12 OUTPUT REPORTS

12 OUTPUT REPORTS

12.1 Introduction

ASEAM3.0 is capable of creating many different output reports. Run-time reports and graphic displays are available while the calculations are being performed. These reports may be directed to the printer or to the screen, but cannot be stored in a file and accessed later. There are also numerous reports that are written to files, and you need not be at the computer during the calculations to obtain them.

This chapter describes various types of output reports, the data they contain, the file-naming conventions, and how to get the data into useful form. Not all output reports are available from all calculation modes. Refer to Section 12.2.1, 12.2.2, and 12.2.3 for a listing of output reports created by different calculation methods.

Note: Make sure, when specifying the analyses, that all of the output reports you want are available with the type of calculation you are performing and that the reports have been specified, if required. Once the runs have been made, there is no way to backtrack and obtain additional output data that was not specified originally. You must first specify the additional outputs and then rerun the calculations.

12.2 Types of Output

ASEAM3.0 can produce many different kinds of output reports. Outlined in the sections below are the various output reports that can be specified or produced for the different calculation modes. Also refer to Chapter 11 for a discussion of the various outputs created by the calculation modes.

12.2.1 Single and Batch Run Modes

Single and Batch Run Modes can create up to 39 reports that detail heating and cooling loads, system psychrometrics, energy consumptions, and the like by zone or by system. Most of these reports can be imported into a spreadsheet package (such as LOTUS) for further calculations or graphical presentation, or into a three-dimensional graphics package.

Output reports are available for both peak and diversified loads. Note that peak loads correspond to full occupancy, full solar, all lights and equipment on, etc. Diversified loads take into account the fraction percent sunshine (from the weather file), occupancy, lighting, and equipment schedules (entered as diversity factors in the Loads input segment of the program). All loads type report values are in BTUH, except for daylighting reports, which use footcandles on the work plane. The following output reports are available for single run and batch run modes:

LOADS REPORTS: For each zone (the 24 hourly values for reports LB through LW are written to file by month)

LA - Peak Loads Summary (This report is *not* LOTUS compatible. It generates the load by components at the time the zone peak load occurs. Use the Miscellaneous Output Reports from the main menu to access these reports).

LB - Peak Total Load (sum of all time-dependent peak load components excluding temperature-dependent loads such as conduction and infiltration)

LC - Diversified Total Load (sum of all time-dependent diversified load components excluding temperature-dependent loads such as conduction and infiltration)

LD - Peak Opaque CLTD Load (sum of wall and roof CLTD)

LE - Peak Glass Solar Load

LF - Peak Lighting Load

LG - Diversified Lighting Load

LH - Peak Plenum Load

LI - Diversified Plenum Load

LJ - Peak People Load

LK - Diversified People Load

LL - Peak Equipment Load

LM - Diversified Equipment Load

LN - Daylighting Footcandles on Work plane, Function 1, Overcast Sky

LO - Daylighting Footcandles on Work plane, Function 2, Overcast Sky

LP - Daylighting Footcandles on Work plane, Function 3, Overcast Sky

LQ - Daylighting Footcandles on Work plane, Function 1, Clear Sky

LR - Daylighting Footcandles on Work plane, Function 2, Clear Sky

LS - Daylighting Footcandles on Work plane, Function 3, Clear Sky

LT - Wall CLTD Load

LU - Roof CLTD Load

LV - Direct Solar on Glass (considers only effect of external shading, *not* orientation)

LW - Shaded Solar on Glass (considers only effect of external shading, *not* orientation)

SYSTEMS REPORTS: For each system (the values are written to file by cycle, by month, and by bin)

SA - System Loads (Zone Diversified Loads on System)

SB - System Energy Requirements (System Loads on Plant)

SC - System Psychrometrics (Central Systems)

SD - System Psychrometrics (Unitary Systems)

PLANT REPORTS: For each plant component (values are written to file by cycle, by month, and by bin)

SLDS - Plant Loads (Composite System Loads on Plant)

PDHW - Domestic Hot Water

PCEN - Centrifugal Chiller

PABS - Absorption Chiller

PDBC - Double Bundle Chiller

PREC - Reciprocating Chiller

PDBH - Double Bundle Heating

PBLR - Boiler

PTOW - Cooling Tower

BEPS report - building end-use summary (this report is *not* LOTUS-compatible)

MCON - Monthly energy consumption by fuel type.

Note: All reports *except* the Peak Loads Summary (LA) and the Building Energy End-Use Summary (BEPS) are suitable for importing into LOTUS. If you indicated that a printer was available, and asked for either of these reports, they will automatically be printed when the run calculations are finished. To access these two data type output file, refer to Section 12.4.2.

The report file names of LOTUS-compatible output files will appear as xxxxLLyy.PRN, xxxxSSzz.PRN, or xxxxPPPP.PRN:

1. `xxxx' is the file-name prefix you specified in "Specify Analysis"
2. `LL' is the loads report type (LB through LW)
3. `yy' is the zone number for loads report
4. `SS' is the systems report type (SA through SD)
5. `ZZ' is the system number for systems report
6. `PPPP' is the plant report type (SLDS, PDHW, etc.)

The files from these reports are also saved in the data subdirectory. To create legible reports from these files, follow the directions in Section 12.4.1.

12.2.2 Parametric Run Mode

If you are running ASEAM3.0 in the parametric processing mode, the output files are more limited. Refer to Chapter 11 for a discussion of how to specify the outputs included in the report.

The Parametric Run Mode creates a maximum of nine output files. The first two are always created:

xxxxPRIN.PRN (contains the input variables)
xxxxPROU.PRN (contains the output variables and results)

The following seven files are created only if you requested them in "Specify Analysis":

xxxxPRMG.PRN (monthly gas consumption, parametric input variable #30)
xxxxPRMO.PRN (monthly oil consumption, parametric input variable #31)
xxxxPRME.PRN (monthly electricity consumption, parametric input variable #32)
xxxxPRMH.PRN (monthly district heating consumption, parametric input #33)
xxxxPRMC.PRN (monthly district cooling consumption, parametric input #34)
xxxxPRPL.PRN (peak loads summaries, parametric input variable #35)
xxxxPRLC.PRN (BLCC summaries; if a base case BLCC file is specified)

To create legible reports from these LOTUS compatible files, follow the directions in Section 12.4.1.

12.2.3 Single and Multiple ECO Run Modes

If you are running ASEAM3.0 in the Single or Multiple ECO Run mode, the output reports are ASCII text files only, which compare the base case with the ECO case(s). The file names used are xxxxSECO.Z (Single ECO Run Mode) and xxxxMECO.Z (Multiple ECO Run Mode), where Z is the run number (1 is the first, or base case, run; 2 compares the base case run and ECO #1, etc.).

These reports are already in text file mode. The file is legible when you "type" it or retrieve the file with a word processor. Follow the directions in Section 12.4.3.

12.3 Run-Time Graphics and Reports

Run-time graphic displays and reports differ from other output reports in that you must be at the computer while the program is calculating to obtain them. These displays occur while the calculations are being performed regardless of the calculation mode. They show the calculations being performed, typically hour by hour for loads and bin by bin for systems and plant. If you want to see what is happening on a particular hour of a particular month, these data are available, but you must turn on the display when the calculations reach that month.

The run-time outputs are quite voluminous. They may be directed to a printer or to the screen, but not to a file. Viewing or printing the displays slows down the calculations considerably, so you should turn the displays off when you are not watching them.

Run-time outputs are accessed by using the function keys while ASEAM3.0 is performing the calculations. You can tell where you are in the calculations from the message on the screen (e.g., Calculating Loads, Zone 3, May). Below this message a function key menu appears. The keys have the following functions:

F1 - turns on the function key menu. This stops any present screen display.

F2 - stops the program. The screen will display a question asking if you want to stop the program. If this key was pressed by mistake, respond accordingly and the program will continue.

F3 - turns on screen display of calculations (loads only)

F4 - turns off screen display of calculations (loads only)

F5 - turns on screen graphics display of calculations

F6 - turns off screen graphics display of calculations

F7 - turns on printer output

F8 - turns off printer output

F9 - increases graphic screen delay by 1 second. If you want to "freeze" the screen, the CTRL-NUMLOCK keys should be pressed at the same time. Press any key to resume the screen display update.

F10 - decreases graphic screen delay by 1 second

12.4 Accessing Output Reports

The three types of output reports (LOTUS-compatible data files, non-LOTUS-compatible data files, and text files) are accessed differently. Obviously, you can "type" any of these files, but, except for the text files, the result will be basically unintelligible strings of numbers.

ASEAM3.0 includes ways to present the data in a more useful and understandable manner in Section 12.4.1 through 12.4.3.

The following table lists all of the possible output reports, the calculation run modes that generate the reports, and the file type.

Output File Type

REPORT	OUTPUT FILE TYPE			AVAILABILITY				
	LOTUS-COMPAT.	TEXT	DATA	(CALCULATION MODES) S	B	P	E	M
LOADS								
1 xxxxLAyy.-	-	-	S	S	S	-	-	-
2 xxxxLByy.PRN	S	-	-	S	S	-	-	-
3 xxxxLCyy.PRN	S	-	-	S	S	-	-	-
4 xxxxLDyy.PRN	S	-	-	S	S	-	-	-
5 xxxxLEyy.PRN	S	-	-	S	S	-	-	-
6 xxxxLFyy.PRN	S	-	-	S	S	-	-	-
7 xxxxLGyy.PRN	S	-	-	S	S	-	-	-
8 xxxxLHyy.PRN	S	-	-	S	S	-	-	-

9	xxxxLIyy.PRN	S	-	-	S	S	-	-	-
10	xxxxLJyy.PRN	S	-	-	S	S	-	-	-
11	xxxxLKyy.PRN	S	-	-	S	S	-	-	-
12	xxxxLLyy.PRN	S	-	-	S	S	-	-	-
13	xxxxLMyy.PRN	S	-	-	S	S	-	-	-
14	xxxxLNyy.PRN	S	-	-	S	S	-	-	-
15	xxxxLOyy.PRN	S	-	-	S	S	-	-	-
16	xxxxLPyy.PRN	S	-	-	S	S	-	-	-
17	xxxxLQyy.PRN	S	-	-	S	S	-	-	-
18	xxxxLRyy.PRN	S	-	-	S	S	-	-	-
19	xxxxLSyy.PRN	S	-	-	S	S	-	-	-
20	xxxxLTyy.PRN	S	-	-	S	S	-	-	-
21	xxxxLUyy.PRN	S	-	-	S	S	-	-	-
22	xxxxLVyy.PRN	S	-	-	S	S	-	-	-
23	xxxxLWyy.PRN	S	-	-	S	S	-	-	-

SYSTEMS

1	xxxxSAyy.PRN	S	-	-	S	S	-	-	-
2	xxxxSByy.PRN	S	-	-	S	S	-	-	-
3	xxxxSCyy.PRN	S	-	-	S	S	-	-	-
4	xxxxSDyy.PRN	S	-	-	S	S	-	-	-

REPORT	OUTPUT FILE	LOTUS-COMPAT.	TEXT	DATA	AVAILABILITY (CALCULATION MODES) S	B	P	E	M
PLANT									
1	xxxxSLDS.PRN	S	-	-	S	S	-	-	-
2	xxxxPDHW.PRN	S	-	-	S	S	-	-	-
3	xxxxPCEN.PRN	S	-	-	S	S	-	-	-
4	xxxxPABS.PRN	S	-	-	S	S	-	-	-
5	xxxxPDBC.PRN	S	-	-	S	S	-	-	-
6	xxxxPREC.PRN	S	-	-	S	S	-	-	-
7	xxxxPDBH.PRN	S	-	-	S	S	-	-	-
8	xxxxPBLR.PRN	S	-	-	S	S	-	-	-
9	xxxxPTOW.PRN	S	-	-	S	S	-	-	-
10	xxxxBEPS.ASO	-	-	-	S	S	S	-	-
PARAMETRIC									
1	xxxxPRIN.PRN	D	-	-	-	-	D	-	-
2	xxxxPROU.PRN	D	-	-	-	-	D	-	-
3	xxxxPRPL.PRN	S	-	-	-	-	S	-	-
4	xxxxPRLC.PRN	S	-	-	-	-	S	-	-
5	xxxxPRMG.PRN	S	-	-	-	-	S	-	-
6	xxxxPRMO.PRN	S	-	-	-	-	S	-	-
7	xxxxPRME.PRN	S	-	-	-	-	S	-	-
8	xxxxPRMH.PRN	S	-	-	-	-	S	-	-
9	xxxxPRMC.PRN	S	-	-	-	-	S	-	-
LCC									
1	xxxxLCCO.LCO	-	S	-	S	S	-	-	-
ECO									
1	xxxxSECO.Z	-	D	-	-	-	-	D	-
2	xxxxMECO.Z	-	D	-	-	-	-	-	D

where 'S' indicates this report may (or may not) be specified
'D' indicates this report is defaulted - it always is produced

Availability (Calculation Mode) Codes
`S' Single Run Mode
`B' Batch Run Mode
`P' Parametric Run Mode
`E' Single ECO Run Mode
`M' Multiple ECO Run Mode

12.4.1 LOTUS-Compatible Reports

All output reports from the Single and Batch Run Modes are written in standard ASCII files and may be imported into many spreadsheet or word processing packages

except for the Peak Loads (xxxxLAyy.PRN) and BEPS (xxxxBEPS.ASO) reports. All output reports from the Parametric Run mode are also LOTUS-compatible. This section explains how to use LOTUS to format these reports.

To format Peak Loads and BEPS reports, refer to Section 12.4.2. The output reports from Single and Multiple ECO Run modes and from the BLCC program are text files. Refer to Section 12.4.3 for instructions.

ASEAM3.0 includes a LOTUS worksheet template file consisting of many "macros" for formatting LOTUS-compatible output files. This file is named "AS3TEMPL.WKS" and is located in the ASEAM3.0 directory. To use this template, enter LOTUS and, on the blank worksheet, use the "/File Retrieve" command to load in "AS3TEMPL". This file contains macro's for formatting ASEAM3.0 output reports. Instructions are included in the file and will be visible when the file is imported into LOTUS.

First, determine the output report file to be displayed (see menu below). Second, position the cursor to the right of the instructions, separated by at least one blank column and five blank rows. If you are importing more than one file, import the others below or to the right of each other, separated by at least five blank rows (for headings) and one blank column. Third, press the appropriate key (see below) to format your report. If your report file is not in your data subdirectory, press "Ctrl-Break" to stop the macro.

Macro Definitions

Loads Reports
- Alt-a all loads reports

Systems Reports
- Alt-b systems SA report (zone loads on systems)
- Alt-c systems SB report (system energy requirements)
- Alt-d systems SC report (system psychrometrics central systems)
- Alt-e systems SD report (system psychrometrics unitary systems)

Plant Reports
- Alt-f plant SLDS report (system loads on plant)
- Alt-g plant PDHW report (plant domestic hot water)
- Alt-h plant PCEN report (centrifugal or recipricating chiller)
- Alt-i plant PABS report (absorption chiller)
- Alt-j plant PBDC report (double bundle chiller cooling)
- Alt-k plant PBDH report (double bundle chiller heating)
- Alt-l plant PBLR report (boiler)
- Alt-m plant PTOW report (cooling tower)

Parametric Reports
- Alt-p parametric output reports

Monthly Energy Consumption
- Alt-x monthly energy consumption by fuel type

12.4.2 Data Files - BEPS and Peak Load Summaries

The BEPS and Peak Load summaries (if specified) will automatically be printed if you

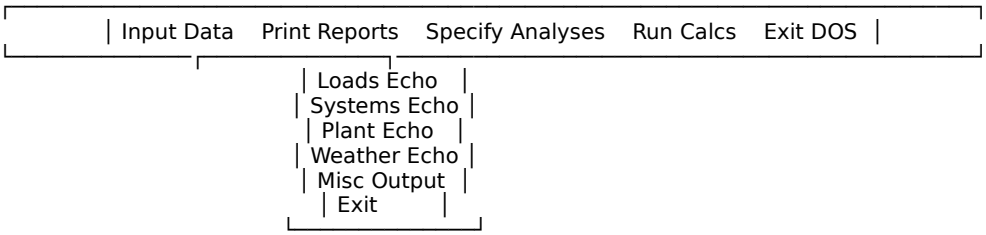
indicated that you have a printer installed. The data for these files will also be written to files in the data subdirectory for later use. Printed output of these files is suppressed in the parametric run mode.

The BEPS and Peak Loads summaries are stored in data files that are not LOTUS-compatible (i.e., you cannot import these files into a spreadsheet). To generate useful reports from these files, ASEAM3.0 includes report generator programs.

The report generator program is used after the calculations are complete. The file names in the data subdirectory will be in the form xxxxBEPS.ASO (BEPS file) and xxxxLAyy.PRN (Peak Loads file), where `xxxx' is your specified file-name prefix, `yy' is the zone number for the report, and `00' is the whole building peak loads summary.

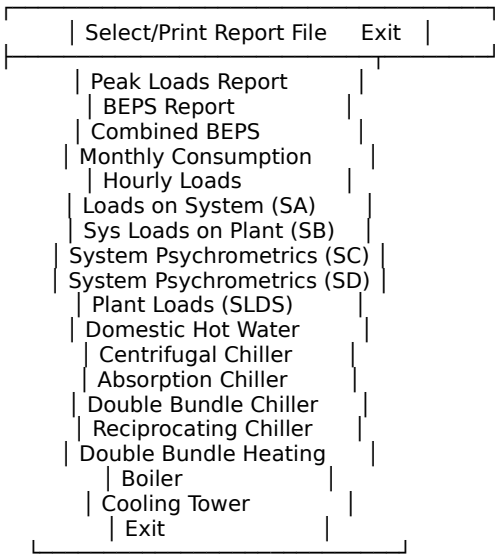
You can enter the report generator program from the Main Menu or from the "exit" choices of any program. If you access this program from the Main Menu (shown below), select "Print Reports" from the horizontal bar and then "Misc Output" from the pull-down menu.

ASEAM3 MAIN MENU



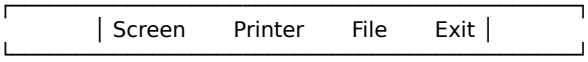
The ASEAM3.0 Reports Program Menu will then appear on the screen. Select "Select/Print Report File" and press CR. Select the type of output report to be generated. The "Combined BEPS" report is used when you want to combine several BEPS reports. For example, if a building was so complex that it had to be modeled by two separate ASEAM3.0 runs (e.g., if the building model required more than 15 zones), you would combine the two "halves" of the building to obtain the total annual energy consumption.

ASEAM3 REPORTS PROGRAM



Next, specify the output device for the output report. The output report may be printed to the screen, to a printer, or to a file. You will be asked to provide a two-line title, which will appear at the top of the output report. If the report is to be written to a file, you will also be asked for the file name. Do not include a drive specification; the file will automatically be written to drive B.

ASEAM3 OUTPUT DEVICE



12.4.3 Text Files

The outputs of the BLCC and ECO calculations are text files. You can view these files using the "type" command from DOS (e.g., "type xxxxLCCO.LCO" (CR)). The files are standard ASCII files, so they may also be retrieved and edited with a word processor.

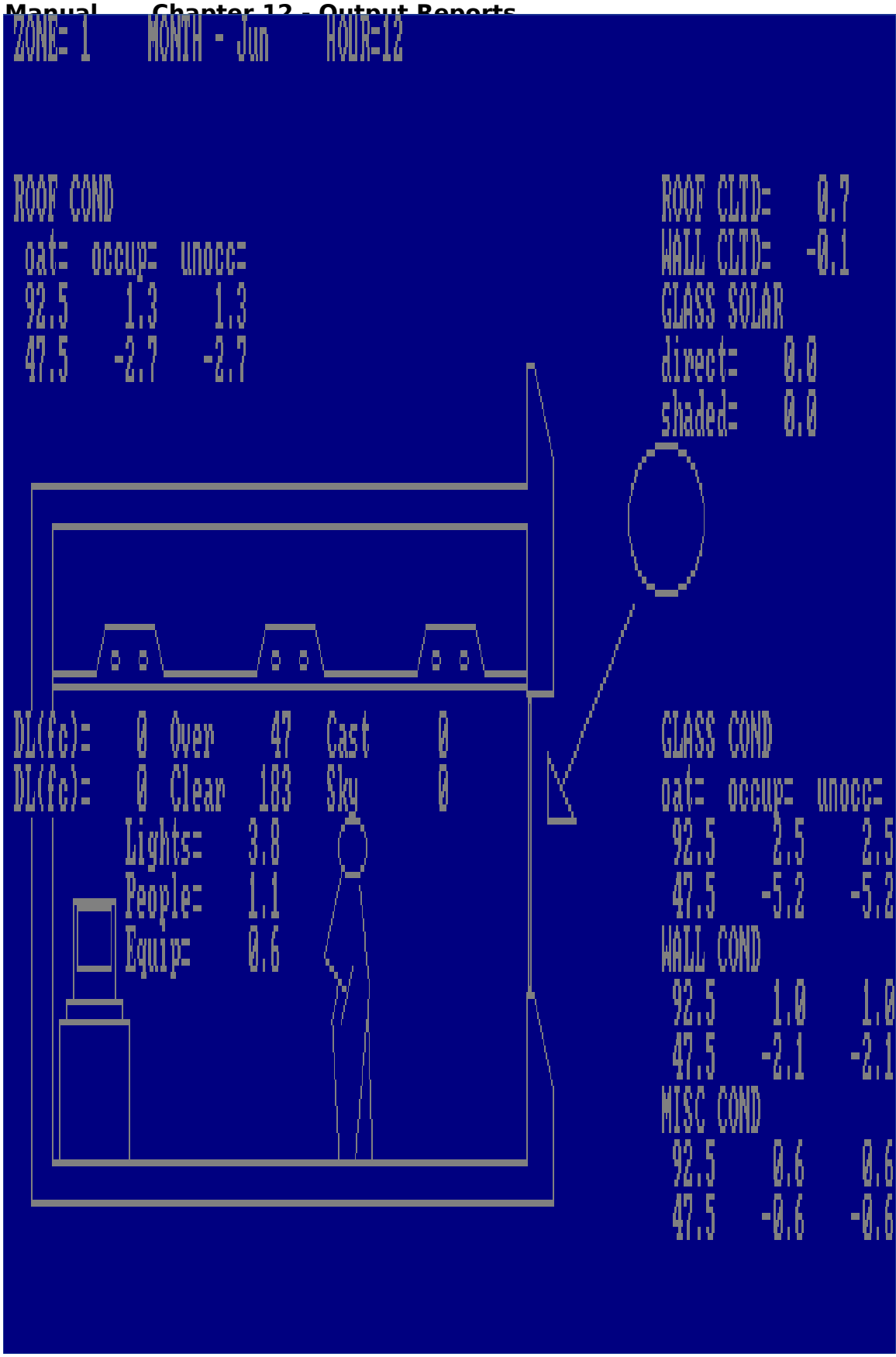
12.5 Sample Outputs

12.5.1 Run-Time Graphics

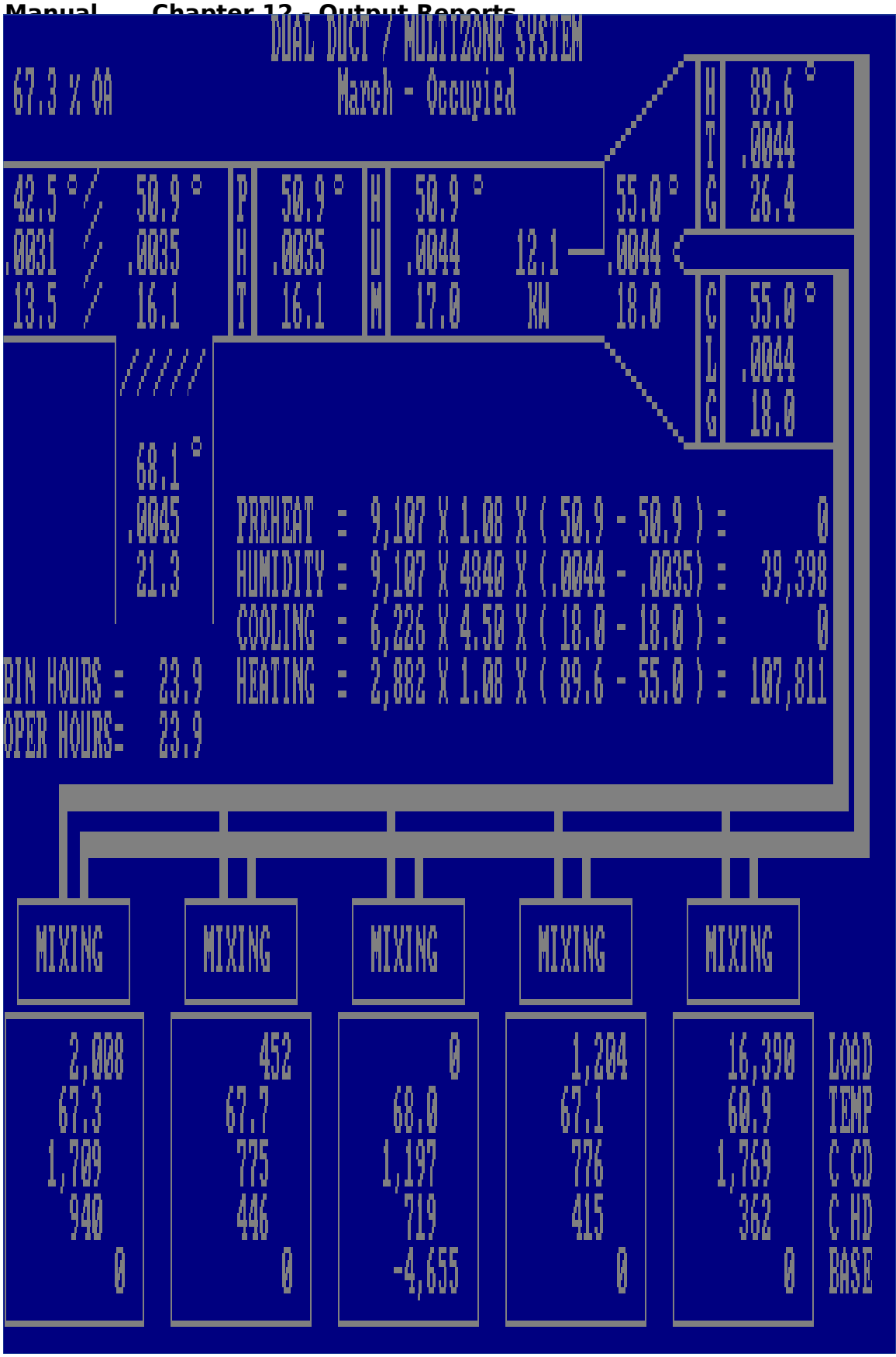
Examples of run-time graphics are shown on the following pages. The graphics vary with system type and plant component. The examples do not include all possible combinations.

Run-time graphics will be displayed on the screen when you press the F5 key during the calculations. Refer to Section 12.3 for details.

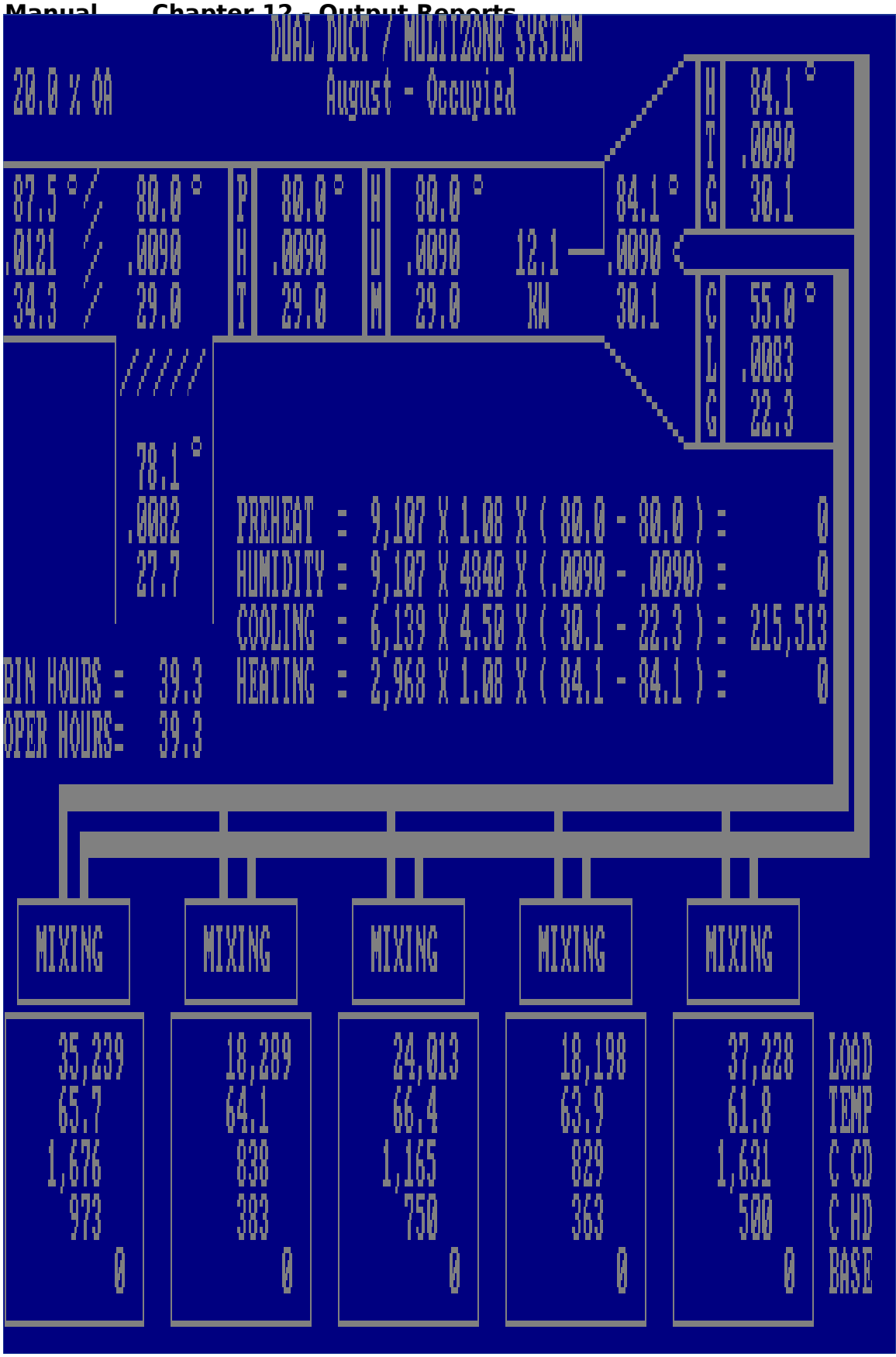
Sample ASEAM3.0 Graphic Screen - Loads


ZONE= 1 MONTH = Jun HOUR=12
ROOF COND
oat= occup= unocc=
92.5 1.3 1.3
47.5 -2.7 -2.7
ROOF CLTD= 0.7
WALL CLTD= -0.1
GLASS SOLAR
direct= 0.0
shaded= 0.0
DL(fc)= 0 Over 47 Cast 0
DL(fc)= 0 Clear 183 Sky 0
Lights= 3.8
People= 1.1
Equip= 0.6
GLASS COND
oat= occup= unocc=
92.5 2.5 2.5
47.5 -5.2 -5.2
WALL COND
92.5 1.0 1.0
47.5 -2.1 -2.1
MISC COND
92.5 0.6 0.6
47.5 -0.6 -0.6

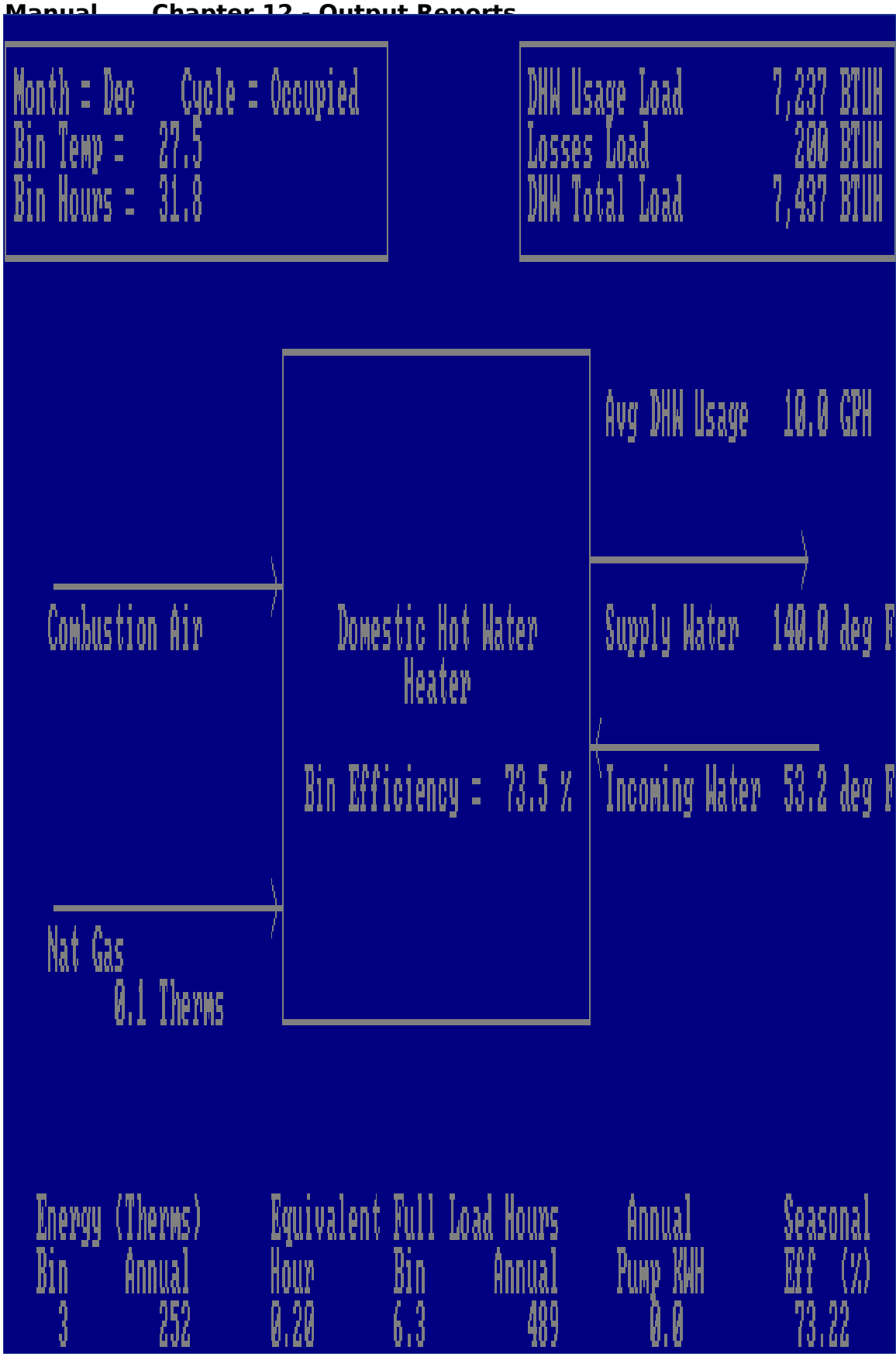
Sample ASEAM3.0 Graphic Screen - Dual Duct / Multizone System - Heating


DUAL DUCT / MULTIZONE SYSTEM
67.3 % OA
March - Occupied
H 89.6
T .0044
G 26.4
42.5 / 50.9
.0031 / .0035
13.5 / 16.1
P 50.9
H .0035
T 16.1
H 50.9
U .0044
M 17.0
12.1 KW
55.0
.0044
18.0
C 55.0
L .0044
G 18.0
68.1
.0045
21.3
PREHEAT : 9,107 X 1.08 X (50.9 - 50.9) : 0
HUMIDITY : 9,107 X 4840 X (.0044 - .0035) : 39,398
COOLING : 6,226 X 4.50 X (18.0 - 18.0) : 0
HEATING : 2,882 X 1.08 X (89.6 - 55.0) : 107,811
BIN HOURS = 23.9
OPER HOURS= 23.9
MIXING
MIXING
MIXING
MIXING
MIXING
2,008 452 0 1,204 16,390 LOAD
67.3 67.7 68.0 67.1 60.9 TEMP
1,709 775 1,197 776 1,769 C CD
940 446 719 415 362 C HD
0 0 -4,655 0 0 BASE

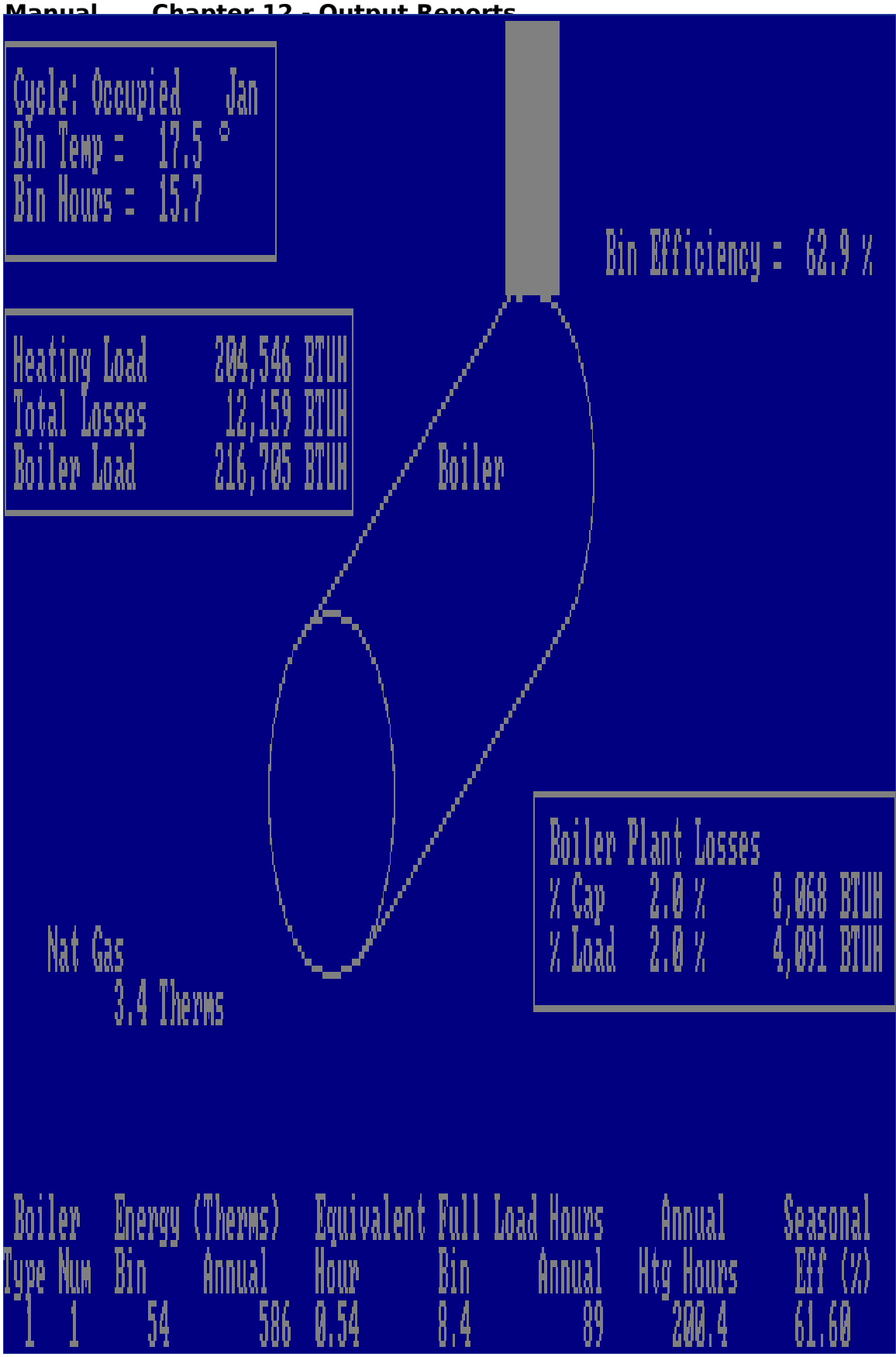
Sample ASEAM3.0 Graphic Screen - Dual Duct / Muiltizone System - Cooling


DUAL DUCT / MULTIZONE SYSTEM
20.0 % OA
August - Occupied
87.5 °F 80.0 °F
.0121 lb/lb .0090
34.3 °F 29.0 °F
78.1 °F
.0082 lb/lb
27.7 °F
P 80.0 °F
H .0090 lb/lb
T 29.0 °F
H 80.0 °F
U .0090 lb/lb
M 29.0 °F
12.1 KW
84.1 °F .0090 lb/lb
30.1 °F
H 84.1 °F
T .0090 lb/lb
G 30.1 °F
C 55.0 °F
L .0083 lb/lb
G 22.3 °F
PREHEAT : 9,107 X 1.08 X (80.0 - 80.0) : 0
HUMIDITY : 9,107 X 4840 X (.0090 - .0090) : 0
COOLING : 6,139 X 4.50 X (30.1 - 22.3) : 215,513
HEATING : 2,968 X 1.08 X (84.1 - 84.1) : 0
BIN HOURS = 39.3
OPER HOURS= 39.3
MIXING
MIXING
MIXING
MIXING
MIXING
35,239 18,289 24,013 18,198 37,228 LOAD
65.7 64.1 66.4 63.9 61.8 TEMP
1,676 838 1,165 829 1,631 C CD
973 383 750 363 500 C HD
0 0 0 0 0 BASE

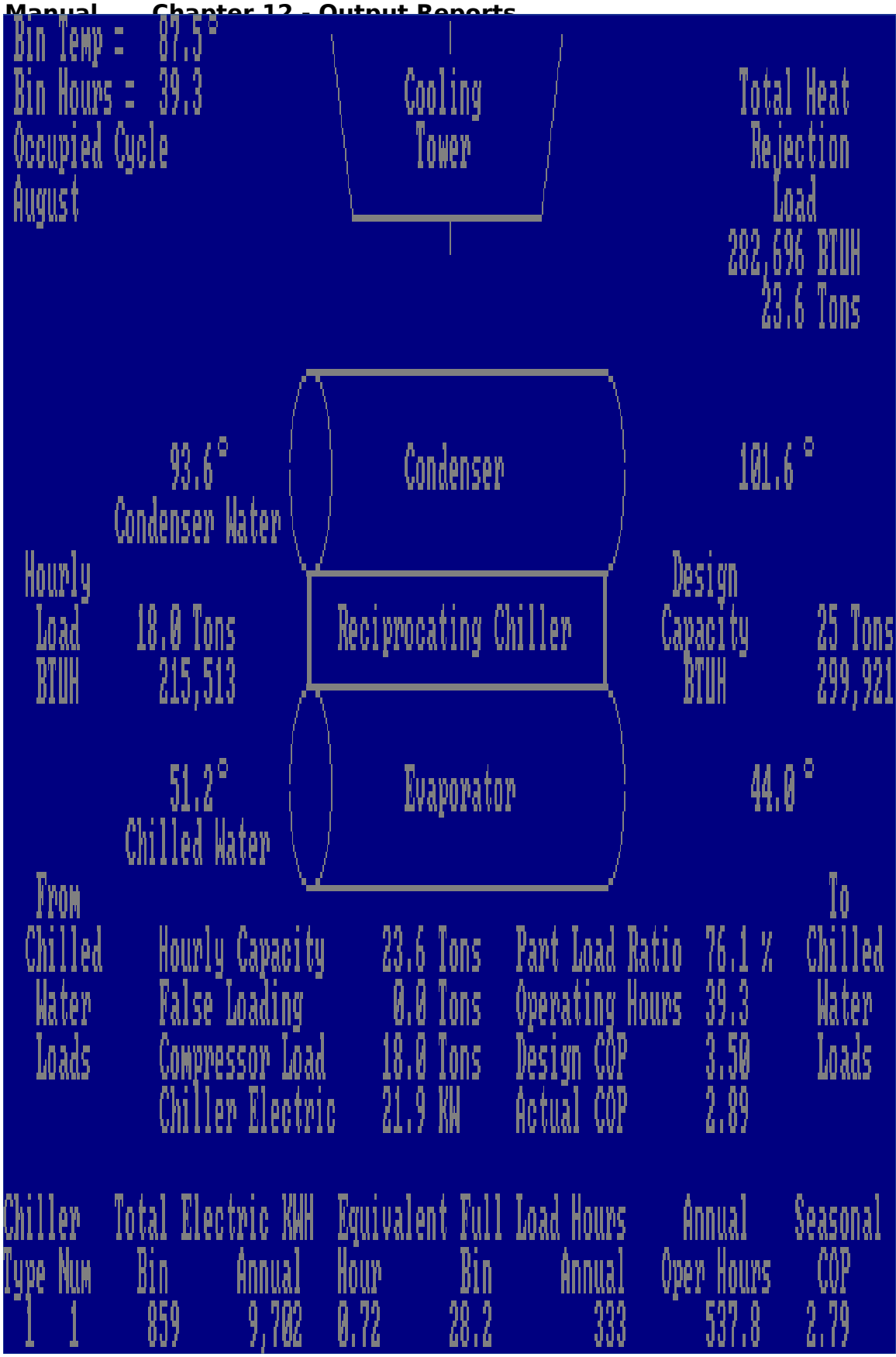
Sample ASEAM3.0 Graphic Screen - Domestic Hot Water


Month = Dec Cycle = Occupied
Bin Temp = 27.5
Bin Hours = 31.8
DHW Usage Load 7,237 BTUH
Losses Load 200 BTUH
DHW Total Load 7,437 BTUH
Avg DHW Usage 10.0 GPH
Combustion Air
Domestic Hot Water Heater
Supply Water 140.0 deg F
Bin Efficiency = 73.5 %
Incoming Water 53.2 deg F
Nat Gas
0.1 Therms
Energy (Therms)
Bin Annual
3 252
Equivalent Full Load Hours
Hour Bin Annual
0.20 6.3 489
Annual Pump KWH
0.0
Seasonal Eff (%)
73.22

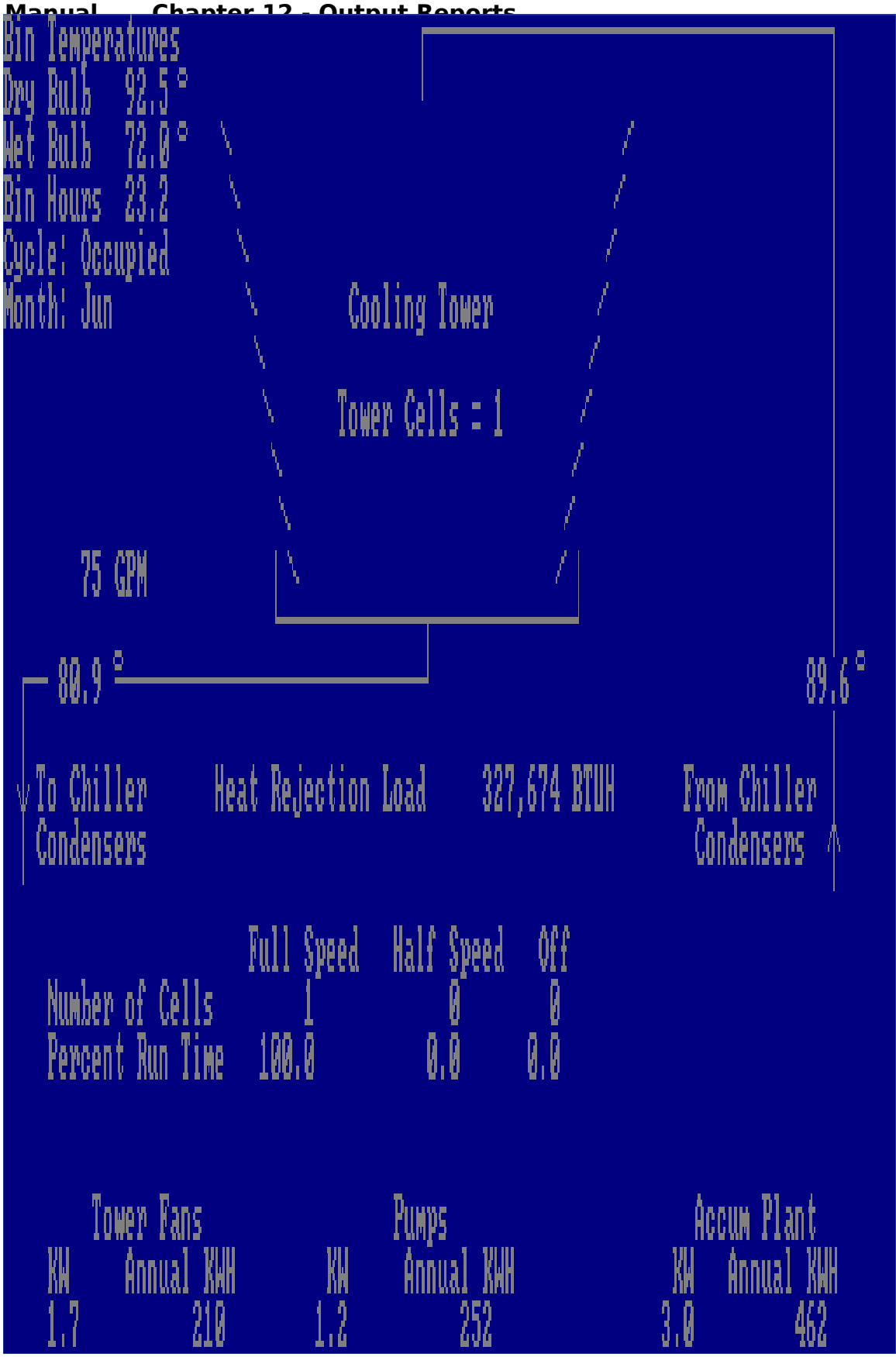
Sample ASEAM3.0 Graphic Screen - Boiler


Cycle: Occupied Jan
Bin Temp = 17.5 °
Bin Hours = 15.7
Bin Efficiency = 62.9 %
Heating Load 204,546 BTUH
Total Losses 12,159 BTUH
Boiler Load 216,705 BTUH
Boiler
Boiler Plant Losses
% Cap 2.0 % 8,068 BTUH
% Load 2.0 % 4,091 BTUH
Nat Gas
3.4 Therms
Boiler Energy (Therms) Equivalent Full Load Hours Annual Seasonal
Type Num Bin Annual Hour Bin Annual Htg Hours Eff (%)
1 1 54 586 0.54 8.4 89 200.4 61.60

Sample ASEAM3.0 Graphic Screen - Reciprocating Chiller


Bin Temp = 87.5°
Bin Hours = 39.3
Occupied Cycle
August
Cooling Tower
Total Heat Rejection Load
282,696 BTUH
23.6 Tons
93.6°
Condenser Water
Condenser
101.6°
Hourly Load 18.0 Tons
BTUH 215,513
Reciprocating Chiller
Design Capacity 25 Tons
BTUH 299,921
51.2°
Chilled Water
Evaporator
44.0°
From Chilled Water Loads
To Chilled Water Loads
Hourly Capacity 23.6 Tons
False Loading 0.0 Tons
Compressor Load 18.0 Tons
Chiller Electric 21.9 KW
Part Load Ratio 76.1 %
Operating Hours 39.3
Design COP 3.50
Actual COP 2.89
Chiller Type Num
Total Electric KWH Bin Annual
Equivalent Full Load Hours Bin Annual
Annual Oper Hours
Seasonal COP
1 1 859 9,702 0.72 28.2 333 537.8 2.79

Sample ASEAM3.0 Graphic Screen - Cooling Tower


Bin Temperatures
Dry Bulb 92.5°
Wet Bulb 72.0°
Bin Hours 23.2
Cycle: Occupied
Month: Jun
Cooling Tower
Tower Cells = 1
75 GPM
80.9°
89.6°
To Chiller Condensers
Heat Rejection Load 327,674 BTUH
From Chiller Condensers
Full Speed Half Speed Off
Number of Cells 1 0 0
Percent Run Time 100.0 0.0 0.0
Tower Fans
KW Annual KWH
1.7 210
Pumps
KW Annual KWH
1.2 252
Accum Plant
KW Annual KWH
3.0 462

12.5.2 Run-Time Calculation Reports

Examples of run-time loads calculations are shown on the following pages. The calculation reports for the systems and plant calculations vary with system type and plant component. The examples shown below only include the load calculations.

Run-time calculations will be printed when you press the F7 key during the calculations. For the Loads segment *only*, run-time calculations will be displayed on the screen when you press the F3 key. Refer to Section 12.3 for details.

Exterior Load Calculations

ASEAM3 breaks down the exterior loads into two load components - time (CLTD) and temperature (conduction) dependent loads. The wall and roof conduction and CLTD loads were calculated using the CLTD method outlined in Chapter 26 of the 1985 ASHRAE Handbook of Fundamentals (see Table 7), where

Wall Load = U * A * Corrected CLTD

where:
Corr. CLTD = [(CLTD + LM) * K + (78 - Tr) + (To - 85)]

= [(CLTD + LM) * K + (78 -85)] + [(To - Tr)]

or:

Wall Load = U * A * [(CLTD + LM) * K - 7] CLTD term (time dependent)
+
U * A * (To - Tr) conduction term (temperature dependent)

with,

U	=	wall U Factor, Btu / hr-ft²-°F
A	=	wall area, ft²
CLTD	=	1985 ASHRAE Fundamentals, Chapter 26 - Table 7
LM	=	latitude and month correction, Chapter 26 - Table 9
K	=	color correction, see footnote in Table 7, Chapter 26
To	=	outside air temperature, °F
Tr	=	room or zone set point temperature, °F

Outlined below are sample conduction and CLTD outputs.

Wall Conduction

	a)	b)	c)	d)	e)	f)	g)	h)	i)
Load Calc	Z#	M#	S#	U-FCT	AREA	OAT	SPC T	WALL LOAD	ACCUM WALL
Wall Cond	1	2	1	(0.100)(	700)(	57.5 -	68.0)=	-735	-735
Wall Cond	1	2	1	(0.100)(	700)(	-2.5 -	68.0)=	-4,935	-4,935
Wall Cond	1	2	1	(0.100)(	700)(	57.5 -	60.0)=	-175	-175
Wall Cond	1	2	1	(0.100)(	700)(	-2.5 -	60.0)=	-4,375	-4,375

a) is the zone number

b) is the month number

c) is the wall type. It corresponds to one of the four columns entered in the wall input screen.

d) is the wall U-Value. (Wall Input Screen); [Btu / hr-ft²-°F]

e) is the wall area. (Wall Input Screen); [ft²]

f) is the outside air temperature. (Maximum and minimum bin temperature for the month). [°F]

g) is the zone set point temperature. (Zone Input Screen); [°F]

h) is the wall load due to "pure" conduction. (i.e. no CLTD correction)
(h) = (d) * (e) * [(f)-(g)]; [Btu/hr]

i) Accumulated wall conduction from all wall types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases for each wall. These are:

Case#1: Occupied cycle, high temperature bin. (Max. outside temp.)
Case#2: Occupied cycle, low temperature bin. (Min. outside temp.)

Case#3: Same as case #1 for unoccupied cycle.
Case#4: Same as case #2 for unoccupied cycle.

Wall CLTD

a) b) c) d) e) f) g) h) i) j) k) l) m)
Load Z# M# S# HR SOL# U-FCT AREA CLTD LMC COL C CLTD LD ACC LD

Wall CLTD 1 2 1 1 1.1 (0.100)(700)[(18.8 + 12)(0.83)-7]= 1,297 1,297 Wall CLTD 1 2 1 2 2.1 (0.100)(700)[(16.8 + 12)(0.83)-7]= 1,181 1,181 Wall CLTD 1 2 1 3 3.1 (0.100) (700)[(14.8 + 12)(0.83)-7]= 1,065 1,065 Wall CLTD 1 2 1 4 4.1 (0.100)(700)[(12.8 + 12)(0.83)-7]= 949 949 Wall CLTD 1 2 1 5 5.1 (0.100)(700)[(10.8 + 12)(0.83)-7]= 833 833 Wall CLTD 1 2 1 6 6.1 (0.100)(700)[(8.9 + 12)(0.83)-7]= 723 723 Wall CLTD 1 2 1 7 7.1 (0.100)(700)[(7.9 + 12)(0.83)-7]= 665 665 Wall CLTD 1 2 1 8 8.1 (0.100)(700)[(6.9 + 12)(0.83)-7]= 607 607 Wall CLTD 1 2 1 9 9.1 (0.100)(700)[(6.0 + 12)(0.83)-7]= 556 556 Wall CLTD 1 2 1 10 10.1 (0.100)(700)[(6.1 + 12)(0.83)-7]= 563 563 Wall CLTD 1 2 1 11 11.1 (0.100)(700)[(7.2 + 12)(0.83)-7]= 628 628 Wall CLTD 1 2 1 12 12.1 (0.100)(700)[(9.4 + 12)(0.83)-7]= 751 751 Wall CLTD 1 2 1 13 13.1 (0.100)(700)[(12.5 + 12)(0.83)-7]= 932 932 Wall CLTD 1 2 1 14 14.1 (0.100) (700)[(16.5 + 12)(0.83)-7]= 1,164 1,164 Wall CLTD 1 2 1 15 15.1 (0.100)(700)[(20.5 + 12)(0.83)-7]= 1,397 1,397 Wall CLTD 1 2 1 16 16.1 (0.100)(700)[(24.4 + 12)(0.83)-7]= 1,622 1,622 Wall CLTD 1 2 1 17 17.1 (0.100)(700)[(27.2 + 12)(0.83)-7]= 1,790 1,790 Wall CLTD 1 2 1 18 18.1 (0.100)(700)[(29.0 + 12)(0.83)-7]= 1,892 1,892 Wall CLTD 1 2 1 19 19.1 (0.100)(700)[(29.0 + 12)(0.83)-7]= 1,892 1,892 Wall CLTD 1 2 1 20 20.1 (0.100)(

700)[(28.8 + 12)(0.83)-7]= 1,878 1,878 Wall CLTD 1 2 1 21 21.1 (0.100)(700)[(26.9 + 12)(0.83)-7]= 1,769 1,769 Wall CLTD 1 2 1 22 22.1 (0.100)(700)[(25.8 + 12)(0.83)-7]= 1,704 1,704 Wall CLTD 1 2 1 23 23.1 (0.100)(700)[(23.8 + 12)(0.83)-7]= 1,588 1,588 Wall CLTD 1 2 1 24 24.1 (0.100)(700)[(21.6 + 12)(0.83)-7]= 1,465 1,465

a) is the zone number

b) is the month number

c) is the wall type. It corresponds to one of the four columns entered in the wall input screen.

d) is the local time.

e) is the solar time.

f) is the wall U-value. (Wall Input Screen); [Btu / hr-ft²-°F]

g) is the wall area. (Wall Input Screen); [ft²]

h) is the Cooling Load Temperature Difference. Based on wall orientation, classification (U-value/thermal mass) and location's latitude. [°F] 1985 ASHRAE Fundamentals, Chapter 26 - Table 7. (Adjusted for the local solar hour)

i) is a CLTD latitude/month correction. 1985 ASHRAE Fundamentals, Chapter 26 - Table 9.

j) is a CLTD color adjustment factor. (Wall Input Screen)

k) is a CLTD temperature adjustment resulting from rearranging the equation for the corrected CLTD in 1985 ASHRAE Fundamentals, Chapter 26 - Table 7. (k)= 7 °F)

l) is the wall load resulting from the CLTD component. This part of the load accounts for solar gains through opaque walls, radiative exchanges of wall surface with ambient, ... See 1985 ASHRAE Fundamentals, Chapter 26. [Btu/hr]

m) is the accumulated wall CLTD loads from all wall types. [Btu/hr]

Roof Conduction

	a)	b)	c)	d)	e)	f)	g)	h)	i)
Load Calc	Z#	M#	S#	U-FCT	AREA	OAT	SPC T	BIN LOAD	ACCUM LOAD
Roof Cond	1	2	1	(0.100)(	900)(	57.5 -	68.0)=	-945	-945
Roof Cond	1	2	1	(0.100)(	900)(	-2.5 -	68.0)=	-6,345	-6,345
Roof Cond	1	2	1	(0.100)(	900)(	57.5 -	60.0)=	-225	-225
Roof Cond	1	2	1	(0.100)(	900)(	-2.5 -	60.0)=	-5,625	-5,625

a) is the zone number

b) is the month number

c) is the roof type. It corresponds to one of the two columns entered in the roof input screen.

d) is the roof U-Value. (Roof Input Screen); [Btu / hr-ft²-°F]

e) is the wall area. (Roof Input Screen); [ft²]

f) is the outside air temperature. (Max/Min from weather data for the month). [°F]

g) is the set point / zone temperature. (Zone Input Screen); [°F]

h) is the roof load due to "pure" conduction. (i.e. no CLTD correction)
(h) = (d) * (e) * [(f)-(g)]; [Btu/hr]

i) Accumulated roof conduction from all roof types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases as in the wall conduction

Roof CLTD

Load	a) Z#	b) M#	c) S#	d) HR	e) SOL#	f) U-FCT	g) AREA	h) CLTD	i) LMC	j) COL	k) C	l) CLTD LD	m) ACC LD
Roof CLTD	1	2	1	1	1.1	(0.100)	(900)	[(31.5 + -14)(1.00)-7]=				947	2,245
Roof CLTD	1	2	1	2	2.1	(0.100)	(900)	[(27.4 + -14)(1.00)-7]=				577	1,758
Roof CLTD	1	2	1	3	3.1	(0.100)	(900)	[(22.5 + -14)(1.00)-7]=				137	1,202
Roof CLTD	1	2	1	4	4.1	(0.100)	(900)	[(18.6 + -14)(1.00)-7]=				-212	737
Roof CLTD	1	2	1	5	5.1	(0.100)	(900)	[(15.6 + -14)(1.00)-7]=				-482	351
Roof CLTD	1	2	1	6	6.1	(0.100)	(900)	[(12.6 + -14)(1.00)-7]=				-752	-29
Roof CLTD	1	2	1	7	7.1	(0.100)	(900)	[(9.8 + -14)(1.00)-7]=				-1,011	-346
Roof CLTD	1	2	1	8	8.1	(0.100)	(900)	[(7.9 + -14)(1.00)-7]=				-1,181	-574
Roof CLTD	1	2	1	9	9.1	(0.100)	(900)	[(7.1 + -14)(1.00)-7]=				-1,249	-694
Roof CLTD	1	2	1	10	10.1	(0.100)	(900)	[(8.4 + -14)(1.00)-7]=				-1,138	-575
Roof CLTD	1	2	1	11	11.1	(0.100)	(900)	[(11.6 + -14)(1.00)-7]=				-847	-219
Roof CLTD	1	2	1	12	12.1	(0.100)	(900)	[(16.7 + -14)(1.00)-7]=				-386	364
Roof CLTD	1	2	1	13	13.1	(0.100)	(900)	[(22.8 + -14)(1.00)-7]=				164	1,096
Roof CLTD	1	2	1	14	14.1	(0.100)	(900)	[(29.8 + -14)(1.00)-7]=				794	1,959
Roof CLTD	1	2	1	15	15.1	(0.100)	(900)	[(36.7 + -14)(1.00)-7]=				1,414	2,810
Roof CLTD	1	2	1	16	16.1	(0.100)	(900)	[(42.7 + -14)(1.00)-7]=				1,954	3,576
Roof CLTD	1	2	1	17	17.1	(0.100)	(900)	[(48.5 + -14)(1.00)-7]=				2,473	4,262
Roof CLTD	1	2	1	18	18.1	(0.100)	(900)	[(52.2 + -14)(1.00)-7]=				2,811	4,703
Roof CLTD	1	2	1	19	19.1	(0.100)	(900)	[(54.0 + -14)(1.00)-7]=				2,970	4,862
Roof CLTD	1	2	1	20	20.1	(0.100)	(900)	[(53.6 + -14)(1.00)-7]=				2,938	4,816
Roof CLTD	1	2	1	21	21.1	(0.100)	(900)	[(50.5 + -14)(1.00)-7]=				2,657	4,427
Roof CLTD	1	2	1	22	22.1	(0.100)	(900)	[(46.4 + -14)(1.00)-7]=				2,287	3,991
Roof CLTD	1	2	1	23	23.1	(0.100)	(900)	[(41.4 + -14)(1.00)-7]=				1,837	3,425
Roof CLTD	1	2	1	24	24.1	(0.100)	(900)	[(36.4 + -14)(1.00)-7]=				1,387	2,852

a) is the zone number

b) is the month number

c) is the roof type. It corresponds to one of the two columns entered in the roof input screen.

d) is the local time.

e) is the solar time.

f) is the roof U-value. (Roof Input Screen); [Btu / hr-ft²-°F]

g) is the roof Area. (Roof Input Screen); [ft²]

h) is the Cooling Load Temperature Difference. Based on roof classification (U-value/thermal mass) and location's latitude. [°F] 1985 ASHRAE Fundamentals, Chapter 26 - Table 5.

i) is a CLTD latitude/month correction. 1985 ASHRAE Fundamentals, Chapter 26 - Table 9.

j) is a CLTD color adjustment factor. (Roof Input Screen)

k) is a CLTD temperature adjustment resulting from rearranging the equation for the corrected CLTD in 1985 ASHRAE Fundamentals, Chapter 26 - Table 5. (k)= 7 °F)

l) is the roof load resulting from the CLTD component. This part of the load accounts for solar gains through opaque roofs, radiative exchanges of roof surface with ambient, ... See 1985 ASHRAE Fundamentals, Chapter 26. [Btu/hr]

m) is the accumulated CLTD loads from all wall and roof types. [Btu/hr]

Glass Conduction

	a)	b)	c)	d)	e)	f)	g)	h)	i)	
Load Calc	Z#	M#	S#	U-FCT	AREA	OAT	SPC T	BIN LOAD	ACCUM LOAD	
Glass Cond	1	2	1	(0.570)(	300)(	57.5 -	68.0)=	-1,796	-1,796	
Glass Cond	1	2	1	(0.570)(	300)(	-2.5 -	68.0)=	-12,056	-12,056	
Glass Cond	1	2	1	(0.570)(	300)(	57.5 -	60.0)=	-428	-428	
Glass Cond	1	2	1	(0.570)(	300)(	-2.5 -	60.0)=	-10,688	-10,688	

a) is the zone number

b) is the month number

c) is the window type. It corresponds to one of the four columns entered in the window input screen.

d) is the window U-Value. (Window Input Screen); [Btu / hr-ft²-°F]

e) is the window area. (Window Input Screen); [ft²]

f) is the outside air temperature. (Maximum and minimum bin temperatures for

the month). [°F]

g) is the zone setpoint temperature. (Zone Input Screen); [°F]

h) is the window load due to "pure" conduction. (i.e. no CLTD correction)
(h) = (d) * (e) * [(f)-(g)]; [Btu/hr]

i) Accumulated window conduction from all window types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases as in the wall conduction

Glass CLTD

	a)	b)	c)	d)	e)	f)	g)	h)	i)	j)	k)
Load	Z#	M#	S#	HR	SOL#	U-FCT	AREA	CLTD		CLTD LOAD	ACCUM LOAD
Glass CLTD	1	2	1	1	1.1	(0.570)	(300)	(0.9 - 7)	=	-1,046	1,199
Glass CLTD	1	2	1	2	2.1	(0.570)	(300)	(-0.1 - 7)	=	-1,217	541
Glass CLTD	1	2	1	3	3.1	(0.570)	(300)	(-1.1 - 7)	=	-1,388	-186
Glass CLTD	1	2	1	4	4.1	(0.570)	(300)	(-2.0 - 7)	=	-1,539	-802
Glass CLTD	1	2	1	5	5.1	(0.570)	(300)	(-2.0 - 7)	=	-1,539	-1,188
Glass CLTD	1	2	1	6	6.1	(0.570)	(300)	(-2.0 - 7)	=	-1,539	-1,568
Glass CLTD	1	2	1	7	7.1	(0.570)	(300)	(-1.8 - 7)	=	-1,499	-1,845
Glass CLTD	1	2	1	8	8.1	(0.570)	(300)	(0.2 - 7)	=	-1,157	-1,730
Glass CLTD	1	2	1	9	9.1	(0.570)	(300)	(2.2 - 7)	=	-815	-1,508
Glass CLTD	1	2	1	10	10.1	(0.570)	(300)	(4.4 - 7)	=	-452	-1,028
Glass CLTD	1	2	1	11	11.1	(0.570)	(300)	(7.2 - 7)	=	40	-179
Glass CLTD	1	2	1	12	12.1	(0.570)	(300)	(9.4 - 7)	=	403	767
Glass CLTD	1	2	1	13	13.1	(0.570)	(300)	(12.1 - 7)	=	875	1,971
Glass CLTD	1	2	1	14	14.1	(0.570)	(300)	(13.1 - 7)	=	1,046	3,005
Glass CLTD	1	2	1	15	15.1	(0.570)	(300)	(14.0 - 7)	=	1,197	4,007
Glass CLTD	1	2	1	16	16.1	(0.570)	(300)	(13.9 - 7)	=	1,177	4,753
Glass CLTD	1	2	1	17	17.1	(0.570)	(300)	(12.9 - 7)	=	1,006	5,268
Glass CLTD	1	2	1	18	18.1	(0.570)	(300)	(11.8 - 7)	=	815	5,518
Glass CLTD	1	2	1	19	19.1	(0.570)	(300)	(9.8 - 7)	=	473	5,335
Glass CLTD	1	2	1	20	20.1	(0.570)	(300)	(7.8 - 7)	=	131	4,947
Glass CLTD	1	2	1	21	21.1	(0.570)	(300)	(5.8 - 7)	=	-211	4,215
Glass CLTD	1	2	1	22	22.1	(0.570)	(300)	(3.9 - 7)	=	-533	3,458
Glass CLTD	1	2	1	23	23.1	(0.570)	(300)	(2.9 - 7)	=	-704	2,721
Glass CLTD	1	2	1	24	24.1	(0.570)	(300)	(1.9 - 7)	=	-875	1,976

a) is the zone number

b) is the month number

c) is the window type. It corresponds to one of the four columns entered in the window input screen.

d) is the local time.

e) is the solar time.

f) is the window U-value. (Window Input Screen); [Btu / hr-ft²-°F]

g) is the window area. (Window Input Screen); [ft²]

h) is the Cooling Load Temperature Difference for glass conduction. 1985 ASHRAE Fundamentals, Chapter 26 - Table 10. (adjusted for the solar hour); [°F]

i) is a CLTD temperature adjustment resulting from rearranging the equation for CLTD in 1985 ASHRAE Fundamentals, Chapter 26 - Table 10. (k)= 7 °F)

j) is the window load resulting from the CLTD component ... See 1985 ASHRAE Fundamentals, Chapter 26, page 26.13. [Btu/hr]

k) is the accumulated CLTD loads from all wall, roof and window types. [Btu/hr]

Exterior Window Shading

Load	a) Z#	b) M#	c) S#	d) HR	e) SOL#	f) AREA	g) MSHG	h) CLFG	i) SHDC	j) CLF LOAD	k) ACCUM LOAD
Glass Direct	1	2	1	1	1.1	(300)	(247)	(0.12)	(0.80)	= 7,044	7,044
Glass Shade	1	2	1	1	1.1	(0)	(22)	(0.23)	(0.80)	= 0	7,044

HOURS BETWEEN 1:00 A.M AND SUNRISE :

a) is the zone number

b) is the month number

c) is the window type. It corresponds to one of the four columns entered in the window input screen.

d) is the local time.

e) is the solar time.

f) is the window area. (Window Input Screen); [ft²]

g) is the Maximum Solar Heat Gain Factor (hourly), from 1985 ASHRAE Fundamentals, Chapter 26 - Table 11. These values are provided for each month as a function of latitude and orientation.

h) is the Cooling Load Factor for Glass, from 1985 ASHRAE Fundamentals, Chapter 26 - Table 13. These values are provided for each hour for different thermal mass levels and windows orientations.

i) is the window Shading Coefficient. (Window Input Screen) ... See 1985 ASHRAE Fundamentals, Chapter 27 for further discussion.

j) is the cooling load due to fenestration solar heat gain for the hour. From equation 12, page 26.14 of the 1985 ASHRAE Fundamentals. [Btu/hr]

k) is the accumulated cooling load due to solar gains from all window types. [Btu/hr]

```
Glass Direct  1  2  1  6  6.1 (  300)( 247)(0.08)(0.80)=      4,952       4,952
Glass Shade   1  2  1  6  6.1 (    0)(  22)(0.35)(0.80)=          0       4,952


WALL   SOLAR   ANGLE  SOLAR    <------- AREAS SHADED ------->    TOTAL    TOTAL
AZIM  AZIMUTH   DIFF   ALT     OVER                  SIDE   SHADED   SUNLIT
180   108.8   -71.2    1.0     0.1      0.0     0.0      7.3      7.4     7.61

          a) b) c) d)  e)     f)    g)    h)    i)         j)         k)
Load        Z# M# S# HR SOL#   AREA  MSHG  CLFG  SHDC     CLF LOAD  ACCUM LOAD

Glass Direct  1  2  1  7  7.1 (  152)( 247)(0.11)(0.80)=      3,417       4,498
Glass Shade   1  2  1  7  7.1 (  148)(  22)(0.42)(0.80)=      1,081       4,498
```

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.

HOURS BETWEEN SUNRISE AND SUNSET:

For the hours that the sun is up, the shaded areas of the typical window are calculated as a function of the hourly solar angles and the window geometry. The results are presented in two tables for each hour. The first table outlines the data and results of the shading calculations, the second table presents the calculated cooling loads in exactly the same format as for the other hours of the day (i.e. a) ... k) are the same entries as for hours between 1:00 a.m. and Sunrise). The portion of the total window area that is shaded is assigned a north facing orientation (with maximum solar heat gain factors and cooling load factors for north). This method of estimating the cooling loads due to solar heat gain is an approximation based on an extrapolation of the method used for non-shaded windows as presented in 1985 ASHRAE Fundamentals, chap 26.14.

The method used to perform the shading calculations was based on an algorithm presented in "Procedures for Determining Heating and Cooling Loads for Computerizing Energy Calculations, Algorithms for Building Heat Transfer Subroutines", 1985 ASHRAE Energy Calculations 1 (1975).

All shading calculations are done on per window basis, then generalized to the total glazing area.

```
WALL   SOLAR   ANGLE  SOLAR    <------- AREAS SHADED ------->    TOTAL    TOTAL
AZIM  AZIMUTH   DIFF   ALT     OVER                  SIDE   SHADED   SUNLIT
180   249.3    69.3    3.0     0.2      0.0     0.0      6.6      6.7     8.26

Load        Z# M# S# HR SOL#   AREA  MSHG  CLFG  SHDC     CLF LOAD  ACCUM LOAD
Glass Direct  1  2  1 17 17.1 (  165)( 247)(0.40)(0.80)=     13,191      14,950
Glass Shade   1  2  1 17 17.1 (  135)(  22)(0.74)(0.80)=      1,760      14,950


Glass Direct  1  2  1 18 18.1 (  300)( 247)(0.35)(0.80)=     20,851      20,851
Glass Shade   1  2  1 18 18.1 (    0)(  22)(0.67)(0.80)=          0      20,851
```

HOURS BETWEEN SUNSET AND MIDNIGHT:

(Same entries as hours between 1:00 a.m. and Sunrise)

```
Glass Direct  1  2  1 24 24.1 (  300)( 247)(0.14)(0.80)=      8,159      8,159
Glass Shade   1  2  1 24 24.1 (    0)(  22)(0.27)(0.80)=          0      8,159
```

Glass Infiltration

```
        a) b) c)    d)    e)    f)      g)          h)          i)
Load Calc   Z# M# S#  CFM I        OAT    SPC T     BIN LOAD    ACCUM LOAD

Glass Infil  1  2  1 (  141)(1.08)( 57.5 -  68.0)=     -1,602       -1,602
Glass Infil  1  2  1 (  141)(1.08)( -2.5 -  68.0)=    -10,755      -10,755
Glass Infil  1  2  1 (  141)(1.08)( 57.5 -  60.0)=       -381         -381
Glass Infil  1  2  1 (  141)(1.08)( -2.5 -  60.0)=     -9,535       -9,535
```

a) is the zone number

b) is the month number

c) is the window type. It corresponds to one of the four columns entered in the window input screen.

d) is the crack induced infiltration rate in CFM, calculated once every month based on the wind speed and pressure, crack length and leakage coefficient.

CFM I = CRACK LENGTH * LEAKAGE COEFFICIENT * INFILC

with,

INFILC= (WIND PRESSURE)^0.65

WIND PRESSURE= 0.000482 * (MONTHLY AVERAGE WIND SPEED)^2

Please refer to section A5.7 of the "Cooling and Heating Load Calculation Manual" of ASHRAE GRP 158 (1979) for further discussion.

e) 1.08 is a conversion factor used to convert air flow (CFM) rate and temperature into an energy term

1.08 = AIR DENSITY * SPECIFIC HEAT OF AIR * 60 MINUTES/HR

= 0.075 * 0.24 * 60

f) is the outside air temperature. (Maximum and minimum bin temperatures for the month). [°F]

g) is the zone setpoint temperature. (Zone Input Screen); [°F]

h) is the window load due to infiltration through window cracks. [Btu/hr]

i) is the accumulated crack infiltration load from all window types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases as in the wall conduction

Door Conduction

	a)	b)	c)	d)	e)	f)	g)	h)	i)
Load Calc	Z#	M#	S#	U-FCT	AREA	OAT	SPC T	BIN LOAD	ACCUM LOAD
Door Cond	1	2	1	(0.700)(	42)(	57.5 -	68.0)=	-309	-309
Door Cond	1	2	1	(0.700)(	42)(	-2.5 -	68.0)=	-2,073	-2,073
Door Cond	1	2	1	(0.700)(	42)(	57.5 -	60.0)=	-74	-74
Door Cond	1	2	1	(0.700)(	42)(	-2.5 -	60.0)=	-1,838	-1,838

a) is the zone number

b) is the month number

c) is the door type. It corresponds to one of the two columns entered in the door input screen.

d) is the door U-Value. (Door Input Screen); [Btu / hr-ft²-°F]

e) is the door area. (Door Input Screen); [ft²]

f) is the outside air temperature. (Maximum and minimum bin temperatures for the month). [°F]

g) is the zone setpoint temperature. (Zone Input Screen); [°F]

h) is the door load due to "pure" conduction. (i.e. no CLTD correction)
(h) = (d) * (e) * [(f)-(g)]; [Btu/hr]

i) Accumulated door conduction from all door types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases as in the wall conduction

Door CLTD

	a)	b)	c)	d)	e)	f)	g)	h)	i)	j)	k)
Load Calc	Z#	M#	S#	HR	SOL#	U-FCT	AREA	CLTD		CLTD LOAD	ACCUM LOAD
Door CLTD	1	2	1	1	1.1	(0.700)(	42)(	0.9 -	7)=	-180	1,019
Door CLTD	1	2	1	2	2.1	(0.700)(	42)(	-0.1 -	7)=	-209	332
Door CLTD	1	2	1	3	3.1	(0.700)(	42)(	-1.1 -	7)=	-239	-424
Door CLTD	1	2	1	4	4.1	(0.700)(	42)(	-2.0 -	7)=	-265	-1,067
Door CLTD	1	2	1	5	5.1	(0.700)(	42)(	-2.0 -	7)=	-265	-1,453
Door CLTD	1	2	1	6	6.1	(0.700)(	42)(	-2.0 -	7)=	-265	-1,832
Door CLTD	1	2	1	7	7.1	(0.700)(	42)(	-1.8 -	7)=	-258	-2,102
Door CLTD	1	2	1	8	8.1	(0.700)(	42)(	0.2 -	7)=	-199	-1,929
Door CLTD	1	2	1	9	9.1	(0.700)(	42)(	2.2 -	7)=	-140	-1,648
Door CLTD	1	2	1	10	10.1	(0.700)(	42)(	4.4 -	7)=	-78	-1,106

```
Door CLTD   1  2  1 11 11.1 (0.700)(   42)(  7.2 - 7)=       7        -172
Door CLTD   1  2  1 12 12.1 (0.700)(   42)(  9.4 - 7)=      69         836
Door CLTD   1  2  1 13 13.1 (0.700)(   42)( 12.1 - 7)=     150       2,122
Door CLTD   1  2  1 14 14.1 (0.700)(   42)( 13.1 - 7)=     180       3,185
Door CLTD   1  2  1 15 15.1 (0.700)(   42)( 14.0 - 7)=     206       4,213
Door CLTD   1  2  1 16 16.1 (0.700)(   42)( 13.9 - 7)=     202       4,955
Door CLTD   1  2  1 17 17.1 (0.700)(   42)( 12.9 - 7)=     173       5,441
Door CLTD   1  2  1 18 18.1 (0.700)(   42)( 11.8 - 7)=     140       5,658
Door CLTD   1  2  1 19 19.1 (0.700)(   42)(  9.8 - 7)=      81       5,416
Door CLTD   1  2  1 20 20.1 (0.700)(   42)(  7.8 - 7)=      22       4,970
Door CLTD   1  2  1 21 21.1 (0.700)(   42)(  5.8 - 7)=     -36       4,179
Door CLTD   1  2  1 22 22.1 (0.700)(   42)(  3.9 - 7)=     -92       3,366
Door CLTD   1  2  1 23 23.1 (0.700)(   42)(  2.9 - 7)=    -121       2,599
Door CLTD   1  2  1 24 24.1 (0.700)(   42)(  1.9 - 7)=    -150       1,826
```

a) is the zone number

b) is the month number

c) is the door type. It corresponds to one of the two columns entered in the door input screen.

d) is the local time.

e) is the solar time.

f) is the door U-value. (Door Input Screen); [Btu / hr-ft²-°F]

g) is the door area. (Door Input Screen); [ft²]

h) is the Cooling Load Temperature Difference for glass conduction. 1985 ASHRAE Fundamentals, Chapter 26 - Table 10. (Adjusted for the solar hour); [°F]

i) is a CLTD temperature adjustment resulting from rearranging the equation for CLTD in 1985 ASHRAE Fundamentals, Chapter 26 - Table 10. (k)= 7 °F)

j) is the door load resulting from the CLTD component; [Btu/hr]

k) is the accumulated CLTD loads from all wall, roof, window and door types. [Btu/hr]

Door Infiltration

```
          a) b) c)     d)    e)    f)      g)          h)          i)
Load Calc   Z# M# S#    CFM I        OAT    SPC T     BIN LOAD    ACCUM LOAD

Door Infil   1  2  1  (   44)(1.08)( 57.5 -  68.0)=      -505       -2,106
Door Infil   1  2  1  (   44)(1.08)( -2.5 -  68.0)=    -3,388      -14,143
Door Infil   1  2  1  (   44)(1.08)( 57.5 -  60.0)=      -120         -502
Door Infil   1  2  1  (   44)(1.08)( -2.5 -  60.0)=    -3,003      -12,538
```

a) is the zone number

b) is the month number

c) is the door type. It corresponds to one of the 2 columns entered in the door input screen.

d) is the crack induced infiltration rate in CFM, calculated once every month based on the wind speed and pressure, crack length and leakage coefficient.

CFM I = CRACK LENGTH * LEAKAGE COEFFICIENT * INFILC

with,

INFILC= (WIND PRESSURE)^0.65

WIND PRESSURE= 0.000482 * (MONTHLY AVERAGE WIND SPEED)^2

Please refer to section A5.7 of the "Cooling and Heating Load Calculation Manual" of ASHRAE GRP 158 (1979) for further discussion.

e) 1.08 is a conversion factor used to convert air flow (CFM) rate and temperature into an energy term

1.08 = AIR DENSITY * SPECIFIC HEAT OF AIR * 60 MINUTES/HR
= 0.075 * 0.24 * 60

f) is the outside air temperature. (Maximum and minimum bin temperatures for the month). [°F]

g) is the zone setpoint temperature. (Zone Input Screen); [°F]

h) is the door load due to infiltration through door cracks. [Btu/hr]

i) Accumulated crack infiltration from all door and window types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases as in the wall conduction

Air Change Infiltration

	a)	b)	c)	d)	e)	f)	g)	h)
Load Calc	Z#	M#	CFM I		OAT	SPC T	BIN LOAD	ACCUM LOAD
Air Change Infil	1	2	(38)	(1.08)	(57.5 -	68.0) =	-425	-2,532
Air Change Infil	1	2	(38)	(1.08)	(-2.5 -	68.0) =	-2,855	-16,998
Air Change Infil	1	2	(75)	(1.08)	(57.5 -	60.0) =	-203	-704
Air Change Infil	1	2	(75)	(1.08)	(-2.5 -	60.0) =	-5,063	-17,601

a) is the zone number

b) is the month number

c) is the infiltration rate -due to air change- in CFM, calculated once every month based on the number of air changes per hour entered in the infiltration screen.

INFILTRATION CFM = ACH * ZONE VOLUME * 1 HR / 60 MIN

d) 1.08 is a conversion factor used to convert air flow (CFM) and temperature into energy terms

1.08 = AIR DENSITY * SPECIFIC HEAT OF AIR * 60 MINUTES/HR
= 0.075 * 0.24 * 60

e) is the outside air temperature. (Maximum and minimum bin temperatures for the month). [°F]

f) is the set point / zone temperature. (Zone Input Screen); [°F]

g) is zone load due to infiltration calculated using the air change method. [Btu/hr]

h) is the accumulated <u>total</u> infiltration load for the zone. [Btu/hr]

<u>Note:</u> Each of the above entries is provided for 4 cases as in the wall conduction

<u>Miscellaneous Conduction</u>

	a)	b)	c)	d)	e)	f)	g)	h)	i)
Load Calc	Z#	M#	S#	U-FCT	AREA	OAT	SPC T	BIN LOAD	ACCUM LOAD
Misc Cond	1	2	1	(0.350)(	250)(	73.9 -	68.0)=	520	520
Misc Cond	1	2	1	(0.350)(	250)(	55.0 -	68.0)=	-1,137	-1,137
Misc Cond	1	2	1	(0.350)(	250)(	73.9 -	60.0)=	1,220	1,220
Misc Cond	1	2	1	(0.350)(	250)(	55.0 -	60.0)=	-438	-438

a) is the zone number

b) is the month number

c) is the miscellaneous conduction type. It corresponds to one of the two columns entered in the miscellaneous conduction input screen.

d) is the miscellaneous conduction U-Value. (Miscellaneous conduction Input Screen); [Btu / hr-ft^2-°F]

e) is the miscellaneous conduction area. (Miscellaneous conduction Input Screen); [ft^2]

f) is the outside air temperature. (Maximum and minimum bin temperatures for the month). [°F]

g) is the set point / zone temperature. (Zone Input Screen); [°F]

h) is the miscellaneous conduction load
(h) = (d) * (e) * [(f)-(g)]; [Btu/hr]

i) is the accumulated miscellaneous conduction conduction from all miscellaneous conduction types. [Btu/hr]

Note: Each of the above entries is provided for 4 cases as in the wall conduction

Daylighting Calculations

ASEAM3 performs daylight calculations for two sky conditions. The first part of the calculations is for an overcast sky condition, the second is done for a clear sky condition.

The first two parts of the hourly output summarize the key parameters used in the calculations for the overcast and the clear sky conditions respectively. The same format is used in both cases. The following two tables summarize the daylight contribution in the two cases for the specified daylight control strategy. Finally, the table of lighting peak load is provided for the indicated hour.

It is important to note that the current version of ASEAM does not consider peak load reduction due to the presence of daylighting.

OVERCAST Hr = 7 Solar Alt 1.0 Surface Azimuth 180 Solar Azimuth 109

Illumination of sky on window (Ekw)	13	O.1)
Illumination of sky on ground (Ekg)	35	O.2)
Illumination of ground on window (Egw)	4	O.3)

FC on working plane from sky	0	O.4)
FC on working plane from ground	0	O.5)
FC total on working plane	1	O.6)

With,

O.1) is the illumination on the window from an overcast sky condition. See Figure 7-9 page 7.6 of the "Daylighting" section of the IES Lighting Handbook, 1984 Reference Manual.

O.2) is the illumination on the ground from an overcast sky condition. See Fig 7-9 page 7.6 of the "Daylighting" section of the IES Lighting Handbook, 1984 Reference Manual.

O.3) is the illumination on the window from the ground. This value is calculated by multiplying the ground illumination from the sky by the ground reflectance and the ground-to-window view factor.

O.4) is the total illuminance from the sky on the working plane in Foot-Candles for the control sensor location entered in the daylighting input screen. This value is calculated by multiplying the illuminance on the window by the glass transmittance and two coefficients of utilization determined from Figure 7-40 page 7.26 of the "Daylighting" section of the IES Lighting Handbook, 1984 Reference Manual. The first coefficient is provided as a function of room length and wall reflectance, the second is based on ceiling height and wall reflectance. Both are provided for various room widths. ASEAM uses a Lagrange interpolation procedure to provide the respective coefficients for the prescribed room conditions.

O.5) same as above for illuminance from ground.

O.6) is the total illuminance on the working plane under overcast sky conditions.

CLEAR SKY Hr = 7 Solar Alt 1.0 Surface Azimuth 180 Solar Azimuth 109

Illumination of sky on window (Ekw)	288	C.1)
Illumination of sun on window (Euw)	0	C.2)
Illumination of sky on ground (Ekg)	51	C.3)
Illumination of sun on ground (Eug)	2	C.4)
Illumination on window from sky / sun	288	C.5)
Illumination on ground from sky / sun	53	C.6)
Illumination on window from ground	5	C.7)
FC on working plane from sky	12	C.8)
FC on working plane from ground	0	C.9)
FC total on working plane	12	C.10)

with

C.1,2) are the illumination of the sky and sun on the window under clear sky condition. These numbers were calculated based on the procedures provided in the "Daylighting" section of the IES Lighting Handbook, 1984 Reference Manual, page 7-18. [footcandle]

C.3,4) are the illumination of the sky and sun on the ground. These figures are also based on the procedures provided in the "Daylighting" section of the IES Lighting Handbook, 1984 Reference Manual, page 7-18. [footcandle]

C.5) is the total illumination from the sun and the sky on the window. {C.1) + C.2}; [footcandle]

C.6) is the total illumination from the sun and the sky on the ground. {C.3) + C.4)}; [footcandle]

C.7) is the illumination on the window from the ground. This value is calculated by multiplying the ground illumination from the sky by the ground reflectance and the ground-to-window view factor.

C.8) is the total illuminance from the sky and sun on the working plane in Foot-Candles for the control sensor location entered in the daylighting input screen. This value is calculated by multiplying the illuminance on the window by the glass transmittance and two coefficients of utilization determined from Figure 7-40 page 7.26 of the "Daylighting" section of the IES Lighting Handbook, 1984 Reference Manual. The first coefficient is provided as a function of room length and wall reflectance, the second is based on ceiling height and wall reflectance. Both are provided for various room widths. ASEAM3 uses a Lagrange interpolation procedure to provide the respective coefficients for the prescribed room conditions.

C.9) same as above for illuminance from ground.

C.10) is the total illuminance on the working plane under clear sky conditions.

Sky Condition: Overcast Daylight Control: Dimming Hour = 7
Present FC = 60 Present Watts = 1,575 a)
Daylite FC = 1 b)
Art Lighting FC = 49 Revised Watts = 1,325 c)

Unoccupied Cycle Diversity Factor = 1.000 d)
(Percent time in sky condition = 0.530 Occupied Cycle Diversity Factor=0.823)

Sky Condition: Clear Daylight Control: Dimming Hour = 7
Present FC = 60 Present Watts = 1,575 a)
Daylite FC = 12 b)
Art Lighting FC = 38 Revised Watts = 1,059 c)

Unoccupied Cycle Diversity Factor = 1.000 d)
(Percent time in sky condition = 0.470 Occupied Cycle Diversity Factor=0.544)

a) This line contains two figures. The first is the total illumination intensity on the working plane resulting from both artificial and daylight. The second is the total installed watts in the room. Note that the first number could be larger than the design illumination intensity depending on the type of daylighting control used.

b) is the daylight contribution to the required lighting level.

c) This line contains two figures. The first is the artificial light contribution to the lighting level. The second is the effective lighting watts in the space. This value is calculated by deducting the equivalent watts of the daylight contribution from the total installed watts.

d) This line of output has two formats. The first is a format used for unoccupied hours, the second is used for occupied periods. A sample of the second format was included in the above output as an example. (This sample was extracted from a different hour and is shown above between parenthesis)

* Unoccupied Hours Format: Only one output value, the night time diversity factor.

* Occupied Hours Format: Two output values, the first is a ratio reflecting the fraction of time the sky was under the given condition; i.e. overcast or clear, this number is deduced from the percent possible sunshine values for the respective month. The second number is a diversity factor reflecting the daylight contribution.

NOTE: The above calculations are provided in two sets. The first set provides all calculations for the overcast sky conditions. The second set provides the calculations for the clear sky condition. The overall daylighting contribution is estimated by multiplying the overcast and clear sky contribution by their respective fraction of time.

a) b) c) d) e) f) g) h) i) j) k)
Load Calc Z# M# S# H# BTU/WT LTG WT CLFL HTSPC BIN LOAD ACCUM LOAD
Lighting 1 2 1 1 7 (3.413)(1575)(0.13)(0.80)= 542 542
Plenum 1 2 1 1 7 (3.413)(1575)(0.13)(0.20)= 135 135
.
.

HOURS BETWEEN SUNRISE AND SUNSET

OVERCAST Hr =17 Solar Alt 3.0 Surface Azimuth 180 Solar Azimuth 249
Illumination of sky on window (Ekw) 40

```
 Illumination of sky on ground (Ekg)       105
 Illumination of ground on window (Egw)     11

  FC on working plane from sky             1
  FC on working plane from ground           0
  FC total on working plane                2

CLEAR SKY  Hr =17   Solar Alt    3.0  Surface Azimuth  180   Solar Azimuth 249
 Illumination of sky on window (Ekw)       415
 Illumination of sun on window (Euw)        73
 Illumination of sky on ground (Ekg)       147
 Illumination of sun on ground (Eug)        44
 Illumination on window from sky / sun     488
 Illumination on ground from sky / sun     191
 Illumination on window from ground         19

  FC on working plane from sky            20
  FC on working plane from ground          1
  FC total on working plane               20

Sky Condition: Overcast  Daylight Control: Dimming     Hour = 17
Present FC      =    60    Present Watts =   1,575
Daylite FC      =     2
Art Lighting FC =    48    Revised Watts =   1,297

Percent time in sky condition = 0.530   Occupied Cycle Diversity Factor = 0.823


Sky Condition: Clear     Daylight Control: Dimming     Hour = 17
Present FC      =    60    Present Watts =   1,575
Daylite FC      =    20
Art Lighting FC =    30    Revised Watts =     856

Percent time in sky condition = 0.470   Occupied Cycle Diversity Factor = 0.544



        a) b) c) d) e)    f)      g)     h)    i)         j)          k)
Load Calc Z# M# S#    H# BTU/WT  LTG WT  CLFL HTSPC     BIN LOAD     ACCUM LOAD
Lighting   1  2  1 11 17 (3.413)(  1575)(0.86)(0.80)=      3,688         3,688
Plenum     1  2  1 11 17 (3.413)(  1575)(0.86)(0.20)=        922           922
          .
          .
          .        HOURS BETWEEN SUNSET AND SUNRISE  (See Lighting Output Description)
          .
          .
Load Calc Z# M# S#    H# BTU/WT  LTG WT  CLFL HTSPC     BIN LOAD     ACCUM LOAD
Lighting   1  2  1 24  6 (3.413)(  1575)(0.14)(0.80)=        583           583
Plenum     1  2  1 24  6 (3.413)(  1575)(0.14)(0.20)=        146           146
```

a) is the zone number

b) is the month number

c) is the lighting function type. It corresponds to one of the four columns entered in the lighting input screen.

d) is the number of hours elapsed since the lights were turned on. This is calculated from the building's operation starting hour entered in the zone input screen. This number is used to determine the lighting cooling load factor for the hour (column h)).

e) is the local time.

f) is a conversion factor to calculate the corresponding BTU/hr to the lighting wattage.

g) is the lighting wattage entered in the lighting input screen for the given lighting function.

h) is the lighting cooling load factor for the given hour. This cooling load factor is based on the tabulated values in Chapter 26 of the 1985 ASHRAE Fundamentals in Tables 17A through 17E. The tabulated values were adjusted to account for any amount of lights that remains on during the unoccupied hours using the following:

ADJUSTED CLF = [CLF*(TOTAL WATTAGE-UNOCCUPIED WATTAGE) +
UNOCCUPIED WATTAGE] / TOTAL WATTAGE

Note that CLF = 1 if all lights remain on continuously (24 hours).

e) is the fraction of heat from lights that enters the space. (Lighting input screen)

f) is the lighting load for the given lighting function. [Btu/hr]

g) is the accumulated lighting load from all lighting functions. [Btu/hr]

Lighting Calculations

Load Calc	Z#	M#	S#	H#	a) BTU/WT	b) LTG WT	c) CLFL	d) HTSPC	e)	f) BIN LOAD	g) ACCUM LOAD
Lighting	1	2	2	1	7	(3.413)(	200)(	0.26)(	1.00)=	180	722
Lighting	1	2	2	2	8	(3.413)(	200)(	0.70)(	1.00)=	475	3,223
Lighting	1	2	2	3	9	(3.413)(	200)(	0.73)(	1.00)=	497	3,408
Lighting	1	2	2	4	10	(3.413)(	200)(	0.75)(	1.00)=	513	3,547
Lighting	1	2	2	5	11	(3.413)(	200)(	0.78)(	1.00)=	535	3,732
Lighting	1	2	2	6	12	(3.413)(	200)(	0.80)(	1.00)=	546	3,825
Lighting	1	2	2	7	13	(3.413)(	200)(	0.82)(	1.00)=	562	3,964
Lighting	1	2	2	8	14	(3.413)(	200)(	0.84)(	1.00)=	573	4,057
Lighting	1	2	2	9	15	(3.413)(	200)(	0.86)(	1.00)=	584	4,149
Lighting	1	2	2	10	16	(3.413)(	200)(	0.87)(	1.00)=	595	4,242
Lighting	1	2	2	11	17	(3.413)(	200)(	0.88)(	1.00)=	601	4,288
Lighting	1	2	2	12	18	(3.413)(	200)(	0.46)(	1.00)=	311	1,834
Lighting	1	2	2	13	19	(3.413)(	200)(	0.43)(	1.00)=	295	1,695
Lighting	1	2	2	14	20	(3.413)(	200)(	0.41)(	1.00)=	279	1,556
Lighting	1	2	2	15	21	(3.413)(	200)(	0.38)(	1.00)=	262	1,417
Lighting	1	2	2	16	22	(3.413)(	200)(	0.37)(	1.00)=	251	1,324

```
Lighting   1  2  2 17 23 (3.413)(   200)(0.35)(1.00)=       240        1,232
Lighting   1  2  2 18 24 (3.413)(   200)(0.34)(1.00)=       229        1,139
Lighting   1  2  2 19  1 (3.413)(   200)(0.32)(1.00)=       218        1,046
Lighting   1  2  2 20  2 (3.413)(   200)(0.31)(1.00)=       213        1,000
Lighting   1  2  2 21  3 (3.413)(   200)(0.30)(1.00)=       202          907
Lighting   1  2  2 22  4 (3.413)(   200)(0.29)(1.00)=       197          861
Lighting   1  2  2 23  5 (3.413)(   200)(0.28)(1.00)=       191          815
Lighting   1  2  2 24  6 (3.413)(   200)(0.27)(1.00)=       186          768
```

a) is the zone number

b) is the month number

c) is the lighting function type. It corresponds to one of the four columns entered in the lighting input screen.

d) is the number of hours elapsed since the lights were turned on. This is calculated from the building's operation starting hour entered in the zone input screen. This number is used to determine the lighting cooling load factor for the hour (column h)).

e) is the local time.

f) is a conversion factor to calculate the corresponding Btu/hr to the lighting wattage.

g) is the lighting wattage entered in the lighting input screen for the given lighting function.

h) is the lighting cooling load factor for the given hour. This cooling load factor is based on the tabulated values in chapter 26 of the 1985 ASHRAE Fundamentals in Tables 17A through 17E. The tabulated values were adjusted to account for any amount of lights that remains on during the unoccupied hours using the following:

ADJUSTED CLF = [CLF*(TOTAL WATTAGE-UNOCCUPIED WATTAGE) +
UNOCCUPIED WATTAGE] / TOTAL WATTAGE

Note that CLF = 1 if all lights remain on continuously (24 hours).

i) is the fraction of heat from lights that enters the space. (Lighting input screen)

j) is the lighting load for the given lighting function. [Btu/hr]

k) is accumulated lighting load from all lighting functions. [Btu/hr]

People Calculations

```
                a) b) c) d)    e)    f)    g)          h)
Load Calc         Z# M#    H#  #PEOP BTUPP  CLF/DF    HOUR LOAD

People Sensible    1  2  1  8  (   6)( 230)(0.53)=         731
People Latent      1  2  1  8  (   6)( 190)(1.00)=       1,140
```

```
People Sensible   1  2  2  9  (   6)( 230)(0.62)=       856
People Latent     1  2  2  9  (   6)( 190)(1.00)=     1,140
        .                                   .
        .                                   .
        .                                   .
        .                                   .
        .                                   .
People Sensible   1  2 23  6  (   6)( 230)(0.07)=        97
People Latent     1  2 23  6  (   6)( 190)(0.00)=         0

People Sensible   1  2 24  7  (   6)( 230)(0.06)=        83
People Latent     1  2 24  7  (   6)( 190)(0.00)=         0
```

a) is the zone number

b) is the month number

c) is the number of hours elapsed since the occupants entered the zone. This is calculated from the building's operation starting hour entered in the zone input screen. This number is used to determine the people cooling load factor for the hour (column h)).

d) is the local time.

e) is the total number of people in the space. (People input screen)

f) is the rate of heat gains from occupants. (People input screen); [Btu/hr]

g) is an adjusted occupants cooling load factor based on the tabulated values in chapter 26 of the 1985 ASHRAE Fundamentals in Table 19. The tabulated values were adjusted to account for any number of people in the zone during the unoccupied hours using a similar formulation to the one used for lighting cooling load factors.

Note that CLF = 1 for the sensible load portion if all occupants remain in the zone continuously (24 hours). Latent loads are instantaneous loads (no time delay); therefore the multiplier is 1.0

h) is the hourly load from occupants gains. [Btu/hr]

Miscellaneous Electric Calculations

```
        a) b) c) d) e)     f)      g)     h)         i)          j)
Load Calc   Z# M# S#    H#  BTU/WT   WATTS  CLF      BIN LOAD     ACCUM LOAD

Misc Elect   1  2  1  1  8  (3.413)(   225)(0.60)=       461          461
Misc Elect   1  2  1  2  9  (3.413)(   225)(0.68)=       522          522
Misc Elect   1  2  1  3 10  (3.413)(   225)(0.73)=       561          561
Misc Elect   1  2  1  4 11  (3.413)(   225)(0.77)=       591          591
Misc Elect   1  2  1  5 12  (3.413)(   225)(0.81)=       622          622
Misc Elect   1  2  1  6 13  (3.413)(   225)(0.83)=       637          637
Misc Elect   1  2  1  7 14  (3.413)(   225)(0.85)=       653          653
Misc Elect   1  2  1  8 15  (3.413)(   225)(0.87)=       668          668
Misc Elect   1  2  1  9 16  (3.413)(   225)(0.89)=       683          683
```

```
Misc Elect  1  2  1 10 17  (3.413)(   225)(0.90)=      691        691
Misc Elect  1  2  1 11 18  (3.413)(   225)(0.36)=      276        276
Misc Elect  1  2  1 12 19  (3.413)(   225)(0.29)=      223        223
Misc Elect  1  2  1 13 20  (3.413)(   225)(0.24)=      184        184
Misc Elect  1  2  1 14 21  (3.413)(   225)(0.20)=      154        154
Misc Elect  1  2  1 15 22  (3.413)(   225)(0.17)=      131        131
Misc Elect  1  2  1 16 23  (3.413)(   225)(0.15)=      115        115
Misc Elect  1  2  1 17 24  (3.413)(   225)(0.13)=      100        100
Misc Elect  1  2  1 18  1  (3.413)(   225)(0.11)=       84         84
Misc Elect  1  2  1 19  2  (3.413)(   225)(0.10)=       77         77
Misc Elect  1  2  1 20  3  (3.413)(   225)(0.08)=       61         61
Misc Elect  1  2  1 21  4  (3.413)(   225)(0.07)=       54         54
Misc Elect  1  2  1 22  5  (3.413)(   225)(0.07)=       54         54
Misc Elect  1  2  1 23  6  (3.413)(   225)(0.06)=       46         46
Misc Elect  1  2  1 24  7  (3.413)(   225)(0.05)=       38         38
```

a) is the zone number

b) is the month number

c) is the miscellaneous electric equipment type. It corresponds to one of the 2 columns entered in the miscellaneous electric equipment input screen.

d) is the number of hours elapsed since the equipments were turned on. This is calculated from the building's operation starting hour entered in the zone input screen. This number is used to determine the equipment cooling load factor (CLF) for the hour (column h)).

e) is the local time.

f) is a conversion factor to calculate the corresponding Btu/hr to the electric wattage.

g) is the equipment wattage entered in the equipment input screen for the given miscellaneous electric equipment.

h) is the equipment cooling load factor for the given hour. This cooling load factor is based on the tabulated values in chapter 26 of the 1985 ASHRAE Fundamentals in Tables 22 and 23. The tabulated values were adjusted to account for any part of the equipments that remains on during the unoccupied hours using the same approach used to determine the lighting cooling load factors.

Note that CLF = 1 if all equipments remain on continuously (24 hours).

i) is the load resulting from miscellaneous electric equipment. [Btu/hr]

j) is the total accumulated load from all electric equipments. [Btu/hr]

Miscellaneous Sensible Loads

```
          a)  b)  c)  d)  e)       f)    g)         h)         i)
Load Calc     Z#  M#  S#      H#       BTUH  CLF      BIN LOAD     ACCUM LOAD
```

Misc Sensible	1	2	1	1	8	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	2	9	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	3	10	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	4	11	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	5	12	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	6	13	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	7	14	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	8	15	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	9	16	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	10	17	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	11	18	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	12	19	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	13	20	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	14	21	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	15	22	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	16	23	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	17	24	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	18	1	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	19	2	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	20	3	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	21	4	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	22	5	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	23	6	(	1500)(1.00)=	1,500	1,500
Misc Sensible	1	2	1	24	7	(	1500)(1.00)=	1,500	1,500

a) is the zone number

b) is the month number

c) is the miscellaneous sensible heat type. It corresponds to one of the 2 columns entered in the lighting input screen.

d) is the number of hours elapsed since the miscellaneous sensible heat were turned on. This is calculated from the building's operation starting hour entered in the zone input screen. This number is used to determine the equipment cooling load factor for the hour (column g)).

e) is the local time.

f) is the Btu/hour sensible heat rating entered for the given miscellaneous sensible heat.

g) is the sensible heat cooling load factor for the given hour. This cooling load factor is based on the tabulated values in chapter 26 of the 1985 ASHRAE Fundamentals in Tables 22 and 23. The tabulated values were adjusted to account for any part of the sensible heat present during the unoccupied hours using the same approach used to determine the lighting cooling load factors.

Note that CLF = 1 if all sensible heat is generated continuously (24 hours).

h) is the load resulting from miscellaneous sensible heat. [Btu/hr]

i) is the total accumulated load from all types of sensible heat. [Btu/hr]

SUMMARY OF HOURLY PEAK LOADS BY COMPONENT

a) HR	b) SOL HR	c) OPAQUE	d) GLASS	e) LIGHTS	f) PEOPLE	g) EQUIP	h) MIS SENS	i) TOTAL HOUR
1	1.1	1,019	7,044	1,046	179	84	1,500	10,872
2	2.1	332	6,381	1,000	152	77	1,500	9,441
3	3.1	-424	5,265	907	138	61	1,500	7,448
4	4.1	-1,067	4,672	861	124	54	1,500	6,145
5	5.1	-1,453	4,220	815	110	54	1,500	5,246
6	6.1	-1,832	4,952	768	97	46	1,500	5,531
7	7.1	-2,102	4,498	722	83	38	1,500	4,739
8	8.1	-1,929	6,741	3,223	731	461	1,500	10,728
9	9.1	-1,648	10,724	3,408	856	522	1,500	15,362
10	10.1	-1,106	16,375	3,547	952	561	1,500	21,829
11	11.1	-172	22,898	3,732	1,021	591	1,500	29,571
12	12.1	836	29,140	3,825	1,063	622	1,500	36,986
13	13.1	2,122	30,477	3,964	1,104	637	1,500	39,804
14	14.1	3,185	29,134	4,057	1,145	653	1,500	39,674
15	15.1	4,213	24,999	4,149	1,173	668	1,500	36,703
16	16.1	4,955	20,286	4,242	1,201	683	1,500	32,867
17	17.1	5,441	14,950	4,288	1,228	691	1,500	28,099
18	18.1	5,658	20,851	1,834	580	276	1,500	30,698
19	19.1	5,416	16,911	1,695	469	223	1,500	26,214
20	20.1	4,970	14,540	1,556	386	184	1,500	23,136
21	21.1	4,179	12,239	1,417	317	154	1,500	19,805
22	22.1	3,366	10,530	1,324	276	131	1,500	17,127
23	23.1	2,599	9,345	1,232	235	115	1,500	15,026
24	24.1	1,826	8,159	1,139	207	100	1,500	12,931

a) is the local hour.

b) is the solar hour.

c) is the peak hourly total opaque CLTD loads from all contributing components (walls, roofs, etc.) [Btu/hr]

d) is the peak hourly total solar load through all glazing areas. [Btu/hr]

e) is the peak hourly total load from all interior lighting fixtures. [Btu/hr]

f) is the peak hourly total load from occupants. [Btu/hr]

g) is the peak hourly total load from all electric equipments. [Btu/hr]

h) is the peak hourly total load from all miscellaneous sensible heat. [Btu/hr]

i) is the total or summation of the previous hourly loads. [Btu/hr]

DIVERSIFIED HOURLY SOLAR LOADS

	a) HR	b) SOL HR	c) OPAQUE	d) GLASS	e) FPSS	f) HOURLY LOAD	g) ACCUM HOURLY
Solar	1	1.1	1,019	7,044	0.470	3,789	3,789
Solar	2	2.1	332	6,381	0.470	3,155	3,155
Solar	3	3.1	-424	5,265	0.470	2,275	2,275
Solar	4	4.1	-1,067	4,672	0.470	1,695	1,695
Solar	5	5.1	-1,453	4,220	0.470	1,300	1,300
Solar	6	6.1	-1,832	4,952	0.470	1,466	1,466
Solar	7	7.1	-2,102	4,498	0.470	1,126	1,126
Solar	8	8.1	-1,929	6,741	0.470	2,262	2,262
Solar	9	9.1	-1,648	10,724	0.470	4,266	4,266
Solar	10	10.1	-1,106	16,375	0.470	7,177	7,177
Solar	11	11.1	-172	22,898	0.470	10,681	10,681
Solar	12	12.1	836	29,140	0.470	14,089	14,089
Solar	13	13.1	2,122	30,477	0.470	15,321	15,321
Solar	14	14.1	3,185	29,134	0.470	15,190	15,190
Solar	15	15.1	4,213	24,999	0.470	13,730	13,730
Solar	16	16.1	4,955	20,286	0.470	11,863	11,863
Solar	17	17.1	5,441	14,950	0.470	9,584	9,584
Solar	18	18.1	5,658	20,851	0.470	12,459	12,459
Solar	19	19.1	5,416	16,911	0.470	10,494	10,494
Solar	20	20.1	4,970	14,540	0.470	9,169	9,169
Solar	21	21.1	4,179	12,239	0.470	7,716	7,716
Solar	22	22.1	3,366	10,530	0.470	6,531	6,531
Solar	23	23.1	2,599	9,345	0.470	5,614	5,614
Solar	24	24.1	1,826	8,159	0.470	4,693	4,693

a) is the local hour.

b) is the solar hour.

c) is the peak hourly total opaque CLTD loads from all contributing components. [Btu/hr]

d) is the peak hourly total solar load through all glazing areas. [Btu/hr]

e) is the monthly-averaged percent possible sunshine fraction. This value is taken from the solar weather file and varies by month.

f) is the hourly diversified solar load. (Monthly average); [Btu/hr]
f) = e) * [c) + d)]

g) is the total accumulated hourly diversified load from the solar contribution. [Btu/hr]

DIVERSIFIED HOURLY LIGHTING LOADS

	a) H#	b) PEAK HR LOAD	c) DIVR HR LOAD	d) ACCUM HOURLY LOAD
Lites	1	1,046	1,046	4,836

Lites	2	1,000	1,000	4,155
Lites	3	907	907	3,182
Lites	4	861	861	2,556
Lites	5	815	815	2,115
Lites	6	768	768	2,235
Lites	7	722	481	1,607
Lites	8	3,223	1,890	4,152
Lites	9	3,408	1,871	6,137
Lites	10	3,547	1,839	9,015
Lites	11	3,732	1,855	12,536
Lites	12	3,825	1,869	15,957
Lites	13	3,964	1,957	17,278
Lites	14	4,057	2,076	17,266
Lites	15	4,149	2,241	15,971
Lites	16	4,242	2,442	14,305
Lites	17	4,288	3,152	12,735
Lites	18	1,834	1,834	14,293
Lites	19	1,695	1,695	12,188
Lites	20	1,556	1,556	10,725
Lites	21	1,417	1,417	9,133
Lites	22	1,324	1,324	7,855
Lites	23	1,232	1,232	6,845
Lites	24	1,139	1,139	5,832

a) is the local hour.

b) is the peak hourly load from lighting. [Btu/hr]

c) is the diversified hourly load from lighting. [Btu/hr]

d) is the accumulated diversified hourly load from solar and lights. [Btu/hr]

DIVERSIFIED HOURLY PEOPLE LOADS

	a) H#	b) PEAK HR LOAD	c) DIVR HR LOAD	d) ACCUM HOURLY LOAD
People	1	179	179	5,015
People	2	152	152	4,307
People	3	138	138	3,320
People	4	124	124	2,680
People	5	110	110	2,225
People	6	97	97	2,331
People	7	83	83	1,690
People	8	731	731	4,884
People	9	856	856	6,992
People	10	952	952	9,968
People	11	1,021	1,021	13,557
People	12	1,063	1,063	17,020
People	13	1,104	1,104	18,382
People	14	1,145	1,145	18,411
People	15	1,173	1,173	17,144
People	16	1,201	1,201	15,506

People	17	1,228	1,228	13,964
People	18	580	580	14,872
People	19	469	469	12,658
People	20	386	386	11,112
People	21	317	317	9,450
People	22	276	276	8,131
People	23	235	235	7,080
People	24	207	207	6,039

a) is the local hour.

b) is the peak hourly load from occupants. [Btu/hr]

c) is the diversified hourly load from occupants. [Btu/hr]

d) is the accumulated diversified hourly load from solar, lights and occupants. [Btu/hr]

DIVERSIFIED HOURLY EQUIPMENT LOADS

	a) H#	b) PEAK HR LOAD	c) DIVR HR LOAD	d) ACCUM HOURLY LOAD
Equip	1	84	84	5,099
Equip	2	77	77	4,383
Equip	3	61	61	3,382
Equip	4	54	54	2,734
Equip	5	54	54	2,279
Equip	6	46	46	2,378
Equip	7	38	38	1,728
Equip	8	461	461	5,344
Equip	9	522	522	7,514
Equip	10	561	561	10,528
Equip	11	591	591	14,149
Equip	12	622	622	17,642
Equip	13	637	637	19,020
Equip	14	653	653	19,064
Equip	15	668	668	17,812
Equip	16	683	683	16,189
Equip	17	691	691	14,655
Equip	18	276	276	15,149
Equip	19	223	223	12,880
Equip	20	184	184	11,296
Equip	21	154	154	9,604
Equip	22	131	131	8,262
Equip	23	115	115	7,195
Equip	24	100	100	6,139

a) is the local hour.

b) is the peak hourly load from electric equipment. [Btu/hr]

c) is the diversified hourly load from electric equipment. [Btu/hr]

d) is the accumulated diversified hourly load from solar, lights, occupants and electric equipment. [Btu/hr]

DIVERSIFIED HOURLY MISC SENSIBLE LOADS

	a) H#	b) PEAK HR LOAD	c) DIVR HR LOAD	d) ACCUM HOURLY LOAD
Misc Sens	1	1,500	1,500	6,599
Misc Sens	2	1,500	1,500	5,883
Misc Sens	3	1,500	1,500	4,882
Misc Sens	4	1,500	1,500	4,234
Misc Sens	5	1,500	1,500	3,779
Misc Sens	6	1,500	1,500	3,878
Misc Sens	7	1,500	1,500	3,228
Misc Sens	8	1,500	1,500	6,844
Misc Sens	9	1,500	1,500	9,014
Misc Sens	10	1,500	1,500	12,028
Misc Sens	11	1,500	1,500	15,649
Misc Sens	12	1,500	1,500	19,142
Misc Sens	13	1,500	1,500	20,520
Misc Sens	14	1,500	1,500	20,564
Misc Sens	15	1,500	1,500	19,312
Misc Sens	16	1,500	1,500	17,689
Misc Sens	17	1,500	1,500	16,155
Misc Sens	18	1,500	1,500	16,649
Misc Sens	19	1,500	1,500	14,380
Misc Sens	20	1,500	1,500	12,796
Misc Sens	21	1,500	1,500	11,104
Misc Sens	22	1,500	1,500	9,762
Misc Sens	23	1,500	1,500	8,695
Misc Sens	24	1,500	1,500	7,639

a) is the local hour.

b) is the peak hourly load from miscellaneous sensible heat. [Btu/hr]

c) is the diversified hourly load from miscellaneous sensible heat. [Btu/hr]

d) is the accumulated diversified hourly load from solar, lights, occupants, electric equipment and miscellaneous sensible heat. [Btu/hr]

DIVERSIFIED HOURLY SUMMARY

	a) H#	b) PEAK HR LOAD	c) DIVR HR LOAD	d) ACC SYS OCC	e) ACC SYS UNO
Total	1	10,872	6,599	0	6,599
Total	2	9,441	5,883	0	12,483

Total	3	7,448	4,882	0	17,365
Total	4	6,145	4,234	0	21,598
Total	5	5,246	3,779	0	25,377
Total	6	5,531	3,878	0	29,255
Total	7	4,739	3,228	0	32,483
Total	8	10,728	6,844	0	39,328
Total	9	15,362	9,014	9,014	39,328
Total	10	21,829	12,028	21,043	39,328
Total	11	29,571	15,649	36,691	39,328
Total	12	36,986	19,142	55,833	39,328
Total	13	39,804	20,520	76,353	39,328
Total	14	39,674	20,564	96,917	39,328
Total	15	36,703	19,312	116,229	39,328
Total	16	32,867	17,689	133,919	39,328
Total	17	28,099	16,155	150,073	39,328
Total	18	30,698	16,649	166,722	39,328
Total	19	26,214	14,380	166,722	53,708
Total	20	23,136	12,796	166,722	66,504
Total	21	19,805	11,104	166,722	77,608
Total	22	17,127	9,762	166,722	87,370
Total	23	15,026	8,695	166,722	96,065
Total	24	12,931	7,639	166,722	103,704

a) is the local hour.

b) is the total non-temperature dependent peak hourly load from all contributing components. [Btu/hr]

c) is the total non-temperature dependent diversified hourly load from all contributing components. [Btu/hr]; (Monthly average)

d) is the accumulated daily time dependent diversified load from all contributing components for the occupied period. (sum over all previous occupied hours of column c)); [Btu/hr]

e) is the accumulated daily non-temperature dependent diversified load from all contributing components for the unoccupied period. (sum over all previous unoccupied hours of column c)); [Btu/hr]

SUMMARY OF DIVERSIFIED LOADS BY BIN (OCCUPIED AND UNOCCUPIED)

a) BIN T	b) OCC CONST	c) OCC LINEAR	d) OCC TOTAL	e) UNO CONST	f) UNO LINEAR	g) UNO TOTAL
57.5	16,672	-4,742	11,930	7,407	-134	7,274
52.5	16,672	-7,386	9,286	7,407	-2,981	4,427
47.5	16,672	-10,031	6,642	7,407	-5,827	1,580
42.5	16,672	-12,675	3,997	7,407	-8,674	-1,267
37.5	16,672	-15,319	1,353	7,407	-11,521	-4,113
32.5	16,672	-17,963	-1,291	7,407	-14,367	-6,960
27.5	16,672	-20,607	-3,935	7,407	-17,214	-9,807
22.5	16,672	-23,252	-6,579	7,407	-20,061	-12,653

17.5	16,672	-25,896	-9,224	7,407	-22,907	-15,500
12.5	16,672	-28,540	-11,868	7,407	-25,754	-18,347
7.5	16,672	-31,184	-14,512	7,407	-28,601	-21,193
2.5	16,672	-33,828	-17,156	7,407	-31,447	-24,040
-2.5	16,672	-36,473	-19,800	7,407	-34,294	-26,887

a) is the bin temperature considered. [°F]

b) is the average time dependent hourly diversified load for the occupied period. (= [daily accumulated time dependent diversified load for occupied hours] / [number of occupied hours]); from the previous page, 166,722 Btus were accumulated over 10 occupied hours or 166,722 / 10 is the average time dependent load [Btu/hr]

c) is the hourly temperature dependent load for the occupied period. This includes all thermal loads due to conduction and infiltration. [Btu/hr]

d) is the total thermal hourly load for the occupied period. [= b) + c)] [Btu/hr]

e) is the average time dependent hourly diversified load for the unoccupied period. (= [daily accumulated time dependent diversified load for unoccupied hours] / [number of unoccupied hours]); from the previous page, 103,704 Btus were accumulated during the 14 unoccupied hours; 103,704 / 14 = 7,407 [Btu/hr]

f) is the hourly temperature dependent load for the unoccupied period. This includes all thermal loads due to conduction and infiltration. [Btu/hr]

g) is the total thermal hourly load for the unoccupied period. [= e) + f)] [Btu/hr]

12.5.3 LOTUS-Compatible Reports

Examples of LOTUS-compatible reports, after formatting with the template macros, are shown on the following pages. The examples do not include all possible combinations. Refer to Section 12.4.1 for instructions on formatting these reports.

Sample Lotus Report for Loads - LQ report (Daylighting Footcandles - Clear Sky)

Report	Zone	Month	Var	12 Mid	1 am	2 am	3 am	4 am	5 am	6 am	7 am	8 am	9 am	10 am	11 am	12 Noon	13 pm	14 pm	15 pm	16 pm	17 pm	18 pm	19 pm	20 pm	21 pm	22 pm	23 pm
LQ	1	1	16	0	0	0	0	0	0	0	63	191	276	325	342	326	278	194	67	0	0	0	0	0	0	0	0
LQ	1	2	16	0	0	0	0	0	0	11	112	213	286	332	349	337	296	228	133	20	0	0	0	0	0	0	0
LQ	1	3	16	0	0	0	0	0	0	51	136	214	275	314	328	315	276	215	137	52	0	0	0	0	0	0	0
LQ	1	4	16	0	0	0	0	0	18	52	119	184	234	265	274	259	222	167	100	35	14	0	0	0	0	0	0
LQ	1	5	16	0	0	0	0	0	11	24	38	86	142	186	212	219	204	170	120	61	32	19	0	0	0	0	0
LQ	1	6	16	0	0	0	0	0	13	26	39	62	115	156	182	190	177	146	101	48	35	22	10	0	0	0	0
LQ	1	7	16	0	0	0	0	0	11	24	37	64	119	163	190	200	189	159	114	58	36	22	10	0	0	0	0
LQ	1	8	16	0	0	0	0	0	0	20	35	96	157	205	236	246	233	200	150	88	33	18	0	0	0	0	0
LQ	1	9	16	0	0	0	0	0	0	15	68	143	212	265	296	303	285	244	184	111	39	0	0	0	0	0	0
LQ	1	10	16	0	0	0	0	0	0	0	70	169	248	305	336	339	315	264	190	95	10	0	0	0	0	0	0
LQ	1	11	16	0	0	0	0	0	0	17	140	240	306	340	343	315	256	163	35	0	0	0	0	0	0	0	0
LQ	1	12	16	0	0	0	0	0	0	0	77	203	282	325	334	309	250	151	20	0	0	0	0	0	0	0	0

Sample Lotus Report - Systems Report 'SA' - Sensible Loads on Zones

Report	System	Cycle	Month	Bin Temp	Bin Hours	Load Zone	Bin Load	Div Sen Load Zone	Div Sen Load	Div Sen Load Zone	Div Sen Load	Div Sen Load Zone	Div Sen Load	Div Sen Load Zone	Div Sen Load
SA	1	1	4	87.5	8.2	1	23,182	2	10,710	3	16,171	4	11,396	5	24,781
SA	1	1	4	82.5	11.4	1	20,559	2	9,635	3	13,948	4	10,321	5	23,581
SA	1	1	4	77.5	7.9	1	17,937	2	8,561	3	11,726	4	9,246	5	22,381
SA	1	1	4	72.5	6.8	1	15,314	2	7,486	3	9,503	4	8,171	5	21,181
SA	1	1	4	67.5	12.9	1	12,692	2	6,411	3	7,281	4	7,096	5	19,981
SA	1	1	4	62.5	7.9	1	10,069	2	5,336	3	5,058	4	6,021	5	18,781
SA	1	1	4	57.5	22.5	1	7,447	2	4,261	3	2,836	4	4,946	5	17,581
SA	1	1	4	52.5	22.9	1	4,824	2	3,186	3	614	4	3,871	5	16,381
SA	1	1	4	47.5	43.9	1	2,202	2	2,111	3	(1,609)	4	2,796	5	15,181
SA	1	1	4	42.5	43.9	1	(421)	2	1,036	3	(3,831)	4	1,721	5	13,981
SA	1	1	4	37.5	23.9	1	(3,044)	2	(39)	3	(6,054)	4	646	5	12,781
SA	1	1	4	32.5	2.1	1	(5,666)	2	(1,114)	3	(8,276)	4	(429)	5	11,581
SA	1	1	5	87.5	1.4	1	15,874	2	8,354	3	12,084	4	10,047	5	22,663
SA	1	1	5	82.5	18.6	1	13,320	2	7,305	3	9,914	4	8,998	5	21,463
SA	1	1	5	77.5	39.6	1	10,766	2	6,256	3	7,743	4	7,949	5	20,263
SA	1	1	5	72.5	38.2	1	8,212	2	5,207	3	5,573	4	6,900	5	19,063
SA	1	1	5	67.5	20.0	1	5,658	2	4,158	3	3,403	4	5,851	5	17,863
SA	1	1	5	62.5	12.5	1	3,104	2	3,109	3	1,233	4	4,802	5	16,663
SA	1	1	5	57.5	27.1	1	550	2	2,061	3	(937)	4	3,754	5	15,463
SA	1	1	5	52.5	25.7	1	(2,003)	2	1,012	3	(3,107)	4	2,705	5	14,263
SA	1	1	5	47.5	29.6	1	(4,557)	2	(37)	3	(5,278)	4	1,656	5	13,063
SA	1	1	5	42.5	7.9	1	(7,111)	2	(1,086)	3	(7,448)	4	607	5	11,863
SA	1	1	5	37.5	0.7	1	(9,665)	2	(2,135)	3	(9,618)	4	(442)	5	10,663
SA	1	1	6	92.5	23.2	1	18,655	2	9,709	3	15,835	4	11,610	5	24,245
SA	1	1	6	87.5	28.2	1	16,148	2	8,677	3	13,699	4	10,578	5	23,045
SA	1	1	6	82.5	39.3	1	13,640	2	7,646	3	11,564	4	9,547	5	21,845
SA	1	1	6	77.5	28.2	1	11,132	2	6,615	3	9,429	4	8,516	5	20,645
SA	1	1	6	72.5	40.7	1	8,624	2	5,583	3	7,294	4	7,485	5	19,445
SA	1	1	6	67.5	21.1	1	6,116	2	4,552	3	5,159	4	6,453	5	18,245
SA	1	1	6	62.5	22.9	1	3,609	2	3,521	3	3,024	4	5,422	5	17,045
SA	1	1	6	57.5	10.7	1	1,101	2	2,490	3	889	4	4,391	5	15,845

Sample Lotus Report - 'SB' - System Coil Loads on Plant

Report	Sys	Cycle	Month	Bin Temp	Bin Hours	Oper Hours	Heating Load	Cooling Load	Baseboard Load	Humidif Load	Preheat Load	Fan KW	Furnace	DX
SB	1	1	4	87.5	8.2	8.2	0	0	0	0	0	12.1	0	0
SB	1	1	4	82.5	11.4	11.4	0	0	0	0	0	12.1	0	0
SB	1	1	4	77.5	7.9	7.9	0	0	0	0	0	12.1	0	0
SB	1	1	4	72.5	6.8	6.8	0	0	0	0	0	12.1	0	0
SB	1	1	4	67.5	12.9	12.9	0	0	0	0	0	12.1	0	0
SB	1	1	4	62.5	7.9	7.9	0	0	0	0	0	12.1	0	0
SB	1	1	4	57.5	22.5	22.5	10,090	0	0	0	0	12.1	0	0
SB	1	1	4	52.5	22.9	22.9	67,018	0	0	0	0	12.1	0	0
SB	1	1	4	47.5	43.9	43.9	100,142	0	0	11,651	0	12.1	0	0
SB	1	1	4	42.5	43.9	43.9	106,914	0	4,251	13,264	0	12.1	0	0
SB	1	1	4	37.5	23.9	23.9	111,905	0	9,135	33,724	0	12.1	0	0
SB	1	1	4	32.5	2.1	2.1	115,432	0	15,484	36,451	0	12.1	0	0
SB	1	1	5	87.5	1.4	1.4	0	201,995	0	0	0	12.1	0	0
SB	1	1	5	82.5	18.6	18.6	0	165,530	0	0	0	12.1	0	0
SB	1	1	5	77.5	39.6	39.6	0	140,139	0	0	0	12.1	0	0
SB	1	1	5	72.5	38.2	38.2	0	111,832	0	0	0	12.1	0	0
SB	1	1	5	67.5	20.0	20.0	1,420	14,125	0	0	0	12.1	0	0
SB	1	1	5	62.5	12.5	12.5	77,343	11,482	0	0	0	12.1	0	0
SB	1	1	5	57.5	27.1	27.1	144,746	9,854	0	0	0	12.1	0	0
SB	1	1	5	52.5	25.7	25.7	197,481	3,631	0	0	0	12.1	0	0
SB	1	1	5	47.5	29.6	29.6	219,625	0	0	0	0	12.1	0	0
SB	1	1	5	42.5	7.9	7.9	229,327	0	0	0	0	12.1	0	0
SB	1	1	5	37.5	0.7	0.7	237,418	0	0	0	0	12.1	0	0
SB	1	1	6	92.5	23.2	23.2	0	248,309	0	0	0	12.1	0	0
SB	1	1	6	87.5	28.2	28.2	0	216,014	0	0	0	12.1	0	0
SB	1	1	6	82.5	39.3	39.3	0	186,012	0	0	0	12.1	0	0
SB	1	1	6	77.5	28.2	28.2	0	155,663	0	0	0	12.1	0	0
SB	1	1	6	72.5	40.7	40.7	0	124,796	0	0	0	12.1	0	0
SB	1	1	6	67.5	21.1	21.1	0	16,936	0	0	0	12.1	0	0
SB	1	1	6	62.5	22.9	22.9	0	0	0	0	0	12.1	0	0
SB	1	1	6	57.5	10.7	10.7	0	0	0	0	0	12.1	0	0

Sample Lotus Report - 'SC' - System Psychrometrics

Report	System	Cycle	Month	Hours	Bin Hours	Oper Temp	Bin Temp	Return Temp	Mixed Temp	Preheat Temp	Fan D Temp	CLG D Temp	HTG D Temp (DDMZ)	Outside Humid Ratio	Return Humid Ratio	Mixed Humid Ratio	Cooling Disch Humid Ratio	CLG Air Flow CFM	HTG Air Flow CFM	Percent O.A.	Fan KW
SC	1	1	4	8.2	8.2	87.5	68.1	72.0	72.0	76.1	76.1	76.1	0.0070	0.0076	0.0075	0.0075	0.0075	9,107	0	0.20	12.11
SC	1	1	4	11.4	11.4	82.5	68.1	71.0	71.0	75.1	75.1	75.1	0.0068	0.0074	0.0073	0.0073	0.0073	9,107	0	0.20	12.11
SC	1	1	4	7.9	7.9	77.5	68.1	70.0	70.0	74.1	74.1	74.1	0.0060	0.0067	0.0065	0.0065	0.0065	9,107	0	0.20	12.11
SC	1	1	4	6.8	6.8	72.5	68.1	69.0	69.0	73.1	73.1	73.1	0.0078	0.0084	0.0083	0.0083	0.0083	9,107	0	0.20	12.11
SC	1	1	4	12.9	12.9	67.5	68.1	67.5	67.5	71.6	71.6	71.8	0.0089	0.0091	0.0089	0.0089	0.0089	9,107	0	1.00	12.11
SC	1	1	4	7.9	7.9	62.5	68.1	62.5	62.5	66.6	66.6	75.4	0.0060	0.0062	0.0060	0.0060	0.0060	9,107	0	1.00	12.11
SC	1	1	4	22.5	22.5	57.5	68.1	57.5	57.5	61.6	61.6	78.9	0.0051	0.0052	0.0051	0.0051	0.0051	8,567	540	1.00	12.11
SC	1	1	4	22.9	22.9	52.5	68.1	52.5	52.5	56.6	56.6	82.5	0.0047	0.0049	0.0047	0.0047	0.0047	6,709	2,399	1.00	12.11
SC	1	1	4	43.9	43.9	47.5	68.1	50.9	50.9	55.0	55.0	86.1	0.0041	0.0045	0.0041	0.0044	0.0044	6,123	2,984	0.84	12.11
SC	1	1	4	43.9	43.9	42.5	68.1	50.9	50.9	55.0	55.0	89.6	0.0039	0.0045	0.0041	0.0044	0.0044	6,250	2,858	0.67	12.11
SC	1	1	4	23.9	23.9	37.5	68.1	50.9	50.9	55.0	55.0	93.2	0.0030	0.0045	0.0037	0.0044	0.0044	6,396	2,711	0.56	12.11
SC	1	1	4	2.1	2.1	32.5	68.1	50.9	50.9	55.0	55.0	96.8	0.0027	0.0045	0.0036	0.0045	0.0045	6,549	2,558	0.48	12.11
SC	1	1	5	1.4	1.4	87.5	78.1	80.0	80.0	84.1	55.0	84.1	0.0091	0.0077	0.0079	0.0079	0.0076	6,039	3,068	0.20	12.11
SC	1	1	5	18.6	18.6	82.5	78.1	79.0	79.0	83.1	55.0	83.1	0.0074	0.0074	0.0074	0.0074	0.0073	5,268	3,839	0.20	12.11
SC	1	1	5	39.6	39.6	77.5	78.1	78.0	78.0	82.1	55.0	82.1	0.0086	0.0079	0.0080	0.0080	0.0076	4,440	4,667	0.20	12.11
SC	1	1	5	38.2	38.2	72.5	78.1	77.0	77.0	81.1	55.0	81.1	0.0091	0.0082	0.0084	0.0084	0.0078	3,549	5,558	0.20	12.11
SC	1	1	5	20.0	20.0	67.5	78.1	67.5	67.5	71.6	55.0	71.8	0.0089	0.0090	0.0089	0.0089	0.0083	664	8,444	1.00	12.11
SC	1	1	5	12.5	12.5	62.5	78.1	62.5	62.5	66.6	55.0	75.4	0.0077	0.0078	0.0077	0.0077	0.0077	901	8,206	1.00	12.11
SC	1	1	5	27.1	27.1	57.5	78.1	57.5	57.5	61.6	55.0	78.9	0.0066	0.0068	0.0066	0.0066	0.0066	1,360	7,748	1.00	12.11
SC	1	1	5	25.7	25.7	52.5	78.1	52.5	52.5	56.6	55.0	82.5	0.0062	0.0064	0.0062	0.0062	0.0062	2,039	7,068	1.00	12.11
SC	1	1	5	29.6	29.6	47.5	78.1	50.9	50.9	55.0	55.0	86.1	0.0049	0.0051	0.0050	0.0050	0.0050	2,562	6,545	0.89	12.11
SC	1	1	5	7.9	7.9	42.5	78.1	50.9	50.9	55.0	55.0	89.6	0.0039	0.0041	0.0039	0.0039	0.0039	2,978	6,129	0.77	12.11
SC	1	1	5	0.7	0.7	37.5	78.1	50.9	50.9	55.0	55.0	93.2	0.0038	0.0040	0.0039	0.0039	0.0039	3,355	5,753	0.67	12.11
SC	1	1	6	23.2	23.2	92.5	78.1	81.0	81.0	85.1	55.0	85.1	0.0125	0.0081	0.0089	0.0089	0.0084	6,941	2,166	0.20	12.11
SC	1	1	6	28.2	28.2	87.5	78.1	80.0	80.0	84.1	55.0	84.1	0.0113	0.0081	0.0087	0.0087	0.0082	6,236	2,871	0.20	12.11
SC	1	1	6	39.3	39.3	82.5	78.1	79.0	79.0	83.1	55.0	83.1	0.0109	0.0082	0.0088	0.0088	0.0081	5,482	3,626	0.20	12.11
SC	1	1	6	28.2	28.2	77.5	78.1	78.0	78.0	82.1	55.0	82.1	0.0106	0.0084	0.0089	0.0089	0.0081	4,671	4,436	0.20	12.11
SC	1	1	6	40.7	40.7	72.5	78.1	77.0	77.0	81.1	55.0	81.1	0.0104	0.0086	0.0090	0.0090	0.0081	3,799	5,308	0.20	12.11
SC	1	1	6	21.1	21.1	67.5	78.1	67.5	67.5	71.6	55.0	71.6	0.0096	0.0096	0.0096	0.0096	0.0085	716	8,391	1.00	12.11
SC	1	1	6	22.9	22.9	62.5	78.1	62.5	62.5	66.6	55.0	66.6	0.0077	0.0078	0.0077	0.0077	0.0077	0	9,107	1.00	12.11
SC	1	1	6	10.7	10.7	57.5	78.1	57.5	57.5	61.6	55.0	61.6	0.0072	0.0073	0.0072	0.0072	0.0072	0	9,107	1.00	12.11

Sample Lotus Report - 'SLDS' - Composite System Loads on Plant

					<---------- Chiller Loads ---------->								
Report	Cycle	Month	Bin Temp	Bin Hours	Centrif Load	Absorpt Load	Dist Clg Load	DB Chiller Load	Reciproc Load	Boiler Load	Ele Resist Load	Dist Htg Load	DB Htg
SLDS	1	4	87.5	8.2	0	0	0	0	0	0	0	0	0
SLDS	1	4	82.5	11.4	0	0	0	0	0	0	0	0	0
SLDS	1	4	77.5	7.9	0	0	0	0	0	0	0	0	0
SLDS	1	4	72.5	6.8	0	0	0	0	0	0	0	0	0
SLDS	1	4	67.5	12.9	0	0	0	0	0	0	0	0	0
SLDS	1	4	62.5	7.9	0	0	0	0	0	0	0	0	0
SLDS	1	4	57.5	22.5	0	0	0	0	0	10,089	0	0	0
SLDS	1	4	52.5	22.9	0	0	0	0	0	67,017	0	0	0
SLDS	1	4	47.5	43.9	0	0	0	0	0	111,792	0	0	0
SLDS	1	4	42.5	43.9	0	0	0	0	0	124,429	0	0	0
SLDS	1	4	37.5	23.9	0	0	0	0	0	154,764	0	0	0
SLDS	1	4	32.5	2.1	0	0	0	0	0	167,366	0	0	0
SLDS	1	5	87.5	1.4	0	0	0	0	201,994	0	0	0	0
SLDS	1	5	82.5	18.6	0	0	0	0	165,530	0	0	0	0
SLDS	1	5	77.5	39.6	0	0	0	0	140,139	0	0	0	0
SLDS	1	5	72.5	38.2	0	0	0	0	111,832	0	0	0	0
SLDS	1	5	67.5	20.0	0	0	0	0	14,125	1,419	0	0	0
SLDS	1	5	62.5	12.5	0	0	0	0	11,482	77,343	0	0	0
SLDS	1	5	57.5	27.1	0	0	0	0	9,854	144,745	0	0	0
SLDS	1	5	52.5	25.7	0	0	0	0	3,630	197,480	0	0	0
SLDS	1	5	47.5	29.6	0	0	0	0	0	219,625	0	0	0
SLDS	1	5	42.5	7.9	0	0	0	0	0	229,327	0	0	0
SLDS	1	5	37.5	0.7	0	0	0	0	0	237,417	0	0	0
SLDS	1	6	92.5	23.2	0	0	0	0	248,309	0	0	0	0
SLDS	1	6	87.5	28.2	0	0	0	0	216,014	0	0	0	0
SLDS	1	6	82.5	39.3	0	0	0	0	186,011	0	0	0	0
SLDS	1	6	77.5	28.2	0	0	0	0	155,662	0	0	0	0
SLDS	1	6	72.5	40.7	0	0	0	0	124,795	0	0	0	0
SLDS	1	6	67.5	21.1	0	0	0	0	16,935	0	0	0	0
SLDS	1	6	62.5	22.9	0	0	0	0	0	0	0	0	0
SLDS	1	6	57.5	10.7	0	0	0	0	0	0	0	0	0

Sample Lotus Report - 'PDHW' - Domestic Hot Water

Report	Cycle	Month	Bin Temp	Bin Hours	Usage Load	Total Load	Part Effic	DHW Units	Energy KW	Pump
PDHW	1	4	87.5	11.4	6,710	6,910	0.183	72.9	0.09	0.0
PDHW	1	4	82.5	7.8	6,754	6,954	0.184	73.0	0.10	0.0
PDHW	1	4	77.5	6.7	6,798	6,998	0.185	73.0	0.10	0.0
PDHW	1	4	72.5	12.8	6,842	7,042	0.186	73.1	0.10	0.0
PDHW	1	4	67.5	7.8	6,885	7,085	0.187	73.1	0.10	0.0
PDHW	1	4	62.5	22.5	6,929	7,129	0.189	73.2	0.10	0.0
PDHW	1	4	57.5	22.8	6,973	7,173	0.190	73.2	0.10	0.0
PDHW	1	4	52.5	43.9	7,017	7,217	0.191	73.3	0.10	0.0
PDHW	1	4	47.5	43.9	7,061	7,261	0.192	73.3	0.10	0.0
PDHW	1	4	42.5	23.9	7,105	7,305	0.193	73.4	0.10	0.0
PDHW	1	4	37.5	2.1	7,149	7,349	0.194	73.4	0.10	0.0
PDHW	1	4	27.5	1.4	7,236	7,436	0.197	73.5	0.10	0.0
PDHW	1	5	87.5	18.5	6,710	6,910	0.183	72.9	0.09	0.0
PDHW	1	5	82.5	39.6	6,754	6,954	0.184	73.0	0.10	0.0
PDHW	1	5	77.5	38.2	6,798	6,998	0.185	73.0	0.10	0.0
PDHW	1	5	72.5	20.0	6,842	7,042	0.186	73.1	0.10	0.0
PDHW	1	5	67.5	12.5	6,885	7,085	0.187	73.1	0.10	0.0
PDHW	1	5	62.5	27.1	6,929	7,129	0.189	73.2	0.10	0.0
PDHW	1	5	57.5	25.7	6,973	7,173	0.190	73.2	0.10	0.0
PDHW	1	5	52.5	29.6	7,017	7,217	0.191	73.3	0.10	0.0
PDHW	1	5	47.5	7.8	7,061	7,261	0.192	73.3	0.10	0.0
PDHW	1	5	42.5	0.7	7,105	7,305	0.193	73.4	0.10	0.0
PDHW	1	5	37.5	23.2	7,149	7,349	0.194	73.4	0.10	0.0
PDHW	1	6	92.5	28.2	6,666	6,866	0.182	72.9	0.09	0.0
PDHW	1	6	87.5	39.2	6,710	6,910	0.183	72.9	0.09	0.0
PDHW	1	6	82.5	28.2	6,754	6,954	0.184	73.0	0.10	0.0
PDHW	1	6	77.5	40.7	6,798	6,998	0.185	73.0	0.10	0.0
PDHW	1	6	72.5	21.0	6,842	7,042	0.186	73.1	0.10	0.0
PDHW	1	6	67.5	22.8	6,885	7,085	0.187	73.1	0.10	0.0
PDHW	1	6	62.5	10.7	6,929	7,129	0.189	73.2	0.10	0.0

PDHW	1	6	47.5	5.7	7,061	7,261	0.192	73.3	0.10	0.0

Sample Lotus Report - 'PREC' - Reciprocating Chiller

Report	Cycle Type	Month	Chil Numb	Chil	Temp	Bin Hours	Bin Hours	Oper	Cooling Load	False Load	Cooling Capacity	Part Load	COP	Plant KW	Ent CW Temp	Lvg CW Temp	Ent CHW Temp	Lvg CHW Temp	Tower Load
PREC	1	5	1	1	87.5	1.4	1.4	201,994	0		284,096	0.711	2.856	20.7	93.1	101.1	50.7	44	265,627
PREC	1	5	1	1	82.5	18.5	18.5	165,530	0		286,976	0.576	2.766	17.5	91.6	99.6	49.5	44	219,384
PREC	1	5	1	1	77.5	39.6	39.6	140,139	0		288,950	0.484	2.689	15.3	90.5	98.5	48.7	44	187,028
PREC	1	5	1	1	72.5	38.2	38.2	111,832	0		291,120	0.384	2.581	12.7	89.4	97.4	47.7	44	150,827
PREC	1	5	1	1	67.5	20.0	3.7	14,125	0		298,370	0.250	2.427	1.7	85.4	93.4	44.5	44	19,362
PREC	1	5	1	1	62.5	12.5	1.9	11,482	(1)		298,561	0.250	2.430	1.4	85.3	93.3	44.4	44	15,733
PREC	1	5	1	1	57.5	27.1	3.5	9,854	(1)		298,679	0.250	2.432	1.2	85.3	93.3	44.3	44	13,499
PREC	1	5	1	1	52.5	25.7	1.2	3,630	(1)		299,127	0.250	2.440	0.4	85.0	93.0	44.1	44	4,969
PREC	1	6	1	1	92.5	23.2	23.2	248,309	0		280,363	0.885	2.955	24.6	94.9	102.9	52.3	44	323,917
PREC	1	6	1	1	87.5	28.2	28.2	216,014	0		282,975	0.763	2.888	21.9	93.6	101.6	51.2	44	283,328
PREC	1	6	1	1	82.5	39.2	39.2	186,011	0		285,365	0.651	2.819	19.3	92.4	100.4	50.2	44	245,393
PREC	1	6	1	1	77.5	28.2	28.2	155,662	0		287,746	0.540	2.738	16.7	91.2	99.2	49.2	44	206,824
PREC	1	6	1	1	72.5	40.7	40.7	124,795	0		290,130	0.430	2.634	13.9	89.9	97.9	48.2	44	167,422
PREC	1	6	1	1	67.5	21.0	4.7	16,935	(1)		298,167	0.250	2.423	2.0	85.5	93.5	44.6	44	23,223

Sample Lotus Report - 'PBLR' - Boiler

Report	Cycle	Month	Boil Type	Boil Numb	Boil Temp	Bin Hours	Bin Hours	Oper Load	Heating Load	Plant Load	Part Load	Boiler Effic	Fuel Cons
PBLR	1	4	1	1	57.5	22.5	4.0	10,089	18,359	0.250		55.68	0.3
PBLR	1	4	1	1	52.5	22.8	17.3	67,017	76,426	0.250		55.68	1.4
PBLR	1	4	1	1	47.5	43.9	43.9	111,792	122,096	0.302		57.97	2.1
PBLR	1	4	1	1	42.5	43.9	43.9	124,429	134,986	0.334		59.05	2.3
PBLR	1	4	1	1	37.5	23.9	23.9	154,764	165,927	0.411		60.96	2.7
PBLR	1	4	1	1	32.5	2.1	2.1	167,366	178,781	0.443		61.56	2.9
PBLR	1	5	1	1	67.5	20.0	1.8	1,419	9,516	0.250		55.68	0.2
PBLR	1	5	1	1	62.5	12.5	10.7	77,343	86,958	0.250		55.68	1.6
PBLR	1	5	1	1	57.5	27.1	27.1	144,745	155,708	0.385		60.42	2.6
PBLR	1	5	1	1	52.5	25.7	25.7	197,480	209,498	0.519		62.66	3.3
PBLR	1	5	1	1	47.5	29.6	29.6	219,625	232,086	0.575		63.24	3.7
PBLR	1	5	1	1	42.5	7.8	7.8	229,327	241,981	0.599		63.45	3.8
PBLR	1	5	1	1	37.5	0.7	0.7	237,417	250,234	0.620		63.61	3.9

Sample Lotus Report - 'PTOW' - Cooling Tower

Report	Cycle	Month	Bin Temp	MCWB Temp	Bin Hours	Tower Load	Fan KW	Pump KW	Lvg CW Temp	Ent CW Temp
PTOW	1	5	87.5	66.0	1.4	269,384	1.73	1.22	74.5	81.7
PTOW	1	5	82.5	62.0	18.5	223,140	1.73	1.22	70.0	76.0
PTOW	1	5	77.5	62.0	39.6	190,785	1.73	1.22	68.9	74.0
PTOW	1	5	72.5	61.0	38.2	154,584	1.73	1.22	67.1	71.2
PTOW	1	5	67.5	59.0	20.0	23,119	0.00	1.22	85.5	86.2
PTOW	1	5	62.5	55.0	12.5	19,490	0.00	1.22	85.4	86.0
PTOW	1	5	57.5	51.0	27.1	17,256	0.00	1.22	85.4	85.8
PTOW	1	5	52.5	48.0	25.7	8,726	0.00	1.22	85.2	85.4
PTOW	1	6	92.5	72.0	23.2	327,674	1.73	1.22	80.8	89.6
PTOW	1	6	87.5	69.0	28.2	287,085	1.73	1.22	77.3	85.0
PTOW	1	6	82.5	67.0	39.2	249,149	1.73	1.22	74.6	81.2
PTOW	1	6	77.5	65.0	28.2	210,581	1.73	1.22	71.8	77.4
PTOW	1	6	72.5	63.0	40.7	171,178	1.73	1.22	69.1	73.7
PTOW	1	6	67.5	60.0	21.0	26,980	0.00	1.22	85.6	86.4

Sample Lotus Report - 'MCON' - Monthly Energy Consumption

Month		Gas Therms	Oil Gallons	Electric KWH	Dist Htg MBTU	Dist Clg MBTU
January	J 1	1,164	0	5,494	0.0	0.0
February	F 2	1,016	0	4,935	0.0	0.0
March	M 3	873	0	5,350	0.0	0.0
April	A 4	471	0	5,041	0.0	0.0
May	M 5	532	0	7,301	0.0	0.0
June	J 6	29	0	8,431	0.0	0.0
July	J 7	32	0	9,646	0.0	0.0
August	A 8	32	0	9,468	0.0	0.0
September	S 9	30	0	7,260	0.0	0.0
October	O 10	786	0	6,545	0.0	0.0
November	N 11	760	0	5,304	0.0	0.0
December	D 12	1,097	0	5,536	0.0	0.0

12.5.4 BEPS Report

A sample BEPS report is shown on the following page. Refer to Section 12.4.2 for instructions on formatting this report.

ASEAM3 Report: Monthly Energy Consumption Date: 04-04-1991

Month	Natural Gas (Therms)	Oil (Gallons)	Electricity (kwh)	District Heating (MBTU)	District Cooling (MBTU)
Jan	1,164	0	5,494	0.0	0.0
Feb	1,016	0	4,935	0.0	0.0
Mar	873	0	5,350	0.0	0.0
Apr	471	0	5,041	0.0	0.0
May	532	0	7,301	0.0	0.0
Jun	29	0	8,431	0.0	0.0
Jul	32	0	9,646	0.0	0.0
Aug	32	0	9,468	0.0	0.0
Sep	30	0	7,260	0.0	0.0
Oct	786	0	6,545	0.0	0.0
Nov	760	0	5,304	0.0	0.0
Dec	1,097	0	5,536	0.0	0.0
Ann	6,822	0	80,310	0.0	0.0

Year-to-Date Totals

Totals Through Month	Natural Gas (Therms)	Oil (Gallons)	Electricity (kwh)	District Heating (MBTU)	District Cooling (MBTU)
Jan	1,164	0	5,494	0.0	0.0
Feb	2,180	0	10,429	0.0	0.0
Mar	3,052	0	15,779	0.0	0.0
Apr	3,524	0	20,820	0.0	0.0
May	4,056	0	28,120	0.0	0.0
Jun	4,085	0	36,551	0.0	0.0
Jul	4,117	0	46,198	0.0	0.0
Aug	4,150	0	55,666	0.0	0.0

Sep	4,179	0	62,926	0.0	0.0
Oct	4,965	0	69,470	0.0	0.0
Nov	5,725	0	74,774	0.0	0.0
Dec	6,822	0	80,310	0.0	0.0

ASEAM3.0 Sample BEPS Report
Building Energy Performance

* Building Annual Energy by *
* End Use and Fuel Type *

	Nat Gas (THERMS)	Electric (KWH)	Site (MBTU)
Heating Energy			
Gas Boiler	6,512		651.21
Cooling Energy			
Reciprocating Chiller		14,872	50.76
Domestic Hot Water Energy			
Domestic HW Heater	285		28.51
Building Miscellaneous			
Lights		22,276	76.03
Equipment		3,259	11.12
System Miscellaneous			
Fans		31,665	108.07
Plant Miscellaneous			
Cooling Tower		2,784	9.50
Pumping		3,454	11.79
Exterior Lighting		2,000	6.83
Gas Range (Kitchen)	25		2.50

Consumption Totals	6,822	80,310	
Unit Cost	$0.500	$0.050	
Dollar Cost	$3,411	$4,016	$7,427
Site Energy (MBTU)	682.2	274.1	956.3
Source Energy (MBTU)	682.2	931.6	1,613.8

12.5.5 Peak Loads Summary

A sample Peak Loads Summary for a building is shown below. Refer to Section 12.4.2 for instructions on formatting this report.

ASEAM3.0 Sample LA Report
Peak Loads on Building

Loads Report File: DEMOLA00.PRN

Report: Peak Load Summary

Space: Building
Floor Area: 5,000 sq ft Volume: 50,000 cu ft

	COOLING		HEATING
Time of Peak	Apr hour = 17		Feb hour = 5
Outside Temp	87.5 deg F		-2.5 deg F

	Sensible (BTUH)	Latent (BTUH)	Sensible (BTUH)
Glass Solar	36,181		0
Glass Conduction	10,004		-32,063
Wall Conduction	4,095		-13,125
Roof Conduction	9,750		-31,250
Opaque Solar	25,625		0
Door Conduction	573		-1,838
Misc Conduction	1,349		-438
Occupants	6,960	6,460	0
Lights	28,438		0
Equipment	3,840		0
Misc Sensible	1,500		1,500
Infiltration	11,718		-46,233
Total	140,032		-124,945

Total Load / Area	28.0	(BTUH/FT2)	-25.0

12.5.6 Parametric Output

Parametric run outputs give an echo copy of the altered input values, the output variables from the calculations, and the peak loads. See Section 11.5 for sample outputs from an ASEAM3.0 parametric analysis. In section 11.5.6, two spreadsheet applications are presented to help analyze the parametric output. You are advised to read these sections.

Since the output of the parametric analysis is LOTUS compatible, you could "sort" these values to determine the optimum combination of inputs, or add additional calculations (e.g., simple payback period).

12.5.7 ECO/BLCC Output

The output of an ECO run and life-cycle cost analysis is a brief summary of the present value of the project. A sample loads ECO is presented below. The first two pages (Monthly Energy Consumption and BEPS report) have been omitted below.

ASEAM3 ECO Summary

ECO Description

Sample Loads ECO

ECO Comparison with Base Case

Energy Type	Units	Base Case	ECO Case	Savings	Percent Savings
Gas	Therms	6,822	5,377	1,445	21.2
Electricity	kWh	80,310	72,321	7,989	9.9
Gas	Dollars	3,411	2,689	722	21.2
Electricity	Dollars	4,016	3,616	399	9.9
Annual Totals	Dollars	7,427	6,305	1,122	15.1

Gas	MBTU	682.218	537.743	144.476	21.2
Electricity	MBTU	274.099	246.833	27.266	9.9
Annual Totals	MBTU	956.318	784.576	171.742	18.0

BLCC SUMMARY FOR (file name)

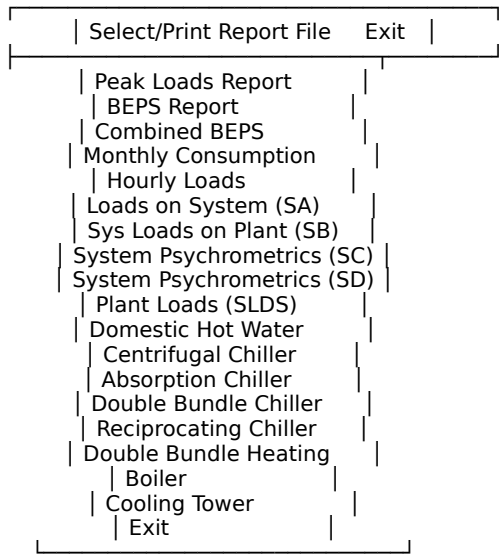
	PRESENT VALUE	ANNUAL VALUE
INITIAL COST (AT OCCUPANCY)	$10,479	$841
ANNUALLY RECURRING O&M COSTS	$9,543	$766
NON-AN. RECURRING O&M COSTS	$501	$40
ENERGY COSTS	$97,927	$7,858
REPLACEMENT COSTS	$3,063	$246
LESS: REMAINING VALUE	($0)	($0)
TOTAL LCC	$121,513	$9,751

12.5.8 Stand Alone Reports

ASEAM3.0 contains an additional report labeled "Stand Alone Report Program". This is not actually a report, but rather a command to execute a menu-driven report program (AS3REPRT) at the completion of an ASEAM run. The "Miscellaneous Output Reports" program (AS3REPRT) has been expanded to include reading other Lotus compatible report data such as the hourly loads report files and the plant boiler, dhw, chiller, etc. files.

This report program is menu driven and allows the user to access report data without leaving ASEAM. At the completion of the ASEAM analysis, the report program will print out the peak loads and BEPS reports as usual, but instead of continuing with the next analysis (or going to the main menu), a new menu will appear. The menu appears below (fully expanded).

ASEAM3 REPORTS PROGRAM



The report program has been structured so that additional reports can be generated without having to recompile ASEAM. Reports are easy to generate by modifying or creating "report format" (.RPF) text files.

Sample '.RPF' file (Used with boiler reports)

Line - Description or value

```
1 - Boiler Report
2 -
3 -
4 - Cycle  Month  Bin     Bin     Operating    Boiler Load  Plant Load  Efficiency
5 -              Temp   Hours      Hours         BTUH         BTUH       Percent
6 - ------------------------------------------------------------------------------
7 -  ##    ##   ###.#   ###.#     ###.#    ###,###,###  ##,###,###     ###.#
8 - 13
9 - 1,1
10 - 2
11 - 3
12 - 6
13 - 8
14 - 2,3,6,7,8,9,10,12
```

These .'RPF' files must match the file structure of the corresponding data file. The last four characters of the filename correspond to the last four characters of the report data file. For example, the boiler report 'REP1PBLR.RPF' file must be used with a 'xxxxPBLR.PRN' data file. A sample boiler data file is shown below.

Sample boiler data file.

```
"PBLR",1,1,1,1,42.5,1.4,1.4,170499,181977,.451,61.694,2.94
"PBLR",1,1,1,1,37.5,33.9,33.9,161863,173168,.429,61.312,2.82
"PBLR",1,1,1,1,32.5,90,90,155964,167151,.414,61.025,2.73
"PBLR",1,1,1,1,27.5,38.9,38.9,176735,188338,.466,61.946,3.04
"PBLR",1,1,1,1,22.5,20.3,20.3,192270,204183,.506,62.493,3.26
"PBLR",1,1,1,1,17.5,15.7,15.7,204546,216705,.537,62.858,3.44
"PBLR",1,1,1,1,12.5,17.8,17.8,214544,226903,.562,63.118,3.59
"PBLR",1,1,1,1,7.5,2.5,2.5,219674,232136,.575,63.239,3.67
"PBLR",1,1,1,1,2.5,.7,.7,227915,240542,.596,63.419,3.79
"PBLR",1,2,1,1,57.5,2.5,.5,15735,24118,.25,55.679,.43
"PBLR",1,2,1,1,52.5,10.3,8.4,73032,82560,.25,55.679,1.48
"PBLR",1,2,1,1,47.5,11,11,104627,114788,.284,57.268,2
"PBLR",1,2,1,1,42.5,13.2,13.2,129361,140016,.347,59.416,2.35
"PBLR",1,2,1,1,37.5,31.4,31.4,159786,171050,.424,61.213,2.79
"PBLR",1,2,1,1,32.5,33.2,33.2,171220,182713,.452,61.724,2.96
"PBLR",1,2,1,1,27.5,35.3,35.3,182079,193789,.48,62.146,3.11
"PBLR",1,2,1,1,22.5,27.8,27.8,191034,202923,.503,62.453,3.24
```

"PBLR",1,2,1,1,17.5,9.2,9.2,208121,220352,.546,62.955,3.5
"PBLR",1,2,1,1,12.5,8.5,8.5,217717,230140,.57,63.194,3.64
"PBLR",1,2,1,1,7.5,8.5,8.5,226059,238648,.591,63.38,3.76
"PBLR",1,2,1,1,2.5,7.8,7.8,233667,246409,.61,63.534,3.87
"PBLR",1,2,1,1,-2.5,.7,.7,240801,253685,.628,63.666,3.98
"PBLR",1,3,1,1,57.5,5.7,1,10585,18865,.25,55.679,.33
"PBLR",1,3,1,1,52.5,14.2,11,68231,77664,.25,55.679,1.39
etc.

The report format text files actually format the report through the use of codes. Each report has a consistent format (see above for sample):

Lines 1 through 6 Text output to be printed at the beginning of the report. Lines 4, 5, and 6 are generally the column headers.

Line 7 BASIC format statement

Line 8 Number of data values per record in the corresponding data file. In the above printout "PBLR" is the first value, '1' is the second, etc.

Line 9 The number of character strings to ignore in each record, followed by the column number containing the character strings. For example, "1,1" says there is one character string to ignore, and it is located in the first field.

Line 10 The column or field number containing the cycle.

Line 11 The column or field number containing the month.

Line 12 The column or field number containing the bin temperature.

Line 13 The number of separate fields to be printed in the report. This should correspond to the format entered in line 7.

Line 14 The column numbers to be printed, separated by commas. The number of entries should be equal to the number entered in line 13. For example, "2,3,6,..." states that field number 2 in the data file should be printed using the first formatted number (##) in line 7, field number 3 printed with the second formatted number (also ##), field number 6 (bin temperature) should be printed in the third column using the BASIC ###.# number format.

Several inputs questions are displayed in the new report program which allow you to select which data to display. Note that cycle '1' corresponds to the occupied cycle and cycle '2' to the unoccupied cycle. The reporting limits months for the months use the 'and' condition - i.e. in order for a particular month's data to be printed, the month number must be both greater than the beginning month number and less than the ending month number.

New Input Questions:

Cycle, Months, and Temperature Limits for Report

Enter beginning cycle number for report (1 or 2) ? 1
Enter ending cycle number for report (1 or 2) ? 1

Print all months greater or equal to (1 to 12) ? 1
Print all months less than or equal to (1 to 12) ? 3

Print all bin temperatures greater than (deg F) ? -20
Print all bin temperatures less than (deg F) ? 40

After the input questions are answered, you can select the output device and report titles.

ASEAM3 OUTPUT DEVICE

| Screen | Printer | File | Exit |

ASEAM3 REPORT TITLE

Enter title (line 1)? sample report
Enter title (line 2)?

Are Titles Correct (Y/N) ?

Finally, the report is printed, displayed on screen or written to a file.

sample report

Boiler Report

Cycle	Month	Bin Temp	Bin Hours	Operating Hours	Boiler Load BTUH	Plant Load BTUH	Efficiency Percent
1	1	37.5	33.9	33.9	161,863	173,168	61.3
1	1	32.5	90.0	90.0	155,964	167,151	61.0
1	1	27.5	38.9	38.9	176,735	188,338	61.9
1	1	22.5	20.3	20.3	192,270	204,183	62.5
1	1	17.5	15.7	15.7	204,546	216,705	62.9
1	1	12.5	17.8	17.8	214,544	226,903	63.1
1	1	7.5	2.5	2.5	219,674	232,136	63.2
1	1	2.5	0.7	0.7	227,915	240,542	63.4
1	2	37.5	31.4	31.4	159,786	171,050	61.2
1	2	32.5	33.2	33.2	171,220	182,713	61.7
1	2	27.5	35.3	35.3	182,079	193,789	62.1
1	2	22.5	27.8	27.8	191,034	202,923	62.5
1	2	17.5	9.2	9.2	208,121	220,352	63.0
1	2	12.5	8.5	8.5	217,717	230,140	63.2
1	2	7.5	8.5	8.5	226,059	238,648	63.4
1	2	2.5	7.8	7.8	233,667	246,409	63.5
1	2	-2.5	0.7	0.7	240,801	253,685	63.7
1	3	37.5	70.7	70.7	156,271	167,465	61.0
1	3	32.5	59.2	59.2	160,528	171,806	61.2
1	3	27.5	19.2	19.2	179,648	191,309	62.1
1	3	22.5	2.8	2.8	194,266	206,219	62.6

For the hourly loads reports, the report format is shown below. Each report is in units of BTUH.

Hourly Load Summary for Report LB

Hour	Jan	Feb	Mar	Apr	May	June
1	9,431	9,421	8,590	7,114	7,650	7,734
2	8,025	8,116	7,355	5,976	6,477	6,527
3	6,222	6,371	5,842	4,740	5,364	5,420
4	5,012	5,190	4,783	3,846	4,297	4,356
5	4,247	4,378	4,098	3,289	3,489	3,527
6	4,621	4,712	4,497	3,723	2,954	2,950
7	5,896	5,800	5,338	4,281	3,352	3,612
8	11,620	11,160	10,461	9,054	7,406	7,658
9	16,221	15,191	13,819	11,544	8,746	8,904
10	22,332	20,617	18,212	14,675	10,680	10,662
11	29,123	26,787	23,177	18,172	13,207	12,928
12	34,966	32,239	27,497	21,192	15,908	15,403
13	38,598	35,786	30,424	23,405	18,421	17,763
14	39,721	37,152	31,605	24,449	20,315	19,646
15	38,200	36,030	31,015	24,511	21,371	20,823
16	35,970	34,192	29,817	24,085	21,753	21,418
17	33,549	32,131	28,433	23,504	21,638	21,474
18	27,405	26,401	23,145	18,770	17,817	17,854
19	23,527	22,795	20,304	16,819	16,599	16,746
20	20,684	20,169	18,017	14,938	15,069	15,270
21	17,663	17,306	15,559	12,966	13,413	13,578
22	15,231	14,975	13,541	11,324	11,743	11,881
23	13,265	13,105	11,860	9,879	10,276	10,383
24	11,306	11,254	10,200	8,454	8,960	9,046

Hour	Jul	Aug	Sep	Oct	Nov	Dec
1	7,879	8,476	8,739	9,645	8,601	8,763
2	6,648	7,153	7,412	8,226	6,995	7,226
3	5,559	5,990	6,145	6,706	5,479	5,587
4	4,467	4,782	4,902	5,338	4,419	4,461
5	3,610	3,869	3,991	4,352	4,074	3,954
6	3,018	3,267	3,463	3,959	4,798	4,538
7	3,581	3,731	3,891	4,560	6,184	5,896
8	7,583	7,907	8,259	9,362	12,638	12,100
9	8,805	9,418	10,157	12,167	17,727	17,060
10	10,566	11,754	13,082	16,455	23,942	23,312
11	12,867	14,844	16,883	21,845	30,255	29,892
12	15,437	18,231	20,867	27,242	34,996	35,119
13	17,885	21,330	24,325	31,513	37,607	38,153
14	19,858	23,581	26,596	33,922	37,529	38,526
15	21,076	24,712	27,420	34,096	35,822	36,848
16	21,645	24,826	27,093	32,851	33,646	34,605
17	21,668	24,372	26,231	31,094	31,476	32,292
18	17,993	20,210	21,687	25,752	24,881	25,833
19	16,921	18,749	19,786	22,866	21,710	22,348
20	15,398	16,798	17,605	20,104	18,833	19,463
21	13,748	14,940	15,550	17,534	16,113	16,605
22	12,040	13,017	13,510	15,130	13,988	14,345
23	10,525	11,350	11,781	13,172	12,083	12,404
24	9,189	9,906	10,263	11,422	10,160	10,454

Presented on the following pages are sample reports for various other stand alone reports.

ASEAM3.0 - Stand Alone Reports - Hourly Load Summary for Report LQ

Hour	Jan	Feb	Mar	Apr	May	June
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	18	11	13
7	0	11	51	52	24	26
8	63	112	136	119	38	39
9	191	213	214	184	86	62
10	276	286	275	234	142	115
11	325	332	314	265	186	156
12	342	349	328	274	212	182
13	326	337	315	259	219	190
14	278	296	276	222	204	177
15	194	228	215	167	170	146
16	67	133	137	100	120	101
17	0	20	52	35	61	48
18	0	0	0	14	32	35
19	0	0	0	0	19	22
20	0	0	0	0	0	10

etc ....

Hour	Jul	Aug	Sep	Oct	Nov	Dec
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	11	0	0	0	0	0
7	24	20	15	0	17	0
8	37	35	68	70	140	77
9	64	96	143	169	240	203
10	119	157	212	248	306	282

11	163	205	265	305	340	325
12	190	236	296	336	343	334
13	200	246	303	339	315	309
14	189	233	285	315	256	250
15	159	200	244	264	163	151
16	114	150	184	190	35	20
17	58	88	111	95	0	0
18	36	33	39	10	0	0
19	22	18	0	0	0	0
20	10	0	0	0	0	0
21	0	0	0	0	0	0

etc ....

ASEAM3.0 Stand Alone Report

Systems 'SA' Report - Zone Loads on System

Systems Report - Zone Loads (Sensible) on Systems

Cycle	Month	Bin Temp	Bin Hours	Zone 1 Load BTUH	Zone 2 Load BTUH	Zone 3 Load BTUH	Zone 4 Load BTUH	Zone 5 Load BTUH
1	4	87.5	8.2	23,182	10,710	16,171	11,396	24,781
1	4	82.5	11.4	20,559	9,635	13,948	10,321	23,581
1	4	77.5	7.9	17,937	8,561	11,726	9,246	22,381
1	4	72.5	6.8	15,314	7,486	9,503	8,171	21,181
1	4	67.5	12.9	12,692	6,411	7,281	7,096	19,981
1	4	62.5	7.9	10,069	5,336	5,058	6,021	18,781
1	4	57.5	22.5	7,447	4,261	2,836	4,946	17,581
1	4	52.5	22.9	4,824	3,186	614	3,871	16,381
1	4	47.5	43.9	2,202	2,111	-1,609	2,796	15,181
1	4	42.5	43.9	-421	1,036	-3,831	1,721	13,981
1	4	37.5	23.9	-3,044	-39	-6,054	646	12,781
1	4	32.5	2.1	-5,666	-1,114	-8,276	-429	11,581
1	5	87.5	1.4	15,874	8,354	12,084	10,047	22,663
1	5	82.5	18.6	13,320	7,305	9,914	8,998	21,463
1	5	77.5	39.6	10,766	6,256	7,743	7,949	20,263
1	5	72.5	38.2	8,212	5,207	5,573	6,900	19,063
1	5	67.5	20.0	5,658	4,158	3,403	5,851	17,863
1	5	62.5	12.5	3,104	3,109	1,233	4,802	16,663
1	5	57.5	27.1	550	2,061	-937	3,754	15,463
1	5	52.5	25.7	-2,003	1,012	-3,107	2,705	14,263
1	5	47.5	29.6	-4,557	-37	-5,278	1,656	13,063
1	5	42.5	7.9	-7,111	-1,086	-7,448	607	11,863
1	5	37.5	0.7	-9,665	-2,135	-9,618	-442	10,663
1	6	92.5	23.2	18,655	9,709	15,835	11,610	24,245
1	6	87.5	28.2	16,148	8,677	13,699	10,578	23,045

1	6	82.5	39.3	13,640	7,646	11,564	9,547	21,845
1	6	77.5	28.2	11,132	6,615	9,429	8,516	20,645
1	6	72.5	40.7	8,624	5,583	7,294	7,485	19,445
1	6	67.5	21.1	6,116	4,552	5,159	6,453	18,245
1	6	62.5	22.9	3,609	3,521	3,024	5,422	17,045
1	6	57.5	10.7	1,101	2,490	889	4,391	15,845

ASEAM3.0 Stand Alone Report

Report SB - System Loads of Plant Equipment

Cycle	Month	Bin Temp	Bin Hours	Heating BTUH	Cooling BTUH	Baseboard BTUH	Humidification BTUH	Preheat BTUH
1	4	87.5	8.2	0	0	0	0	0
1	4	82.5	11.4	0	0	0	0	0
1	4	77.5	7.9	0	0	0	0	0
1	4	72.5	6.8	0	0	0	0	0
1	4	67.5	12.9	0	0	0	0	0
1	4	62.5	7.9	0	0	0	0	0
1	4	57.5	22.5	10,090	0	0	0	0
1	4	52.5	22.9	67,018	0	0	0	0
1	4	47.5	43.9	100,142	0	0	11,651	0
1	4	42.5	43.9	106,914	0	4,251	13,264	0
1	4	37.5	23.9	111,905	0	9,135	33,724	0
1	4	32.5	2.1	115,432	0	15,484	36,451	0
1	5	87.5	1.4	0	201,995	0	0	0
1	5	82.5	18.6	0	165,530	0	0	0
1	5	77.5	39.6	0	140,139	0	0	0
1	5	72.5	38.2	0	111,832	0	0	0
1	5	67.5	20.0	1,420	14,125	0	0	0
1	5	62.5	12.5	77,343	11,482	0	0	0
1	5	57.5	27.1	144,746	9,854	0	0	0
1	5	52.5	25.7	197,481	3,631	0	0	0
1	5	47.5	29.6	219,625	0	0	0	0
1	5	42.5	7.9	229,327	0	0	0	0
1	5	37.5	0.7	237,418	0	0	0	0
1	6	92.5	23.2	0	248,309	0	0	0
1	6	87.5	28.2	0	216,014	0	0	0
1	6	82.5	39.3	0	186,012	0	0	0
1	6	77.5	28.2	0	155,663	0	0	0
1	6	72.5	40.7	0	124,796	0	0	0

1	6	67.5	21.1	0	16,936	0	0	0	
1	6	62.5	22.9	0	0	0	0	0	
1	6	57.5	10.7	0	0	0	0	0	
1	6	52.5	0.0	0	0	0	0	0	
1	6	47.5	0.0	0	0	0	0	0	

ASEAM3.0 Stand Alone Report

ASEAM Report SC - System Psychrometrics
Temperature Values in Deg F.

Cycle	Month	Bin Hours	Outside Temp	Return Temp	Mixed Temp	Preheat Discharge	Fan Discharge	Cooling Dischrg	Heating Dischrg
1	4	8.2	87.5	68.1	72.0	72.0	76.1	76.1	76.1
1	4	11.4	82.5	68.1	71.0	71.0	75.1	75.1	75.1
1	4	7.9	77.5	68.1	70.0	70.0	74.1	74.1	74.1
1	4	6.8	72.5	68.1	69.0	69.0	73.1	73.1	73.1
1	4	12.9	67.5	68.1	67.5	67.5	71.6	71.6	71.8
1	4	7.9	62.5	68.1	62.5	62.5	66.6	66.6	75.4
1	4	22.5	57.5	68.1	57.5	57.5	61.6	61.6	78.9
1	4	22.9	52.5	68.1	52.5	52.5	56.6	56.6	82.5
1	4	43.9	47.5	68.1	50.9	50.9	55.0	55.0	86.1
1	4	43.9	42.5	68.1	50.9	50.9	55.0	55.0	89.6
1	4	23.9	37.5	68.1	50.9	50.9	55.0	55.0	93.2
1	4	2.1	32.5	68.1	50.9	50.9	55.0	55.0	96.8
1	5	1.4	87.5	78.1	80.0	80.0	84.1	55.0	84.1
1	5	18.6	82.5	78.1	79.0	79.0	83.1	55.0	83.1
1	5	39.6	77.5	78.1	78.0	78.0	82.1	55.0	82.1
1	5	38.2	72.5	78.1	77.0	77.0	81.1	55.0	81.1
1	5	20.0	67.5	78.1	67.5	67.5	71.6	55.0	71.8
1	5	12.5	62.5	78.1	62.5	62.5	66.6	55.0	75.4
1	5	27.1	57.5	78.1	57.5	57.5	61.6	55.0	78.9
1	5	25.7	52.5	78.1	52.5	52.5	56.6	55.0	82.5
1	5	29.6	47.5	78.1	50.9	50.9	55.0	55.0	86.1
1	5	7.9	42.5	78.1	50.9	50.9	55.0	55.0	89.6
1	5	0.7	37.5	78.1	50.9	50.9	55.0	55.0	93.2
1	6	23.2	92.5	78.1	81.0	81.0	85.1	55.0	85.1
1	6	28.2	87.5	78.1	80.0	80.0	84.1	55.0	84.1
1	6	39.3	82.5	78.1	79.0	79.0	83.1	55.0	83.1
1	6	28.2	77.5	78.1	78.0	78.0	82.1	55.0	82.1
1	6	40.7	72.5	78.1	77.0	77.0	81.1	55.0	81.1

1	6	21.1	67.5	78.1	67.5	67.5	71.6	55.0	71.6
1	6	22.9	62.5	78.1	62.5	62.5	66.6	55.0	66.6
1	6	10.7	57.5	78.1	57.5	57.5	61.6	55.0	61.6

ASEAM3.0 Stand Alone Report

Report SLDS - Load on Plant Equipment
All Loads in BTUH

Cycle	Month	Bin Temp	Bin Hours	Centrif BTUH	Recip BTUH	Tower BTUH	Boiler BTUH	Elec Resist BTUH
1	4	87.5	8.2	0	0	0	0	0
1	4	82.5	11.4	0	0	0	0	0
1	4	77.5	7.9	0	0	0	0	0
1	4	72.5	6.8	0	0	0	0	0
1	4	67.5	12.9	0	0	0	0	0
1	4	62.5	7.9	0	0	0	0	0
1	4	57.5	22.5	0	0	0	10,089	0
1	4	52.5	22.9	0	0	0	67,017	0
1	4	47.5	43.9	0	0	0	111,792	0
1	4	42.5	43.9	0	0	0	124,429	0
1	4	37.5	23.9	0	0	0	154,764	0
1	4	32.5	2.1	0	0	0	167,366	0
1	4	27.5	0.0	0	0	0	0	0
1	5	87.5	1.4	0	201,994	0	0	0
1	5	82.5	18.6	0	165,530	0	0	0
1	5	77.5	39.6	0	140,139	0	0	0
1	5	72.5	38.2	0	111,832	0	0	0
1	5	67.5	20.0	0	14,125	0	1,419	0
1	5	62.5	12.5	0	11,482	0	77,343	0
1	5	57.5	27.1	0	9,854	0	144,745	0
1	5	52.5	25.7	0	3,630	0	197,480	0
1	5	47.5	29.6	0	0	0	219,625	0
1	5	42.5	7.9	0	0	0	229,327	0
1	5	37.5	0.7	0	0	0	237,417	0
1	6	92.5	23.2	0	248,309	0	0	0
1	6	87.5	28.2	0	216,014	0	0	0
1	6	82.5	39.3	0	186,011	0	0	0
1	6	77.5	28.2	0	155,662	0	0	0

1	6	72.5	40.7	0	124,795	0	0	0
1	6	67.5	21.1	0	16,935	0	0	0
1	6	62.5	22.9	0	0	0	0	0
1	6	57.5	10.7	0	0	0	0	0
1	6	52.5	0.0	0	0	0	0	0
1	6	47.5	0.0	0	0	0	0	0

ASEAM3.0 Stand Alone Report

Reciprocating Chiller Report

Cycle	Month	Bin Temp	Bin Hours	Operating Hours	Chiller Load BTUH	Part Load Ratio	COP	Tower Load BTUH
1	5	87.5	1.4	1.4	201,994	0.711	2.9	265,627
1	5	82.5	18.5	18.5	165,530	0.576	2.8	219,384
1	5	77.5	39.6	39.6	140,139	0.484	2.7	187,028
1	5	72.5	38.2	38.2	111,832	0.384	2.6	150,827
1	5	67.5	20.0	3.7	14,125	0.250	2.4	19,362
1	5	62.5	12.5	1.9	11,482	0.250	2.4	15,733
1	5	57.5	27.1	3.5	9,854	0.250	2.4	13,499
1	5	52.5	25.7	1.2	3,630	0.250	2.4	4,969
1	6	92.5	23.2	23.2	248,309	0.885	3.0	323,917
1	6	87.5	28.2	28.2	216,014	0.763	2.9	283,328
1	6	82.5	39.2	39.2	186,011	0.651	2.8	245,393
1	6	77.5	28.2	28.2	155,662	0.540	2.7	206,824
1	6	72.5	40.7	40.7	124,795	0.430	2.6	167,422
1	6	67.5	21.0	4.7	16,935	0.250	2.4	23,223

ASEAM3.0 Stand Alone Report

Boiler Report

Cycle	Month	Bin Temp	Bin Hours	Operating Hours	Boiler Load BTUH	Plant Load BTUH	Efficiency Percent
1	4	57.5	22.5	4.0	10,089	18,359	55.7
1	4	52.5	22.8	17.3	67,017	76,426	55.7
1	4	47.5	43.9	43.9	111,792	122,096	58.0
1	4	42.5	43.9	43.9	124,429	134,986	59.0
1	4	37.5	23.9	23.9	154,764	165,927	61.0
1	4	32.5	2.1	2.1	167,366	178,781	61.6
1	5	67.5	20.0	1.8	1,419	9,516	55.7
1	5	62.5	12.5	10.7	77,343	86,958	55.7
1	5	57.5	27.1	27.1	144,745	155,708	60.4
1	5	52.5	25.7	25.7	197,480	209,498	62.7
1	5	47.5	29.6	29.6	219,625	232,086	63.2
1	5	42.5	7.8	7.8	229,327	241,981	63.4
1	5	37.5	0.7	0.7	237,417	250,234	63.6

ASEAM3.0 Stand Alone Report

ASEAM Plant Report - TOW - Cooling Tower

Cycle	Month	Bin Wet Bulb Temp	Bin Hours	Leaving Tower BTUH	Entering Load kW	Fan kW	Pump kW	Condenser Water Temp
1	5	87.5	66.0	1.4	269,384	1.7	1.2	74.5	81.7
1	5	82.5	62.0	18.5	223,140	1.7	1.2	70.0	76.0
1	5	77.5	62.0	39.6	190,785	1.7	1.2	68.9	74.0
1	5	72.5	61.0	38.2	154,584	1.7	1.2	67.1	71.2
1	5	67.5	59.0	20.0	23,119	0.0	1.2	85.5	86.2
1	5	62.5	55.0	12.5	19,490	0.0	1.2	85.4	86.0
1	5	57.5	51.0	27.1	17,256	0.0	1.2	85.4	85.8
1	5	52.5	48.0	25.7	8,726	0.0	1.2	85.2	85.4
1	6	92.5	72.0	23.2	327,674	1.7	1.2	80.8	89.6
1	6	87.5	69.0	28.2	287,085	1.7	1.2	77.3	85.0
1	6	82.5	67.0	39.2	249,149	1.7	1.2	74.6	81.2
1	6	77.5	65.0	28.2	210,581	1.7	1.2	71.8	77.4
1	6	72.5	63.0	40.7	171,178	1.7	1.2	69.1	73.7
1	6	67.5	60.0	21.0	26,980	0.0	1.2	85.6	86.4