BCS BOEING COMPUTER SERVICES, INC.

SCOUT

ACCESS AND CONTROL GUIDE

BCS BOEING COMPUTER SERVICES, INC.

S C O U T

DESIGN AND ENERGY ANALYSIS PROGRAMS

ACCESS AND CONTROL GUIDE

SEPTEMBER, 1977

BCS BOEING COMPUTER SERVICES, INC.

CONTENTS

Section		Page
1.0	INTRODUCTION	1
1.1	Overview of SCOUT	1
1.2	SCOUT Processing at GLDC	2
1.3	How to Become a SCOUT User	2
2.0	USING SCOUT AT THE GLDC	3
2.1	Steps in SCOUT Processing	3
2.2	Input cards for Using SCOUT at the GLDC	3
2.2.1	User Job Card	3
2.2.2	Procedure Execute Card	7
2.2.3	Input Data Definition Card	7
2.3	Procedure for Using Existing Weather Tapes	9
2.4	Procedure for Acquiring Additional SCOUT Weather Data	9
2.5	Problem Resolution Procedure	9
2.6	Procedure Output Files	10
3.0	SAMPLE SCOUT JOB CONTROL PROCEDURES	11
3.1	RESFAC - Response Factor Procedure	11
3.2	DVPLAP - Data Verification Procedure for Load Analysis Procedure	12
3.3	DVPLAPS - Data Verification Procedure for Load Analysis Procedure with Shadows	13
3.4	LAP - Load Analysis Procedure	14
3.5	LAPS - Load Analysis Procedure with Shadows	15
3.6	DVPTAP - Data Verification Procedure for Temperature Variation Procedure	16
3.7	TAP - Temperature Variation Procedure	17
3.8	DVPSAP - Data Verification Procedure for Systems Analysis Procedure	18
3.9	SAP - Systems Analysis Procedure	19
3.10	CAP - Life Cycle Cost Procedure	20
4.0	EXAMPLE PROBLEM	21
APPENDIX I	Currently Available Weather Data	23
APPENDIX II	Estimated Processing Times	24

FIGURES

Figure		Page
1	Design Load Analysis Sequence	5
2	Energy Analysis Sequence	6

TABLES

Table		Page
1	Available SCOUT Procedures	8
2	Processing Requirements for Example Problem	22

1.0 INTRODUCTION

1.1 Overview of SCOUT

SCOUT is a versatile building design and energy analysis tool which has embodied within it ASHRAE state-of-the-art techniques for performing thermal load calculations and energy usage predictions. It is a highly sophisticated tool which may be used to evaluate various combinations of building envelope, thermal systems equipment, and equipment operations that are most economically applicable to the site.

In each case, the SCOUT program series uses descriptive data developed or gathered by the user. This input information may include such elements as building and equipment characteristics, local weather profiles, fuel and electricity costs, interest rates, etc. The final results from the SCOUT processing are computer-generated reports that indicate the following:

. the amount of energy the site will consume for each alternative type of equipment employed,

. effects of building envelope changes,

. effects of internal load changes,

. effects of scheduling of thermostats,

. effects of undersizing equipment,

. effects of night time and seasonal temperature set-back/set-forward,

. effects of distribution system changes,

. economic expense variation between alternatives.

To aid the user in analyzing his problem, SCOUT is made up of ten main programs:

* Response Factor Program (RESFAC).

* Data Verification Program for Load Analysis Program (DVPLAP).

* Data Verification Program for Load Analysis Program with Shadows (DVPLAPS).

* Load Analysis Program (LAP).

* Load Analysis Program with Shadows (LAPS).

* Data Verification Program for Temperature Analysis Program (DVPTAP).

* Temperature Analysis Program (TAP)

* Data Verification Program for Systems Analysis Program (DVPSAP).

* Systems Analysis Program (SAP)

* Life Cycle Cost Analysis Program (CAP)

1.2 SCOUT Processing at GLDC

Boeing Computer Services (BCS) runs the SCOUT system on the computer located at the Great Lakes Data Center (GLDC) in Chicago. SCOUT users can gain access to this system in three ways:

- By coming directly to the GLDC, the SCOUT user can leave his job for processing and return later to pick up the results. In this case, GLDC personnel handle all of the hardware operations that are involved in running the computer.

- By using an existing RJE terminal in his office or at another BCS location, the SCOUT user can send his job to the GLDC over tele-communications lines for processing and have the SCOUT output returned and printed via the terminal. In this case, the user acquires the benefits of shorter job turn-around inherent in remote batch processing.

- By using Boeing Conversational Remote Entry (BCRE) on a low speed terminal, the SCOUT user can build input data files, maintain data input files, submit jobs to the computer, and look at his output. Upon verification that printed output is desired, it can be routed to the GLDC local printer, or to another remote set up for printed output. In the event that the output is printed at the GLDC, it can be held for SCOUT user pick up or arrangements can be made for shipment to the user's office.

1.3 How to Become a SCOUT User

- Contact your local BCS sales office.

- A BCS sales representative will contact you to initiate a services agreement. There is no sign-up or minimum charge for entering into a services agreement. The monthly charges to the SCOUT user are based upon the amount of SCOUT usage.

- Arrange for BCS support at this time. (i.e. Job Control Card Assistance)

. For more information, please contact your local sales office as listed on the back cover.

2.0 USING SCOUT AT THE GLDC

2.1 Steps in SCOUT Processing

Figures 1 and 2 illustrate the relationships that exist between the 10 primary SCOUT programs for both the Design Load Analysis Sequence and the Energy Analysis Sequence. More specifically, it indicates the program input data requirements and output results.

2.2 Input Cards for Using SCOUT at the GLDC

When a SCOUT user is employing this series of programs at the GLDC, the following standard IBM Job Control cards are required:

- User Job Card
- Procedure Execute Card
- Input Data Definition Card

2.2.1 User Job Card

The User Job Card is submitted as the first card of the customer's SCOUT input stream. The User Job Card identifies the customer for accounting purposes. The SCOUT User Job Card should have the following format:

Columns	Description of Input
1-2	//
3-10	A unique 4-8 character left justified name to be assigned to the job for identification purposes.
11	Blank
12-14	JOB
15	Blank
16-71	(MWx,nnnnn,UUU,,LL),PRTY=PP,TIME=TT Where x = 1 for jobs submitted over the counter at the GLDC x = B for jobs submitted thru BCRE x = R for jobs submitted thru RJE nnnnn = assigned customer account number (CWA) UUU = three character user ID assigned by GLDC LL = Maximum number of lines, in thousands, of output. If the line count exceeds LL x 1000, the job will be terminated. For a typical run, set LL = 10. PP = Priority Select a value of 02, 05, 07, 09, 10, 12, or 13. Consult your rate schedule for more details on these priorities and the corresponding charges. As a general rule, one should consider using low priority for the larger analysis runs and run them

Columns	Description of Input	
		overnight to minimize costs. The data verification runs are not very costly and a high priority on them will allow more time to check the data for the big overnight runs. When a job uses input and/or output tapes, the highest priorities may be negated by the delay in retrieving and mounting the tapes.
	TT	= Maximum CPU time in minutes (see Appendix II for typical values). If this CPU time is exceeded, the job will be terminated.
72-80	Blank	

Example User Job Card

```
Card    1       2       3       4       5       6
Col.    0       0       0       0       0       0

//SAMPLE   JOB (MWR,A1111,ABC,,10),PRTY=02,TIME=05
```

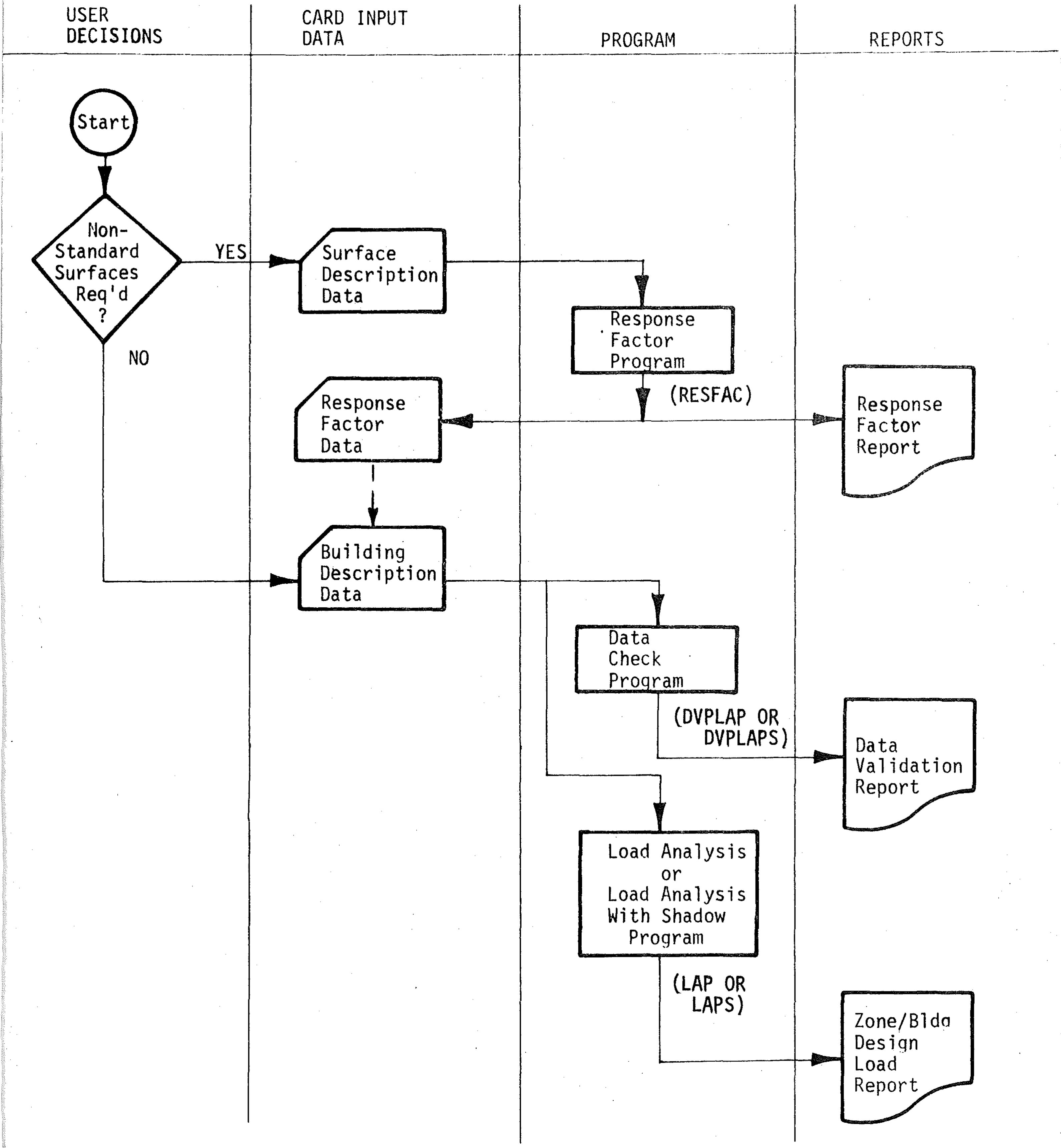

Figure 1 DESIGN LOAD ANALYSIS SEQUENCE

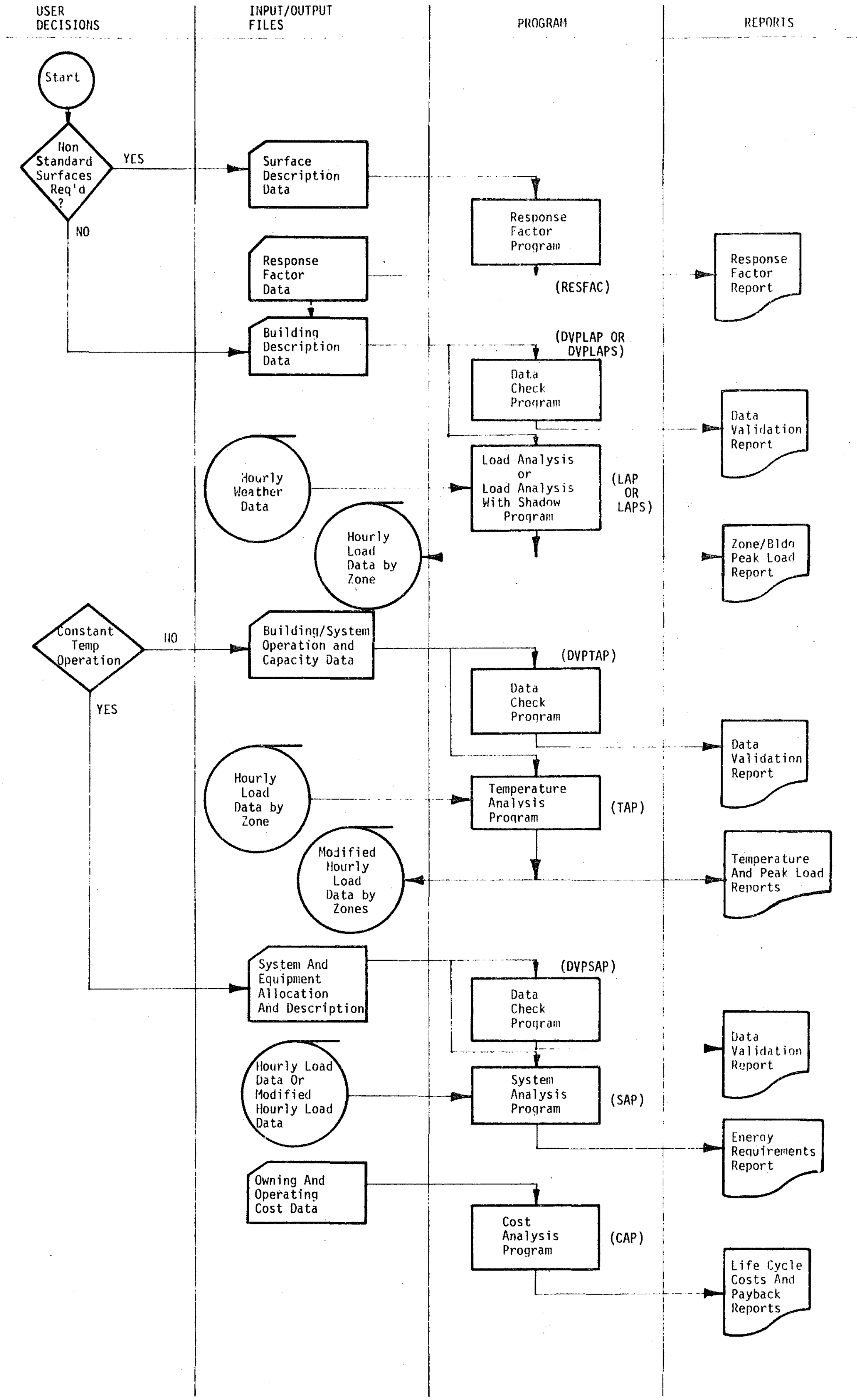

Figure 2 ENERGY ANALYSIS SEQUENCE

2.2.2 Procedure Execute Card

Immediately following the SCOUT user Job Card the SCOUT user must insert a Procedure Execute Card. This card specifies which of the SCOUT Procedures the user wishes to employ in this job. This card is also used to specify the parameters required by the procedure. See Section 3.0 for a detailed description of these parameters.

To specify this information the Procedure Execute Card should take the following format:

Columns	Description of Input
1-2	//
3	Blank
4-7	EXEC
8-9	Blank
10-71	Procedure to be executed and related parameters see table 2.1 and section 3.0
72-80	Blank

2.2.3 Input Data Definition Card

Immediately after the Procedure Execute Card the SCOUT user must insert an Input Data Definition Card. This card is used to describe the SCOUT input data to the procedure. The card can take one of two forms based upon the mode of data entry being used. The input Data Definition Card must take one of the following formats:

Format 1

Columns	Description of Input
1-2	//
3-15	nnnnnnn.SYSIN Where nnnnnnn is always replaced by name of the SCOUT procedure being used. (See section 3.0 for greater detail).
16-17	Blank
18-19	DD
20	Blank
21	*
22-88	Blank

Procedure Name		SCOUT Program
RESFAC	-	Response Factor Program
DVPLAP	-	Data Verification Program for Load Analysis Program
DVPLAPS	-	Data Verification Program for Load Analysis Program with Shadows
LAP	-	Load Analysis Program
LAPS	-	Load Analysis Program with Shadows
DVPTAP	-	Data Verification Program for Temperature Analysis Program
TAP	-	Temperature Analysis Program
DVPSAP	-	Data Verification Program for System Analysis Program
SAP	-	Systems Analysis Program
CAP	-	Life Cycle Cost Analysis Program

Table 1 - Available SCOUT Procedures

When using this format, the SCOUT user must place his SCOUT input data cards immediately following the Data Definition Card.

Format 2

Columns	Description of Input
1-2	//
3-15	nnnnnnn.SYSIN Where nnnnnnn is always replaced by the name of the SCOUT procedure being used. (See Section 3.0 for greater detail).
16-17	Blank
18-19	DD
20	Blank
21-71	DSN=DATANAME,DISP=(OLD,KEEP) Where DATANAME is the fully qualified data file name assigned to the SCOUT input data file when it was created and stored previously. This input file must be a cataloged data set. Cataloging is done automatically on BCRE when a file is created. Thru RJE, DISP=(,CATLG) must be specified when the file is created.
72-80	Blank

2.3 Procedure for Using Existing Weather Tapes

The SCOUT user obtains the weather input data for the Load Analysis Programs by specifying the city he desires as a parameter on the Procedure Execute Card for the LAP and LAPS procedures. Appendix I lists the currently available cities and the related parameter value to be specified.

2.4 Procedure for Acquiring Additional SCOUT Weather Data

SCOUT uses weather tapes purchased from the National Climatic Center in Ashville, North Carolina. By contacting your SCOUT representative, a weather tape for a specific city can be ordered. Two to three weeks must be allowed before the weather data is available to the SCOUT user.

2.5 Problem Resolution Procedure

In the event the SCOUT user has any problems processing with the SCOUT series, he should contact the local BCS technical representative or BCS Customer Services at 312/781-7900. BCS Customer Services will determine the nature of the problem and recommend appropriate action. In all cases where there is a problem, the SCOUT output should be retained and made available to the BCS technical representative, if requested.

2.6 Procedure Output Files

Output files created by LAP, LAPS, and TAP are written on magnetic tape. Each output file, when created, is given a name consisting of the following elements:

User ID
SCOUT
Procedure Name
Version (User's file identification)

If, for example, the LAP procedure is executed with the following example:

```
// EXEC LAP,City=CHI,Cust=XXX,VERS=10,SZE=S,REG=150
```

the name of the output file will be XXX.SCOUT.LAP10.

This name along with the tape serial number will be entered into the system catalog for ease of retrieval. This name cannot be used again for an output file unless it has been removed from the system catalog through special request. If a file name that is in the system catalog is used, the catalog will continue to point to the original file and the new file will not be cataloged. Caution: If a job terminates abnormally creating a defective file, the "VERS" parameter must be changed before the job is rerun.

When a tape file is created, it is given a retention period specified on the EXEC card or through the default. At the end of this period, the tape file will automatically be deleted without notice. Tapes may be deleted prior to the expiration of the retention period by contacting your BCS representative.

3.0 SAMPLE SCOUT JOB CONTROL PROCEDURES

3.1 RESFAC - Response Factor Procedure

```
Card   1         2         3         4         5         6
Col.   0         0         0         0         0         0

//xxxxxxx  JOB Standard Job Card
// EXEC  RESFAC
//RESFAC.SYSIN DD *

  Response Factor Data

/*
```

3.1.1 Procedure Variable Parameters

None

Note: If user terminal does not have the capability to accept the RESFAC punched card output, special arrangements will have to be made with BCS to have cards punched locally and mailed to user.

3.2 DVPLAP - Data Verification Procedure for Load Analysis Procedure

```
Card    1         2         3         4         5         6
Col.    0         0         0         0         0         0

//xxxxxxx   JOB Standard Job Card
// EXEC  DVPLAP
//DVPLAP.SYSIN DD *

  Building Description Data

/*
```

3.2.1 Procedure Variable Parameters

None

3.3 DVPLAPS - Data Verification Procedure for Load Analysis Procedure with Shadows

```
Card    1       2       3       4       5       6
Col.    0       0       0       0       0       0

//xxxxxxx   JOB Standard Job Card
// EXEC  DVPLAPS
//DVPLAPS.SYSIN DD *

  Building Description Data

/*
```

3.3.1 Procedure Variable Parameters

None

3.4 LAP - Load Analysis Procedure

```
Card    1         2         3         4         5         6
Col.    0         0         0         0         0         0

//xxxxxxx   JOB Standard Job Card
// EXEC   LAP,CITY=AAAAA,CUST=III,VERS=NN,SZE=S,REG=RRR,DAYS=YYY
//LAP.SYSIN DD *


Building description data


/*
```

3.4.1 Procedure Variable Parameters

AAAAA = This parameter indicates the city for which weather data is required. See Appendix 1 for the available cities and their abbreviations.

III = This parameter is the unique three character user ID which is assigned by the GLDC to each customer.

NN = This parameter is any 1-4 digit number or identifier which will differentiate one run of the job from another. It will be this identifier which will enable the user to identify each cycle through the model.

S = This parameter specifies the program size requirement. The value of this parameter is S, M, or L for Small, Medium, or Large. The output listing from the Data Verification Program (DVPLAP) will indicate which of the three is to be used.

RRR = This parameter is a 3 digit number which specifies the amount of computer memory to be made available to the executing program. The amount of core needed is dictated by the need of the processing program. Therefore, if the small (S) version is being executed, REG=130 is specified, if the medium version (M) is used, REG=150 is specified, or if the large (L) version is used, then REG=225 is specified.

YYY = This parameter indicates the number of days that the output file from this procedure is to be retained. At the end of that period, the file will be deleted. The default, if this parameter is omitted, is 90 days.

NOTE: For design load analysis, the "CITY" and "DAYS" parameters can be omitted.

3.5 LAPS - Load Analysis Procedure With Shadows

```
Card    1         2         3         4         5         6
Col.    0         0         0         0         0         0

//xxxxxxx   JOB Standard Job Card
// EXEC LAPS,CITY=AAAAA,CUST=III,VERS=NN,SZE=S,REG=RRR,DAY=YYY
//LAPS.SYSIN DD *


Building Description Data


/*
```

3.5.1 Procedure Variable Parameters

AAAAA = This parameter indicates the city for which weather data is required. See Appendix 1 for the available cities and their abbreviations.

III = This parameter is the unique three character user ID which is assigned to each customer.

NN = This parameter is any 1-4 digit number or identifier which will differentiate one run of the job from another. It will be this identifier which will enable the user to identify each cycle through the model.

S = This parameter specifies the program size requirements. The value of this parameter is S, M, or L for Small, Medium, or Large. The output listing from the Data Verification Program (DVPLAPS) will indicate which of the three is to be used.

RRR = This parameter is a 3 digit number which specifies the amount of computer memory to be made available to the executing program. The amount of core need is dicated by the needs of the processing program. Therefore, if the small (S) version is being executed, REG=200 is specified, if the medium (M) version is used, REG=275 is specified, or if the large (L) version is used, then REG=400 is specified.

YYY = This parameter indicates the number of days that the output file from this procedure is to be retained. At the end of that period, the file will be deleted. The default if this parameter is omitted is 90 days.

NOTE: For design load analysis, the "CITY" and "DAYS" parameters can be omitted.

3.6 DVPTAP - Data Verification Procedure for Temperature Analysis Procedure

```
Card    1         2         3         4         5         6
Col.    0         0         0         0         0         0

//xxxxxxx   JOB Standard Job Card
// EXEC  DVPTAP
//DVPTAP.SYSIN DD *


Building/System Operations and Capacity Data


/*
```

3.6.1 Procedure Variable Parameters

None

3.7 TAP - Temperature Analysis Procedure

```
Card      1         2         3         4         5         6
Col.      0         0         0         0         0         0

//xxxxxxx   JOB Standard Job Card
// EXEC TAP,CUST=III,SRCE=PPPP,VERSIN=N1,VERSOUT=N2,DAYS=YYY
//TAP.SYSIN DD *


Building/system operation and capacity data


/*
```

3.7.1 Procedure Variable Parameters

III = This parameter is the unique three character user ID which is assigned by the GLDC to each customer.

PPPP= This parameter designates the source procedure of the input hourly zone load data. Either LAP or LAPS is specified depending upon whether the load analysis procedure was used or the load analysis procedure with shadows was used.

N1 = This parameter is the 1-4 digit number or identifier specifying the input file to be used in this procedure.

N2 = This parameter is any 1-4 digit number or identifier specifying the output file of this run of the procedure.

YYY = This parameter indicates the number of days that the output file from this procedure is to be retained. At the end of that period, the file will be deleted. The default, if this parameter is omitted, is 90 days.

3.8 DVPSAP - Data Verification Procedure for Systems Analysis Procedure

```
Card    1       2       3       4       5       6
Col.    0       0       0       0       0       0

//xxxxxxxx   JOB Standard Job Card
// EXEC  DVPSAP
//DVPSAP.SYSIN DD *

  System and Equipment Allocation and Description Data

/*
```

3.8.1 Procedure Variable Parameters

None

3.9 SAP - Systems Analysis Procedure

```
Card    1       2       3       4       5       6
Col.    0       0       0       0       0       0

//xxxxxxxx   JOB Standard Job Card
// EXEC  SAP,CUST=III,SRCE=PPPP,VERS=NN
//SAP.SYSIN DD*

System and Equipment Allocation and Description Data

/*
```

3.9.1 Procedure Variable Parameters

III = This parameter is the unique three character user ID which is assigned by the GLDC to each customer.

PPPP = This parameter designates the source procedure of the input hourly zone load data. Either LAP, LAPS, or TAP is specified depending upon whether the load analysis procedure, load analysis procedure with shadows, or temperature analysis procedure created the hourly zone load data which is to be input to this procedure.

NN = This parameter is any 1-4 digit identifier which will differentiate one run of the job from another. It will be this identifier which will enable the user to differentiate each cycle through the model.

3.10 CAP - Life Cycle Cost Analysis Procedure

```
Card    1       2       3       4       5       6
Col.    0       0       0       0       0       0

//xxxxxxx   JOB Standard Job Card
// EXEC  CAP
//CAP.SYSIN DD *

  Owning and Operating Cost Data

/*
```

3.10.1 Procedure Variable Parameters

None

4.0 Example

To illustrate the use of the SCOUT procedures outlined within this Access and Control Guide, the following example problem has been outlined to demonstrate the series of program runs that are typically required.

Assume a building for which an evaluation of the following is required:

1. Design load analysis of two (2) alternative building envelope designs.

2. Energy analysis of each building design using two (2) different types of HVAC systems.

3. Life cycle cost analysis and comparison of all 4 building/system alternatives.

A summary of the computer runs required plus input/output requirements are indicated in the Table 2. Output file names generated by each program for output tape files are also indicated. User ID is ABC.

TABLE 2

PROCESSING REQUIREMENTS FOR EXAMPLE PROBLEM

COMPUTER RUN	PROCEDURE USED	CARD INPUT DATA DESCRIBING	INPUT TAPE NAME	OUTPUT TAPE NAME
1	LAP	BUILDING DESIGN 1+ DESIGN WEATHER	-	-
2	LAP	BUILDING DESIGN 1	CHI*	ABC.SCOUT.LAP01
3	TAP	BUILDING OPERATION 1	ABC.SCOUT.LAP01	ABC.SCOUT.TAP01
4	SAP	SYSTEM 1+ EQUIPMENT	ABC.SCOUT.TAP01	-
5	SAP	SYSTEM 2+ EQUIPMENT	ABC.SCOUT.TAP01	-
6	LAP	BUILDING DESIGN 2+ DESIGN WEATHER	-	-
7	LAP	BUILDING DESIGN 2	CHI*	ABC.SCOUT.LAP02
8	TAP	BUILDING OPERATION 2	ABC.SCOUT.LAP02	ABC.SCOUT.TAP02
9	SAP	SYSTEM 1+ EQUIPMENT	ABC.SCOUT.TAP02	-
10	SAP	SYSTEM 2+ EQUIPMENT	ABC.SCOUT.TAP02	-
11	CAP	COST DATA FOR RESULTS FROM COMPUTER RUNS 4, 5, 9 and 10	-	-

* OTHER CITIES FOR WHICH WEATHER IS AVAILABLE COULD HAVE BEEN USED. SEE APPENDIX 1.

APPENDIX 1

Currently Available Weather Data *

City	Years	Abbreviation
Atlanta, Ga.	1/49 - 12-58	ATL
Baltimore, Md.	1/54 - 12/63	BALT
Boston, Ma.	1/49 - 12/58	BOST
Chicago, Il.	1/63 - 12-72	CHI
Denver, Co.	1/49 - 12/58	DENV
Detroit, Mi.	1/49 - 12/58	DET
Evansville, In.	1/55 - 12/64	EVANS
Houston, Tx.	1/55 - 12/64	HOUST
Los Angeles, Ca.	1/49 - 12/58	LAX
Milwaukee, Wi.	1/49 - 12/58	MILW
Minneapolis, Mn.	1/50 - 12/60	MPLS
Philadelphia, Pa.	1/49 - 12/58	PHIL
St. Louis, Mo.	1/49 - 12/58	STL
San Francisco, Ca.	1/49 - 12/58	SFO

* Other cities available upon request

APPENDIX II

VALUE FOR

RECOMMENDED JOB CARD TIME PARAMETER

Number of Zones	Time in Minutes											
	RESFAC	DVPLAP	DVPLAPS	(Design Load) LAP	(Hourly) LAP	(Design Load) LAPS	(Hourly) LAPS	DVPTAP	TAP	DVPSAP	SAP	CAP
1	5	5	5	5	10	10	15	5	5	5	5	5
2	5	5	5	5	10	10	15	5	5	5	5	5
3	5	5	5	5	10	10	15	5	5	5	5	5
4	5	5	5	5	10	10	15	5	5	5	5	5
5	5	5	5	5	10	10	15	5	5	5	5	5
6	5	5	5	10	20	20	25	5	10	5	10	5
7	5	5	5	10	20	20	25	5	10	5	10	5
8	5	5	5	10	20	20	25	5	10	5	10	5
9	5	5	5	10	20	20	25	5	10	5	10	5
10	5	5	5	10	20	20	25	5	10	5	10	5
11	5	5	5	15	30	30	35	5	15	5	15	5
12	5	5	5	15	30	30	35	5	15	5	15	5
13	5	5	5	15	30	30	35	5	15	5	15	5
14	5	5	5	15	30	30	35	5	15	5	15	5
15	5	5	5	15	30	30	35	5	15	5	15	5
16	5	5	5	20	40	40	45	5	20	5	20	5
17	5	5	5	20	40	40	45	5	20	5	20	5
18	5	5	5	20	40	40	45	5	20	5	20	5
19	5	5	5	20	40	40	45	5	20	5	20	5
20	5	5	5	20	40	40	45	5	20	5	20	5

NOTE: These recommended times are for problems of average complexity. For problems involving detailed modeling (i.e., heavily shaded building, excessive number of delayed surfaces), these time estimates may not be sufficient.

How to use SCOUT

The SCOUT energy analysis program is accessible through terminals in your own office or through high speed terminals at local BCS offices. If you would like to know more about SCOUT and how it can best serve your needs, or when the next SCOUT training seminar is to be held, call or write one of the following locations:

BCS/CHICAGO
35 East Wacker Drive
Chicago, Illinois 60601
(312) 781-7900

BCS/CLEVELAND
Towers East, Suite 330
20600 Chagrin Boulevard
Cleveland, Ohio 44122
(216) 921-0800

BCS/DETROIT
Parklane Towers, Suite 401-W
One Parklane Boulevard
Dearborn, Michigan 48126
(313) 271-8000

BCS/DALLAS
1111 West Mockingbird Lane, Suite 832
Dallas, Texas 75247
(214) 630-4701

BCS/WICHITA
209 East William, Suite 820
Wichita, Kansas 67202
(316) 687-2824

BCS/HOUSTON
3334 Richmond, Suite 109
Houston, Texas 77006
(713) 526-1331

GARD, INC.
7449 N. Natchez Avenue
Niles, Illinois 60648
(312) 647-9000

About BCS and GARD

Boeing Computer Services, Inc. was formed in 1970 by the Boeing Company to offer the experience of 4,000 people and the computer power provided by a nationwide data communication network to solve data processing problems. Today BCS is one of the largest data processing service companies in the country, doing business with over 2,900 clients.

GARD, INC. is a leading applied engineering, research and development contractor for Government and Industry. GARD has extensive experience in the development, support, and application of computerized energy analysis programs, dating back to 1968 when it began work on the U.S. Postal Service Program.

GATX
GARD, INC.

BCS BOEING COMPUTER SERVICES, INC

BCS BOEING COMPUTER SERVICES, INC.

CORPORATE HEADQUARTERS
177 MADISON AVENUE
MORRISTOWN, N.J. 07960
(201) 540-7700

CORPORATE OFFICES
P.O. BOX 24346
SEATTLE, WASHINGTON 98124
(206) 773-1152

OFFICE OF FINANCIAL SERVICES
505 INDUSTRY DRIVE
SEATTLE, WASHINGTON 98188
(206) 773-2794

DISTRICT OFFICES

NORTHEAST
SCOTT PLAZA 2
INDUSTRIAL HIGHWAY
PHILADELPHIA, PENNSYLVANIA 19113
(215) 522-3600

WESTERN
P.O. BOX 24346
SEATTLE, WASHINGTON 98124
(206) 773-2136

CENTRAL
SUTTON PLACE, SUITE 820
209 EAST WILLIAM
WICHITA, KANSAS 67202
(316) 687-2824

GREAT LAKES DATA CENTER
35 EAST WACKER
CHICAGO, ILLINOIS 60601
(312) 781-7919

EASTERN
7598 COLSHIRE DRIVE
MCLEAN, VIRGINIA 22101
(703) 821-6000

SOUTHEAST AREA
6520 POWERS FERRY ROAD
ATLANTA, GEORGIA 30339
(404) 955-3650

DIVISION OFFICES

SPACE AND MILITARY APPLICATIONS (SAMA)
P.O. BOX 24346
SEATTLE, WASHINGTON 98124
(206) 773-8393

THE CONSULTING DIVISION
505 BAKER BOULEVARD
SEATTLE, WASHINGTON 98188
(206) 773-1141

EDUCATION AND TRAINING
P.O. BOX 24346
SEATTLE, WASHINGTON 98124
(206) 655-6575

GROUP OFFICES

SPACE, ENERGY, AND MILITARY APPLICATIONS
P.O. BOX 24346
SEATTLE, WASHINGTON 98124
(206) 773-9130

SUBSIDIARIES

BOEING COMPUTER CENTRES, LTD.
ST. MARTINS HOUSE
31 CLARENDON ROAD
WATFORD, HERTS, WD1 1JA
ENGLAND
(WATFORD 38321)

BOEING COMPUTER SERVICES CANADA, LTD.
134 ABBOT STREET, GASTOWN
VANCOUVER, B.C., CANADA V6B 2K4
(604) 688-2266

THE LEADER CORPORATION
651 STRANDER BOULEVARD
SEATTLE, WASHINGTON 98188
(206) 773-2800

X