.00	0.0	0.00	.06	0.00
2	7.0	0.00	0.00	0.00	8.5	8.5	0.00	0.0	0.00	.06	0.00
3	6.9	0.00	0.00	0.00	8.0	8.0	0.00	0.0	0.00	.05	0.00
4	6.7	0.00	0.00	0.00	7.6	7.6	0.00	0.0	0.00	.05	0.00
5	6.3	0.00	0.00	0.00	7.2	7.2	0.00	0.0	0.00	.05	0.00
6	6.0	0.00	0.00	0.00	6.8	6.8	0.00	0.0	0.00	.04	0.00
7	5.6	0.00	0.00	0.00	6.4	6.4	0.00	0.0	0.00	.04	0.00
8	6.9	1.37	0.00	0.00	6.6	6.6	0.00	0.0	0.00	.03	0.00
9	8.1	7.71	6.11	27.31	86.2	90.9	1.96	32.1	.04	.21	.06
10	9.4	11.66	8.13	27.31	90.3	101.2	4.51	55.5	4.28	.23	.06
11	10.7	13.38	8.16	27.31	90.3	100.7	4.28	52.4	4.05	.23	.06
12	12.0	14.06	7.81	27.31	90.3	99.7	3.88	49.7	3.66	.22	.06
13	13.3	14.09	7.84	27.31	90.3	99.7	3.90	49.8	3.68	.22	.06
14	13.7	13.47	8.22	27.31	90.3	100.8	4.33	52.7	4.11	.22	.06
15	14.0	11.91	8.30	27.31	90.3	101.6	4.65	56.1	4.43	.22	.06
16	14.4	7.96	6.31	27.31	90.3	95.3	2.06	32.6	1.84	.21	.06
17	13.1	1.04	0.00	0.00	52.2	52.2	0.00	0.0	0.00	.46	0.00
18	11.9	0.00	0.00	0.00	35.1	35.1	0.00	0.0	0.00	.24	0.00
19	10.6	0.00	0.00	0.00	25.7	25.7	0.00	0.0	0.00	.17	0.00
20	10.2	0.00	0.00	0.00	20.1	20.1	0.00	0.0	0.00	.13	0.00
21	9.8	0.00	0.00	0.00	16.5	16.5	0.00	0.0	0.00	.10	0.00
22	9.4	0.00	0.00	0.00	14.1	14.1	0.00	0.0	0.00	.09	0.00
23	8.5	0.00	0.00	0.00	12.2	12.2	0.00	0.0	0.00	.08	0.00
24	7.6	0.00	0.00	0.00	10.7	10.7	0.00	0.0	0.00	.07	0.00
TOTAL/AVE	---	96.65	60.90	---	---	---	29.57	48.6	26.09	3.48	.51

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

23 FEBRUARY (DAY 54)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	8.9	0.00	0.00	0.00	11.6	11.6	0.00	0.0	0.00	.07	0.00
2	7.8	0.00	0.00	0.00	10.3	10.3	0.00	0.0	0.00	.07	0.00
3	6.7	0.00	0.00	0.00	9.1	9.1	0.00	0.0	0.00	.06	0.00
4	5.6	0.00	0.00	0.00	8.0	8.0	0.00	0.0	0.00	.06	0.00
5	6.1	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.05	0.00
6	6.7	0.00	0.00	0.00	7.1	7.1	0.00	0.0	0.00	.04	0.00
7	7.2	0.00	0.00	0.00	7.2	7.2	0.00	0.0	0.00	.04	0.00
8	8.1	4.74	4.39	27.31	86.4	88.0	.67	15.2	-1.16	.21	.06
9	9.1	9.59	8.24	27.31	90.3	99.5	3.79	46.0	3.57	.23	.06
10	10.0	12.47	9.77	27.31	90.3	104.1	5.72	58.6	5.49	.23	.06
11	11.1	14.00	10.00	27.31	90.3	104.1	5.71	57.1	5.48	.23	.06
12	12.2	14.63	9.83	27.31	90.3	103.6	5.48	55.8	5.26	.23	.06
13	13.3	14.56	9.78	27.31	90.3	103.5	5.46	55.9	5.24	.23	.06
14	14.4	14.00	10.00	27.31	90.3	104.2	5.73	57.4	5.51	.23	.06
15	15.6	12.61	9.88	27.31	90.3	104.4	5.84	59.0	5.61	.22	.06
16	16.7	9.87	8.48	27.31	90.3	99.9	3.98	46.9	3.76	.22	.06
17	15.4	4.94	4.58	27.31	90.3	92.1	.74	16.2	.53	.21	.06
18	14.1	0.00	0.00	0.00	52.3	52.3	0.00	0.0	0.00	.44	0.00
19	12.8	0.00	0.00	0.00	35.7	35.7	0.00	0.0	0.00	.24	0.00
20	12.1	0.00	0.00	0.00	26.6	26.6	0.00	0.0	0.00	.16	0.00
21	11.3	0.00	0.00	0.00	21.1	21.1	0.00	0.0	0.00	.12	0.00
22	10.6	0.00	0.00	0.00	17.4	17.4	0.00	0.0	0.00	.10	0.00
23	9.8	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.09	0.00
24	9.1	0.00	0.00	0.00	12.9	12.9	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	111.39	84.96	---	---	---	43.12	50.8	39.28	3.84	.64

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

24 MARCH (DAY 83)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	11.1	0.00	0.00	0.00	13.3	13.3	0.00	0.0	0.00	.07	0.00
2	10.2	0.00	0.00	0.00	12.3	12.3	0.00	0.0	0.00	.06	0.00
3	9.2	0.00	0.00	0.00	11.3	11.3	0.00	0.0	0.00	.06	0.00
4	8.3	0.00	0.00	0.00	10.3	10.3	0.00	0.0	0.00	.06	0.00
5	8.1	0.00	0.00	0.00	9.6	9.6	0.00	0.0	0.00	.05	0.00
6	8.0	0.00	0.00	0.00	9.1	9.1	0.00	0.0	0.00	.05	0.00
7	7.8	1.64	0.00	0.00	8.7	8.7	0.00	0.0	0.00	.04	0.00
8	9.1	7.16	6.97	27.31	86.3	92.0	2.33	33.4	.48	.21	.06
9	10.4	11.19	10.44	27.31	90.3	105.5	6.28	60.2	6.05	.23	.06
10	11.7	13.45	11.84	27.31	90.3	107.7	7.17	60.6	6.94	.23	.06
11	12.2	14.54	12.11	27.31	90.3	108.0	7.30	60.3	7.07	.23	.06
12	12.8	14.85	11.93	27.31	90.3	107.6	7.15	59.9	6.91	.23	.06
13	13.3	14.60	11.73	27.31	90.3	107.3	7.02	59.9	6.79	.23	.06
14	13.7	14.31	11.91	27.31	90.3	107.7	7.19	60.3	6.96	.23	.06
15	14.0	13.38	11.78	27.31	90.3	107.6	7.15	60.7	6.92	.23	.06
16	14.4	11.32	10.55	27.31	90.3	105.8	6.39	60.5	6.16	.23	.06
17	13.7	7.43	7.24	27.31	90.3	96.2	2.44	33.7	2.22	.22	.06
18	12.9	1.46	0.00	0.00	52.2	52.2	0.00	0.0	0.00	.46	0.00
19	12.2	0.00	0.00	0.00	35.3	35.3	0.00	0.0	0.00	.24	0.00
20	11.7	0.00	0.00	0.00	26.3	26.3	0.00	0.0	0.00	.16	0.00
21	11.1	0.00	0.00	0.00	20.8	20.8	0.00	0.0	0.00	.12	0.00
22	10.6	0.00	0.00	0.00	17.2	17.2	0.00	0.0	0.00	.10	0.00
23	10.0	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.09	0.00
24	9.5	0.00	0.00	0.00	13.0	13.0	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	125.35	106.54	---	---	---	60.41	56.7	56.50	3.92	.64

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

26 APRIL (DAY 116)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	12.2	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.08	0.00
2	11.7	0.00	0.00	0.00	14.2	14.2	0.00	0.0	0.00	.07	0.00
3	11.1	0.00	0.00	0.00	13.2	13.2	0.00	0.0	0.00	.06	0.00
4	10.6	0.00	0.00	0.00	12.3	12.3	0.00	0.0	0.00	.06	0.00
5	11.1	0.00	0.00	0.00	11.9	11.9	0.00	0.0	0.00	.05	0.00
6	11.7	0.00	0.00	0.00	11.9	11.9	0.00	0.0	0.00	.05	0.00
7	12.2	4.30	4.28	27.31	86.7	88.9	.90	21.1	-.81	.20	.06
8	13.5	9.16	9.14	27.31	90.3	101.3	4.56	49.9	4.34	.22	.06
9	14.8	12.44	12.23	27.31	90.3	108.5	7.49	61.3	7.26	.23	.06
10	16.1	14.14	13.53	27.31	90.3	110.4	8.31	61.5	8.08	.23	.06
11	17.0	14.53	13.51	27.31	90.3	110.4	8.30	61.5	8.08	.23	.06
12	18.0	14.67	13.39	27.31	90.3	110.2	8.23	61.5	8.00	.23	.06
13	18.9	14.50	13.23	27.31	90.3	110.0	8.14	61.5	7.91	.23	.06
14	18.9	14.40	13.39	27.31	90.3	110.3	8.24	61.5	8.01	.23	.06
15	18.9	13.92	13.32	27.31	90.3	110.2	8.20	61.6	7.97	.23	.06
16	18.9	12.45	12.25	27.31	90.3	108.6	7.54	61.5	7.31	.22	.06
17	17.6	9.43	9.41	27.31	90.3	101.8	4.74	50.3	4.52	.22	.06
18	16.3	4.57	4.54	27.31	90.3	92.7	.98	21.6	.77	.21	.06
19	15.0	0.00	0.00	0.00	53.0	53.0	0.00	0.0	0.00	.44	0.00
20	14.6	0.00	0.00	0.00	36.9	36.9	0.00	0.0	0.00	.23	0.00
21	14.3	0.00	0.00	0.00	28.3	28.3	0.00	0.0	0.00	.16	0.00
22	13.9	0.00	0.00	0.00	23.1	23.1	0.00	0.0	0.00	.12	0.00
23	13.3	0.00	0.00	0.00	19.7	19.7	0.00	0.0	0.00	.10	0.00
24	12.8	0.00	0.00	0.00	17.4	17.4	0.00	0.0	0.00	.09	0.00
TOTAL/AVE	---	138.51	132.26	---	---	---	75.63	57.2	71.45	4.18	.77

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

29 MAY (DAY 149)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	12.8	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.07	0.00
2	12.4	0.00	0.00	0.00	14.5	14.5	0.00	0.0	0.00	.07	0.00
3	12.1	0.00	0.00	0.00	13.7	13.7	0.00	0.0	0.00	.06	0.00
4	11.7	0.00	0.00	0.00	13.1	13.1	0.00	0.0	0.00	.06	0.00
5	12.2	0.00	0.00	0.00	12.8	12.8	0.00	0.0	0.00	.05	0.00
6	12.8	.60	0.00	0.00	12.8	12.8	0.00	0.0	0.00	.04	0.00
7	13.3	6.11	5.96	27.31	86.6	91.6	2.03	34.1	.31	.20	.06
8	14.4	10.35	10.32	27.31	90.3	105.1	6.11	59.1	5.88	.23	.06
9	15.6	12.75	12.73	27.31	90.3	109.5	7.92	62.2	7.69	.23	.06
10	16.7	13.82	13.64	27.31	90.3	110.7	8.43	61.8	8.20	.23	.06
11	17.4	14.14	13.75	27.31	90.3	110.8	8.47	61.6	8.24	.23	.06
12	18.2	14.23	13.69	27.31	90.3	110.7	8.44	61.6	8.21	.23	.06
13	18.9	14.07	13.53	27.31	90.3	110.5	8.34	61.6	8.11	.23	.06
14	19.1	14.02	13.63	27.31	90.3	110.7	8.41	61.7	8.18	.23	.06
15	19.2	13.78	13.60	27.31	90.3	110.7	8.42	61.9	8.19	.23	.06
16	19.4	12.90	12.88	27.31	90.3	109.8	8.05	62.5	7.82	.23	.06
17	18.3	10.78	10.75	27.31	90.3	105.8	6.40	59.6	6.18	.22	.06
18	17.2	6.82	6.66	27.31	90.3	95.9	2.32	34.8	2.10	.21	.06
19	16.1	.92	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.44	0.00
20	15.7	0.00	0.00	0.00	38.1	38.1	0.00	0.0	0.00	.24	0.00
21	15.4	0.00	0.00	0.00	29.5	29.5	0.00	0.0	0.00	.16	0.00
22	15.0	0.00	0.00	0.00	24.3	24.3	0.00	0.0	0.00	.12	0.00
23	14.6	0.00	0.00	0.00	20.9	20.9	0.00	0.0	0.00	.10	0.00
24	14.3	0.00	0.00	0.00	18.7	18.7	0.00	0.0	0.00	.09	0.00
TOTAL/AVE	---	145.31	141.17	---	---	---	83.32	59.0	79.12	4.19	.77

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

28 JUNE (DAY 179)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	14.4	0.00	0.00	0.00	17.5	17.5	0.00	0.0	0.00	.08	0.00
2	13.9	0.00	0.00	0.00	16.3	16.3	0.00	0.0	0.00	.07	0.00
3	13.3	0.00	0.00	0.00	15.3	15.3	0.00	0.0	0.00	.06	0.00
4	12.8	0.00	0.00	0.00	14.5	14.5	0.00	0.0	0.00	.06	0.00
5	13.3	0.00	0.00	0.00	14.1	14.1	0.00	0.0	0.00	.05	0.00
6	13.9	.71	0.00	0.00	14.0	14.0	0.00	0.0	0.00	.05	0.00
7	14.4	6.01	5.83	27.31	86.6	91.8	2.11	36.3	.39	.20	.06
8	15.7	10.60	10.54	27.31	90.3	105.9	6.42	60.9	6.20	.23	.06
9	17.0	12.85	12.84	27.31	90.3	109.8	8.04	62.6	7.81	.23	.06
10	18.3	13.86	13.73	27.31	90.3	110.9	8.52	62.0	8.29	.23	.06
11	19.4	14.16	13.86	27.31	90.3	111.0	8.56	61.8	8.34	.23	.06
12	20.6	14.24	13.81	27.31	90.3	111.0	8.53	61.8	8.31	.23	.06
13	21.7	14.16	13.72	27.31	90.3	110.9	8.49	61.8	8.26	.22	.06
14	21.1	14.11	13.81	27.31	90.3	111.0	8.55	61.9	8.32	.22	.06
15	20.6	13.90	13.77	27.31	90.3	111.0	8.56	62.2	8.33	.23	.06
16	20.0	13.16	13.15	27.31	90.3	110.3	8.26	62.9	8.04	.23	.06
17	18.9	11.21	11.16	27.31	90.3	106.9	6.84	61.3	6.62	.22	.06
18	17.8	7.27	7.05	27.31	90.3	96.7	2.63	37.3	2.42	.21	.06
19	16.7	1.43	0.00	0.00	54.8	54.8	0.00	0.0	0.00	.44	0.00
20	16.1	0.00	0.00	0.00	38.6	38.6	0.00	0.0	0.00	.24	0.00
21	15.6	0.00	0.00	0.00	29.8	29.8	0.00	0.0	0.00	.16	0.00
22	15.0	0.00	0.00	0.00	24.5	24.5	0.00	0.0	0.00	.12	0.00
23	14.6	0.00	0.00	0.00	21.0	21.0	0.00	0.0	0.00	.10	0.00
24	14.3	0.00	0.00	0.00	18.8	18.8	0.00	0.0	0.00	.09	0.00
TOTAL/AVE	---	147.67	143.31	---	---	---	85.52	59.7	81.34	4.19	.77

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

5 JULY (DAY 186)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	16.1	0.00	0.00	0.00	19.1	19.1	0.00	0.0	0.00	.08	0.00
2	15.7	0.00	0.00	0.00	18.0	18.0	0.00	0.0	0.00	.07	0.00
3	15.4	0.00	0.00	0.00	17.1	17.1	0.00	0.0	0.00	.06	0.00
4	15.0	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.06	0.00
5	16.1	0.00	0.00	0.00	16.3	16.3	0.00	0.0	0.00	.05	0.00
6	17.2	.59	0.00	0.00	16.6	16.6	0.00	0.0	0.00	.04	0.00
7	18.3	5.80	5.63	27.31	86.7	91.6	2.02	35.9	.33	.20	.06
8	19.6	10.49	10.45	27.31	90.3	105.7	6.34	60.7	6.12	.22	.06
9	20.9	12.83	12.82	27.31	90.3	109.8	8.04	62.7	7.82	.22	.06
10	22.2	13.91	13.77	27.31	90.3	111.0	8.56	62.2	8.34	.22	.06
11	21.8	14.21	13.87	27.31	90.3	111.1	8.59	61.9	8.37	.22	.06
12	21.5	14.30	13.84	27.31	90.3	111.0	8.56	61.8	8.33	.22	.06
13	21.1	14.23	13.77	27.31	90.3	110.9	8.51	61.8	8.29	.22	.06
14	20.5	14.18	13.85	27.31	90.3	111.1	8.57	61.9	8.34	.23	.06
15	20.0	13.96	13.82	27.31	90.3	111.1	8.58	62.1	8.35	.23	.06
16	19.4	13.18	13.17	27.31	90.3	110.3	8.26	62.7	8.04	.23	.06
17	17.9	11.17	11.12	27.31	90.3	106.7	6.76	60.8	6.54	.22	.06
18	16.5	7.14	6.94	27.31	90.3	96.4	2.53	36.4	2.32	.21	.06
19	15.0	1.26	0.00	0.00	53.7	53.7	0.00	0.0	0.00	.45	0.00
20	14.6	0.00	0.00	0.00	37.2	37.2	0.00	0.0	0.00	.24	0.00
21	14.3	0.00	0.00	0.00	28.5	28.5	0.00	0.0	0.00	.16	0.00
22	13.9	0.00	0.00	0.00	23.2	23.2	0.00	0.0	0.00	.12	0.00
23	13.9	0.00	0.00	0.00	20.0	20.0	0.00	0.0	0.00	.10	0.00
24	13.9	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	147.26	143.08	---	---	---	85.33	59.6	81.18	4.17	.77

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

1 AUGUST (DAY 213)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	15.8	0.00	0.00	0.00	16.3	16.3	0.00	0.0	0.00	.02	0.00
2	15.4	0.00	0.00	0.00	16.0	16.0	0.00	0.0	0.00	.02	0.00
3	15.2	0.00	0.00	0.00	15.7	15.7	0.00	0.0	0.00	.01	0.00
4	15.0	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.01	0.00
5	15.1	0.00	0.00	0.00	15.4	15.4	0.00	0.0	0.00	.01	0.00
6	15.5	.04	0.00	0.00	15.4	15.4	0.00	0.0	0.00	.01	0.00
7	15.6	4.90	4.83	27.31	85.5	88.8	1.38	28.5	-.82	.20	.06
8	16.5	9.71	9.70	27.31	90.3	103.4	5.40	55.7	5.18	.22	.06
9	17.4	12.37	12.29	27.31	90.3	108.7	7.59	61.8	7.36	.23	.06
10	18.3	13.72	13.39	27.31	90.3	110.3	8.25	61.6	8.03	.23	.06
11	19.2	14.21	13.57	27.31	90.3	110.6	8.37	61.6	8.14	.23	.06
12	20.2	14.32	13.50	27.31	90.3	110.5	8.32	61.7	8.10	.23	.06
13	21.1	14.31	13.49	27.31	90.3	110.5	8.32	61.7	8.10	.22	.06
14	21.1	14.23	13.60	27.31	90.3	110.6	8.39	61.7	8.17	.22	.06
15	21.1	13.95	13.62	27.31	90.3	110.7	8.42	61.8	8.19	.22	.06
16	21.1	12.88	12.80	27.31	90.3	109.6	7.95	62.1	7.73	.22	.06
17	19.6	10.56	10.56	27.31	90.3	104.7	5.93	56.2	5.71	.22	.06
18	18.2	6.25	6.16	27.31	90.3	94.8	1.84	29.8	1.63	.21	.06
19	16.7	.22	0.00	0.00	54.5	54.5	0.00	0.0	0.00	.44	0.00
20	15.8	0.00	0.00	0.00	38.3	38.3	0.00	0.0	0.00	.24	0.00
21	14.8	0.00	0.00	0.00	29.3	29.3	0.00	0.0	0.00	.16	0.00
22	13.9	0.00	0.00	0.00	23.7	23.7	0.00	0.0	0.00	.13	0.00
23	13.7	0.00	0.00	0.00	20.2	20.2	0.00	0.0	0.00	.10	0.00
24	13.5	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.09	0.00
TOTAL/AVE	---	141.68	137.54	---	---	---	80.17	58.3	75.51	3.87	.77

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

1 SEPTEMBER (DAY 244)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	15.0	0.00	0.00	0.00	17.3	17.3	0.00	0.0	0.00	.07	0.00
2	14.6	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.06	0.00
3	14.2	0.00	0.00	0.00	15.7	15.7	0.00	0.0	0.00	.06	0.00
4	13.7	0.00	0.00	0.00	15.0	15.0	0.00	0.0	0.00	.05	0.00
5	13.3	0.00	0.00	0.00	14.5	14.5	0.00	0.0	0.00	.05	0.00
6	12.9	0.00	0.00	0.00	14.0	14.0	0.00	0.0	0.00	.05	0.00
7	15.6	1.65	0.00	0.00	14.5	14.5	0.00	0.0	0.00	.03	0.00
8	16.7	7.86	7.80	27.31	86.5	94.6	3.36	43.1	1.56	.20	.06
9	18.3	11.37	10.97	27.31	90.3	106.5	6.69	61.0	6.46	.22	.06
10	20.6	13.16	12.20	27.31	90.3	108.4	7.49	61.4	7.27	.22	.06
11	21.1	13.96	12.44	27.31	90.3	108.8	7.64	61.4	7.41	.22	.06
12	25.0	14.23	12.37	27.31	90.3	108.7	7.61	61.5	7.39	.22	.06
13	25.6	14.22	12.36	27.31	90.3	108.7	7.60	61.5	7.39	.22	.06
14	25.0	14.03	12.50	27.31	90.3	109.0	7.70	61.6	7.49	.22	.06
15	23.3	13.39	12.42	27.31	90.3	108.8	7.65	61.6	7.43	.22	.06
16	22.8	11.86	11.44	27.31	90.3	107.3	7.02	61.4	6.80	.22	.06
17	21.7	8.74	8.67	27.31	90.3	99.5	3.78	43.6	3.57	.21	.06
18	18.9	2.52	0.00	0.00	56.8	56.8	0.00	0.0	0.00	.44	0.00
19	17.2	0.00	0.00	0.00	40.1	40.1	0.00	0.0	0.00	.24	0.00
20	16.1	0.00	0.00	0.00	30.9	30.9	0.00	0.0	0.00	.17	0.00
21	15.6	0.00	0.00	0.00	25.3	25.3	0.00	0.0	0.00	.13	0.00
22	15.0	0.00	0.00	0.00	21.7	21.7	0.00	0.0	0.00	.10	0.00
23	15.0	0.00	0.00	0.00	19.5	19.5	0.00	0.0	0.00	.09	0.00
24	15.0	0.00	0.00	0.00	18.0	18.0	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	126.99	113.18	---	---	---	66.53	58.8	62.76	3.79	.64

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

3 OCTOBER (DAY 276)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	14.8	0.00	0.00	0.00	17.3	17.3	0.00	0.0	0.00	.07	0.00
2	14.4	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.06	0.00
3	14.4	0.00	0.00	0.00	15.7	15.7	0.00	0.0	0.00	.06	0.00
4	14.4	0.00	0.00	0.00	15.3	15.3	0.00	0.0	0.00	.05	0.00
5	14.4	0.00	0.00	0.00	15.0	15.0	0.00	0.0	0.00	.05	0.00
6	14.8	0.00	0.00	0.00	14.9	14.9	0.00	0.0	0.00	.04	0.00
7	15.2	.00	0.00	0.00	15.0	15.0	0.00	0.0	0.00	.04	0.00
8	15.6	4.72	4.49	27.31	86.5	89.1	1.08	24.0	-.69	.20	.06
9	17.8	9.75	8.75	27.31	90.3	101.7	4.72	53.9	4.50	.22	.06
10	20.0	12.38	10.32	27.31	90.3	105.4	6.22	60.3	6.00	.22	.06
11	22.2	13.71	10.62	27.31	90.3	105.7	6.33	59.6	6.12	.22	.06
12	22.8	14.23	10.52	27.31	90.3	105.3	6.19	58.8	5.97	.22	.06
13	23.3	14.19	10.49	27.31	90.3	105.3	6.18	58.9	5.96	.22	.06
14	23.9	13.75	10.65	27.31	90.3	105.7	6.37	59.8	6.15	.21	.06
15	24.1	12.58	10.49	27.31	90.3	105.7	6.36	60.6	6.14	.21	.06
16	24.2	10.15	9.12	27.31	90.3	102.4	4.97	54.6	4.76	.21	.06
17	24.4	5.38	5.13	27.31	90.3	93.5	1.32	25.7	1.12	.20	.06
18	23.1	.01	0.00	0.00	58.4	58.4	0.00	0.0	0.00	.40	0.00
19	21.9	0.00	0.00	0.00	43.3	43.3	0.00	0.0	0.00	.23	0.00
20	20.6	0.00	0.00	0.00	34.6	34.6	0.00	0.0	0.00	.16	0.00
21	20.0	0.00	0.00	0.00	29.4	29.4	0.00	0.0	0.00	.12	0.00
22	19.5	0.00	0.00	0.00	25.9	25.9	0.00	0.0	0.00	.10	0.00
23	18.9	0.00	0.00	0.00	23.5	23.5	0.00	0.0	0.00	.09	0.00
24	18.2	0.00	0.00	0.00	21.8	21.8	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	110.85	90.61	---	---	---	49.73	54.9	46.04	3.67	.64

RUN ID: CT3
83/11/16.

CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

5 NOVEMBER (DAY 309)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	12.4	12.4	0.00	0.0	0.00	.02	0.00
2	9.4	0.00	0.00	0.00	11.4	11.4	0.00	0.0	0.00	.02	0.00
3	9.4	0.00	0.00	0.00	10.7	10.7	0.00	0.0	0.00	.01	0.00
4	8.9	0.00	0.00	0.00	10.1	10.1	0.00	0.0	0.00	.01	0.00
5	9.4	0.00	0.00	0.00	9.9	9.9	0.00	0.0	0.00	.01	0.00
6	8.3	0.00	0.00	0.00	9.4	9.4	0.00	0.0	0.00	.01	0.00
7	8.3	0.00	0.00	0.00	9.0	9.0	0.00	0.0	0.00	.01	0.00
8	9.4	1.25	0.00	0.00	9.1	9.1	0.00	0.0	0.00	.00	0.00
9	12.2	7.75	6.30	27.31	85.2	90.8	2.32	36.9	.01	.20	.06
10	13.9	11.51	8.32	27.31	90.3	101.8	4.73	56.8	4.50	.22	.06
11	15.0	13.27	8.52	27.31	90.3	101.5	4.62	54.3	4.40	.22	.06
12	16.1	13.96	8.25	27.31	90.3	100.7	4.30	52.1	4.08	.22	.06
13	17.2	14.00	8.28	27.31	90.3	100.8	4.32	52.2	4.10	.22	.06
14	18.3	13.37	8.58	27.31	90.3	101.7	4.69	54.6	4.47	.22	.06
15	19.4	11.76	8.50	27.31	90.3	102.1	4.88	57.4	4.66	.22	.06
16	20.0	8.10	6.59	27.31	90.3	96.3	2.46	37.4	2.26	.21	.06
17	21.1	1.25	0.00	0.00	57.6	57.6	0.00	0.0	0.00	.42	0.00
18	18.9	0.00	0.00	0.00	41.4	41.4	0.00	0.0	0.00	.24	0.00
19	17.8	0.00	0.00	0.00	32.3	32.3	0.00	0.0	0.00	.16	0.00
20	14.4	0.00	0.00	0.00	25.7	25.7	0.00	0.0	0.00	.14	0.00
21	13.9	0.00	0.00	0.00	21.6	21.6	0.00	0.0	0.00	.11	0.00
22	13.9	0.00	0.00	0.00	18.9	18.9	0.00	0.0	0.00	.09	0.00
23	11.7	0.00	0.00	0.00	16.5	16.5	0.00	0.0	0.00	.09	0.00
24	11.7	0.00	0.00	0.00	14.9	14.9	0.00	0.0	0.00	.07	0.00
TOTAL/AVE	---	96.23	63.35	---	---	---	32.32	51.0	28.48	3.13	.51

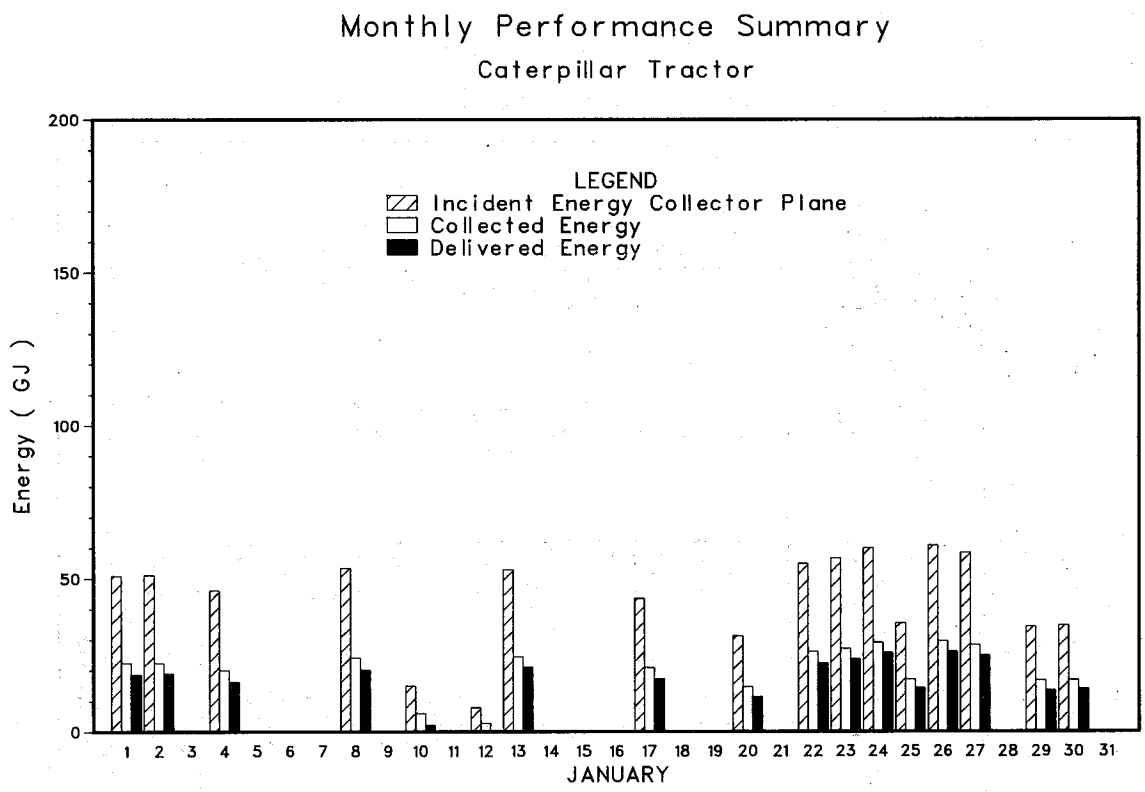
RUN ID: CT3
83/11/16.

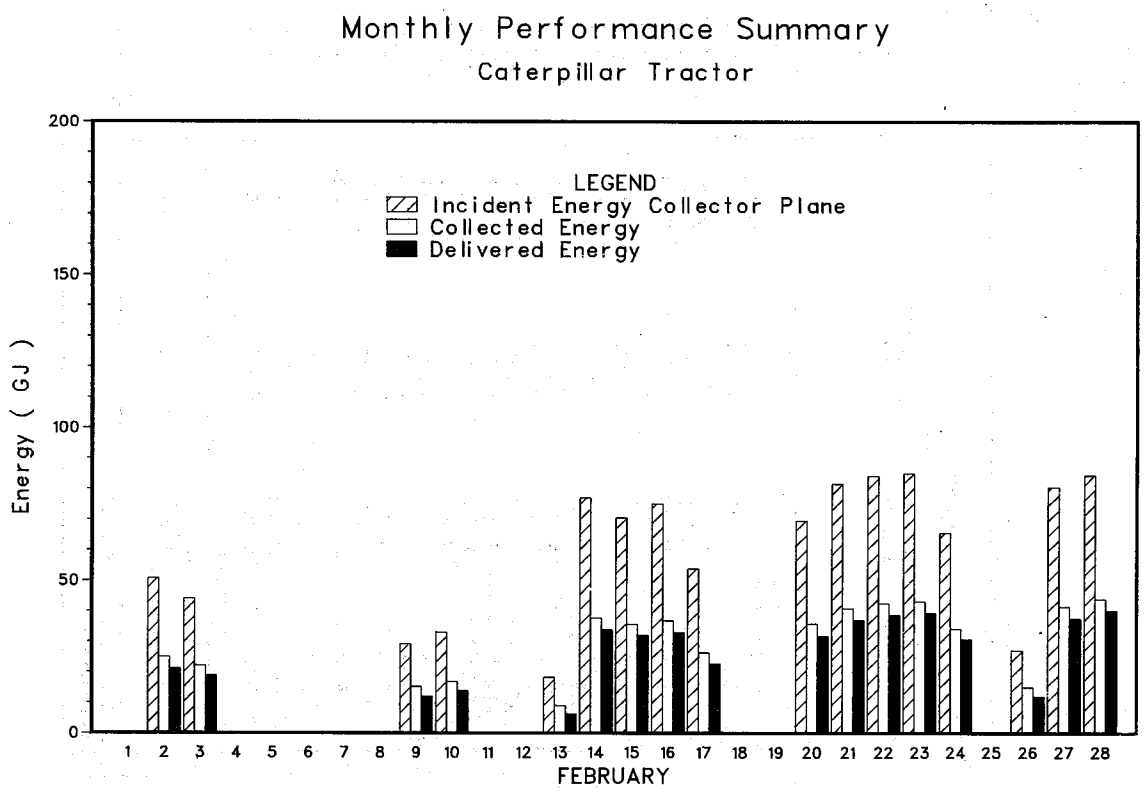
CATERPILLAR TRACTOR

CLEAR DAY PERFORMANCE TABLE

31 DECEMBER (DAY 365)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	6.7	0.00	0.00	0.00	7.7	7.7	0.00	0.0	0.00	.01	0.00
2	5.9	0.00	0.00	0.00	7.1	7.1	0.00	0.0	0.00	.01	0.00
3	5.2	0.00	0.00	0.00	6.5	6.5	0.00	0.0	0.00	.01	0.00
4	4.4	0.00	0.00	0.00	5.8	5.8	0.00	0.0	0.00	.01	0.00
5	4.8	0.00	0.00	0.00	5.5	5.5	0.00	0.0	0.00	.01	0.00
6	5.2	0.00	0.00	0.00	5.4	5.4	0.00	0.0	0.00	.01	0.00
7	5.6	0.00	0.00	0.00	5.5	5.5	0.00	0.0	0.00	.00	0.00
8	7.6	.10	0.00	0.00	6.1	6.1	0.00	0.0	0.00	-.00	0.00
9	9.7	6.01	4.55	27.31	85.1	87.7	1.06	23.4	-1.28	.20	.06
10	11.7	10.41	6.81	27.31	90.3	98.9	3.56	52.3	3.34	.22	.06
11	12.1	12.73	7.10	27.31	90.3	98.8	3.49	49.2	3.27	.22	.06
12	12.4	13.48	6.69	27.31	90.3	97.7	3.04	45.4	2.82	.22	.06
13	12.8	13.54	6.72	27.31	90.3	97.7	3.06	45.5	2.84	.22	.06
14	12.4	12.85	7.17	27.31	90.3	98.9	3.53	49.3	3.31	.22	.06
15	12.1	10.60	6.93	27.31	90.3	99.1	3.63	52.4	3.41	.22	.06
16	11.7	6.09	4.61	27.31	90.3	92.9	1.06	23.0	.85	.21	.06
17	11.1	.03	0.00	0.00	50.5	50.5	0.00	0.0	0.00	.46	0.00
18	10.6	0.00	0.00	0.00	33.6	33.6	0.00	0.0	0.00	.24	0.00
19	10.2	0.00	0.00	0.00	24.7	24.7	0.00	0.0	0.00	.16	0.00
20	9.4	0.00	0.00	0.00	19.1	19.1	0.00	0.0	0.00	.12	0.00
21	8.7	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.10	0.00
22	8.0	0.00	0.00	0.00	12.9	12.9	0.00	0.0	0.00	.09	0.00
23	7.3	0.00	0.00	0.00	11.0	11.0	0.00	0.0	0.00	.08	0.00
24	6.6	0.00	0.00	0.00	9.6	9.6	0.00	0.0	0.00	.07	0.00
TOTAL/AVE	---	85.84	50.59	---	---	---	22.44	44.3	18.56	3.14	.51


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JANUARY


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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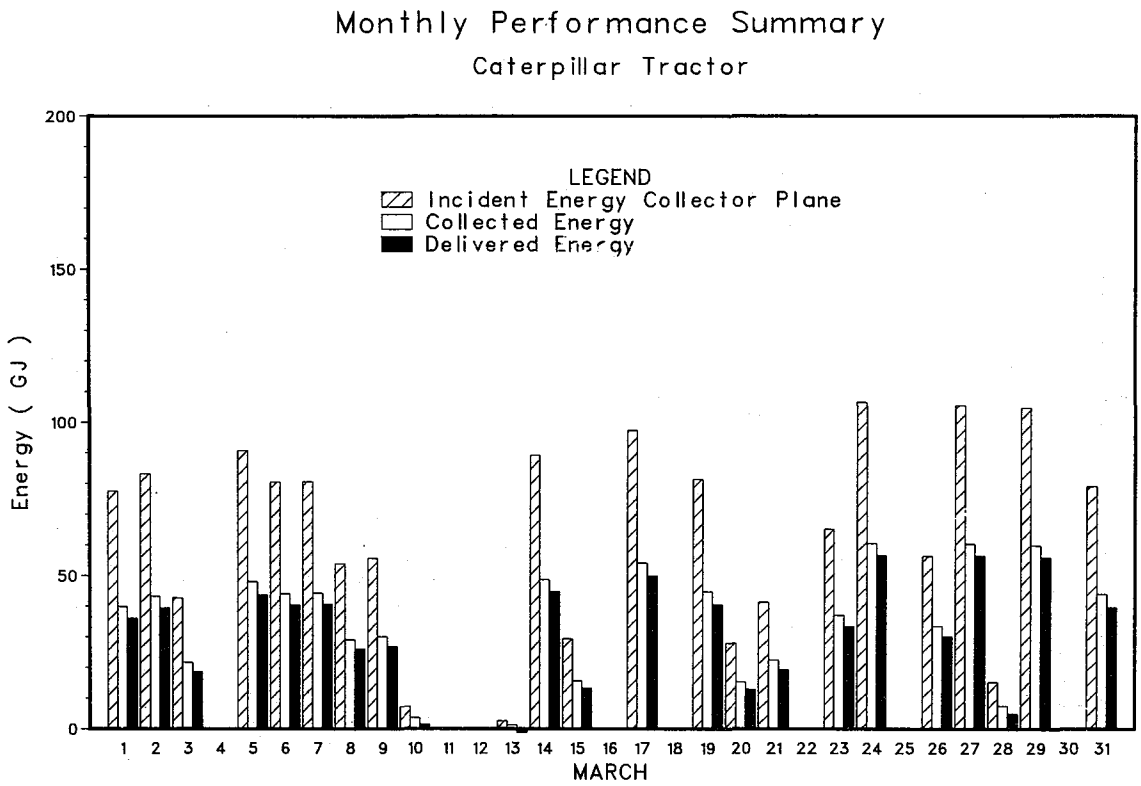
FEBRUARY


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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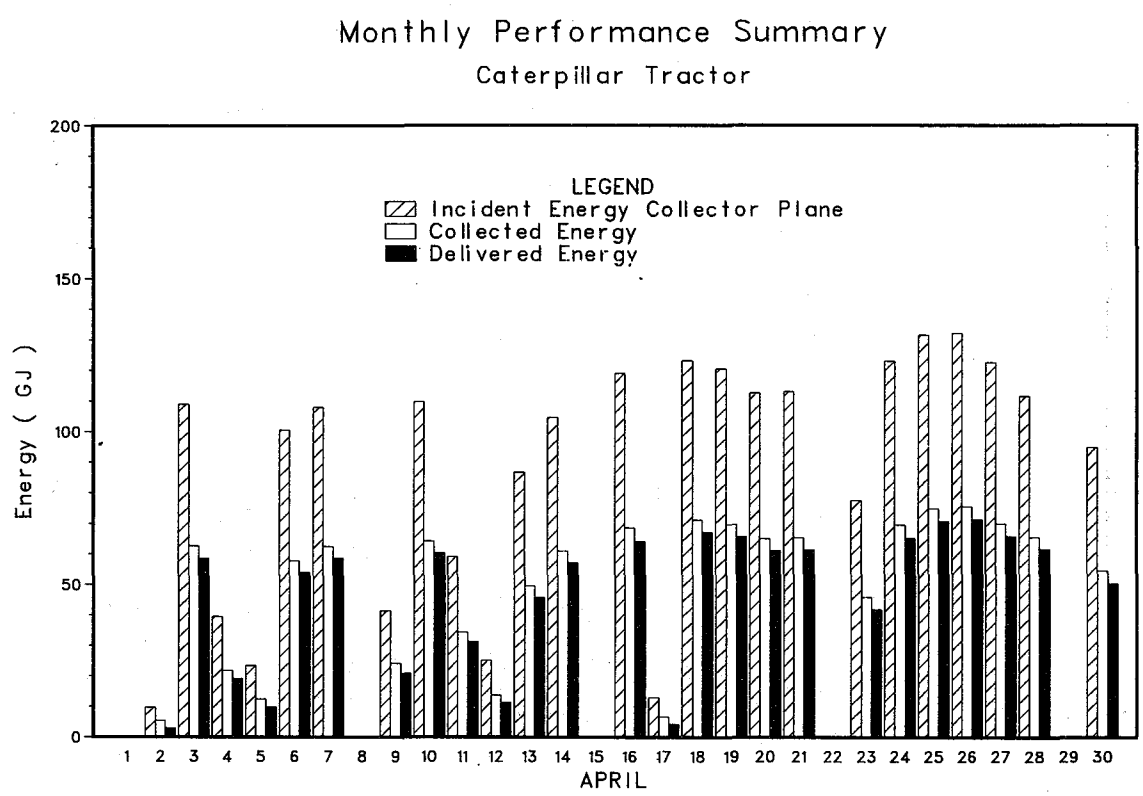
MARCH


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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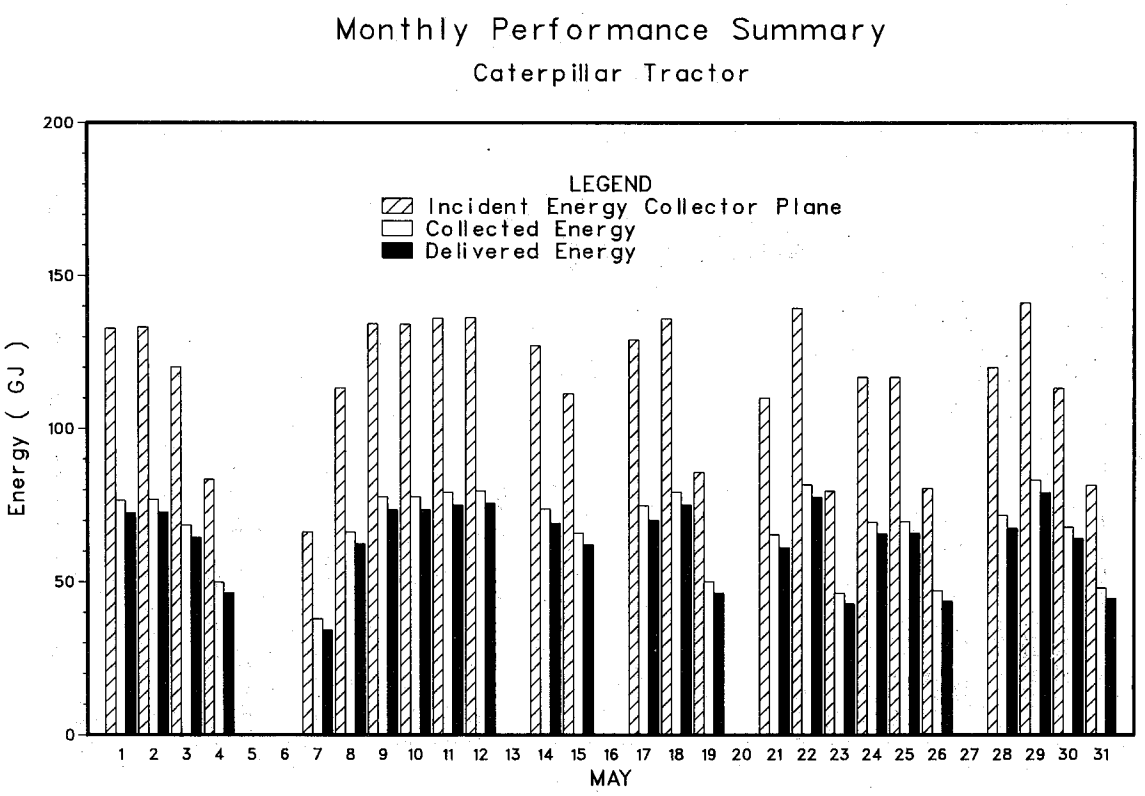
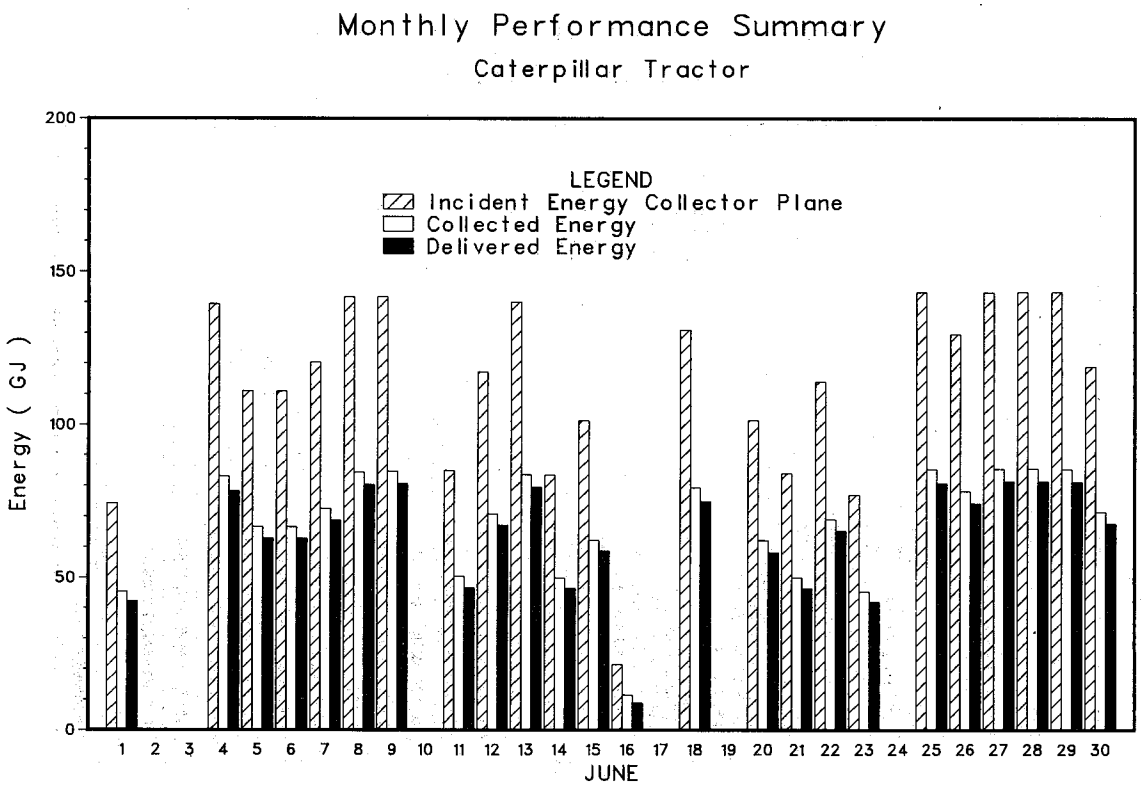
APRIL


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MAY


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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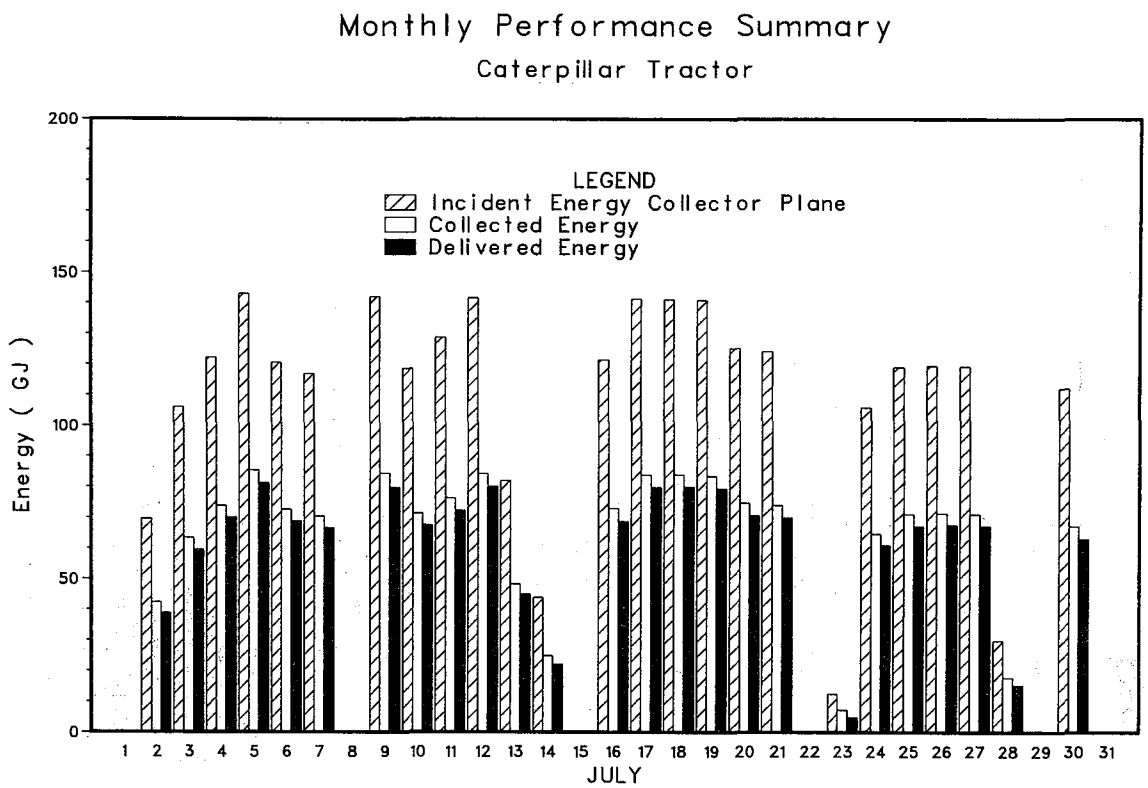
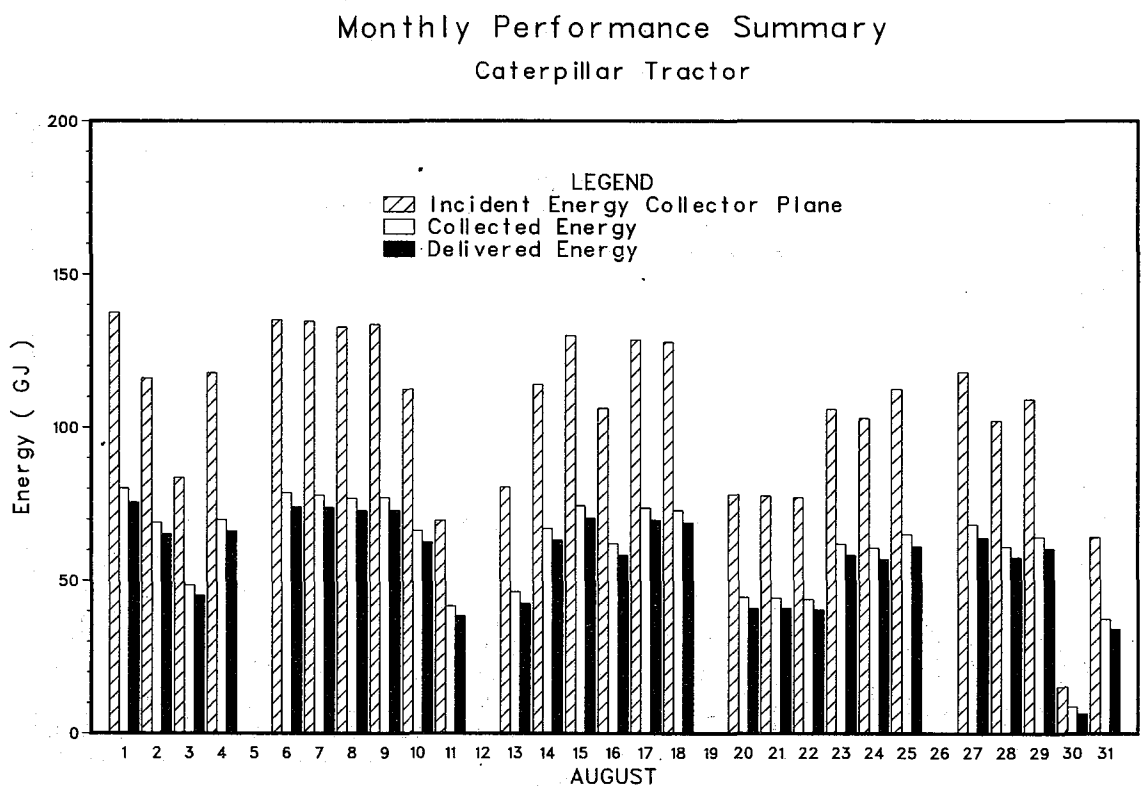
JUNE


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JULY


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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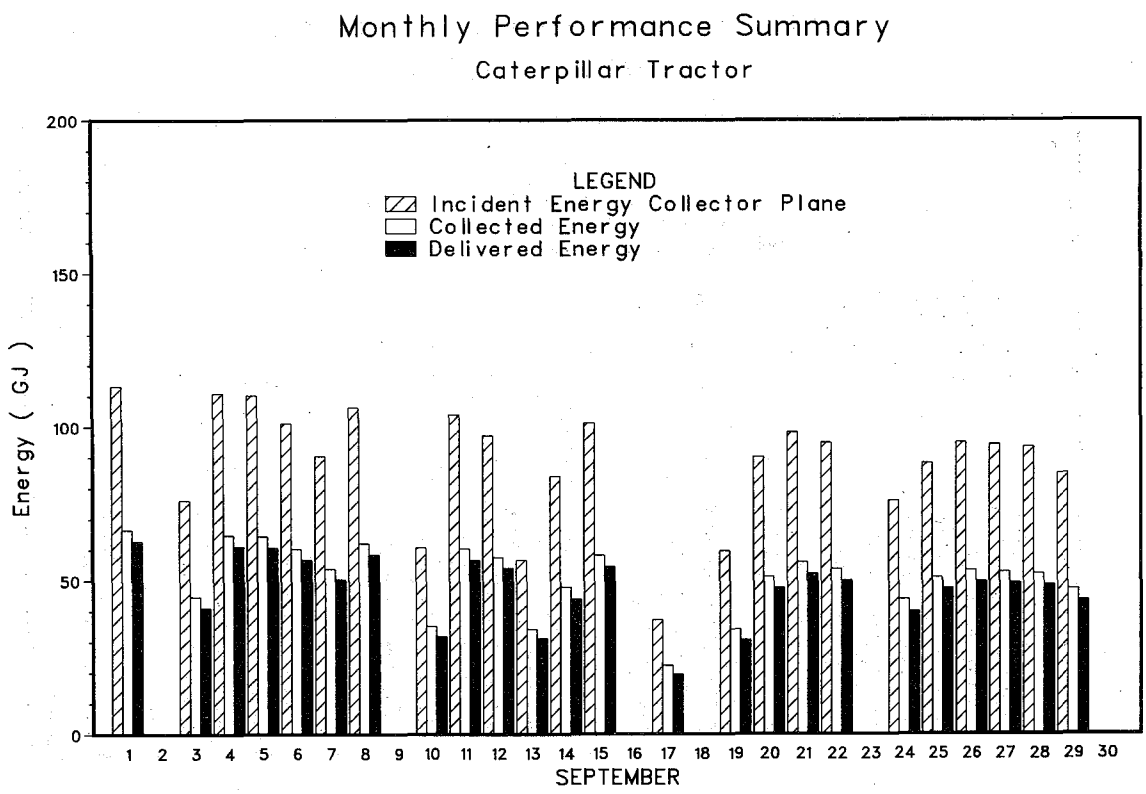
AUGUST


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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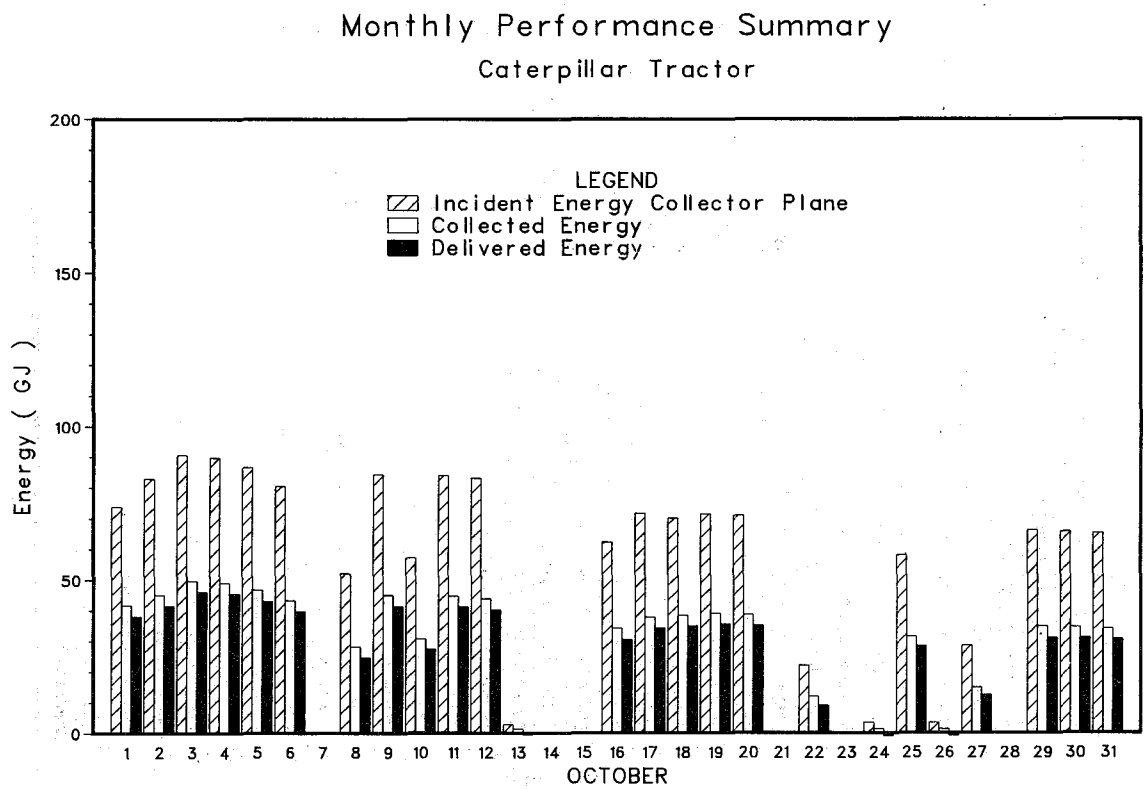
SEPTEMBER


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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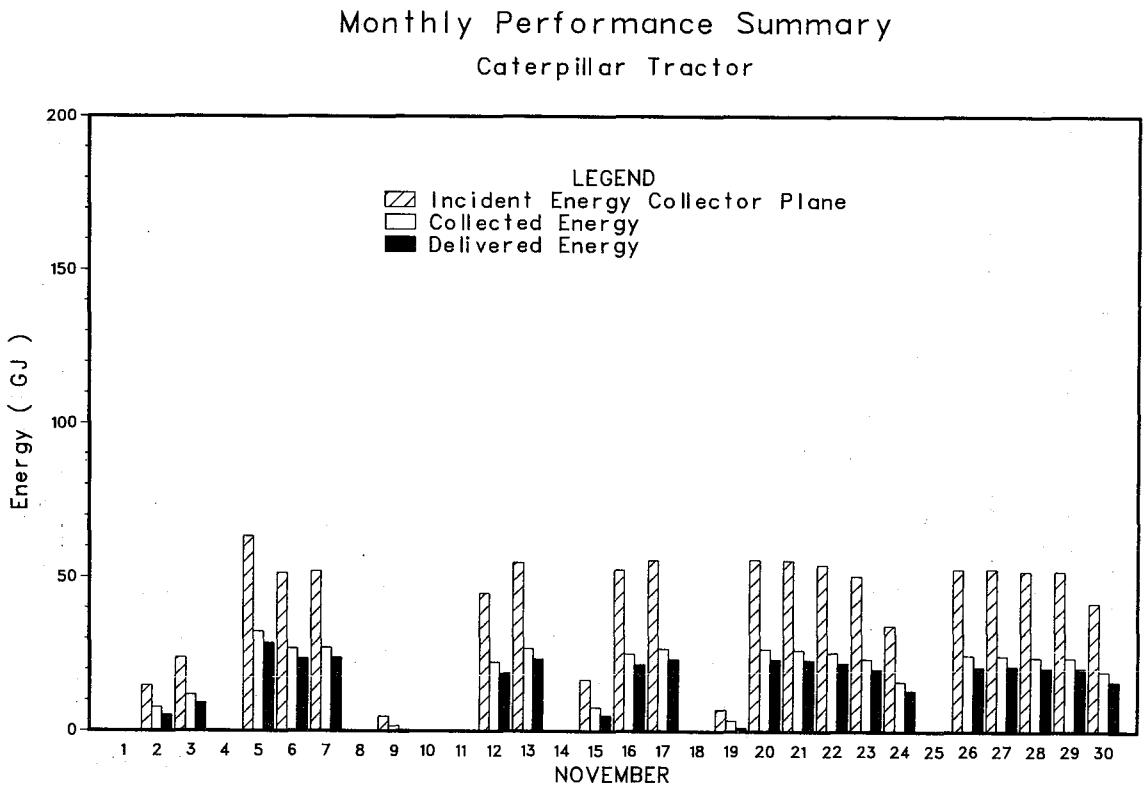
OCTOBER


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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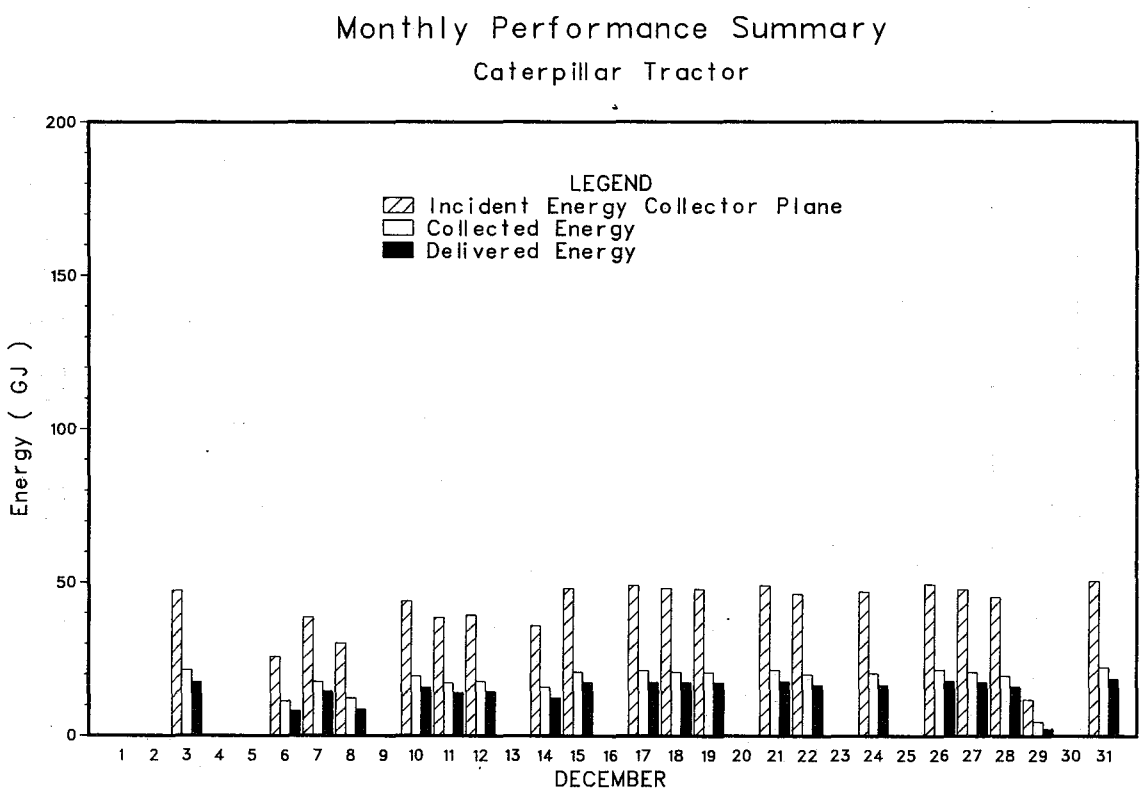
NOVEMBER


Monthly Performance Summary
Caterpillar Tractor
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
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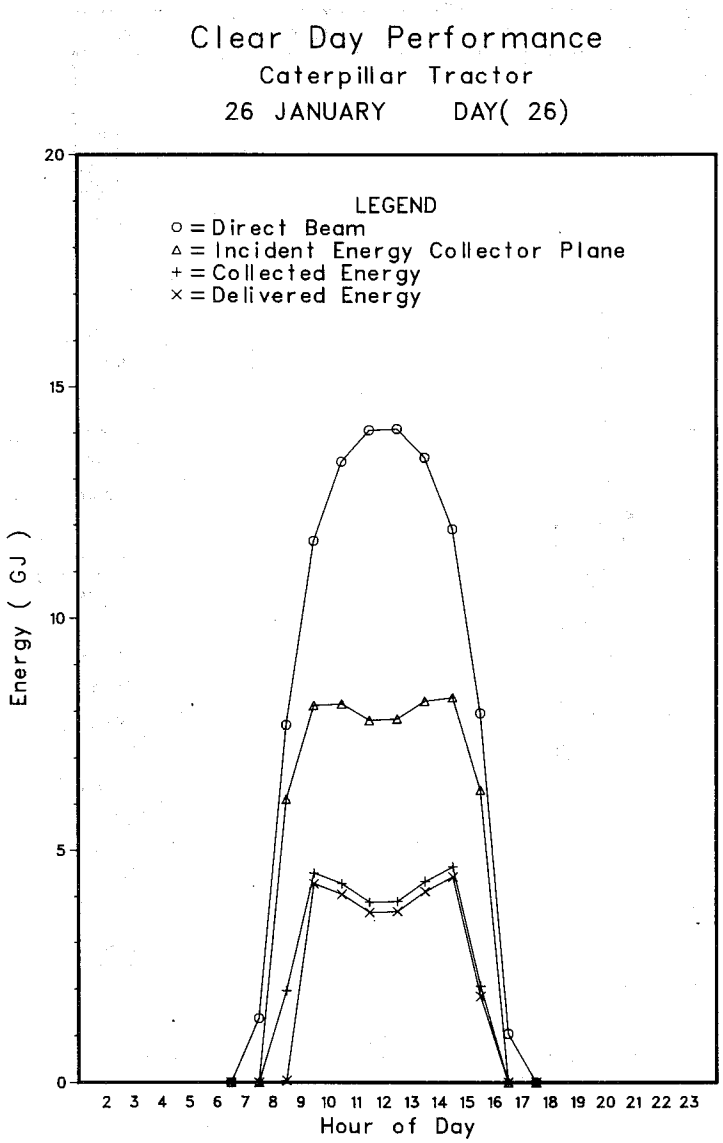
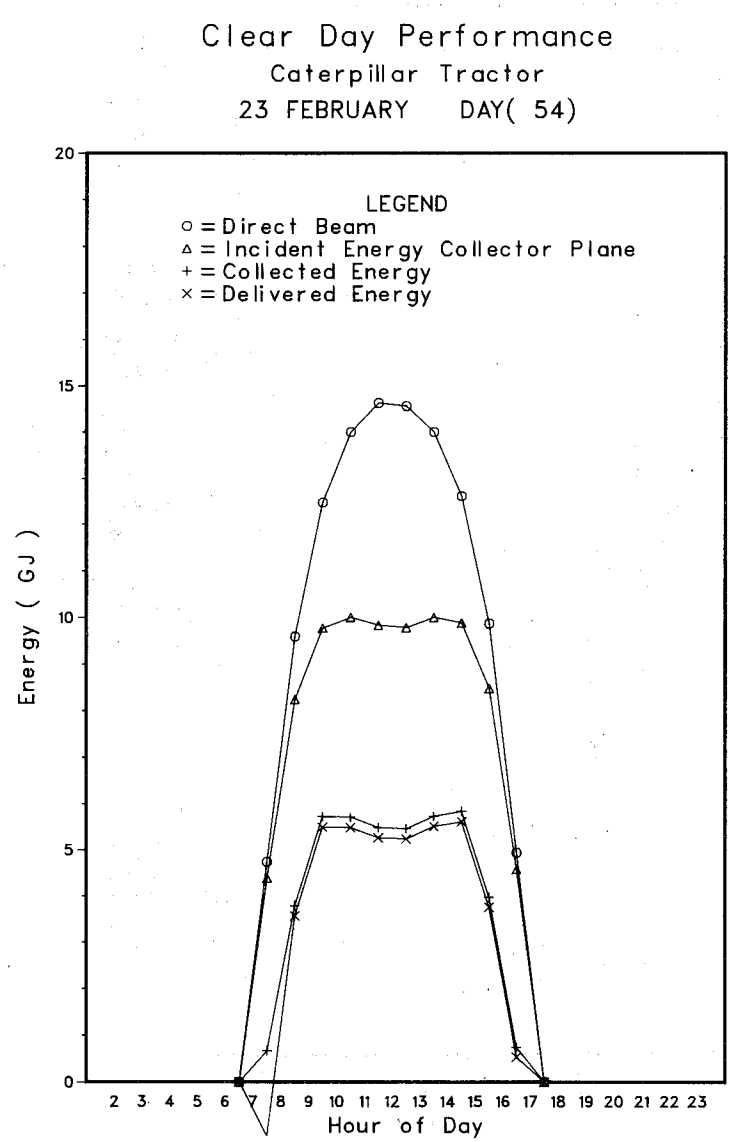
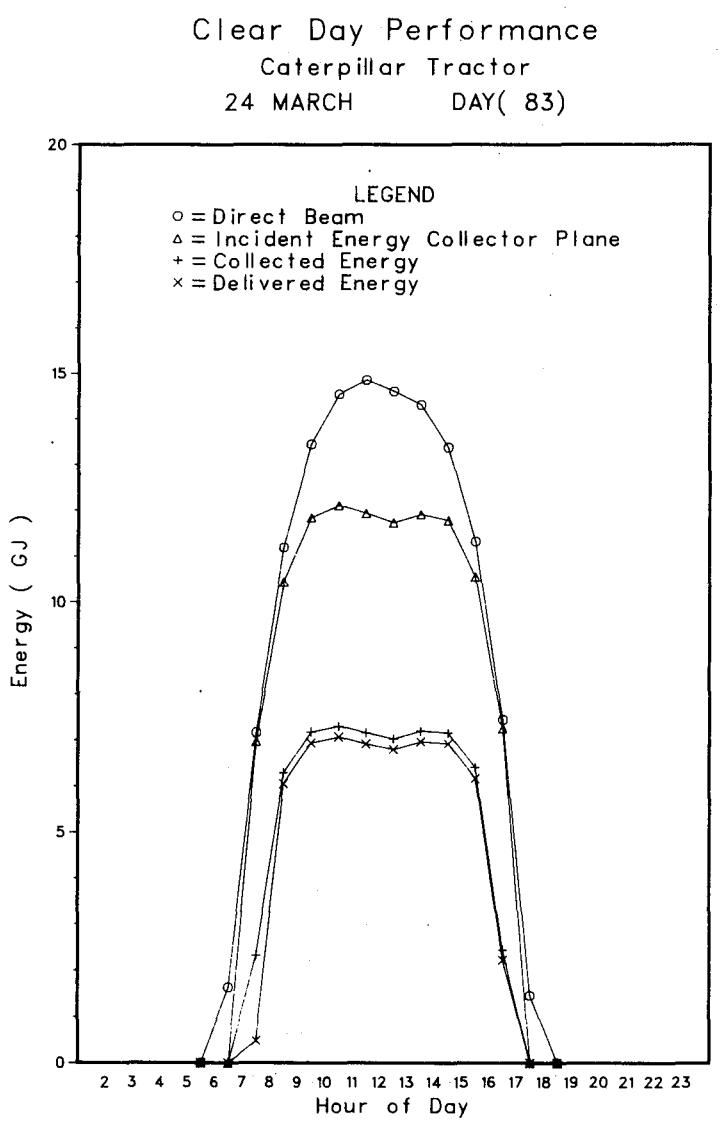
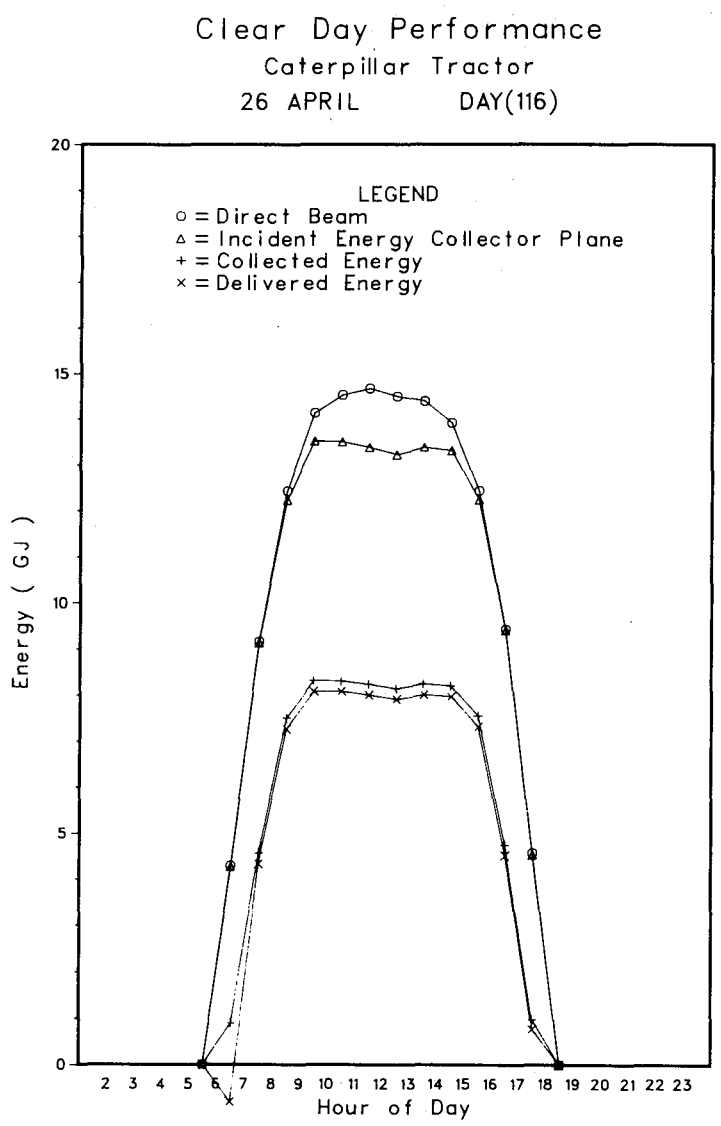
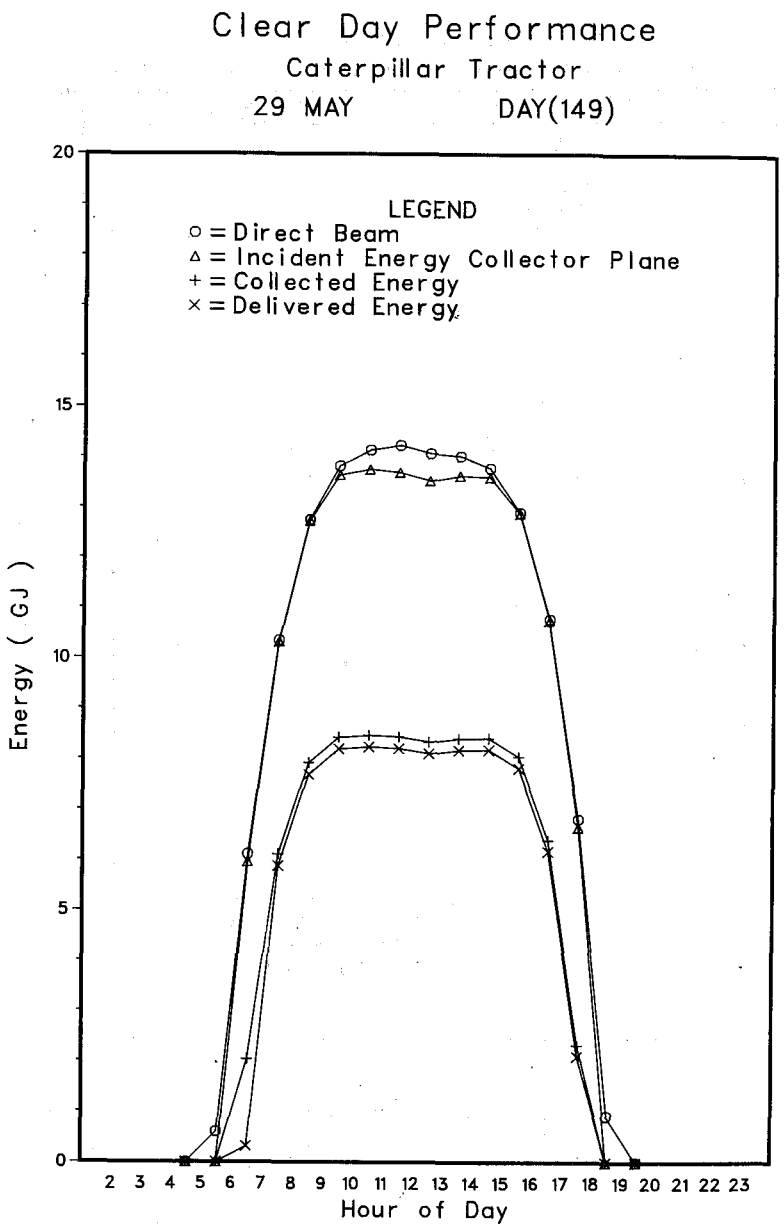
DECEMBER

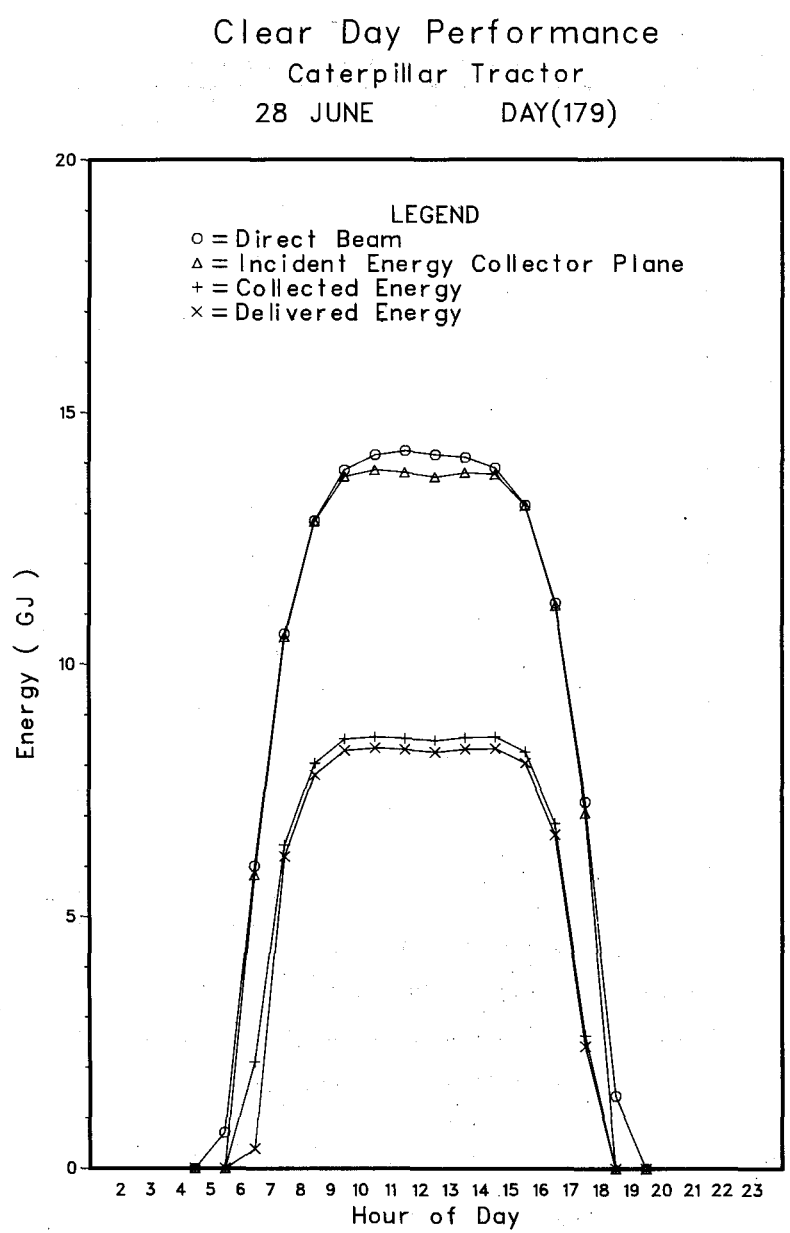

Clear Day Performance
Caterpillar Tractor
26 JANUARY DAY(26)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

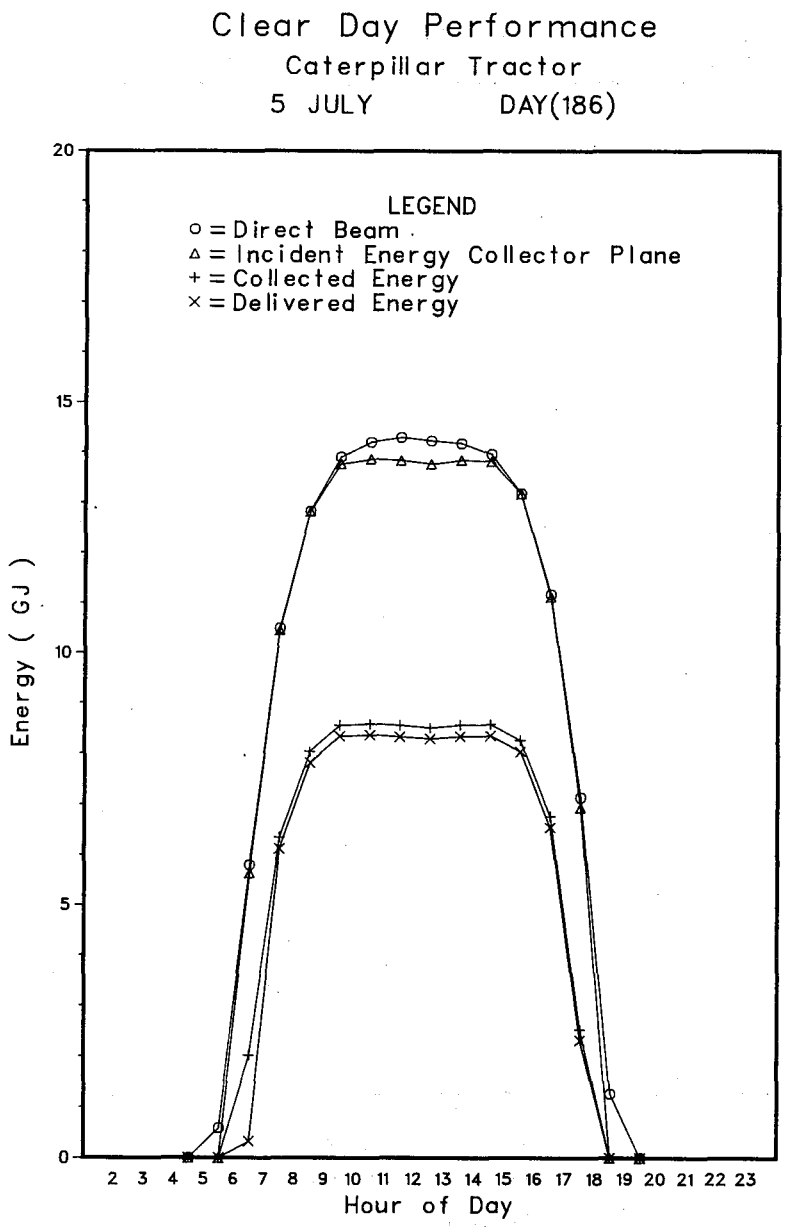

Clear Day Performance
Caterpillar Tractor
23 FEBRUARY DAY(54)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

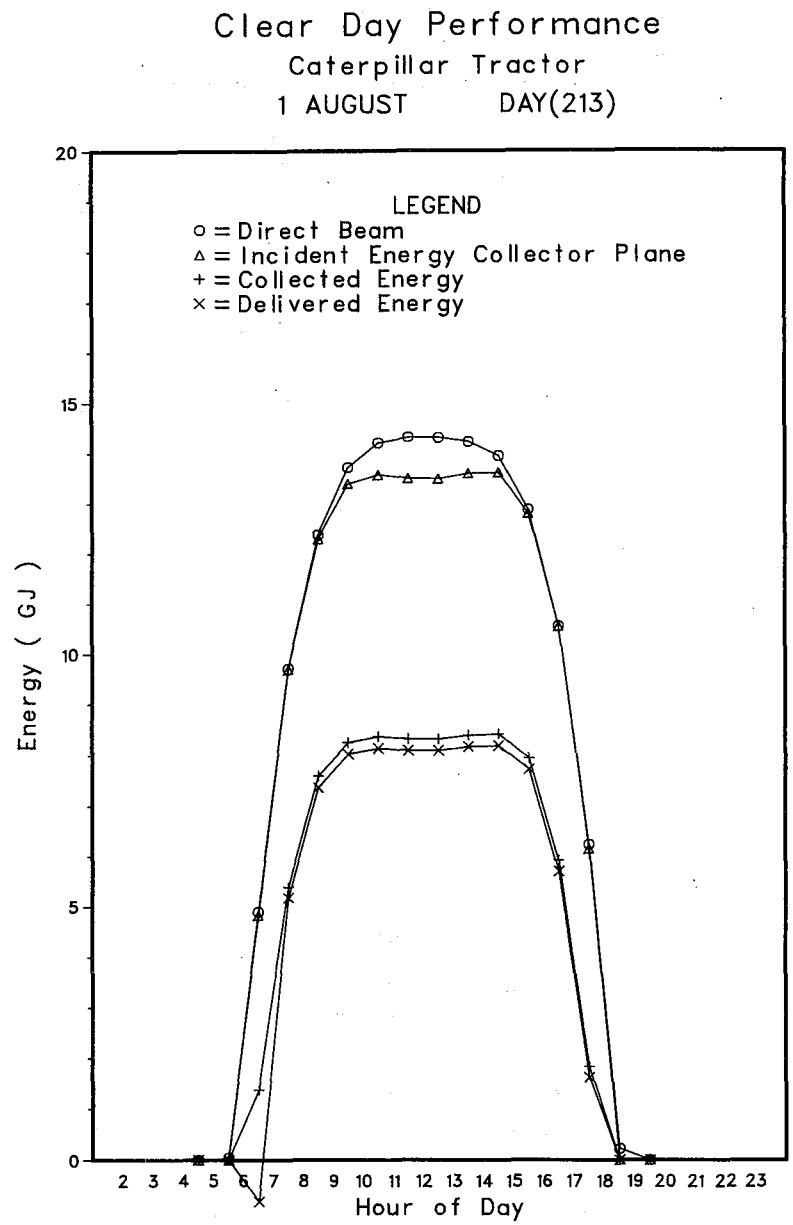

Clear Day Performance
Caterpillar Tractor
24 MARCH DAY(83)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day
0
5
10
15
20
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

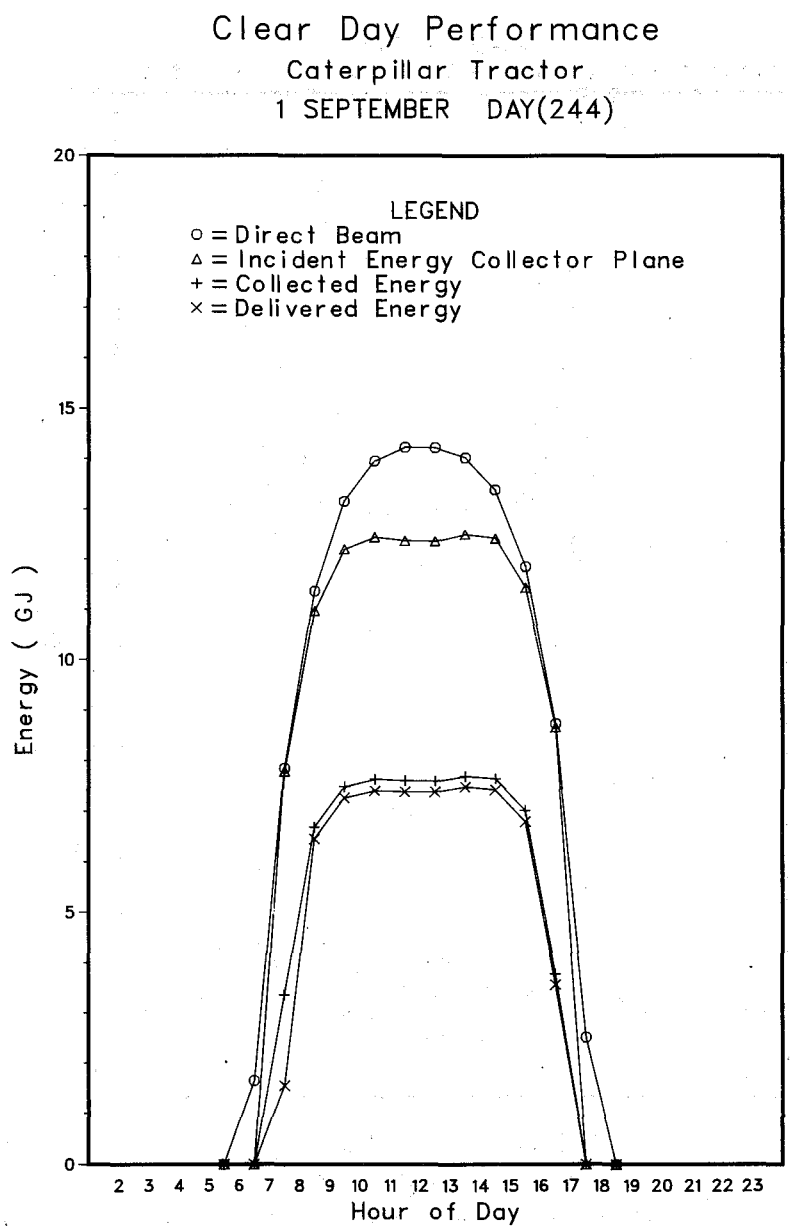

Clear Day Performance
Caterpillar Tractor
26 APRIL DAY(116)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day
0
5
10
15
20
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

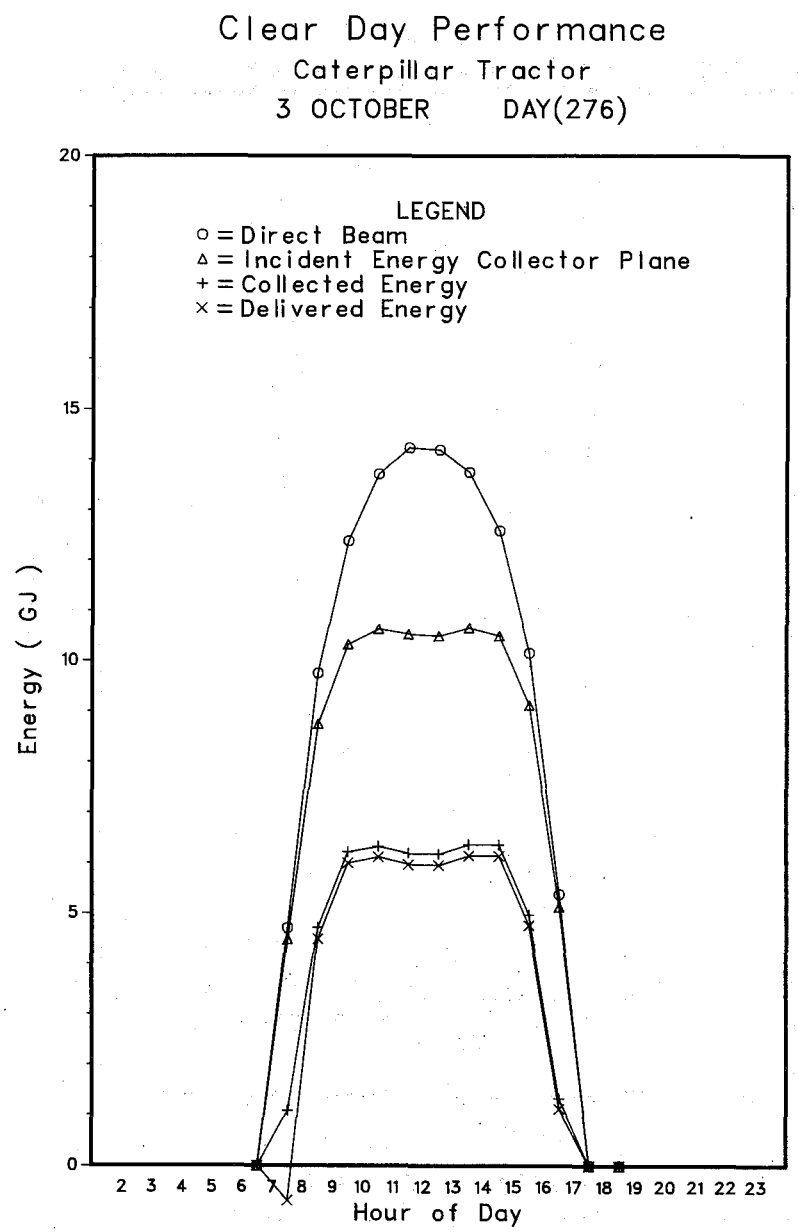

Clear Day Performance
Caterpillar Tractor
29 MAY DAY(149)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

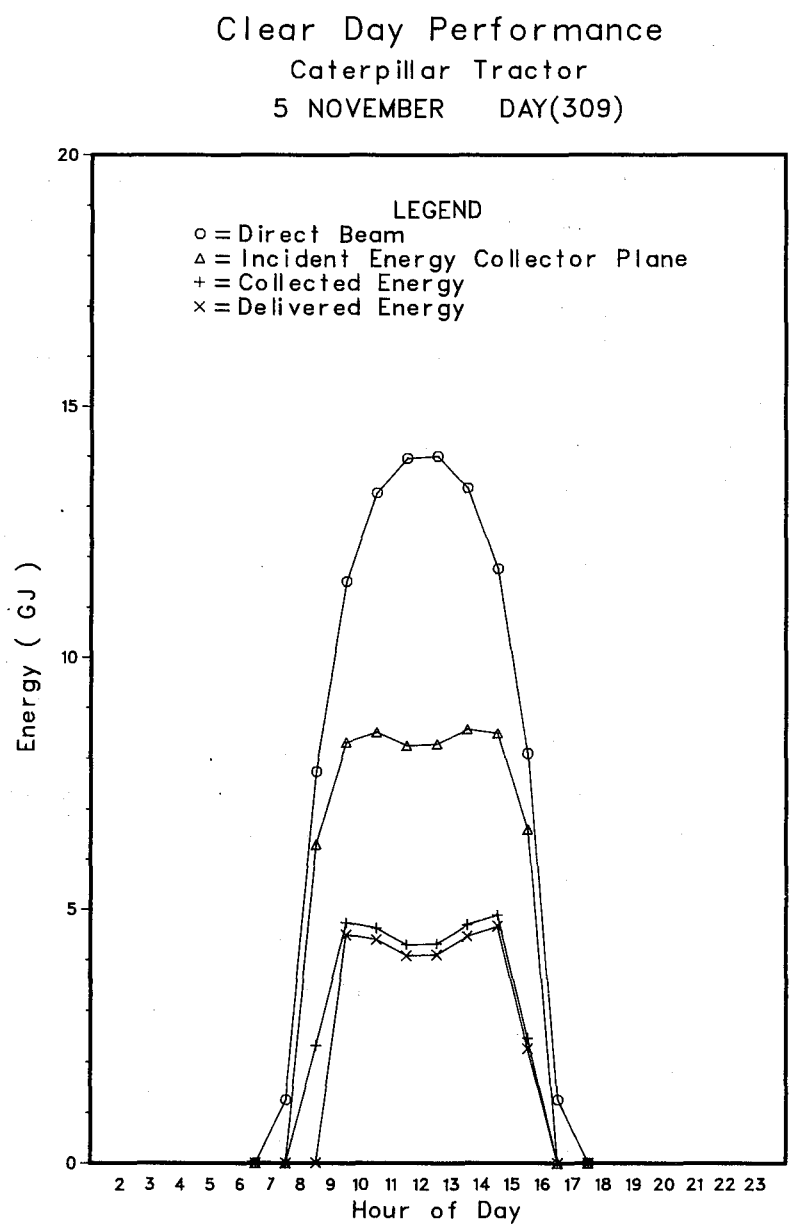

Clear Day Performance
Caterpillar Tractor
28 JUNE DAY(179)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

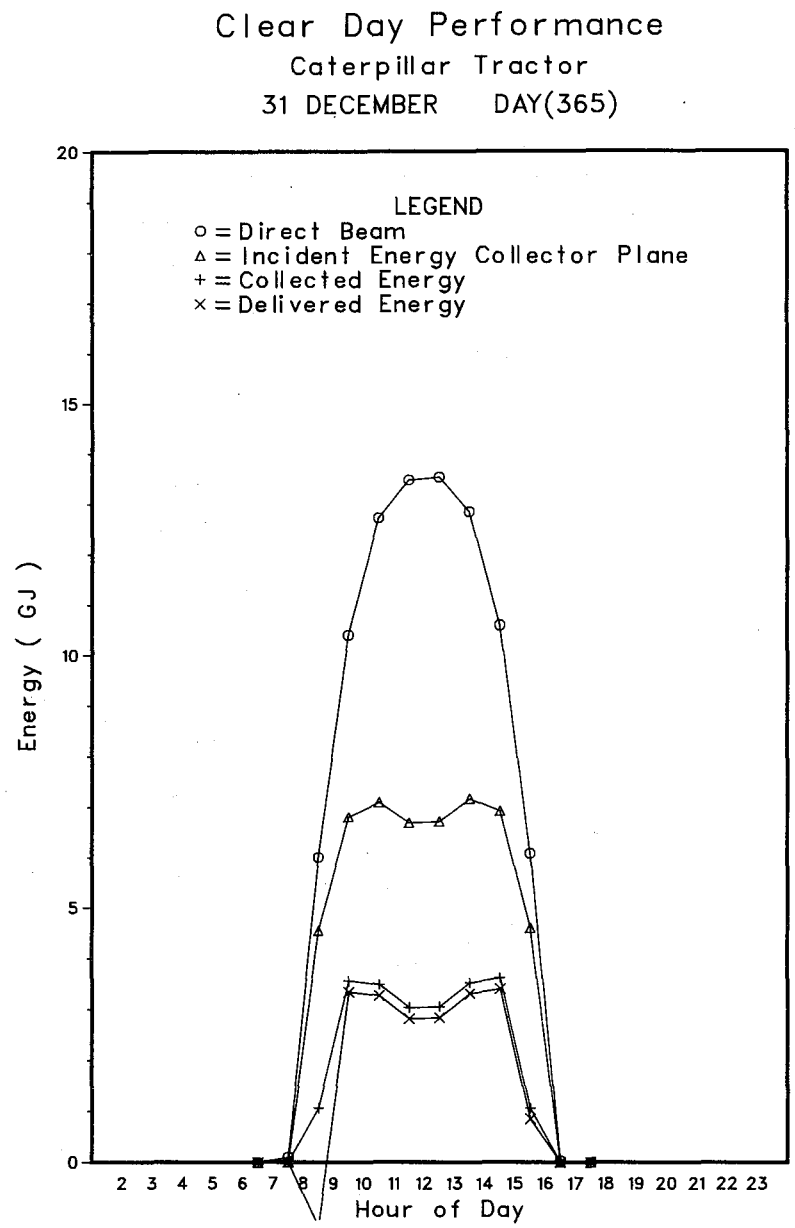

Clear Day Performance
Caterpillar Tractor
5 JULY DAY(186)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Caterpillar Tractor
1 AUGUST DAY(213)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Caterpillar Tractor
1 SEPTEMBER DAY(244)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
5
10
15
20
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Caterpillar Tractor
3 OCTOBER DAY(276)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
5
10
15
20
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Caterpillar Tractor
5 NOVEMBER DAY(309)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day
0
5
10
15
20
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23


Clear Day Performance
Caterpillar Tractor
31 DECEMBER DAY(365)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day
0
5
10
15
20
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

RUN ID: DW2
83/09/02.

DOW CHEMICAL

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	213.5	252.1	175.8	68.0	38.7	22.5	28.6	16.6	12.8	.8
FEBRUARY	260.0	265.9	208.4	87.4	41.9	40.8	31.5	14.8	19.6	.8
MARCH	369.4	305.3	262.1	115.9	44.2	58.4	38.4	19.4	22.3	1.0
APRIL	504.5	387.6	348.3	161.1	46.3	89.5	49.6	21.7	25.7	1.3
MAY	546.6	384.6	363.7	169.9	46.7	99.5	52.1	18.1	27.4	1.4
JUNE	570.8	392.4	364.5	168.2	46.1	90.4	55.5	22.1	24.8	1.6
JULY	551.5	374.3	333.4	155.3	46.6	82.4	50.7	22.3	24.7	1.4
AUGUST	525.7	418.3	386.6	182.5	47.2	100.5	55.6	26.1	26.0	1.5
SEPTEMBER	415.9	350.3	319.4	147.2	46.1	83.6	44.3	19.3	26.2	1.2
OCTOBER	357.6	381.8	306.6	136.2	44.4	71.7	44.2	20.6	23.4	1.2
NOVEMBER	253.6	325.7	233.6	95.7	40.9	41.9	35.5	18.1	17.9	1.0
DECEMBER	186.1	223.1	144.0	53.7	37.3	13.1	25.6	14.9	9.1	.7
TOTALS/AVERAGES	4755.2	4061.3	3446.4	1541.0	44.7	794.4	511.6	233.9	23.0	14.0

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	1.8	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
2	1/ 2	10.2	19.6	13.6	5.4	39.7	2.2	2.0	.8	15.8	.1
3	1/ 3	8.4	11.4	6.9	2.7	39.9	.6	1.2	.9	9.2	.0
4	1/ 4	3.7	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
5	1/ 5	5.0	3.3	2.2	.8	37.2	0.0	.3	.5	0.0	.0
6	1/ 6	8.2	11.8	8.3	3.3	39.9	.8	1.5	.8	9.8	.0
7	1/ 7	10.2	19.2	13.2	5.0	38.3	2.0	2.2	.9	15.2	.1
8	1/ 8	4.0	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
9	1/ 9	3.2	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
10	1/10	1.8	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
11	1/11	4.2	1.3	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
12	1/12	4.5	1.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
13	1/13	10.1	17.9	12.8	5.0	39.1	1.7	2.1	.8	13.0	.1
14	1/14	8.7	12.9	9.4	3.2	34.2	.6	1.7	.9	6.1	.0
15	1/15	3.5	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
16	1/16	8.3	11.2	8.0	3.0	37.3	.3	1.5	1.0	4.0	.0
17	1/17	11.2	21.3	15.6	6.0	38.4	2.7	2.3	.9	17.4	.1
18	1/18	3.9	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
19	1/19	4.3	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
20	1/20	10.1	15.6	11.0	4.5	41.3	1.7	1.7	.8	15.5	.0
21	1/21	3.7	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
22	1/22	6.8	3.9	2.3	.9	41.2	0.0	.4	.5	0.0	.0
23	1/23	4.2	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
24	1/24	9.9	14.0	9.9	3.7	37.0	.8	1.6	.9	7.7	.0
25	1/25	12.0	21.2	15.8	6.2	39.1	2.9	2.4	.8	18.4	.1
26	1/26	10.6	15.7	11.8	4.4	37.2	1.5	2.0	.9	12.9	.1
27	1/27	4.2	2.2	1.1	.4	34.5	0.0	.1	.6	0.0	.0
28	1/28	6.9	5.3	3.4	1.4	40.4	0.0	.6	.7	0.0	.0
29	1/29	11.2	17.1	13.3	5.2	39.1	2.0	2.1	.9	15.1	.1
30	1/30	12.2	19.6	15.0	5.9	39.7	2.7	2.4	.9	17.9	.1
31	1/31	6.1	3.7	2.3	.9	39.1	0.0	.3	.7	0.0	.0
TOTALS/AVERAGES		213.5	252.1	175.8	68.0	38.7	22.5	28.6	16.6	12.8	.8

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	2.2	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
33	2/ 2	12.6	20.1	15.6	6.1	39.3	2.4	2.5	.9	15.7	.1
34	2/ 3	12.9	21.0	16.2	6.4	39.7	2.9	2.5	.9	18.0	.1
35	2/ 4	13.1	20.8	16.2	6.5	40.2	3.1	2.5	.9	19.1	.1
36	2/ 5	12.1	17.2	13.4	5.2	38.5	1.9	2.3	.9	14.2	.1
37	2/ 6	3.2	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
38	2/ 7	4.0	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
39	2/ 8	6.0	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
40	2/ 9	3.5	.3	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
41	2/10	2.5	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
42	2/11	6.7	2.9	1.7	.8	44.2	0.0	.2	.4	0.0	.0
43	2/12	6.3	.9	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
44	2/13	6.2	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
45	2/14	6.9	3.1	1.8	.8	44.6	0.0	.2	.4	0.0	.0
46	2/15	11.2	11.3	8.6	3.1	36.5	.3	1.6	1.1	3.5	.0
47	2/16	5.4	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
48	2/17	5.4	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
49	2/18	15.4	22.6	18.2	8.1	44.7	4.5	2.4	.8	24.6	.1
50	2/19	15.5	22.7	18.3	8.1	44.3	4.7	2.5	.9	25.9	.1
51	2/20	15.7	22.7	19.4	8.2	42.0	4.7	2.8	.8	24.0	.1
52	2/21	9.7	6.2	4.1	1.8	43.6	.2	.7	.9	3.7	.0
53	2/22	16.1	22.9	19.7	8.3	42.0	4.6	2.9	.8	23.4	.1
54	2/23	14.8	19.1	15.7	6.6	42.1	3.1	2.5	.9	19.9	.1
55	2/24	5.0	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
56	2/25	5.1	1.7	.8	.4	44.8	0.0	.1	.4	0.0	.0
57	2/26	15.0	17.5	13.7	6.3	46.1	3.1	2.0	.8	22.4	.0
58	2/27	16.9	23.3	20.4	8.9	43.7	5.3	2.8	.8	26.1	.1
59	2/28	10.6	6.5	4.5	1.8	39.7	0.0	.9	.9	0.0	.0
TOTALS/AVERAGES		260.0	265.9	208.4	87.4	41.9	40.8	31.5	14.8	19.6	.8

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	15.0	16.9	14.9	5.8	38.9	2.3	2.7	.8	15.7	.1
61	3/ 2	17.2	22.6	20.0	8.7	43.8	5.1	2.8	.8	25.6	.1
62	3/ 3	6.8	2.3	1.6	.8	47.7	0.0	.2	.8	0.0	.0
63	3/ 4	16.1	18.1	15.1	6.7	44.1	3.4	2.2	.9	22.3	.1
64	3/ 5	15.0	16.7	14.6	6.5	44.5	3.6	2.1	.9	24.4	.0
65	3/ 6	16.9	20.7	18.3	7.7	41.9	4.0	2.9	.9	21.7	.1
66	3/ 7	18.2	23.6	20.9	9.3	44.5	5.6	2.8	.9	26.6	.1
67	3/ 8	7.9	1.4	.7	.3	41.8	0.0	.1	.5	0.0	.0
68	3/ 9	18.0	21.7	18.9	8.9	47.0	5.2	2.4	.8	27.7	.1
69	3/10	11.4	7.3	6.1	2.7	44.0	.8	1.0	.9	13.0	.0
70	3/11	6.8	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
71	3/12	6.8	.3	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
72	3/13	3.5	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
73	3/14	16.6	17.5	15.6	6.9	44.3	3.5	2.3	.8	22.2	.1
74	3/15	19.3	23.6	21.0	9.3	44.5	5.5	3.0	.9	26.2	.1
75	3/16	19.8	24.6	22.0	9.9	45.2	6.1	2.9	.9	27.8	.1
76	3/17	14.9	10.9	9.3	3.9	41.5	1.1	1.8	.9	12.1	.0
77	3/18	16.8	16.2	14.0	6.2	44.1	2.9	2.0	1.4	20.7	.1
78	3/19	5.4	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
79	3/20	14.6	10.6	9.1	3.9	42.4	1.2	1.5	.9	13.2	.0
80	3/21	19.5	21.1	18.9	9.1	48.4	5.7	2.4	.9	30.3	.1
81	3/22	8.7	1.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
82	3/23	4.0	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
83	3/24	3.9	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
84	3/25	13.3	9.7	8.9	4.1	46.7	1.8	1.3	.8	20.4	.0
85	3/26	12.1	5.1	3.2	1.3	42.3	0.0	.5	.9	0.0	.0
86	3/27	6.2	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
87	3/28	13.2	9.4	8.1	3.5	43.2	.6	1.3	1.4	7.5	.0
88	3/29	7.7	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
89	3/30	8.5	1.6	1.1	.4	37.6	0.0	.1	.4	0.0	.0
90	3/31	5.3	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
TOTALS/AVERAGES		369.4	305.3	262.1	115.9	44.2	58.4	38.4	19.4	22.3	1.0

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	10.9	4.7	3.7	1.6	42.2	0.0	.6	.7	0.0	.0
92	4/ 2	20.9	21.7	20.0	9.1	45.4	5.2	2.9	.9	26.2	.1
93	4/ 3	16.4	11.4	10.4	4.3	41.1	1.4	1.9	.8	14.0	.1
94	4/ 4	9.9	4.6	3.7	1.5	40.0	0.0	.7	.9	0.0	.0
95	4/ 5	20.0	18.0	16.2	7.3	45.0	3.8	2.5	.9	23.8	.1
96	4/ 6	21.3	21.3	19.7	9.1	46.1	5.5	2.8	.8	27.9	.1
97	4/ 7	8.2	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
98	4/ 8	12.1	6.7	5.3	2.4	44.6	.5	.8	.9	9.5	.0
99	4/ 9	23.3	26.0	24.1	11.5	47.9	7.6	3.0	.9	31.5	.1
100	4/10	18.0	12.7	11.8	4.8	40.3	1.5	2.4	.8	13.1	.1
101	4/11	4.4	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
102	4/12	11.5	4.6	3.5	1.5	42.7	0.0	.6	.7	0.0	.0
103	4/13	8.8	.8	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
104	4/14	18.9	13.5	12.1	5.3	43.9	2.3	2.1	.7	19.2	.1
105	4/15	21.1	18.3	17.1	7.8	45.7	4.4	2.6	.8	25.9	.1
106	4/16	21.5	20.4	18.8	9.3	49.3	6.1	2.2	.8	32.7	.1
107	4/17	20.3	17.1	15.5	7.3	46.9	4.2	2.2	.9	27.1	.1
108	4/18	24.2	26.4	25.3	12.3	48.6	8.5	3.0	.8	33.5	.1
109	4/19	20.8	17.6	16.9	7.2	43.0	3.7	2.8	.8	21.7	.1
110	4/20	13.5	4.6	2.0	.9	44.7	0.0	.3	.7	0.0	.0
111	4/21	8.7	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
112	4/22	17.1	12.7	11.4	5.5	47.9	2.8	1.5	.8	24.8	.0
113	4/23	24.7	26.6	25.5	12.5	48.9	8.6	3.0	.8	33.7	.1
114	4/24	24.2	25.1	24.0	11.5	48.0	7.7	3.1	.8	31.9	.1
115	4/25	14.7	8.7	7.6	3.2	42.3	1.2	1.2	.9	15.8	.0
116	4/26	24.1	24.5	23.6	11.3	47.8	7.2	3.1	.8	30.7	.1
117	4/27	24.0	23.9	22.9	11.0	47.9	7.1	3.0	.9	30.8	.1
118	4/28	12.8	4.5	3.5	1.4	41.5	0.0	.7	.9	0.0	.0
119	4/29	12.3	3.3	1.3	.6	48.5	0.0	.2	.6	0.0	.0
120	4/30	16.0	6.5	2.4	1.1	45.4	0.0	.4	.8	0.0	.0
TOTALS/AVERAGES		504.5	387.6	348.3	161.1	46.3	89.5	49.6	21.7	25.7	1.3

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	9.0	.6	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
122	5/ 2	9.6	1.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
123	5/ 3	17.7	12.2	11.5	5.3	46.2	2.5	1.6	.8	21.7	.0
124	5/ 4	8.2	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
125	5/ 5	7.1	.7	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
126	5/ 6	21.1	16.5	16.2	7.2	44.6	3.7	2.6	.7	22.7	.1
127	5/ 7	25.7	26.3	26.1	12.5	47.7	8.3	3.4	.8	31.9	.1
128	5/ 8	14.7	5.2	1.8	.8	46.4	0.0	.3	.8	0.0	.0
129	5/ 9	15.6	7.7	6.4	2.7	43.0	.6	1.2	.8	9.1	.0
130	5/10	14.9	7.6	6.7	2.8	41.9	.9	1.1	.7	13.1	.0
131	5/11	9.3	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
132	5/12	22.2	18.3	18.0	8.3	46.2	4.7	2.7	.7	26.4	.1
133	5/13	23.9	21.7	21.6	9.8	45.5	5.9	3.2	.8	27.1	.1
134	5/14	25.1	23.9	23.7	11.3	47.5	7.4	3.2	.7	31.1	.1
135	5/15	8.5	.8	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
136	5/16	16.0	8.9	8.0	3.4	42.5	1.1	1.4	.7	14.1	.0
137	5/17	23.3	20.3	20.2	9.1	45.2	5.3	3.1	.7	26.5	.1
138	5/18	24.0	21.6	20.9	9.9	47.4	6.2	2.9	.8	29.5	.1
139	5/19	22.8	18.9	18.2	8.4	45.9	4.8	2.8	.8	26.3	.1
140	5/20	26.0	25.3	25.1	12.1	48.3	8.3	3.2	.7	32.9	.1
141	5/21	10.0	1.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
142	5/22	8.1	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
143	5/23	21.0	15.7	15.1	7.0	46.1	3.7	2.2	.7	24.5	.1
144	5/24	24.9	22.1	21.4	10.7	49.8	7.1	2.7	.8	33.2	.1
145	5/25	24.9	22.6	22.4	10.9	48.4	7.2	3.0	.8	31.9	.1
146	5/26	5.1	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
147	5/27	25.5	24.1	23.9	11.4	47.5	7.3	3.2	.7	30.4	.1
148	5/28	25.9	25.0	24.7	11.8	47.9	7.8	3.2	.8	31.4	.1
149	5/29	19.5	11.6	10.4	4.7	45.4	2.2	1.7	.8	20.9	.0
150	5/30	21.6	15.6	14.5	6.7	46.5	3.6	2.3	.8	25.0	.1
151	5/31	15.2	7.7	6.9	3.1	45.1	1.2	1.2	.9	17.1	.0
TOTALS/AVERAGES		546.6	384.6	363.7	169.9	46.7	99.5	52.1	18.1	27.4	1.4

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	20.2	14.5	13.6	6.2	45.5	3.1	2.0	1.0	23.1	.1
153	6/ 2	12.2	2.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
154	6/ 3	25.5	23.7	23.5	11.2	47.6	7.1	3.2	.7	30.2	.1
155	6/ 4	10.8	1.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
156	6/ 5	17.3	9.0	7.7	3.3	42.7	.4	1.4	1.2	4.8	.0
157	6/ 6	25.4	23.5	23.2	11.0	47.5	7.1	3.2	.7	30.5	.1
158	6/ 7	23.4	18.9	17.8	8.5	47.9	5.1	2.6	.8	28.8	.1
159	6/ 8	17.3	11.0	10.5	4.7	44.6	2.2	1.7	.8	21.3	.0
160	6/ 9	11.9	2.8	1.9	.9	45.8	0.0	.3	.6	0.0	.0
161	6/10	10.3	2.9	1.5	.7	43.7	0.0	.3	.5	0.0	.0
162	6/11	18.8	12.8	12.1	5.7	46.9	3.1	1.7	.7	25.2	.0
163	6/12	18.4	12.2	11.5	5.3	46.0	2.8	1.7	.7	24.2	.0
164	6/13	15.1	5.8	4.4	1.7	38.8	0.0	1.0	.7	0.0	.0
165	6/14	20.3	13.3	12.0	5.5	45.6	2.5	2.0	1.0	20.7	.1
166	6/15	21.4	15.8	15.4	6.9	44.8	3.6	2.6	.8	23.3	.1
167	6/16	9.6	.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
168	6/17	18.2	12.3	11.7	5.4	46.5	2.8	1.7	.7	24.0	.0
169	6/18	23.1	18.2	17.5	8.6	48.8	5.4	2.4	.8	30.7	.1
170	6/19	20.7	14.8	13.6	5.8	42.8	2.3	2.5	1.0	17.1	.1
171	6/20	20.5	13.5	12.2	5.8	47.7	3.2	1.8	.8	26.0	.0
172	6/21	25.5	23.9	23.5	11.3	47.8	7.3	3.2	.7	31.2	.1
173	6/22	19.6	14.2	12.4	5.5	44.7	2.3	2.0	1.3	18.3	.1
174	6/23	12.2	3.3	1.6	.7	42.9	0.0	.3	.6	0.0	.0
175	6/24	13.9	5.5	4.5	1.9	41.9	.0	.9	.8	.9	.0
176	6/25	23.4	19.4	18.5	8.7	46.8	5.1	2.8	.8	27.6	.1
177	6/26	22.1	17.4	17.1	7.4	43.2	3.7	3.0	.7	21.9	.1
178	6/27	25.1	23.1	22.3	10.9	48.7	7.2	2.9	.7	32.2	.1
179	6/28	24.5	22.4	22.1	10.4	47.2	6.6	3.1	.7	29.9	.1
180	6/29	22.0	16.7	16.2	7.2	44.8	3.8	2.7	.7	23.8	.1
181	6/30	22.1	16.7	16.1	7.2	44.4	3.6	2.7	.8	22.6	.1
TOTALS/AVERAGES		570.8	392.4	364.5	168.2	46.1	90.4	55.5	22.1	24.8	1.6

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	18.7	11.7	9.9	4.7	47.3	2.4	1.5	.8	24.2	.0
183	7/ 2	19.2	12.1	10.6	4.8	45.3	2.2	1.8	.8	21.1	.0
184	7/ 3	22.9	18.5	17.1	8.0	46.8	4.6	2.6	.8	26.7	.1
185	7/ 4	20.0	13.8	11.8	5.3	45.1	2.2	2.0	1.1	18.4	.1
186	7/ 5	25.3	23.8	23.2	11.5	49.5	7.8	2.9	.8	33.7	.1
187	7/ 6	8.2	.9	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
188	7/ 7	17.4	10.2	9.4	4.1	43.7	1.7	1.6	.6	18.0	.0
189	7/ 8	21.2	15.6	14.7	6.5	44.5	3.2	2.6	.8	21.4	.1
190	7/ 9	14.2	6.6	4.3	1.7	39.3	.2	.9	.7	4.3	.0
191	7/10	15.1	8.1	6.4	3.0	46.6	1.2	1.0	.9	18.2	.0
192	7/11	15.1	6.2	4.4	1.7	39.7	0.0	1.0	.8	0.0	.0
193	7/12	23.7	21.1	20.4	9.7	47.7	6.0	2.8	.8	29.4	.1
194	7/13	22.7	19.1	18.4	8.5	46.1	4.9	2.8	.8	26.5	.1
195	7/14	15.1	5.8	3.2	1.4	43.3	0.0	.6	.8	0.0	.0
196	7/15	22.4	18.2	17.0	8.0	46.8	4.5	2.6	.8	26.7	.1
197	7/16	19.2	12.4	11.6	5.3	45.5	2.6	1.9	.8	22.2	.1
198	7/17	14.8	7.6	6.4	2.7	42.1	.9	1.1	.7	13.5	.0
199	7/18	13.6	6.0	3.7	1.6	44.7	.1	.6	.8	4.1	.0
200	7/19	11.7	6.9	6.0	2.7	45.4	1.0	1.0	.9	16.6	.0
201	7/20	12.9	4.7	2.7	1.2	42.5	0.0	.5	.6	0.0	.0
202	7/21	21.6	17.2	15.8	7.6	47.9	4.4	2.3	.8	27.7	.1
203	7/22	23.1	20.5	20.1	9.6	47.5	6.1	2.8	.7	30.2	.1
204	7/23	16.3	9.0	6.5	2.9	44.4	.9	1.1	.8	14.5	.0
205	7/24	8.0	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
206	7/25	11.6	3.6	2.0	1.0	47.7	0.0	.3	.6	0.0	.0
207	7/26	23.5	22.0	20.7	10.2	49.4	6.7	2.7	.8	32.1	.1
208	7/27	21.6	18.0	17.0	8.1	47.9	5.1	2.3	.8	30.1	.1
209	7/28	23.8	22.8	22.2	10.7	48.4	7.1	2.9	.7	32.1	.1
210	7/29	19.5	14.5	12.9	6.1	46.9	3.2	2.0	.8	25.0	.1
211	7/30	20.1	15.7	14.8	6.7	45.5	3.5	2.4	.8	23.7	.1
212	7/31	9.2	1.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
TOTALS/AVERAGES		551.5	374.3	333.4	155.3	46.6	82.4	50.7	22.3	24.7	1.4

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	18.9	14.9	14.0	6.5	46.2	3.0	2.2	1.1	21.2	.1
214	8/ 2	22.2	20.6	20.0	9.8	48.9	6.3	2.7	.8	31.6	.1
215	8/ 3	22.3	21.0	19.8	9.6	48.7	6.2	2.7	.8	31.2	.1
216	8/ 4	16.6	10.6	8.2	3.6	44.2	1.1	1.4	1.2	13.8	.0
217	8/ 5	11.8	5.0	3.7	1.6	43.2	.0	.7	.8	1.2	.0
218	8/ 6	19.9	16.6	15.4	7.4	48.1	4.4	2.1	.8	28.7	.1
219	8/ 7	21.9	20.7	20.0	9.8	48.7	6.3	2.7	.8	31.3	.1
220	8/ 8	19.9	17.3	16.8	8.0	47.7	4.9	2.4	.8	29.1	.1
221	8/ 9	21.2	19.1	18.4	9.0	48.9	5.7	2.4	.8	31.0	.1
222	8/10	15.6	9.9	7.7	3.4	44.1	.9	1.4	1.3	11.4	.0
223	8/11	11.4	4.3	2.1	1.0	47.0	0.0	.3	.6	0.0	.0
224	8/12	21.3	19.4	18.5	9.0	48.7	5.7	2.4	.8	30.9	.1
225	8/13	22.0	20.7	19.9	9.8	49.2	6.4	2.5	.9	32.1	.1
226	8/14	11.3	4.2	3.3	1.4	43.2	0.0	.6	1.0	0.0	.0
227	8/15	4.1	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
228	8/16	5.0	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
229	8/17	19.7	17.5	16.4	8.0	48.9	4.8	2.1	.7	29.3	.1
230	8/18	17.1	13.0	12.0	5.1	42.4	1.7	2.3	1.1	14.5	.1
231	8/19	21.8	21.3	20.2	9.9	49.3	6.6	2.5	.8	32.7	.1
232	8/20	21.6	21.3	20.4	9.8	48.3	6.3	2.7	.8	31.1	.1
233	8/21	17.7	13.8	13.2	6.0	45.2	3.0	2.1	.8	22.4	.1
234	8/22	13.4	7.9	7.1	3.3	47.0	1.5	1.0	.8	20.7	.0
235	8/23	8.8	3.6	3.0	1.3	44.7	.1	.5	.8	2.2	.0
236	8/24	19.0	16.5	15.7	7.5	47.8	4.5	2.1	.9	28.8	.1
237	8/25	18.6	16.4	15.8	7.3	46.3	4.2	2.4	.8	26.5	.1
238	8/26	14.6	9.1	7.0	3.1	44.4	.5	1.1	1.5	6.9	.0
239	8/27	19.3	17.0	16.4	7.4	45.3	4.1	2.6	.8	24.8	.1
240	8/28	18.6	16.4	15.7	7.0	44.4	3.7	2.6	.8	23.2	.1
241	8/29	15.1	10.6	9.4	4.5	47.4	2.3	1.3	.9	24.5	.0
242	8/30	16.1	11.8	10.5	4.6	43.8	2.0	1.8	.8	18.7	.0
243	8/31	19.1	17.3	16.0	7.6	47.8	4.4	2.1	1.1	27.5	.1
TOTALS/AVERAGES		525.7	418.3	386.6	182.5	47.2	100.5	55.6	26.1	26.0	1.5

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	18.9	17.2	16.5	7.7	46.7	4.6	2.3	.8	27.9	.1
245	9/ 2	21.1	22.2	21.2	10.2	47.9	6.7	2.7	.8	31.3	.1
246	9/ 3	19.4	18.5	17.4	8.2	47.0	5.0	2.3	1.0	28.5	.1
247	9/ 4	20.0	20.1	19.3	9.0	46.8	5.6	2.6	.8	28.8	.1
248	9/ 5	20.8	22.0	21.0	10.0	47.7	6.6	2.6	.8	31.3	.1
249	9/ 6	20.3	20.9	20.0	9.4	47.2	6.1	2.6	.8	30.3	.1
250	9/ 7	18.6	17.3	16.3	7.6	46.5	4.5	2.3	.8	27.5	.1
251	9/ 8	15.7	11.3	10.1	4.4	43.7	1.7	1.7	1.1	16.5	.0
252	9/ 9	13.1	6.3	4.3	1.8	42.4	0.0	.8	1.1	0.0	.0
253	9/10	9.5	4.3	3.6	1.7	47.5	.3	.5	.9	9.0	.0
254	9/11	7.5	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
255	9/12	20.0	21.6	20.5	9.6	47.0	6.0	2.6	.7	29.5	.1
256	9/13	20.4	22.6	21.4	10.1	47.0	6.5	2.8	.8	30.4	.1
257	9/14	11.2	3.8	1.5	.6	41.6	0.0	.3	.6	0.0	.0
258	9/15	8.8	1.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
259	9/16	3.7	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
260	9/17	5.2	.6	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
261	9/18	10.7	5.6	4.1	1.9	47.2	0.0	.6	1.0	0.0	.0
262	9/19	16.5	16.0	14.9	6.8	45.7	3.8	2.1	.8	25.9	.1
263	9/20	17.3	17.6	16.5	7.2	43.8	3.9	2.6	.8	23.9	.1
264	9/21	18.2	19.9	18.6	8.4	45.0	4.9	2.6	.8	26.5	.1
265	9/22	14.3	13.1	12.2	5.2	42.8	2.1	1.9	1.2	17.1	.1
266	9/23	18.5	20.7	19.2	8.8	45.9	5.4	2.6	.8	28.1	.1
267	9/24	18.4	20.9	19.4	8.8	45.5	5.4	2.7	.8	27.9	.1
268	9/25	11.2	7.8	7.1	3.0	42.0	1.0	1.2	.9	13.9	.0
269	9/26	8.2	1.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
270	9/27	3.2	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
271	9/28	3.2	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
272	9/29	6.6	.4	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
273	9/30	15.4	16.0	14.2	6.6	46.1	3.6	1.9	.7	25.1	.0
TOTALS/AVERAGES		415.9	350.3	319.4	147.2	46.1	83.6	44.3	19.3	26.2	1.2

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	6.0	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
275	10/ 2	8.6	4.1	3.3	1.3	38.7	0.0	.6	.6	0.0	.0
276	10/ 3	13.4	12.9	11.1	5.0	45.3	2.7	1.5	.8	24.0	.0
277	10/ 4	13.4	13.4	11.6	5.3	45.4	2.9	1.6	.8	25.0	.0
278	10/ 5	17.0	21.0	18.9	8.5	45.3	5.3	2.6	.7	28.0	.1
279	10/ 6	14.5	15.6	13.4	5.8	43.0	2.6	2.2	.8	19.7	.1
280	10/ 7	16.2	20.1	18.0	8.0	44.4	4.7	2.6	.7	26.4	.1
281	10/ 8	9.1	5.9	4.5	1.9	41.8	.1	.9	.8	3.3	.0
282	10/ 9	12.5	10.4	8.2	3.6	43.6	1.4	1.4	.8	16.5	.0
283	10/10	12.9	12.3	9.8	4.5	45.8	2.1	1.5	.8	21.8	.0
284	10/11	6.5	.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
285	10/12	12.7	12.2	9.1	4.1	45.3	1.7	1.4	.8	18.9	.0
286	10/13	7.0	1.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
287	10/14	5.8	1.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
288	10/15	13.6	15.2	12.5	5.4	43.6	2.5	1.9	.8	19.8	.1
289	10/16	10.6	7.8	5.8	2.1	36.2	.0	1.4	.8	.2	.0
290	10/17	15.6	21.7	17.9	8.1	45.5	4.7	2.4	.9	26.5	.1
291	10/18	15.4	21.6	17.8	8.0	45.1	4.7	2.4	.9	26.6	.1
292	10/19	15.3	21.6	17.7	8.0	45.1	4.7	2.4	.9	26.7	.1
293	10/20	15.2	21.5	17.6	7.9	45.0	4.7	2.4	.9	26.6	.1
294	10/21	14.8	20.8	16.9	7.5	44.7	4.3	2.3	.9	25.8	.1
295	10/22	14.6	20.7	16.8	7.5	44.4	4.3	2.3	.9	25.4	.1
296	10/23	14.7	21.4	17.3	7.7	44.5	4.5	2.4	.9	25.9	.1
297	10/24	11.3	13.0	9.6	4.4	45.9	2.2	1.3	.9	23.1	.0
298	10/25	14.1	20.1	15.5	7.0	45.2	3.9	2.2	.9	25.3	.1
299	10/26	14.3	21.2	17.0	7.5	44.2	4.4	2.3	.9	25.7	.1
300	10/27	13.2	17.6	14.0	6.1	43.1	3.2	2.0	.9	22.8	.1
301	10/28	5.9	4.0	2.5	1.0	41.6	0.0	.4	.8	0.0	.0
302	10/29	5.9	1.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
303	10/30	4.9	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
304	10/31	2.4	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
TOTALS/AVERAGES		357.6	381.8	306.6	136.2	44.4	71.7	44.2	20.6	23.4	1.2

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	2.9	.1	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
306	11/ 2	7.2	3.0	1.3	.6	44.6	0.0	.2	.3	0.0	.0
307	11/ 3	13.4	21.1	16.5	7.1	43.0	3.8	2.3	.8	22.7	.1
308	11/ 4	13.2	21.1	16.5	6.9	42.1	3.7	2.4	.9	22.4	.1
309	11/ 5	13.1	21.1	16.4	6.9	41.9	3.6	2.4	.9	22.0	.1
310	11/ 6	5.8	1.8	.6	.2	32.2	0.0	.1	.4	0.0	.0
311	11/ 7	12.9	21.0	16.2	6.8	41.7	3.3	2.3	.9	20.2	.1
312	11/ 8	12.5	20.0	15.5	6.3	40.4	3.0	2.4	.9	19.3	.1
313	11/ 9	4.5	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
314	11/10	9.7	12.7	8.9	3.8	42.6	1.4	1.3	.8	15.9	.0
315	11/11	11.7	19.0	13.9	5.8	41.5	2.7	2.2	.9	19.3	.1
316	11/12	11.0	16.4	12.1	4.8	40.0	1.9	2.1	.8	15.9	.1
317	11/13	12.2	20.9	15.9	6.5	41.2	3.4	2.3	.9	21.3	.1
318	11/14	5.1	1.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
319	11/15	12.0	20.9	15.8	6.5	41.1	3.2	2.2	.8	20.5	.1
320	11/16	9.0	11.9	8.3	3.4	41.5	1.3	1.3	.9	15.8	.0
321	11/17	8.8	11.5	8.0	3.3	40.9	1.1	1.2	.9	14.3	.0
322	11/18	5.1	1.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
323	11/19	2.4	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
324	11/20	11.1	19.0	13.7	5.6	40.8	2.4	2.1	.8	17.4	.1
325	11/21	11.1	19.9	14.1	5.7	40.0	2.5	2.2	1.0	17.5	.1
326	11/22	11.3	20.3	14.4	5.8	40.0	2.5	2.3	1.0	17.4	.1
327	11/23	4.0	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
328	11/24	3.3	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
329	11/25	8.1	10.7	7.3	2.8	38.9	.5	1.2	.8	7.0	.0
330	11/26	3.9	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
331	11/27	8.0	9.6	6.6	2.4	35.9	.2	1.3	.7	2.9	.0
332	11/28	9.4	14.7	10.1	4.0	40.0	1.5	1.6	.9	14.5	.0
333	11/29	5.2	1.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
334	11/30	5.8	3.4	1.5	.5	35.1	0.0	.2	.4	0.0	.0
TOTALS/AVERAGES		253.6	325.7	233.6	95.7	40.9	41.9	35.5	18.1	17.9	1.0

RUN ID: DW2
83/09/02.

DOW CHEMICAL

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	10.6	19.8	13.8	5.4	39.4	2.1	2.1	.8	15.5	.1
336	12/ 2	6.2	4.7	2.9	1.1	38.0	0.0	.6	.7	0.0	.0
337	12/ 3	9.6	16.4	10.8	4.2	38.7	1.3	1.9	.9	11.6	.0
338	12/ 4	9.5	17.1	11.8	4.2	35.8	1.1	2.2	.9	9.6	.1
339	12/ 5	3.7	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
340	12/ 6	2.8	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
341	12/ 7	3.0	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
342	12/ 8	3.6	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
343	12/ 9	4.4	1.6	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
344	12/10	2.8	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
345	12/11	3.6	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
346	12/12	3.6	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
347	12/13	3.6	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
348	12/14	4.6	2.4	1.5	.5	36.2	0.0	.2	.3	0.0	.0
349	12/15	8.2	12.1	8.1	3.1	38.1	.6	1.4	.8	7.4	.0
350	12/16	8.9	15.7	10.8	3.9	35.8	.9	2.0	.9	8.7	.1
351	12/17	3.5	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
352	12/18	7.6	9.7	5.9	2.3	39.6	.2	1.0	.8	3.8	.0
353	12/19	8.5	13.3	8.5	3.1	37.0	.8	1.5	.9	9.2	.0
354	12/20	8.8	15.1	9.8	3.6	37.2	.9	1.8	.9	9.6	.0
355	12/21	9.4	17.1	11.2	4.4	39.0	1.6	1.9	.9	14.2	.0
356	12/22	6.1	3.8	1.6	.5	33.5	0.0	.4	.5	0.0	.0
357	12/23	1.7	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
358	12/24	7.8	10.8	6.8	2.3	33.4	0.0	1.5	.6	0.0	.0
359	12/25	9.8	18.5	12.7	4.7	37.1	1.6	2.2	.8	12.5	.1
360	12/26	9.3	16.5	10.8	4.2	38.6	1.3	1.8	.9	12.2	.0
361	12/27	7.8	11.3	7.6	2.6	34.7	.4	1.5	.8	5.3	.0
362	12/28	1.7	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
363	12/29	7.8	10.7	6.7	2.4	36.3	.2	1.2	.9	2.5	.0
364	12/30	6.0	4.4	2.7	1.0	37.3	0.0	.5	.6	0.0	.0
365	12/31	1.8	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
TOTALS/AVERAGES		186.1	223.1	144.0	53.7	37.3	13.1	25.6	14.9	9.1	.7

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

17 JANUARY (DAY 17)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-1.1	0.00	0.00	0.00	-.8	-.8	0.00	0.0	0.00	.02	0.00
2	-1.7	0.00	0.00	0.00	-1.4	-1.4	0.00	0.0	0.00	.02	0.00
3	-2.2	0.00	0.00	0.00	-2.0	-2.0	0.00	0.0	0.00	.02	0.00
4	-2.8	0.00	0.00	0.00	-2.6	-2.6	0.00	0.0	0.00	.02	0.00
5	-3.3	0.00	0.00	0.00	-3.1	-3.1	0.00	0.0	0.00	.01	0.00
6	-3.9	0.00	0.00	0.00	-3.7	-3.7	0.00	0.0	0.00	.01	0.00
7	-4.4	0.00	0.00	0.00	-4.2	-4.2	0.00	0.0	0.00	.01	0.00
8	-3.3	.99	.87	3.13	53.6	54.6	.03	3.1	0.00	.09	.01
9	-1.7	1.87	1.55	3.13	86.8	107.7	.52	33.8	0.00	.15	.01
10	2.2	2.53	1.96	3.13	160.4	195.8	.89	45.3	0.00	.27	.01
11	5.6	2.77	2.02	3.13	181.1	216.1	.87	43.3	.44	.31	.01
12	7.2	2.88	2.02	3.13	182.0	216.4	.86	42.6	.55	.31	.01
13	8.9	2.85	2.00	3.13	182.0	216.1	.85	42.6	.55	.31	.01
14	10.6	2.73	1.99	3.13	182.1	216.6	.86	43.4	.56	.30	.01
15	11.7	2.41	1.86	3.13	182.1	214.6	.81	43.5	.52	.30	.01
16	11.7	1.62	1.34	3.13	180.9	192.8	.30	22.2	.11	.29	.01
17	11.1	.66	0.00	0.00	57.2	57.2	0.00	0.0	0.00	.34	0.00
18	8.3	0.00	0.00	0.00	21.9	21.9	0.00	0.0	0.00	.15	0.00
19	6.1	0.00	0.00	0.00	10.5	10.5	0.00	0.0	0.00	.08	0.00
20	2.8	0.00	0.00	0.00	4.9	4.9	0.00	0.0	0.00	.06	0.00
21	2.2	0.00	0.00	0.00	3.0	3.0	0.00	0.0	0.00	.04	0.00
22	.6	0.00	0.00	0.00	1.3	1.3	0.00	0.0	0.00	.03	0.00
23	0.0	0.00	0.00	0.00	.3	.3	0.00	0.0	0.00	.03	0.00
24	0.0	0.00	0.00	0.00	.1	.1	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	21.32	15.62	---	---	---	6.00	38.4	2.72	3.21	.06

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

27 FEBRUARY (DAY 58)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-3.9	0.00	0.00	0.00	-3.6	-3.6	0.00	0.0	0.00	.02	0.00
2	-4.2	0.00	0.00	0.00	-4.0	-4.0	0.00	0.0	0.00	.02	0.00
3	-4.5	0.00	0.00	0.00	-4.4	-4.4	0.00	0.0	0.00	.02	0.00
4	-5.0	0.00	0.00	0.00	-4.8	-4.8	0.00	0.0	0.00	.02	0.00
5	-5.1	0.00	0.00	0.00	-5.0	-5.0	0.00	0.0	0.00	.01	0.00
6	-5.3	0.00	0.00	0.00	-5.2	-5.2	0.00	0.0	0.00	.01	0.00
7	-5.6	.06	0.00	0.00	-5.5	-5.5	0.00	0.0	0.00	.01	0.00
8	-2.5	1.31	1.25	3.13	82.5	92.7	.26	20.4	0.00	.14	.01
9	.3	2.10	1.93	3.13	150.3	186.8	.91	47.3	0.00	.26	.01
10	3.3	2.57	2.27	3.13	180.8	223.4	1.07	47.1	.53	.31	.01
11	7.8	2.81	2.39	3.13	182.7	228.3	1.14	47.7	.80	.32	.01
12	12.2	2.91	2.42	3.13	183.1	229.5	1.16	48.0	.85	.31	.01
13	16.7	2.92	2.44	3.13	183.3	230.4	1.18	48.3	.87	.30	.01
14	17.2	2.82	2.40	3.13	183.3	229.8	1.16	48.4	.86	.30	.01
15	17.8	2.56	2.26	3.13	183.1	226.4	1.08	47.9	.80	.30	.01
16	18.3	2.04	1.88	3.13	182.6	216.9	.86	45.7	.61	.29	.01
17	16.1	1.18	1.13	3.13	176.1	179.7	.09	8.0	0.00	.27	.01
18	13.9	.07	0.00	0.00	59.5	59.5	0.00	0.0	0.00	.33	0.00
19	11.7	0.00	0.00	0.00	25.0	25.0	0.00	0.0	0.00	.15	0.00
20	10.4	0.00	0.00	0.00	14.5	14.5	0.00	0.0	0.00	.08	0.00
21	9.1	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.05	0.00
22	7.8	0.00	0.00	0.00	8.6	8.6	0.00	0.0	0.00	.04	0.00
23	6.1	0.00	0.00	0.00	6.8	6.8	0.00	0.0	0.00	.03	0.00
24	4.5	0.00	0.00	0.00	5.1	5.1	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	23.34	20.36	---	---	---	8.91	43.7	5.32	3.62	.07

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

16 MARCH (DAY 75)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	1.7	0.00	0.00	0.00	1.8	1.8	0.00	0.0	0.00	.02	0.00
2	1.1	0.00	0.00	0.00	1.3	1.3	0.00	0.0	0.00	.02	0.00
3	.6	0.00	0.00	0.00	.8	.8	0.00	0.0	0.00	.02	0.00
4	-.6	0.00	0.00	0.00	-.2	-.2	0.00	0.0	0.00	.02	0.00
5	0.0	0.00	0.00	0.00	-.1	-.1	0.00	0.0	0.00	.01	0.00
6	-.6	0.00	0.00	0.00	-.4	-.4	0.00	0.0	0.00	.01	0.00
7	-.6	.41	0.00	0.00	-.6	-.6	0.00	0.0	0.00	.01	0.00
8	1.1	1.44	1.41	3.13	94.7	111.4	.42	29.6	0.00	.16	.01
9	2.8	2.17	2.07	3.13	169.4	208.3	.97	47.0	0.00	.29	.01
10	4.4	2.58	2.39	3.13	182.4	228.2	1.15	47.9	.74	.32	.01
11	5.6	2.77	2.51	3.13	182.9	231.6	1.22	48.5	.88	.32	.01
12	7.2	2.85	2.54	3.13	183.1	232.5	1.24	48.7	.91	.32	.01
13	8.3	2.89	2.58	3.13	183.2	233.7	1.26	48.9	.94	.32	.01
14	9.4	2.82	2.56	3.13	183.2	233.2	1.25	48.9	.94	.32	.01
15	10.6	2.62	2.44	3.13	183.1	230.3	1.18	48.5	.88	.31	.01
16	11.7	2.18	2.09	3.13	182.7	221.6	.97	46.7	.71	.31	.01
17	11.1	1.40	1.37	3.13	180.9	191.9	.27	20.0	.12	.29	.01
18	10.0	.43	0.00	0.00	59.1	59.1	0.00	0.0	0.00	.36	0.00
19	7.8	0.00	0.00	0.00	22.1	22.1	0.00	0.0	0.00	.16	0.00
20	6.7	0.00	0.00	0.00	11.0	11.0	0.00	0.0	0.00	.08	0.00
21	5.6	0.00	0.00	0.00	7.1	7.1	0.00	0.0	0.00	.05	0.00
22	3.9	0.00	0.00	0.00	4.8	4.8	0.00	0.0	0.00	.04	0.00
23	3.3	0.00	0.00	0.00	3.7	3.7	0.00	0.0	0.00	.03	0.00
24	1.7	0.00	0.00	0.00	2.3	2.3	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	24.56	21.96	---	---	---	9.93	45.2	6.10	3.81	.07

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

23 APRIL (DAY 113)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	8.9	0.00	0.00	0.00	9.3	9.3	0.00	0.0	0.00	.02	0.00
2	8.3	0.00	0.00	0.00	8.6	8.6	0.00	0.0	0.00	.02	0.00
3	7.8	0.00	0.00	0.00	8.0	8.0	0.00	0.0	0.00	.02	0.00
4	7.2	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.02	0.00
5	7.4	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.01	0.00
6	7.6	0.00	0.00	0.00	7.5	7.5	0.00	0.0	0.00	.01	0.00
7	7.8	.81	.80	3.13	82.9	87.9	.13	15.7	0.00	.12	.01
8	10.8	1.73	1.72	3.13	141.1	173.7	.82	47.3	0.00	.23	.01
9	13.7	2.35	2.35	3.13	180.3	226.8	1.16	49.5	.54	.30	.01
10	16.7	2.68	2.65	3.13	183.6	237.0	1.34	50.3	.98	.31	.01
11	19.1	2.81	2.76	3.13	184.0	239.8	1.40	50.6	1.08	.31	.01
12	21.5	2.85	2.78	3.13	184.2	240.6	1.41	50.7	1.11	.30	.01
13	23.9	2.87	2.81	3.13	184.3	241.5	1.43	51.0	1.13	.30	.01
14	24.8	2.85	2.80	3.13	184.3	241.5	1.43	51.1	1.13	.30	.01
15	25.8	2.74	2.72	3.13	184.4	239.9	1.39	51.1	1.10	.30	.01
16	26.7	2.41	2.41	3.13	183.9	232.5	1.21	50.5	.96	.29	.01
17	25.9	1.74	1.74	3.13	182.8	214.0	.78	44.9	.58	.28	.01
18	25.2	.78	0.00	0.00	68.9	68.9	0.00	0.0	0.00	.33	0.00
19	24.4	0.00	0.00	0.00	36.8	36.8	0.00	0.0	0.00	.15	0.00
20	21.5	0.00	0.00	0.00	25.8	25.8	0.00	0.0	0.00	.08	0.00
21	18.5	0.00	0.00	0.00	20.5	20.5	0.00	0.0	0.00	.06	0.00
22	15.6	0.00	0.00	0.00	17.0	17.0	0.00	0.0	0.00	.04	0.00
23	13.9	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.04	0.00
24	12.3	0.00	0.00	0.00	13.0	13.0	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	26.61	25.53	---	---	---	12.49	48.9	8.61	3.86	.08

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

7 MAY (DAY 127)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	9.4	0.00	0.00	0.00	9.9	9.9	0.00	0.0	0.00	.03	0.00
2	8.1	0.00	0.00	0.00	8.6	8.6	0.00	0.0	0.00	.02	0.00
3	6.9	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.02	0.00
4	5.6	0.00	0.00	0.00	6.1	6.1	0.00	0.0	0.00	.02	0.00
5	6.0	0.00	0.00	0.00	6.0	6.0	0.00	0.0	0.00	.01	0.00
6	6.3	.01	0.00	0.00	6.2	6.2	0.00	0.0	0.00	.01	0.00
7	6.7	.95	.93	3.13	79.3	88.4	.23	24.3	0.00	.12	.01
8	9.1	1.77	1.76	3.13	143.0	177.0	.85	48.3	0.00	.23	.01
9	11.5	2.33	2.32	3.13	180.5	226.6	1.15	49.6	.55	.30	.01
10	13.9	2.61	2.60	3.13	183.5	236.0	1.31	50.5	.96	.31	.01
11	15.2	2.71	2.70	3.13	183.7	238.2	1.36	50.5	1.04	.31	.01
12	16.5	2.74	2.72	3.13	183.8	238.6	1.37	50.5	1.06	.31	.01
13	17.8	2.77	2.74	3.13	183.9	239.4	1.39	50.7	1.08	.31	.01
14	18.3	2.76	2.74	3.13	184.0	239.7	1.39	50.9	1.08	.31	.01
15	18.9	2.67	2.66	3.13	184.0	238.3	1.36	51.0	1.06	.31	.01
16	19.4	2.39	2.39	3.13	183.6	231.7	1.20	50.3	.93	.30	.01
17	19.0	1.74	1.73	3.13	182.5	213.8	.78	45.1	.57	.29	.01
18	18.7	.84	.82	3.13	171.7	173.7	.05	6.2	0.00	.26	.01
19	18.3	.01	0.00	0.00	61.2	61.2	0.00	0.0	0.00	.31	0.00
20	15.3	0.00	0.00	0.00	28.1	28.1	0.00	0.0	0.00	.14	0.00
21	12.4	0.00	0.00	0.00	16.8	16.8	0.00	0.0	0.00	.08	0.00
22	9.4	0.00	0.00	0.00	11.4	11.4	0.00	0.0	0.00	.05	0.00
23	8.3	0.00	0.00	0.00	9.2	9.2	0.00	0.0	0.00	.04	0.00
24	7.2	0.00	0.00	0.00	7.7	7.7	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	26.29	26.12	---	---	---	12.45	47.7	8.33	4.12	.08

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

21 JUNE (DAY 172)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	17.8	0.00	0.00	0.00	18.1	18.1	0.00	0.0	0.00	.02	0.00
2	17.4	0.00	0.00	0.00	17.6	17.6	0.00	0.0	0.00	.02	0.00
3	17.1	0.00	0.00	0.00	17.2	17.2	0.00	0.0	0.00	.02	0.00
4	16.7	0.00	0.00	0.00	16.8	16.8	0.00	0.0	0.00	.01	0.00
5	17.2	0.00	0.00	0.00	17.1	17.1	0.00	0.0	0.00	.01	0.00
6	17.8	.03	0.00	0.00	17.6	17.6	0.00	0.0	0.00	.01	0.00
7	18.3	.85	.81	3.13	95.1	105.0	.25	30.9	0.00	.13	.01
8	20.5	1.80	1.76	3.13	157.3	190.6	.83	47.5	0.00	.24	.01
9	22.8	2.29	2.27	3.13	182.3	226.9	1.12	49.1	.63	.29	.01
10	25.0	2.52	2.52	3.13	183.8	234.9	1.28	50.8	.95	.29	.01
11	26.5	2.49	2.49	3.13	184.0	235.2	1.28	51.4	.99	.29	.01
12	27.9	2.40	2.40	3.13	184.0	232.9	1.22	50.9	.95	.29	.01
13	29.4	2.37	2.37	3.13	183.9	232.1	1.21	50.9	.92	.28	.01
14	30.0	2.31	2.31	3.13	183.9	230.9	1.17	50.8	.90	.28	.01
15	30.5	2.20	2.20	3.13	183.7	227.4	1.09	49.7	.83	.28	.01
16	31.1	1.96	1.94	3.13	183.3	220.3	.93	47.7	.68	.27	.01
17	30.7	1.65	1.61	3.13	182.7	211.4	.72	44.7	.49	.27	.01
18	30.4	.92	.87	3.13	181.3	187.6	.16	17.9	.01	.26	.01
19	30.0	.08	0.00	0.00	73.0	73.0	0.00	0.0	0.00	.31	0.00
20	28.3	0.00	0.00	0.00	40.7	40.7	0.00	0.0	0.00	.14	0.00
21	26.7	0.00	0.00	0.00	30.6	30.6	0.00	0.0	0.00	.07	0.00
22	25.0	0.00	0.00	0.00	26.6	26.6	0.00	0.0	0.00	.05	0.00
23	23.9	0.00	0.00	0.00	24.6	24.6	0.00	0.0	0.00	.04	0.00
24	22.8	0.00	0.00	0.00	23.3	23.3	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	23.87	23.55	---	---	---	11.25	47.8	7.34	3.89	.08

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

5 JULY (DAY 186)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	23.3	0.00	0.00	0.00	23.5	23.5	0.00	0.0	0.00	.02	0.00
2	22.6	0.00	0.00	0.00	22.9	22.9	0.00	0.0	0.00	.02	0.00
3	21.8	0.00	0.00	0.00	22.1	22.1	0.00	0.0	0.00	.02	0.00
4	21.1	0.00	0.00	0.00	21.4	21.4	0.00	0.0	0.00	.01	0.00
5	21.1	0.00	0.00	0.00	21.2	21.2	0.00	0.0	0.00	.01	0.00
6	21.1	.02	0.00	0.00	21.1	21.1	0.00	0.0	0.00	.01	0.00
7	21.1	.70	.67	3.13	96.1	103.4	.18	27.3	0.00	.12	.01
8	23.1	1.62	1.58	3.13	149.7	179.6	.75	47.2	0.00	.22	.01
9	25.2	2.22	2.21	3.13	181.4	224.7	1.08	49.1	.54	.28	.01
10	27.2	2.53	2.53	3.13	183.9	235.6	1.29	51.1	.96	.29	.01
11	28.5	2.51	2.51	3.13	184.1	235.9	1.29	51.6	1.00	.29	.01
12	29.8	2.42	2.41	3.13	184.1	233.3	1.23	51.0	.96	.28	.01
13	31.1	2.38	2.37	3.13	184.0	232.4	1.21	50.9	.93	.28	.01
14	31.3	2.49	2.49	3.13	184.2	235.7	1.29	51.7	.99	.28	.01
15	31.5	2.55	2.54	3.13	184.2	236.5	1.31	51.4	1.02	.28	.01
16	31.7	2.45	2.43	3.13	184.1	233.1	1.23	50.4	.96	.28	.01
17	31.1	1.42	1.39	3.13	182.6	206.2	.59	42.3	.44	.27	.01
18	30.6	.44	0.00	0.00	76.2	76.2	0.00	0.0	0.00	.33	0.00
19	30.0	.02	0.00	0.00	42.8	42.8	0.00	0.0	0.00	.14	0.00
20	28.0	0.00	0.00	0.00	32.1	32.1	0.00	0.0	0.00	.08	0.00
21	25.9	0.00	0.00	0.00	27.6	27.6	0.00	0.0	0.00	.05	0.00
22	23.9	0.00	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.04	0.00
23	23.2	0.00	0.00	0.00	23.7	23.7	0.00	0.0	0.00	.03	0.00
24	22.4	0.00	0.00	0.00	22.8	22.8	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	23.77	23.15	---	---	---	11.45	49.5	7.80	3.67	.08

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

19 AUGUST (DAY 231)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	20.0	0.00	0.00	0.00	20.2	20.2	0.00	0.0	0.00	.02	0.00
2	20.0	0.00	0.00	0.00	20.1	20.1	0.00	0.0	0.00	.02	0.00
3	19.4	0.00	0.00	0.00	19.6	19.6	0.00	0.0	0.00	.02	0.00
4	19.4	0.00	0.00	0.00	19.5	19.5	0.00	0.0	0.00	.01	0.00
5	18.9	0.00	0.00	0.00	19.1	19.1	0.00	0.0	0.00	.01	0.00
6	19.4	0.00	0.00	0.00	19.3	19.3	0.00	0.0	0.00	.01	0.00
7	20.0	.01	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.01	0.00
8	21.7	.44	0.00	0.00	21.2	21.2	0.00	0.0	0.00	.01	0.00
9	22.8	2.14	2.14	3.13	169.1	211.8	1.07	50.0	0.00	.25	.01
10	25.6	2.45	2.43	3.13	183.3	231.8	1.21	50.0	.81	.29	.01
11	27.2	2.58	2.54	3.13	184.0	234.9	1.27	50.3	.97	.29	.01
12	28.3	2.62	2.56	3.13	184.1	235.7	1.29	50.4	1.00	.29	.01
13	29.4	2.46	2.40	3.13	184.0	231.8	1.20	49.8	.93	.28	.01
14	29.4	2.30	2.27	3.13	183.7	228.3	1.12	49.2	.85	.28	.01
15	30.6	2.20	2.18	3.13	183.7	226.5	1.07	49.1	.80	.28	.01
16	30.6	2.03	2.03	3.13	183.4	223.0	.99	48.8	.73	.28	.01
17	30.6	1.62	1.62	3.13	182.8	211.5	.72	44.4	.50	.27	.01
18	29.4	.47	0.00	0.00	76.1	76.1	0.00	0.0	0.00	.34	0.00
19	27.8	0.00	0.00	0.00	41.2	41.2	0.00	0.0	0.00	.15	0.00
20	23.9	0.00	0.00	0.00	28.7	28.7	0.00	0.0	0.00	.08	0.00
21	22.8	0.00	0.00	0.00	24.4	24.4	0.00	0.0	0.00	.05	0.00
22	21.1	0.00	0.00	0.00	22.0	22.0	0.00	0.0	0.00	.04	0.00
23	21.7	0.00	0.00	0.00	21.8	21.8	0.00	0.0	0.00	.03	0.00
24	20.0	0.00	0.00	0.00	20.5	20.5	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	21.32	20.16	---	---	---	9.94	49.3	6.59	3.33	.06

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

13 SEPTEMBER (DAY 256)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	16.1	0.00	0.00	0.00	16.5	16.5	0.00	0.0	0.00	.02	0.00
2	15.6	0.00	0.00	0.00	15.9	15.9	0.00	0.0	0.00	.02	0.00
3	15.0	0.00	0.00	0.00	15.2	15.2	0.00	0.0	0.00	.02	0.00
4	13.9	0.00	0.00	0.00	14.3	14.3	0.00	0.0	0.00	.02	0.00
5	13.9	0.00	0.00	0.00	14.0	14.0	0.00	0.0	0.00	.01	0.00
6	13.9	0.00	0.00	0.00	13.9	13.9	0.00	0.0	0.00	.01	0.00
7	13.9	.08	0.00	0.00	13.9	13.9	0.00	0.0	0.00	.01	0.00
8	16.1	1.28	1.27	3.13	109.6	127.7	.45	35.6	0.00	.16	.01
9	19.4	2.09	2.04	3.13	173.8	212.9	.98	47.9	.12	.27	.01
10	20.6	2.46	2.36	3.13	183.2	229.2	1.15	48.9	.78	.29	.01
11	21.1	2.63	2.48	3.13	183.6	232.5	1.22	49.4	.91	.30	.01
12	22.2	2.69	2.51	3.13	183.7	233.4	1.24	49.6	.94	.30	.01
13	22.8	2.73	2.54	3.13	183.7	234.2	1.26	49.7	.96	.30	.01
14	23.3	2.67	2.52	3.13	183.8	233.8	1.25	49.7	.96	.30	.01
15	24.4	2.50	2.40	3.13	183.7	231.0	1.18	49.3	.90	.29	.01
16	25.0	2.12	2.07	3.13	183.2	222.8	.99	47.7	.74	.29	.01
17	25.0	1.26	1.25	3.13	181.7	195.2	.34	27.0	.19	.27	.01
18	23.9	.08	0.00	0.00	69.7	69.7	0.00	0.0	0.00	.33	0.00
19	21.7	0.00	0.00	0.00	35.0	35.0	0.00	0.0	0.00	.15	0.00
20	19.4	0.00	0.00	0.00	23.8	23.8	0.00	0.0	0.00	.08	0.00
21	17.2	0.00	0.00	0.00	19.0	19.0	0.00	0.0	0.00	.05	0.00
22	16.1	0.00	0.00	0.00	16.9	16.9	0.00	0.0	0.00	.04	0.00
23	15.0	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.03	0.00
24	13.9	0.00	0.00	0.00	14.4	14.4	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	22.59	21.43	---	---	---	10.07	47.0	6.51	3.57	.07

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

17 OCTOBER (DAY 290)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	9.4	0.00	0.00	0.00	9.8	9.8	0.00	0.0	0.00	.02	0.00
2	9.2	0.00	0.00	0.00	9.4	9.4	0.00	0.0	0.00	.01	0.00
3	9.1	0.00	0.00	0.00	9.2	9.2	0.00	0.0	0.00	.01	0.00
4	8.9	0.00	0.00	0.00	9.0	9.0	0.00	0.0	0.00	.01	0.00
5	8.2	0.00	0.00	0.00	8.4	8.4	0.00	0.0	0.00	.01	0.00
6	7.4	0.00	0.00	0.00	7.7	7.7	0.00	0.0	0.00	.01	0.00
7	6.7	0.00	0.00	0.00	7.0	7.0	0.00	0.0	0.00	.01	0.00
8	9.1	1.00	.95	3.13	71.7	78.9	.18	19.0	0.00	.10	.01
9	11.5	1.93	1.75	3.13	134.3	167.3	.82	47.0	0.00	.21	.01
10	13.9	2.42	2.12	3.13	178.9	218.7	1.00	47.1	.37	.29	.01
11	15.2	2.69	2.26	3.13	182.8	225.6	1.07	47.4	.74	.30	.01
12	16.5	2.80	2.30	3.13	183.0	226.6	1.09	47.5	.78	.30	.01
13	17.8	2.83	2.33	3.13	183.1	227.5	1.11	47.7	.81	.30	.01
14	18.3	2.72	2.29	3.13	183.2	226.9	1.09	47.8	.80	.30	.01
15	18.9	2.44	2.13	3.13	183.0	223.2	1.01	47.2	.73	.30	.01
16	19.4	1.91	1.74	3.13	182.4	212.3	.75	43.0	.51	.29	.01
17	16.5	.93	0.00	0.00	62.6	62.6	0.00	0.0	0.00	.35	0.00
18	13.5	0.00	0.00	0.00	27.1	27.1	0.00	0.0	0.00	.16	0.00
19	10.6	0.00	0.00	0.00	15.2	15.2	0.00	0.0	0.00	.09	0.00
20	9.5	0.00	0.00	0.00	11.1	11.1	0.00	0.0	0.00	.06	0.00
21	8.3	0.00	0.00	0.00	9.1	9.1	0.00	0.0	0.00	.04	0.00
22	7.2	0.00	0.00	0.00	7.7	7.7	0.00	0.0	0.00	.03	0.00
23	6.7	0.00	0.00	0.00	7.0	7.0	0.00	0.0	0.00	.03	0.00
24	6.1	0.00	0.00	0.00	6.3	6.3	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	21.68	17.86	---	---	---	8.12	45.5	4.73	3.25	.06

RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

3 NOVEMBER (DAY 307)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	20.6	0.00	0.00	0.00	20.7	20.7	0.00	0.0	0.00	.01	0.00
2	20.2	0.00	0.00	0.00	20.3	20.3	0.00	0.0	0.00	.01	0.00
3	19.8	0.00	0.00	0.00	19.9	19.9	0.00	0.0	0.00	.01	0.00
4	19.4	0.00	0.00	0.00	19.6	19.6	0.00	0.0	0.00	.01	0.00
5	17.9	0.00	0.00	0.00	18.4	18.4	0.00	0.0	0.00	.01	0.00
6	16.5	0.00	0.00	0.00	17.0	17.0	0.00	0.0	0.00	.01	0.00
7	15.0	0.00	0.00	0.00	15.6	15.6	0.00	0.0	0.00	.01	0.00
8	15.2	.76	.70	3.13	48.8	52.6	.10	13.8	0.00	.06	.01
9	15.4	1.87	1.62	3.13	103.1	130.4	.68	42.0	0.00	.15	.01
10	15.6	2.46	2.02	3.13	173.9	211.4	.94	46.5	.10	.28	.01
11	16.1	2.73	2.14	3.13	182.6	221.9	.98	46.0	.64	.30	.01
12	16.7	2.84	2.16	3.13	182.8	222.3	.99	45.7	.69	.30	.01
13	17.2	2.86	2.17	3.13	182.8	222.6	1.00	45.8	.70	.30	.01
14	16.7	2.73	2.14	3.13	182.8	222.3	.99	46.0	.69	.30	.01
15	16.1	2.44	2.01	3.13	182.6	219.3	.92	45.7	.63	.30	.01
16	15.6	1.80	1.57	3.13	181.6	202.4	.52	33.2	.31	.29	.01
17	14.1	.64	0.00	0.00	63.6	63.6	0.00	0.0	0.00	.36	0.00
18	12.6	0.00	0.00	0.00	26.8	26.8	0.00	0.0	0.00	.16	0.00
19	11.1	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.08	0.00
20	10.0	0.00	0.00	0.00	11.5	11.5	0.00	0.0	0.00	.05	0.00
21	8.9	0.00	0.00	0.00	9.6	9.6	0.00	0.0	0.00	.04	0.00
22	7.8	0.00	0.00	0.00	8.3	8.3	0.00	0.0	0.00	.03	0.00
23	6.7	0.00	0.00	0.00	7.1	7.1	0.00	0.0	0.00	.03	0.00
24	5.5	0.00	0.00	0.00	6.0	6.0	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	21.13	16.53	---	---	---	7.11	43.0	3.76	3.09	.06

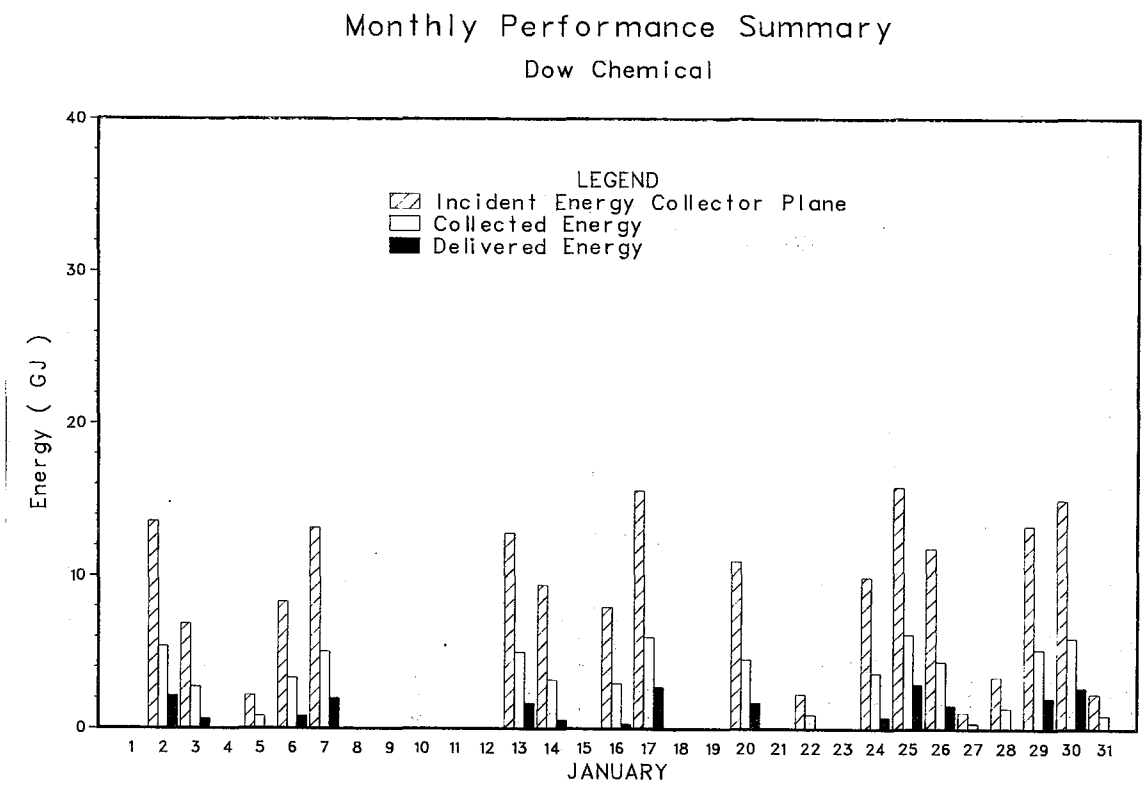
RUN ID: DW2
83/09/02.

DOW CHEMICAL

CLEAR DAY PERFORMANCE TABLE

1 DECEMBER (DAY 335)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-.3	0.00	0.00	0.00	.0	.0	0.00	0.0	0.00	.01	0.00
2	-1.1	0.00	0.00	0.00	-.8	-.8	0.00	0.0	0.00	.01	0.00
3	-1.7	0.00	0.00	0.00	-1.4	-1.4	0.00	0.0	0.00	.01	0.00
4	-2.2	0.00	0.00	0.00	-2.0	-2.0	0.00	0.0	0.00	.01	0.00
5	-2.6	0.00	0.00	0.00	-2.4	-2.4	0.00	0.0	0.00	.01	0.00
6	-2.9	0.00	0.00	0.00	-2.8	-2.8	0.00	0.0	0.00	.01	0.00
7	-3.9	0.00	0.00	0.00	-3.6	-3.6	0.00	0.0	0.00	.01	0.00
8	-2.1	.66	0.00	0.00	-2.5	-2.5	0.00	0.0	0.00	.00	0.00
9	-.5	1.72	1.40	3.13	66.3	85.0	.47	33.4	0.00	.11	.01
10	1.1	2.35	1.79	3.13	135.4	168.3	.82	46.0	0.00	.23	.01
11	3.9	2.66	1.90	3.13	177.7	209.6	.80	42.1	.21	.30	.01
12	6.6	2.78	1.91	3.13	181.7	213.3	.79	41.3	.47	.31	.01
13	9.4	2.75	1.89	3.13	181.9	213.2	.78	41.4	.48	.30	.01
14	10.7	2.62	1.87	3.13	181.9	213.4	.79	42.1	.48	.30	.01
15	12.0	2.26	1.72	3.13	181.9	210.9	.72	42.0	.44	.30	.01
16	13.3	1.57	1.28	3.13	180.8	190.8	.25	19.4	.05	.28	.01
17	11.5	.44	0.00	0.00	60.0	60.0	0.00	0.0	0.00	.35	0.00
18	9.6	0.00	0.00	0.00	23.6	23.6	0.00	0.0	0.00	.15	0.00
19	7.8	0.00	0.00	0.00	12.2	12.2	0.00	0.0	0.00	.08	0.00
20	7.6	0.00	0.00	0.00	8.9	8.9	0.00	0.0	0.00	.05	0.00
21	7.4	0.00	0.00	0.00	7.8	7.8	0.00	0.0	0.00	.04	0.00
22	7.2	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.03	0.00
23	5.9	0.00	0.00	0.00	6.3	6.3	0.00	0.0	0.00	.03	0.00
24	4.6	0.00	0.00	0.00	5.1	5.1	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	19.81	13.77	---	---	---	5.42	39.4	2.13	2.96	.06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Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
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0
10
20
30
40
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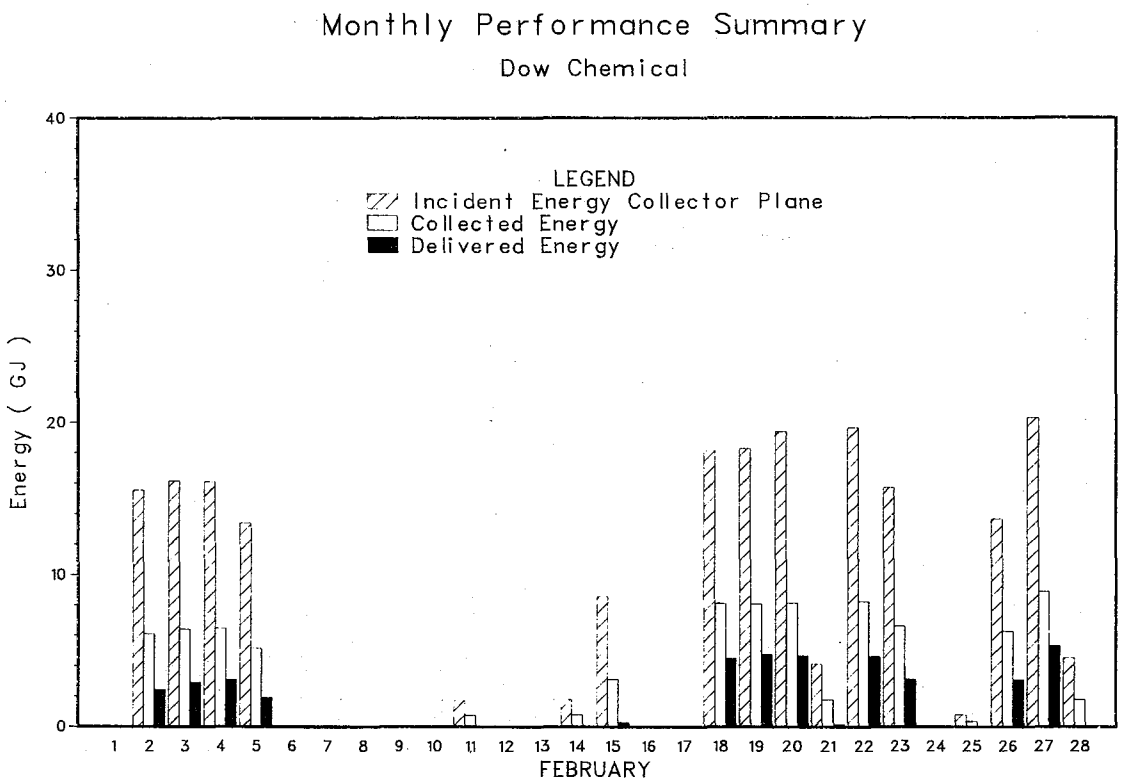
JANUARY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Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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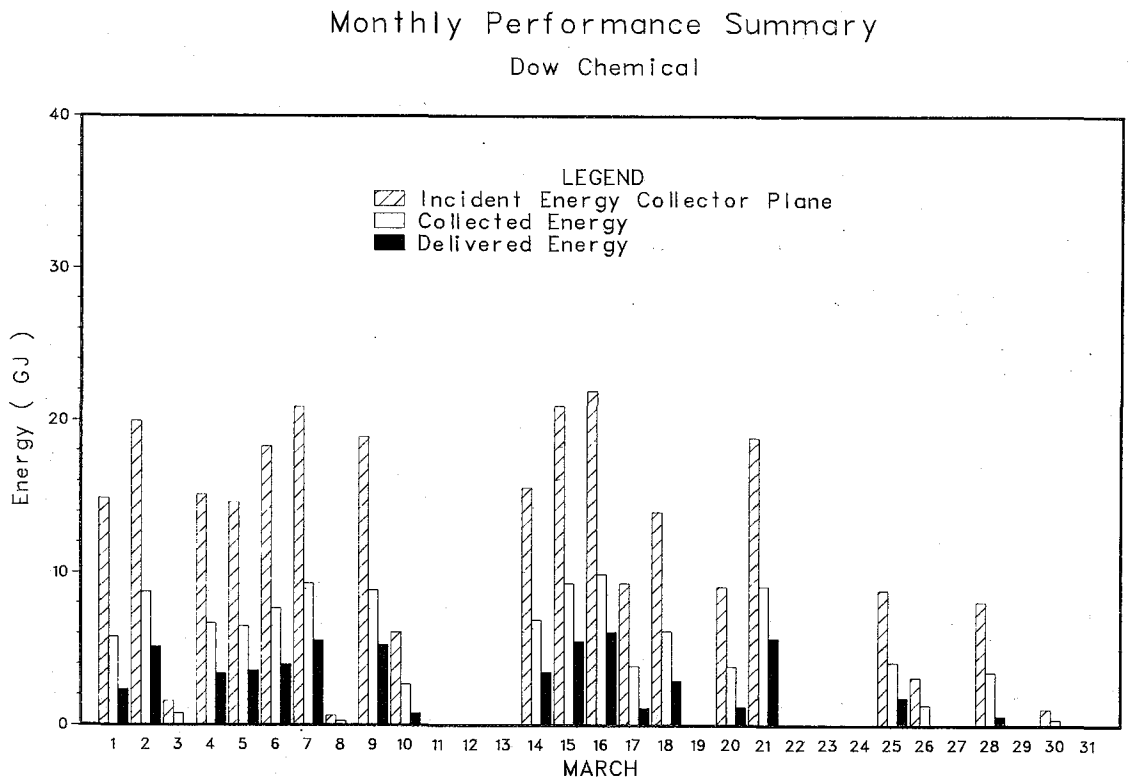
Monthly Performance Summary
Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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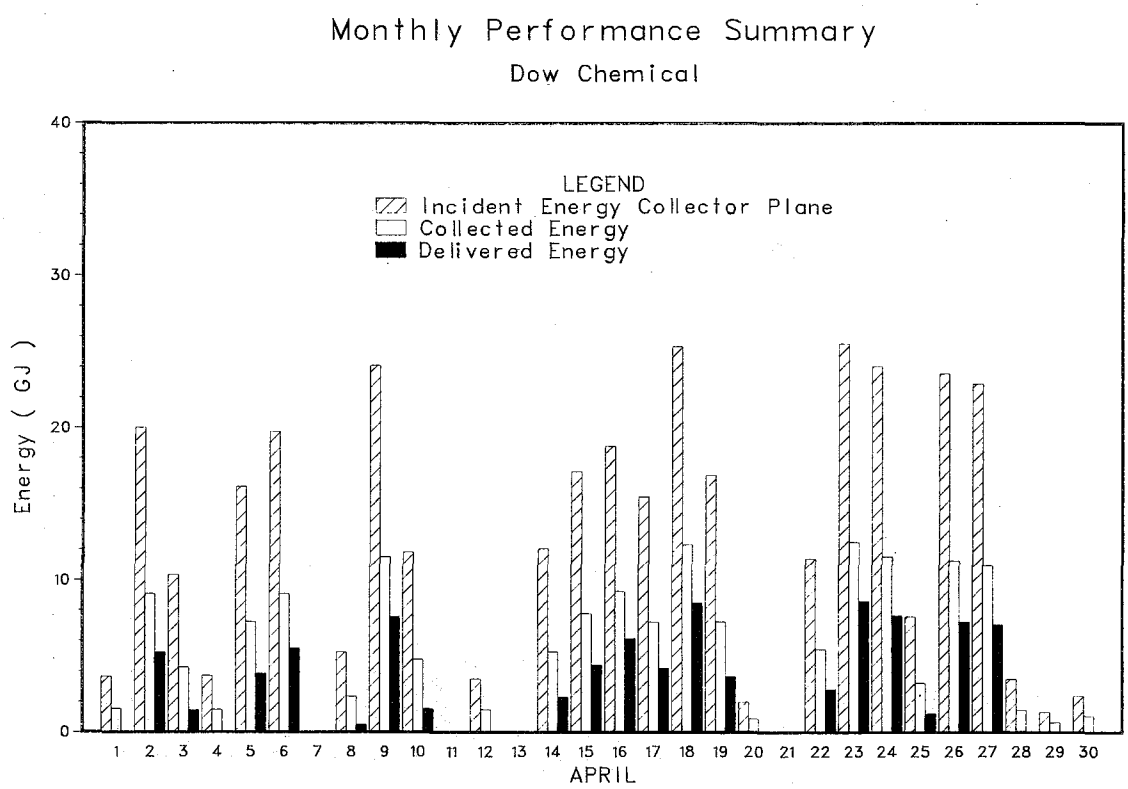
MARCH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Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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30
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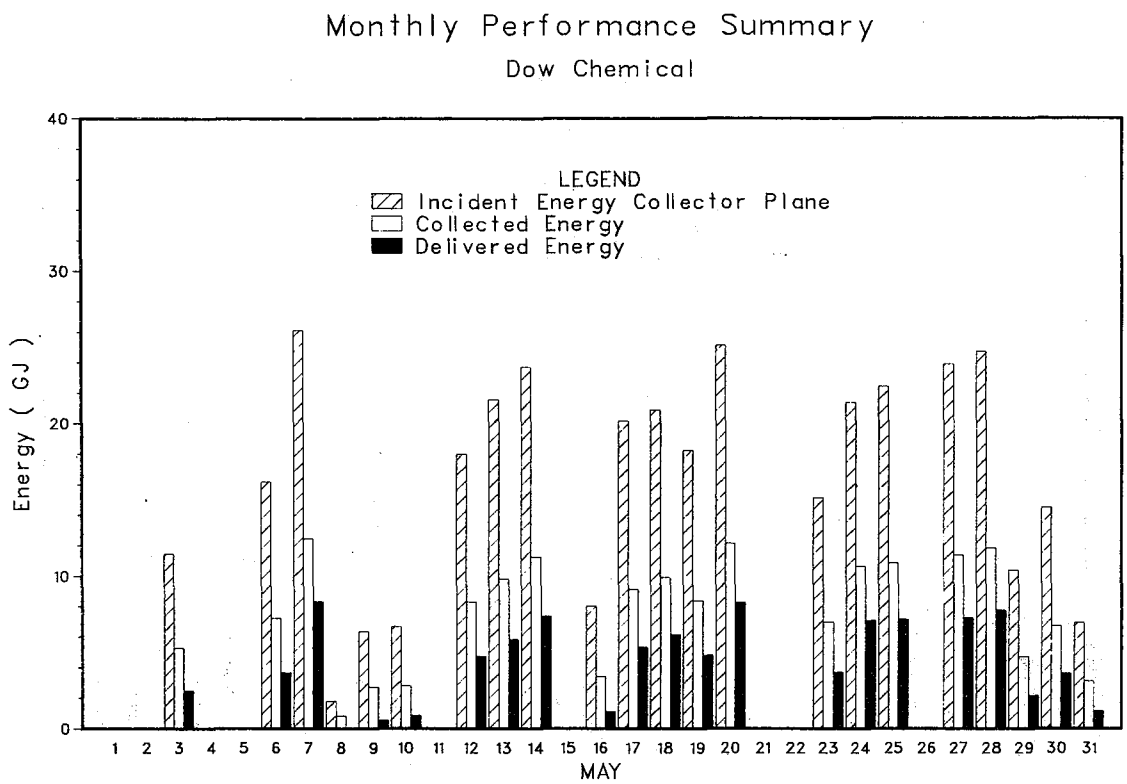
Monthly Performance Summary
Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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30
40
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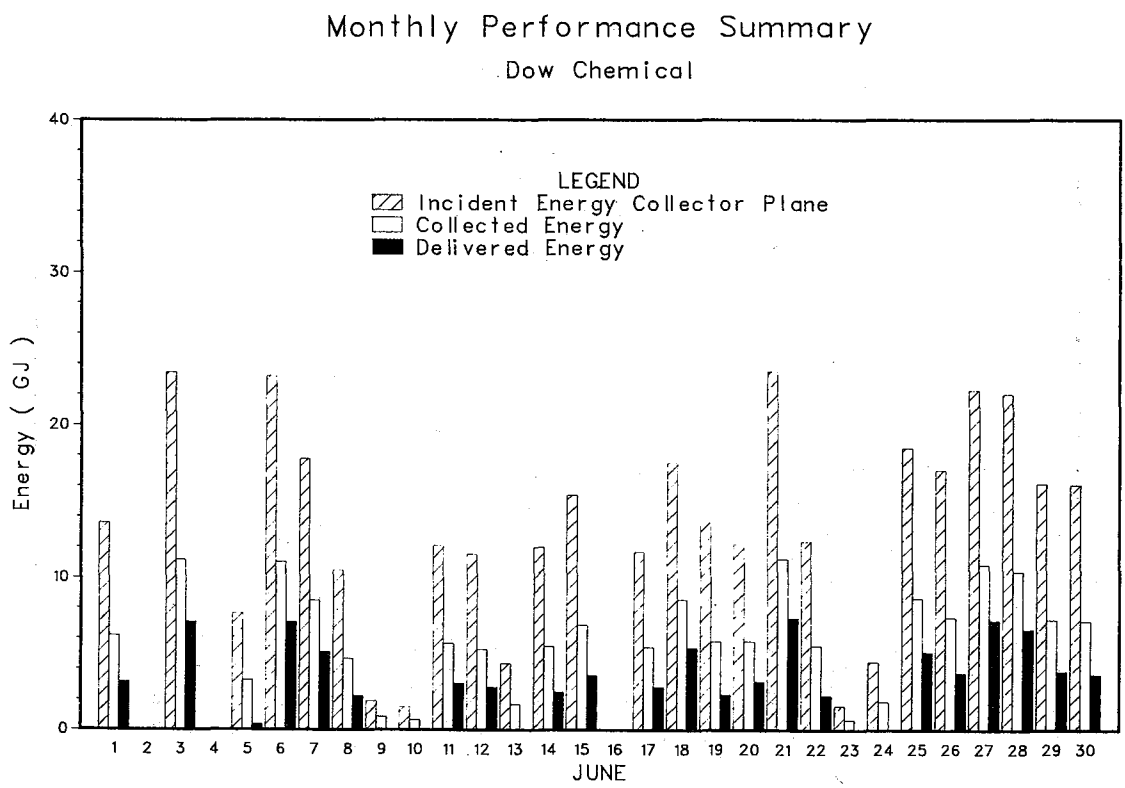
MAY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Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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30
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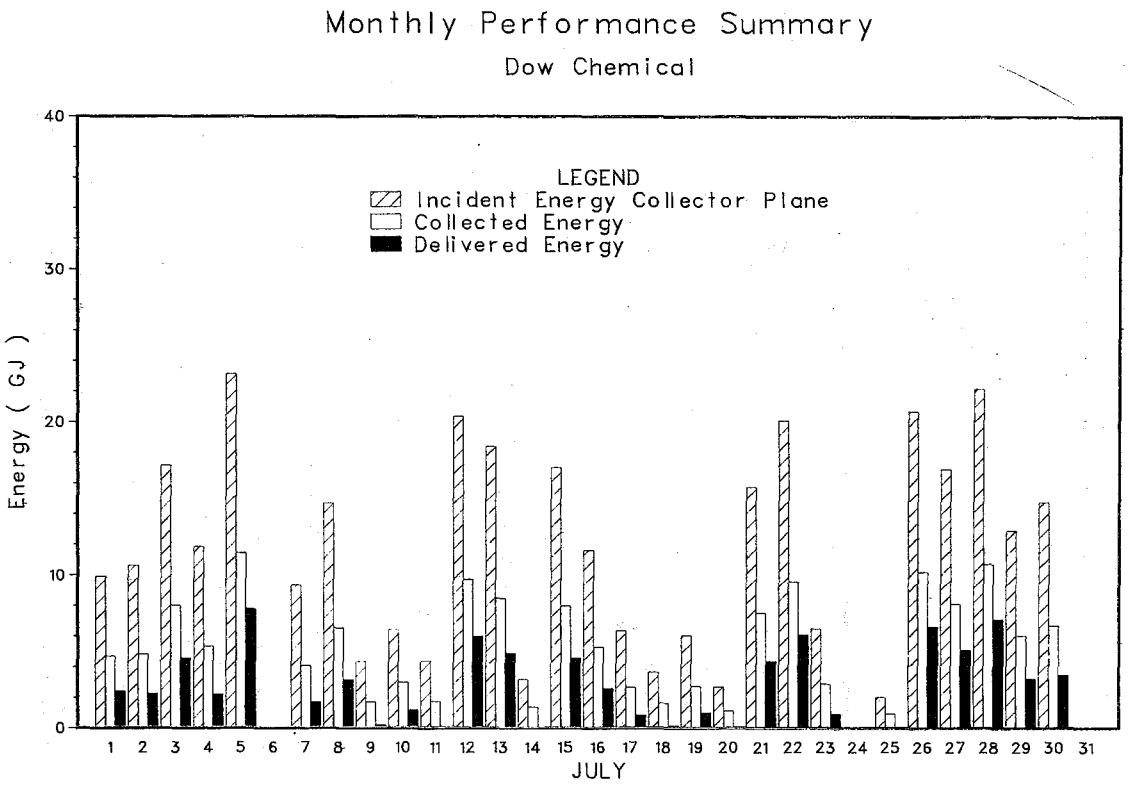
JUNE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Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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20
30
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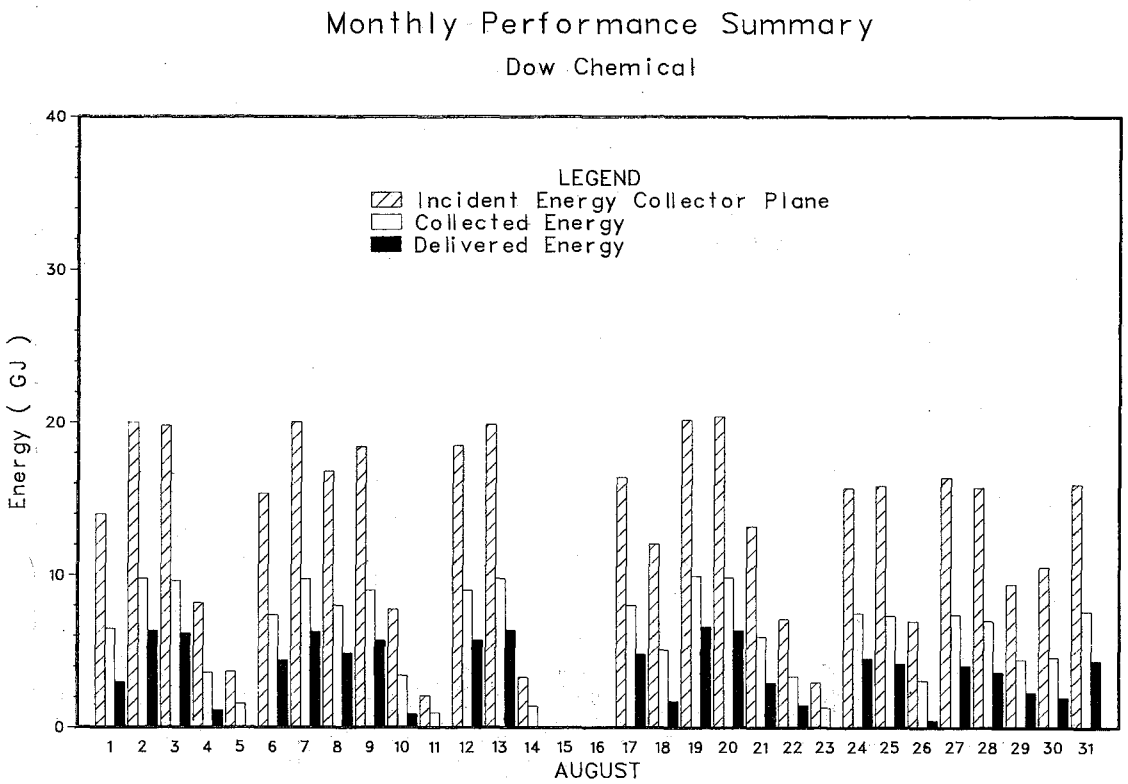
JULY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Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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20
30
40
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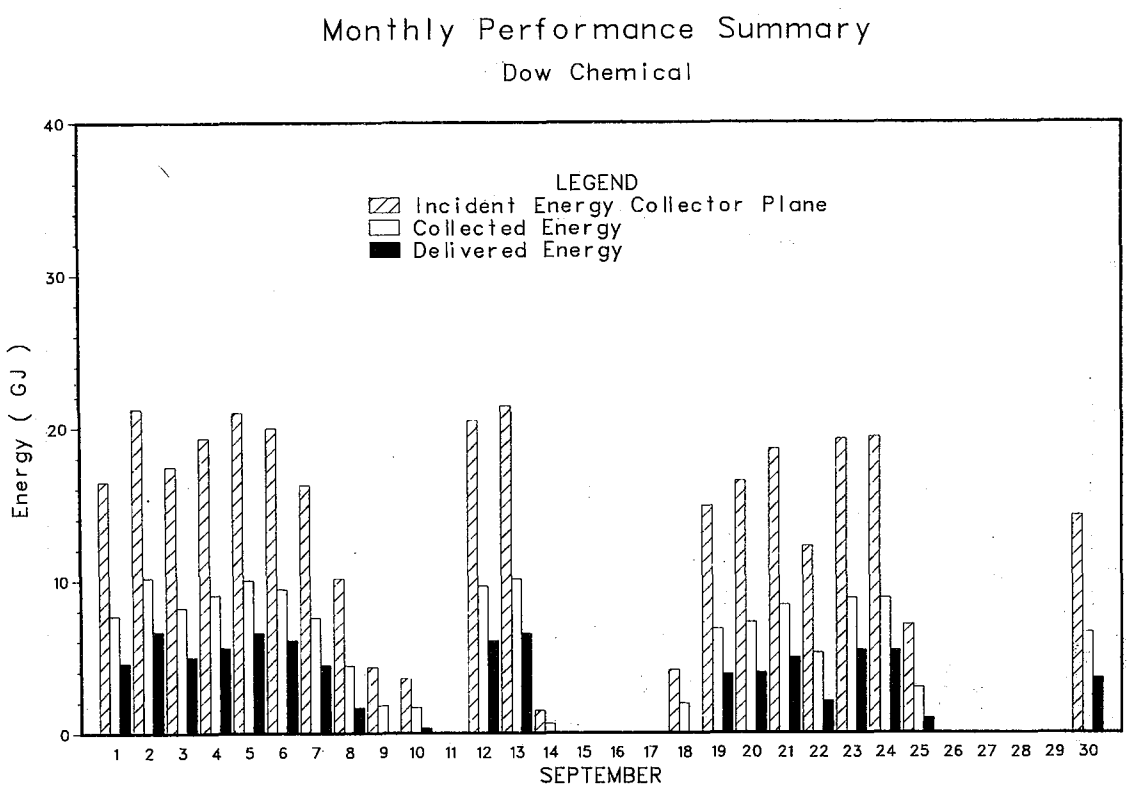
AUGUST


Monthly Performance Summary
Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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30
40
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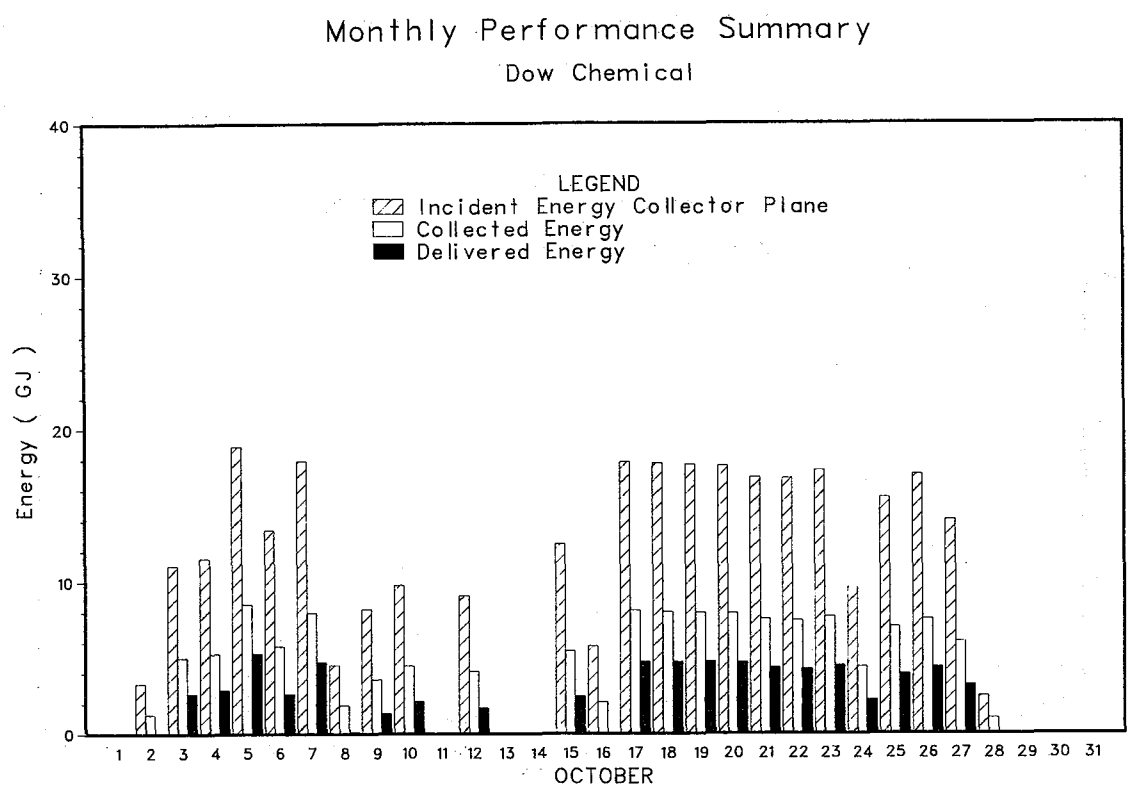
SEPTEMBER


Monthly Performance Summary
Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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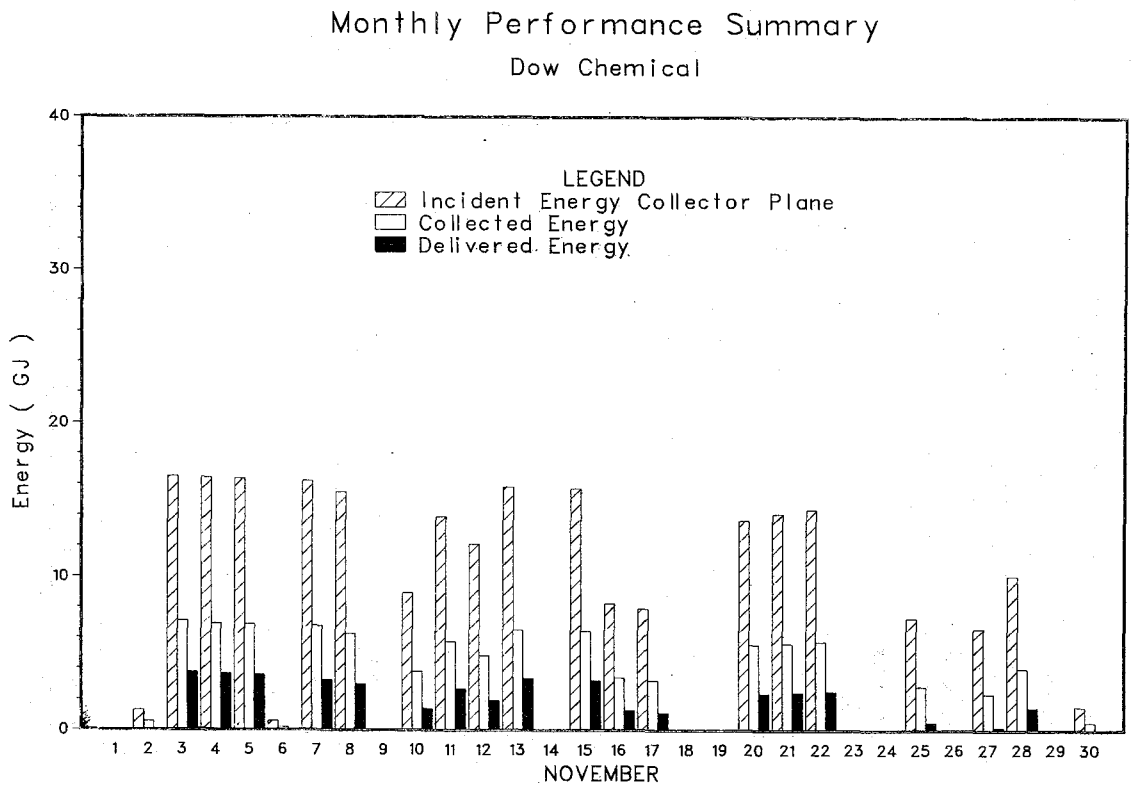
OCTOBER


Monthly Performance Summary
Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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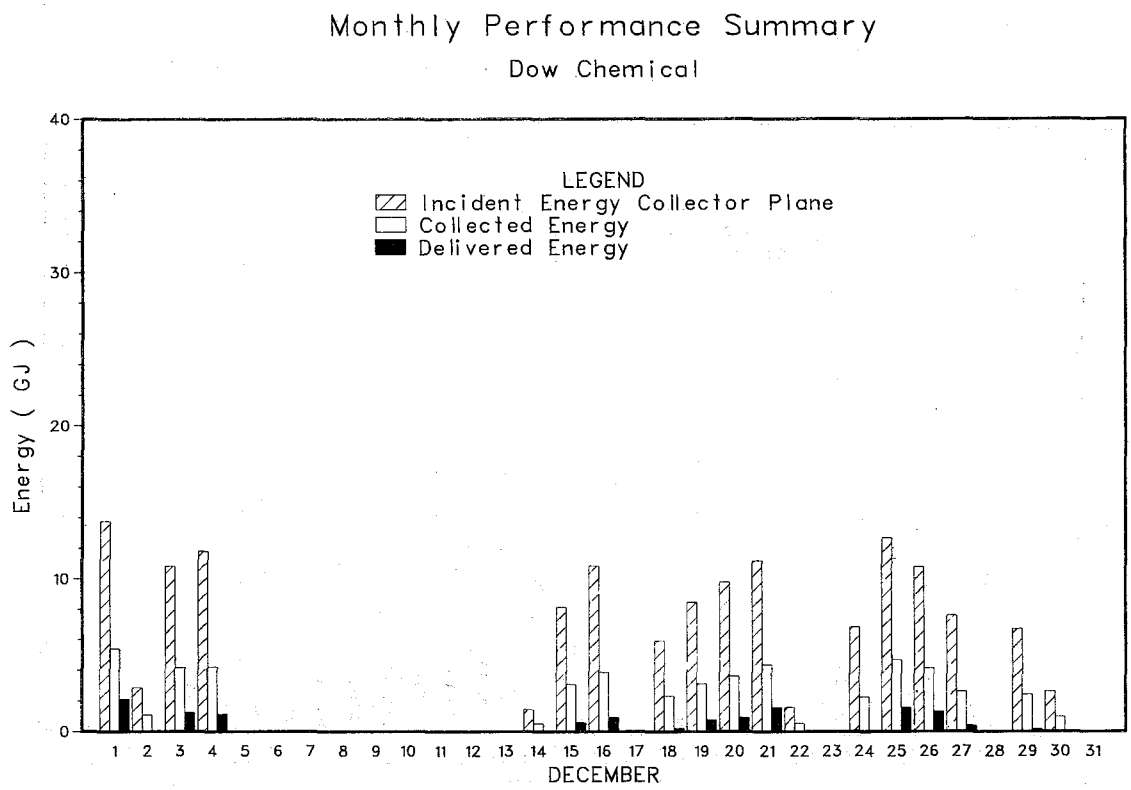
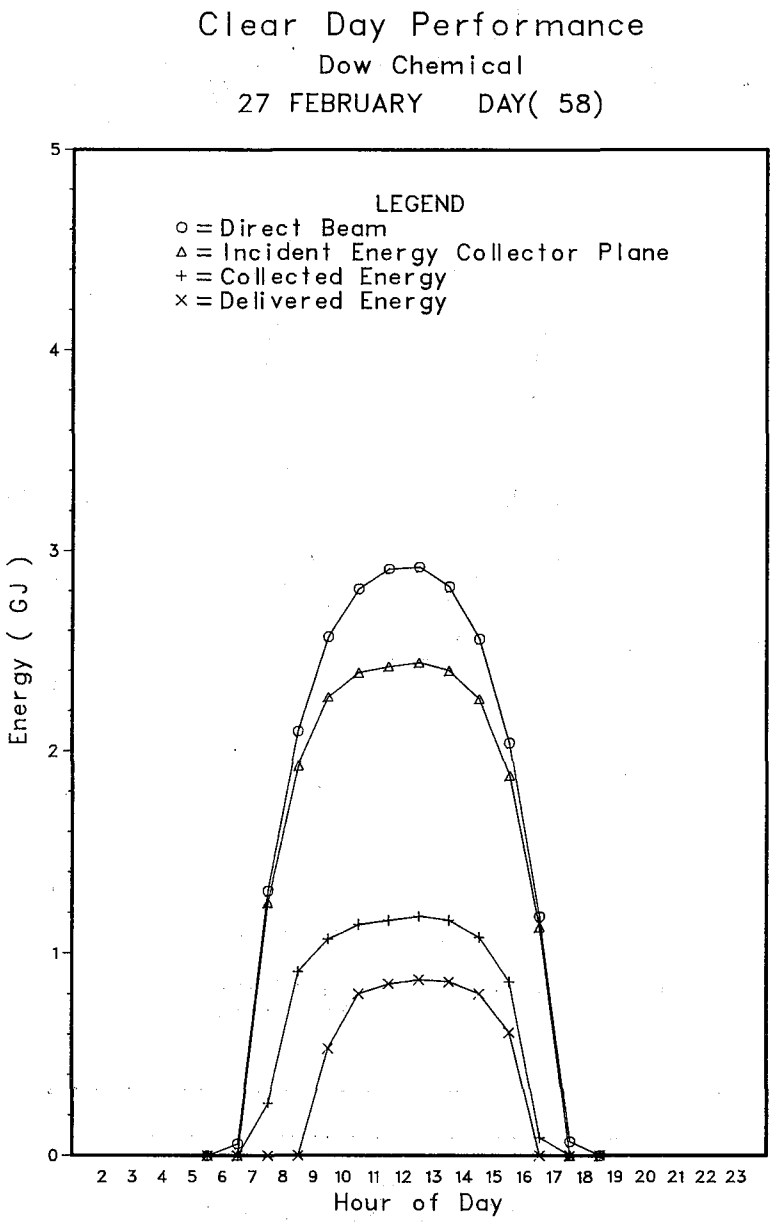
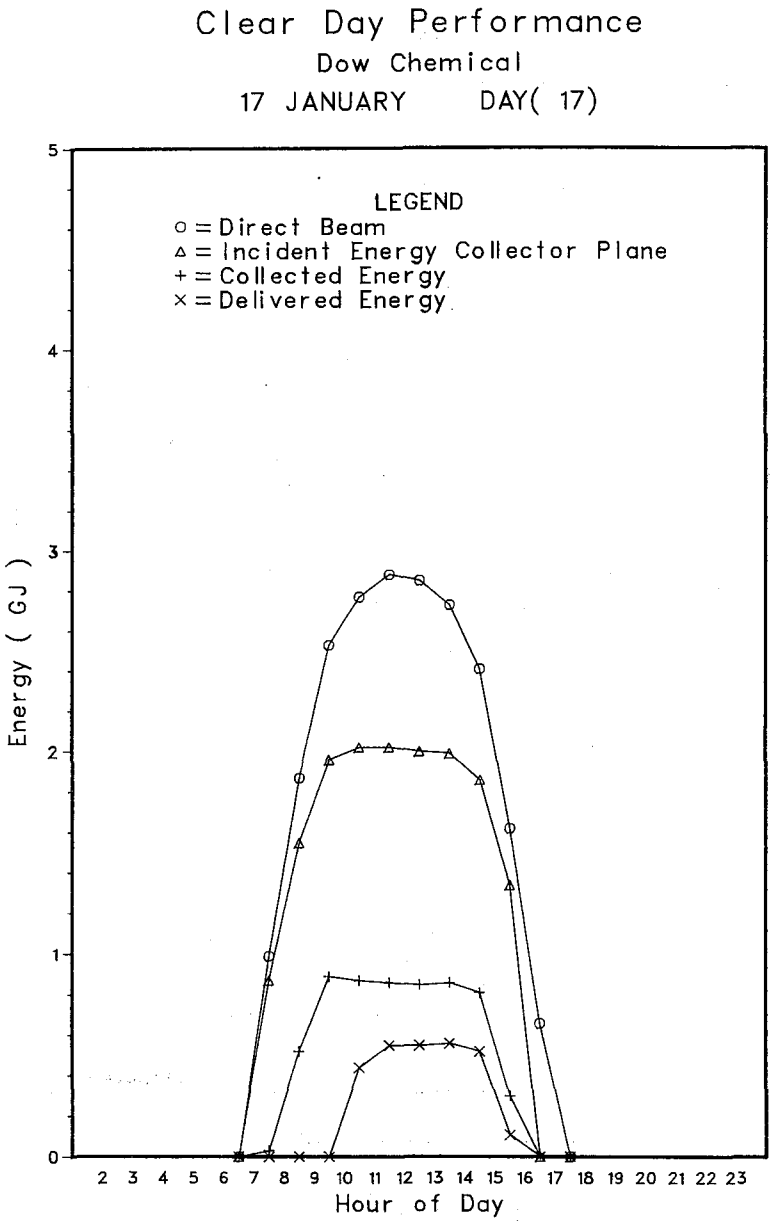
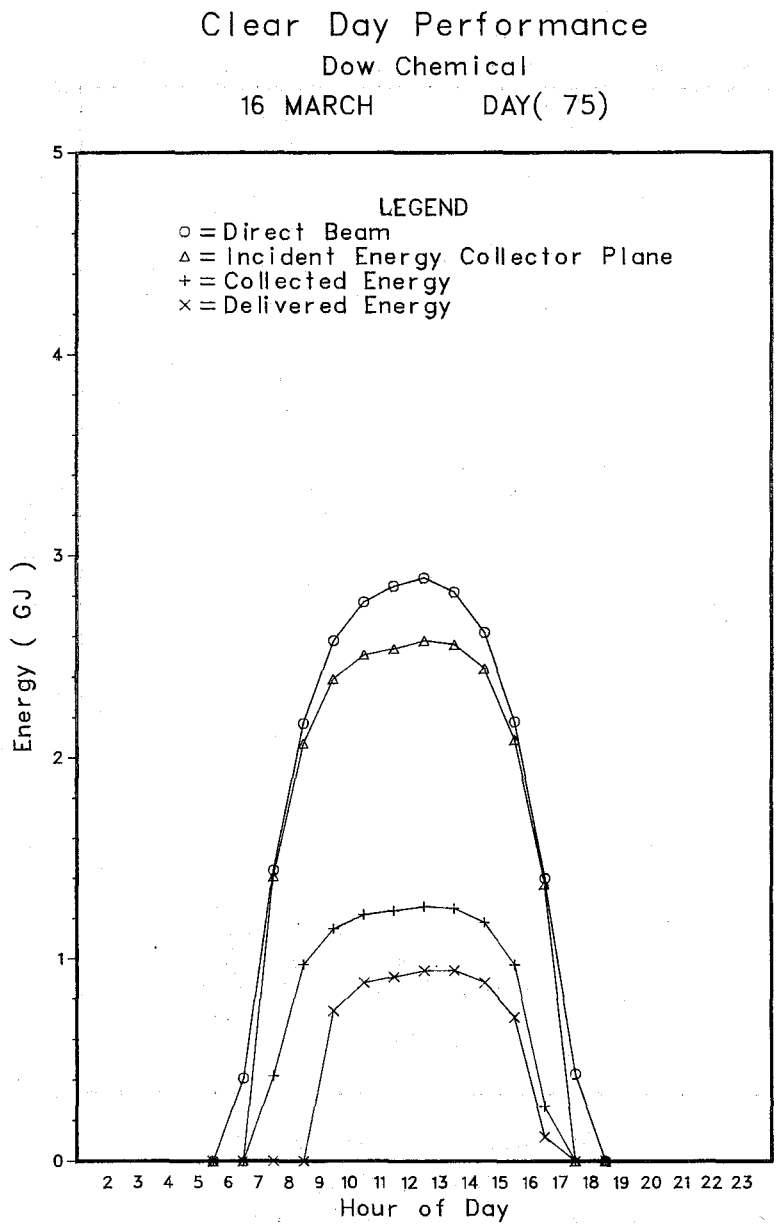
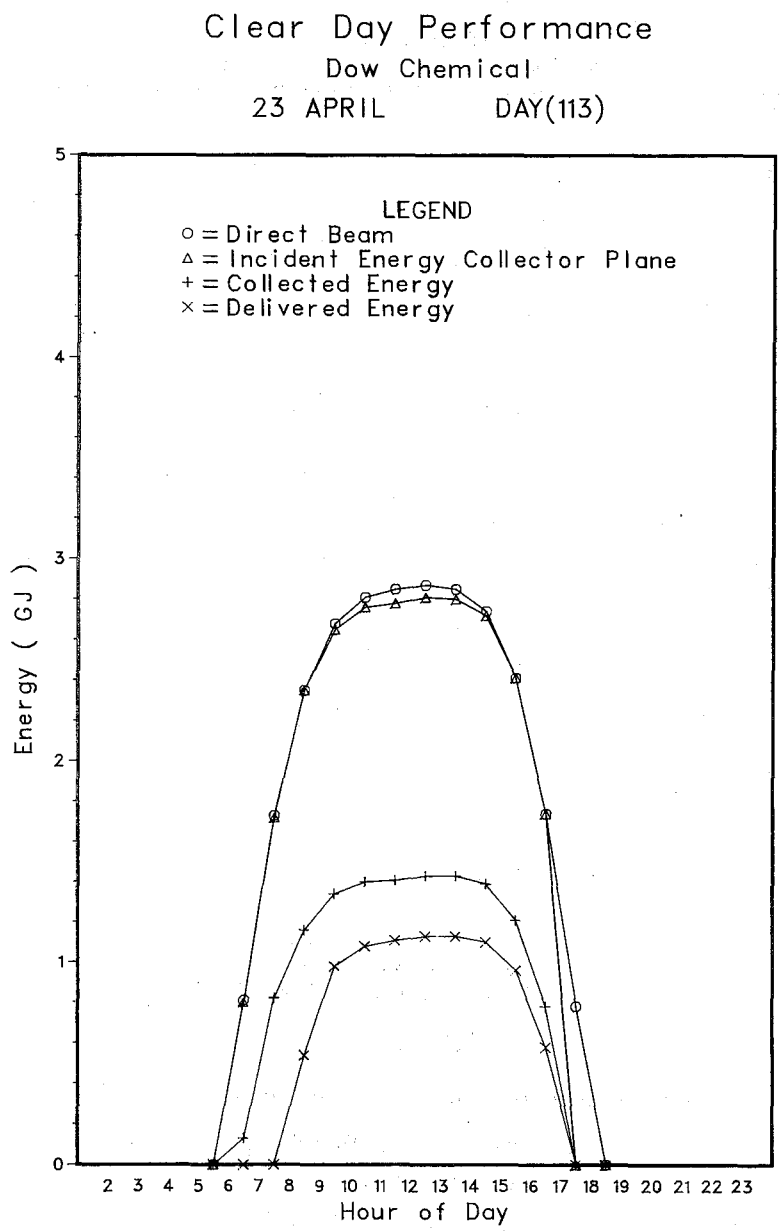
NOVEMBER

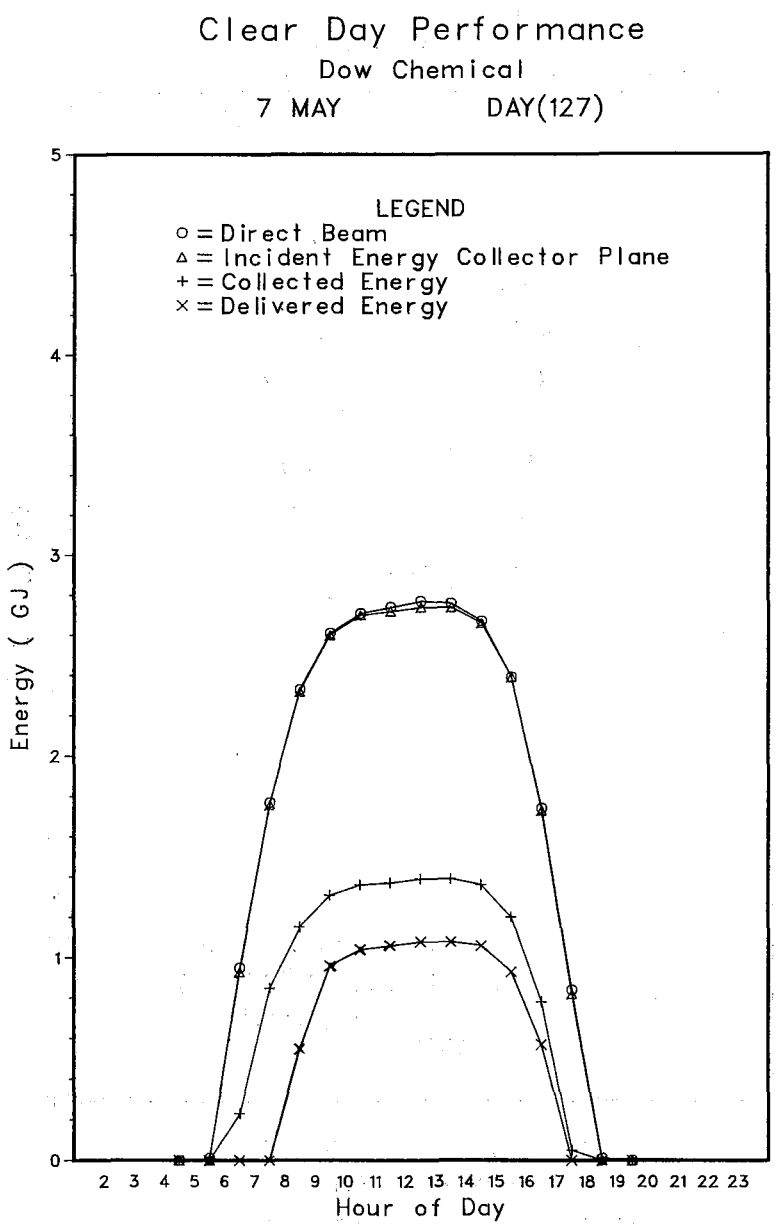

Monthly Performance Summary
Dow Chemical
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

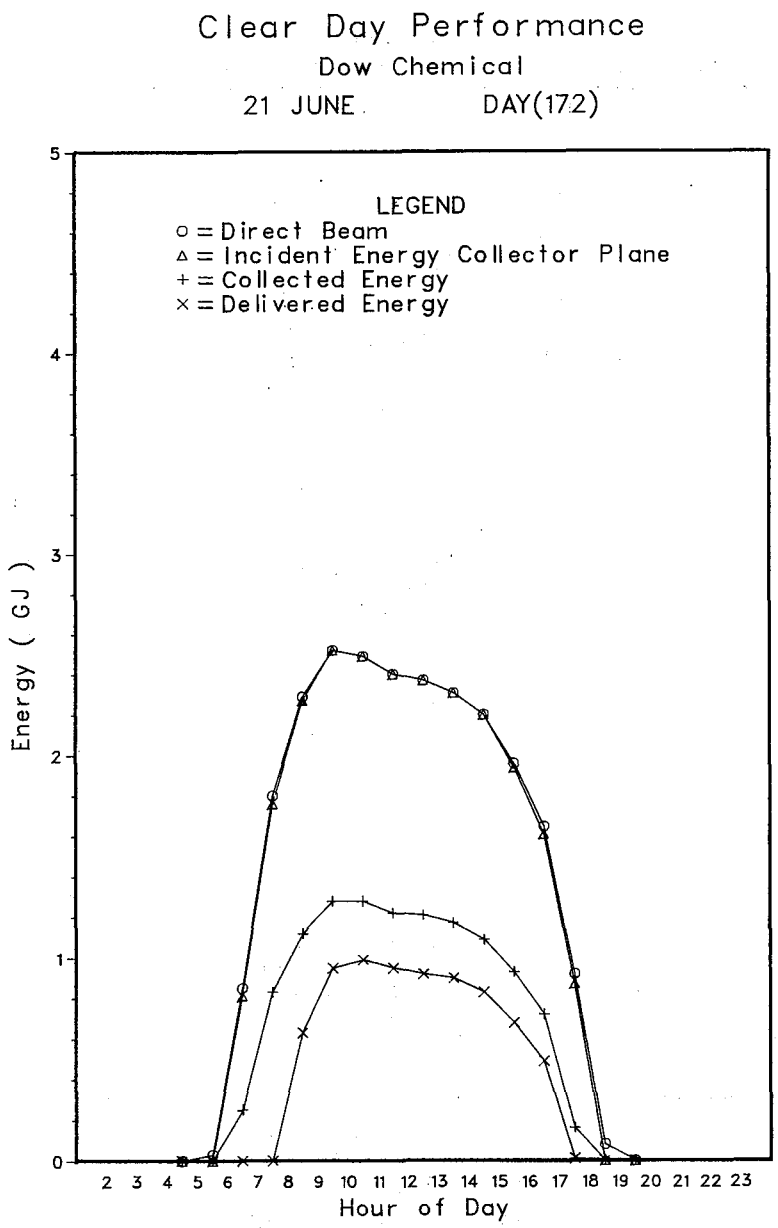

Clear Day Performance
Dow Chemical
27 FEBRUARY DAY(58)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

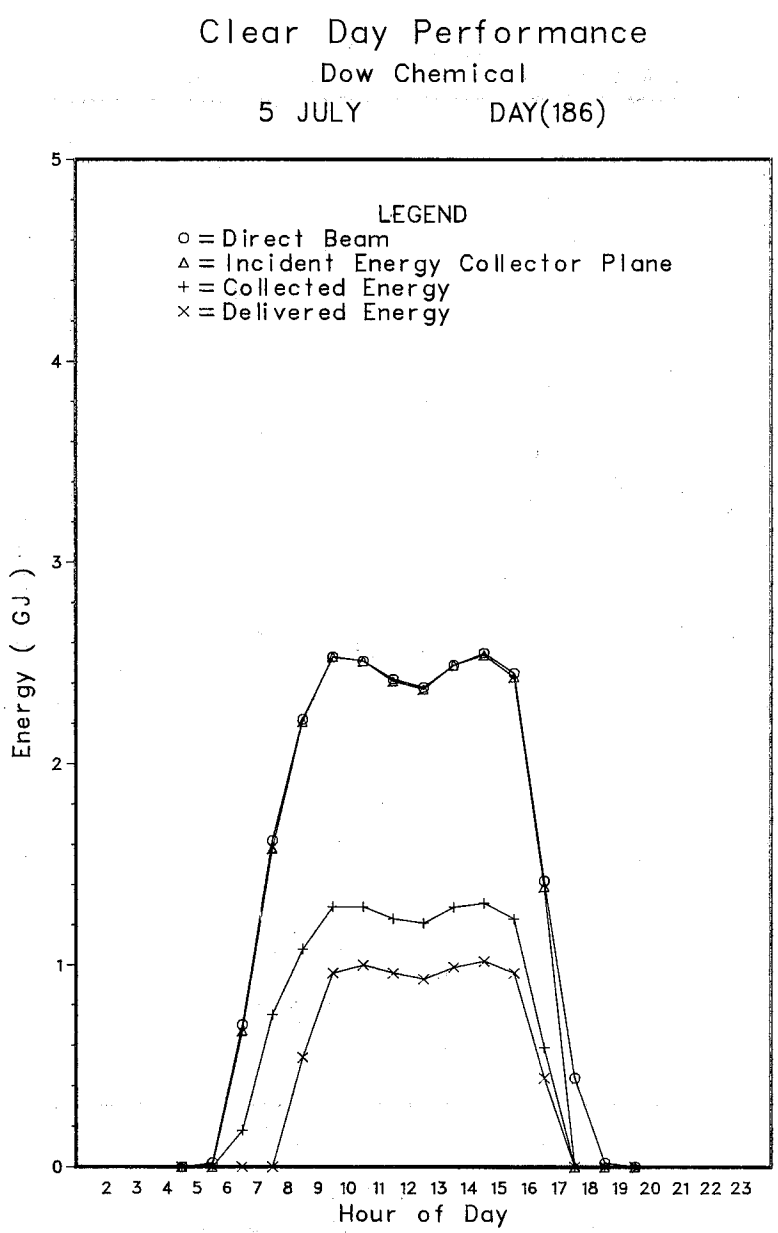

Clear Day Performance
Dow Chemical
17 JANUARY DAY(17)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

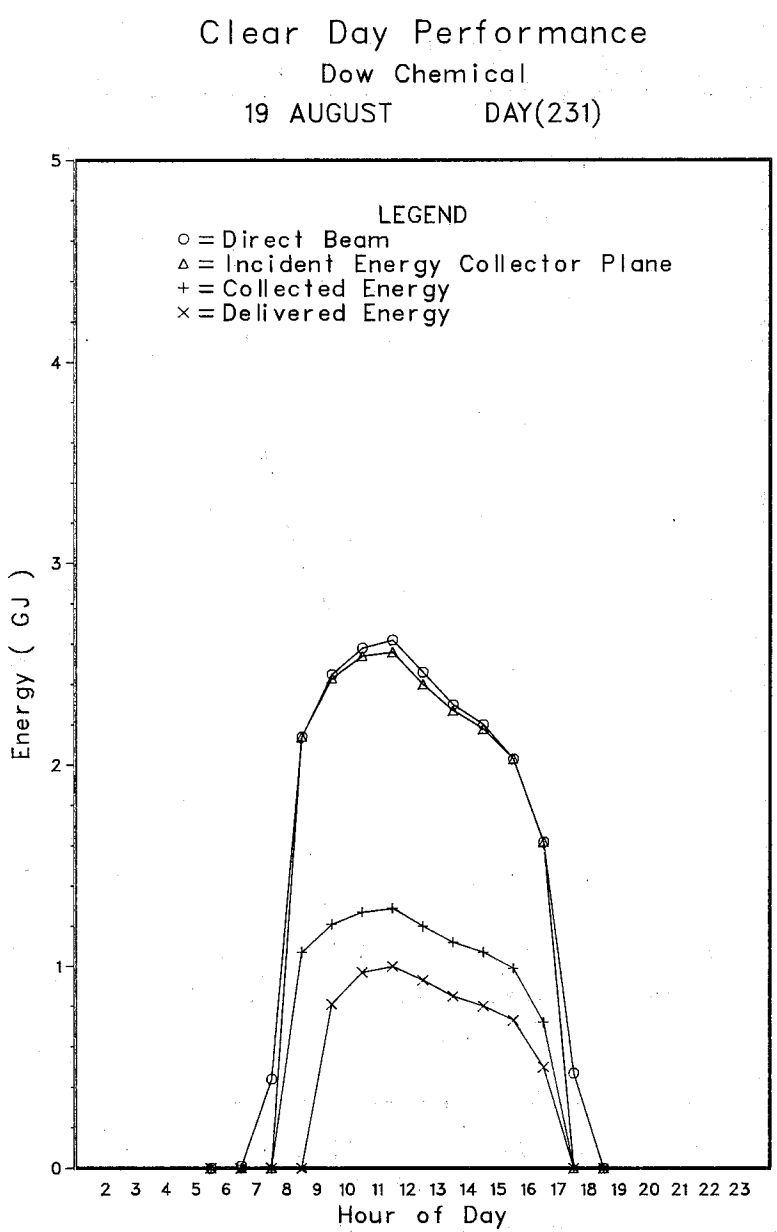

Clear Day Performance
Dow Chemical
16 MARCH DAY(75)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

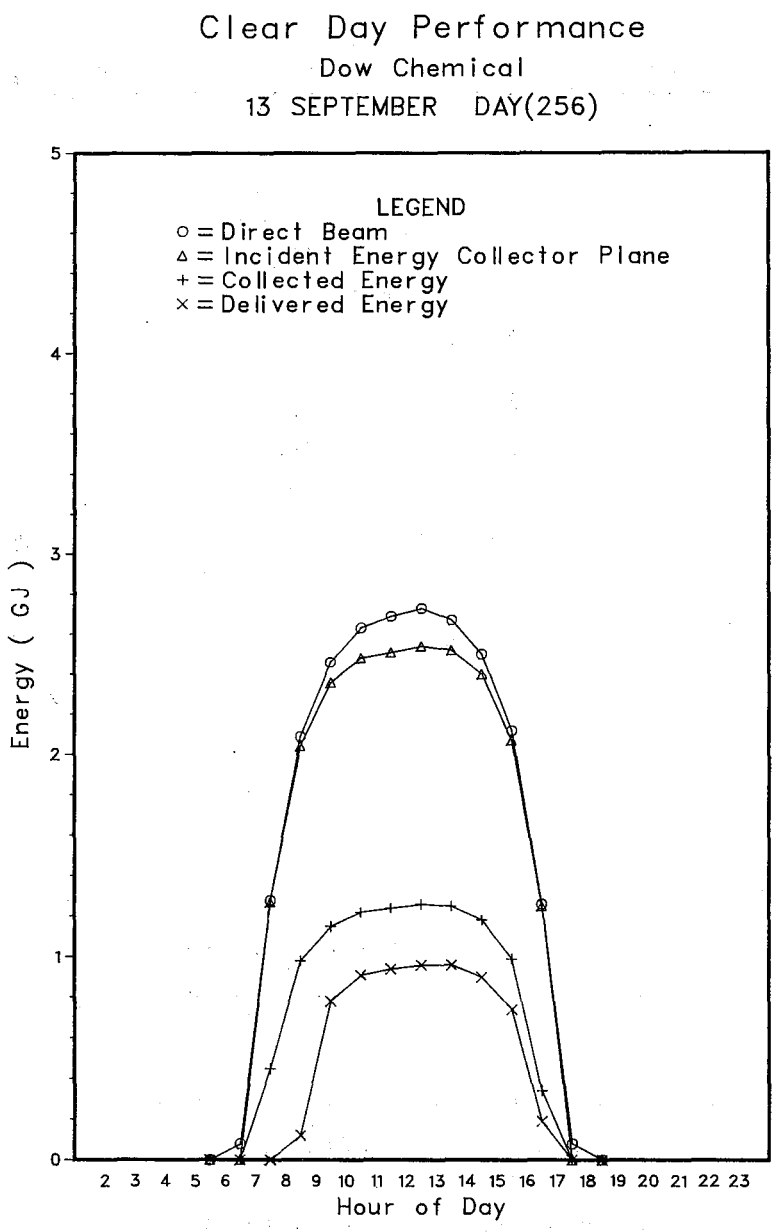

Clear Day Performance
Dow Chemical
23 APRIL DAY(113)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

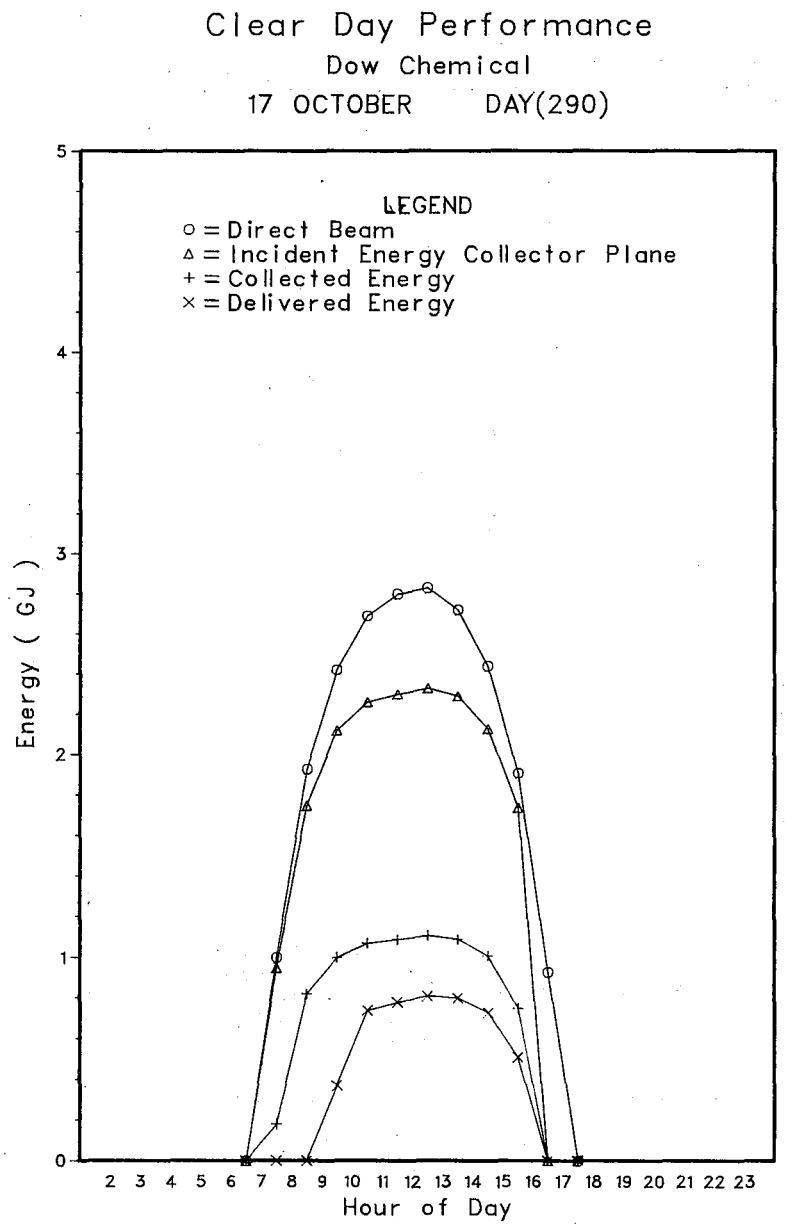

Clear Day Performance
Dow Chemical
7 MAY DAY(127)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

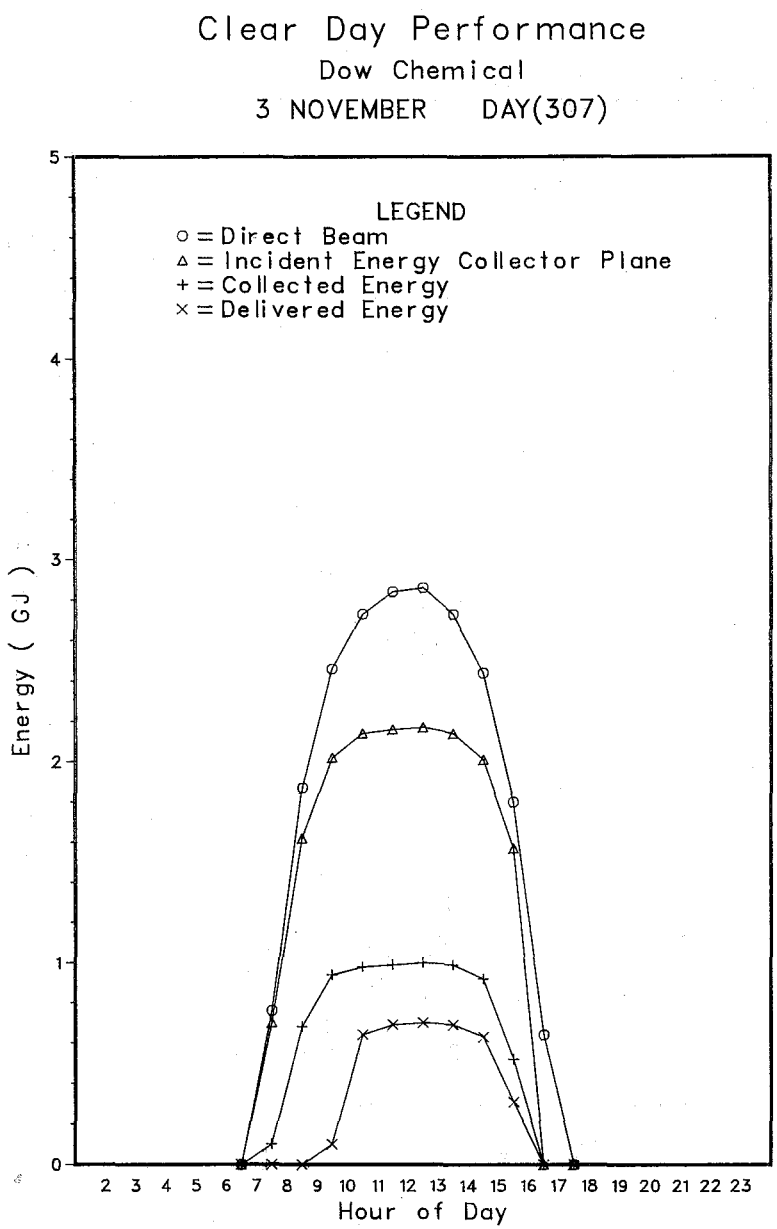

Clear Day Performance
Dow Chemical
21 JUNE DAY(172)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

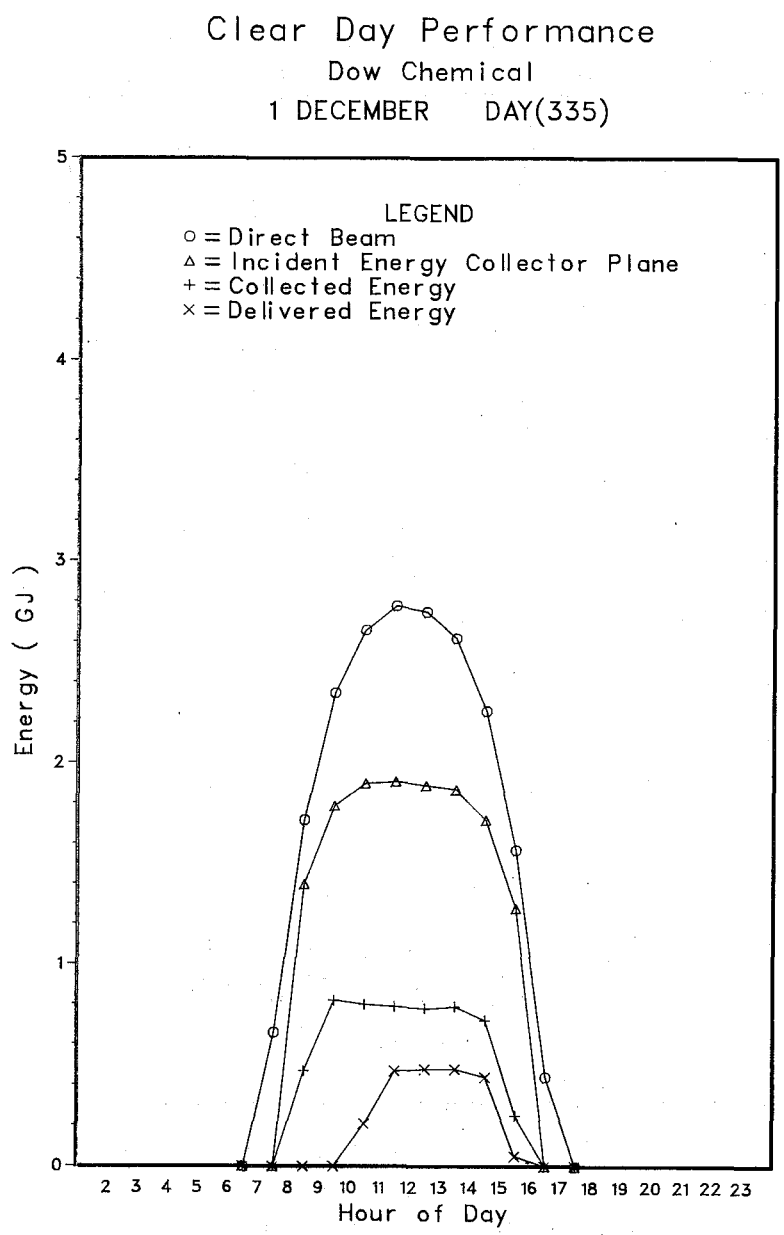

Clear Day Performance
Dow Chemical
5 JULY DAY(186)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Dow Chemical
19 AUGUST DAY(231)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Dow Chemical
13 SEPTEMBER DAY(256)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Dow Chemical
17 OCTOBER DAY(290)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Dow Chemical
3 NOVEMBER DAY(307)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Dow Chemical
1 DECEMBER DAY(335)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	144.7	225.4	141.5	66.7	47.1	54.4	7.1	4.3	38.4	3.7
FEBRUARY	171.2	215.4	145.2	74.1	51.0	59.9	8.1	5.5	41.2	3.3
MARCH	248.0	258.0	194.4	101.6	52.2	81.3	11.2	8.3	41.8	3.9
APRIL	276.8	255.2	204.6	110.1	53.8	87.6	12.2	9.3	42.8	3.5
MAY	343.7	298.1	237.7	130.0	54.7	104.2	14.3	10.7	43.8	4.1
JUNE	308.4	252.3	192.9	106.4	55.1	84.3	11.5	10.0	43.7	3.3
JULY	362.6	354.4	295.2	162.1	54.9	132.1	18.1	11.1	44.7	4.7
AUGUST	343.3	345.1	285.1	154.9	54.3	125.7	16.9	11.5	44.1	4.7
SEPTEMBER	241.8	245.8	198.3	105.7	53.3	85.3	11.3	8.6	43.0	3.7
OCTOBER	205.5	235.1	164.7	85.6	52.0	68.6	9.0	7.3	41.7	3.6
NOVEMBER	151.5	216.4	135.8	65.8	48.4	54.0	6.9	4.3	39.8	3.5
DECEMBER	120.1	188.7	113.5	52.0	45.8	42.3	5.3	3.8	37.3	3.3
TOTALS/AVERAGES	2917.5	3089.8	2309.1	1215.0	52.6	979.7	131.9	94.6	42.4	45.2

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	6.4	11.2	7.0	3.2	45.9	2.7	.3	.1	38.3	.2
2	1/ 2	6.6	11.7	7.3	3.3	46.0	2.7	.4	.2	37.6	.2
3	1/ 3	6.9	12.4	7.7	3.6	46.0	2.9	.4	.2	37.3	.2
4	1/ 4	6.9	12.6	7.8	3.6	46.0	3.0	.4	.2	37.7	.2
5	1/ 5	4.5	4.4	2.1	1.0	46.4	.8	.1	.2	39.7	.1
6	1/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
7	1/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
8	1/ 8	6.9	12.4	7.8	3.6	46.4	2.9	.4	.2	36.9	.2
9	1/ 9	6.9	12.3	7.8	3.6	46.5	3.0	.4	.2	38.6	.2
10	1/10	7.1	12.8	8.1	3.8	46.6	3.1	.4	.2	38.2	.2
11	1/11	6.8	11.7	7.4	3.4	46.8	2.9	.4	.2	39.6	.2
12	1/12	7.2	13.0	8.2	3.8	46.8	3.1	.4	.2	38.1	.2
13	1/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
14	1/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
15	1/15	7.1	12.3	7.9	3.7	47.0	3.0	.4	.2	38.5	.2
16	1/16	6.0	8.1	4.8	2.3	47.0	1.8	.2	.2	37.2	.1
17	1/17	7.2	12.3	8.0	3.8	47.3	3.1	.4	.2	38.3	.2
18	1/18	7.5	13.0	8.4	4.0	47.4	3.2	.4	.2	38.6	.2
19	1/19	7.2	11.6	7.3	3.5	47.8	2.8	.4	.3	37.8	.2
20	1/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
21	1/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
22	1/22	2.3	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
23	1/23	7.6	12.5	8.1	3.9	48.0	3.2	.4	.2	39.4	.2
24	1/24	2.1	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
25	1/25	7.9	13.0	8.5	4.1	48.3	3.3	.5	.2	39.2	.2
26	1/26	8.2	13.6	8.9	4.3	48.4	3.5	.5	.3	39.3	.2
27	1/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
28	1/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
29	1/29	3.8	.6	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
30	1/30	3.2	.4	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
31	1/31	8.3	13.1	8.7	4.3	49.2	3.5	.5	.2	40.0	.2
TOTALS/AVERAGES		144.7	225.4	141.5	66.7	47.1	54.4	7.1	4.3	38.4	3.7

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	7.8	10.7	6.8	3.3	49.4	2.7	.4	.3	39.5	.2
33	2/ 2	8.5	13.2	8.8	4.4	49.5	3.5	.5	.3	40.0	.2
34	2/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
35	2/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
36	2/ 5	4.4	1.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
37	2/ 6	8.4	11.7	8.0	4.0	50.2	3.3	.4	.2	41.8	.2
38	2/ 7	8.9	13.4	9.0	4.6	50.4	3.6	.5	.3	39.6	.2
39	2/ 8	5.5	3.6	2.1	1.1	52.1	1.0	.1	.2	48.1	.1
40	2/ 9	8.5	11.6	7.9	4.0	50.9	3.1	.4	.3	39.2	.2
41	2/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
42	2/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
43	2/12	9.6	14.5	9.8	5.0	51.0	4.0	.5	.3	40.7	.2
44	2/13	9.7	14.5	9.9	5.1	51.0	4.1	.5	.4	41.5	.2
45	2/14	7.9	9.0	6.0	3.0	51.0	2.7	.3	.2	44.6	.2
46	2/15	9.9	14.4	9.9	5.1	51.1	4.0	.6	.3	40.0	.2
47	2/16	9.7	13.7	9.4	4.8	51.2	4.0	.5	.3	41.9	.2
48	2/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
49	2/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
50	2/19	10.1	14.2	9.9	5.1	51.4	4.1	.6	.3	41.6	.2
51	2/20	10.1	14.0	9.8	5.1	51.6	4.1	.6	.3	41.8	.2
52	2/21	4.7	.6	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
53	2/22	9.8	12.4	8.3	4.3	51.5	3.5	.5	.3	42.4	.2
54	2/23	10.4	14.1	10.0	5.2	51.8	4.1	.6	.3	41.1	.2
55	2/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
56	2/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
57	2/26	9.3	10.1	7.1	3.7	51.8	3.0	.4	.3	42.4	.2
58	2/27	10.7	13.7	9.5	4.9	51.8	3.8	.5	.4	40.2	.2
59	2/28	7.4	4.9	3.0	1.5	51.5	1.3	.2	.3	43.5	.1
TOTALS/AVERAGES		171.2	215.4	145.2	74.1	51.0	59.9	8.1	5.5	41.2	3.3

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	11.4	15.1	11.6	5.9	50.9	4.6	.7	.4	39.7	.2
61	3/ 2	11.5	15.2	11.7	6.0	50.9	4.8	.7	.4	41.2	.2
62	3/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
63	3/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
64	3/ 5	11.9	15.3	11.9	6.1	51.2	4.9	.7	.4	41.2	.2
65	3/ 6	12.0	15.3	11.9	6.1	51.4	5.0	.7	.4	41.9	.2
66	3/ 7	12.1	15.5	12.1	6.2	51.4	5.1	.7	.4	41.9	.2
67	3/ 8	11.9	14.5	10.7	5.6	52.5	4.5	.6	.4	42.3	.2
68	3/ 9	9.7	9.2	6.4	3.4	52.6	2.7	.4	.4	41.3	.1
69	3/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
70	3/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
71	3/12	6.7	2.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
72	3/13	12.4	14.9	11.8	6.1	52.0	4.9	.7	.4	41.4	.2
73	3/14	12.5	14.8	11.8	6.1	52.0	5.0	.7	.4	42.5	.2
74	3/15	13.0	16.0	12.7	6.6	51.9	5.3	.7	.4	41.9	.2
75	3/16	10.7	9.9	8.0	4.2	52.0	3.6	.5	.3	44.7	.2
76	3/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
77	3/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
78	3/19	12.6	14.1	11.4	6.0	52.5	4.7	.7	.4	41.5	.2
79	3/20	12.8	14.1	11.1	5.9	53.0	4.8	.7	.4	43.3	.2
80	3/21	12.5	13.0	9.8	5.2	53.0	4.1	.6	.4	42.0	.2
81	3/22	11.6	10.9	7.8	4.2	53.2	3.2	.4	.4	41.4	.2
82	3/23	7.9	4.1	2.0	1.1	54.6	.9	.1	.3	44.8	.1
83	3/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
84	3/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
85	3/26	11.1	9.7	7.0	3.7	53.4	2.7	.4	.4	38.6	.1
86	3/27	10.3	7.4	4.0	2.2	53.3	1.9	.2	.4	46.6	.1
87	3/28	12.6	12.1	9.6	5.1	53.4	3.8	.6	.4	39.6	.2
88	3/29	12.1	10.4	8.1	4.3	53.3	3.5	.5	.4	42.8	.2
89	3/30	8.9	4.3	2.9	1.6	54.1	1.3	.2	.3	45.9	.1
90	3/31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
TOTALS/AVERAGES		248.0	258.0	194.4	101.6	52.2	81.3	11.2	8.3	41.8	3.9

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
92	4/ 2	14.8	16.9	13.9	7.4	53.1	5.7	.8	.4	41.1	.2
93	4/ 3	14.7	16.4	13.7	7.3	53.2	6.0	.8	.4	44.1	.2
94	4/ 4	14.7	16.3	13.5	7.2	53.5	5.9	.8	.5	43.6	.2
95	4/ 5	15.1	17.0	14.1	7.5	53.4	6.1	.8	.5	43.6	.2
96	4/ 6	15.1	16.8	14.0	7.5	53.4	6.1	.8	.5	43.5	.2
97	4/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
98	4/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
99	4/ 9	9.3	5.0	2.7	1.5	54.9	1.1	.1	.3	41.3	.1
100	4/10	13.5	12.2	9.1	4.9	53.8	3.8	.5	.5	41.5	.2
101	4/11	13.9	13.3	10.8	5.8	53.6	4.5	.6	.5	41.6	.2
102	4/12	9.8	5.4	4.3	2.3	53.9	1.8	.2	.5	40.9	.1
103	4/13	11.1	8.2	5.5	3.0	54.4	2.1	.3	.5	38.7	.1
104	4/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
105	4/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
106	4/16	15.3	15.8	13.1	7.1	54.1	5.7	.8	.4	43.3	.2
107	4/17	7.2	1.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
108	4/18	15.7	16.6	14.0	7.5	54.0	6.1	.9	.4	43.4	.2
109	4/19	15.9	17.3	14.5	7.8	53.9	6.4	.9	.5	43.9	.2
110	4/20	16.1	17.5	14.6	7.9	54.0	6.5	.9	.5	44.2	.2
111	4/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
112	4/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
113	4/23	16.4	17.8	14.9	8.1	54.1	6.5	.9	.5	43.7	.2
114	4/24	13.9	12.6	10.0	5.4	53.9	4.3	.6	.5	42.6	.2
115	4/25	11.0	7.3	5.1	2.8	54.9	2.1	.3	.5	41.2	.1
116	4/26	9.7	4.6	3.3	1.8	54.6	1.2	.2	.5	36.2	.1
117	4/27	7.7	1.4	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
118	4/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
119	4/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
120	4/30	15.9	16.0	13.4	7.3	54.5	5.8	.8	.4	43.5	.2
TOTALS/AVERAGES		276.8	255.2	204.6	110.1	53.8	87.6	12.2	9.3	42.8	3.5

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	15.3	14.1	11.4	6.2	54.2	4.9	.7	.5	42.8	.2
122	5/ 2	15.2	13.9	11.2	6.1	54.2	4.9	.7	.5	43.3	.2
123	5/ 3	13.3	9.5	8.0	4.4	54.7	3.9	.5	.3	49.2	.2
124	5/ 4	11.8	7.8	5.3	2.9	55.0	2.0	.3	.4	38.1	.1
125	5/ 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
126	5/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
127	5/ 7	14.5	12.1	9.7	5.3	54.7	4.1	.6	.4	42.2	.2
128	5/ 8	15.1	13.3	10.6	5.8	54.5	4.6	.6	.5	43.2	.2
129	5/ 9	17.0	17.3	14.5	7.9	54.5	6.4	.9	.5	44.1	.2
130	5/10	16.3	15.5	12.5	6.8	54.6	5.5	.8	.5	44.3	.2
131	5/11	17.2	17.7	14.8	8.1	54.6	6.5	.9	.5	44.4	.2
132	5/12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
133	5/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
134	5/14	14.9	12.6	10.2	5.6	54.8	4.4	.6	.4	43.5	.2
135	5/15	12.7	7.8	6.2	3.4	54.9	2.8	.4	.4	45.4	.1
136	5/16	14.8	11.7	10.1	5.5	54.7	4.5	.6	.4	44.2	.2
137	5/17	12.6	9.1	6.1	3.4	55.2	2.4	.3	.5	39.8	.1
138	5/18	11.3	6.7	3.5	1.9	56.0	1.6	.2	.4	44.8	.1
139	5/19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
140	5/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
141	5/21	17.6	18.0	15.6	8.5	54.2	6.6	.9	.5	42.4	.3
142	5/22	17.8	18.3	15.9	8.6	54.2	7.0	1.0	.5	44.3	.3
143	5/23	15.9	14.1	11.3	6.2	54.8	5.0	.7	.5	43.8	.2
144	5/24	9.7	4.5	1.0	.6	57.3	.6	.1	.3	57.8	.0
145	5/25	12.0	7.2	4.0	2.2	56.1	1.7	.2	.4	43.3	.1
146	5/26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
147	5/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
148	5/28	17.6	17.7	15.5	8.4	54.5	6.6	.9	.4	42.8	.3
149	5/29	16.3	14.7	11.7	6.4	54.9	5.1	.7	.5	43.7	.2
150	5/30	17.6	17.6	14.6	8.1	55.0	6.7	.9	.5	45.7	.2
151	5/31	17.2	16.9	13.9	7.7	55.2	6.2	.8	.5	45.0	.2
TOTALS/AVERAGES		343.7	298.1	237.7	130.0	54.7	104.2	14.3	10.7	43.8	4.1

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	17.4	17.1	14.2	7.8	55.0	6.3	.9	.5	44.6	.2
153	6/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
154	6/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
155	6/ 4	18.1	18.5	16.0	8.7	54.5	7.0	1.0	.5	44.0	.3
156	6/ 5	12.8	9.0	6.0	3.3	55.6	2.6	.3	.5	42.9	.1
157	6/ 6	12.8	8.9	5.9	3.3	55.6	2.5	.3	.5	41.6	.1
158	6/ 7	9.8	4.2	1.0	.5	57.7	.5	.0	.3	57.1	.0
159	6/ 8	8.2	1.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
160	6/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
161	6/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
162	6/11	12.8	8.3	4.6	2.6	56.1	1.9	.3	.4	41.0	.1
163	6/12	16.8	15.4	12.4	6.9	55.2	5.1	.7	.5	41.5	.2
164	6/13	15.3	12.2	10.4	5.8	55.1	4.8	.6	.4	46.2	.2
165	6/14	18.3	18.6	16.0	8.8	54.6	7.0	1.0	.5	43.8	.3
166	6/15	16.2	14.2	11.4	6.3	55.0	5.1	.7	.5	44.2	.2
167	6/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
168	6/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
169	6/18	16.0	14.0	11.2	6.2	55.1	4.9	.7	.4	43.9	.2
170	6/19	15.8	13.7	10.9	6.0	55.2	4.8	.7	.5	44.2	.2
171	6/20	17.9	18.2	15.6	8.6	54.8	7.0	.9	.5	44.7	.3
172	6/21	17.4	16.6	13.1	7.2	55.2	5.9	.8	.5	44.7	.2
173	6/22	16.1	14.3	11.2	6.2	55.1	5.0	.7	.5	44.1	.2
174	6/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
175	6/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
176	6/25	12.9	9.3	6.1	3.4	55.7	2.5	.3	.4	41.9	.1
177	6/26	10.1	3.5	1.0	.6	56.2	.6	.0	.3	55.8	.0
178	6/27	12.7	8.0	5.7	3.2	56.0	2.3	.3	.4	40.4	.1
179	6/28	14.8	12.8	8.5	4.8	55.8	3.4	.5	.6	39.8	.2
180	6/29	16.2	14.6	11.5	6.3	55.1	5.0	.7	.5	43.6	.2
181	6/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
TOTALS/AVERAGES		308.4	252.3	192.9	106.4	55.1	84.3	11.5	10.0	43.7	3.3

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
183	7/ 2	15.9	14.1	10.5	5.8	54.9	4.5	.6	.5	42.8	.2
184	7/ 3	17.8	18.3	15.1	8.3	55.0	6.8	.9	.5	44.8	.2
185	7/ 4	15.9	14.8	11.5	6.4	55.6	5.1	.7	.6	44.6	.2
186	7/ 5	16.2	14.8	11.9	6.5	54.9	5.2	.7	.5	43.7	.2
187	7/ 6	8.6	2.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
188	7/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
189	7/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
190	7/ 9	17.6	17.9	15.1	8.3	55.0	6.8	.9	.4	45.0	.2
191	7/10	17.9	18.7	15.5	8.5	55.0	6.9	.9	.5	44.8	.2
192	7/11	17.9	18.6	15.5	8.5	55.0	7.0	.9	.5	45.1	.2
193	7/12	17.9	18.6	15.5	8.5	54.9	7.0	.9	.5	45.0	.2
194	7/13	16.7	16.1	13.3	7.3	55.0	6.0	.8	.5	44.9	.2
195	7/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
196	7/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
197	7/16	16.2	15.1	12.4	6.8	54.7	5.4	.7	.5	43.3	.2
198	7/17	17.4	17.8	15.1	8.3	54.9	6.8	.9	.5	44.8	.2
199	7/18	16.6	16.3	13.8	7.6	55.0	6.4	.9	.5	46.2	.2
200	7/19	16.7	16.8	14.4	7.9	54.9	6.4	.9	.5	44.3	.2
201	7/20	17.2	17.4	14.7	8.1	54.9	6.6	.9	.5	44.9	.2
202	7/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
203	7/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
204	7/23	17.1	17.6	14.7	8.1	54.9	6.5	.9	.5	44.4	.2
205	7/24	16.2	15.6	14.1	7.8	55.0	6.4	.9	.5	45.4	.2
206	7/25	17.1	17.6	15.0	8.2	54.7	6.7	.9	.5	44.7	.2
207	7/26	17.2	17.9	15.0	8.2	54.7	6.7	.9	.5	44.9	.2
208	7/27	14.9	13.8	12.9	7.1	54.9	6.2	.8	.4	47.8	.2
209	7/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
210	7/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
211	7/30	16.9	17.6	14.9	8.1	54.7	6.4	.9	.4	43.3	.2
212	7/31	16.5	16.5	14.4	7.9	54.7	6.4	.9	.5	44.5	.2
TOTALS/AVERAGES		362.6	354.4	295.2	162.1	54.9	132.1	18.1	11.1	44.7	4.7

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	16.1	16.1	13.8	7.6	54.8	6.3	.8	.5	45.4	.2
214	8/ 2	17.0	18.1	15.1	8.3	54.6	6.7	.9	.5	44.4	.2
215	8/ 3	11.5	8.5	5.3	3.0	55.9	2.3	.3	.6	42.4	.1
216	8/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
217	8/ 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
218	8/ 6	16.8	18.0	15.0	8.2	54.6	6.5	.9	.4	43.6	.2
219	8/ 7	16.7	17.8	14.9	8.2	54.6	6.7	.9	.5	44.8	.2
220	8/ 8	15.0	13.9	11.8	6.4	54.3	5.2	.7	.5	43.8	.2
221	8/ 9	16.5	17.4	14.7	8.0	54.5	6.5	.9	.5	44.6	.2
222	8/10	13.6	12.1	9.5	5.2	54.5	4.1	.6	.5	43.7	.2
223	8/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
224	8/12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
225	8/13	11.8	9.2	7.1	3.9	54.6	3.0	.4	.4	42.0	.1
226	8/14	14.3	13.4	10.1	5.5	54.2	4.3	.6	.5	42.5	.2
227	8/15	16.2	17.4	14.6	7.9	54.4	6.5	.9	.5	44.6	.2
228	8/16	16.2	17.4	14.5	7.9	54.4	6.5	.9	.5	44.6	.2
229	8/17	16.1	17.3	14.5	7.9	54.3	6.5	.9	.5	44.6	.2
230	8/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
231	8/19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
232	8/20	15.2	15.5	13.0	7.0	54.0	5.7	.8	.4	43.6	.2
233	8/21	15.2	15.6	13.1	7.1	54.0	5.8	.8	.5	43.9	.2
234	8/22	14.3	13.9	11.3	6.1	54.0	4.9	.7	.5	43.6	.2
235	8/23	13.8	12.7	11.2	6.1	54.2	5.1	.7	.4	45.8	.2
236	8/24	12.0	10.1	7.7	4.2	54.3	3.1	.4	.5	40.7	.1
237	8/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
238	8/26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
239	8/27	15.4	16.7	14.0	7.6	54.1	6.1	.8	.4	43.8	.2
240	8/28	14.7	15.3	12.8	6.9	53.9	5.6	.8	.5	43.8	.2
241	8/29	15.2	16.5	13.8	7.5	54.0	6.1	.8	.5	44.2	.2
242	8/30	15.2	16.5	13.9	7.5	54.0	6.1	.8	.5	44.3	.2
243	8/31	14.7	15.6	13.2	7.2	54.2	6.0	.8	.4	45.1	.2
TOTALS/AVERAGES		343.3	345.1	285.1	154.9	54.3	125.7	16.9	11.5	44.1	4.7

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
245	9/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
246	9/ 3	13.9	14.1	11.2	6.0	53.7	4.8	.7	.4	42.7	.2
247	9/ 4	13.5	13.6	11.2	6.0	53.6	4.8	.7	.5	43.3	.2
248	9/ 5	13.4	13.5	11.2	6.1	53.9	4.9	.7	.4	43.9	.2
249	9/ 6	13.8	14.5	12.1	6.5	53.8	5.3	.7	.5	43.6	.2
250	9/ 7	13.6	14.4	12.3	6.6	53.7	5.5	.7	.4	44.9	.2
251	9/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
252	9/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
253	9/10	12.1	11.6	9.2	4.9	53.6	3.9	.5	.4	41.9	.2
254	9/11	13.6	14.7	12.4	6.6	53.4	5.5	.7	.4	44.1	.2
255	9/12	8.5	5.4	3.7	2.0	54.5	1.5	.2	.4	41.8	.1
256	9/13	10.4	8.0	5.4	2.9	54.5	2.3	.3	.4	42.6	.1
257	9/14	11.4	10.5	8.3	4.4	53.6	3.4	.5	.4	40.4	.2
258	9/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
259	9/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
260	9/17	13.3	14.8	12.3	6.5	53.0	5.3	.7	.4	43.0	.2
261	9/18	12.9	14.0	11.7	6.2	53.0	5.1	.7	.4	43.3	.2
262	9/19	9.7	7.9	5.5	2.9	53.7	2.3	.3	.4	41.3	.1
263	9/20	9.4	7.8	5.7	3.1	53.6	2.3	.3	.4	40.7	.1
264	9/21	11.6	11.4	9.8	5.2	53.1	4.2	.6	.4	42.7	.2
265	9/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
266	9/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
267	9/24	12.7	14.8	12.1	6.4	52.6	5.2	.7	.4	42.8	.2
268	9/25	12.5	14.6	12.0	6.3	52.4	5.2	.7	.4	43.6	.2
269	9/26	11.6	12.7	10.0	5.3	52.9	4.3	.6	.4	42.7	.2
270	9/27	12.1	13.9	11.1	5.9	53.0	4.8	.6	.4	43.1	.2
271	9/28	11.9	13.7	11.1	5.8	52.4	4.9	.6	.4	43.5	.2
272	9/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
273	9/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
TOTALS/AVERAGES		241.8	245.8	198.3	105.7	53.3	85.3	11.3	8.6	43.0	3.7

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	10.6	11.5	8.9	4.7	52.9	3.8	.5	.3	42.2	.2
275	10/ 2	8.2	6.7	4.3	2.3	53.6	1.8	.2	.4	41.5	.1
276	10/ 3	10.4	11.2	7.5	4.0	52.9	3.1	.4	.4	40.8	.2
277	10/ 4	6.5	2.6	.8	.4	54.1	.5	.0	.2	56.3	.0
278	10/ 5	10.5	11.9	9.1	4.8	52.6	3.7	.5	.3	40.3	.2
279	10/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
280	10/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
281	10/ 8	11.1	14.0	10.4	5.5	52.5	4.4	.6	.3	42.8	.2
282	10/ 9	11.0	14.0	10.3	5.4	52.4	4.5	.6	.3	43.2	.2
283	10/10	10.2	12.0	8.2	4.3	52.4	3.5	.5	.4	42.0	.2
284	10/11	7.9	7.5	5.2	2.7	52.4	2.1	.3	.3	40.8	.1
285	10/12	10.9	14.5	10.5	5.5	52.2	4.5	.6	.4	42.3	.2
286	10/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
287	10/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
288	10/15	9.7	11.5	8.9	4.6	51.8	3.7	.5	.3	42.1	.2
289	10/16	8.6	9.2	6.2	3.2	51.8	2.5	.3	.3	40.8	.1
290	10/17	7.7	7.4	5.2	2.7	52.0	2.2	.3	.3	42.4	.1
291	10/18	5.2	2.1	1.2	.6	53.1	.4	.0	.2	35.4	.0
292	10/19	8.0	8.5	5.9	3.1	51.6	2.3	.3	.3	38.9	.1
293	10/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
294	10/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
295	10/22	5.3	2.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
296	10/23	7.5	8.3	6.0	3.1	52.2	2.4	.3	.3	40.7	.2
297	10/24	9.5	13.1	9.2	4.7	51.4	3.8	.5	.3	41.6	.2
298	10/25	9.7	13.8	9.7	5.0	51.3	4.1	.5	.3	41.8	.2
299	10/26	9.6	13.7	9.6	4.9	51.2	4.0	.5	.3	41.9	.2
300	10/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
301	10/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
302	10/29	9.3	13.5	9.5	4.8	50.9	3.9	.5	.3	41.2	.2
303	10/30	9.3	13.5	9.4	4.8	50.8	3.9	.5	.3	41.4	.2
304	10/31	8.8	12.5	8.7	4.4	50.8	3.6	.5	.3	41.9	.2
TOTALS/AVERAGES		205.5	235.1	164.7	85.6	52.0	68.6	9.0	7.3	41.7	3.6

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	7.7	9.7	6.7	3.4	51.1	3.0	.4	.2	44.5	.2
306	11/ 2	9.0	13.4	9.3	4.7	50.5	3.7	.5	.3	39.5	.2
307	11/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
308	11/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
309	11/ 5	8.5	12.9	8.8	4.4	50.0	3.6	.5	.3	40.8	.2
310	11/ 6	7.7	10.4	6.9	3.5	49.8	3.0	.4	.2	42.5	.2
311	11/ 7	5.4	4.1	2.1	1.1	51.0	.9	.1	.2	42.6	.1
312	11/ 8	8.5	13.3	9.0	4.5	49.5	3.5	.5	.3	38.6	.2
313	11/ 9	8.4	13.3	8.9	4.4	49.3	3.6	.5	.3	40.4	.2
314	11/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
315	11/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
316	11/12	8.0	12.9	8.6	4.2	48.8	3.4	.5	.2	40.1	.2
317	11/13	5.5	4.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
318	11/14	3.7	1.7	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
319	11/15	6.2	7.0	4.0	1.9	48.7	1.7	.2	.1	42.5	.2
320	11/16	2.8	.3	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
321	11/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
322	11/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
323	11/19	7.6	12.5	8.1	3.9	47.9	3.1	.4	.2	37.9	.2
324	11/20	7.5	12.6	8.2	3.9	47.8	3.2	.4	.2	38.9	.2
325	11/21	7.5	12.6	8.2	3.9	47.6	3.2	.4	.2	39.4	.2
326	11/22	4.4	2.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
327	11/23	7.4	12.6	8.1	3.9	47.4	3.2	.4	.2	38.8	.2
328	11/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
329	11/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
330	11/26	7.3	12.5	8.0	3.8	47.1	3.1	.4	.2	38.8	.2
331	11/27	7.0	11.6	7.4	3.5	47.0	2.9	.4	.2	39.3	.2
332	11/28	7.2	12.4	7.9	3.7	46.9	3.0	.4	.2	38.4	.2
333	11/29	7.1	12.3	7.8	3.7	46.8	3.0	.4	.2	38.6	.2
334	11/30	7.1	12.3	7.8	3.6	46.6	3.0	.4	.2	38.6	.2
TOTALS/AVERAGES		151.5	216.4	135.8	65.8	48.4	54.0	6.9	4.3	39.8	3.5

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
336	12/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
337	12/ 3	1.8	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
338	12/ 4	5.7	8.7	5.4	2.5	46.4	2.0	.3	.2	37.3	.2
339	12/ 5	4.1	3.7	1.8	.9	48.9	.6	.1	.2	33.8	.1
340	12/ 6	3.4	.9	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
341	12/ 7	6.6	11.3	7.1	3.3	46.1	2.7	.3	.2	37.6	.2
342	12/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
343	12/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
344	12/10	6.8	12.1	7.6	3.5	45.8	2.8	.4	.2	37.2	.2
345	12/11	6.7	12.0	7.5	3.4	45.8	2.8	.4	.2	37.7	.2
346	12/12	6.7	11.9	7.4	3.4	45.8	2.8	.4	.2	37.9	.2
347	12/13	5.9	9.1	5.3	2.4	45.8	2.0	.2	.2	37.6	.2
348	12/14	3.8	2.3	.6	.3	40.8	.3	.0	.1	40.5	.0
349	12/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
350	12/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
351	12/17	5.6	8.4	5.1	2.3	45.8	1.8	.2	.2	35.5	.2
352	12/18	6.7	12.1	7.5	3.4	45.6	2.8	.3	.2	37.1	.2
353	12/19	6.7	12.1	7.5	3.4	45.6	2.9	.3	.2	37.9	.2
354	12/20	6.7	12.1	7.5	3.4	45.6	2.9	.3	.2	37.9	.2
355	12/21	6.5	11.9	7.4	3.4	45.6	2.8	.3	.2	37.9	.2
356	12/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
357	12/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
358	12/24	6.3	11.1	6.9	3.2	45.6	2.6	.3	.2	37.6	.2
359	12/25	5.7	8.8	5.3	2.4	45.7	1.9	.3	.2	36.4	.2
360	12/26	6.7	12.2	7.6	3.4	45.5	2.8	.4	.2	36.8	.2
361	12/27	6.7	12.1	7.5	3.4	45.6	2.8	.4	.2	37.1	.2
362	12/28	5.6	8.1	4.4	2.1	46.7	1.7	.2	.2	37.8	.2
363	12/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
364	12/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
365	12/31	5.5	7.4	4.0	1.9	46.6	1.4	.2	.2	35.3	.1
TOTALS/AVERAGES		120.1	188.7	113.5	52.0	45.8	42.3	5.3	3.8	37.3	3.3

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

26 JANUARY (DAY 26)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.01	0.00
2	10.0	0.00	0.00	0.00	52.8	52.8	0.00	0.0	0.00	.01	0.00
3	10.0	0.00	0.00	0.00	51.6	51.6	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	50.5	50.5	0.00	0.0	0.00	.01	0.00
5	9.4	0.00	0.00	0.00	49.6	49.6	0.00	0.0	0.00	.00	0.00
6	9.4	0.00	0.00	0.00	48.8	48.8	0.00	0.0	0.00	.00	0.00
7	8.3	0.00	0.00	0.00	48.0	48.0	0.00	0.0	0.00	.00	0.00
8	10.6	.33	0.00	0.00	47.6	47.6	0.00	0.0	0.00	.00	0.00
9	13.9	1.15	.92	4.40	61.6	68.2	.44	47.9	.36	.04	.03
10	15.6	1.62	1.17	4.40	86.6	95.5	.60	51.0	.36	.05	.03
11	17.8	1.81	1.18	4.40	95.3	103.8	.57	48.5	.42	.06	.03
12	19.4	1.89	1.14	4.40	96.2	104.2	.54	46.8	.45	.06	.03
13	17.8	1.89	1.14	4.40	96.4	104.4	.53	46.8	.46	.06	.03
14	17.8	1.82	1.18	4.40	99.7	108.2	.57	48.4	.47	.06	.03
15	17.8	1.64	1.18	4.40	103.7	112.7	.60	50.6	.49	.07	.03
16	17.2	1.18	.95	4.40	94.3	101.0	.45	47.2	.47	.06	.03
17	15.6	.29	0.00	0.00	85.3	85.3	0.00	0.0	0.00	.06	0.00
18	13.9	0.00	0.00	0.00	76.8	76.8	0.00	0.0	0.00	.05	0.00
19	13.9	0.00	0.00	0.00	70.9	70.9	0.00	0.0	0.00	.04	0.00
20	13.3	0.00	0.00	0.00	66.5	66.5	0.00	0.0	0.00	.03	0.00
21	13.3	0.00	0.00	0.00	63.2	63.2	0.00	0.0	0.00	.02	0.00
22	13.3	0.00	0.00	0.00	60.6	60.6	0.00	0.0	0.00	.02	0.00
23	13.3	0.00	0.00	0.00	58.6	58.6	0.00	0.0	0.00	.01	0.00
24	12.8	0.00	0.00	0.00	56.9	56.9	0.00	0.0	0.00	.01	0.00
TOTAL/AVE	---	13.62	8.87	---	---	---	4.30	48.4	3.49	.74	.21

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

13 FEBRUARY (DAY 44)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.3	0.00	0.00	0.00	57.0	57.0	0.00	0.0	0.00	.01	0.00
2	11.6	0.00	0.00	0.00	55.3	55.3	0.00	0.0	0.00	.01	0.00
3	10.0	0.00	0.00	0.00	53.7	53.7	0.00	0.0	0.00	.01	0.00
4	8.3	0.00	0.00	0.00	52.0	52.0	0.00	0.0	0.00	.01	0.00
5	8.9	0.00	0.00	0.00	50.8	50.8	0.00	0.0	0.00	.01	0.00
6	9.4	0.00	0.00	0.00	49.8	49.8	0.00	0.0	0.00	.01	0.00
7	10.0	0.00	0.00	0.00	49.1	49.1	0.00	0.0	0.00	.00	0.00
8	13.0	.58	0.00	0.00	48.9	48.9	0.00	0.0	0.00	.00	0.00
9	15.9	1.26	1.06	4.40	75.9	84.5	.57	53.9	.45	.05	.03
10	18.9	1.64	1.27	4.40	99.4	109.4	.66	52.1	.44	.06	.03
11	20.0	1.84	1.31	4.40	109.0	118.8	.66	50.3	.49	.07	.03
12	21.1	1.92	1.29	4.40	111.2	120.7	.63	49.0	.53	.07	.03
13	22.2	1.91	1.28	4.40	112.0	121.5	.63	49.1	.54	.07	.03
14	21.3	1.84	1.31	4.40	114.6	124.5	.66	50.2	.55	.07	.03
15	20.3	1.66	1.28	4.40	116.5	126.4	.66	51.7	.56	.08	.03
16	19.4	1.29	1.10	4.40	111.7	120.5	.58	53.0	.55	.07	.03
17	17.2	.61	0.00	0.00	96.5	96.5	0.00	0.0	0.00	.07	0.00
18	15.0	0.00	0.00	0.00	84.3	84.3	0.00	0.0	0.00	.06	0.00
19	12.8	0.00	0.00	0.00	75.8	75.8	0.00	0.0	0.00	.05	0.00
20	12.6	0.00	0.00	0.00	69.8	69.8	0.00	0.0	0.00	.04	0.00
21	12.4	0.00	0.00	0.00	65.5	65.5	0.00	0.0	0.00	.03	0.00
22	12.2	0.00	0.00	0.00	62.2	62.2	0.00	0.0	0.00	.02	0.00
23	11.8	0.00	0.00	0.00	59.5	59.5	0.00	0.0	0.00	.02	0.00
24	11.5	0.00	0.00	0.00	57.3	57.3	0.00	0.0	0.00	.01	0.00
TOTAL/AVE	---	14.55	9.91	---	---	---	5.06	51.0	4.12	.90	.21

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

15 MARCH (DAY 74)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	55.1	55.1	0.00	0.0	0.00	.01	0.00
2	10.2	0.00	0.00	0.00	53.5	53.5	0.00	0.0	0.00	.01	0.00
3	9.8	0.00	0.00	0.00	52.2	52.2	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	51.0	51.0	0.00	0.0	0.00	.01	0.00
5	9.0	0.00	0.00	0.00	49.9	49.9	0.00	0.0	0.00	.01	0.00
6	8.7	0.00	0.00	0.00	49.0	49.0	0.00	0.0	0.00	.01	0.00
7	8.3	.12	0.00	0.00	48.1	48.1	0.00	0.0	0.00	.00	0.00
8	10.9	.89	.86	4.40	58.7	64.0	.35	41.0	.44	.04	.03
9	13.5	1.44	1.33	4.40	96.4	107.3	.73	54.5	.41	.06	.03
10	16.1	1.74	1.52	4.40	120.8	132.9	.81	53.4	.51	.08	.03
11	16.7	1.88	1.56	4.40	132.3	144.6	.82	52.4	.60	.09	.03
12	17.2	1.92	1.54	4.40	136.2	148.2	.80	51.8	.65	.09	.03
13	17.8	1.89	1.51	4.40	136.8	148.6	.78	51.7	.67	.09	.03
14	17.6	1.85	1.53	4.40	138.6	150.6	.80	52.2	.68	.10	.03
15	17.4	1.73	1.51	4.40	139.4	151.3	.80	52.8	.69	.10	.03
16	17.2	1.46	1.35	4.40	134.6	145.4	.72	53.5	.68	.09	.03
17	15.9	.93	0.00	0.00	107.1	107.1	0.00	0.0	0.00	.10	0.00
18	14.6	.11	0.00	0.00	90.4	90.4	0.00	0.0	0.00	.07	0.00
19	13.3	0.00	0.00	0.00	79.9	79.9	0.00	0.0	0.00	.06	0.00
20	13.3	0.00	0.00	0.00	72.9	72.9	0.00	0.0	0.00	.04	0.00
21	13.3	0.00	0.00	0.00	68.0	68.0	0.00	0.0	0.00	.03	0.00
22	13.3	0.00	0.00	0.00	64.3	64.3	0.00	0.0	0.00	.03	0.00
23	13.3	0.00	0.00	0.00	61.5	61.5	0.00	0.0	0.00	.02	0.00
24	13.3	0.00	0.00	0.00	59.3	59.3	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	15.96	12.72	---	---	---	6.61	51.9	5.33	1.17	.23

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

23 APRIL (DAY 113)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	12.8	0.00	0.00	0.00	51.7	51.7	0.00	0.0	0.00	.00	0.00
2	13.3	0.00	0.00	0.00	51.2	51.2	0.00	0.0	0.00	.00	0.00
3	12.8	0.00	0.00	0.00	50.7	50.7	0.00	0.0	0.00	.00	0.00
4	12.8	0.00	0.00	0.00	50.3	50.3	0.00	0.0	0.00	.00	0.00
5	12.8	0.00	0.00	0.00	49.9	49.9	0.00	0.0	0.00	.00	0.00
6	12.2	0.00	0.00	0.00	49.5	49.5	0.00	0.0	0.00	.00	0.00
7	11.7	.50	0.00	0.00	49.1	49.1	0.00	0.0	0.00	.00	0.00
8	15.0	1.17	1.16	4.40	88.7	98.7	.67	57.1	.58	.06	.03
9	17.2	1.62	1.60	4.40	124.8	138.0	.88	55.3	.56	.08	.03
10	19.4	1.84	1.77	4.40	147.1	161.5	.96	54.2	.66	.10	.03
11	20.0	1.89	1.78	4.40	156.6	170.9	.95	53.5	.74	.11	.03
12	20.6	1.90	1.77	4.40	160.1	174.3	.94	53.2	.78	.11	.03
13	18.9	1.88	1.74	4.40	160.6	174.5	.93	53.2	.80	.11	.03
14	19.4	1.87	1.76	4.40	161.9	176.0	.94	53.3	.81	.11	.03
15	18.3	1.81	1.75	4.40	162.2	176.2	.94	53.6	.81	.11	.03
16	18.9	1.62	1.60	4.40	157.9	170.9	.87	54.2	.80	.11	.03
17	17.8	1.20	0.00	0.00	117.5	117.5	0.00	0.0	0.00	.12	0.00
18	16.1	.52	0.00	0.00	96.7	96.7	0.00	0.0	0.00	.09	0.00
19	15.0	0.00	0.00	0.00	84.4	84.4	0.00	0.0	0.00	.07	0.00
20	13.3	0.00	0.00	0.00	76.0	76.0	0.00	0.0	0.00	.05	0.00
21	12.8	0.00	0.00	0.00	70.1	70.1	0.00	0.0	0.00	.04	0.00
22	12.8	0.00	0.00	0.00	65.8	65.8	0.00	0.0	0.00	.03	0.00
23	12.8	0.00	0.00	0.00	62.5	62.5	0.00	0.0	0.00	.03	0.00
24	13.9	0.00	0.00	0.00	60.2	60.2	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	17.79	14.93	---	---	---	8.07	54.1	6.52	1.38	.23

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

22 MAY (DAY 142)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	14.3	0.00	0.00	0.00	60.0	60.0	0.00	0.0	0.00	.02	0.00
2	13.9	0.00	0.00	0.00	58.2	58.2	0.00	0.0	0.00	.01	0.00
3	13.7	0.00	0.00	0.00	56.7	56.7	0.00	0.0	0.00	.01	0.00
4	13.5	0.00	0.00	0.00	55.4	55.4	0.00	0.0	0.00	.01	0.00
5	13.3	0.00	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.01	0.00
6	14.1	.02	0.00	0.00	53.6	53.6	0.00	0.0	0.00	.01	0.00
7	14.8	.72	.70	4.40	60.7	65.2	.30	42.0	.54	.03	.03
8	15.6	1.29	1.29	4.40	97.8	108.7	.73	56.4	.44	.06	.03
9	17.3	1.63	1.63	4.40	131.1	144.9	.92	56.4	.55	.09	.03
10	18.9	1.78	1.77	4.40	150.7	165.3	.97	54.9	.67	.10	.03
11	20.6	1.82	1.79	4.40	159.7	174.2	.97	54.2	.75	.11	.03
12	20.8	1.84	1.78	4.40	163.3	177.7	.96	53.9	.80	.11	.03
13	20.9	1.81	1.76	4.40	163.9	178.1	.95	53.8	.81	.11	.03
14	21.1	1.80	1.77	4.40	164.9	179.2	.95	54.0	.82	.11	.03
15	20.7	1.77	1.76	4.40	165.7	180.0	.96	54.5	.83	.12	.03
16	20.4	1.65	1.65	4.40	163.6	177.3	.91	55.4	.82	.11	.03
17	20.0	1.34	0.00	0.00	121.0	121.0	0.00	0.0	0.00	.12	0.00
18	18.9	.79	0.00	0.00	99.8	99.8	0.00	0.0	0.00	.09	0.00
19	17.8	.03	0.00	0.00	87.4	87.4	0.00	0.0	0.00	.07	0.00
20	16.7	0.00	0.00	0.00	79.2	79.2	0.00	0.0	0.00	.05	0.00
21	16.3	0.00	0.00	0.00	73.3	73.3	0.00	0.0	0.00	.04	0.00
22	16.0	0.00	0.00	0.00	69.0	69.0	0.00	0.0	0.00	.03	0.00
23	15.6	0.00	0.00	0.00	65.6	65.6	0.00	0.0	0.00	.03	0.00
24	15.6	0.00	0.00	0.00	63.0	63.0	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	18.31	15.89	---	---	---	8.61	54.2	7.04	1.50	.26

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

4 JUNE (DAY 155)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.2	0.00	0.00	0.00	49.6	49.6	0.00	0.0	0.00	.00	0.00
2	12.8	0.00	0.00	0.00	49.3	49.3	0.00	0.0	0.00	.00	0.00
3	12.6	0.00	0.00	0.00	49.0	49.0	0.00	0.0	0.00	.00	0.00
4	12.4	0.00	0.00	0.00	48.8	48.8	0.00	0.0	0.00	.00	0.00
5	12.2	0.00	0.00	0.00	48.5	48.5	0.00	0.0	0.00	.00	0.00
6	13.1	.04	0.00	0.00	48.4	48.4	0.00	0.0	0.00	.00	0.00
7	14.1	.73	.71	4.40	59.2	64.0	.32	44.7	.51	.03	.03
8	15.0	1.33	1.32	4.40	98.2	109.3	.74	56.1	.43	.06	.03
9	15.9	1.64	1.64	4.40	132.0	146.0	.93	56.7	.55	.09	.03
10	16.9	1.77	1.77	4.40	151.2	165.8	.97	55.1	.67	.11	.03
11	17.8	1.81	1.79	4.40	160.1	174.7	.97	54.3	.76	.11	.03
12	18.3	1.82	1.79	4.40	163.6	178.1	.96	54.0	.80	.12	.03
13	18.9	1.80	1.76	4.40	164.4	178.7	.95	53.9	.82	.12	.03
14	19.4	1.80	1.77	4.40	165.5	179.9	.96	54.2	.83	.12	.03
15	19.0	1.77	1.76	4.40	166.3	180.8	.96	54.7	.83	.12	.03
16	18.7	1.66	1.66	4.40	165.1	179.0	.93	55.7	.83	.12	.03
17	18.3	1.39	0.00	0.00	120.3	120.3	0.00	0.0	0.00	.13	0.00
18	17.6	.84	0.00	0.00	98.8	98.8	0.00	0.0	0.00	.09	0.00
19	16.8	.06	0.00	0.00	86.5	86.5	0.00	0.0	0.00	.07	0.00
20	16.1	0.00	0.00	0.00	78.3	78.3	0.00	0.0	0.00	.05	0.00
21	15.5	0.00	0.00	0.00	72.5	72.5	0.00	0.0	0.00	.04	0.00
22	15.0	0.00	0.00	0.00	68.1	68.1	0.00	0.0	0.00	.03	0.00
23	14.4	0.00	0.00	0.00	64.7	64.7	0.00	0.0	0.00	.03	0.00
24	14.2	0.00	0.00	0.00	62.0	62.0	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	18.47	15.97	---	---	---	8.70	54.5	7.02	1.46	.26

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

10 JULY (DAY 191)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	18.9	0.00	0.00	0.00	64.0	64.0	0.00	0.0	0.00	.02	0.00
2	18.9	0.00	0.00	0.00	62.4	62.4	0.00	0.0	0.00	.01	0.00
3	18.9	0.00	0.00	0.00	61.1	61.1	0.00	0.0	0.00	.01	0.00
4	18.3	0.00	0.00	0.00	59.9	59.9	0.00	0.0	0.00	.01	0.00
5	17.8	0.00	0.00	0.00	58.8	58.8	0.00	0.0	0.00	.01	0.00
6	17.8	.03	0.00	0.00	57.9	57.9	0.00	0.0	0.00	.01	0.00
7	18.9	.66	0.00	0.00	57.3	57.3	0.00	0.0	0.00	.00	0.00
8	20.0	1.32	1.31	4.40	99.4	110.4	.74	56.2	.64	.06	.03
9	24.4	1.65	1.65	4.40	135.1	149.2	.94	56.9	.61	.09	.03
10	24.4	1.80	1.79	4.40	154.9	169.7	.99	55.2	.70	.10	.03
11	25.6	1.84	1.81	4.40	163.6	178.4	.99	54.5	.78	.11	.03
12	25.0	1.85	1.81	4.40	167.1	181.8	.98	54.1	.82	.11	.03
13	25.0	1.84	1.80	4.40	168.2	182.8	.97	54.0	.84	.11	.03
14	25.0	1.84	1.81	4.40	169.4	184.1	.98	54.3	.85	.12	.03
15	25.0	1.81	1.80	4.40	170.3	185.0	.98	54.8	.85	.12	.03
16	26.7	1.70	1.70	4.40	169.4	183.7	.95	55.9	.85	.11	.03
17	26.7	1.42	0.00	0.00	127.5	127.5	0.00	0.0	0.00	.12	0.00
18	25.6	.84	0.00	0.00	106.4	106.4	0.00	0.0	0.00	.09	0.00
19	24.4	.07	0.00	0.00	94.0	94.0	0.00	0.0	0.00	.07	0.00
20	22.2	0.00	0.00	0.00	85.4	85.4	0.00	0.0	0.00	.05	0.00
21	20.6	0.00	0.00	0.00	79.0	79.0	0.00	0.0	0.00	.04	0.00
22	20.0	0.00	0.00	0.00	74.2	74.2	0.00	0.0	0.00	.04	0.00
23	19.4	0.00	0.00	0.00	70.5	70.5	0.00	0.0	0.00	.03	0.00
24	18.9	0.00	0.00	0.00	67.6	67.6	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	18.66	15.49	---	---	---	8.52	55.0	6.93	1.48	.23

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

2 AUGUST (DAY 214)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	17.2	0.00	0.00	0.00	62.3	62.3	0.00	0.0	0.00	.02	0.00
2	17.2	0.00	0.00	0.00	60.7	60.7	0.00	0.0	0.00	.01	0.00
3	17.2	0.00	0.00	0.00	59.4	59.4	0.00	0.0	0.00	.01	0.00
4	16.7	0.00	0.00	0.00	58.2	58.2	0.00	0.0	0.00	.01	0.00
5	17.2	0.00	0.00	0.00	57.3	57.3	0.00	0.0	0.00	.01	0.00
6	17.8	0.00	0.00	0.00	56.6	56.6	0.00	0.0	0.00	.01	0.00
7	20.0	.58	0.00	0.00	56.4	56.4	0.00	0.0	0.00	.00	0.00
8	21.7	1.24	1.24	4.40	95.7	106.3	.71	57.0	.61	.06	.03
9	22.2	1.60	1.60	4.40	129.4	142.8	.89	56.0	.59	.09	.03
10	23.9	1.78	1.75	4.40	149.4	163.8	.96	54.8	.68	.10	.03
11	23.3	1.83	1.78	4.40	158.7	173.1	.96	54.0	.75	.11	.03
12	25.0	1.85	1.77	4.40	162.6	176.9	.95	53.8	.79	.11	.03
13	25.6	1.85	1.77	4.40	164.3	178.5	.95	53.7	.81	.11	.03
14	25.6	1.84	1.78	4.40	165.7	180.1	.96	53.9	.82	.11	.03
15	23.9	1.80	1.77	4.40	166.5	181.0	.96	54.2	.83	.11	.03
16	23.3	1.67	1.66	4.40	164.3	178.0	.91	55.0	.83	.11	.03
17	21.7	1.35	0.00	0.00	122.3	122.3	0.00	0.0	0.00	.12	0.00
18	21.1	.70	0.00	0.00	101.6	101.6	0.00	0.0	0.00	.09	0.00
19	20.6	.00	0.00	0.00	89.6	89.6	0.00	0.0	0.00	.07	0.00
20	20.0	0.00	0.00	0.00	81.7	81.7	0.00	0.0	0.00	.05	0.00
21	19.4	0.00	0.00	0.00	76.0	76.0	0.00	0.0	0.00	.04	0.00
22	19.4	0.00	0.00	0.00	71.9	71.9	0.00	0.0	0.00	.03	0.00
23	20.0	0.00	0.00	0.00	68.9	68.9	0.00	0.0	0.00	.03	0.00
24	19.4	0.00	0.00	0.00	66.4	66.4	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	18.09	15.13	---	---	---	8.26	54.6	6.71	1.43	.23

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

10 SEPTEMBER (DAY 253)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	18.9	0.00	0.00	0.00	54.5	54.5	0.00	0.0	0.00	.00	0.00
2	18.3	0.00	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.00	0.00
3	18.3	0.00	0.00	0.00	54.1	54.1	0.00	0.0	0.00	.00	0.00
4	18.3	0.00	0.00	0.00	53.9	53.9	0.00	0.0	0.00	.00	0.00
5	18.3	0.00	0.00	0.00	53.8	53.8	0.00	0.0	0.00	.00	0.00
6	18.3	0.00	0.00	0.00	53.7	53.7	0.00	0.0	0.00	.00	0.00
7	18.3	.01	0.00	0.00	53.6	53.6	0.00	0.0	0.00	.00	0.00
8	18.3	.03	0.00	0.00	53.5	53.5	0.00	0.0	0.00	.00	0.00
9	18.9	.06	0.00	0.00	53.5	53.5	0.00	0.0	0.00	.00	0.00
10	20.6	.08	0.00	0.00	53.7	53.7	0.00	0.0	0.00	-.00	0.00
11	22.8	1.67	1.49	4.40	99.9	112.0	.81	54.3	.56	.06	.03
12	23.3	1.84	1.60	4.40	127.8	140.6	.85	53.4	.57	.08	.03
13	22.2	1.73	1.51	4.40	134.8	146.8	.80	53.1	.63	.09	.03
14	23.3	1.80	1.60	4.40	142.3	155.1	.85	53.2	.68	.10	.03
15	22.8	1.71	1.58	4.40	145.4	158.1	.85	53.5	.71	.10	.03
16	22.2	1.49	1.43	4.40	142.2	153.8	.77	54.0	.71	.10	.03
17	21.1	1.02	0.00	0.00	113.5	113.5	0.00	0.0	0.00	.10	0.00
18	20.6	.14	0.00	0.00	96.6	96.6	0.00	0.0	0.00	.07	0.00
19	19.4	0.00	0.00	0.00	86.0	86.0	0.00	0.0	0.00	.06	0.00
20	18.9	0.00	0.00	0.00	78.9	78.9	0.00	0.0	0.00	.04	0.00
21	18.3	0.00	0.00	0.00	73.7	73.7	0.00	0.0	0.00	.04	0.00
22	18.3	0.00	0.00	0.00	69.9	69.9	0.00	0.0	0.00	.03	0.00
23	17.8	0.00	0.00	0.00	66.8	66.8	0.00	0.0	0.00	.02	0.00
24	18.3	0.00	0.00	0.00	64.5	64.5	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	11.59	9.21	---	---	---	4.93	53.6	3.86	.91	.16

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

12 OCTOBER (DAY 285)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	16.1	0.00	0.00	0.00	60.1	60.1	0.00	0.0	0.00	.01	0.00
2	15.6	0.00	0.00	0.00	58.6	58.6	0.00	0.0	0.00	.01	0.00
3	15.0	0.00	0.00	0.00	57.2	57.2	0.00	0.0	0.00	.01	0.00
4	15.0	0.00	0.00	0.00	56.1	56.1	0.00	0.0	0.00	.01	0.00
5	13.9	0.00	0.00	0.00	55.0	55.0	0.00	0.0	0.00	.01	0.00
6	13.9	0.00	0.00	0.00	54.1	54.1	0.00	0.0	0.00	.01	0.00
7	13.9	0.00	0.00	0.00	53.3	53.3	0.00	0.0	0.00	.00	0.00
8	14.4	.60	0.00	0.00	52.7	52.7	0.00	0.0	0.00	.00	0.00
9	17.8	1.27	1.13	4.40	80.8	90.0	.61	54.4	.47	.05	.03
10	20.0	1.62	1.34	4.40	106.0	116.7	.71	53.0	.47	.07	.03
11	20.6	1.80	1.39	4.40	117.5	128.3	.72	51.7	.53	.08	.03
12	21.7	1.87	1.39	4.40	121.4	132.0	.70	50.8	.57	.08	.03
13	21.7	1.86	1.38	4.40	122.7	133.2	.70	50.8	.59	.08	.03
14	21.1	1.80	1.39	4.40	124.9	135.6	.72	51.5	.61	.08	.03
15	20.6	1.64	1.36	4.40	125.6	136.3	.71	52.5	.61	.08	.03
16	20.6	1.31	1.17	4.40	119.8	129.1	.62	53.4	.60	.08	.03
17	19.4	.67	0.00	0.00	101.8	101.8	0.00	0.0	0.00	.08	0.00
18	18.3	0.00	0.00	0.00	88.9	88.9	0.00	0.0	0.00	.06	0.00
19	17.2	0.00	0.00	0.00	80.3	80.3	0.00	0.0	0.00	.05	0.00
20	17.2	0.00	0.00	0.00	74.4	74.4	0.00	0.0	0.00	.04	0.00
21	17.2	0.00	0.00	0.00	70.1	70.1	0.00	0.0	0.00	.03	0.00
22	16.7	0.00	0.00	0.00	66.7	66.7	0.00	0.0	0.00	.02	0.00
23	16.7	0.00	0.00	0.00	64.1	64.1	0.00	0.0	0.00	.02	0.00
24	16.7	0.00	0.00	0.00	62.1	62.1	0.00	0.0	0.00	.01	0.00
TOTAL/AVE	---	14.46	10.54	---	---	---	5.50	52.2	4.46	.96	.21

RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

2 NOVEMBER (DAY 306)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.5	0.00	0.00	0.00	55.3	55.3	0.00	0.0	0.00	.01	0.00
2	12.8	0.00	0.00	0.00	54.1	54.1	0.00	0.0	0.00	.01	0.00
3	12.6	0.00	0.00	0.00	53.1	53.1	0.00	0.0	0.00	.01	0.00
4	12.4	0.00	0.00	0.00	52.3	52.3	0.00	0.0	0.00	.00	0.00
5	12.2	0.00	0.00	0.00	51.5	51.5	0.00	0.0	0.00	.00	0.00
6	12.0	0.00	0.00	0.00	50.8	50.8	0.00	0.0	0.00	.00	0.00
7	11.9	0.00	0.00	0.00	50.3	50.3	0.00	0.0	0.00	.00	0.00
8	11.7	.26	0.00	0.00	49.7	49.7	0.00	0.0	0.00	.00	0.00
9	13.9	1.11	.92	4.40	64.1	71.4	.49	53.1	.32	.04	.03
10	16.1	1.57	1.19	4.40	89.3	98.5	.62	51.9	.36	.06	.03
11	18.3	1.79	1.24	4.40	100.5	109.8	.62	49.8	.44	.06	.03
12	18.9	1.88	1.22	4.40	103.3	112.2	.59	48.4	.48	.07	.03
13	19.4	1.87	1.22	4.40	104.6	113.5	.59	48.4	.50	.07	.03
14	20.0	1.80	1.24	4.40	107.7	117.0	.62	49.6	.51	.07	.03
15	19.8	1.62	1.23	4.40	110.3	119.8	.63	51.4	.53	.07	.03
16	19.6	1.20	1.00	4.40	103.8	111.6	.52	52.2	.52	.07	.03
17	19.4	.31	0.00	0.00	92.8	92.8	0.00	0.0	0.00	.06	0.00
18	18.5	0.00	0.00	0.00	83.3	83.3	0.00	0.0	0.00	.05	0.00
19	17.6	0.00	0.00	0.00	76.6	76.6	0.00	0.0	0.00	.04	0.00
20	16.7	0.00	0.00	0.00	71.6	71.6	0.00	0.0	0.00	.03	0.00
21	16.3	0.00	0.00	0.00	67.8	67.8	0.00	0.0	0.00	.02	0.00
22	16.0	0.00	0.00	0.00	64.8	64.8	0.00	0.0	0.00	.02	0.00
23	15.6	0.00	0.00	0.00	62.4	62.4	0.00	0.0	0.00	.02	0.00
24	15.2	0.00	0.00	0.00	60.4	60.4	0.00	0.0	0.00	.01	0.00
TOTAL/AVE	---	13.41	9.26	---	---	---	4.67	50.5	3.66	.79	.21

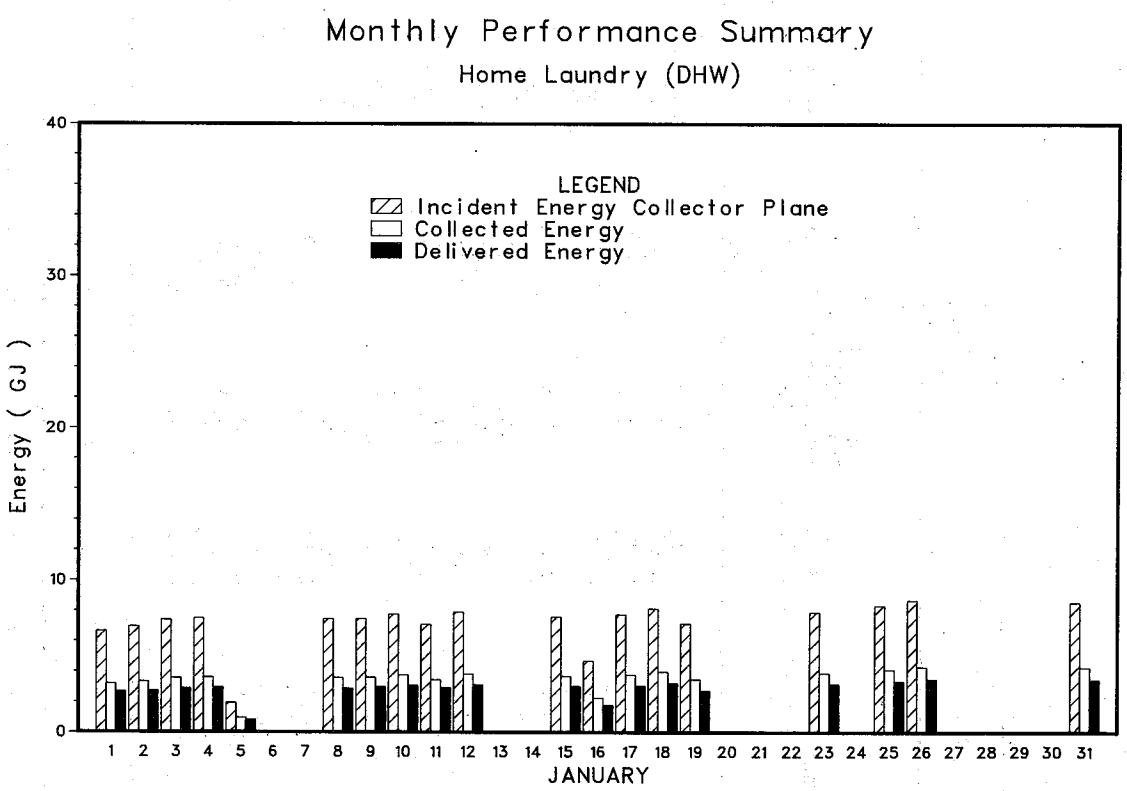
RUN ID: HW2
83/09/02.

HOME LAUNDRY (DHW)

CLEAR DAY PERFORMANCE TABLE

26 DECEMBER (DAY 360)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	7.8	0.00	0.00	0.00	49.9	49.9	0.00	0.0	0.00	.01	0.00
2	7.2	0.00	0.00	0.00	48.7	48.7	0.00	0.0	0.00	.01	0.00
3	7.2	0.00	0.00	0.00	47.7	47.7	0.00	0.0	0.00	.01	0.00
4	6.7	0.00	0.00	0.00	46.8	46.8	0.00	0.0	0.00	.00	0.00
5	6.7	0.00	0.00	0.00	46.0	46.0	0.00	0.0	0.00	.00	0.00
6	6.7	0.00	0.00	0.00	45.4	45.4	0.00	0.0	0.00	.00	0.00
7	6.1	0.00	0.00	0.00	44.8	44.8	0.00	0.0	0.00	.00	0.00
8	6.7	.11	0.00	0.00	44.3	44.3	0.00	0.0	0.00	.00	0.00
9	7.8	.99	.76	4.40	46.0	50.6	.31	40.6	.27	.03	.03
10	10.0	1.48	1.00	4.40	70.0	77.5	.50	49.8	.28	.04	.03
11	12.2	1.72	1.02	4.40	79.1	86.2	.48	46.6	.33	.05	.03
12	14.4	1.81	.98	4.40	79.7	86.3	.44	44.4	.36	.05	.03
13	14.4	1.81	.99	4.40	80.1	86.7	.44	44.4	.37	.05	.03
14	14.4	1.73	1.03	4.40	83.9	91.0	.48	46.5	.39	.05	.03
15	15.0	1.50	1.01	4.40	87.7	95.2	.50	49.4	.40	.06	.03
16	15.0	1.00	.77	4.40	74.5	79.2	.31	40.1	.38	.05	.03
17	14.4	.05	0.00	0.00	71.1	71.1	0.00	0.0	0.00	.04	0.00
18	13.9	0.00	0.00	0.00	66.8	66.8	0.00	0.0	0.00	.03	0.00
19	12.2	0.00	0.00	0.00	63.2	63.2	0.00	0.0	0.00	.03	0.00
20	12.2	0.00	0.00	0.00	60.4	60.4	0.00	0.0	0.00	.02	0.00
21	11.1	0.00	0.00	0.00	57.9	57.9	0.00	0.0	0.00	.02	0.00
22	11.1	0.00	0.00	0.00	56.0	56.0	0.00	0.0	0.00	.01	0.00
23	10.6	0.00	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.01	0.00
24	10.0	0.00	0.00	0.00	52.9	52.9	0.00	0.0	0.00	.01	0.00
TOTAL/AVE	---	12.23	7.57	---	---	---	3.45	45.5	2.79	.59	.21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Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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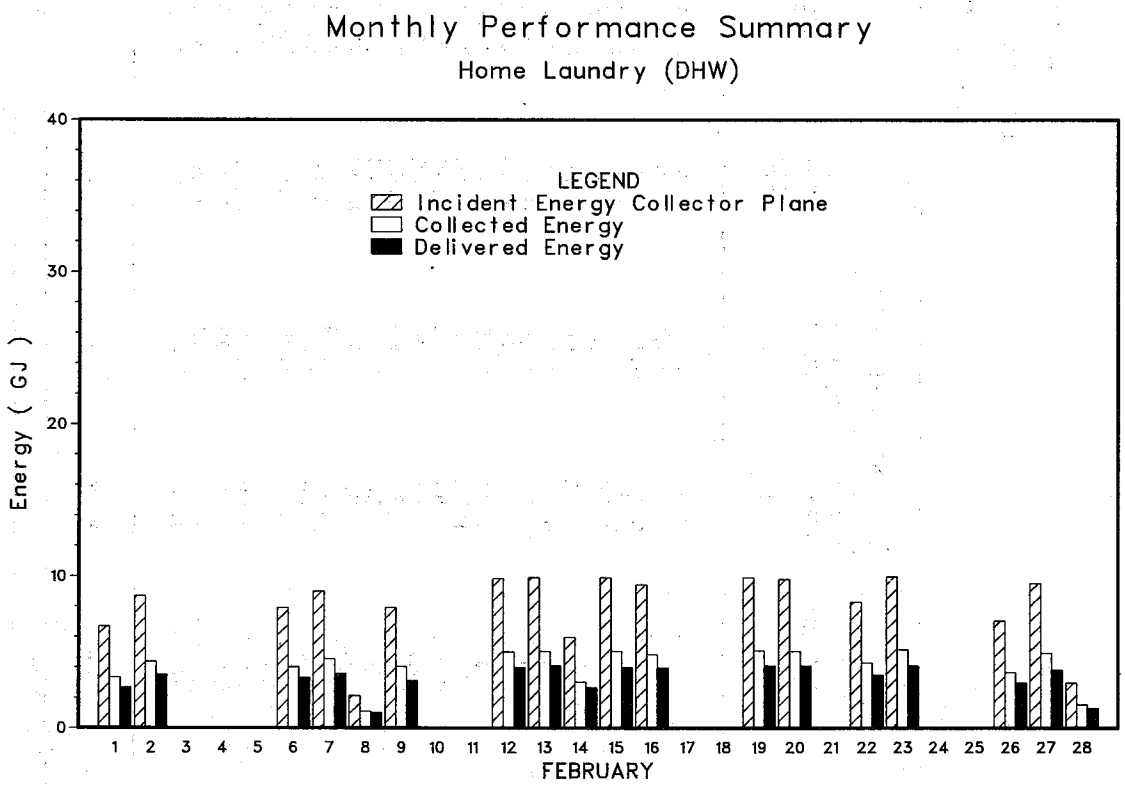
Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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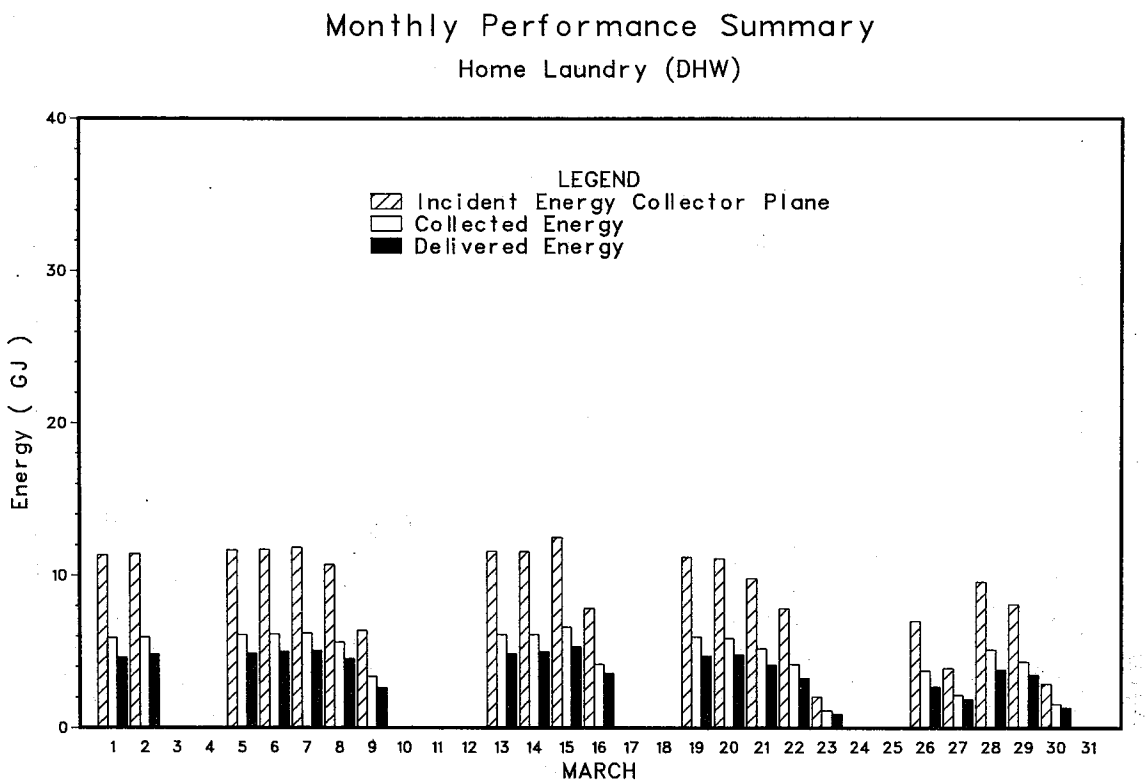
Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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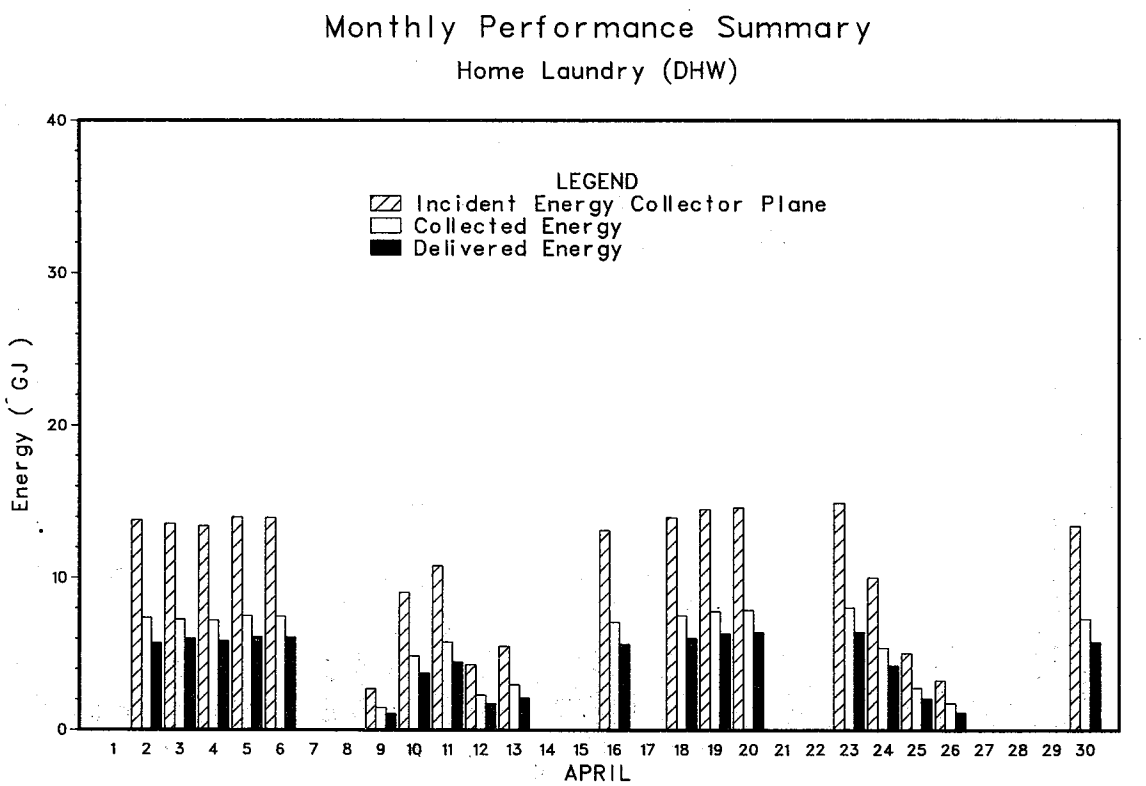
MARCH


Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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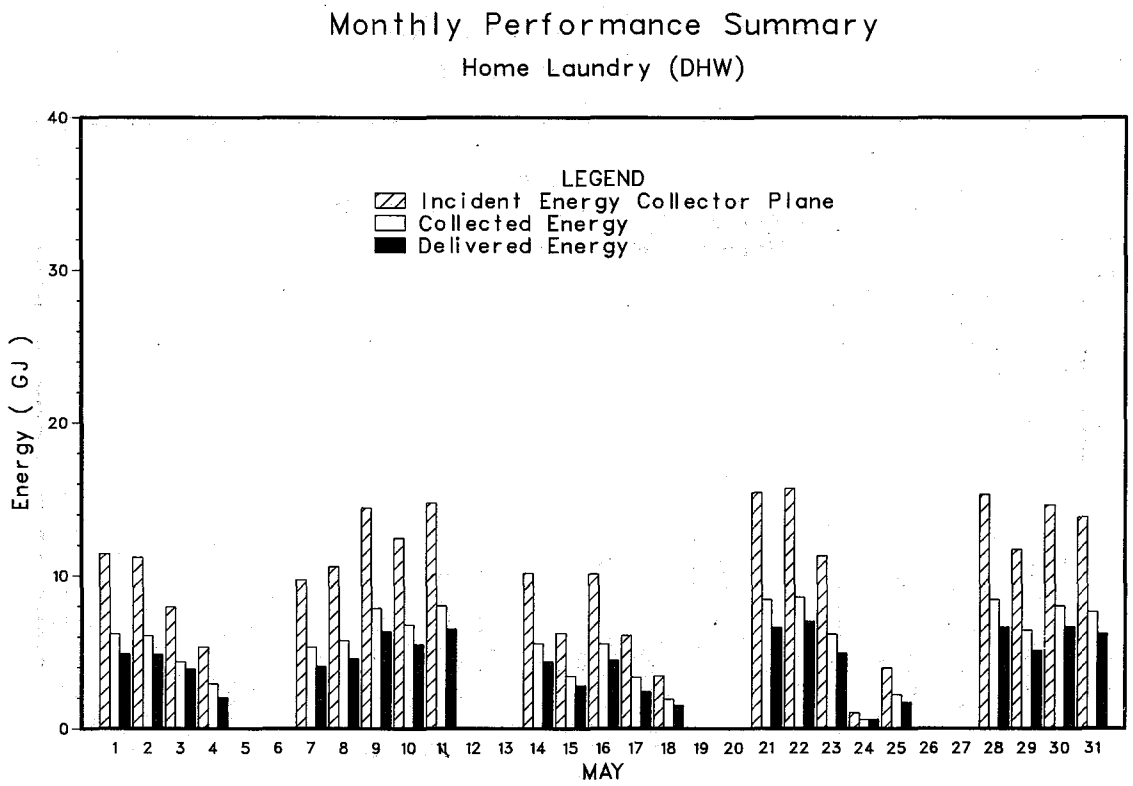
Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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40
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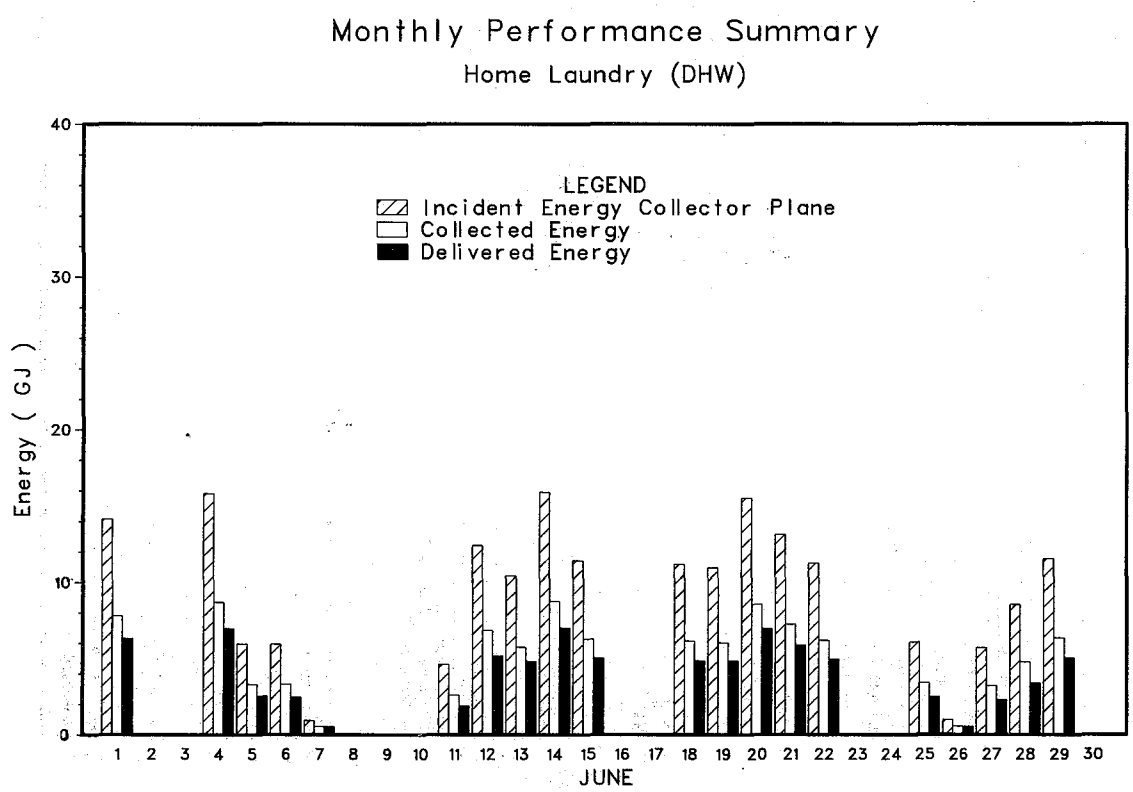
MAY


Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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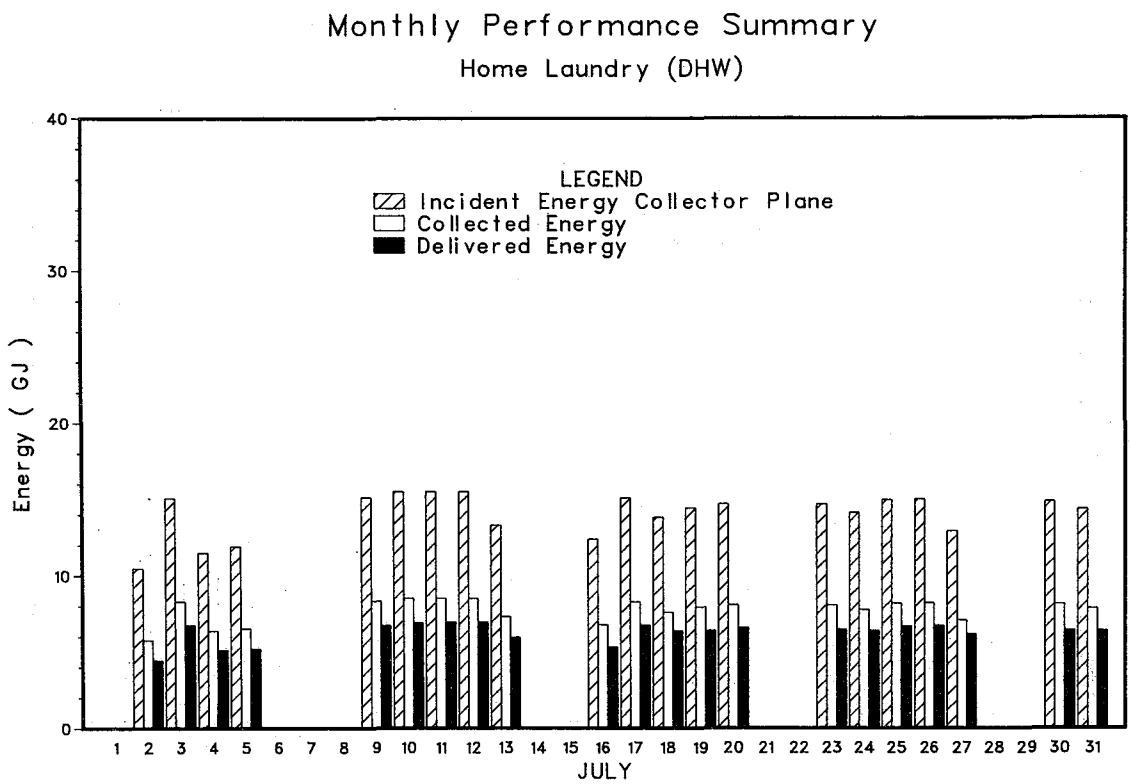
JUNE


Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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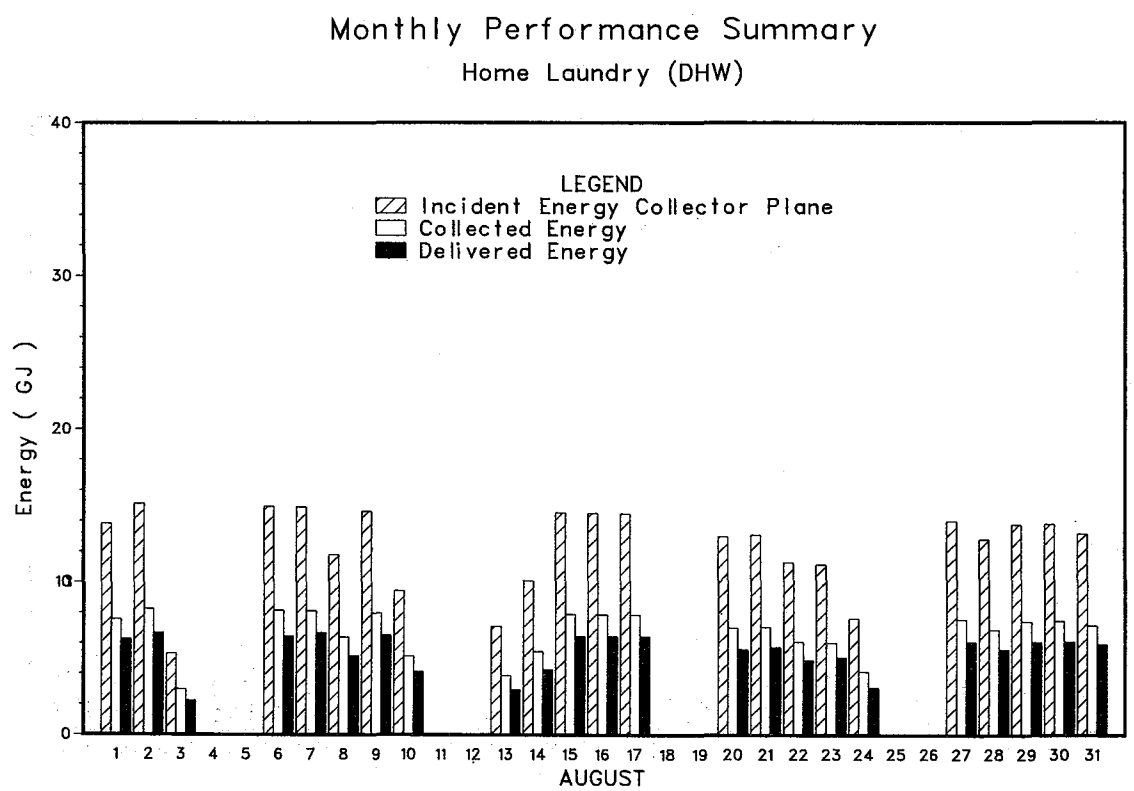
JULY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Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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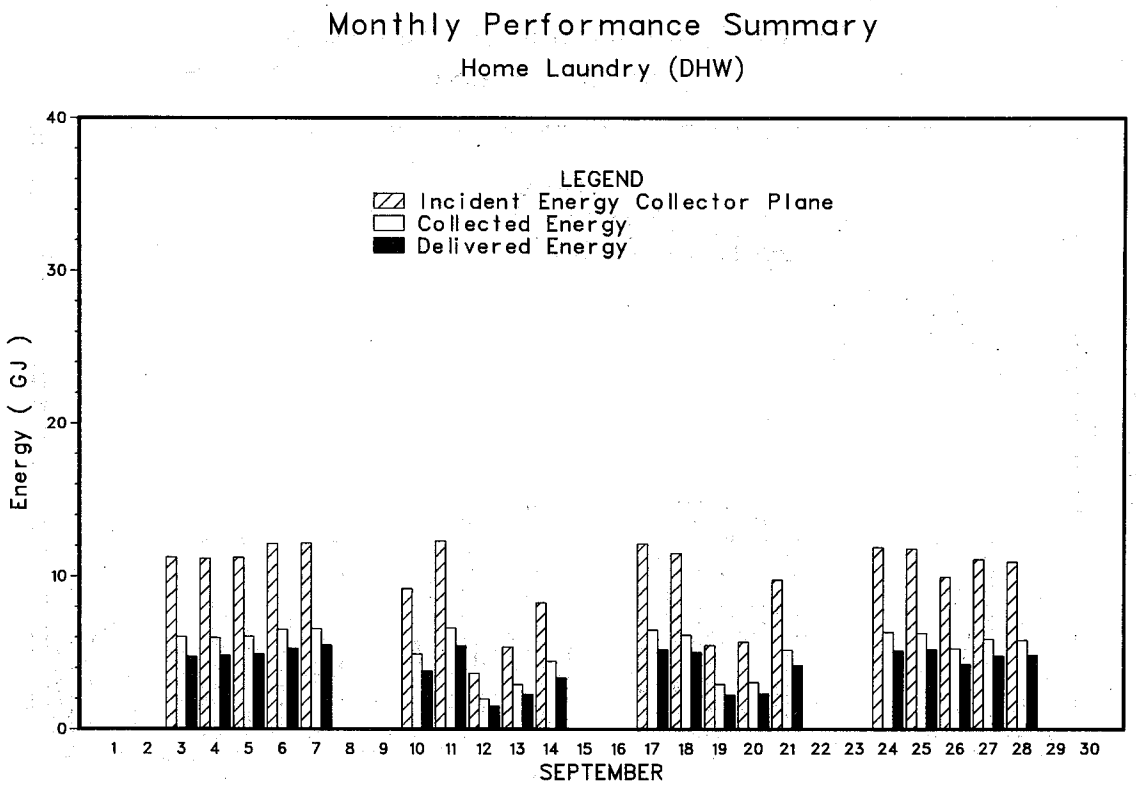
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Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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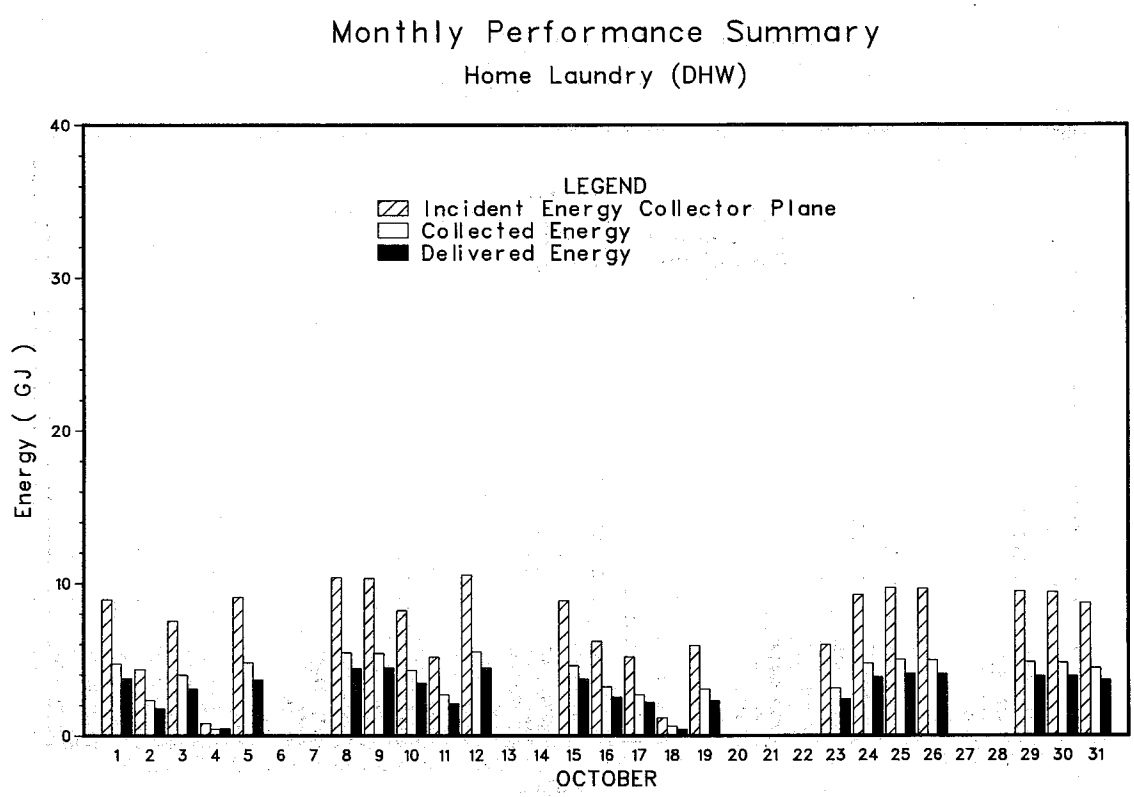
SEPTEMBER


Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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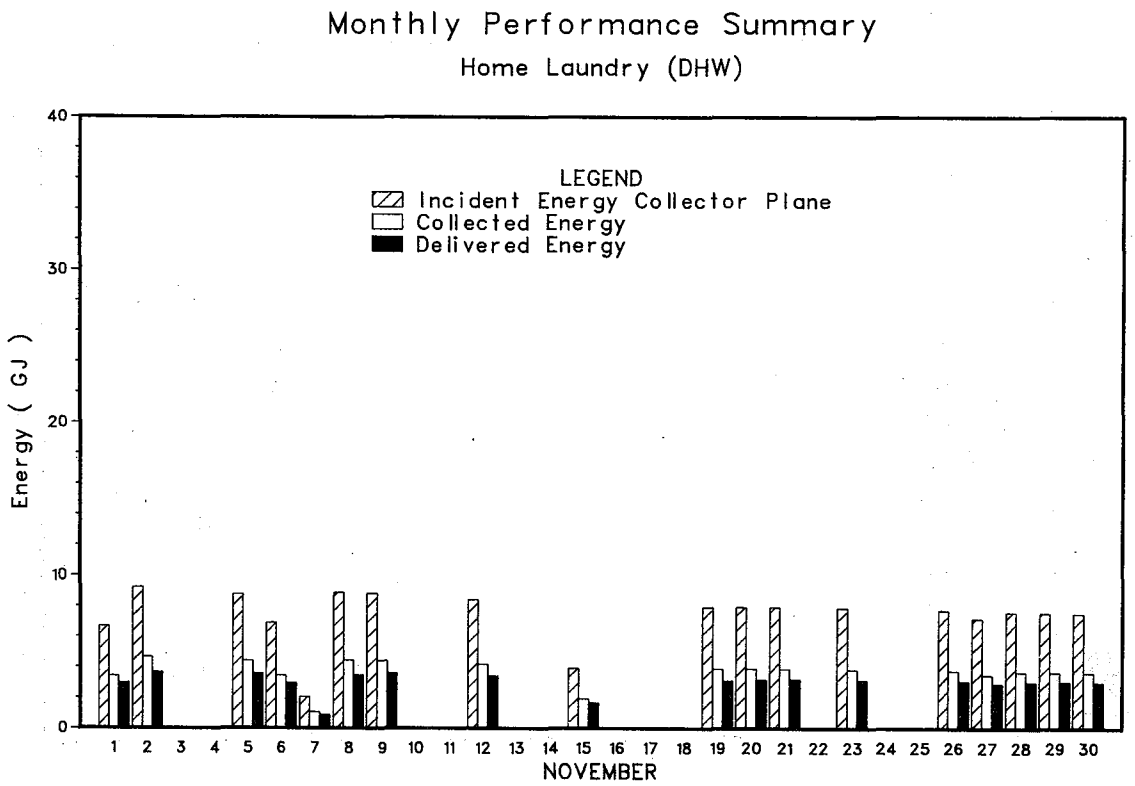
OCTOBER


Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
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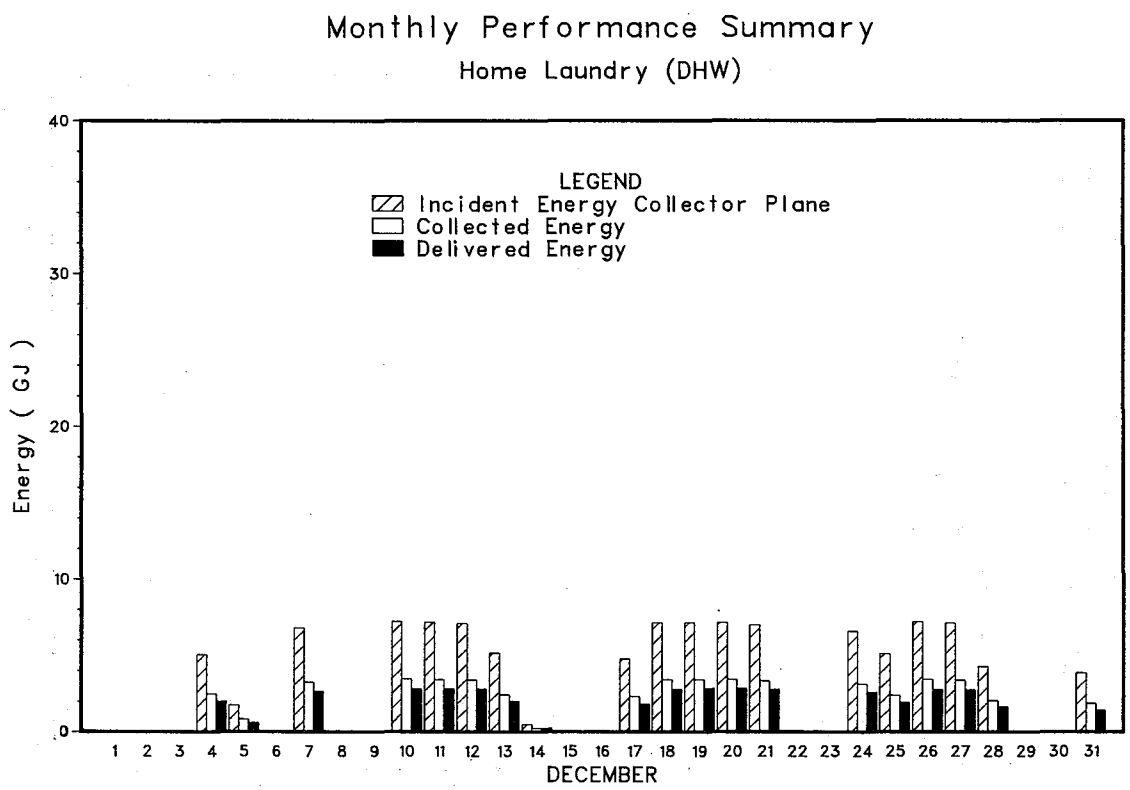
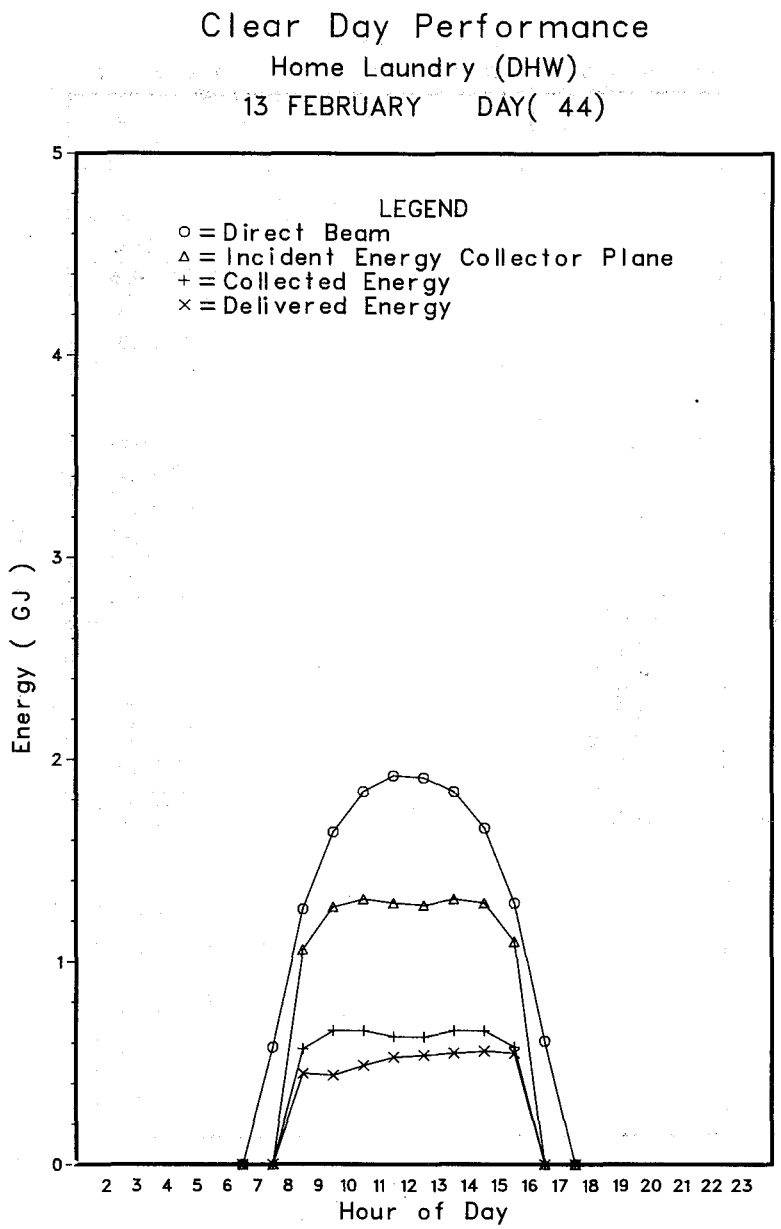
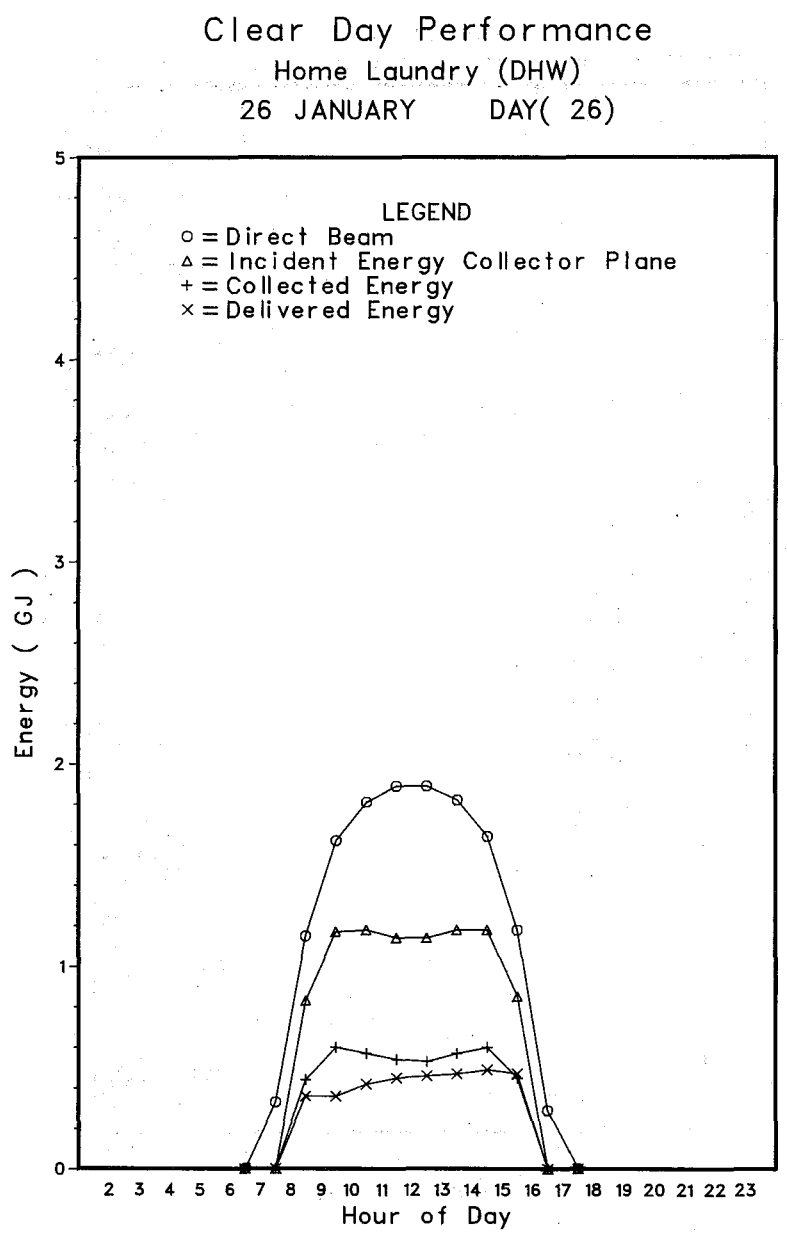
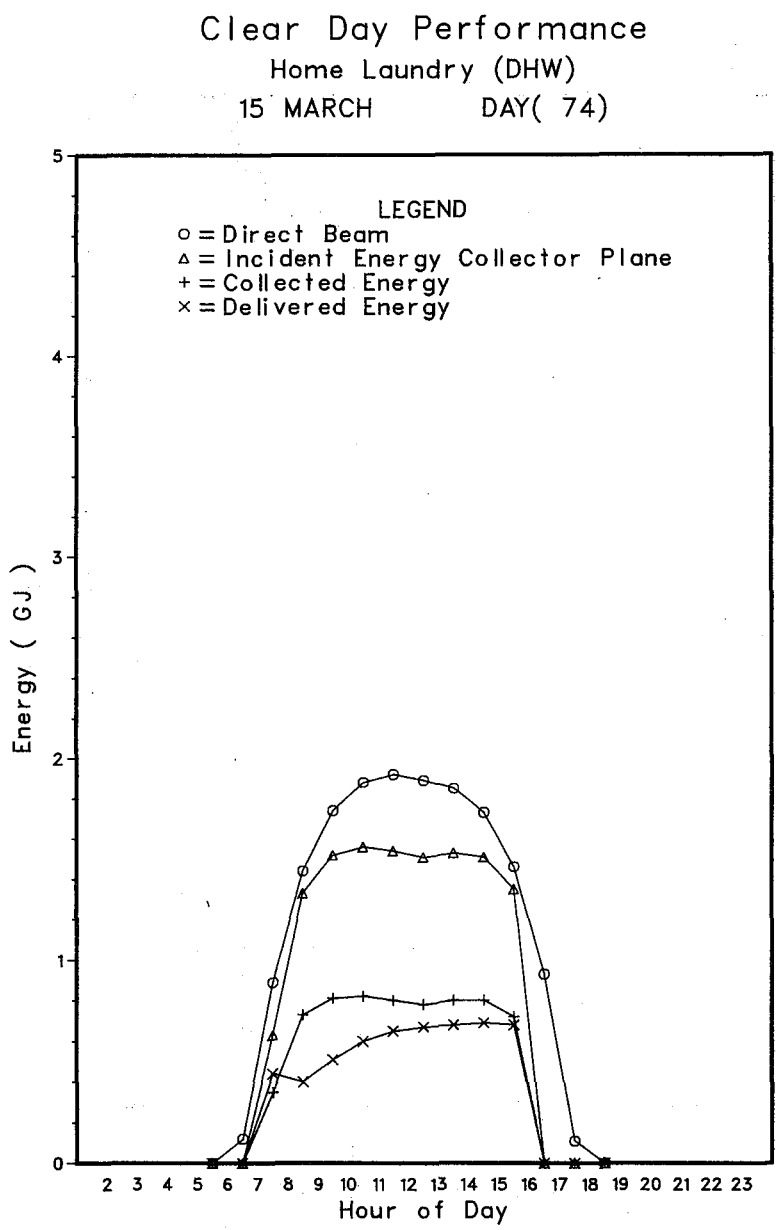
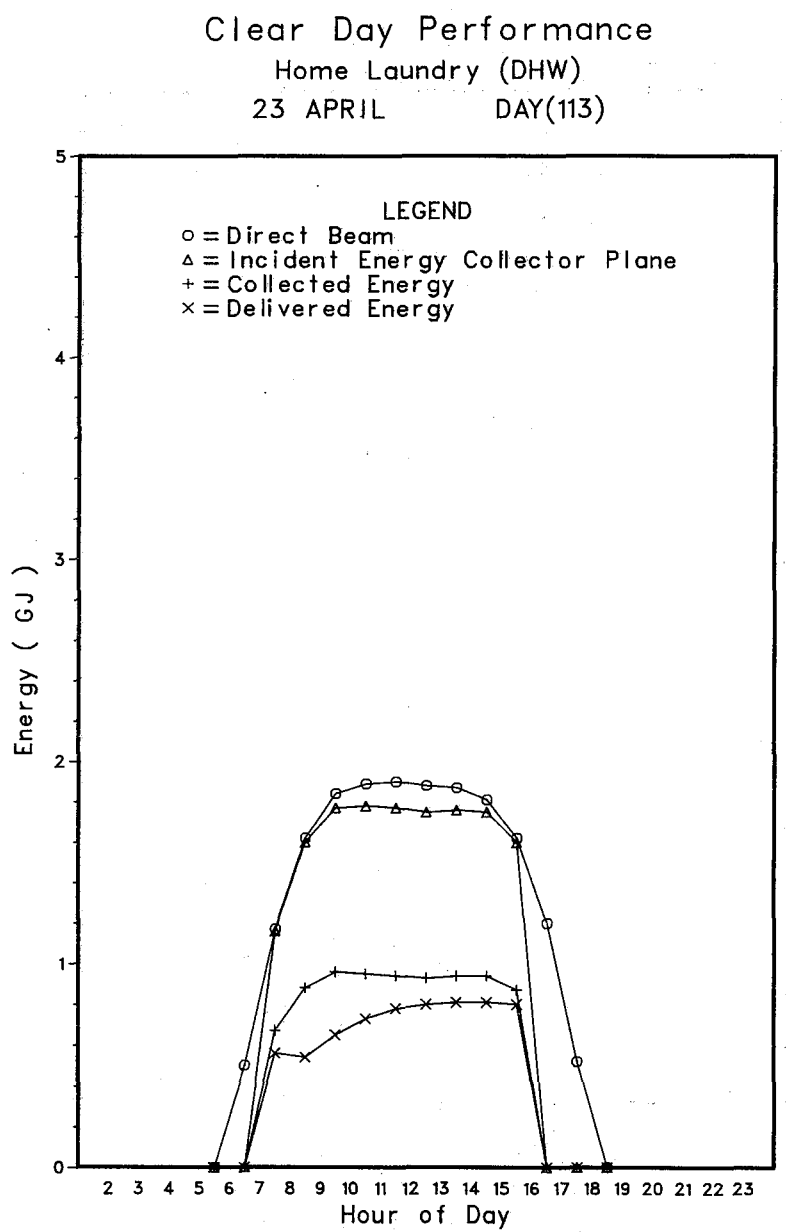
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER

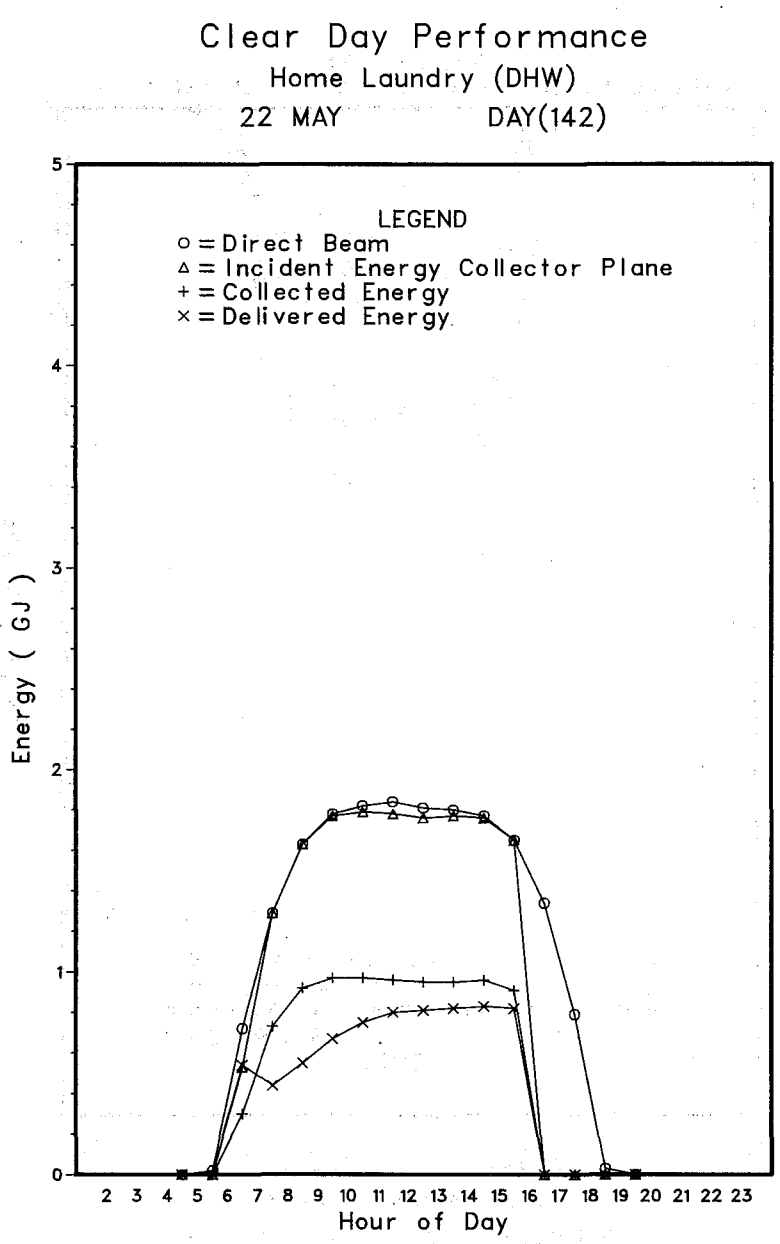

Monthly Performance Summary
Home Laundry (DHW)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

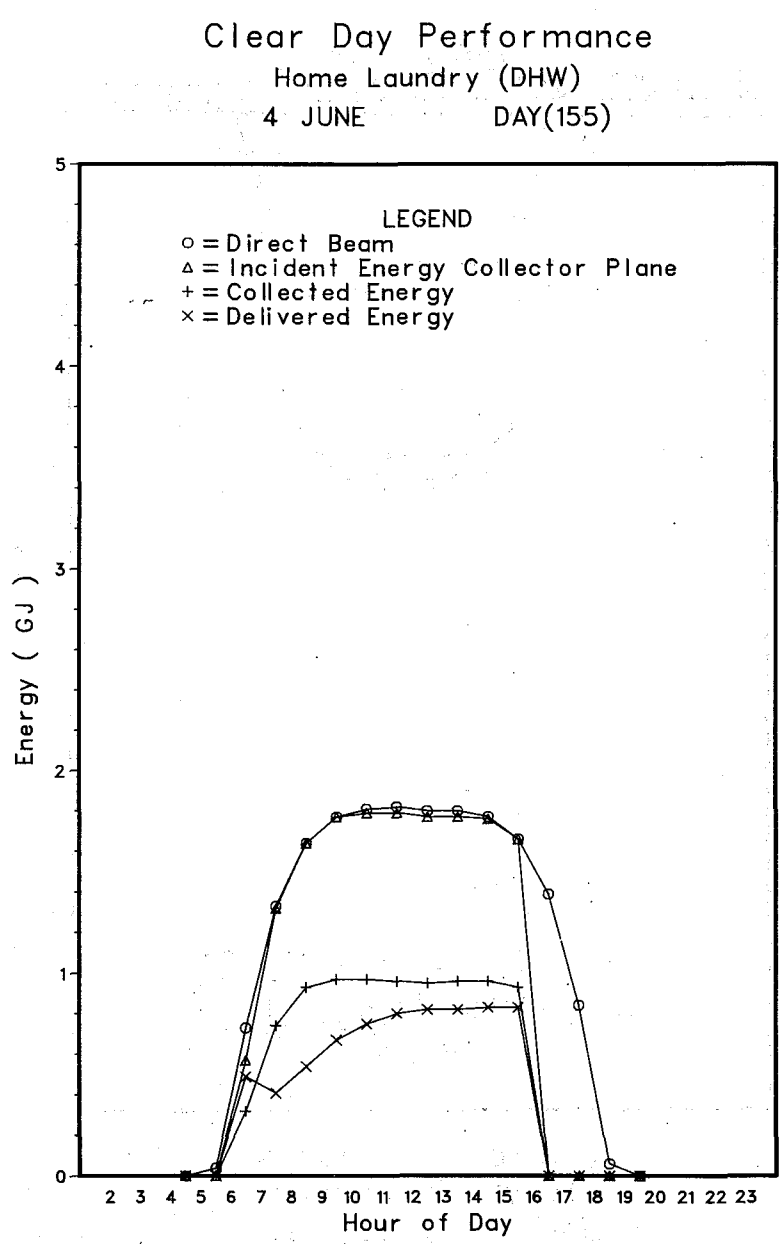

Clear Day Performance
Home Laundry (DHW)
13 FEBRUARY DAY(44)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

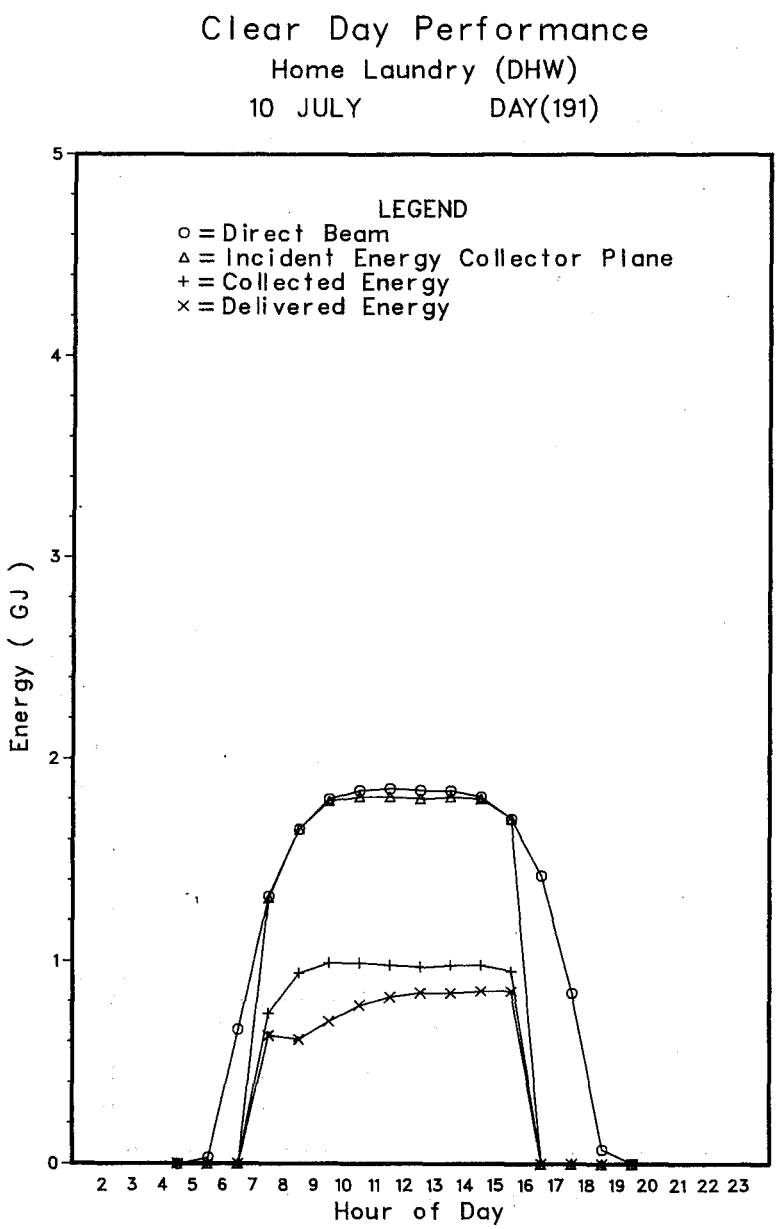

Clear Day Performance
Home Laundry (DHW)
26 JANUARY DAY(26)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

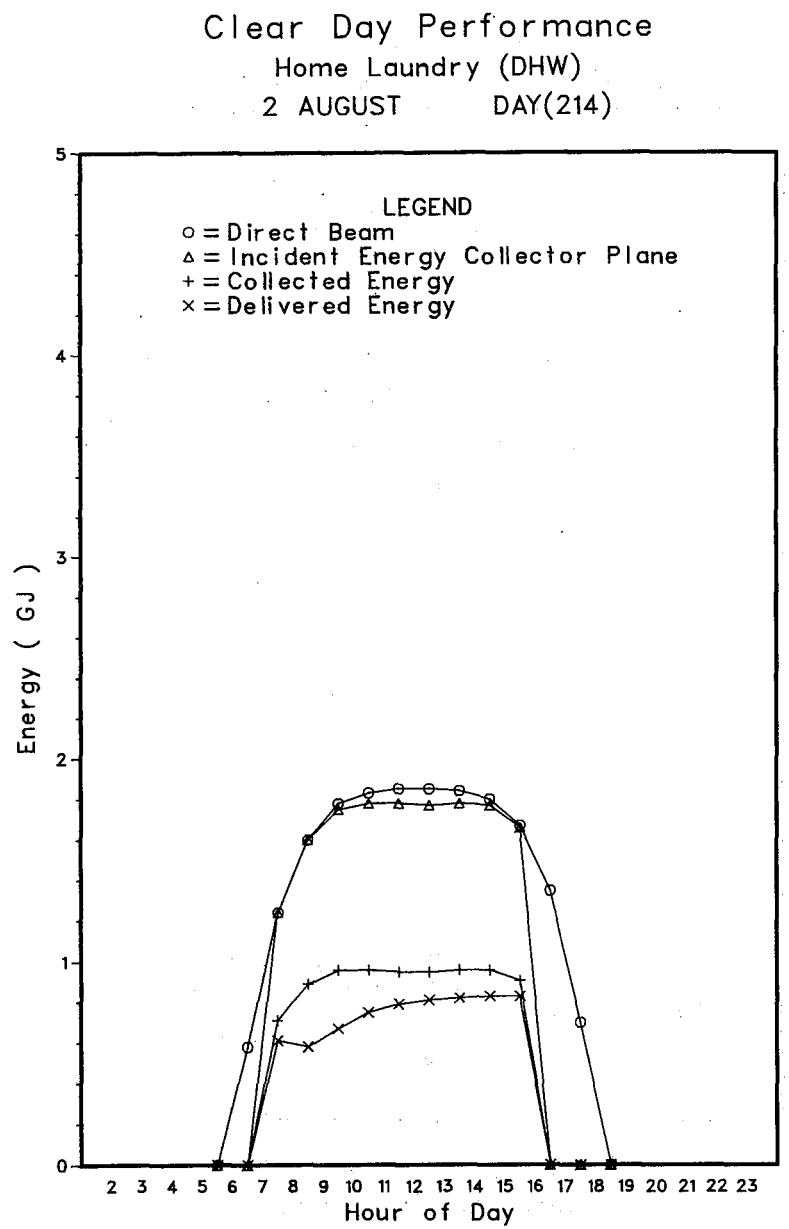

Clear Day Performance
Home Laundry (DHW)
15 MARCH DAY(74)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

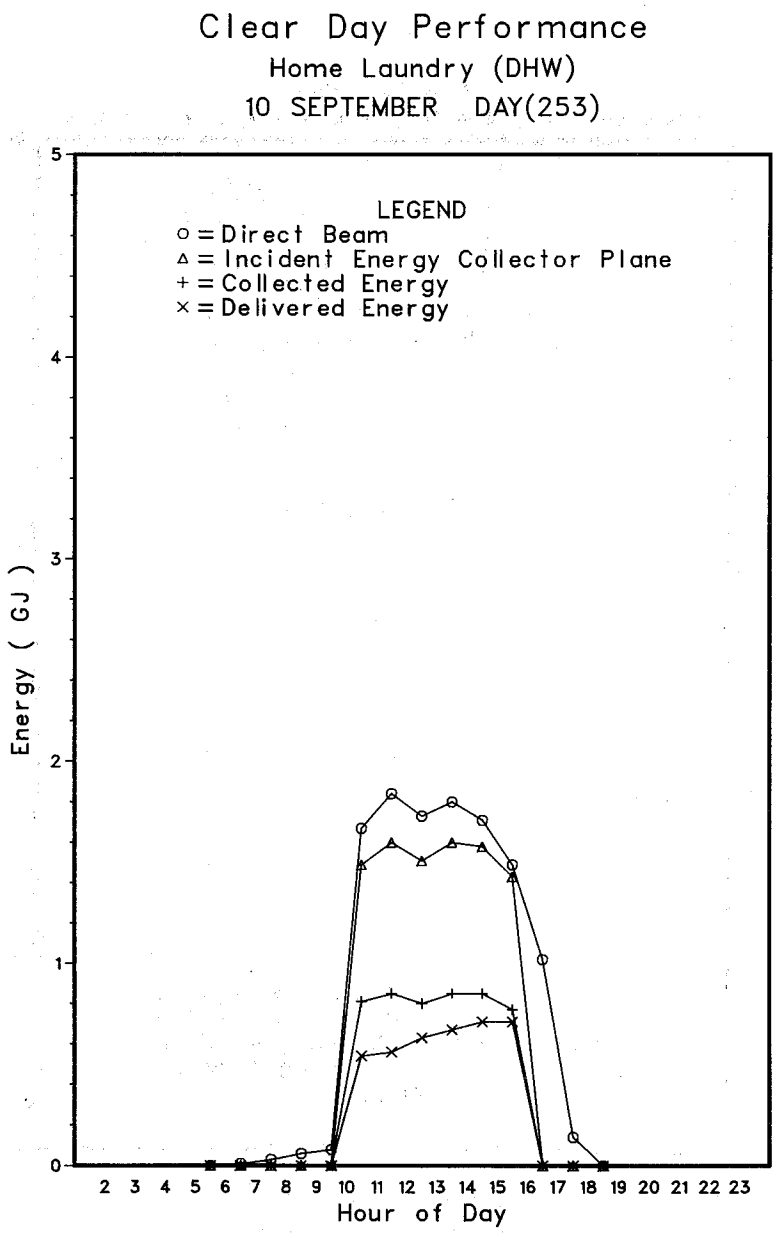

Clear Day Performance
Home Laundry (DHW)
23 APRIL DAY(113)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

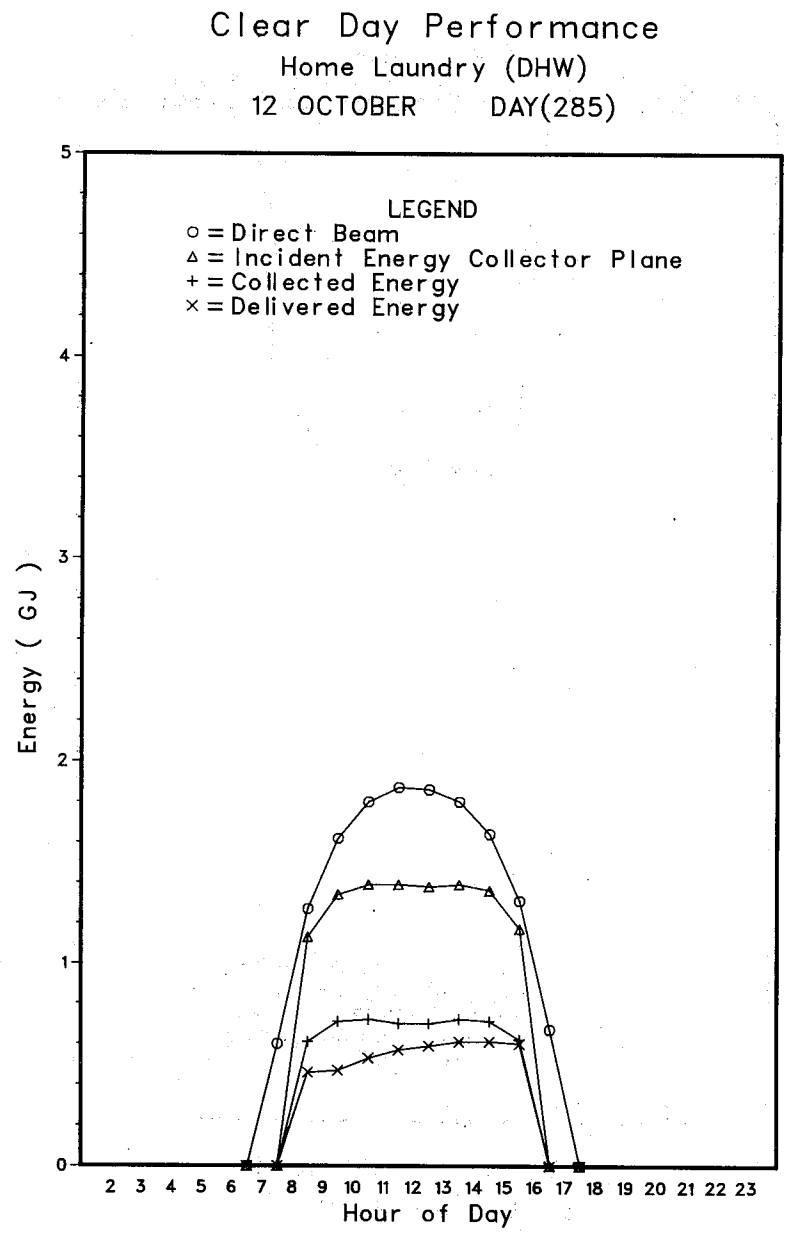

Clear Day Performance
Home Laundry (DHW)
22 MAY DAY(142)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

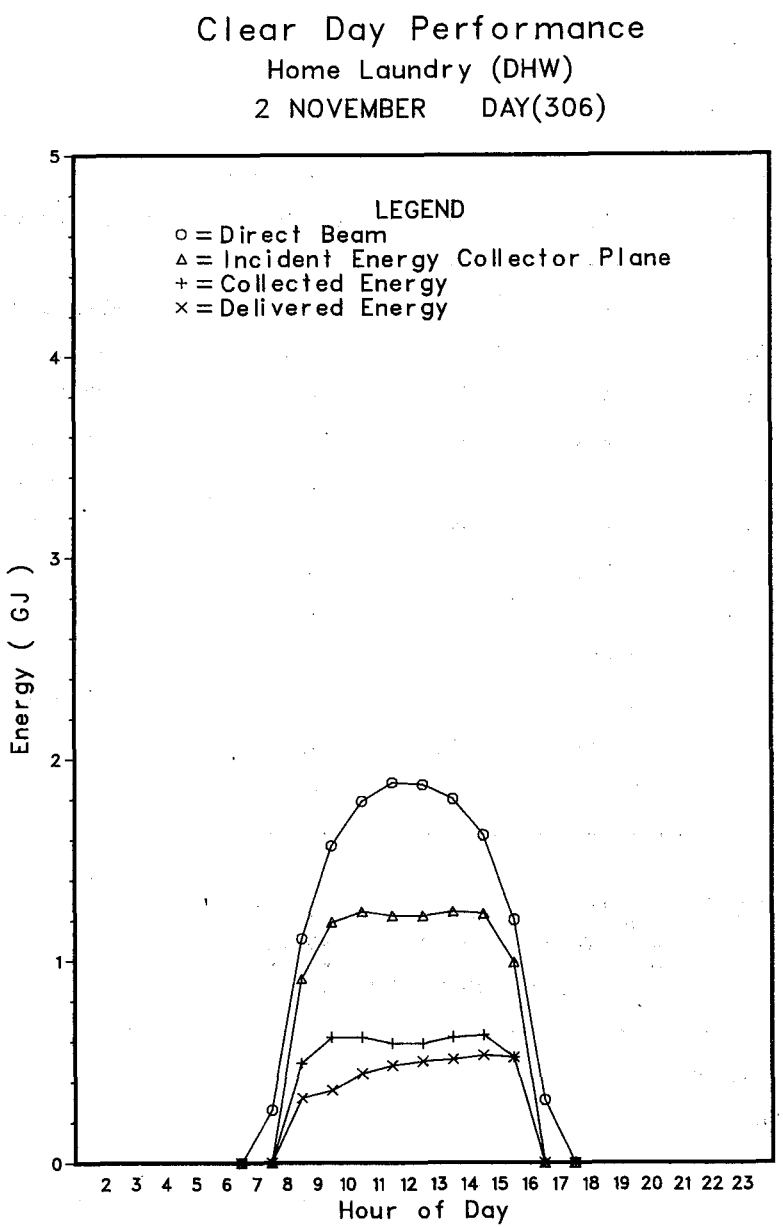

Clear Day Performance
Home Laundry (DHW)
4 JUNE DAY(155)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

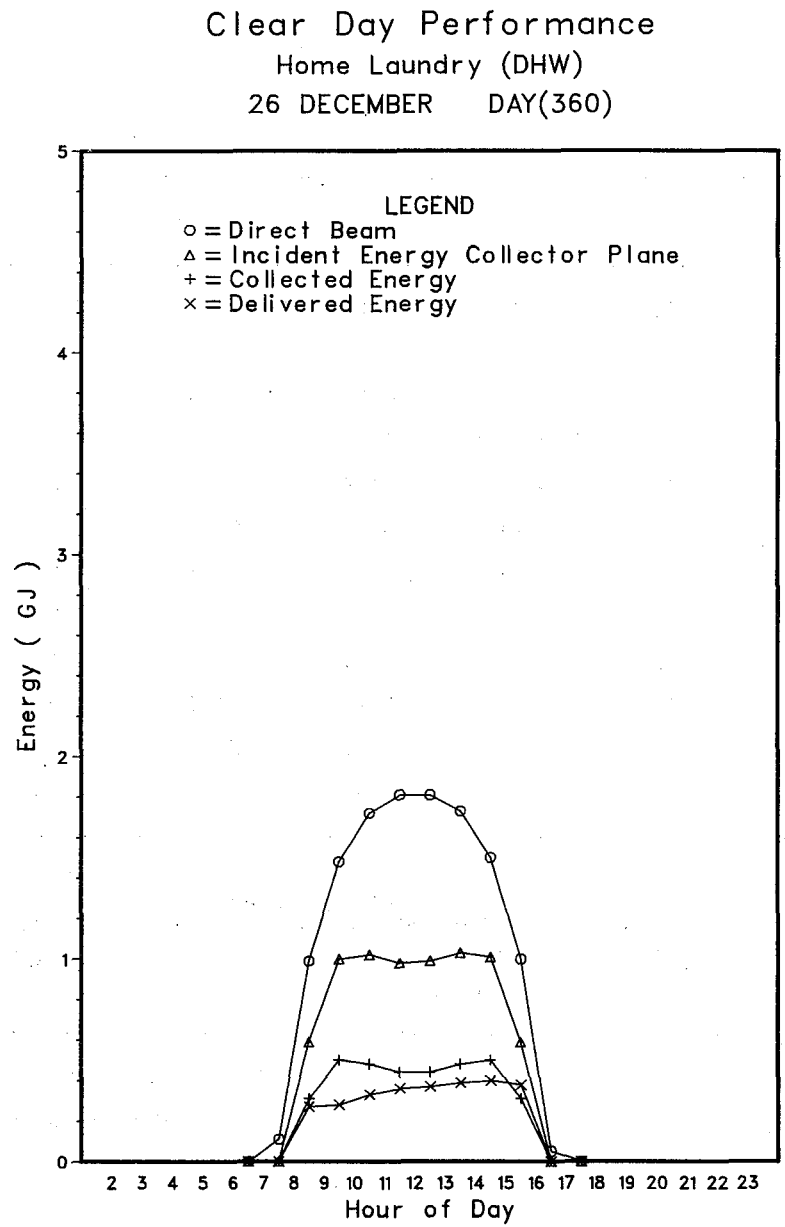

Clear Day Performance
Home Laundry (DHW)
10 JULY DAY(191)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (DHW)
2 AUGUST DAY(214)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (DHW)
10 SEPTEMBER DAY(253)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (DHW)
12 OCTOBER DAY(285)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (DHW)
2 NOVEMBER DAY(306)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Home Laundry (DHW)
26 DECEMBER DAY(360)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	144.7	225.4	141.5	61.4	43.4	32.2	16.6	11.6	22.8	3.7
FEBRUARY	171.2	215.4	145.2	69.5	47.8	41.9	15.6	11.5	28.8	3.3
MARCH	248.0	258.0	194.4	96.6	49.7	63.4	18.6	14.1	32.6	3.9
APRIL	276.8	255.2	204.6	106.3	51.9	75.1	17.4	13.2	36.7	3.5
MAY	343.7	298.1	237.7	125.6	52.8	89.2	20.4	15.4	37.5	4.1
JUNE	308.4	252.3	192.9	103.0	53.4	72.2	16.3	14.1	37.4	3.3
JULY	362.6	354.4	295.2	157.6	53.4	118.6	24.0	14.1	40.2	4.7
AUGUST	343.3	345.1	285.1	150.0	52.6	110.2	23.5	15.5	38.7	4.7
SEPTEMBER	241.8	245.8	198.3	101.3	51.1	69.6	17.9	13.4	35.1	3.7
OCTOBER	205.5	235.1	164.7	80.9	49.1	49.5	16.6	13.9	30.1	3.6
NOVEMBER	151.5	216.4	135.8	60.9	44.8	33.3	15.8	11.2	24.5	3.5
DECEMBER	120.1	188.7	113.5	47.5	41.9	20.7	14.1	12.0	18.3	3.3
TOTALS/AVERAGES	2917.5	3089.8	2309.1	1160.5	50.3	776.2	216.9	160.2	33.6	45.2

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	6.4	11.2	7.0	2.9	41.9	1.2	.9	.5	17.5	.2
2	1/ 2	6.6	11.7	7.3	3.0	41.7	1.5	.9	.6	20.3	.2
3	1/ 3	6.9	12.4	7.7	3.3	42.1	1.7	.9	.6	22.0	.2
4	1/ 4	6.9	12.6	7.8	3.3	42.2	1.7	.9	.6	22.3	.2
5	1/ 5	4.5	4.4	2.1	.9	42.9	0.0	.3	.6	0.0	.1
6	1/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
7	1/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
8	1/ 8	6.9	12.4	7.8	3.3	42.5	1.6	.9	.5	21.2	.2
9	1/ 9	6.9	12.3	7.8	3.3	42.7	1.8	.9	.6	23.1	.2
10	1/10	7.1	12.8	8.1	3.5	43.1	1.9	.9	.6	24.1	.2
11	1/11	6.8	11.7	7.4	3.2	42.9	1.7	.9	.6	22.5	.2
12	1/12	7.2	13.0	8.2	3.5	43.1	2.0	.9	.6	24.2	.2
13	1/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
14	1/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
15	1/15	7.1	12.3	7.9	3.4	43.2	1.7	.9	.5	22.0	.2
16	1/16	6.0	8.1	4.8	2.1	43.2	.9	.6	.6	18.2	.1
17	1/17	7.2	12.3	8.0	3.5	43.4	1.9	.9	.6	23.7	.2
18	1/18	7.5	13.0	8.4	3.7	43.9	2.1	.9	.6	25.0	.2
19	1/19	7.2	11.6	7.3	3.2	44.1	1.7	.8	.6	23.8	.2
20	1/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
21	1/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
22	1/22	2.3	.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
23	1/23	7.6	12.5	8.1	3.6	44.3	1.9	.9	.5	23.5	.2
24	1/24	2.1	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
25	1/25	7.9	13.0	8.5	3.8	44.8	2.2	1.0	.5	25.7	.2
26	1/26	8.2	13.6	8.9	4.0	45.1	2.4	1.0	.6	27.0	.2
27	1/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
28	1/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
29	1/29	3.8	.6	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
30	1/30	3.2	.4	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
31	1/31	8.3	13.1	8.7	4.0	45.8	2.2	1.0	.5	25.9	.2
TOTALS/AVERAGES		144.7	225.4	141.5	61.4	43.4	32.2	16.6	11.6	22.8	3.7

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	7.8	10.7	6.8	3.1	45.6	1.6	.8	.6	24.0	.2
33	2/ 2	8.5	13.2	8.8	4.1	46.1	2.4	1.0	.6	27.6	.2
34	2/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
35	2/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
36	2/ 5	4.4	1.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
37	2/ 6	8.4	11.7	8.0	3.7	46.4	2.0	1.0	.5	25.3	.2
38	2/ 7	8.9	13.4	9.0	4.2	46.9	2.6	1.0	.6	28.6	.2
39	2/ 8	5.5	3.6	2.1	1.0	47.8	.1	.3	.6	6.3	.1
40	2/ 9	8.5	11.6	7.9	3.7	47.1	2.1	.9	.6	26.6	.2
41	2/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
42	2/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
43	2/12	9.6	14.5	9.8	4.7	48.2	3.0	1.0	.5	30.6	.2
44	2/13	9.7	14.5	9.9	4.8	48.1	3.1	1.0	.6	31.5	.2
45	2/14	7.9	9.0	6.0	2.8	47.2	1.5	.7	.6	25.5	.2
46	2/15	9.9	14.4	9.9	4.8	48.1	3.1	1.0	.6	31.1	.2
47	2/16	9.7	13.7	9.4	4.5	48.1	2.9	1.0	.6	30.6	.2
48	2/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
49	2/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
50	2/19	10.1	14.2	9.9	4.8	48.5	3.1	1.0	.5	31.0	.2
51	2/20	10.1	14.0	9.8	4.8	48.5	3.1	1.0	.6	31.5	.2
52	2/21	4.7	.6	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
53	2/22	9.8	12.4	8.3	4.0	48.5	2.5	.9	.5	29.8	.2
54	2/23	10.4	14.1	10.0	4.9	48.8	3.2	1.0	.6	31.9	.2
55	2/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
56	2/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
57	2/26	9.3	10.1	7.1	3.4	48.7	2.0	.7	.6	28.2	.2
58	2/27	10.7	13.7	9.5	4.7	49.1	3.1	.9	.6	32.3	.2
59	2/28	7.4	4.9	3.0	1.4	48.2	.5	.3	.6	16.4	.1
TOTALS/AVERAGES		171.2	215.4	145.2	69.5	47.8	41.9	15.6	11.5	28.8	3.3

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	11.4	15.1	11.6	5.6	48.2	3.8	1.1	.6	32.6	.2
61	3/ 2	11.5	15.2	11.7	5.6	48.3	3.8	1.1	.6	32.8	.2
62	3/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
63	3/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
64	3/ 5	11.9	15.3	11.9	5.8	48.8	3.9	1.1	.6	33.0	.2
65	3/ 6	12.0	15.3	11.9	5.9	49.0	4.1	1.1	.6	34.1	.2
66	3/ 7	12.1	15.5	12.1	5.9	49.0	4.2	1.1	.6	34.3	.2
67	3/ 8	11.9	14.5	10.7	5.3	49.9	3.6	1.0	.6	33.8	.2
68	3/ 9	9.7	9.2	6.4	3.2	49.9	1.9	.6	.6	30.0	.1
69	3/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
70	3/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
71	3/12	6.7	2.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
72	3/13	12.4	14.9	11.8	5.8	49.5	3.9	1.1	.6	33.3	.2
73	3/14	12.5	14.8	11.8	5.8	49.5	4.0	1.1	.6	34.2	.2
74	3/15	13.0	16.0	12.7	6.3	49.7	4.5	1.1	.6	35.4	.2
75	3/16	10.7	9.9	8.0	3.9	49.1	2.5	.8	.6	31.5	.2
76	3/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
77	3/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
78	3/19	12.6	14.1	11.4	5.7	49.9	3.8	1.1	.6	33.2	.2
79	3/20	12.8	14.1	11.1	5.6	50.6	3.9	1.0	.6	35.5	.2
80	3/21	12.5	13.0	9.8	5.0	50.6	3.4	.9	.6	34.4	.2
81	3/22	11.6	10.9	7.8	4.0	50.7	2.5	.7	.7	32.5	.2
82	3/23	7.9	4.1	2.0	1.1	51.9	.2	.2	.6	11.3	.1
83	3/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
84	3/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
85	3/26	11.1	9.7	7.0	3.6	51.2	2.2	.6	.6	31.5	.1
86	3/27	10.3	7.4	4.0	2.0	49.1	.5	.5	.9	11.9	.1
87	3/28	12.6	12.1	9.6	4.9	51.0	3.3	.9	.6	34.8	.2
88	3/29	12.1	10.4	8.1	4.1	50.9	2.7	.8	.7	33.6	.2
89	3/30	8.9	4.3	2.9	1.5	50.8	.5	.3	.6	18.0	.1
90	3/31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
TOTALS/AVERAGES		248.0	258.0	194.4	96.6	49.7	63.4	18.6	14.1	32.6	3.9

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
92	4/ 2	14.8	16.9	13.9	7.1	51.3	5.2	1.2	.6	37.2	.2
93	4/ 3	14.7	16.4	13.7	7.0	51.4	5.2	1.2	.6	38.1	.2
94	4/ 4	14.7	16.3	13.5	7.0	51.5	5.1	1.2	.6	38.1	.2
95	4/ 5	15.1	17.0	14.1	7.3	51.6	5.4	1.2	.7	38.6	.2
96	4/ 6	15.1	16.8	14.0	7.2	51.6	5.4	1.2	.7	38.4	.2
97	4/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
98	4/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
99	4/ 9	9.3	5.0	2.7	1.4	52.5	.5	.2	.5	16.8	.1
100	4/10	13.5	12.2	9.1	4.7	51.7	3.1	.8	.8	34.3	.2
101	4/11	13.9	13.3	10.8	5.6	51.8	4.0	.9	.7	36.8	.2
102	4/12	9.8	5.4	4.3	2.2	51.5	1.2	.4	.7	27.0	.1
103	4/13	11.1	8.2	5.5	2.9	52.1	1.6	.5	.7	29.0	.1
104	4/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
105	4/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
106	4/16	15.3	15.8	13.1	6.8	52.0	4.9	1.2	.6	37.2	.2
107	4/17	7.2	1.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
108	4/18	15.7	16.6	14.0	7.3	52.2	5.3	1.2	.6	38.3	.2
109	4/19	15.9	17.3	14.5	7.6	52.2	5.7	1.2	.7	39.2	.2
110	4/20	16.1	17.5	14.6	7.7	52.3	5.8	1.2	.7	39.4	.2
111	4/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
112	4/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
113	4/23	16.4	17.8	14.9	7.8	52.5	5.9	1.2	.6	39.2	.2
114	4/24	13.9	12.6	10.0	5.2	52.2	3.7	.8	.7	37.1	.2
115	4/25	11.0	7.3	5.1	2.7	52.3	1.3	.5	.8	25.7	.1
116	4/26	9.7	4.6	3.3	1.7	52.6	.8	.3	.7	24.1	.1
117	4/27	7.7	1.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
118	4/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
119	4/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
120	4/30	15.9	16.0	13.4	7.0	52.5	5.1	1.2	.6	37.7	.2
TOTALS/AVERAGES		276.8	255.2	204.6	106.3	51.9	75.1	17.4	13.2	36.7	3.5

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	15.3	14.1	11.4	6.0	52.5	4.4	.9	.7	38.2	.2
122	5/ 2	15.2	13.9	11.2	5.9	52.5	4.3	.9	.7	38.0	.2
123	5/ 3	13.3	9.5	8.0	4.1	51.7	2.7	.9	.6	33.5	.2
124	5/ 4	11.8	7.8	5.3	2.8	52.6	1.6	.5	.6	30.7	.1
125	5/ 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
126	5/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
127	5/ 7	14.5	12.1	9.7	5.1	52.5	3.5	.9	.6	35.5	.2
128	5/ 8	15.1	13.3	10.6	5.6	52.6	4.0	.9	.7	37.4	.2
129	5/ 9	17.0	17.3	14.5	7.6	52.8	5.7	1.2	.7	39.6	.2
130	5/10	16.3	15.5	12.5	6.6	52.8	4.8	1.1	.7	38.8	.2
131	5/11	17.2	17.7	14.8	7.8	53.0	5.9	1.2	.7	40.2	.2
132	5/12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
133	5/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
134	5/14	14.9	12.6	10.2	5.4	52.9	3.7	.9	.6	36.5	.2
135	5/15	12.7	7.8	6.2	3.3	52.3	2.0	.6	.6	32.2	.1
136	5/16	14.8	11.7	10.1	5.3	52.6	3.8	.9	.6	37.5	.2
137	5/17	12.6	9.1	6.1	3.3	53.2	2.0	.5	.7	33.5	.1
138	5/18	11.3	6.7	3.5	1.8	53.2	.8	.4	.6	24.1	.1
139	5/19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
140	5/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
141	5/21	17.6	18.0	15.6	8.2	52.6	6.1	1.3	.6	39.0	.3
142	5/22	17.8	18.3	15.9	8.4	52.6	6.4	1.3	.7	40.1	.3
143	5/23	15.9	14.1	11.3	6.0	53.2	4.4	.9	.7	38.8	.2
144	5/24	9.7	4.5	1.0	.6	54.9	0.0	.1	.5	0.0	.0
145	5/25	12.0	7.2	4.0	2.1	52.7	.7	.5	.9	18.2	.1
146	5/26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
147	5/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
148	5/28	17.6	17.7	15.5	8.2	53.0	6.2	1.3	.6	40.0	.3
149	5/29	16.3	14.7	11.7	6.3	53.5	4.6	.9	.7	39.6	.2
150	5/30	17.6	17.6	14.6	7.8	53.5	6.0	1.2	.6	40.9	.2
151	5/31	17.2	16.9	13.9	7.4	53.4	5.5	1.2	.7	39.7	.2
TOTALS/AVERAGES		343.7	298.1	237.7	125.6	52.8	89.2	20.4	15.4	37.5	4.1

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	17.4	17.1	14.2	7.5	53.2	5.6	1.2	.7	39.6	.2
153	6/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
154	6/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
155	6/ 4	18.1	18.5	16.0	8.5	53.0	6.4	1.3	.6	39.8	.3
156	6/ 5	12.8	9.0	6.0	3.2	53.7	2.0	.5	.7	33.7	.1
157	6/ 6	12.8	8.9	5.9	3.2	53.6	2.0	.5	.7	33.6	.1
158	6/ 7	9.8	4.2	1.0	.5	55.3	0.0	.1	.5	0.0	.0
159	6/ 8	8.2	1.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
160	6/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
161	6/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
162	6/11	12.8	8.3	4.6	2.5	53.4	1.0	.5	.8	21.3	.1
163	6/12	16.8	15.4	12.4	6.6	53.5	4.9	1.0	.7	39.2	.2
164	6/13	15.3	12.2	10.4	5.6	53.2	4.0	.9	.6	38.4	.2
165	6/14	18.3	18.6	16.0	8.5	53.2	6.5	1.3	.6	40.7	.3
166	6/15	16.2	14.2	11.4	6.1	53.4	4.5	.9	.7	39.3	.2
167	6/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
168	6/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
169	6/18	16.0	14.0	11.2	6.0	53.5	4.3	.9	.6	38.4	.2
170	6/19	15.8	13.7	10.9	5.8	53.4	4.2	.9	.7	38.7	.2
171	6/20	17.9	18.2	15.6	8.3	53.2	6.4	1.3	.6	40.6	.3
172	6/21	17.4	16.6	13.1	7.0	53.6	5.3	1.1	.7	40.4	.2
173	6/22	16.1	14.3	11.2	6.0	53.5	4.4	.9	.7	39.1	.2
174	6/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
175	6/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
176	6/25	12.9	9.3	6.1	3.3	53.9	2.0	.5	.6	33.3	.1
177	6/26	10.1	3.5	1.0	.5	53.8	0.0	.1	.5	0.0	.0
178	6/27	12.7	8.0	5.7	3.0	53.0	1.5	.6	.9	25.6	.1
179	6/28	14.8	12.8	8.5	4.6	53.6	2.8	.8	.9	32.9	.2
180	6/29	16.2	14.6	11.5	6.2	53.5	4.5	.9	.7	39.4	.2
181	6/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
TOTALS/AVERAGES		308.4	252.3	192.9	103.0	53.4	72.2	16.3	14.1	37.4	3.3

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
183	7/ 2	15.9	14.1	10.5	5.6	53.5	4.0	.8	.6	38.2	.2
184	7/ 3	17.8	18.3	15.1	8.1	53.6	6.2	1.2	.7	40.8	.2
185	7/ 4	15.9	14.8	11.5	6.1	53.3	4.2	1.1	.8	36.8	.2
186	7/ 5	16.2	14.8	11.9	6.4	53.4	4.7	1.0	.7	39.6	.2
187	7/ 6	8.6	2.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
188	7/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
189	7/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
190	7/ 9	17.6	17.9	15.1	8.1	53.7	6.1	1.2	.6	40.6	.2
191	7/10	17.9	18.7	15.5	8.3	53.7	6.4	1.2	.6	41.5	.2
192	7/11	17.9	18.6	15.5	8.3	53.7	6.4	1.2	.7	41.4	.2
193	7/12	17.9	18.6	15.5	8.3	53.6	6.4	1.2	.7	41.3	.2
194	7/13	16.7	16.1	13.3	7.1	53.5	5.4	1.1	.7	40.4	.2
195	7/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
196	7/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
197	7/16	16.2	15.1	12.4	6.6	53.4	4.9	.9	.6	39.3	.2
198	7/17	17.4	17.8	15.1	8.1	53.4	6.1	1.2	.7	40.7	.2
199	7/18	16.6	16.3	13.8	7.3	53.1	5.5	1.2	.6	39.6	.2
200	7/19	16.7	16.8	14.4	7.7	53.2	5.8	1.2	.6	40.2	.2
201	7/20	17.2	17.4	14.7	7.8	53.4	6.0	1.2	.6	40.7	.2
202	7/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
203	7/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
204	7/23	17.1	17.6	14.7	7.8	53.4	5.9	1.2	.6	39.9	.2
205	7/24	16.2	15.6	14.1	7.5	53.3	5.7	1.2	.6	40.2	.2
206	7/25	17.1	17.6	15.0	8.0	53.2	6.1	1.2	.6	40.7	.2
207	7/26	17.2	17.9	15.0	8.0	53.2	6.1	1.2	.6	40.7	.2
208	7/27	14.9	13.8	12.9	6.8	52.9	5.1	1.2	.6	39.4	.2
209	7/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
210	7/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
211	7/30	16.9	17.6	14.9	7.9	53.2	5.9	1.2	.6	39.9	.2
212	7/31	16.5	16.5	14.4	7.6	53.1	5.7	1.2	.6	40.0	.2
TOTALS/AVERAGES		362.6	354.4	295.2	157.6	53.4	118.6	24.0	14.1	40.2	4.7

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	16.1	16.1	13.8	7.3	52.9	5.5	1.2	.6	39.5	.2
214	8/ 2	17.0	18.1	15.1	8.0	53.2	6.1	1.2	.6	40.6	.2
215	8/ 3	11.5	8.5	5.3	2.9	53.4	1.4	.5	1.0	25.5	.1
216	8/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
217	8/ 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
218	8/ 6	16.8	18.0	15.0	8.0	53.2	6.0	1.2	.6	40.0	.2
219	8/ 7	16.7	17.8	14.9	7.9	53.1	6.1	1.2	.6	40.6	.2
220	8/ 8	15.0	13.9	11.8	6.2	52.8	4.6	.9	.7	39.2	.2
221	8/ 9	16.5	17.4	14.7	7.8	53.0	5.9	1.2	.6	40.2	.2
222	8/10	13.6	12.1	9.5	5.0	52.6	3.5	.8	.7	37.2	.2
223	8/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
224	8/12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
225	8/13	11.8	9.2	7.1	3.8	52.9	2.4	.6	.6	34.1	.1
226	8/14	14.3	13.4	10.1	5.3	52.6	3.8	.8	.7	38.0	.2
227	8/15	16.2	17.4	14.6	7.7	52.8	5.8	1.2	.6	40.0	.2
228	8/16	16.2	17.4	14.5	7.7	52.8	5.8	1.2	.6	39.9	.2
229	8/17	16.1	17.3	14.5	7.6	52.7	5.8	1.2	.6	39.8	.2
230	8/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
231	8/19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
232	8/20	15.2	15.5	13.0	6.8	52.4	5.0	1.1	.6	38.2	.2
233	8/21	15.2	15.6	13.1	6.9	52.3	5.1	1.1	.7	38.9	.2
234	8/22	14.3	13.9	11.3	5.9	52.2	4.3	.9	.7	38.1	.2
235	8/23	13.8	12.7	11.2	5.8	52.1	4.2	1.0	.6	37.5	.2
236	8/24	12.0	10.1	7.7	4.0	52.3	2.7	.6	.7	34.8	.1
237	8/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
238	8/26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
239	8/27	15.4	16.7	14.0	7.3	52.4	5.4	1.2	.6	38.6	.2
240	8/28	14.7	15.3	12.8	6.7	52.1	4.9	1.1	.6	38.5	.2
241	8/29	15.2	16.5	13.8	7.2	52.2	5.4	1.2	.6	38.7	.2
242	8/30	15.2	16.5	13.9	7.2	52.2	5.4	1.2	.6	38.9	.2
243	8/31	14.7	15.6	13.2	6.9	52.3	5.2	1.1	.6	39.0	.2
TOTALS/AVERAGES		343.3	345.1	285.1	150.0	52.6	110.2	23.5	15.5	38.7	4.7

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
245	9/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
246	9/ 3	13.9	14.1	11.2	5.8	51.9	4.2	.9	.6	36.9	.2
247	9/ 4	13.5	13.6	11.2	5.8	51.8	4.2	.9	.6	37.6	.2
248	9/ 5	13.4	13.5	11.2	5.8	51.8	4.1	1.0	.6	36.9	.2
249	9/ 6	13.8	14.5	12.1	6.3	51.8	4.6	1.0	.6	37.6	.2
250	9/ 7	13.6	14.4	12.3	6.3	51.4	4.5	1.1	.6	37.1	.2
251	9/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
252	9/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
253	9/10	12.1	11.6	9.2	4.8	51.6	3.2	.8	.6	34.9	.2
254	9/11	13.6	14.7	12.4	6.4	51.1	4.6	1.1	.6	36.7	.2
255	9/12	8.5	5.4	3.7	1.9	52.1	.9	.3	.6	25.1	.1
256	9/13	10.4	8.0	5.4	2.8	51.2	1.3	.6	.9	24.3	.1
257	9/14	11.4	10.5	8.3	4.3	51.4	2.8	.7	.6	34.3	.2
258	9/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
259	9/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
260	9/17	13.3	14.8	12.3	6.2	50.9	4.4	1.1	.5	35.6	.2
261	9/18	12.9	14.0	11.7	5.9	50.6	4.1	1.1	.6	35.4	.2
262	9/19	9.7	7.9	5.5	2.8	51.4	1.7	.5	.6	30.5	.1
263	9/20	9.4	7.8	5.7	2.9	51.3	1.8	.5	.6	31.1	.1
264	9/21	11.6	11.4	9.8	5.0	50.9	3.4	.9	.6	35.3	.2
265	9/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
266	9/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
267	9/24	12.7	14.8	12.1	6.1	50.4	4.2	1.1	.5	35.2	.2
268	9/25	12.5	14.6	12.0	6.0	50.1	4.3	1.1	.6	35.6	.2
269	9/26	11.6	12.7	10.0	5.0	50.6	3.5	.9	.6	34.9	.2
270	9/27	12.1	13.9	11.1	5.6	50.6	3.9	1.0	.6	35.4	.2
271	9/28	11.9	13.7	11.1	5.5	49.8	3.8	1.1	.6	34.4	.2
272	9/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
273	9/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
TOTALS/AVERAGES		241.8	245.8	198.3	101.3	51.1	69.6	17.9	13.4	35.1	3.7

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	10.6	11.5	8.9	4.5	50.5	2.9	.8	.5	32.8	.2
275	10/ 2	8.2	6.7	4.3	2.2	50.7	1.0	.4	.7	23.5	.1
276	10/ 3	10.4	11.2	7.5	3.8	50.4	2.3	.7	.7	31.2	.2
277	10/ 4	6.5	2.6	.8	.4	52.0	0.0	.1	.5	0.0	.0
278	10/ 5	10.5	11.9	9.1	4.6	50.1	3.0	.9	.6	32.7	.2
279	10/ 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
280	10/ 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
281	10/ 8	11.1	14.0	10.4	5.2	49.9	3.5	1.0	.5	33.2	.2
282	10/ 9	11.0	14.0	10.3	5.1	49.7	3.5	1.0	.6	34.1	.2
283	10/10	10.2	12.0	8.2	4.1	49.5	2.6	.8	.6	31.4	.2
284	10/11	7.9	7.5	5.2	2.6	49.7	1.4	.5	.6	27.8	.1
285	10/12	10.9	14.5	10.5	5.2	49.6	3.6	1.0	.6	33.8	.2
286	10/13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
287	10/14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
288	10/15	9.7	11.5	8.9	4.3	49.1	2.7	.9	.5	31.0	.2
289	10/16	8.6	9.2	6.2	3.0	48.9	1.8	.6	.6	28.5	.1
290	10/17	7.7	7.4	5.2	2.5	48.4	1.3	.6	.6	24.6	.1
291	10/18	5.2	2.1	1.2	.6	50.8	0.0	.1	.5	0.0	.0
292	10/19	8.0	8.5	5.9	2.9	48.6	1.6	.6	.6	27.1	.1
293	10/20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
294	10/21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
295	10/22	5.3	2.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
296	10/23	7.5	8.3	6.0	2.9	48.8	1.3	.7	.7	21.5	.2
297	10/24	9.5	13.1	9.2	4.4	48.3	2.8	1.0	.6	30.6	.2
298	10/25	9.7	13.8	9.7	4.7	48.4	3.1	1.0	.6	31.6	.2
299	10/26	9.6	13.7	9.6	4.7	48.3	3.0	1.0	.6	31.3	.2
300	10/27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
301	10/28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
302	10/29	9.3	13.5	9.5	4.5	47.8	2.8	1.0	.5	29.5	.2
303	10/30	9.3	13.5	9.4	4.5	47.7	2.8	1.0	.6	30.2	.2
304	10/31	8.8	12.5	8.7	4.1	47.4	2.5	1.0	.6	28.8	.2
TOTALS/AVERAGES		205.5	235.1	164.7	80.9	49.1	49.5	16.6	13.9	30.1	3.6

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	7.7	9.7	6.7	3.1	46.5	1.6	.9	.6	23.8	.2
306	11/ 2	9.0	13.4	9.3	4.4	47.3	2.7	1.0	.6	29.6	.2
307	11/ 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
308	11/ 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
309	11/ 5	8.5	12.9	8.8	4.1	46.8	2.4	1.0	.5	27.6	.2
310	11/ 6	7.7	10.4	6.9	3.2	46.1	1.8	.8	.6	26.0	.2
311	11/ 7	5.4	4.1	2.1	1.0	46.9	.1	.3	.6	4.6	.1
312	11/ 8	8.5	13.3	9.0	4.2	46.2	2.6	1.0	.6	28.4	.2
313	11/ 9	8.4	13.3	8.9	4.1	46.0	2.5	1.0	.6	28.1	.2
314	11/10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
315	11/11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
316	11/12	8.0	12.9	8.6	3.9	45.4	2.2	1.0	.5	25.8	.2
317	11/13	5.5	4.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
318	11/14	3.7	1.7	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
319	11/15	6.2	7.0	4.0	1.8	44.0	.4	.6	.5	11.1	.2
320	11/16	2.8	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
321	11/17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
322	11/18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
323	11/19	7.6	12.5	8.1	3.6	44.2	1.9	.9	.5	23.4	.2
324	11/20	7.5	12.6	8.2	3.6	44.1	2.0	.9	.6	24.7	.2
325	11/21	7.5	12.6	8.2	3.6	44.0	2.0	.9	.6	24.9	.2
326	11/22	4.4	2.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
327	11/23	7.4	12.6	8.1	3.6	43.8	1.9	.9	.5	23.9	.2
328	11/24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
329	11/25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
330	11/26	7.3	12.5	8.0	3.5	43.6	1.8	.9	.5	23.1	.2
331	11/27	7.0	11.6	7.4	3.2	43.1	1.7	.9	.6	22.4	.2
332	11/28	7.2	12.4	7.9	3.4	43.2	1.9	.9	.6	23.6	.2
333	11/29	7.1	12.3	7.8	3.4	43.2	1.8	.9	.6	23.5	.2
334	11/30	7.1	12.3	7.8	3.3	42.9	1.8	.9	.6	23.2	.2
TOTALS/AVERAGES		151.5	216.4	135.8	60.9	44.8	33.3	15.8	11.2	24.5	3.5

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
336	12/ 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
337	12/ 3	1.8	.1	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
338	12/ 4	5.7	8.7	5.4	2.3	42.6	.7	.7	.7	12.8	.2
339	12/ 5	4.1	3.7	1.8	.8	46.0	.0	.2	.6	1.6	.1
340	12/ 6	3.4	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
341	12/ 7	6.6	11.3	7.1	3.0	42.0	1.4	.9	.5	19.8	.2
342	12/ 8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
343	12/ 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
344	12/10	6.8	12.1	7.6	3.2	41.8	1.5	.9	.5	20.1	.2
345	12/11	6.7	12.0	7.5	3.1	41.7	1.6	.9	.6	21.0	.2
346	12/12	6.7	11.9	7.4	3.1	41.8	1.6	.9	.6	21.1	.2
347	12/13	5.9	9.1	5.3	2.2	41.7	.9	.7	.6	17.6	.2
348	12/14	3.8	2.3	.6	.3	39.2	0.0	.1	.4	0.0	.0
349	12/15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
350	12/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
351	12/17	5.6	8.4	5.1	2.1	42.1	.6	.7	.6	12.0	.2
352	12/18	6.7	12.1	7.5	3.1	41.8	1.6	.9	.6	21.5	.2
353	12/19	6.7	12.1	7.5	3.2	41.9	1.6	.9	.6	21.8	.2
354	12/20	6.7	12.1	7.5	3.2	41.9	1.6	.9	.6	21.8	.2
355	12/21	6.5	11.9	7.4	3.1	41.7	1.6	.9	.6	21.1	.2
356	12/22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
357	12/23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
358	12/24	6.3	11.1	6.9	2.9	41.4	1.2	.9	.5	18.1	.2
359	12/25	5.7	8.8	5.3	2.2	41.5	.9	.7	.6	16.9	.2
360	12/26	6.7	12.2	7.6	3.1	41.4	1.6	.9	.6	20.6	.2
361	12/27	6.7	12.1	7.5	3.1	41.4	1.5	.9	.6	20.3	.2
362	12/28	5.6	8.1	4.4	1.9	41.9	.4	.7	.8	9.6	.2
363	12/29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
364	12/30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
365	12/31	5.5	7.4	4.0	1.7	42.6	.3	.5	.7	7.3	.1
TOTALS/AVERAGES		120.1	188.7	113.5	47.5	41.9	20.7	14.1	12.0	18.3	3.3

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

26 JANUARY (DAY 26)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	57.1	57.1	0.00	0.0	0.00	.02	0.00
2	10.0	0.00	0.00	0.00	55.1	55.1	0.00	0.0	0.00	.02	0.00
3	10.0	0.00	0.00	0.00	53.5	53.5	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	52.1	52.1	0.00	0.0	0.00	.01	0.00
5	9.4	0.00	0.00	0.00	50.9	50.9	0.00	0.0	0.00	.01	0.00
6	9.4	0.00	0.00	0.00	49.9	49.9	0.00	0.0	0.00	.01	0.00
7	8.3	0.00	0.00	0.00	48.9	48.9	0.00	0.0	0.00	.01	0.00
8	10.6	.33	0.00	0.00	48.4	48.4	0.00	0.0	0.00	.01	0.00
9	13.9	1.15	.92	4.40	124.3	130.6	.42	45.8	0.00	.08	.03
10	15.6	1.62	1.17	4.40	171.2	179.5	.56	47.6	.17	.12	.03
11	17.8	1.81	1.18	4.40	178.9	186.9	.53	45.0	.37	.13	.03
12	19.4	1.89	1.14	4.40	179.0	186.5	.50	43.3	.37	.13	.03
13	17.8	1.89	1.14	4.40	179.1	186.5	.49	43.2	.37	.13	.03
14	17.8	1.82	1.18	4.40	179.8	187.8	.53	45.0	.39	.13	.03
15	17.8	1.64	1.18	4.40	180.8	189.2	.56	47.3	.42	.13	.03
16	17.2	1.18	.95	4.40	177.2	183.3	.41	43.0	.31	.13	.03
17	15.6	.29	0.00	0.00	120.8	120.8	0.00	0.0	0.00	.14	0.00
18	13.9	0.00	0.00	0.00	97.2	97.2	0.00	0.0	0.00	.10	0.00
19	13.9	0.00	0.00	0.00	84.4	84.4	0.00	0.0	0.00	.07	0.00
20	13.3	0.00	0.00	0.00	76.0	76.0	0.00	0.0	0.00	.06	0.00
21	13.3	0.00	0.00	0.00	70.2	70.2	0.00	0.0	0.00	.05	0.00
22	13.3	0.00	0.00	0.00	66.0	66.0	0.00	0.0	0.00	.04	0.00
23	13.3	0.00	0.00	0.00	62.8	62.8	0.00	0.0	0.00	.03	0.00
24	12.8	0.00	0.00	0.00	60.2	60.2	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	13.62	8.87	---	---	---	4.00	45.1	2.40	1.57	.21

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

13 FEBRUARY (DAY 44)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.3	0.00	0.00	0.00	58.8	58.8	0.00	0.0	0.00	.02	0.00
2	11.6	0.00	0.00	0.00	56.8	56.8	0.00	0.0	0.00	.02	0.00
3	10.0	0.00	0.00	0.00	54.8	54.8	0.00	0.0	0.00	.02	0.00
4	8.3	0.00	0.00	0.00	53.0	53.0	0.00	0.0	0.00	.01	0.00
5	8.9	0.00	0.00	0.00	51.5	51.5	0.00	0.0	0.00	.01	0.00
6	9.4	0.00	0.00	0.00	50.4	50.4	0.00	0.0	0.00	.01	0.00
7	10.0	0.00	0.00	0.00	49.6	49.6	0.00	0.0	0.00	.01	0.00
8	13.0	.58	0.00	0.00	49.4	49.4	0.00	0.0	0.00	.00	0.00
9	15.9	1.26	1.06	4.40	144.2	152.4	.55	51.5	0.00	.10	.03
10	18.9	1.64	1.27	4.40	177.5	186.8	.62	49.1	.32	.12	.03
11	20.0	1.84	1.31	4.40	182.6	191.8	.62	47.3	.46	.13	.03
12	21.1	1.92	1.29	4.40	182.7	191.6	.60	46.2	.46	.13	.03
13	22.2	1.91	1.28	4.40	182.7	191.6	.59	46.2	.46	.13	.03
14	21.3	1.84	1.31	4.40	183.2	192.5	.62	47.4	.48	.13	.03
15	20.3	1.66	1.28	4.40	183.6	193.0	.63	48.9	.49	.13	.03
16	19.4	1.29	1.10	4.40	181.7	189.9	.54	49.6	.44	.13	.03
17	17.2	.61	0.00	0.00	123.5	123.5	0.00	0.0	0.00	.15	0.00
18	15.0	0.00	0.00	0.00	99.1	99.1	0.00	0.0	0.00	.10	0.00
19	12.8	0.00	0.00	0.00	85.0	85.0	0.00	0.0	0.00	.08	0.00
20	12.6	0.00	0.00	0.00	76.2	76.2	0.00	0.0	0.00	.06	0.00
21	12.4	0.00	0.00	0.00	70.1	70.1	0.00	0.0	0.00	.05	0.00
22	12.2	0.00	0.00	0.00	65.6	65.6	0.00	0.0	0.00	.04	0.00
23	11.8	0.00	0.00	0.00	62.1	62.1	0.00	0.0	0.00	.03	0.00
24	11.5	0.00	0.00	0.00	59.4	59.4	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	14.55	9.91	---	---	---	4.77	48.1	3.12	1.62	.21

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

15 MARCH (DAY 74)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	56.3	56.3	0.00	0.0	0.00	.02	0.00
2	10.2	0.00	0.00	0.00	54.5	54.5	0.00	0.0	0.00	.02	0.00
3	9.8	0.00	0.00	0.00	52.9	52.9	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	51.6	51.6	0.00	0.0	0.00	.01	0.00
5	9.0	0.00	0.00	0.00	50.4	50.4	0.00	0.0	0.00	.01	0.00
6	8.7	0.00	0.00	0.00	49.4	49.4	0.00	0.0	0.00	.01	0.00
7	8.3	.12	0.00	0.00	48.5	48.5	0.00	0.0	0.00	.01	0.00
8	10.9	.89	.86	4.40	113.9	118.9	.34	39.2	0.00	.08	.03
9	13.5	1.44	1.33	4.40	172.8	183.1	.69	51.6	.22	.12	.03
10	16.1	1.74	1.52	4.40	186.6	198.2	.77	50.9	.57	.13	.03
11	16.7	1.88	1.56	4.40	188.8	200.5	.78	50.2	.63	.14	.03
12	17.2	1.92	1.54	4.40	188.9	200.4	.77	49.7	.63	.14	.03
13	17.8	1.89	1.51	4.40	188.8	200.1	.75	49.6	.62	.14	.03
14	17.6	1.85	1.53	4.40	188.7	200.2	.77	50.2	.63	.14	.03
15	17.4	1.73	1.51	4.40	188.8	200.3	.77	50.8	.63	.14	.03
16	17.2	1.46	1.35	4.40	187.0	197.3	.69	51.1	.57	.13	.03
17	15.9	.93	0.00	0.00	124.1	124.1	0.00	0.0	0.00	.15	0.00
18	14.6	.11	0.00	0.00	99.2	99.2	0.00	0.0	0.00	.10	0.00
19	13.3	0.00	0.00	0.00	85.3	85.3	0.00	0.0	0.00	.08	0.00
20	13.3	0.00	0.00	0.00	76.6	76.6	0.00	0.0	0.00	.06	0.00
21	13.3	0.00	0.00	0.00	70.6	70.6	0.00	0.0	0.00	.05	0.00
22	13.3	0.00	0.00	0.00	66.3	66.3	0.00	0.0	0.00	.04	0.00
23	13.3	0.00	0.00	0.00	63.0	63.0	0.00	0.0	0.00	.03	0.00
24	13.3	0.00	0.00	0.00	60.5	60.5	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	15.96	12.72	---	---	---	6.32	49.7	4.50	1.79	.23

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

23 APRIL (DAY 113)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	12.8	0.00	0.00	0.00	51.7	51.7	0.00	0.0	0.00	.00	0.00
2	13.3	0.00	0.00	0.00	51.2	51.2	0.00	0.0	0.00	.00	0.00
3	12.8	0.00	0.00	0.00	50.7	50.7	0.00	0.0	0.00	.00	0.00
4	12.8	0.00	0.00	0.00	50.3	50.3	0.00	0.0	0.00	.00	0.00
5	12.8	0.00	0.00	0.00	49.9	49.9	0.00	0.0	0.00	.00	0.00
6	12.2	0.00	0.00	0.00	49.5	49.5	0.00	0.0	0.00	.00	0.00
7	11.7	.50	0.00	0.00	49.1	49.1	0.00	0.0	0.00	.00	0.00
8	15.0	1.17	1.16	4.40	145.8	155.4	.64	55.1	0.00	.10	.03
9	17.2	1.62	1.60	4.40	184.8	197.5	.85	53.1	.51	.13	.03
10	19.4	1.84	1.77	4.40	193.3	207.2	.93	52.5	.75	.14	.03
11	20.0	1.89	1.78	4.40	194.5	208.4	.93	52.1	.78	.14	.03
12	20.6	1.90	1.77	4.40	194.6	208.3	.92	51.9	.78	.14	.03
13	18.9	1.88	1.74	4.40	194.4	208.0	.90	51.8	.77	.14	.03
14	19.4	1.87	1.76	4.40	194.3	208.1	.92	52.1	.77	.14	.03
15	18.3	1.81	1.75	4.40	194.4	208.1	.91	52.3	.77	.14	.03
16	18.9	1.62	1.60	4.40	192.5	205.2	.84	52.8	.72	.14	.03
17	17.8	1.20	0.00	0.00	127.2	127.2	0.00	0.0	0.00	.16	0.00
18	16.1	.52	0.00	0.00	101.4	101.4	0.00	0.0	0.00	.11	0.00
19	15.0	0.00	0.00	0.00	87.3	87.3	0.00	0.0	0.00	.08	0.00
20	13.3	0.00	0.00	0.00	77.9	77.9	0.00	0.0	0.00	.06	0.00
21	12.8	0.00	0.00	0.00	71.4	71.4	0.00	0.0	0.00	.05	0.00
22	12.8	0.00	0.00	0.00	66.7	66.7	0.00	0.0	0.00	.04	0.00
23	12.8	0.00	0.00	0.00	63.3	63.3	0.00	0.0	0.00	.03	0.00
24	13.9	0.00	0.00	0.00	60.8	60.8	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	17.79	14.93	---	---	---	7.84	52.5	5.85	1.79	.23

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

22 MAY (DAY 142)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	14.3	0.00	0.00	0.00	60.4	60.4	0.00	0.0	0.00	.02	0.00
2	13.9	0.00	0.00	0.00	58.5	58.5	0.00	0.0	0.00	.02	0.00
3	13.7	0.00	0.00	0.00	57.0	57.0	0.00	0.0	0.00	.02	0.00
4	13.5	0.00	0.00	0.00	55.7	55.7	0.00	0.0	0.00	.01	0.00
5	13.3	0.00	0.00	0.00	54.5	54.5	0.00	0.0	0.00	.01	0.00
6	14.1	.02	0.00	0.00	53.7	53.7	0.00	0.0	0.00	.01	0.00
7	14.8	.72	.70	4.40	111.4	115.6	.28	40.1	0.00	.07	.03
8	15.6	1.29	1.29	4.40	172.2	182.5	.69	53.5	.20	.12	.03
9	17.3	1.63	1.63	4.40	190.0	203.2	.88	54.2	.66	.14	.03
10	18.9	1.78	1.77	4.40	194.4	208.5	.94	53.3	.78	.14	.03
11	20.6	1.82	1.79	4.40	195.1	209.3	.94	52.8	.80	.14	.03
12	20.8	1.84	1.78	4.40	195.2	209.3	.94	52.6	.80	.14	.03
13	20.9	1.81	1.76	4.40	195.3	209.2	.92	52.6	.79	.14	.03
14	21.1	1.80	1.77	4.40	195.2	209.2	.93	52.8	.79	.14	.03
15	20.7	1.77	1.76	4.40	195.2	209.2	.94	53.3	.80	.14	.03
16	20.4	1.65	1.65	4.40	194.2	207.5	.89	54.1	.76	.14	.03
17	20.0	1.34	0.00	0.00	129.3	129.3	0.00	0.0	0.00	.16	0.00
18	18.9	.79	0.00	0.00	103.9	103.9	0.00	0.0	0.00	.11	0.00
19	17.8	.03	0.00	0.00	89.9	89.9	0.00	0.0	0.00	.08	0.00
20	16.7	0.00	0.00	0.00	80.8	80.8	0.00	0.0	0.00	.06	0.00
21	16.3	0.00	0.00	0.00	74.5	74.5	0.00	0.0	0.00	.05	0.00
22	16.0	0.00	0.00	0.00	69.9	69.9	0.00	0.0	0.00	.04	0.00
23	15.6	0.00	0.00	0.00	66.3	66.3	0.00	0.0	0.00	.03	0.00
24	15.6	0.00	0.00	0.00	63.5	63.5	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	18.31	15.89	---	---	---	8.37	52.6	6.38	1.96	.26

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

4 JUNE (DAY 155)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.2	0.00	0.00	0.00	49.6	49.6	0.00	0.0	0.00	.00	0.00
2	12.8	0.00	0.00	0.00	49.3	49.3	0.00	0.0	0.00	.00	0.00
3	12.6	0.00	0.00	0.00	49.0	49.0	0.00	0.0	0.00	.00	0.00
4	12.4	0.00	0.00	0.00	48.8	48.8	0.00	0.0	0.00	.00	0.00
5	12.2	0.00	0.00	0.00	48.5	48.5	0.00	0.0	0.00	.00	0.00
6	13.1	.04	0.00	0.00	48.4	48.4	0.00	0.0	0.00	.00	0.00
7	14.1	.73	.71	4.40	97.1	101.7	.31	43.4	0.00	.06	.03
8	15.0	1.33	1.32	4.40	169.9	180.5	.70	53.4	.16	.12	.03
9	15.9	1.64	1.64	4.40	190.0	203.4	.90	54.6	.66	.14	.03
10	16.9	1.77	1.77	4.40	194.4	208.6	.94	53.5	.78	.14	.03
11	17.8	1.81	1.79	4.40	195.2	209.4	.95	53.0	.80	.14	.03
12	18.3	1.82	1.79	4.40	195.3	209.4	.94	52.7	.80	.14	.03
13	18.9	1.80	1.76	4.40	195.3	209.3	.93	52.7	.80	.14	.03
14	19.4	1.80	1.77	4.40	195.3	209.3	.94	53.0	.80	.14	.03
15	19.0	1.77	1.76	4.40	195.3	209.4	.94	53.5	.80	.14	.03
16	18.7	1.66	1.66	4.40	194.7	208.3	.91	54.5	.78	.14	.03
17	18.3	1.39	0.00	0.00	128.1	128.1	0.00	0.0	0.00	.16	0.00
18	17.6	.84	0.00	0.00	102.7	102.7	0.00	0.0	0.00	.11	0.00
19	16.8	.06	0.00	0.00	88.8	88.8	0.00	0.0	0.00	.08	0.00
20	16.1	0.00	0.00	0.00	79.8	79.8	0.00	0.0	0.00	.06	0.00
21	15.5	0.00	0.00	0.00	73.6	73.6	0.00	0.0	0.00	.05	0.00
22	15.0	0.00	0.00	0.00	68.9	68.9	0.00	0.0	0.00	.04	0.00
23	14.4	0.00	0.00	0.00	65.3	65.3	0.00	0.0	0.00	.03	0.00
24	14.2	0.00	0.00	0.00	62.5	62.5	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	18.47	15.97	---	---	---	8.46	53.0	6.36	1.89	.26

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

10 JULY (DAY 191)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	18.9	0.00	0.00	0.00	64.5	64.5	0.00	0.0	0.00	.02	0.00
2	18.9	0.00	0.00	0.00	62.8	62.8	0.00	0.0	0.00	.02	0.00
3	18.9	0.00	0.00	0.00	61.4	61.4	0.00	0.0	0.00	.01	0.00
4	18.3	0.00	0.00	0.00	60.1	60.1	0.00	0.0	0.00	.01	0.00
5	17.8	0.00	0.00	0.00	59.0	59.0	0.00	0.0	0.00	.01	0.00
6	17.8	.03	0.00	0.00	58.1	58.1	0.00	0.0	0.00	.01	0.00
7	18.9	.66	0.00	0.00	57.5	57.5	0.00	0.0	0.00	.01	0.00
8	20.0	1.32	1.31	4.40	166.8	177.4	.71	53.8	.06	.11	.03
9	24.4	1.65	1.65	4.40	190.2	203.7	.91	54.9	.66	.13	.03
10	24.4	1.80	1.79	4.40	195.2	209.6	.96	53.8	.80	.14	.03
11	25.6	1.84	1.81	4.40	196.0	210.5	.97	53.3	.82	.14	.03
12	25.0	1.85	1.81	4.40	196.1	210.5	.96	53.0	.82	.14	.03
13	25.0	1.84	1.80	4.40	196.2	210.5	.96	53.0	.82	.14	.03
14	25.0	1.84	1.81	4.40	196.2	210.6	.96	53.3	.82	.14	.03
15	25.0	1.81	1.80	4.40	196.2	210.7	.97	53.8	.82	.14	.03
16	26.7	1.70	1.70	4.40	195.9	209.8	.93	54.8	.81	.14	.03
17	26.7	1.42	0.00	0.00	134.9	134.9	0.00	0.0	0.00	.15	0.00
18	25.6	.84	0.00	0.00	110.1	110.1	0.00	0.0	0.00	.10	0.00
19	24.4	.07	0.00	0.00	96.3	96.3	0.00	0.0	0.00	.08	0.00
20	22.2	0.00	0.00	0.00	86.8	86.8	0.00	0.0	0.00	.06	0.00
21	20.6	0.00	0.00	0.00	80.0	80.0	0.00	0.0	0.00	.05	0.00
22	20.0	0.00	0.00	0.00	75.0	75.0	0.00	0.0	0.00	.04	0.00
23	19.4	0.00	0.00	0.00	71.1	71.1	0.00	0.0	0.00	.03	0.00
24	18.9	0.00	0.00	0.00	68.0	68.0	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	18.66	15.49	---	---	---	8.32	53.7	6.42	1.86	.23

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

2 AUGUST (DAY 214)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	17.2	0.00	0.00	0.00	62.9	62.9	0.00	0.0	0.00	.02	0.00
2	17.2	0.00	0.00	0.00	61.2	61.2	0.00	0.0	0.00	.02	0.00
3	17.2	0.00	0.00	0.00	59.8	59.8	0.00	0.0	0.00	.01	0.00
4	16.7	0.00	0.00	0.00	58.5	58.5	0.00	0.0	0.00	.01	0.00
5	17.2	0.00	0.00	0.00	57.6	57.6	0.00	0.0	0.00	.01	0.00
6	17.8	0.00	0.00	0.00	56.9	56.9	0.00	0.0	0.00	.01	0.00
7	20.0	.58	0.00	0.00	56.6	56.6	0.00	0.0	0.00	.01	0.00
8	21.7	1.24	1.24	4.40	165.8	175.9	.68	54.5	.03	.11	.03
9	22.2	1.60	1.60	4.40	188.4	201.3	.86	53.9	.62	.13	.03
10	23.9	1.78	1.75	4.40	193.9	207.8	.93	53.2	.76	.14	.03
11	23.3	1.83	1.78	4.40	194.8	208.9	.94	52.7	.79	.14	.03
12	25.0	1.85	1.77	4.40	195.0	208.9	.93	52.6	.79	.14	.03
13	25.6	1.85	1.77	4.40	195.0	209.0	.93	52.6	.79	.14	.03
14	25.6	1.84	1.78	4.40	195.2	209.3	.94	52.8	.80	.14	.03
15	23.9	1.80	1.77	4.40	195.3	209.4	.94	53.1	.80	.14	.03
16	23.3	1.67	1.66	4.40	194.3	207.7	.89	53.8	.77	.14	.03
17	21.7	1.35	0.00	0.00	130.7	130.7	0.00	0.0	0.00	.16	0.00
18	21.1	.70	0.00	0.00	105.7	105.7	0.00	0.0	0.00	.11	0.00
19	20.6	.00	0.00	0.00	92.1	92.1	0.00	0.0	0.00	.08	0.00
20	20.0	0.00	0.00	0.00	83.4	83.4	0.00	0.0	0.00	.06	0.00
21	19.4	0.00	0.00	0.00	77.2	77.2	0.00	0.0	0.00	.05	0.00
22	19.4	0.00	0.00	0.00	72.8	72.8	0.00	0.0	0.00	.04	0.00
23	20.0	0.00	0.00	0.00	69.6	69.6	0.00	0.0	0.00	.03	0.00
24	19.4	0.00	0.00	0.00	66.9	66.9	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	18.09	15.13	---	---	---	8.04	53.2	6.14	1.85	.23

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

10 SEPTEMBER (DAY 253)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	18.9	0.00	0.00	0.00	54.5	54.5	0.00	0.0	0.00	.00	0.00
2	18.3	0.00	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.00	0.00
3	18.3	0.00	0.00	0.00	54.1	54.1	0.00	0.0	0.00	.00	0.00
4	18.3	0.00	0.00	0.00	53.9	53.9	0.00	0.0	0.00	.00	0.00
5	18.3	0.00	0.00	0.00	53.8	53.8	0.00	0.0	0.00	.00	0.00
6	18.3	0.00	0.00	0.00	53.7	53.7	0.00	0.0	0.00	.00	0.00
7	18.3	.01	0.00	0.00	53.6	53.6	0.00	0.0	0.00	.00	0.00
8	18.3	.03	0.00	0.00	53.5	53.5	0.00	0.0	0.00	.00	0.00
9	18.9	.06	0.00	0.00	53.5	53.5	0.00	0.0	0.00	.00	0.00
10	20.6	.08	0.00	0.00	53.7	53.7	0.00	0.0	0.00	.00	0.00
11	22.8	1.67	1.49	4.40	164.2	175.9	.78	52.3	.02	.11	.03
12	23.3	1.84	1.60	4.40	187.2	199.5	.82	51.3	.59	.13	.03
13	22.2	1.73	1.51	4.40	188.7	200.2	.77	51.0	.63	.13	.03
14	23.3	1.80	1.60	4.40	190.5	202.9	.82	51.4	.67	.13	.03
15	22.8	1.71	1.58	4.40	190.6	202.9	.82	51.8	.68	.13	.03
16	22.2	1.49	1.43	4.40	189.0	200.2	.75	52.0	.63	.13	.03
17	21.1	1.02	0.00	0.00	128.7	128.7	0.00	0.0	0.00	.15	0.00
18	20.6	.14	0.00	0.00	104.5	104.5	0.00	0.0	0.00	.10	0.00
19	19.4	0.00	0.00	0.00	90.9	90.9	0.00	0.0	0.00	.08	0.00
20	18.9	0.00	0.00	0.00	82.2	82.2	0.00	0.0	0.00	.06	0.00
21	18.3	0.00	0.00	0.00	76.1	76.1	0.00	0.0	0.00	.05	0.00
22	18.3	0.00	0.00	0.00	71.6	71.6	0.00	0.0	0.00	.04	0.00
23	17.8	0.00	0.00	0.00	68.2	68.2	0.00	0.0	0.00	.03	0.00
24	18.3	0.00	0.00	0.00	65.6	65.6	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	11.59	9.21	---	---	---	4.75	51.6	3.21	1.33	.16

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

12 OCTOBER (DAY 285)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	16.1	0.00	0.00	0.00	61.9	61.9	0.00	0.0	0.00	.02	0.00
2	15.6	0.00	0.00	0.00	60.0	60.0	0.00	0.0	0.00	.02	0.00
3	15.0	0.00	0.00	0.00	58.4	58.4	0.00	0.0	0.00	.01	0.00
4	15.0	0.00	0.00	0.00	57.1	57.1	0.00	0.0	0.00	.01	0.00
5	13.9	0.00	0.00	0.00	55.9	55.9	0.00	0.0	0.00	.01	0.00
6	13.9	0.00	0.00	0.00	54.8	54.8	0.00	0.0	0.00	.01	0.00
7	13.9	0.00	0.00	0.00	53.9	53.9	0.00	0.0	0.00	.01	0.00
8	14.4	.60	0.00	0.00	53.2	53.2	0.00	0.0	0.00	.01	0.00
9	17.8	1.27	1.13	4.40	151.8	160.6	.59	51.9	0.00	.10	.03
10	20.0	1.62	1.34	4.40	180.5	190.6	.67	50.2	.40	.13	.03
11	20.6	1.80	1.39	4.40	185.0	195.3	.68	49.0	.53	.13	.03
12	21.7	1.87	1.39	4.40	185.2	195.3	.67	48.3	.53	.13	.03
13	21.7	1.86	1.38	4.40	185.3	195.3	.66	48.2	.53	.13	.03
14	21.1	1.80	1.39	4.40	185.5	195.7	.68	49.0	.54	.13	.03
15	20.6	1.64	1.36	4.40	185.6	195.8	.68	50.0	.54	.13	.03
16	20.6	1.31	1.17	4.40	183.4	192.3	.59	50.5	.48	.13	.03
17	19.4	.67	0.00	0.00	125.7	125.7	0.00	0.0	0.00	.15	0.00
18	18.3	0.00	0.00	0.00	101.9	101.9	0.00	0.0	0.00	.10	0.00
19	17.2	0.00	0.00	0.00	88.4	88.4	0.00	0.0	0.00	.08	0.00
20	17.2	0.00	0.00	0.00	80.0	80.0	0.00	0.0	0.00	.06	0.00
21	17.2	0.00	0.00	0.00	74.2	74.2	0.00	0.0	0.00	.05	0.00
22	16.7	0.00	0.00	0.00	69.8	69.8	0.00	0.0	0.00	.04	0.00
23	16.7	0.00	0.00	0.00	66.5	66.5	0.00	0.0	0.00	.03	0.00
24	16.7	0.00	0.00	0.00	64.0	64.0	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	14.46	10.54	---	---	---	5.22	49.6	3.56	1.63	.21

RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

2 NOVEMBER (DAY 306)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.5	0.00	0.00	0.00	59.8	59.8	0.00	0.0	0.00	.02	0.00
2	12.8	0.00	0.00	0.00	57.8	57.8	0.00	0.0	0.00	.02	0.00
3	12.6	0.00	0.00	0.00	56.2	56.2	0.00	0.0	0.00	.01	0.00
4	12.4	0.00	0.00	0.00	54.8	54.8	0.00	0.0	0.00	.01	0.00
5	12.2	0.00	0.00	0.00	53.6	53.6	0.00	0.0	0.00	.01	0.00
6	12.0	0.00	0.00	0.00	52.6	52.6	0.00	0.0	0.00	.01	0.00
7	11.9	0.00	0.00	0.00	51.8	51.8	0.00	0.0	0.00	.01	0.00
8	11.7	.26	0.00	0.00	51.0	51.0	0.00	0.0	0.00	.01	0.00
9	13.9	1.11	.92	4.40	131.4	138.4	.47	50.7	0.00	.09	.03
10	16.1	1.57	1.19	4.40	173.3	182.0	.58	48.5	.22	.12	.03
11	18.3	1.79	1.24	4.40	180.7	189.3	.58	46.5	.41	.13	.03
12	18.9	1.88	1.22	4.40	180.8	189.0	.55	45.2	.42	.13	.03
13	19.4	1.87	1.22	4.40	180.9	189.1	.55	45.2	.42	.13	.03
14	20.0	1.80	1.24	4.40	181.7	190.4	.58	46.6	.44	.13	.03
15	19.8	1.62	1.23	4.40	182.2	191.1	.59	48.3	.45	.13	.03
16	19.6	1.20	1.00	4.40	179.6	186.9	.48	48.4	.38	.13	.03
17	19.4	.31	0.00	0.00	124.4	124.4	0.00	0.0	0.00	.14	0.00
18	18.5	0.00	0.00	0.00	101.3	101.3	0.00	0.0	0.00	.10	0.00
19	17.6	0.00	0.00	0.00	88.3	88.3	0.00	0.0	0.00	.07	0.00
20	16.7	0.00	0.00	0.00	79.7	79.7	0.00	0.0	0.00	.06	0.00
21	16.3	0.00	0.00	0.00	73.7	73.7	0.00	0.0	0.00	.05	0.00
22	16.0	0.00	0.00	0.00	69.3	69.3	0.00	0.0	0.00	.04	0.00
23	15.6	0.00	0.00	0.00	65.9	65.9	0.00	0.0	0.00	.03	0.00
24	15.2	0.00	0.00	0.00	63.1	63.1	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	13.41	9.26	---	---	---	4.38	47.3	2.74	1.58	.21

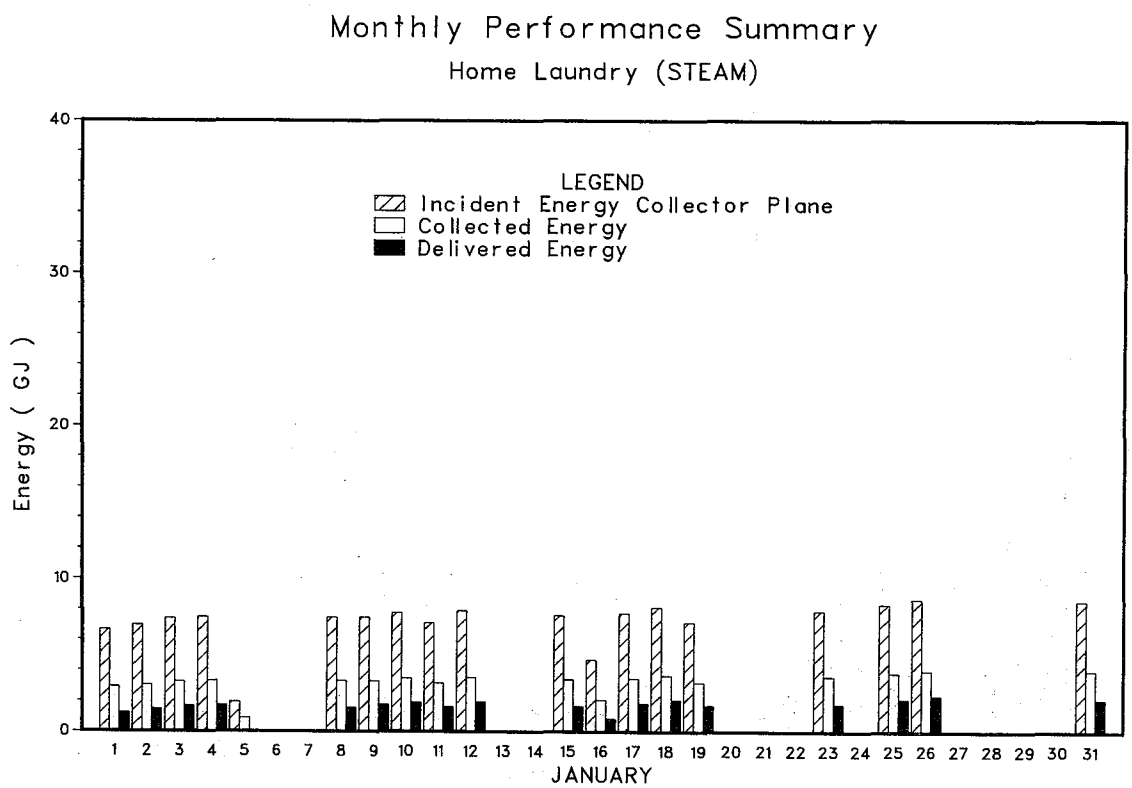
RUN ID: HS2
83/09/02.

HOME LAUNDRY (STEAM)

CLEAR DAY PERFORMANCE TABLE

26 DECEMBER (DAY 360)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	7.8	0.00	0.00	0.00	54.3	54.3	0.00	0.0	0.00	.02	0.00
2	7.2	0.00	0.00	0.00	52.3	52.3	0.00	0.0	0.00	.02	0.00
3	7.2	0.00	0.00	0.00	50.7	50.7	0.00	0.0	0.00	.01	0.00
4	6.7	0.00	0.00	0.00	49.3	49.3	0.00	0.0	0.00	.01	0.00
5	6.7	0.00	0.00	0.00	48.1	48.1	0.00	0.0	0.00	.01	0.00
6	6.7	0.00	0.00	0.00	47.2	47.2	0.00	0.0	0.00	.01	0.00
7	6.1	0.00	0.00	0.00	46.2	46.2	0.00	0.0	0.00	.01	0.00
8	6.7	.11	0.00	0.00	45.6	45.6	0.00	0.0	0.00	.01	0.00
9	7.8	.99	.76	4.40	102.2	106.6	.30	38.8	0.00	.07	.03
10	10.0	1.48	1.00	4.40	162.7	169.6	.46	45.8	-.02	.12	.03
11	12.2	1.72	1.02	4.40	174.6	181.1	.43	42.2	.25	.13	.03
12	14.4	1.81	.98	4.40	174.9	180.8	.39	40.0	.26	.12	.03
13	14.4	1.81	.99	4.40	175.0	180.9	.39	40.0	.26	.13	.03
14	14.4	1.73	1.03	4.40	176.2	182.7	.43	42.3	.30	.13	.03
15	15.0	1.50	1.01	4.40	177.1	184.0	.46	45.2	.32	.13	.03
16	15.0	1.00	.77	4.40	172.1	176.1	.27	34.7	.18	.12	.03
17	14.4	.05	0.00	0.00	118.2	118.2	0.00	0.0	0.00	.14	0.00
18	13.9	0.00	0.00	0.00	96.0	96.0	0.00	0.0	0.00	.09	0.00
19	12.2	0.00	0.00	0.00	82.9	82.9	0.00	0.0	0.00	.07	0.00
20	12.2	0.00	0.00	0.00	74.6	74.6	0.00	0.0	0.00	.06	0.00
21	11.1	0.00	0.00	0.00	68.6	68.6	0.00	0.0	0.00	.05	0.00
22	11.1	0.00	0.00	0.00	64.2	64.2	0.00	0.0	0.00	.04	0.00
23	10.6	0.00	0.00	0.00	60.8	60.8	0.00	0.0	0.00	.03	0.00
24	10.0	0.00	0.00	0.00	58.0	58.0	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	12.23	7.57	---	---	---	3.13	41.4	1.56	1.53	.21


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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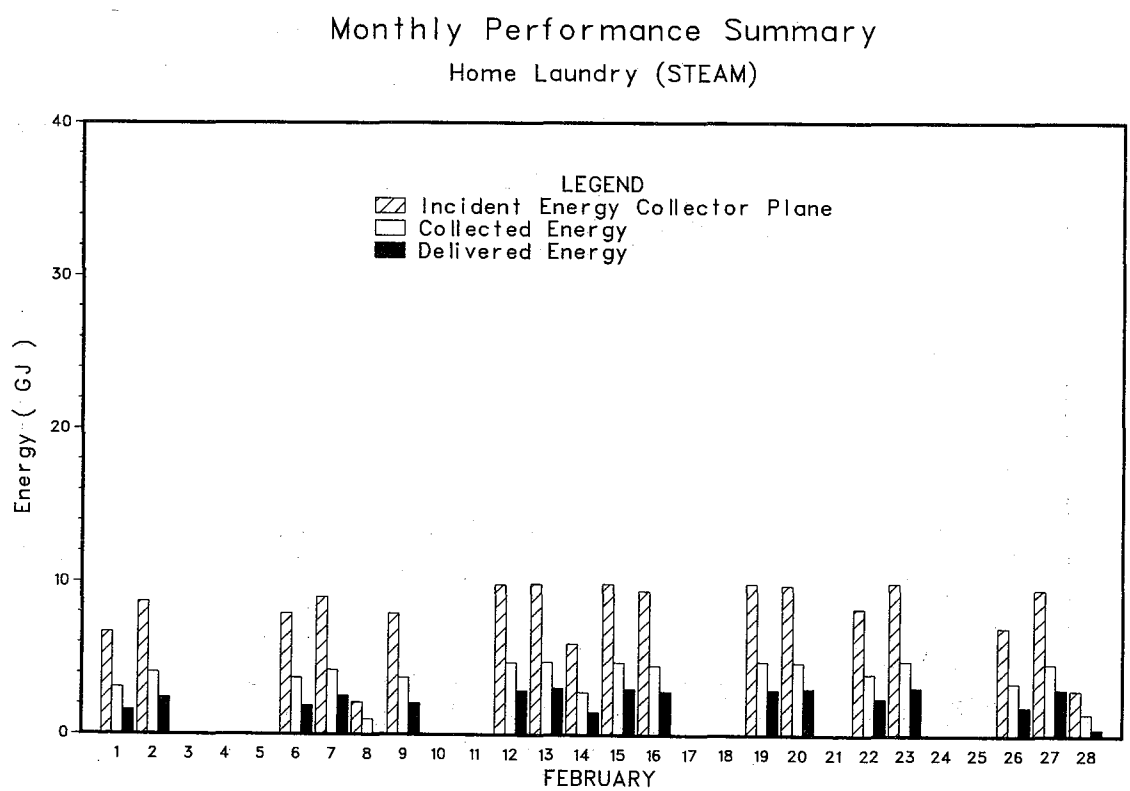
JANUARY


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
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40
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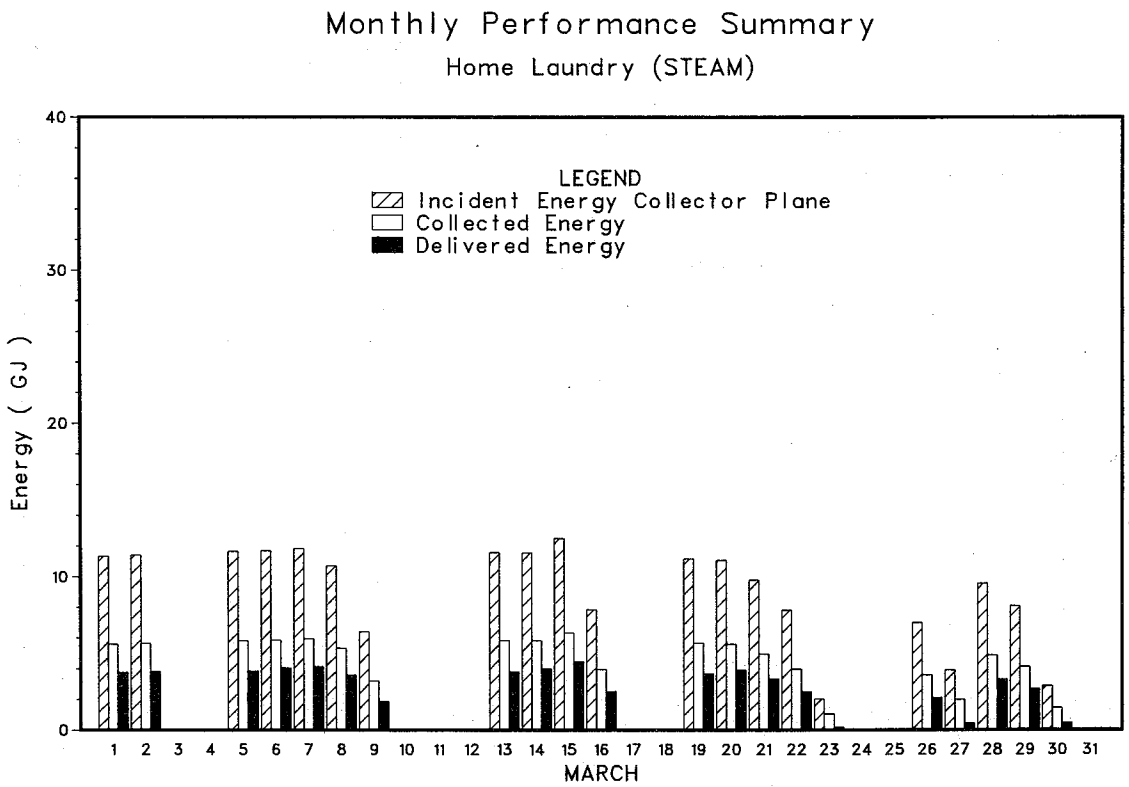
FEBRUARY


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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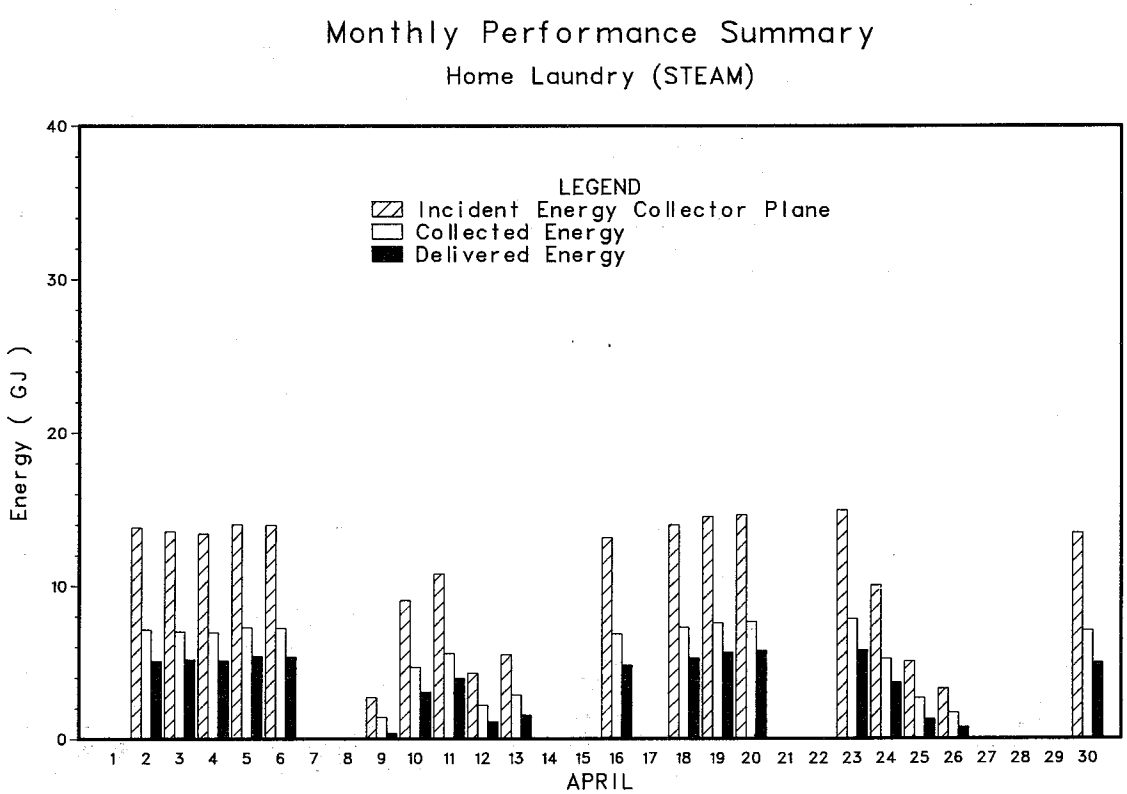
MARCH


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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40
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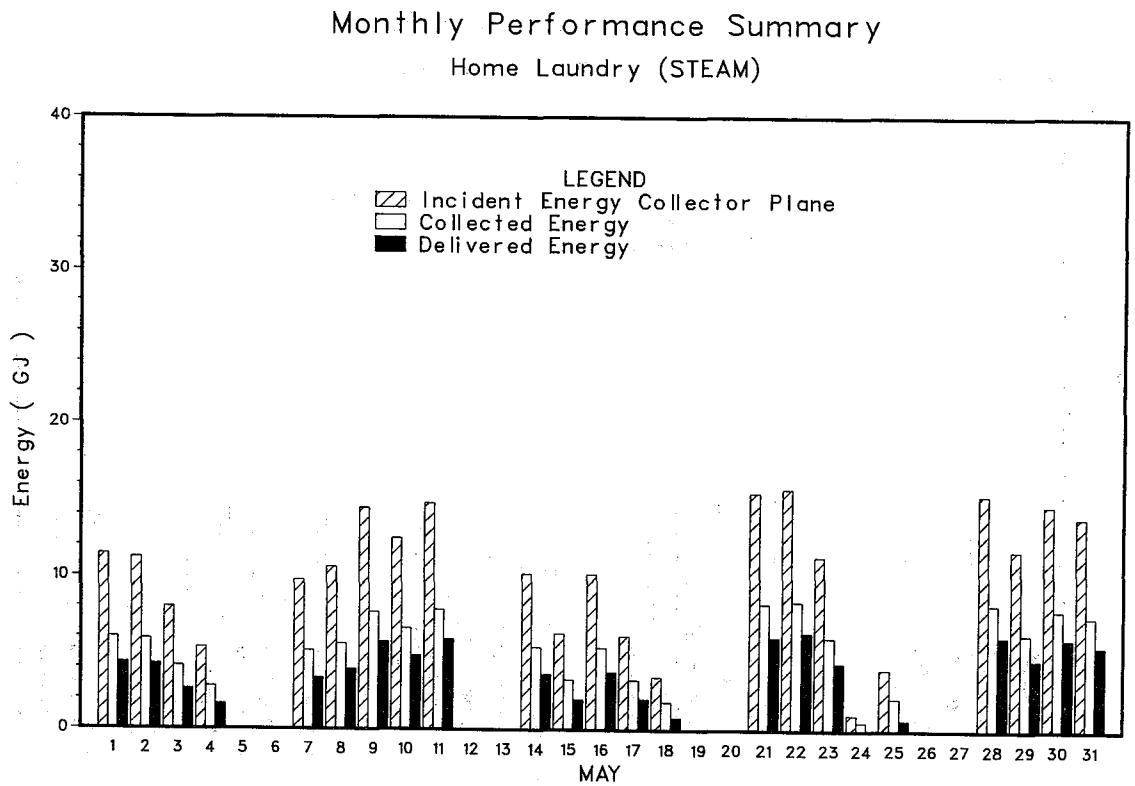
APRIL


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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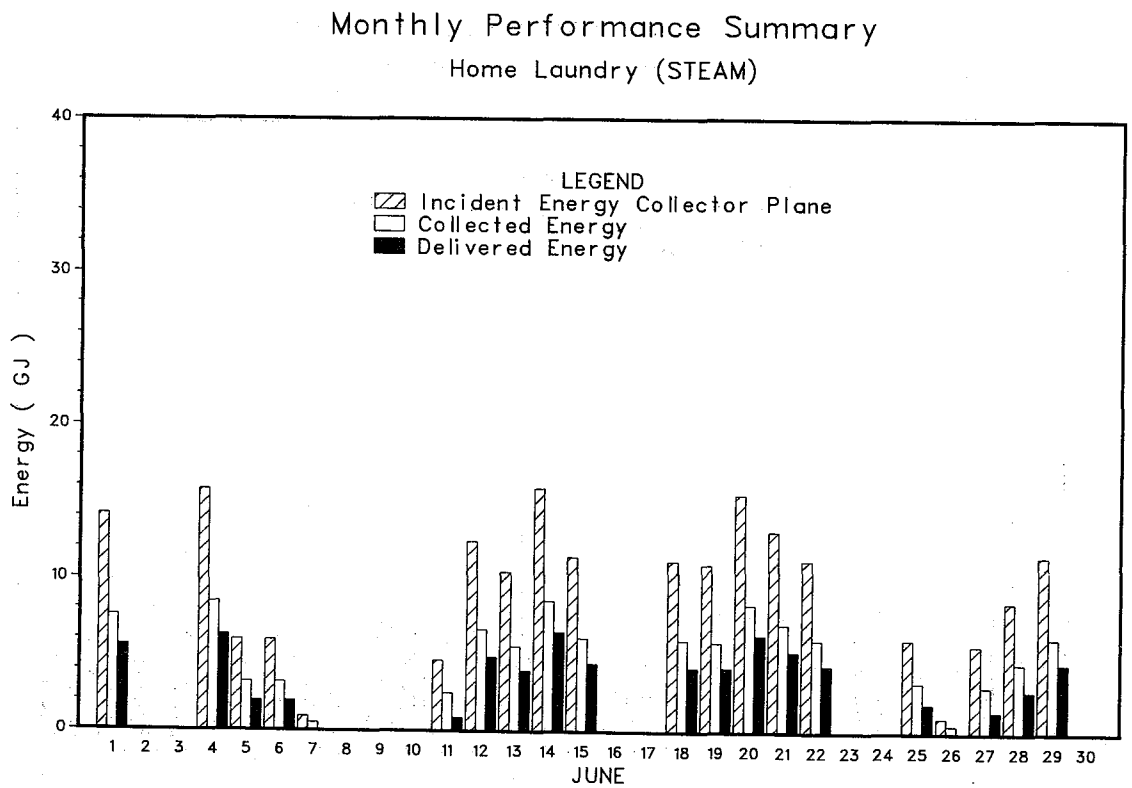
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MAY


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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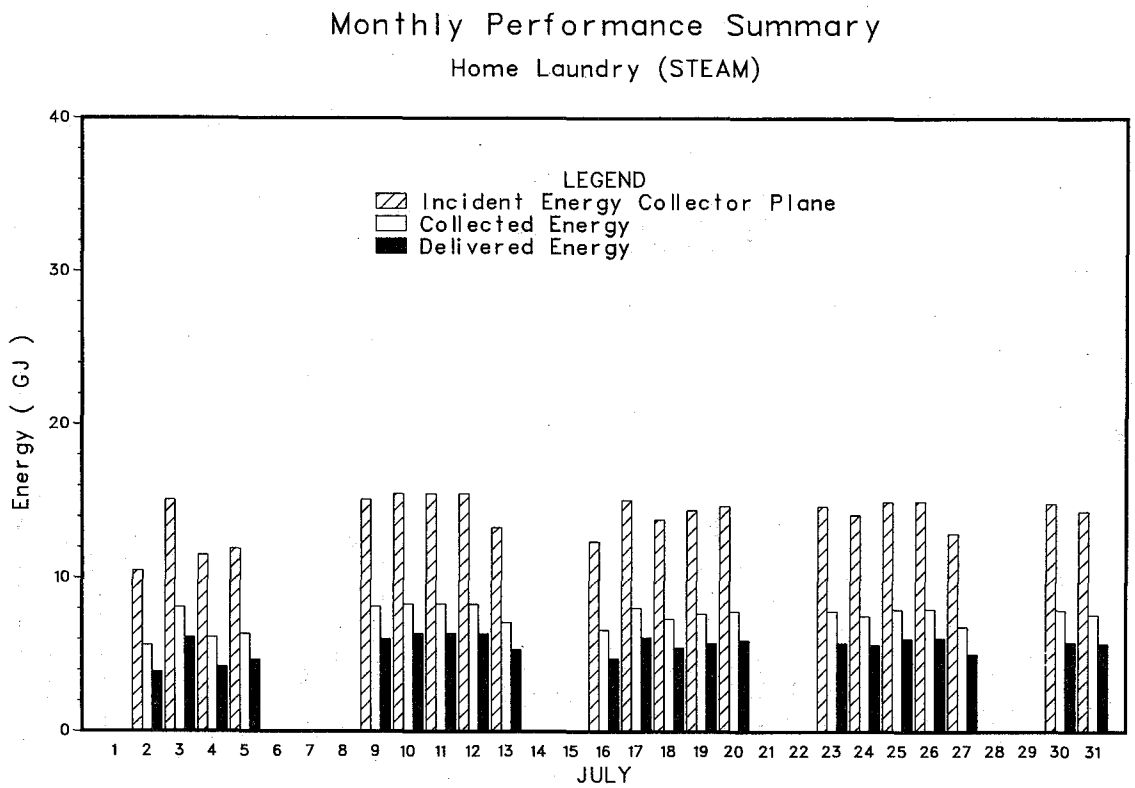
JUNE


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
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40
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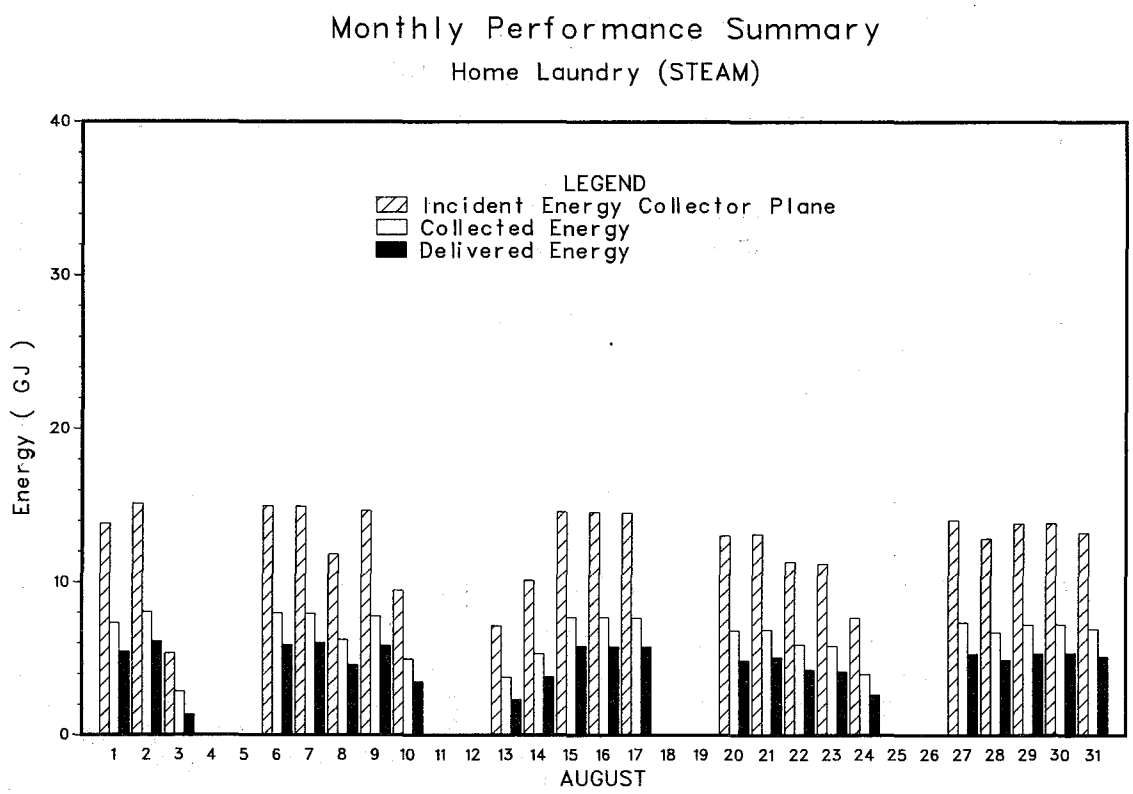
JULY


Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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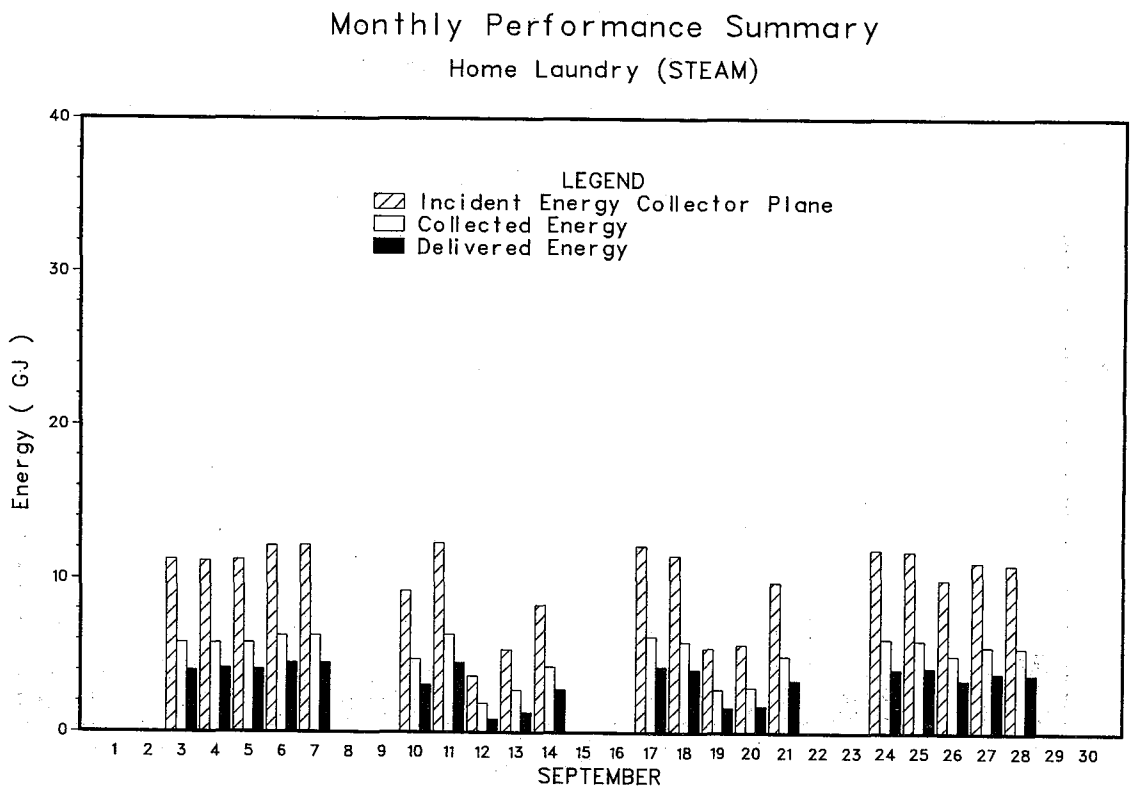
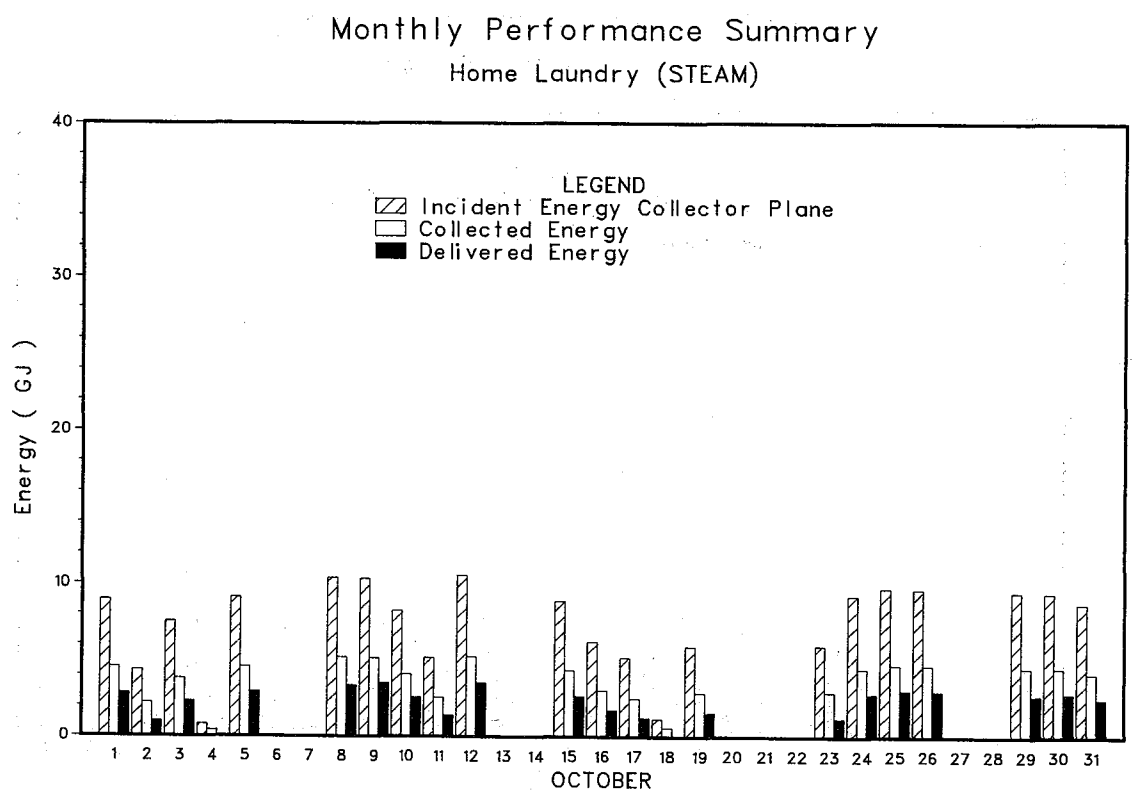
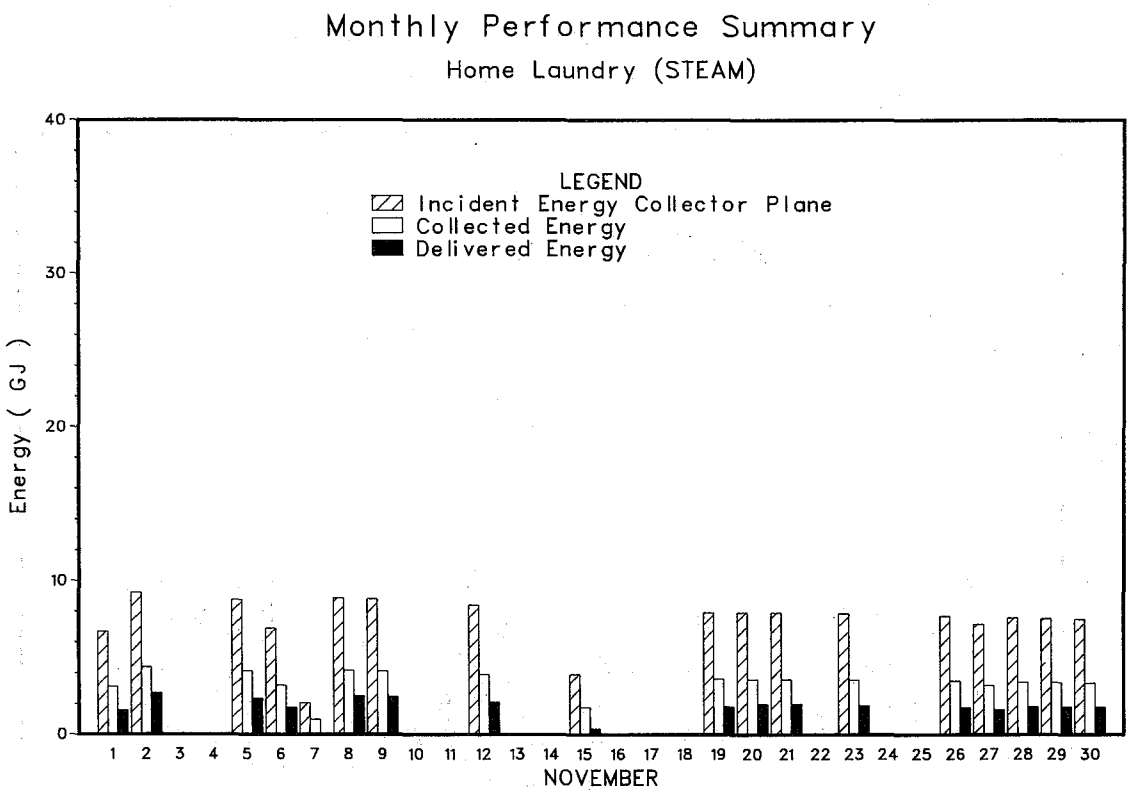
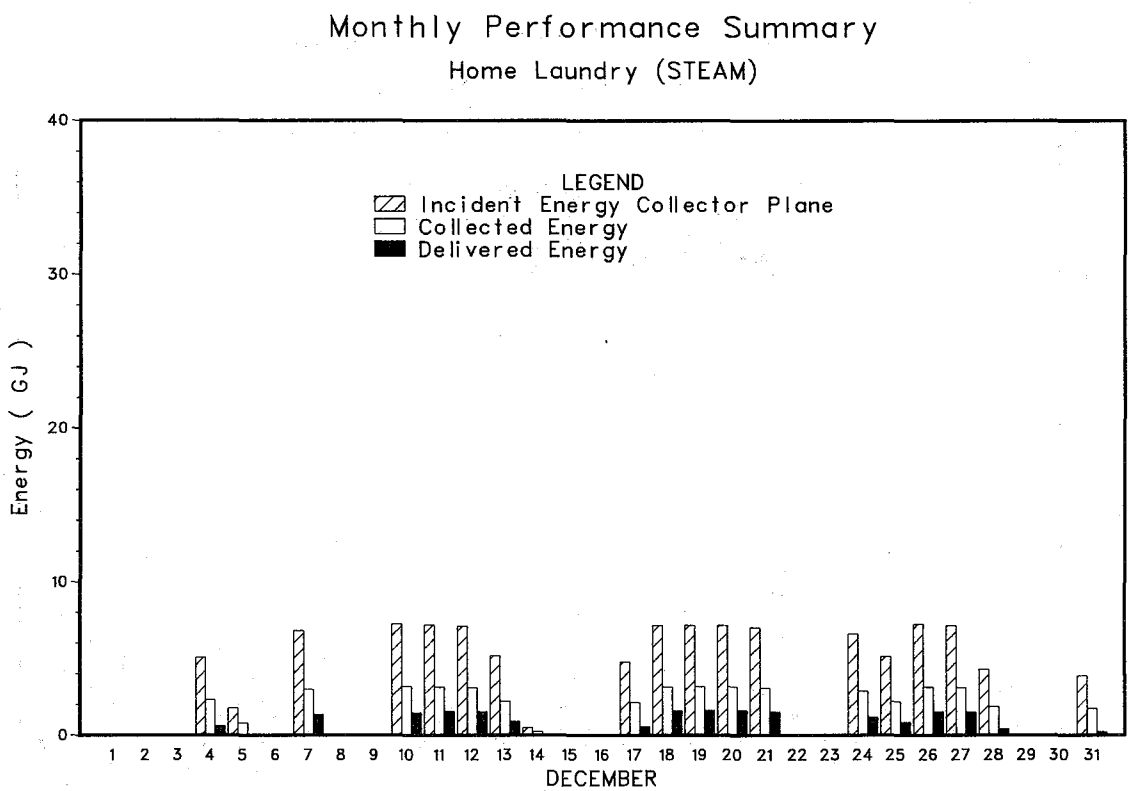
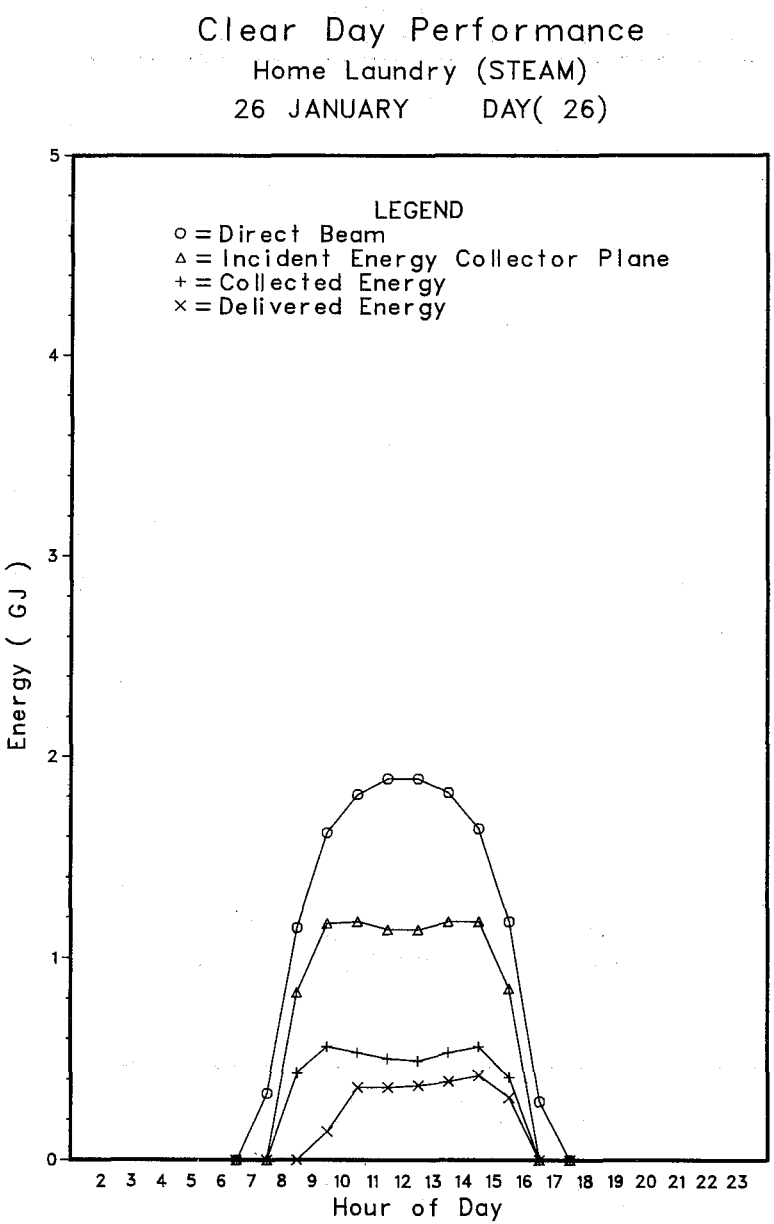
AUGUST

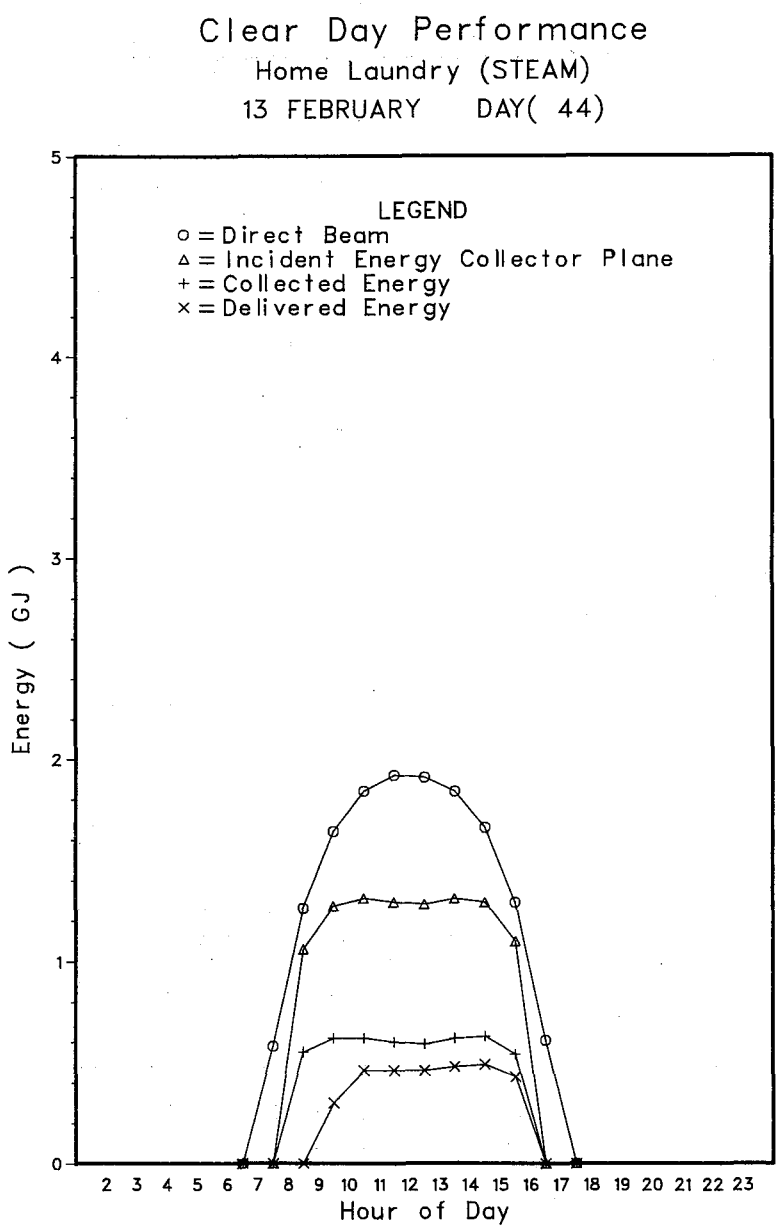

Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
SEPTEMBER

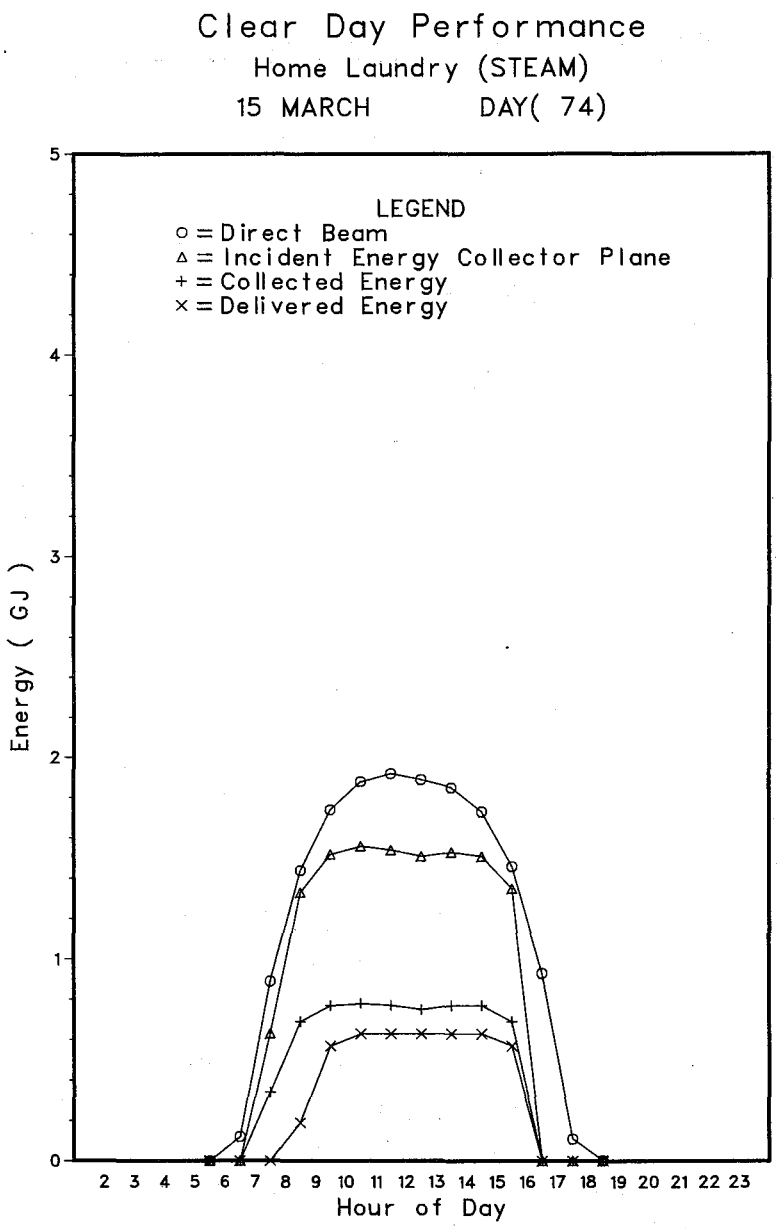

Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
OCTOBER

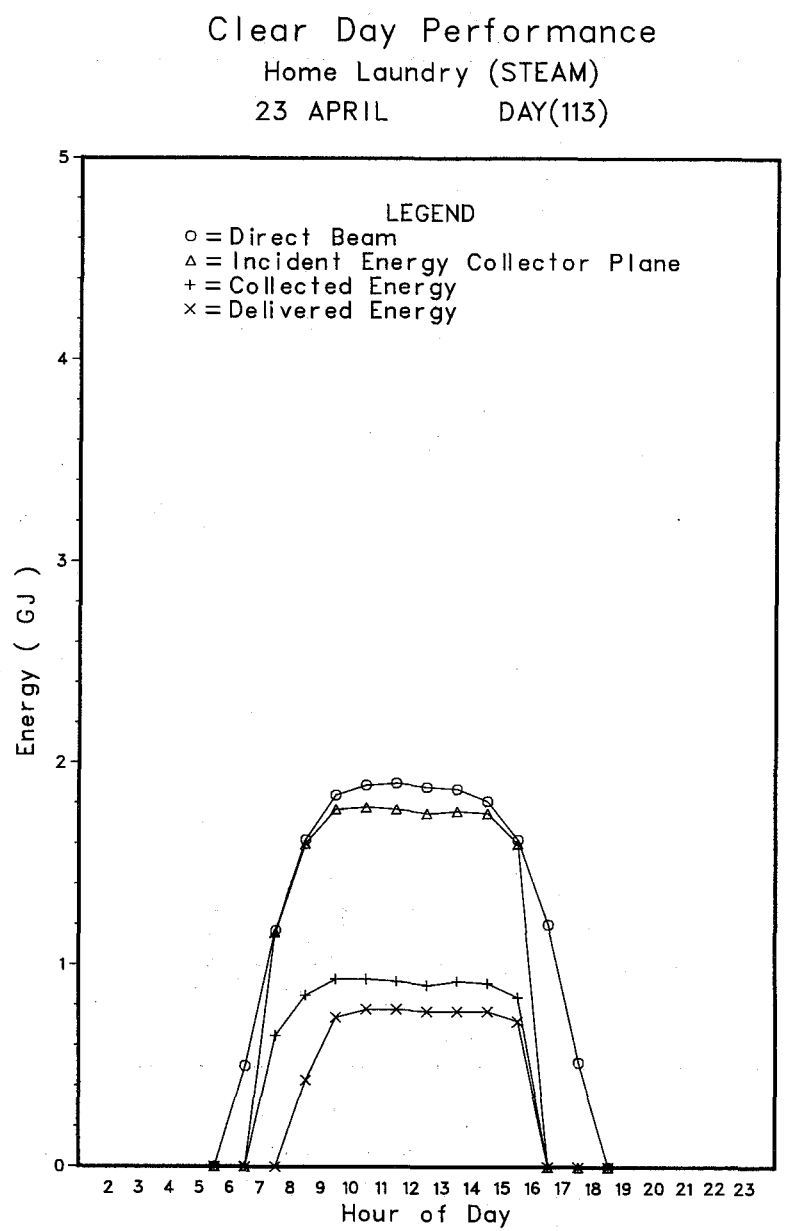

Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER

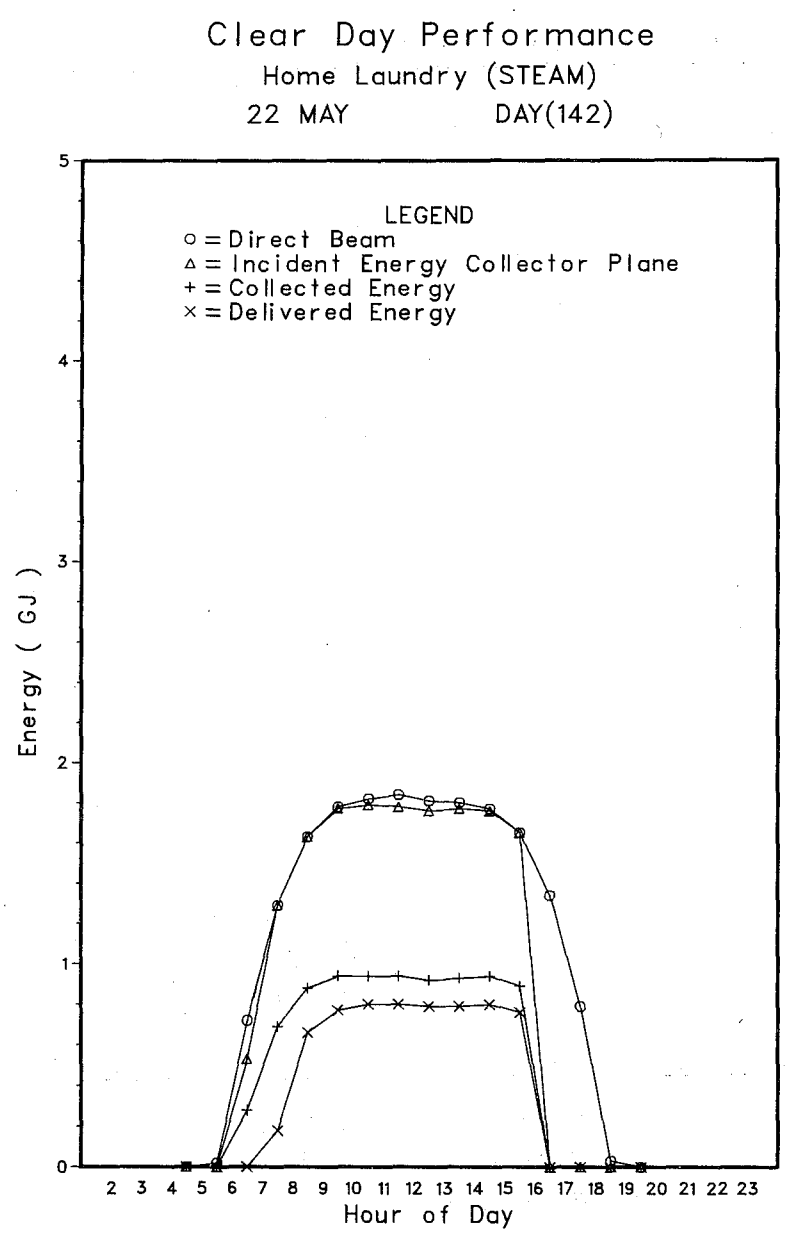

Monthly Performance Summary
Home Laundry (STEAM)
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

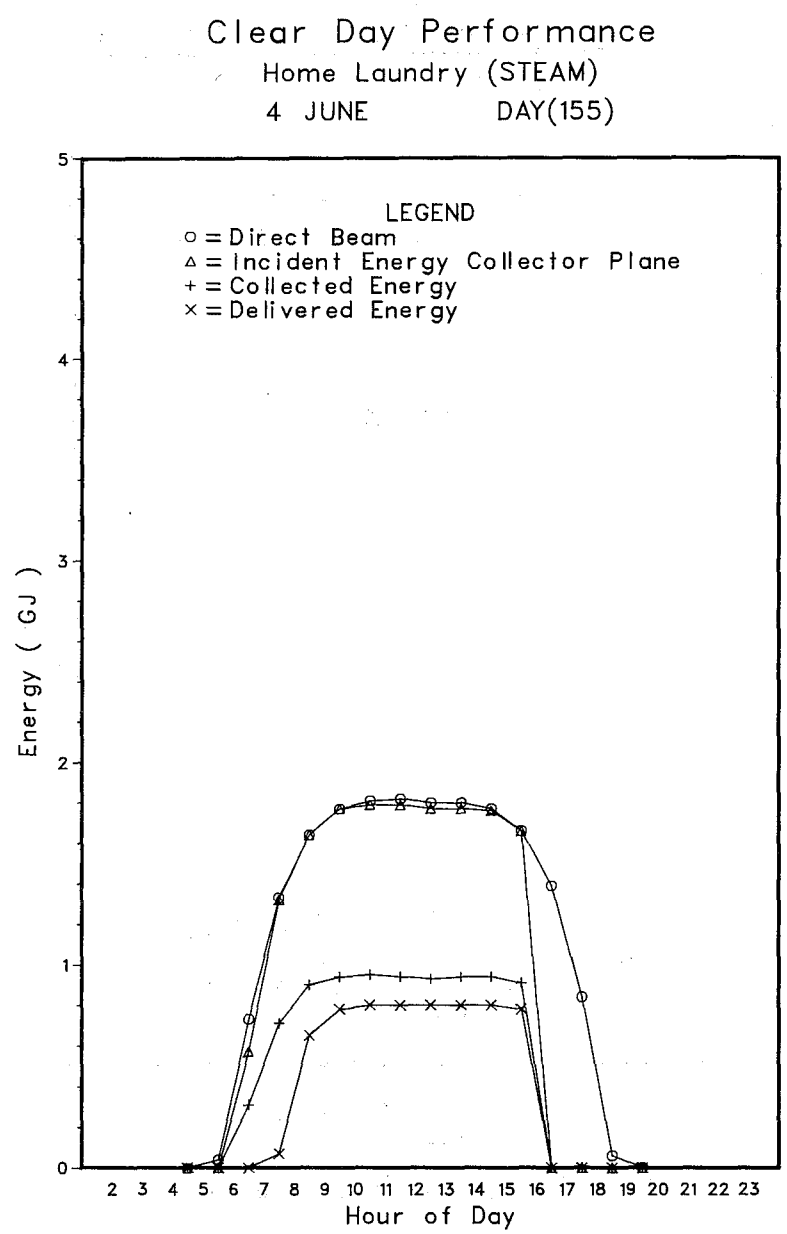

Clear Day Performance
Home Laundry (STEAM)
26 JANUARY DAY(26)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

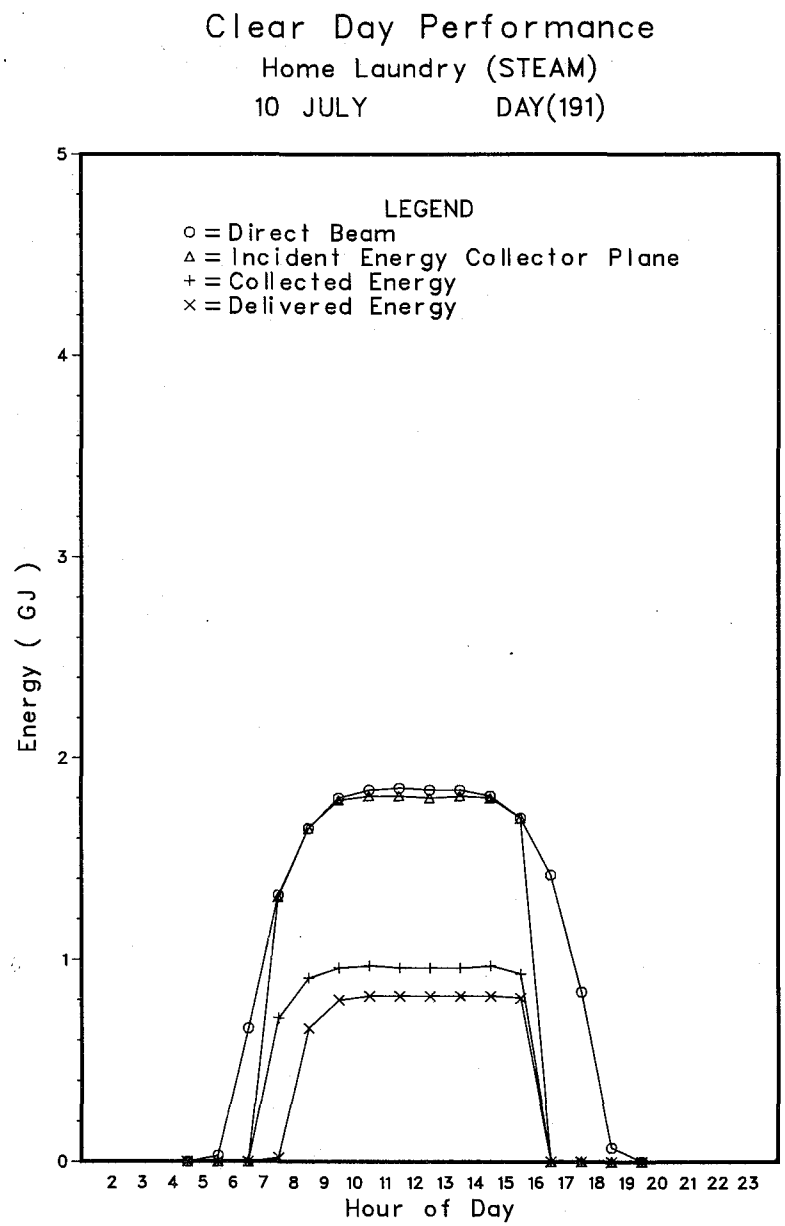

Clear Day Performance
Home Laundry (STEAM)
13 FEBRUARY DAY(44)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

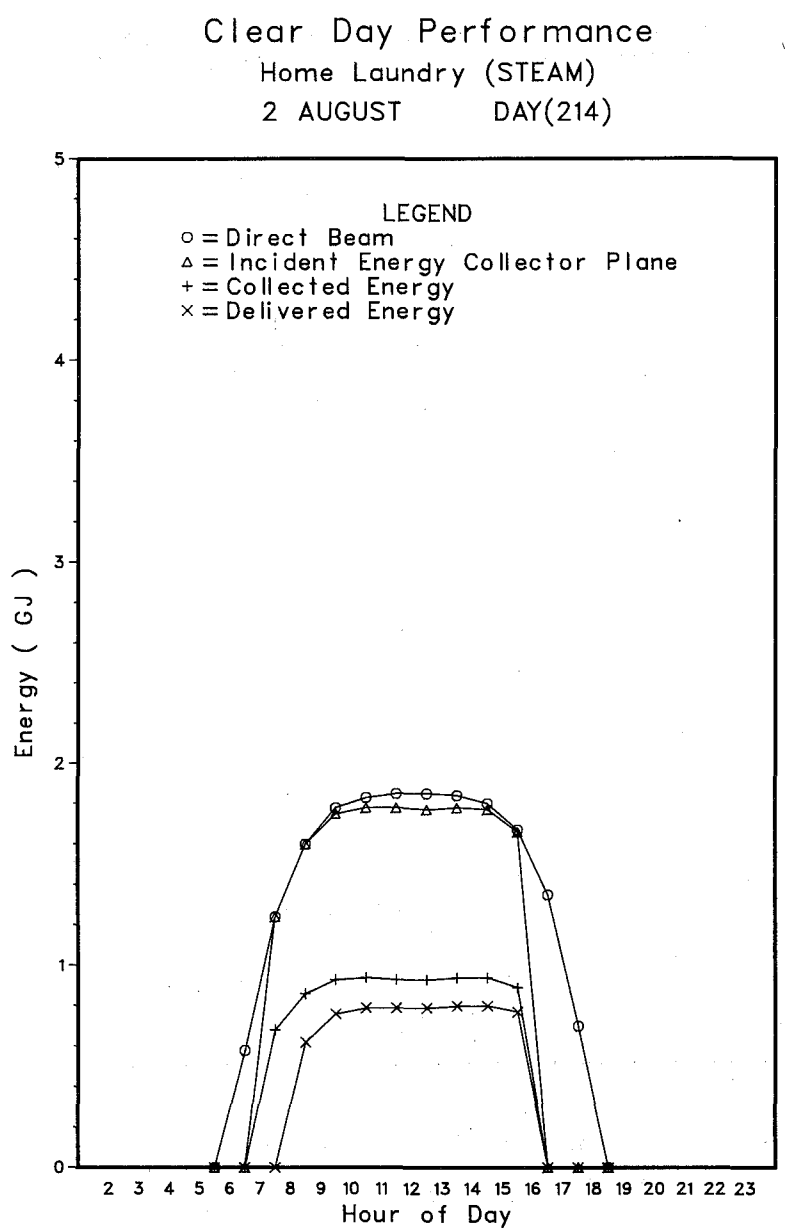

Clear Day Performance
Home Laundry (STEAM)
15 MARCH DAY(74)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

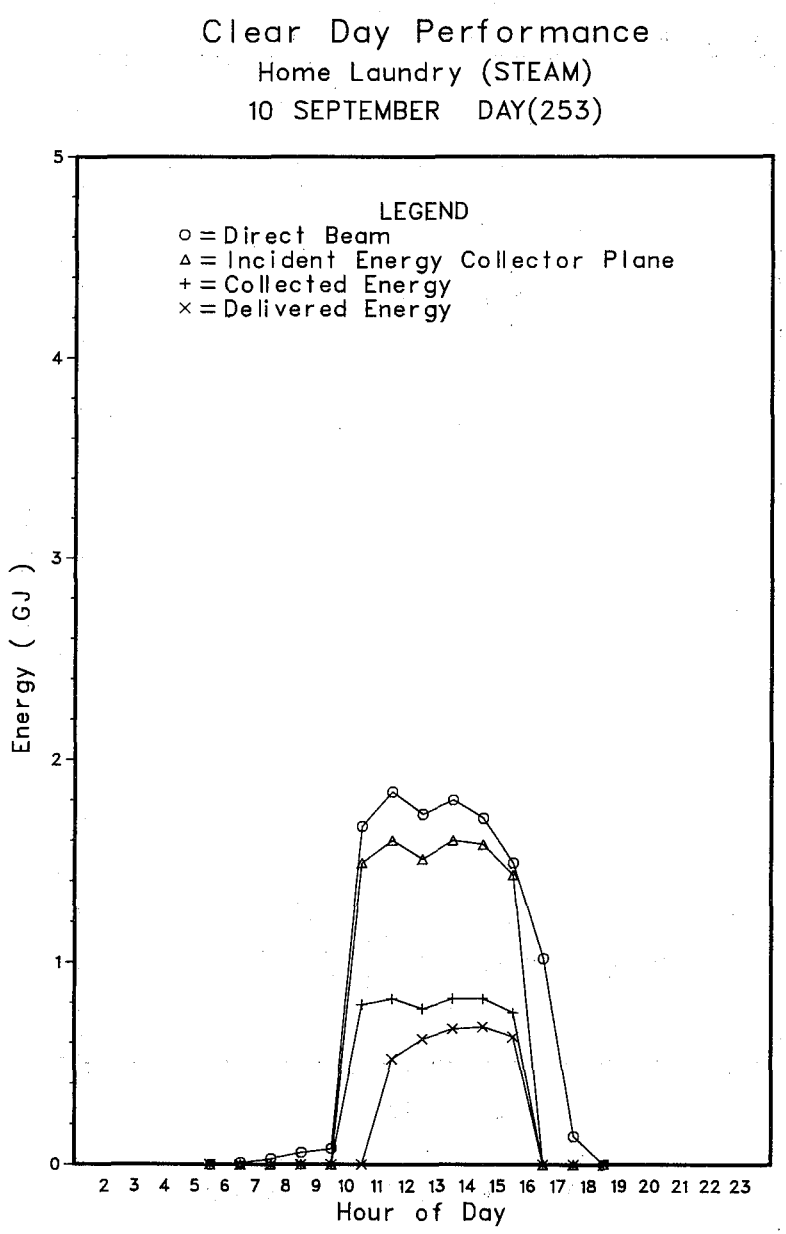

Clear Day Performance
Home Laundry (STEAM)
23 APRIL DAY(113)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

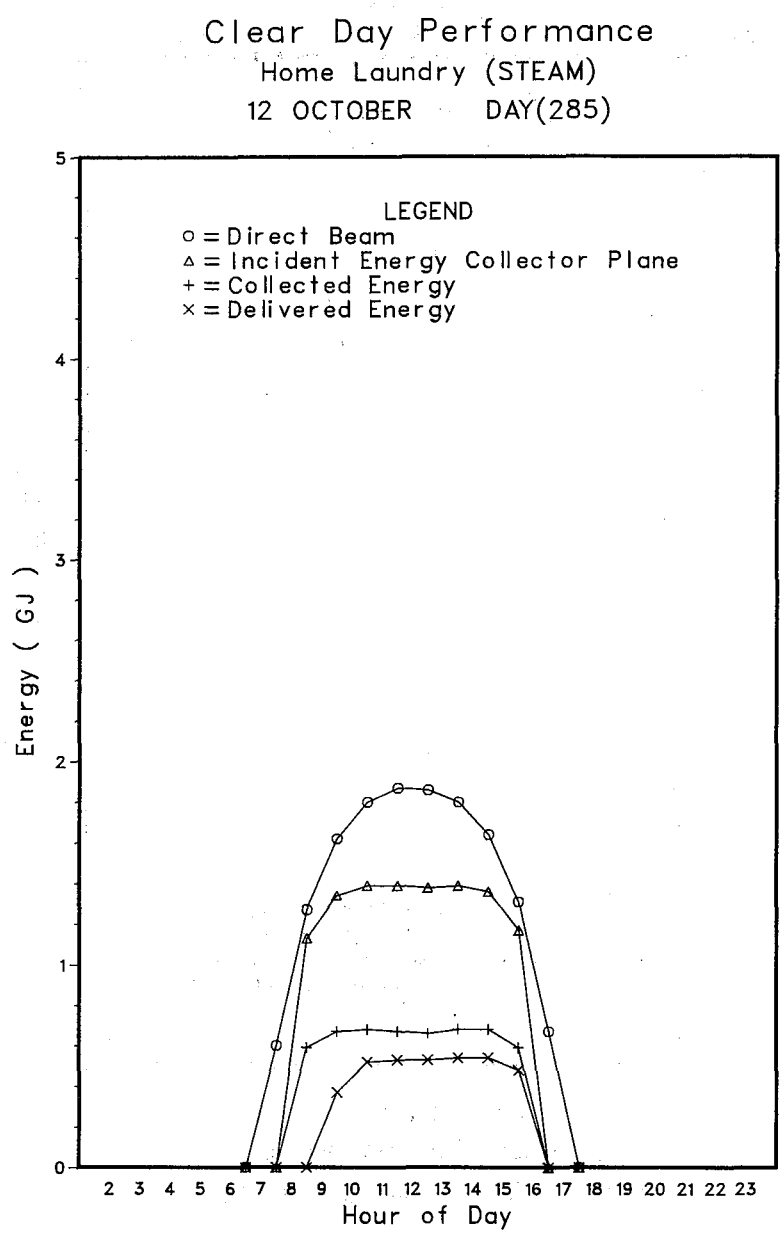

Clear Day Performance
Home Laundry (STEAM)
22 MAY DAY(142)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

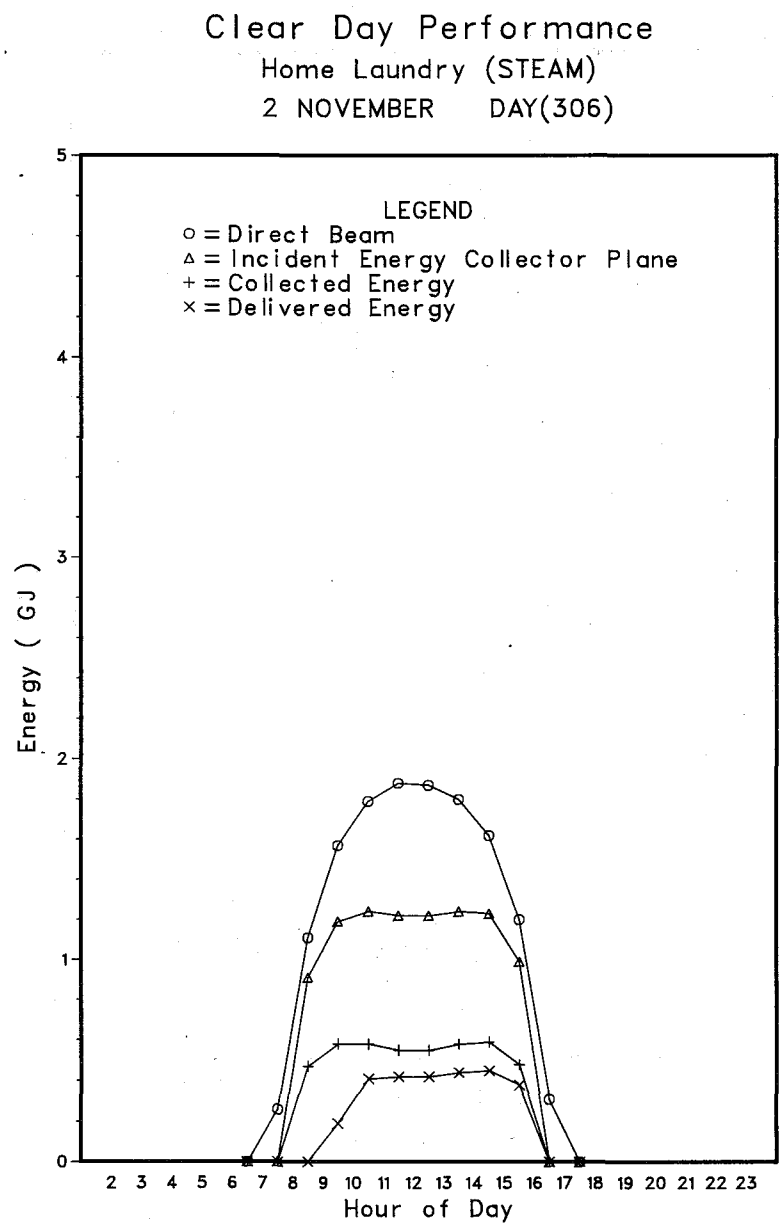

Clear Day Performance
Home Laundry (STEAM)
4 JUNE DAY(155)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

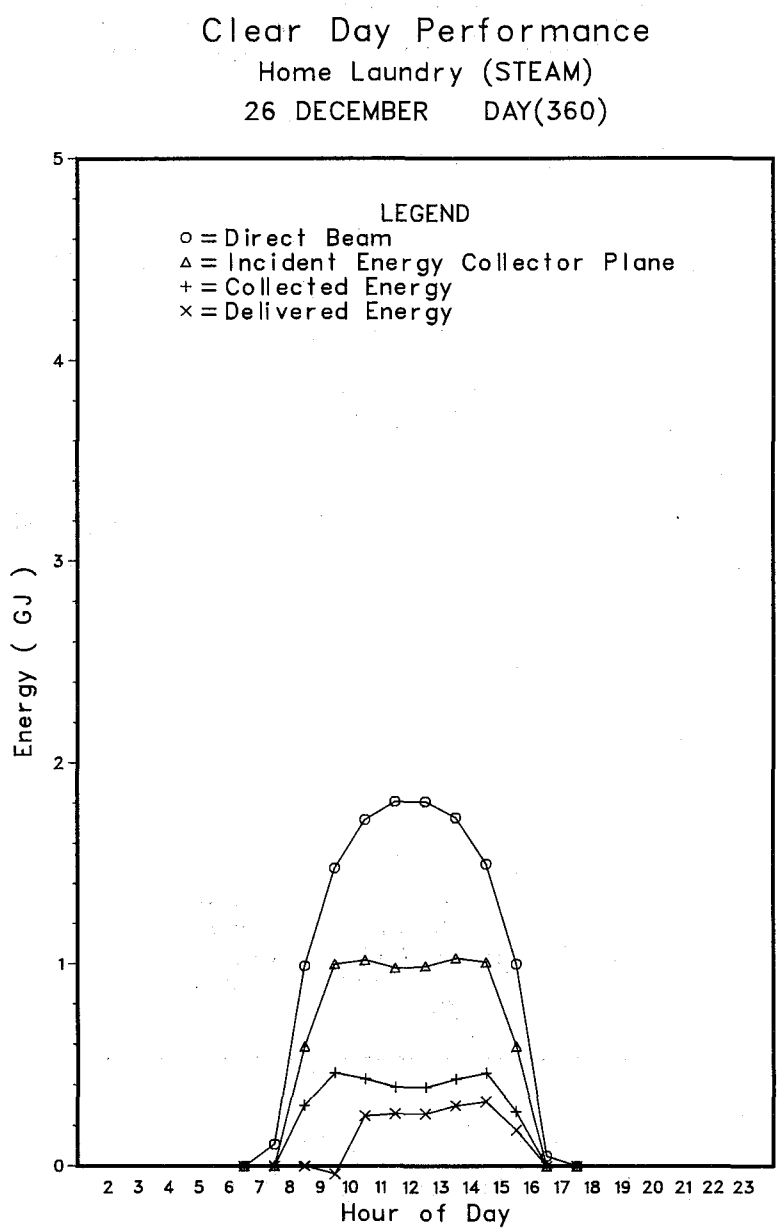

Clear Day Performance
Home Laundry (STEAM)
10 JULY DAY(191)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Home Laundry (STEAM)
2 AUGUST DAY(214)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Home Laundry (STEAM)
10 SEPTEMBER DAY(253)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (STEAM)
12 OCTOBER DAY(285)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (STEAM)
2 NOVEMBER DAY(306)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Home Laundry (STEAM)
26 DECEMBER DAY(360)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	288.8	396.4	259.9	90.6	34.9	58.6	15.6	15.9	22.5	.9
FEBRUARY	315.5	342.5	262.1	98.4	37.5	68.5	15.6	14.0	26.1	.8
MARCH	453.4	410.4	345.9	144.7	41.8	111.3	18.4	14.8	32.2	1.0
APRIL	466.1	329.3	284.9	122.5	43.0	90.2	15.9	16.3	31.6	.9
MAY	573.3	440.4	417.3	182.5	43.7	142.8	23.1	16.4	34.2	1.2
JUNE	621.9	497.7	477.8	214.5	44.9	171.3	26.9	16.1	35.9	1.5
JULY	672.0	586.3	564.0	255.5	45.3	208.6	30.5	16.3	37.0	1.6
AUGUST	583.8	511.2	477.9	214.1	44.8	171.3	25.8	16.9	35.8	1.4
SEPTEMBER	497.5	457.2	409.0	176.8	43.2	137.2	23.5	16.1	33.5	1.3
OCTOBER	409.0	447.2	361.6	145.6	40.3	109.1	20.6	16.1	30.2	1.1
NOVEMBER	296.5	363.0	250.2	93.0	37.2	62.2	15.0	15.5	24.8	.8
DECEMBER	264.0	356.5	228.1	76.7	33.6	47.4	14.6	14.3	20.8	.8
TOTALS/AVERAGES	5441.9	5138.0	4338.7	1814.8	41.8	1378.5	245.4	188.9	31.8	13.3

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	10.7	17.9	11.8	4.0	33.4	2.1	.8	.5	17.7	.0
2	1/ 2	10.2	14.7	8.4	3.0	35.7	1.8	.6	.6	21.8	.0
3	1/ 3	12.2	21.9	14.7	5.1	34.7	3.6	.9	.6	24.8	.0
4	1/ 4	12.2	22.0	14.7	5.1	34.5	3.6	.9	.6	24.5	.0
5	1/ 5	12.3	22.0	14.8	5.2	34.9	3.7	.9	.6	25.0	.0
6	1/ 6	12.3	22.1	14.8	5.2	35.2	3.8	.9	.6	25.5	.0
7	1/ 7	12.4	22.2	14.9	5.2	34.8	3.7	.9	.6	25.0	.0
8	1/ 8	6.6	6.2	3.2	1.1	34.2	0.0	.2	1.0	0.0	.0
9	1/ 9	12.5	22.4	15.1	5.2	34.7	3.7	.9	.6	24.4	.0
10	1/10	12.5	22.5	15.2	5.3	35.0	3.8	.9	.6	25.2	.0
11	1/11	12.6	22.6	15.3	5.4	35.0	3.9	.9	.6	25.3	.0
12	1/12	12.7	22.6	15.4	5.4	35.0	3.9	.9	.6	25.3	.0
13	1/13	12.7	22.7	15.5	5.4	34.9	3.9	.9	.6	25.2	.0
14	1/14	12.2	21.6	14.9	5.2	34.8	3.7	.9	.6	24.8	.0
15	1/15	12.5	21.2	14.4	5.2	36.1	3.7	.9	.6	26.0	.0
16	1/16	11.6	17.6	11.7	4.1	35.0	2.8	.7	.7	23.8	.0
17	1/17	4.6	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
18	1/18	7.0	4.3	1.6	.7	42.5	0.0	.1	.6	0.0	.0
19	1/19	13.1	22.6	15.6	5.5	35.4	3.9	.9	.6	24.8	.0
20	1/20	10.5	13.6	9.4	3.0	31.7	1.7	.7	.6	18.2	.0
21	1/21	2.4	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
22	1/22	4.7	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
23	1/23	7.6	4.4	2.1	.8	36.8	0.0	.1	.6	0.0	.0
24	1/24	4.0	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
25	1/25	6.1	2.7	1.8	.5	29.5	0.0	.1	.4	0.0	.0
26	1/26	4.3	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
27	1/27	7.8	5.8	3.1	1.1	36.8	0.0	.2	.6	0.0	.0
28	1/28	6.3	2.7	1.6	.5	33.7	0.0	.1	.5	0.0	.0
29	1/29	8.3	8.1	4.9	1.9	39.1	.9	.3	.6	18.7	.0
30	1/30	9.3	7.5	4.8	1.5	31.3	.3	.4	.8	6.4	.0
31	1/31	4.6	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
TOTALS/AVERAGES		288.8	396.4	259.9	90.6	34.9	58.6	15.6	15.9	22.5	.9

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	13.3	18.7	12.5	5.0	40.2	3.5	.7	.6	28.3	.0
33	2/ 2	13.8	19.7	14.7	5.4	36.7	3.9	.9	.6	26.7	.0
34	2/ 3	14.7	22.8	17.5	6.4	36.7	4.9	1.0	.5	27.9	.1
35	2/ 4	8.5	8.2	6.3	2.2	35.2	1.2	.4	.7	19.0	.0
36	2/ 5	12.8	16.2	11.8	4.4	37.5	3.2	.7	.5	26.8	.0
37	2/ 6	9.3	8.3	5.1	2.0	39.1	1.0	.3	.6	20.3	.0
38	2/ 7	15.1	22.9	17.9	6.5	36.6	5.0	1.0	.6	28.0	.1
39	2/ 8	15.5	23.4	18.4	6.8	37.1	5.2	1.0	.6	28.4	.1
40	2/ 9	7.0	2.4	1.3	.5	33.9	0.0	.1	.5	0.0	.0
41	2/10	7.5	3.2	1.7	.6	38.8	0.0	.1	.5	0.0	.0
42	2/11	7.8	5.8	4.1	1.6	39.3	.6	.3	.6	14.4	.0
43	2/12	16.0	23.6	18.8	7.0	37.3	5.4	1.0	.6	28.8	.1
44	2/13	6.9	3.4	2.7	.7	26.4	0.0	.2	.6	0.0	.0
45	2/14	13.1	15.4	12.1	4.4	36.6	3.0	.8	.6	24.6	.0
46	2/15	16.4	23.8	19.2	7.3	38.1	5.7	1.0	.6	29.7	.1
47	2/16	8.4	3.8	2.3	.9	38.0	.1	.2	.6	3.7	.0
48	2/17	6.2	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
49	2/18	5.4	.6	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
50	2/19	12.9	13.6	10.6	4.2	39.4	2.8	.6	.5	26.4	.0
51	2/20	13.9	15.1	12.2	4.3	35.0	2.7	.9	.6	22.5	.0
52	2/21	16.1	20.7	17.0	6.3	37.1	4.7	1.0	.6	27.6	.1
53	2/22	14.2	15.6	12.2	4.2	34.7	2.7	.9	.6	22.0	.0
54	2/23	3.2	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
55	2/24	4.0	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
56	2/25	7.5	2.0	1.1	.2	21.3	0.0	.0	.3	0.0	.0
57	2/26	17.3	22.6	18.9	7.6	40.1	5.7	1.0	.5	30.1	.1
58	2/27	17.6	23.0	19.2	7.7	40.2	6.1	1.0	.6	31.9	.1
59	2/28	11.0	7.0	4.7	2.0	41.7	1.0	.3	.7	21.5	.0
TOTALS/AVERAGES		315.5	342.5	262.1	98.4	37.5	68.5	15.6	14.0	26.1	.8

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	18.4	24.4	20.4	8.5	41.4	6.9	1.0	.6	33.6	.1
61	3/ 2	18.5	24.3	20.4	8.4	41.1	6.8	1.0	.6	33.3	.1
62	3/ 3	8.0	1.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
63	3/ 4	14.0	13.9	11.7	4.7	39.9	3.2	.7	.6	27.7	.0
64	3/ 5	7.0	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
65	3/ 6	9.4	3.5	2.4	.7	30.9	0.0	.2	.4	0.0	.0
66	3/ 7	15.5	15.0	12.4	5.2	42.2	3.9	.7	.6	31.2	.0
67	3/ 8	18.2	21.2	17.5	7.4	42.1	5.8	.9	.6	33.2	.0
68	3/ 9	8.0	3.0	2.3	.7	29.1	0.0	.2	.5	0.0	.0
69	3/10	16.5	15.5	12.6	5.3	42.2	3.8	.8	.6	30.5	.0
70	3/11	8.3	1.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
71	3/12	18.3	20.2	17.1	7.4	43.5	5.8	.9	.6	34.2	.0
72	3/13	20.0	24.9	21.3	8.9	42.0	7.2	1.1	.7	33.8	.1
73	3/14	19.7	23.7	20.3	8.5	41.7	6.8	1.1	.6	33.2	.1
74	3/15	9.3	4.9	3.7	1.3	34.6	.4	.3	.6	10.8	.0
75	3/16	15.8	13.8	11.3	4.6	40.5	3.2	.7	.7	28.7	.0
76	3/17	7.5	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
77	3/18	20.8	25.7	23.0	9.7	42.2	7.9	1.1	.5	34.4	.1
78	3/19	21.0	25.7	23.0	9.7	42.0	8.0	1.1	.6	34.7	.1
79	3/20	18.7	18.6	15.5	6.7	43.5	5.3	.8	.6	34.5	.0
80	3/21	6.7	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
81	3/22	10.4	3.3	2.1	.7	33.0	0.0	.2	.4	0.0	.0
82	3/23	12.0	7.1	5.7	2.2	39.0	1.2	.4	.6	20.4	.0
83	3/24	21.5	25.9	23.4	10.0	42.5	8.3	1.1	.6	35.2	.1
84	3/25	21.7	25.9	23.5	10.0	42.7	8.3	1.1	.6	35.5	.1
85	3/26	8.5	1.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
86	3/27	16.8	14.1	12.2	5.3	43.3	3.9	.7	.5	32.0	.0
87	3/28	12.3	4.9	3.6	1.5	41.2	.7	.3	.6	18.0	.0
88	3/29	8.2	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
89	3/30	21.0	22.6	20.2	8.6	42.6	6.8	1.1	.5	33.6	.1
90	3/31	21.3	22.7	20.4	8.9	43.4	7.2	1.0	.6	35.3	.1
TOTALS/AVERAGES		453.4	410.4	345.9	144.7	41.8	111.3	18.4	14.8	32.2	1.0

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	22.3	25.3	23.3	10.1	43.2	8.4	1.1	.6	36.0	.1
92	4/ 2	8.5	1.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
93	4/ 3	17.2	12.4	10.6	4.7	44.9	3.4	.6	.6	32.2	.0
94	4/ 4	22.8	25.9	24.0	10.5	43.6	8.8	1.1	.6	36.4	.1
95	4/ 5	22.9	25.9	24.1	10.5	43.7	8.8	1.1	.6	36.6	.1
96	4/ 6	23.0	26.0	24.1	10.6	43.9	8.9	1.1	.6	36.9	.1
97	4/ 7	23.1	26.0	24.2	10.6	43.8	8.9	1.1	.6	36.8	.1
98	4/ 8	21.3	20.7	19.1	8.7	45.3	7.1	.9	.6	37.4	.0
99	4/ 9	10.4	2.4	1.1	.5	42.5	0.0	.1	.5	0.0	.0
100	4/10	14.9	7.4	5.7	2.2	38.2	1.0	.5	.6	17.6	.0
101	4/11	10.7	3.0	1.9	.7	38.0	0.0	.2	.6	0.0	.0
102	4/12	8.7	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
103	4/13	7.6	1.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
104	4/14	8.5	2.7	1.4	.6	39.2	0.0	.1	.4	0.0	.0
105	4/15	16.5	10.8	9.1	3.9	42.6	2.5	.6	.5	27.5	.0
106	4/16	15.3	8.2	6.3	2.5	40.0	1.5	.5	.6	23.4	.0
107	4/17	9.0	2.3	1.1	.4	34.4	0.0	.1	.5	0.0	.0
108	4/18	24.0	26.1	24.7	11.0	44.4	9.1	1.1	.6	36.9	.1
109	4/19	12.6	7.3	6.3	2.5	40.3	1.5	.5	.6	23.8	.0
110	4/20	18.8	13.1	11.7	4.9	42.2	3.6	.8	.6	30.7	.0
111	4/21	16.7	11.5	9.8	4.2	43.4	2.9	.6	.7	29.9	.0
112	4/22	13.8	5.8	4.7	1.9	41.1	1.0	.4	.6	21.8	.0
113	4/23	12.7	3.3	1.5	.6	38.5	0.0	.1	.5	0.0	.0
114	4/24	10.9	3.7	2.5	.9	36.0	0.0	.2	.5	0.0	.0
115	4/25	14.7	7.9	6.8	2.9	42.0	1.8	.5	.6	26.5	.0
116	4/26	17.9	11.5	10.0	4.2	42.0	2.7	.7	.8	27.0	.0
117	4/27	13.8	5.2	3.5	1.5	42.2	.6	.3	.6	16.9	.0
118	4/28	13.6	5.3	4.3	1.7	40.3	.7	.4	.7	15.8	.0
119	4/29	14.0	10.0	8.8	3.9	43.9	2.7	.5	.6	30.8	.0
120	4/30	19.9	15.8	14.2	5.9	41.2	4.2	.9	.8	29.5	.0
TOTALS/AVERAGES		466.1	329.3	284.9	122.5	43.0	90.2	15.9	16.3	31.6	.9

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	15.7	12.2	11.4	5.3	46.7	4.1	.5	.7	36.4	.0
122	5/ 2	10.6	1.8	.8	.3	40.8	0.0	.1	.4	0.0	.0
123	5/ 3	5.9	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
124	5/ 4	16.0	10.1	8.4	3.7	44.4	2.4	.5	.5	28.6	.0
125	5/ 5	14.7	7.7	5.7	2.3	39.3	1.0	.4	.8	16.7	.0
126	5/ 6	23.8	23.0	21.5	9.9	45.8	8.2	1.1	.6	38.3	.1
127	5/ 7	24.9	25.7	25.4	11.1	44.0	9.4	1.2	.5	37.1	.1
128	5/ 8	25.0	25.6	25.3	11.2	44.2	9.4	1.2	.5	37.2	.1
129	5/ 9	23.9	22.6	21.8	10.0	45.6	8.4	1.0	.5	38.3	.1
130	5/10	22.6	21.1	20.9	8.8	42.0	7.0	1.2	.5	33.7	.1
131	5/11	17.9	15.7	15.0	6.3	42.1	4.5	.9	.9	29.9	.0
132	5/12	25.0	25.3	25.0	10.9	43.7	9.2	1.3	.5	36.6	.1
133	5/13	24.6	24.5	24.2	10.6	43.8	8.8	1.2	.5	36.5	.1
134	5/14	18.5	13.6	12.3	5.5	44.4	4.3	.6	.6	34.9	.0
135	5/15	20.1	15.9	15.1	7.1	47.2	5.8	.7	.6	38.4	.0
136	5/16	23.2	20.7	20.2	9.0	44.4	7.4	1.1	.5	36.4	.1
137	5/17	9.9	1.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
138	5/18	11.5	5.3	4.5	1.7	38.5	.8	.3	.5	16.9	.0
139	5/19	15.8	7.0	5.8	2.2	37.5	.9	.5	.7	15.8	.0
140	5/20	17.6	12.3	11.8	4.9	41.2	3.5	.8	.6	29.6	.0
141	5/21	25.4	25.7	25.5	11.4	44.8	9.6	1.2	.5	37.8	.1
142	5/22	22.8	19.5	19.1	8.7	45.4	7.1	1.0	.5	37.3	.1
143	5/23	20.5	16.3	16.0	7.0	43.8	5.5	.9	.5	34.6	.0
144	5/24	13.9	5.6	4.4	1.9	43.8	1.0	.3	.6	23.3	.0
145	5/25	9.3	.7	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
146	5/26	16.6	10.4	9.6	4.0	41.5	2.7	.7	.5	27.7	.0
147	5/27	21.2	17.0	16.8	6.9	41.1	5.3	1.1	.5	31.2	.1
148	5/28	18.9	12.1	11.7	4.7	39.8	3.2	.9	.5	27.4	.1
149	5/29	12.4	2.7	.9	.4	42.4	0.0	.1	.5	0.0	.0
150	5/30	21.5	17.3	16.9	7.3	43.1	5.5	1.1	.5	32.6	.1
151	5/31	23.8	21.7	21.0	9.5	45.1	7.8	1.1	.5	37.1	.1
TOTALS/AVERAGES		573.3	440.4	417.3	182.5	43.7	142.8	23.1	16.4	34.2	1.2

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY: HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY: DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY: COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM: OPERATING LOSSES GJ	SYSTEM: NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	22.3	18.7	18.4	8.1	43.9	6.4	1.1	.5	35.0	.1
153	6/ 2	17.3	11.9	11.1	5.1	45.8	3.9	.6	.6	34.6	.0
154	6/ 3	19.3	14.8	14.3	6.4	44.6	5.0	.8	.6	35.4	.0
155	6/ 4	14.7	7.4	6.1	2.4	39.7	1.4	.5	.5	23.0	.0
156	6/ 5	15.6	7.3	6.0	2.7	45.1	1.7	.4	.6	28.2	.0
157	6/ 6	22.8	19.7	19.5	8.7	44.7	7.1	1.1	.5	36.4	.1
158	6/ 7	18.1	12.2	11.9	4.7	40.0	3.2	.8	.7	26.6	.0
159	6/ 8	18.1	11.5	10.8	4.5	41.2	3.1	.8	.5	29.0	.0
160	6/ 9	19.7	13.9	12.9	5.8	45.4	4.5	.8	.6	34.7	.0
161	6/10	19.3	13.5	12.7	5.7	45.3	4.4	.8	.6	34.7	.0
162	6/11	25.2	24.4	24.2	11.1	45.8	9.3	1.2	.5	38.7	.1
163	6/12	23.9	21.4	21.2	9.8	46.1	8.1	1.1	.5	38.4	.1
164	6/13	23.6	20.8	20.5	9.4	45.6	7.7	1.1	.5	37.8	.1
165	6/14	23.1	20.0	19.7	8.9	45.3	7.3	1.1	.5	37.0	.1
166	6/15	24.3	22.7	22.1	10.2	46.2	8.5	1.1	.5	38.7	.1
167	6/16	24.7	22.9	22.5	10.5	46.7	8.9	1.1	.5	39.4	.1
168	6/17	22.2	18.4	18.1	8.3	45.8	6.8	1.0	.5	37.4	.1
169	6/18	22.0	18.0	17.0	7.6	44.9	6.1	1.0	.5	36.0	.1
170	6/19	21.0	15.8	14.7	6.3	42.7	4.7	1.0	.5	32.4	.1
171	6/20	24.3	23.4	23.1	10.5	45.4	8.8	1.2	.5	38.0	.1
172	6/21	24.0	22.8	22.6	10.2	45.0	8.5	1.2	.5	37.4	.1
173	6/22	24.3	23.1	22.9	10.4	45.4	8.7	1.2	.5	38.0	.1
174	6/23	23.0	20.4	19.7	9.0	45.6	7.4	1.1	.5	37.4	.1
175	6/24	19.6	14.2	12.7	5.6	44.0	4.3	.8	.5	33.6	.0
176	6/25	23.5	21.7	21.5	9.6	44.6	7.9	1.2	.5	36.7	.1
177	6/26	17.6	11.6	10.4	4.8	46.0	3.6	.6	.6	34.4	.0
178	6/27	8.6	1.5	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
179	6/28	17.9	10.9	10.0	4.1	40.8	2.7	.7	.5	26.9	.0
180	6/29	20.0	15.0	14.5	6.4	44.2	5.0	.9	.5	34.5	.0
181	6/30	21.8	17.7	16.8	7.8	46.6	6.3	.9	.6	37.6	.0
TOTALS/AVERAGES		621.9	497.7	477.8	214.5	44.9	171.3	26.9	16.1	35.9	1.5

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	18.0	10.6	9.0	3.7	41.0	2.4	.7	.7	26.6	.0
183	7/ 2	8.3	1.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
184	7/ 3	15.9	8.1	7.1	2.7	38.4	1.3	.7	.5	18.9	.0
185	7/ 4	21.1	16.8	15.8	7.1	45.0	5.7	.9	.5	36.0	.0
186	7/ 5	22.3	19.2	18.6	8.3	44.5	6.6	1.1	.5	35.7	.1
187	7/ 6	22.9	20.4	20.0	9.0	45.3	7.4	1.1	.5	37.2	.1
188	7/ 7	23.1	20.7	19.9	9.2	46.1	7.6	1.0	.5	38.3	.1
189	7/ 8	24.1	23.0	22.8	10.4	45.5	8.7	1.2	.5	38.0	.1
190	7/ 9	24.8	24.3	24.1	11.1	45.8	9.3	1.2	.5	38.7	.1
191	7/10	22.1	18.8	18.4	8.4	45.8	6.9	1.0	.5	37.6	.1
192	7/11	22.3	18.9	17.8	8.2	46.2	6.7	1.0	.6	37.5	.1
193	7/12	23.5	21.8	21.5	9.9	46.2	8.3	1.1	.5	38.7	.1
194	7/13	21.7	18.2	16.9	7.6	44.8	6.1	1.0	.5	35.8	.1
195	7/14	23.3	21.7	21.0	9.6	45.7	7.9	1.1	.5	37.9	.1
196	7/15	22.3	19.5	19.1	8.8	45.9	7.2	1.0	.5	38.0	.1
197	7/16	21.6	18.4	18.0	8.2	45.5	6.7	1.0	.5	37.1	.1
198	7/17	21.9	19.1	18.3	8.3	45.4	6.8	1.0	.5	37.0	.1
199	7/18	22.0	19.2	18.8	8.3	44.5	6.7	1.1	.5	35.9	.1
200	7/19	21.6	18.6	18.0	8.1	45.0	6.5	1.0	.5	36.4	.1
201	7/20	23.5	22.3	21.5	9.9	45.9	8.3	1.1	.5	38.4	.1
202	7/21	23.2	22.1	21.3	9.7	45.6	8.1	1.1	.5	38.0	.1
203	7/22	24.5	24.4	23.7	11.0	46.6	9.4	1.1	.5	39.6	.1
204	7/23	20.4	16.5	15.7	7.0	44.4	5.5	.9	.5	35.3	.0
205	7/24	24.1	23.8	23.6	10.8	45.5	9.1	1.2	.5	38.4	.1
206	7/25	22.4	20.3	19.9	9.1	45.9	7.6	1.0	.5	38.2	.1
207	7/26	21.4	18.5	17.3	8.0	46.5	6.5	.9	.6	37.8	.0
208	7/27	20.8	17.5	16.7	7.5	44.8	5.9	1.0	.6	35.2	.1
209	7/28	22.1	20.2	19.4	8.7	44.8	7.1	1.1	.5	36.7	.1
210	7/29	22.7	21.4	21.0	9.4	44.8	7.7	1.1	.6	36.7	.1
211	7/30	22.7	21.4	20.7	9.4	45.3	7.8	1.1	.5	37.6	.1
212	7/31	21.6	19.3	18.0	8.1	44.9	6.6	1.0	.5	36.5	.1
TOTALS/AVERAGES		672.0	586.3	564.0	255.5	45.3	208.6	30.5	16.3	37.0	1.6

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY: HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY: DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY: COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM: OPERATING LOSSES GJ	SYSTEM: NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	22.5	21.8	21.6	9.5	43.9	7.8	1.2	.5	36.2	.1
214	8/ 2	23.0	22.7	22.5	10.0	44.3	8.3	1.2	.5	36.8	.1
215	8/ 3	24.1	24.9	24.7	11.1	45.2	9.4	1.2	.5	38.3	.1
216	8/ 4	22.6	21.2	20.6	9.5	46.2	8.0	1.0	.5	38.8	.1
217	8/ 5	22.8	21.8	21.5	9.8	45.5	8.2	1.1	.5	38.1	.1
218	8/ 6	21.8	20.9	20.0	8.9	44.6	7.3	1.1	.6	36.4	.1
219	8/ 7	22.7	22.5	21.5	9.8	45.4	8.2	1.1	.5	37.9	.1
220	8/ 8	9.8	3.0	.8	.3	34.9	0.0	.1	.5	0.0	.0
221	8/ 9	22.8	22.8	21.3	9.9	46.5	8.1	1.0	.5	38.1	.1
222	8/10	22.2	21.9	20.9	9.4	44.8	7.7	1.1	.5	37.1	.1
223	8/11	21.0	18.9	17.9	8.3	46.3	6.8	.9	.6	38.1	.0
224	8/12	20.9	19.5	18.3	8.3	45.3	6.7	1.0	.6	36.8	.1
225	8/13	19.2	16.5	15.5	6.7	43.3	5.2	1.0	.6	33.5	.1
226	8/14	20.1	17.4	16.6	7.3	44.1	5.8	1.0	.5	35.0	.1
227	8/15	20.5	18.6	17.1	7.8	45.6	6.3	.9	.6	36.8	.0
228	8/16	21.1	19.5	18.2	8.4	46.1	6.9	.9	.6	38.0	.0
229	8/17	20.1	17.6	16.6	7.6	45.4	6.1	.9	.6	36.7	.0
230	8/18	19.7	17.2	15.9	7.2	45.2	5.7	.9	.6	36.1	.0
231	8/19	20.6	19.3	18.3	8.2	44.9	6.7	1.0	.6	36.5	.1
232	8/20	18.2	14.4	12.6	5.7	45.0	4.4	.7	.6	35.0	.0
233	8/21	18.1	14.6	13.9	5.8	41.8	4.3	1.0	.5	30.9	.1
234	8/22	19.7	17.5	16.3	7.3	44.9	5.9	.9	.6	35.9	.0
235	8/23	8.4	2.6	1.6	.6	38.8	0.0	.2	.6	0.0	.0
236	8/24	10.6	4.4	3.3	1.3	38.9	.3	.3	.6	10.6	.0
237	8/25	6.3	1.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
238	8/26	11.6	5.2	3.8	1.5	39.0	.3	.3	.7	8.9	.0
239	8/27	11.9	5.0	3.2	1.1	34.9	0.0	.3	.8	0.0	.0
240	8/28	20.5	20.0	18.7	8.3	44.6	6.8	1.0	.6	36.2	.1
241	8/29	20.3	19.1	18.0	8.1	44.7	6.5	1.0	.6	36.2	.1
242	8/30	22.2	23.2	21.6	9.9	45.8	8.3	1.0	.6	38.5	.1
243	8/31	18.6	16.2	14.8	6.5	43.9	5.1	.9	.6	34.3	.0
TOTALS/AVERAGES		583.8	511.2	477.9	214.1	44.8	171.3	25.8	16.9	35.8	1.4

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY: HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY: DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY: COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM: OPERATING LOSSES GJ	SYSTEM: NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	21.0	21.0	19.4	9.0	46.4	7.5	.9	.6	38.7	.0
245	9/ 2	19.9	19.0	17.2	7.8	45.2	6.3	.9	.6	36.8	.0
246	9/ 3	18.4	16.1	14.6	6.5	44.7	5.2	.8	.6	35.4	.0
247	9/ 4	18.6	16.3	15.0	6.7	44.5	5.2	.9	.6	34.8	.0
248	9/ 5	20.5	20.8	19.4	8.7	44.7	7.1	1.0	.5	36.8	.1
249	9/ 6	20.4	21.0	19.5	8.7	44.4	7.1	1.0	.5	36.5	.1
250	9/ 7	19.7	19.7	18.3	8.0	43.7	6.4	1.0	.6	35.3	.1
251	9/ 8	19.0	18.6	17.3	7.4	42.9	5.9	1.0	.5	34.0	.1
252	9/ 9	19.2	18.8	16.8	7.5	44.7	6.0	.9	.6	35.9	.0
253	9/10	15.1	9.5	8.4	3.3	38.9	2.0	.8	.6	23.4	.0
254	9/11	3.6	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
255	9/12	3.8	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
256	9/13	14.1	10.6	9.2	3.9	43.1	2.6	.5	.5	28.9	.0
257	9/14	17.5	15.1	13.5	5.6	41.3	4.1	.9	.6	30.5	.0
258	9/15	14.5	8.1	6.0	2.3	38.4	1.1	.5	.6	19.3	.0
259	9/16	17.0	14.7	13.3	5.5	41.6	4.0	.9	.6	30.3	.0
260	9/17	15.5	11.2	8.8	3.7	42.2	2.4	.6	.8	27.7	.0
261	9/18	20.4	22.8	20.8	9.1	43.9	7.5	1.0	.5	36.0	.1
262	9/19	20.3	22.7	20.7	9.1	43.8	7.5	1.0	.6	36.1	.1
263	9/20	17.4	16.8	15.3	6.5	42.9	5.1	.9	.6	33.3	.0
264	9/21	16.1	13.3	11.7	4.8	41.1	3.5	.8	.5	29.6	.0
265	9/22	17.7	17.4	15.6	6.8	43.7	5.4	.9	.5	34.5	.0
266	9/23	16.9	16.1	14.4	6.1	42.5	4.7	.9	.5	32.5	.0
267	9/24	16.0	14.3	12.6	5.3	42.2	4.0	.8	.6	31.7	.0
268	9/25	9.9	6.0	5.0	1.9	38.4	1.0	.3	.6	20.4	.0
269	9/26	19.1	21.9	19.6	8.5	43.3	6.9	1.0	.5	35.3	.1
270	9/27	17.4	18.0	15.9	6.9	43.1	5.4	.9	.6	34.0	.0
271	9/28	16.1	15.4	13.4	5.6	42.2	4.3	.8	.6	32.0	.0
272	9/29	16.9	17.2	14.7	6.2	42.4	4.8	.9	.6	32.6	.0
273	9/30	15.5	14.6	12.7	5.3	41.8	4.0	.8	.5	31.2	.0
TOTALS/AVERAGES		497.5	457.2	409.0	176.8	43.2	137.2	23.5	16.1	33.5	1.3

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	15.5	14.8	12.7	5.3	41.8	4.0	.8	.6	31.3	.0
275	10/ 2	16.4	17.2	15.0	6.4	42.7	5.0	.9	.5	33.2	.0
276	10/ 3	8.5	3.5	1.7	.8	44.9	.0	.1	.6	2.9	.0
277	10/ 4	6.8	1.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
278	10/ 5	17.7	21.0	18.3	7.7	42.1	6.0	1.0	.5	33.0	.1
279	10/ 6	17.4	20.8	18.1	7.5	41.5	6.0	1.0	.5	33.0	.1
280	10/ 7	18.3	23.1	20.0	8.5	42.4	6.9	1.0	.6	34.5	.1
281	10/ 8	12.2	10.2	8.6	3.4	39.6	2.0	.5	.8	23.5	.0
282	10/ 9	11.9	9.8	8.1	3.0	37.4	1.7	.6	.8	20.7	.0
283	10/10	17.1	20.4	17.4	7.2	41.6	5.7	1.0	.5	32.9	.1
284	10/11	17.7	22.6	19.3	8.0	41.6	6.5	1.0	.6	33.6	.1
285	10/12	14.7	15.6	13.0	5.1	39.5	3.7	.9	.6	28.3	.0
286	10/13	5.9	1.0	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
287	10/14	10.0	7.3	6.1	2.1	35.0	1.0	.4	.6	16.0	.0
288	10/15	16.8	21.5	18.0	7.2	40.0	5.6	1.0	.6	31.3	.1
289	10/16	15.0	17.3	14.0	5.5	39.1	4.0	.9	.6	28.5	.0
290	10/17	12.3	11.7	8.4	3.3	39.6	2.2	.5	.6	26.6	.0
291	10/18	15.1	18.2	14.5	5.8	39.9	4.3	.9	.6	29.5	.0
292	10/19	16.8	23.0	19.0	7.5	39.7	6.0	1.0	.6	31.4	.1
293	10/20	14.7	17.6	13.7	5.7	41.7	4.3	.8	.6	31.2	.0
294	10/21	15.8	20.6	16.3	6.4	39.5	4.9	.9	.7	30.0	.0
295	10/22	13.5	15.3	12.2	4.9	40.0	3.6	.7	.6	29.5	.0
296	10/23	15.1	19.8	15.9	6.1	38.5	4.5	.9	.8	28.1	.0
297	10/24	16.2	22.9	18.5	7.3	39.3	5.7	1.0	.6	31.0	.1
298	10/25	16.1	22.8	18.4	7.2	39.1	5.6	1.0	.6	30.6	.1
299	10/26	15.3	20.3	15.5	6.3	40.7	4.8	.9	.6	31.3	.0
300	10/27	7.2	2.8	1.2	.4	36.4	0.0	.1	.5	0.0	.0
301	10/28	15.7	22.5	18.0	6.8	38.1	5.2	1.0	.5	28.7	.1
302	10/29	2.7	.1	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
303	10/30	5.9	1.8	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
304	10/31	4.6	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
TOTALS/AVERAGES		409.0	447.2	361.6	145.6	40.3	109.1	20.6	16.1	30.2	1.1

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	12.5	15.1	11.4	4.4	38.9	2.9	.6	.5	25.8	.0
306	11/ 2	11.5	13.8	10.5	4.0	38.1	2.8	.6	.6	27.0	.0
307	11/ 3	15.1	22.9	17.8	6.6	36.8	5.0	1.0	.6	28.0	.1
308	11/ 4	8.6	8.1	6.2	2.2	35.8	1.2	.4	.6	19.4	.0
309	11/ 5	10.8	12.1	8.1	3.3	40.7	2.2	.5	.6	27.1	.0
310	11/ 6	12.9	17.0	11.8	4.8	40.3	3.5	.7	.6	29.4	.0
311	11/ 7	13.4	19.4	14.7	5.4	37.1	4.0	.9	.6	27.2	.0
312	11/ 8	4.5	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
313	11/ 9	5.9	1.0	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
314	11/10	14.2	22.2	15.8	6.2	39.2	4.5	.8	.5	28.3	.0
315	11/11	14.2	22.8	16.2	6.2	38.2	4.7	.9	.6	29.1	.0
316	11/12	9.5	10.9	7.0	2.8	39.3	1.7	.4	.6	25.0	.0
317	11/13	9.8	10.9	7.2	2.8	38.5	1.7	.5	.6	24.0	.0
318	11/14	9.2	8.0	4.5	1.6	35.1	.4	.3	.9	8.3	.0
319	11/15	6.8	3.2	1.7	.6	34.9	0.0	.2	.5	0.0	.0
320	11/16	12.6	18.6	12.7	5.0	39.3	3.6	.7	.6	28.1	.0
321	11/17	8.7	8.6	5.6	1.8	32.6	.5	.3	1.0	9.3	.0
322	11/18	4.0	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
323	11/19	13.2	21.2	14.5	5.7	39.0	4.1	.8	.6	28.4	.0
324	11/20	13.4	22.3	15.5	5.7	36.6	4.2	.9	.6	27.1	.0
325	11/21	4.9	.5	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
326	11/22	7.4	7.4	4.8	1.8	37.9	.8	.3	.6	17.0	.0
327	11/23	8.4	9.1	6.3	2.0	31.7	1.0	.4	.6	16.1	.0
328	11/24	4.8	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
329	11/25	12.9	21.7	14.9	5.4	36.4	3.8	.8	.6	25.6	.0
330	11/26	8.5	6.8	3.8	1.1	28.2	0.0	.4	.7	0.0	.0
331	11/27	10.8	15.5	9.9	3.7	37.7	2.5	.6	.6	25.0	.0
332	11/28	12.7	21.9	14.8	5.1	34.3	3.6	.9	.6	24.1	.0
333	11/29	12.4	20.7	14.5	4.9	34.0	3.4	.9	.6	23.6	.0
334	11/30	3.0	.2	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
TOTALS/AVERAGES		296.5	363.0	250.2	93.0	37.2	62.2	15.0	15.5	24.8	.8

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	4.9	1.5	.9	.1	6.7	0.0	.0	.2	0.0	.0
336	12/ 2	8.0	9.4	6.0	2.3	37.4	.9	.4	.5	15.7	.0
337	12/ 3	7.3	4.9	2.7	.8	28.5	0.0	.3	.5	0.0	.0
338	12/ 4	5.8	2.5	1.2	.4	29.3	0.0	.1	.5	0.0	.0
339	12/ 5	12.3	21.6	14.5	4.9	34.0	3.2	.9	.6	21.8	.0
340	12/ 6	10.9	17.2	10.8	3.6	33.2	2.2	.8	.6	20.1	.0
341	12/ 7	4.5	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
342	12/ 8	4.5	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
343	12/ 9	1.9	.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
344	12/10	5.6	1.6	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
345	12/11	12.0	21.4	14.2	4.9	34.8	3.2	.8	.5	22.4	.0
346	12/12	12.0	21.5	14.3	4.8	33.9	3.4	.9	.6	23.6	.0
347	12/13	10.3	15.7	9.7	3.4	35.3	2.2	.6	.6	22.6	.0
348	12/14	12.0	21.5	14.2	4.7	33.1	3.2	.9	.6	22.5	.0
349	12/15	11.3	20.1	13.4	4.3	32.1	2.8	.9	.6	20.8	.0
350	12/16	11.3	20.0	13.2	4.4	33.2	2.9	.9	.6	22.2	.0
351	12/17	4.8	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
352	12/18	5.5	1.6	.6	.2	33.4	0.0	.1	.3	0.0	.0
353	12/19	4.4	.3	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
354	12/20	11.9	21.5	14.2	4.9	34.2	3.1	.8	.5	21.6	.0
355	12/21	11.9	21.5	14.2	4.8	33.8	3.3	.9	.6	23.5	.0
356	12/22	10.2	15.7	9.8	3.5	36.0	2.3	.6	.6	23.6	.0
357	12/23	6.8	7.8	4.8	1.7	35.3	.8	.3	.6	16.6	.0
358	12/24	10.4	17.1	11.3	3.6	31.7	2.2	.8	.6	19.4	.0
359	12/25	11.9	21.6	14.3	5.0	34.7	3.5	.8	.6	24.8	.0
360	12/26	11.9	21.6	14.3	4.8	33.8	3.4	.9	.6	23.6	.0
361	12/27	11.9	21.4	14.2	4.7	33.4	3.3	.9	.6	22.9	.0
362	12/28	5.8	5.0	2.9	1.0	33.0	.2	.2	.6	5.7	.0
363	12/29	7.8	8.6	5.4	1.8	33.1	.8	.4	.6	14.3	.0
364	12/30	5.4	2.9	1.2	.4	29.3	0.0	.1	.5	0.0	.0
365	12/31	8.8	9.6	5.7	1.9	33.1	.7	.5	.6	12.0	.0
TOTALS/AVERAGES		264.0	356.5	228.1	76.7	33.6	47.4	14.6	14.3	20.8	.8

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

13 JANUARY (DAY 13)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	2.8	0.00	0.00	0.00	4.7	4.7	0.00	0.0	0.00	.01	0.00
2	2.8	0.00	0.00	0.00	3.9	3.9	0.00	0.0	0.00	.01	0.00
3	1.7	0.00	0.00	0.00	3.0	3.0	0.00	0.0	0.00	.01	0.00
4	1.1	0.00	0.00	0.00	2.2	2.2	0.00	0.0	0.00	.01	0.00
5	.6	0.00	0.00	0.00	1.6	1.6	0.00	0.0	0.00	.01	0.00
6	0.0	0.00	0.00	0.00	.9	.9	0.00	0.0	0.00	.01	0.00
7	.6	0.00	0.00	0.00	.8	.8	0.00	0.0	0.00	.01	0.00
8	2.2	1.14	.99	3.67	96.3	97.9	.05	5.3	0.00	.05	.01
9	7.2	2.10	1.68	3.67	143.7	159.4	.51	30.3	0.00	.09	.01
10	10.0	2.58	1.88	3.67	175.2	199.1	.77	41.1	.45	.11	.01
11	11.1	2.79	1.86	3.67	177.4	199.8	.73	39.1	.62	.11	.01
12	12.2	2.87	1.82	3.67	177.4	198.4	.68	37.6	.58	.11	.01
13	13.9	2.87	1.82	3.67	177.3	198.5	.69	37.8	.58	.11	.01
14	15.0	2.79	1.87	3.67	177.4	200.1	.74	39.5	.62	.11	.01
15	15.6	2.59	1.89	3.67	177.6	201.7	.78	41.5	.67	.11	.01
16	15.6	2.07	1.66	3.67	176.8	190.7	.45	27.2	.38	.11	.01
17	14.4	.92	0.00	0.00	73.1	73.1	0.00	0.0	0.00	.22	0.00
18	12.2	0.00	0.00	0.00	42.2	42.2	0.00	0.0	0.00	.10	0.00
19	11.1	0.00	0.00	0.00	27.8	27.8	0.00	0.0	0.00	.06	0.00
20	6.1	0.00	0.00	0.00	18.1	18.1	0.00	0.0	0.00	.05	0.00
21	3.3	0.00	0.00	0.00	11.7	11.7	0.00	0.0	0.00	.04	0.00
22	2.8	0.00	0.00	0.00	7.9	7.9	0.00	0.0	0.00	.03	0.00
23	1.1	0.00	0.00	0.00	5.0	5.0	0.00	0.0	0.00	.02	0.00
24	1.1	0.00	0.00	0.00	3.4	3.4	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	22.73	15.47	---	---	---	5.41	34.9	3.90	1.51	.05

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

15 FEBRUARY (DAY 46)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	5.0	0.00	0.00	0.00	7.8	7.8	0.00	0.0	0.00	.02	0.00
2	4.4	0.00	0.00	0.00	6.4	6.4	0.00	0.0	0.00	.01	0.00
3	3.3	0.00	0.00	0.00	5.1	5.1	0.00	0.0	0.00	.01	0.00
4	3.3	0.00	0.00	0.00	4.4	4.4	0.00	0.0	0.00	.01	0.00
5	3.3	0.00	0.00	0.00	3.9	3.9	0.00	0.0	0.00	.01	0.00
6	2.8	0.00	0.00	0.00	3.5	3.5	0.00	0.0	0.00	.01	0.00
7	2.2	0.00	0.00	0.00	2.9	2.9	0.00	0.0	0.00	.01	0.00
8	3.3	1.40	1.29	3.67	110.2	116.1	.19	14.9	0.00	.06	.01
9	8.3	2.15	1.87	3.67	168.4	189.9	.70	37.2	.10	.10	.01
10	12.2	2.60	2.11	3.67	177.8	206.4	.93	44.0	.77	.11	.01
11	13.9	2.82	2.16	3.67	178.0	207.1	.94	43.5	.83	.11	.01
12	15.6	2.91	2.15	3.67	178.0	206.5	.92	43.0	.82	.11	.01
13	16.7	2.89	2.13	3.67	178.0	206.3	.92	43.1	.81	.11	.01
14	17.8	2.82	2.16	3.67	178.0	207.3	.95	43.9	.84	.11	.01
15	18.3	2.63	2.14	3.67	178.1	207.5	.96	44.7	.85	.11	.01
16	18.3	2.19	1.90	3.67	177.5	199.5	.71	37.5	.63	.11	.01
17	18.3	1.36	1.26	3.67	175.7	178.6	.09	7.4	.06	.10	.01
18	16.1	0.00	0.00	0.00	74.9	74.9	0.00	0.0	0.00	.22	0.00
19	15.0	0.00	0.00	0.00	44.6	44.6	0.00	0.0	0.00	.10	0.00
20	14.4	0.00	0.00	0.00	30.7	30.7	0.00	0.0	0.00	.06	0.00
21	13.3	0.00	0.00	0.00	23.1	23.1	0.00	0.0	0.00	.04	0.00
22	11.1	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.03	0.00
23	10.6	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.02	0.00
24	9.4	0.00	0.00	0.00	12.6	12.6	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	23.78	19.20	---	---	---	7.32	38.1	5.69	1.61	.05

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

25 MARCH (DAY 84)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	7.8	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.02	0.00
2	6.7	0.00	0.00	0.00	9.0	9.0	0.00	0.0	0.00	.01	0.00
3	5.6	0.00	0.00	0.00	7.6	7.6	0.00	0.0	0.00	.01	0.00
4	5.6	0.00	0.00	0.00	6.8	6.8	0.00	0.0	0.00	.01	0.00
5	5.6	0.00	0.00	0.00	6.3	6.3	0.00	0.0	0.00	.01	0.00
6	5.6	0.00	0.00	0.00	6.0	6.0	0.00	0.0	0.00	.01	0.00
7	8.9	.78	.78	3.67	94.2	94.6	.01	1.9	0.00	.05	.01
8	12.3	1.74	1.72	3.67	138.6	153.6	.49	28.4	0.00	.08	.01
9	15.6	2.36	2.26	3.67	175.7	207.9	1.05	46.2	.66	.11	.01
10	18.2	2.69	2.50	3.67	178.7	214.9	1.18	47.0	1.04	.11	.01
11	20.7	2.80	2.52	3.67	178.8	215.5	1.19	47.2	1.08	.11	.01
12	23.3	2.83	2.50	3.67	178.8	215.2	1.18	47.2	1.07	.11	.01
13	24.4	2.75	2.43	3.67	178.8	214.0	1.14	47.1	1.04	.11	.01
14	25.6	2.74	2.46	3.67	178.8	214.7	1.17	47.4	1.06	.11	.01
15	26.7	2.64	2.45	3.67	178.8	214.6	1.16	47.5	1.06	.11	.01
16	26.5	2.33	2.24	3.67	178.5	210.9	1.05	46.9	.96	.11	.01
17	26.3	1.68	1.66	3.67	176.8	189.7	.42	25.3	.38	.10	.01
18	26.1	.53	0.00	0.00	84.1	84.1	0.00	0.0	0.00	.22	0.00
19	23.9	0.00	0.00	0.00	53.6	53.6	0.00	0.0	0.00	.10	0.00
20	21.6	0.00	0.00	0.00	38.8	38.8	0.00	0.0	0.00	.06	0.00
21	19.4	0.00	0.00	0.00	30.2	30.2	0.00	0.0	0.00	.04	0.00
22	18.5	0.00	0.00	0.00	25.2	25.2	0.00	0.0	0.00	.03	0.00
23	17.6	0.00	0.00	0.00	22.0	22.0	0.00	0.0	0.00	.02	0.00
24	16.7	0.00	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	25.87	23.51	---	---	---	10.04	42.7	8.34	1.67	.06

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

18 APRIL (DAY 108)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	12.8	0.00	0.00	0.00	14.3	14.3	0.00	0.0	0.00	.01	0.00
2	11.7	0.00	0.00	0.00	13.2	13.2	0.00	0.0	0.00	.01	0.00
3	10.6	0.00	0.00	0.00	12.1	12.1	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	11.0	11.0	0.00	0.0	0.00	.01	0.00
5	10.0	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.01	0.00
6	9.4	0.00	0.00	0.00	10.1	10.1	0.00	0.0	0.00	.01	0.00
7	10.6	.88	.88	3.67	86.6	90.2	.12	13.1	0.00	.05	.01
8	13.9	1.80	1.80	3.67	152.6	172.4	.64	35.8	0.00	.09	.01
9	16.1	2.40	2.38	3.67	177.7	212.1	1.12	47.0	.83	.11	.01
10	16.7	2.69	2.62	3.67	178.8	217.2	1.25	47.5	1.12	.11	.01
11	18.3	2.76	2.64	3.67	178.9	217.7	1.26	47.6	1.14	.11	.01
12	20.0	2.78	2.63	3.67	179.0	217.7	1.26	47.6	1.14	.11	.01
13	21.1	2.66	2.52	3.67	178.9	215.6	1.19	47.4	1.09	.11	.01
14	21.7	2.67	2.56	3.67	178.9	216.4	1.22	47.6	1.10	.11	.01
15	22.8	2.62	2.55	3.67	178.9	216.5	1.22	47.8	1.11	.11	.01
16	23.3	2.37	2.35	3.67	178.7	213.0	1.11	47.5	1.02	.11	.01
17	23.3	1.77	1.77	3.67	177.4	195.9	.60	33.9	.55	.10	.01
18	22.8	.74	0.00	0.00	80.2	80.2	0.00	0.0	0.00	.21	0.00
19	21.1	0.00	0.00	0.00	50.3	50.3	0.00	0.0	0.00	.10	0.00
20	19.4	0.00	0.00	0.00	36.1	36.1	0.00	0.0	0.00	.06	0.00
21	16.7	0.00	0.00	0.00	27.5	27.5	0.00	0.0	0.00	.05	0.00
22	15.0	0.00	0.00	0.00	22.1	22.1	0.00	0.0	0.00	.03	0.00
23	15.0	0.00	0.00	0.00	19.1	19.1	0.00	0.0	0.00	.02	0.00
24	11.7	0.00	0.00	0.00	16.0	16.0	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	26.15	24.70	---	---	---	10.98	44.4	9.10	1.68	.06

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

21 MAY (DAY 141)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	14.4	0.00	0.00	0.00	17.3	17.3	0.00	0.0	0.00	.02	0.00
2	14.4	0.00	0.00	0.00	16.1	16.1	0.00	0.0	0.00	.02	0.00
3	13.9	0.00	0.00	0.00	15.2	15.2	0.00	0.0	0.00	.01	0.00
4	13.3	0.00	0.00	0.00	14.4	14.4	0.00	0.0	0.00	.01	0.00
5	12.8	0.00	0.00	0.00	13.8	13.8	0.00	0.0	0.00	.01	0.00
6	12.8	.01	0.00	0.00	13.4	13.4	0.00	0.0	0.00	.01	0.00
7	15.6	1.06	1.03	3.67	117.0	123.1	.20	19.4	0.00	.06	.01
8	18.9	1.85	1.84	3.67	170.1	193.5	.76	41.4	.20	.10	.01
9	21.1	2.33	2.33	3.67	178.4	213.1	1.12	48.2	.96	.11	.01
10	22.2	2.57	2.56	3.67	178.9	217.3	1.24	48.6	1.12	.11	.01
11	23.3	2.63	2.61	3.67	179.0	217.9	1.26	48.4	1.15	.11	.01
12	24.4	2.65	2.62	3.67	179.1	218.0	1.26	48.3	1.15	.11	.01
13	25.6	2.49	2.46	3.67	178.9	215.2	1.18	47.9	1.08	.11	.01
14	27.2	2.50	2.48	3.67	178.9	215.8	1.20	48.3	1.09	.11	.01
15	28.3	2.47	2.47	3.67	178.9	216.0	1.20	48.8	1.09	.11	.01
16	28.9	2.29	2.29	3.67	178.7	213.1	1.12	48.7	1.02	.11	.01
17	28.9	1.83	1.82	3.67	177.8	201.0	.75	41.5	.69	.10	.01
18	28.3	.98	.95	3.67	175.8	178.8	.10	10.0	.07	.10	.01
19	27.8	0.00	0.00	0.00	84.3	84.3	0.00	0.0	0.00	.20	0.00
20	26.1	0.00	0.00	0.00	55.0	55.0	0.00	0.0	0.00	.09	0.00
21	25.0	0.00	0.00	0.00	41.2	41.2	0.00	0.0	0.00	.06	0.00
22	23.9	0.00	0.00	0.00	33.6	33.6	0.00	0.0	0.00	.04	0.00
23	22.2	0.00	0.00	0.00	28.7	28.7	0.00	0.0	0.00	.03	0.00
24	21.7	0.00	0.00	0.00	25.8	25.8	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	25.67	25.46	---	---	---	11.40	44.8	9.62	1.76	.06

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

11 JUNE (DAY 162)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	24.4	0.00	0.00	0.00	26.6	26.6	0.00	0.0	0.00	.02	0.00
2	24.4	0.00	0.00	0.00	25.7	25.7	0.00	0.0	0.00	.01	0.00
3	24.4	0.00	0.00	0.00	25.2	25.2	0.00	0.0	0.00	.01	0.00
4	24.4	0.00	0.00	0.00	24.8	24.8	0.00	0.0	0.00	.01	0.00
5	24.4	0.00	0.00	0.00	24.7	24.7	0.00	0.0	0.00	.01	0.00
6	23.9	.02	0.00	0.00	24.4	24.4	0.00	0.0	0.00	.01	0.00
7	24.4	.76	.73	3.67	116.1	120.5	.14	19.6	0.00	.06	.01
8	25.0	1.41	1.39	3.67	168.6	186.1	.57	40.9	.03	.09	.01
9	26.7	1.89	1.88	3.67	177.7	204.5	.87	46.2	.71	.10	.01
10	27.8	2.38	2.38	3.67	178.7	214.6	1.17	49.0	1.03	.11	.01
11	30.0	2.60	2.59	3.67	179.1	218.4	1.28	49.2	1.16	.11	.01
12	30.6	2.62	2.60	3.67	179.1	218.5	1.28	49.1	1.17	.11	.01
13	31.7	2.49	2.48	3.67	179.0	216.2	1.21	48.8	1.11	.11	.01
14	32.2	2.50	2.49	3.67	179.0	216.8	1.22	49.1	1.12	.11	.01
15	33.3	2.48	2.47	3.67	179.0	216.9	1.23	49.7	1.12	.11	.01
16	33.9	2.32	2.31	3.67	178.8	213.5	1.13	48.7	1.03	.10	.01
17	34.4	1.91	1.89	3.67	178.0	203.9	.84	44.4	.77	.10	.01
18	32.8	.97	.93	3.67	176.0	179.8	.12	13.2	.10	.09	.01
19	31.7	.01	0.00	0.00	87.5	87.5	0.00	0.0	0.00	.20	0.00
20	30.0	0.00	0.00	0.00	58.6	58.6	0.00	0.0	0.00	.09	0.00
21	28.9	0.00	0.00	0.00	45.0	45.0	0.00	0.0	0.00	.06	0.00
22	27.8	0.00	0.00	0.00	37.4	37.4	0.00	0.0	0.00	.04	0.00
23	26.7	0.00	0.00	0.00	32.8	32.8	0.00	0.0	0.00	.03	0.00
24	25.0	0.00	0.00	0.00	29.5	29.5	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	24.36	24.16	---	---	---	11.05	45.8	9.34	1.71	.06

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

22 JULY (DAY 203)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	26.7	0.00	0.00	0.00	30.0	30.0	0.00	0.0	0.00	.02	0.00
2	25.6	0.00	0.00	0.00	28.2	28.2	0.00	0.0	0.00	.02	0.00
3	25.0	0.00	0.00	0.00	26.9	26.9	0.00	0.0	0.00	.01	0.00
4	24.4	0.00	0.00	0.00	25.8	25.8	0.00	0.0	0.00	.01	0.00
5	23.9	0.00	0.00	0.00	25.0	25.0	0.00	0.0	0.00	.01	0.00
6	24.4	0.00	0.00	0.00	24.8	24.8	0.00	0.0	0.00	.01	0.00
7	25.0	.51	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.01	0.00
8	25.6	1.56	1.55	3.67	167.8	187.1	.63	40.5	0.00	.09	.01
9	27.8	2.29	2.29	3.67	178.3	212.7	1.12	48.6	.91	.11	.01
10	29.4	2.54	2.53	3.67	179.0	217.2	1.24	49.1	1.12	.11	.01
11	31.1	2.63	2.61	3.67	179.2	218.5	1.28	49.0	1.17	.11	.01
12	32.2	2.65	2.62	3.67	179.2	218.6	1.28	48.9	1.17	.11	.01
13	33.9	2.52	2.49	3.67	179.1	216.5	1.21	48.7	1.12	.10	.01
14	35.6	2.53	2.51	3.67	179.1	217.0	1.23	49.1	1.13	.10	.01
15	36.7	2.49	2.49	3.67	179.1	217.0	1.23	49.5	1.13	.10	.01
16	36.7	2.16	2.16	3.67	178.7	211.3	1.06	48.9	.98	.10	.01
17	36.1	1.71	1.70	3.67	177.7	199.5	.71	41.6	.65	.10	.01
18	36.1	.78	.76	3.67	175.8	177.4	.05	7.0	.03	.09	.01
19	35.0	0.00	0.00	0.00	89.8	89.8	0.00	0.0	0.00	.19	0.00
20	32.8	0.00	0.00	0.00	61.2	61.2	0.00	0.0	0.00	.09	0.00
21	31.1	0.00	0.00	0.00	47.4	47.4	0.00	0.0	0.00	.06	0.00
22	29.4	0.00	0.00	0.00	39.5	39.5	0.00	0.0	0.00	.04	0.00
23	28.3	0.00	0.00	0.00	34.7	34.7	0.00	0.0	0.00	.03	0.00
24	27.2	0.00	0.00	0.00	31.5	31.5	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	24.38	23.71	---	---	---	11.04	46.6	9.39	1.65	.06

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

3 AUGUST (DAY 215)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	26.7	0.00	0.00	0.00	29.6	29.6	0.00	0.0	0.00	.02	0.00
2	25.6	0.00	0.00	0.00	27.9	27.9	0.00	0.0	0.00	.02	0.00
3	25.0	0.00	0.00	0.00	26.7	26.7	0.00	0.0	0.00	.01	0.00
4	25.0	0.00	0.00	0.00	26.0	26.0	0.00	0.0	0.00	.01	0.00
5	23.3	0.00	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.01	0.00
6	23.3	0.00	0.00	0.00	24.2	24.2	0.00	0.0	0.00	.01	0.00
7	24.4	.78	.76	3.67	111.2	114.9	.12	15.9	0.00	.05	.01
8	26.1	1.74	1.74	3.67	168.6	189.9	.69	39.9	.10	.10	.01
9	27.8	2.26	2.26	3.67	178.4	212.0	1.09	48.4	.92	.11	.01
10	30.0	2.51	2.50	3.67	178.9	216.4	1.22	48.7	1.09	.11	.01
11	32.2	2.61	2.57	3.67	179.1	217.7	1.25	48.7	1.14	.11	.01
12	34.4	2.64	2.58	3.67	179.1	218.0	1.26	48.8	1.15	.11	.01
13	34.4	2.52	2.47	3.67	179.0	215.9	1.20	48.5	1.10	.10	.01
14	36.7	2.53	2.49	3.67	179.0	216.4	1.22	48.9	1.11	.10	.01
15	37.2	2.48	2.46	3.67	179.0	216.3	1.21	49.1	1.11	.10	.01
16	37.8	2.27	2.27	3.67	178.8	213.4	1.12	49.4	1.03	.10	.01
17	37.2	1.79	1.78	3.67	177.8	200.0	.72	40.4	.67	.10	.01
18	36.7	.80	.78	3.67	175.7	177.0	.04	5.1	.02	.09	.01
19	35.6	0.00	0.00	0.00	90.2	90.2	0.00	0.0	0.00	.19	0.00
20	33.9	0.00	0.00	0.00	62.0	62.0	0.00	0.0	0.00	.09	0.00
21	31.7	0.00	0.00	0.00	48.1	48.1	0.00	0.0	0.00	.06	0.00
22	30.0	0.00	0.00	0.00	40.1	40.1	0.00	0.0	0.00	.04	0.00
23	27.8	0.00	0.00	0.00	34.8	34.8	0.00	0.0	0.00	.03	0.00
24	26.7	0.00	0.00	0.00	31.4	31.4	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	24.93	24.66	---	---	---	11.14	45.2	9.44	1.69	.06

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

18 SEPTEMBER (DAY 261)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	17.2	0.00	0.00	0.00	18.7	18.7	0.00	0.0	0.00	.01	0.00
2	16.7	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.01	0.00
3	16.1	0.00	0.00	0.00	17.1	17.1	0.00	0.0	0.00	.01	0.00
4	15.6	0.00	0.00	0.00	16.5	16.5	0.00	0.0	0.00	.01	0.00
5	13.9	0.00	0.00	0.00	15.4	15.4	0.00	0.0	0.00	.01	0.00
6	13.9	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.01	0.00
7	15.0	.15	0.00	0.00	14.9	14.9	0.00	0.0	0.00	.01	0.00
8	18.9	1.37	1.35	3.67	128.8	140.4	.38	27.9	0.00	.07	.01
9	21.7	2.11	2.03	3.67	173.0	201.7	.93	46.0	.46	.10	.01
10	23.9	2.46	2.28	3.67	178.4	211.2	1.06	46.7	.93	.11	.01
11	25.0	2.62	2.35	3.67	178.6	212.6	1.10	47.0	.99	.11	.01
12	25.6	2.67	2.35	3.67	178.6	212.6	1.10	46.9	1.00	.11	.01
13	26.1	2.61	2.30	3.67	178.6	211.8	1.08	46.8	.97	.11	.01
14	27.2	2.58	2.32	3.67	178.6	212.2	1.09	47.0	.98	.11	.01
15	28.3	2.47	2.29	3.67	178.6	211.9	1.08	47.1	.97	.11	.01
16	27.8	2.16	2.07	3.67	178.3	207.9	.96	46.3	.87	.11	.01
17	27.8	1.44	1.42	3.67	176.5	186.7	.33	23.3	.30	.10	.01
18	27.2	.12	0.00	0.00	84.7	84.7	0.00	0.0	0.00	.21	0.00
19	25.0	0.00	0.00	0.00	54.5	54.5	0.00	0.0	0.00	.10	0.00
20	23.3	0.00	0.00	0.00	40.1	40.1	0.00	0.0	0.00	.06	0.00
21	22.2	0.00	0.00	0.00	32.2	32.2	0.00	0.0	0.00	.04	0.00
22	21.7	0.00	0.00	0.00	27.7	27.7	0.00	0.0	0.00	.03	0.00
23	20.6	0.00	0.00	0.00	24.7	24.7	0.00	0.0	0.00	.02	0.00
24	20.0	0.00	0.00	0.00	22.8	22.8	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	22.75	20.75	---	---	---	9.12	43.9	7.47	1.57	.05

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

7 OCTOBER (DAY 280)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	20.6	0.00	0.00	0.00	22.7	22.7	0.00	0.0	0.00	.02	0.00
2	19.4	0.00	0.00	0.00	21.3	21.3	0.00	0.0	0.00	.01	0.00
3	20.0	0.00	0.00	0.00	20.8	20.8	0.00	0.0	0.00	.01	0.00
4	19.4	0.00	0.00	0.00	20.2	20.2	0.00	0.0	0.00	.01	0.00
5	18.3	0.00	0.00	0.00	19.4	19.4	0.00	0.0	0.00	.01	0.00
6	17.2	0.00	0.00	0.00	18.5	18.5	0.00	0.0	0.00	.01	0.00
7	17.2	.04	0.00	0.00	18.0	18.0	0.00	0.0	0.00	.01	0.00
8	20.6	1.35	1.29	3.67	125.6	134.1	.28	21.4	0.00	.07	.01
9	23.3	2.11	1.94	3.67	171.9	198.3	.86	44.3	.36	.10	.01
10	25.0	2.52	2.20	3.67	178.2	209.6	1.02	46.2	.88	.11	.01
11	26.7	2.72	2.27	3.67	178.5	210.8	1.05	46.3	.94	.11	.01
12	27.8	2.79	2.27	3.67	178.5	210.6	1.04	46.1	.94	.11	.01
13	28.9	2.75	2.23	3.67	178.5	210.2	1.03	46.0	.93	.11	.01
14	30.0	2.70	2.26	3.67	178.4	210.8	1.05	46.5	.94	.10	.01
15	30.6	2.54	2.22	3.67	178.5	210.5	1.04	46.8	.94	.10	.01
16	30.0	2.16	1.98	3.67	178.1	205.3	.88	44.6	.80	.10	.01
17	29.4	1.38	1.32	3.67	176.2	182.7	.21	16.0	.18	.10	.01
18	28.3	.01	0.00	0.00	85.1	85.1	0.00	0.0	0.00	.21	0.00
19	26.1	0.00	0.00	0.00	55.3	55.3	0.00	0.0	0.00	.10	0.00
20	26.1	0.00	0.00	0.00	41.9	41.9	0.00	0.0	0.00	.06	0.00
21	25.0	0.00	0.00	0.00	34.5	34.5	0.00	0.0	0.00	.04	0.00
22	23.3	0.00	0.00	0.00	29.7	29.7	0.00	0.0	0.00	.03	0.00
23	22.8	0.00	0.00	0.00	26.8	26.8	0.00	0.0	0.00	.02	0.00
24	22.2	0.00	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	23.09	19.98	---	---	---	8.46	42.4	6.90	1.55	.05

RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

3 NOVEMBER (DAY 307)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.9	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.02	0.00
2	12.2	0.00	0.00	0.00	14.6	14.6	0.00	0.0	0.00	.01	0.00
3	10.6	0.00	0.00	0.00	13.0	13.0	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	11.5	11.5	0.00	0.0	0.00	.01	0.00
5	8.3	0.00	0.00	0.00	10.2	10.2	0.00	0.0	0.00	.01	0.00
6	7.8	0.00	0.00	0.00	9.2	9.2	0.00	0.0	0.00	.01	0.00
7	7.8	0.00	0.00	0.00	8.6	8.6	0.00	0.0	0.00	.01	0.00
8	8.9	1.15	1.04	3.67	103.6	107.4	.12	11.8	0.00	.06	.01
9	10.6	2.08	1.77	3.67	163.8	182.8	.62	34.8	0.00	.10	.01
10	12.2	2.54	2.01	3.67	177.5	204.1	.86	43.0	.68	.11	.01
11	15.0	2.77	2.04	3.67	177.8	204.4	.86	42.4	.75	.11	.01
12	15.0	2.86	2.02	3.67	177.8	203.6	.84	41.5	.73	.11	.01
13	18.3	2.86	2.02	3.67	177.8	203.8	.84	41.8	.74	.11	.01
14	18.9	2.78	2.05	3.67	177.8	204.8	.88	42.9	.76	.11	.01
15	17.8	2.58	2.03	3.67	177.9	205.3	.89	43.7	.78	.11	.01
16	17.8	2.14	1.82	3.67	177.3	196.5	.63	34.4	.55	.11	.01
17	17.2	1.13	1.03	3.67	172.8	173.2	.01	1.2	0.00	.10	.01
18	15.6	0.00	0.00	0.00	73.7	73.7	0.00	0.0	0.00	.21	0.00
19	13.9	0.00	0.00	0.00	43.4	43.4	0.00	0.0	0.00	.10	0.00
20	12.2	0.00	0.00	0.00	29.0	29.0	0.00	0.0	0.00	.06	0.00
21	11.1	0.00	0.00	0.00	21.1	21.1	0.00	0.0	0.00	.04	0.00
22	8.9	0.00	0.00	0.00	15.9	15.9	0.00	0.0	0.00	.03	0.00
23	8.3	0.00	0.00	0.00	12.7	12.7	0.00	0.0	0.00	.02	0.00
24	7.8	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	22.89	17.82	---	---	---	6.55	36.8	4.98	1.59	.05

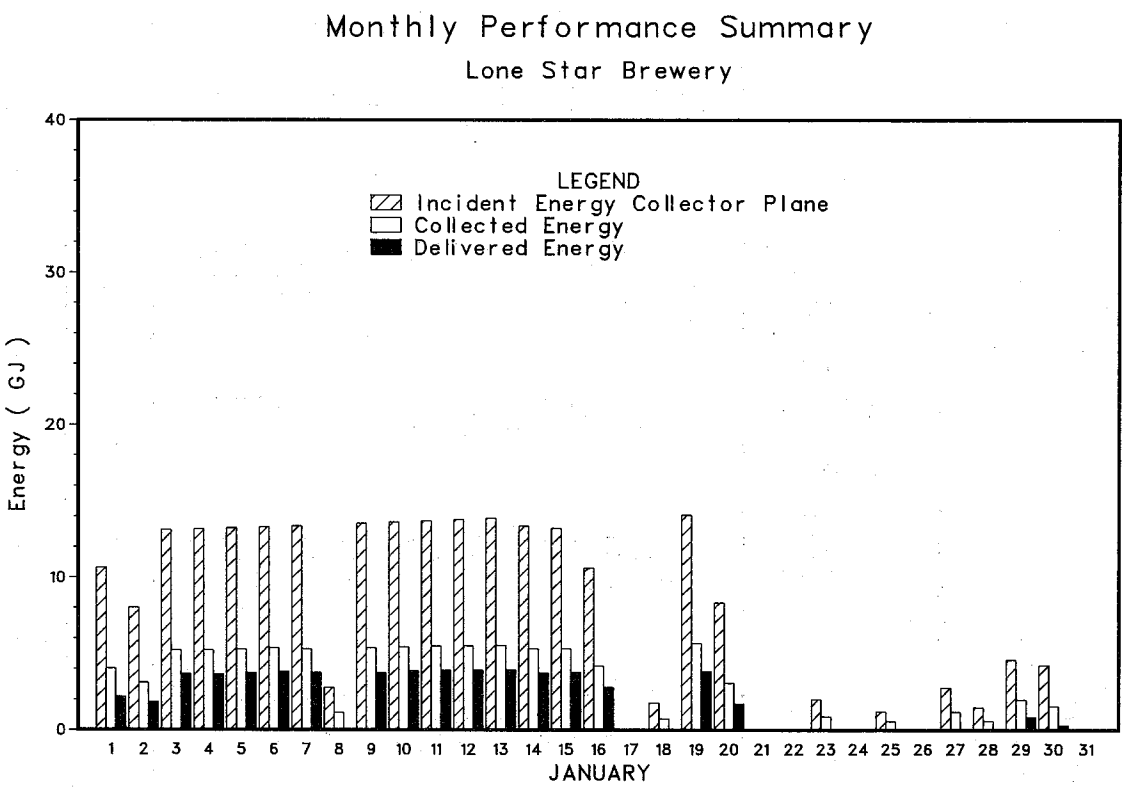
RUN ID: LS2
83/09/02.

LONE STAR BREWERY

CLEAR DAY PERFORMANCE TABLE

25 DECEMBER (DAY 359)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	11.6	11.6	0.00	0.0	0.00	.01	0.00
2	9.4	0.00	0.00	0.00	10.7	10.7	0.00	0.0	0.00	.01	0.00
3	10.0	0.00	0.00	0.00	10.4	10.4	0.00	0.0	0.00	.01	0.00
4	9.4	0.00	0.00	0.00	10.0	10.0	0.00	0.0	0.00	.01	0.00
5	10.0	0.00	0.00	0.00	10.0	10.0	0.00	0.0	0.00	.01	0.00
6	11.7	0.00	0.00	0.00	10.7	10.7	0.00	0.0	0.00	.01	0.00
7	13.9	0.00	0.00	0.00	12.0	12.0	0.00	0.0	0.00	.00	0.00
8	11.7	1.02	.87	3.67	96.5	97.4	.03	3.4	0.00	.05	.01
9	18.9	1.94	1.52	3.67	136.9	150.7	.45	29.3	0.00	.08	.01
10	22.8	2.46	1.74	3.67	174.0	196.2	.72	41.2	.35	.10	.01
11	26.7	2.69	1.74	3.67	177.3	198.4	.68	39.3	.57	.10	.01
12	27.2	2.79	1.70	3.67	177.4	197.0	.64	37.6	.54	.10	.01
13	27.8	2.80	1.71	3.67	177.3	197.1	.64	37.8	.54	.10	.01
14	27.8	2.71	1.75	3.67	177.4	198.7	.69	39.5	.58	.10	.01
15	27.8	2.48	1.76	3.67	177.5	200.0	.73	41.5	.62	.10	.01
16	27.8	1.94	1.52	3.67	176.7	188.6	.39	25.6	.33	.10	.01
17	26.7	.82	0.00	0.00	82.9	82.9	0.00	0.0	0.00	.21	0.00
18	22.8	0.00	0.00	0.00	52.5	52.5	0.00	0.0	0.00	.10	0.00
19	20.0	0.00	0.00	0.00	37.4	37.4	0.00	0.0	0.00	.06	0.00
20	15.6	0.00	0.00	0.00	27.7	27.7	0.00	0.0	0.00	.05	0.00
21	12.8	0.00	0.00	0.00	21.2	21.2	0.00	0.0	0.00	.04	0.00
22	13.3	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.02	0.00
23	11.1	0.00	0.00	0.00	15.0	15.0	0.00	0.0	0.00	.02	0.00
24	11.1	0.00	0.00	0.00	13.4	13.4	0.00	0.0	0.00	.02	0.00
TOTAL/AVE	---	21.64	14.31	---	---	---	4.97	34.7	3.55	1.41	.05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Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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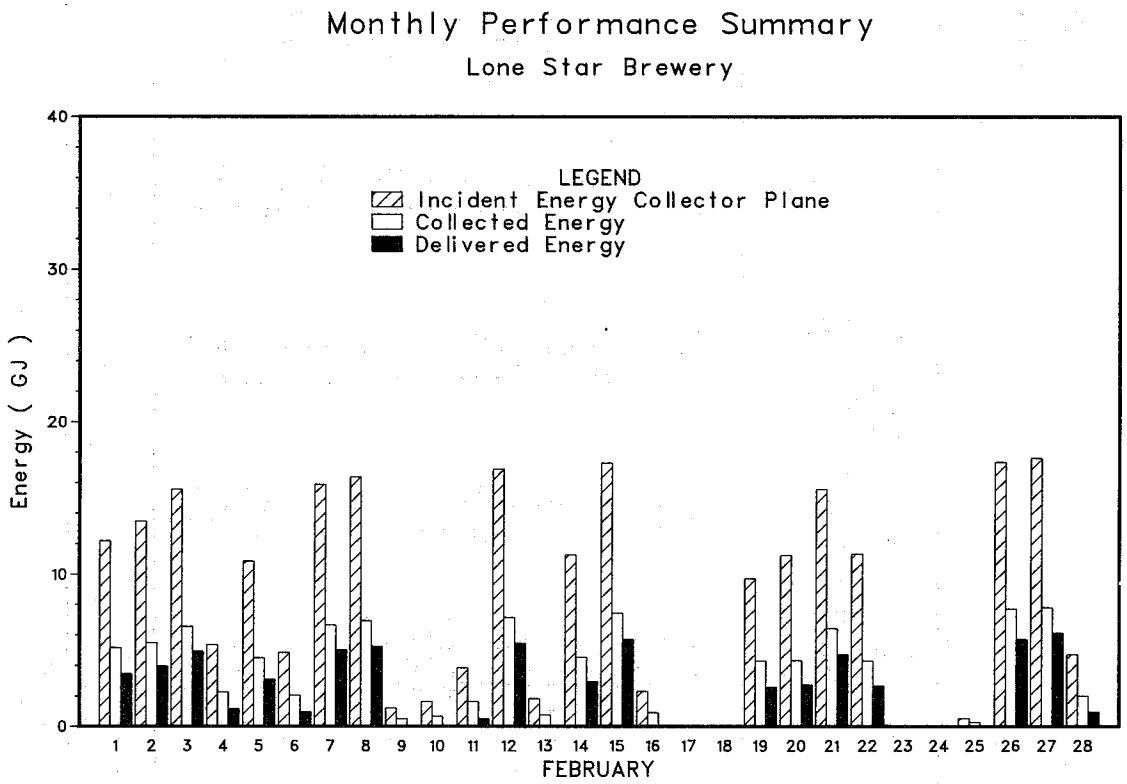
JANUARY


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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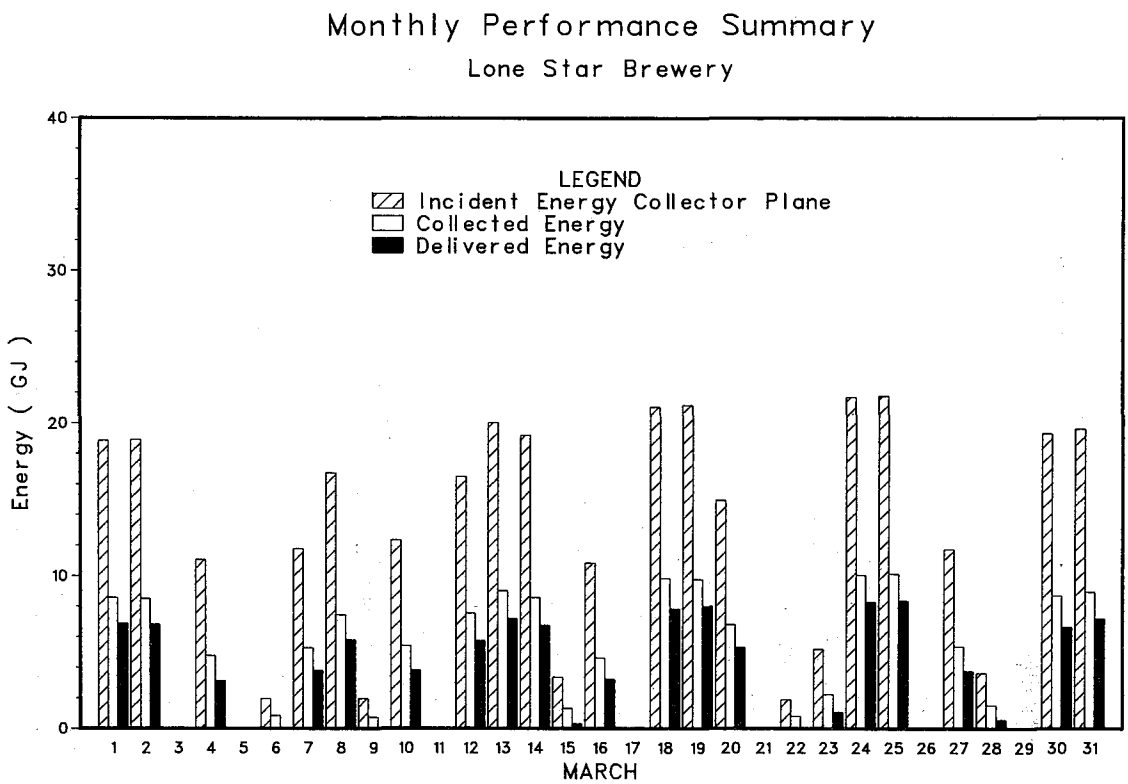
FEBRUARY


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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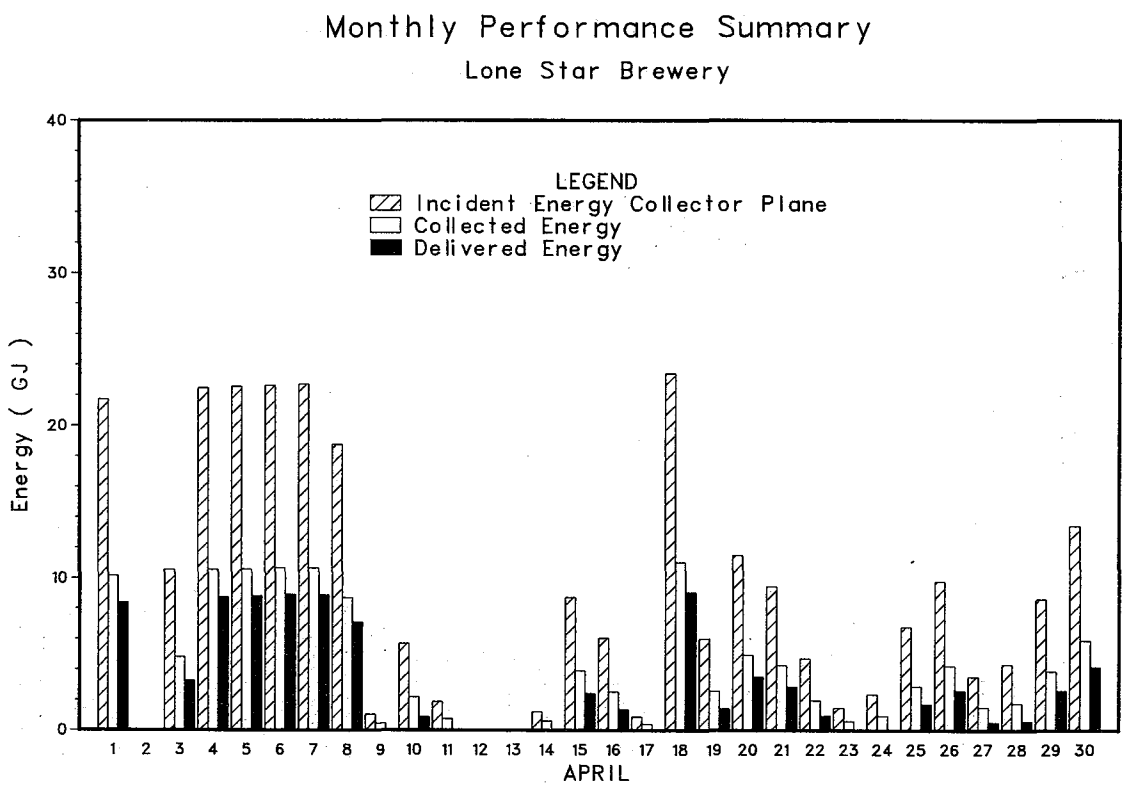
MARCH


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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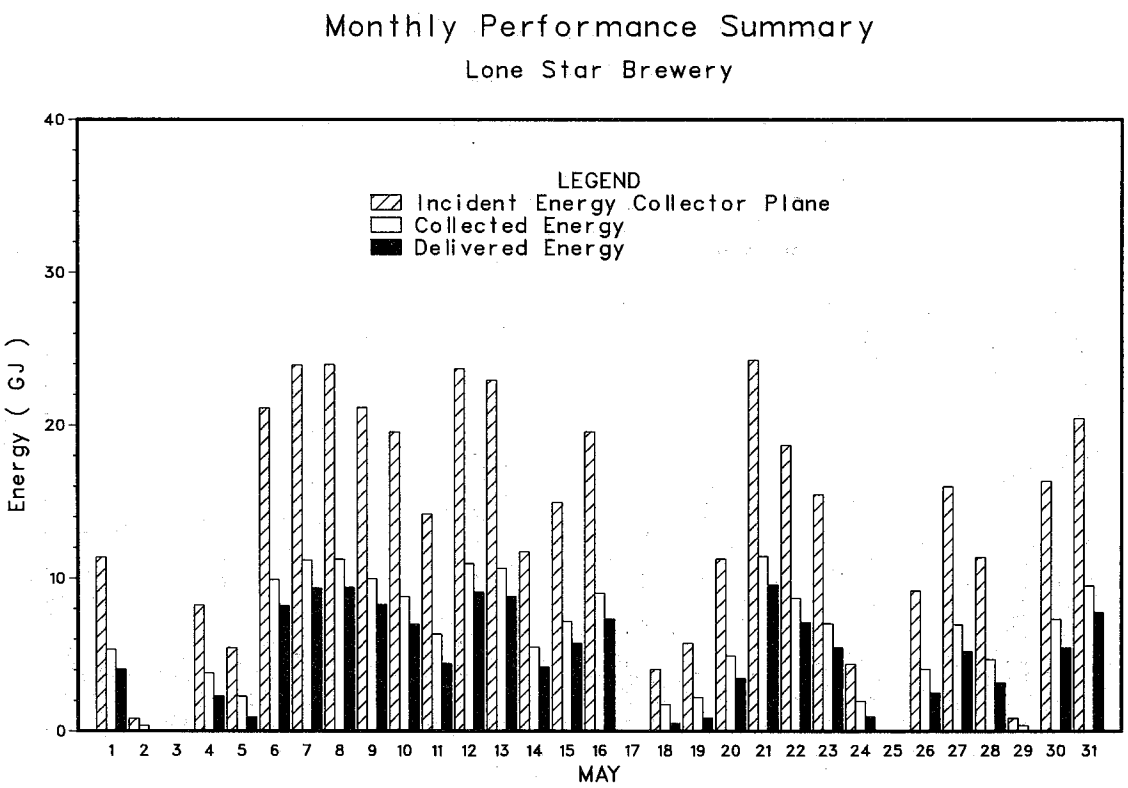
APRIL


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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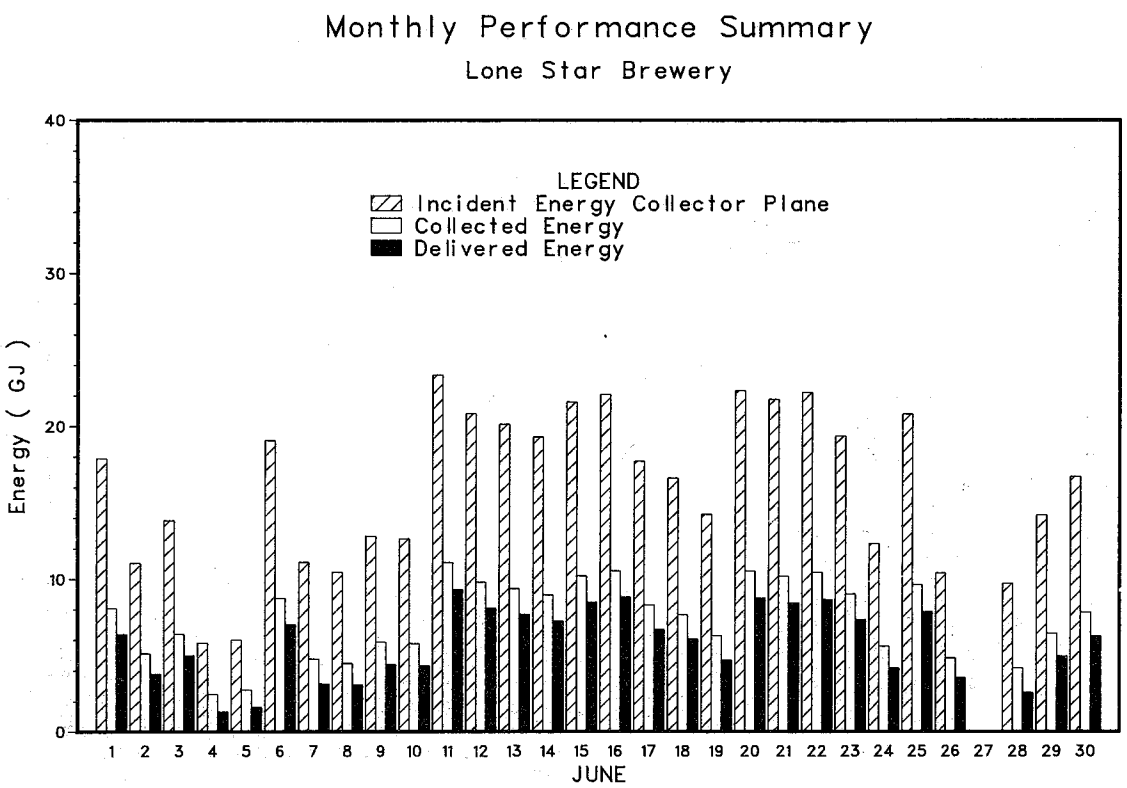
MAY


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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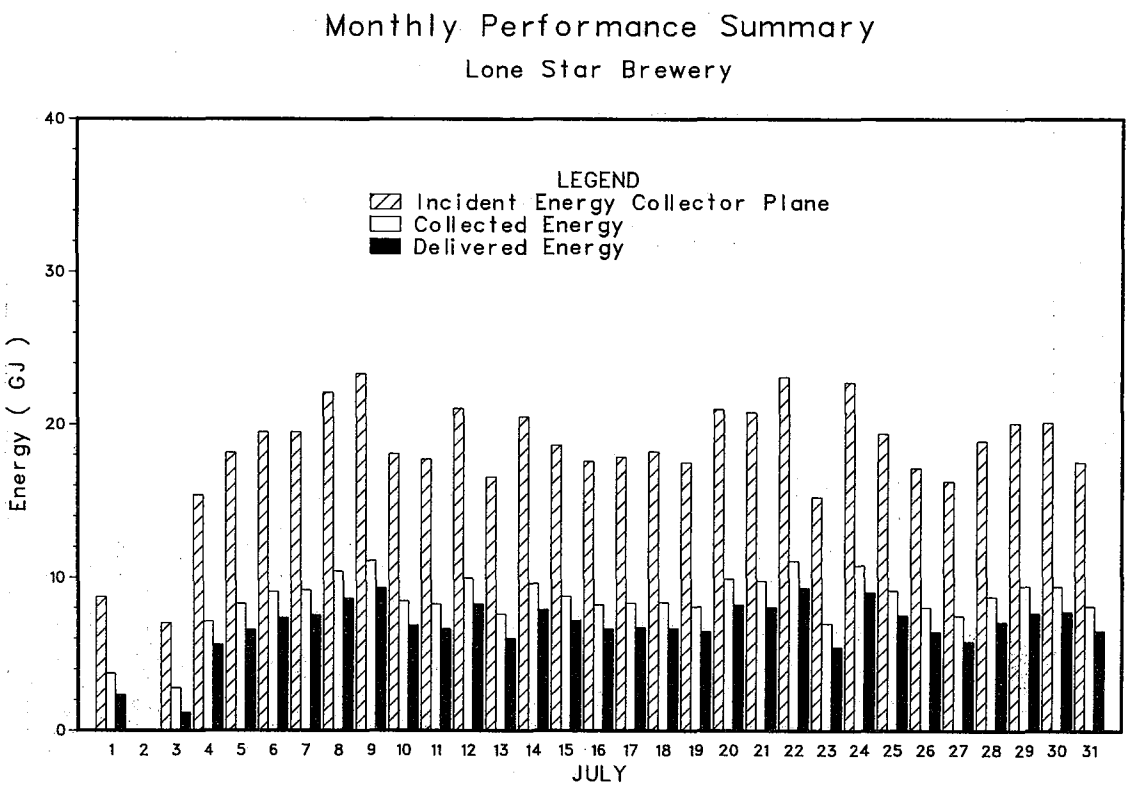
JUNE


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
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10
20
30
40
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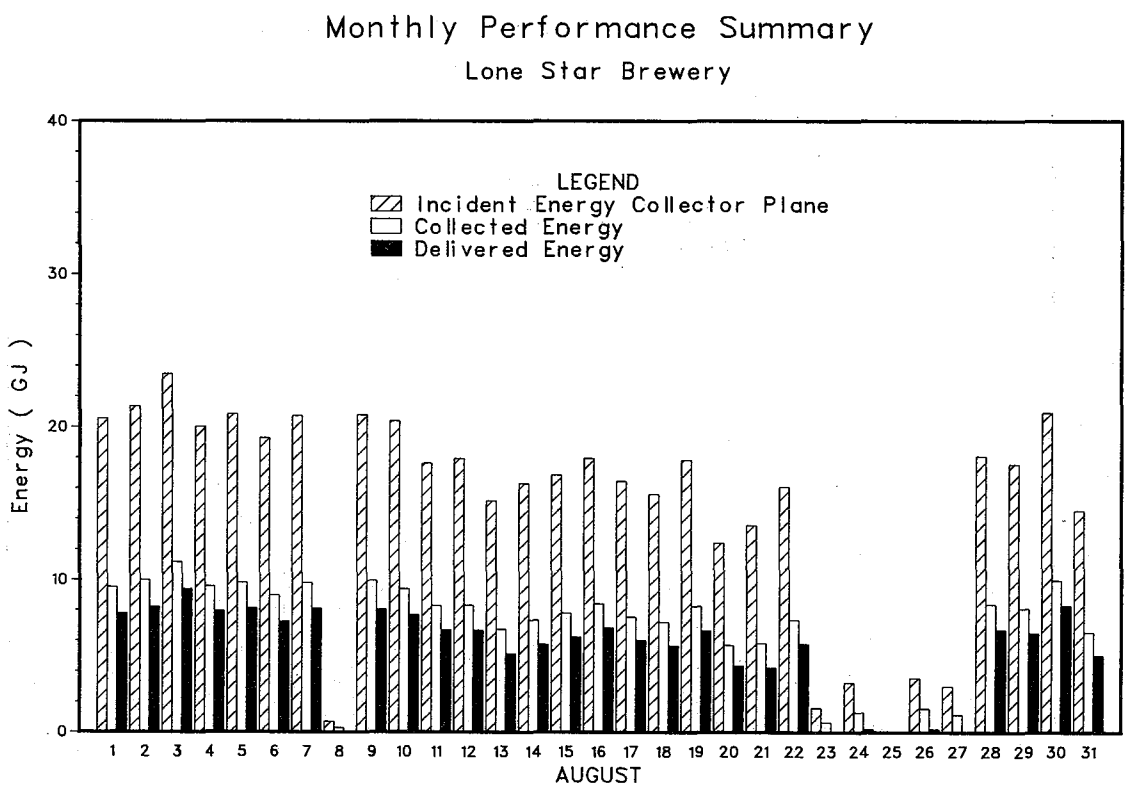
JULY


Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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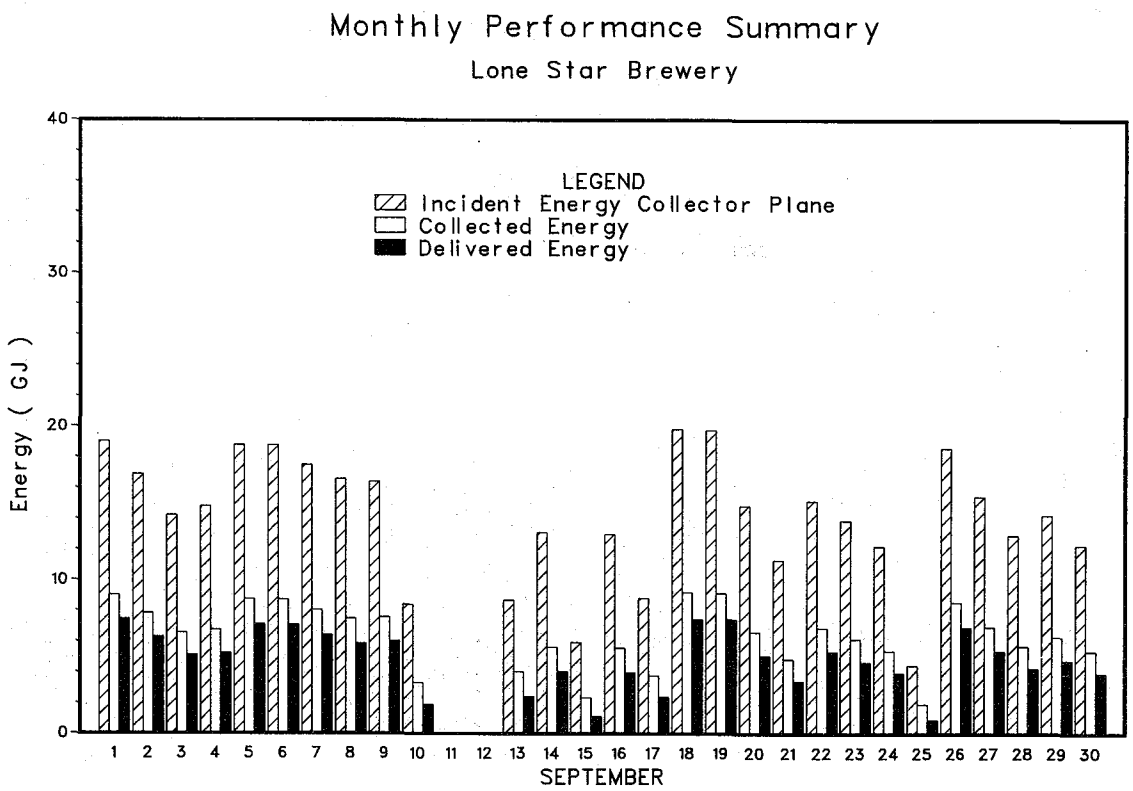
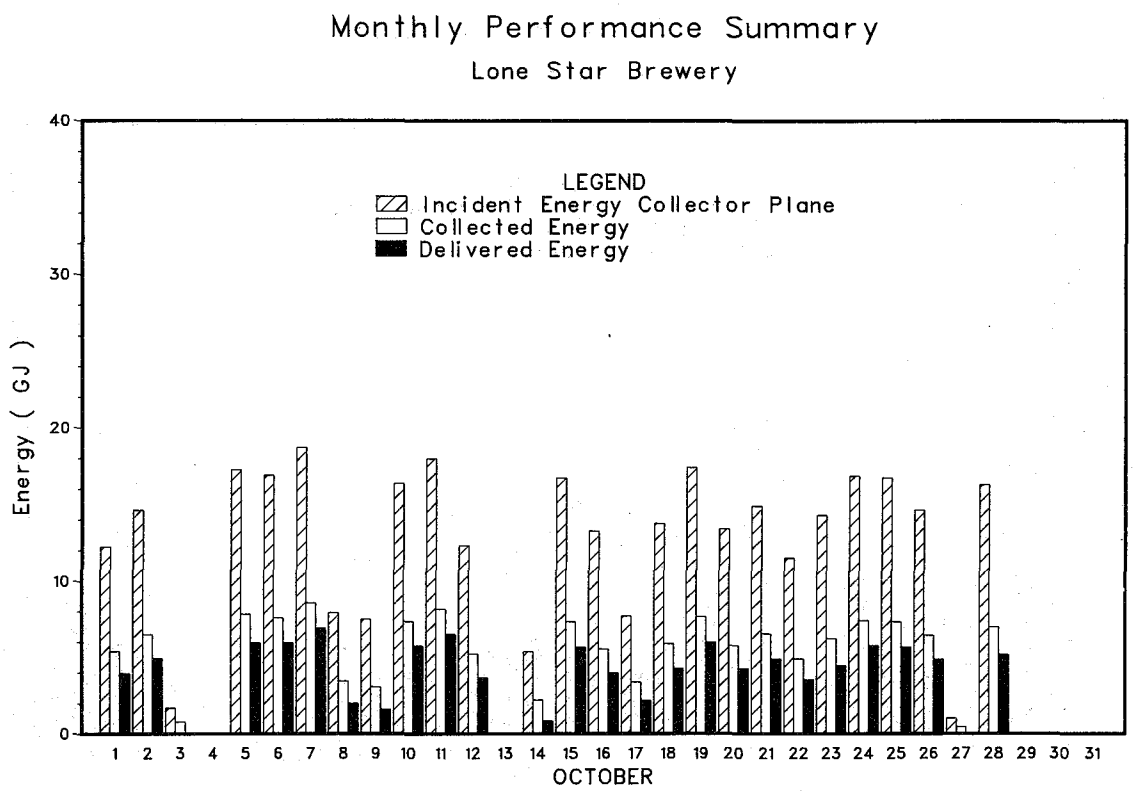
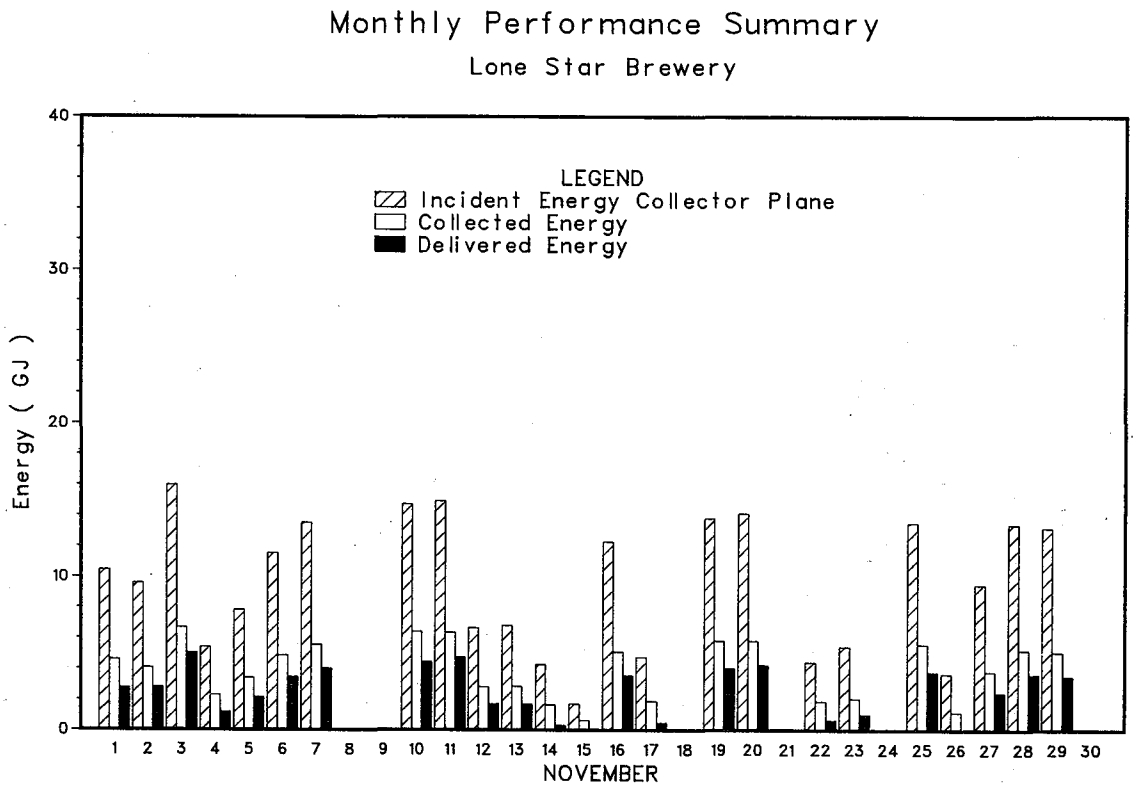
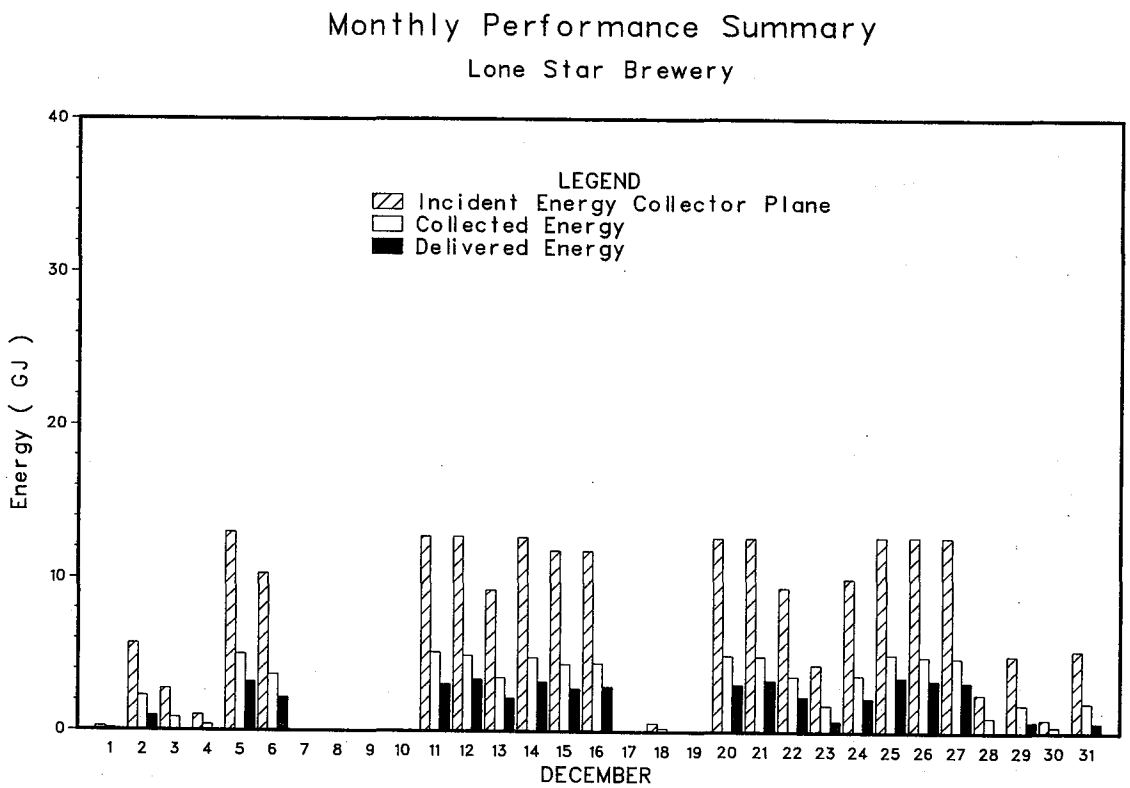
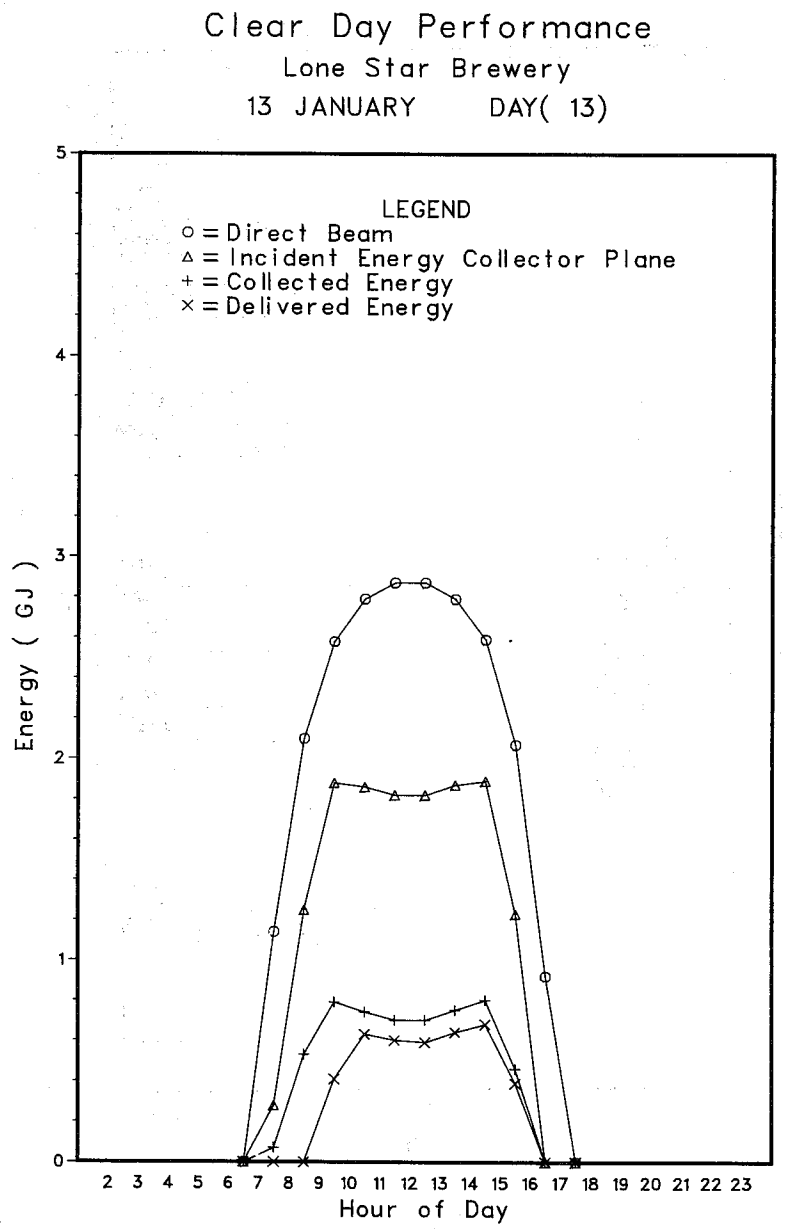
AUGUST

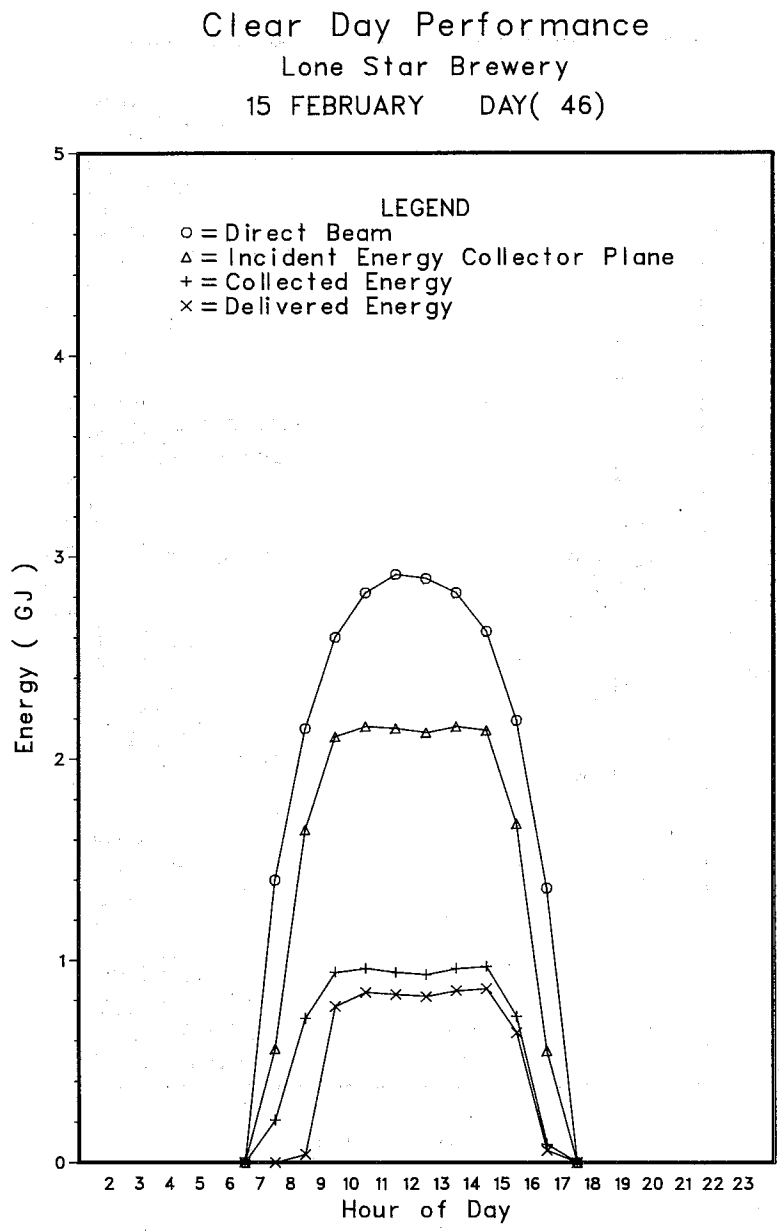

Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
SEPTEMBER

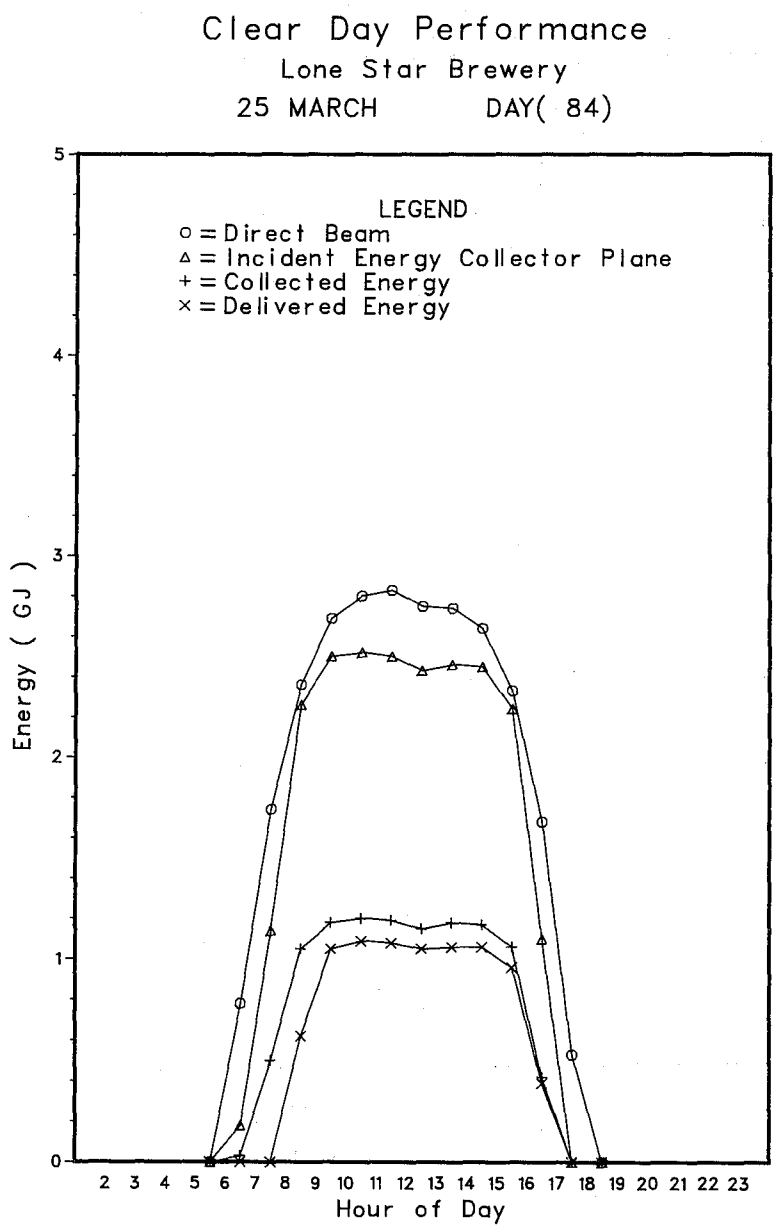

Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
OCTOBER

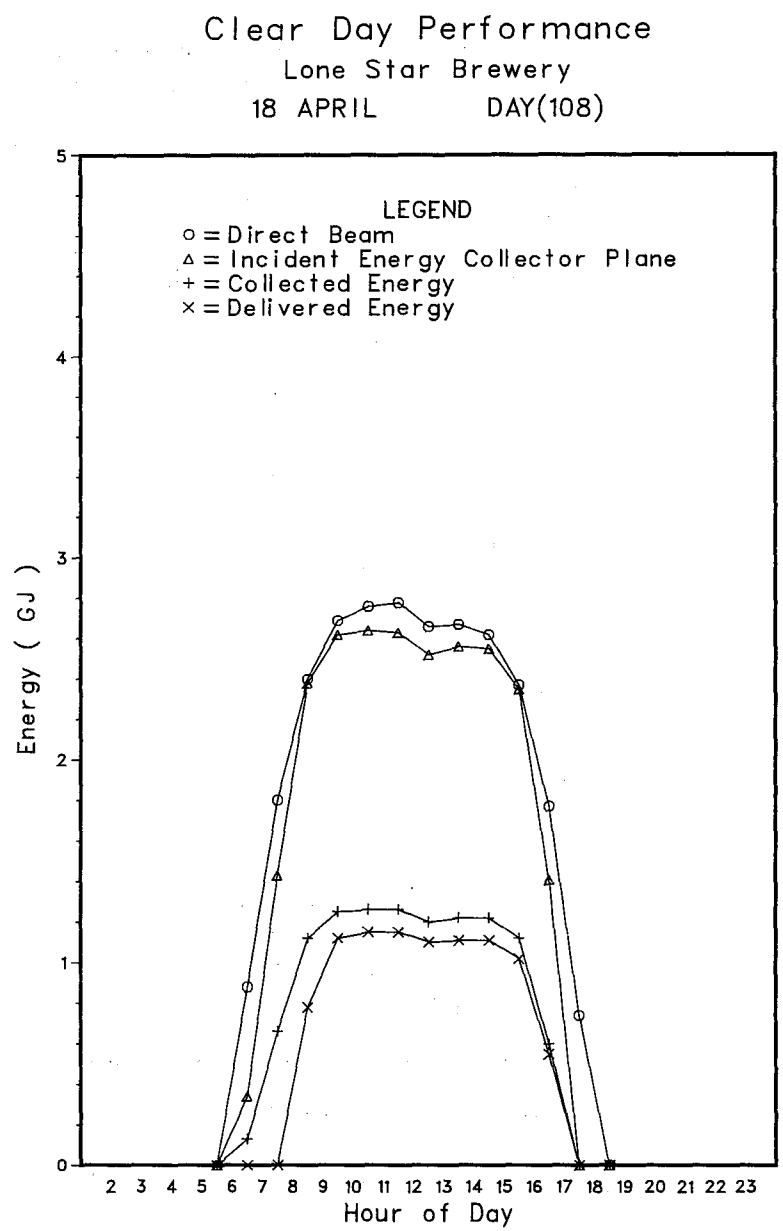

Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER

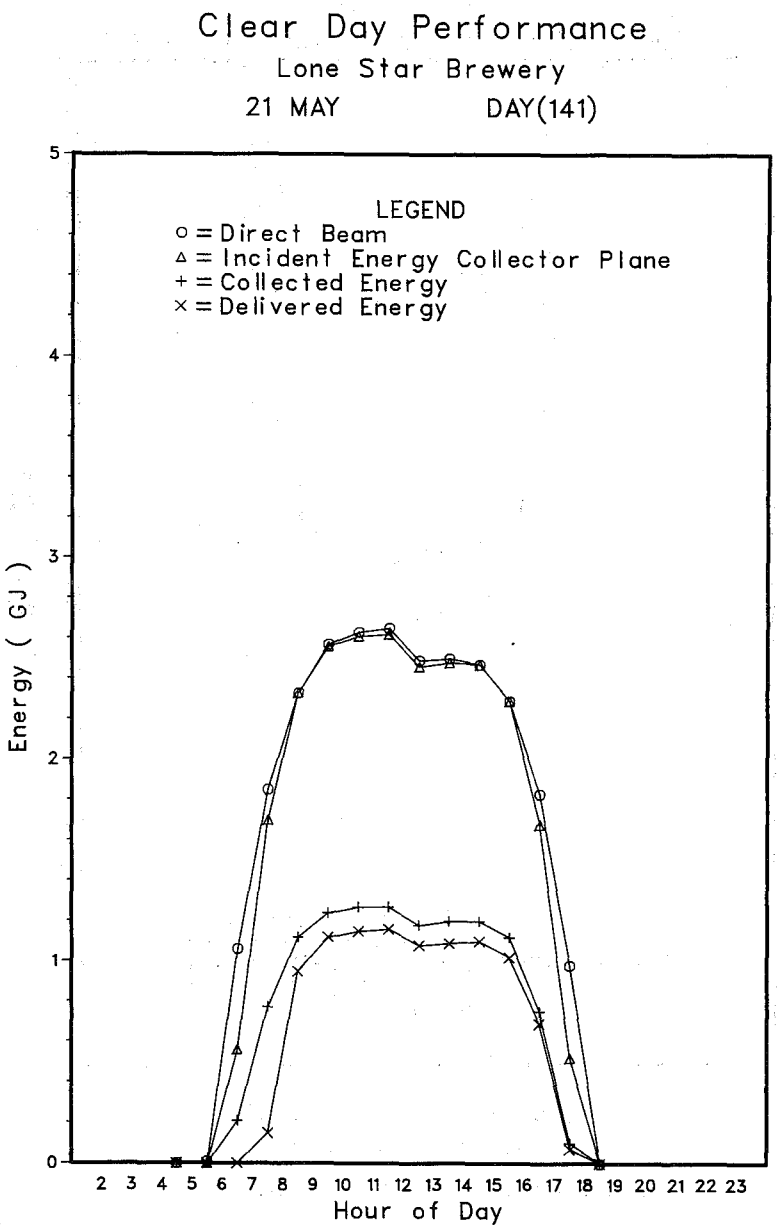

Monthly Performance Summary
Lone Star Brewery
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

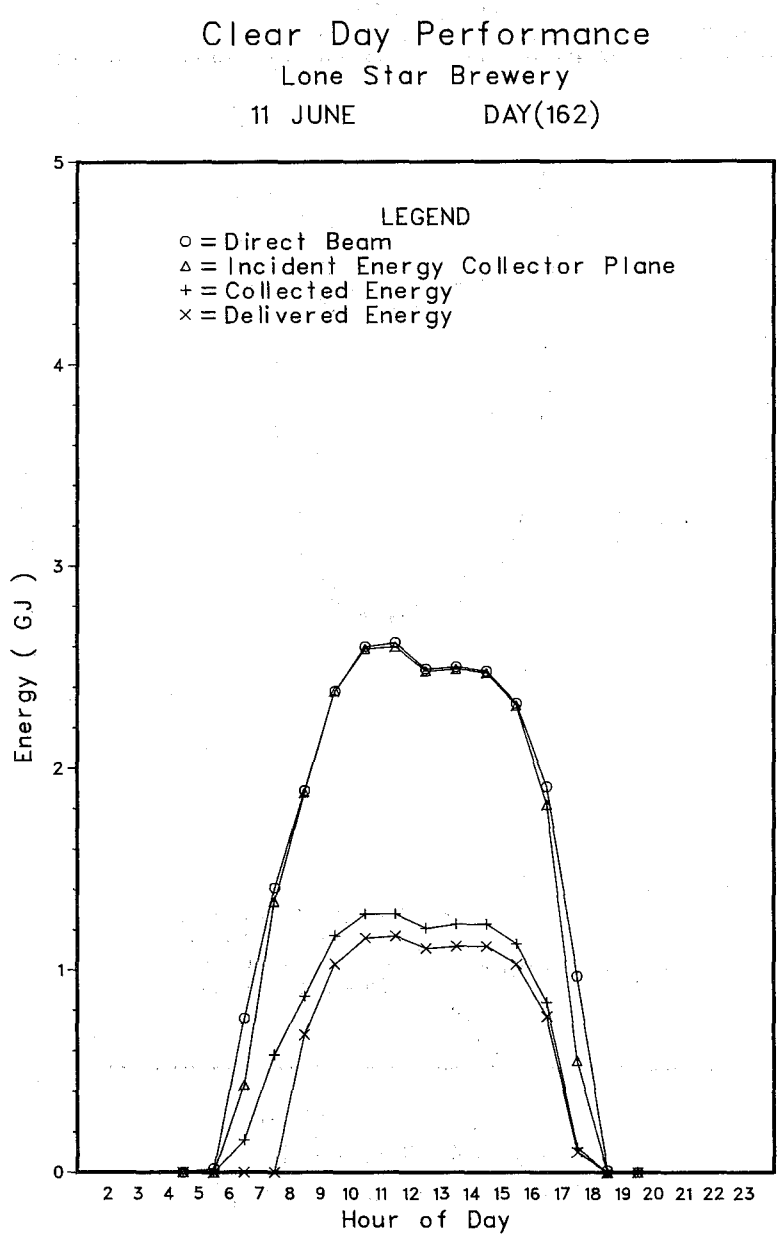

Clear Day Performance
Lone Star Brewery
13 JANUARY DAY(13)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

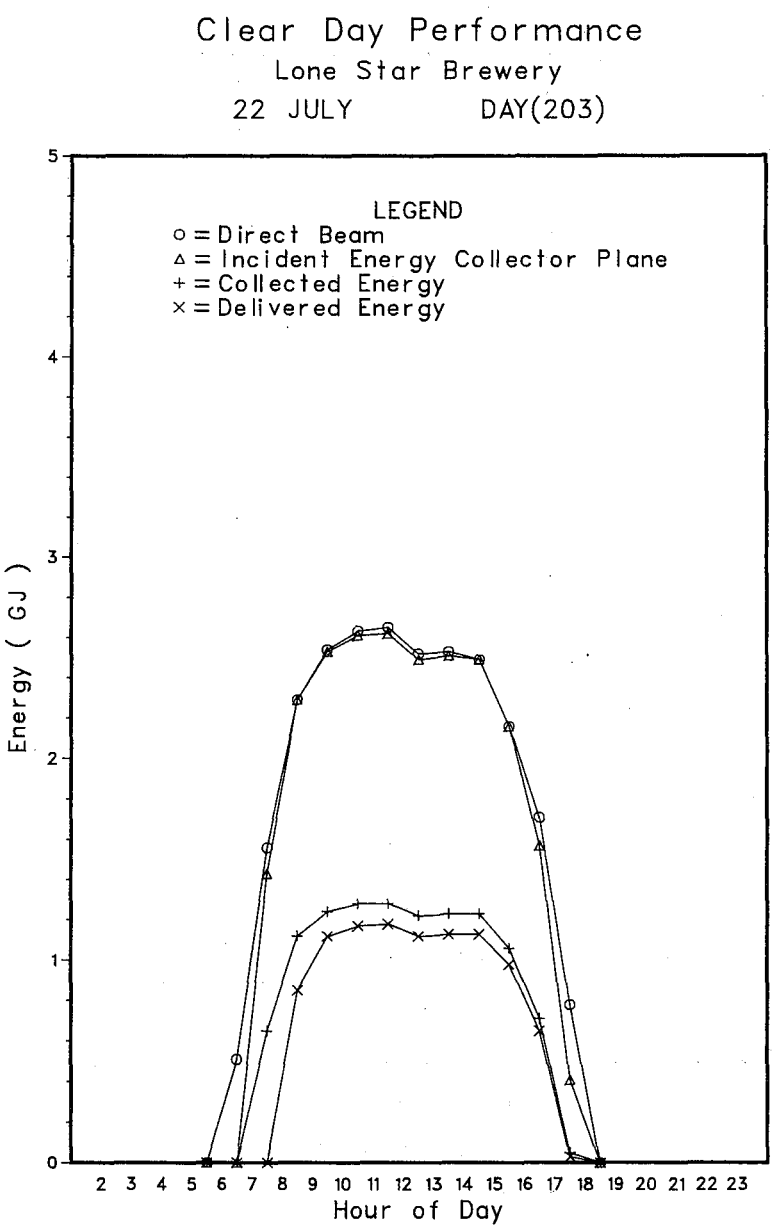

Clear Day Performance
Lone Star Brewery
15 FEBRUARY DAY(46)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

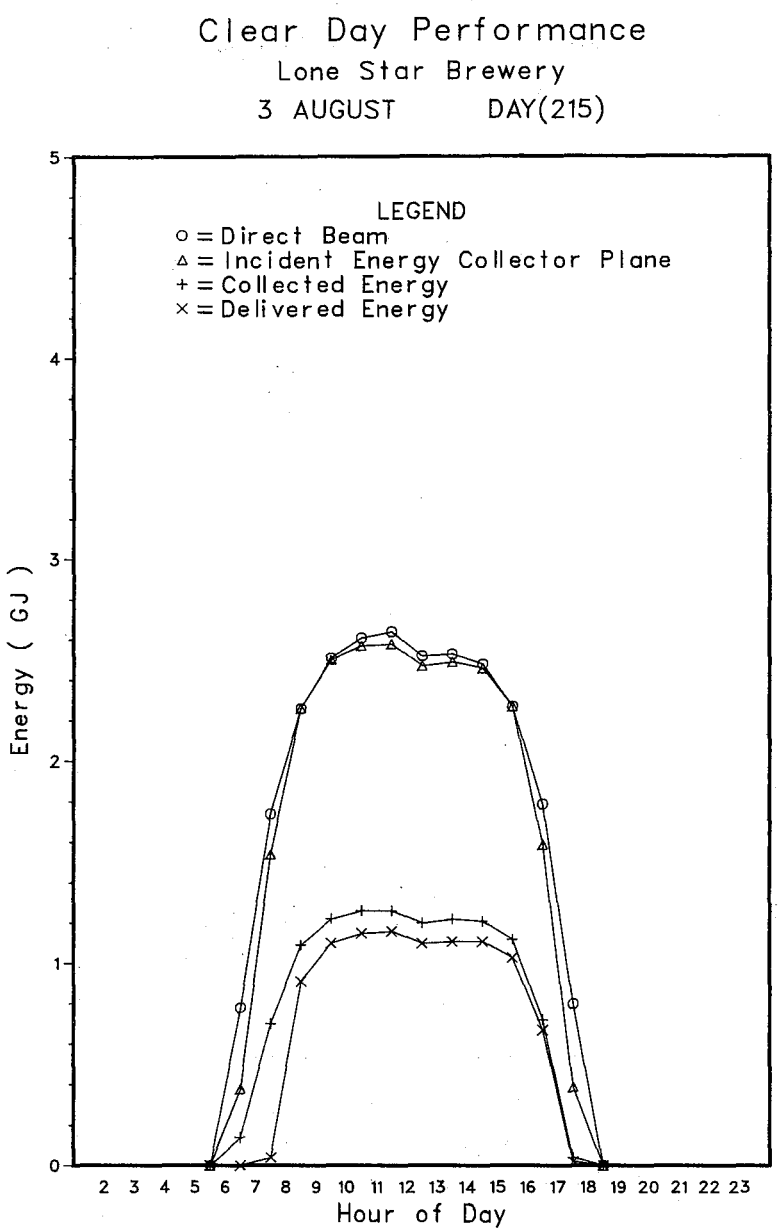

Clear Day Performance
Lone Star Brewery
25 MARCH DAY(84)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

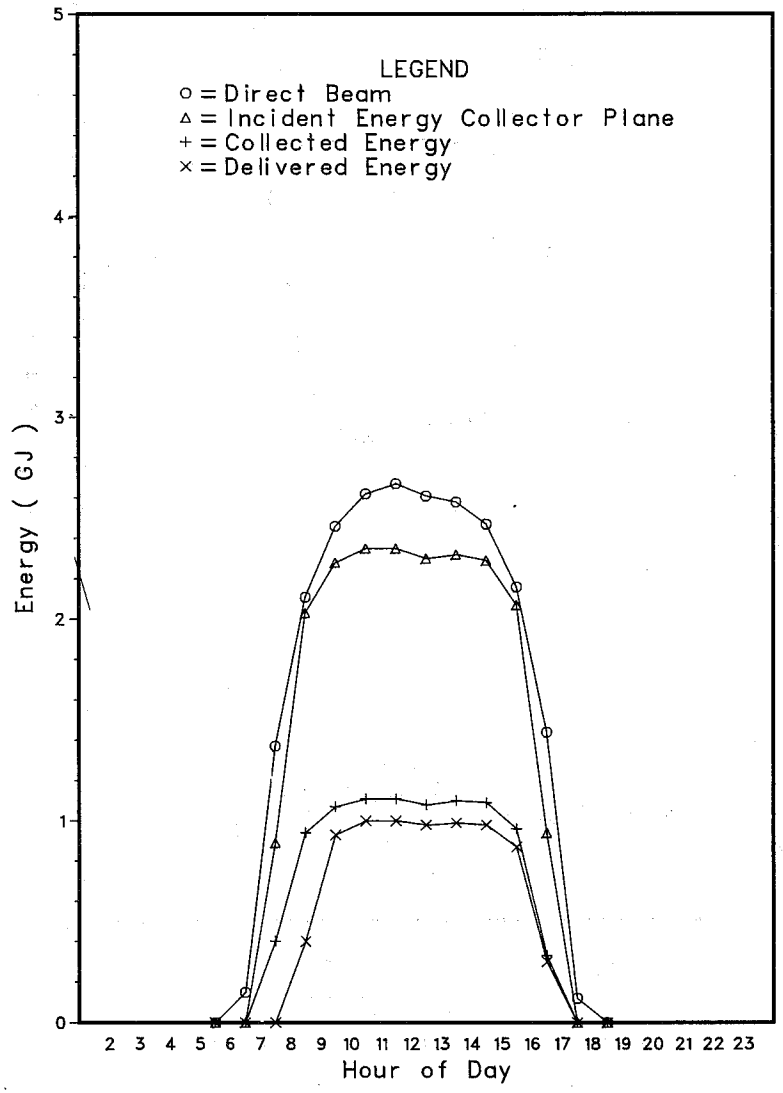

Clear Day Performance
Lone Star Brewery
18 APRIL DAY(108)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

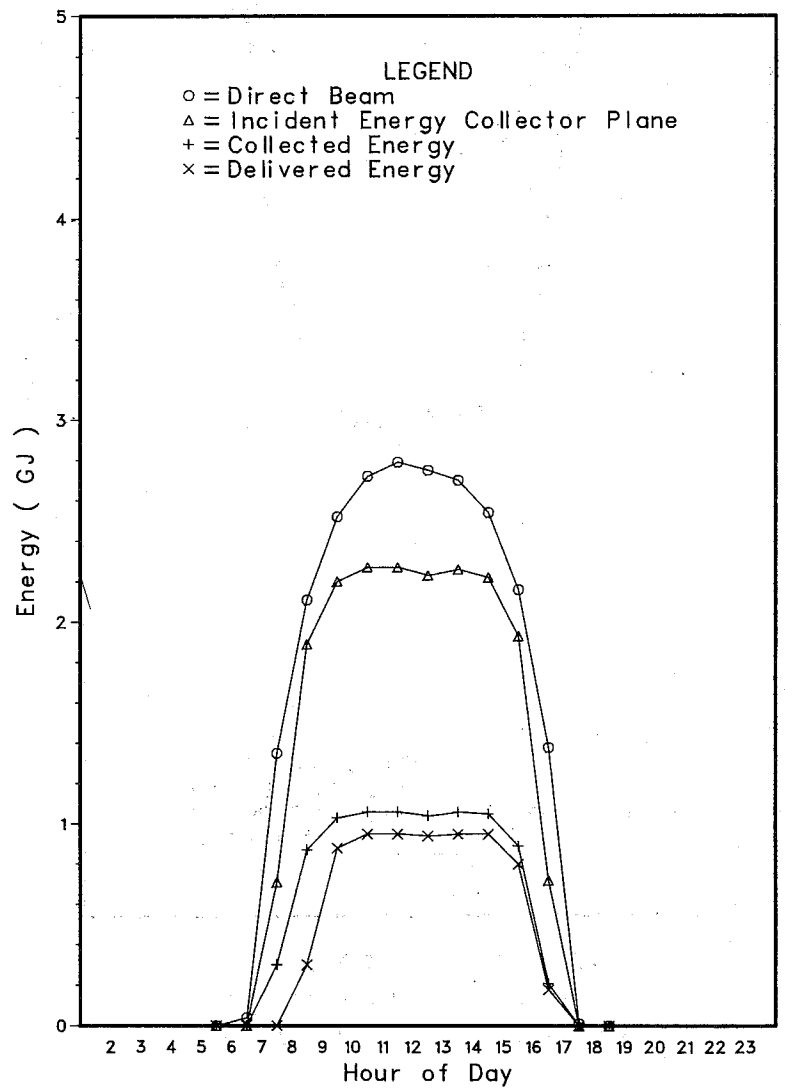

Clear Day Performance
Lone Star Brewery
21 MAY DAY(141)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

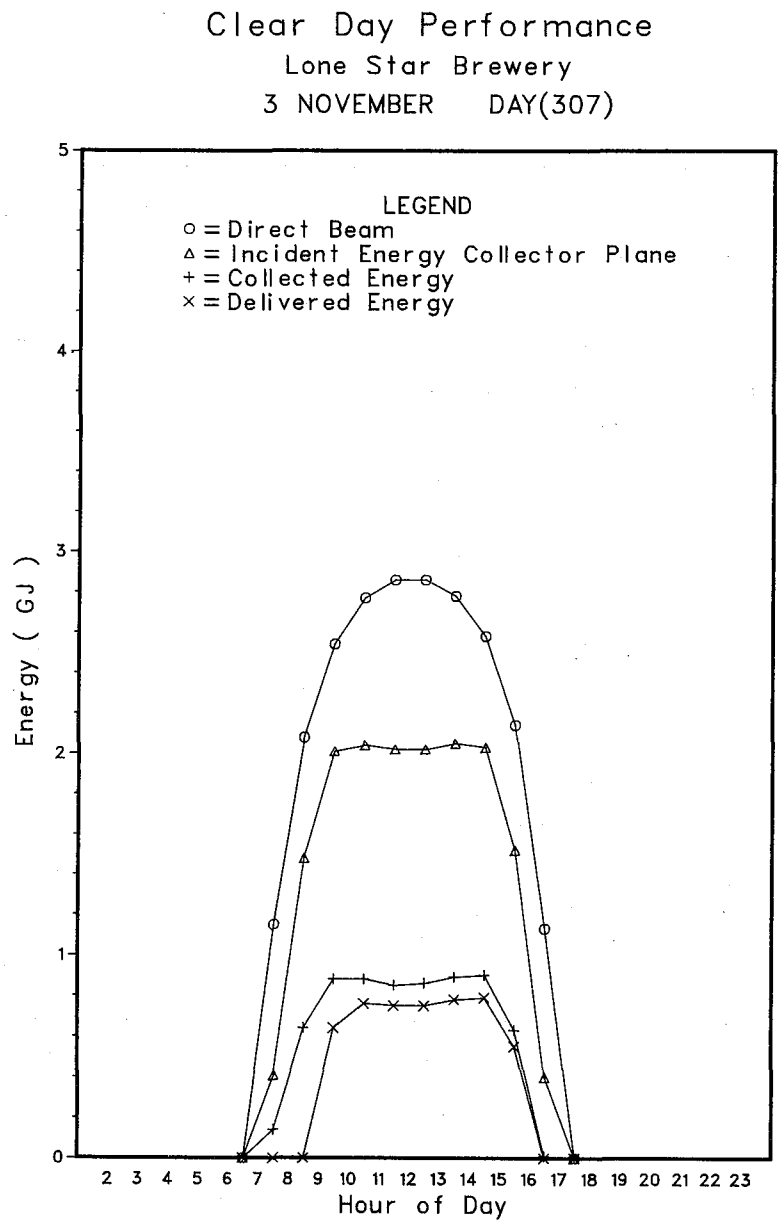

Clear Day Performance
Lone Star Brewery
11 JUNE DAY(162)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

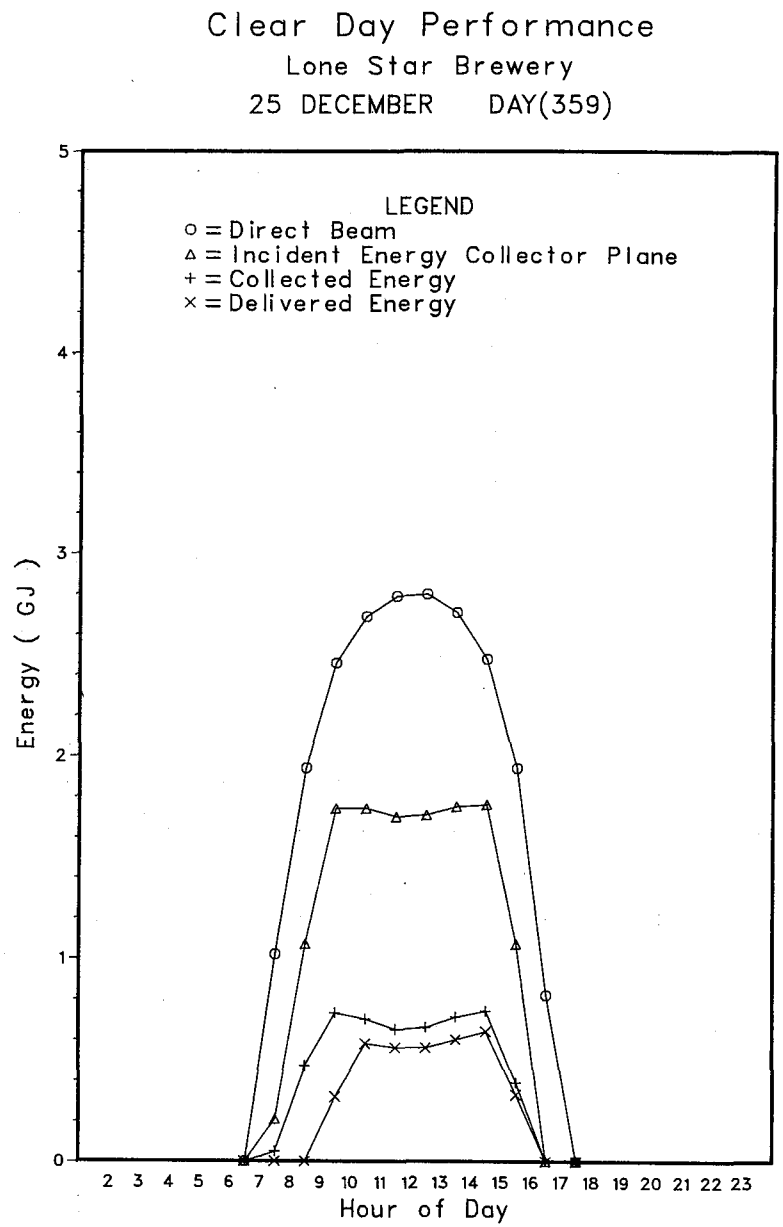

Clear Day Performance
Lone Star Brewery
22 JULY DAY(203)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Lone Star Brewery
3 AUGUST DAY(215)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Lone Star Brewery
18 SEPTEMBER DAY(261)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Lone Star Brewery
7 OCTOBER DAY(280)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Lone Star Brewery
3 NOVEMBER DAY(307)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day


Clear Day Performance
Lone Star Brewery
25 DECEMBER DAY(359)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

RUN ID: OR2
83/09/02.

ORE IDA FOODS

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	149.4	222.2	108.0	37.6	34.8	-.2	15.6	21.6	-.2	2.3
FEBRUARY	239.5	352.4	214.0	80.1	37.4	9.3	40.5	33.9	4.4	3.9
MARCH	380.0	419.1	311.7	130.5	41.9	35.5	58.9	38.9	11.4	4.9
APRIL	541.1	555.3	480.8	220.5	45.9	100.6	79.2	44.2	20.9	6.4
MAY	675.9	686.2	621.3	303.3	48.8	162.5	94.6	49.4	26.2	7.8
JUNE	730.4	763.2	708.1	352.8	49.8	198.2	105.4	52.4	28.0	8.8
JULY	794.1	898.4	832.2	425.6	51.1	264.7	114.0	50.2	31.8	9.1
AUGUST	671.6	793.1	725.4	351.7	48.5	200.7	105.9	48.6	27.7	8.7
SEPTEMBER	499.9	623.0	507.4	236.5	46.6	114.9	80.3	45.4	22.6	6.7
OCTOBER	343.1	520.9	353.5	144.2	40.8	42.4	60.3	45.0	12.0	5.4
NOVEMBER	176.8	264.5	146.4	53.3	36.4	2.9	26.6	27.2	2.0	3.0
DECEMBER	131.5	209.9	95.3	31.8	33.3	-.2	16.6	18.9	-.2	2.5
TOTALS/AVERAGES	5333.2	6308.2	5104.1	2368.0	46.4	1131.3	798.0	475.7	22.2	69.3

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	6.2	14.2	6.9	2.4	35.2	-.0	1.0	1.2	-.2	.2
2	1/ 2	5.0	8.6	3.8	1.4	37.5	-.0	.5	1.0	-.2	.1
3	1/ 3	6.6	16.3	8.0	2.7	33.5	-.0	1.1	1.3	-.2	.2
4	1/ 4	3.0	.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
5	1/ 5	3.0	.7	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
6	1/ 6	6.8	16.5	8.1	2.8	33.9	-.0	1.2	1.3	-.2	.2
7	1/ 7	6.7	16.1	8.0	2.6	33.2	-.0	1.2	1.4	-.2	.2
8	1/ 8	3.6	2.2	.6	.1	9.8	-.0	.1	.5	-.3	.0
9	1/ 9	6.6	15.3	7.6	2.7	35.7	-.0	1.0	1.2	-.2	.2
10	1/10	3.7	1.7	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
11	1/11	4.2	3.4	1.4	.3	25.0	-.0	.1	.4	-.3	.0
12	1/12	2.0	.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
13	1/13	5.8	11.0	5.6	2.2	39.9	-.0	.6	1.1	-.1	.1
14	1/14	4.1	4.1	1.8	.5	28.7	-.0	.3	.6	-.3	.1
15	1/15	2.7	.6	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
16	1/16	6.1	11.6	6.1	2.0	33.0	-.0	.7	1.0	-.2	.1
17	1/17	2.6	.5	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
18	1/18	7.6	17.8	9.1	3.3	36.2	-.0	1.3	1.5	-.1	.2
19	1/19	7.7	17.8	9.1	3.2	35.1	-.0	1.5	1.7	-.1	.2
20	1/20	3.5	.9	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
21	1/21	7.6	16.4	9.5	3.2	33.5	-.0	1.6	1.4	-.1	.2
22	1/22	8.0	18.0	9.3	3.4	36.0	-.0	1.5	1.7	-.1	.2
23	1/23	2.4	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
24	1/24	3.3	.9	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
25	1/25	6.5	11.3	6.7	2.3	34.3	-.0	1.1	1.1	-.2	.2
26	1/26	4.6	2.9	.7	.3	39.3	-.0	.1	.6	-.3	.0
27	1/27	4.0	1.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
28	1/28	3.1	.5	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
29	1/29	2.9	.5	0.0	0.0	0.0	0.0	0.0	-.0	0.0	0.0
30	1/30	2.9	.7	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
31	1/31	6.6	9.2	5.8	2.2	38.4	-.0	.7	1.0	-.1	.1
TOTALS/AVERAGES		149.4	222.2	108.0	37.6	34.8	-.2	15.6	21.6	-.2	2.3

RUN ID: OR2
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ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	9.0	18.2	11.1	3.9	34.9	.2	1.9	1.6	1.5	.2
33	2/ 2	7.0	9.4	5.0	2.1	42.4	-.0	.9	1.5	-.2	.1
34	2/ 3	9.2	18.2	11.1	3.8	34.2	.1	2.1	1.6	.5	.2
35	2/ 4	2.6	.2	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
36	2/ 5	9.7	19.1	11.6	4.1	35.3	.2	2.2	1.6	1.7	.2
37	2/ 6	9.9	19.5	11.9	4.2	35.1	.3	2.3	1.7	2.2	.2
38	2/ 7	10.3	20.6	12.6	4.6	36.2	.6	2.3	1.8	4.7	.2
39	2/ 8	10.5	20.8	12.8	4.7	36.5	.7	2.3	1.8	5.3	.2
40	2/ 9	7.2	7.4	3.9	1.5	37.9	-.0	.9	1.1	-.3	.2
41	2/10	7.7	9.9	5.9	2.2	36.9	-.0	1.1	1.0	-.2	.2
42	2/11	10.8	20.9	12.9	4.9	38.0	.8	2.2	1.7	6.4	.2
43	2/12	10.6	19.3	12.0	4.5	37.8	.7	2.3	1.7	6.0	.2
44	2/13	10.5	18.7	11.5	4.3	37.4	.4	2.2	1.8	3.6	.2
45	2/14	8.9	12.1	7.3	2.6	35.4	-.0	1.6	1.3	-.2	.2
46	2/15	7.7	7.9	4.0	1.7	42.0	-.0	.8	1.2	-.2	.1
47	2/16	11.5	20.7	13.6	5.2	38.3	1.0	2.4	1.6	7.3	.2
48	2/17	3.2	.2	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
49	2/18	11.0	18.2	11.6	4.6	39.6	.6	2.1	1.6	5.5	.2
50	2/19	3.6	.3	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
51	2/20	12.6	23.0	15.2	6.0	39.1	1.6	2.6	1.6	10.4	.2
52	2/21	12.4	22.2	14.7	5.7	38.9	1.4	2.6	1.8	9.8	.2
53	2/22	8.7	8.7	5.2	1.7	32.5	-.0	1.1	1.2	-.2	.2
54	2/23	11.8	18.6	12.2	5.1	41.5	.8	2.1	1.7	6.9	.2
55	2/24	6.9	2.4	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
56	2/25	4.7	.6	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
57	2/26	9.9	11.6	7.1	2.6	36.7	-.0	1.5	1.3	-.2	.2
58	2/27	5.2	.7	0.0	0.0	0.0	0.0	.1	.2	0.0	0.0
59	2/28	6.3	2.9	.5	.2	37.5	-.0	.2	.3	-.4	.0
TOTALS/AVERAGES		239.5	352.4	214.0	80.1	37.4	9.3	40.5	33.9	4.4	3.9

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ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	14.2	23.7	16.4	6.9	41.9	1.9	2.6	1.6	11.8	.2
61	3/ 2	10.4	12.2	8.1	3.0	37.1	-.0	1.7	1.7	-.1	.2
62	3/ 3	6.6	1.2	0.0	0.0	0.0	0.0	.1	.2	0.0	0.0
63	3/ 4	11.2	13.8	9.3	3.7	39.8	-.0	1.9	1.7	-.1	.2
64	3/ 5	14.2	22.5	17.1	6.6	38.8	2.0	3.1	1.6	11.7	.3
65	3/ 6	14.5	22.8	17.5	6.9	39.6	2.3	3.1	1.6	13.1	.3
66	3/ 7	7.8	2.4	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
67	3/ 8	15.5	24.1	18.6	7.6	41.0	2.8	3.1	1.5	15.2	.3
68	3/ 9	12.8	15.7	11.2	4.5	39.8	.6	2.4	1.7	5.1	.2
69	3/10	12.5	13.4	9.2	4.3	46.1	.6	1.9	1.8	6.3	.2
70	3/11	7.4	3.4	1.4	.7	47.4	-.0	.4	.9	-.3	.0
71	3/12	4.5	.3	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
72	3/13	6.9	2.9	2.2	.6	27.4	-.0	.3	.5	-.2	.0
73	3/14	7.2	1.7	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
74	3/15	14.3	17.9	14.0	5.7	40.4	.9	2.8	1.4	6.8	.3
75	3/16	10.9	9.8	6.6	2.7	41.1	-.0	1.3	1.8	-.1	.1
76	3/17	17.1	25.3	19.9	8.5	42.9	3.5	3.3	1.6	17.6	.3
77	3/18	17.8	26.3	20.7	9.0	43.3	3.9	3.4	1.8	18.9	.3
78	3/19	18.0	26.5	20.9	9.2	43.8	4.2	3.3	1.7	19.9	.3
79	3/20	17.5	25.2	19.9	8.8	44.2	3.9	3.3	1.7	19.7	.3
80	3/21	12.7	10.8	7.7	3.7	47.6	.5	1.5	1.8	5.9	.2
81	3/22	5.1	.3	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
82	3/23	6.5	.8	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
83	3/24	14.7	15.8	12.5	4.8	38.3	.2	3.0	1.4	1.8	.3
84	3/25	8.7	1.7	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
85	3/26	14.5	14.4	11.2	5.4	48.1	1.5	2.2	1.6	13.0	.2
86	3/27	13.0	11.5	8.2	3.4	41.4	.2	1.8	1.7	2.3	.2
87	3/28	16.2	19.6	16.2	6.4	39.2	1.3	3.3	1.6	8.1	.3
88	3/29	16.3	19.2	15.9	6.3	39.9	1.5	3.2	1.6	9.5	.3
89	3/30	12.9	9.2	6.5	3.0	46.8	-.0	1.5	1.8	-.2	.2
90	3/31	18.3	24.6	20.4	8.9	43.6	3.8	3.5	1.6	18.4	.3
TOTALS/AVERAGES		380.0	419.1	311.7	130.5	41.9	35.5	58.9	38.9	11.4	4.9

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	11.9	6.3	4.5	1.9	41.9	-.0	1.1	1.2	-.2	.1
92	4/ 2	20.8	28.0	23.5	10.9	46.3	5.6	3.4	1.6	24.0	.3
93	4/ 3	19.7	24.5	20.8	9.5	45.7	4.7	3.5	1.6	22.4	.3
94	4/ 4	13.6	10.9	8.1	3.6	44.6	.5	1.4	1.7	6.6	.1
95	4/ 5	9.7	2.0	0.0	0.0	0.0	0.0	.1	.4	0.0	0.0
96	4/ 6	10.9	4.7	3.0	1.2	41.6	-.0	.7	.8	-.3	.1
97	4/ 7	14.6	10.0	7.4	3.4	46.0	-.0	1.8	1.5	-.2	.2
98	4/ 8	17.5	18.0	14.5	6.8	46.7	2.3	2.8	1.7	15.6	.2
99	4/ 9	20.2	24.2	20.8	9.8	46.9	4.9	3.5	1.6	23.4	.3
100	4/10	14.3	10.3	8.3	3.9	47.1	.7	1.7	1.6	8.3	.2
101	4/11	13.2	7.2	4.9	2.5	51.8	-.0	1.0	1.7	-.2	.1
102	4/12	9.5	1.8	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
103	4/13	19.2	22.7	20.7	8.5	41.1	3.1	3.9	1.3	14.9	.3
104	4/14	18.8	20.8	18.3	8.0	43.9	3.0	3.3	1.8	16.2	.3
105	4/15	22.7	28.9	26.2	12.2	46.6	6.9	3.9	1.5	26.5	.3
106	4/16	13.6	12.3	10.2	5.0	49.3	1.7	1.6	1.8	16.6	.1
107	4/17	20.5	24.3	22.1	9.4	42.5	4.0	4.0	1.6	18.0	.3
108	4/18	19.6	21.7	19.8	8.1	41.1	2.8	3.9	1.6	14.0	.3
109	4/19	24.0	30.6	28.0	13.1	46.7	7.4	4.0	1.7	26.6	.3
110	4/20	20.2	22.6	20.6	8.8	42.6	3.5	3.8	1.6	16.9	.3
111	4/21	12.4	5.4	3.1	1.1	34.7	-.0	.6	1.0	-.2	.1
112	4/22	24.2	30.4	27.8	13.2	47.4	7.4	4.0	1.6	26.5	.3
113	4/23	24.4	30.5	27.9	13.4	47.8	7.9	3.9	1.6	28.3	.3
114	4/24	13.1	7.2	5.3	2.0	37.4	-.0	.9	1.4	-.1	.1
115	4/25	17.9	14.6	11.8	5.4	46.1	.9	2.7	1.7	7.9	.2
116	4/26	25.0	31.5	28.8	13.8	47.8	8.1	4.1	1.7	28.1	.3
117	4/27	25.2	31.5	28.9	14.0	48.3	8.4	3.9	1.6	29.3	.3
118	4/28	24.8	30.9	28.3	13.7	48.5	8.3	3.9	1.7	29.4	.3
119	4/29	13.8	9.7	8.1	3.4	42.1	.3	1.5	1.7	4.2	.1
120	4/30	25.5	31.8	29.1	14.0	48.1	8.2	4.1	1.7	28.1	.3
TOTALS/AVERAGES		541.1	555.3	480.8	220.5	45.9	100.6	79.2	44.2	20.9	6.4

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	18.7	16.9	14.2	6.7	47.3	2.9	2.2	1.9	20.4	.2
122	5/ 2	25.9	31.7	28.9	14.1	48.7	8.5	4.0	1.5	29.2	.3
123	5/ 3	26.0	31.9	29.0	14.3	49.1	8.8	3.9	1.6	30.2	.3
124	5/ 4	17.4	14.0	12.3	5.9	47.8	2.1	2.3	1.8	17.1	.2
125	5/ 5	13.7	9.8	8.2	3.5	42.2	.4	1.4	1.6	4.6	.1
126	5/ 6	19.3	18.2	16.8	6.9	41.1	1.7	3.6	1.7	9.9	.3
127	5/ 7	23.9	28.2	25.8	12.4	48.0	6.8	4.0	1.7	26.4	.3
128	5/ 8	26.4	32.0	29.1	14.4	49.6	8.9	4.0	1.6	30.6	.3
129	5/ 9	24.9	27.8	25.6	12.8	50.1	7.6	3.8	1.6	29.7	.3
130	5/10	18.8	14.3	12.2	5.9	47.9	1.6	2.8	1.7	12.8	.2
131	5/11	20.1	17.3	15.5	7.6	48.8	3.0	2.9	1.6	19.7	.3
132	5/12	14.3	8.8	6.7	2.8	42.2	-.0	1.3	1.6	-.1	.1
133	5/13	12.9	8.0	6.3	2.6	41.5	-.0	1.1	1.7	-.1	.1
134	5/14	14.2	4.9	2.0	1.0	48.9	-.0	.5	1.1	-.3	.1
135	5/15	23.0	23.7	21.5	11.0	51.0	5.9	3.2	1.4	27.3	.3
136	5/16	27.3	32.7	30.3	14.9	49.3	9.2	4.1	1.6	30.4	.3
137	5/17	27.4	32.9	30.5	15.1	49.6	9.6	4.0	1.6	31.4	.3
138	5/18	27.5	32.9	30.6	15.2	49.9	9.7	4.0	1.6	31.8	.3
139	5/19	16.1	8.3	6.6	2.8	42.0	-.0	1.7	1.5	-.2	.2
140	5/20	19.6	17.9	15.6	7.5	48.2	3.1	2.3	1.9	19.8	.2
141	5/21	21.5	19.7	17.6	8.9	50.5	4.6	2.8	1.7	25.9	.2
142	5/22	27.0	32.1	29.9	14.8	49.4	9.0	4.2	1.7	30.2	.3
143	5/23	25.8	28.0	26.5	13.0	49.2	7.6	4.1	1.5	28.8	.3
144	5/24	24.6	26.3	24.3	12.3	50.7	7.0	3.7	1.6	28.7	.3
145	5/25	15.4	9.4	8.0	3.6	44.9	.4	1.7	1.6	5.6	.2
146	5/26	11.1	4.0	2.7	1.1	41.6	-.0	.6	1.0	-.2	.1
147	5/27	26.7	30.5	28.6	14.4	50.2	8.6	4.0	1.5	30.0	.3
148	5/28	26.4	31.1	29.0	14.5	50.0	9.0	4.0	1.6	31.1	.3
149	5/29	26.6	31.3	29.2	14.6	50.0	9.1	4.0	1.6	31.0	.3
150	5/30	27.5	31.8	29.7	15.0	50.4	9.3	4.1	1.7	31.4	.3
151	5/31	26.0	30.0	28.0	13.8	49.3	8.2	4.0	1.6	29.4	.3
TOTALS/AVERAGES		675.9	686.2	621.3	303.3	48.8	162.5	94.6	49.4	26.2	7.8

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	28.2	32.8	30.7	15.7	50.9	10.2	4.0	1.6	33.2	.3
153	6/ 2	26.9	31.1	29.2	14.7	50.2	9.3	4.0	1.6	31.7	.3
154	6/ 3	24.1	25.4	23.7	11.5	48.3	6.2	3.9	1.5	26.1	.3
155	6/ 4	27.4	30.0	28.7	15.1	52.7	9.9	3.6	1.7	34.5	.3
156	6/ 5	26.3	29.7	27.8	14.0	50.4	8.7	3.9	1.5	31.4	.3
157	6/ 6	25.2	27.6	25.8	12.5	48.5	7.0	4.0	1.6	27.2	.3
158	6/ 7	27.4	29.7	28.4	14.6	51.2	9.2	4.0	1.6	32.2	.3
159	6/ 8	14.8	10.0	6.8	3.0	43.9	-.0	1.0	2.2	-.1	.1
160	6/ 9	16.3	10.7	9.0	3.6	40.1	-.0	1.7	2.1	-.2	.2
161	6/10	28.4	32.8	30.8	15.7	51.1	9.9	4.0	1.6	32.3	.3
162	6/11	21.1	19.2	17.7	8.1	45.8	3.0	3.2	2.1	17.1	.3
163	6/12	21.7	19.9	18.6	8.7	47.0	3.4	3.7	1.6	18.6	.3
164	6/13	23.2	22.5	21.4	10.6	49.4	5.4	3.6	1.9	25.0	.3
165	6/14	21.7	20.4	18.9	8.8	46.6	3.1	3.6	2.1	16.3	.3
166	6/15	16.9	13.6	12.1	5.1	41.9	.1	2.3	2.8	1.0	.2
167	6/16	27.8	32.1	30.1	15.3	50.7	9.4	4.1	1.6	31.3	.3
168	6/17	28.4	32.7	30.7	15.7	51.1	10.0	4.1	1.6	32.7	.3
169	6/18	25.9	29.3	27.5	13.8	50.2	8.4	3.9	1.6	30.5	.3
170	6/19	19.9	17.0	14.8	6.8	46.2	2.5	2.9	1.9	16.7	.3
171	6/20	20.6	18.1	16.1	7.6	46.9	2.7	2.9	1.8	17.0	.3
172	6/21	25.8	27.2	25.3	13.0	51.5	7.7	3.8	1.7	30.5	.3
173	6/22	28.4	32.7	30.7	15.7	51.0	9.9	4.1	1.6	32.3	.3
174	6/23	28.2	32.5	30.5	15.7	51.3	10.1	4.0	1.6	33.2	.3
175	6/24	25.6	28.8	27.1	13.4	49.5	7.9	4.0	1.6	29.3	.3
176	6/25	24.1	24.1	22.1	11.3	51.1	6.4	3.3	1.7	29.1	.3
177	6/26	17.6	12.3	10.6	4.7	44.5	.8	2.2	2.0	7.3	.2
178	6/27	27.6	31.0	28.7	15.0	52.4	9.5	3.8	1.5	33.1	.3
179	6/28	28.2	32.5	30.6	15.7	51.4	10.2	4.0	1.6	33.3	.3
180	6/29	28.1	32.3	30.5	15.7	51.4	10.2	4.0	1.6	33.4	.3
181	6/30	24.7	25.2	23.3	12.0	51.5	7.0	3.7	1.5	30.2	.3
TOTALS/AVERAGES		730.4	763.2	708.1	352.8	49.8	198.2	105.4	52.4	28.0	8.8

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	28.1	32.6	30.6	15.7	51.4	10.2	4.0	1.6	33.2	.3
183	7/ 2	27.8	32.3	30.3	15.5	51.1	9.9	4.1	1.6	32.7	.3
184	7/ 3	28.0	32.5	30.6	15.7	51.2	10.1	4.0	1.6	33.2	.3
185	7/ 4	28.0	32.5	30.5	15.7	51.4	10.3	4.0	1.5	33.6	.3
186	7/ 5	22.6	21.5	18.9	9.6	50.7	5.1	3.1	1.7	26.8	.3
187	7/ 6	26.6	30.4	28.3	14.8	52.2	9.5	3.7	1.5	33.7	.3
188	7/ 7	27.8	32.4	29.9	15.6	52.1	10.3	3.8	1.6	34.3	.3
189	7/ 8	25.0	26.7	24.8	12.7	51.2	7.7	3.8	1.5	31.1	.3
190	7/ 9	17.8	15.7	13.1	5.7	43.8	.8	2.3	2.6	6.3	.2
191	7/10	27.5	32.0	29.7	15.4	51.8	9.9	3.9	1.6	33.3	.3
192	7/11	26.2	29.5	27.5	14.2	51.8	8.9	3.8	1.6	32.5	.3
193	7/12	27.5	32.1	29.8	15.5	52.0	10.2	3.8	1.6	34.2	.3
194	7/13	27.4	32.0	29.7	15.5	52.0	10.2	3.8	1.6	34.2	.3
195	7/14	27.4	32.0	29.7	15.3	51.7	10.0	3.9	1.6	33.6	.3
196	7/15	27.3	31.9	29.6	15.3	51.7	10.0	3.9	1.6	33.6	.3
197	7/16	27.2	31.8	29.6	15.3	51.7	9.9	3.8	1.6	33.6	.3
198	7/17	27.0	31.6	29.4	15.2	51.6	9.9	3.8	1.6	33.6	.3
199	7/18	26.8	31.4	29.2	15.1	51.7	9.8	3.8	1.6	33.5	.3
200	7/19	26.9	31.4	29.2	14.9	51.1	9.5	4.0	1.7	32.4	.3
201	7/20	24.7	29.0	27.0	13.5	49.9	8.0	4.0	1.6	29.4	.3
202	7/21	24.3	26.1	23.8	12.3	51.8	7.2	3.6	1.7	30.4	.3
203	7/22	26.7	31.3	29.2	14.9	51.0	9.4	3.9	1.6	32.2	.3
204	7/23	25.4	29.3	27.4	14.0	51.2	8.8	3.7	1.6	32.1	.3
205	7/24	26.3	31.0	28.9	14.8	51.2	9.6	3.8	1.6	33.0	.3
206	7/25	26.3	31.0	28.9	14.8	51.2	9.5	3.8	1.6	32.9	.3
207	7/26	25.4	30.0	28.1	14.3	50.8	9.0	3.8	1.6	32.1	.3
208	7/27	26.1	30.8	28.8	14.7	51.0	9.4	3.8	1.6	32.7	.3
209	7/28	25.9	30.3	28.3	14.5	51.1	9.3	3.7	1.5	32.8	.3
210	7/29	19.9	19.0	17.1	8.2	47.8	3.5	3.2	1.6	20.5	.3
211	7/30	14.8	8.8	6.3	2.9	45.8	.0	1.6	1.6	.0	.2
212	7/31	25.3	29.6	27.8	14.1	50.9	8.9	3.7	1.4	32.0	.3
TOTALS/AVERAGES		794.1	898.4	832.2	425.6	51.1	264.7	114.0	50.2	31.8	9.1

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	17.4	15.7	14.3	6.3	43.8	1.7	2.6	2.1	11.9	.3
214	8/ 2	15.8	12.7	10.9	5.1	47.4	2.0	1.7	1.6	18.0	.2
215	8/ 3	25.2	30.1	28.2	14.2	50.4	9.0	3.8	1.6	31.9	.3
216	8/ 4	25.2	30.0	28.1	14.2	50.5	9.0	3.7	1.6	32.1	.3
217	8/ 5	23.7	27.0	25.3	12.8	50.7	7.9	3.6	1.5	31.0	.3
218	8/ 6	10.2	5.2	4.6	1.8	40.0	-.0	1.0	1.2	-.2	.1
219	8/ 7	22.0	25.1	23.4	11.2	48.0	5.9	3.6	1.5	25.3	.3
220	8/ 8	24.2	29.0	27.2	13.4	49.3	8.0	3.8	1.6	29.6	.3
221	8/ 9	24.5	29.4	27.5	13.6	49.5	8.3	3.8	1.6	30.1	.3
222	8/10	24.3	29.1	27.3	13.5	49.6	8.3	3.8	1.6	30.3	.3
223	8/11	24.2	29.2	27.3	13.5	49.5	8.3	3.8	1.6	30.3	.3
224	8/12	23.0	27.7	25.9	12.7	49.0	7.5	3.7	1.6	29.0	.3
225	8/13	19.9	22.1	19.9	9.5	48.0	4.6	3.4	1.7	23.0	.3
226	8/14	23.5	28.4	26.4	12.9	48.7	7.6	3.9	1.5	28.9	.3
227	8/15	23.5	28.6	26.6	13.0	49.0	7.8	3.7	1.6	29.3	.3
228	8/16	23.4	28.7	26.6	13.0	48.9	7.9	3.7	1.6	29.5	.3
229	8/17	23.3	28.6	26.5	13.0	48.8	7.8	3.7	1.6	29.5	.3
230	8/18	22.9	28.3	26.1	12.7	48.7	7.7	3.7	1.5	29.3	.3
231	8/19	19.0	21.5	19.9	8.6	43.4	3.6	3.7	1.5	17.9	.3
232	8/20	22.3	27.7	25.5	12.2	47.7	6.9	3.8	1.5	27.1	.3
233	8/21	22.4	27.7	25.4	12.2	48.1	7.1	3.7	1.5	28.1	.3
234	8/22	16.2	14.2	11.2	5.6	49.4	1.6	2.4	1.7	14.1	.2
235	8/23	21.9	27.3	25.0	12.0	47.9	7.0	3.6	1.4	28.0	.3
236	8/24	21.0	25.9	23.6	11.2	47.3	6.2	3.6	1.5	26.4	.3
237	8/25	22.2	27.9	25.4	12.2	48.0	7.2	3.6	1.5	28.5	.3
238	8/26	22.1	28.0	25.4	12.2	47.8	7.2	3.6	1.5	28.4	.3
239	8/27	21.6	27.4	24.9	11.8	47.6	7.0	3.5	1.5	27.9	.3
240	8/28	21.9	27.8	25.1	12.0	47.5	7.0	3.5	1.5	28.0	.3
241	8/29	21.7	27.7	24.0	11.8	49.2	6.9	3.3	1.7	28.7	.3
242	8/30	21.6	27.6	23.9	11.7	49.1	6.9	3.3	1.6	28.9	.3
243	8/31	21.4	27.5	23.7	11.6	48.9	6.8	3.3	1.6	28.6	.3
TOTALS/AVERAGES		671.6	793.1	725.4	351.7	48.5	200.7	105.9	48.6	27.7	8.7

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	21.2	27.7	23.9	11.7	48.9	6.9	3.3	1.6	28.8	.3
245	9/ 2	21.1	27.6	23.7	11.6	48.7	6.8	3.3	1.6	28.5	.3
246	9/ 3	20.9	27.5	23.6	11.3	47.8	6.3	3.5	1.7	26.8	.3
247	9/ 4	20.7	27.4	23.4	11.2	47.8	6.2	3.4	1.7	26.5	.3
248	9/ 5	20.6	27.2	23.3	11.1	47.6	6.1	3.4	1.7	26.2	.3
249	9/ 6	20.4	27.1	23.1	11.0	47.7	6.1	3.3	1.7	26.6	.3
250	9/ 7	19.6	26.1	22.2	10.5	47.4	5.7	3.3	1.6	25.9	.3
251	9/ 8	18.7	24.3	20.3	9.8	48.6	5.3	3.0	1.6	26.1	.3
252	9/ 9	16.6	18.2	14.3	7.3	50.9	3.4	2.3	1.7	23.9	.2
253	9/10	13.9	11.9	9.0	4.4	49.0	1.0	1.9	1.6	10.9	.2
254	9/11	18.2	23.2	19.4	9.3	47.9	4.7	3.0	1.6	24.5	.3
255	9/12	19.2	25.6	21.1	10.1	47.8	5.4	3.2	1.6	25.7	.3
256	9/13	18.9	25.7	21.1	10.0	47.3	5.3	3.2	1.7	25.2	.3
257	9/14	19.0	25.9	21.3	9.9	46.6	5.0	3.3	1.7	23.7	.3
258	9/15	18.5	24.9	20.5	9.5	46.5	4.8	3.2	1.7	23.1	.3
259	9/16	15.2	17.0	12.8	5.8	45.7	1.8	2.5	1.8	14.1	.2
260	9/17	17.4	23.8	19.5	9.0	45.8	4.3	3.1	1.6	22.0	.3
261	9/18	11.8	9.3	7.0	3.4	49.2	.6	1.3	1.7	8.6	.1
262	9/19	12.2	9.8	7.1	3.0	41.9	-.0	1.9	1.4	-.2	.2
263	9/20	15.0	18.8	15.4	6.5	42.3	1.9	3.0	1.6	12.4	.3
264	9/21	17.5	24.5	20.0	9.0	45.0	4.2	3.2	1.7	21.2	.3
265	9/22	17.0	23.8	19.2	8.6	45.0	4.0	3.1	1.6	20.9	.3
266	9/23	7.9	1.4	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
267	9/24	16.6	23.0	18.5	8.3	45.0	3.7	3.0	1.5	19.8	.3
268	9/25	17.0	24.6	19.9	8.8	44.4	4.2	3.1	1.6	21.2	.3
269	9/26	15.7	22.6	18.1	7.9	43.6	3.4	3.0	1.6	18.8	.3
270	9/27	16.2	23.7	18.9	8.3	44.1	3.9	3.0	1.6	20.4	.3
271	9/28	16.1	23.8	18.9	8.2	43.5	3.7	3.0	1.6	19.6	.3
272	9/29	7.9	2.6	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
273	9/30	8.6	4.2	1.7	.8	44.2	-.0	.4	.7	-.3	.1
TOTALS/AVERAGES		499.9	623.0	507.4	236.5	46.6	114.9	80.3	45.4	22.6	6.7

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	15.9	24.5	19.3	8.3	43.3	3.5	2.9	1.4	18.4	.3
275	10/ 2	15.7	24.5	19.2	8.2	42.5	3.6	3.0	1.6	19.0	.3
276	10/ 3	15.5	24.4	19.0	8.1	42.3	3.6	3.0	1.6	18.8	.3
277	10/ 4	15.1	24.1	18.7	7.8	42.0	3.4	3.0	1.6	18.3	.3
278	10/ 5	15.1	24.2	18.7	7.8	41.8	3.4	2.9	1.6	18.3	.3
279	10/ 6	6.7	2.2	.6	.1	14.6	-.0	.2	.6	-.3	.0
280	10/ 7	11.1	15.3	10.8	4.7	43.7	.9	1.8	1.6	8.0	.2
281	10/ 8	13.6	21.2	14.4	6.4	44.2	2.1	2.6	1.8	14.9	.2
282	10/ 9	13.0	19.4	13.8	6.1	44.2	2.0	2.4	1.8	14.4	.2
283	10/10	7.0	3.0	1.1	.6	50.5	-.0	.3	.9	-.2	.0
284	10/11	4.6	1.1	.5	.2	48.2	-.0	.2	.4	-.4	.0
285	10/12	7.5	5.2	2.5	1.0	40.5	-.0	.3	.7	-.1	.0
286	10/13	13.1	20.9	14.5	6.1	42.2	1.7	2.5	1.6	11.9	.2
287	10/14	13.6	23.5	16.1	6.6	41.0	2.2	2.7	1.8	13.6	.2
288	10/15	12.8	22.1	14.9	6.0	40.3	1.7	2.6	1.7	11.7	.2
289	10/16	13.2	23.3	15.8	6.4	40.6	2.2	2.6	1.7	13.6	.2
290	10/17	13.0	23.1	15.6	6.3	40.2	2.0	2.6	1.8	13.1	.2
291	10/18	12.9	23.0	15.4	6.2	40.0	2.0	2.6	1.7	12.9	.2
292	10/19	12.2	21.3	14.4	5.7	39.7	1.7	2.4	1.7	11.7	.2
293	10/20	11.4	19.5	13.0	4.8	36.8	.7	2.5	1.7	5.3	.2
294	10/21	9.9	13.9	8.1	3.4	42.0	.2	1.5	1.9	2.4	.2
295	10/22	11.0	18.8	12.1	5.1	41.6	1.3	2.1	1.6	11.1	.2
296	10/23	9.8	16.1	10.7	3.7	34.5	.0	2.1	1.6	.2	.2
297	10/24	11.1	20.0	12.5	4.9	38.9	1.0	2.3	1.8	7.7	.2
298	10/25	11.5	21.3	14.0	5.4	38.3	1.4	2.4	1.7	9.7	.2
299	10/26	6.4	6.0	2.7	1.1	40.1	-.0	.4	1.2	-.1	.0
300	10/27	9.5	15.3	9.2	3.6	39.4	.1	1.6	1.7	.7	.2
301	10/28	4.5	.9	0.0	0.0	0.0	0.0	.1	.2	0.0	0.0
302	10/29	10.9	21.0	13.1	5.0	37.8	.9	2.3	1.6	6.7	.2
303	10/30	10.5	20.0	12.6	4.7	37.5	.8	2.3	1.7	6.3	.2
304	10/31	5.0	1.7	.3	.1	32.6	-.0	.2	.6	-.6	.0
TOTALS/AVERAGES		343.1	520.9	353.5	144.2	40.8	42.4	60.3	45.0	12.0	5.4

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	10.2	19.5	12.1	4.6	38.2	.6	2.0	1.5	4.9	.2
306	11/ 2	10.3	20.6	12.7	4.7	36.8	.8	2.2	1.7	6.5	.2
307	11/ 3	10.0	19.9	12.3	4.5	36.3	.7	2.2	1.7	5.4	.2
308	11/ 4	9.7	19.0	11.6	4.2	35.9	.5	2.2	1.6	4.2	.2
309	11/ 5	3.7	2.4	1.6	.4	25.9	-.0	.3	.8	-.2	.0
310	11/ 6	9.4	18.7	11.4	4.1	35.8	.1	2.0	1.5	1.2	.2
311	11/ 7	9.4	18.9	11.5	4.0	34.7	.3	2.2	1.6	2.5	.2
312	11/ 8	4.3	1.1	0.0	0.0	0.0	0.0	.1	.3	0.0	0.0
313	11/ 9	3.9	2.4	1.0	.5	47.5	-.0	.2	.5	-.2	.0
314	11/10	7.7	14.5	9.1	3.2	35.0	-.0	1.6	1.4	-.2	.2
315	11/11	4.6	3.5	1.7	.8	43.5	-.0	.4	.8	-.2	.0
316	11/12	4.0	1.0	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
317	11/13	7.3	12.5	6.4	2.6	40.5	-.0	1.1	1.3	-.1	.1
318	11/14	4.7	4.1	2.3	.7	27.8	-.0	.4	.8	-.2	.0
319	11/15	5.8	7.4	3.0	1.2	40.2	-.0	.5	.8	-.3	.1
320	11/16	6.6	11.7	7.1	2.5	35.8	-.0	1.1	1.3	-.1	.1
321	11/17	3.7	1.0	0.0	0.0	0.0	0.0	.1	.2	0.0	0.0
322	11/18	5.2	6.8	4.3	1.5	34.4	-.0	.6	.9	-.1	.1
323	11/19	3.2	.7	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
324	11/20	3.5	.9	0.0	0.0	0.0	0.0	.1	-.0	0.0	0.0
325	11/21	6.7	13.1	6.9	2.6	38.2	-.0	1.0	1.4	-.2	.2
326	11/22	4.1	4.9	3.2	1.0	30.6	-.0	.6	.8	-.2	.1
327	11/23	6.4	12.3	6.1	2.3	38.2	-.0	1.0	1.2	-.2	.2
328	11/24	7.4	16.8	8.6	3.0	35.1	-.0	1.5	1.5	-.2	.2
329	11/25	5.6	9.1	4.4	1.4	32.7	-.0	.9	.9	-.3	.2
330	11/26	2.4	.4	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
331	11/27	3.1	2.1	.6	.3	49.1	-.0	.2	.4	-.3	.0
332	11/28	3.0	.7	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
333	11/29	6.1	12.0	5.7	2.2	38.0	-.0	.9	1.1	-.2	.1
334	11/30	4.9	6.5	2.7	1.2	42.2	-.0	.5	.9	-.2	.1
TOTALS/AVERAGES		176.8	264.5	146.4	53.3	36.4	2.9	26.6	27.2	2.0	3.0

RUN ID: OR2
83/09/02.

ORE IDA FOODS

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	4.9	8.2	4.8	1.6	32.8	-.0	.8	1.0	-.2	.1
336	12/ 2	2.4	.5	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
337	12/ 3	2.4	.4	0.0	0.0	0.0	0.0	.1	.0	0.0	0.0
338	12/ 4	4.2	6.4	2.5	.9	37.2	-.0	.4	.6	-.2	.1
339	12/ 5	2.2	.5	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
340	12/ 6	2.3	.4	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
341	12/ 7	3.8	4.2	2.1	.9	44.3	-.0	.3	.6	-.3	.1
342	12/ 8	3.1	.9	0.0	0.0	0.0	0.0	.1	.0	0.0	0.0
343	12/ 9	4.6	7.7	3.5	1.2	33.6	-.0	.5	.7	-.2	.1
344	12/10	5.3	11.3	5.5	2.0	36.4	-.0	.8	1.1	-.2	.1
345	12/11	4.1	5.5	2.1	.7	33.2	-.0	.4	.7	-.3	.1
346	12/12	3.5	2.9	1.6	.3	20.8	-.0	.2	.3	-.2	.0
347	12/13	4.5	7.1	2.8	1.1	37.8	-.0	.4	.6	-.3	.1
348	12/14	3.2	1.5	.4	.1	33.9	-.0	.2	.2	-.5	.0
349	12/15	4.0	4.2	1.8	.7	36.8	-.0	.3	.4	-.3	.1
350	12/16	3.9	3.8	1.1	.3	27.1	-.0	.2	.3	-.3	.0
351	12/17	2.9	.6	0.0	0.0	0.0	0.0	.1	.0	0.0	0.0
352	12/18	2.9	.6	0.0	0.0	0.0	0.0	.1	-.0	0.0	0.0
353	12/19	2.0	.3	0.0	0.0	0.0	0.0	.1	-.1	0.0	0.0
354	12/20	5.0	9.4	3.8	1.3	34.6	-.0	.5	.7	-.2	.1
355	12/21	6.2	15.3	7.3	2.4	32.8	-.0	1.1	1.2	-.2	.2
356	12/22	6.4	15.9	7.6	2.5	32.3	-.0	1.2	1.3	-.2	.2
357	12/23	6.3	15.6	7.5	2.4	32.3	-.0	1.2	1.3	-.2	.2
358	12/24	6.1	14.7	7.1	2.3	32.5	-.0	1.2	1.3	-.2	.2
359	12/25	5.2	10.1	4.2	1.4	32.7	-.0	.7	1.0	-.2	.1
360	12/26	2.1	.3	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
361	12/27	6.2	15.0	7.1	2.4	33.1	-.0	1.1	1.1	-.2	.2
362	12/28	3.0	.8	0.0	0.0	0.0	0.0	.1	.1	0.0	0.0
363	12/29	6.5	16.1	7.8	2.6	33.1	-.0	1.2	1.2	-.2	.2
364	12/30	6.5	16.1	7.8	2.6	32.6	-.0	1.3	1.4	-.2	.2
365	12/31	6.0	13.6	6.7	2.2	32.3	-.0	1.2	1.2	-.2	.2
TOTALS/AVERAGES		131.5	209.9	95.3	31.8	33.3	-.2	16.6	18.9	-.2	2.5

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

22 JANUARY (DAY 22)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-5.6	0.00	0.00	0.00	-5.3	-5.3	0.00	0.0	0.00	.05	0.00
2	-6.7	0.00	0.00	0.00	-6.3	-6.3	0.00	0.0	0.00	.04	0.00
3	-6.7	0.00	0.00	0.00	-6.6	-6.6	0.00	0.0	0.00	.03	0.00
4	-5.6	0.00	0.00	0.00	-5.9	-5.9	0.00	0.0	0.00	.02	0.00
5	-5.6	0.00	0.00	0.00	-5.7	-5.7	0.00	0.0	0.00	.02	0.00
6	-6.7	0.00	0.00	0.00	-6.4	-6.4	0.00	0.0	0.00	.02	0.00
7	-7.8	0.00	0.00	0.00	-7.3	-7.3	0.00	0.0	0.00	.02	0.00
8	-7.8	0.00	0.00	0.00	-7.7	-7.7	0.00	0.0	0.00	.01	0.00
9	-6.7	1.47	.93	2.92	39.8	43.7	.18	19.9	0.00	.09	.03
10	-3.3	2.31	1.19	2.92	61.4	72.3	.52	43.6	0.00	.13	.03
11	-1.7	2.57	1.13	2.92	80.7	89.2	.41	36.2	0.00	.17	.03
12	-.6	2.75	1.22	2.92	97.1	106.1	.43	35.4	0.00	.21	.03
13	0.0	2.72	1.43	2.92	119.1	131.2	.58	40.4	0.00	.25	.03
14	.6	2.59	1.68	2.92	149.4	165.4	.76	45.5	0.00	.32	.03
15	1.7	2.28	1.76	2.92	163.9	173.8	.48	27.1	0.00	.34	.03
16	1.7	1.28	0.00	0.00	53.6	53.6	0.00	0.0	0.00	.45	0.00
17	.6	0.00	0.00	0.00	17.6	17.6	0.00	0.0	0.00	.28	0.00
18	-1.1	0.00	0.00	0.00	4.9	4.9	0.00	0.0	0.00	.21	0.00
19	-1.7	0.00	0.00	0.00	.4	.4	0.00	0.0	0.00	.16	0.00
20	-2.2	0.00	0.00	0.00	-1.4	-1.4	0.00	0.0	0.00	.12	0.00
21	-3.3	0.00	0.00	0.00	-2.7	-2.7	0.00	0.0	0.00	.10	0.00
22	-3.3	0.00	0.00	0.00	-3.1	-3.1	0.00	0.0	0.00	.08	0.00
23	-3.3	0.00	0.00	0.00	-3.2	-3.2	0.00	0.0	0.00	.06	0.00
24	-2.2	0.00	0.00	0.00	-2.5	-2.5	0.00	0.0	0.00	.05	0.00
TOTAL/AVE	---	17.97	9.34	---	---	---	3.36	36.0	-.01	3.23	.18

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

20 FEBRUARY (DAY 51)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	2.6	0.00	0.00	0.00	2.5	2.5	0.00	0.0	0.00	.01	0.00
2	2.8	0.00	0.00	0.00	2.7	2.7	0.00	0.0	0.00	.01	0.00
3	2.1	0.00	0.00	0.00	2.3	2.3	0.00	0.0	0.00	.01	0.00
4	1.3	0.00	0.00	0.00	1.6	1.6	0.00	0.0	0.00	.01	0.00
5	.6	0.00	0.00	0.00	.9	.9	0.00	0.0	0.00	.01	0.00
6	.2	0.00	0.00	0.00	.4	.4	0.00	0.0	0.00	.01	0.00
7	-.1	0.00	0.00	0.00	.1	.1	0.00	0.0	0.00	.01	0.00
8	-.6	1.00	.82	2.92	39.6	41.3	.08	9.6	0.00	.08	.03
9	1.1	2.09	1.51	2.92	61.4	72.7	.54	35.8	0.00	.13	.03
10	2.7	2.64	1.65	2.92	101.5	118.4	.81	49.0	0.00	.22	.03
11	4.4	2.84	1.60	2.92	133.9	148.2	.68	42.7	0.00	.28	.03
12	5.7	2.88	1.63	2.92	159.4	173.3	.67	40.8	0.00	.33	.03
13	7.0	2.88	1.82	2.92	174.2	191.1	.80	44.2	.22	.37	.03
14	8.3	2.84	2.07	2.92	173.7	195.3	1.03	49.6	.62	.37	.03
15	8.7	2.65	2.20	2.92	173.8	193.5	.94	42.8	.59	.37	.03
16	9.0	2.11	1.94	2.92	174.4	182.9	.41	21.0	.16	.36	.03
17	9.4	1.07	0.00	0.00	61.8	61.8	0.00	0.0	0.00	.46	0.00
18	7.4	0.00	0.00	0.00	24.8	24.8	0.00	0.0	0.00	.30	0.00
19	5.3	0.00	0.00	0.00	11.6	11.6	0.00	0.0	0.00	.22	0.00
20	3.3	0.00	0.00	0.00	5.9	5.9	0.00	0.0	0.00	.17	0.00
21	1.8	0.00	0.00	0.00	3.1	3.1	0.00	0.0	0.00	.14	0.00
22	.4	0.00	0.00	0.00	1.3	1.3	0.00	0.0	0.00	.11	0.00
23	-1.1	0.00	0.00	0.00	-.3	-.3	0.00	0.0	0.00	.09	0.00
24	-1.0	0.00	0.00	0.00	-.8	-.8	0.00	0.0	0.00	.07	0.00
TOTAL/AVE	---	23.02	15.23	---	---	---	5.95	39.1	1.58	4.16	.23

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

19 MARCH (DAY 78)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-1.4	0.00	0.00	0.00	-1.4	-1.4	0.00	0.0	0.00	.07	0.00
2	-1.1	0.00	0.00	0.00	-1.2	-1.2	0.00	0.0	0.00	.06	0.00
3	-.8	0.00	0.00	0.00	-.9	-.9	0.00	0.0	0.00	.05	0.00
4	-.7	0.00	0.00	0.00	-.8	-.8	0.00	0.0	0.00	.04	0.00
5	-.6	0.00	0.00	0.00	-.7	-.7	0.00	0.0	0.00	.03	0.00
6	-.5	0.00	0.00	0.00	-.5	-.5	0.00	0.0	0.00	.03	0.00
7	-.5	.47	0.00	0.00	-.5	-.5	0.00	0.0	0.00	.02	0.00
8	-.6	1.85	1.65	2.92	65.9	74.7	.42	25.4	0.00	.14	.03
9	1.3	2.54	2.07	2.92	110.5	131.1	.98	47.4	0.00	.24	.03
10	3.1	2.73	2.03	2.92	161.0	182.4	1.02	50.3	0.00	.34	.03
11	5.0	2.82	1.97	2.92	174.0	193.8	.94	47.8	.43	.37	.03
12	6.7	2.85	2.01	2.92	173.7	194.1	.97	48.3	.60	.37	.03
13	8.3	2.85	2.14	2.92	173.8	196.4	1.08	50.5	.70	.37	.03
14	10.0	2.81	2.32	2.92	173.5	199.3	1.23	53.0	.83	.37	.03
15	10.6	2.72	2.45	2.92	173.4	201.3	1.33	54.3	.94	.37	.03
16	11.1	2.53	2.43	2.92	173.8	192.9	.91	37.4	.64	.37	.03
17	11.7	1.83	1.82	2.92	174.6	180.2	.27	14.7	.05	.35	.03
18	9.1	.51	0.00	0.00	63.0	63.0	0.00	0.0	0.00	.47	0.00
19	6.5	0.00	0.00	0.00	24.6	24.6	0.00	0.0	0.00	.30	0.00
20	3.9	0.00	0.00	0.00	10.5	10.5	0.00	0.0	0.00	.22	0.00
21	3.3	0.00	0.00	0.00	5.6	5.6	0.00	0.0	0.00	.17	0.00
22	2.8	0.00	0.00	0.00	3.7	3.7	0.00	0.0	0.00	.13	0.00
23	2.2	0.00	0.00	0.00	2.7	2.7	0.00	0.0	0.00	.11	0.00
24	2.0	0.00	0.00	0.00	2.2	2.2	0.00	0.0	0.00	.09	0.00
TOTAL/AVE	---	26.51	20.90	---	---	---	9.15	43.8	4.16	5.08	.25

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

30 APRIL (DAY 120)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	.2	0.00	0.00	0.00	.6	.6	0.00	0.0	0.00	.09	0.00
2	-.6	0.00	0.00	0.00	-.2	-.2	0.00	0.0	0.00	.07	0.00
3	-1.4	0.00	0.00	0.00	-1.0	-1.0	0.00	0.0	0.00	.06	0.00
4	-2.3	0.00	0.00	0.00	-1.9	-1.9	0.00	0.0	0.00	.05	0.00
5	-3.3	0.00	0.00	0.00	-2.8	-2.8	0.00	0.0	0.00	.04	0.00
6	-1.9	.31	0.00	0.00	-2.2	-2.2	0.00	0.0	0.00	.03	0.00
7	-.6	1.73	1.66	2.92	64.2	72.5	.39	23.7	0.00	.13	.03
8	.6	2.47	2.40	2.92	110.3	131.5	1.01	42.1	0.00	.24	.03
9	2.8	2.70	2.52	2.92	174.3	202.9	1.36	54.1	.08	.38	.03
10	5.0	2.81	2.50	2.92	173.2	201.6	1.35	54.1	.98	.38	.03
11	7.2	2.84	2.46	2.92	173.2	201.1	1.33	54.0	.96	.38	.03
12	7.9	2.87	2.49	2.92	173.3	201.6	1.35	54.2	.97	.38	.03
13	8.7	2.89	2.59	2.92	173.3	203.0	1.41	54.7	1.03	.38	.03
14	9.4	2.89	2.70	2.92	173.2	204.6	1.49	55.3	1.11	.38	.03
15	9.6	2.84	2.77	2.92	173.2	205.5	1.54	55.7	1.16	.38	.03
16	9.8	2.73	2.72	2.92	173.1	205.2	1.53	56.4	1.16	.38	.03
17	10.0	2.49	2.47	2.92	173.7	193.5	.94	38.1	.70	.37	.03
18	9.6	1.80	1.79	2.92	174.5	180.0	.26	14.5	.05	.36	.03
19	10.6	.48	0.00	0.00	63.9	63.9	0.00	0.0	0.00	.46	0.00
20	7.9	0.00	0.00	0.00	25.8	25.8	0.00	0.0	0.00	.30	0.00
21	5.9	0.00	0.00	0.00	12.3	12.3	0.00	0.0	0.00	.22	0.00
22	4.6	0.00	0.00	0.00	7.1	7.1	0.00	0.0	0.00	.17	0.00
23	3.9	0.00	0.00	0.00	4.9	4.9	0.00	0.0	0.00	.13	0.00
24	3.8	0.00	0.00	0.00	4.2	4.2	0.00	0.0	0.00	.11	0.00
TOTAL/AVE	---	31.84	29.07	---	---	---	13.98	48.1	8.18	5.86	.30

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

18 MAY (DAY 138)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	12.8	0.00	0.00	0.00	13.2	13.2	0.00	0.0	0.00	.08	0.00
2	12.2	0.00	0.00	0.00	12.5	12.5	0.00	0.0	0.00	.07	0.00
3	12.0	0.00	0.00	0.00	12.2	12.2	0.00	0.0	0.00	.06	0.00
4	11.9	0.00	0.00	0.00	12.0	12.0	0.00	0.0	0.00	.05	0.00
5	11.7	0.00	0.00	0.00	11.8	11.8	0.00	0.0	0.00	.04	0.00
6	13.2	.74	.64	2.92	61.8	62.6	.04	5.5	0.00	.10	.03
7	14.6	1.91	1.80	2.92	81.9	93.5	.55	30.7	0.00	.15	.03
8	16.1	2.48	2.44	2.92	137.5	161.3	1.13	46.4	0.00	.27	.03
9	18.3	2.70	2.58	2.92	174.0	204.0	1.43	55.4	.54	.35	.03
10	20.6	2.80	2.60	2.92	173.3	203.6	1.44	55.6	1.09	.36	.03
11	22.8	2.84	2.57	2.92	173.4	203.4	1.43	55.6	1.08	.35	.03
12	24.1	2.85	2.58	2.92	173.4	203.6	1.44	55.7	1.09	.35	.03
13	25.4	2.86	2.66	2.92	173.4	204.7	1.49	56.1	1.14	.35	.03
14	26.7	2.85	2.74	2.92	173.4	205.8	1.55	56.5	1.19	.35	.03
15	27.1	2.82	2.78	2.92	173.3	206.6	1.58	57.0	1.24	.35	.03
16	27.4	2.72	2.72	2.92	173.3	206.4	1.58	58.1	1.24	.35	.03
17	27.8	2.50	2.47	2.92	173.8	197.0	1.10	44.8	.87	.34	.03
18	26.7	1.97	1.97	2.92	174.6	184.2	.46	23.4	.27	.33	.03
19	25.5	.87	0.00	0.00	72.9	72.9	0.00	0.0	0.00	.42	0.00
20	24.4	0.00	0.00	0.00	39.9	39.9	0.00	0.0	0.00	.27	0.00
21	23.1	0.00	0.00	0.00	28.5	28.5	0.00	0.0	0.00	.20	0.00
22	21.9	0.00	0.00	0.00	24.0	24.0	0.00	0.0	0.00	.15	0.00
23	20.6	0.00	0.00	0.00	21.7	21.7	0.00	0.0	0.00	.12	0.00
24	18.9	0.00	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.10	0.00
TOTAL/AVE	---	32.91	30.55	---	---	---	15.23	49.9	9.72	5.58	.33

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

10 JUNE (DAY 161)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	11.7	0.00	0.00	0.00	12.5	12.5	0.00	0.0	0.00	.07	0.00
2	11.7	0.00	0.00	0.00	12.0	12.0	0.00	0.0	0.00	.05	0.00
3	10.0	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.05	0.00
4	9.4	0.00	0.00	0.00	9.8	9.8	0.00	0.0	0.00	.04	0.00
5	9.4	0.00	0.00	0.00	9.5	9.5	0.00	0.0	0.00	.03	0.00
6	8.3	.79	.67	2.92	50.9	52.7	.09	13.1	0.00	.09	.03
7	11.1	1.97	1.83	2.92	78.3	92.0	.66	35.7	0.00	.15	.03
8	15.0	2.48	2.43	2.92	139.7	165.2	1.21	50.0	0.00	.28	.03
9	17.2	2.69	2.61	2.92	173.9	204.3	1.45	55.5	.60	.36	.03
10	18.9	2.78	2.63	2.92	173.3	204.0	1.46	55.7	1.11	.36	.03
11	21.7	2.81	2.61	2.92	173.3	203.9	1.46	55.8	1.11	.36	.03
12	22.2	2.81	2.62	2.92	173.4	204.1	1.46	55.8	1.11	.36	.03
13	23.3	2.82	2.68	2.92	173.4	204.9	1.50	56.1	1.15	.35	.03
14	23.9	2.82	2.74	2.92	173.3	205.8	1.55	56.4	1.19	.35	.03
15	24.4	2.79	2.77	2.92	173.3	206.5	1.58	57.1	1.23	.35	.03
16	24.4	2.69	2.69	2.92	173.3	205.7	1.55	57.5	1.21	.35	.03
17	25.0	2.49	2.47	2.92	173.7	198.6	1.19	48.2	.92	.35	.03
18	23.9	2.00	2.00	2.92	174.4	186.0	.55	27.5	.35	.34	.03
19	22.8	.89	0.00	0.00	71.1	71.1	0.00	0.0	0.00	.43	0.00
20	21.1	0.00	0.00	0.00	37.1	37.1	0.00	0.0	0.00	.28	0.00
21	17.8	0.00	0.00	0.00	24.0	24.0	0.00	0.0	0.00	.21	0.00
22	15.0	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.16	0.00
23	14.4	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.13	0.00
24	13.3	0.00	0.00	0.00	14.0	14.0	0.00	0.0	0.00	.10	0.00
TOTAL/AVE	---	32.83	30.76	---	---	---	15.71	51.1	9.94	5.61	.33

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

1 JULY (DAY 182)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	17.1	0.00	0.00	0.00	18.5	18.5	0.00	0.0	0.00	.08	0.00
2	15.1	0.00	0.00	0.00	16.2	16.2	0.00	0.0	0.00	.07	0.00
3	13.6	0.00	0.00	0.00	14.4	14.4	0.00	0.0	0.00	.06	0.00
4	12.5	0.00	0.00	0.00	13.1	13.1	0.00	0.0	0.00	.05	0.00
5	11.9	0.00	0.00	0.00	12.3	12.3	0.00	0.0	0.00	.04	0.00
6	11.6	.68	.57	2.92	58.2	59.4	.06	10.5	0.00	.10	.03
7	15.0	1.92	1.78	2.92	83.4	96.7	.64	35.6	0.00	.15	.03
8	17.2	2.48	2.43	2.92	144.1	169.5	1.21	50.0	0.00	.28	.03
9	20.0	2.68	2.60	2.92	173.9	204.3	1.45	55.7	.66	.35	.03
10	22.8	2.77	2.62	2.92	173.4	204.1	1.47	55.9	1.12	.35	.03
11	25.6	2.80	2.61	2.92	173.4	204.1	1.46	56.0	1.12	.35	.03
12	26.7	2.81	2.62	2.92	173.4	204.3	1.47	56.1	1.13	.35	.03
13	27.8	2.83	2.69	2.92	173.4	205.2	1.51	56.4	1.17	.35	.03
14	28.9	2.82	2.75	2.92	173.4	206.1	1.56	56.7	1.21	.35	.03
15	29.3	2.79	2.77	2.92	173.4	206.7	1.59	57.4	1.25	.35	.03
16	29.6	2.70	2.70	2.92	173.3	206.0	1.56	57.8	1.23	.34	.03
17	30.0	2.50	2.48	2.92	173.7	199.1	1.21	48.6	.95	.34	.03
18	29.6	1.99	1.99	2.92	174.5	186.2	.56	28.0	.37	.33	.03
19	29.3	.80	0.00	0.00	75.5	75.5	0.00	0.0	0.00	.42	0.00
20	28.9	0.00	0.00	0.00	43.8	43.8	0.00	0.0	0.00	.27	0.00
21	26.1	0.00	0.00	0.00	31.8	31.8	0.00	0.0	0.00	.20	0.00
22	23.4	0.00	0.00	0.00	26.1	26.1	0.00	0.0	0.00	.16	0.00
23	20.6	0.00	0.00	0.00	22.4	22.4	0.00	0.0	0.00	.13	0.00
24	18.7	0.00	0.00	0.00	19.9	19.9	0.00	0.0	0.00	.11	0.00
TOTAL/AVE	---	32.59	30.63	---	---	---	15.74	51.4	10.16	5.56	.33

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

3 AUGUST (DAY 215)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	18.9	0.00	0.00	0.00	19.1	19.1	0.00	0.0	0.00	.08	0.00
2	22.2	0.00	0.00	0.00	21.2	21.2	0.00	0.0	0.00	.06	0.00
3	21.7	0.00	0.00	0.00	21.5	21.5	0.00	0.0	0.00	.05	0.00
4	20.6	0.00	0.00	0.00	20.9	20.9	0.00	0.0	0.00	.04	0.00
5	17.8	0.00	0.00	0.00	18.8	18.8	0.00	0.0	0.00	.04	0.00
6	17.8	.13	0.00	0.00	18.1	18.1	0.00	0.0	0.00	.03	0.00
7	19.4	1.58	1.50	2.92	81.8	90.3	.41	27.1	0.00	.13	.03
8	22.8	2.34	2.29	2.92	129.1	150.6	1.03	44.8	0.00	.24	.03
9	25.0	2.63	2.49	2.92	174.3	203.2	1.38	55.5	.38	.34	.03
10	27.2	2.75	2.51	2.92	173.5	202.7	1.39	55.6	1.05	.35	.03
11	27.8	2.80	2.49	2.92	173.5	202.5	1.38	55.5	1.05	.34	.03
12	28.9	2.77	2.47	2.92	173.6	202.3	1.37	55.5	1.04	.34	.03
13	30.0	2.78	2.54	2.92	173.6	203.4	1.42	55.9	1.08	.34	.03
14	30.6	2.80	2.66	2.92	173.6	205.0	1.50	56.5	1.15	.34	.03
15	31.7	2.75	2.70	2.92	173.5	205.7	1.54	56.9	1.20	.34	.03
16	31.7	2.63	2.63	2.92	173.4	205.3	1.52	57.7	1.19	.34	.03
17	31.7	2.35	2.33	2.92	174.0	194.5	.98	42.1	.76	.33	.03
18	31.7	1.60	1.60	2.92	174.8	181.0	.29	18.4	.12	.32	.03
19	31.1	.18	0.00	0.00	78.1	78.1	0.00	0.0	0.00	.41	0.00
20	29.4	0.00	0.00	0.00	45.0	45.0	0.00	0.0	0.00	.26	0.00
21	25.6	0.00	0.00	0.00	31.8	31.8	0.00	0.0	0.00	.20	0.00
22	22.2	0.00	0.00	0.00	25.3	25.3	0.00	0.0	0.00	.16	0.00
23	21.7	0.00	0.00	0.00	22.8	22.8	0.00	0.0	0.00	.12	0.00
24	20.0	0.00	0.00	0.00	20.9	20.9	0.00	0.0	0.00	.10	0.00
TOTAL/AVE	---	30.08	28.20	---	---	---	14.21	50.4	8.99	5.32	.30

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

1 SEPTEMBER (DAY 244)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	15.7	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.07	0.00
2	15.0	0.00	0.00	0.00	15.4	15.4	0.00	0.0	0.00	.06	0.00
3	14.6	0.00	0.00	0.00	14.9	14.9	0.00	0.0	0.00	.05	0.00
4	14.7	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.04	0.00
5	15.2	0.00	0.00	0.00	15.1	15.1	0.00	0.0	0.00	.03	0.00
6	16.0	0.00	0.00	0.00	15.7	15.7	0.00	0.0	0.00	.03	0.00
7	16.9	.94	.92	2.92	66.1	68.5	.11	12.1	0.00	.10	.03
8	17.8	2.06	1.94	2.92	94.4	109.0	.70	36.0	0.00	.17	.03
9	20.9	2.56	2.27	2.92	156.5	182.7	1.25	55.0	0.00	.30	.03
10	24.1	2.72	2.27	2.92	173.9	199.6	1.22	53.9	.66	.34	.03
11	27.2	2.80	2.24	2.92	173.8	198.9	1.20	53.5	.87	.34	.03
12	28.9	2.82	2.27	2.92	173.8	199.4	1.22	53.8	.88	.34	.03
13	30.5	2.82	2.36	2.92	173.8	200.9	1.29	54.8	.95	.34	.03
14	32.2	2.79	2.49	2.92	173.7	202.9	1.39	55.8	1.04	.34	.03
15	32.4	2.71	2.57	2.92	173.6	204.0	1.45	56.3	1.11	.34	.03
16	32.6	2.54	2.51	2.92	173.8	199.8	1.24	49.5	.96	.33	.03
17	32.8	2.03	2.03	2.92	174.5	187.1	.60	29.6	.41	.32	.03
18	30.9	.92	0.00	0.00	76.7	76.7	0.00	0.0	0.00	.41	0.00
19	29.1	0.00	0.00	0.00	44.3	44.3	0.00	0.0	0.00	.27	0.00
20	27.2	0.00	0.00	0.00	32.7	32.7	0.00	0.0	0.00	.20	0.00
21	25.2	0.00	0.00	0.00	27.6	27.6	0.00	0.0	0.00	.15	0.00
22	23.1	0.00	0.00	0.00	24.5	24.5	0.00	0.0	0.00	.13	0.00
23	21.1	0.00	0.00	0.00	22.2	22.2	0.00	0.0	0.00	.10	0.00
24	20.9	0.00	0.00	0.00	21.3	21.3	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	27.71	23.87	---	---	---	11.67	48.9	6.87	4.89	.28

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

1 OCTOBER (DAY 274)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.9	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.01	0.00
2	10.8	0.00	0.00	0.00	10.7	10.7	0.00	0.0	0.00	.01	0.00
3	10.5	0.00	0.00	0.00	10.6	10.6	0.00	0.0	0.00	.01	0.00
4	10.0	0.00	0.00	0.00	10.2	10.2	0.00	0.0	0.00	.01	0.00
5	9.4	0.00	0.00	0.00	9.7	9.7	0.00	0.0	0.00	.01	0.00
6	8.5	0.00	0.00	0.00	8.9	8.9	0.00	0.0	0.00	.01	0.00
7	8.3	.00	0.00	0.00	8.5	8.5	0.00	0.0	0.00	.01	0.00
8	11.1	1.49	1.30	2.92	42.4	48.9	.31	24.0	0.00	.07	.03
9	16.1	2.37	1.87	2.92	86.0	104.3	.87	46.4	0.00	.16	.03
10	17.2	2.71	1.93	2.92	138.7	159.6	1.00	51.7	0.00	.27	.03
11	18.9	2.81	1.86	2.92	174.6	192.9	.87	46.8	.09	.34	.03
12	20.6	2.85	1.89	2.92	174.0	192.8	.90	47.3	.55	.35	.03
13	21.7	2.84	2.04	2.92	173.9	195.4	1.02	50.1	.66	.35	.03
14	23.3	2.81	2.24	2.92	173.8	198.7	1.19	53.1	.81	.35	.03
15	24.4	2.71	2.39	2.92	173.6	200.7	1.29	54.0	.93	.35	.03
16	25.0	2.35	2.23	2.92	174.2	190.0	.75	33.7	.53	.34	.03
17	23.9	1.53	1.52	2.92	171.4	174.4	.14	9.4	0.00	.32	.03
18	22.2	.01	0.00	0.00	70.4	70.4	0.00	0.0	0.00	.42	0.00
19	18.9	0.00	0.00	0.00	35.4	35.4	0.00	0.0	0.00	.27	0.00
20	18.9	0.00	0.00	0.00	24.2	24.2	0.00	0.0	0.00	.19	0.00
21	15.0	0.00	0.00	0.00	17.9	17.9	0.00	0.0	0.00	.16	0.00
22	12.2	0.00	0.00	0.00	14.0	14.0	0.00	0.0	0.00	.13	0.00
23	12.2	0.00	0.00	0.00	12.8	12.8	0.00	0.0	0.00	.10	0.00
24	11.7	0.00	0.00	0.00	12.0	12.0	0.00	0.0	0.00	.08	0.00
TOTAL/AVE	---	24.48	19.27	---	---	---	8.34	43.3	3.55	4.34	.25

RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

2 NOVEMBER (DAY 306)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	6.7	0.00	0.00	0.00	7.0	7.0	0.00	0.0	0.00	.06	0.00
2	5.6	0.00	0.00	0.00	6.0	6.0	0.00	0.0	0.00	.05	0.00
3	6.1	0.00	0.00	0.00	6.1	6.1	0.00	0.0	0.00	.04	0.00
4	6.1	0.00	0.00	0.00	6.1	6.1	0.00	0.0	0.00	.03	0.00
5	6.1	0.00	0.00	0.00	6.1	6.1	0.00	0.0	0.00	.03	0.00
6	6.1	0.00	0.00	0.00	6.1	6.1	0.00	0.0	0.00	.02	0.00
7	5.6	0.00	0.00	0.00	5.8	5.8	0.00	0.0	0.00	.02	0.00
8	6.1	.34	0.00	0.00	6.0	6.0	0.00	0.0	0.00	.02	0.00
9	7.8	1.88	1.27	2.92	65.6	73.1	.36	28.3	0.00	.12	.03
10	10.6	2.49	1.42	2.92	94.7	108.6	.66	46.7	0.00	.19	.03
11	13.3	2.79	1.40	2.92	120.9	132.6	.56	40.0	0.00	.24	.03
12	15.0	2.88	1.46	2.92	142.4	154.2	.56	38.5	0.00	.28	.03
13	16.1	2.87	1.67	2.92	168.0	182.7	.70	42.0	0.00	.33	.03
14	17.2	2.75	1.90	2.92	174.1	193.2	.91	47.9	.44	.35	.03
15	17.2	2.45	1.97	2.92	174.1	189.0	.71	36.0	.40	.35	.03
16	17.8	1.82	1.63	2.92	173.9	178.6	.22	13.5	0.00	.34	.03
17	17.2	.32	0.00	0.00	68.1	68.1	0.00	0.0	0.00	.44	0.00
18	15.0	0.00	0.00	0.00	32.0	32.0	0.00	0.0	0.00	.28	0.00
19	8.9	0.00	0.00	0.00	16.3	16.3	0.00	0.0	0.00	.22	0.00
20	6.7	0.00	0.00	0.00	9.8	9.8	0.00	0.0	0.00	.17	0.00
21	8.3	0.00	0.00	0.00	8.8	8.8	0.00	0.0	0.00	.13	0.00
22	6.7	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.11	0.00
23	7.8	0.00	0.00	0.00	7.7	7.7	0.00	0.0	0.00	.08	0.00
24	5.6	0.00	0.00	0.00	6.3	6.3	0.00	0.0	0.00	.07	0.00
TOTAL/AVE	---	20.59	12.72	---	---	---	4.68	36.8	.83	3.97	.20

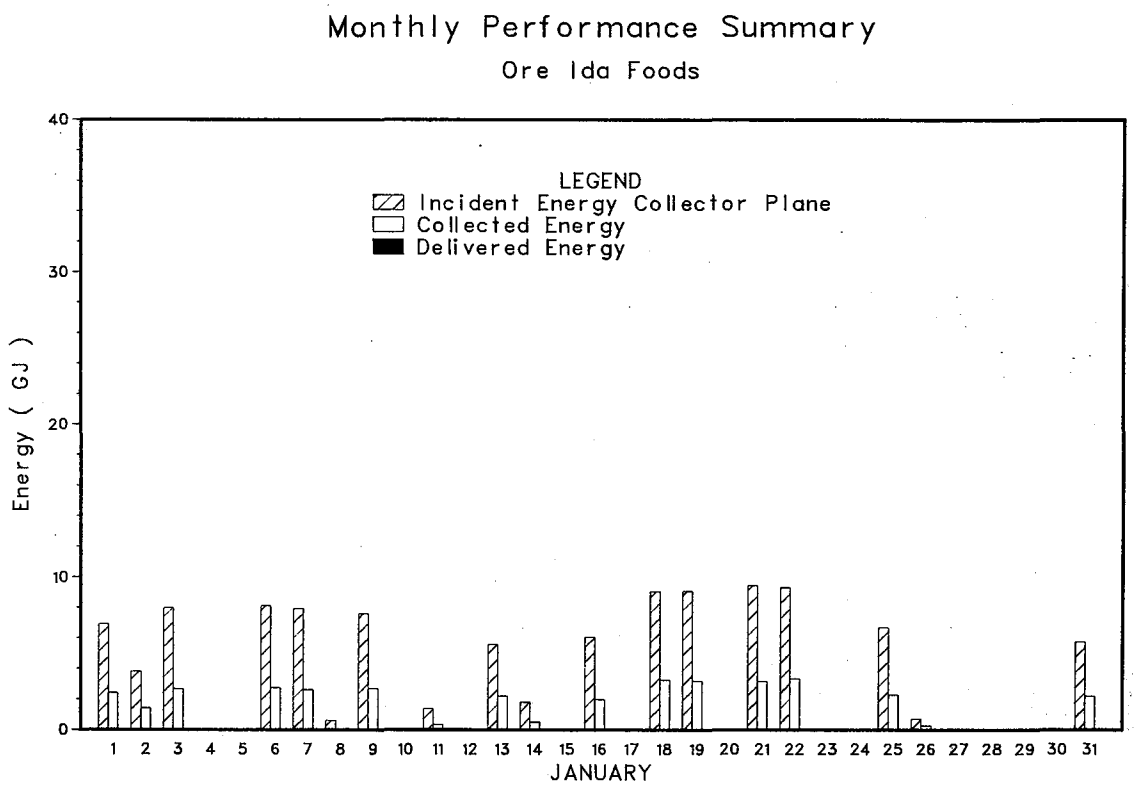
RUN ID: OR2
83/09/02.

ORE IDA FOODS

CLEAR DAY PERFORMANCE TABLE

30 DECEMBER (DAY 364)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-4.4	0.00	0.00	0.00	-4.3	-4.3	0.00	0.0	0.00	.04	0.00
2	-5.0	0.00	0.00	0.00	-4.8	-4.8	0.00	0.0	0.00	.03	0.00
3	-5.0	0.00	0.00	0.00	-4.9	-4.9	0.00	0.0	0.00	.03	0.00
4	-5.0	0.00	0.00	0.00	-5.0	-5.0	0.00	0.0	0.00	.02	0.00
5	-5.6	0.00	0.00	0.00	-5.4	-5.4	0.00	0.0	0.00	.02	0.00
6	-5.6	0.00	0.00	0.00	-5.5	-5.5	0.00	0.0	0.00	.02	0.00
7	-6.1	0.00	0.00	0.00	-5.9	-5.9	0.00	0.0	0.00	.02	0.00
8	-5.6	0.00	0.00	0.00	-5.7	-5.7	0.00	0.0	0.00	.01	0.00
9	-3.3	1.02	.61	2.92	33.8	35.3	.07	11.8	0.00	.07	.03
10	-3.3	2.08	.99	2.92	47.1	54.9	.37	37.3	0.00	.11	.03
11	0.0	2.46	.95	2.92	62.2	68.9	.32	33.6	0.00	.13	.03
12	.6	2.61	1.02	2.92	75.3	82.3	.34	32.7	0.00	.16	.03
13	1.7	2.57	1.25	2.92	94.7	105.0	.49	39.3	0.00	.20	.03
14	3.3	2.42	1.49	2.92	120.4	133.5	.62	41.7	0.00	.25	.03
15	3.9	2.01	1.50	2.92	130.3	137.4	.34	22.6	0.00	.27	.03
16	2.8	.93	0.00	0.00	43.4	43.4	0.00	0.0	0.00	.36	0.00
17	0.0	0.00	0.00	0.00	13.9	13.9	0.00	0.0	0.00	.23	0.00
18	-1.7	0.00	0.00	0.00	3.3	3.3	0.00	0.0	0.00	.17	0.00
19	-3.3	0.00	0.00	0.00	-1.2	-1.2	0.00	0.0	0.00	.13	0.00
20	-3.3	0.00	0.00	0.00	-2.6	-2.6	0.00	0.0	0.00	.10	0.00
21	-2.8	0.00	0.00	0.00	-2.7	-2.7	0.00	0.0	0.00	.08	0.00
22	-3.3	0.00	0.00	0.00	-3.1	-3.1	0.00	0.0	0.00	.07	0.00
23	-2.8	0.00	0.00	0.00	-2.9	-2.9	0.00	0.0	0.00	.05	0.00
24	-2.8	0.00	0.00	0.00	-2.8	-2.8	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	16.11	7.83	---	---	---	2.55	32.6	-.01	2.65	.18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Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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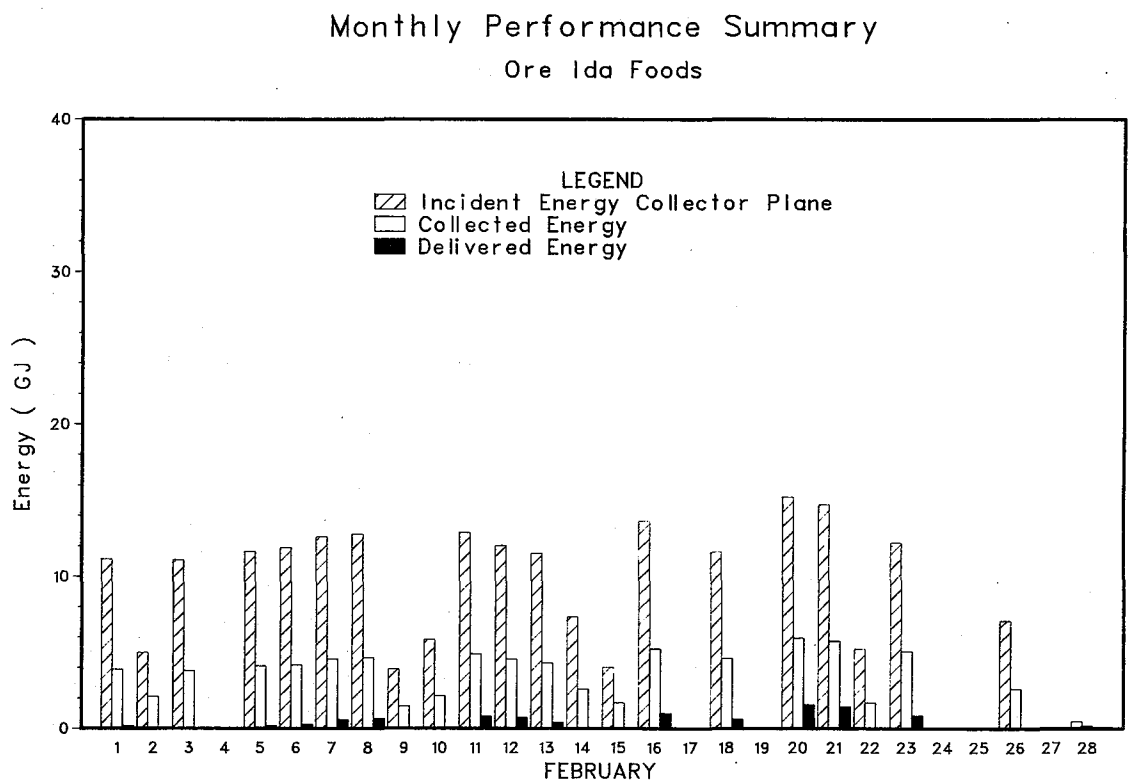
JANUARY


Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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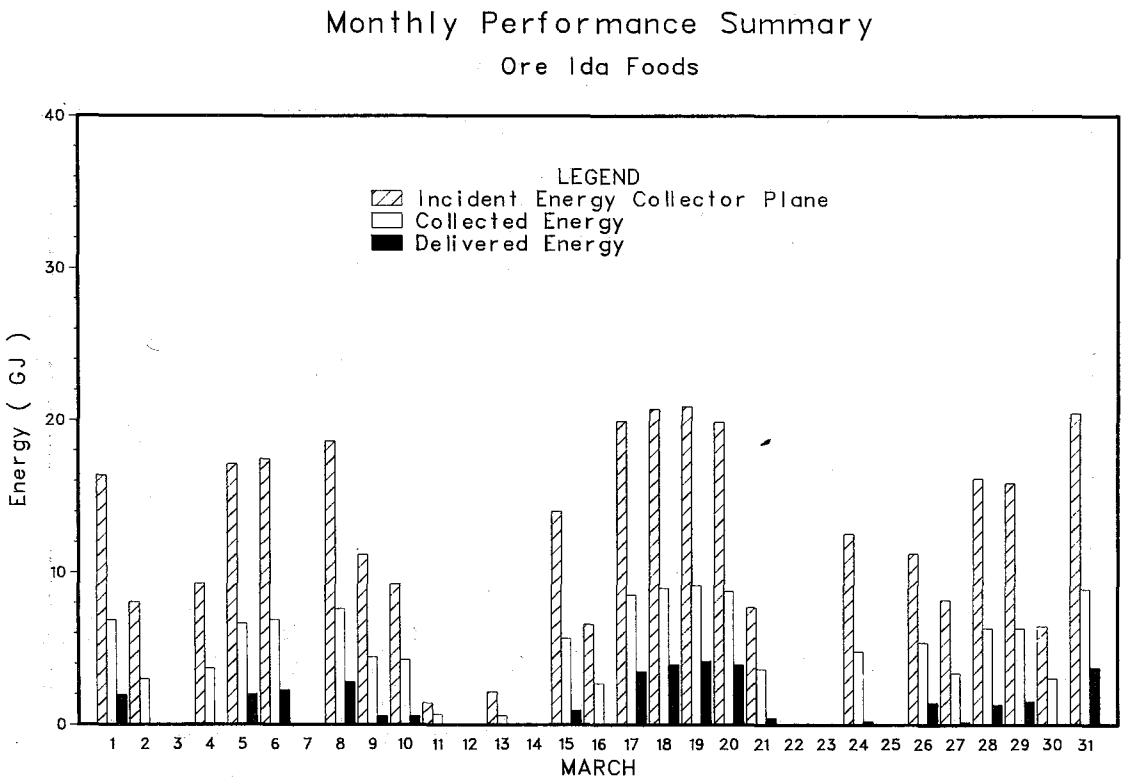
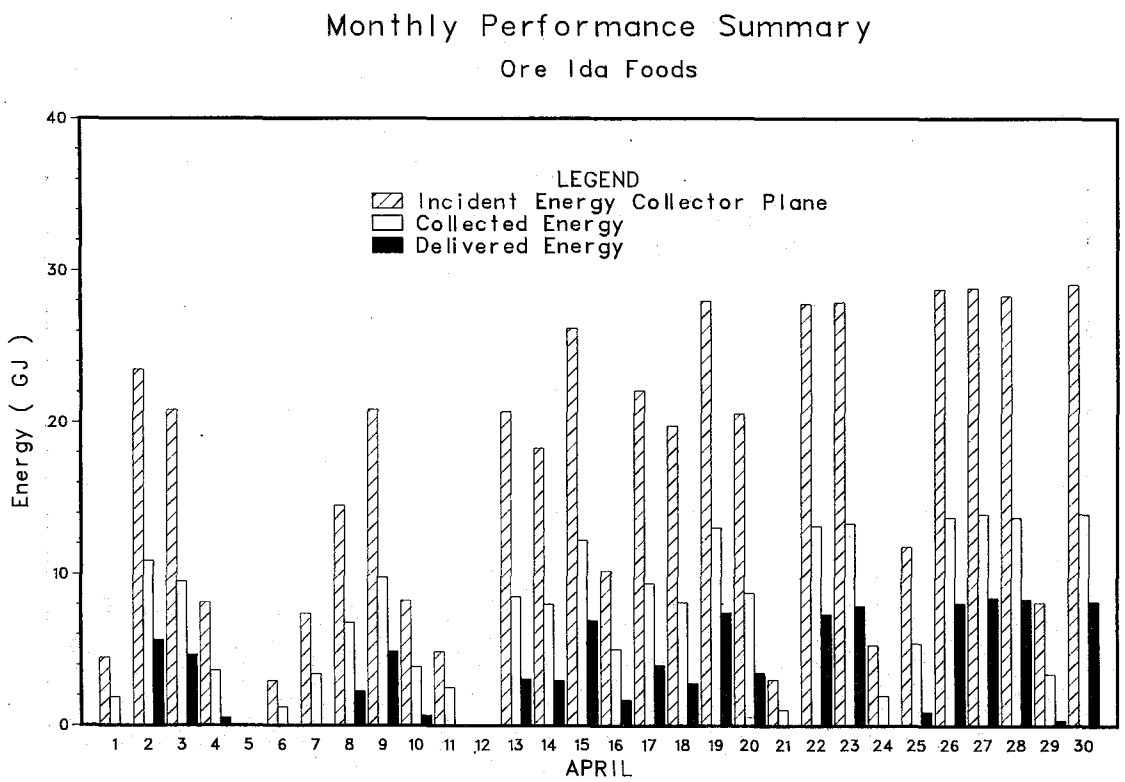
FEBRUARY


Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MARCH


Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
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20
30
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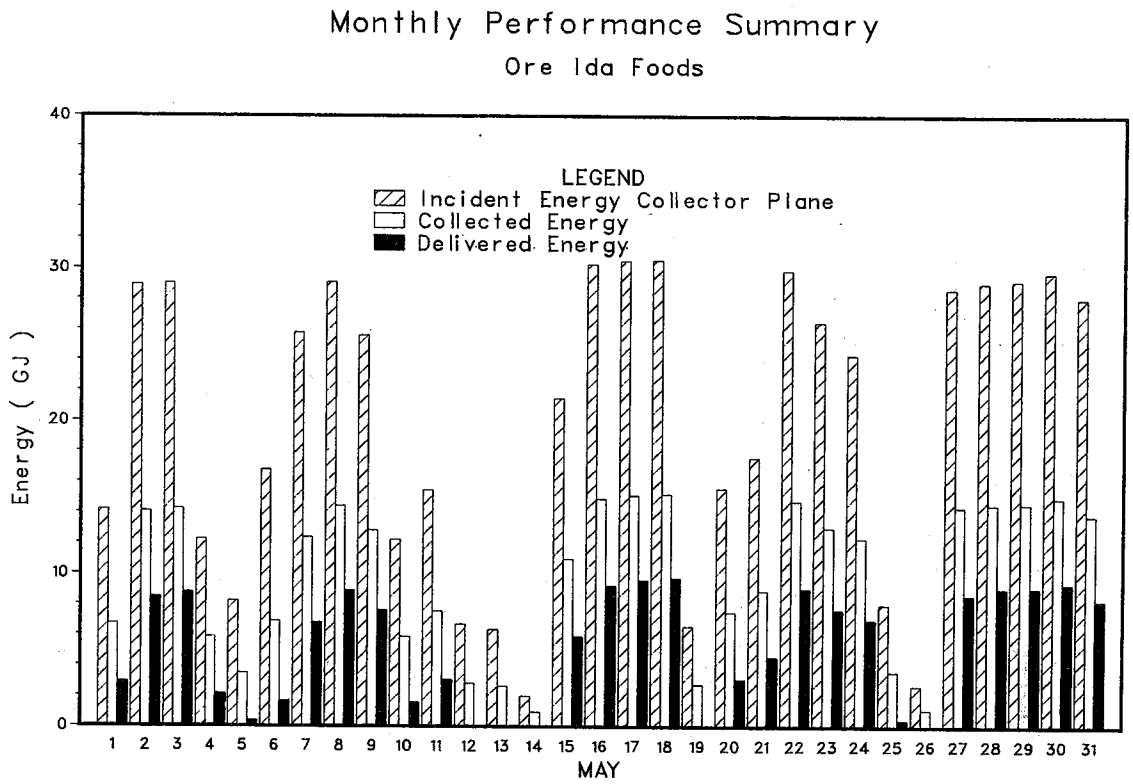
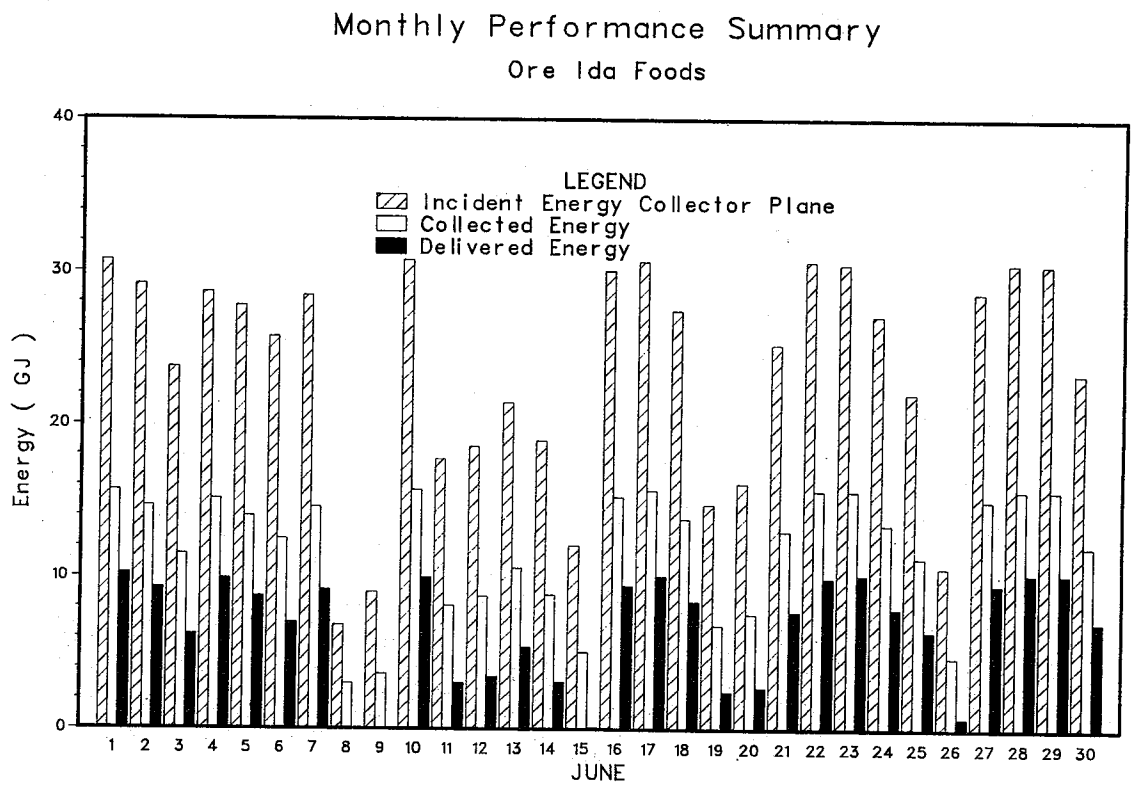
APRIL


Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MAY


Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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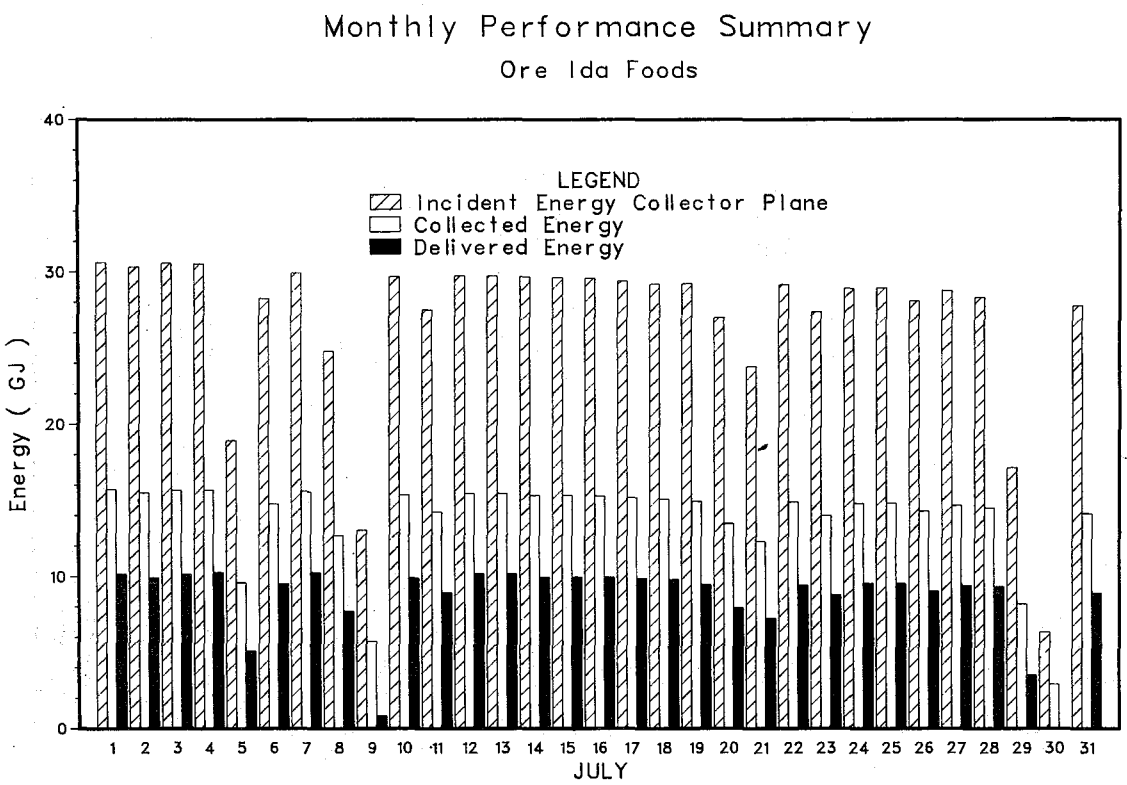
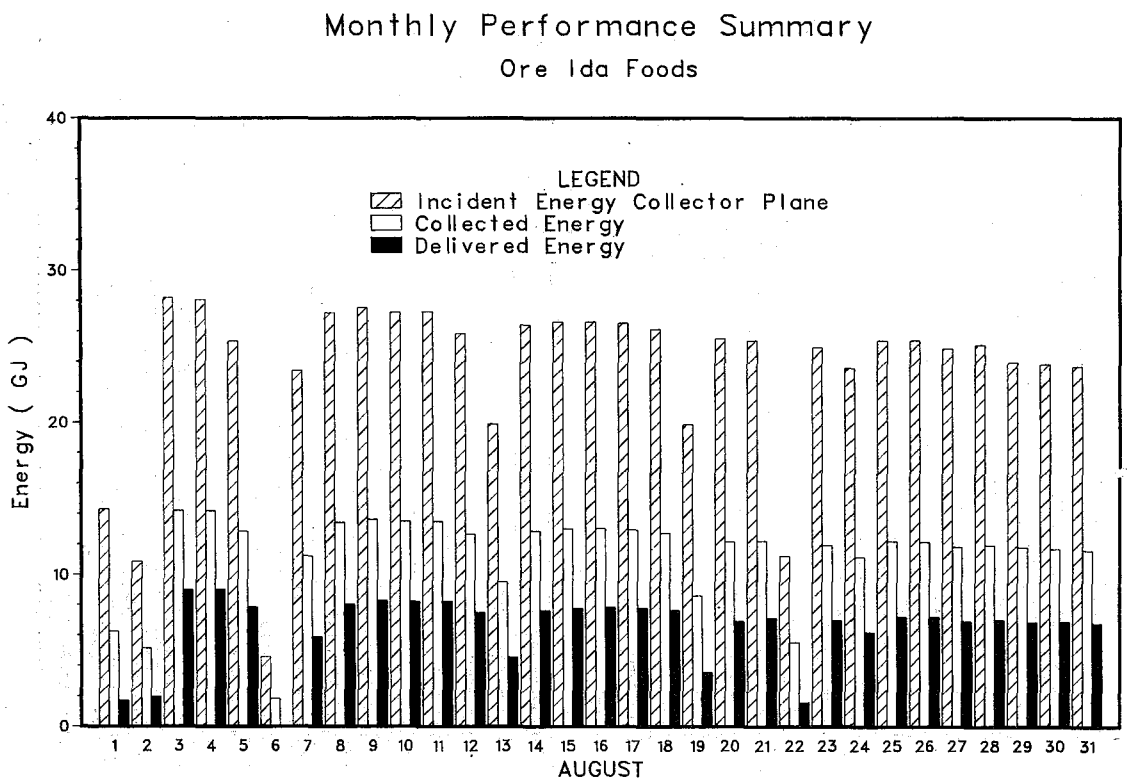
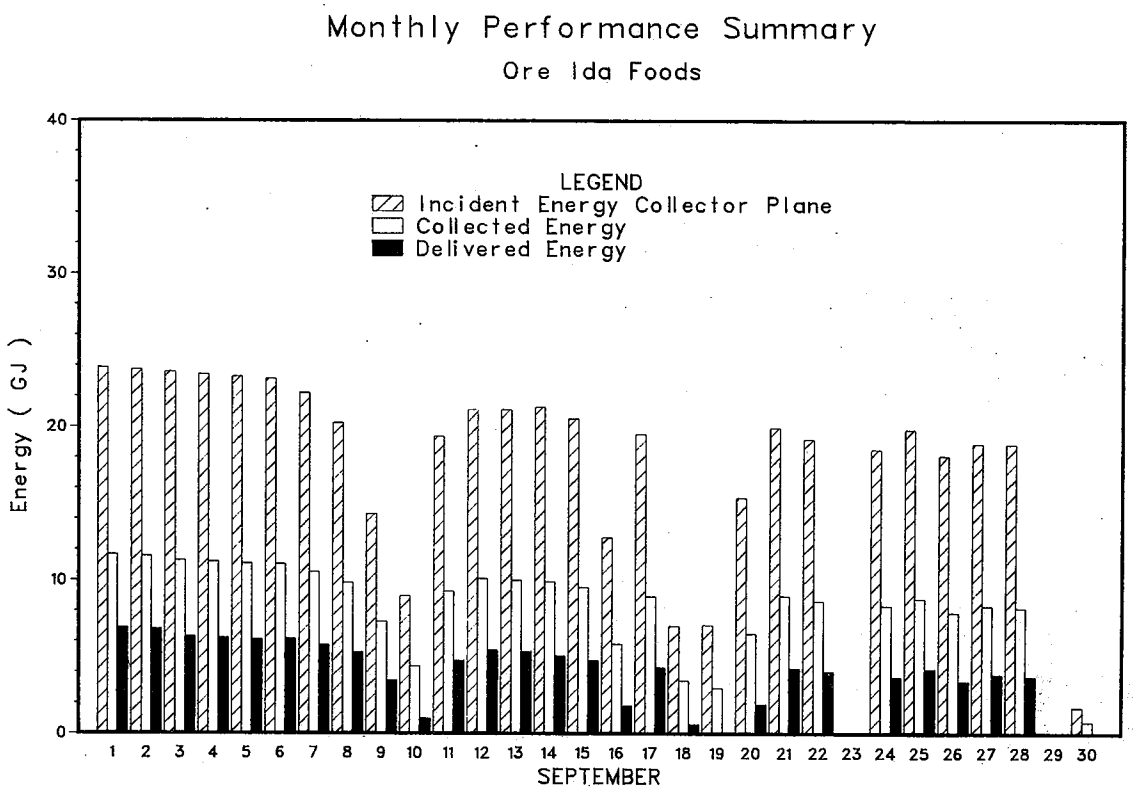
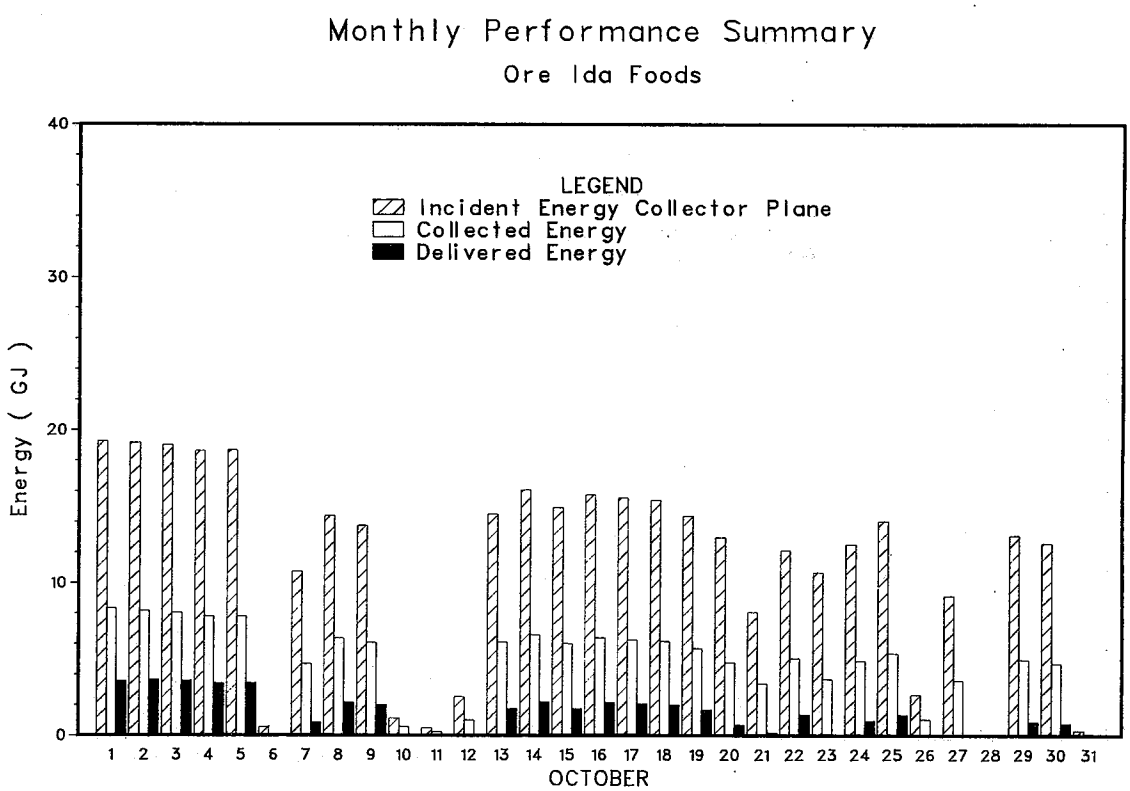
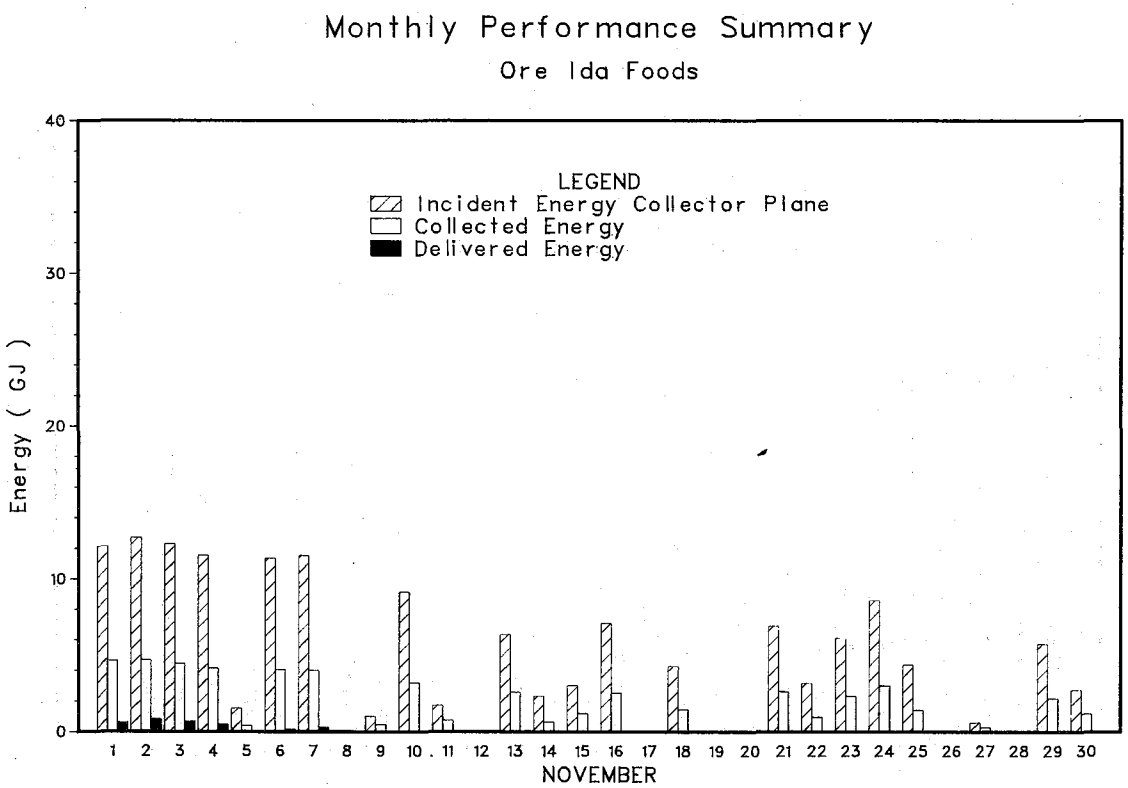
JUNE

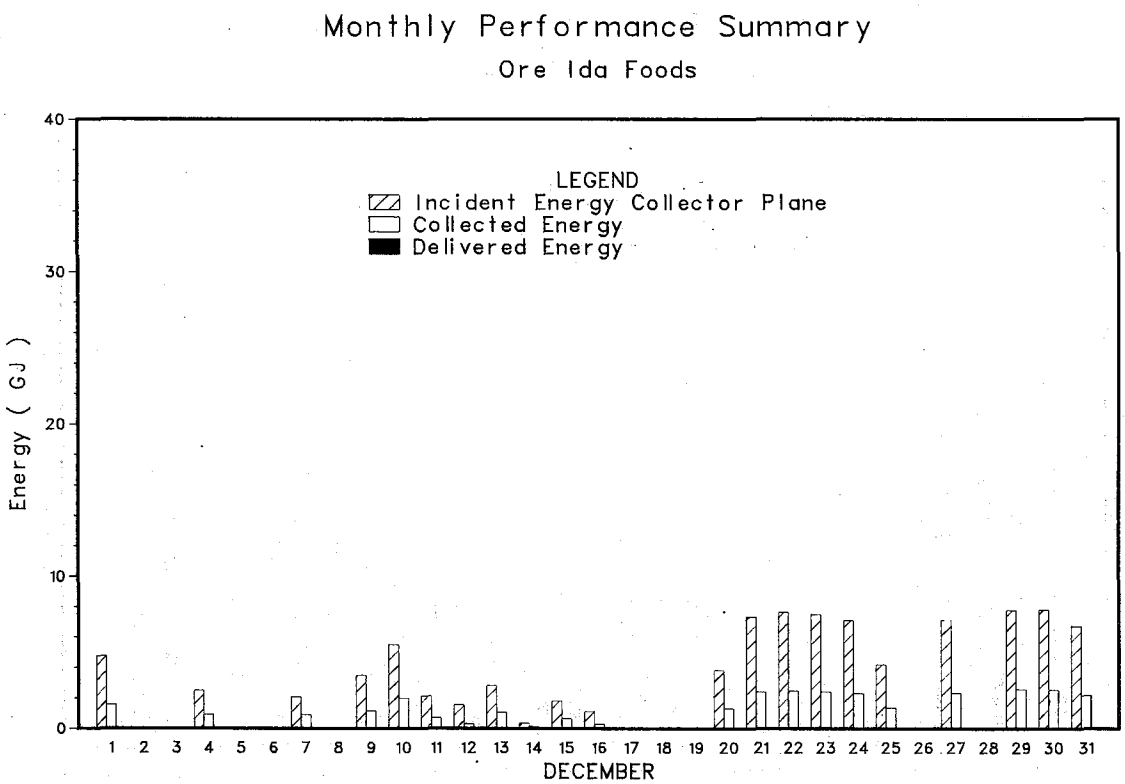

Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JULY

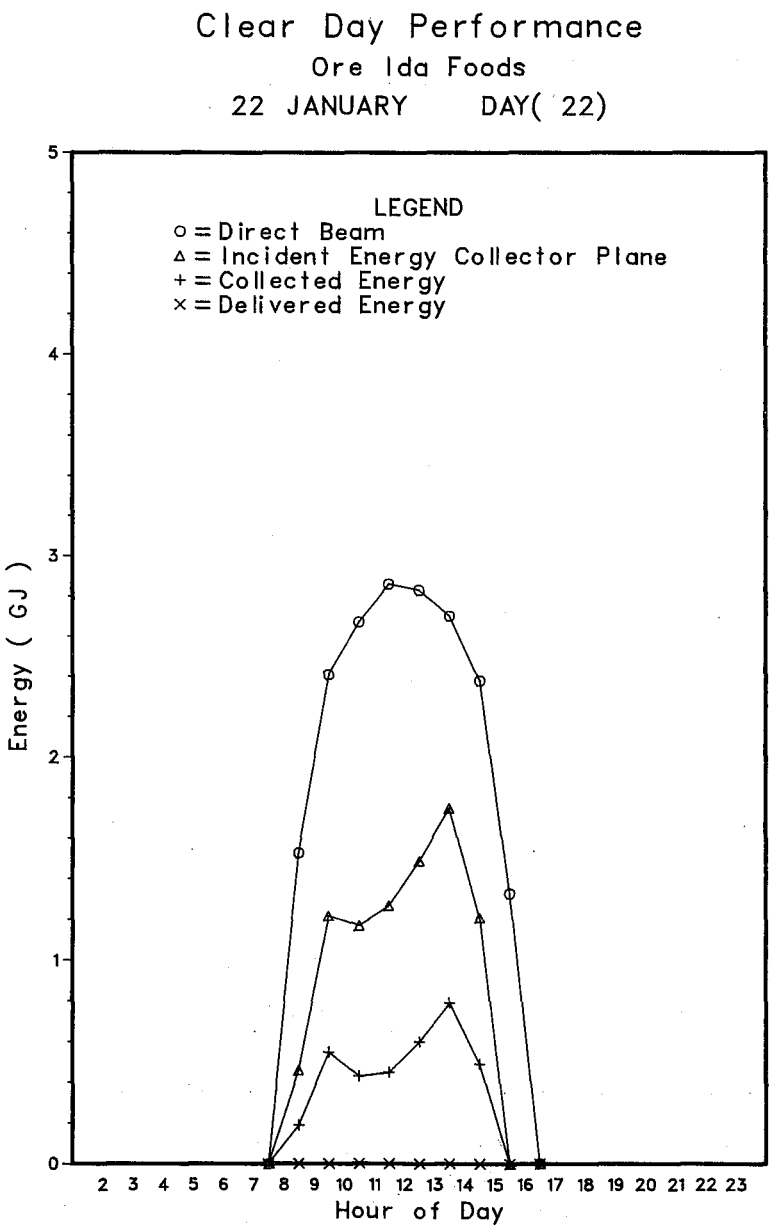

Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
AUGUST

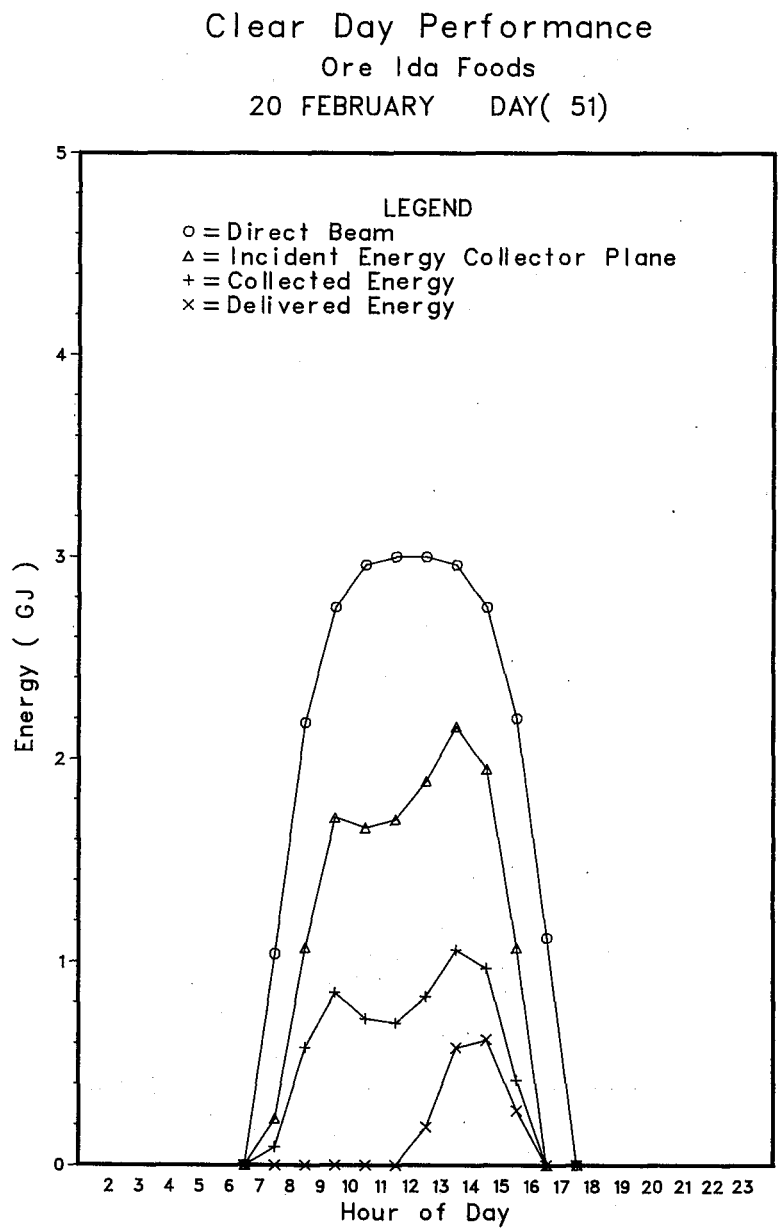

Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
SEPTEMBER

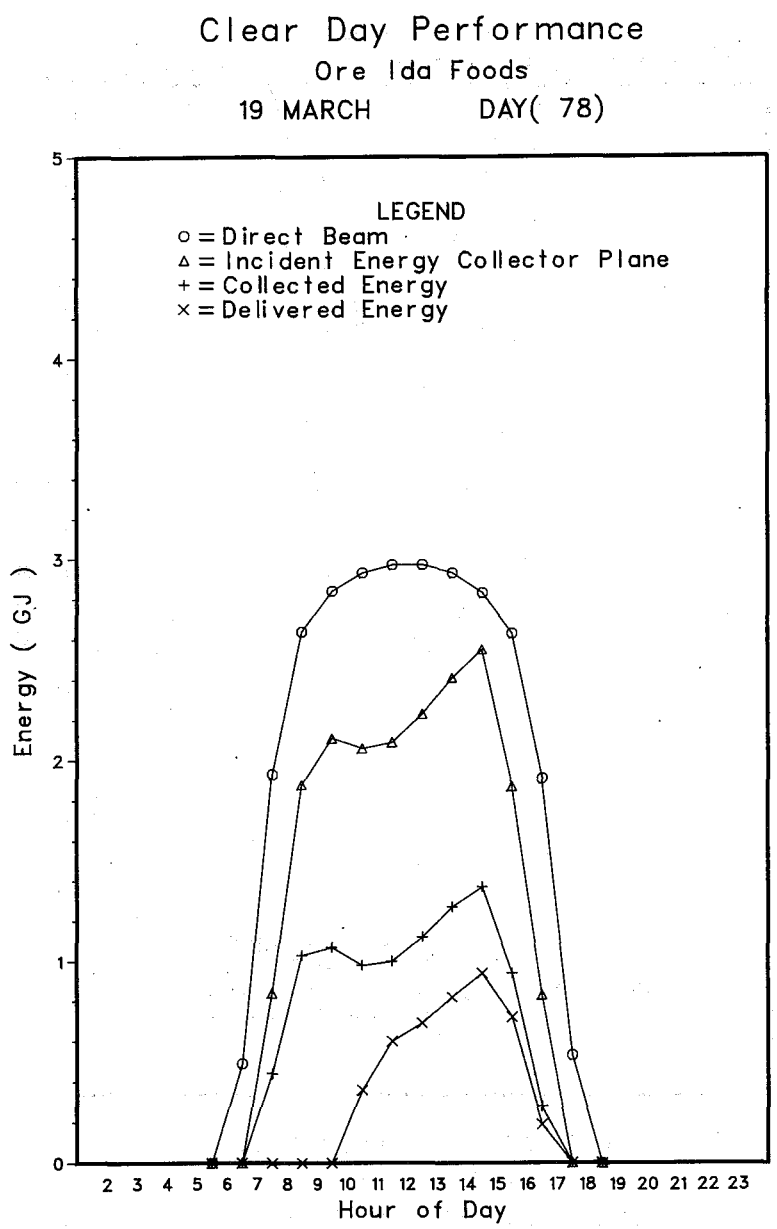

Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
OCTOBER

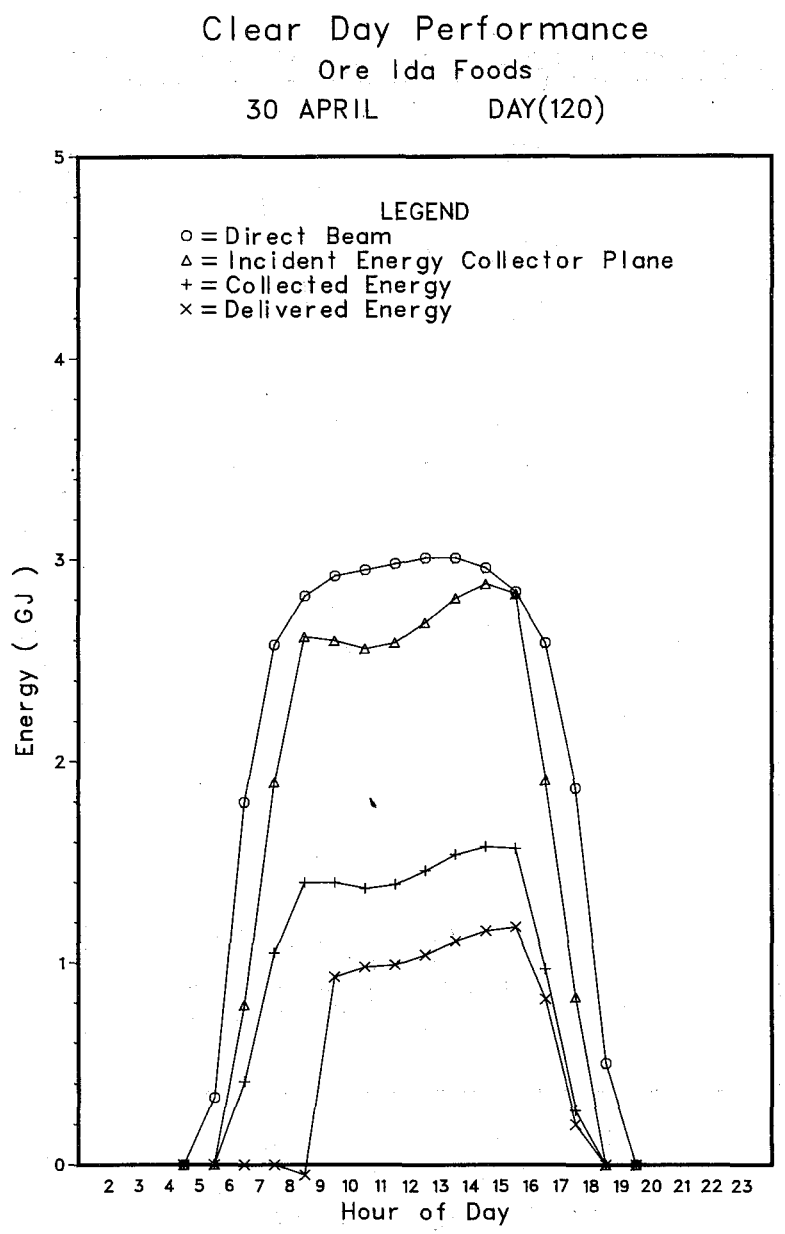

Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER

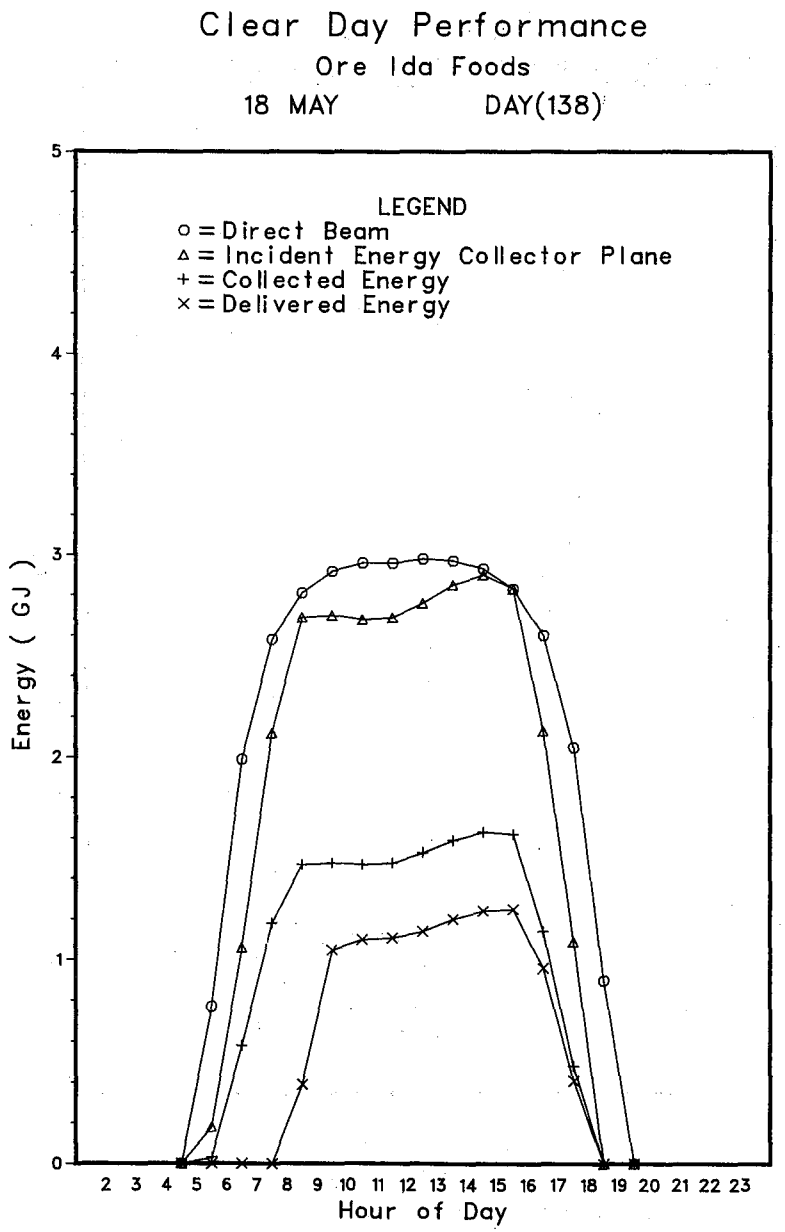

Monthly Performance Summary
Ore Ida Foods
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

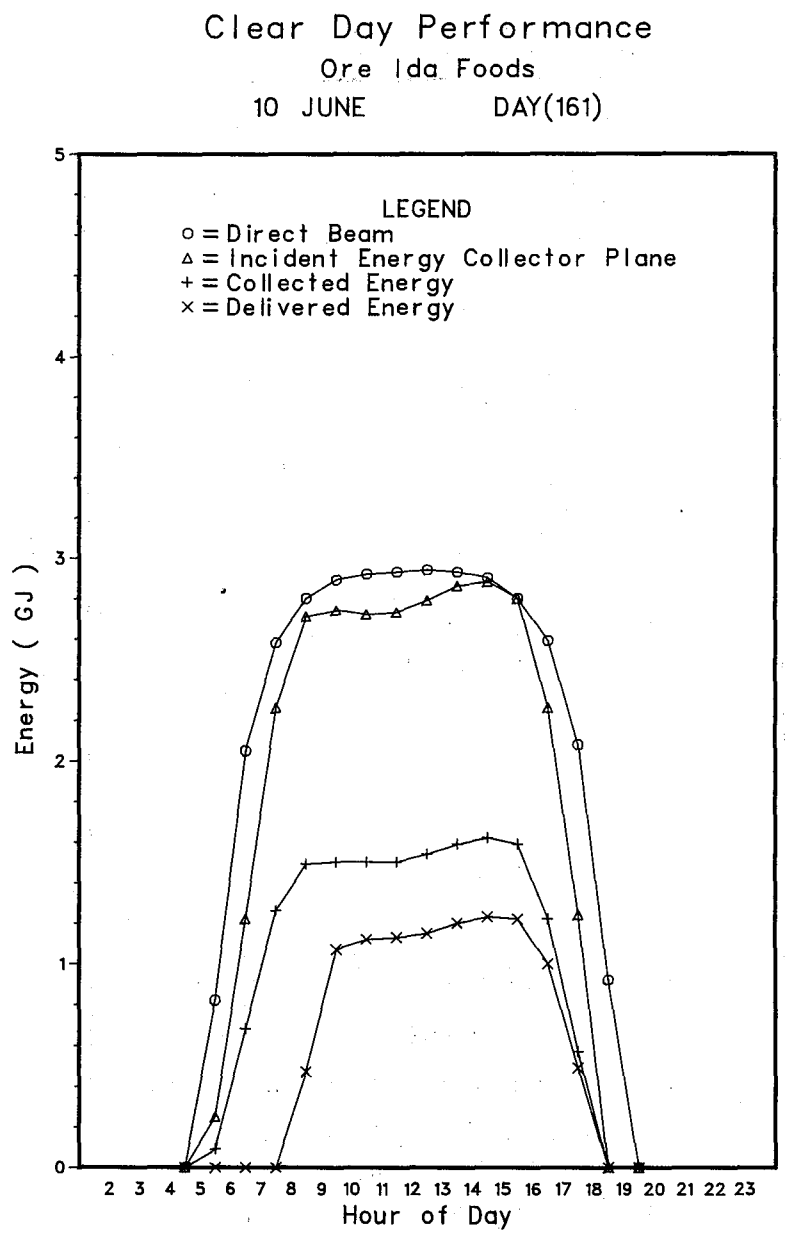

Clear Day Performance
Ore Ida Foods
22 JANUARY DAY(22)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

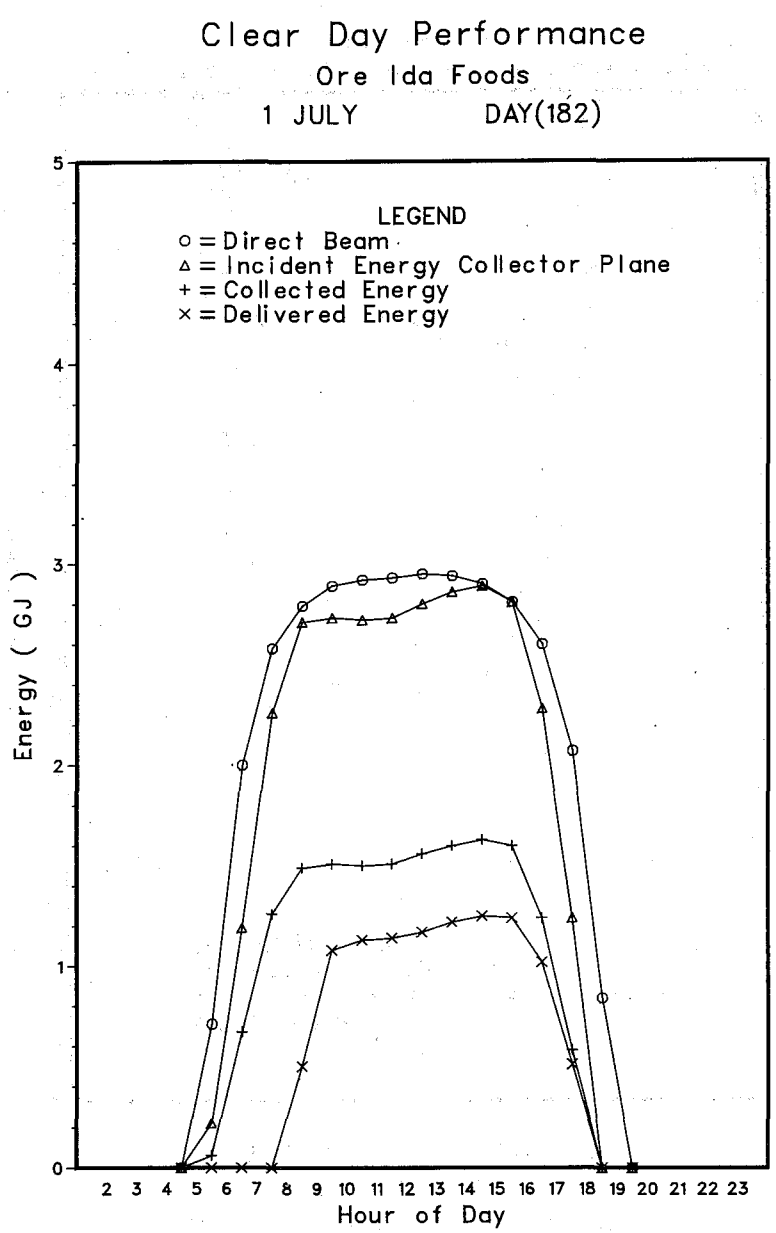

Clear Day Performance
Ore Ida Foods
20 FEBRUARY DAY(51)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
0
1
2
3
4
5
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour of Day

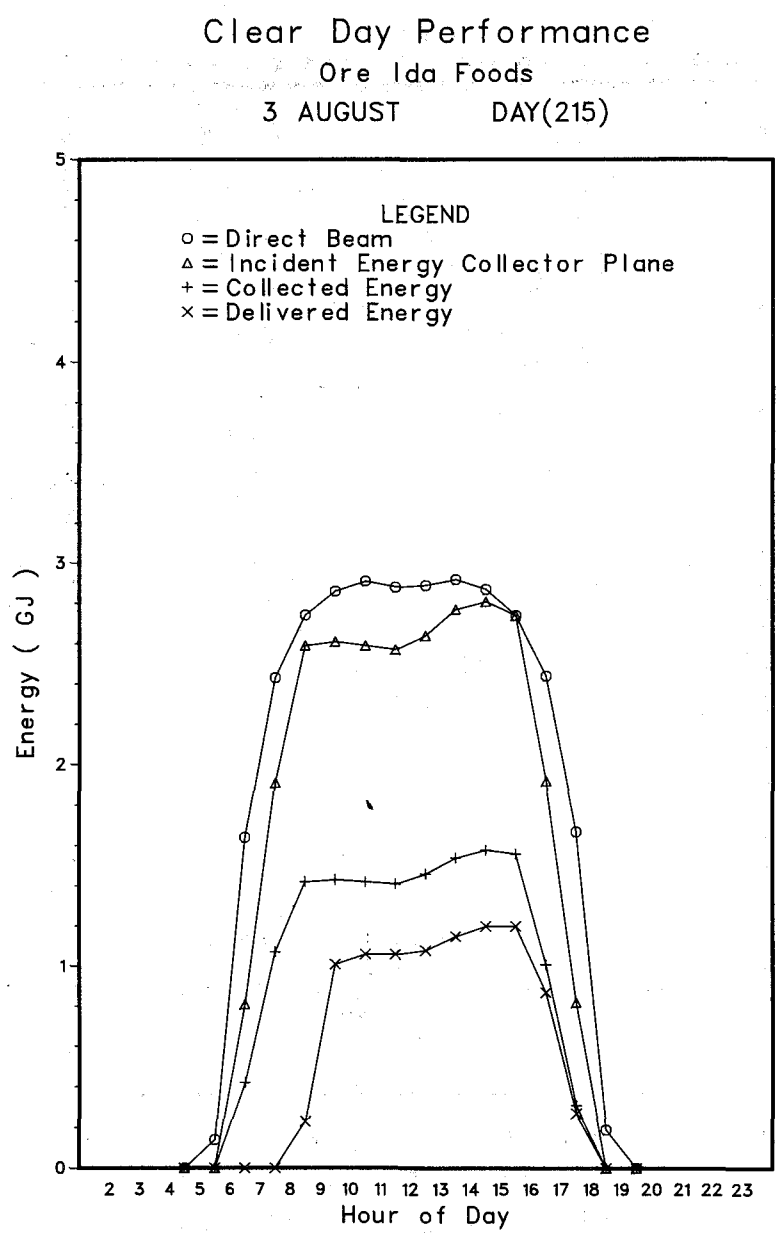

Clear Day Performance
Ore Ida Foods
19 MARCH DAY(78)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

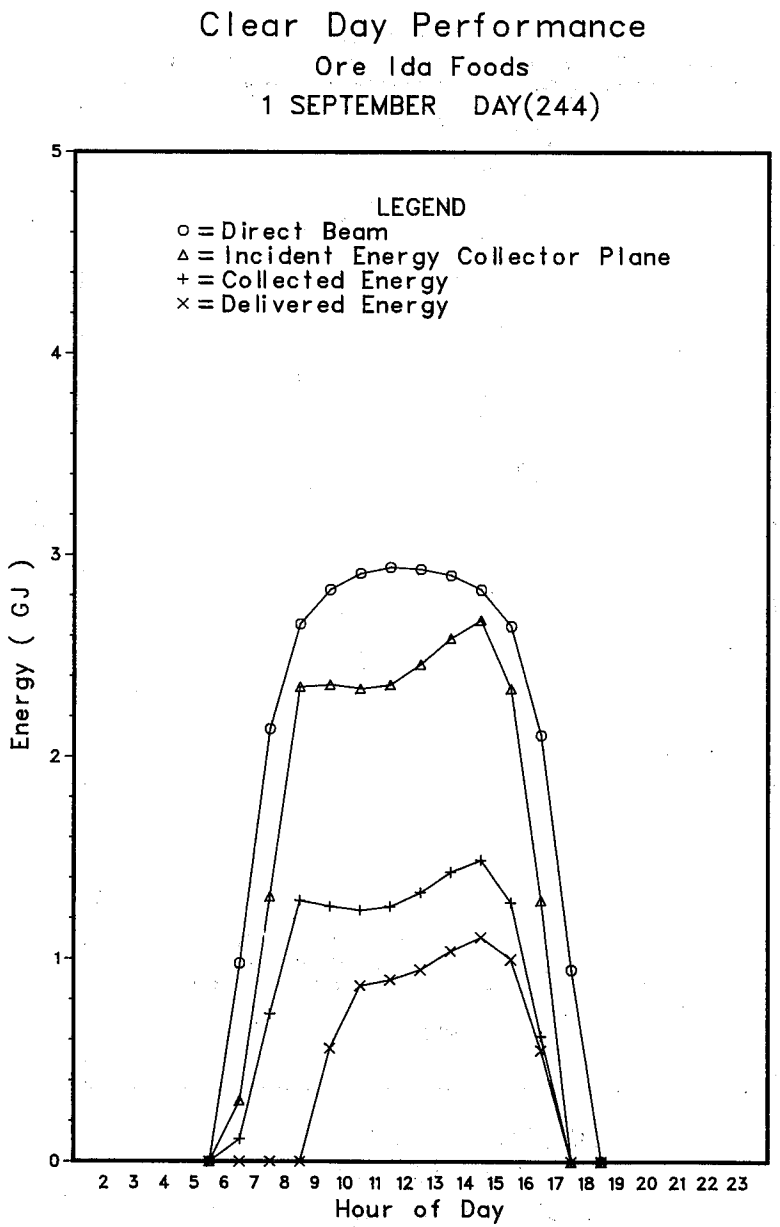

Clear Day Performance
Ore Ida Foods
30 APRIL DAY(120)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

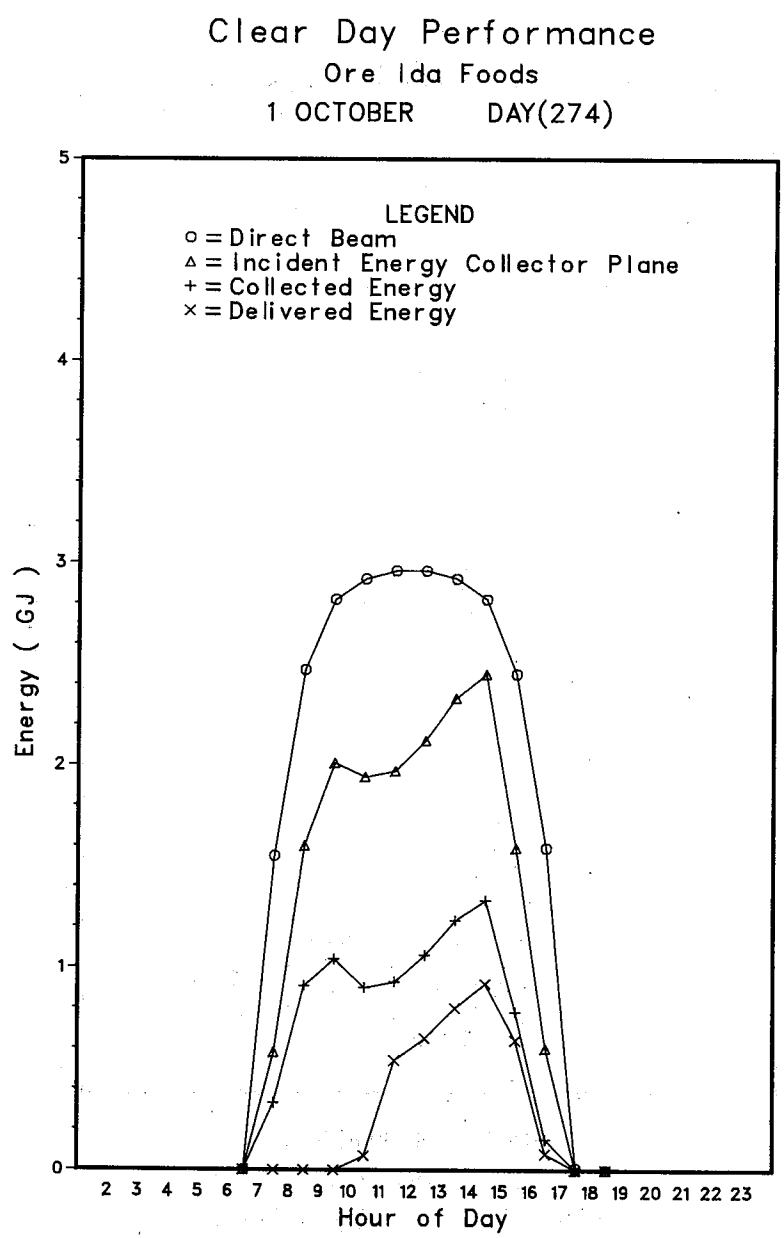

Clear Day Performance
Ore Ida Foods
18 MAY DAY(138)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

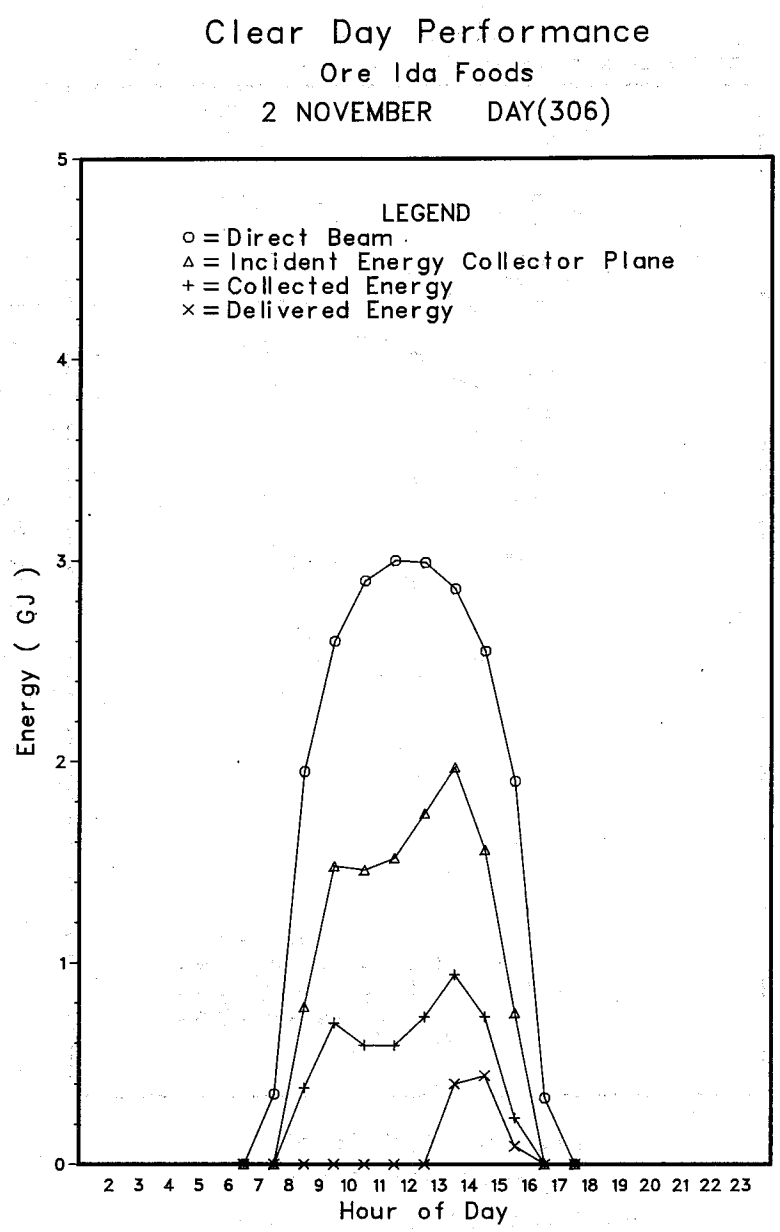

Clear Day Performance
Ore Ida Foods
10 JUNE DAY(161)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

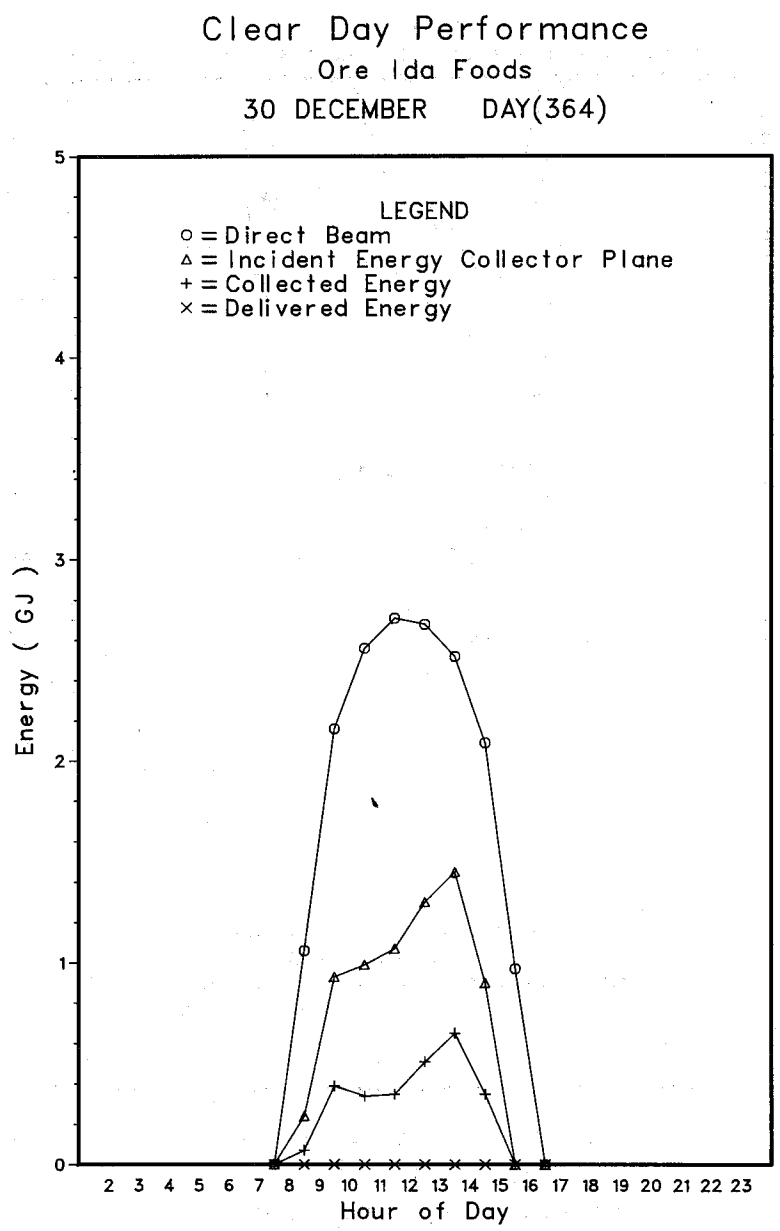

Clear Day Performance
Ore Ida Foods
1 JULY DAY(182)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Ore Ida Foods
3 AUGUST DAY(215)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Ore Ida Foods
1 SEPTEMBER DAY(244)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Ore Ida Foods
1 OCTOBER DAY(274)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Ore Ida Foods
2 NOVEMBER DAY(306)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Ore Ida Foods
30 DECEMBER DAY(364)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

RUN ID: SU2
83/09/02.

SOUTHERN UNION

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	349.1	604.5	495.7	217.8	44.0	156.8	31.8	28.2	31.6	12.3
FEBRUARY	411.6	597.9	470.8	204.5	43.4	148.2	31.3	24.8	31.5	12.6
MARCH	604.7	706.0	526.3	226.8	43.1	164.5	35.3	26.7	31.3	14.3
APRIL	708.1	765.4	536.4	229.7	42.8	166.3	35.8	27.4	31.0	14.6
MAY	807.4	814.3	585.5	249.0	42.5	181.1	41.1	26.3	30.9	17.6
JUNE	825.2	833.3	624.8	269.2	43.1	200.7	43.0	25.3	32.1	18.1
JULY	821.1	838.9	635.4	277.8	43.7	208.3	43.1	26.0	32.8	18.4
AUGUST	724.0	758.8	563.4	246.5	43.8	180.7	38.0	27.6	32.1	16.2
SEPTEMBER	613.0	690.9	526.1	227.5	43.2	165.9	35.8	25.6	31.5	15.0
OCTOBER	487.7	667.6	524.2	231.0	44.1	171.1	34.2	25.5	32.6	14.1
NOVEMBER	370.0	608.9	497.3	219.4	44.1	158.8	32.6	27.9	31.9	13.0
DECEMBER	312.4	558.2	469.8	203.3	43.3	143.5	30.7	29.0	30.5	11.8
TOTALS/AVERAGES	7034.2	8444.8	6455.7	2802.7	43.4	2046.0	432.7	320.4	31.7	178.0

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	11.7	23.3	19.8	8.8	44.6	5.9	1.2	.9	30.0	.5
2	1/ 2	11.5	22.8	19.5	8.5	43.5	6.3	1.2	1.0	32.2	.5
3	1/ 3	11.3	22.2	18.9	8.2	43.3	6.0	1.2	.9	31.9	.5
4	1/ 4	2.8	.2	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
5	1/ 5	3.4	.4	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
6	1/ 6	12.1	24.3	20.3	8.9	44.0	6.4	1.2	.9	31.5	.5
7	1/ 7	12.3	24.6	20.5	9.0	44.1	6.8	1.3	1.0	33.3	.5
8	1/ 8	12.0	23.4	19.8	8.7	44.0	6.6	1.2	.9	33.0	.5
9	1/ 9	11.6	20.9	17.3	7.8	44.9	5.6	1.0	1.1	32.4	.4
10	1/10	12.5	25.1	20.6	9.2	44.7	7.0	1.2	1.0	33.8	.5
11	1/11	11.7	21.7	18.6	8.2	44.0	6.1	1.2	.9	32.6	.5
12	1/12	12.4	24.2	20.2	9.0	44.6	6.8	1.2	.9	33.8	.5
13	1/13	9.9	14.6	10.3	4.6	44.6	3.0	.6	1.0	29.2	.2
14	1/14	12.8	25.4	20.7	9.3	44.9	7.0	1.2	1.0	33.8	.5
15	1/15	13.0	25.7	20.8	9.4	45.1	7.1	1.2	1.1	34.0	.5
16	1/16	11.4	20.9	17.7	7.6	43.3	5.5	1.2	.9	31.3	.5
17	1/17	11.1	19.2	15.8	6.7	42.2	4.5	1.2	.9	28.7	.5
18	1/18	8.4	7.9	5.1	2.1	40.9	.2	.4	1.5	4.4	.2
19	1/19	4.7	.9	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
20	1/20	10.6	16.5	13.2	5.5	41.2	3.0	1.0	1.2	22.6	.4
21	1/21	12.2	20.4	16.9	7.6	44.7	5.5	1.1	1.0	32.6	.4
22	1/22	13.0	23.7	19.7	8.7	44.3	6.5	1.3	.9	33.1	.5
23	1/23	10.5	14.7	10.9	4.6	42.0	2.6	.8	1.2	24.0	.3
24	1/24	12.3	19.4	16.9	7.5	44.4	5.5	1.1	.9	32.2	.5
25	1/25	13.9	26.0	21.2	9.4	44.5	7.2	1.3	.9	33.9	.5
26	1/26	9.8	11.6	9.1	3.4	36.9	1.6	.9	1.0	17.6	.4
27	1/27	13.5	23.7	20.0	8.8	43.8	6.5	1.3	.9	32.8	.5
28	1/28	14.1	26.0	20.9	9.2	43.9	6.9	1.3	.9	33.1	.5
29	1/29	14.1	25.1	20.6	9.1	44.2	6.9	1.3	.9	33.4	.5
30	1/30	13.6	22.7	18.8	8.5	45.4	6.4	1.2	.9	34.1	.5
31	1/31	14.9	26.7	21.5	9.6	44.5	7.3	1.3	.9	34.1	.5
TOTALS/AVERAGES		349.1	604.5	495.7	217.8	44.0	156.8	31.8	28.2	31.6	12.3

RUN ID: SU2
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SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	14.5	25.8	20.8	9.2	44.5	7.1	1.3	.9	33.9	.5
33	2/ 2	11.5	14.5	12.4	4.9	39.8	3.0	1.1	.9	23.9	.5
34	2/ 3	14.8	26.0	20.9	9.3	44.3	7.0	1.3	.9	33.4	.5
35	2/ 4	15.4	26.9	21.5	9.6	44.6	7.3	1.3	.9	34.1	.5
36	2/ 5	15.1	25.7	20.8	9.3	44.6	7.0	1.3	.9	33.8	.5
37	2/ 6	15.3	26.4	21.0	9.2	43.7	6.9	1.3	1.0	32.9	.5
38	2/ 7	7.6	2.7	.5	.1	27.8	-.0	.1	.6	-.4	.1
39	2/ 8	16.0	27.3	21.6	9.6	44.4	6.8	1.3	.9	31.7	.5
40	2/ 9	10.6	10.5	6.6	2.2	33.7	.6	.7	1.2	9.0	.3
41	2/10	16.3	27.3	21.5	9.8	45.3	7.2	1.3	.9	33.7	.5
42	2/11	14.1	20.2	16.0	7.1	44.3	5.1	1.0	1.0	32.0	.4
43	2/12	16.6	27.7	21.7	9.7	44.5	7.4	1.3	1.0	33.9	.5
44	2/13	16.3	26.7	21.1	9.4	44.6	7.2	1.3	.9	34.0	.5
45	2/14	13.9	18.5	15.0	6.6	44.0	4.6	1.1	.9	30.7	.5
46	2/15	15.6	24.3	18.9	8.3	43.8	6.1	1.3	.9	32.4	.5
47	2/16	16.6	26.8	21.1	9.3	44.2	7.0	1.3	.9	33.4	.5
48	2/17	17.3	27.7	22.3	9.7	43.4	7.4	1.5	.9	33.0	.6
49	2/18	17.4	27.9	22.3	9.7	43.6	7.4	1.4	.9	33.0	.6
50	2/19	14.2	17.7	14.4	5.8	40.6	3.8	1.2	.9	26.1	.5
51	2/20	5.0	.3	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
52	2/21	12.8	14.8	11.5	4.8	41.5	2.9	.8	.8	24.9	.3
53	2/22	17.6	27.2	21.1	9.3	44.1	7.0	1.3	.9	33.3	.5
54	2/23	17.8	26.8	21.5	9.3	43.4	7.1	1.4	.9	32.8	.6
55	2/24	17.8	26.7	20.6	8.9	43.2	6.6	1.3	1.0	31.9	.5
56	2/25	14.5	15.3	12.6	5.3	42.2	3.4	1.0	.9	27.0	.4
57	2/26	11.5	7.4	4.4	1.5	35.1	.2	.5	.9	3.5	.2
58	2/27	16.2	20.4	16.5	7.0	42.6	5.0	1.2	.9	30.2	.5
59	2/28	19.4	28.5	22.4	9.7	43.2	7.3	1.5	.9	32.7	.6
TOTALS/AVERAGES		411.6	597.9	470.8	204.5	43.4	148.2	31.3	24.8	31.5	12.6

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SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	7.6	1.2	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
61	3/ 2	16.0	18.4	14.9	6.5	43.8	4.4	1.0	.9	29.4	.4
62	3/ 3	15.7	17.6	13.2	5.4	40.9	3.4	1.0	.9	25.6	.4
63	3/ 4	19.4	26.4	20.4	8.8	43.1	6.5	1.3	.9	32.0	.5
64	3/ 5	14.3	13.4	9.7	4.1	41.9	2.4	.7	1.0	24.3	.3
65	3/ 6	15.4	14.2	11.9	5.1	43.2	3.4	.9	.9	28.2	.3
66	3/ 7	20.8	28.6	22.1	9.5	43.1	7.2	1.4	.9	32.4	.6
67	3/ 8	19.4	23.7	18.8	8.5	45.4	6.4	1.2	.9	34.2	.5
68	3/ 9	19.5	25.5	19.4	8.6	44.2	6.4	1.3	.9	33.1	.5
69	3/10	20.5	27.4	21.1	9.2	43.5	6.9	1.4	.9	32.9	.6
70	3/11	21.3	28.6	21.2	9.2	43.7	6.9	1.3	1.0	32.7	.5
71	3/12	16.7	15.5	13.4	5.9	44.3	4.1	.9	.9	30.8	.3
72	3/13	10.3	2.1	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
73	3/14	22.1	29.4	22.1	9.6	43.5	7.1	1.4	.8	32.3	.6
74	3/15	22.0	29.6	22.0	9.3	42.5	7.0	1.5	.9	31.9	.6
75	3/16	16.8	16.6	11.9	5.0	41.8	3.2	.8	1.0	27.0	.3
76	3/17	20.5	25.2	18.4	7.8	42.3	5.5	1.3	.9	30.0	.5
77	3/18	22.9	30.2	22.3	9.6	43.1	7.2	1.5	.9	32.5	.6
78	3/19	23.0	30.3	22.3	9.6	43.2	7.2	1.4	.9	32.5	.6
79	3/20	23.2	30.4	22.3	9.7	43.5	7.3	1.4	.9	32.9	.6
80	3/21	23.4	30.5	22.4	9.7	43.5	7.4	1.4	.9	32.9	.6
81	3/22	23.2	29.5	22.0	9.6	43.7	7.3	1.4	.9	33.2	.6
82	3/23	12.8	5.8	2.7	.9	34.9	-.0	.3	1.0	-.3	.2
83	3/24	16.4	12.6	9.1	3.3	36.3	1.2	.9	.9	12.8	.5
84	3/25	18.5	17.6	13.0	5.2	39.7	3.2	1.1	.8	24.6	.5
85	3/26	23.4	27.9	21.6	9.5	44.1	7.3	1.4	.9	33.6	.5
86	3/27	22.7	28.1	20.1	8.5	42.5	6.3	1.4	.9	31.2	.6
87	3/28	23.9	29.4	22.1	9.7	43.8	7.4	1.4	.9	33.5	.6
88	3/29	24.7	31.2	22.6	9.8	43.4	7.5	1.4	.9	33.1	.6
89	3/30	24.6	30.3	22.4	9.8	43.8	7.5	1.4	.9	33.4	.6
90	3/31	23.6	28.6	21.2	9.2	43.4	6.9	1.4	.9	32.8	.6
TOTALS/AVERAGES		604.7	706.0	526.3	226.8	43.1	164.5	35.3	26.7	31.3	14.3

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	25.0	30.7	22.3	9.7	43.8	7.4	1.4	.9	33.3	.6
92	4/ 2	19.9	21.9	13.5	5.2	38.3	2.8	1.1	1.4	20.7	.5
93	4/ 3	24.1	29.4	20.5	8.5	41.5	6.1	1.4	.9	29.8	.6
94	4/ 4	24.6	29.0	20.7	9.1	44.0	6.8	1.3	1.0	33.0	.5
95	4/ 5	25.8	31.6	22.6	9.8	43.4	7.4	1.4	.9	33.0	.6
96	4/ 6	25.9	31.8	22.6	9.8	43.3	7.4	1.5	.9	32.8	.6
97	4/ 7	26.1	31.9	22.7	9.8	43.1	7.4	1.5	.9	32.6	.6
98	4/ 8	25.4	28.9	21.5	9.6	44.8	7.3	1.3	1.0	34.3	.5
99	4/ 9	26.4	32.0	22.8	9.7	42.4	7.2	1.5	.9	31.8	.6
100	4/10	22.5	24.6	17.0	6.7	39.3	4.4	1.4	.9	25.9	.6
101	4/11	26.6	32.1	22.8	10.0	43.7	7.6	1.4	.9	33.1	.6
102	4/12	26.8	32.2	22.9	10.0	43.8	7.6	1.4	.9	33.4	.6
103	4/13	21.7	23.1	14.8	5.6	37.8	3.4	1.3	.9	22.8	.6
104	4/14	26.8	32.1	22.8	9.9	43.5	7.5	1.5	.9	33.0	.6
105	4/15	16.9	15.0	8.9	3.5	39.3	1.8	.7	1.1	19.7	.3
106	4/16	24.6	26.8	20.3	9.0	44.4	6.8	1.3	1.0	33.3	.5
107	4/17	12.8	2.8	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
108	4/18	17.1	14.0	9.5	4.1	43.4	2.2	.6	1.1	23.3	.3
109	4/19	14.9	7.7	3.0	.9	30.3	-.0	.3	.8	-.2	.2
110	4/20	14.6	5.8	2.0	.8	41.3	-.0	.2	.8	-.3	.2
111	4/21	24.5	25.0	18.6	7.9	42.2	5.3	1.3	.8	28.5	.6
112	4/22	27.8	32.7	23.1	10.2	43.9	7.7	1.4	1.0	33.4	.6
113	4/23	27.7	32.5	23.1	10.1	43.7	7.6	1.5	1.0	33.1	.6
114	4/24	24.1	24.5	17.8	7.5	42.1	5.2	1.3	1.0	29.3	.5
115	4/25	28.2	33.0	23.7	10.3	43.6	8.0	1.5	.8	33.5	.6
116	4/26	28.3	33.1	23.8	10.4	43.7	8.0	1.5	.8	33.8	.6
117	4/27	27.9	31.0	23.0	10.2	44.6	8.0	1.4	.9	34.6	.6
118	4/28	27.7	31.9	22.8	10.0	43.9	7.6	1.4	1.0	33.3	.6
119	4/29	25.0	26.5	19.1	7.7	40.6	5.5	1.4	.8	28.7	.6
120	4/30	18.3	12.0	8.4	3.7	44.3	2.2	.6	1.0	26.7	.2
TOTALS/AVERAGES		708.1	765.4	536.4	229.7	42.8	166.3	35.8	27.4	31.0	14.6

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	28.7	32.8	23.6	10.1	42.7	7.6	1.5	.9	32.1	.6
122	5/ 2	22.9	21.5	15.1	5.6	36.7	3.4	1.4	.8	22.2	.6
123	5/ 3	28.7	32.7	23.6	10.2	43.1	7.7	1.5	.8	32.8	.6
124	5/ 4	27.8	31.5	22.8	9.8	42.8	7.4	1.5	.8	32.3	.6
125	5/ 5	15.2	6.5	1.5	.4	24.1	-.0	.2	.6	-.4	.2
126	5/ 6	26.0	27.4	20.4	8.8	43.2	6.2	1.4	.8	30.6	.6
127	5/ 7	28.9	32.4	23.6	10.3	43.7	7.9	1.5	.8	33.6	.6
128	5/ 8	28.3	30.9	23.0	10.1	43.9	7.8	1.5	.8	33.8	.6
129	5/ 9	26.7	29.0	21.3	9.2	43.1	6.8	1.5	.8	32.2	.6
130	5/10	27.0	28.1	21.3	9.5	44.7	7.3	1.4	.8	34.4	.6
131	5/11	22.3	19.3	13.8	5.2	37.8	3.1	1.3	.8	22.4	.6
132	5/12	29.6	33.1	24.0	10.5	43.9	8.1	1.5	.8	33.9	.6
133	5/13	27.7	29.7	21.9	9.6	43.6	7.3	1.5	.8	33.2	.6
134	5/14	26.1	26.4	19.7	8.4	42.4	6.1	1.4	.9	31.0	.6
135	5/15	29.8	33.2	24.1	10.4	43.0	7.9	1.6	.9	32.8	.6
136	5/16	29.9	33.3	24.1	10.5	43.7	8.1	1.5	.9	33.7	.6
137	5/17	26.2	27.4	19.7	8.2	41.6	5.9	1.5	.8	29.9	.6
138	5/18	20.9	15.5	10.1	4.1	40.5	2.2	.9	1.1	21.4	.4
139	5/19	16.0	6.0	1.8	.6	32.0	-.0	.2	.7	-.3	.2
140	5/20	22.1	18.7	13.1	4.7	35.8	2.3	1.3	.8	17.7	.6
141	5/21	30.1	33.4	24.3	10.5	43.2	8.0	1.6	.9	33.0	.6
142	5/22	30.2	33.5	24.3	10.7	43.8	8.2	1.5	.8	33.9	.6
143	5/23	30.1	33.4	24.3	10.8	44.3	8.4	1.5	.8	34.5	.6
144	5/24	29.5	32.4	23.7	10.5	44.0	8.1	1.5	.8	34.1	.6
145	5/25	23.6	20.8	15.6	6.1	39.3	4.0	1.4	.8	25.7	.6
146	5/26	27.4	28.2	21.1	9.0	42.8	6.7	1.5	.8	31.7	.6
147	5/27	29.0	31.3	23.3	10.1	43.4	7.7	1.5	.8	33.1	.6
148	5/28	20.2	14.9	9.0	3.1	34.4	.9	1.0	1.2	10.1	.5
149	5/29	28.9	30.0	22.7	10.1	44.5	7.8	1.4	.8	34.3	.6
150	5/30	17.4	7.8	3.5	1.3	38.0	-.0	.4	1.1	-.2	.2
151	5/31	30.1	33.3	24.9	10.7	42.9	8.1	1.7	.7	32.7	.7
TOTALS/AVERAGES		807.4	814.3	585.5	249.0	42.5	181.1	41.1	26.3	30.9	17.6

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	18.2	9.7	7.4	2.8	38.3	1.2	.7	1.0	15.8	.3
153	6/ 2	28.4	29.9	22.2	9.6	43.1	7.2	1.5	.8	32.4	.6
154	6/ 3	30.5	33.5	25.1	10.8	43.1	8.3	1.7	.8	33.2	.7
155	6/ 4	24.6	21.9	16.2	6.9	42.7	4.7	1.2	1.0	29.0	.5
156	6/ 5	30.6	33.5	25.2	10.9	43.4	8.5	1.7	.8	33.6	.7
157	6/ 6	24.5	21.9	16.3	6.7	41.3	4.6	1.3	.9	28.1	.6
158	6/ 7	29.8	32.2	24.4	10.6	43.3	8.1	1.6	.7	33.4	.7
159	6/ 8	23.6	20.6	15.0	5.8	38.7	3.7	1.3	.8	24.7	.6
160	6/ 9	30.6	33.5	25.2	10.9	43.4	8.4	1.7	.8	33.5	.7
161	6/10	30.6	33.5	25.2	11.0	43.4	8.5	1.7	.8	33.6	.7
162	6/11	18.7	12.7	6.4	2.2	33.8	.3	.6	1.2	4.9	.3
163	6/12	28.3	28.5	21.6	9.3	43.2	7.0	1.5	.8	32.2	.6
164	6/13	19.3	13.4	7.2	2.6	36.3	.7	.7	1.3	9.3	.3
165	6/14	21.7	18.3	14.9	6.8	45.2	4.8	1.0	.9	32.3	.4
166	6/15	29.0	30.8	23.6	10.1	43.1	7.8	1.6	.7	33.0	.7
167	6/16	29.5	32.0	24.2	10.4	42.9	8.0	1.7	.8	32.8	.7
168	6/17	16.8	7.3	3.6	1.2	33.3	-.0	.4	.9	-.2	.2
169	6/18	29.6	31.0	24.1	10.5	43.6	8.0	1.6	.8	33.2	.7
170	6/19	30.3	32.6	24.4	10.8	44.3	8.4	1.5	.9	34.4	.6
171	6/20	28.5	28.7	22.5	9.8	43.7	7.6	1.5	.8	33.6	.6
172	6/21	30.5	33.2	25.2	11.0	43.7	8.5	1.6	.8	33.8	.7
173	6/22	30.5	33.2	25.2	11.0	43.8	8.6	1.6	.8	34.1	.7
174	6/23	30.5	33.2	25.2	11.1	43.9	8.6	1.6	.8	34.2	.7
175	6/24	30.3	32.8	25.0	10.9	43.7	8.5	1.6	.8	34.0	.7
176	6/25	29.5	30.8	23.9	10.5	43.8	8.1	1.6	.8	33.8	.7
177	6/26	30.3	32.9	25.1	10.9	43.7	8.5	1.6	.8	33.8	.7
178	6/27	30.1	32.8	25.0	10.9	43.7	8.5	1.6	.8	34.0	.7
179	6/28	30.3	33.1	25.1	11.0	43.8	8.6	1.6	.8	34.1	.7
180	6/29	30.2	32.9	25.0	11.0	43.9	8.6	1.6	.8	34.2	.7
181	6/30	30.2	32.9	25.1	11.0	43.8	8.6	1.6	.8	34.2	.7
TOTALS/AVERAGES		825.2	833.3	624.8	269.2	43.1	200.7	43.0	25.3	32.1	18.1

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	29.8	32.5	24.7	10.7	43.5	8.3	1.6	.8	33.7	.7
183	7/ 2	15.6	7.7	4.6	1.9	40.9	.5	.4	1.0	11.3	.2
184	7/ 3	25.1	23.4	18.1	8.0	44.0	5.8	1.3	.8	32.2	.5
185	7/ 4	26.9	25.9	20.2	8.9	44.2	6.8	1.4	.8	33.4	.6
186	7/ 5	28.2	29.9	22.7	10.0	44.3	7.7	1.5	.8	33.9	.6
187	7/ 6	28.3	30.8	23.3	10.0	43.0	7.7	1.6	.8	32.9	.7
188	7/ 7	28.5	31.0	23.7	10.2	43.1	7.8	1.6	.8	33.0	.7
189	7/ 8	27.2	26.6	21.2	9.6	45.0	7.3	1.4	.9	34.5	.6
190	7/ 9	23.1	21.1	14.8	5.6	38.0	3.4	1.3	.8	23.1	.6
191	7/10	26.4	25.6	20.2	8.9	44.1	6.7	1.4	.8	33.1	.6
192	7/11	23.7	20.9	16.1	6.7	41.4	4.6	1.3	1.0	28.4	.6
193	7/12	28.4	31.2	23.3	10.2	43.9	7.7	1.5	.8	33.1	.6
194	7/13	24.8	22.1	18.2	8.3	45.8	6.4	1.2	.9	34.9	.5
195	7/14	20.6	14.6	11.2	4.6	40.6	2.7	1.0	.9	23.7	.5
196	7/15	27.3	27.9	21.7	9.8	45.1	7.5	1.4	.9	34.6	.6
197	7/16	28.8	31.5	23.6	10.5	44.4	8.0	1.5	.8	34.1	.6
198	7/17	27.7	29.3	22.4	9.9	44.3	7.6	1.5	.8	34.0	.6
199	7/18	27.9	29.2	22.3	10.0	44.9	7.7	1.4	.8	34.7	.6
200	7/19	29.1	32.0	23.8	10.6	44.5	8.3	1.5	.8	34.7	.6
201	7/20	24.4	22.9	17.3	7.4	42.6	5.1	1.3	1.0	29.4	.6
202	7/21	26.2	26.8	20.3	8.8	43.5	6.5	1.4	.8	32.1	.6
203	7/22	25.8	26.4	19.8	8.5	42.6	6.2	1.4	.8	31.1	.6
204	7/23	28.9	31.9	23.7	10.4	44.1	8.1	1.5	.8	34.2	.6
205	7/24	28.8	31.8	23.6	10.5	44.3	8.1	1.5	.8	34.4	.6
206	7/25	25.9	26.0	20.4	9.2	44.9	7.0	1.3	.8	34.4	.5
207	7/26	27.5	30.2	22.5	9.8	43.6	7.5	1.5	.8	33.3	.6
208	7/27	27.9	30.7	22.9	10.0	43.9	7.7	1.5	.8	33.7	.6
209	7/28	27.7	30.9	22.8	10.0	43.8	7.7	1.5	.8	33.6	.6
210	7/29	27.8	31.0	22.9	10.0	43.8	7.7	1.5	.8	33.6	.6
211	7/30	26.2	27.6	21.0	9.1	43.4	6.8	1.5	.8	32.6	.6
212	7/31	26.8	29.6	22.0	9.6	43.7	7.3	1.5	.8	33.2	.6
TOTALS/AVERAGES		821.1	838.9	635.4	277.8	43.7	208.3	43.1	26.0	32.8	18.4

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	27.8	31.1	23.1	10.2	44.2	7.9	1.5	.8	34.2	.6
214	8/ 2	27.9	31.4	23.2	10.3	44.4	8.0	1.5	.8	34.4	.6
215	8/ 3	25.9	27.2	21.2	9.6	45.1	7.4	1.3	.9	34.9	.6
216	8/ 4	20.0	16.6	12.5	5.5	43.9	3.8	.9	.9	30.3	.3
217	8/ 5	21.3	19.4	14.3	6.2	43.5	4.4	1.0	.9	30.5	.4
218	8/ 6	27.4	30.2	22.9	10.1	44.0	7.8	1.5	.8	33.9	.6
219	8/ 7	25.2	26.5	20.2	8.6	42.8	6.4	1.4	.8	31.8	.6
220	8/ 8	25.3	28.0	20.4	8.8	43.1	6.6	1.4	.8	32.1	.6
221	8/ 9	25.8	28.9	21.3	9.3	43.5	7.0	1.4	.8	32.9	.6
222	8/10	26.2	29.9	21.9	9.5	43.4	7.2	1.5	.8	33.0	.6
223	8/11	25.3	27.7	20.7	9.0	43.2	6.7	1.4	.8	32.4	.6
224	8/12	23.0	22.3	17.4	7.8	44.8	5.8	1.2	1.0	33.2	.5
225	8/13	21.1	21.2	13.9	6.0	43.0	3.7	1.0	1.3	26.5	.5
226	8/14	22.9	22.9	17.4	7.5	43.1	5.3	1.3	.8	30.6	.6
227	8/15	25.1	27.0	19.9	9.0	45.3	6.8	1.2	.9	34.1	.5
228	8/16	23.9	24.4	19.0	8.5	44.8	6.3	1.2	.9	33.4	.5
229	8/17	12.8	8.7	4.9	1.8	35.8	.4	.5	.9	8.1	.2
230	8/18	13.4	9.9	4.5	1.6	35.3	-.0	.4	1.3	-.2	.2
231	8/19	24.6	28.1	20.1	8.7	43.2	6.3	1.4	.9	31.4	.6
232	8/20	25.4	29.3	21.2	9.3	43.8	7.0	1.4	.9	33.0	.6
233	8/21	24.4	26.9	19.9	8.7	43.6	6.5	1.4	.9	32.6	.6
234	8/22	25.7	28.9	21.5	9.5	44.4	7.2	1.4	.9	33.6	.6
235	8/23	25.7	29.4	21.6	9.5	44.2	7.3	1.4	.9	33.6	.6
236	8/24	25.1	27.3	20.7	9.4	45.3	7.2	1.3	.9	34.6	.5
237	8/25	23.5	24.7	18.8	8.1	43.0	5.9	1.3	.8	31.6	.6
238	8/26	25.0	27.9	21.0	9.3	44.2	7.0	1.4	.9	33.6	.6
239	8/27	24.2	26.6	19.7	8.9	45.1	6.7	1.2	.9	34.0	.5
240	8/28	17.5	13.4	12.1	5.8	47.7	4.1	.7	1.0	34.0	.3
241	8/29	23.6	26.7	19.8	8.5	43.1	6.3	1.4	.8	31.9	.6
242	8/30	20.9	19.8	16.2	7.0	43.6	5.0	1.2	.9	31.0	.5
243	8/31	18.0	16.2	12.0	4.6	38.1	2.6	1.1	.8	21.8	.5
TOTALS/AVERAGES		724.0	758.8	563.4	246.5	43.8	180.7	38.0	27.6	32.1	16.2

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	24.9	29.4	21.9	9.6	44.1	7.4	1.4	.8	33.8	.6
245	9/ 2	24.9	29.5	21.9	9.7	44.1	7.4	1.4	.8	33.9	.6
246	9/ 3	17.3	16.0	10.4	3.7	35.5	1.5	1.0	1.3	14.5	.5
247	9/ 4	24.2	28.5	21.4	9.2	42.9	6.9	1.4	.9	32.1	.6
248	9/ 5	22.8	25.6	19.7	8.7	44.3	6.5	1.3	.9	33.2	.5
249	9/ 6	10.8	2.1	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
250	9/ 7	22.5	25.4	19.8	8.6	43.5	6.3	1.3	.7	31.9	.6
251	9/ 8	15.6	10.1	7.0	2.6	36.4	.8	.8	1.0	11.2	.4
252	9/ 9	22.4	25.6	19.9	8.6	43.3	6.4	1.3	.8	32.3	.6
253	9/10	22.9	26.5	20.2	9.1	44.9	6.9	1.3	.9	34.2	.5
254	9/11	18.4	16.6	12.6	5.5	43.5	3.7	.9	.9	29.4	.4
255	9/12	22.1	25.9	20.1	8.7	43.4	6.5	1.4	.8	32.6	.6
256	9/13	20.9	21.7	17.0	7.5	44.1	5.5	1.1	.9	32.4	.5
257	9/14	17.6	17.1	13.5	5.6	41.7	3.8	1.0	.9	28.0	.4
258	9/15	15.6	11.3	7.7	2.8	35.7	.9	.8	1.0	11.6	.5
259	9/16	22.7	27.5	21.2	9.1	43.1	6.9	1.4	.8	32.4	.6
260	9/17	22.1	27.0	20.8	9.0	43.3	6.8	1.4	.8	32.7	.6
261	9/18	22.0	26.8	20.7	9.0	43.5	6.8	1.4	.8	32.8	.6
262	9/19	21.7	26.8	20.7	9.0	43.7	6.8	1.4	.8	33.1	.6
263	9/20	22.3	27.8	21.4	9.3	43.7	7.1	1.4	.8	33.2	.6
264	9/21	21.2	26.7	20.5	8.9	43.4	6.6	1.4	.8	32.5	.6
265	9/22	22.0	27.8	21.4	9.4	44.0	7.2	1.4	.8	33.6	.6
266	9/23	21.8	27.6	21.3	9.4	44.2	7.2	1.4	.8	33.7	.6
267	9/24	21.7	27.5	21.3	9.4	43.9	7.1	1.4	.9	33.5	.6
268	9/25	14.8	12.8	9.0	3.8	42.6	2.1	.7	1.1	22.8	.3
269	9/26	21.0	26.6	20.9	9.1	43.7	6.9	1.4	.8	33.3	.6
270	9/27	21.3	27.6	21.4	9.4	43.8	7.2	1.4	.9	33.4	.6
271	9/28	17.1	18.4	14.9	6.4	43.1	4.5	1.0	.9	30.4	.4
272	9/29	18.2	21.7	16.6	7.3	43.9	5.2	1.2	.9	31.3	.5
273	9/30	20.5	26.8	21.0	9.1	43.1	6.9	1.4	.8	32.8	.6
TOTALS/AVERAGES		613.0	690.9	526.1	227.5	43.2	165.9	35.8	25.6	31.5	15.0

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	10.7	4.9	2.8	1.0	34.6	-.0	.4	1.0	-.3	.2
275	10/ 2	17.8	21.3	17.4	7.8	44.7	5.4	1.1	.8	30.9	.5
276	10/ 3	8.4	4.0	1.9	.5	29.5	-.0	.2	.7	-.3	.2
277	10/ 4	18.6	23.6	18.9	8.7	45.9	6.3	1.1	.9	33.3	.5
278	10/ 5	19.8	27.4	21.5	9.5	44.0	7.3	1.4	.8	33.9	.6
279	10/ 6	19.8	27.7	21.8	9.6	44.1	7.3	1.4	.9	33.7	.6
280	10/ 7	19.6	27.7	21.8	9.6	43.8	7.3	1.4	.9	33.4	.6
281	10/ 8	19.5	27.7	21.8	9.6	44.0	7.3	1.4	.9	33.5	.6
282	10/ 9	15.0	17.3	14.0	5.8	41.6	3.8	1.1	.9	27.1	.5
283	10/10	18.2	25.4	19.8	8.9	44.8	6.7	1.3	.9	33.9	.5
284	10/11	18.7	27.1	21.5	9.4	44.0	7.3	1.4	.8	33.8	.6
285	10/12	18.9	27.6	21.8	9.6	44.0	7.3	1.4	.9	33.5	.6
286	10/13	18.7	27.6	21.9	9.6	43.9	7.3	1.4	.9	33.5	.6
287	10/14	18.6	27.6	21.9	9.6	43.8	7.3	1.4	.9	33.4	.6
288	10/15	8.0	1.8	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
289	10/16	4.5	.3	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
290	10/17	9.8	8.0	5.0	1.9	38.8	.2	.5	.8	4.4	.2
291	10/18	15.9	21.7	17.8	7.7	43.1	5.6	1.2	.9	31.2	.5
292	10/19	8.8	3.4	1.3	.5	42.3	-.0	.1	.8	-.1	.1
293	10/20	17.5	26.9	20.9	9.4	44.8	6.9	1.3	.8	32.9	.5
294	10/21	16.5	23.6	19.3	8.5	43.9	6.4	1.3	.8	33.0	.5
295	10/22	17.3	27.2	21.8	9.6	43.9	7.3	1.4	.9	33.5	.6
296	10/23	17.2	27.1	21.8	9.6	43.9	7.3	1.4	.9	33.5	.6
297	10/24	15.6	24.0	19.5	8.4	43.1	6.2	1.4	.8	31.8	.6
298	10/25	16.8	27.0	21.2	9.6	45.1	7.3	1.3	.9	34.5	.5
299	10/26	16.7	26.9	21.2	9.5	44.8	7.3	1.3	.9	34.3	.5
300	10/27	16.5	26.8	21.2	9.6	45.3	7.4	1.3	.9	34.9	.5
301	10/28	16.3	26.2	21.0	9.4	44.6	7.1	1.3	.9	34.1	.5
302	10/29	16.2	26.7	21.2	9.5	45.1	7.3	1.3	.9	34.6	.5
303	10/30	16.1	26.6	21.2	9.4	44.2	7.1	1.3	.9	33.5	.5
304	10/31	15.8	26.3	21.0	9.4	44.7	7.1	1.3	.9	34.0	.5
TOTALS/AVERAGES		487.7	667.6	524.2	231.0	44.1	171.1	34.2	25.5	32.6	14.1

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	13.5	19.6	15.8	7.0	44.2	5.0	1.0	1.0	31.7	.4
306	11/ 2	15.7	26.8	21.4	9.5	44.4	7.2	1.3	.9	33.8	.5
307	11/ 3	14.1	22.6	18.7	8.2	43.7	6.0	1.3	.9	32.2	.5
308	11/ 4	14.1	23.0	18.8	8.3	43.9	6.1	1.3	.9	32.2	.5
309	11/ 5	14.8	25.7	20.9	9.2	44.0	6.9	1.3	.9	33.2	.5
310	11/ 6	14.9	25.9	21.0	9.4	44.8	7.2	1.3	.9	34.3	.5
311	11/ 7	10.0	10.3	8.1	3.0	37.7	1.3	.8	.9	16.6	.4
312	11/ 8	14.5	25.6	21.0	9.4	45.0	7.2	1.3	.9	34.4	.5
313	11/ 9	11.6	16.3	13.9	6.1	43.7	4.2	1.0	.9	30.1	.4
314	11/10	14.3	25.7	21.0	9.3	44.5	7.1	1.3	.9	33.7	.5
315	11/11	14.3	25.8	21.1	9.5	44.8	7.3	1.3	.9	34.3	.5
316	11/12	14.4	26.2	21.4	9.5	44.5	7.3	1.3	.9	34.0	.5
317	11/13	12.5	21.1	17.7	7.6	42.9	5.5	1.3	.9	30.8	.5
318	11/14	13.2	24.4	19.8	8.7	43.9	6.5	1.3	.9	32.5	.5
319	11/15	11.7	18.5	15.6	7.2	46.1	5.3	.9	.9	34.1	.3
320	11/16	13.6	25.5	21.1	9.5	45.0	7.3	1.3	.9	34.6	.5
321	11/17	13.3	24.6	20.1	9.2	45.9	7.0	1.2	1.0	34.9	.5
322	11/18	13.3	24.6	20.1	9.2	45.7	7.0	1.2	1.0	34.6	.5
323	11/19	13.4	25.1	20.5	9.3	45.5	7.0	1.2	1.1	34.3	.5
324	11/20	12.4	22.1	18.5	8.3	44.6	6.1	1.2	.9	33.1	.5
325	11/21	8.9	10.8	8.0	2.8	34.6	.7	.9	1.2	8.6	.4
326	11/22	8.2	6.8	4.9	1.6	32.1	-.0	.7	.9	-.2	.3
327	11/23	6.1	1.6	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
328	11/24	8.4	8.0	6.2	2.5	40.1	.8	.6	.8	12.6	.3
329	11/25	7.4	5.3	3.8	1.5	39.9	.2	.4	.9	5.7	.2
330	11/26	12.8	24.7	20.4	9.3	45.5	7.1	1.2	1.0	34.5	.5
331	11/27	12.7	24.6	20.4	9.1	44.7	6.8	1.2	1.1	33.5	.5
332	11/28	11.8	22.5	18.7	8.2	43.7	6.0	1.2	1.0	32.1	.5
333	11/29	11.7	21.5	18.3	8.2	44.7	6.0	1.2	.9	33.0	.5
334	11/30	12.4	23.9	20.0	9.0	44.7	6.8	1.2	1.0	34.0	.5
TOTALS/AVERAGES		370.0	608.9	497.3	219.4	44.1	158.8	32.6	27.9	31.9	13.0

RUN ID: SU2
83/09/02.

SOUTHERN UNION

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	12.3	24.2	20.3	9.1	44.9	6.9	1.2	.9	34.2	.5
336	12/ 2	11.9	22.6	19.3	8.6	44.8	6.5	1.2	.9	33.7	.5
337	12/ 3	8.0	9.3	8.1	3.3	41.1	1.6	.6	1.1	19.4	.3
338	12/ 4	9.1	12.5	10.3	4.6	44.5	3.0	.7	.9	28.6	.3
339	12/ 5	12.0	23.7	20.1	8.9	44.4	6.7	1.2	.9	33.5	.5
340	12/ 6	11.7	22.9	19.4	8.5	44.0	6.4	1.2	.9	32.8	.5
341	12/ 7	2.9	.2	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
342	12/ 8	6.7	5.9	3.4	1.4	40.7	-.0	.2	1.0	-.1	.1
343	12/ 9	10.4	19.7	16.8	7.1	42.0	4.9	1.2	.9	28.8	.5
344	12/10	6.5	5.7	3.5	1.3	37.7	.1	.3	1.0	1.5	.1
345	12/11	5.7	3.7	2.2	.8	36.9	-.0	.2	1.0	-.2	.1
346	12/12	9.7	15.5	12.8	5.5	43.2	3.4	.9	.9	26.8	.3
347	12/13	11.2	22.0	18.9	8.0	42.6	5.8	1.2	1.0	30.9	.5
348	12/14	7.4	10.1	8.2	3.4	41.3	1.8	.6	1.0	22.1	.2
349	12/15	7.0	6.1	5.0	1.5	29.6	-.0	.7	.9	-.2	.3
350	12/16	10.3	18.9	16.3	7.0	43.0	4.9	1.1	.9	29.9	.5
351	12/17	11.6	23.1	19.8	8.7	43.9	6.6	1.2	.9	33.1	.5
352	12/18	8.8	14.2	11.9	4.7	39.4	2.8	1.0	1.0	23.2	.4
353	12/19	9.9	18.1	15.4	6.3	41.1	4.2	1.1	1.0	27.3	.5
354	12/20	11.3	22.7	19.3	8.4	43.5	6.2	1.2	1.0	32.2	.5
355	12/21	11.6	23.3	19.9	8.8	44.1	6.6	1.2	1.0	33.1	.5
356	12/22	11.6	23.4	20.0	8.7	43.7	6.6	1.2	.9	32.9	.5
357	12/23	11.6	23.5	20.0	8.7	43.7	6.5	1.2	1.0	32.7	.5
358	12/24	11.6	23.4	20.0	8.7	43.7	6.5	1.2	1.0	32.6	.5
359	12/25	11.7	23.5	20.0	8.8	43.8	6.6	1.2	.9	32.8	.5
360	12/26	11.1	22.0	18.7	8.2	44.0	6.1	1.2	1.0	32.5	.5
361	12/27	11.7	23.6	20.1	8.7	43.4	6.5	1.3	1.0	32.3	.5
362	12/28	11.7	23.7	20.1	8.7	43.5	6.5	1.3	1.0	32.4	.5
363	12/29	11.6	23.2	19.8	8.7	44.0	6.5	1.2	1.0	32.9	.5
364	12/30	11.8	23.8	20.2	9.0	44.5	6.8	1.2	1.0	33.7	.5
365	12/31	11.8	23.8	20.1	8.9	44.2	6.7	1.2	1.0	33.3	.5
TOTALS/AVERAGES		312.4	558.2	469.8	203.3	43.3	143.5	30.7	29.0	30.5	11.8

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

31 JANUARY (DAY 31)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	11.1	0.00	0.00	0.00	12.9	12.9	0.00	0.0	0.00	.03	0.00
2	10.3	0.00	0.00	0.00	11.8	11.8	0.00	0.0	0.00	.02	0.00
3	9.5	0.00	0.00	0.00	10.9	10.9	0.00	0.0	0.00	.02	0.00
4	8.6	0.00	0.00	0.00	9.9	9.9	0.00	0.0	0.00	.02	0.00
5	7.8	0.00	0.00	0.00	9.1	9.1	0.00	0.0	0.00	.02	0.00
6	7.2	0.00	0.00	0.00	8.3	8.3	0.00	0.0	0.00	.02	0.00
7	7.2	0.00	0.00	0.00	7.8	7.8	0.00	0.0	0.00	.01	0.00
8	7.8	1.28	.61	4.98	105.8	107.2	.07	11.0	0.00	.07	.06
9	9.4	2.53	1.66	4.98	148.7	163.6	.67	40.7	0.00	.11	.06
10	11.1	3.06	2.49	4.98	188.6	213.2	1.12	44.8	.56	.15	.06
11	12.8	3.26	3.04	4.98	194.0	225.4	1.43	47.1	1.21	.17	.06
12	12.8	3.30	3.27	4.98	194.9	229.5	1.57	48.1	1.38	.17	.06
13	13.3	3.30	3.27	4.98	194.9	229.5	1.58	48.2	1.40	.17	.06
14	14.4	3.26	3.04	4.98	194.5	226.0	1.43	47.2	1.28	.17	.06
15	14.4	3.05	2.49	4.98	193.0	217.4	1.11	44.6	.99	.16	.06
16	14.4	2.50	1.64	4.98	190.7	203.5	.59	35.7	.51	.14	.06
17	13.3	1.21	0.00	0.00	74.7	74.7	0.00	0.0	0.00	.28	0.00
18	9.4	0.00	0.00	0.00	41.1	41.1	0.00	0.0	0.00	.14	0.00
19	10.4	0.00	0.00	0.00	27.0	27.0	0.00	0.0	0.00	.10	0.00
20	6.4	0.00	0.00	0.00	17.8	17.8	0.00	0.0	0.00	.08	0.00
21	3.4	0.00	0.00	0.00	11.6	11.6	0.00	0.0	0.00	.06	0.00
22	1.5	0.00	0.00	0.00	7.3	7.3	0.00	0.0	0.00	.05	0.00
23	.6	0.00	0.00	0.00	4.5	4.5	0.00	0.0	0.00	.04	0.00
24	.7	0.00	0.00	0.00	2.9	2.9	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	26.74	21.50	---	---	---	9.57	44.5	7.32	2.26	.51

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

28 FEBRUARY (DAY 59)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	.9	0.00	0.00	0.00	3.1	3.1	0.00	0.0	0.00	.03	0.00
2	0.0	0.00	0.00	0.00	1.8	1.8	0.00	0.0	0.00	.03	0.00
3	-1.6	0.00	0.00	0.00	.4	.4	0.00	0.0	0.00	.03	0.00
4	-3.2	0.00	0.00	0.00	-1.1	-1.1	0.00	0.0	0.00	.02	0.00
5	-5.0	0.00	0.00	0.00	-2.7	-2.7	0.00	0.0	0.00	.02	0.00
6	-2.5	0.00	0.00	0.00	-2.6	-2.6	0.00	0.0	0.00	.02	0.00
7	-.1	.02	0.00	0.00	-1.6	-1.6	0.00	0.0	0.00	.01	0.00
8	2.2	1.89	.77	4.98	108.2	112.1	.18	23.0	0.00	.08	.06
9	5.7	2.81	1.74	4.98	152.6	167.6	.68	39.2	0.00	.11	.06
10	9.3	3.14	2.51	4.98	189.1	213.6	1.11	44.4	.59	.15	.06
11	12.8	3.23	2.99	4.98	193.8	224.6	1.40	47.0	1.18	.17	.06
12	14.8	3.26	3.24	4.98	194.8	229.1	1.56	48.2	1.37	.17	.06
13	16.9	3.26	3.24	4.98	195.0	229.3	1.56	48.3	1.39	.17	.06
14	18.9	3.23	2.99	4.98	194.5	225.6	1.42	47.4	1.27	.17	.06
15	18.9	3.14	2.50	4.98	193.1	217.8	1.13	44.9	1.00	.16	.06
16	18.9	2.76	1.71	4.98	190.8	204.3	.61	35.7	.54	.14	.06
17	18.9	1.80	.73	4.98	186.8	187.7	.04	5.5	0.00	.13	.06
18	14.6	.01	0.00	0.00	75.4	75.4	0.00	0.0	0.00	.27	0.00
19	9.9	0.00	0.00	0.00	41.7	41.7	0.00	0.0	0.00	.14	0.00
20	8.1	0.00	0.00	0.00	26.1	26.1	0.00	0.0	0.00	.10	0.00
21	6.3	0.00	0.00	0.00	17.3	17.3	0.00	0.0	0.00	.07	0.00
22	4.5	0.00	0.00	0.00	11.8	11.8	0.00	0.0	0.00	.06	0.00
23	2.6	0.00	0.00	0.00	7.9	7.9	0.00	0.0	0.00	.05	0.00
24	.8	0.00	0.00	0.00	4.9	4.9	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	28.53	22.41	---	---	---	9.69	43.2	7.33	2.34	.57

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

29 MARCH (DAY 88)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	15.0	0.00	0.00	0.00	17.3	17.3	0.00	0.0	0.00	.03	0.00
2	14.2	0.00	0.00	0.00	16.0	16.0	0.00	0.0	0.00	.03	0.00
3	13.4	0.00	0.00	0.00	14.9	14.9	0.00	0.0	0.00	.02	0.00
4	12.5	0.00	0.00	0.00	13.9	13.9	0.00	0.0	0.00	.02	0.00
5	11.7	0.00	0.00	0.00	13.0	13.0	0.00	0.0	0.00	.02	0.00
6	12.2	0.00	0.00	0.00	12.7	12.7	0.00	0.0	0.00	.02	0.00
7	14.4	1.03	0.00	0.00	29.6	29.6	0.00	0.0	0.00	.04	0.00
8	16.1	2.18	.84	4.98	115.3	119.7	.20	24.3	0.00	.08	.06
9	16.7	2.95	1.80	4.98	162.3	177.8	.71	39.3	0.00	.12	.06
10	18.3	3.13	2.48	4.98	190.7	215.2	1.12	44.9	.69	.15	.06
11	19.4	3.20	2.96	4.98	194.0	224.8	1.40	47.4	1.19	.17	.06
12	20.6	3.23	3.20	4.98	194.9	229.0	1.55	48.5	1.37	.17	.06
13	21.1	3.23	3.20	4.98	194.9	229.0	1.55	48.6	1.38	.17	.06
14	22.2	3.20	2.96	4.98	194.5	225.4	1.41	47.6	1.26	.17	.06
15	22.8	3.11	2.47	4.98	193.1	217.6	1.12	45.1	1.00	.16	.06
16	23.3	2.93	1.79	4.98	191.0	205.4	.65	36.5	.57	.15	.06
17	22.2	2.23	.86	4.98	188.4	190.2	.08	9.5	.03	.13	.06
18	21.1	.77	0.00	0.00	80.5	80.5	0.00	0.0	0.00	.26	0.00
19	18.7	0.00	0.00	0.00	49.0	49.0	0.00	0.0	0.00	.13	0.00
20	16.2	0.00	0.00	0.00	33.8	33.8	0.00	0.0	0.00	.09	0.00
21	13.8	0.00	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.07	0.00
22	11.3	0.00	0.00	0.00	19.0	19.0	0.00	0.0	0.00	.06	0.00
23	8.9	0.00	0.00	0.00	14.7	14.7	0.00	0.0	0.00	.05	0.00
24	8.1	0.00	0.00	0.00	11.9	11.9	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	31.19	22.56	---	---	---	9.80	43.4	7.47	2.34	.57

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

26 APRIL (DAY 116)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	14.7	0.00	0.00	0.00	18.2	18.2	0.00	0.0	0.00	.03	0.00
2	13.3	0.00	0.00	0.00	16.1	16.1	0.00	0.0	0.00	.03	0.00
3	12.0	0.00	0.00	0.00	14.4	14.4	0.00	0.0	0.00	.03	0.00
4	10.6	0.00	0.00	0.00	12.8	12.8	0.00	0.0	0.00	.02	0.00
5	9.2	0.00	0.00	0.00	11.3	11.3	0.00	0.0	0.00	.02	0.00
6	7.8	0.00	0.00	0.00	9.9	9.9	0.00	0.0	0.00	.02	0.00
7	10.0	1.54	.40	4.98	103.5	103.6	.00	1.2	0.00	.07	.06
8	15.0	2.65	1.16	4.98	121.0	128.9	.36	30.8	0.00	.08	.06
9	20.6	2.99	1.90	4.98	177.6	194.1	.75	39.6	0.00	.13	.06
10	25.0	3.13	2.52	4.98	192.5	217.8	1.15	45.7	.87	.15	.06
11	29.4	3.19	2.96	4.98	194.3	225.6	1.43	48.2	1.23	.16	.06
12	30.0	3.21	3.18	4.98	194.9	229.3	1.56	49.2	1.38	.16	.06
13	31.7	3.21	3.18	4.98	195.1	229.6	1.57	49.3	1.41	.16	.06
14	32.2	3.19	2.96	4.98	194.7	226.1	1.43	48.4	1.29	.16	.06
15	31.7	3.12	2.52	4.98	193.4	219.0	1.16	46.2	1.05	.15	.06
16	31.7	2.97	1.89	4.98	191.5	207.7	.74	39.2	.65	.14	.06
17	31.1	2.54	1.11	4.98	189.2	194.4	.24	21.2	.17	.13	.06
18	30.6	1.38	0.00	0.00	88.6	88.6	0.00	0.0	0.00	.25	0.00
19	28.5	0.00	0.00	0.00	58.2	58.2	0.00	0.0	0.00	.13	0.00
20	26.3	0.00	0.00	0.00	43.4	43.4	0.00	0.0	0.00	.09	0.00
21	24.2	0.00	0.00	0.00	34.9	34.9	0.00	0.0	0.00	.07	0.00
22	22.1	0.00	0.00	0.00	29.4	29.4	0.00	0.0	0.00	.06	0.00
23	19.9	0.00	0.00	0.00	25.3	25.3	0.00	0.0	0.00	.05	0.00
24	17.8	0.00	0.00	0.00	22.2	22.2	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	33.11	23.79	---	---	---	10.40	43.7	8.03	2.35	.63

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

22 MAY (DAY 142)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	13.3	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.03	0.00
2	11.7	0.00	0.00	0.00	14.4	14.4	0.00	0.0	0.00	.03	0.00
3	10.0	0.00	0.00	0.00	12.6	12.6	0.00	0.0	0.00	.03	0.00
4	8.7	0.00	0.00	0.00	11.0	11.0	0.00	0.0	0.00	.02	0.00
5	7.4	0.00	0.00	0.00	9.5	9.5	0.00	0.0	0.00	.02	0.00
6	6.1	.14	0.00	0.00	8.1	8.1	0.00	0.0	0.00	.02	0.00
7	10.2	1.74	.64	4.98	112.3	114.8	.12	17.9	0.00	.08	.06
8	14.2	2.63	1.32	4.98	137.3	146.9	.44	33.4	0.00	.10	.06
9	18.3	2.94	1.96	4.98	184.5	201.7	.79	40.0	.15	.13	.06
10	21.1	3.08	2.53	4.98	192.7	218.0	1.15	45.6	.92	.16	.06
11	23.9	3.13	2.92	4.98	194.1	224.7	1.39	47.7	1.20	.16	.06
12	26.7	3.14	3.12	4.98	194.7	228.1	1.52	48.8	1.34	.17	.06
13	27.4	3.16	3.13	4.98	194.9	228.6	1.53	48.9	1.37	.17	.06
14	28.2	3.14	2.93	4.98	194.5	225.4	1.41	48.0	1.27	.16	.06
15	28.9	3.08	2.53	4.98	193.4	219.1	1.17	46.2	1.05	.16	.06
16	29.3	2.93	1.96	4.98	191.7	209.1	.79	40.4	.70	.15	.06
17	29.6	2.60	1.30	4.98	189.7	197.5	.36	27.4	.28	.13	.06
18	30.0	1.66	0.00	0.00	88.5	88.5	0.00	0.0	0.00	.25	0.00
19	28.1	.08	0.00	0.00	57.9	57.9	0.00	0.0	0.00	.13	0.00
20	26.3	0.00	0.00	0.00	43.3	43.3	0.00	0.0	0.00	.09	0.00
21	24.4	0.00	0.00	0.00	34.9	34.9	0.00	0.0	0.00	.07	0.00
22	22.9	0.00	0.00	0.00	29.8	29.8	0.00	0.0	0.00	.06	0.00
23	21.5	0.00	0.00	0.00	26.3	26.3	0.00	0.0	0.00	.05	0.00
24	20.0	0.00	0.00	0.00	23.6	23.6	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	33.46	24.35	---	---	---	10.67	43.8	8.25	2.39	.63

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

5 JUNE (DAY 156)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	22.3	0.00	0.00	0.00	25.3	25.3	0.00	0.0	0.00	.03	0.00
2	20.7	0.00	0.00	0.00	23.4	23.4	0.00	0.0	0.00	.03	0.00
3	19.2	0.00	0.00	0.00	21.6	21.6	0.00	0.0	0.00	.03	0.00
4	17.6	0.00	0.00	0.00	20.0	20.0	0.00	0.0	0.00	.02	0.00
5	16.0	0.00	0.00	0.00	18.3	18.3	0.00	0.0	0.00	.02	0.00
6	14.4	.22	0.00	0.00	16.7	16.7	0.00	0.0	0.00	.02	0.00
7	16.1	1.80	.72	4.98	117.8	121.4	.16	22.6	0.00	.08	.06
8	20.6	2.63	1.37	4.98	146.2	156.6	.47	34.7	0.00	.10	.06
9	23.9	2.92	1.99	4.98	186.4	204.3	.81	40.9	.26	.13	.06
10	26.1	3.05	2.53	4.98	192.8	218.4	1.16	46.1	.94	.15	.06
11	28.3	3.10	2.90	4.98	194.1	224.7	1.39	48.0	1.20	.16	.06
12	30.0	3.11	3.09	4.98	194.7	228.0	1.52	49.0	1.33	.16	.06
13	31.1	3.13	3.11	4.98	194.9	228.5	1.53	49.1	1.36	.16	.06
14	31.7	3.12	2.92	4.98	194.5	225.4	1.41	48.2	1.27	.16	.06
15	33.9	3.06	2.53	4.98	193.5	219.5	1.18	46.7	1.06	.15	.06
16	34.4	2.92	1.99	4.98	191.9	210.0	.82	41.5	.73	.14	.06
17	35.0	2.59	1.35	4.98	190.0	198.9	.41	30.1	.34	.13	.06
18	34.4	1.72	.69	4.98	186.7	187.9	.05	8.0	0.00	.12	.06
19	32.8	.14	0.00	0.00	90.3	90.3	0.00	0.0	0.00	.24	0.00
20	29.6	0.00	0.00	0.00	59.5	59.5	0.00	0.0	0.00	.13	0.00
21	26.4	0.00	0.00	0.00	44.1	44.1	0.00	0.0	0.00	.09	0.00
22	23.1	0.00	0.00	0.00	34.7	34.7	0.00	0.0	0.00	.07	0.00
23	19.9	0.00	0.00	0.00	28.3	28.3	0.00	0.0	0.00	.06	0.00
24	16.7	0.00	0.00	0.00	23.3	23.3	0.00	0.0	0.00	.05	0.00
TOTAL/AVE	---	33.51	25.18	---	---	---	10.93	43.4	8.47	2.45	.68

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

1 JULY (DAY 182)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	18.1	0.00	0.00	0.00	23.3	23.3	0.00	0.0	0.00	.04	0.00
2	16.7	0.00	0.00	0.00	20.5	20.5	0.00	0.0	0.00	.03	0.00
3	16.1	0.00	0.00	0.00	18.7	18.7	0.00	0.0	0.00	.03	0.00
4	16.3	0.00	0.00	0.00	17.7	17.7	0.00	0.0	0.00	.02	0.00
5	17.3	0.00	0.00	0.00	17.5	17.5	0.00	0.0	0.00	.02	0.00
6	19.1	.12	0.00	0.00	18.2	18.2	0.00	0.0	0.00	.02	0.00
7	22.8	1.68	.69	4.98	117.8	121.5	.17	24.0	0.00	.07	.06
8	25.0	2.58	1.36	4.98	147.0	157.6	.48	35.4	0.00	.10	.06
9	27.8	2.91	1.99	4.98	186.7	204.8	.83	41.5	.28	.13	.06
10	28.9	3.04	2.52	4.98	192.9	218.6	1.17	46.3	.95	.15	.06
11	30.6	3.09	2.89	4.98	194.1	224.7	1.39	48.1	1.21	.16	.06
12	31.7	3.05	3.03	4.98	194.6	227.3	1.49	49.0	1.31	.16	.06
13	33.3	3.03	3.00	4.98	194.7	227.1	1.47	49.0	1.31	.16	.06
14	33.9	3.01	2.82	4.98	194.3	224.1	1.36	48.2	1.22	.16	.06
15	33.3	3.00	2.49	4.98	193.4	218.8	1.16	46.5	1.03	.15	.06
16	33.9	2.91	1.99	4.98	191.9	210.1	.83	41.6	.73	.14	.06
17	33.3	2.47	1.30	4.98	189.9	198.3	.38	29.5	.31	.13	.06
18	32.2	1.52	.62	4.98	184.4	185.1	.03	5.1	0.00	.12	.06
19	30.1	.09	0.00	0.00	87.6	87.6	0.00	0.0	0.00	.24	0.00
20	28.0	0.00	0.00	0.00	57.5	57.5	0.00	0.0	0.00	.12	0.00
21	25.9	0.00	0.00	0.00	42.9	42.9	0.00	0.0	0.00	.09	0.00
22	23.8	0.00	0.00	0.00	34.4	34.4	0.00	0.0	0.00	.07	0.00
23	21.7	0.00	0.00	0.00	28.9	28.9	0.00	0.0	0.00	.05	0.00
24	21.4	0.00	0.00	0.00	25.8	25.8	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	32.49	24.71	---	---	---	10.75	43.5	8.33	2.43	.68

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

2 AUGUST (DAY 214)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	25.0	0.00	0.00	0.00	27.4	27.4	0.00	0.0	0.00	.03	0.00
2	24.2	0.00	0.00	0.00	26.1	26.1	0.00	0.0	0.00	.03	0.00
3	23.4	0.00	0.00	0.00	25.0	25.0	0.00	0.0	0.00	.02	0.00
4	22.5	0.00	0.00	0.00	24.0	24.0	0.00	0.0	0.00	.02	0.00
5	21.7	0.00	0.00	0.00	23.0	23.0	0.00	0.0	0.00	.02	0.00
6	22.2	0.00	0.00	0.00	22.7	22.7	0.00	0.0	0.00	.02	0.00
7	25.6	1.36	.45	4.98	112.0	113.2	.05	11.9	0.00	.07	.06
8	27.8	2.41	1.14	4.98	132.2	140.5	.38	33.1	0.00	.08	.06
9	30.0	2.87	1.88	4.98	183.3	200.0	.76	40.5	.08	.12	.06
10	32.8	3.03	2.47	4.98	192.7	217.8	1.14	46.3	.91	.15	.06
11	35.0	3.09	2.87	4.98	194.2	224.7	1.39	48.4	1.20	.16	.06
12	36.1	3.06	3.03	4.98	194.7	227.6	1.50	49.3	1.32	.16	.06
13	36.7	3.07	3.05	4.98	194.8	227.8	1.50	49.4	1.34	.16	.06
14	37.2	3.05	2.84	4.98	194.5	224.7	1.38	48.5	1.24	.16	.06
15	37.8	2.98	2.43	4.98	193.3	218.2	1.13	46.6	1.02	.15	.06
16	37.2	2.87	1.88	4.98	191.6	208.3	.76	40.4	.67	.14	.06
17	37.2	2.37	1.12	4.98	189.4	195.5	.28	24.7	.22	.12	.06
18	35.6	1.28	0.00	0.00	92.8	92.8	0.00	0.0	0.00	.24	0.00
19	34.0	0.00	0.00	0.00	63.1	63.1	0.00	0.0	0.00	.13	0.00
20	32.5	0.00	0.00	0.00	49.0	49.0	0.00	0.0	0.00	.09	0.00
21	30.9	0.00	0.00	0.00	41.0	41.0	0.00	0.0	0.00	.07	0.00
22	29.4	0.00	0.00	0.00	36.0	36.0	0.00	0.0	0.00	.05	0.00
23	27.8	0.00	0.00	0.00	32.5	32.5	0.00	0.0	0.00	.04	0.00
24	26.8	0.00	0.00	0.00	30.1	30.1	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	31.44	23.16	---	---	---	10.27	44.4	7.97	2.28	.63

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

2 SEPTEMBER (DAY 245)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	21.3	0.00	0.00	0.00	23.9	23.9	0.00	0.0	0.00	.03	0.00
2	20.9	0.00	0.00	0.00	22.7	22.7	0.00	0.0	0.00	.03	0.00
3	20.6	0.00	0.00	0.00	21.8	21.8	0.00	0.0	0.00	.02	0.00
4	20.2	0.00	0.00	0.00	21.1	21.1	0.00	0.0	0.00	.02	0.00
5	19.8	0.00	0.00	0.00	20.6	20.6	0.00	0.0	0.00	.02	0.00
6	19.4	0.00	0.00	0.00	20.1	20.1	0.00	0.0	0.00	.02	0.00
7	19.4	.65	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.01	0.00
8	20.0	2.14	.86	4.98	121.2	125.9	.22	25.3	0.00	.08	.06
9	24.4	2.81	1.73	4.98	166.9	182.0	.69	39.5	0.00	.11	.06
10	26.7	3.01	2.40	4.98	191.2	215.2	1.09	45.4	.71	.15	.06
11	29.4	3.10	2.87	4.98	194.0	224.1	1.37	48.0	1.17	.16	.06
12	30.6	3.13	3.10	4.98	194.8	228.2	1.52	49.0	1.34	.16	.06
13	32.2	3.14	3.11	4.98	194.9	228.5	1.53	49.2	1.36	.16	.06
14	33.9	3.10	2.87	4.98	194.5	224.9	1.39	48.3	1.25	.16	.06
15	34.4	3.01	2.40	4.98	193.2	217.4	1.10	45.9	.99	.15	.06
16	35.0	2.79	1.72	4.98	191.1	205.4	.65	37.8	.57	.14	.06
17	35.0	2.10	.84	4.98	188.6	191.1	.11	13.1	.06	.12	.06
18	33.9	.52	0.00	0.00	91.7	91.7	0.00	0.0	0.00	.25	0.00
19	32.2	0.00	0.00	0.00	61.6	61.6	0.00	0.0	0.00	.13	0.00
20	30.3	0.00	0.00	0.00	47.1	47.1	0.00	0.0	0.00	.09	0.00
21	28.4	0.00	0.00	0.00	38.9	38.9	0.00	0.0	0.00	.07	0.00
22	26.6	0.00	0.00	0.00	33.6	33.6	0.00	0.0	0.00	.05	0.00
23	24.7	0.00	0.00	0.00	29.8	29.8	0.00	0.0	0.00	.05	0.00
24	22.8	0.00	0.00	0.00	26.9	26.9	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	29.50	21.90	---	---	---	9.67	44.1	7.44	2.22	.57

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

6 OCTOBER (DAY 279)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	11.6	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.03	0.00
2	10.4	0.00	0.00	0.00	13.0	13.0	0.00	0.0	0.00	.03	0.00
3	9.2	0.00	0.00	0.00	11.4	11.4	0.00	0.0	0.00	.03	0.00
4	8.0	0.00	0.00	0.00	10.0	10.0	0.00	0.0	0.00	.02	0.00
5	6.8	0.00	0.00	0.00	8.7	8.7	0.00	0.0	0.00	.02	0.00
6	5.6	0.00	0.00	0.00	7.4	7.4	0.00	0.0	0.00	.02	0.00
7	5.6	.01	0.00	0.00	6.7	6.7	0.00	0.0	0.00	.02	0.00
8	9.4	1.78	.70	4.98	109.6	113.0	.16	22.0	0.00	.08	.06
9	15.0	2.70	1.66	4.98	152.4	166.9	.66	39.6	0.00	.11	.06
10	20.0	3.08	2.45	4.98	189.1	213.5	1.11	45.2	.59	.15	.06
11	25.0	3.17	2.93	4.98	193.9	224.8	1.40	47.8	1.19	.16	.06
12	27.2	3.21	3.18	4.98	194.9	229.2	1.56	49.0	1.37	.17	.06
13	29.4	3.21	3.18	4.98	195.1	229.4	1.56	49.1	1.40	.17	.06
14	30.0	3.17	2.93	4.98	194.6	225.6	1.41	48.1	1.27	.16	.06
15	30.6	3.08	2.45	4.98	193.2	217.9	1.12	45.8	1.01	.15	.06
16	31.1	2.65	1.63	4.98	190.9	203.9	.59	36.4	.53	.13	.06
17	31.1	1.68	.66	4.98	186.8	187.6	.03	5.1	0.00	.12	.06
18	30.0	.00	0.00	0.00	88.0	88.0	0.00	0.0	0.00	.25	0.00
19	26.1	0.00	0.00	0.00	56.5	56.5	0.00	0.0	0.00	.13	0.00
20	23.4	0.00	0.00	0.00	41.1	41.1	0.00	0.0	0.00	.09	0.00
21	20.8	0.00	0.00	0.00	32.1	32.1	0.00	0.0	0.00	.07	0.00
22	18.1	0.00	0.00	0.00	26.0	26.0	0.00	0.0	0.00	.06	0.00
23	15.5	0.00	0.00	0.00	21.5	21.5	0.00	0.0	0.00	.05	0.00
24	12.8	0.00	0.00	0.00	17.8	17.8	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	27.74	21.79	---	---	---	9.60	44.1	7.33	2.25	.57

RUN ID: SU2
83/09/02.

SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

2 NOVEMBER (DAY 306)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-.1	0.00	0.00	0.00	1.7	1.7	0.00	0.0	0.00	.03	0.00
2	-1.4	0.00	0.00	0.00	.4	.4	0.00	0.0	0.00	.03	0.00
3	-2.8	0.00	0.00	0.00	-.9	-.9	0.00	0.0	0.00	.02	0.00
4	-4.2	0.00	0.00	0.00	-2.3	-2.3	0.00	0.0	0.00	.02	0.00
5	-5.6	0.00	0.00	0.00	-3.7	-3.7	0.00	0.0	0.00	.02	0.00
6	-7.2	0.00	0.00	0.00	-5.1	-5.1	0.00	0.0	0.00	.02	0.00
7	-4.7	0.00	0.00	0.00	-5.0	-5.0	0.00	0.0	0.00	.01	0.00
8	-2.3	1.34	.61	4.98	103.7	105.6	.09	14.3	0.00	.08	.06
9	0.0	2.56	1.65	4.98	144.8	159.2	.66	39.7	0.00	.11	.06
10	3.5	3.09	2.50	4.98	187.8	212.1	1.10	44.1	.52	.14	.06
11	7.1	3.25	3.02	4.98	193.8	224.8	1.41	46.6	1.18	.17	.06
12	10.6	3.29	3.26	4.98	194.8	229.1	1.56	47.9	1.37	.17	.06
13	13.5	3.29	3.26	4.98	194.9	229.4	1.57	48.1	1.39	.17	.06
14	16.5	3.25	3.02	4.98	194.5	225.9	1.43	47.3	1.28	.17	.06
15	19.4	3.06	2.48	4.98	193.1	217.6	1.12	45.0	1.00	.16	.06
16	18.9	2.50	1.61	4.98	190.7	203.3	.58	35.7	.51	.14	.06
17	18.3	1.18	0.00	0.00	78.9	78.9	0.00	0.0	0.00	.28	0.00
18	17.8	0.00	0.00	0.00	47.9	47.9	0.00	0.0	0.00	.14	0.00
19	13.7	0.00	0.00	0.00	31.9	31.9	0.00	0.0	0.00	.10	0.00
20	9.7	0.00	0.00	0.00	22.0	22.0	0.00	0.0	0.00	.08	0.00
21	5.6	0.00	0.00	0.00	14.8	14.8	0.00	0.0	0.00	.06	0.00
22	3.7	0.00	0.00	0.00	10.1	10.1	0.00	0.0	0.00	.05	0.00
23	1.9	0.00	0.00	0.00	6.6	6.6	0.00	0.0	0.00	.04	0.00
24	0.0	0.00	0.00	0.00	3.8	3.8	0.00	0.0	0.00	.04	0.00
TOTAL/AVE	---	26.80	21.42	---	---	---	9.51	44.4	7.23	2.26	.51

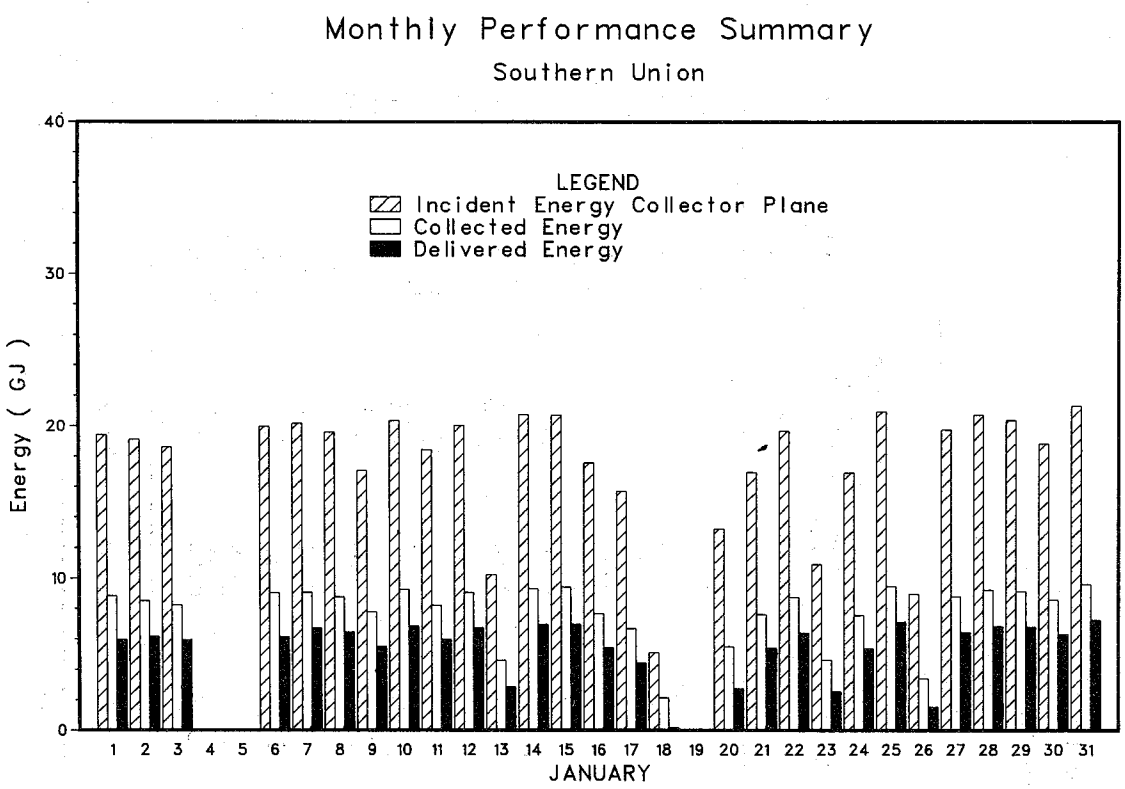
RUN ID: SU2
83/09/02.

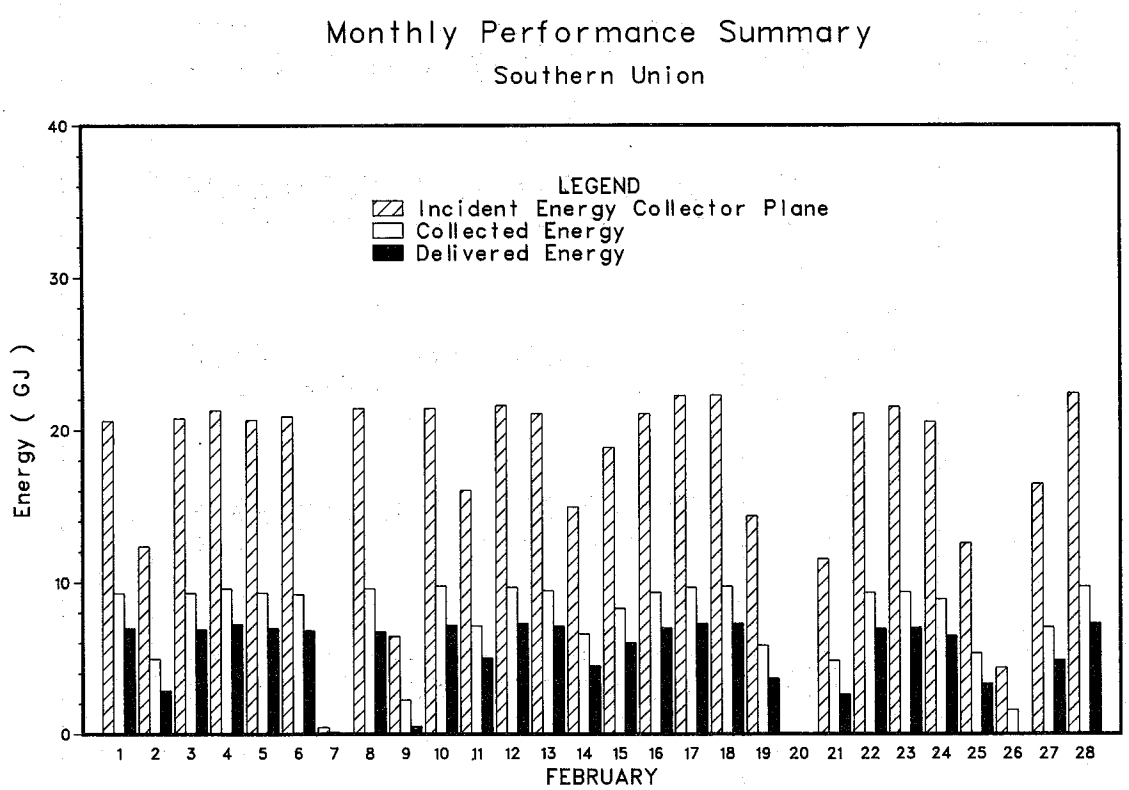
SOUTHERN UNION

CLEAR DAY PERFORMANCE TABLE

1 DECEMBER (DAY 335)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-.5	0.00	0.00	0.00	2.1	2.1	0.00	0.0	0.00	.03	0.00
2	-1.0	0.00	0.00	0.00	.8	.8	0.00	0.0	0.00	.03	0.00
3	-1.1	0.00	0.00	0.00	.0	.0	0.00	0.0	0.00	.02	0.00
4	-1.1	0.00	0.00	0.00	-.4	-.4	0.00	0.0	0.00	.02	0.00
5	-1.0	0.00	0.00	0.00	-.7	-.7	0.00	0.0	0.00	.02	0.00
6	-1.0	0.00	0.00	0.00	-.8	-.8	0.00	0.0	0.00	.02	0.00
7	-2.2	0.00	0.00	0.00	-1.4	-1.4	0.00	0.0	0.00	.02	0.00
8	-2.2	.58	0.00	0.00	-1.7	-1.7	0.00	0.0	0.00	.01	0.00
9	2.8	2.28	1.55	4.98	140.3	152.7	.57	36.6	0.00	.10	.06
10	7.2	2.90	2.40	4.98	185.9	209.3	1.06	44.3	.39	.14	.06
11	11.1	3.19	2.99	4.98	193.8	224.5	1.40	46.8	1.16	.17	.06
12	13.3	3.31	3.28	4.98	194.9	229.7	1.58	48.2	1.39	.17	.06
13	16.1	3.31	3.28	4.98	195.1	230.0	1.59	48.4	1.42	.17	.06
14	17.8	3.18	2.97	4.98	194.5	225.4	1.41	47.3	1.27	.17	.06
15	20.0	2.81	2.32	4.98	192.8	215.5	1.03	44.6	.93	.16	.06
16	21.7	2.22	1.51	4.98	190.3	200.8	.48	31.8	.42	.13	.06
17	21.1	.45	0.00	0.00	82.2	82.2	0.00	0.0	0.00	.28	0.00
18	16.1	0.00	0.00	0.00	48.1	48.1	0.00	0.0	0.00	.14	0.00
19	15.0	0.00	0.00	0.00	32.7	32.7	0.00	0.0	0.00	.10	0.00
20	13.6	0.00	0.00	0.00	24.3	24.3	0.00	0.0	0.00	.07	0.00
21	12.1	0.00	0.00	0.00	19.0	19.0	0.00	0.0	0.00	.06	0.00
22	10.7	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.05	0.00
23	9.2	0.00	0.00	0.00	12.9	12.9	0.00	0.0	0.00	.04	0.00
24	7.8	0.00	0.00	0.00	10.7	10.7	0.00	0.0	0.00	.03	0.00
TOTAL/AVE	---	24.24	20.30	---	---	---	9.12	44.9	6.95	2.15	.46


Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JANUARY


Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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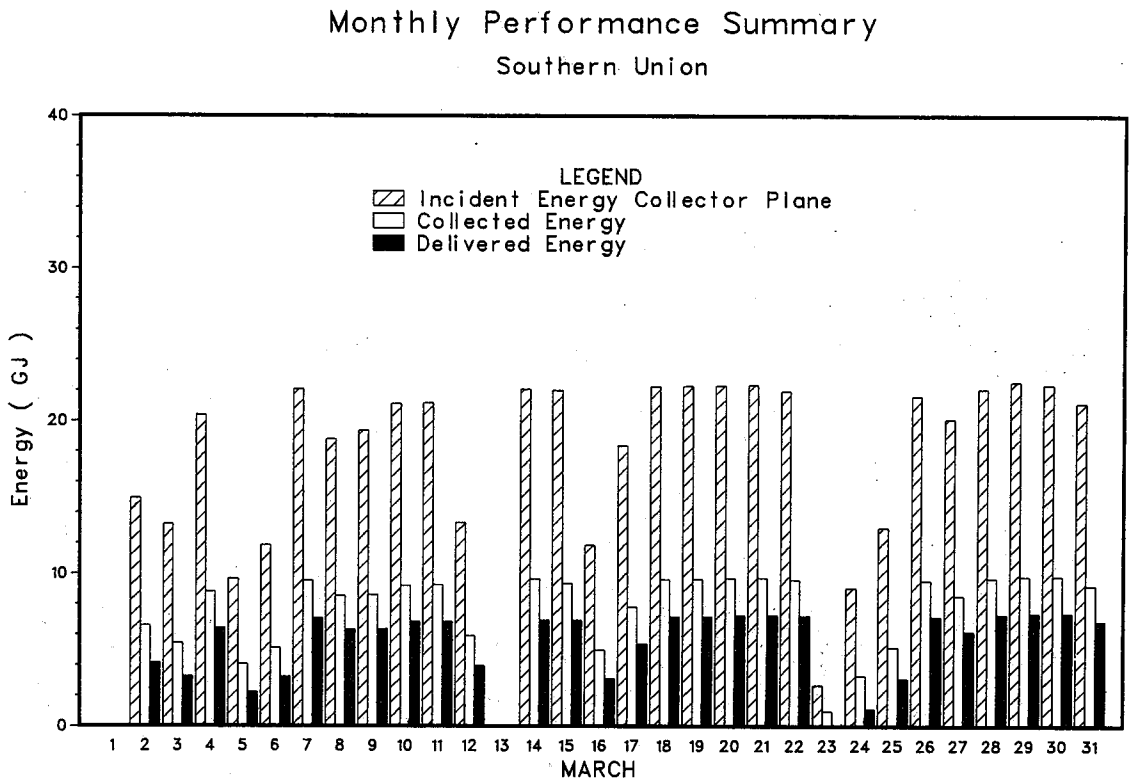
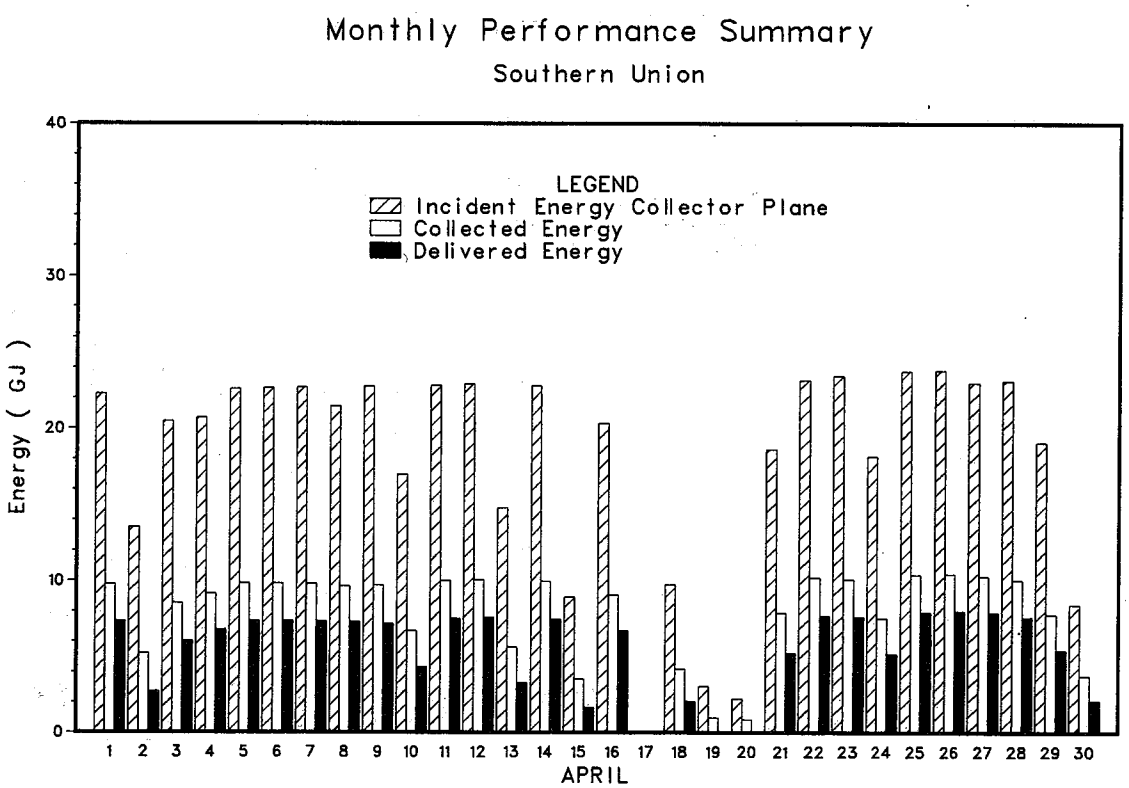
FEBRUARY


Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MARCH


Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
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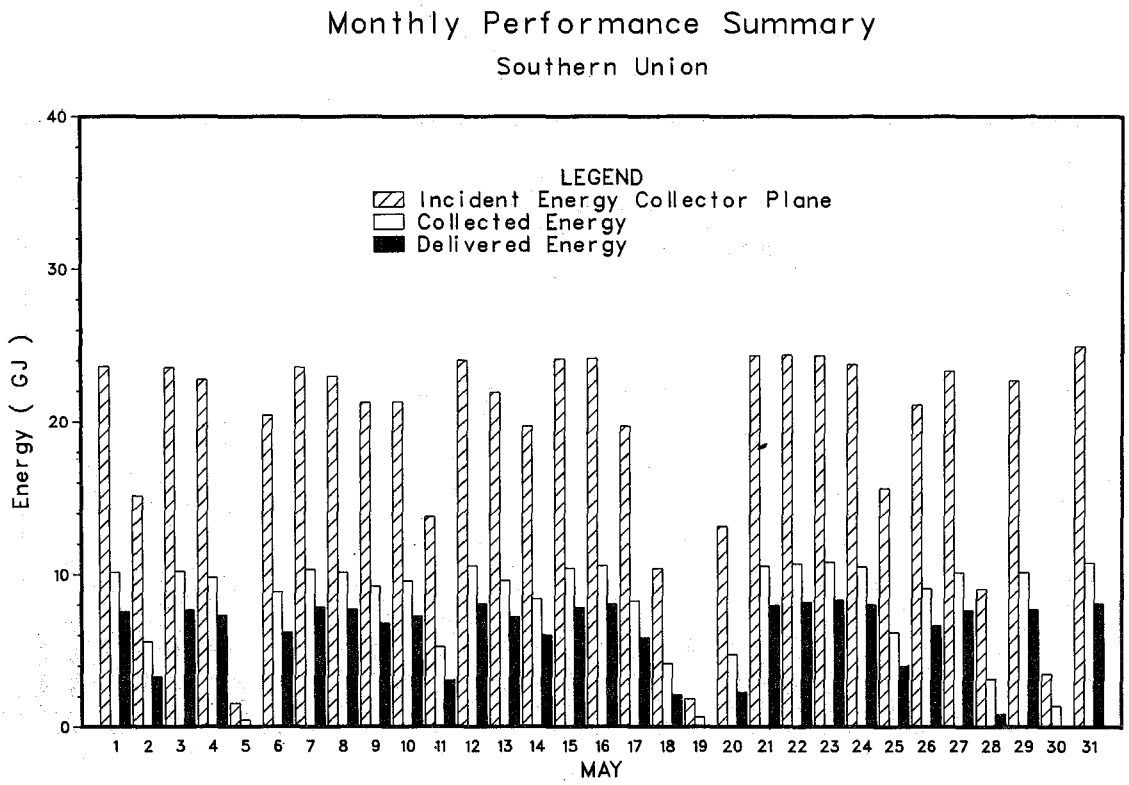
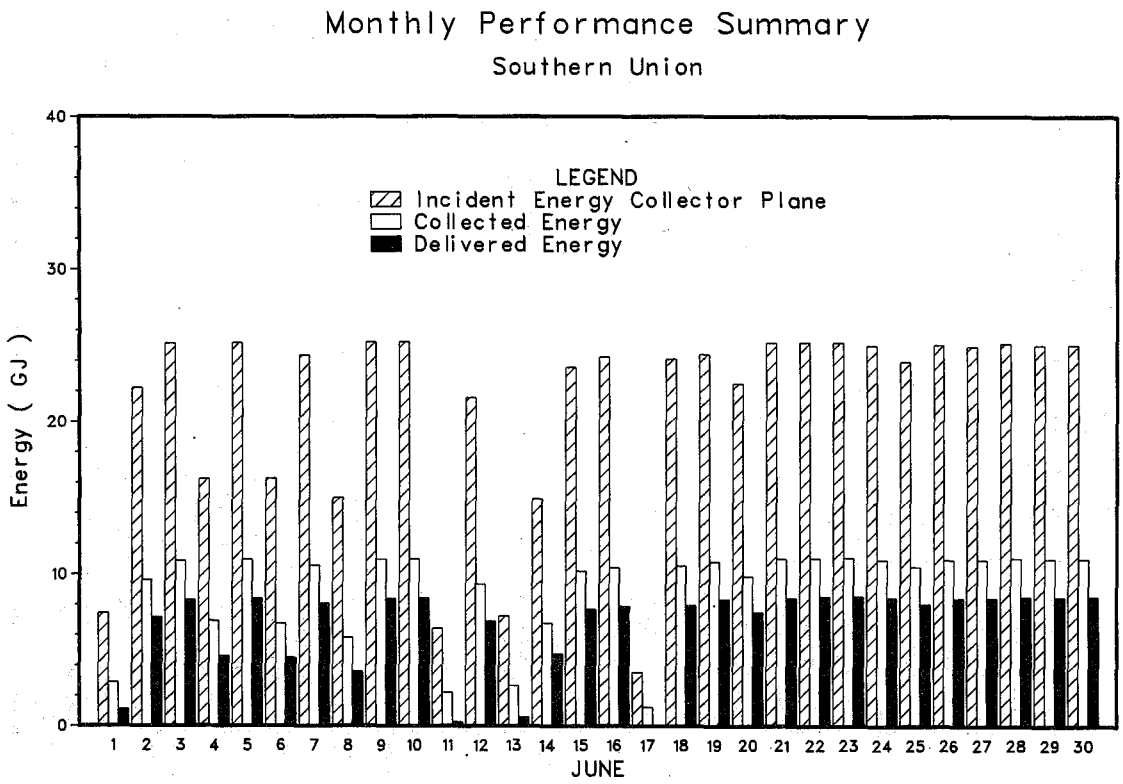
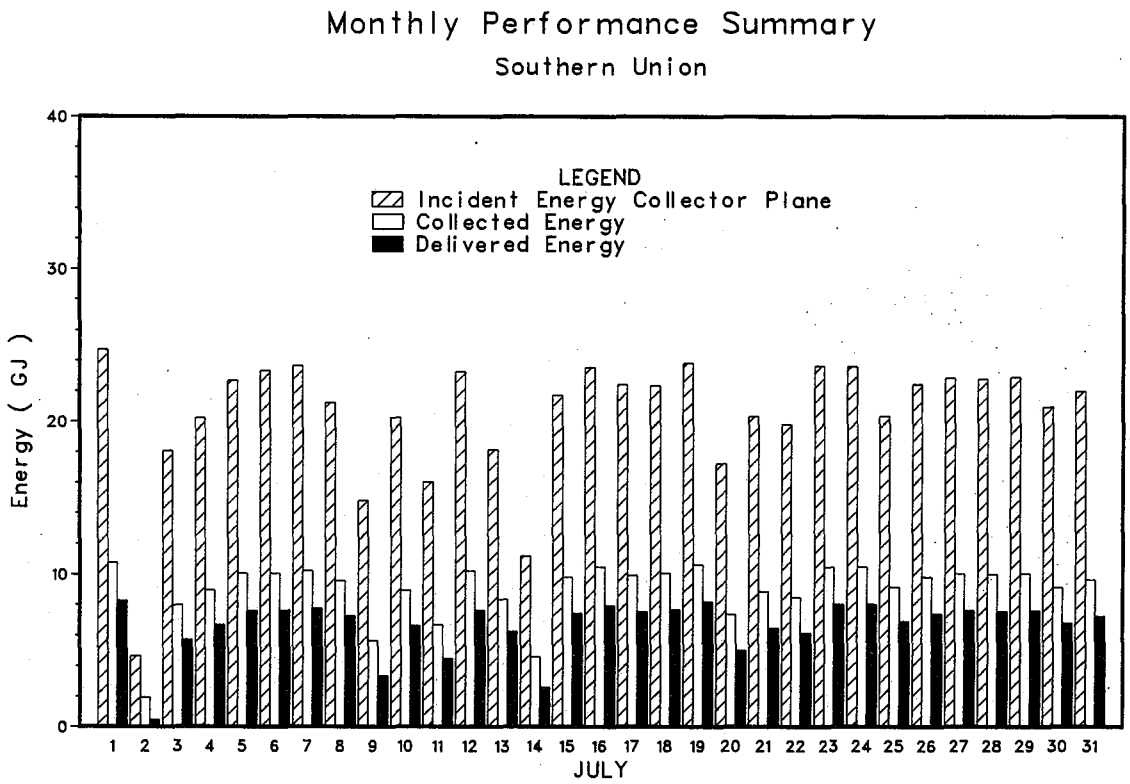
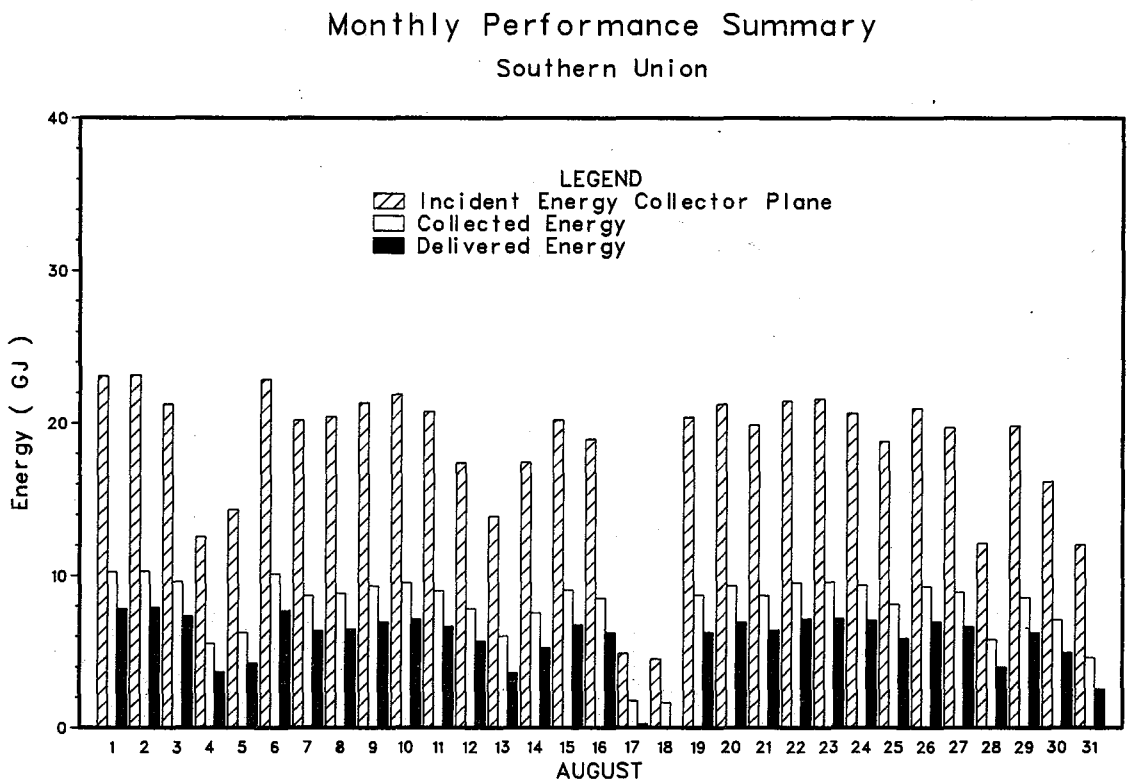
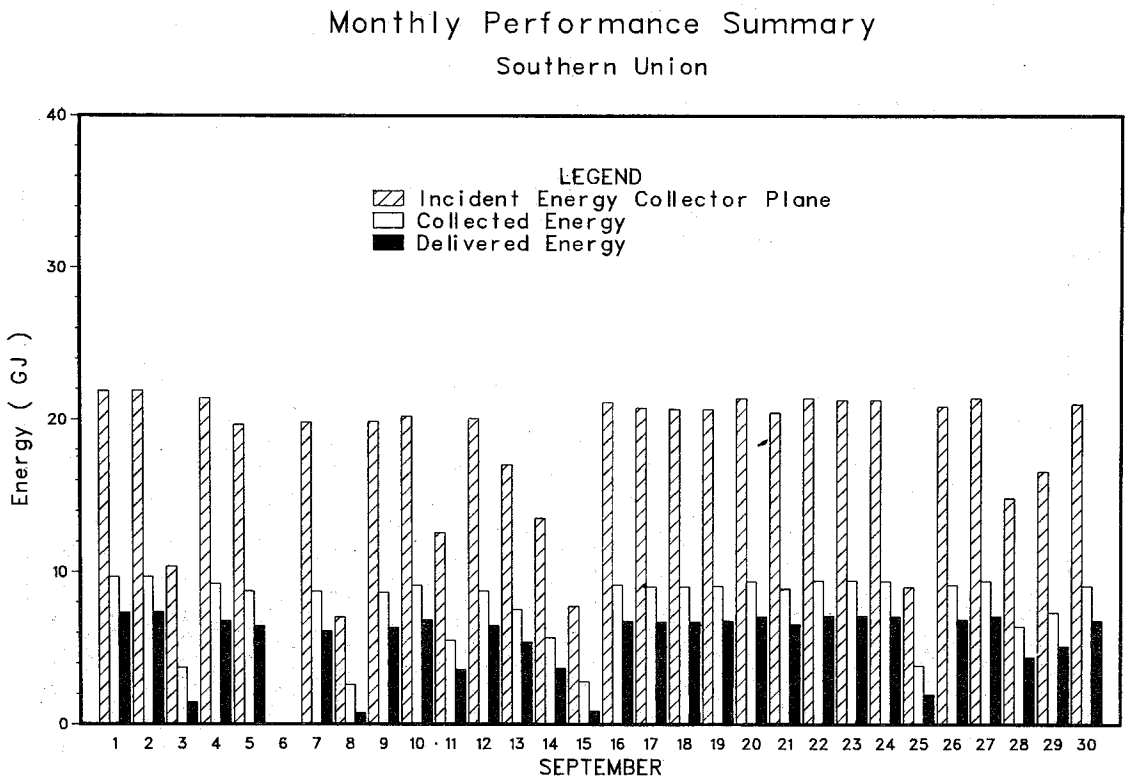
APRIL

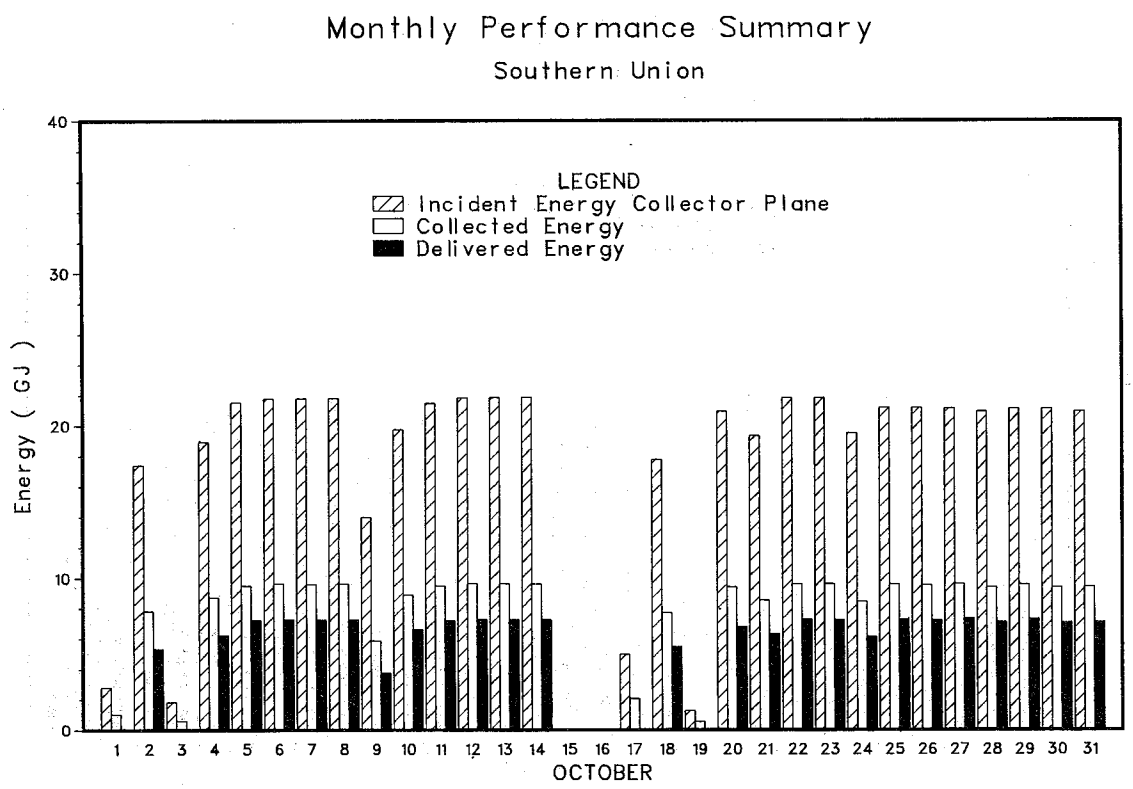

Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MAY

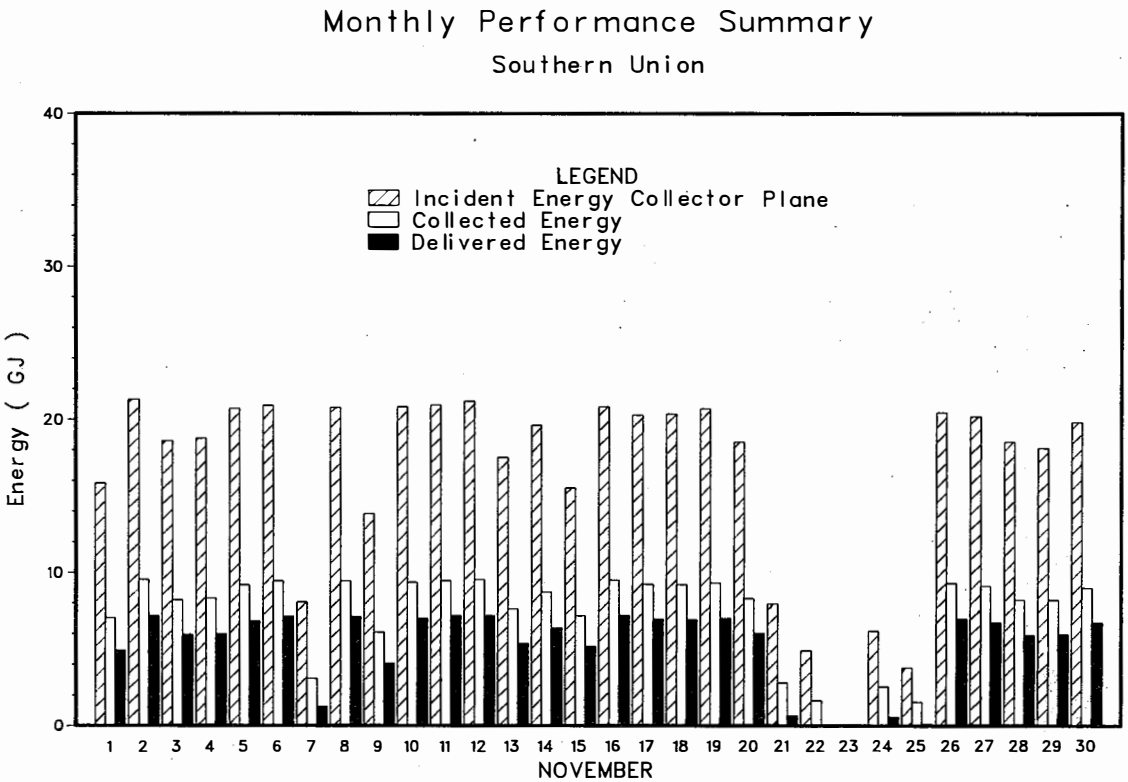

Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
JUNE

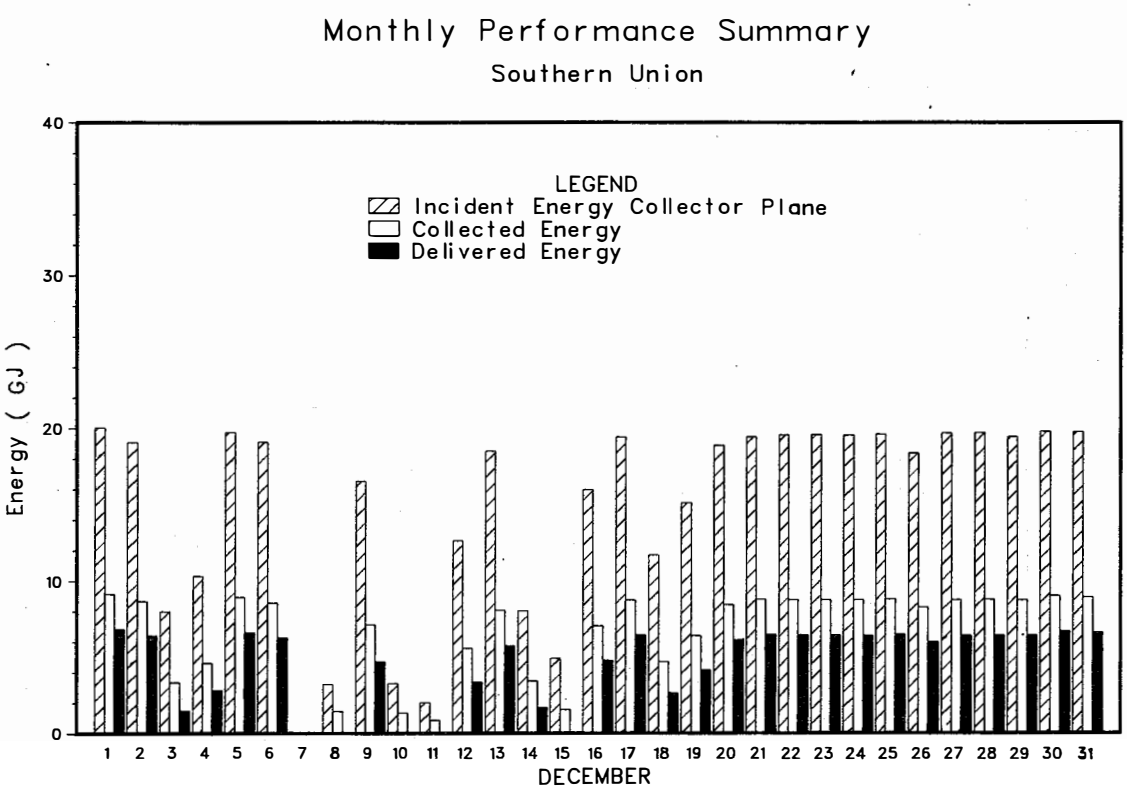

Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JULY

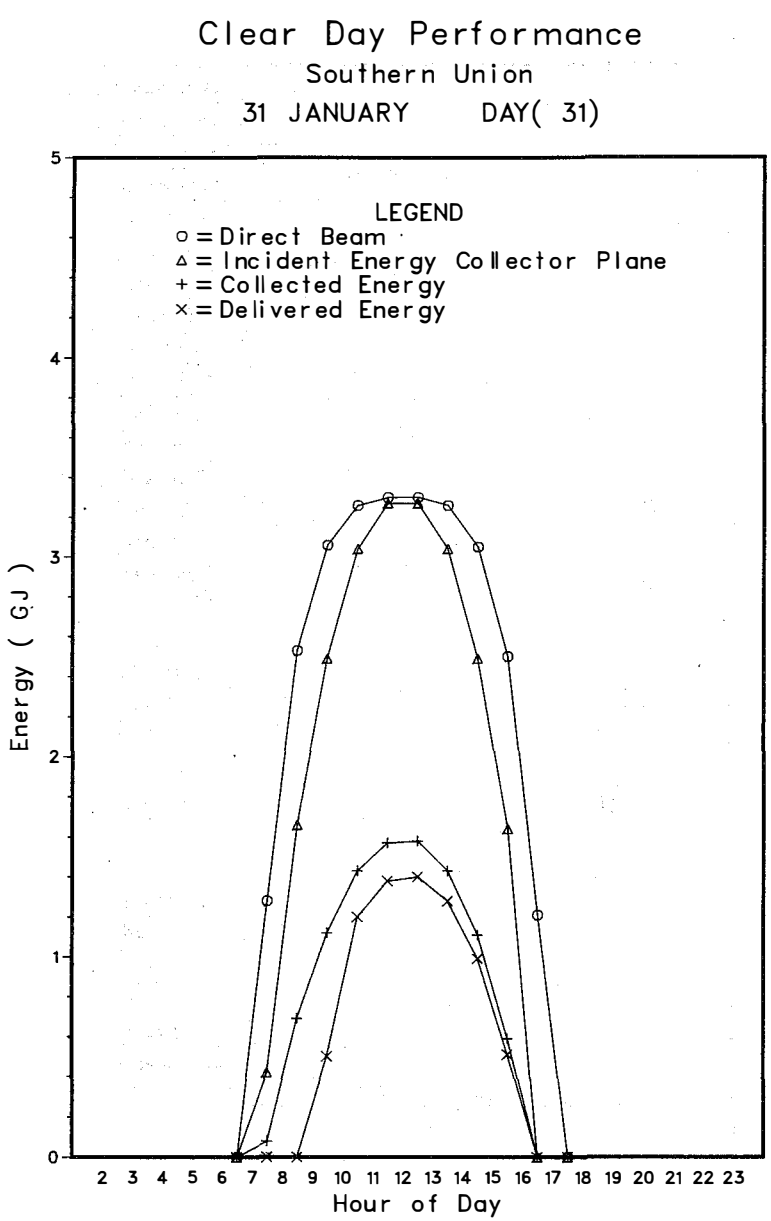

Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
AUGUST

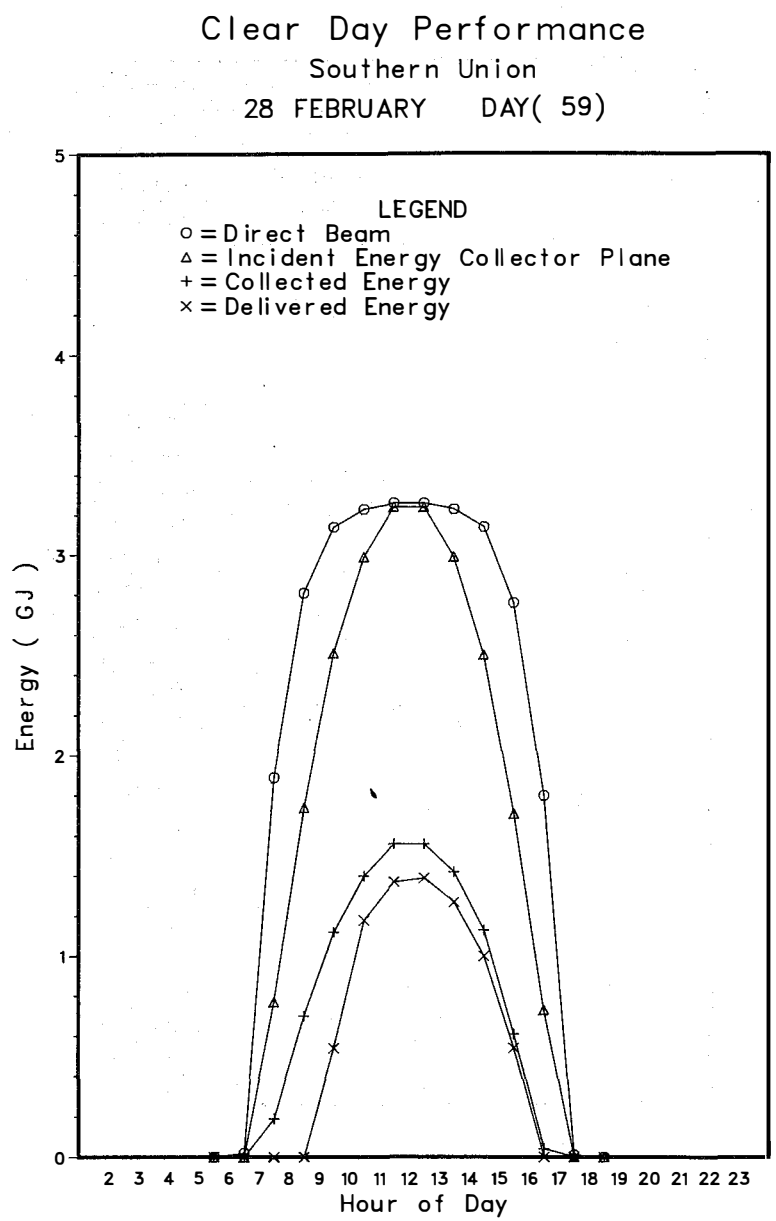

Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
SEPTEMBER


Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
OCTOBER

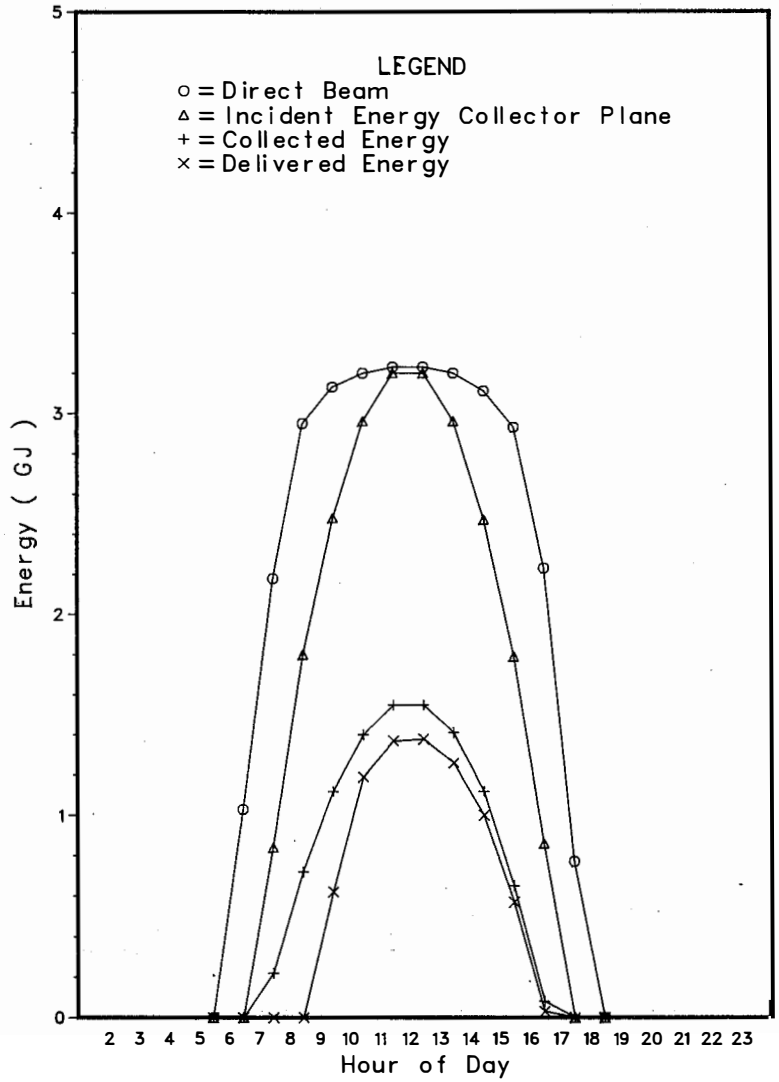

Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER


Monthly Performance Summary
Southern Union
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
0
10
20
30
40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

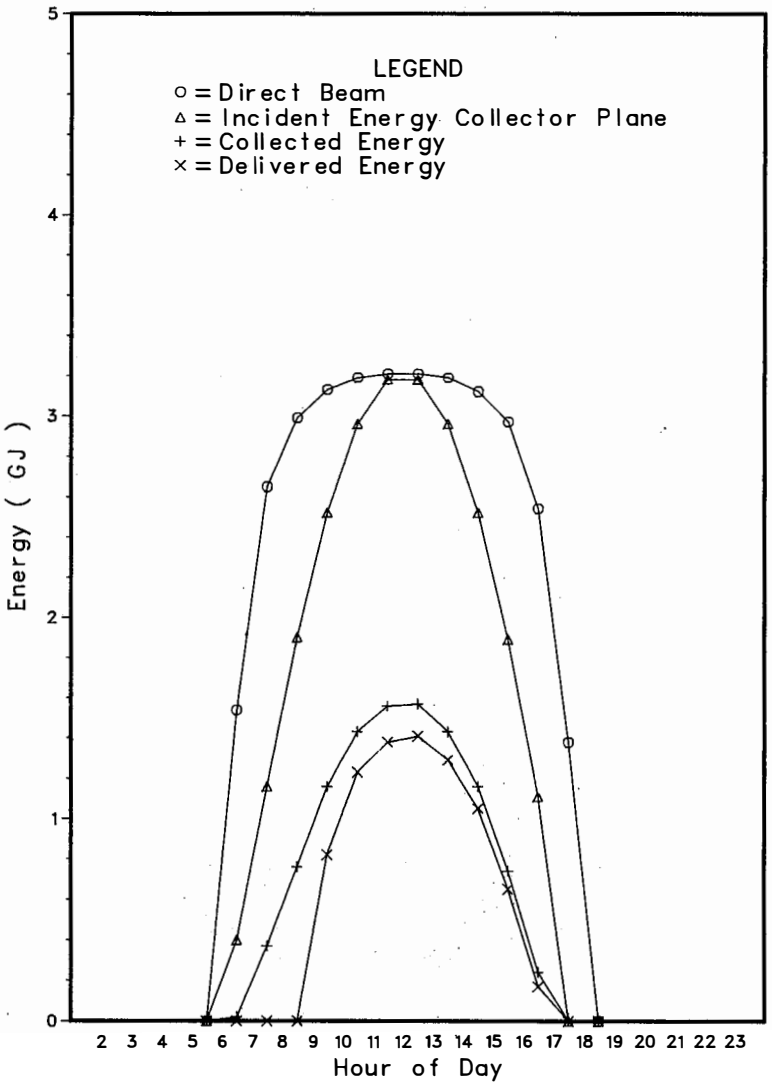

Clear Day Performance
Southern Union
31 JANUARY DAY(31)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

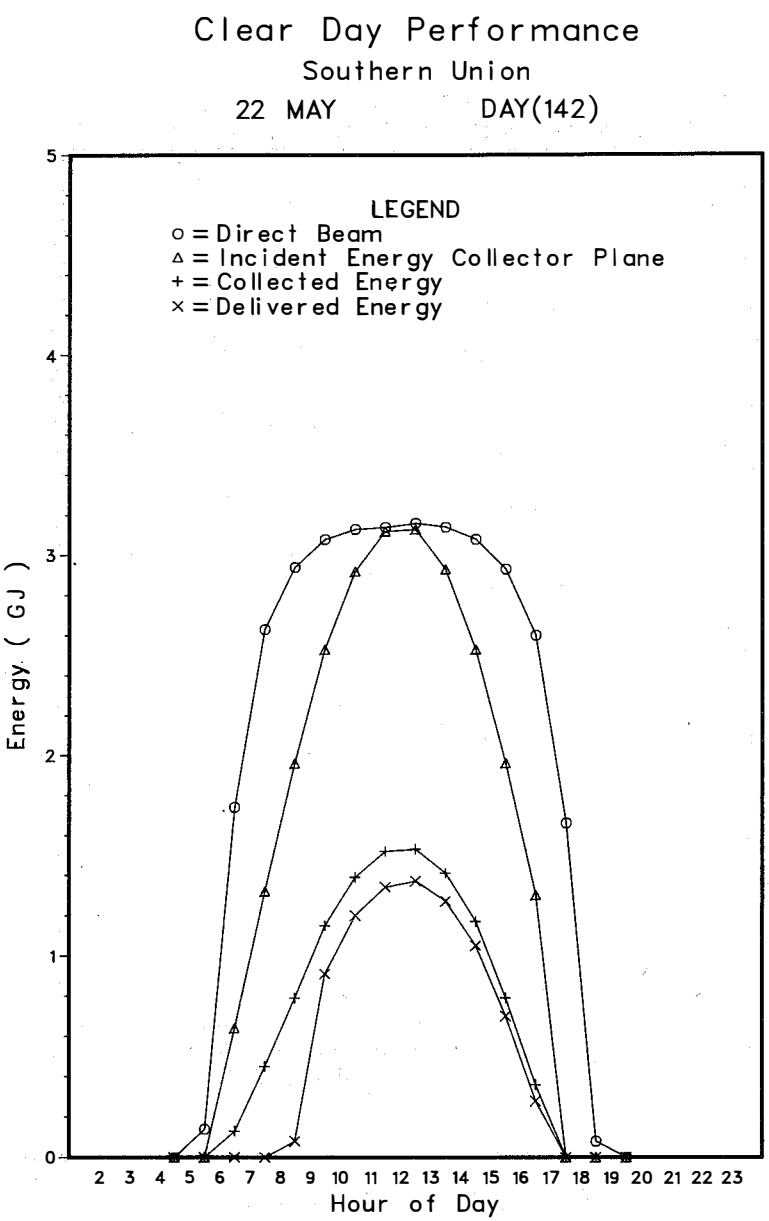

Clear Day Performance
Southern Union
28 FEBRUARY DAY(59)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

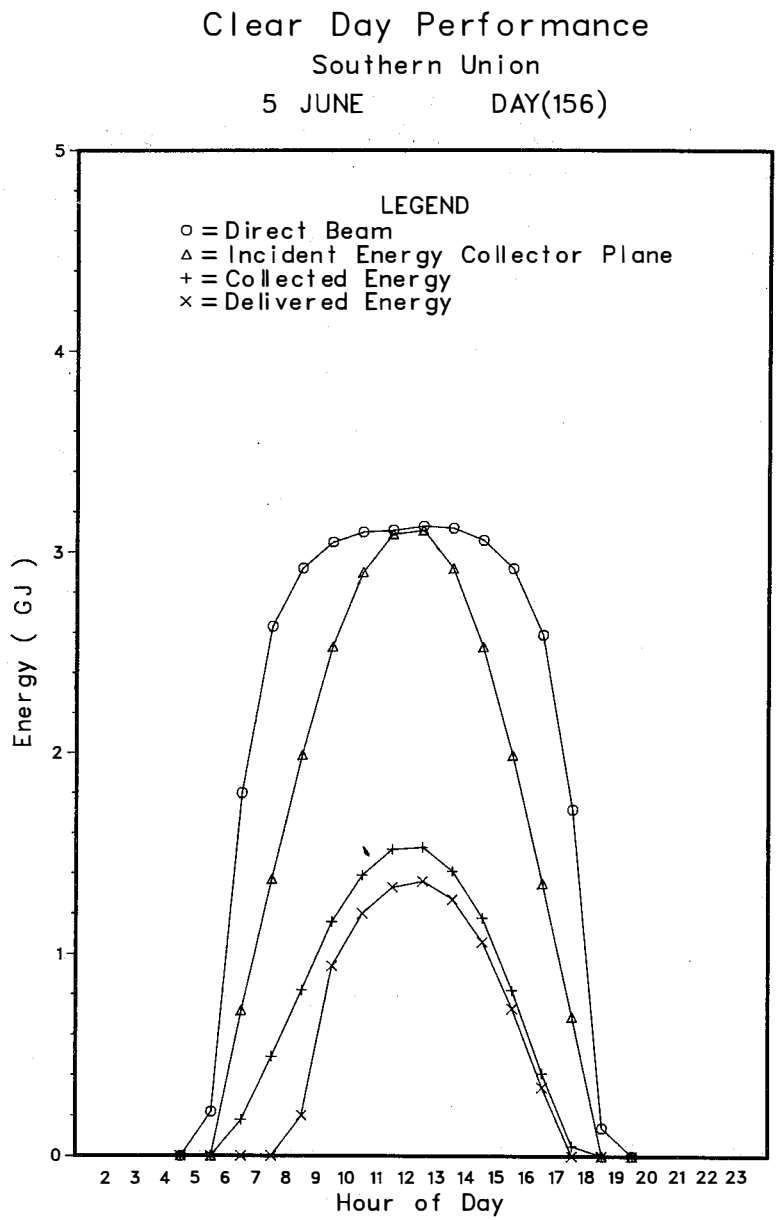
Clear Day Performance
Southern Union
29 MARCH DAY(88)

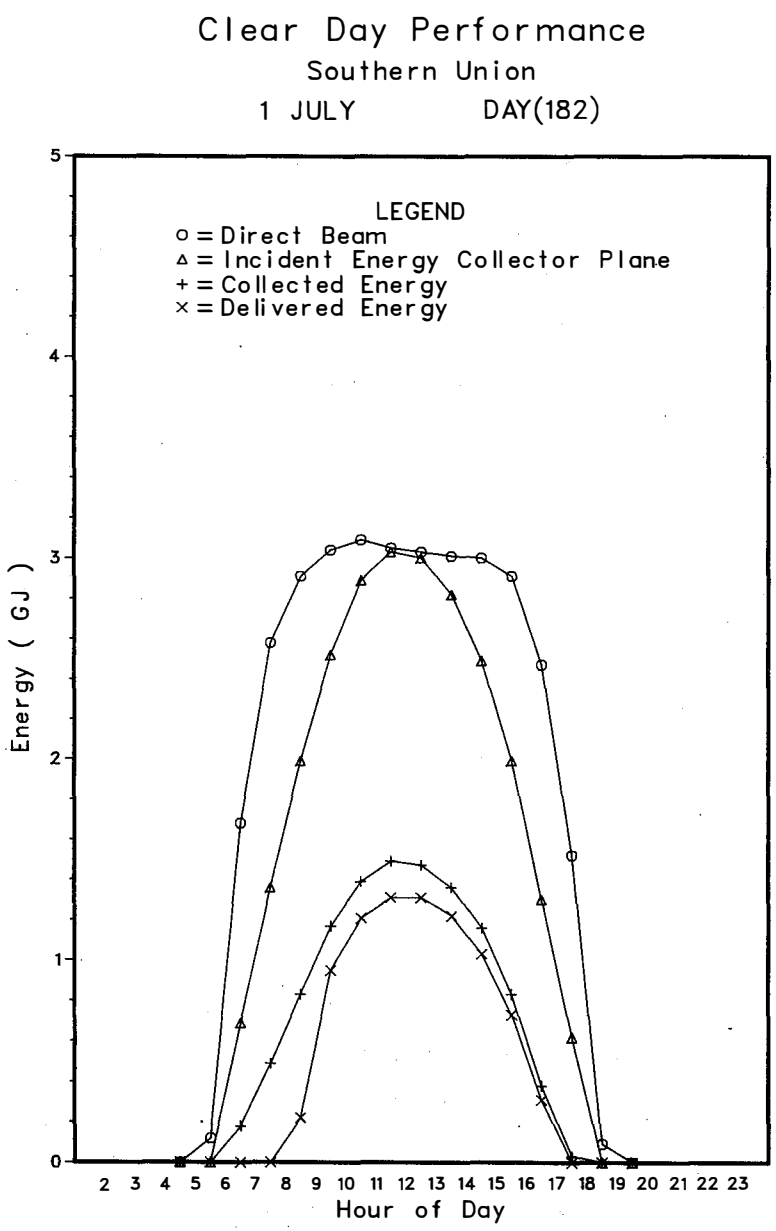


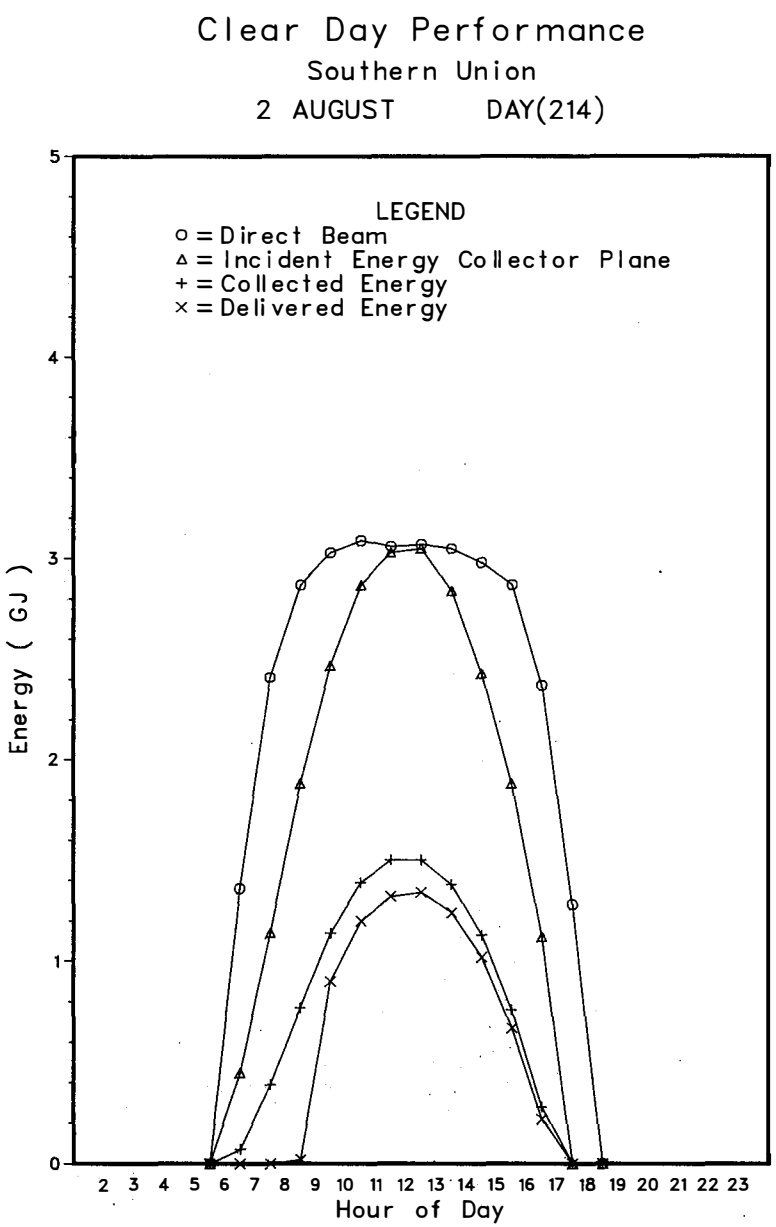
Clear Day Performance
Southern Union
26 APRIL DAY(116)

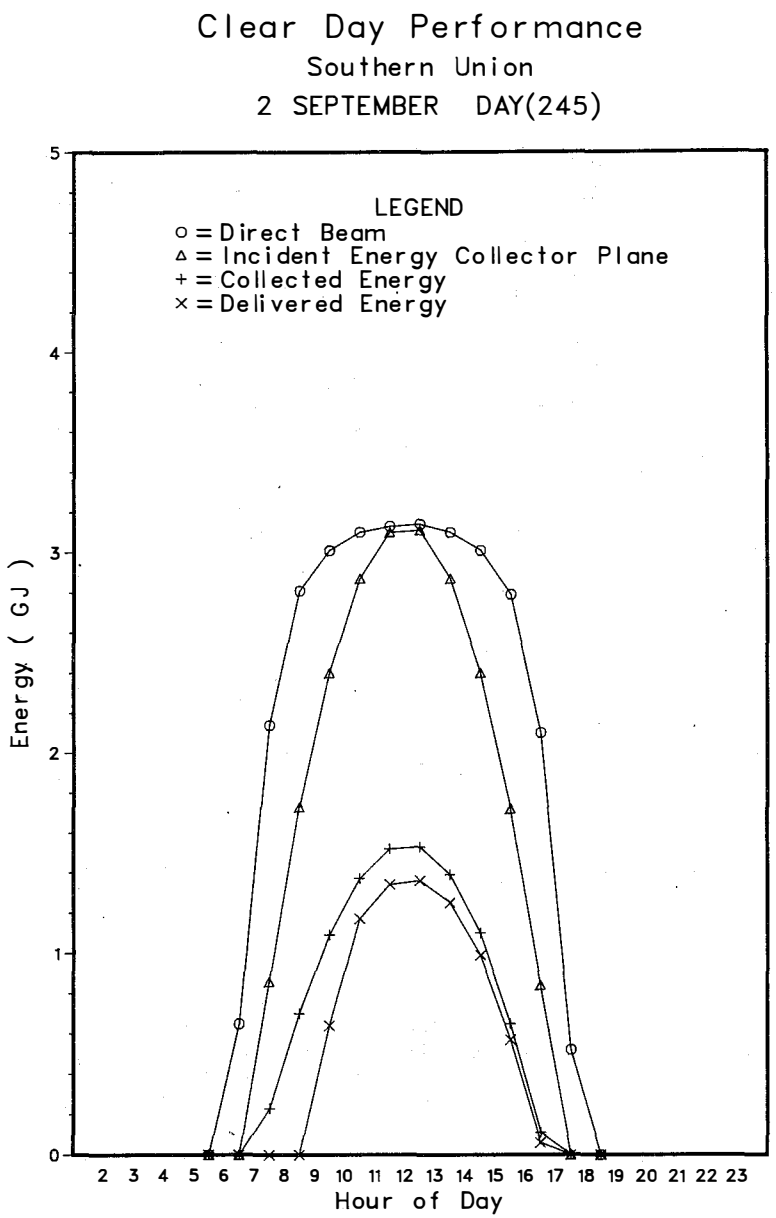


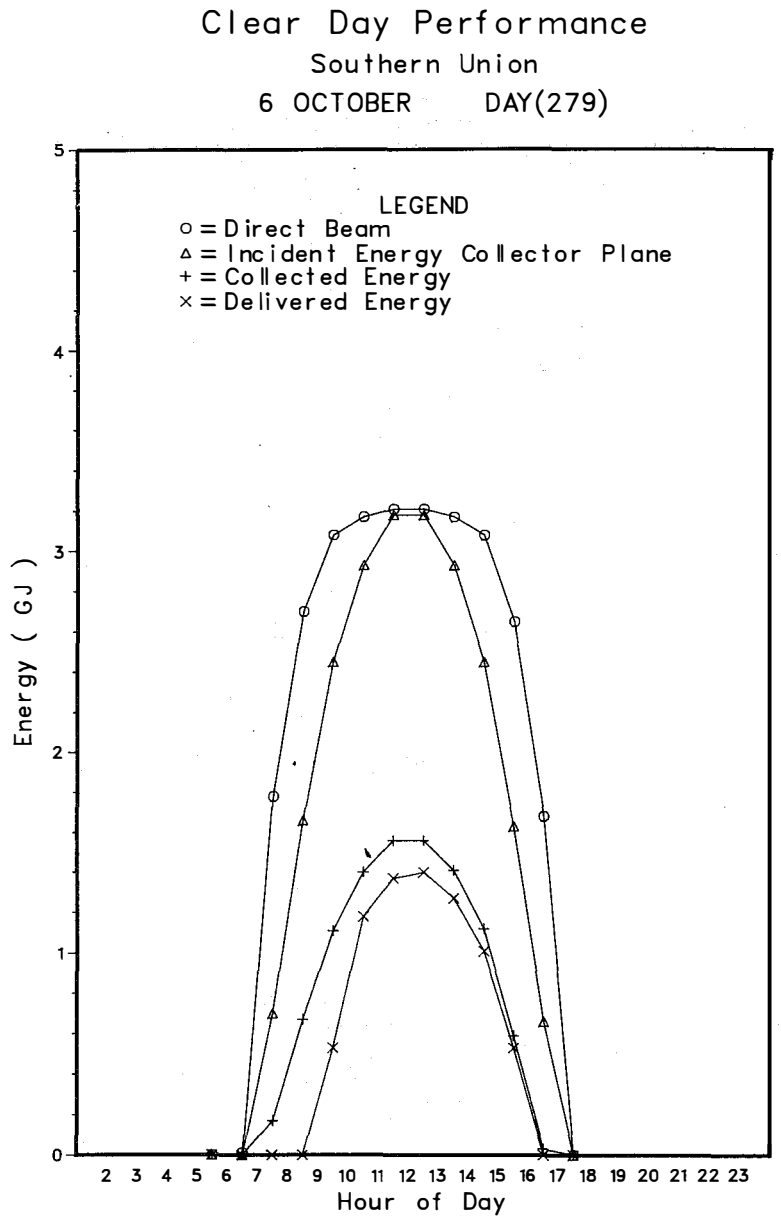

Clear Day Performance
Southern Union
22 MAY DAY(142)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Southern Union
5 JUNE DAY(156)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

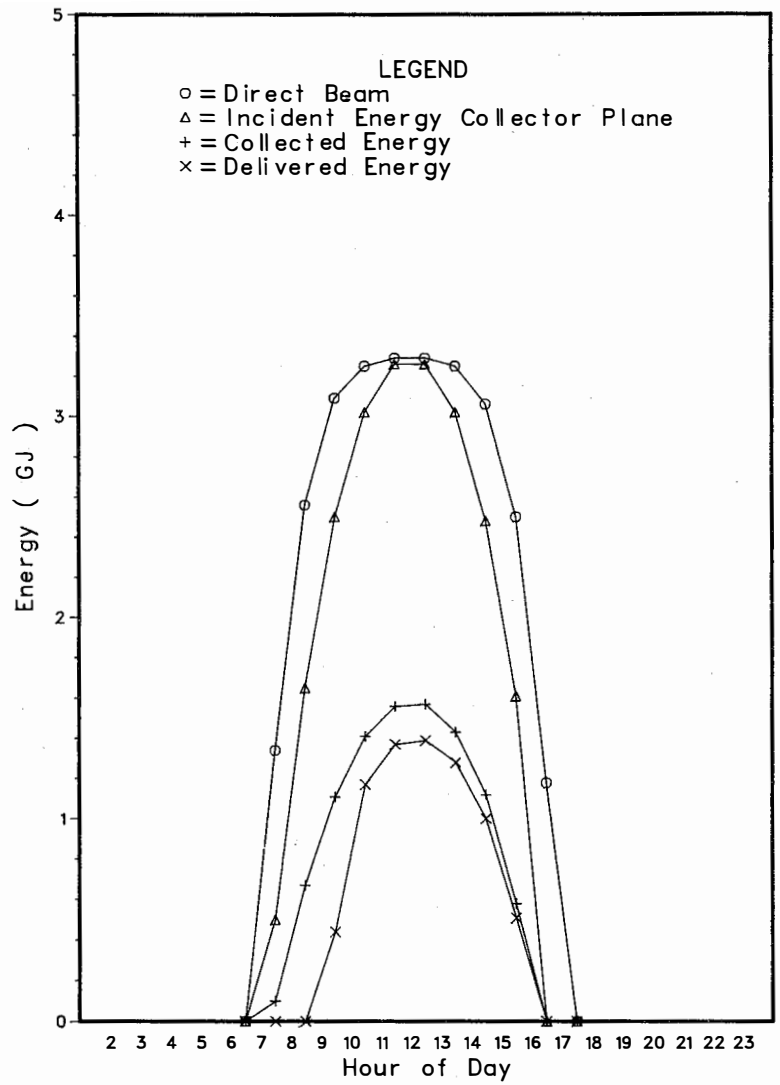

Clear Day Performance
Southern Union
1 JULY DAY(182)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Southern Union
2 AUGUST DAY(214)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

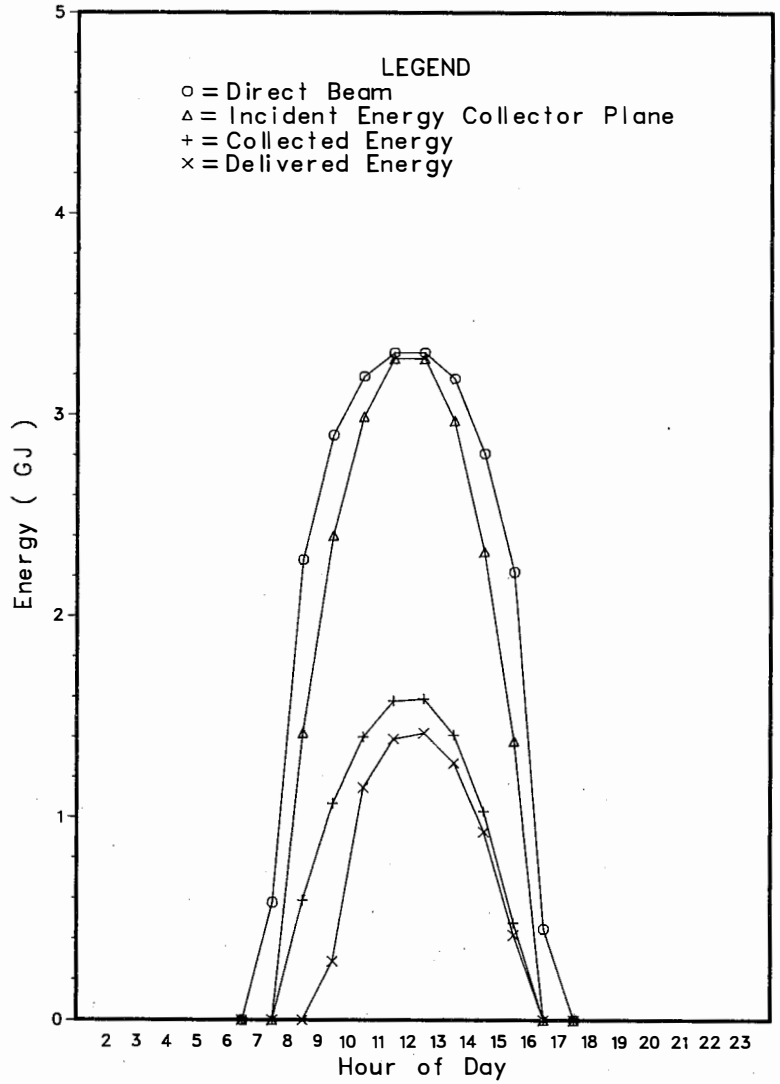

Clear Day Performance
Southern Union
2 SEPTEMBER DAY(245)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
Southern Union
6 OCTOBER DAY(279)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

Clear Day Performance
Southern Union
2 NOVEMBER DAY(306)



Clear Day Performance
Southern Union
1 DECEMBER DAY(335)



RUN ID: US3
83/10/07.

USS CHEMICALS

ANNUAL PERFORMANCE SUMMARY TABLE

MONTH	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	SYSTEM NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
JANUARY	789.0	845.5	473.8	187.7	39.6	93.7	22.4	69.7	19.8	5.4
FEBRUARY	1123.4	1054.0	604.6	250.6	41.4	152.8	28.0	67.2	25.3	6.3
MARCH	1672.9	1184.4	760.4	353.2	46.5	250.2	31.4	71.0	32.9	6.9
APRIL	2176.3	1504.4	1152.1	566.4	49.2	444.9	43.0	78.1	38.6	9.2
MAY	2888.4	2134.6	1748.2	870.9	49.8	707.6	65.1	100.1	40.5	14.5
JUNE	3029.7	2162.5	1740.3	883.0	50.7	725.8	61.3	92.6	41.7	14.0
JULY	2893.3	2034.2	1567.3	785.5	50.1	621.9	58.4	105.1	39.7	13.4
AUGUST	2662.3	2191.9	1784.1	890.6	49.9	725.2	67.1	97.8	40.7	15.4
SEPTEMBER	1911.0	1537.7	1132.8	555.5	49.0	428.7	43.4	84.9	37.8	10.0
OCTOBER	1576.6	1748.9	1174.2	541.8	46.1	404.0	47.0	88.8	34.4	10.8
NOVEMBER	896.7	975.8	530.8	213.7	40.3	120.5	25.3	68.9	22.7	6.4
DECEMBER	735.5	829.2	408.6	161.3	39.5	77.0	19.4	63.9	18.8	5.0
TOTALS/AVERAGES	22355.2	18203.1	13077.2	6260.1	47.9	4752.3	511.8	988.0	36.3	117.3

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

JANUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
1	1/ 1	6.7	.4	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
2	1/ 2	20.5	17.4	6.2	3.4	54.5	0.0	.2	1.7	0.0	.1
3	1/ 3	36.9	61.3	35.7	13.7	38.2	6.5	1.9	3.7	18.1	.5
4	1/ 4	19.6	4.8	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
5	1/ 5	42.1	82.3	51.4	18.3	35.7	10.6	2.6	3.5	20.5	.6
6	1/ 6	31.7	44.5	33.2	12.7	38.2	6.5	1.7	4.2	19.7	.4
7	1/ 7	16.0	1.1	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
8	1/ 8	21.4	10.1	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
9	1/ 9	16.1	3.0	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
10	1/10	37.2	55.5	32.3	13.7	42.6	6.0	1.4	3.6	18.6	.4
11	1/11	43.0	78.4	44.2	18.1	41.0	11.6	2.0	4.5	26.2	.4
12	1/12	37.5	56.1	29.7	12.3	41.4	6.6	1.3	4.4	22.3	.3
13	1/13	39.2	59.9	40.1	15.9	39.7	10.2	1.9	3.9	25.4	.4
14	1/14	10.5	.7	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
15	1/15	7.4	.5	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
16	1/16	20.8	12.4	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
17	1/17	28.6	30.8	10.9	4.0	36.4	0.0	.5	2.8	0.0	.2
18	1/18	46.3	84.1	47.6	18.7	39.3	10.5	2.2	3.9	22.1	.5
19	1/19	16.0	1.1	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
20	1/20	8.6	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
21	1/21	8.0	.5	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
22	1/22	33.3	27.2	7.0	3.6	50.9	0.0	.2	2.6	0.0	.1
23	1/23	42.3	62.9	39.4	14.8	37.5	7.2	2.2	4.0	18.2	.5
24	1/24	41.0	52.9	31.6	11.4	36.2	5.5	1.9	4.1	17.3	.4
25	1/25	19.1	1.3	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
26	1/26	15.6	1.0	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
27	1/27	43.1	63.1	43.6	18.9	43.3	11.7	1.7	3.3	26.9	.4
28	1/28	25.7	18.9	14.9	5.9	39.7	.9	.6	4.3	5.9	.1
29	1/29	9.6	.6	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
30	1/30	20.3	1.2	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
31	1/31	24.4	11.0	5.9	2.3	39.1	0.0	.2	1.9	0.0	.1
TOTALS/AVERAGES		789.0	845.5	473.8	187.7	39.6	93.7	22.4	69.7	19.8	5.4

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

FEBRUARY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
32	2/ 1	19.0	3.0	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
33	2/ 2	22.8	16.3	3.5	1.4	40.0	0.0	.1	1.5	0.0	.1
34	2/ 3	16.1	1.0	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
35	2/ 4	55.1	85.2	49.7	21.2	42.7	12.5	2.1	3.3	25.2	.5
36	2/ 5	43.6	44.2	14.2	4.5	31.8	.1	.8	4.3	.9	.2
37	2/ 6	31.4	16.2	3.1	1.1	35.2	0.0	.2	2.6	0.0	.1
38	2/ 7	22.6	1.6	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
39	2/ 8	39.9	27.3	12.1	5.7	46.7	0.0	.5	3.2	0.0	.1
40	2/ 9	58.3	89.1	58.2	23.3	39.9	15.6	2.8	3.9	26.9	.6
41	2/10	57.3	81.7	53.8	21.0	39.0	14.0	2.8	4.2	26.1	.6
42	2/11	62.5	97.4	63.8	26.4	41.4	19.2	2.9	4.2	30.1	.6
43	2/12	61.1	91.1	59.4	24.4	41.1	17.3	2.8	4.1	29.2	.6
44	2/13	24.6	3.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
45	2/14	10.6	.3	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
46	2/15	10.7	.3	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
47	2/16	48.9	44.9	17.7	6.6	37.3	.1	1.1	3.7	.6	.3
48	2/17	66.2	95.5	63.5	26.3	41.4	18.7	2.9	4.0	29.5	.6
49	2/18	53.5	57.5	30.2	11.3	37.4	5.2	1.7	4.5	17.4	.4
50	2/19	64.9	86.7	58.6	26.8	45.8	19.9	2.3	4.0	33.9	.5
51	2/20	21.1	1.2	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
52	2/21	32.8	4.0	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
53	2/22	34.4	8.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
54	2/23	56.9	55.4	26.8	9.7	36.3	3.0	1.4	3.7	11.3	.4
55	2/24	73.6	105.9	76.0	33.9	44.6	25.9	3.1	3.9	34.1	.7
56	2/25	30.0	3.7	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
57	2/26	37.4	9.0	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
58	2/27	28.7	1.8	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
59	2/28	39.4	21.9	14.0	7.0	49.7	1.0	.5	3.0	6.9	.1
TOTALS/AVERAGES		1123.4	1054.0	604.6	250.6	41.4	152.8	28.0	67.2	25.3	6.3

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USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

MARCH

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
60	3/ 1	75.7	99.4	68.8	31.5	45.8	24.6	2.8	4.0	35.8	.6
61	3/ 2	33.5	3.7	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
62	3/ 3	12.9	.3	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
63	3/ 4	77.0	98.4	77.4	32.6	42.2	24.2	3.5	3.0	31.2	.7
64	3/ 5	53.7	36.5	26.3	12.1	45.9	6.2	1.3	4.3	23.6	.3
65	3/ 6	15.7	.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
66	3/ 7	20.8	1.0	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
67	3/ 8	40.7	14.3	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
68	3/ 9	79.5	93.0	69.1	30.7	44.4	22.0	3.1	3.1	31.8	.7
69	3/10	18.4	.6	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
70	3/11	50.1	19.9	4.4	2.0	45.0	0.0	.2	2.2	0.0	.1
71	3/12	68.4	61.6	45.2	22.8	50.4	15.4	1.5	3.3	34.1	.4
72	3/13	33.5	1.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
73	3/14	56.5	26.1	5.2	2.6	50.5	0.0	.2	2.3	0.0	.1
74	3/15	43.7	15.2	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
75	3/16	34.5	3.7	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
76	3/17	58.7	37.9	27.4	12.9	47.1	5.7	1.2	3.2	20.8	.3
77	3/18	50.5	15.1	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
78	3/19	21.4	.7	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
79	3/20	51.8	17.5	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
80	3/21	94.0	111.3	91.4	43.7	47.8	34.9	3.4	2.9	38.1	.7
81	3/22	31.4	1.6	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
82	3/23	66.1	35.6	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
83	3/24	54.0	30.8	11.4	5.1	45.0	0.0	.5	3.5	0.0	.1
84	3/25	62.1	34.4	17.1	7.1	41.7	1.6	.9	4.1	9.6	.2
85	3/26	82.4	105.8	85.3	41.7	48.9	34.2	2.9	3.6	40.1	.6
86	3/27	86.0	76.5	56.0	25.2	44.9	18.5	2.7	4.0	33.0	.6
87	3/28	59.3	36.2	23.6	10.1	43.0	5.3	1.3	4.3	22.4	.3
88	3/29	47.8	7.3	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
89	3/30	96.8	100.0	75.2	36.1	48.1	27.9	2.8	3.5	37.1	.6
90	3/31	95.9	97.6	76.5	36.8	48.1	29.7	3.0	3.7	38.9	.7
TOTALS/AVERAGES		1672.9	1184.4	760.4	353.2	46.5	250.2	31.4	71.0	32.9	6.9

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

APRIL

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
91	4/ 1	43.7	7.4	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0
92	4/ 2	34.9	3.1	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
93	4/ 3	59.4	43.7	29.9	13.7	45.9	7.2	1.3	3.6	24.3	.3
94	4/ 4	92.3	82.4	66.5	32.5	48.9	25.5	2.5	3.7	38.3	.5
95	4/ 5	104.8	111.2	93.6	45.7	48.8	38.4	3.5	3.7	41.0	.7
96	4/ 6	99.8	96.6	76.0	36.8	48.4	29.9	3.0	3.8	39.3	.7
97	4/ 7	41.4	3.1	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0
98	4/ 8	82.7	61.7	43.7	19.3	44.1	12.1	2.1	3.9	27.6	.4
99	4/ 9	110.5	121.0	102.3	50.0	48.8	41.9	3.7	3.5	41.0	.7
100	4/10	47.6	5.9	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
101	4/11	66.3	41.5	33.5	15.9	47.6	9.8	1.5	2.9	29.4	.4
102	4/12	47.5	6.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
103	4/13	91.1	68.9	59.4	28.9	48.6	21.9	2.5	2.7	36.8	.6
104	4/14	43.2	3.1	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
105	4/15	35.0	2.1	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
106	4/16	63.5	25.4	12.7	6.1	47.6	.8	.6	3.5	6.1	.1
107	4/17	116.9	127.2	108.9	55.2	50.7	47.3	3.5	3.4	43.5	.7
108	4/18	114.7	119.8	102.2	51.9	50.7	44.8	3.4	3.6	43.8	.7
109	4/19	34.4	6.8	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
110	4/20	35.1	2.1	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
111	4/21	21.6	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
112	4/22	81.0	54.1	43.9	22.1	50.3	15.1	1.6	2.8	34.4	.4
113	4/23	55.4	8.9	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
114	4/24	87.6	52.1	15.6	6.8	43.4	1.4	.9	3.8	9.3	.2
115	4/25	116.7	114.6	98.3	49.5	50.3	41.6	3.3	3.5	42.3	.7
116	4/26	119.2	122.7	105.2	52.6	50.0	45.1	3.6	3.9	42.8	.7
117	4/27	118.2	117.1	101.1	50.6	50.0	43.5	3.5	3.7	43.1	.7
118	4/28	63.5	16.7	6.1	3.0	49.4	0.0	.2	3.8	0.0	.1
119	4/29	48.6	8.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
120	4/30	99.5	70.8	53.4	26.0	48.7	18.7	2.2	2.9	34.9	.5
TOTALS/AVERAGES		2176.3	1504.4	1152.1	566.4	49.2	444.9	43.0	78.1	38.6	9.2

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

MAY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
121	5/ 1	57.9	12.6	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
122	5/ 2	87.3	45.0	28.3	12.9	45.5	6.9	1.5	3.2	24.5	.4
123	5/ 3	94.6	66.3	46.4	21.2	45.7	13.7	2.3	5.0	29.6	.5
124	5/ 4	96.1	61.7	44.3	20.3	45.8	14.0	2.3	3.9	31.6	.5
125	5/ 5	114.4	101.5	87.4	42.9	49.0	35.6	3.4	3.6	40.8	.7
126	5/ 6	108.2	87.0	70.7	34.4	48.7	28.0	2.9	3.7	39.6	.7
127	5/ 7	74.6	28.8	12.4	6.0	48.2	.0	.5	5.3	.4	.1
128	5/ 8	27.0	.6	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
129	5/ 9	40.6	4.2	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
130	5/10	125.1	122.6	105.6	53.4	50.6	44.7	3.5	3.0	42.3	.7
131	5/11	125.6	122.3	105.9	53.7	50.7	46.4	3.5	3.7	43.8	.7
132	5/12	119.7	108.1	94.6	47.4	50.2	40.5	3.4	3.6	42.8	.7
133	5/13	22.3	.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
134	5/14	92.4	54.8	45.5	22.4	49.2	15.7	1.9	3.1	34.4	.4
135	5/15	81.4	46.2	36.9	16.6	45.1	11.1	1.9	4.1	30.0	.4
136	5/16	55.3	25.4	13.7	6.6	48.1	1.8	.6	3.6	13.4	.1
137	5/17	111.0	89.8	72.8	35.3	48.5	28.9	3.0	3.8	39.7	.7
138	5/18	122.6	113.5	102.1	51.4	50.3	44.0	3.6	3.3	43.1	.8
139	5/19	121.3	111.0	99.9	50.2	50.2	43.1	3.6	3.4	43.1	.8
140	5/20	77.5	41.0	29.0	13.7	47.4	9.1	1.3	4.2	31.3	.3
141	5/21	113.0	90.9	75.4	38.3	50.8	31.7	2.6	3.0	42.1	.6
142	5/22	122.9	112.1	102.2	51.7	50.6	44.7	3.6	3.4	43.7	.8
143	5/23	125.0	117.4	104.8	53.2	50.8	46.1	3.6	3.5	44.0	.8
144	5/24	129.8	125.9	113.1	58.2	51.5	51.0	3.6	3.5	45.1	.8
145	5/25	127.6	121.1	104.6	54.0	51.6	47.1	3.3	3.5	45.0	.7
146	5/26	130.5	126.1	114.2	58.8	51.5	51.7	3.7	3.5	45.2	.8
147	5/27	106.5	74.1	61.2	30.4	49.7	24.6	2.3	4.0	40.2	.5
148	5/28	97.5	61.8	45.2	22.3	49.3	16.3	1.9	3.6	36.1	.4
149	5/29	72.0	42.7	32.1	15.6	48.6	10.9	1.3	4.3	34.1	.3
150	5/30	48.9	9.4	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
151	5/31	59.9	10.8	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
TOTALS/AVERAGES		2888.4	2134.6	1748.2	870.9	49.8	707.6	65.1	100.1	40.5	14.5

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

JUNE

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
152	6/ 1	46.0	5.9	0.0	0.0	0.0	0.0	0.0	-.1	0.0	0.0
153	6/ 2	111.8	86.1	73.4	37.3	50.8	29.5	2.6	2.7	40.2	.6
154	6/ 3	80.4	34.7	18.3	8.7	47.8	4.0	.9	3.9	21.9	.2
155	6/ 4	133.5	130.1	117.6	60.8	51.7	53.4	3.7	3.5	45.4	.8
156	6/ 5	133.5	129.9	117.6	60.9	51.8	53.6	3.7	3.5	45.6	.8
157	6/ 6	122.6	106.9	94.7	48.4	51.1	41.7	3.2	3.5	44.0	.7
158	6/ 7	99.0	60.2	42.7	20.5	48.1	15.3	1.9	4.0	35.9	.4
159	6/ 8	101.8	61.1	44.7	22.1	49.4	16.5	1.8	3.5	36.9	.4
160	6/ 9	128.7	119.2	104.8	54.5	52.1	47.4	3.2	3.3	45.2	.7
161	6/10	122.9	106.3	94.4	48.4	51.3	42.1	3.2	3.4	44.6	.7
162	6/11	125.9	112.6	100.5	52.0	51.8	45.3	3.2	3.4	45.1	.7
163	6/12	117.8	96.6	84.4	42.1	49.9	35.6	3.2	3.5	42.1	.7
164	6/13	133.1	128.2	112.7	58.0	51.5	50.6	3.5	3.7	44.9	.7
165	6/14	77.8	23.8	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
166	6/15	101.6	66.7	53.8	27.8	51.5	21.5	1.8	2.8	40.0	.4
167	6/16	70.6	17.9	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
168	6/17	85.6	45.2	35.6	17.4	48.8	11.4	1.5	2.9	32.0	.4
169	6/18	119.4	100.6	87.8	43.8	49.9	36.9	3.3	3.5	42.0	.7
170	6/19	88.9	46.9	23.2	11.6	49.9	6.7	.9	3.9	28.8	.2
171	6/20	128.2	119.7	105.4	54.1	51.4	47.1	3.4	3.6	44.7	.7
172	6/21	114.3	88.9	78.1	38.4	49.2	31.8	3.2	3.5	40.7	.7
173	6/22	74.6	39.2	26.7	12.7	47.8	8.2	1.2	4.2	30.9	.3
174	6/23	107.8	78.1	64.5	32.2	49.9	25.8	2.5	3.3	40.0	.6
175	6/24	82.1	33.3	10.2	4.7	46.3	.8	.5	4.0	7.6	.1
176	6/25	57.7	7.4	0.0	0.0	0.0	0.0	0.0	.9	0.0	0.0
177	6/26	81.3	44.8	36.2	17.9	49.4	11.8	1.5	2.8	32.7	.4
178	6/27	43.2	3.2	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0
179	6/28	101.0	63.4	39.7	19.5	49.1	13.2	1.6	3.2	33.3	.4
180	6/29	112.0	86.3	69.0	34.7	50.3	28.4	2.6	3.5	41.1	.6
181	6/30	126.5	119.3	104.3	54.3	52.0	47.1	3.2	3.4	45.2	.7
TOTALS/AVERAGES		3029.7	2162.5	1740.3	883.0	50.7	725.8	61.3	92.6	41.7	14.0

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

JULY

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
182	7/ 1	76.7	37.1	23.0	11.4	49.8	6.8	.9	3.9	29.8	.2
183	7/ 2	109.4	82.2	61.7	30.1	48.7	23.0	2.6	4.7	37.2	.6
184	7/ 3	123.8	112.5	99.5	51.0	51.2	44.0	3.3	3.5	44.2	.7
185	7/ 4	117.1	98.8	86.9	43.8	50.4	37.1	3.2	3.4	42.7	.7
186	7/ 5	74.1	35.5	20.9	10.1	48.4	5.7	.9	4.3	27.3	.2
187	7/ 6	99.0	68.0	56.7	29.3	51.6	23.5	1.9	3.2	41.4	.4
188	7/ 7	121.7	108.8	96.5	49.5	51.3	42.8	3.2	3.4	44.4	.7
189	7/ 8	83.6	46.9	24.5	12.1	49.6	7.5	.9	4.3	30.7	.2
190	7/ 9	95.9	57.2	37.7	19.5	51.8	14.3	1.2	3.5	37.9	.3
191	7/10	88.3	52.0	34.6	16.6	48.1	9.9	1.5	5.2	28.5	.4
192	7/11	68.0	29.1	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
193	7/12	129.3	126.9	112.1	58.6	52.3	50.6	3.3	2.8	45.1	.7
194	7/13	80.7	38.7	23.2	11.7	50.4	7.2	.9	4.1	30.9	.2
195	7/14	105.8	79.1	54.8	28.0	51.1	22.0	1.9	3.6	40.2	.4
196	7/15	109.2	84.7	74.6	37.3	49.9	30.7	2.9	3.8	41.1	.7
197	7/16	114.1	96.7	84.5	42.0	49.7	35.5	3.2	3.4	42.0	.7
198	7/17	106.0	78.9	68.8	33.9	49.2	27.7	2.8	3.5	40.3	.7
199	7/18	45.4	10.5	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
200	7/19	80.1	38.7	20.5	10.1	49.2	4.8	.9	2.7	23.3	.2
201	7/20	99.0	68.9	54.6	25.0	45.7	17.7	2.8	4.4	32.5	.7
202	7/21	113.5	98.2	82.9	41.9	50.5	35.2	3.0	3.6	42.4	.7
203	7/22	120.0	113.1	99.3	50.7	51.1	43.8	3.3	3.5	44.1	.7
204	7/23	100.9	72.6	53.5	26.9	50.4	21.5	1.9	4.0	40.1	.4
205	7/24	44.0	8.8	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
206	7/25	90.5	54.0	33.5	16.3	48.8	10.3	1.5	2.9	30.8	.4
207	7/26	70.9	25.9	6.6	3.3	49.9	0.0	.3	3.7	0.0	.1
208	7/27	107.3	93.0	80.7	39.5	48.9	32.3	3.3	3.2	40.0	.7
209	7/28	92.1	68.3	57.6	28.4	49.3	22.6	2.3	3.9	39.3	.5
210	7/29	80.7	45.4	28.7	13.9	48.4	8.7	1.3	3.7	30.3	.3
211	7/30	35.2	2.8	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
212	7/31	111.3	100.9	89.4	44.6	50.0	36.8	3.3	2.8	41.1	.7
TOTALS/AVERAGES		2893.3	2034.2	1567.3	785.5	50.1	621.9	58.4	105.1	39.7	13.4

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

AUGUST

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
213	8/ 1	104.7	87.7	77.8	39.6	50.9	33.3	2.8	3.3	42.8	.7
214	8/ 2	95.6	71.9	51.3	24.8	48.4	19.1	2.2	3.9	37.3	.5
215	8/ 3	67.5	41.3	30.9	15.4	49.8	10.2	1.2	3.5	33.1	.3
216	8/ 4	107.1	96.4	82.8	41.5	50.2	34.9	3.0	3.7	42.2	.7
217	8/ 5	61.4	19.7	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
218	8/ 6	107.1	97.9	85.9	43.0	50.0	35.5	3.2	2.7	41.3	.7
219	8/ 7	106.0	97.4	86.2	43.1	50.0	36.3	3.2	3.4	42.1	.7
220	8/ 8	53.9	13.3	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
221	8/ 9	21.2	.8	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
222	8/10	41.9	3.8	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
223	8/11	105.4	99.0	87.9	44.5	50.6	36.3	3.2	2.6	41.2	.7
224	8/12	47.9	16.2	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
225	8/13	85.5	63.3	49.5	24.6	49.8	18.3	1.9	3.2	36.9	.4
226	8/14	105.1	101.2	89.3	45.3	50.7	38.3	3.2	3.3	42.9	.7
227	8/15	102.4	96.7	85.8	43.2	50.4	36.6	3.2	3.4	42.6	.7
228	8/16	91.0	76.3	63.6	32.2	50.6	26.4	2.2	3.9	41.6	.5
229	8/17	90.1	75.0	63.9	31.1	48.7	24.7	2.8	3.3	38.7	.7
230	8/18	93.4	80.7	69.2	34.1	49.3	27.9	2.8	3.4	40.3	.7
231	8/19	67.4	44.1	31.4	15.3	48.8	10.6	1.3	4.2	33.7	.3
232	8/20	84.7	67.4	47.8	22.9	47.8	15.3	2.1	4.7	32.1	.5
233	8/21	110.5	115.0	101.0	51.6	51.1	44.6	3.3	3.5	44.2	.7
234	8/22	69.8	50.5	36.0	17.3	48.0	12.3	1.6	4.1	34.1	.4
235	8/23	78.9	57.0	47.8	23.0	48.0	17.0	2.1	3.3	35.5	.5
236	8/24	93.0	81.6	65.2	31.8	48.7	25.6	2.6	3.8	39.3	.6
237	8/25	99.8	97.2	80.1	40.1	50.0	33.2	2.9	3.6	41.5	.7
238	8/26	100.8	100.4	87.5	43.7	50.0	37.1	3.2	3.4	42.4	.7
239	8/27	103.7	107.0	93.4	47.4	50.7	40.5	3.2	3.5	43.4	.7
240	8/28	107.8	115.0	100.7	51.7	51.3	44.8	3.3	3.5	44.6	.7
241	8/29	101.5	102.7	84.5	42.9	50.8	36.4	2.9	3.7	43.0	.7
242	8/30	69.0	41.7	26.7	12.6	47.3	8.2	1.2	4.0	30.6	.3
243	8/31	87.9	73.8	58.0	28.2	48.5	21.8	2.5	3.3	37.6	.6
TOTALS/AVERAGES		2662.3	2191.9	1784.1	890.6	49.9	725.2	67.1	97.8	40.7	15.4

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

SEPTEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
244	9/ 1	99.7	102.7	84.4	43.0	50.9	36.3	2.9	3.6	43.0	.7
245	9/ 2	100.1	105.8	92.0	46.6	50.7	40.0	3.2	3.4	43.5	.7
246	9/ 3	79.9	63.7	41.3	19.8	47.8	12.9	1.8	5.1	31.2	.4
247	9/ 4	64.9	36.6	27.0	13.1	48.6	8.2	1.2	3.8	30.3	.3
248	9/ 5	85.3	68.0	51.1	25.0	49.0	19.2	1.9	4.1	37.6	.4
249	9/ 6	82.6	69.5	37.7	17.9	47.4	12.7	1.6	4.0	33.5	.4
250	9/ 7	89.5	87.6	70.2	34.0	48.3	26.9	2.9	3.5	38.2	.7
251	9/ 8	100.7	111.5	96.6	48.6	50.3	41.8	3.3	3.5	43.3	.7
252	9/ 9	92.3	91.4	73.1	36.6	50.0	30.1	2.6	3.9	41.2	.6
253	9/10	87.6	80.3	65.4	32.2	49.3	26.2	2.5	3.6	40.1	.6
254	9/11	81.0	66.5	49.8	23.7	47.7	18.0	2.2	3.7	36.2	.5
255	9/12	87.3	80.9	61.8	30.8	49.9	24.7	2.2	3.7	40.0	.5
256	9/13	28.7	2.4	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
257	9/14	55.8	21.7	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
258	9/15	51.0	28.7	19.8	9.7	48.9	3.8	.9	3.1	19.4	.2
259	9/16	94.9	107.9	91.9	44.9	48.9	38.0	3.4	3.5	41.4	.7
260	9/17	79.3	68.3	51.9	24.6	47.4	18.7	2.2	3.9	35.9	.5
261	9/18	51.7	27.6	3.9	1.8	45.3	0.0	.2	3.1	0.0	.1
262	9/19	15.0	.3	0.0	0.0	0.0	0.0	0.0	.7	0.0	0.0
263	9/20	16.1	.4	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
264	9/21	43.7	6.7	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
265	9/22	51.4	29.2	13.3	6.7	50.5	0.0	.5	3.8	0.0	.1
266	9/23	76.8	81.6	61.3	30.0	48.9	23.4	2.3	3.8	38.2	.5
267	9/24	81.1	85.8	64.3	30.3	47.1	24.0	2.7	3.9	37.3	.6
268	9/25	21.1	.8	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
269	9/26	32.8	2.0	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
270	9/27	18.3	.6	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
271	9/28	57.6	42.2	31.0	15.2	49.2	8.7	1.2	3.0	27.9	.3
272	9/29	71.2	66.6	45.1	21.1	46.8	15.3	1.9	4.0	33.9	.4
273	9/30	13.6	.3	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
TOTALS/AVERAGES		1911.0	1537.7	1132.8	555.5	49.0	428.7	43.4	84.9	37.8	10.0

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

OCTOBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
274	10/ 1	41.0	12.6	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
275	10/ 2	77.2	92.7	67.0	31.4	46.8	23.4	2.7	3.2	34.9	.6
276	10/ 3	81.7	105.3	80.2	37.8	47.2	30.5	3.1	4.0	38.1	.7
277	10/ 4	78.8	99.9	75.7	35.5	46.9	28.6	3.0	4.0	37.7	.7
278	10/ 5	51.1	26.5	3.6	1.5	41.0	0.0	.2	3.2	0.0	.1
279	10/ 6	78.0	100.5	72.1	35.0	48.6	27.1	2.5	3.3	37.6	.6
280	10/ 7	54.7	41.4	15.9	6.3	39.5	2.0	.9	4.3	12.4	.2
281	10/ 8	12.6	.3	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
282	10/ 9	64.1	69.3	51.9	24.8	47.8	17.6	2.1	3.1	33.8	.5
283	10/10	39.7	19.6	7.4	3.7	50.0	0.0	.3	3.8	0.0	.1
284	10/11	75.3	102.9	72.6	34.6	47.7	27.8	2.6	3.8	38.3	.6
285	10/12	74.6	102.6	72.1	34.1	47.3	27.4	2.7	4.0	38.0	.6
286	10/13	73.8	102.2	71.7	34.5	48.1	28.0	2.5	3.8	39.0	.6
287	10/14	55.9	75.7	51.9	23.1	44.5	17.1	2.5	3.7	32.9	.6
288	10/15	64.0	76.5	49.5	22.3	45.1	16.5	2.1	3.9	33.2	.5
289	10/16	31.8	5.2	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
290	10/17	11.5	.3	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
291	10/18	11.3	.3	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
292	10/19	11.2	.3	0.0	0.0	0.0	0.0	0.0	.2	0.0	0.0
293	10/20	50.3	51.7	40.1	19.5	48.6	12.4	1.5	3.0	30.9	.4
294	10/21	65.0	92.5	63.3	28.8	45.6	22.3	2.6	3.8	35.2	.6
295	10/22	66.8	98.0	67.3	31.2	46.3	24.8	2.6	3.9	36.8	.6
296	10/23	64.4	92.4	64.5	29.6	45.9	23.2	2.5	3.9	36.0	.6
297	10/24	57.6	74.1	51.9	22.9	44.1	16.8	2.4	3.7	32.5	.6
298	10/25	17.5	2.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
299	10/26	52.2	60.1	43.5	20.7	47.5	14.1	1.6	3.3	32.3	.4
300	10/27	62.9	95.4	64.9	28.7	44.3	22.1	2.6	3.9	34.0	.6
301	10/28	27.1	5.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
302	10/29	18.5	1.1	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
303	10/30	59.5	89.6	59.8	25.6	42.8	18.1	2.6	3.1	30.2	.6
304	10/31	46.6	53.0	27.2	10.2	37.6	4.5	1.5	4.3	16.7	.4
TOTALS/AVERAGES		1576.6	1748.9	1174.2	541.8	46.1	404.0	47.0	88.8	34.4	10.8

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

NOVEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
305	11/ 1	25.5	7.5	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
306	11/ 2	38.1	32.5	23.6	10.4	44.1	4.9	1.1	3.0	20.6	.3
307	11/ 3	41.0	40.3	17.8	6.5	36.3	1.6	1.1	4.0	9.2	.3
308	11/ 4	9.2	.3	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
309	11/ 5	21.1	1.7	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
310	11/ 6	31.2	17.4	3.0	1.2	37.9	0.0	.1	1.6	0.0	.1
311	11/ 7	54.4	88.8	58.5	24.8	42.4	16.4	2.4	3.2	28.1	.6
312	11/ 8	52.1	81.9	55.0	22.7	41.3	16.2	2.5	3.9	29.5	.6
313	11/ 9	53.1	87.9	57.5	23.7	41.2	17.2	2.6	3.9	29.9	.6
314	11/10	19.9	1.6	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
315	11/11	8.5	.3	0.0	0.0	0.0	0.0	0.0	.5	0.0	0.0
316	11/12	19.4	1.8	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
317	11/13	24.3	7.1	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
318	11/14	20.0	7.5	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
319	11/15	33.5	25.0	5.5	2.9	53.0	0.0	.2	1.8	0.0	.1
320	11/16	41.2	45.0	23.2	9.9	42.5	3.2	1.1	3.9	13.7	.3
321	11/17	48.2	83.2	48.4	19.8	40.8	13.2	2.2	4.1	27.3	.5
322	11/18	38.2	49.5	23.7	8.1	34.1	2.7	1.4	4.2	11.6	.4
323	11/19	10.4	.7	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
324	11/20	40.4	55.6	31.1	13.4	43.1	7.0	1.4	3.5	22.4	.4
325	11/21	17.6	1.6	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
326	11/22	17.4	1.5	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
327	11/23	45.1	79.1	45.8	19.2	41.9	11.8	2.0	3.1	25.8	.5
328	11/24	7.4	.2	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
329	11/25	35.0	42.0	15.1	4.5	29.9	0.0	.9	3.3	0.0	.3
330	11/26	42.3	72.6	41.5	16.1	38.8	8.8	2.1	4.0	21.3	.5
331	11/27	12.2	.8	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
332	11/28	41.8	70.9	40.7	15.5	38.2	8.7	2.0	3.4	21.3	.5
333	11/29	41.2	71.2	40.5	15.2	37.5	8.7	2.1	4.1	21.5	.5
334	11/30	7.0	.2	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
TOTALS/AVERAGES		896.7	975.8	530.8	213.7	40.3	120.5	25.3	68.9	22.7	6.4

RUN ID: US3
83/10/07.

USS CHEMICALS

MONTHLY PERFORMANCE SUMMARY TABLE

DECEMBER

JULIAN DAY	DATE	INCIDENT SOLAR ENERGY HORIZONTAL SURFACE GJ	DIRECT NORMAL GJ	COLLECTOR PLANE (*) GJ	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM OPERATING LOSSES GJ	NON-OPERATING LOSSES GJ	SYSTEM EFFICIENCY BASED ON (*) %	PARASITIC ENERGY GJ
335	12/ 1	42.7	80.4	45.5	18.0	39.7	10.5	2.1	3.6	23.1	.5
336	12/ 2	18.7	4.5	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
337	12/ 3	26.7	21.5	7.2	3.4	47.2	0.0	.2	2.7	0.0	.1
338	12/ 4	24.6	12.5	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
339	12/ 5	41.0	75.1	42.0	17.7	42.3	10.4	1.7	3.3	24.7	.4
340	12/ 6	13.4	1.4	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
341	12/ 7	38.3	67.5	36.5	14.5	39.7	7.7	1.8	3.5	21.1	.4
342	12/ 8	40.9	79.1	44.2	17.5	39.5	11.0	2.1	4.2	24.8	.5
343	12/ 9	27.2	20.3	2.5	.6	23.1	0.0	.2	2.9	0.0	.1
344	12/10	9.8	.7	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
345	12/11	15.6	1.2	0.0	0.0	0.0	0.0	0.0	.0	0.0	0.0
346	12/12	13.1	1.2	0.0	0.0	0.0	0.0	0.0	.1	0.0	0.0
347	12/13	7.6	.5	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
348	12/14	25.6	28.2	19.5	9.3	47.9	2.0	.8	3.3	10.4	.2
349	12/15	12.2	.6	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0
350	12/16	15.0	.9	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
351	12/17	12.5	.7	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
352	12/18	29.4	35.7	10.4	3.6	34.8	0.0	.5	2.7	0.0	.2
353	12/19	33.7	52.6	23.8	7.8	32.7	.9	1.5	3.8	3.8	.4
354	12/20	6.5	.3	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
355	12/21	9.4	.5	0.0	0.0	0.0	0.0	0.0	.4	0.0	0.0
356	12/22	37.1	65.2	31.6	11.7	37.1	3.7	1.5	4.2	11.7	.4
357	12/23	15.0	.9	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
358	12/24	21.3	5.7	0.0	0.0	0.0	0.0	0.0	.3	0.0	0.0
359	12/25	11.7	.7	0.0	0.0	0.0	0.0	0.0	.6	0.0	0.0
360	12/26	40.0	78.4	46.6	17.5	37.6	10.1	2.2	3.2	21.8	.5
361	12/27	37.6	67.9	36.6	14.3	39.0	7.7	1.8	4.4	21.1	.4
362	12/28	37.0	61.0	33.9	13.7	40.5	7.7	1.6	4.4	22.7	.4
363	12/29	23.5	17.4	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
364	12/30	32.7	45.9	28.4	11.5	40.6	5.2	1.4	3.2	18.3	.4
365	12/31	15.4	1.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
TOTALS/AVERAGES		735.5	829.2	408.6	161.3	39.5	77.0	19.4	63.9	18.8	5.0

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

18 JANUARY (DAY 18)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-16.1	0.00	0.00	0.00	-14.6	-14.6	0.00	0.0	0.00	.08	0.00
2	-17.2	0.00	0.00	0.00	-15.5	-15.5	0.00	0.0	0.00	.08	0.00
3	-18.3	0.00	0.00	0.00	-16.5	-16.5	0.00	0.0	0.00	.08	0.00
4	-17.8	0.00	0.00	0.00	-17.0	-17.0	0.00	0.0	0.00	.07	0.00
5	-17.2	0.00	0.00	0.00	-17.1	-17.1	0.00	0.0	0.00	.06	0.00
6	-17.8	0.00	0.00	0.00	-17.3	-17.3	0.00	0.0	0.00	.05	0.00
7	-18.3	0.00	0.00	0.00	-17.7	-17.7	0.00	0.0	0.00	.05	0.00
8	-17.8	.98	0.00	0.00	-17.7	-17.7	0.00	0.0	0.00	.04	0.00
9	-17.8	6.98	3.23	20.13	52.9	60.5	1.15	35.6	0.00	.15	.07
10	-15.0	10.66	4.40	20.13	75.5	84.7	1.39	31.5	0.00	.21	.07
11	-12.2	12.75	5.80	20.13	108.4	120.8	1.87	32.2	0.00	.28	.07
12	-11.1	13.46	7.57	20.13	149.9	167.5	2.66	35.1	.26	.38	.07
13	-9.4	13.55	9.36	20.13	155.5	181.9	3.98	42.5	3.14	.40	.07
14	-7.8	12.87	10.41	20.13	156.2	188.3	4.84	46.5	4.24	.40	.07
15	-6.1	7.52	6.79	20.13	155.4	174.1	2.81	41.4	2.85	.39	.07
16	-5.6	4.49	0.00	0.00	44.0	44.0	0.00	0.0	0.00	1.15	0.00
17	-5.6	.82	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.49	0.00
18	-6.7	0.00	0.00	0.00	8.4	8.4	0.00	0.0	0.00	.37	0.00
19	-7.2	0.00	0.00	0.00	2.1	2.1	0.00	0.0	0.00	.31	0.00
20	-6.7	0.00	0.00	0.00	-1.2	-1.2	0.00	0.0	0.00	.27	0.00
21	-5.6	0.00	0.00	0.00	-2.9	-2.9	0.00	0.0	0.00	.23	0.00
22	-3.9	0.00	0.00	0.00	-3.2	-3.2	0.00	0.0	0.00	.20	0.00
23	-3.9	0.00	0.00	0.00	-3.5	-3.5	0.00	0.0	0.00	.18	0.00
24	-2.8	0.00	0.00	0.00	-3.2	-3.2	0.00	0.0	0.00	.16	0.00
TOTAL/AVE	---	84.09	47.57	---	---	---	18.70	39.3	10.50	6.07	.51

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

24 FEBRUARY (DAY 55)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-3.3	0.00	0.00	0.00	-1.7	-1.7	0.00	0.0	0.00	.12	0.00
2	-4.1	0.00	0.00	0.00	-2.6	-2.6	0.00	0.0	0.00	.11	0.00
3	-5.1	0.00	0.00	0.00	-3.5	-3.5	0.00	0.0	0.00	.11	0.00
4	-6.1	0.00	0.00	0.00	-4.4	-4.4	0.00	0.0	0.00	.10	0.00
5	-6.2	0.00	0.00	0.00	-5.1	-5.1	0.00	0.0	0.00	.09	0.00
6	-6.4	0.00	0.00	0.00	-5.5	-5.5	0.00	0.0	0.00	.08	0.00
7	-6.7	0.00	0.00	0.00	-6.0	-6.0	0.00	0.0	0.00	.08	0.00
8	-4.0	5.39	3.73	20.13	84.6	92.1	1.13	30.4	0.00	.20	.07
9	-1.4	9.41	5.72	20.13	120.1	135.3	2.28	39.9	0.00	.28	.07
10	1.1	11.75	6.73	20.13	151.7	167.5	2.39	35.5	.64	.35	.07
11	2.8	13.02	7.85	20.13	155.2	175.4	3.04	38.8	2.44	.37	.07
12	4.4	13.53	9.23	20.13	155.8	182.7	4.06	43.9	3.46	.37	.07
13	6.1	13.77	10.78	20.13	156.5	190.9	5.19	48.2	4.56	.38	.07
14	7.0	13.21	11.59	20.13	156.9	195.4	5.79	50.0	5.27	.38	.07
15	8.0	11.83	11.23	20.13	157.0	194.2	5.61	49.9	5.26	.38	.07
16	8.9	9.20	9.12	20.13	156.4	185.7	4.41	48.3	4.30	.37	.07
17	6.9	4.83	0.00	0.00	56.1	56.1	0.00	0.0	0.00	1.10	0.00
18	4.8	0.00	0.00	0.00	30.8	30.8	0.00	0.0	0.00	.49	0.00
19	2.8	0.00	0.00	0.00	18.6	18.6	0.00	0.0	0.00	.37	0.00
20	2.4	0.00	0.00	0.00	12.1	12.1	0.00	0.0	0.00	.31	0.00
21	2.1	0.00	0.00	0.00	8.2	8.2	0.00	0.0	0.00	.27	0.00
22	1.7	0.00	0.00	0.00	5.8	5.8	0.00	0.0	0.00	.24	0.00
23	.9	0.00	0.00	0.00	4.0	4.0	0.00	0.0	0.00	.21	0.00
24	.2	0.00	0.00	0.00	2.6	2.6	0.00	0.0	0.00	.19	0.00
TOTAL/AVE	---	105.93	75.98	---	---	---	33.90	44.6	25.94	6.96	.66

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

21 MARCH (DAY 80)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-2.2	0.00	0.00	0.00	-.6	-.6	0.00	0.0	0.00	.02	0.00
2	-2.3	0.00	0.00	0.00	-1.2	-1.2	0.00	0.0	0.00	.02	0.00
3	-2.5	0.00	0.00	0.00	-1.7	-1.7	0.00	0.0	0.00	.02	0.00
4	-2.8	0.00	0.00	0.00	-2.1	-2.1	0.00	0.0	0.00	.02	0.00
5	-2.7	0.00	0.00	0.00	-2.3	-2.3	0.00	0.0	0.00	.01	0.00
6	-2.7	0.00	0.00	0.00	-2.4	-2.4	0.00	0.0	0.00	.01	0.00
7	-2.8	1.83	0.00	0.00	-2.6	-2.6	0.00	0.0	0.00	.01	0.00
8	-.1	5.92	4.68	20.13	83.1	98.6	2.33	49.7	0.00	.19	.07
9	2.4	8.84	6.45	20.13	134.0	152.7	2.82	43.7	0.00	.31	.07
10	5.0	10.39	7.31	20.13	154.2	174.5	3.06	41.8	1.83	.36	.07
11	7.2	11.90	8.62	20.13	155.7	181.2	3.85	44.7	3.27	.36	.07
12	9.5	12.90	10.12	20.13	156.3	188.5	4.85	48.0	4.26	.37	.07
13	11.7	13.94	11.99	20.13	157.1	197.3	6.07	50.6	5.43	.37	.07
14	13.0	13.59	12.65	20.13	157.5	200.6	6.50	51.4	6.03	.37	.07
15	14.3	12.60	12.36	20.13	157.5	199.7	6.37	51.5	6.02	.37	.07
16	15.6	10.53	10.52	20.13	157.1	193.0	5.42	51.5	5.26	.36	.07
17	14.3	6.84	6.74	20.13	155.6	171.9	2.47	36.6	2.76	.34	.07
18	13.0	2.04	0.00	0.00	61.1	61.1	0.00	0.0	0.00	1.00	0.00
19	11.7	0.00	0.00	0.00	37.0	37.0	0.00	0.0	0.00	.45	0.00
20	10.8	0.00	0.00	0.00	25.7	25.7	0.00	0.0	0.00	.34	0.00
21	9.8	0.00	0.00	0.00	19.3	19.3	0.00	0.0	0.00	.29	0.00
22	8.9	0.00	0.00	0.00	15.3	15.3	0.00	0.0	0.00	.25	0.00
23	8.3	0.00	0.00	0.00	12.7	12.7	0.00	0.0	0.00	.22	0.00
24	7.8	0.00	0.00	0.00	10.9	10.9	0.00	0.0	0.00	.20	0.00
TOTAL/AVE	---	111.32	91.44	---	---	---	43.74	47.8	34.87	6.27	.73

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

17 APRIL (DAY 107)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	10.6	0.00	0.00	0.00	11.3	11.3	0.00	0.0	0.00	.10	0.00
2	9.8	0.00	0.00	0.00	10.8	10.8	0.00	0.0	0.00	.09	0.00
3	9.1	0.00	0.00	0.00	10.2	10.2	0.00	0.0	0.00	.09	0.00
4	8.3	0.00	0.00	0.00	9.5	9.5	0.00	0.0	0.00	.08	0.00
5	7.9	0.00	0.00	0.00	8.9	8.9	0.00	0.0	0.00	.08	0.00
6	7.6	0.00	0.00	0.00	8.4	8.4	0.00	0.0	0.00	.07	0.00
7	7.2	4.01	0.00	0.00	8.0	8.0	0.00	0.0	0.00	.07	0.00
8	9.2	8.33	7.34	20.13	132.3	156.1	3.58	48.8	0.00	.28	.07
9	11.3	11.20	9.40	20.13	154.6	184.8	4.55	48.4	2.99	.35	.07
10	13.3	12.79	10.51	20.13	156.6	191.0	5.18	49.3	4.63	.36	.07
11	14.6	13.50	11.28	20.13	157.0	194.6	5.67	50.2	5.19	.36	.07
12	15.9	13.72	12.02	20.13	157.3	198.1	6.15	51.2	5.68	.36	.07
13	17.2	13.88	12.88	20.13	157.6	202.0	6.69	51.9	6.21	.37	.07
14	17.9	13.71	13.34	20.13	157.8	204.2	6.98	52.3	6.55	.37	.07
15	18.7	13.05	13.02	20.13	157.8	203.6	6.90	53.0	6.55	.36	.07
16	19.4	11.35	11.27	20.13	157.4	196.0	5.82	51.6	5.70	.36	.07
17	19.2	8.15	7.78	20.13	156.3	180.8	3.70	47.6	3.82	.34	.07
18	19.1	3.52	0.00	0.00	67.1	67.1	0.00	0.0	0.00	.99	0.00
19	18.9	0.00	0.00	0.00	43.7	43.7	0.00	0.0	0.00	.44	0.00
20	16.3	0.00	0.00	0.00	31.8	31.8	0.00	0.0	0.00	.35	0.00
21	13.7	0.00	0.00	0.00	24.4	24.4	0.00	0.0	0.00	.30	0.00
22	11.1	0.00	0.00	0.00	19.2	19.2	0.00	0.0	0.00	.26	0.00
23	10.5	0.00	0.00	0.00	15.9	15.9	0.00	0.0	0.00	.23	0.00
24	10.0	0.00	0.00	0.00	13.7	13.7	0.00	0.0	0.00	.21	0.00
TOTAL/AVE	---	127.20	108.85	---	---	---	55.23	50.7	47.32	6.87	.73

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

26 MAY (DAY 146)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	20.0	0.00	0.00	0.00	22.9	22.9	0.00	0.0	0.00	.18	0.00
2	19.3	0.00	0.00	0.00	21.6	21.6	0.00	0.0	0.00	.16	0.00
3	18.5	0.00	0.00	0.00	20.5	20.5	0.00	0.0	0.00	.15	0.00
4	17.8	0.00	0.00	0.00	19.5	19.5	0.00	0.0	0.00	.14	0.00
5	17.6	0.00	0.00	0.00	18.8	18.8	0.00	0.0	0.00	.12	0.00
6	17.4	.66	0.00	0.00	18.3	18.3	0.00	0.0	0.00	.11	0.00
7	17.2	5.71	4.66	20.13	127.7	141.5	2.09	44.8	0.00	.26	.07
8	19.1	9.36	8.51	20.13	153.6	181.2	4.16	48.9	2.22	.33	.07
9	20.9	11.47	10.61	20.13	156.7	192.5	5.40	50.9	4.71	.35	.07
10	22.8	12.55	11.48	20.13	157.2	196.5	5.93	51.7	5.46	.35	.07
11	24.3	12.99	12.00	20.13	157.4	198.9	6.25	52.1	5.83	.35	.07
12	25.7	13.11	12.43	20.13	157.6	200.9	6.52	52.5	6.12	.35	.07
13	27.2	13.18	12.87	20.13	157.8	203.0	6.81	53.0	6.41	.35	.07
14	27.6	12.54	12.50	20.13	157.8	202.1	6.68	53.4	6.36	.34	.07
15	27.9	11.63	11.60	20.13	157.5	198.3	6.15	53.0	5.92	.34	.07
16	28.3	10.09	9.77	20.13	157.0	190.1	4.99	51.1	4.91	.33	.07
17	27.4	8.19	7.78	20.13	156.2	181.4	3.79	48.8	3.73	.32	.07
18	26.5	4.61	0.00	0.00	73.7	73.7	0.00	0.0	0.00	.93	0.00
19	25.6	0.00	0.00	0.00	50.4	50.4	0.00	0.0	0.00	.43	0.00
20	23.9	0.00	0.00	0.00	39.0	39.0	0.00	0.0	0.00	.33	0.00
21	22.3	0.00	0.00	0.00	32.2	32.2	0.00	0.0	0.00	.28	0.00
22	20.6	0.00	0.00	0.00	27.7	27.7	0.00	0.0	0.00	.25	0.00
23	19.8	0.00	0.00	0.00	24.7	24.7	0.00	0.0	0.00	.22	0.00
24	19.1	0.00	0.00	0.00	22.6	22.6	0.00	0.0	0.00	.19	0.00
TOTAL/AVE	---	126.09	114.21	---	---	---	58.78	51.5	51.67	7.14	.80

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

4 JUNE (DAY 155)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	16.1	0.00	0.00	0.00	19.5	19.5	0.00	0.0	0.00	.18	0.00
2	15.7	0.00	0.00	0.00	18.1	18.1	0.00	0.0	0.00	.16	0.00
3	15.4	0.00	0.00	0.00	17.1	17.1	0.00	0.0	0.00	.15	0.00
4	15.0	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.13	0.00
5	15.9	0.00	0.00	0.00	16.2	16.2	0.00	0.0	0.00	.12	0.00
6	16.9	.58	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.10	0.00
7	17.8	5.39	4.36	20.13	122.2	135.2	1.96	45.0	0.00	.24	.07
8	19.8	9.32	8.41	20.13	152.7	180.1	4.12	49.0	1.93	.32	.07
9	21.9	11.37	10.62	20.13	156.7	192.7	5.42	51.0	4.69	.34	.07
10	23.9	12.40	11.46	20.13	157.2	196.5	5.93	51.8	5.46	.35	.07
11	24.5	12.83	11.96	20.13	157.4	198.8	6.23	52.1	5.82	.35	.07
12	25.0	12.94	12.35	20.13	157.6	200.5	6.47	52.4	6.07	.35	.07
13	25.6	13.00	12.75	20.13	157.8	202.4	6.73	52.8	6.33	.35	.07
14	26.0	12.95	12.93	20.13	157.9	203.9	6.93	53.6	6.54	.35	.07
15	26.3	12.62	12.57	20.13	157.9	202.3	6.69	53.2	6.40	.35	.07
16	26.7	11.62	11.21	20.13	157.4	196.0	5.82	51.9	5.67	.34	.07
17	26.1	9.44	9.04	20.13	156.7	186.7	4.52	50.1	4.47	.33	.07
18	25.6	5.16	0.00	0.00	73.2	73.2	0.00	0.0	0.00	.96	0.00
19	25.0	.44	0.00	0.00	49.8	49.8	0.00	0.0	0.00	.44	0.00
20	23.3	0.00	0.00	0.00	38.4	38.4	0.00	0.0	0.00	.34	0.00
21	21.7	0.00	0.00	0.00	31.6	31.6	0.00	0.0	0.00	.28	0.00
22	20.0	0.00	0.00	0.00	27.1	27.1	0.00	0.0	0.00	.25	0.00
23	19.1	0.00	0.00	0.00	24.1	24.1	0.00	0.0	0.00	.22	0.00
24	18.1	0.00	0.00	0.00	21.8	21.8	0.00	0.0	0.00	.20	0.00
TOTAL/AVE	---	130.06	117.64	---	---	---	60.83	51.7	53.39	7.19	.80

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

12 JULY (DAY 193)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	21.1	0.00	0.00	0.00	22.2	22.2	0.00	0.0	0.00	.03	0.00
2	20.4	0.00	0.00	0.00	21.6	21.6	0.00	0.0	0.00	.03	0.00
3	19.6	0.00	0.00	0.00	20.9	20.9	0.00	0.0	0.00	.03	0.00
4	18.9	0.00	0.00	0.00	20.1	20.1	0.00	0.0	0.00	.03	0.00
5	19.3	0.00	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.03	0.00
6	19.6	.22	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.03	0.00
7	20.0	4.30	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.02	0.00
8	21.7	8.59	7.77	20.13	135.3	161.5	3.95	50.8	0.00	.27	.07
9	23.3	11.07	10.31	20.13	155.6	190.5	5.26	51.0	3.78	.33	.07
10	25.0	12.21	11.25	20.13	157.1	195.7	5.82	51.7	5.31	.34	.07
11	25.9	12.71	11.81	20.13	157.4	198.3	6.16	52.2	5.74	.34	.07
12	26.9	12.86	12.24	20.13	157.6	200.2	6.43	52.5	6.03	.34	.07
13	27.8	13.17	12.90	20.13	157.8	203.2	6.84	53.1	6.41	.34	.07
14	28.3	13.11	13.08	20.13	158.0	204.7	7.04	53.9	6.65	.34	.07
15	28.9	12.73	12.69	20.13	158.0	203.1	6.80	53.6	6.51	.34	.07
16	29.4	11.65	11.26	20.13	157.5	196.5	5.88	52.2	5.74	.34	.07
17	29.0	9.24	8.82	20.13	156.7	186.1	4.43	50.2	4.42	.33	.07
18	28.7	4.65	0.00	0.00	76.0	76.0	0.00	0.0	0.00	.93	0.00
19	28.3	.36	0.00	0.00	52.9	52.9	0.00	0.0	0.00	.43	0.00
20	26.5	0.00	0.00	0.00	41.5	41.5	0.00	0.0	0.00	.33	0.00
21	24.6	0.00	0.00	0.00	34.7	34.7	0.00	0.0	0.00	.28	0.00
22	22.8	0.00	0.00	0.00	30.0	30.0	0.00	0.0	0.00	.25	0.00
23	22.1	0.00	0.00	0.00	27.0	27.0	0.00	0.0	0.00	.22	0.00
24	21.3	0.00	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.20	0.00
TOTAL/AVE	---	126.88	112.11	---	---	---	58.61	52.3	50.59	6.17	.73

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

21 AUGUST (DAY 233)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	20.6	0.00	0.00	0.00	23.2	23.2	0.00	0.0	0.00	.17	0.00
2	19.5	0.00	0.00	0.00	21.9	21.9	0.00	0.0	0.00	.16	0.00
3	18.3	0.00	0.00	0.00	20.5	20.5	0.00	0.0	0.00	.14	0.00
4	17.2	0.00	0.00	0.00	19.3	19.3	0.00	0.0	0.00	.13	0.00
5	16.8	0.00	0.00	0.00	18.4	18.4	0.00	0.0	0.00	.12	0.00
6	16.5	0.00	0.00	0.00	17.7	17.7	0.00	0.0	0.00	.11	0.00
7	16.1	2.78	0.00	0.00	17.1	17.1	0.00	0.0	0.00	.10	0.00
8	18.3	7.99	7.14	20.13	143.5	166.4	3.45	48.3	0.00	.29	.07
9	20.6	10.59	9.04	20.13	155.6	185.1	4.45	49.2	3.37	.34	.07
10	22.8	11.99	10.04	20.13	156.6	190.0	5.04	50.2	4.54	.34	.07
11	24.3	12.65	10.76	20.13	157.0	193.4	5.49	51.0	5.04	.34	.07
12	25.7	12.87	11.44	20.13	157.2	196.6	5.93	51.8	5.49	.34	.07
13	27.2	12.95	12.13	20.13	157.5	199.8	6.37	52.5	5.93	.34	.07
14	27.6	12.48	12.20	20.13	157.5	200.2	6.43	52.7	6.06	.34	.07
15	27.9	11.59	11.58	20.13	157.5	198.4	6.17	53.3	5.88	.34	.07
16	28.3	9.92	9.83	20.13	157.0	190.5	5.05	51.4	4.96	.33	.07
17	27.4	7.23	6.86	20.13	156.0	177.6	3.25	47.4	3.32	.32	.07
18	26.5	1.99	0.00	0.00	73.5	73.5	0.00	0.0	0.00	.91	0.00
19	25.6	0.00	0.00	0.00	50.3	50.3	0.00	0.0	0.00	.43	0.00
20	24.1	0.00	0.00	0.00	39.0	39.0	0.00	0.0	0.00	.33	0.00
21	22.6	0.00	0.00	0.00	32.4	32.4	0.00	0.0	0.00	.27	0.00
22	21.1	0.00	0.00	0.00	28.0	28.0	0.00	0.0	0.00	.24	0.00
23	20.4	0.00	0.00	0.00	25.1	25.1	0.00	0.0	0.00	.21	0.00
24	19.6	0.00	0.00	0.00	23.1	23.1	0.00	0.0	0.00	.19	0.00
TOTAL/AVE	---	115.03	101.02	---	---	---	51.61	51.1	44.60	6.85	.73

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

8 SEPTEMBER (DAY 251)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	15.0	0.00	0.00	0.00	17.5	17.5	0.00	0.0	0.00	.17	0.00
2	14.6	0.00	0.00	0.00	16.4	16.4	0.00	0.0	0.00	.15	0.00
3	14.3	0.00	0.00	0.00	15.7	15.7	0.00	0.0	0.00	.14	0.00
4	13.9	0.00	0.00	0.00	15.0	15.0	0.00	0.0	0.00	.13	0.00
5	13.5	0.00	0.00	0.00	14.5	14.5	0.00	0.0	0.00	.12	0.00
6	13.2	0.00	0.00	0.00	14.0	14.0	0.00	0.0	0.00	.11	0.00
7	12.8	1.09	0.00	0.00	13.6	13.6	0.00	0.0	0.00	.10	0.00
8	15.6	6.80	5.71	20.13	132.1	149.7	2.66	46.7	0.00	.27	.07
9	18.3	10.27	8.10	20.13	154.0	179.3	3.82	47.1	2.25	.33	.07
10	21.1	11.97	9.18	20.13	156.2	185.6	4.42	48.1	3.89	.34	.07
11	22.8	12.76	10.01	20.13	156.6	189.4	4.95	49.4	4.49	.34	.07
12	24.4	13.07	10.90	20.13	157.0	193.8	5.55	51.0	5.08	.34	.07
13	26.1	13.18	11.83	20.13	157.4	198.3	6.17	52.1	5.69	.34	.07
14	26.3	12.91	12.33	20.13	157.6	200.6	6.47	52.5	6.06	.34	.07
15	26.5	12.10	12.00	20.13	157.6	199.6	6.33	52.7	6.02	.34	.07
16	26.7	10.29	10.27	20.13	157.1	192.7	5.36	52.2	5.23	.34	.07
17	25.4	6.44	6.26	20.13	155.9	175.0	2.88	45.9	3.09	.32	.07
18	24.1	.65	0.00	0.00	71.2	71.2	0.00	0.0	0.00	.92	0.00
19	22.8	0.00	0.00	0.00	47.7	47.7	0.00	0.0	0.00	.43	0.00
20	21.1	0.00	0.00	0.00	36.2	36.2	0.00	0.0	0.00	.33	0.00
21	19.5	0.00	0.00	0.00	29.5	29.5	0.00	0.0	0.00	.28	0.00
22	17.8	0.00	0.00	0.00	24.9	24.9	0.00	0.0	0.00	.25	0.00
23	17.1	0.00	0.00	0.00	22.0	22.0	0.00	0.0	0.00	.22	0.00
24	16.3	0.00	0.00	0.00	19.8	19.8	0.00	0.0	0.00	.19	0.00
TOTAL/AVE	---	111.52	96.59	---	---	---	48.61	50.3	41.79	6.83	.73

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

3 OCTOBER (DAY 276)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	2.2	0.00	0.00	0.00	4.7	4.7	0.00	0.0	0.00	.18	0.00
2	2.2	0.00	0.00	0.00	3.8	3.8	0.00	0.0	0.00	.16	0.00
3	2.2	0.00	0.00	0.00	3.2	3.2	0.00	0.0	0.00	.14	0.00
4	2.2	0.00	0.00	0.00	2.9	2.9	0.00	0.0	0.00	.13	0.00
5	1.5	0.00	0.00	0.00	2.4	2.4	0.00	0.0	0.00	.12	0.00
6	.7	0.00	0.00	0.00	1.8	1.8	0.00	0.0	0.00	.11	0.00
7	0.0	.03	0.00	0.00	1.1	1.1	0.00	0.0	0.00	.11	0.00
8	3.5	5.38	4.01	20.13	106.9	117.3	1.57	39.0	0.00	.23	.07
9	7.1	9.53	6.43	20.13	148.8	166.0	2.59	40.3	.04	.33	.07
10	10.6	11.74	7.56	20.13	155.3	175.9	3.11	41.1	2.45	.35	.07
11	12.1	12.87	8.61	20.13	155.8	180.7	3.77	43.8	3.26	.35	.07
12	13.5	13.33	9.83	20.13	156.3	187.1	4.64	47.2	4.09	.36	.07
13	15.0	13.49	11.13	20.13	156.8	193.8	5.57	50.0	5.00	.36	.07
14	15.7	13.03	11.82	20.13	157.2	197.3	6.04	51.1	5.57	.36	.07
15	16.5	11.81	11.43	20.13	157.2	195.9	5.83	51.0	5.52	.36	.07
16	17.2	9.36	9.34	20.13	156.7	187.7	4.68	50.1	4.57	.35	.07
17	15.5	4.71	0.00	0.00	64.1	64.1	0.00	0.0	0.00	1.04	0.00
18	13.9	.01	0.00	0.00	39.5	39.5	0.00	0.0	0.00	.47	0.00
19	12.2	0.00	0.00	0.00	27.7	27.7	0.00	0.0	0.00	.36	0.00
20	10.0	0.00	0.00	0.00	20.5	20.5	0.00	0.0	0.00	.31	0.00
21	7.8	0.00	0.00	0.00	15.5	15.5	0.00	0.0	0.00	.27	0.00
22	5.6	0.00	0.00	0.00	11.7	11.7	0.00	0.0	0.00	.25	0.00
23	5.8	0.00	0.00	0.00	9.5	9.5	0.00	0.0	0.00	.21	0.00
24	5.9	0.00	0.00	0.00	8.2	8.2	0.00	0.0	0.00	.19	0.00
TOTAL/AVE	---	105.30	80.16	---	---	---	37.80	47.2	30.51	7.11	.66

RUN ID: US3
83/10/07.

USS CHEMICALS

CLEAR DAY PERFORMANCE TABLE

7 NOVEMBER (DAY 311)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	4.4	0.00	0.00	0.00	5.1	5.1	0.00	0.0	0.00	.04	0.00
2	3.9	0.00	0.00	0.00	4.7	4.7	0.00	0.0	0.00	.04	0.00
3	3.3	0.00	0.00	0.00	4.2	4.2	0.00	0.0	0.00	.04	0.00
4	2.8	0.00	0.00	0.00	3.7	3.7	0.00	0.0	0.00	.03	0.00
5	2.2	0.00	0.00	0.00	3.2	3.2	0.00	0.0	0.00	.03	0.00
6	1.7	0.00	0.00	0.00	2.6	2.6	0.00	0.0	0.00	.03	0.00
7	1.1	0.00	0.00	0.00	2.1	2.1	0.00	0.0	0.00	.03	0.00
8	3.0	1.72	0.00	0.00	2.4	2.4	0.00	0.0	0.00	.02	0.00
9	4.8	7.82	4.02	20.13	60.1	71.6	1.74	43.4	0.00	.13	.07
10	6.7	11.06	5.19	20.13	96.1	108.9	1.93	37.2	0.00	.21	.07
11	8.0	12.72	6.45	20.13	138.0	153.0	2.26	35.1	0.00	.30	.07
12	9.3	13.32	8.05	20.13	154.6	176.1	3.24	40.3	2.03	.35	.07
13	10.6	13.23	9.56	20.13	156.0	185.3	4.42	46.2	3.77	.36	.07
14	10.8	12.25	10.20	20.13	156.5	189.6	4.99	48.9	4.49	.37	.07
15	10.9	9.98	9.19	20.13	156.4	185.8	4.44	48.3	4.19	.36	.07
16	11.1	5.96	5.82	20.13	155.1	166.7	1.75	30.0	1.98	.35	.07
17	9.4	.71	0.00	0.00	57.6	57.6	0.00	0.0	0.00	1.00	0.00
18	7.8	0.00	0.00	0.00	33.2	33.2	0.00	0.0	0.00	.46	0.00
19	6.1	0.00	0.00	0.00	21.5	21.5	0.00	0.0	0.00	.35	0.00
20	5.2	0.00	0.00	0.00	14.9	14.9	0.00	0.0	0.00	.29	0.00
21	4.2	0.00	0.00	0.00	10.8	10.8	0.00	0.0	0.00	.25	0.00
22	3.3	0.00	0.00	0.00	7.9	7.9	0.00	0.0	0.00	.23	0.00
23	2.9	0.00	0.00	0.00	6.1	6.1	0.00	0.0	0.00	.20	0.00
24	2.6	0.00	0.00	0.00	4.8	4.8	0.00	0.0	0.00	.18	0.00
TOTAL/AVE	---	88.77	58.47	---	---	---	24.77	42.4	16.45	5.65	.58

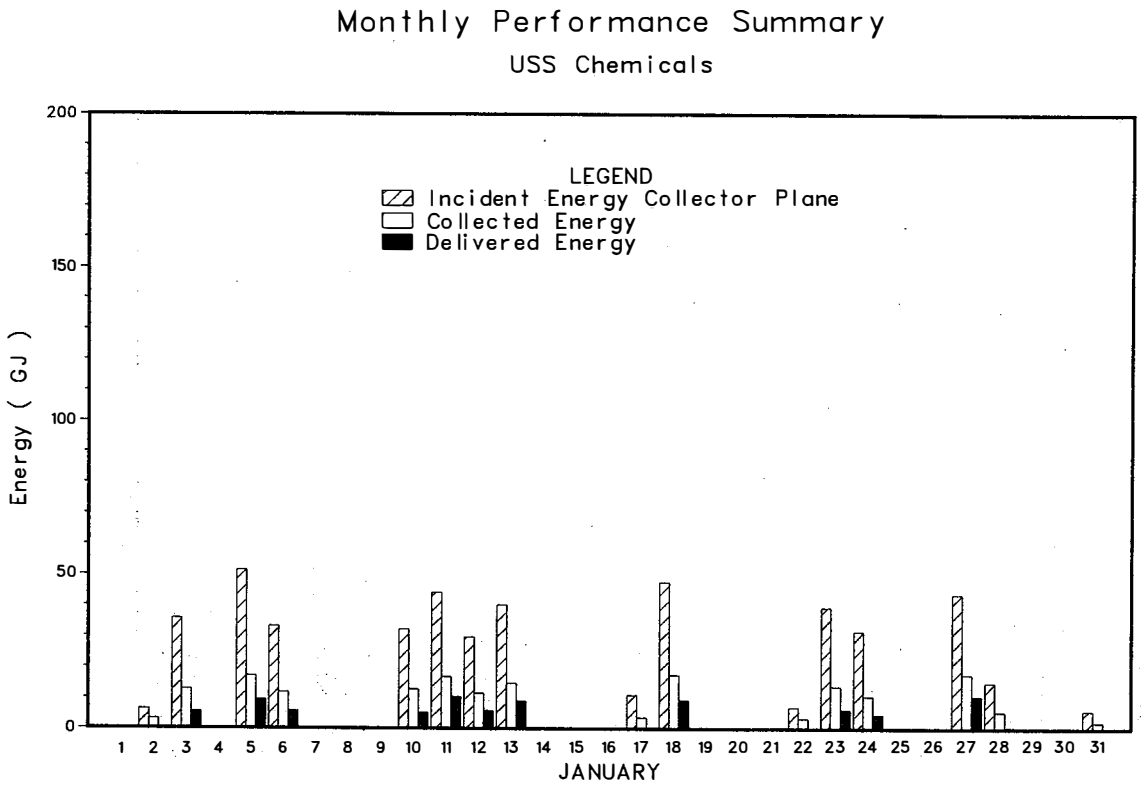
RUN ID: US3
83/10/07.

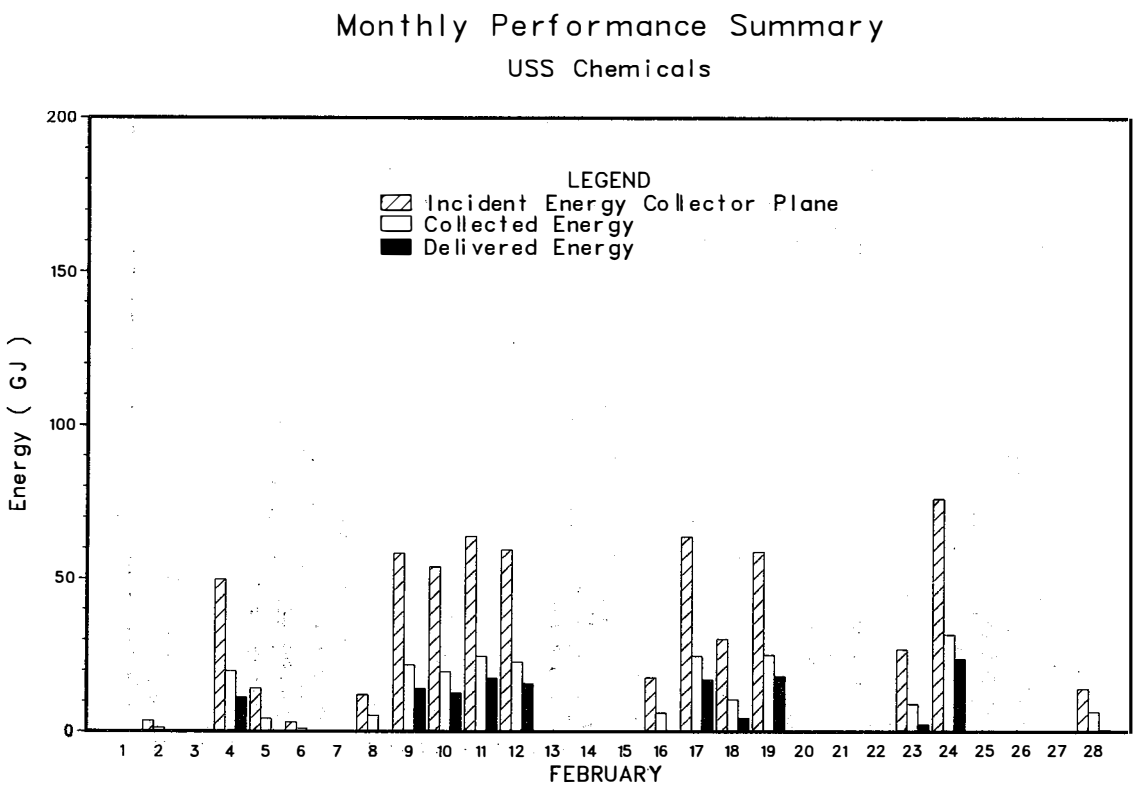
USS CHEMICALS

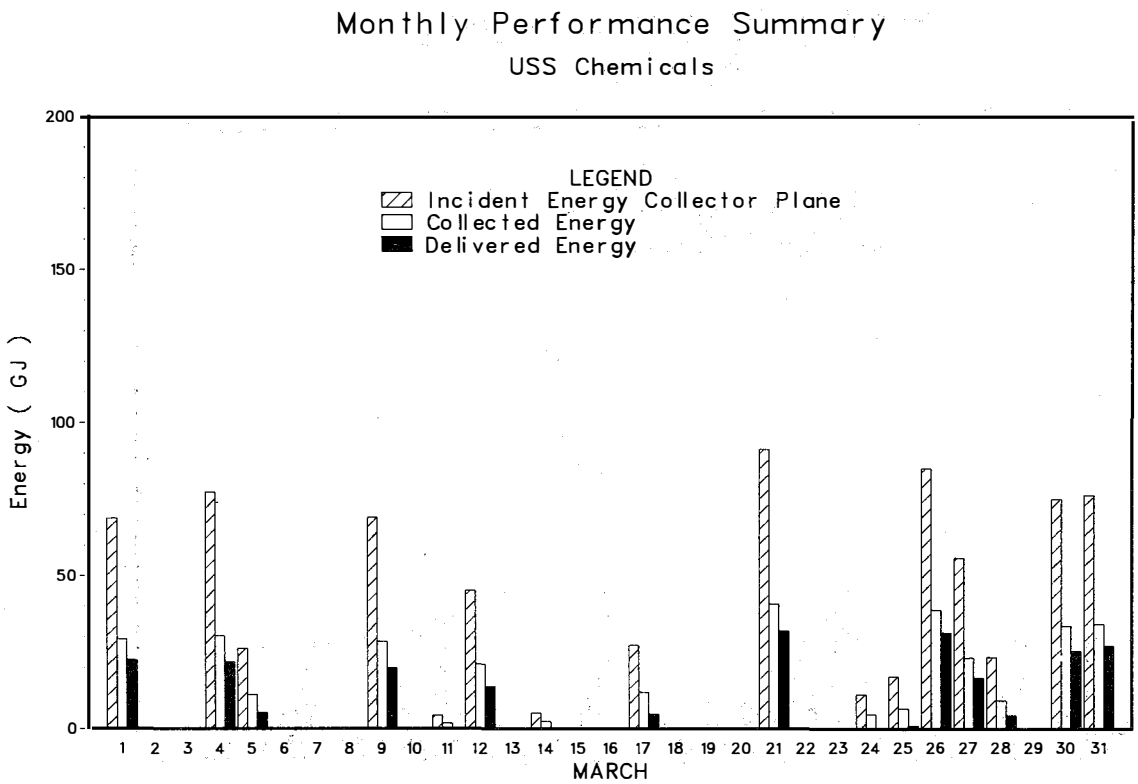
CLEAR DAY PERFORMANCE TABLE

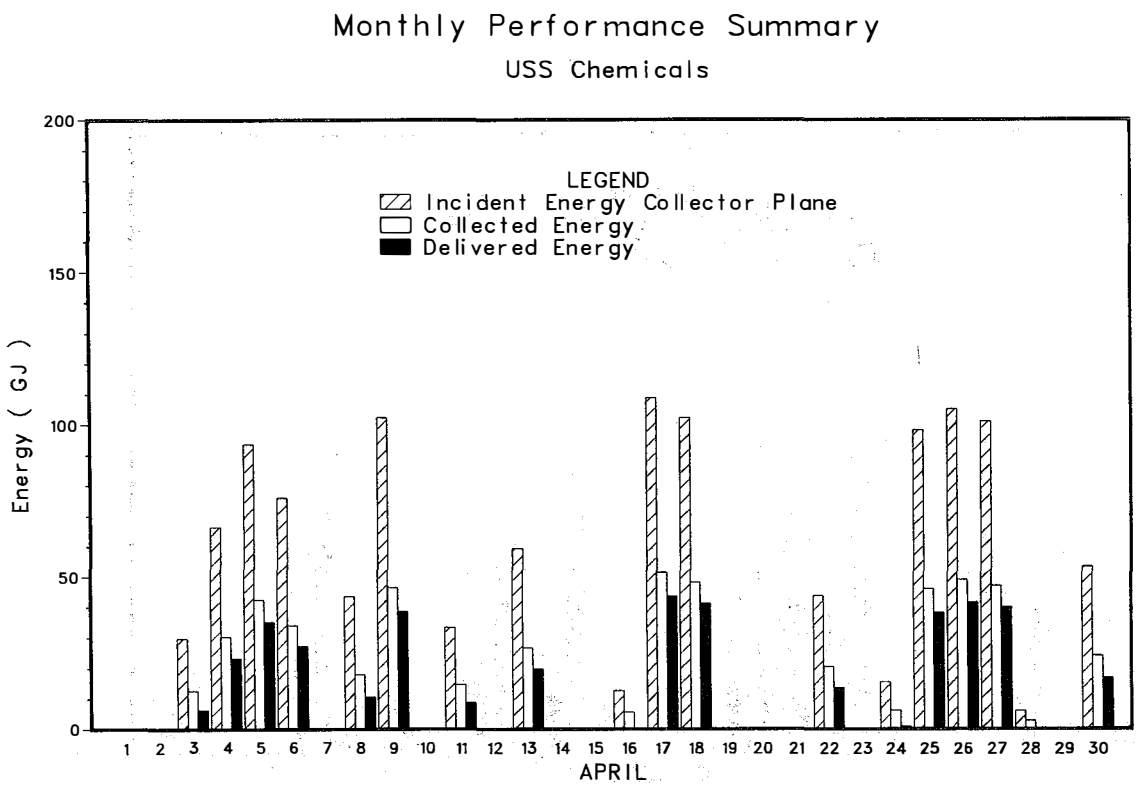
1 DECEMBER (DAY 335)

HOUR	AMBIENT TEMP C	INCIDENT SOLAR ENERGY DIRECT NORMAL GJ	INCIDENT SOLAR ENERGY COLLECTOR PLANE (*) GJ	FLOW RATE KG/S	COLLECTOR TEMP INLET C	COLLECTOR TEMP OUTLET C	ENERGY COLLECTED GJ	COLLECTOR EFFICIENCY BASED ON (*) %	ENERGY DELIVERED GJ	SYSTEM LOSSES GJ	PARASITIC ENERGY GJ
1	-1.2	0.00	0.00	0.00	-.1	-.1	0.00	0.0	0.00	.03	0.00
2	-3.2	0.00	0.00	0.00	-1.2	-1.2	0.00	0.0	0.00	.04	0.00
3	-5.0	0.00	0.00	0.00	-2.6	-2.6	0.00	0.0	0.00	.04	0.00
4	-6.5	0.00	0.00	0.00	-4.0	-4.0	0.00	0.0	0.00	.04	0.00
5	-7.0	0.00	0.00	0.00	-5.1	-5.1	0.00	0.0	0.00	.04	0.00
6	-6.2	0.00	0.00	0.00	-5.5	-5.5	0.00	0.0	0.00	.03	0.00
7	-6.7	0.00	0.00	0.00	-5.9	-5.9	0.00	0.0	0.00	.03	0.00
8	-6.7	.14	0.00	0.00	-6.2	-6.2	0.00	0.0	0.00	.03	0.00
9	-5.6	6.34	2.81	20.13	67.6	73.6	.90	32.1	0.00	.16	.07
10	-3.3	10.03	3.92	20.13	84.2	91.8	1.14	29.2	0.00	.20	.07
11	-2.2	11.91	5.18	20.13	111.5	122.1	1.59	30.7	0.00	.26	.07
12	-.6	12.73	6.97	20.13	150.0	166.1	2.43	34.8	.16	.35	.07
13	.6	12.63	8.57	20.13	155.4	179.5	3.63	42.4	2.85	.37	.07
14	1.7	11.72	9.37	20.13	156.0	184.9	4.35	46.4	3.81	.38	.07
15	2.8	9.63	8.63	20.13	156.0	182.6	4.00	46.4	3.70	.38	.07
16	2.8	5.23	0.00	0.00	52.2	52.2	0.00	0.0	0.00	1.12	0.00
17	2.2	.05	0.00	0.00	27.7	27.7	0.00	0.0	0.00	.48	0.00
18	.6	0.00	0.00	0.00	16.0	16.0	0.00	0.0	0.00	.37	0.00
19	0.0	0.00	0.00	0.00	9.6	9.6	0.00	0.0	0.00	.31	0.00
20	0.0	0.00	0.00	0.00	5.9	5.9	0.00	0.0	0.00	.27	0.00
21	-.6	0.00	0.00	0.00	3.5	3.5	0.00	0.0	0.00	.24	0.00
22	-.6	0.00	0.00	0.00	2.0	2.0	0.00	0.0	0.00	.21	0.00
23	-.6	0.00	0.00	0.00	1.0	1.0	0.00	0.0	0.00	.19	0.00
24	-.6	0.00	0.00	0.00	.4	.4	0.00	0.0	0.00	.17	0.00
TOTAL/AVE	---	80.42	45.45	---	---	---	18.05	39.7	10.52	5.75	.51


Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JANUARY

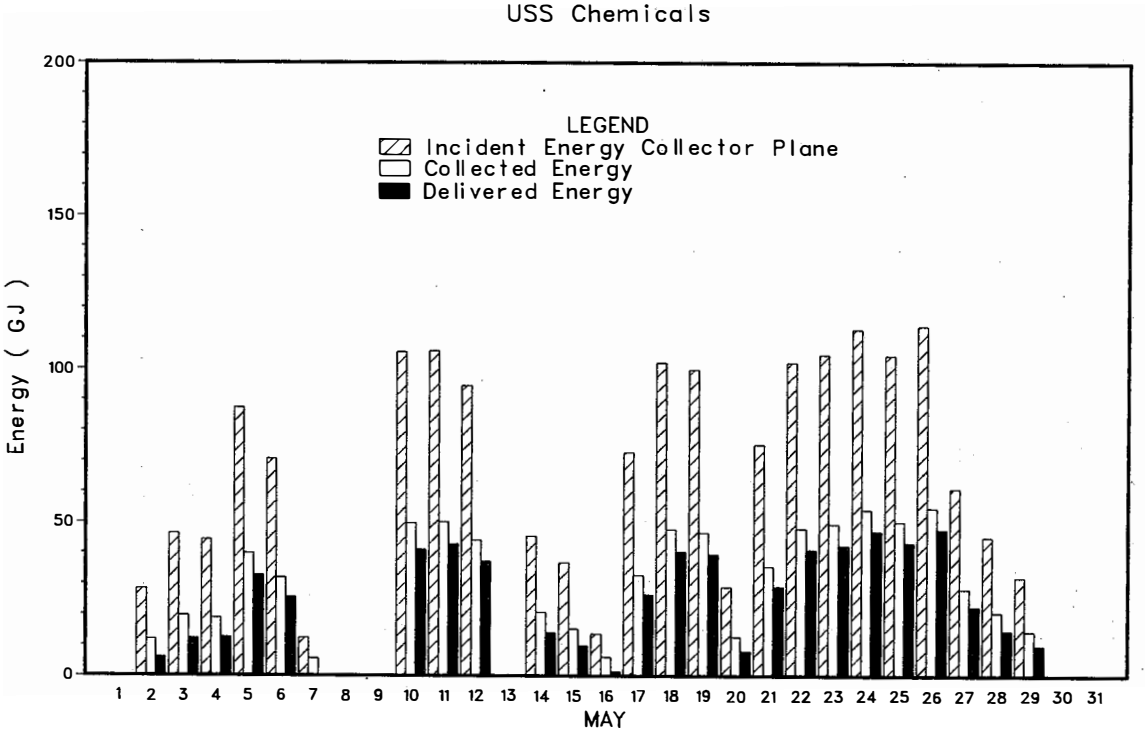

Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
FEBRUARY


Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
MARCH


Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
APRIL

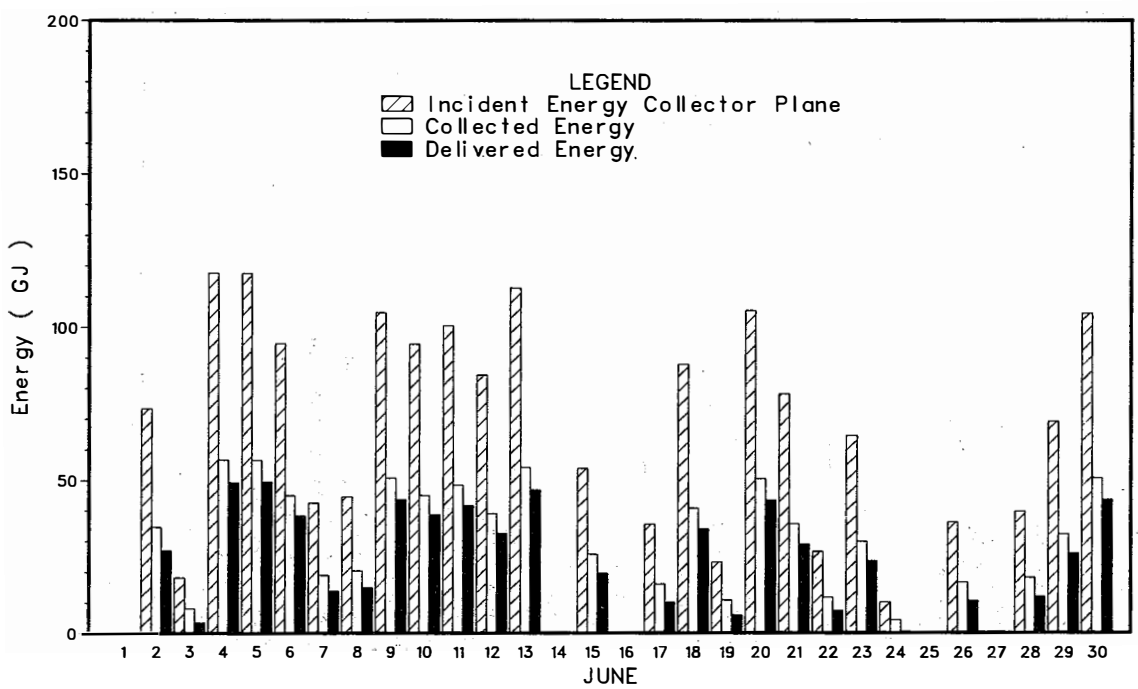
Monthly Performance Summary

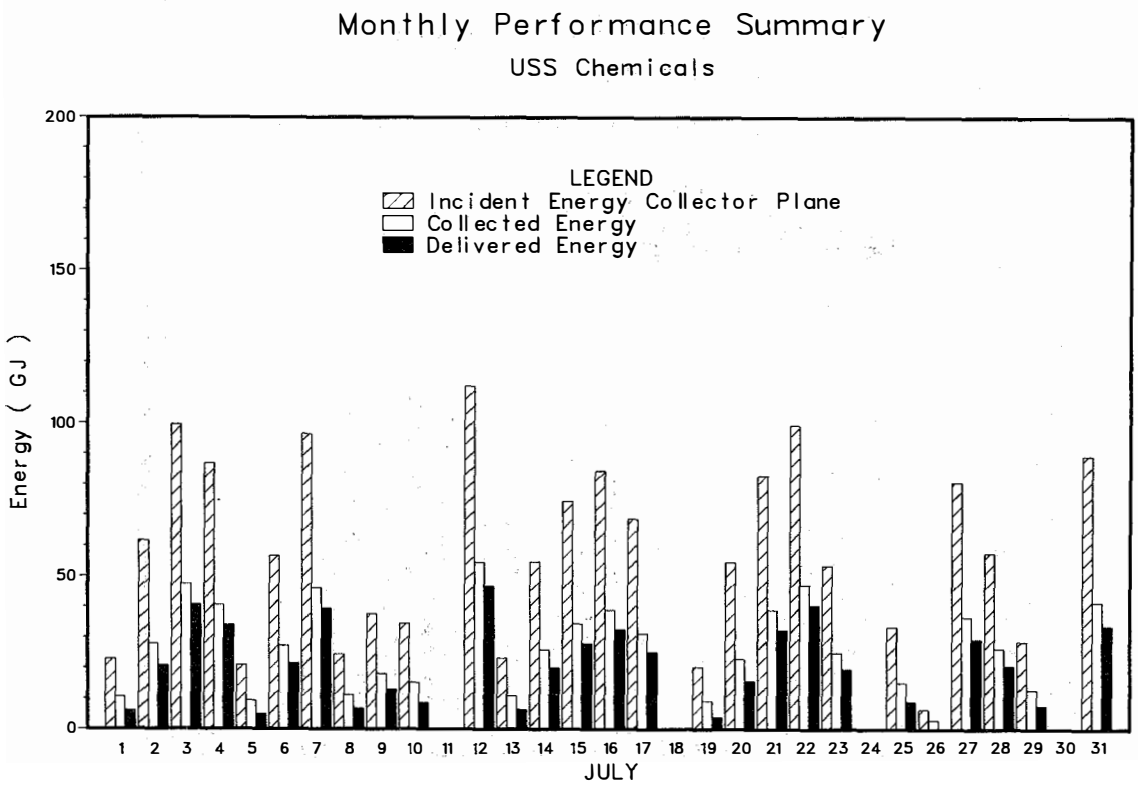
USS Chemicals

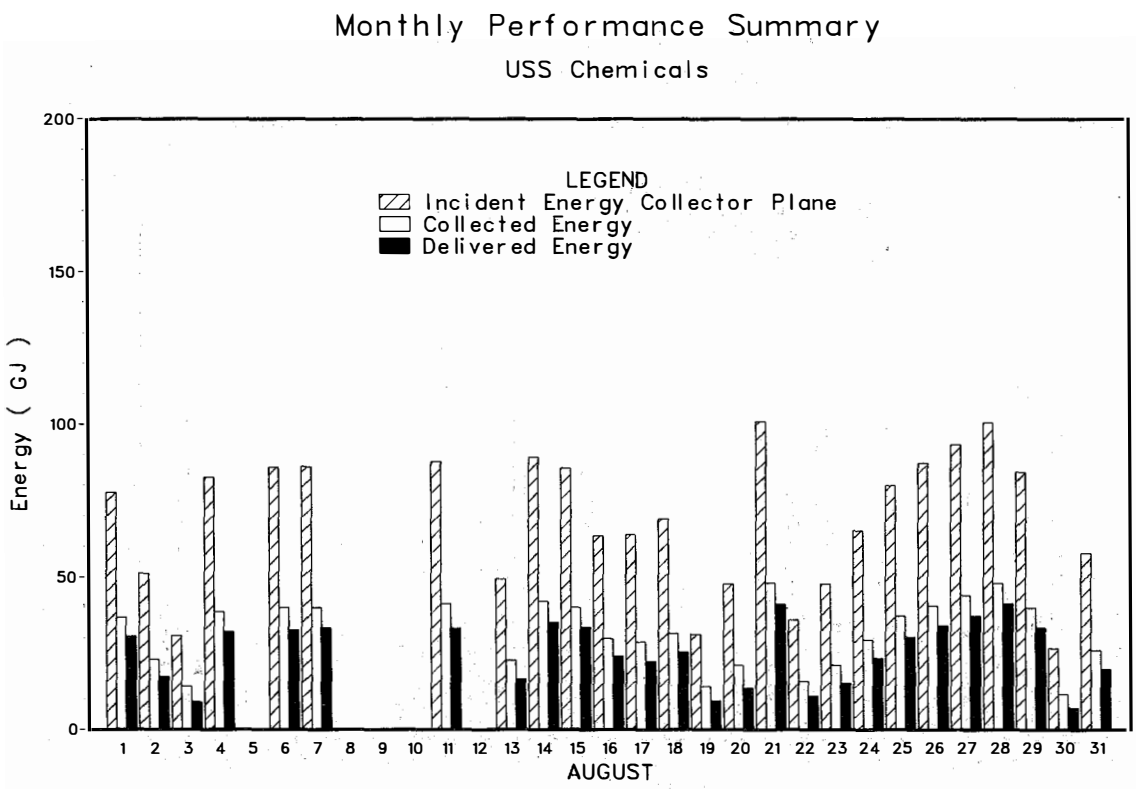


Monthly Performance Summary

USS Chemicals

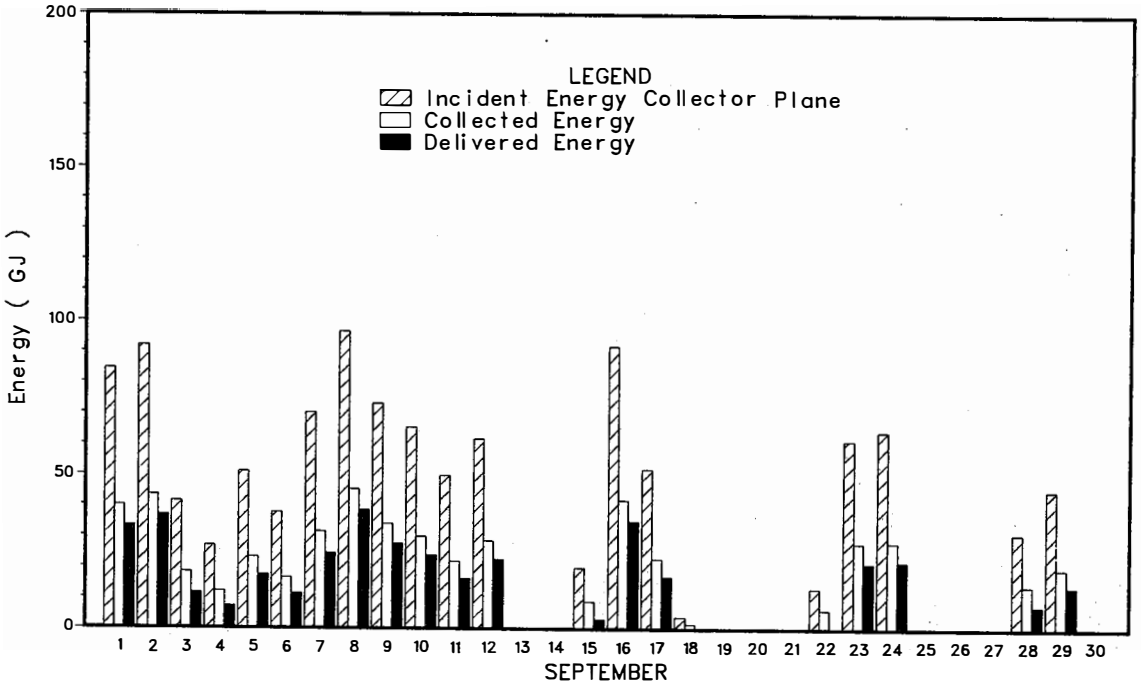



Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
JULY


Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
AUGUST

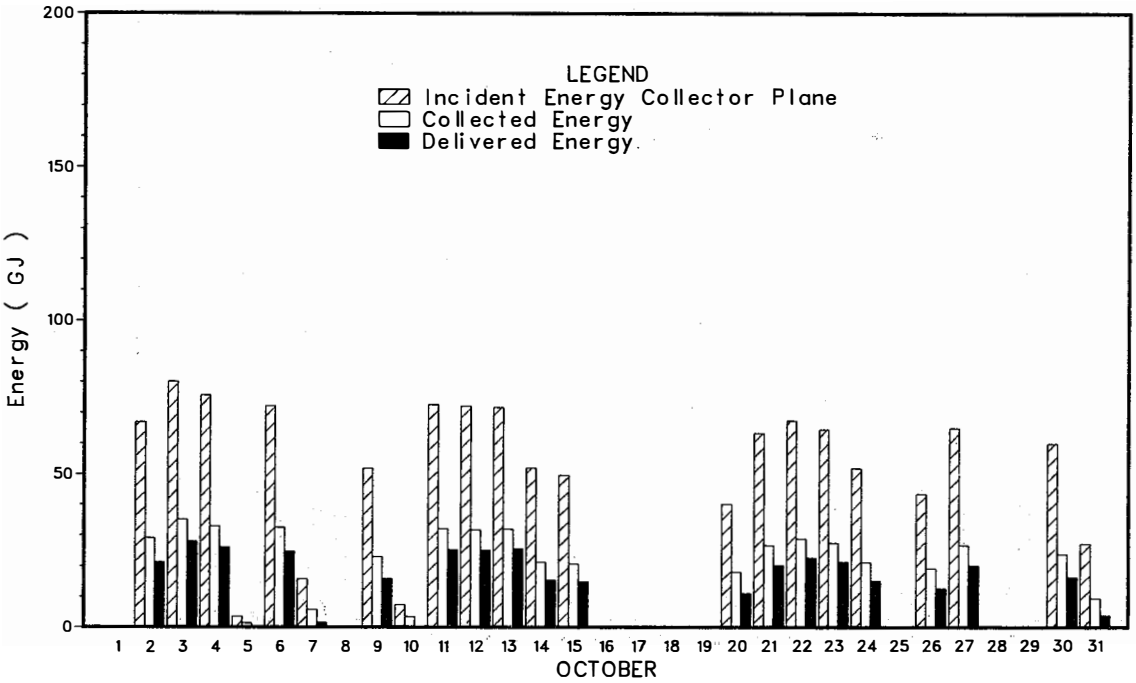
Monthly Performance Summary

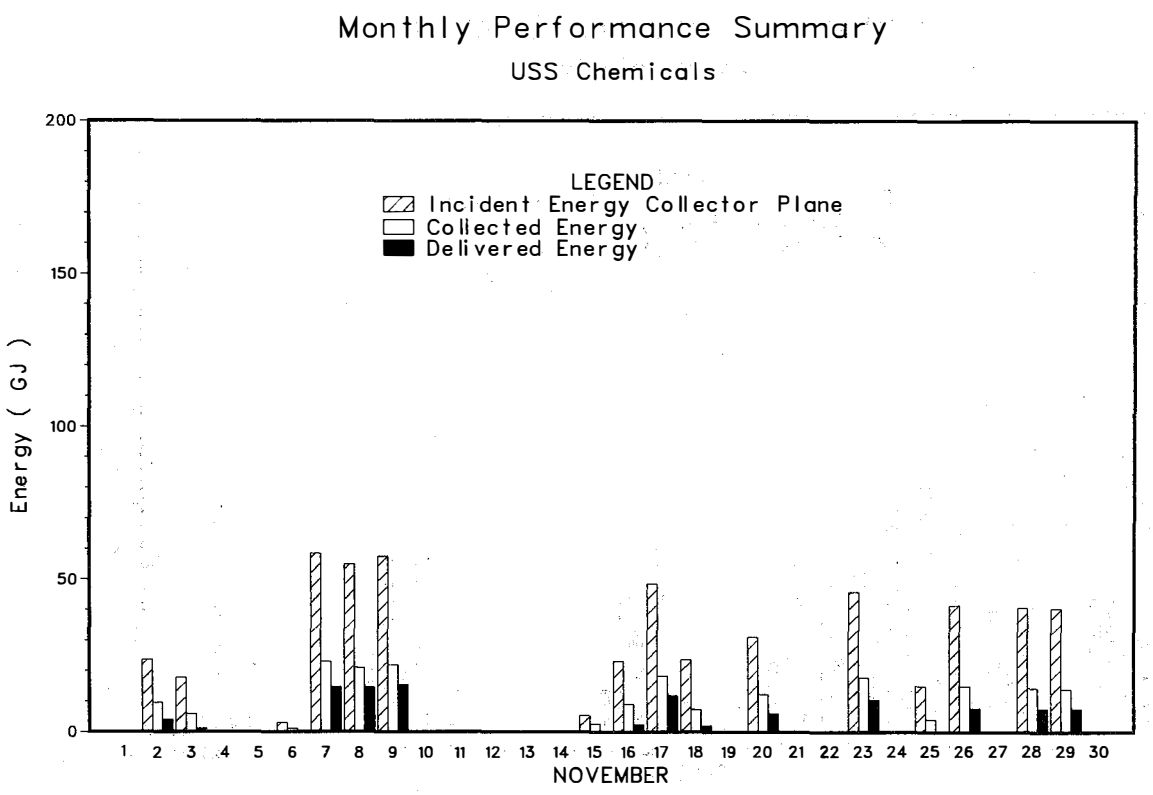
USS Chemicals

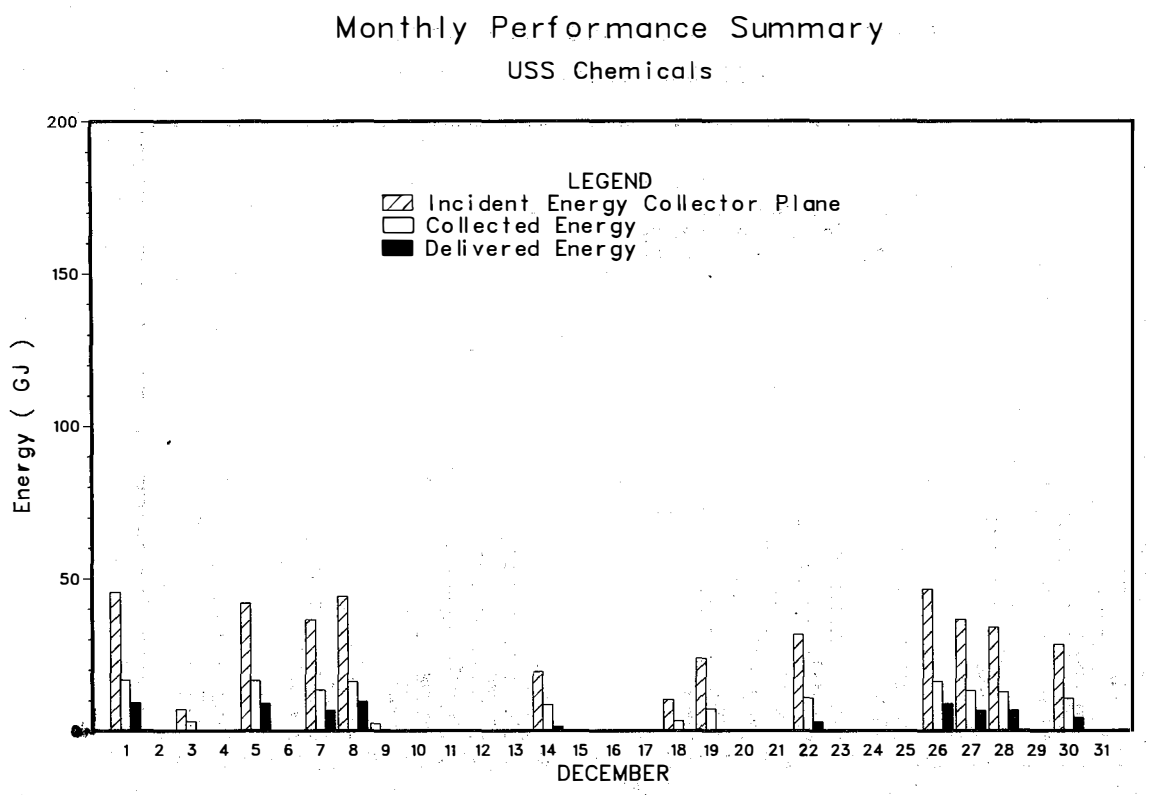


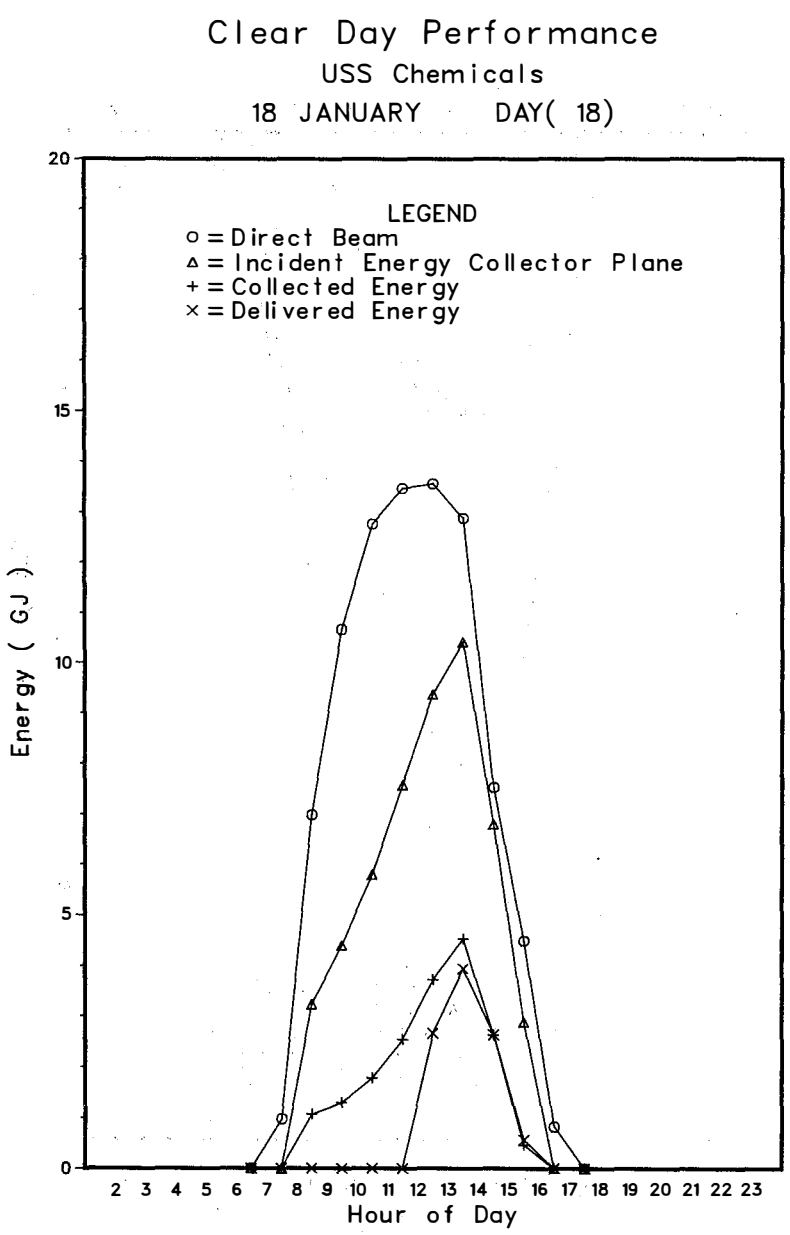
Monthly Performance Summary

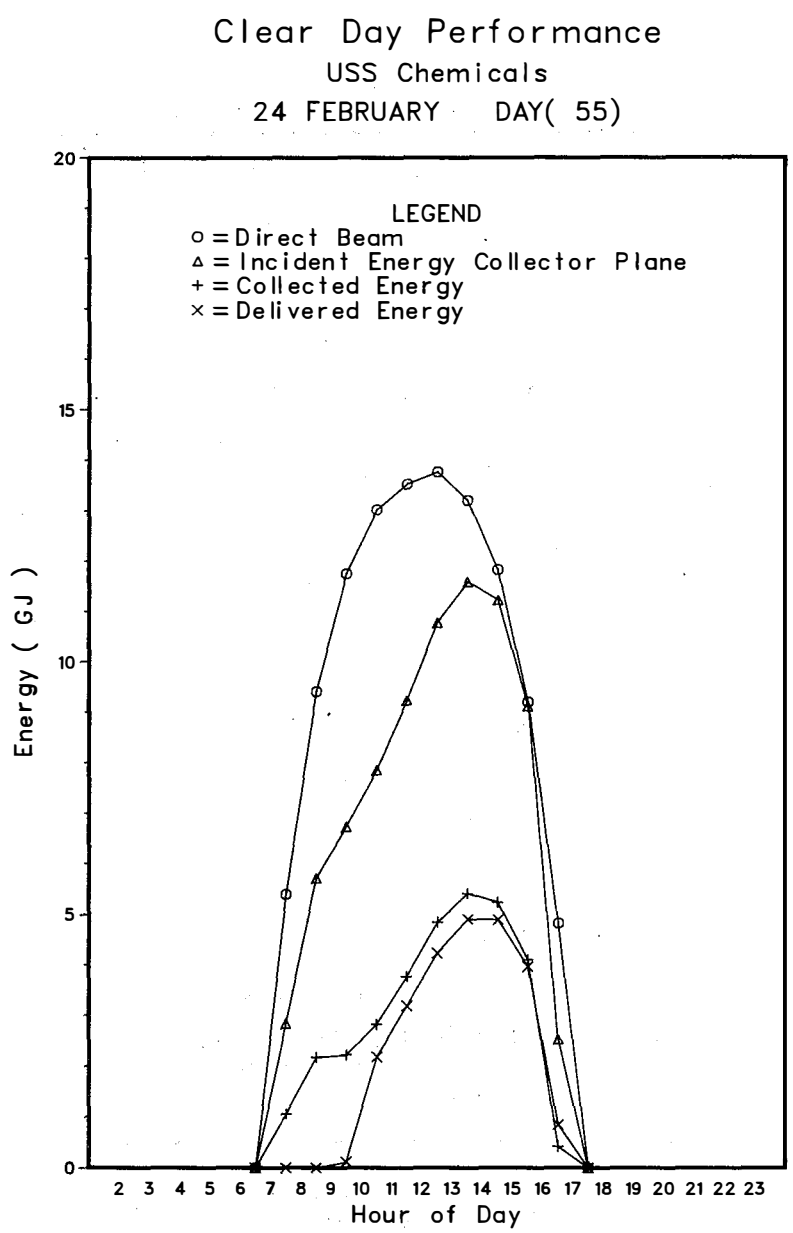
USS Chemicals

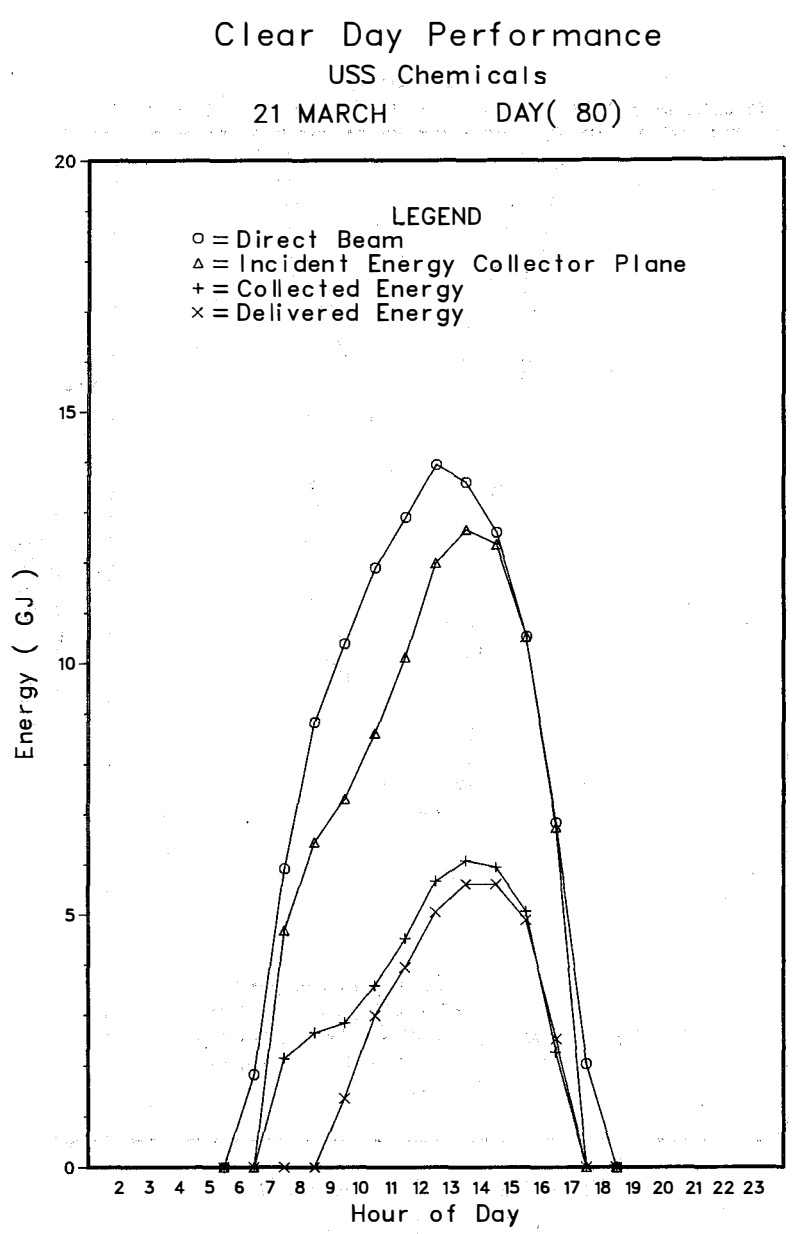


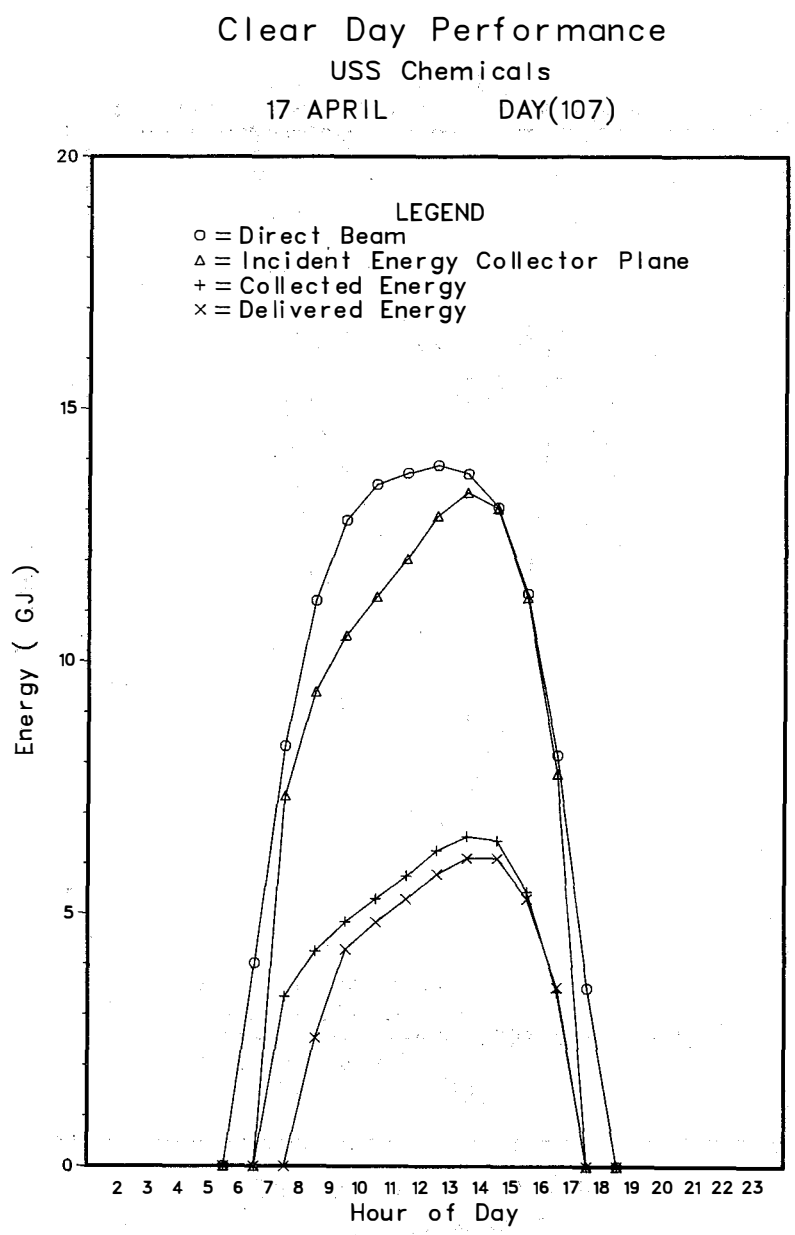

Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
NOVEMBER

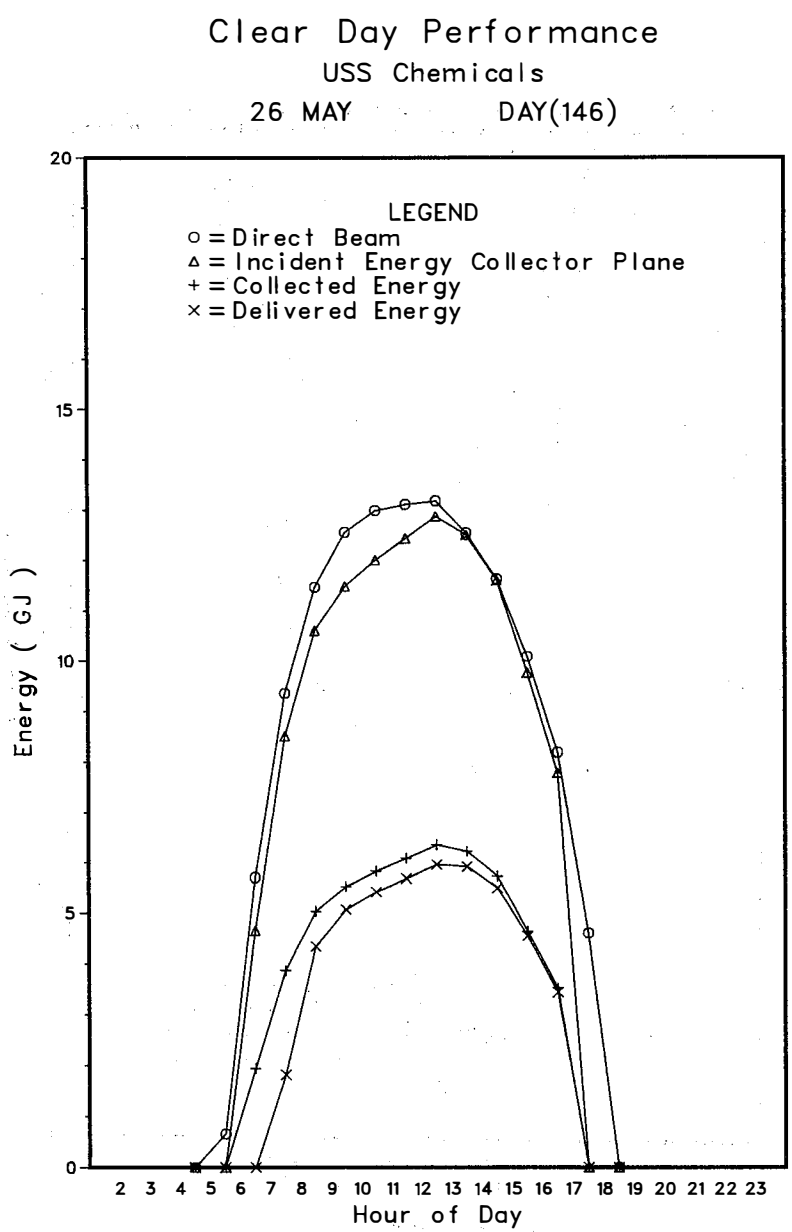

Monthly Performance Summary
USS Chemicals
LEGEND
Incident Energy Collector Plane
Collected Energy
Delivered Energy
Energy (GJ)
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DECEMBER

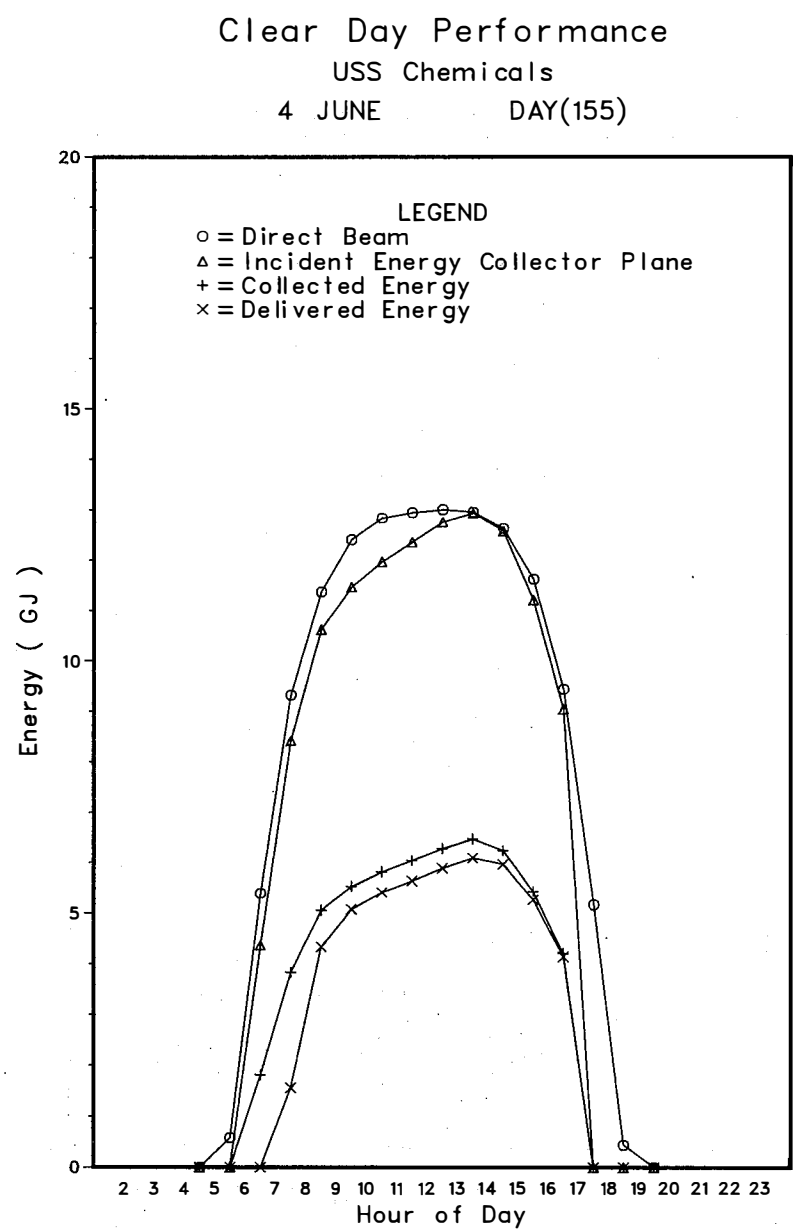

Clear Day Performance
USS Chemicals
18 JANUARY DAY(18)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

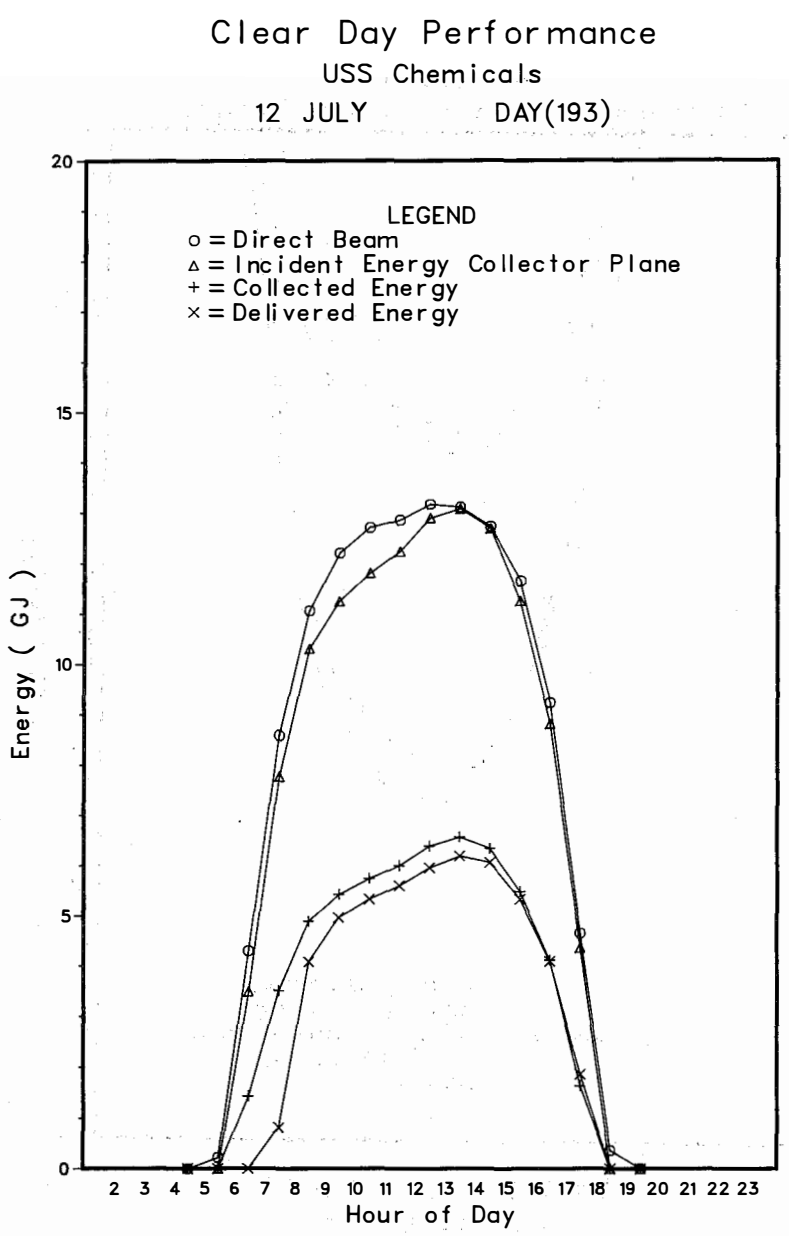

Clear Day Performance
USS Chemicals
24 FEBRUARY DAY(55)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

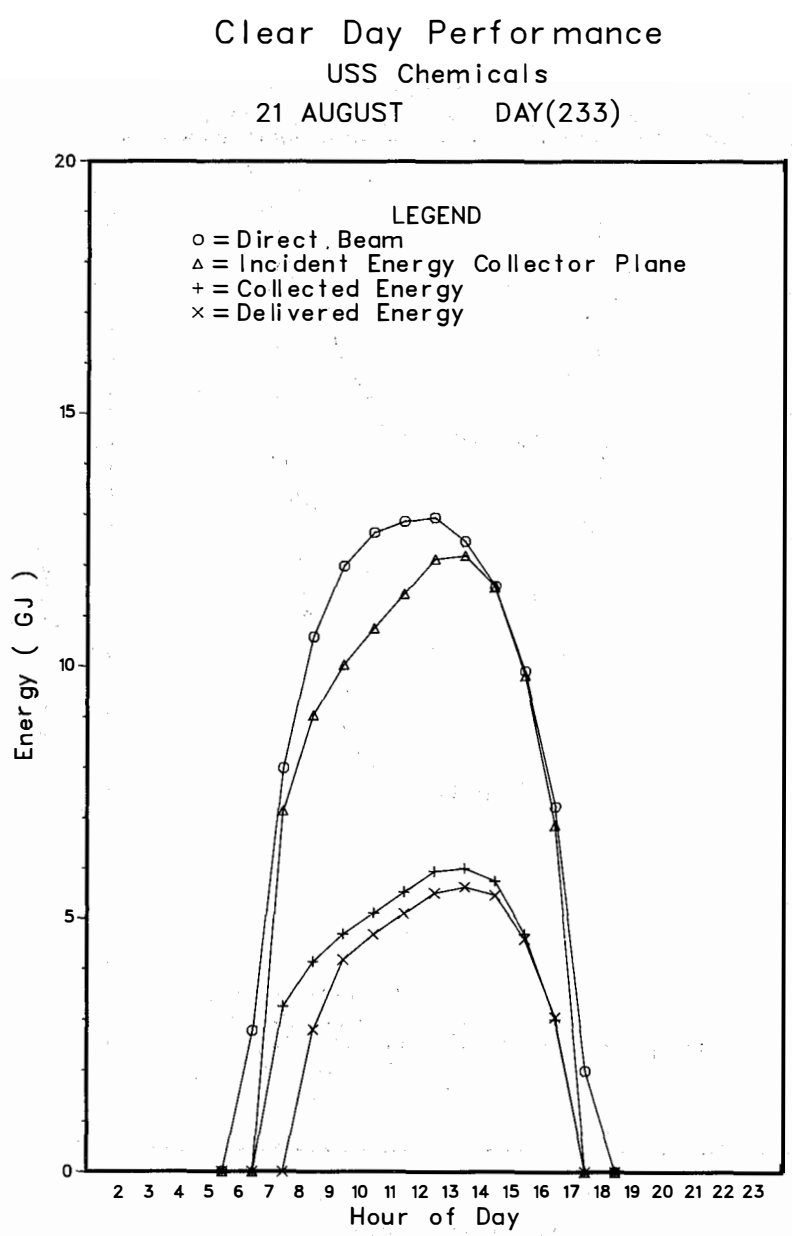

Clear Day Performance
USS Chemicals
21 MARCH DAY(80)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

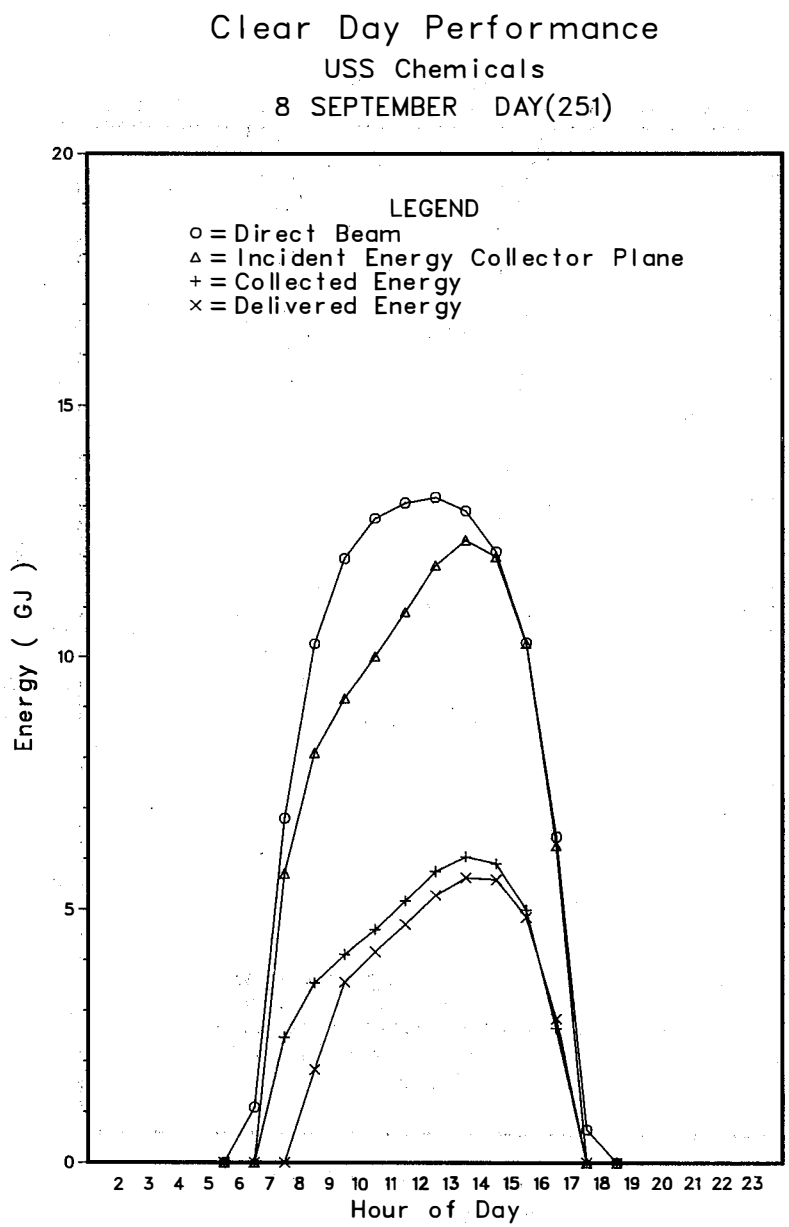

Clear Day Performance
USS Chemicals
17 APRIL DAY(107)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

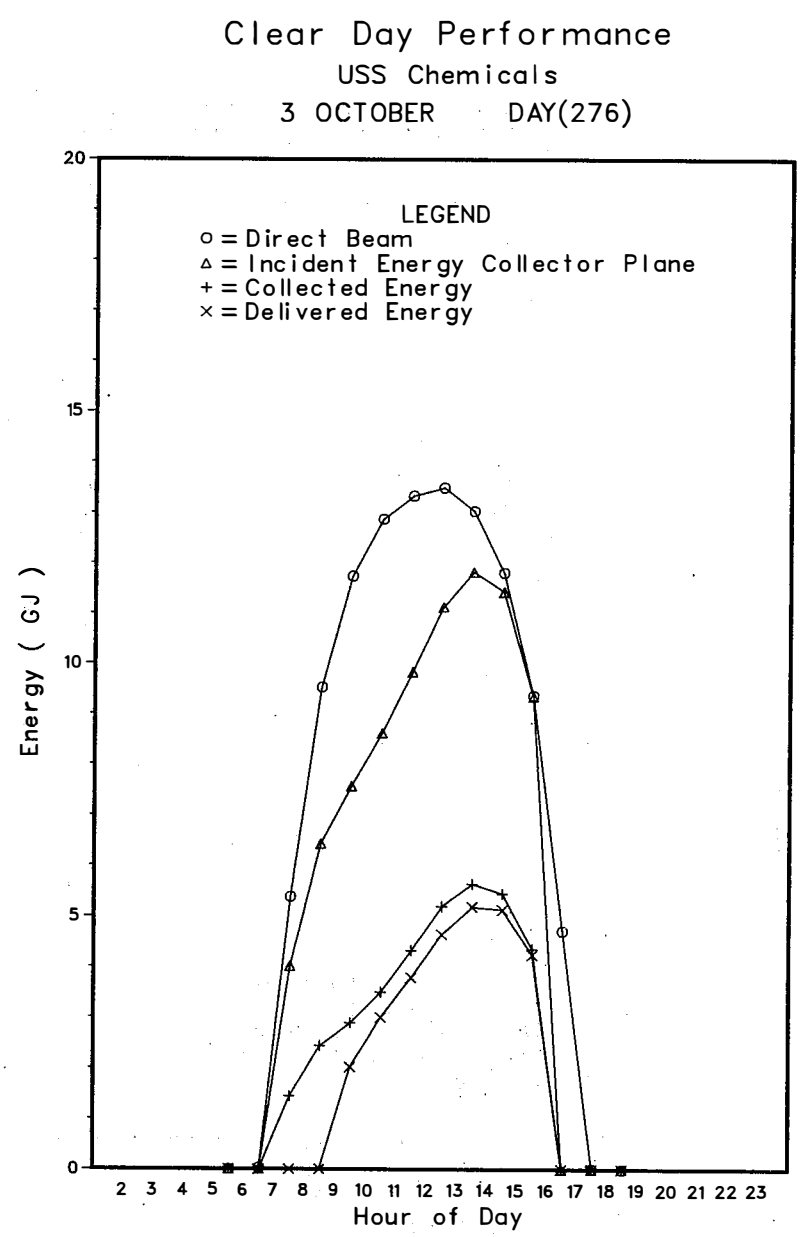

Clear Day Performance
USS Chemicals
26 MAY DAY(146)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

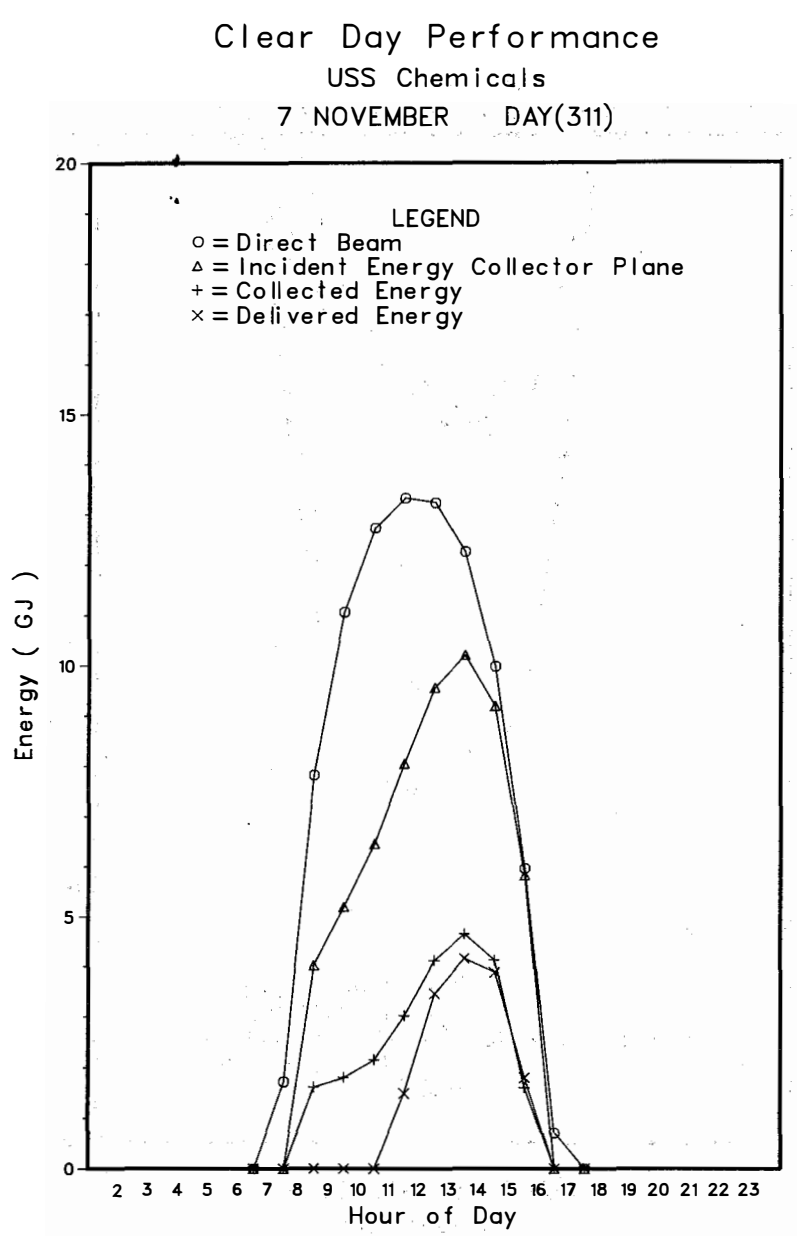

Clear Day Performance
USS Chemicals
4 JUNE DAY(155)
LEGEND
○ = Direct Beam
△ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

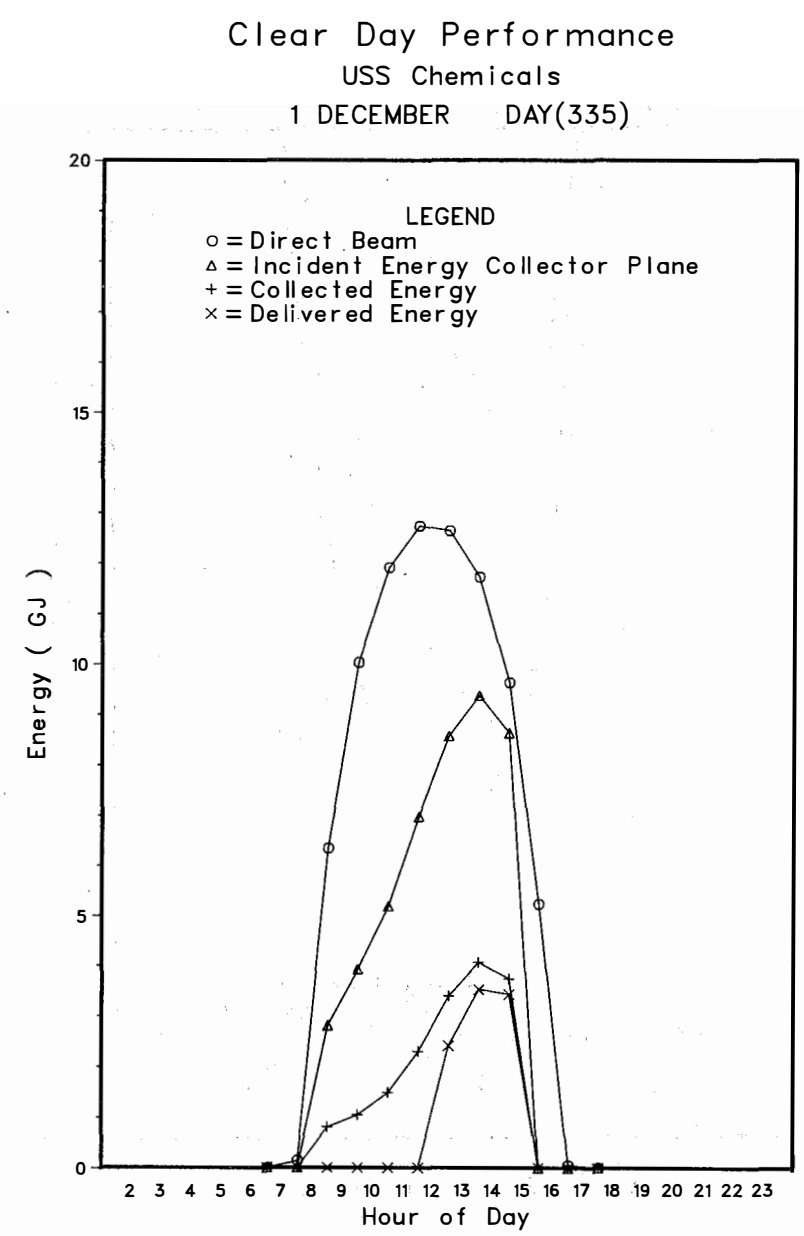

Clear Day Performance
USS Chemicals
12 JULY DAY(193)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
USS Chemicals
21 AUGUST DAY(233)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
USS Chemicals
8 SEPTEMBER DAY(251)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
USS Chemicals
3 OCTOBER DAY(276)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
USS Chemicals
7 NOVEMBER DAY(311)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day


Clear Day Performance
USS Chemicals
1 DECEMBER DAY(335)
LEGEND
o = Direct Beam
Δ = Incident Energy Collector Plane
+ = Collected Energy
× = Delivered Energy
Energy (GJ)
Hour of Day

SECTION 2.0

PROGRAM LISTINGS

SECTION 2.1

UNFIRED BOILER SYSTEM MAIN ROUTINE (LUNF)

```
      PROGRAM SOLIPH(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE6=OUTPUT,
     1               TAPE7,TAPE8,TAPE9,TAPE10,TAPE11,TAPE12)
C
C
C         THIS VERSION OF SOLIPH IS DESIGNED TO RUN ON THE CYBER 720
C         USING REFORMATTED TMY DATA.  THE MAIN PROGRAM IS MODIFIED
C         FOR EACH IPH SITE, RETAINING ONLY INITIALIZATION, INPUT AND
C         OUTPUT SECTIONS PLUS SUBROUTINES AS COMMON TO ALL SYSTEMS.
C         THE PROGRAM PERFORMS A QUASI-STEADY-STATE HOUR-BY-HOUR
C         SIMULATION OF A SOLAR IPH SYSTEM.
C
C*****************************************************************
C
C         THE FOLLOWING SUBROUTINES ARE AVAILABLE :
C
C           FPLATE  -  FLAT PLATE AND EVACUATED TUBE COLLECTOR
C           TROUGH  -  LINE FOCUS CONCENTRATORS
C           PIPE    -  OPERATING AND NON - OPERATING HEAT LOSS FROM PIPES
C           HX      -  HEAT EXCHANGER
C           HX2     -  HEAT EXHANGER WITH STORAGE
C           LOADS   -  LOAD SCHEDULE AND FLOWS
C           STORE   -  SINGLE NODE STORAGE TANK
C           TCSTORE -  TWO NODE STORAGE TANK
C           FLASH   -  FLASH TANK, INCLUDING VALVE, SEPARATOR AND BFW
C           BOILER  -  UNFIRED BOILER, NO PREHEATER
C           BOILER2 -  UNFIRED BOILER WITH PREHEATER
C           DEBUG   -  DETAILED DAILY OUTPUT
C
C*****************************************************************
C
C         THE LOGICAL UNIT NUMBERS(LUN) IN THE PROGRAM STATEMENT ARE
C         ASSOCIATED WITH THE FOLLOWING DATA :
C
C               LUN        DATA
C
C                1         TMY INPUT-UNFORMATTED READ
C                2         NAMELIST INPUT-SYSTEM CONFIGURATION AND PARAMETERS
C                3         RUN NUMBER FROM SUBMIT FILE
C                6         OUTPUT-USED TO OUTPUT DEBUG INFORMATION
C                7         CLEAR DAY OUTPUT
C                8         MONTHLY OUTPUT
C                9         ANNUAL OUTPUT
C               10         DAILY PLOT DATA
C               11         MONTHLY PLOT DATA
C               12         ANNUAL PLOT DATA
C
C*****************************************************************
C
C
C         THIS VERSION IS FOR :
C
C           UNFIRED BOILER SYSTEMS WITH NO STORAGE AT:
C
C              1) DOW CHEMICAL
C              2) SOUTHERN UNION
C              3) LONE STAR BREWERY
C              4) USS CHEMICALS
```

```
C
C
C
      DIMENSION KDEBUG(12),KCLEAR(12)
C
      DIMENSION MTD(12),E(6),MON(12),NAME(2)
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT,IAPNS
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER DAY,HR
C
      CHARACTER *10 DAT,DATE
C
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     6  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,STO1,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
      COMMON /CBSUN/ SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,SINHR,
     1      COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
C
```

```
115          C
116          C  INITIALIZE ALL INPUT PARAMETERS
117          C
118                DATA MTD/31,28,31,30,31,30,31,31,30,31,30,31/
119                DATA MON/"JANUARY","FEBRUARY","MARCH","APRIL","MAY","JUNE",
120               1         "JULY","AUGUST","SEPTEMBER","OCTOBER","NOVEMBER",
121               2         "DECEMBER"/
122          C
123          C
124          C        THE FOLLOWING NAMELIST CONTAINS ALL THE INPUTS TO THE PROGRAM
125          C
126                NAMELIST /ALL/ IRUN,LTI,LHRON,LHROFF,LDTON,LDTOFF
127               1,CFLWI,L2FLOW,LFLWI,CFLWMAX,QSL
128               2,PUA,BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,PMCP
129               3,CCP,L2CP,L2VIS,L2RHO,CRHO,CVIS
130               4,KSTYPE,SVOL,SUA,EFF,NHRMAX,WBAN,LAT
131               5,CETAOPT,IORIENT,FUL1,FUL2,RCVRMC,B1,B2,B3,B4,CRINT
132               6,CTILT,CAZI,YO,FRUL,BO,CAREA,CDTON,CDTOFF,TAUC
133               7,KTCON,KEND,KDEBUG,CTOSET,GCR,LT
134               8,TMAKE,TSTEAM,KBOIL,KPIPE,KCLEAR,CW,CL,FL,FTUA,FTMC,EPOW
135               9,KPLOT
136          C
137          C
138          C         INITIALIZE PROGRAM PARAMETERS
139          C
140                CTI=CTO=CTAVG=25.
141                DO 5 I=1,6
142                   PTI(I)=25.
143                   PTO(I)=25.
144           5    CONTINUE
145                FTO=25.
146                STO=25.
147                TB=25.
148                DT=1.
149                ITRMAX=50
150                ITERTM=30
151                CRIT1=.1
152                CRIT2=.2
153                CRIT3=.2
154                CTCONV=1.
155                TCRIT=.1
156                NHRS=0
157                MO=1
158                DAY=0
159                KD=1
160          C
161          C         READ IN THE INPUTS FOR EACH RUN
162          C
163          C
164                READ(2,2000) NAME
165                READ(2,ALL)
166                READ(3,3000) RUN
167                DAT=DATE()
168          C
169          C    SOME VARIABLES WILL BE DEPENDENT ON THE IPH CONFIGURATION
170          C    IN THE MAIN PROGRAM SEGMENT DESCRIBING THE SYSTEM.  THIS
171          C    SECTION SHOULD CONTAIN THE ASSIGNMENT OF VARIABLES THAT DO
```

```
C     NOT CHANGE DURING THE SIMULATION.
C
      CFLW=CFLWI
      ST=25.0
      SCP=CCP
      PIPEMC=0.0
      DO 1 I=1,6
         PIPEMC=PIPEMC+PMCP(I)
         PCP(I)=CCP
         PQCOOL(I)=0.0
         PQLOSS(I)=0.0
 1    CONTINUE
      SMCP=PIPEMC+RCVRMC
      SFLOWC=0.0
C
C   CALCULATE TRIG FUNCTIONS FOR ORIENTATION OF COLLECTOR
C
         SINLAT=SIND(LAT)
         COSLAT=COSD(LAT)
         SINTIL=SIND(CTILT)
         COSTIL=COSD(CTILT)
         SINAZ=SIND(CAZI)
         COSAZ=COSD(CAZI)
         SINDIF=SIND(CTILT-LAT)
         COSDIF=COSD(CTILT-LAT)
C
C  READ ISTA FROM UNFORMATTED FILE
C
      READ(1) ISTA
C
C   CHECK FOR CORRECT WBAN # IN NAMELIST FILE
C
      IF(ISTA.NE.WBAN) THEN
         WRITE(6,6010)
         STOP
      END IF
C
C          BEGINNING OF TIME STEP LOOP
C          ***************************
C
   25 NHRS = NHRS + 1
      IF(NHRS.GE.NHRMAX) THEN
         WRITE(6,6000)
         STOP
      END IF
C
C  ROUTINE TO CALCULATE HR,DAY,MON
C
      HR=MOD(NHRS-1,24)+1
      HRANGL=(12.5-HR)*15.0
         SINHR=SIND(HRANGL)
         COSHR=COSD(HRANGL)
      IF(HR.EQ.1) DAY=DAY+1
      IF(DAY.GT.MTD(MO)) THEN
         DAY=1
         MO=MO+1
      END IF
```

```
229                JDATE=DOY(DAY,MO)
230                DEC=23.45*SIND(0.98630*(284.+JDATE))
231                   SINDEC=SIND(DEC)
232                   COSDEC=COSD(DEC)
233                   TANDEC=TAND(DEC)
234          C
235          C
236          C  READ TMY TAPE FOR TIME, DIRECT NORMAL, TOTAL HORIZONTAL, AMBIENT
237          C  TEMPERATURE.  BEGIN TIME STEP LOOP.
238          C
239                READ(1) IBN,ITHOR,TAMB
240                ITER=0
241          C
242          C  BEGIN STEADY STATE CONVERGENCE LOOP.
243          C
244          C  ***********************************
245          C
246           100  ITER = ITER + 1
247                IF(ITER.GE.ITRMAX) THEN
248                   WRITE(6,6020)
249                   STOP
250                END IF
251          C
252          C
253          C   THE MAIN PROGRAM SEGMENT DESCRIBING THE IPH FIELD TEST SITE
254          C   CONFIGURATION STARTS HERE.  FOR EACH NEW CONFIGURATION, INSERT
255          C   A NEW SET OF CALLS.
256          C
257          C*************************************************************************
258          C
259          C
260          C    COLLECTOR ROUTINE
261          C
262                CTI=PTO(4)
263                CALL TROUGH
264          C
265          C   ACCOUNT FOR THERMAL MASS OF THE SYSTEM (LESS THAT OF THE UNFIRED
266          C   BOILER BY LUMPING ALL COMPONENTS INTO ONE STORAGE NODE.  THE
267          C   STORAGE TEMP MUST BE LOWERED TO ACCOUNT FOR OVERNIGHT LOSSES IF
268          C   THE PUMP HAS JUST COME ON.
269          C
270                IF(KPSTRT.EQ.1) THEN
271                   STO=STO-OVNLOSS/SMCP
272                   OVNLOSS=0.0
273                END IF
274          C
275          C   SET UP STORAGE INPUTS
276          C
277                SFLOWH=CFLOW
278                STHI=CTO
279                STCI=0.0
280                CALL STORE
281          C
282          C   SET PIPE(1) INLET = STORAGE NODE OUTLET
283          C
284                PTI(1)=ST
285                CALL PIPE(1)
```

```
286          C
287          C    SET PIPE(1) OUTLET = PIPE(2) INLET
288          C
289                PTI(2)=PTO(1)
290                CALL PIPE(2)
291          C
292          C    SET PIPE(2) OUTLET = BOILER INLET
293          C
294                BTI=PTO(2)
295                CALL BOILER
296          C
297          C    SET BOILER OUTLET = PIPE(3) INLET
298          C
299                PTI(3)=BTO
300                CALL PIPE(3)
301          C
302          C    SET PIPE(3) OUTLET = PIPE(4) INLET
303          C
304                PTI(4)=PTO(3)
305                CALL PIPE(4)
306          C
307          C
308          C    IF PUMP IS ON, CHECK FOR CONVERGENCE, OTHERWISE CONVERGENCE
309          C    NOT REQUIRED FOR NON-OPERATING CONDITION
310          C
311          C
312                IF(KPON.EQ.1) THEN
313                    CONV1=ABS(PTO(4)-CTI)
314                    IF(CONV1.GT.CRIT1) GOTO 100
315                    QSEAL=QSL
316                    EPAR=EPOW
317                ELSE
318                   QSEAL=0.0
319                   EPAR=0.0
320                END IF
321          C
322          C    RESET PUMP START, STOP FLAGS AND ANY OTHER NECESSARY
323          C    VARIABLES FOR START OF NEXT TIME STEP.
324          C
325                KPSTRT=0
326                KPSHUT=0
327                STO=STON
328                FTO=FTON
329                TB=TBN
330          C
331          C
332          C*********************************************************************
333          C
334          C
335          C   THE MAIN PROGRAM SEGMENT DESCIBING THE IPH FIELD TEST CONFIGURATION
336          C   ENDS HERE.  THE REMAINING SEGMENT OF THE MAIN PROGRAM DEALS WITH
337          C   OUTPUT OF DAILY(CLEAR DAY), MONTHLY, AND ANNUAL COMPUTATIONS.
338          C
339          C*********************************************************************
340          C
341          C  CALCULATE TOTAL OPERATIONAL AND NON-OP PIPING AND COLLECTOR LOSSES.
342          C
```

```
 OLOSS  =PQLOSS(1)+ PQLOSS(2)+PQLOSS(3)+PQLOSS(4)+
1   PQLOSS(5)+PQLOSS(6)+QSEAL+QBLOWD+BSKLO
 NOLOSS = PQCOOL(1)+PQCOOL(2)+PQCOOL(3)+PQCOOL(4)+
1   PQCOOL(5)+PQCOOL(6)+CQCOOL+BSKLN
 OVNLOSS=OVNLOSS+NOLOSS-BSKLN
C
C
 ITHD   = ITHD   + CAREA*ITHOR/1.0E6
 IAVALD = IAVALD + CAREA*IAVAIL/1.0E6
C                  ACCUMULATE IAPERD ONLY WHEN TRACKING BUT W/O SHADING LOSSLOSS.
 IF(IAPER.GT.0.0)IAPERD=IAPERD+CAREA*IAVAIL/1.0E6
 IBND   = IBND   + CAREA*IBN/1.0E6
 QCOLLD = QCOLLD + CQCOLL/1.0E6
 QDELD  = QDELD  +(BQDEL-QSEAL)/1.0E6
 OLOSD  = OLOSD  + OLOSS/1.0E6
 NOLOSD = NOLOSD + NOLOSS/1.0E6
 SLOSD  = SLOSD  + SQLOSS/1.0E6
 EPARD  = EPARD  + EPAR/1.0E6
C
C   CHECK FOR DEBUG OUTPUT FLAG
C
 IF(KDEBUG(KD).EQ.JDATE) THEN
    CALL DEBUG
    IF(HR.EQ.24) KD=KD+1
 END IF
C
C   DAILY CLEAR DAY OUTPUT( 1 CLEAR DAY FOR EACH MONTH AS DETERMINED
C   BY THE FLAG KCLEAR)
C
 IF(JDATE.EQ.KCLEAR(MO)) THEN
C
C    1ST HR - OUTPUT HEADING
C
        IF(HR.EQ.1) THEN
           WRITE(7,9070) RUN,DAT,NAME,DAY,MON(MO),JDATE
           IF(KPLOT.EQ.1) WRITE(10,1010) NAME,JDATE,MO,MON(MO),DAY
        END IF
 IAPNS=0.0
 IF(IAPER.GT.0.0) IAPNS=IAVAIL
        IF(IAPNS.LE.0.0) THEN
           ETAA=0.0
        ELSE
           ETAA=CQCOLL/IAPNS/CAREA*100.
        END IF
        WRITE(7,9071) HR,TAMB,IBN*CAREA/1.E6,IAPNS*CAREA/1.E6,
1        CFLOW/3600.,CTI,CTO,CQCOLL/1.E6,
2        ETAA,BQDEL/1.E6,(OLOSS+NOLOSS)/1.E6,
3        EPAR/1.E6
         IF(KPLOT.EQ.1) WRITE(10,1020) HR,IBN*CAREA/1.E6,
1          IAPNS*CAREA/1.E6,CQCOLL/1.E6,BQDEL/1.E6
    IF(HR.EQ.24) WRITE(7,9072) IBND,IAPERD,QCOLLD,
1         QCOLLD/IAPERD*100.,QDELD,OLOSD+NOLOSD,EPARD
 END IF
C
C    MONTHLY OUTPUTS - 1ST DAY - OUTPUT HEADING
C
 IF(DAY.EQ.1.AND.HR.EQ.1) THEN
```

```
400                 WRITE(8,9080) RUN,DAT,NAME,MON(MO)
401                 IF(KPLOT.EQ.1) WRITE(11,1110) NAME,MO,MON(MO)
402              END IF
403        C
404        C    DAILY DATA
405        C
406              IF(ITHD.EQ.0.0) THEN
407                 ETADH=0.0
408                 ETASH=0.0
409              ELSE
410                 ETADH=QCOLLD/ITHD*100.
411                 ETASH=QDELD/ITHD*100.
412              END IF
413              IF(IAPERD.EQ.0.0) THEN
414                 ETADA=0.0
415                 ETASA=0.0
416              ELSE
417                 ETADA=QCOLLD/IAPERD*100.
418                 ETASA=QDELD/IAPERD*100.
419              END IF
420              IF(HR.LT.24) THEN
421                 GOTO 25
422              ELSE
423                 WRITE(8,9081) JDATE,MO,DAY,ITHD,IBND,IAPERD,QCOLLD,
424            1    ETADA,QDELD,OLOSD,NOLOSD,
425            2    ETASA,EPARD
426                 IF(KPLOT.EQ.1) WRITE(11,1120) DAY,IBND,IAPERD,QCOLLD,QDELD
427        C
428        C    ACCUMULATE MONTHLY TOTALS & RESET DAILY TOTALS
429        C
430              ITHM   = ITHM   + ITHD
431              IAVALM = IAVALM + IAVALD
432              IBNM   = IBNM   + IBND
433              IAPERM = IAPERM + IAPERD
434              QCOLLM = QCOLLM + QCOLLD
435              QDELM  = QDELM  + QDELD
436              OLOSM  = OLOSM  + OLOSD
437              NOLOSM = NOLOSM + NOLOSD
438              SLOSM  = SLOSM  + SLOSD
439              EPARM  = EPARM  + EPARD
440        C
441        C    RESET DAILY TOTALS
442        C
443              ITHD   = 0.
444              IAVALD = 0.
445              IBND   = 0.
446              IAPERD = 0.
447              QCOLLD = 0.
448              QDELD  = 0.
449              OLOSD  = 0.
450              NOLOSD = 0.
451              SLOSD  = 0.
452              EPARD  = 0.
453              END IF
454        C
455        C     IF DAY LT LAST DAY OF THE MONTH GO BACK
456        C     TO NEXT TIME STEP
```

```
C
      IF(DAY.LT.MTD(MO)) THEN
         GOTO 25
      ELSE
C
C     OUTPUT MONTHLY DATA TO MONTHLY AND ANNUAL SUMMARIES
C
         IF(MO.EQ.1) THEN
            WRITE(9,9090) RUN,DAT,NAME
            IF(KPLOT.EQ.1) WRITE(12,1210) NAME
         END IF
         WRITE(8,9082) ITHM,IBNM,IAPERM,QCOLLM,
     1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
     2      QDELM/IAPERM*100.,EPARM
         IF(KPLOT.EQ.1) WRITE(12,1220) MO,IBNM,IAPERM,QCOLLM,QDELM
         WRITE(9,9091)MON(MO),ITHM,IBNM,IAPERM,QCOLLM,
     1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
     2      QDELM/IAPERM*100.,EPARM
C
C    ACCUMULATE ANNUAL TOTALS AND RESET MONTHLY TOTALS
         ITHT   = ITHT   + ITHM
         IAVALT = IAVALT + IAVALM
         IAPERT = IAPERT + IAPERM
         IBNT   = IBNT   + IBNM
         QCOLLT = QCOLLT + QCOLLM
         QDELT  = QDELT  + QDELM
         OLOST  = OLOST  + OLOSM
         NOLOST = NOLOST + NOLOSM
         SLOST  = SLOST  + SLOSM
         EPART  = EPART  + EPARM
C
         ITHM   = 0.
         IAVALM = 0.
         IAPERM = 0.
         IBNM   = 0.
         QCOLLM = 0.
         QDELM  = 0.
         OLOSM  = 0.
         NOLOSM = 0.
         SLOSM  = 0.
         EPARM  = 0.
C
      END IF
C
C    OUTPUT CUMULATIVE ANNUAL TOTALS ON LAST HR OF THE YEAR
C
      IF(MO.LT.12) THEN
         GOTO 25
      ELSE
            WRITE(9,9092) ITHT,IBNT,IAPERT,QCOLLT,
     1      QCOLLT/IAPERT*100.,QDELT,OLOST,NOLOST,
     2      QDELT/IAPERT*100.,EPART
C
C   IF NOT THE END OF THE YEAR GO BACK TO NEXT TIME STEP
C
C
C   RESET ANNUAL TOTALS
```

```
514          C
515                   ITHT=0.
516                   IAVALT=0.
517                   IBNT=0.
518                   QCOLLT=0.
519                   QDELT=0.
520                   IAPERT=0.
521                   OLOST=0.
522                   NOLOST=0.
523                   SLOST=0.
524                   EPART=0.
525                END IF
526                STOP
527          C
528          C   END OF PROGRAM AND FORMAT STATEMENTS
529          C
530           1010 FORMAT(2A10,2I10,A10,I10)
531           1020 FORMAT(I10,4F10.2)
532           1110 FORMAT(2A10,I10,A10)
533           1120 FORMAT(I10,4F10.2)
534           1210 FORMAT(2A10)
535           1220 FORMAT(I10,4F10.2)
536           2000 FORMAT(2A10)
537           3000 FORMAT(A10)
538           6000 FORMAT(1X,"SIMULATION OVER - NHRS LIMIT EXCEEDED")
539           6010 FORMAT(1X,"WBAN # DOES NOT CORRESPOND WITH NAMELIST INPUT")
540           6020 FORMAT(1X,"ITERATION COUNT EXCEEDED")
541           9070 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/4(/),56X,2A10,//,53X,
542               1 "CLEAR DAY PERFORMANCE TABLE"//,56X,
543               2 I2,1X,A9," (DAY ",I3,")"//,1X,132("-")//,24X,"INCIDENT SOLAR ",
544               3 "ENERGY"/,24X,21("-"),45X,"COLLECTOR"/,25X,"DIRECT    COLLECTOR"
545               4 ,45X,"EFFICIENCY"/,14X,"AMBIENT    NORMAL      PLANE",7X,"FLOW",
546               5 8X,"COLLECTOR TEMP",6X,"ENERGY",3X,"BASED ON",4X,"ENERGY",
547               6 "      SYSTEM",4X,"PARASITIC"/,15X,"TEMP",19X,"(*)",
548               7 "        RATE",7X,"INLET     OUTLET    COLLECTED",4X,
549               8 "(*)      DELIVERED",3X,"LOSSES     ENERGY"/,4X,"HOUR          C",
550               9 9X,"GJ          GJ",9X,"KG/S",9X,"C",10X,"C          GJ",9X,
551               * "%          GJ          GJ          GJ"//,1X,132("-")/)
552           9071 FORMAT(5X,I2,F12.1,2F11.2,F12.2,2F11.1,F11.2,F10.1,
553               1 3F11.2)
554           9072 FORMAT(/,1X,132("-")//,1X,"TOTAL/AVE      ---",2F11.2,9X,
555               1 "---         ---",8X,"---",F11.2,F10.1,3F11.2,
556               2 //,1X,132("-"))
557           9080 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/4(/),57X,2A10,//,50X,
558               1 "MONTHLY PERFORMANCE SUMMARY TABLE"//,
559               2 62X,A9//1X,132("-")//25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,
560               3 20X,31("-"),13X,"COLLECTOR",12X,20("-"),3X,"SYSTEM"/,20X,
561               4 "HORIZONTAL   DIRECT   COLLECTOR",12X,"EFFICIENCY",25X,"NON-",4X,
562               5 "EFFICIENCY"/,22X,"SURFACE    NORMAL    PLANE      ENERGY",
563               6  4X,"BASED ON",
564               7 3X,"ENERGY    OPERATING  OPERATING",2X,"BASED ON",4X,
565               8 "PARASITIC"/,2X,"JULIAN",26X,"          (*)     COLLECTED",6X,
566               9 "(*)",4X,"DELIVERED",3X,"LOSSES     LOSSES     ",3X,"(*)",
567               * 7X,"ENERGY"/,4X,"DAY      DATE       GJ",8X,"GJ",8X,"GJ",10X,
568               1 "GJ",10X,"%",8X,"GJ         GJ",9X,"GJ       ",
569               2 4X,"%",10X,"GJ"//,1X,132("-")/)
570           9081 FORMAT(3X,I3,6X,I2,"/",I2,3X,F7.1,3X,F7.1,3X,2(F7.1,4X),
```

```
     1  F8.1,3X,4(F7.1,4X),F8.1)
9082 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES",F11.1,3X,F7.1,3X,
     1  2(F7.1,4X),F8.1,3X,
     2 4(F7.1,4X),F8.1//,1X,132("-"))
9090 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/4(/),57X,2A10,//,51X,
     1 "ANNUAL PERFORMANCE SUMMARY TABLE"//,
     2 1X,132("-")//,25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,20X,
     3 31("-"),13X,"COLLECTOR",13X,19("-"),4X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",13X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL     PLANE      ENERGY",4X,
     6  "BASED ON",
     7 3X,"ENERGY   OPERATING  OPERATING",3X,"BASED ON",3X,
     8 "PARASITIC"/,35X,"          (*)     COLLECTED",5X,"(*)",
     9 5X,"DELIVERED",3X,"LOSSES     LOSSES  ",4X,"(*)",
     * 7X,"ENERGY"/,3X,"  MONTH",14X,"GJ",9X,"GJ",8X,"GJ",9X,"GJ",10X,
     1 "%         GJ         GJ",9X,"GJ       ",3X,"%",
     2 10X,"GJ"//,1X,132("-"))
9091 FORMAT(1H0,3X,A9,8X,F7.1,4X,F7.1,3X,2(F7.1,4X),F6.1,4X,
     1  3(F7.1,4X),
     2 F6.1,4X,F7.1)
9092 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES ",F11.1,4X,F7.1,3X,
     1  2(F7.1,4X),
     2 F5.1,5X,3(F7.1,4X),F6.1,4X,F7.1//,1X,132("-"))
      END
```

SECTION 2.2

FLASH STEAM SYSTEM MAIN ROUTINE (LFLASH)

```
      C
            PROGRAM SOLIPH(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE6=OUTPUT,
     1                TAPE7,TAPE8,TAPE9,TAPE10,TAPE11,TAPE12)
      C
      C
      C         THIS VERSION OF SOLIPH IS DESIGNED TO RUN ON THE CYBER 720
      C         USING REFORMATTED TMY DATA.  THE MAIN PROGRAM IS MODIFIED
      C         FOR EACH IPH SITE, RETAINING ONLY INITIALIZATION, INPUT AND
      C         OUTPUT SECTIONS PLUS SUBROUTINES AS COMMON TO ALL SYSTEMS.
      C         THE PROGRAM PERFORMS A QUASI-STEADY-STATE HOUR-BY-HOUR
      C         SIMULATION OF A SOLAR IPH SYSTEM.
      C
      C*********************************************************************
      C
      C         THE FOLLOWING SUBROUTINES ARE AVAILABLE :
      C
      C           FPLATE  -  FLAT PLATE AND EVACUATED TUBE COLLECTOR
      C           TROUGH  -  LINE FOCUS CONCENTRATORS
      C           PIPE    -  OPERATING AND NON - OPERATING HEAT LOSS FROM PIPES
      C           HX      -  HEAT EXCHANGER
      C           HX2     -  HEAT EXHANGER WITH STORAGE
      C           LOADS   -  LOAD SCHEDULE AND FLOWS
      C           STORE   -  SINGLE NODE STORAGE TANK
      C           TCSTORE -  TWO NODE STORAGE TANK
      C           FLASH   -  FLASH TANK, INCLUDING VALVE, SEPARATOR AND BFW
      C           BOILER  -  UNFIRED BOILER, NO PREHEATER
      C           BOILER2 -  UNFIRED BOILER WITH PREHEATER
      C           DEBUG   -  DETAILED DAILY OUTPUT
      C
      C*********************************************************************
      C
      C         THE LOGICAL UNIT NUMBERS(LUN) IN THE PROGRAM STATEMENT ARE
      C         ASSOCIATED WITH THE FOLLOWING DATA :
      C
      C               LUN        DATA
      C
      C                1         TMY INPUT-UNFORMATTED READ
      C                2         NAMELIST INPUT-SYSTEM CONFIGURATION AND PARAMETERS
      C                3         RUN NUMBER FROM SUBMIT FILE
      C                6         OUTPUT-USED TO OUTPUT DEBUG INFORMATION
      C                7         CLEAR DAY OUTPUT
      C                8         MONTHLY OUTPUT
      C                9         ANNUAL OUTPUT
      C               10         DAILY PLOT DATA
      C               11         MONTHLY PLOT DATA
      C               12         ANNUAL PLOT DATA
      C
      C*********************************************************************
      C
      C         THIS VERSION IS FOR :
      C
      C           FLASH TANK SYTEMS WITH NO STORAGE AT :
      C
      C             1) ORE IDA FOODS
      C
      C
      C
```

```
      DIMENSION KDEBUG(12),KCLEAR(12)
C
      DIMENSION MTD(12),E(6),MON(12),NAME(2)
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER DAY,HR
C
      CHARACTER *10 DAT,DATE
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,ST01,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
      COMMON /CBSUN/ SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,SINHR,
     1      COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
C
C
C  INITIALIZE ALL INPUT PARAMETERS
C
      DATA MTD/31,28,31,30,31,30,31,31,30,31,30,31/
```

```
      DATA MON/"JANUARY","FEBRUARY","MARCH","APRIL","MAY","JUNE",
     1         "JULY","AUGUST","SEPTEMBER","OCTOBER","NOVEMBER",
     2         "DECEMBER"/
C
C
C        THE FOLLOWING NAMELIST CONTAINS ALL THE INPUTS TO THE PROGRAM
C
      NAMELIST /ALL/ IRUN,LTI,LHRON,LHROFF,LDTON,LDTOFF
     1,CFLWI,L2FLOW,LFLWI,CFLWMAX,QSL
     2,PUA,BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,PMCP
     3,CCP,L2CP,L2VIS,L2RHO,CRHO,CVIS
     4,KSTYPE,SVOL,SUA,EFF,NHRMAX,WBAN,LAT
     5,CETAOPT,IORIENT,FUL1,FUL2,RCVRMC,B1,B2,B3,B4,CRINT
     6,CTILT,CAZI,YO,FRUL,BO,CAREA,CDTON,CDTOFF,TAUC
     7,KTCON,KEND,KDEBUG,CTOSET,GCR,LT
     8,TMAKE,TSTEAM,KBOIL,KPIPE,KCLEAR,CW,CL,FL,FTUA,FTMC,EPOW
     9,KPLOT
C
C
C         INITIALIZE PROGRAM PARAMETERS
C
      CTI=CTO=CTAVG=25.
      DO 5 I=1,6
         PTI(I)=25.
         PTO(I)=25.
    5 CONTINUE
      FTO=25.
      STO=25.
      TB=25.
      DT=1.
      ITRMAX=200
      ITERTM=30
      CRIT1=.1
      CRIT2=.2
      CRIT3=.2
      CTCONV=1.
      TCRIT=.1
      NHRS=0
      MO=1
      DAY=0
      KD=1
C
C
C         READ IN THE INPUTS FOR EACH RUN
C
C
      READ(2,2000) NAME
      READ(2,ALL)
      READ(3,3000) RUN
      DAT=DATE()
C
C    SOME VARIABLES WILL BE DEPENDENT ON THE IPH CONFIGURATION
C    IN THE MAIN PROGRAM SEGMENT DESCRIBING THE SYSTEM.  THIS
C    SECTION SHOULD CONTAIN THE ASSIGNMENT OF VARIABLES THAT DO
C    NOT CHANGE DURING THE SIMULATION.
C
      CFLW=CFLWI
```

```
172                 ST=TSTEAM
173                 SCP=CCP
174                 PIPEMC=0.0
175                 DO 1 I=1,6
176                    PIPEMC=PIPEMC+PMCP(I)
177                    PCP(I)=CCP
178                    PQCOOL(I)=0.0
179                    PQLOSS(I)=0.0
180            1    CONTINUE
181                 SMCP=PIPEMC+RCVRMC
182                 SFLOWC=0.0
183           C
184           C   CALCULATE TRIG FUNCTIONS FOR ORIENTATION OF COLLECTOR
185           C
186                    SINLAT=SIND(LAT)
187                    COSLAT=COSD(LAT)
188                    SINTIL=SIND(CTILT)
189                    COSTIL=COSD(CTILT)
190                    SINAZ=SIND(CAZI)
191                    COSAZ=COSD(CAZI)
192                    SINDIF=SIND(CTILT-LAT)
193                    COSDIF=COSD(CTILT-LAT)
194           C
195           C  READ ISTA FROM UNFORMATTED FILE
196           C
197                 READ(1) ISTA
198           C
199           C   CHECK FOR CORRECT WBAN # IN NAMELIST FILE
200           C
201                 IF(ISTA.NE.WBAN) THEN
202                    WRITE(6,6010)
203                    STOP
204                 END IF
205           C
206           C          BEGINNING OF TIME STEP LOOP
207           C          ***************************
208           C
209              25 NHRS = NHRS + 1
210                 IF(NHRS.GE.NHRMAX) THEN
211                    WRITE(6,6000)
212                    STOP
213                 END IF
214           C
215           C  ROUTINE TO CALCULATE HR,DAY,MON
216           C
217                 HR=MOD(NHRS-1,24)+1
218                 HRANGL=(12.5-HR)*15.0
219                    SINHR=SIND(HRANGL)
220                    COSHR=COSD(HRANGL)
221                 IF(HR.EQ.1) DAY=DAY+1
222                 IF(DAY.GT.MTD(MO)) THEN
223                    DAY=1
224                    MO=MO+1
225                 END IF
226                 JDATE=DOY(DAY,MO)
227                 DEC=23.45*SIND(0.98630*(284.+JDATE))
228                    SINDEC=SIND(DEC)
```

```
229                 COSDEC=COSD(DEC)
230                 TANDEC=TAND(DEC)
231          C
232          C
233          C  READ TMY TAPE FOR TIME, DIRECT NORMAL, TOTAL HORIZONTAL, AMBIENT
234          C  TEMPERATURE.  BEGIN TIME STEP LOOP.
235          C
236                READ(1) IBN,ITHOR,TAMB
237                ITER=0
238          C
239          C  BEGIN STEADY STATE CONVERGENCE LOOP.
240          C
241          C  ***********************************
242          C
243           100  ITER = ITER + 1
244                IF(ITER.GE.ITRMAX) THEN
245                   WRITE(6,6020)
246                   STOP
247                END IF
248          C
249          C
250          C   THE MAIN PROGRAM SEGMENT DESCRIBING THE IPH FIELD TEST SITE
251          C   CONFIGURATION STARTS HERE.  FOR EACH NEW CONFIGURATION, INSERT
252          C   A NEW SET OF CALLS.
253          C
254          C*************************************************************************
255          C
256          C    COLLECTOR ROUTINE
257          C
258                CTI=PTO(4)
259                CALL TROUGH
260          C
261          C   ACCOUNT FOR THERMAL MASS OF THE SYSTEM (LESS THAT OF THE UNFIRED
262          C   BOILER BY LUMPING ALL COMPONENTS INTO ONE STORAGE NODE.  THE
263          C   STORAGE TEMP MUST BE LOWERED TO ACCOUNT FOR OVERNIGHT LOSSES IF
264          C   THE PUMP HAS JUST COME ON.
265          C
266                IF(KPSTRT.EQ.1) THEN
267                   STO=STO-OVNLOSS/SMCP
268                   OVNLOSS=0.0
269                END IF
270          C
271          C   SET UP STORAGE INPUTS
272          C
273                SFLOWH=CFLOW
274                STHI=CTO
275                STCI=0.0
276                CALL STORE
277          C
278          C   SET PIPE(1) INLET = STORAGE NODE OUTLET
279          C
280                PTI(1)=ST
281                CALL PIPE(1)
282          C
283          C    SET PIPE(1) OUTLET = PIPE(2) INLET
284          C
285                PTI(2)=PTO(1)
```

```
      CALL PIPE(2)
C
C     SET PIPE(2) OUTLET = BOILER INLET
C
      FTIN=PTO(2)
      CALL FLASH
C
C     SET BOILER OUTLET = PIPE(3) INLET
C
      PTI(3)=FTOUT
      CALL PIPE(3)
C
C     SET PIPE(3) OUTLET = PIPE(4) INLET
C
      PTI(4)=PTO(3)
      CALL PIPE(4)
C
C
C     IF PUMP IS ON, CHECK FOR CONVERGENCE, OTHERWISE CONVERGENCE
C     NOT REQUIRED FOR NON-OPERATING CONDITION
C
C
      IF(KPON.EQ.1) THEN
          CONV1=ABS(PTO(4)-CTI)
          IF(CONV1.GT.CRIT1) GOTO 100
          QSEAL=QSL
          EPAR=EPOW
      ELSE
         QSEAL=0.0
         EPAR=0.0
      END IF
C
C     RESET PUMP START, STOP FLAGS AND ANY OTHER NECESSARY
C     VARIABLES FOR START OF NEXT TIME STEP.
C
      KPSTRT=0
      KPSHUT=0
      STO=STON
      FTO=FTON
      TB=TBN
C
C*********************************************************************
C
C
C    THE MAIN PROGRAM SEGMENT DESCIBING THE IPH FIELD TEST CONFIGURATION
C    ENDS HERE. THE REMAINING SEGMENT OF THE MAIN PROGRAM DEALS WITH
C    OUTPUT OF DAILY(CLEAR DAY), MONTHLY, AND ANNUAL COMPUTATIONS.
C
C*********************************************************************
C
C   CALCULATE TOTAL OPERATIONAL AND NON-OP PIPING AND COLLECTOR LOSSES.
C
      OLOSS  =PQLOSS(1)+ PQLOSS(2)+PQLOSS(3)+PQLOSS(4)+
     1   PQLOSS(5)+PQLOSS(6)+QSEAL+QBLOWD+BSKLO
      NOLOSS = PQCOOL(1)+PQCOOL(2)+PQCOOL(3)+PQCOOL(4)+
     1   PQCOOL(5)+PQCOOL(6)+CQCOOL+BSKLN
      OVNLOSS=OVNLOSS+NOLOSS-BSKLN
```

```
C
C
      ITHD   = ITHD   + CAREA*ITHOR/1.0E6
      IAVALD = IAVALD + CAREA*IAVAIL/1.0E6
C                   ACCUMULATE IAPERD ONLY WHEN TRACKING BUT W/O SHADING LOSSLOSS.
      IF(IAPER.GT.0.0)IAPERD=IAPERD+CAREA*IAVAIL/1.0E6
      IBND   = IBND   + CAREA*IBN/1.0E6
      QCOLLD = QCOLLD + CQCOLL/1.0E6
      QDELD  = QDELD  +(BQDEL-QSEAL)/1.0E6
      OLOSD  = OLOSD  + OLOSS/1.0E6
      NOLOSD = NOLOSD + NOLOSS/1.0E6
      SLOSD  = SLOSD  + SQLOSS/1.0E6
      EPARD  = EPARD  + EPAR/1.0E6
C
C   CHECK FOR DEBUG OUTPUT FLAG
C
      IF(KDEBUG(KD).EQ.JDATE) THEN
         CALL DEBUG
         IF(HR.EQ.24) KD=KD+1
      END IF
C
C   DAILY CLEAR DAY OUTPUT( 1 CLEAR DAY FOR EACH MONTH AS DETERMINED
C   BY THE FLAG KCLEAR)
C
      IF(JDATE.EQ.KCLEAR(MO)) THEN
C
C    1ST HR - OUTPUT HEADING
C
            IF(HR.EQ.1) THEN
               WRITE(7,9070) RUN,DAT,NAME,DAY,MON(MO),JDATE
               IF(KPLOT.EQ.1) WRITE(10,1010) NAME,JDATE,MO,MON(MO),DAY
            END IF
      IAPNS=0.0
      IF(IAPER.GT.0.0) IAPNS=IAVAIL
            IF(IAPNS.LE.0.0) THEN
               ETAA=0.0
            ELSE
               ETAA=CQCOLL/IAPNS/CAREA*100.
            END IF
            WRITE(7,9071) HR,TAMB,IBN*CAREA/1.E6,IAPNS*CAREA/1.E6,
     1       CFLOW/3600.,CTI,CTO,CQCOLL/1.E6,
     2       ETAA,BQDEL/1.E6,(OLOSS+NOLOSS)/1.E6,
     3       EPAR/1.E6
             IF(KPLOT.EQ.1) WRITE(10,1020) HR,IBN*CAREA/1.E6,
     1         IAPNS*CAREA/1.E6,CQCOLL/1.E6,BQDEL/1.E6
         IF(HR.EQ.24) WRITE(7,9072) IBND,IAPERD,QCOLLD,
     1        QCOLLD/IAPERD*100.,QDELD,OLOSD+NOLOSD,EPARD
      END IF
C
C    MONTHLY OUTPUTS - 1ST DAY - OUTPUT HEADING
C
      IF(DAY.EQ.1.AND.HR.EQ.1) THEN
         WRITE(8,9080) RUN,DAT,NAME,MON(MO)
         IF(KPLOT.EQ.1) WRITE(11,1110) NAME,MO,MON(MO)
      END IF
C
C    DAILY DATA
```

```
C
      IF(ITHD.EQ.0.0) THEN
         ETADH=0.0
         ETASH=0.0
      ELSE
         ETADH=QCOLLD/ITHD*100.
         ETASH=QDELD/ITHD*100.
      END IF
      IF(IAPERD.EQ.0.0) THEN
         ETADA=0.0
         ETASA=0.0
      ELSE
         ETADA=QCOLLD/IAPERD*100.
         ETASA=QDELD/IAPERD*100.
      END IF
      IF(HR.LT.24) THEN
         GOTO 25
      ELSE
         WRITE(8,9081) JDATE,MO,DAY,ITHD,IBND,IAPERD,QCOLLD,
     1   ETADA,QDELD,OLOSD,NOLOSD,
     2   ETASA,EPARD
         IF(KPLOT.EQ.1) WRITE(11,1120) DAY,IBND,IAPERD,QCOLLD,QDELD
C
C    ACCUMULATE MONTHLY TOTALS & RESET DAILY TOTALS
C
      ITHM   = ITHM   + ITHD
      IAVALM = IAVALM + IAVALD
      IBNM   = IBNM   + IBND
      IAPERM = IAPERM + IAPERD
      QCOLLM = QCOLLM + QCOLLD
      QDELM  = QDELM  + QDELD
      OLOSM  = OLOSM  + OLOSD
      NOLOSM = NOLOSM + NOLOSD
      SLOSM  = SLOSM  + SLOSD
      EPARM  = EPARM  + EPARD
C
C    RESET DAILY TOTALS
C
      ITHD   = 0.
      IAVALD = 0.
      IBND   = 0.
      IAPERD = 0.
      QCOLLD = 0.
      QDELD  = 0.
      OLOSD  = 0.
      NOLOSD = 0.
      SLOSD  = 0.
      EPARD  = 0.
      END IF
C
C     IF DAY LT LAST DAY OF THE MONTH GO BACK
C     TO NEXT TIME STEP
C
      IF(DAY.LT.MTD(MO)) THEN
         GOTO 25
      ELSE
C
```

```
C     OUTPUT MONTHLY DATA TO MONTHLY AND ANNUAL SUMMARIES
C
         IF(MO.EQ.1) THEN
            WRITE(9,9090) RUN,DAT,NAME
            IF(KPLOT.EQ.1) WRITE(12,1210) NAME
         END IF
         WRITE(8,9082) ITHM,IBNM,IAPERM,QCOLLM,
     1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
     2      QDELM/IAPERM*100.,EPARM
         IF(KPLOT.EQ.1) WRITE(12,1220) MO,IBNM,IAPERM,QCOLLM,QDELM
         WRITE(9,9091)MON(MO),ITHM,IBNM,IAPERM,QCOLLM,
     1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
     2      QDELM/IAPERM*100.,EPARM
C
C    ACCUMULATE ANNUAL TOTALS AND RESET MONTHLY TOTALS
         ITHT   = ITHT   + ITHM
         IAVALT = IAVALT + IAVALM
         IAPERT = IAPERT + IAPERM
         IBNT   = IBNT   + IBNM
         QCOLLT = QCOLLT + QCOLLM
         QDELT  = QDELT  + QDELM
         OLOST  = OLOST  + OLOSM
         NOLOST = NOLOST + NOLOSM
         SLOST  = SLOST  + SLOSM
         EPART  = EPART  + EPARM
C
         ITHM   = 0.
         IAVALM = 0.
         IAPERM = 0.
         IBNM   = 0.
         QCOLLM = 0.
         QDELM  = 0.
         OLOSM  = 0.
         NOLOSM = 0.
         SLOSM  = 0.
         EPARM  = 0.
C
      END IF
C
C    OUTPUT CUMULATIVE ANNUAL TOTALS ON LAST HR OF THE YEAR
C
      IF(MO.LT.12) THEN
         GOTO 25
      ELSE
            WRITE(9,9092) ITHT,IBNT,IAPERT,QCOLLT,
     1      QCOLLT/IAPERT*100.,QDELT,OLOST,NOLOST,
     2      QDELT/IAPERT*100.,EPART
C
C   IF NOT THE END OF THE YEAR GO BACK TO NEXT TIME STEP
C
C
C   RESET ANNUAL TOTALS
C
         ITHT=0.
         IAVALT=0.
         IBNT=0.
         QCOLLT=0.
```

```
514                 QDELT=0.
515                 IAPERT=0.
516                 OLOST=0.
517                 NOLOST=0.
518                 SLOST=0.
519                 EPART=0.
520              END IF
521              STOP
522        C
523        C   END OF PROGRAM AND FORMAT STATEMENTS
524        C
525         1010 FORMAT(2A10,2I10,A10,I10)
526         1020 FORMAT(I10,4F10.2)
527         1110 FORMAT(2A10,I10,A10)
528         1120 FORMAT(I10,4F10.2)
529         1210 FORMAT(2A10)
530         1220 FORMAT(I10,4F10.2)
531         2000 FORMAT(2A10)
532         3000 FORMAT(A10)
533         6000 FORMAT(1X,"SIMULATION OVER - NHRS LIMIT EXCEEDED")
534         6010 FORMAT(1X,"WBAN # DOES NOT CORRESPOND WITH NAMELIST INPUT")
535         6020 FORMAT(1X,"ITERATION COUNT EXCEEDED")
536         9070 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),56X,2A10,//,53X,
537             1 "CLEAR DAY PERFORMANCE TABLE"//,56X,
538             2 I2,1X,A9," (DAY ",I3,")"//,1X,132("-")//,24X,"INCIDENT SOLAR ",
539             3 "ENERGY"/,24X,21("-"),45X,"COLLECTOR"/,25X,"DIRECT    COLLECTOR"
540             4 ,45X,"EFFICIENCY"/,14X,"AMBIENT    NORMAL      PLANE",7X,"FLOW",
541             5 8X,"COLLECTOR TEMP",6X,"ENERGY",3X,"BASED ON",4X,"ENERGY",
542             6 "     SYSTEM",4X,"PARASITIC"/,15X,"TEMP",19X,"(*)",
543             7 "         RATE",7X,"INLET     OUTLET    COLLECTED",4X,
544             8 "(*)     DELIVERED",3X,"LOSSES     ENERGY"/,4X,"HOUR         C",
545             9 9X,"GJ         GJ",9X,"KG/S",9X,"C",10X,"C         GJ",9X,
546             * "%         GJ         GJ         GJ"//,1X,132("-")/)
547         9071 FORMAT(5X,I2,F12.1,2F11.2,F12.2,2F11.1,F11.2,F10.1,
548             1 3F11.2)
549         9072 FORMAT(/,1X,132("-")//,1X,"TOTAL/AVE      ---",2F11.2,9X,
550             1 "---         ---",8X,"---",F11.2,F10.1,3F11.2,
551             2 //,1X,132("-"))
552         9080 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,50X,
553             1 "MONTHLY PERFORMANCE SUMMARY TABLE"//,
554             2 62X,A9//1X,132("-")//25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,
555             3 20X,31("-"),13X,"COLLECTOR",12X,20("-"),3X,"SYSTEM"/,20X,
556             4 "HORIZONTAL   DIRECT   COLLECTOR",12X,"EFFICIENCY",25X,"NON-",4X,
557             5 "EFFICIENCY"/,22X,"SURFACE    NORMAL    PLANE      ENERGY",
558             6  4X,"BASED ON",
559             7 3X,"ENERGY    OPERATING  OPERATING",2X,"BASED ON",4X,
560             8 "PARASITIC"/,2X,"JULIAN",26X,"          (*)     COLLECTED",6X,
561             9 "(*)",4X,"DELIVERED",3X,"LOSSES     LOSSES    ",3X,"(*)",
562             * 7X,"ENERGY"/,4X,"DAY      DATE       GJ",8X,"GJ",8X,"GJ",10X,
563             1 "GJ",10X,"%",8X,"GJ         GJ",9X,"GJ      ",
564             2 4X,"%",10X,"GJ"//,1X,132("-")/)
565         9081 FORMAT(3X,I3,6X,I2,"/",I2,3X,F7.1,3X,F7.1,3X,2(F7.1,4X),
566             1  F8.1,3X,4(F7.1,4X),F8.1)
567         9082 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES",F11.1,3X,F7.1,3X,
568             1  2(F7.1,4X),F8.1,3X,
569             2 4(F7.1,4X),F8.1//,1X,132("-"))
570         9090 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,51X,
```

```
     1 "ANNUAL PERFORMANCE SUMMARY TABLE"//,
     2 1X,132("-")//,25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,20X,
     3 31("-"),13X,"COLLECTOR",13X,19("-"),4X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",13X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL     PLANE      ENERGY",4X,
     6  "BASED ON",
     7 3X,"ENERGY   OPERATING  OPERATING",3X,"BASED ON",3X,
     8 "PARASITIC"/,35X,"          (*)     COLLECTED",5X,"(*)",
     9 5X,"DELIVERED",3X,"LOSSES     LOSSES  ",4X,"(*)",
     * 7X,"ENERGY"/,3X,"  MONTH",14X,"GJ",9X,"GJ",8X,"GJ",9X,"GJ",10X,
     1 "%         GJ         GJ",9X,"GJ       ",3X,"%",
     2 10X,"GJ"//,1X,132("-"))
9091 FORMAT(1H0,3X,A9,8X,F7.1,4X,F7.1,3X,2(F7.1,4X),F6.1,4X,
     1  3(F7.1,4X),
     2 F6.1,4X,F7.1)
9092 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES ",F11.1,4X,F7.1,3X,
     1  2(F7.1,4X),
     2 F5.1,5X,3(F7.1,4X),F6.1,4X,F7.1//,1X,132("-"))
      END
```

SECTION 2.3

DOMESTIC HOT WATER SYSTEM (HOME LAUNDRY) MAIN ROUTINE (LHOMW)

```
      C
            PROGRAM SOLIPH(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE6=OUTPUT,
     1                TAPE7,TAPE8,TAPE9,TAPE10,TAPE11,TAPE12)
      C
      C
      C         THIS VERSION OF SOLIPH IS DESIGNED TO RUN ON THE CYBER 720
      C         USING REFORMATTED TMY DATA.  THE MAIN PROGRAM IS MODIFIED
      C         FOR EACH IPH SITE, RETAINING ONLY INITIALIZATION, INPUT AND
      C         OUTPUT SECTIONS PLUS SUBROUTINES AS COMMON TO ALL SYSTEMS.
      C         THE PROGRAM PERFORMS A QUASI-STEADY-STATE HOUR-BY-HOUR
      C         SIMULATION OF A SOLAR IPH SYSTEM.
      C
      C*********************************************************************
      C
      C         THE FOLLOWING SUBROUTINES ARE AVAILABLE :
      C
      C           FPLATE  -  FLAT PLATE AND EVACUATED TUBE COLLECTOR
      C           TROUGH  -  LINE FOCUS CONCENTRATORS
      C           PIPE    -  OPERATING AND NON - OPERATING HEAT LOSS FROM PIPES
      C           HX      -  HEAT EXCHANGER
      C           HX2     -  HEAT EXHANGER WITH STORAGE
      C           LOADS   -  LOAD SCHEDULE AND FLOWS
      C           STORE   -  SINGLE NODE STORAGE TANK
      C           TCSTORE -  TWO NODE STORAGE TANK
      C           FLASH   -  FLASH TANK, INCLUDING VALVE, SEPARATOR AND BFW
      C           BOILER  -  UNFIRED BOILER, NO PREHEATER
      C           BOILER2 -  UNFIRED BOILER WITH PREHEATER
      C           DEBUG   -  DETAILED DAILY OUTPUT
      C
      C*********************************************************************
      C
      C         THE LOGICAL UNIT NUMBERS(LUN) IN THE PROGRAM STATEMENT ARE
      C         ASSOCIATED WITH THE FOLLOWING DATA :
      C
      C               LUN        DATA
      C
      C                1         TMY INPUT-UNFORMATTED READ
      C                2         NAMELIST INPUT-SYSTEM CONFIGURATION AND PARAMETERS
      C                3         RUN NUMBER FROM SUBMIT FILE
      C                6         OUTPUT-USED TO OUTPUT DEBUG INFORMATION
      C                7         CLEAR DAY OUTPUT
      C                8         MONTHLY OUTPUT
      C                9         ANNUAL OUTPUT
      C               10         DAILY PLOT DATA
      C               11         MONTHLY PLOT DATA
      C               12         ANNUAL PLOT DATA
      C
      C*********************************************************************
      C
      C         THIS VERSION IS FOR :
      C
      C           DOMESTIC HOT WATER SYSTEMS USING HEAT EXCHANGER WITH STORAGE AT:
      C
      C              1) HOME LAUNDRY
      C
      C
      C
```

```
      DIMENSION KDEBUG(12),KCLEAR(12)
C
      DIMENSION MTD(12),E(6),MON(12),NAME(2)
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER DAY,HR
C
      CHARACTER *10 DAT,DATE
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     6  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,ST01,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
      COMMON /CBSUN/ SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,SINHR,
     1      COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
C
C
C  INITIALIZE ALL INPUT PARAMETERS
C
      DATA MTD/31,28,31,30,31,30,31,31,30,31,30,31/
```

```
      DATA MON/"JANUARY","FEBRUARY","MARCH","APRIL","MAY","JUNE",
     1         "JULY","AUGUST","SEPTEMBER","OCTOBER","NOVEMBER",
     2         "DECEMBER"/
C
C
C        THE FOLLOWING NAMELIST CONTAINS ALL THE INPUTS TO THE PROGRAM
C
      NAMELIST /ALL/ IRUN,LTI,LHRON,LHROFF,LDTON,LDTOFF
     1,CFLWI,L2FLOW,LFLWI,CFLWMAX,QSL
     2,PUA,BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,PMCP
     3,CCP,L2CP,L2VIS,L2RHO,CRHO,CVIS
     4,KSTYPE,SVOL,SUA,EFF,NHRMAX,WBAN,LAT
     5,CETAOPT,IORIENT,FUL1,FUL2,RCVRMC,B1,B2,B3,B4,CRINT
     6,CTILT,CAZI,YO,FRUL,BO,CAREA,CDTON,CDTOFF,TAUC
     7,KTCON,KEND,KDEBUG,CTOSET,GCR,LT
     8,TMAKE,TSTEAM,KBOIL,KPIPE,KCLEAR,CW,CL,FL,FTUA,FTMC,EPOW
     9,KPLOT
C
C
C         INITIALIZE PROGRAM PARAMETERS
C
      CTI=CTO=CTAVG=25.
      DO 5 I=1,6
         PTI(I)=25.
         PTO(I)=25.
    5 CONTINUE
      FTO=25.
      STO=25.
      TB=25.
      DT=1.
      ITRMAX=150
      ITERTM=30
      CRIT1=.125
      CRIT2=.2
      CRIT3=.2
      CTCONV=1.
      TCRIT=.1
      NHRS=0
      MO=1
      DAY=0
      KD=1
C
C         READ IN THE INPUTS FOR EACH RUN
C
C
      READ(2,2000) NAME
      READ(2,ALL)
      READ(3,3000) RUN
      DAT=DATE()
C
C    SOME VARIABLES WILL BE DEPENDENT ON THE IPH CONFIGURATION
C    IN THE MAIN PROGRAM SEGMENT DESCRIBING THE SYSTEM.  THIS
C    SECTION SHOULD CONTAIN THE ASSIGNMENT OF VARIABLES THAT DO
C    NOT CHANGE DURING THE SIMULATION.
C
      CFLW=CFLWI
      ST=TSTEAM
```

```
172                 SCP=CCP
173                 PIPEMC=0.0
174                 DO 1 I=1,6
175                    PIPEMC=PIPEMC+PMCP(I)
176                    PCP(I)=CCP
177                    PQCOOL(I)=0.0
178                    PQLOSS(I)=0.0
179            1    CONTINUE
180                 SMCP=PIPEMC+RCVRMC
181                 SFLOWC=0.0
182           C
183           C   CALCULATE TRIG FUNCTIONS FOR ORIENTATION OF COLLECTOR
184           C
185                    SINLAT=SIND(LAT)
186                    COSLAT=COSD(LAT)
187                    SINTIL=SIND(CTILT)
188                    COSTIL=COSD(CTILT)
189                    SINAZ=SIND(CAZI)
190                    COSAZ=COSD(CAZI)
191                    SINDIF=SIND(CTILT-LAT)
192                    COSDIF=COSD(CTILT-LAT)
193           C
194           C  READ ISTA FROM UNFORMATTED FILE
195           C
196                 READ(1) ISTA
197           C
198           C   CHECK FOR CORRECT WBAN # IN NAMELIST FILE
199           C
200                 IF(ISTA.NE.WBAN) THEN
201                    WRITE(6,6010)
202                    STOP
203                 END IF
204           C
205           C          BEGINNING OF TIME STEP LOOP
206           C          ***************************
207           C
208              25 NHRS = NHRS + 1
209                 IF(NHRS.GE.NHRMAX) THEN
210                    WRITE(6,6000)
211                    STOP
212                 END IF
213           C
214           C  ROUTINE TO CALCULATE HR,DAY,MON
215           C
216                 HR=MOD(NHRS-1,24)+1
217                 HRANGL=(12.5-HR)*15.0
218                    SINHR=SIND(HRANGL)
219                    COSHR=COSD(HRANGL)
220                 IF(HR.EQ.1) DAY=DAY+1
221                 IF(DAY.GT.MTD(MO)) THEN
222                    DAY=1
223                    MO=MO+1
224                 END IF
225                 JDATE=DOY(DAY,MO)
226                 DEC=23.45*SIND(0.98630*(284.+JDATE))
227                    SINDEC=SIND(DEC)
228                    COSDEC=COSD(DEC)
```

```
                TANDEC=TAND(DEC)
      C
      C
      C  READ TMY TAPE FOR TIME, DIRECT NORMAL, TOTAL HORIZONTAL, AMBIENT
      C  TEMPERATURE.  BEGIN TIME STEP LOOP.
      C
            READ(1) IBN,ITHOR,TAMB
            ITER=0
      C
      C  BEGIN STEADY STATE CONVERGENCE LOOP.
      C
      C  ************************************
      C
       100  ITER = ITER + 1
            IF(ITER.GE.ITRMAX) THEN
               WRITE(6,6020)
               STOP
            END IF
      C
      C
      C   THE MAIN PROGRAM SEGMENT DESCRIBING THE IPH FIELD TEST SITE
      C   CONFIGURATION STARTS HERE.  FOR EACH NEW CONFIGURATION, INSERT
      C   A NEW SET OF CALLS.
      C
      C*************************************************************************
      C
      C
      C   CHECK FOR PROCESS SCHEDULE SHUT DOWN
      C
            IF(MOD(JDATE,7).EQ.0.OR.MOD(JDATE,7).EQ.6) THEN
               IBN=0.0
               ITHOR=0.0
            END IF
            IF(HR.GT.16) THEN
               BNTEMP=IBN
               IBN=0.0
               THTEMP=ITHOR
               ITHOR=0.0
            END IF
      C
      C    COLLECTOR ROUTINE
      C
            CTI=PTO(4)
            CALL TROUGH
      C
      C   ACCOUNT FOR THERMAL MASS OF THE SYSTEM (LESS THAT OF THE UNFIRED
      C   BOILER BY LUMPING ALL COMPONENTS INTO ONE STORAGE NODE.  THE
      C   STORAGE TEMP MUST BE LOWERED TO ACCOUNT FOR OVERNIGHT LOSSES IF
      C   THE PUMP HAS JUST COME ON.
      C
            IF(KPSTRT.EQ.1) THEN
               STO=STO-OVNLOSS/SMCP
               OVNLOSS=0.0
            END IF
      C
      C   SET UP STORAGE INPUTS
      C
```

```
286                 SFLOWH=CFLOW
287                 STHI=CTO
288                 STCI=0.0
289                 CALL STORE
290          C
291          C   SET PIPE(1) INLET = STORAGE NODE OUTLET
292          C
293                 PTI(1)=ST
294                 CALL PIPE(1)
295          C
296          C    SET PIPE(1) OUTLET = PIPE(2) INLET
297          C
298                 PTI(2)=PTO(1)
299                 CALL PIPE(2)
300          C
301          C    SET PIPE(2) OUTLET = HEAT EXCHANGER INLET
302          C
303                 BTI=PTO(2)
304                 CALL HX2
305          C
306          C    SET HEAT EXCHANGER OUTLET   PIPE(3) INLET
307          C
308                 PTI(3)=BTO
309                 CALL PIPE(3)
310          C
311          C    SET PIPE(3) OUTLET   PIPE(4) INLET
312          C
313                 PTI(4)=PTO(3)
314                 CALL PIPE(4)
315          C
316          C
317          C    IF PUMP IS ON, CHECK FOR CONVERGENCE, OTHERWISE CONVERGENCE
318          C    NOT REQUIRED FOR NON-OPERATING CONDITION
319          C
320          C
321                 IF(KPON.EQ.1) THEN
322                     CONV1=ABS(PTO(4)-CTI)
323                     IF(CONV1.GT.CRIT1) GOTO 100
324                     QSEAL=QSL
325                     EPAR=EPOW
326                 ELSE
327                    QSEAL=0.0
328                    EPAR=0.0
329                 END IF
330          C
331          C    RESET PUMP START, STOP FLAGS AND ANY OTHER NECESSARY
332          C    VARIABLES FOR START OF NEXT TIME STEP.
333          C
334                 KPSTRT=0
335                 KPSHUT=0
336                 STO=STON
337                 FTO=FTON
338                 TB=TBN
339          C
340          C   RESET BEAM AND HORIZONTAL
341          C
342                 IF(HR.GT.16) THEN
```

```
                 IBN=BNTEMP
                 ITHOR=THTEMP
              END IF
      C
      C
      C*********************************************************************
      C
      C
      C   THE MAIN PROGRAM SEGMENT DESCIBING THE IPH FIELD TEST CONFIGURATION
      C   ENDS HERE.  THE REMAINING SEGMENT OF THE MAIN PROGRAM DEALS WITH
      C   OUTPUT OF DAILY(CLEAR DAY), MONTHLY, AND ANNUAL COMPUTATIONS.
      C
      C*********************************************************************
      C
      C  CALCULATE TOTAL OPERATIONAL AND NON-OP PIPING AND COLLECTOR LOSSES.
      C
            OLOSS  =PQLOSS(1)+ PQLOSS(2)+PQLOSS(3)+PQLOSS(4)+
           1   PQLOSS(5)+PQLOSS(6)+QSEAL+QBLOWD+BSKLO
            NOLOSS = PQCOOL(1)+PQCOOL(2)+PQCOOL(3)+PQCOOL(4)+
           1   PQCOOL(5)+PQCOOL(6)+CQCOOL+BSKLN
            OVNLOSS=OVNLOSS+NOLOSS-BSKLN
      C
      C
            ITHD   = ITHD   + CAREA*ITHOR/1.0E6
            IAVALD = IAVALD + CAREA*IAVAIL/1.0E6
      C                   ACCUMULATE IAPERD ONLY WHEN TRACKING BUT W/O SHADING LOSSLOSS.
            IF(IAPER.GT.0.0)IAPERD=IAPERD+CAREA*IAVAIL/1.0E6
            IBND   = IBND   + CAREA*IBN/1.0E6
            QCOLLD = QCOLLD + CQCOLL/1.0E6
            QDELD  = QDELD  +(BQDEL-QSEAL)/1.0E6
            OLOSD  = OLOSD  + OLOSS/1.0E6
            NOLOSD = NOLOSD + NOLOSS/1.0E6
            SLOSD  = SLOSD  + SQLOSS/1.0E6
            EPARD  = EPARD  + EPAR/1.0E6
      C
      C   CHECK FOR DEBUG OUTPUT FLAG
      C
            IF(KDEBUG(KD).EQ.JDATE) THEN
               CALL DEBUG
               IF(HR.EQ.24) KD=KD+1
            END IF
      C
      C   DAILY CLEAR DAY OUTPUT( 1 CLEAR DAY FOR EACH MONTH AS DETERMINED
      C   BY THE FLAG KCLEAR)
      C
            IF(JDATE.EQ.KCLEAR(MO)) THEN
      C
      C    1ST HR - OUTPUT HEADING
      C
                  IF(HR.EQ.1) THEN
                     WRITE(7,9070) RUN,DAT,NAME,DAY,MON(MO),JDATE
                     IF(KPLOT.EQ.1) WRITE(10,1010) NAME,JDATE,MO,MON(MO),DAY
                  END IF
            IAPNS=0.0
            IF(IAPER.GT.0.0) IAPNS=IAVAIL
                  IF(IAPNS.LE.0.0) THEN
                     ETAA=0.0
```

```
400                     ELSE
401                        ETAA=CQCOLL/IAPNS/CAREA*100.
402                     END IF
403                     WRITE(7,9071) HR,TAMB,IBN*CAREA/1.E6,IAPNS*CAREA/1.E6,
404              1       CFLOW/3600.,CTI,CTO,CQCOLL/1.E6,
405              2       ETAA,BQDEL/1.E6,(OLOSS+NOLOSS)/1.E6,
406              3       EPAR/1.E6
407                      IF(KPLOT.EQ.1) WRITE(10,1020) HR,IBN*CAREA/1.E6,
408              1         IAPNS*CAREA/1.E6,CQCOLL/1.E6,BQDEL/1.E6
409                  IF(HR.EQ.24) WRITE(7,9072) IBND,IAPERD,QCOLLD,
410              1        QCOLLD/IAPERD*100.,QDELD,OLOSD+NOLOSD,EPARD
411               END IF
412         C
413         C    MONTHLY OUTPUTS - 1ST DAY - OUTPUT HEADING
414         C
415               IF(DAY.EQ.1.AND.HR.EQ.1) THEN
416                  WRITE(8,9080) RUN,DAT,NAME,MON(MO)
417                  IF(KPLOT.EQ.1) WRITE(11,1110) NAME,MO,MON(MO)
418               END IF
419         C
420         C    DAILY DATA
421         C
422               IF(ITHD.EQ.0.0) THEN
423                  ETADH=0.0
424                  ETASH=0.0
425               ELSE
426                  ETADH=QCOLLD/ITHD*100.
427                  ETASH=QDELD/ITHD*100.
428               END IF
429               IF(IAPERD.EQ.0.0) THEN
430                  ETADA=0.0
431                  ETASA=0.0
432               ELSE
433                  ETADA=QCOLLD/IAPERD*100.
434                  ETASA=QDELD/IAPERD*100.
435               END IF
436               IF(HR.LT.24) THEN
437                  GOTO 25
438               ELSE
439                  WRITE(8,9081) JDATE,MO,DAY,ITHD,IBND,IAPERD,QCOLLD,
440              1   ETADA,QDELD,OLOSD,NOLOSD,
441              2   ETASA,EPARD
442                  IF(KPLOT.EQ.1) WRITE(11,1120) DAY,IBND,IAPERD,QCOLLD,QDELD
443         C
444         C    ACCUMULATE MONTHLY TOTALS & RESET DAILY TOTALS
445         C
446               ITHM   = ITHM   + ITHD
447               IAVALM = IAVALM + IAVALD
448               IBNM   = IBNM   + IBND
449               IAPERM = IAPERM + IAPERD
450               QCOLLM = QCOLLM + QCOLLD
451               QDELM  = QDELM  + QDELD
452               OLOSM  = OLOSM  + OLOSD
453               NOLOSM = NOLOSM + NOLOSD
454               SLOSM  = SLOSM  + SLOSD
455               EPARM  = EPARM  + EPARD
456         C
```

```
C    RESET DAILY TOTALS
C
      ITHD   = 0.
      IAVALD = 0.
      IBND   = 0.
      IAPERD = 0.
      QCOLLD = 0.
      QDELD  = 0.
      OLOSD  = 0.
      NOLOSD = 0.
      SLOSD  = 0.
      EPARD  = 0.
      END IF
C
C     IF DAY LT LAST DAY OF THE MONTH GO BACK
C     TO NEXT TIME STEP
C
      IF(DAY.LT.MTD(MO)) THEN
         GOTO 25
      ELSE
C
C     OUTPUT MONTHLY DATA TO MONTHLY AND ANNUAL SUMMARIES
C
         IF(MO.EQ.1) THEN
            WRITE(9,9090) RUN,DAT,NAME
            IF(KPLOT.EQ.1) WRITE(12,1210) NAME
         END IF
         WRITE(8,9082) ITHM,IBNM,IAPERM,QCOLLM,
     1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
     2      QDELM/IAPERM*100.,EPARM
         IF(KPLOT.EQ.1) WRITE(12,1220) MO,IBNM,IAPERM,QCOLLM,QDELM
         WRITE(9,9091)MON(MO),ITHM,IBNM,IAPERM,QCOLLM,
     1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
     2      QDELM/IAPERM*100.,EPARM
C
C    ACCUMULATE ANNUAL TOTALS AND RESET MONTHLY TOTALS
         ITHT   = ITHT   + ITHM
         IAVALT = IAVALT + IAVALM
         IAPERT = IAPERT + IAPERM
         IBNT   = IBNT   + IBNM
         QCOLLT = QCOLLT + QCOLLM
         QDELT  = QDELT  + QDELM
         OLOST  = OLOST  + OLOSM
         NOLOST = NOLOST + NOLOSM
         SLOST  = SLOST  + SLOSM
         EPART  = EPART  + EPARM
C
         ITHM   = 0.
         IAVALM = 0.
         IAPERM = 0.
         IBNM   = 0.
         QCOLLM = 0.
         QDELM  = 0.
         OLOSM  = 0.
         NOLOSM = 0.
         SLOSM  = 0.
         EPARM  = 0.
```

```
514          C
515                END IF
516          C
517          C    OUTPUT CUMULATIVE ANNUAL TOTALS ON LAST HR OF THE YEAR
518          C
519                IF(MO.LT.12) THEN
520                   GOTO 25
521                ELSE
522                      WRITE(9,9092) ITHT,IBNT,IAPERT,QCOLLT,
523               1      QCOLLT/IAPERT*100.,QDELT,OLOST,NOLOST,
524               2      QDELT/IAPERT*100.,EPART
525          C
526          C   IF NOT THE END OF THE YEAR GO BACK TO NEXT TIME STEP
527          C
528          C
529          C   RESET ANNUAL TOTALS
530          C
531                   ITHT=0.
532                   IAVALT=0.
533                   IBNT=0.
534                   QCOLLT=0.
535                   QDELT=0.
536                   IAPERT=0.
537                   OLOST=0.
538                   NOLOST=0.
539                   SLOST=0.
540                   EPART=0.
541                END IF
542                STOP
543          C
544          C   END OF PROGRAM AND FORMAT STATEMENTS
545          C
546           1010 FORMAT(2A10,2I10,A10,I10)
547           1020 FORMAT(I10,4F10.2)
548           1110 FORMAT(2A10,I10,A10)
549           1120 FORMAT(I10,4F10.2)
550           1210 FORMAT(2A10)
551           1220 FORMAT(I10,4F10.2)
552           2000 FORMAT(2A10)
553           3000 FORMAT(A10)
554           6000 FORMAT(1X,"SIMULATION OVER - NHRS LIMIT EXCEEDED")
555           6010 FORMAT(1X,"WBAN # DOES NOT CORRESPOND WITH NAMELIST INPUT")
556           6020 FORMAT(1X,"ITERATION COUNT EXCEEDED")
557           9070 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),56X,2A10,//,53X,
558               1 "CLEAR DAY PERFORMANCE TABLE"//,56X,
559               2 I2,1X,A9," (DAY ",I3,")"//,1X,132("-")//,24X,"INCIDENT SOLAR ",
560               3 "ENERGY"/,24X,21("-"),45X,"COLLECTOR"/,25X,"DIRECT    COLLECTOR"
561               4 ,45X,"EFFICIENCY"/,14X,"AMBIENT    NORMAL      PLANE",7X,"FLOW",
562               5 8X,"COLLECTOR TEMP",6X,"ENERGY",3X,"BASED ON",4X,"ENERGY",
563               6 "     SYSTEM",4X,"PARASITIC"/,15X,"TEMP",19X,"(*)",
564               7 "        RATE",7X,"INLET     OUTLET    COLLECTED",4X,
565               8 "(*)     DELIVERED",3X,"LOSSES     ENERGY"/,4X,"HOUR         C",
566               9 9X,"GJ         GJ",9X,"KG/S",9X,"C",10X,"C         GJ",9X,
567               * "%         GJ         GJ         GJ"//,1X,132("-")/)
568           9071 FORMAT(5X,I2,F12.1,2F11.2,F12.2,2F11.1,F11.2,F10.1,
569               1 3F11.2)
570           9072 FORMAT(/,1X,132("-")//,1X,"TOTAL/AVE      ---",2F11.2,9X,
```

```
     1 "---        ---",8X,"---",F11.2,F10.1,3F11.2,
     2 //,1X,132("-"))
9080 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,50X,
     1 "MONTHLY PERFORMANCE SUMMARY TABLE"//,
     2 62X,A9//1X,132("-")//25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,
     3 20X,31("-"),13X,"COLLECTOR",12X,20("-"),3X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",12X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL    PLANE      ENERGY",
     6  4X,"BASED ON",
     7 3X,"ENERGY    OPERATING  OPERATING",2X,"BASED ON",4X,
     8 "PARASITIC"/,2X,"JULIAN",26X,"         (*)     COLLECTED",6X,
     9 "(*)",4X,"DELIVERED",3X,"LOSSES     LOSSES    ",3X,"(*)",
     * 7X,"ENERGY"/,4X,"DAY      DATE       GJ",8X,"GJ",8X,"GJ",10X
     1 "GJ",10X,"%",8X,"GJ         GJ",9X,"GJ       ",
     2 4X,"%",10X,"GJ"//,1X,132("-")/)
9081 FORMAT(3X,I3,6X,I2,"/",I2,3X,F7.1,3X,F7.1,3X,2(F7.1,4X),
     1  F8.1,3X,4(F7.1,4X),F8.1)
9082 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES",F11.1,3X,F7.1,3X,
     1  2(F7.1,4X),F8.1,3X,
     2 4(F7.1,4X),F8.1//,1X,132("-"))
9090 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,51X,
     1 "ANNUAL PERFORMANCE SUMMARY TABLE"//,
     2 1X,132("-")//,25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,20X,
     3 31("-"),13X,"COLLECTOR",13X,19("-"),4X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",13X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL     PLANE      ENERGY",4X,
     6  "BASED ON",
     7 3X,"ENERGY   OPERATING  OPERATING",3X,"BASED ON",3X,
     8 "PARASITIC"/,35X,"          (*)     COLLECTED",5X,"(*)",
     9 5X,"DELIVERED",3X,"LOSSES     LOSSES  ",4X,"(*)",
     * 7X,"ENERGY"/,3X,"  MONTH",14X,"GJ",9X,"GJ",8X,"GJ",9X,"GJ",10X,
     1 "%         GJ         GJ",9X,"GJ       ",3X,"%",
     2 10X,"GJ"//,1X,132("-"))
9091 FORMAT(1H0,3X,A9,8X,F7.1,4X,F7.1,3X,2(F7.1,4X),F6.1,4X,
     1  3(F7.1,4X),
     2 F6.1,4X,F7.1)
9092 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES ",F11.1,4X,F7.1,3X,
     1  2(F7.1,4X),
     2 F5.1,5X,3(F7.1,4X),F6.1,4X,F7.1//,1X,132("-"))
      END
```

SECTION 2.4

UNFIRED BOILER SYSTEM (HOME LAUNDRY) MAIN ROUTINE (LHOMS)

```
      C
            PROGRAM SOLIPH(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE6=OUTPUT,
     1                TAPE7,TAPE8,TAPE9,TAPE10,TAPE11,TAPE12)
      C
      C
      C         THIS VERSION OF SOLIPH IS DESIGNED TO RUN ON THE CYBER 720
      C         USING REFORMATTED TMY DATA.  THE MAIN PROGRAM IS MODIFIED
      C         FOR EACH IPH SITE, RETAINING ONLY INITIALIZATION, INPUT AND
      C         OUTPUT SECTIONS PLUS SUBROUTINES AS COMMON TO ALL SYSTEMS.
      C         THE PROGRAM PERFORMS A QUASI-STEADY-STATE HOUR-BY-HOUR
      C         SIMULATION OF A SOLAR IPH SYSTEM.
      C
      C*********************************************************************
      C
      C         THE FOLLOWING SUBROUTINES ARE AVAILABLE :
      C
      C           FPLATE  -  FLAT PLATE AND EVACUATED TUBE COLLECTOR
      C           TROUGH  -  LINE FOCUS CONCENTRATORS
      C           PIPE    -  OPERATING AND NON - OPERATING HEAT LOSS FROM PIPES
      C           HX      -  HEAT EXCHANGER
      C           HX2     -  HEAT EXHANGER WITH STORAGE
      C           LOADS   -  LOAD SCHEDULE AND FLOWS
      C           STORE   -  SINGLE NODE STORAGE TANK
      C           TCSTORE -  TWO NODE STORAGE TANK
      C           FLASH   -  FLASH TANK, INCLUDING VALVE, SEPARATOR AND BFW
      C           BOILER  -  UNFIRED BOILER, NO PREHEATER
      C           BOILER2 -  UNFIRED BOILER WITH PREHEATER
      C           DEBUG   -  DETAILED DAILY OUTPUT
      C
      C*********************************************************************
      C
      C         THE LOGICAL UNIT NUMBERS(LUN) IN THE PROGRAM STATEMENT ARE
      C         ASSOCIATED WITH THE FOLLOWING DATA :
      C
      C               LUN        DATA
      C
      C                1         TMY INPUT-UNFORMATTED READ
      C                2         NAMELIST INPUT-SYSTEM CONFIGURATION AND PARAMETERS
      C                3         RUN NUMBER FROM SUBMIT FILE
      C                6         OUTPUT-USED TO OUTPUT DEBUG INFORMATION
      C                7         CLEAR DAY OUTPUT
      C                8         MONTHLY OUTPUT
      C                9         ANNUAL OUTPUT
      C               10         DAILY PLOT DATA
      C               11         MONTHLY PLOT DATA
      C               12         ANNUAL PLOT DATA
      C
      C*********************************************************************
      C
      C         THIS VERSION IS FOR :
      C
      C           UNFIRED BOILER SYSTEMS WITH NO STORAGE AT:
      C
      C              1) HOME LAUNDRY
      C
      C
      C
```

```
      DIMENSION KDEBUG(12),KCLEAR(12)
C
      DIMENSION MTD(12),E(6),MON(12),NAME(2)
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER DAY,HR
C
      CHARACTER *10 DAT,DATE
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     6  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,STO1,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
      COMMON /CBSUN/ SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,SINHR,
     1      COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
C
C
C  INITIALIZE ALL INPUT PARAMETERS
C
      DATA MTD/31,28,31,30,31,30,31,31,30,31,30,31/
```

```
      DATA MON/"JANUARY","FEBRUARY","MARCH","APRIL","MAY","JUNE",
     1         "JULY","AUGUST","SEPTEMBER","OCTOBER","NOVEMBER",
     2         "DECEMBER"/
C
C
C        THE FOLLOWING NAMELIST CONTAINS ALL THE INPUTS TO THE PROGRAM
C
      NAMELIST /ALL/ IRUN,LTI,LHRON,LHROFF,LDTON,LDTOFF
     1,CFLWI,L2FLOW,LFLWI,CFLWMAX,QSL
     2,PUA,BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,PMCP
     3,CCP,L2CP,L2VIS,L2RHO,CRHO,CVIS
     4,KSTYPE,SVOL,SUA,EFF,NHRMAX,WBAN,LAT
     5,CETAOPT,IORIENT,FUL1,FUL2,RCVRMC,B1,B2,B3,B4,CRINT
     6,CTILT,CAZI,YO,FRUL,BO,CAREA,CDTON,CDTOFF,TAUC
     7,KTCON,KEND,KDEBUG,CTOSET,GCR,LT
     8,TMAKE,TSTEAM,KBOIL,KPIPE,KCLEAR,CW,CL,FL,FTUA,FTMC,EPOW
     9,KPLOT
C
C
C         INITIALIZE PROGRAM PARAMETERS
C
      CTI=CTO=CTAVG=25.
      DO 5 I=1,6
         PTI(I)=25.
         PTO(I)=25.
 5    CONTINUE
      FTO=25.
      STO=25.
      TB=25.
      DT=1.
      ITRMAX=150
      ITERTM=30
      CRIT1=.125
      CRIT2=.2
      CRIT3=.2
      CTCONV=1.
      TCRIT=.1
      NHRS=0
      MO=1
      DAY=0
      KD=1
C
C    SOME VARIABLES WILL BE DEPENDENT ON THE IPH CONFIGURATION
C
C         READ IN THE INPUTS FOR EACH RUN
C
C
      READ(2,2000) NAME
      READ(2,ALL)
      READ(3,3000) RUN
      DAT=DATE()
C
C    IN THE MAIN PROGRAM SEGMENT DESCRIBING THE SYSTEM.  THIS
C    SECTION SHOULD CONTAIN THE ASSIGNMENT OF VARIABLES THAT DO
C    NOT CHANGE DURING THE SIMULATION.
C
      CFLW=CFLWI
```

```
      ST=TSTEAM
      SCP=CCP
      PIPEMC=0.0
      DO 1 I=1,6
         PIPEMC=PIPEMC+PMCP(I)
         PCP(I)=CCP
         PQCOOL(I)=0.0
         PQLOSS(I)=0.0
    1 CONTINUE
      SMCP=PIPEMC+RCVRMC
      SFLOWC=0.0
C
C   CALCULATE TRIG FUNCTIONS FOR ORIENTATION OF COLLECTOR
C
         SINLAT=SIND(LAT)
         COSLAT=COSD(LAT)
         SINTIL=SIND(CTILT)
         COSTIL=COSD(CTILT)
         SINAZ=SIND(CAZI)
         COSAZ=COSD(CAZI)
         SINDIF=SIND(CTILT-LAT)
         COSDIF=COSD(CTILT-LAT)
C
C  READ ISTA FROM UNFORMATTED FILE
C
      READ(1) ISTA
C
C   CHECK FOR CORRECT WBAN # IN NAMELIST FILE
C
      IF(ISTA.NE.WBAN) THEN
         WRITE(6,6010)
         STOP
      END IF
C
C          BEGINNING OF TIME STEP LOOP
C          ***************************
C
   25 NHRS = NHRS + 1
      IF(NHRS.GE.NHRMAX) THEN
         WRITE(6,6000)
         STOP
      END IF
C
C  ROUTINE TO CALCULATE HR,DAY,MON
C
      HR=MOD(NHRS-1,24)+1
      HRANGL=(12.5-HR)*15.0
         SINHR=SIND(HRANGL)
         COSHR=COSD(HRANGL)
      IF(HR.EQ.1) DAY=DAY+1
      IF(DAY.GT.MTD(MO)) THEN
         DAY=1
         MO=MO+1
      END IF
      JDATE=DOY(DAY,MO)
      DEC=23.45*SIND(0.98630*(284.+JDATE))
         SINDEC=SIND(DEC)
```

```
229                 COSDEC=COSD(DEC)
230                 TANDEC=TAND(DEC)
231          C
232          C
233          C  READ TMY TAPE FOR TIME, DIRECT NORMAL, TOTAL HORIZONTAL, AMBIENT
234          C  TEMPERATURE.  BEGIN TIME STEP LOOP.
235          C
236                READ(1) IBN,ITHOR,TAMB
237                ITER=O
238          C
239          C  BEGIN STEADY STATE CONVERGENCE LOOP.
240          C
241          C  ************************************
242          C
243           100  ITER = ITER + 1
244                IF(ITER.GE.ITRMAX) THEN
245                   WRITE(6,6020)
246                   STOP
247                END IF
248          C
249          C
250          C   THE MAIN PROGRAM SEGMENT DESCRIBING THE IPH FIELD TEST SITE
251          C   CONFIGURATION STARTS HERE.  FOR EACH NEW CONFIGURATION, INSERT
252          C   A NEW SET OF CALLS.
253          C
254          C*********************************************************************
255          C
256          C
257          C   CHECK FOR PROCESS SCHEDULE SHUT DOWN
258          C
259                IF(MOD(JDATE,7).EQ.O.OR.MOD(JDATE,7).EQ.6) THEN
260                   IBN=0.0
261                   ITHOR=0.0
262                END IF
263                IF(HR.GT.16) THEN
264                   BNTEMP=IBN
265                   IBN=0.0
266                   THTEMP=ITHOR
267                   ITHOR=0.0
268                END IF
269          C
270          C    COLLECTOR ROUTINE
271          C
272                CTI=PTO(4)
273                CALL TROUGH
274          C
275          C   ACCOUNT FOR THERMAL MASS OF THE SYSTEM (LESS THAT OF THE UNFIRED
276          C   BOILER BY LUMPING ALL COMPONENTS INTO ONE STORAGE NODE.  THE
277          C   STORAGE TEMP MUST BE LOWERED TO ACCOUNT FOR OVERNIGHT LOSSES IF
278          C   THE PUMP HAS JUST COME ON.
279          C
280                IF(KPSTRT.EQ.1) THEN
281                   STO=STO-OVNLOSS/SMCP
282                   OVNLOSS=0.0
283                END IF
284          C
285          C   SET UP STORAGE INPUTS
```

```
286          C
287                SFLOWH=CFLOW
288                STHI=CTO
289                STCI=0.0
290                CALL STORE
291          C
292          C   SET PIPE(1) INLET = STORAGE NODE OUTLET
293          C
294                PTI(1)=ST
295                CALL PIPE(1)
296          C
297          C    SET PIPE(1) OUTLET = PIPE(2) INLET
298          C
299                PTI(2)=PTO(1)
300                CALL PIPE(2)
301          C
302          C    SET PIPE(2) OUTLET = BOILER INLET
303          C
304                BTI=PTO(2)
305                CALL BOILER
306          C
307          C    SET BOILER OUTLET = PIPE(3) INLET
308          C
309                PTI(3)=BTO
310                CALL PIPE(3)
311          C
312          C    SET PIPE(3) OUTLET = PIPE(4) INLET
313          C
314                PTI(4)=PTO(3)
315                CALL PIPE(4)
316          C
317          C
318          C    IF PUMP IS ON, CHECK FOR CONVERGENCE, OTHERWISE CONVERGENCE
319          C    NOT REQUIRED FOR NON-OPERATING CONDITION
320          C
321          C
322                IF(KPON.EQ.1) THEN
323                    CONV1=ABS(PTO(4)-CTI)
324                    IF(CONV1.GT.CRIT1) GOTO 100
325                    QSEAL=QSL
326                    EPAR=EPOW
327                ELSE
328                   QSEAL=0.0
329                   EPAR=0.0
330                END IF
331          C
332          C    RESET PUMP START, STOP FLAGS AND ANY OTHER NECESSARY
333          C    VARIABLES FOR START OF NEXT TIME STEP.
334          C
335                KPSTRT=0
336                KPSHUT=0
337                STO=STON
338                FTO=FTON
339                TB=TBN
340          C
341          C   RESET BEAM AND HORIZONTAL
342          C
```

```
343                IF(HR.GT.16) THEN
344                   IBN=BNTEMP
345                   ITHOR=THTEMP
346                END IF
347          C
348          C
349          C*********************************************************************
350          C
351          C
352          C   THE MAIN PROGRAM SEGMENT DESCIBING THE IPH FIELD TEST CONFIGURATION
353          C   ENDS HERE.  THE REMAINING SEGMENT OF THE MAIN PROGRAM DEALS WITH
354          C   OUTPUT OF DAILY(CLEAR DAY), MONTHLY, AND ANNUAL COMPUTATIONS.
355          C
356          C*********************************************************************
357          C
358          C  CALCULATE TOTAL OPERATIONAL AND NON-OP PIPING AND COLLECTOR LOSSES.
359          C
360                OLOSS  =PQLOSS(1)+ PQLOSS(2)+PQLOSS(3)+PQLOSS(4)+
361               1   PQLOSS(5)+PQLOSS(6)+QSEAL+QBLOWD+BSKLO
362                NOLOSS = PQCOOL(1)+PQCOOL(2)+PQCOOL(3)+PQCOOL(4)+
363               1   PQCOOL(5)+PQCOOL(6)+CQCOOL+BSKLN
364                OVNLOSS=OVNLOSS+NOLOSS-BSKLN
365          C
366          C
367                ITHD   = ITHD   + CAREA*ITHOR/1.0E6
368                IAVALD = IAVALD + CAREA*IAVAIL/1.0E6
369          C                   ACCUMULATE IAPERD ONLY WHEN TRACKING BUT W/O SHADING LOSSLOSS.
370                IF(IAPER.GT.0.0)IAPERD=IAPERD+CAREA*IAVAIL/1.0E6
371                IBND   = IBND   + CAREA*IBN/1.0E6
372                QCOLLD = QCOLLD + CQCOLL/1.0E6
373                QDELD  = QDELD  +(BQDEL-QSEAL)/1.0E6
374                OLOSD  = OLOSD  + OLOSS/1.0E6
375                NOLOSD = NOLOSD + NOLOSS/1.0E6
376                SLOSD  = SLOSD  + SQLOSS/1.0E6
377                EPARD  = EPARD  + EPAR/1.0E6
378          C
379          C   CHECK FOR DEBUG OUTPUT FLAG
380          C
381                IF(KDEBUG(KD).EQ.JDATE) THEN
382                   CALL DEBUG
383                   IF(HR.EQ.24) KD=KD+1
384                END IF
385          C
386          C   DAILY CLEAR DAY OUTPUT( 1 CLEAR DAY FOR EACH MONTH AS DETERMINED
387          C   BY THE FLAG KCLEAR)
388          C
389                IF(JDATE.EQ.KCLEAR(MO)) THEN
390          C
391          C    1ST HR - OUTPUT HEADING
392          C
393                      IF(HR.EQ.1) THEN
394                         WRITE(7,9070) RUN,DAT,NAME,DAY,MON(MO),JDATE
395                         IF(KPLOT.EQ.1) WRITE(10,1010) NAME,JDATE,MO,MON(MO),DAY
396                      END IF
397                IAPNS=0.0
398                IF(IAPER.GT.0.0) IAPNS=IAVAIL
399                      IF(IAPNS.LE.0.0) THEN
```

```
400                        ETAA=0.0
401                     ELSE
402                        ETAA=CQCOLL/IAPNS/CAREA*100.
403                     END IF
404                     WRITE(7,9071) HR,TAMB,IBN*CAREA/1.E6,IAPNS*CAREA/1.E6,
405              1       CFLOW/3600.,CTI,CTO,CQCOLL/1.E6,
406              2       ETAA,BQDEL/1.E6,(OLOSS+NOLOSS)/1.E6,
407              3       EPAR/1.E6
408                      IF(KPLOT.EQ.1) WRITE(10,1020) HR,IBN*CAREA/1.E6,
409              1         IAPNS*CAREA/1.E6,CQCOLL/1.E6,BQDEL/1.E6
410                  IF(HR.EQ.24) WRITE(7,9072) IBND,IAPERD,QCOLLD,
411              1        QCOLLD/IAPERD*100.,QDELD,OLOSD+NOLOSD,EPARD
412               END IF
413        C
414        C     MONTHLY OUTPUTS - 1ST DAY - OUTPUT HEADING
415        C
416               IF(DAY.EQ.1.AND.HR.EQ.1) THEN
417                  WRITE(8,9080) RUN,DAT,NAME,MON(MO)
418                  IF(KPLOT.EQ.1) WRITE(11,1110) NAME,MO,MON(MO)
419               END IF
420        C
421        C     DAILY DATA
422        C
423               IF(ITHD.EQ.0.0) THEN
424                  ETADH=0.0
425                  ETASH=0.0
426               ELSE
427                  ETADH=QCOLLD/ITHD*100.
428                  ETASH=QDELD/ITHD*100.
429               END IF
430               IF(IAPERD.EQ.0.0) THEN
431                  ETADA=0.0
432                  ETASA=0.0
433               ELSE
434                  ETADA=QCOLLD/IAPERD*100.
435                  ETASA=QDELD/IAPERD*100.
436               END IF
437               IF(HR.LT.24) THEN
438                  GOTO 25
439               ELSE
440                  WRITE(8,9081) JDATE,MO,DAY,ITHD,IBND,IAPERD,QCOLLD,
441              1   ETADA,QDELD,OLOSD,NOLOSD,
442              2   ETASA,EPARD
443                  IF(KPLOT.EQ.1) WRITE(11,1120) DAY,IBND,IAPERD,QCOLLD,QDELD
444        C
445        C     ACCUMULATE MONTHLY TOTALS & RESET DAILY TOTALS
446        C
447               ITHM   = ITHM   + ITHD
448               IAVALM = IAVALM + IAVALD
449               IBNM   = IBNM   + IBND
450               IAPERM = IAPERM + IAPERD
451               QCOLLM = QCOLLM + QCOLLD
452               QDELM  = QDELM  + QDELD
453               OLOSM  = OLOSM  + OLOSD
454               NOLOSM = NOLOSM + NOLOSD
455               SLOSM  = SLOSM  + SLOSD
456               EPARM  = EPARM  + EPARD
```

```
457          C
458          C    RESET DAILY TOTALS
459          C
460                ITHD   = 0.
461                IAVALD = 0.
462                IBND   = 0.
463                IAPERD = 0.
464               QCOLLD = 0.
465               QDELD  = 0.
466               OLOSD  = 0.
467               NOLOSD = 0.
468               SLOSD  = 0.
469               EPARD  = 0.
470               END IF
471          C
472          C     IF DAY LT LAST DAY OF THE MONTH GO BACK
473          C     TO NEXT TIME STEP
474          C
475                IF(DAY.LT.MTD(MO)) THEN
476                   GOTO 25
477                ELSE
478          C
479          C     OUTPUT MONTHLY DATA TO MONTHLY AND ANNUAL SUMMARIES
480          C
481                   IF(MO.EQ.1) THEN
482                      WRITE(9,9090) RUN,DAT,NAME
483                      IF(KPLOT.EQ.1) WRITE(12,1210) NAME
484                   END IF
485                   WRITE(8,9082) ITHM,IBNM,IAPERM,QCOLLM,
486               1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
487               2      QDELM/IAPERM*100.,EPARM
488                   IF(KPLOT.EQ.1) WRITE(12,1220) MO,IBNM,IAPERM,QCOLLM,QDELM
489                   WRITE(9,9091)MON(MO),ITHM,IBNM,IAPERM,QCOLLM,
490               1      QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
491               2      QDELM/IAPERM*100.,EPARM
492          C
493          C    ACCUMULATE ANNUAL TOTALS AND RESET MONTHLY TOTALS
494                   ITHT   = ITHT   + ITHM
495                   IAVALT = IAVALT + IAVALM
496                   IAPERT = IAPERT + IAPERM
497                   IBNT   = IBNT   + IBNM
498                   QCOLLT = QCOLLT + QCOLLM
499                   QDELT  = QDELT  + QDELM
500                   OLOST  = OLOST  + OLOSM
501                   NOLOST = NOLOST + NOLOSM
502                   SLOST  = SLOST  + SLOSM
503                   EPART  = EPART  + EPARM
504          C
505                   ITHM   = 0.
506                   IAVALM = 0.
507                   IAPERM = 0.
508                   IBNM   = 0.
509                   QCOLLM = 0.
510                   QDELM  = 0.
511                   OLOSM  = 0.
512                   NOLOSM = 0.
513                   SLOSM  = 0.
```

```
                 EPARM  = 0.
C
            END IF
C
C    OUTPUT CUMULATIVE ANNUAL TOTALS ON LAST HR OF THE YEAR
C
            IF(MO.LT.12) THEN
               GOTO 25
            ELSE
                  WRITE(9,9092) ITHT,IBNT,IAPERT,QCOLLT,
         1        QCOLLT/IAPERT*100.,QDELT,OLOST,NOLOST,
         2        QDELT/IAPERT*100.,EPART
C
C   IF NOT THE END OF THE YEAR GO BACK TO NEXT TIME STEP
C
C
C   RESET ANNUAL TOTALS
C
                 ITHT=0.
                 IAVALT=0.
                 IBNT=0.
                 QCOLLT=0.
                 QDELT=0.
                 IAPERT=0.
                 OLOST=0.
                 NOLOST=0.
                 SLOST=0.
                 EPART=0.
            END IF
            STOP
C
C   END OF PROGRAM AND FORMAT STATEMENTS
C
 1010 FORMAT(2A10,2I10,A10,I10)
 1020 FORMAT(I10,4F10.2)
 1110 FORMAT(2A10,I10,A10)
 1120 FORMAT(I10,4F10.2)
 1210 FORMAT(2A10)
 1220 FORMAT(I10,4F10.2)
 2000 FORMAT(2A10)
 3000 FORMAT(A10)
 6000 FORMAT(1X,"SIMULATION OVER - NHRS LIMIT EXCEEDED")
 6010 FORMAT(1X,"WBAN # DOES NOT CORRESPOND WITH NAMELIST INPUT")
 6020 FORMAT(1X,"ITERATION COUNT EXCEEDED")
 9070 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),56X,2A10,//,53X,
     1 "CLEAR DAY PERFORMANCE TABLE"//,56X,
     2 I2,1X,A9," (DAY ",I3,")"//,1X,132("-")//,24X,"INCIDENT SOLAR ",
     3 "ENERGY"/,24X,21("-"),45X,"COLLECTOR"/,25X,"DIRECT    COLLECTOR"
     4 ,45X,"EFFICIENCY"/,14X,"AMBIENT    NORMAL      PLANE",7X,"FLOW",
     5 8X,"COLLECTOR TEMP",6X,"ENERGY",3X,"BASED ON",4X,"ENERGY",
     6 "     SYSTEM",4X,"PARASITIC"/,15X,"TEMP",19X,"(*)",
     7 "        RATE",7X,"INLET     OUTLET    COLLECTED",4X,
     8 "(*)     DELIVERED",3X,"LOSSES     ENERGY"/,4X,"HOUR         C",
     9 9X,"GJ         GJ",9X,"KG/S",9X,"C",10X,"C         GJ",9X,
     * "%         GJ         GJ         GJ"//,1X,132("-")/)
 9071 FORMAT(5X,I2,F12.1,2F11.2,F12.2,2F11.1,F11.2,F10.1,
     1 3F11.2)
```

```
 9072 FORMAT(/,1X,132("-")//,1X,"TOTAL/AVE      ---",2F11.2,9X,
     1 "---        ---",8X,"---",F11.2,F10.1,3F11.2,
     2 //,1X,132("-"))
 9080 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,50X,
     1 "MONTHLY PERFORMANCE SUMMARY TABLE"//,
     2 62X,A9//1X,132("-")//25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,
     3 20X,31("-"),13X,"COLLECTOR",12X,20("-"),3X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",12X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL    PLANE      ENERGY",
     6  4X,"BASED ON",
     7 3X,"ENERGY    OPERATING  OPERATING",2X,"BASED ON",4X,
     8 "PARASITIC"/,2X,"JULIAN",26X,"          (*)     COLLECTED",6X,
     9 "(*)",4X,"DELIVERED",3X,"LOSSES     LOSSES    ",3X,"(*)",
     * 7X,"ENERGY"/,4X,"DAY      DATE       GJ",8X,"GJ",8X,"GJ",10X,
     1 "GJ",10X,"%",8X,"GJ         GJ",9X,"GJ       ",
     2 4X,"%",10X,"GJ"//,1X,132("-")/)
 9081 FORMAT(3X,I3,6X,I2,"/",I2,3X,F7.1,3X,F7.1,3X,2(F7.1,4X),
     1  F8.1,3X,4(F7.1,4X),F8.1)
 9082 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES",F11.1,3X,F7.1,3X,
     1  2(F7.1,4X),F8.1,3X,
     2 4(F7.1,4X),F8.1//,1X,132("-"))
 9090 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,51X,
     1 "ANNUAL PERFORMANCE SUMMARY TABLE"//,
     2 1X,132("-")//,25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,20X,
     3 31("-"),13X,"COLLECTOR",13X,19("-"),4X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",13X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL    PLANE      ENERGY",4X,
     6  "BASED ON",
     7 3X,"ENERGY   OPERATING  OPERATING",3X,"BASED ON",3X,
     8 "PARASITIC"/,35X,"          (*)     COLLECTED",5X,"(*)",
     9 5X,"DELIVERED",3X,"LOSSES     LOSSES  ",4X,"(*)",
     * 7X,"ENERGY"/,3X,"  MONTH",14X,"GJ",9X,"GJ",8X,"GJ",9X,"GJ",10X,
     1 "%          GJ          GJ",9X,"GJ       ",3X,"%",
     2 10X,"GJ"//,1X,132("-"))
 9091 FORMAT(1H0,3X,A9,8X,F7.1,4X,F7.1,3X,2(F7.1,4X),F6.1,4X,
     1  3(F7.1,4X),
     2 F6.1,4X,F7.1)
 9092 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES ",F11.1,4X,F7.1,3X,
     1  2(F7.1,4X),
     2 F5.1,5X,3(F7.1,4X),F6.1,4X,F7.1//,1X,132("-"))
      END
```

SECTION 2.5

HOT WATER PREHEAT SYSTEM (CATERPILLAR) MAIN ROUTINE (LCAT)

```
      C
            PROGRAM SOLIPH(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE6=OUTPUT,
           1               TAPE7,TAPE8,TAPE9,TAPE10,TAPE11,TAPE12)
      C
      C
      C         THIS VERSION OF SOLIPH IS DESIGNED TO RUN ON THE CYBER 720
      C         USING REFORMATTED TMY DATA.  THE MAIN PROGRAM IS MODIFIED
      C         FOR EACH IPH SITE, RETAINING ONLY INITIALIZATION, INPUT AND
      C         OUTPUT SECTIONS PLUS SUBROUTINES AS COMMON TO ALL SYSTEMS.
      C         THE PROGRAM PERFORMS A QUASI-STEADY-STATE HOUR-BY-HOUR
      C         SIMULATION OF A SOLAR IPH SYSTEM.
      C
      C*********************************************************************
      C
      C         THE FOLLOWING SUBROUTINES ARE AVAILABLE :
      C
      C           FPLATE  -  FLAT PLATE AND EVACUATED TUBE COLLECTOR
      C           TROUGH  -  LINE FOCUS CONCENTRATORS
      C           PIPE    -  OPERATING AND NON - OPERATING HEAT LOSS FROM PIPES
      C           HX      -  HEAT EXCHANGER
      C           HX2     -  HEAT EXHANGER WITH STORAGE
      C           LOADS   -  LOAD SCHEDULE AND FLOWS
      C           STORE   -  SINGLE NODE STORAGE TANK
      C           TCSTORE -  TWO NODE STORAGE TANK
      C           FLASH   -  FLASH TANK, INCLUDING VALVE, SEPARATOR AND BFW
      C           BOILER  -  UNFIRED BOILER, NO PREHEATER
      C           BOILER2 -  UNFIRED BOILER WITH PREHEATER
      C           DEBUG   -  DETAILED DAILY OUTPUT
      C
      C*********************************************************************
      C
      C         THE LOGICAL UNIT NUMBERS(LUN) IN THE PROGRAM STATEMENT ARE
      C         ASSOCIATED WITH THE FOLLOWING DATA :
      C
      C               LUN        DATA
      C
      C                1         TMY INPUT-UNFORMATTED READ
      C                2         NAMELIST INPUT-SYSTEM CONFIGURATION AND PARAMETERS
      C                3         RUN NUMBER FROM SUBMIT FILE
      C                6         OUTPUT-USED TO OUTPUT DEBUG INFORMATION
      C                7         CLEAR DAY OUTPUT
      C                8         MONTHLY OUTPUT
      C                9         ANNUAL OUTPUT
      C               10         DAILY PLOT DATA
      C               11         MONTHLY PLOT DATA
      C               12         ANNUAL PLOT DATA
      C
      C*********************************************************************
      C
      C         THIS VERSION IS FOR :
      C
      C           WATER PREHEAT SYSTEMS WITH NO STORAGE AT:
      C
      C               1) CATERPILLAR TRACTOR
      C
      C
      C
```

```
      DIMENSION KDEBUG(12),KCLEAR(12)
C
      DIMENSION MTD(12),E(6),MON(12),NAME(2)
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER DAY,HR
C
      CHARACTER *10 DAT,DATE
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     6  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,STO1,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
      COMMON /CBSUN/ SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,SINHR,
     1      COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
C
C
C  INITIALIZE ALL INPUT PARAMETERS
C
      DATA MTD/31,28,31,30,31,30,31,31,30,31,30,31/
```

```
115                 DATA MON/"JANUARY","FEBRUARY","MARCH","APRIL","MAY","JUNE",
116                1         "JULY","AUGUST","SEPTEMBER","OCTOBER","NOVEMBER",
117                2         "DECEMBER"/
118          C
119          C
120          C        THE FOLLOWING NAMELIST CONTAINS ALL THE INPUTS TO THE PROGRAM
121          C
122                 NAMELIST /ALL/ IRUN,LTI,LHRON,LHROFF,LDTON,LDTOFF
123                1,CFLWI,L2FLOW,LFLWI,CFLWMAX,QSL
124                2,PUA,BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,PMCP
125                3,CCP,L2CP,L2VIS,L2RHO,CRHO,CVIS
126                4,KSTYPE,SVOL,SUA,EFF,NHRMAX,WBAN,LAT
127                5,CETAOPT,IORIENT,FUL1,FUL2,RCVRMC,B1,B2,B3,B4,CRINT
128                6,CTILT,CAZI,YO,FRUL,BO,CAREA,CDTON,CDTOFF,TAUC
129                7,KTCON,KEND,KDEBUG,CTOSET,GCR,LT
130                8,TMAKE,TSTEAM,KBOIL,KPIPE,KCLEAR,CW,CL,FL,FTUA,FTMC,EPOW
131                9,KPLOT
132          C
133          C
134          C         INITIALIZE PROGRAM PARAMETERS
135          C
136                 CTI=CTO=CTAVG=25.
137                 DO 5 I=1,6
138                    PTI(I)=25.
139                    PTO(I)=25.
140           5     CONTINUE
141                 FTO=25.
142                 STO=25.
143                 TB=25.
144                 DT=1.
145                 ITRMAX=50
146                 ITERTM=30
147                 CRIT1=.1
148                 CRIT2=.2
149                 CRIT3=.2
150                 CTCONV=1.
151                 TCRIT=.1
152                 NHRS=0
153                 MO=1
154                 DAY=0
155                 KD=1
156          C
157          C
158          C         READ IN THE INPUTS FOR EACH RUN
159          C
160          C
161                 READ(2,2000) NAME
162                 READ(2,ALL)
163                 READ(3,3000) RUN
164                 DAT=DATE()
165          C
166          C     SOME VARIABLES WILL BE DEPENDENT ON THE IPH CONFIGURATION
167          C     IN THE MAIN PROGRAM SEGMENT DESCRIBING THE SYSTEM.  THIS
168          C     SECTION SHOULD CONTAIN THE ASSIGNMENT OF VARIABLES THAT DO
169          C     NOT CHANGE DURING THE SIMULATION.
170          C
171                 CFLW=CFLWI
```

```
172                 SCP=CCP
173                 PIPEMC=0.0
174                 DO 1 I=1,6
175                    PIPEMC=PIPEMC+PMCP(I)
176                    PCP(I)=CCP
177                    PQCOOL(I)=0.0
178                    PQLOSS(I)=0.0
179            1    CONTINUE
180                 SMCP=PIPEMC+RCVRMC
181                 SFLOWC=0.0
182                 QSEAL=0.0
183           C
184           C   CALCULATE TRIG FUNCTIONS FOR ORIENTATION OF COLLECTOR
185           C
186                    SINLAT=SIND(LAT)
187                    COSLAT=COSD(LAT)
188                    SINTIL=SIND(CTILT)
189                    COSTIL=COSD(CTILT)
190                    SINAZ=SIND(CAZI)
191                    COSAZ=COSD(CAZI)
192                    SINDIF=SIND(CTILT-LAT)
193                    COSDIF=COSD(CTILT-LAT)
194           C
195           C  READ ISTA FROM UNFORMATTED FILE
196           C
197                 READ(1) ISTA
198           C
199           C   CHECK FOR CORRECT WBAN # IN NAMELIST FILE
200           C
201                 IF(ISTA.NE.WBAN) THEN
202                    WRITE(6,6010)
203                    STOP
204                 END IF
205           C
206           C          BEGINNING OF TIME STEP LOOP
207           C          ***************************
208           C
209              25 NHRS = NHRS + 1
210                 IF(NHRS.GE.NHRMAX) THEN
211                    WRITE(6,6000)
212                    STOP
213                 END IF
214           C
215           C  ROUTINE TO CALCULATE HR,DAY,MON
216           C
217                 HR=MOD(NHRS-1,24)+1
218                 HRANGL=(12.5-HR)*15.0
219                    SINHR=SIND(HRANGL)
220                    COSHR=COSD(HRANGL)
221                 IF(HR.EQ.1) DAY=DAY+1
222                 IF(DAY.GT.MTD(MO)) THEN
223                    DAY=1
224                    MO=MO+1
225                 END IF
226                 JDATE=DOY(DAY,MO)
227                 DEC=23.45*SIND(0.98630*(284.+JDATE))
228                    SINDEC=SIND(DEC)
```

```
229                 COSDEC=COSD(DEC)
230                 TANDEC=TAND(DEC)
231          C
232          C
233          C  READ TMY TAPE FOR TIME, DIRECT NORMAL, TOTAL HORIZONTAL, AMBIENT
234          C  TEMPERATURE.  BEGIN TIME STEP LOOP.
235          C
236                READ(1) IBN,ITHOR,TAMB
237                ITER=0
238          C
239          C  BEGIN STEADY STATE CONVERGENCE LOOP.
240          C
241          C  ***********************************
242          C
243           100  ITER = ITER + 1
244                IF(ITER.GE.ITRMAX) THEN
245                   WRITE(6,6020)
246                   STOP
247                END IF
248          C
249          C
250          C   THE MAIN PROGRAM SEGMENT DESCRIBING THE IPH FIELD TEST SITE
251          C   CONFIGURATION STARTS HERE.  FOR EACH NEW CONFIGURATION, INSERT
252          C   A NEW SET OF CALLS.
253          C
254          C*********************************************************************
255          C
256          C    TEST FOR 1 DAY PER WEEK PLANT SHUTDOWN
257          C
258                CTI=PTO(4)
259                IF(MOD(JDATE,7).EQ.0) THEN
260                   IBN=0.0
261                   ITHOR=0.0
262                END IF
263          C
264          C   CHECK FOR PUMP CONDITION
265          C
266                IF(IBN.LT.CRINT) THEN
267                   IF(KPON.EQ.1) KPSHUT=1
268                   KPON=0
269                   EPAR=0.0
270                   DO 26 I=1,6
271            26     PFLOW(I)=0.0
272                   CFLOW=0.0
273                ELSE
274                   IF(KPON.EQ.0) KPSTRT=1
275                   EPAR=EPOW
276                   DO 27 I=1,6
277            27     PFLOW(I)=CFLW
278                   CFLOW=CFLW
279                END IF
280          C
281          C   SET UP STORAGE NODE
282          C
283                IF(KPSTRT.EQ.1) THEN
284                   STO=STO-OVNLOSS/SMCP
285                   OVNLOSS=0.0
```

```
286                 END IF
287           C
288                 SFLOWH=CFLOW
289                 STHI=90.6
290                 CALL STORE
291           C
292           C   PIPE 1
293           C
294                 PTI(1)=ST
295                 CALL PIPE(1)
296           C
297           C
298           C   PIPE 2
299           C
300                 PTI(2)=PTO(1)
301                 CALL PIPE(2)
302           C
303           C
304           C   TROUGH
305           C
306                 CTI=PTO(2)
307                 CALL TROUGH
308           C
309           C   PIPE(3)
310           C
311                 PTI(3)=CTO
312                 CALL PIPE (3)
313           C
314           C   PIPE 4
315           C
316                 PTI(4)=PTO(3)
317                 CALL PIPE(4)
318           C
319           C   ENERGY DELIVERY
320           C
321                 BQDEL=CFLOW*CCP*(PTO(4)-90.6)
322           C
323           C
324           C    RESET PUMP START, STOP FLAGS AND ANY OTHER NECESSARY
325           C    VARIABLES FOR START OF NEXT TIME STEP.
326           C
327                 KPSTRT=0
328                 KPSHUT=0
329                 STO=STON
330           C
331           C*************************************************************************
332           C
333           C
334           C   THE MAIN PROGRAM SEGMENT DESCIBING THE IPH FIELD TEST CONFIGURATION
335           C   ENDS HERE.  THE REMAINING SEGMENT OF THE MAIN PROGRAM DEALS WITH
336           C   OUTPUT OF DAILY(CLEAR DAY), MONTHLY, AND ANNUAL COMPUTATIONS.
337           C
338           C*************************************************************************
339           C
340           C  CALCULATE TOTAL OPERATIONAL AND NON-OP PIPING AND COLLECTOR LOSSES.
341           C
342                 OLOSS  =PQLOSS(1)+ PQLOSS(2)+PQLOSS(3)+PQLOSS(4)+
```

```
     1   PQLOSS(5)+PQLOSS(6)+QSEAL+QBLOWD+BSKLO
      NOLOSS = PQCOOL(1)+PQCOOL(2)+PQCOOL(3)+PQCOOL(4)+
     1   PQCOOL(5)+PQCOOL(6)+CQCOOL+BSKLN
      OVNLOSS=OVNLOSS+NOLOSS-BSKLN
C
C
      ITHD   = ITHD   + CAREA*ITHOR/1.0E6
      IAVALD = IAVALD + CAREA*IAVAIL/1.0E6
C                     ACCUMULATE IAPERD ONLY WHEN TRACKING BUT W/O SHADING LOSSLOSS.
      IF(IAPER.GT.0.0)IAPERD=IAPERD+CAREA*IAVAIL/1.0E6
      IBND   = IBND   + CAREA*IBN/1.0E6
      QCOLLD = QCOLLD + CQCOLL/1.0E6
      QDELD  = QDELD  +(BQDEL-QSEAL)/1.0E6
      OLOSD  = OLOSD  + OLOSS/1.0E6
      NOLOSD = NOLOSD + NOLOSS/1.0E6
      SLOSD  = SLOSD  + SQLOSS/1.0E6
      EPARD  = EPARD  + EPAR/1.0E6
C
C   CHECK FOR DEBUG OUTPUT FLAG
C
      IF(KDEBUG(KD).EQ.JDATE) THEN
         CALL DEBUG
         IF(HR.EQ.24) KD=KD+1
      END IF
C
C   DAILY CLEAR DAY OUTPUT( 1 CLEAR DAY FOR EACH MONTH AS DETERMINED
C   BY THE FLAG KCLEAR)
C
      IF(JDATE.EQ.KCLEAR(MO)) THEN
C
C    1ST HR - OUTPUT HEADING
C
            IF(HR.EQ.1) THEN
               WRITE(7,9070) RUN,DAT,NAME,DAY,MON(MO),JDATE
               IF(KPLOT.EQ.1) WRITE(10,1010) NAME,JDATE,MO,MON(MO),DAY
            END IF
      IAPNS=0.0
      IF(IAPER.GT.0.0) IAPNS=IAVAIL
            IF(IAPNS.LE.0.0) THEN
               ETAA=0.0
            ELSE
               ETAA=CQCOLL/IAPNS/CAREA*100.
            END IF
            WRITE(7,9071) HR,TAMB,IBN*CAREA/1.E6,IAPNS*CAREA/1.E6,
     1       CFLOW/3600.,CTI,CTO,CQCOLL/1.E6,
     2       ETAA,BQDEL/1.E6,(OLOSS+NOLOSS)/1.E6,
     3       EPAR/1.E6
             IF(KPLOT.EQ.1) WRITE(10,1020) HR,IBN*CAREA/1.E6,
     1         IAPNS*CAREA/1.E6,CQCOLL/1.E6,BQDEL/1.E6
         IF(HR.EQ.24) WRITE(7,9072) IBND,IAPERD,QCOLLD,
     1        QCOLLD/IAPERD*100.,QDELD,OLOSD+NOLOSD,EPARD
      END IF
C
C    MONTHLY OUTPUTS - 1ST DAY - OUTPUT HEADING
C
      IF(DAY.EQ.1.AND.HR.EQ.1) THEN
         WRITE(8,9080) RUN,DAT,NAME,MON(MO)
```

```
400                 IF(KPLOT.EQ.1) WRITE(11,1110) NAME,MO,MON(MO)
401              END IF
402        C
403        C     DAILY DATA
404        C
405              IF(ITHD.EQ.0.0) THEN
406                 ETADH=0.0
407                 ETASH=0.0
408              ELSE
409                 ETADH=QCOLLD/ITHD*100.
410                 ETASH=QDELD/ITHD*100.
411              END IF
412              IF(IAPERD.EQ.0.0) THEN
413                 ETADA=0.0
414                 ETASA=0.0
415              ELSE
416                 ETADA=QCOLLD/IAPERD*100.
417                 ETASA=QDELD/IAPERD*100.
418              END IF
419              IF(HR.LT.24) THEN
420                 GOTO 25
421              ELSE
422                 WRITE(8,9081) JDATE,MO,DAY,ITHD,IBND,IAPERD,QCOLLD,
423            1    ETADA,QDELD,OLOSD,NOLOSD,
424            2    ETASA,EPARD
425                 IF(KPLOT.EQ.1) WRITE(11,1120) DAY,IBND,IAPERD,QCOLLD,QDELD
426        C
427        C     ACCUMULATE MONTHLY TOTALS & RESET DAILY TOTALS
428        C
429              ITHM   = ITHM   + ITHD
430              IAVALM = IAVALM + IAVALD
431              IBNM   = IBNM   + IBND
432              IAPERM = IAPERM + IAPERD
433              QCOLLM = QCOLLM + QCOLLD
434              QDELM  = QDELM  + QDELD
435              OLOSM  = OLOSM  + OLOSD
436              NOLOSM = NOLOSM + NOLOSD
437              SLOSM  = SLOSM  + SLOSD
438              EPARM  = EPARM  + EPARD
439        C
440        C     RESET DAILY TOTALS
441        C
442              ITHD   = 0.
443              IAVALD = 0.
444              IBND   = 0.
445              IAPERD = 0.
446              QCOLLD = 0.
447              QDELD  = 0.
448              OLOSD  = 0.
449              NOLOSD = 0.
450              SLOSD  = 0.
451              EPARD  = 0.
452              END IF
453        C
454        C      IF DAY LT LAST DAY OF THE MONTH GO BACK
455        C      TO NEXT TIME STEP
456        C
```

```
457                 IF(DAY.LT.MTD(MO)) THEN
458                    GOTO 25
459                 ELSE
460          C
461          C      OUTPUT MONTHLY DATA TO MONTHLY AND ANNUAL SUMMARIES
462          C
463                    IF(MO.EQ.1) THEN
464                       WRITE(9,9090) RUN,DAT,NAME
465                       IF(KPLOT.EQ.1) WRITE(12,1210) NAME
466                    END IF
467                    WRITE(8,9082) ITHM,IBNM,IAPERM,QCOLLM,
468               1       QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
469               2       QDELM/IAPERM*100.,EPARM
470                    IF(KPLOT.EQ.1) WRITE(12,1220) MO,IBNM,IAPERM,QCOLLM,QDELM
471                    WRITE(9,9091)MON(MO),ITHM,IBNM,IAPERM,QCOLLM,
472               1       QCOLLM/IAPERM*100.,QDELM,OLOSM,NOLOSM,
473               2       QDELM/IAPERM*100.,EPARM
474          C
475          C    ACCUMULATE ANNUAL TOTALS AND RESET MONTHLY TOTALS
476                    ITHT   = ITHT   + ITHM
477                    IAVALT = IAVALT + IAVALM
478                    IAPERT = IAPERT + IAPERM
479                    IBNT   = IBNT   + IBNM
480                    QCOLLT = QCOLLT + QCOLLM
481                    QDELT  = QDELT  + QDELM
482                    OLOST  = OLOST  + OLOSM
483                    NOLOST = NOLOST + NOLOSM
484                    SLOST  = SLOST  + SLOSM
485                    EPART  = EPART  + EPARM
486          C
487                    ITHM   = 0.
488                    IAVALM = 0.
489                    IAPERM = 0.
490                    IBNM   = 0.
491                    QCOLLM = 0.
492                    QDELM  = 0.
493                    OLOSM  = 0.
494                    NOLOSM = 0.
495                    SLOSM  = 0.
496                    EPARM  = 0.
497          C
498                 END IF
499          C
500          C    OUTPUT CUMULATIVE ANNUAL TOTALS ON LAST HR OF THE YEAR
501          C
502                 IF(MO.LT.12) THEN
503                    GOTO 25
504                 ELSE
505                       WRITE(9,9092) ITHT,IBNT,IAPERT,QCOLLT,
506               1       QCOLLT/IAPERT*100.,QDELT,OLOST,NOLOST,
507               2       QDELT/IAPERT*100.,EPART
508          C
509          C   IF NOT THE END OF THE YEAR GO BACK TO NEXT TIME STEP
510          C
511          C
512          C   RESET ANNUAL TOTALS
513          C
```

```
                 ITHT=0.
                 IAVALT=0.
                 IBNT=0.
                 QCOLLT=0.
                 QDELT=0.
                 IAPERT=0.
                 OLOST=0.
                 NOLOST=0.
                 SLOST=0.
                 EPART=0.
              END IF
              STOP
C
C   END OF PROGRAM AND FORMAT STATEMENTS
C
 1010 FORMAT(2A10,2I10,A10,I10)
 1020 FORMAT(I10,4F10.2)
 1110 FORMAT(2A10,I10,A10)
 1120 FORMAT(I10,4F10.2)
 1210 FORMAT(2A10)
 1220 FORMAT(I10,4F10.2)
 2000 FORMAT(2A10)
 3000 FORMAT(A10)
 6000 FORMAT(1X,"SIMULATION OVER - NHRS LIMIT EXCEEDED")
 6010 FORMAT(1X,"WBAN # DOES NOT CORRESPOND WITH NAMELIST INPUT")
 6020 FORMAT(1X,"ITERATION COUNT EXCEEDED")
 9070 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),56X,2A10,//,53X,
     1 "CLEAR DAY PERFORMANCE TABLE"//,56X,
     2 I2,1X,A9," (DAY ",I3,")"//,1X,132("-")//,24X,"INCIDENT SOLAR ",
     3 "ENERGY"/,24X,21("-"),45X,"COLLECTOR"/,25X,"DIRECT    COLLECTOR"
     4 ,45X,"EFFICIENCY"/,14X,"AMBIENT    NORMAL      PLANE",7X,"FLOW",
     5 8X,"COLLECTOR TEMP",6X,"ENERGY",3X,"BASED ON",4X,"ENERGY",
     6 "     SYSTEM",4X,"PARASITIC"/,15X,"TEMP",19X,"(*)",
     7 "        RATE",7X,"INLET     OUTLET    COLLECTED",4X,
     8 "(*)     DELIVERED",3X,"LOSSES     ENERGY"/,4X,"HOUR          C",
     9 9X,"GJ         GJ",9X,"KG/S",9X,"C",10X,"C          GJ",9X,
     * "%         GJ         GJ         GJ"//,1X,132("-")/)
 9071 FORMAT(5X,I2,F12.1,2F11.2,F12.2,2F11.1,F11.2,F10.1,
     1 3F11.2)
 9072 FORMAT(/,1X,132("-")//,1X,"TOTAL/AVE      ---",2F11.2,9X,
     1 "---        ---",8X,"---",F11.2,F10.1,3F11.2,
     2 //,1X,132("-"))
 9080 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,50X,
     1 "MONTHLY PERFORMANCE SUMMARY TABLE"//,
     2 62X,A9//1X,132("-")//25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,
     3 20X,31("-"),13X,"COLLECTOR",12X,20("-"),3X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",12X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE     NORMAL    PLANE      ENERGY",
     6  4X,"BASED ON",
     7 3X,"ENERGY    OPERATING  OPERATING",2X,"BASED ON",4X,
     8 "PARASITIC"/,2X,"JULIAN",26X,"          (*)     COLLECTED",6X,
     9 "(*)",4X,"DELIVERED",3X,"LOSSES     LOSSES    ",3X,"(*)",
     * 7X,"ENERGY"/,4X,"DAY      DATE       GJ",8X,"GJ",8X,"GJ",10X,
     1 "GJ",10X,"%",8X,"GJ         GJ",9X,"GJ       ",
     2 4X,"%",10X,"GJ"//,1X,132("-")/)
 9081 FORMAT(3X,I3,6X,I2,"/",I2,3X,F7.1,3X,F7.1,3X,2(F7.1,4X),
     1  F8.1,3X,4(F7.1,4X),F8.1)
```

```
 9082 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES",F11.1,3X,F7.1,3X,
     1  2(F7.1,4X),F8.1,3X,
     2 4(F7.1,4X),F8.1//,1X,132("-"))
 9090 FORMAT(1H1,110X,"RUN ID: ",A10/110X,A10/,4(/),57X,2A10,//,51X,
     1 "ANNUAL PERFORMANCE SUMMARY TABLE"//,
     2 1X,132("-")//,25X,"INCIDENT SOLAR ENERGY",46X,"SYSTEM"/,20X,
     3 31("-"),13X,"COLLECTOR",13X,19("-"),4X,"SYSTEM"/,20X,
     4 "HORIZONTAL   DIRECT   COLLECTOR",13X,"EFFICIENCY",25X,"NON-",4X,
     5 "EFFICIENCY"/,22X,"SURFACE    NORMAL     PLANE      ENERGY",4X,
     6  "BASED ON",
     7 3X,"ENERGY   OPERATING  OPERATING",3X,"BASED ON",3X,
     8 "PARASITIC"/,35X,"          (*)     COLLECTED",5X,"(*)",
     9 5X,"DELIVERED",3X,"LOSSES     LOSSES  ",4X,"(*)",
     * 7X,"ENERGY"/,3X,"  MONTH",14X,"GJ",9X,"GJ",8X,"GJ",9X,"GJ",10X,
     1 "%         GJ         GJ",9X,"GJ       ",3X,"%",
     2 10X,"GJ"//,1X,132("-"))
 9091 FORMAT(1H0,3X,A9,8X,F7.1,4X,F7.1,3X,2(F7.1,4X),F6.1,4X,
     1  3(F7.1,4X),
     2 F6.1,4X,F7.1)
 9092 FORMAT(/,1X,132("-")//,1X,"TOTALS/AVERAGES ",F11.1,4X,F7.1,3X,
     1  2(F7.1,4X),
     2 F5.1,5X,3(F7.1,4X),F6.1,4X,F7.1//,1X,132("-"))
      END
```

SECTION 2.6

COMPONENT SUBROUTINES

```
      SUBROUTINE FPLATE
C
C  COLLECTOR SUBROUTINE HANDLES FLAT PLATE COLLECTORS.
C
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON / CBSUN / SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,
     1      SINHR,COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
C
      REAL LFLOW,LVIS,LRHO,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,IAPER
C
      INTEGER PIPENO,DAY,HR
C
C
C
C  CALCULATE COSINE OF INCIDENCE ANGLE AND BEAM IN COLLECTOR PLANE.
C
      IF(ITER.GT.1) GOTO 5
      CSTLT1 = SINDEC*(SINLAT*COSTIL - COSLAT*
     2            SINTIL*COSAZ)
      CSTLT2 = COSDEC*COSLAT*COSTIL*COSHR
      CSTLT3 = COSDEC*SINLAT*SINTIL*COSAZ*COSHR
      CSTLT4 = COSDEC*SINTIL*SINAZ*SINHR
      COSTLT = CSTLT1 + CSTLT2 + CSTLT3 + CSTLT4
      IBTLT  = IBN * COSTLT
C
C  CALCULATE BEAM IN HORIZONTAL PLANE
C
      COSHOR = SINDEC*SINLAT + COSDEC*COSLAT*COSHR
      IBHOR  = IBN*COSHOR
C
C  CALCULATE DIFFUSE IN HORIZONTAL PLANE AS DIFFERENCE BETWEEN TOTAL
C  AND BEAM.
C
      IDHOR  = ITHOR - IBHOR
C
C  CALCULATE DIFFUSE IN TILTED PLANE - SKY AND GROUND REFLECTANCE
C  COMPONENTS (LATTER INCLUDES BEAM) AND ADD TO BEAM IN TILTED PLANE.
C
      IDSKY  = IDHOR*(1+COSTIL)/2.
      IDGRND = (IBHOR + IDHOR)*(1-COSTIL)*O.
      ITTLT  = IBTLT + IDSKY + IDGRND
      IAVAIL = ITTLT
```

```
C
C   CALCULATE INSOLATION IN APERTURE,INCLUDING SHADING
C                  (FOR LONG ROWS)
C
      IAPER=AMIN1(IAVAIL,IDSKY+IBHOR/GCR)
C
C  CALCULATE GLOBAL INCIDENCE ANGLE MODIFIER (CF. LUNDE)
C
      IF(ITTLT.NE.0.) ANGMOD=1.-BO*(1.+(IBTLT/ITTLT)*((1./COSTLT)-2.))
      IF(ITER.GT.1) GO TO 8
C
C  IF PUMP IS ON, COMPARE COLLECTOR OUTLET TO STORAGE TEMPERATURE
C  TO DETERMINE NEW PUMP STATUS.
C
 5    IF(KPON.EQ.0) GO TO 6
      CTCOMP = CTO - ST
      GO TO 8
C
C  CALCULATE COLLECTOR PLATE TEMPERATURE AND DIFFERENCE FROM STORAGE
C  TANK TEMPERATURE TO DETERMINE IF PUMP IS ON.
C
 6    CTPLT  = TAMB + (ANGMOD*YO*IAPER)/FRUL
      CTCOMP = CTPLT - ST
      GO TO 8
C
 7    WRITE(6,6600) DAY,HR,CTPLT,ST,CTCOMP,CDTON,KCDBND,KPON
 6600 FORMAT(2X,2I6,4F10.1,2I6)
      WRITE(6,6602) ANGMOD,FRUL,YO,IAPER,IBTLT,IDSKY,IDGRND,IBN,COSTLT
 6602 FORMAT(2X,9F10.2)
      WRITE(6,6604) COSHOR,IBHOR,IDHOR,ITHOR
      GO TO 25
 6604 FORMAT(2X,4F10.2)
C
 8    CONTINUE
C
      IF (CTCOMP.GE.CDTON.OR.KCDBND.EQ.1) GO TO 10
      GO TO 25
C
 10   KCDBND = 1
      IF (CTCOMP.LT.CDTOFF) GO TO 20
      KPOCHK = 1
      IF (KPSCHK.EQ.1) KPSTRT = 1
      KPSCHK = 0
C
C  SET PUMP-ON FLAG AND FLOWRATE
C
      KPON   = 1
      PFLOW(1) = CFLW
      PFLOW(2) = CFLW
      PFLOW(3) = L2FLOW
      PFLOW(4) = L2FLOW
      CFLOW  = CFLW
C
C  CALCULATE EFFICIENCY, ENERGY COLLECTED, OUTLET TEMPERATURE.
C
      IF(IAPER.EQ.0.) GO TO 7
      CETA   = ANGMOD*YO - FRUL*(CTI - TAMB)/IAPER
```

```
115                CQCOLL = CETA*IAPER*CAREA
116                CQCOOL  = 0.
117                CTO    = CTI + CQCOLL/(CFLOW*CCP)
118                RETURN
119             20 KCDBND = 0
120          C
121          C  INDICATE PUMP IS OFF, SET FLOW TO ZERO.
122          C
123             25 KPSCHK = 1
124                KPON   = 0
125                DO 28 I=1,4
126             28 PFLOW(I) = 0.
127                CFLOW = 0.
128                IF (KPOCHK.EQ.1) KPSHUT = 1
129                KPOCHK = 0
130          C
131          C  IF PUMP JUST SHUT OFF SET COLLECTOR ARRAY TEMPERATURE EQUAL TO
132          C  AVERAGE OF INLET AND OUTLET.
133          C
134                IF (KPSHUT.EQ.0) GO TO 30
135                CTAVG  = (CTI + CTO)/2.
136          C
137          C     CALCULATE DECAYING ARRAY TEMPERATURE
138          C
139             30 CTAVO  = CTAVG
140                CEXP   = -FRUL/(602.*TAUC)
141                SOURCE = ANGMOD*YO*IAPER/FRUL
142          C     SOURCE = 0.
143                CTAVG  = TAMB + SOURCE + (CTAVO - TAMB -
144               2  SOURCE)*EXP(CEXP*DT)
145                CQCOLL  = 0.
146                CTO    = CTAVG
147                CTI = CTAVG
148          C
149          C  CALCULATE COOLDOWN HEAT LOSS.
150          C
151                CQCOOL = 602.*TAUC*CAREA*(CTAVO-CTAVG)
152                RETURN
153                END
```

```
C*************************************************************************
      SUBROUTINE TROUGH
C
C   PARABOLIC TROUGH COLLECTOR ROUTINE
C
C
C   THIS TROUGH SUBROUTINE REQUIRES AN EFFICIENCY CURVE OF THE FORM
C                 CETA = CETAOPT-FUL1*(TDELT/I)-FUL2*(TDELT)¬2/I
C          (A MODIFIED FORM OF EQUATIONS IN SAND80-1964,NOV. 1980)
C        AND AN INCIDENCE ANGLE MODIFIER OF THE FORM
C               ANGMOD = 1+B1*AINC¬2 +B2*AINC¬3 +B3*AINC¬4 +B4*AINC5
C           (SEE JOURNAL OF SOLAR ENERGY ENGR. ,VOL.102 ,PG 16)
C           END LOSSES ARE INCLUDED
C
C           ASSUMES THE HEAT REMOVAL FACTOR( F' ) IS A CONSTANT
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON / CBSUN / SINLAT,COSLAT,SINTIL,COSTIL,SINAZ,COSAZ,
     1      SINHR,COSHR,SINDEC,COSDEC,TANDEC,SINDIF,COSDIF
      REAL LFLOW,LVIS,LRHO,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,IAPER
C
      INTEGER DAY,HR
C
C
C
C   CALCULATE COSINE OF INCIDENCE ANGLE FOR NS OR EW AXIS TROUGHS
C
      IF(ITER.GT.1) GOTO 5
C
C   CALCULATE SOLAR AZIMUTH AND ALTITUDE ANGLES
C
      SINALS=SINLAT*SINDEC+COSLAT*COSDEC*COSHR
      COSALS=COS(ASIN(SINALS))
      SINAZS=COSDEC*SINHR/COSALS
      AZS=ASIN(SINAZS)
C
C   CHECK FOR ORIENTATION
C
      IF(IORIENT-2) 1,2,3
C
C   E-W TROUGH
```

```
C
 1    COSINC=SQRT(1.0-COSDEC**2*SINHR**2)
      GOTO 4
C
C   N-S TROUGH INCLUDING OFF N-S ALIGNMENT
C
 2    COSAZ=COS(AZS-CAZI/57.3)
      COSINC=SQRT(1.0-COSALS**2*COSAZ**2)
      GOTO 4
C
C    N-S, TILTED TROUGH
C
 3    COSINC=COS(ASIN(COSHR*COSDEC*SINDIF+SINDEC*COSDIF))
C
 4    CONTINUE
C
C   CALCULATE INSOLATION ON THE APERTURE, INCLUDING ROW-TO-ROW SHADING
C                     (ASSUMES LONG ROWS)
C
      IAVAIL=IBN*COSINC
      COSHOR=SINALS
      IAPER=AMIN1(IAVAIL,IBN*COSHOR/GCR)
C
C   CHECK IF THE CRITICAL INTENSITY OF THE COLLECTOR CAN BE
C   EXCEEDED AND THE COLLECTOR TURNED ON.
C
 5    IF(IBN.LT.CRINT) GO TO 46
C
C    CHECK FOR PUMP START.
C
      IF(KPON.EQ.0) KPSTRT=1
C
C   SET FLOWRATE
C
      CFLOW=CFLW
C
C   CALCULATE INCIDENCE ANGLE MODIFIER
C
      IF(ITER.GT.1) GOTO 10
      AINCD=ACOS(COSINC)*57.3
      ANGMOD=((B4*AINCD+B3)*AINCD+B2)*AINCD+B1
C
C   CALCULATE END LOSSES
C
      FF2=1.+CW*CW/(48.*FL*FL)
      ENDF=1.0-FL/CL*FF2*TAND(AINCD)
C
C
C   CALCULATE EFFICIENCY,ENERGY COLLECTED,AND AVERAGE TEMPERATURE.
C
      A=FUL2*CAREA
      B=2.*CFLOW*CCP+CAREA*(FUL1-2.*FUL2*TAMB)
      C1=-CAREA*(CETAOPT*ANGMOD*ENDF*IAPER+TAMB*(FUL1-FUL2*TAMB))
 10   C=C1-2.*CFLOW*CCP*CTI
      IF(FUL2.GE..000001) GO TO 42
      CTAVG=-C/B
      GO TO 43
```

```
   42 CTAVG=(-B+SQRT(B*B-4.*A*C))/2./A
   43 TDELT=CTAVG-TAMB
      CETA=CETAOPT*ANGMOD*ENDF-FUL1*(TDELT/IAPER)-FUL2*
     1  TDELT**2/IAPER
      CQCOLL=CETA*CAREA*IAPER
C
C   SET PUMP-ON FLAG,FLOWRATES AND CHECK IF PUMP JUST STARTED.
C
   44 CTO=CTI+CQCOLL/(CFLOW*CCP)
      IF(CQCOLL) 46,46,45
 45   IF(KPON.EQ.0) KPSTRT=1
      KPON=1
      CFLOW=CFLW
      PFLOW(1)=CFLW
      PFLOW(2)=CFLW
      PFLOW(3)=CFLW
      PFLOW(4)=CFLW
      CQCOOL=0.
C     WRITE(6,500) KPSTRT,CTO
  500 FORMAT(3X,I3,F8.2)
      RETURN
C
C   INDICATE PUMP IS OFF,SET FLOWS TO ZERO AND CHECK IF PUMP JUST SHUT OFF
C
   46 IF(KPON.EQ.1) KPSHUT=1
      KPON=0
C
      IAPER=0.
      DO 28 I=1,4
   28 PFLOW(I)=0.
      CFLOW=0.
C
C   IF PUMP SHUT OFF CALCULATE DECAYING TEMPERATURE OF RECEIVER
C
   48 FUL=FUL1+FUL2*(CTAVG-TAMB)
      CEXP=-FUL/RCVRMC*CAREA
      CQCOOL=RCVRMC*(CTAVG-TAMB)*(1.-EXP(CEXP*DT))
      CTAVG=TAMB+(CTAVG-TAMB)*EXP(CEXP*DT)
      CTO=CTAVG
      CTI=CTAVG
      CQCOLL=0.
      RETURN
      END
```

```
C*****************************************************************************
      SUBROUTINE PIPE(PIPENO)
C
C     PIPE SUBROUTINE ASSUMES STEADY STATE DURING PUMP OPERATION WITH
C       LOGARITHMIC AXIAL TEMPERATURE GRADIENT DUE TO JACKET LOSSES.
C     WHEN PUMP IS OFF, UNIFORM TEMPERATURE IS ASSUMED DECAYING
C       LOGARITHMICALLY WITH TIME.
C
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     6  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
C
      REAL LFLOW,LVIS,LRHO,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      INTEGER PIPENO,DAY,HR
C
C  CHECK IF THIS PIPE IS EXPOSED TO OUTSIDE TEMPERATURE.
C    KPIPE = 1 INDICATES OUTDOOR
C    KPIPE = 0 INDICATES INDOOR
C
      IF(KPIPE(PIPENO).EQ.1) THEN
         TENV=TAMB
      ELSE
         TENV=25.0
      END IF
C
C
C  CHECK TO SEE IF PUMP IS ON TO DETERMINE WHICH HEAT LOSS ALGORITHM IS
C  USED.
C
      IF (PFLOW(PIPENO).GT.0.) GO TO 20
C
      DATA PI/3.14159/
C
C  IF PUMP JUST SHUT OFF, SET PIPE TEMPERATURE EQUAL TO AVERAGE OF
C  INLET AND OUTLET.
C
      IF (KPSHUT.EQ.0) GO TO 10
      PTAVG(PIPENO) = (PTI(PIPENO) + PTO(PIPENO))/2.
C
C  CALCULATE PIPE TEMPERATURE DECAY AND COOLDOWN LOSSES
C
   10 PTAVO(PIPENO) = PTAVG(PIPENO)
      PEXP1 = -PUA(PIPENO)/PMCP(PIPENO)
      PTAVG(PIPENO) = TENV + (PTAVO(PIPENO) - TENV)*EXP(PEXP1*DT)
      PTO(PIPENO) = PTAVG(PIPENO)
      PQCOOL(PIPENO) = PMCP(PIPENO)*(PTAVO(PIPENO)-PTAVG(PIPENO))
C
C     PRINT 37,PTAVO(PIPENO),PTAVG(PIPENO),TENV
   37 FORMAT(3X,3F10.4)
```

```
      DO 15 I=1,6
   15 PQLOSS(I)=0.
      RETURN
C
C  PUMP ON ALGORITHM FOLLOWS.
C
   20 PEXP2 = -PUA(PIPENO)/(PFLOW(PIPENO)*PCP(PIPENO))
C
      PTO(PIPENO) = TENV + (PTI(PIPENO)-TENV)*EXP(PEXP2)
      PQLOSS(PIPENO) = -PFLOW(PIPENO)*PCP(PIPENO)*(PTO(PIPENO) -
     2  PTI(PIPENO))
C     PRINT 372,PIPENO,TENV
C 372 FORMAT(3X,I6,F12.1)
      DO 40 I=1,6
        PQCOOL(I)=0.0
 40   CONTINUE
   30 RETURN
      END
```

```
C*****************************************************************************
      SUBROUTINE HX
C
C  HEAT EXCHANGER SUBROUTINE USES THE HOT AND COLD INLET TEMPERATURES
C  AND THE EFECTIVENESS TO DETERMINE THE HOT AND COLD OUTLET
C  TEMPERATURES.
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      REAL LFLOW,LVIS,LRHO,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      INTEGER PIPENO,DAY,HR
C
C
C
C  CALCULATE HEAT CAPACITY FLOW RATES FOR EACH FLUID.
C
      HXCH   = HXFLWH*HXCPH
      HXCC   = HXFLWC*HXCPC
      IF (HXCC.GT.HXCH) GO TO 10
      HXCMIN = HXCC
      GO TO 20
   10 HXCMIN = HXCH
C
C  CALCULATE OUTLET TEMPERATURES
C
   20 HXTHO  = HXTHI - EFF*(HXCMIN/HXCH)*(HXTHI - HXTCI)
      HXTCO  = HXTCI + EFF*(HXCMIN/HXCC)*(HXTHI - HXTCI)
C     WRITE(6,2000) HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCMIN,HXCC,HXCH
 2000 FORMAT(2X,8F11.3)
      RETURN
      END
```

```
C*****************************************************************************
      SUBROUTINE LOADS
C
C  THE LOADS SUBROUTINE CONTAINS THE LOAD SCHEDULE AND DETERMINES
C  WHETHER STORAGE IS HOT ENOUGH TO SUPPLY A USEFUL AMOUNT OF HEAT.
C
      COMMON /CBLOAD/ LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      REAL LFLOW,LVIS,LRHO,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL LFLWI,LTCOMP,LT
C
      INTEGER PIPENO,DAY,HR
C
C
C
C  CHECK TO SEE IF A LOAD EXISTS AT THIS HOUR.
C
      IF (HR.LE.LHRON.OR.HR.GT.LHROFF) GO TO 30
C
C  CALCULATE DIFFERENCE BETWEEN STORAGE AND LOAD INLET TEMPERATURES TO
C  DETERMINE WHETHER TO SUPPLY LOAD
C
      LTCOMP = ST - LTI
      IF (LTCOMP.GT.LDTON.OR.KLDBND.EQ.1) GO TO 10
      GO TO 30
   10 KLDBND = 1
      IF (LTCOMP.LT.LDTOFF) GO TO 20
      LFLOW  = LFLWI
C
C  MIX VALVE CAPABILITY TO LIMIT LOAD SUPPLY TEMP. AT LT
C
      IF(ST.GT.LT) LFLOW=LFLWI*(LT-LTI)/(ST-LTI)
      KLON   = 1
      GO TO 40
   20 KLDBND = 0
   30 KLON   = 0
      LFLOW  = 0
   40 RETURN
      END
```

```
C*********************************************************************
      SUBROUTINE STORE
C
C  THIS STORAGE SUBROUTINE ASSUMES SIMPLE MIXED STORAGE AND TAKES SKIN
C  LOSSES INTO ACCOUNT
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,DT1,STO1,STON1
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      REAL LFLOW,LVIS,LRHO,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      INTEGER PIPENO,DAY,HR
C
C
C
      SXDUM  = SFLOWH*SCP + SFLOWC*SCP + SUA
      SYDUM  = SFLOWH*SCP*STHI + SFLOWC*SCP*STCI + SUA*TAMB
      SEXP   = -SXDUM/SMCP
      STSS   = SYDUM/SXDUM
C
C  STORAGE TEMPERATURE AS A FUNCTION OF TIME :
C
      ST=STSS-(((STO-STSS)*SMCP)/(DT*SXDUM))*
     2  (EXP(-(SXDUM*DT)/(SMCP))-1)
      STON   = STSS + (STO - STSS)*EXP(SEXP*DT)
C
C  ENERGY LOST FROM STORAGE :
C
      IF (KPON.EQ.0) GO TO 10
   10 SQLOSS = (STSS - TAMB)*SUA*DT + SUA*SMCP/SXDUM
     2  *(STO - STSS)*(1 - EXP(SEXP*DT))
C
C  NET CHANGE IN STORED ENERGY
C
      SQINC  = SMCP*(STON - STO)
C
C  ENERGY DELIVERED TO LOAD
C
C     SQDEL  = SFLOWC*SCP*(ST - STCI)
   20 RETURN
      END
```

```
C*****************************************************************************
      FUNCTION DOY(MDAY,MON)
C
C   THIS FUNCTION CALCULATES THE DAY OF THE YEAR (1-365) GIVEN
C   THE MONTH AND DAY OF THE MONTH.
C
      DIMENSION MTD(12)
C
      DATA (MTD(I),I=1,12)/31,28,31,30,31,30,31,31,30,31,30,31/
C
      DOY=0.0
      IF(MON.EQ.1) GO TO 26
      MDUM = MON - 1
      DO 206 I=1,MDUM
  206 DOY=DOY+MTD(I)
   26 DOY=DOY+MDAY
      RETURN
      END
```

```
C*****************************************************************************
      SUBROUTINE TCSTORE
C
C  MODELS A THERMOCLINE STORAGE TANK WITH TWO NODES BY CALLING
C  THE SINGLE-NODE STORAGE MODEL (SUBROUTINE STORE) TWICE.
C
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,STO1,STON1
C
      COMMON/CBALL/TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
C  DO BOTTOM (COLD) HALF FIRST
C
C  VOLUME AND UA FOR EACH NODE ARE HALF OF TOTAL VALUES, SO DIVIDE THEM
      SVOL = SVOL/2.
      SUA  = SUA/2.
C
C  TEMPORARILY STORE PARAMETERS NEEDED LATER
      STEMP2 = STHI
      STEMP  = STO
      STEMP5 = STCI
C
C  SET UP INPUTS TO SUBROUTINE STORE FOR BOTTOM (COLD) HALF
      STO    = STO1
      STHI   = ST
C
      CALL STORE
C
C  SET THE VALUES OF STON1 AND ST1 FROM THE VALUES RETURNED BY SUBROUTINE
C  STORE
      ST1    = ST
      STON1  = STON
C
C  TEMPORARILY STORE THE LOSSES AND CHANGE IN STORED ENERGY FOR THE BOTTOM
C  HALF, TO BE SUMMED LATER
      STEMP3 = SQLOSS
      STEMP4 = SQINC
C
C
C  NOW DO TOP (HOT) HALF OF STORAGE
C
C  SET UP INPUTS TO SUBROUTINE STORE FOR THE TOP (HOT) HALF
      STHI   = STEMP2
      STO    = STEMP
      STCI   = ST1
C
      CALL STORE
C
C  NOTE:  STORE RETURNS VALUES FOR ST,STON,SQLOSS,AND SQINC WHICH ARE FOR
C         THE TOP (HOT) HALF ONLY
C
C
C  SUM UP THE LOSS AND ENERGY STORAGE TERMS FOR THE TWO HALVES
      SQLOSS = SQLOSS + STEMP3
      SQINC  = SQINC + STEMP4
```

```
C
C  CALCULATE THE ENERGY DELIVERED, USING THE COLD WATER INLET TEMPERATURE
C  SAVED PREVIOUSLY AND THE OUTLET TEMPERATURE FROM THE TOP (HOT) HALF
      SQDEL  = SFLOWC*SCP*(ST-STEMP5)
C
C  RESTORE VOLUME AND UA OF STORAGE
      SVOL = SVOL*2.
      SUA  = SUA*2.
C
      RETURN
      END
```

```
C*****************************************************************************
      SUBROUTINE FLASH
C       THIS INCORPORATES A FLASH VALVE,SEPARATOR AND BFW MAKEUP LINE
C     WATER ENTHALPIES ARE DETERMINED USING A ROUTINE STORE ON FILE
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER PIPENO,DAY,HR
C
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,STO1,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER

      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
C
C     FLASH VALVE
C
      FTINF = FTIN*1.8 + 32.0
      IF(FTIN.LE.0.0) FTINF=32.2
      TSTF =  TSTEAM*1.8 +32.0
      TMAKF= TMAKE*1.8 + 32.0
```

```
      PFLIN = PSL(FTINF)*6.895
      PFOUT = PSL(TSTF)*6.895
C
C      HEAD LOSS ACROSS FLASH VALVE
C
      ELOSS = CFLOW* (PFLIN - PFOUT)*DT/CRHO
      IF (ELOSS.LE.0.0) ELOSS= 0.0
      ELOSS = ELOSS + 34.5*CFLOW/CRHO
      IF (KPON.EQ.0)  ELOSS= 0.0
C     SEPARATOR
C
C      STREAM PROPERTIES
C
      HST = HGT(TSTF)*2.326
      HLIQ = HSL(TSTF)*2.326
      HSLIQ = HSL(FTINF)*2.326
      HMAKE = HSL (TMAKF)*2.326
      BB = CFLOW* (HST-HLIQ)
      FXDUM  = CFLOW*CCP  + FTUA
      FYDUM  = CFLOW*CCP*FTIN+ FTUA*TAMB
      FEXP   = -FXDUM/FTMC
      FTSS   = FYDUM/FXDUM
C
C  STORAGE TEMPERATURE AS A FUNCTION OF TIME :
C
      FT=FTSS-(((FTO-FTSS)*FTMC)/(DT*FXDUM))*
     2  (EXP(-(FXDUM*DT)/FTMC)-1)
      FTON   = FTSS + (FTO - FTSS)*EXP(FEXP*DT)
C
C     IF STORAGE TEMPERATURE IS GT STEAM TEMP. SPLIT HEAT LOSS CALC.
C
      IF(ITER.GT.30) GO TO 69
      IF (FTON.GT.TSTEAM) GO TO 121
C
C  ENERGY LOST FROM STORAGE :
C
 69   BSKLN = (FTSS - TAMB)*FTUA*DT + FTUA*(FTMC/FXDUM)
     2  *(FTO - FTSS)*(1 - EXP(FEXP*DT))
      BQDEL = 0.0
      QBLOWD=0.0
      SQINC = FTMC*(FTON-FTO)
      FTOUT=FT
C     IF (KPON.EQ.1) SQINCP= SQINC
C     SQLOSS = SQLOSS+ SQINCP
      RETURN
C
C    CALC. TIME TO BRING STORAGE UP TO STEAM TEMP.
C    CALC. HEAT LOSS DURING HEAT UP AND AT CONST. STEAM TEMP.
C
  121 CONTINUE
      ALGCHK=(TSTEAM-FTSS)/(FTO-FTSS)
      IF(ALGCHK.LE.0.00)GO TO 69
      TBOIL = -(FTMC/FXDUM)*ALOG((TSTEAM-FTSS)/(FTO-FTSS))
      TLEFT =  DT-TBOIL
      STORL  = (FTSS - TAMB)*FTUA*TBOIL + FTUA*(FTMC/FXDUM)
     2  *(FTO - FTSS)*(1 - EXP(FEXP*TBOIL))
      FTQL = FTUA*(TSTEAM-TAMB)*TLEFT
```

```
115                 BSKLO = STORL   + FTQL
116                 FTON = TSTEAM
117                 SQINC = FTMC*(FTON-FTO)
118           C
119           C     CALC. STEAM QUALITY,FLOW RATE AND ENTHALPY
120           C
121                 QUAL = (CFLOW*CCP*(FTIN- TSTEAM)-BSKLO-SQINC )/BB
122                 STMM = QUAL*CFLOW
123                 STMH = QUAL*BB +CFLOW*QUAL*(TSTEAM-TMAKE)*CCP
124                 IF(STMM.GT.BDSET) THEN
125                    QBLOWD=BDRATE*STMM*4.18*(TSTEAM-TMAKE)
126                 ELSE
127                    QBLOWD=0.0
128                 END IF
129                 BQDEL=STMH-QBLOWD
130           C
131           C     MAKE UP VALVE
132           C     BFW FLOW EQUALS STEAM FLOW RATE
133           C
134                 FTOUT= (1.0-QUAL)*TSTEAM + QUAL*TMAKE
135                 RETURN
136                 END
```

```
C*********************************************************************
      SUBROUTINE BOILER2
C
C  THIS SUBROUTINE MODELS AN UNFIRED BOILER.  THE BOILER IS DIVIDED
C  INTO A PREHEAT SECTION AND A BOILING SECTION WITH TOTAL AREA
C  (PREHEATER + BOILER) HELD CONSTANT.  THE TEMPERATURE OF SATURATED
C  STEAM TO BE DELIVERED IS SPECIFIED, AS ARE INLET HOT (COLLECTOR)
C  AND COLD (LOAD) TEMPERATURES, AND OVERALL U-VALUE.  HOT SIDE FLOW
C  CAN BE VARIED TO YIELD A CONSTANT STEAM FLOW (UP TO A SPECIFIED
C  LIMIT) OR A CONSTANT HOT FLOW CAN YIELD A VARIABLE STEAM OUTPUT.
C  OUTPUTS ARE HOT SIDE OUTLET TEMPERATURE AND THE UNKNOWN FLOW.
C
C  THE ALGORITHM USED IS THE SOLUTION OF FOUR SIMULTANEOUS EQUATIONS:
C  TWO EFFECTIVENESS EQUATIONS (ONE FOR PREHEATER, ONE FOR BOILER)
C  AND TWO ENERGY BALANCE EQUATIONS (ONE EQUATING EACH SIDE OF PRE-
C  HEATER, ONE FOR BOILER).  SINCE THE EQUATIONS ARE NONLINEAR (THE
C  EFFECTIVENESS EQUATIONS CONTAIN EXPONENTIAL OR LOG TERMS), THE
C  FOUR EQUATIONS WERE COMBINED INTO ONE EQUATION IN ONE UNKNOWN,
C  R, THE RATIO OF HOT-TO-COLD HEAT CAPACITANCE FLOW RATES.  A
C  NEWTON-RAPHSON TECHNIQUE IS USED TO FIND THE ROOT OF THE R
C  EQUATION.  A GOOD FIRST GUESS FOR R ENSURES RAPID CONVERGENCE.
C
      DIMENSION R(2),Y(2)
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
      COMMON/CBBOIL/KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1 BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,STO1,STON1
C
      REAL LFLOW,LFLWI,LT,LTI,L2CP
C
C  BOILER INPUTS
C
      UA=77900.
      HFG=2000.
      CPW=4.542
      XLOAD=25000.
      XLOAD=XLOAD*3600.
C
C  CHECK TO SEE IF INLET TEMP IS HIGH ENOUGH FOR BOILER TO TURN ON
C
      TCRIT=TSTEAM+5.
      T1=BTI-TCRIT
C********** NOTE:  CHANGED TO HAVE CONSTANT OIL FLOW RATE
      IF(ITER.GT.30) GO TO 2
      IF(T1.GE.0.) GO TO 25
    2 LFLOW=0.
      BQDEL=0
```

```
      BTO=BTI
      RETURN
C
C  CALCULATE WATER FLOW RATE
C
    5 WW=XLOAD/(HFG+CPW*(TSTEAM-TMAKE))
C
C  CRITICAL VALUE OF R USED FOR CONVERGENCE (THAT VALUE WHICH MAKES
C  A LOG ARGUMENT IN AN EFFECTIVENESS EQUATION BLOW UP)
C
      RCRIT=HFG/CPW/(BTI-TSTEAM)
C
C  ARGUMENT IN EXPONENTIAL TERM TO COMPUTE TRIAL VALUE OF R
C
      T=UA/WW/CPW/RCRIT
C
C  IF ARGUMENT IS LARGE, R MUST BE CLOSE TO RCRIT;
C  NO NEED TO ITERATE.
C
      IF(T.GE.8.) R(1)=RCRIT
      IF(T.GE.8.) GO TO 21
C
C  FIRST GUESS FOR R
C
      R(1)=RCRIT/(1.-EXP(-T))
C
C  *** BEGIN NEWTON-RAPHSON SEARCH TO DETERMINE R.  IT IS ASSUMED
C      THAT FOUR ITERATIONS ARE ENOUGH.  ***
C
      DO 20 I=1,4
C
C  IF NEWTON-RAPHSON EQUATIONS PREDICT R LESS THAN RCRIT, SET R>RCRIT
C  TO PREVENT A NEGATIVE ARGUMENT IN THE LOGARITHM (NEXT 3 LINES)
C
      IF(R(1)-RCRIT) 6,6,7
    6 R(1)=1.010*RCRIT
    7 R(2)=1.04*R(1)
      DO 10 J=1,2
      T1=ALOG((BTI-TSTEAM)/(BTI-TSTEAM-HFG/CPW/R(J)))
      T2=ALOG((BTI-TSTEAM-HFG/CPW/R(J))/(BTI-TMAKE-
     1(HFG/CPW+TSTEAM-TMAKE)/R(J)))
   10 Y(J)=WW*CPW*R(J)*(T1+T2/(1.-R(J)))-UA
   20 R(1)=(R(1)*Y(2)-R(2)*Y(1))/(Y(2)-Y(1))
   21 CONTINUE
      IF(R(1).LE.RCRIT) R(1)=RCRIT
      LFLOW=R(1)*WW*CPW/L2CP
      WH2O=WW
C
C  IF OIL FLOW RATE IS LESS THAN MAXIMUM ALLOWABLE, COMPUTE OUTPUT
C  VARIABLES (LINE 50) AND RETURN.
C
      IF(LFLOW-LFLWI) 50,50,25
C
C  TO REACH THIS POINT, THE OIL FLOWRATE NEEDED TO SUPPLY FULL LOAD
C  MUST EXCEED PUMP CAPACITY.  THEREFORE, SET OIL FLOWRATE TO MAXIMUM
C  VALUE AND COMPUTE HOW MUCH STEAM CAN BE DELIVERED (AGAIN BY
C  NEWTON-RAPHSON).
```

```
C  **** NOTE: IF YOU WANT TO USE A CONSTANT OIL FLOWRATE, JUST GO TO
C       THIS POINT TO BEGIN WITH| ****
C
   25 LFLOW=LFLWI
C
C DETERMINE FIRST GUESS FOR R
C
      RCRIT = HFG/CPW/(BTI-TSTEAM)
      T=UA/LFLOW/L2CP
      IF(T.GE.8.) R(1)=RCRIT
      IF(T.GE.8.) GO TO 41
      R(1)=RCRIT/(1.-EXP(-T))
C
C
C  BEGIN NEWTON-RAPHSON SOLUTION USING FOUR ITERATIONS.
C
      DO 40 I=1,4
      IF(R(1)-RCRIT) 26,26,27
   26 R(1)=1.02*RCRIT
   27 R(2)=1.02*R(1)
      DO 30 J=1,2
      T1=ALOG((BTI-TSTEAM)/(BTI-TSTEAM-HFG/CPW/R(J)))
      T2=ALOG((BTI-TSTEAM-HFG/CPW/R(J))/(BTI-TMAKE-
     1(HFG/CPW+TSTEAM-TMAKE)/R(J)))
   30 Y(J)=LFLOW*L2CP*(T1+T2/(1.-R(J)))-UA
   40 R(1)=(R(1)*Y(2)-R(2)*Y(1))/(Y(2)-Y(1))
   41 WH2O=LFLOW*L2CP/R(1)/CPW
C
C  COMPUTE OUTPUTS
C
   50 BQDEL=WH2O*(HFG+CPW*(TSTEAM-TMAKE))
      BTO=BTI-BQDEL/LFLOW/L2CP
   60 QAUX=XLOAD-BQDEL
      RETURN
      END
```

```
      SUBROUTINE DEBUG
C
C
      DIMENSION MTD(12),WBANLAT(26),E(6)
C
      REAL LFLOW,LVIS,LCP,IBTLT,IBHOR,IDHOR,IDSKY,IDGRND,
     2  ITTLT,LAT,LTI,LDTON,LDTOFF,L2CP,L2RHO,L2FLOW,L2VIS,NOLOSS,NOLOST
C
      REAL IBN,LFLWI,ITHOR,IAVAIL,LT
C
      REAL ITHD,ITHM,ITHT,IAVALD,IAVALM,IAVALT,IBND,IBNM,IBNT,
     2  NOLOSD,NOLOSM,OVNLOSS,IAPER,IAPERD,IAPERM,IAPERT
C
      INTEGER PIPENO,DAY,HR
C
C
C
C  THE FOLLOWING COMMON BLOCKS ALLOW PARAMETERS TO BE PASSED IMPLICITLY
C    BETWEEN THE MAIN PROGRAM AND THE SUBROUTINE EACH REPRESENTS.
C
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     2CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     3  CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
C
      COMMON /CBTROUG/ CETAOPT,IORIENT,FUL1,FUL2,ITERTM,TCRIT,
     1  RCVRMC,B1,B2,B3,B4,CRINT,CW,CL,FL
C
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      COMMON /CBHX/ HXTHI,HXTHO,HXTCI,HXTCO,EFF,HXCPH,HXCPC,
     2  HXFLWH,HXFLWC
C
      COMMON /CBSTOR/ SMCP,STHI,STHO,STCI,STCO,STAVG,SQLOSS,SUA,
     2  SFLOWH,SFLOWC,SCP,STO,SQINC,SQDEL,STON,ST1,ST01,STON1
C
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,KPSHUT,KPU,
     2  KPD,ST,JDATE,ITER
C
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
C
      COMMON /CBBOIL/ KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD, BSKLN,BSKLO,
     1   BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
C
C
C  OUTPUT PARAMETERS FOR THIS TIME STEP.
C
      WRITE(6,2500) MO,DAY,HR,TAMB
 2500 FORMAT(/,1X,"TIME = ",I2,"/",I2,",",I2,14X," AMBIENT TEMP = ",
     2  F10.2)
C
```

```
C  NORMALIZE COLLECTOR FLOW RATE, LOAD FLOW RATE TO PER COLLECTOR AREA
      CFLOWX=CFLOW/CAREA
      XLFLOW=LFLOW/CAREA
C
      WRITE(6,3000) CFLOWX,XLFLOW,IAVAIL
 3000 FORMAT(1X,"COLL FLO RATE = ",F9.1,4X," LOAD FLO RATE = ",
     2  F9.1,4X," AVAILABLE IRRAD = ",F7.1)
      WRITE(6,3002) ITHOR,IAPER
 3002 FORMAT(1X,"TOT HORIZ IRRAD=",F9.1,4X," INCIDENT IRRAD= ",
     2  F9.1)
C
      WRITE(6,3500) CTO,HXTHI,HXTCO,STHI,ST,CTI,HXTHO,HXTCI,ST1
 3500 FORMAT(" COLL OUTLT TEMP = ",F7.3,4X," HX HOT INLET = ",F10.3,
     2  4X," HX COLD OUTLET = ",F8.3,4X," STOR INLET TEMP = ",F7.3/
     3  90X," STOR TEMP (AVG) = ",F7.3/" COLL INLET TEMP = ",F7.3,
     4  4X," HX HOT OUTLET = ",F9.3,4X," HX COLD INLET = ",F9.3,
     5  4X," STOR TEMP (BOT) = ",F7.3)
C
      WRITE(6,3600) PTI(1),PTO(1),PTI(3),PTO(3),PTO(2),PTI(2),
     2  PTO(4),PTI(4)
 3600 FORMAT(" PTI(1) = ",F16.3,4X," PTO(1) = ",F16.3,4X,
     2  " PTI(3) = ",F16.3,4X," PTO(3) = ",F16.3/
     3  " PTO(2) = ",F16.3,4X," PTI(2) = ",F16.3,4X,
     4  " PTO(4) = ",F16.3,4X," PTI(4) = ",F16.3)
      WRITE(6,3601) BTI,BTO,TB,TBN,BQDEL/CAREA,BSKLO/CAREA,BSKLN/CAREA
     1  ,QBLOWD/CAREA
 3601 FORMAT(" BTI= ",F7.2," BTO= ",F7.2,/" TB= ",F7.2,
     1 " TBN= ",F7.2," BQDEL= ",E10.3," BSKLO= ",E10.3,
     2  " BSKLN= ",E10.3," QBLOWD= ",E10.3)
C
C  OUTPUT COLLECTOR EFFICIENCY AND ENERGY BALANCE VALUES.
C
C  NORMALIZE COLLECTOR OUTPUT TO PER UNIT AREA
      CQCOLLX=CQCOLL/CAREA
C
C
      WRITE(6,4000) CETA,CQCOLLX
 4000 FORMAT(1X,"COLL EFFICIENCY = ",F7.3,4X," COLLEC'D EN = ",F11.1)
C
C  NORMALIZE PIPE LOSSES TO PER UNIT AREA BASIS
      PQ1=PQLOSS(1)/CAREA
      PQ2=PQLOSS(2)/CAREA
      PQ3=PQLOSS(3)/CAREA
      PQ4=PQLOSS(4)/CAREA
C
      WRITE(6,4100) PQ1,PQ2,PQ3,PQ4
 4100 FORMAT(" PQLOSS(1) = ",F13.1,4X," PQLOSS(2) = ",F13.1,4X,
     2  " PQLOSS(3) = ",F13.1,4X," PQLOSS(4) = ",F13.1)
C
C  NORMALIZE OPLOSS TO COLLECTOR AREA
      OLOSSX=OLOSS/CAREA
C
      WRITE(6,4200) OLOSSX,PQCOOL(3)/CAREA,PQCOOL(4)/CAREA
 4200 FORMAT(" OP LOSSES = ",F13.1,4X,"PQCOOL(3) = ",F13.1,4X,
     1  "PQCOOL(4) = ",F13.1)
C
C  NORMALIZE COOLDOWN LOSSES TO COLLECTOR AREA
```

```
      PQ1=PQCOOL(1)/CAREA
      PQ2=PQCOOL(2)/CAREA
      CQCOOLX=CQCOOL/CAREA
      NOLOSSX=NOLOSS/CAREA
C
      WRITE(6,4300) PQ1,PQ2,CQCOOLX,NOLOSSX
 4300 FORMAT(" PQCOOL(1) = ",F13.1,4X," PQCOOL(2) = ",F13.1,4X,
     2   " CQCOOL = ",F16.1,4X," NONOP LOSSES = ",F10.
C
C  NORMALIZE STORAGE VALUES TO COLLECTOR AREA
      SQLOSSX=SQLOSS/CAREA
      SQINCX=SQINC/CAREA
      SQDELX=SQDEL/CAREA
C
      WRITE(6,4400) SQLOSSX,SQINCX,SQDELX
 4400 FORMAT(" STORAGE LOSS = ",F10.1,4X," STG EN INC = ",E12.6,
     2  4X," EN DELIVERED FROM STORAGE = ",F10.1)
C
C  WITH UNFIRED BOILER, NEED ADDITIONAL OUTPUTS FOR LOOP 3 AND
C  FOR STEAM DELIVERED.
      IF(KBOIL.EQ.0) GO TO 75
C
C  NORMALIZE TO COLLECTOR AREA
      BQDELX=(BQDEL-QBLOWD-QSEAL)/CAREA
      PQ5=PQLOSS(5)/CAREA
      PQ6=PQLOSS(6)/CAREA
C
      WRITE(6,4402) QBLOWD/CAREA,QSEAL/CAREA,BTI,PTO(6),PTI(6),BTO
 4402 FORMAT(" LOOP 3 AND UNFIRED BOILER OUTPUTS:",/,
     1       " QBLOWD = ",F16.3,4X," QSEALL = ",F16.3,4X
     2                              ," BTI    = ",F16.3,/,
     3       " PTO(6) = ",F16.3,4X," PTI(6) = ",F16.3,
     4                            4X," BTO    = ",F16.3,/)
C
      WRITE (6,4401) BQDELX
 4401 FORMAT(" ENERGY DELIVERED AS STEAM FROM UNFIRED BOILER =",F10.1)
 75   CONTINUE
C
      WRITE(6,4500)  ITER
 4500 FORMAT(1X,I5," ITERATIONS REQUIRED FOR CONVERGENCE",/,
     1       " -----",19("------"))
C
   74 CONTINUE
      RETURN
      END
```

```
C
C  ****************************************************************
      SUBROUTINE BOILER
C
C   THIS SUBROUTINE MODELS AN UNFIRED BOILER. THE SHELL SIDE OF THE
C   BOILER IS ASSUMED TO BE AT ONE MIXED TEMPERATURE. HENCE, NO
C   PREHEATING OF MAKEUP WATER IS CONSIDERED. RATHER, THE MAKEUP WATER
C   IS "INSTANTLY MIXED" AFTER ITS INTRODUCTION IN THE BOILER. THERMAL
C   CAPACITANCE OF THE BOILER IS ACCOUNTED FOR. A BYPASS VALVE IS ALSO
C   MODELLED SO THAT UNTIL A THRESHOLD COLLECTOR LOOP TEMPERATURE IS
C   REACHED , THE HOT FLUID IS BYPASSED AROUND THE BOILER.
C
C   COMMON BLOCKS
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,
     1   KPSHUT,KPU,KPD,ST,JDATE,ITER
      COMMON /CBBOIL/ KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1   BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     1   CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     2   CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
      INTEGER HR
C
C   SET BOILER ENVIRONMENT TEMPERATURE.
C
      IF(KBOIL.EQ.1) THEN
         TENV=TAMB
      ELSE
         TENV=25.0
      END IF
C
C   CHECK IF THIS IS THE FIRST HOUR OF THE YEAR. IF SO, INITIALIZE BOILER
C   TEMPERATURE AND SET STEAM VAPORIZATION ENTHALPY.
C
      IF(JDATE.EQ.1.AND.HR.EQ.1) THEN
      HFG=(HGT(TSTEAM*1.8+32.)-HSL(TSTEAM*1.8+32.))*2.326
      END IF
C
C   CHECK IF THE COLLECTOR LOOP PUMP IS OFF OR IF THE INCOMING FLUID
C   IS TOO COOL AND IS BYPASSED. IF EITHER, CALCULATE SKIN LOSSES AND
C   THE NEW BOILER TEMPERATURE AND RETURN.
C
      IF(KPON.EQ.0.OR.BTI.LT.BTMIN) THEN
      TBN=TENV+(TB-TENV)*EXP(-BSKUA*DT/BMCP)
      BSKLO=0.
      BSKLN=BMCP*(TB-TBN)
      BTO=BTI
      QBLOWD=0.
      BQDEL=0.
      RETURN
```

```
 58                ELSE
 59                    GO TO 200
 60                END IF
 61          C
 62          C   BOILER IS NOT BYPASSED.
 63          C
 64          C      DETERMINE WHETHER INCOMING FLUID IS HOT ENOUGH TO GENERATE ANY
 65          C      STEAM DURING THE HOUR.(CALCULATE THE BULK BOILER TEMPERATURE
 66          C      AFTER ONE HOUR OF SENSIBLE HEATING.)
 67          C
 68          C   DIVIDE THE HOUR INTO TEN TIMESTEPS TO CALCULATE THE FINAL
 69          C   BULK BOILER TEMPERATURE.
 70          C
 71           200  CONTINUE
 72                TBNEW=TB
 73                BTO=0.0
 74                BSKLO=0.0
 75                BEXP=EXP(BUA/(CFLOW*CCP))
 76                DO 250 I=1,10
 77                BTOI=(BTI+TBNEW*(BEXP-1))/BEXP
 78                BTDELT=(CFLOW*CCP*(BTI-BTOI)-BSKUA*(TBNEW-TENV))/BMCP/10.
 79                BSKLI=BSKUA*(TBNEW-TENV)/10.
 80                BSKLO=BSKLO+BSKLI
 81                TBNEW=TBNEW+BTDELT
 82          C
 83          C          CHECK IF THE BOILER REACHES SATURATION TEMPERATURE.
 84          CC          IF IT DOES, JUMP TO THE STEAM GENERATION SECTION.
 85          C
 86                IF(TBNEW.GE.TSTEAM) THEN
 87                    TFRAC=(TSTEAM-TBNEW+BTDELT)/BTDELT
 88                    TBOIL=((I-1)+TFRAC)/10.
 89                    BTO1=BTO+BTOI*TFRAC/10.
 90                    BSKL1=BSKLO+BSKLI*(TFRAC-1)
 91                    GO TO 300
 92                ELSE
 93                    BTO=BTO+BTOI/10.
 94          C     PRINT *,CFLOW*CCP*(BTI-BTOI)*.1,BSKLI,BMCP*BTDELT,BTOI
 95                END IF
 96           250   CONTINUE
 97          C
 98          C          ... NO STEAM GENERATION
 99          C
100                QBLOWD=0.0
101                BQDEL=0.0
102                TBN=TBNEW
103                BSKLN=0.0
104                RETURN
105          C
106          C          ... STEAM IS GENERATED
107          C
108            300 TLEFT=DT-TBOIL
109                BSKL2=BSKUA*(TSTEAM-TENV)*TLEFT
110                BSKLO=BSKL1+BSKL2
111                BSKLN=0.0
112          C
113          C                    CALCULATE THE AVERAGE FLUID TEMPERATURE EXITING FROM
114          C                    THE BOILER BASED ON THE TIME WEIGHTED AVERAGE DURING
```

```
115          C                    BOTH HEAT-UP AND STEAM GENERATION.
116          C
117                 BT02=TSTEAM+(BTI-TSTEAM)*EXP(-BUA/(CFLOW*CCP))
118                BTO=BT01+BT02*TLEFT/DT
119          C
120          C                       SET THE NEW BULK BOILER TEMPERATURE,CALCULATE
121          C                       ENERGY DELIVERED MINUS BLOWDOWN LOSSES.
122          C
123                TBN=TSTEAM
124                BQDEL=CFLOW*CCP*(BTI-BT02)*TLEFT-BSKL2
125          C      PRINT *,BQDEL,BSKL2,CFLOW*CCP*(BTI-BT02)
126          C      PRINT *,BSLKI*TFRAC,BMCP*(TSTEAM-TBNEW+BTDELT),
127          C    1 CFLOW*CCP*(BTI-BT01)*TFRAC
128                MDOTS=BQDEL/(HFG+4.18*(TSTEAM-TMAKE))
129                QBLOWD=0.0
130                IF(MDOTS.GT.BDSET) QBLOWD=BDRATE*MDOTS*4.18*(TSTEAM-TMAKE)
131                BQDEL=BQDEL-QBLOWD
132          C
133                RETURN
134                END
```

```
C  ****************************************************************
      SUBROUTINE HX2
C
C     THIS SUBROUTINE MODELS A HOT WATER TANK WITH A TUBE BUNDLE
C    INSERTED FOR HEAT EXCHANGE TO THE WATER. THE TANK IS ASSUMED
C   TO BE AT ONE MIXED TEMPERATURE. MAKEUP WATER IS "INSTANTLY MIXED"
C   AFTER ITS INTRODUCTION IN THE TANK. A BYPASS VALVE IS ALSO
C   MODELLED SO THAT UNTIL A THRESHOLD COLLECTOR LOOP TEMPERATURE
C   IS REACHED, THE HOT FLUID IS BYPASSED AROUND THE TANK.
C
C   COMMON BLOCKS
C
      COMMON /CBALL/ TAMB,DT,MO,DAY,HR,KPON,KPOFF,KPSTRT,
     1   KPSHUT,KPU,KPD,ST,JDATE,ITER
      COMMON /CBBOIL/ KBOIL,BTI,BTO,BQDEL,L2CP,QBLOWD,BSKLN,BSKLO,
     1   BSKUA,BMCP,BTMIN,BUA,BDSET,BDRATE,TBN,TB
      COMMON /CBLOAD/   LFLOW,LTI,LHRON,LHROFF,
     2  LDTON,LDTOFF,KLDBND,LFLWI,LT
      COMMON/CFLASH/TMAKE,TSTEAM,CRHO,FTIN,FTOUT,FTUA,FTMC,FTO,FTON,
     1  ELOSS
      COMMON /CBCOLL/ IBN,ITHOR,IAVAIL,CFLW,CCP,IAPER,CAZI,
     1   CTI,CTO,CTAVG,CQCOLL,CQCOOL,CETA,CFLOW,BO,YO,FRUL,GCR,
     2   CAREA,KCDBND,CDTON,CDTOFF,KPOCHK,KPSCHK,TAUC,CTAVO
      COMMON /CBPIPE/ PUA(6),PFLOW(6),PCP(6),
     2  PTI(6),PTO(6),PTAVG(6),PQLOSS(6),
     3   PTAVO(6),PQCOOL(6),L2FLOW,
     4  PMCP(6),KPIPE(6),OLOSS,NOLOSS
C
C   SET BOILER ENVIRONMENT TEMPERATURE.
C
      IF(KBOIL.EQ.1) THEN
         TENV=TAMB
      ELSE
         TENV=25.0
      END IF
C
C   CHECK IF THE COLLECTOR LOOP PUMP IS OFF OR IF THE INCOMING FLUID
C   IS TOO COOL AND IS BYPASSED. IF EITHER, CALCULATE SKIN LOSSES AND
C   THE NEW BOILER TEMPERATURE AND RETURN.
C
      IF(KPON.EQ.0) THEN
      TBN=TENV+(TB-TENV)*EXP(-BSKUA*DT/BMCP)
      BSKLO=0.
      BSKLN=BMCP*(TB-TBN)
      BTO=BTI
      BQDEL=0.
      RETURN
C
C   TANK IS NOT BYPASSED.
C
C   DIVIDE THE HOUR INTO TEN TIMESTEPS TO CALCULATE THE FINAL
C   BULK BOILER TEMPERATURE.
C
      ELSE
      TBNEW=TB
      BTO=0.0
      BQDEL=0.0
```

```
      BSKLO=0.0
      BEXP=EXP(BUA/(CFLOW*CCP))
      DO 250 I=1,10
      BTOI=(BTI+TBNEW*(BEXP-1))/BEXP
      BTDELT=(CFLOW*CCP*(BTI-BTOI)-LFLWI*L2CP*(TBNEW-LTI)
     1  -BSKUA*(TBNEW-TENV))/BMCP/10.
      BSKLI=BSKUA*(TBNEW-TENV)/10.
      BSKLO=BSKLO+BSKLI
      TBNEW=TBNEW+BTDELT
      BTO=BTO+BTOI/10.
      BQDELI=LFLWI*L2CP*(TBNEW-LTI)/10.
      BQDEL=BQDEL+BQDELI
  250  CONTINUE
C
       TBN=TBNEW
       BSKLN=0.0
      END IF
       RETURN
      END
```

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The Solar Energy Research Institute (SERI) has modeled seven of the Department of Energy (DOE) sponsored solar Industrial Process Heat (IPH) field experiments and has generated thermal performance predictions for each project. Additionally, these performance predictions have been compared with actual performance measurements taken at the projects. Predictions were generated using SOLIPH, an hour-by-hour computer code with the capability for modeling many types of solar IPH components and system configurations. Comparisons of reported and predicted performance resulted in good agreement when the field test reliability and availability was high. Volume I contains the main body of the work; objective, model description, site configurations, model results, data comparisons, and summary. Volume II contains complete performance prediction results (tabular and graphic output) and computer program listings.

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