MARTIN MARIETTA

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FINAL REPORT

MOLECULAR CONTAMINATION MATH MODEL SUPPORT

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Table of Contents

List of Figures

List of Tables

1.0 SUMMARY

The purpose of this study is to provide user's training/liaison with personnel at NASA MSFC onto the operation and utilization of the SPACE II contamination analysis program and to develop a preliminary preprocessor for SPACE II to streamline its operation and enhance its "user friendliness". All tasks have been completed within the constraints of the contract. This report summarizes the preliminary SPACE II preprocessor and documents its current status. Although it is not completely operational, it should provide sufficient utility to allow evaluation by MSFC. If the preprocessor discussed herein is deemed viable, it is recommended that further refinements and enhancements be made to insure complete, user friendly operation.

This computer program users' manual describes the operation and features of a preprocessor for the Shuttle/Payload Contamination Evaluation Program Version II - The SPACE II Computer Program (Reference 1). The purpose of a preprocessor is to collect input from a user by an interactive dialogue. The preprocessor then generates an input file that will execute the SPACE II program for a case of interest. The interactive dialogue includes logical questions, multiple choice questions and definitive questions; the latter requires a numerical response.

The preprocessor is built as as baseline model so the basic principle can be evaluated before proceeding with the additional development work that will make it fully operational. As a baseline model it will address the first order input instructions and create an input file that will execute the SPACE II program. The input instructions that the preprocessor will not address and the scope of a fully operational preprocessor are also discussed.

2.0 INTRODUCTION

SPACE II was developed to provide the user with a flexible analytical tool with which to predict the external self-induced molecular contaminant environment of a space vehicle during its orbital operations. It mathematically synthesizes the contaminant environment due to material sources of Spacelab, the Space Shuttle Orbiter and any other spacecraft configuration. It predicts surface deposition by direct and return flux transport on surfaces and molecular column density within any selected line-of-sight. The user has an option to modify geometric configurations, outgassing data and mission parameters through the proper program commands.

The current flexible design of SPACE II makes it possible to modify the basic geometric model; Spacelab in the Shuttle Orbiter bay. Spacelab configuration data is input to the program through mass transport factor files known as TAPE 12, 14 or 15. Another method is through formatted input cards but this is so seldom used that it is not a feature of the preprocessor. These tapes are made using the TRASYS II computer program (Reference 2) using a radiation analogue to Lambertian mass emission from outgassing materials.

A user should first conduct an audit of existing Orbiter, Spacelab and payload input tapes. If the appropriate tapes are available then the user can proceed directly to the baseline preprocessor and construct a SPACE II input file. If a user is to evaluate a new payload in the Orbiter payload bay, then the existing Orbiter TAPE14 will apply. The user then must develop a new TAPE15 if there is to be a column density or return flux calculation and a new TAPE12 when direct flux results are of interest. References 1 and 2 will assist the user in developing these additional TAPES.

The baseline preprocessor does not address the development of any input TAPE but requires corresponding information such as geometric node numbers. It is best to have all input TAPES available to the user before using the preprocessor. There is additional information such as node locations and orientations that are available in TRASYS II output which the preprocessor may require depending on the type of calculation results expected from SPACE II. For these reasons it is recommended that all input TAPES be made and computer outputs be available before a user attempts to use the preprocessor.

The following sections discuss the preprocessor program once a user is ready to proceed with developing a SPACE II input file. Section 3 defines the individual subroutines, input instructions and output results. Section 4 describes future work that will enhance the operation and utility of a SPACE II preprocessor. Within the appendices are two sample case outputs; one that develops a limited input file and another that exercises all possible program options, and in addition a listing of the preprocessor source code in FORTRAN IV.

3.0 PROGRAM DESCRIPTION

3.1 Program Overview

The SPACE II preprocessor is an interactive dialogue program that collects input from a user in a real time question and answer session to create an input file for the SPACE II program. There are six principal sections in the program which are utilized in part or whole. These six sections are:

1) Initialize - Give default values to all input variables before program execution.

2) Control data - Define the program control parameters to determine which contaminant analysis is of interest. These inputs are generally associated with the namelist CONTRL input section of SPACE II.

3) Geometric data - Define the surfaces or engines that are sources of contamination and surfaces that are susceptible to contaminants. These inputs are associated with the namelist INPUTA input section of SPACE II.

4) Source information - Define the new surfaces by giving its area, material type and location in the payload bay. If the contaminant source in an engine or vent then define its location and orientation. These inputs are associated with the formatted card images at the end of namelist INPUTA input section of SPACE II.

5) Mission data - Define the flight mission parameters such as altitude and Orbiter orientation. The inputs are associated with the MPDB namelist input section of SPACE II.

6) Build space file - Create an input file for SPACE II using the responses given by the user.

The interrelationship between each of the six principal sections is illustrated in Figure 1. Sections 2 through 5 collect all of the inputs while output is performed in Section 6. There are numerous other input features to the SPACE II program that are not dealt with by the current baseline preprocessor. These include namelist INPUTB, the formatted card images after INPUTB, namelist INPUTC and the formatted card images after namelist MPDB.

The user can also refer to Figure 6-4 of the SPACE II Users Manual for the logical flow that is used to develop a SPACE II input file.

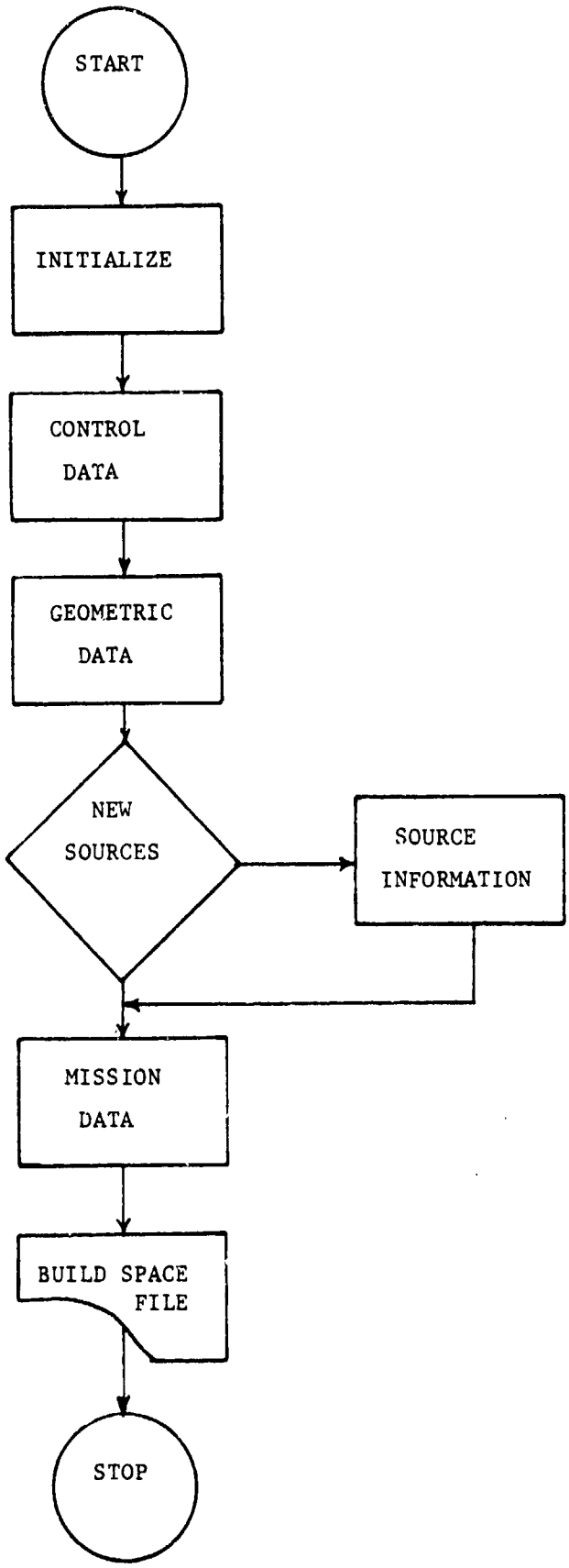


Figure 1 Program Overview

3.2 Program Subroutines

The following subroutines are complete and operational on a FORTRAN IV complier. They were written with the intent to compile as a simplier FORTRAN source (ANSI) on a mini-computer. There is one subroutine PLUMEX that is not ANSI standard FORTRAN IV but can be made compatible by moving all data statements forward of any executable code and also by separating the mixed mode assignments into separate data statements. The functional responsibilities of each subroutine is given below:

SPACEP - As a main program it calls these subroutines; INIT, CONTRL, INPUTA, ADDCON, INPUTB, ADDATA, ADDTMP, MPDB and ADDVFS, which collect input from the user for each of the namelist input sections. It then creates a file using the BUILD subroutine that will execute the SPACE computer program for a particular case of interest. Default values are given to the input variables by the subroutine INIT.

CONTRL - Collect inputs from the user by an interactive dialogue for the CONTRL namelist input section in the SPACE computer program. These inputs will specify the type of analysis, source of contamination, geometric configuration and whether there is new information that is not a part of block data in the SPACE computer program.

INPUTA - Collect inputs from the user by an interactive dialogue for the INPUTA namelist input section. These inputs identify the node number of surfaces and points that are sources of contamination and also the surfaces that as a receiver are susceptible to a contaminant flux.

MPDB - Collect input from the user by an interactive dialogue for the MPDB namelist input section. These inputs will determine the flight mission parameters such as orbital altitude, orientation, and velocity. If there is to be a column density or return flux analysis, then the receiver location, orientation and field-of-view are requested from the user.

ADDCON - Collect input from the user by an interactive dialogue for the formatted input section after INPUTA namelist. These inputs will specify the contaminant source characteristics. If it is a surface source then the type of material, its surface area and the vehicle it belongs on is important. If it is a point source then the type of engine or vent, its location and orientation is requested from the user. The surface source information is usually attached as TAPE4 with the input file while point source characteristics for Orbiter engines are a part of block data in the SPACE computer program.

BUILD - Create a file that will execute the SPACE computer program using inputs given by the user.

KYBDIN - Check whether the response made by the user is appropriate with regard to it being an integer number, floating point number, character string or an unrecognizable input.

ORBTR - This is the Shuttle Orbiter block data which contains descriptive information such as surface area, material name and material location for each of the geometric shapes that collectively simulate the Orbiter.

INIT - Default values are given to the input variables that result in a simple baseline case.

PLUMEX - This is the Orbiter engine block data which contains descriptive information such as species mass fractions, engine location and type. It also contains the plume coefficients which describe the emission pattern from each engine with respect to radial distance and angle from the centerline. The structure is not ANSI standard FORTRAN and may need to be modified for use with a simplier complier.

CLEAR - Clears the terminal screen on a Beehive terminal for a new question and a user response. The escape code is machine dependant and may need to be modified to an appropriate code for use with a different terminal.

HEADER - Places a header on the terminal screen before a new question is given to the user. Each header describes which section of the input listing is currently being considered.

Due to time and budget constraints on this task there are some subroutines that are incomplete but these do not adversely affect the operating characteristics of this preprocessor as a baseline model. After these subroutines are complete then the full capability of SPACE input instructions will be in place. The functional responsibility of each subroutine is given below:

INPUTB - Collect inputs from the user by an interactive dialogue for the INPUTB namelist input section. These inputs will modify either the mass loss characteristics of a surface material or the distribution coefficients of an Orbiter engine. There are default values in the SPACE computer program for these variables. Mass loss characteristics include outgassing rate and time constant while plume distribution coefficients comprise species mass fractions, molecular weight and molecular diameter.

ADDATA - Collect inputs from the user by an interactive dialogue for the format data after INPUTB namelist input section. These inputs describe how many changes to the preset values and the new data input for contaminant species, kind of materials, location of materials and type of engines.

ADDTMP - Collect inputs from the user by an interactive dialogue for the formatted data after INPUTB namelist input section or namelist data in INPUTC input section. These inputs define the temperature of each surface node which is normally attached as TAPE10 with the input file. A temperature file is available as a part of the SPACE II data base for the Orbiter and Skylab nodes.

ADDVFS - Collect inputs from the user by an interactive dialogue for the formatted data after MPDB namelist input section. These inputs are the mass transport factors between any two surfaces having a view of each other. As a geometric dependent parameter of distance from the source and angle off the centerline, each establishes the fraction of mass that can impinge on a surface. A mass transport factor file is usually attached as TAPE12 with the input file.

LMOPX - This is the Long Module - One Pallet configuration of Spacelab block data which contains descriptive information such as surface area, material name and material location for each of the 69 geometric shapes and one vent that collectively simulate this Orbiter payload.

SMTPX - This is the Short Module - Three Pallet configuration of Spacelab block data which contains the same type of information as the previous block data on 91 surfaces and one vent.

FIVPX - This is the Five Pallet configuration of Spacelab block data comprising 82 surfaces and is another payload that is a part of the SPACE data base.

P801X - This is a P80-1 satellite configuration in block data of the Space Test Program and includes 67 surface nodes.

DSPIUS - This is a Defense Satellite Program satellite and Inertial Upper Stage transfer vehicle configuration in block data using 59 surfaces to collectively simulate another Orbiter payload.

TEACH - Instructions are given on request at the beginning of program execution that informs the user about constructing a SPACE input file by using the preprocessor.

MATLX - This is the material and engine block data which contains information on spacecraft material names and locations, the species that outgas from these materials and also names of Orbiter engines that are a part of the SPACE block data.

IERROR - Error messages concerning user input instructions that are not compatible or incomplete for a case of interest.

3.3 Input Description

Input Format - User input to an interactive dialogue as a question and answer format is by an integer number, a real number with a decimal point (exponential format is not available), or a character string including a blank line. If the response is unrecognizable or inappropriate due to typographical errors, then the answer prompt returns for additional user input. The baseline preprocessor does not give a descriptive message describing why the user response is inappropriate. But in most cases it is apparent and the location in the source code where descriptive messages will occur is identified at the end of subroutine KYBDIN.

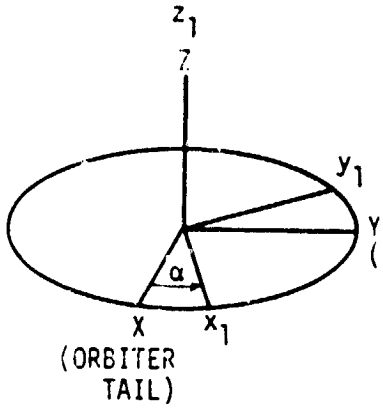
Almost every variable has a default value so not all parameters require a response. Any parameter not given a value will retain the default value. Default values can be found in Reference 1 or in Tables 1 through 4. A sample of user input to the interactive dialogue is shown in the Appendices.

Input Parameters - The input variables that a user will encounter while executing the baseline preprocessor are described in Tables 1 through 4: Table 1 - Program Control Parameters, Table 2 - Geometric Parameters, Table 3 - Contaminant Parameters and Table 4 - Mission Parameters. Under the column heading "Variable Type"; the letter "R" indicates a real number is input which contains a decimal point, the letter "I" indicates an integer number is input which contains no decimal point and the letter "C" indicates a character string is input which contains either alphabetic or numerical symbols. "Default values" are listed under the next column heading as the value of the parameter internally initialized by SPACE before program execution.

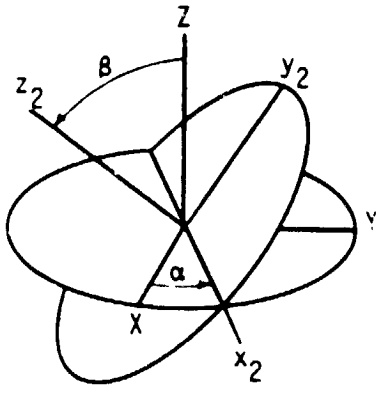
There are three basic types of questions in the interactive dialogue; a logical question using a yes or no response, a multiple choice question using an integer input or a definitive question which requires a real number such as orbital altitude or a character string like the case title, for example.

The yes or no response to a logical question can be shortened to the letters "Y" or "N", respectively. Only the first character of the string defines the response so other responses such as "YEA" or "NAY" are acceptable. Logical questions usually coincide with the logical variables in Tables 1 through 4 which have a TRUE or FALSE default value.

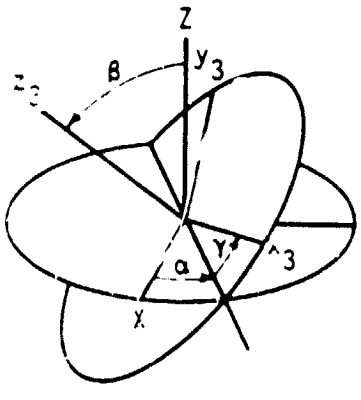
A definitive question is the most difficult to answer while working at a computer terminal without some degree of preparation in advance. The response these questions require is simplier when certain items are available. Among the items of information that should be available to the user are: an output listing from TRASYS (Thermal Radiation Analysis System) or similar computer program for the payload configuration, a listing of the additional input files such as TAPE 4 which contains geometric and material information, a blueprint of the payload configuration, a protractor and a scale. These items will provide a basis for defining geometric node numbers, node locations and node orientations. Locations are given with respect to the standard Orbiter coordinate system so it is best to construct the geometric payload model in this system. Orientations are given with respect to the spherical coordinate system shown in Figure 2.



ROTATION #1



ROTATION #2



ROTATION #3

Figure 2 Rotations Defining Receiver Orientation

There are sixty-five (65) input variables listed in Table 1 through 4 which a user will encounter while executing the baseline preprocessor. Four of these variables will query the user for an input value but subsequently will have no impact on the SPACE II input file. This occurs because other subroutines are incomplete. A star "*" identifies these variables. The description beside each variable is brief and should be used as a guide because the original user manual (Reference 1) for SPACE II contains a complete description. The parameter names are the same as the corresponding parameter in Reference 1 so the extent of the preprocessor can be easily determined by direct comparison.

A virtue of the preprocessor is that it will eliminate the need to input some variables because previous input or information from the built-in data base has resolved their value. REPORT is an example of a variable that is defined according to the user choice of a contaminant transport mechanism. Other variables include SERIES when a built-in spacecraft configuration is chosen, ICCODE, I and K sequence numbers, MOUT1, MOUT2, MED1, MED2, M1 and M2.

A second and equally important benefit of a preprocessor is that it will make the SPACE II program user friendly by creating a manageable set of input variables. The user manual of Reference 1 lists 150 input variables. This development work has reduced that number by more than half to 65 input variables by either neglecting seldom used variables or determining their value from previous input instructions. Future work on a preprocessor concept will eventually shrink the input variable listing to a concise and manageable set.

Table 1 - PROGRAM CONTROL PARAMETERS

Parameter	Type	Default	Description
TITLE	C	--	Description of analysis
ORBITR	C	True	There is an STS Orbiter Configuration
PAYLOD	C	False	There is a payload
NEWCON	C	False	New geometric information not found on TAPE4
SPCRFT	C	--	Payload name
SERIES	I	1000	Numbering scheme for payload nodes
NTAPE4	C	False	Geometric data on TAPE4
OUT	C	True	Outgassing contaminants
ED	C	False	Early desorption contaminants

Table 1 - PROGRAM CONTROL PARAMETERS (Cont'd)

Parameter	Type	Default	Description
LEAK	C	False	Crew cabin leaks contaminants
REFLCT	C	False	Contaminants can reflect on other surfaces
NRFLCT	I	1	Number of reflections
PLUME	C	False	Engine or vent contaminants
NEWPL	C	False	New engine or vent information not found on TAPES
MCD	C	True	Compute mass/number column density
DIRECT	C	False	Compute direct flux transport
PFAS2	C	False	Compute return flux transport from ambient scattering
RFSS	C	False	Compute return flux transport from contaminant scattering
MACH*	R	1.0	Engine flow Mach for contaminant scattering
TSTARR*	R	--	Engine flow temperature for contaminant scattering
MAXTMP	C	True	Maximum temperature of surfaces
MINTMP	C	False	Minimum temperature of surfaces
ATCODE	I	0	Temperature is on Tape 10 in column one through 5
NEWTNL*	C	False	Temperature input permanently updates Tape 10
NEWTCD*	C	False	Temperature input temporarily updates Tape 10
NEWMFP	C	False	Combine tape 14 and 15 and generate a RMS file

* Although there are inputs for these variables they have no impact on final SPACE II input file.

Table 2 - GEOMETRIC PARAMETERS

Parameter	Type	Default	Description
SURFSC	I	--	Eliminate surface nodes that are contaminant sources
SSURFS	I	--	Eliminate surface nodes that reflect contaminant
PNTSC	I	--	Identify engines/vents that are on
ONTIME	F	0.0	Time duration of engine/vent
RECEVR	I	1234	Identify surface nodes susceptible to contaminants
FOVANG	F	180.	Field-of-view half angle for direct flux receivers

Table 3 - CONTAMINANT PARAMETERS

Parameter	Type	Default	Description
IDENT	I	--	Surface node number
SECT	C	--	Location of surface
MATRL	C	--	Name of surface material
AREA	F	--	Area of surface (in^2)
CLOC	C	--	Location of engine/vent
CTYPE	C	--	Name of engine/vent
CXLOC	F	--	Orbiter X location of engine/vent (in)
CYLOC	F	--	Orbiter Y location of engine/vent (in)
CZLOC	F	--	Orbiter Z location of engine/vent (in)
CTHETA	F	--	Angle of nozzle centerline to Z-axis (deg)
CPHI	F	--	Angle of nozzle centerline in X-Y plane from +X axis (deg)

Table 4 - MISSION PARAMETERS

Parameter	Type	Default	Description
PITCH	F	0.0	Orbiter pitch angle (deg)
YAW	F	0.0	Orbiter yaw angle (deg)
ROLL	F	0.0	Orbiter roll angle (deg)
ALT	F	400.	Orbiter altitude (km)
VA	F	7650.	Orbiter velocity (m/sec)
SUNL	C	False	Low sunspot activity
SUNM	C	True	Medium sunspot activity
SUNH	C	False	High sunspot activity
XO	F	1107.	Receiver X-location (in)
YO	F	0.0	Receiver Y-location (in)
ZO	F	507.	Receiver Z-location (in)
	Mass Column Density Calculation Only		
THETAL	F	--	Angle of receiver centerline to Z-axis (deg)
PHIL	F	--	Angle of receiver centerline in X-Y plane from +X axis (deg)
	Return Flux Calculation Only		
ALPHA	F	0.0	Angle of receiver centerline to Z-axis (deg)
BETA	F	0.0	Angle of receiver centerline to local +X axis (deg)
GAMMA	F	0.0	Angle of receiver centerline to local +Z axis (deg)
THETA1	F	0.0	Angle off surface Z-axis where field-of-view (FOV) begins (deg)
THETA2	F	10.24	Angle off surface Z-axis where FOV ends (deg)

Table 4 - MISSION PARAMETERS (Cont'd)

Parameter	Type	Default	Description
PHI1	F	0.0	Angle off surface X-axis where FOV begins (deg)
PHI2	F	360.	Angle off surface X-axis where FOV ends (deg)
DTHETA	F	10.24	Increment in THETA angle
DPHI	F	45.	Increment in PHI angle

3.4 Output Description

Output from the baseline preprocessor is in two formats; one is to the terminal screen and one as a local data file. The former has an organization that is similar to the four sections in Section 3.3 "Input Description". Presently the HEADER subroutine is incomplete but in some instances will write a header on the terminal screen before each question is given to the user. The headers that are operational include: "Space II input deck preprocessor" at the beginning of program execution, "Program control parameters" which corresponds to Table 1 input listing while Table 2 input listing is associated with "Contamination source definition" heading. The printout of a sample case in Appendix A and B illustrate this output format.

There is a special character; >E, that is written to the terminal screen to make it completely clear. Whenever this escape E code appears then the previous information on the screen disappears so a new question can be written. Although this code is machine dependent, it can be easily changed to the appropriate code in any particular application.

The local data file called TAPE1 that appears at the end of program execution is shown at the end of each sample problem. This is compatible with the SPACE II input structure and will execute the contamination case of interest.

3.5 Resource Estimates

The SPACE II preprocessor can be complied and executed with a central memory limit of 70500.

There is one external reference; EOF that is not a part of the preprocessor to determine when there is an end of a data file.

The central-processor-unit (CPU) time to process a particular case depends on the complexity of the input instructions. Experience shows it has always been less than a second.

4.0 Future Enhancements

The genesis of a preprocessor has lead to a baseline computer program that creates a limited input data file for the SPACE II computer program. It has also provided an equally important opportunity to consider the needs of a user who has to deal with the intensive input demand of SPACE II. Although the preprocessor is incomplete, it does demonstrate that a software system that can handle every input function leading to a successful SPACE II execution will necessary be complex. There are a number of ideas that have emerged throughout the development of this preprocessor. These are listed below for consideration:

1) User Input - The structure of a preprocessor to SPACE II will be somewhere between simple and complex depending on the needs of each user. If an analysis involves simple geometric configurations, such as an empty Orbiter payload bay and can use previously built data bases, then a simple preprocessor will adequately handle the task. However, if new geometric configurations or data base information is necessary to accomplish a task, such as program particular thermal and outgassing data, then the preprocessor will necessary have to be complex. A formal definition from the user community with respect to their needs is an important aspect of any future enhancement.

2) Planning - A plan is necessary to assure that the work done during an early stage of development will be applicable to the final product at a later date. The plan should consider the demands on a user community, the resources of hardware components that these people utilize, the structure of software systems that manage their data bases and also the interrelationship between those many input resources that a user has at their disposal such as blueprints and other computer programs.

3) Tape Development - In addition to the input data file are several tapes which are attached to the job stream before executing the SPACE II program. These include surface materials data (TAPE4), surface temperature data (TAPE10), mass transport factors data between adjacent surfaces (TAPE12) and from surfaces to points in space (TAPE 14 & 15). A preprocessor should help the user build these tapes using results from a radiation computer program like TRASYS.

4) Receiver Information - SPACE II input requires the location and orientation of each receiver when a user wants to determine either deposition from return flux contaminant transport or the effect of molecular column density within the field-of-view of an optical component. This information is typically available within the output of their geometric model. A preprocessor should access all relevant information that is a part of the geometric model so a user can be confident that the information is consistent and free of mistakes.

5) Graphics - An interactive plotting capability is the best method that a user has to determine whether the input values are correct. It is easy to mistakenly input the wrong values unless there is a means for feedback that will quickly show the user how the computer program will interpret their input instructions.

6) Data base - The SPACE II data base is an integral part of molecular contamination analysis. A preprocessor should show the user what data is available and help them determine whether it is applicable. Although the data base is extensive, it must be functional to save the user time and eliminate redundant work.

It is recommended that MSFC review the concept of a SPACE II preprocessor and in particular the baseline processor which is presented in this report. A preprocessor can train a new engineer in contamination analysis while being an assistance to an engineer with experience by quickly doing work that had previously been done at the expense of hours or days on a computer terminal. It is our impression that a preprocessor is necessary but at this time we would appreciate MSFC comments about their needs and direction on future work.

REFERENCES

1) Bareiss, L. E., Jarossy, F. J., Pizzicaroli, J. C., and Owen, N., "Shuttle/Payload Contamination Evaluation Program - The SPACE Computer Program Users Manual", MCR-81-509, Martin Marietta Aerospace, 1981.

2) "Thermal Radiation Analysis System (TRASYS)", JSC NAS9-14318, MCR 713-105, Martin Marietta Denver Aerospace, 1975.

APPENDIX A - MINIMUM INPUT SAMPLE CASE

This appendix shows the interactive dialogue that a user will encounter while developing a SPACE II input file for a limited input case. The case corresponds to the first sample problem of Section 5 in Reference 1 which demonstrates the operation of SPACE II when almost all input parameters ae given their default value. The problem involves outgassing from the Space lab Long Module/One Pallet configuration at ten hours into a mission. The mass and number column density of outgassing species along a line-of-sight parallel to the Z-axis is computed. After the interactive dialogue is a listing of the input file for SPACE II that was developed by the preprocessor.

Although a minimum input case may seem to imply that very little response is necessary. In practice, however, the user must answer about 25 questions. The preprocessor has this feature because it will query a user about all options in the control parameters input section and then ask a user only about those options in the latter input sections that are relevant to an analysis.

It needs to be mentioned that there is one anomaly in the namelist section INPUTA of the input file. It shows only one Orbiter surface is taken out of the analysis instead of all Orbiter surfaces outside of the payload bay. This discrepancy can be easily removed in later work by allowing for a user to input a range of node numbers. Presently the baseline preprocessor requires that the user input each individual node number. It is cumbersome to sequentially input the numbers one through 155, so only the number 155 was input. Later the file will need editing from one surface with node number 155 to 155 surfaces starting with node number one.

↑>E


```
-----------------------------------
-                                 -
-        S P A C E   I I          -
-                                 -
-      I N P U T   D E C K        -
-                                 -
-    P R E P R O C E S S O R      -
-                                 -
-----------------------------------
```

==========

DO YOU NEED INSTRUCTIONS (YES/NO)?

? N
↑>E

INPUT TITLE FOR THIS CASE (UP TO 72 CHARACTERS):

? *** SAMPLE CASE NO. 1 MINIMUM INPUT CASE (DEFAULT PARAMETERS) ***
↑>E

```
---------------------------------------
-                                     -
-    P R O G R A M   C O N T R O L    -
-                                     -
-          P A R A M E T E R S        -
-                                     -
---------------------------------------
```

DO YOU WANT THE ORBITER CONFIGURATION ACTIVATED?

? Y
↑>E

```
---------------------------------------
-                                     -
-    P R O G R A M   C O N T R O L    -
-                                     -
-          P A R A M E T E R S        -
-                                     -
---------------------------------------
```

DO YOU WANT A PAYLOAD CONFIGURATION ACTIVATED?

? Y
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

WHICH OF THE FOLLOWING PAYLOAD CONFIGURATIONS DO YOU WISH:

1) LMOP
2) SMTP
3) FIVP
4) P80-1
5) DSP/IUS
6) NEW CONFIGURATION

? 1
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

ARE SURFACE SOURCES TO BE ACTIVATED?

? Y
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

```
 SELECT FROM THE FOLLOWING LIST:

      1) OUTGASSING ONLY
      2) EARLY DESORPTION ONLY
      3) CABIN LEAKAGE ONLY
      4) OUTGASSING + EARLY DESORPTION
      5) OUTGASSING + CABIN LEAKAGE
      6) EARLY DESORPTION + CABIN LEAKAGE
      7) OUTGASSING + EARLY DESORPTION + CABIN LEAKAGE


  ?  1
↑>E

                ----------------------------------------
                -                                      -
                -     P R O G R A M   C O N T R O L    -
                -                                      -
                -          P A R A M E T E R S         -
                -                                      -
                ----------------------------------------


 DO YOU WANT MULTIPLE REFLECTIONS EVALUATED?

  ?  N
↑>E

                ----------------------------------------
                -                                      -
                -     P R O G R A M   C O N T R O L    -
                -                                      -
                -          P A R A M E T E R S         -
                -                                      -
                ----------------------------------------


 DO YOU WANT ANY ORBITER ENGINES OR VENTS ACTIVATED?

  ?  N
↑>E

                ----------------------------------------
                -                                      -
                -     P R O G R A M   C O N T R O L    -
                -                                      -
                -          P A R A M E T E R S         -
                -                                      -
```

```
------------------------------------------

DO YOU WANT TO INPUT NEW POINT SOURCES?

 ? N
↑>E

------------------------------------------
-                                        -
-    P R O G R A M   C O N T R O L       -
-                                        -
-          P A R A M E T E R S           -
-                                        -
------------------------------------------

SELECT TYPE(S) OF ANALYSIS DESIRED:
(TYPE 0 WHEN DONE)

    1) MASS COLUMN DENSITY (MCD) ALONG A LINE OF SIGHT
    2) DIRECT FLUX AND/OR DEPOSITION ON A RECEIVING SURFACE
    3) RETURN FLUX/DEPOSITION DUE TO AMBIENT SCATTERING

 ? 1

 ? 0
↑>E

------------------------------------------
-                                        -
-    P R O G R A M   C O N T R O L       -
-                                        -
-          P A R A M E T E R S           -
-                                        -
------------------------------------------

WHICH OF THE FOLLOWING THERMAL PROFILES FROM
TAPE 10 SHOULD BE USED FOR THIS CASE:

    1) COLUMN 1 (MAXTMP)
    2) COLUMN 2 (MINTMP)
    3) COLUMN 3 (ATCODE=1)
    3) COLUMN 4 (ATCODE=2)
    5) COLUMN 5 (ATCODE=3)
    6) COLUMN 6 (ATCODE=4)
    7) COLUMN 7 (ATCODE=5)

 ? 1
↑>E
```

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

DO YOU WANT TO INPUT THERMAL DATA IN ADDITION TO
THAT CONTAINED ON TAPE 10?

? N
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

DO YOU WANT THIS RUN TO GENERATE A TAPE 13 FROM
THE ORBITER TAPE 14 AND PAYLOAD TAPE 15?

? Y
↑>E

```
-------------------------------------------------
-                                               -
-     C O N T A M I N A T I O N   S O U R C E   -
-                                               -
-               D E F I N I T I O N             -
-                                               -
-------------------------------------------------
```

DO YOU WANT ANY SURFACES DELETED?

? Y
↑>E

```
-------------------------------------------------
-                                               -
-     C O N T A M I N A T I O N   S O U R C E   -
-                                               -
```

```
-                    D E F I N I T I O N                    -
-                                                           -
-----------------------------------------------------------
```

YOU HAVE TWO OPTIONS FOR ZEROING OUT SURFACES.

1) IF YOU KNOW THE SEQUENCE NUMBER (NOT THE NODE NUMBER) OF THE SURFACE(S) TO BE ELIMINATED, YOU CAN INPUT THE NUMBER(S) DIRECTLY, TERMINATING THE LIST WITH "0"

2) IF YOU KNOW THE NODE NUMBER, BUT NOT THE SEQUENCE NUMBER, YOU CAN ELECT TO REVIEW ALL NODES AND THEIR SEQUENCE NUMBERS, 1 SCREENFUL AT A TIME. IF YOU SELECT THIS OPTION, REVIEW THE LIST AND JOT DOWN THE APPROPRIATE SEQUENCE NUMBERS. AT THE END OF THE REVIEW, THE PROGRAM WILL PROMPT YOU AS IN 1)

PLEASE SELECT EITHER OPTION 1) OR 2)

```
 ?  1
↑>E
```

```
-----------------------------------------------------------
-                                                         -
-    C O N T A M I N A T I O N   S O U R C E              -
-                                                         -
-                D E F I N I T I O N                      -
-                                                         -
-----------------------------------------------------------
```

INPUT SEQUENCE NUMBER(S) OF NODES TO BE ELIMINATED (TYPE 0 WHEN DONE)

```
 ?  155

 ?  0
↑>E
```

```
-----------------------------------------------------------
-                                                         -
-    C O N T A M I N A T I O N   S O U R C E              -
-                                                         -
-                D E F I N I T I O N                      -
-                                                         -
-----------------------------------------------------------
```

PLEASE ENTER RECEIVING SURFACE NODE NUMBERS (UP TO 25). ENTER 0 WHEN DONE:

```
    NODE?

?  1234
```

```
     NODE?

 ?  0
↑>E

 DO YOU WANT TO CHANGE THE ORBITER DEFAULT ATTITUDE?

  (PITCH =   0.00, YAW =   0.00, ROLL =   0.00)


 ?  N
↑>E

 DO YOU WANT TO CHANGE THE ORBITER DEFAULT ALTITUDE?

  (ALT = 400.00 KM)

 ?  N
↑>E

 DO YOU WANT TO CHANGE THE ORBITER DEFAULT VELOCITY?

  (VEL =  7650. M/SEC)

 ?  N
↑>E

 SELECT DESIRED ATMOSPHERE DENSITY:

     1) LOW
     2) MEDIUM
     3) HIGH


 ?  2
```

```
***  SAMPLE CASE NO. 1   MINIMUM INPUT CASE (DEFAULT PARAMETERS)  ***
 $CONTRL
  ORBITR=.TRUE.,
  PAYLOD=.TRUE.,
  OUT=.TRUE.,
  ED=.FALSE.,
  LEAK=.FALSE.,
  PLUME=.FALSE.,
  MCD=.TRUE.,
  DIRECT=.FALSE.,
  RFAS2=.FALSE..
  RFSS=.FALSE.,
  REFLCT=.FALSE.,
  NEWCON=.FALSE.,
  NTAPE4=.FALSE.,
  NEWTCD=.FALSE.,
  NEWTNL=.FALSE.,
  NEWMFS=.FALSE.,
  NEWMFP=.TRUE.,
  MAXTMP=.TRUE.,
  REPORT(7)=.TRUE.,REPORT(51)=.TRUE.,
  REPORT(35)=.TRUE.,REPORT(37)=.TRUE.,
  GO=.TRUE.,
 $END
  LMOP     1000
 $INPUTA
  SURFSC( 155)=0.,
  RECEVR( 1)=1234,
  ICCODE(1)= 1*1,
  GO=.TRUE.,
 $END
 $INPUTB
 $END
 $MPDB
  THETAL( 1)=  0.00,PHIL( 1)=  0.00,
  GO=.TRUE.,
 $END
STOP
```

APPENDIX B - ALL PROGRAM OPTIONS SAMPLE CASE

This appendix shows the interactive dialogue that a user will encounter while developing a SPACE II input file using all program options within the preprocessor. The problem involves all contaminant sources from an Orbiter and new payload called DSCS at ten hours into a mission. The results will include number column density, direct flux, return flux, and second surface flux transport deposition. All surfaces will outgas and show early desorption of light gases. Additional light gases will originate from the crew cabin and two evaporator will be expelling water overboard. There is a new surface and point source not found within the data TAPES that must accompany the input file. The Orbiter is 380 km above Earth and has a ten degree pitch angle below local vertical with a zero yaw and roll angle. After the interactive dialogue is a listing of the input file for SPACE II that was made by the preprocessor.

There are about 75 questions that that user must answer to create this input file. Although this is an unusual case because the different transport mechanisms are typically handled as separate cases. It does demonstrate the variety of questions that a user will encounter. The upper limit on the number of questions will generally depend on how many surface or point sources and receiver locations are defined in the input file. If, however, all source characteristics are defined by the alternate TAPE format then the number of questions will be on the order of this sample problem.

↑>E


```
-----------------------------------
-                                 -
-       S P A C E   I I           -
-                                 -
-     I N P U T   D E C K         -
-                                 -
-   P R E P R O C E S S O R       -
-                                 -
-----------------------------------
```

==========

DO YOU NEED INSTRUCTIONS (YES/NO)?

? N
↑>E

INPUT TITLE FOR THIS CASE (UP TO 72 CHARACTERS):

? *** SAMPLE CASE - EXERCISE ALL PROGRAM OPTIONS ***
↑>E

```
-----------------------------------------
-                                       -
-    P R O G R A M   C O N T R O L      -
-                                       -
-         P A R A M E T E R S           -
-                                       -
-----------------------------------------
```

DO YOU WANT THE ORBITER CONFIGURATION ACTIVATED?

? Y
↑>E

```
-----------------------------------------
-                                       -
-    P R O G R A M   C O N T R O L      -
-                                       -
-         P A R A M E T E R S           -
-                                       -
-----------------------------------------
```

DO YOU WANT A PAYLOAD CONFIGURATION ACTIVATED?

? Y
↑>E

```
-----------------------------------------
-                                       -
-    P R O G R A M   C O N T R O L      -
-                                       -
-          P A R A M E T E R S          -
-                                       -
-----------------------------------------
```

WHICH OF THE FOLLOWING PAYLOAD CONFIGURATIONS DO YOU WISH:

1) LMOP
2) SMTP
3) FIVP
4) P80-1
5) DSP/IUS
6) NEW CONFIGURATION

? 6
↑>E

```
-----------------------------------------
-                                       -
-    P R O G R A M   C O N T R O L      -
-                                       -
-          P A R A M E T E R S          -
-                                       -
-----------------------------------------
```

WHAT IS THE NAME OF THE PAYLOAD (6 LETTERS MAX)?

? DSCS
↑>E

```
-----------------------------------------
-                                       -
-    P R O G R A M   C O N T R O L      -
-                                       -
-          P A R A M E T E R S          -
-                                       -
-----------------------------------------
```

IN WHAT RANGE ARE THE PAYLOAD NODE NUMBERS?

1) 1000-1999
2) 2000-2999
3) 3000-3999
4) 4000-4999

? 1
↑>E

```
----------------------------------------
-                                      -
-     P R O G R A M   C O N T R O L    -
-                                      -
-          P A R A M E T E R S         -
-                                      -
----------------------------------------
```

HOW WILL PAYLOAD CONFIGURATION BE INPUT?

1) VIA TAPE 4
2) VIA USER INPUT (THIS SESSION)

? 2
↑>E

```
----------------------------------------
-                                      -
-     P R O G R A M   C O N T R O L    -
-                                      -
-          P A R A M E T E R S         -
-                                      -
----------------------------------------
```

ARE SURFACE SOURCES TO BE ACTIVATED?

? Y
↑>E

```
----------------------------------------
-                                      -
-     P R O G R A M   C O N T R O L    -
-                                      -
-          P A R A M E T E R S         -
-                                      -
----------------------------------------
```

SELECT FROM THE FOLLOWING LIST:

1) OUTGASSING ONLY
2) EARLY DESORPTION ONLY
3) CABIN LEAKAGE ONLY
4) OUTGASSING + EARLY DESORPTION
5) OUTGASSING + CABIN LEAKAGE
6) EARLY DESORPTION + CABIN LEAKAGE
7) OUTGASSING + EARLY DESORPTION + CABIN LEAKAGE

? 7
↑>E

PROGRAM CONTROL PARAMETERS

DO YOU WANT MULTIPLE REFLECTIONS EVALUATED?

? Y

HOW MANY REFLECTIONS ARE DESIRED?

? 4
↑>E

PROGRAM CONTROL PARAMETERS

DO YOU WANT ANY ORBITER ENGINES OR VENTS ACTIVATED?

? Y
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-          P A R A M E T E R S          -
-                                       -
-----------------------------------------
```

DO YOU WANT TO INPUT NEW POINT SOURCES?

? Y

HOW MANY NEW POINT SOURCES WILL THERE BE?

? 1
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-          P A R A M E T E R S          -
-                                       -
-----------------------------------------
```

SELECT TYPE(S) OF ANALYSIS DESIRED:
(TYPE 0 WHEN DONE)

1) MASS COLUMN DENSITY (MCD) ALONG A LINE OF SIGHT
2) DIRECT FLUX AND/OR DEPOSITION ON A RECEIVING SURFACE
3) RETURN FLUX/DEPOSITION DUE TO AMBIENT SCATTERING
4) RETURN FLUX/DEPOSITION DUE TO SELF SCATTERING

? 1

? 2

? 3

? 0
↑>E

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-          P A R A M E T E R S          -
-                                       -
-----------------------------------------
```

```
WHICH OF THE FOLLOWING THERMAL PROFILES FROM
TAPE 10 SHOULD BE USED FOR THIS CASE:

    1) COLUMN 1 (MAXTMP)
    2) COLUMN 2 (MINTMP)
    3) COLUMN 3 (ATCODE=1)
    3) COLUMN 4 (ATCODE=2)
    5) COLUMN 5 (ATCODE=3)
    6) COLUMN 6 (ATCODE=4)
    7) COLUMN 7 (ATCODE=5)


 ?  1
↑>E
```

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

```
DO YOU WANT TO INPUT THERMAL DATA IN ADDITION TO
THAT CONTAINED ON TAPE 10?


 ?  N
↑>E
```

```
-----------------------------------------
-                                       -
-     P R O G R A M   C O N T R O L     -
-                                       -
-           P A R A M E T E R S         -
-                                       -
-----------------------------------------
```

```
DO YOU WANT THIS RUN TO GENERATE A TAPE 13 FROM
THE ORBITER TAPE 14 AND PAYLOAD TAPE 15?


 ?  Y
↑>E
```

```
-------------------------------------------------
-                                               -
-     C O N T A M I N A T I O N   S O U R C E   -
-                                               -
-              D E F I N I T I O N              -
-                                               -
-------------------------------------------------
```

DO YOU WANT ANY SURFACES DELETED?

? Y
↑>E

```
-------------------------------------------------
-                                               -
-     C O N T A M I N A T I O N   S O U R C E   -
-                                               -
-              D E F I N I T I O N              -
-                                               -
-------------------------------------------------
```

YOU HAVE TWO OPTIONS FOR ZEROING OUT SURFACES:

1) IF YOU KNOW THE SEQUENCE NUMBER (NOT THE NODE NUMBER) OF THE SURFACE(S) TO BE ELIMINATED, YOU CAN INPUT THE NUMBER(S) DIRECTLY, TERMINATING THE LIST WITH "0"

2) IF YOU KNOW THE NODE NUMBER, BUT NOT THE SEQUENCE NUMBER, YOU CAN ELECT TO REVIEW ALL NODES AND THEIR SEQUENCE NUMBERS, 1 SCREENFUL AT A TIME. IF YOU SELECT THIS OPTION, REVIEW THE LIST AND JOT DOWN THE APPROPRIATE SEQUENCE NUMBERS. AT THE END OF THE REVIEW, THE PROGRAM WILL PROMPT YOU AS IN 1)

PLEASE SELECT EITHER OPTION 1) OR 2)

? 2
↑>E
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
1	20	RADOOR	TEFLON	12200.0
2	22	RADOOR	TEFLON	12200.0
3	24	RADOOR	TEFLON	12200.0
4	26	RADOOR	TEFLON	12200.0
5	30	RADOOR	TEFLON	12200.0
6	32	RADOOR	TEFLON	12200.0
7	34	RADOOR	TEFLON	12200.0
8	36	RADOOR	TEFLON	12200.0
9	40	RADOOR	TEFLON	25580.0
10	42	RADOOR	TEFLON	25580.0
11	44	RADOOR	TEFLON	25580.0
12	46	RADOOR	TEFLON	25580.0
13	50	RADOOR	TEFLON	25580.0
14	52	RADOOR	TEFLON	25580.0
15	54	RADOOR	TEFLON	25580.0

16	56	RADOOR	TEFLON	25580.0
17	21	FUSLAG	LRSI	12200.0
18	23	FUSLAG	LRSI	12200.0
19	25	FUSLAG	LRSI	12200.0
20	27	FUSLAG	LRSI	12200.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
21	31	FUSLAG	LRSI	12200.0
22	33	FUSLAG	LRSI	12200.0
23	35	FUSLAG	LRSI	12200.0
24	37	FUSLAG	LRSI	12200.0
25	41	FUSLAG	LRSI	25580.0
26	43	FUSLAG	LRSI	25580.0
27	45	FUSLAG	LRSI	25580.0
28	47	FUSLAG	LRSI	25580.0
29	51	FUSLAG	LRSI	25580.0
30	53	FUSLAG	LRSI	25580.0
31	55	FUSLAG	LRSI	25580.0
32	57	FUSLAG	LRSI	25580.0
33	202	FUSLAG	LRSI	32520.0
34	203	FUSLAG	LRSI	32520.0
35	230	FUSLAG	LRSI	25730.0
36	240	FUSLAG	LRSI	16340.0
37	241	FUSLAG	LRSI	16340.0
38	250	FUSLAG	LRSI	19580.0
39	260	FUSLAG	LRSI	20240.0
40	301	FUSLAG	LRSI	26600.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
41	305	FUSLAG	LRSI	30930.0
42	306	FUSLAG	NOMEX	30930.0
43	307	FUSLAG	NOMEX	24770.0
44	311	FUSLAG	LRSI	26600.0
45	315	FUSLAG	LRSI	30930.0
46	316	FUSLAG	NOMEX	30930.0
47	317	FUSLAG	NOMEX	24770.0
48	420	FUSLAG	LRSI	1312.0
49	425	FUSLAG	LRSI	1312.0
50	60	OMS	LRSI	1145.0
51	62	OMS	LRSI	7850.0
52	64	OMS	LRSI	37920.0
53	66	OMS	LRSI	1991.0
54	67	OMS	LRSI	2028.0
55	68	OMS	LRSI	415.0
56	70	OMS	LRSI	895.0
57	72	OMS	LRSI	1406.0
58	74	OMS	LRSI	1312.0
59	76	OMS	LRSI	715.0
60	77	OMS	LRSI	600.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
61	80	OMS	LRSI	1145.0
62	82	OMS	LRSI	35 7813.0

63	84	OMS	LRSI	37740.0
64	86	OMS	LRSI	1991.0
65	87	OMS	LRSI	2028.0
66	88	OMS	LRSI	415.0
67	90	OMS	LRSI	895.0
68	92	OMS	LRSI	1406.0
69	94	OMS	LRSI	1312.0
70	96	OMS	LRSI	715.0
71	97	OMS	LRSI	601.0
72	100	WING	NOMEX	6356.0
73	102	WING	NOMEX	29590.0
74	104	WING	NOMEX	9125.0
75	110	WING	NOMEX	23340.0
76	112	WING	NOMEX	19280.0
77	115	WING	LRSI	19280.0
78	117	WING	HRSI	5650.0
79	118	WING	HRSI	2508.0
80	119	WING	LRSI	3302.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
81	121	WING	RCC	2251.0
82	122	WING	RCC	3123.0
83	130	WING	NOMEX	6356.0
84	132	WING	NOMEX	29590.0
85	134	WING	NOMEX	9125.0
86	140	WING	NOMEX	23340.0
87	142	WING	NOMEX	19280.0
88	145	WING	LRSI	19280.0
89	147	WING	HRSI	5650.0
90	148	WING	HRSI	2508.0
91	149	WING	LRSI	3302.0
92	151	WING	RCC	2251.0
93	152	WING	RCC	3123.0
94	106	ELEVON	NOMEX	6499.0
95	107	ELEVON	NOMEX	17210.0
96	136	ELEVON	NOMEX	6499.0
97	137	ELEVON	NOMEX	9125.0
98	450	ELEVON	NOMEX	138.0
99	451	ELEVON	NOMEX	415.0
100	452	ELEVON	NOMEX	692.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
101	453	ELEVON	NOMEX	960.0
102	454	ELEVON	NOMEX	1246.0
103	455	ELEVON	NOMEX	1523.0
104	456	ELEVON	NOMEX	1800.0
105	457	ELEVON	NOMEX	2076.0
106	458	ELEVON	NOMEX	2353.0
107	459	ELEVON	NOMEX	2630.0
108	460	ELEVON	NOMEX	138.0
109	461	ELEVON	NOMEX	415.0
110	462	ELEVON	NOMEX	692.0
111	463	ELEVON	NOMEX	969.0
112	464	ELEVON	NOMEX	1246.0
113	465	ELEVON	NOMEX	1523.0
114	466	ELEVON	NOMEX	1800.0

115	467	ELEVON	NOMEX	2076.0
116	468	ELEVON	NOMEX	2353.0
117	469	ELEVON	NOMEX	2630.0
118	160	CREW	RCC	7191.0
119	161	CREW	LRSI	9348.0
120	162	CREW	LRSI	9348.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
121	163	CREW	LRSI	3380.0
122	164	CREW	LRSI	3380.0
123	165	CREW	LRSI	4253.0
124	166	CREW	LRSI	4253.0
125	167	CREW	HRSI	12590.0
126	168	CREW	HRSI	12590.0
127	169	CREW	HRSI	9600.0
128	170	CREW	HRSI	9600.0
129	171	CREW	HRSI	3705.0
130	172	CREW	HRSI	3705.0
131	174	CREW	LRSI	20720.0
132	175	CREW	LRSI	10150.0
133	177	CREW	LRSI	10150.0
134	180	CREW	WINDOW	1424.0
135	181	CREW	WINDOW	1424.0
136	182	CREW	WINDOW	1424.0
137	183	CREW	WINDOW	1424.0
138	184	CREW	WINDOW	1424.0
139	185	CREW	WINDOW	1424.0
140	190	CREW	LRSI	10250.0

?
* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE *

SEQ #	NODE	PLACE	MATL	AREA
141	380	TAIL	LRSI	16920.0
142	381	TAIL	LRSI	16920.0
143	382	TAIL	LRSI	8833.0
144	383	TAIL	LRSI	8833.0
145	384	TAIL	LRSI	13940.0
146	385	TAIL	LRSI	13940.0
147	386	TAIL	LRSI	6116.0
148	387	TAIL	LRSI	6116.0
149	388	TAIL	LRSI	2744.0
150	389	TAIL	LRSI	2744.0
151	390	TAIL	LRSI	1160.0
152	391	TAIL	LRSI	1160.0
153	392	TAIL	LRSI	3081.0
154	393	TAIL	LRSI	3081.0
155	399	TAIL	HRSI	3823.0

?
↑>E

CONTAMINATION SOURCE DEFINITION

```
 INPUT SEQUENCE NUMBER(S) OF NODES TO BE
ELIMINATED (TYPE 0 WHEN DONE)


 ?  101

 ?  0
↑>E
```

```
        ------------------------------------------------
        -                                              -
        -    C O N T A M I N A T I O N   S O U R C E   -
        -                                              -
        -              D E F I N I T I O N             -
        -                                              -
        ------------------------------------------------
```

```
 DO YOU WANT ANY SURFACES TO BE DELETED AS
 SECOND SURFACE SOURCES?


 ?  Y
↑ E
```

```
        ------------------------------------------------
        -                                              -
        -    C O N T A M I N A T I O N   S O U R C E   -
        -                                              -
        -              D E F I N I T I O N             -
        -                                              -
        ------------------------------------------------
```

```
 YOU HAVE TWO OPTIONS FOR ZEROING OUT SURFACES:

     1) IF YOU KNOW THE SEQUENCE NUMBER (NOT THE NODE NUMBER)
        OF THE SURFACE(S) TO BE ELIMINATED, YOU CAN INPUT
        THE NUMBER(S) DIRECTLY, TERMINATING THE LIST WITH "0"

     2) IF YOU KNOW THE NODE NUMBER, BUT NOT THE SEQUENCE
        NUMBER, YOU CAN ELECT TO REVIEW ALL NODES AND THEIR
        SEQUENCE NUMBERS, 1 SCREENFUL AT A TIME.  IF YOU
        SELECT THIS OPTION, REVIEW THE LIST AND JOT DOWN
        THE APPROPRIATE SEQUENCE NUMBERS.  AT THE END OF
        THE REVIEW, THE PROGRAM WILL PROMPT YOU AS IN 1)


 PLEASE SELECT EITHER OPTION 1) OR 2)


 ?  1
↑>E
```

```
-------------------------------------------------
-                                               -
-     C O N T A M I N A T I O N   S O U R C E   -
-                                               -
-              D E F I N I T I O N              -
-                                               -
-------------------------------------------------
```

INPUT SEQUENCE NUMBER(S) OF NODES TO BE
ELIMINATED (TYPE 0 WHEN DONE)

? 101

? 0
↑>E

```
-------------------------------------------------
-                                               -
-     C O N T A M I N A T I O N   S O U R C E   -
-                                               -
-              D E F I N I T I O N              -
-                                               -
-------------------------------------------------
```

*** SELECT ACTIVE ORBITER POINT SOURCES ***

YOU HAVE TWO OPTIONS FOR ACTIVATING ORBITER POINT SOURCES:

1) IF YOU KNOW THE NODE NUMBER OF THE ENGINE OR VENT YOU WANT TO ACTIVATE, YOU CAN SIMPLY INPUT THE NODE NUMBER AND THE DESIRED ON TIME (IN SECONDS)

2) IF YOU DON'T KNOW THE NODE NUMBER, YOU CAN ELECT TO REVIEW ALL ORBITER PREDEFINED POINT SOURCES, JOT DOWN THE DESIRED NODE NUMBERS AND THEN BRANCH TO OPTION 1

PLEASE SELECT EITHER OPTION 1) OR 2)

? 2
↑>E
* REVIEW ENGINES/VENTS - PRESS RETURN TO CONTINUE *

NODE	LOC	TYPE	X	Y	Z	THETA	PHI
7112	FLF -X	RCS	332.0	-14.0	389.0	0.0	0.0
7122	FCF -X	RCS	332.0	0.0	391.0	0.0	0.0
7132	FRF -X	RCS	332.0	14.0	389.0	0.0	0.0
7123	FLS +Y	RCS	360.0	-47.0	368.0	0.0	0.0
7113	FLS +Y	RCS	360.0	-47.0	354.0	0.0	0.0
7115	FLU +Z	RCS	350.0	-13.0	395.0	0.0	0.0
7125	FCU +Z	RCS	350.0	0.0	395.0	0.0	0.0

7135	FRU +Z	RCS	350.0	13.0	395.0	0.0	0.0
7116	FLD -Z	RCS	333.0	-41.0	381.0	0.0	0.0
7126	FLD -Z	RCS	347.0	-45.0	386.0	0.0	0.0
7144	FRS -Y	RCS	362.0	47.0	368.0	0.0	0.0
7134	FRS -Y	RCS	362.0	47.0	354.0	0.0	0.0
7136	FRD -Z	RCS	333.0	41.0	381.0	0.0	0.0
7146	FRD -Z	RCS	347.0	45.0	386.0	0.0	0.0
7211	ALA +X	RCS	1557.0	-119.0	473.0	0.0	0.0
7231	ALA +X	RCS	1557.0	-132.0	473.0	0.0	0.0
7243	ALS +Y	RCS	1516.0	-123.0	459.0	0.0	0.0
7223	ALS +Y	RCS	1529.0	-123.0	459.0	0.0	0.0
7233	ALS +Y	RCS	1542.0	-122.0	459.0	0.0	0.0
7213	ALS +Y	RCS	1555.0	-122.0	459.0	0.0	0.0

?
* REVIEW ENGINES/VENTS - PRESS RETURN TO CONTINUE *

NODE	LOC	TYPE	X	Y	Z	THETA	PHI
7245	ALU +Z	RCS	1516.0	-132.0	481.0	0.0	0.0
7225	ALU +Z	RCS	1529.0	-132.0	481.0	0.0	0.0
7215	ALU +Z	RCS	1542.0	-132.0	481.0	0.0	0.0
7246	ALD -Z	RCS	1516.0	-112.0	437.0	0.0	0.0
7226	ALD -Z	RCS	1529.0	-111.0	440.0	0.0	0.0
7236	ALD -Z	RCS	1542.0	-110.0	443.0	0.0	0.0
7311	ARA +X	RCS	1557.0	119.0	473.0	0.0	0.0
7331	ARA +X	RCS	1557.0	132.0	473.0	0.0	0.0
7344	ARS -Y	RCS	1516.0	123.0	459.0	0.0	0.0
7324	ARS -Y	RCS	1529.0	123.0	459.0	0.0	0.0
7334	ARS -Y	RCS	1542.0	123.0	459.0	0.0	0.0
7314	ARS -Y	RCS	1555.0	123.0	459.0	0.0	0.0
7345	ARU +Z	RCS	1516.0	132.0	481.0	0.0	0.0
7325	ARU +Z	RCS	1529.0	132.0	481.0	0.0	0.0
7315	ARU +Z	RCS	1542.0	132.0	481.0	0.0	0.0
7346	ARD -Z	RCS	1516.0	112.0	437.0	0.0	0.0
7326	ARD -Z	RCS	1529.0	111.0	440.0	0.0	0.0
7336	ARD -Z	RCS	1542.0	110.0	443.0	0.0	0.0
8116	FLD -Z	VCS	324.0	-46.0	374.0	0.0	0.0
8136	FRD -Z	VCS	324.0	46.0	374.0	0.0	0.0

?
* REVIEW ENGINES/VENTS - PRESS RETURN TO CONTINUE *

NODE	LOC	TYPE	X	Y	Z	THETA	PHI
8257	ALD -Z	VCS	1565.0	-144.0	459.0	0.0	0.0
8258	ALS +Y	VCS	1565.0	-118.0	457.0	0.0	0.0
8357	ARD -Z	VCS	1565.0	144.0	459.0	0.0	0.0
8358	ARS +Y	VCS	1565.0	-118.0	457.0	0.0	0.0
6877	ARS +Y	EVAP1	1506.0	127.0	305.0	0.0	0.0
6879	ALS -Y	EVAP1	1506.0	-127.0	305.0	0.0	0.0
9000	SMALL	OMS	80.0	0.0	0.0	0.0	0.0
9002	LARGE	OMS	180.0	0.0	0.0	0.0	0.0

0
::::
:: 0.0 0.0 0.0 0.0 0.0

?
↑>E

- CONTAMINATION SOURCE -

```
                    D E F I N I T I O N

INPUT NODE NUMBER OF ORBITER ENGINE OR VENT YOU
WANT ACTIVATED (ENTER 0 TO TERMINATE)

?  6877

INPUT POINT SOURCE ON TIME (IN SECONDS)

?  1.0

INPUT NODE NUMBER OF ORBITER ENGINE OR VENT YOU
WANT ACTIVATED (ENTER 0 TO TERMINATE)

?  6879

INPUT POINT SOURCE ON TIME (IN SECONDS)

?  1.0

INPUT NODE NUMBER OF ORBITER ENGINE OR VENT YOU
WANT ACTIVATED (ENTER 0 TO TERMINATE)

?  0
↑>E

        C O N T A M I N A T I O N  S O U R C E
                    D E F I N I T I O N

NEW POINT SOURCE INPUTS -

INPUT NODE NUMBER OF NEW ENGINE OR VENT YOU
WANT ACTIVATED (ENTER 0 TO TERMINATE)

?  7200

INPUT POINT SOURCE ON TIME (IN SECONDS)

?  1.
↑>E
```

```
-------------------------------------------------
-                                               -
-    C O N T A M I N A T I O N   S O U R C E    -
-                                               -
-              D E F I N I T I O N              -
-                                               -
-------------------------------------------------

 PLEASE ENTER RECEIVING SURFACE NODE NUMBERS (UP
 TO 25).  ENTER 0 WHEN DONE:

     NODE?

 ?  1101
     NODE?

 ?  0
↑>E

-------------------------------------------------
-                                               -
-    C O N T A M I N A T I O N   S O U R C E    -
-                                               -
-              D E F I N I T I O N              -
-                                               -
-------------------------------------------------

 DO YOU WANT THE FIELD OF VIEW OF ANY OF THE
 RECEIVERS LIMITED TO LESS THAN 90 DEGREES (HALF ANGLE)?

 ?  Y

 INPUT RECEIVER NODE NUMBER (0 TO END)

 ?  1101
 INPUT DESIRED FOV LIMITING HALF ANGLE

 ?  45.

 INPUT RECEIVER NODE NUMBER (0 TO END)

 ?  0
↑>E

*** NEW SURFACE CONFIGURATION INPUTS ***

INPUT NEW NODE NR. ("0" IF DONE)

 ?  1101

INPUT LOCATION (6 LETTERS MAX)
```

```
 ?  IUS
INPUT MATERIAL (6 LETTERS MAX)

 ?  PAINT
INPUT SURFACE AREA (SQ. IN.)

 ?  200.

INPUT NEW NODE NR. ("0" IF DONE)

 ?  0
↑>E

*** NEW POINT SOURCE INPUTS ***

NEW POINT SOURCE NUMBER  1 - NODE NUMBER 7200:
INPUT POINT SOURCE LOCATION (6 LETTERS MAX)

 ?  GAS
INPUT POINT SOURCE TYPE (6 LETTERS MAX)

 ?  VENT
INPUT POINT SOURCE X-COORDINATE (INCHES)

 ?  1000.
INPUT POINT SOURCE Y-COORDINATE (INCHES)

 ?  20.
INPUT POINT SOURCE Z-COORDINATE (INCHES)

 ?  400.
INPUT POINT SOURCE ORIENTATION ANGLE (THETA)

 ?  180.
INPUT POINT SOURCE ORIENTATION ANGLE (PHI)
```



```
 ?  45.
↑>E
```

```
 DO YOU WANT TO CHANGE THE ORBITER DEFAULT ATTITUDE?
  (PITCH =   0.00, YAW =   0.00, ROLL =   0.00)

 ?  Y

 ENTER PITCH ANGLE IN DEGREES -

 ?  -10.

 ENTER YAW ANGLE -

 ?  0.

 ENTER ROLL ANGLE -

 ?  0.
↑>E
 DO YOU WANT TO CHANGE THE ORBITER DEFAULT ALTITUDE?
  (ALT = 400.00 KM)
 ?  Y

 ENTER DESIRED ALTITUDE (IN KM)

 ?  380.
↑>E

 DO YOU WANT TO CHANGE THE ORBITER DEFAULT VELOCITY?
  (VEL =  7650. M/SEC)
 ?  Y

 ENTER DESIRED VELOCITY (IN M/SEC)

 ?  7700.
↑>E
 SELECT DESIRED ATMOSPHERE DENSITY:

     1) LOW
     2) MEDIUM
     3) HIGH
 ?  2
```

```
***  SAMPLE CASE - EXERCISE ALL PROGRAM OPTIONS  ***
 $CONTRL
  ORBITR=.TRUE.,
  PAYLOD=.TRUE.,
  OUT=.TRUE.,
  ED=.TRUE.,
  LEAK=.TRUE.,
  PLUME=.TRUE.,
  MCD=.TRUE.,
  DIRECT=.TRUE.,
  RFAS2=.TRUE.,
  RFSS=.FALSE.,
  REFLCT=.TRUE.,
  NRFLCT= 4,
  NEWCON=.TRUE.,
  NTAPE4=.FALSE.,
  NEWTCD=.FALSE.,
  NEWTNL=.FALSE.,
  NEWMFS=.FALSE.,
  NEWMFP=.TRUE.,
  MAXTMP=.TRUE.,
  REPORT(7)=.TRUE.,REPORT(51)=.TRUE.,
  REPORT(21)=4*.TRUE.,
  REPORT(35)=.TRUE.,REPORT(37)=.TRUE.,
  REPORT(45)=.TRUE.,
  GO=.TRUE.,
 $END
  DSCS    1000
 $INPUTA
  SURFSC( 101)=0.,
  SSURFS( 101)=0.,
  PNTSC( 1)=6877,
  PNTSC( 2)=6879,
  PNTSC( 3)=7200,
  ONTIME( 1)=  1.00,
  ONTIME( 2)=  1.00,
  ONTIME( 3)=  1.00,
  NEWPL( 3)=.TRUE.,
  RECEVR( 1)=1101,
  ICCODE(1)= 1*2,
  FOVANG( 1)= 45.00,
  GO=.TRUE.,
 $END
   156 1101        IUS      PAINT      200.0
     3 7200        GAS       VENT     1000.0       20.0      400.0      180.0
99999
 $INPUTB
 $END
 $MPDB
  PITCH=-10.00,
  YAW=  0.00,
  ROLL=  0.00,
  ALT=380.00,
  VA=7700.0,
  THETAL( 1)=  0.00,PHIL( 1)=  0.00,
  GO=.TRUE.,
 $END
STOP
```

APPENDIX C - PROGRAM LISTING

This appendix contains a listing of the SPACE II preprocessor source code.

```
      PROGRAM SPACEP(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1)          0001
                                                                           0001
                                                                           0001
     *************************************                                 0001
     *                                   *                                 0001
     *  SPACE II INPUT DECK PREPROCESSOR *                                 0001
     *                                   *                                 0001
     *************************************                                 0001
                                                                           0001
                                                                           0001
      MARTIN MARIETTA AEROSPACE                  - DESIGNED AND CODED BY   0001
           DENVER DIVISION                         J. C. PIZZICAROLI       0002
             P.O. BOX 179                          AUGUST 1983             0002
          DENVER, COLORADO 80201                                           0002
                                                                           0002
                                                                           0002
C==========================================================================0002
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,       0002
     +                MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,        0002
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,      0003
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),0003
     +                ONTIME(50),  RECEVR(25),     ICCODE,  FOVANG(25),0003
     +                   SEPTE,       NEWDAT,     ADSURF,      NNEWPL,0003
     +                      AL,       KTOTAL,     NORBPL,  ISURF(300),0003
     +               ISSU..(300)                                         0003
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                        0003
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),         0003
     +               AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,      0003
     +                  M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,       0004
     +               TIMEOO                                              0004
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,      0004
     +                SUNM,   SUNH                                        0004
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, XO(25), YO(25), ZO(25),       0004
     +               ALPHA(25),      BETA(25),      GAMMA(25)            0004
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),        0004
     +              DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),       0004
     +              DOMEGA(25),     DS(25),       RMAX,     NTHETA,      0004
     +                  NPHI                                             0004
      COMMON /TEMPS/ TEMP(2000)                                            0004
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0005
     +                  CZLOC(50),    CTHETA(50),  CPHI(50),             0005
     +                 CIDENT(50)                                        0005
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                    0005
      COMMON /SURFS/IDENT(300), AREA(300)                                  0005
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),          0005
     +             KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),        0005
     +            MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),        0005
     +            NPLUME(25)                                             0005
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,        0006
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),   0006
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),           0006
     +               CHPLUM(10,25), CHMF(10,25)                          0006
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),        0006
     +                  INDXJT,     INDXXT                               0006
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),            0006
     +             NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),            0006
     +             NUPLAC(6,30),  NUNPLM(6,25)                           0006
                                                                          0006
      REAL ONTIME, MACH, MOLWT                                            0006
                                                                          0007
```

```
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,   0007
     +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,   0007
     +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL            0007
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    MCD,   0007
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,   0007
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,   0007
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,   0007
     +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,   0007
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,   0007
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL    0008
                                                                         0008
C=====================================================================0008
C..                                                                     0008
C..PERFORM INITIALIZATION OF DEFAULT VALUES, CONSTANTS, COEFFICIENTS, ET0008
C..                                                                     0008
      CALL INIT                                                         0008
C..                                                                     0008
C..WRITE PROGRAM HEADER TO SCREEN                                       0008
C..                                                                     0008
      CALL HEADER(1)                                                    0009
C..                                                                     0009
C..PROVIDE PROGRAM INSTRUCTIONS IF DESIRED                              0009
C..                                                                     0009
      WRITE(6,6010)                                                     0009
 6010 FORMAT(/////1X,35HDO YOU NEED INSTRUCTIONS (YES/NO)? )            0009
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0009
      IF(IRSPNS(IFIRST).EQ.1HY) CALL TEACH                              0009
C..                                                                     0009
C..- BEGIN THE INTERACTIVE QUESTION/ANSWER DIALOGUE PROCESS -           0009
C..                                                                     0010
C..ASK FOR THE TITLE OF THE USER'S ANALYSIS INPUT DECK                  0010
C.                                                                      0010
  100 CALL CLEAR                                                        0010
      WRITE(6,6020)                                                     0010
 6020 FORMAT(/////1X,48HINPUT TITLE FOR THIS CASE (UP TO 72 CHARACTERS):0010
     +//)                                                              0010
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0010
      I = IFIRST - 1                                                    0010
      DO 110 N=1,72                                                     0010
      ITITLE(N) = IRSPNS(I + N)                                         0011
  110 CONTINUE                                                          0011
C..                                                                     0011
C..COLLECT INPUTS FOR NAMELIST $CONTRL                                  0011
C..                                                                     0011
  200 CALL CONTRL                                                       0011
C..                                                                     0011
C..COLLECT INPUTS FOR NAMELIST $INPUTA                                  0011
C..                                                                     0011
  300 CALL INPUTA                                                       0011
C..                                                                     0012
C..IF NEW CONFIGURATION DATA IS REQUESTED, PROMPT FOR THE APPROPRIATE IN0012
C..                                                                     0012
  400 NEWDAT = .FALSE.                                                  0012
      DO 410 K=1,50                                                     0012
      IF(NEWPL(K)) NEWDAT = .TRUE.                                      0012
  410 CONTINUE                                                          0012
      IF(NEWDAT.OR.NEWCON) CALL ADDCON                                  0012
C..                                                                     0012
C..COLLECT INPUTS FOR NAMELIST $INPUTB                                  0012
C..                                                                     0013
  500 CALL INPUTB                                                       0013
C..                                                                     0013
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
..MODIFY ANY SPECIES, KINDS, PLACE OR PLUME CARDS PER USER REQUESTS     0013
..                                                                      0013
 600 NCHG = CHNGES + CHNGEK + CHNGEP + CHNGPL                           0013
     IF(NCHG.GT.0) CALL ADDATA                                          0013
..                                                                      0013
..IF REQUESTED, ACCEPT NEW SURFACE TEMPERATURE INPUTS, EITHER VIA       0013
..FORMATTED CARDS OR VIA NAMELIST $INPUTC                               0013
..                                                                      0014
 700 IF(NEWTCD.OR.NEWTNL) CALL ADDTMP                                   0014
..                                                                      0014
..COLLECT INPUTS FOR NAMELIST $MPDB                                     0014
..                                                                      0014
 800 CALL MPDB                                                          0014
..                                                                      0014
..IF REQUESTED, ACCEPT INPUTS FOR FORMATTED BODY-BODY VIEWFACTOR CARDS  0014
..                                                                      0014
 900 IF(NEWMFS) CALL ADDVFS                                             0014
..                                                                      0015
..- DONE - NOW BUILD THE SPACE II INPUT DATA FILE                       0015
..                                                                      0015
1000 CALL BUILD                                                         0015
                                                                        0015
      STOP                                                              0015
      END                                                               0015
      SUBROUTINE CONTRL                                                 0015
                                                                        0015
      ************************************************************      0015
      *                                                          *      0016
      *   C O L L E C T   I N P U T   F O R   C O N T R L        *      0016
      *                          +                               *      0016
      *  A D D I T I O N A L   I N I T I A L I Z A T I O N       *      0016
      *                                                          *      0016
      ************************************************************      0016
                                                                        0016
=======================================================================0016
                                                                        0016
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    0016
     +                 MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,    0017
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,    0017
     +               MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70) 0017
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50).0017
     +                ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),0017
     +                    SERIES,      NEWDAT,      ADSURF,      NNEWPL,0017
     +                    JTOTAL,      KTOTAL,      NORBPL,  ISURF(300),0017
     +               ISSURF(300)                                        0017
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                     0017
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),      0017
     +               AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,    0018
     +                   M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,    0018
     +               TIMEOO                                             0018
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,    0018
     +                 SUNM,   SUNH                                     0018
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),    0018
     +               ALPHA(25),      BETA(25),      GAMMA(25)           0018
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),     0018
     +              DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),     0018
     +              DOMEGA(25),     DS(25),       RMAX,     NTHETA,     0018
     +                   NPHI                                           0019
      COMMON /TEMPS/ TEMP(2000)                                         0019
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0019
     +                   CZLOC(50),    CTHETA(50),  CPHI(50),          0019
     +                  CIDENT(50)                                     0019
```

```
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                    0019
      COMMON /SURFS/IDENT(300), AREA(300)                                  0019
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),          0019
     +             KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),         0019
     +            MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),         0019
     +            NPLUME(25)                                              0020
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,        0020
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),    0020
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),            0020
     +               CHPLUM(10,25), CHMF(10,25)                           0020
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),        0020
     +                   INDXJT,    INDXKT                               0020
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),            0020
     +            NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),             0020
     +            NUPLAC(6,30),  NUNPLM(6,25)                            0020
                                                                          0021
      REAL ONTIME, MACH, MOLWT                                            0021
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,     0021
     +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,     0021
     +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL              0021
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    MCD,     0021
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,     0021
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,     0021
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,     0021
     +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,     0022
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,     0022
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL      0022
                                                                          0022
C=====================================================================0022
                                                                          0022
      CALL CLEAR                                                          0022
      CALL HEADER(2)                                                      0022
                                                                          0022
C  DETERMINE IF THE ORBITER IS TO BE ACTIVATED                            0022
                                                                          0022
  100 WRITE(6,6010)                                                       0023
 6010 FORMAT(//1X,48HDO YOU WANT THE ORBITER CONFIGURATION ACTIVATED?/)   0023
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0023
      ORBITR = .TRUE.                                                     0023
      IF(IRSPNS(IFIRST).EQ.1HN) ORBITR=.FALSE.                            0023
                                                                          0023
C  SEE IF A PAYLOAD CONFIGURATION IS TO BE ADDED IN                       0023
                                                                          0023
      CALL CLEAR                                                          0023
      CALL HEADER(2)                                                      0023
      WRITE(6,6020)                                                       0024
 6020 FORMAT(//1X,46HDO YOU WANT A PAYLOAD CONFIGURATION ACTIVATED?/)     0024
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0024
      IF(IRSPNS(IFIRST).EQ.1HY) PAYLOD = .TRUE.                           0024
      IF(PAYLOD) GO TO 110                                                0024
      IF(ORBITR) GO TO 250                                                0024
      CALL CLEAR                                                          0024
      CALL HEADER(2)                                                      0024
      WRITE(6,6025)                                                       0024
 6025 FORMAT(//1X,38HIS THIS TO BE A POINT SOURCE ONLY RUN?/)             0024
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0025
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 105                                 0025
      NEWCON = .TRUE.                                                     0025
      GO TO 500                                                           0025
  105 WRITE(6,6030)                                                       0025
 6030 FORMAT(/1X,                                                         0025
     +60H*** EITHER THE ORBITER AND/OR A PAYLOAD MUST BE SELECTED ***)    0025
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      GO TO 100                                                          0025
  110 CALL CLEAR                                                         0025
      CALL HEADER(2)                                                     0025
      NAMEPL = 6H                                                        0026
      WRITE(6,6040)                                                      0026
 6040 FORMAT(//1X,58HWHICH OF THE FOLLOWING PAYLOAD CONFIGURATIONS DO YO0026
     +U WISH:/                                                           0026
     +/5X,7H1) LMOP/5X,7H2) SMTP/5X,7H3) FIVP/5X,8H4) P80-1/             0026
     +5X,10H5) DSP/IUS/5X,20H6) NEW CONFIGURATION//)                     0026
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0026
      IF((IVALUE.LE.0).OR.(IVALUE.GE.7)) GO TO 110                       0026
      IF(IVALUE.EQ.6) GO TO 120                                          0026
      IF(IVALUE.NE.1) GO TO 112                                          0026
      NAMEPL = 6H  LMOP                                                  0026
      SERIES = 1000                                                      0027
      GO TO 250                                                          0027
  112 IF(IVALUE.NE.2) GO TO 114                                          0027
      NAMEPL = 6H  SMTP                                                  0027
      SERIES = 2000                                                      0027
      GO TO 250                                                          0027
  114 IF(IVALUE.NE.3) GO TO 116                                          0027
      NAMEPL = 6H  FIVP                                                  0027
      SERIES = 3000                                                      0027
      GO TO 250                                                          0027
  116 IF(IVALUE.NE.4) GO TO 118                                          0028
      NAMEPL = 6H  P801                                                  0028
      SERIES = 1000                                                      0028
      GO TO 250                                                          0028
  118 IF(IVALUE.NE.5) GO TO 120                                          0028
      NAMEPL = 6HDSPIUS                                                  0028
      SERIES = 1000                                                      0028
      GO TO 250                                                          0028
  120 CALL CLEAR                                                         0028
      CALL HEADER(2)                                                     0028
      WRITE(6,6050)                                                      0029
 6050 FORMAT(//1X,49HWHAT IS THE NAME OF THE PAYLOAD (6 LETTERS MAX)? /)0029
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0029
      NCHAR = ILAST - IFIRST + 1                                         0029
      IF(NCHAR.GT.6) GO TO 120                                           0029
      IPAD = 6 - NCHAR                                                   0029
      IF(IPAD.EQ.0) GO TO 140                                            0029
      DO 130 I=1,IPAD                                                    0029
  130 NEWNAM(I) = 1H                                                     0029
  140 IPAD1 = IPAD + 1                                                   0029
      II = 0                                                             0030
      DO 150 I=IPAD1,6                                                   0030
      II = II + 1                                                        0030
  150 NEWNAM(I) = IRSPNS(IFIRST + II - 1)                                0030
  160 CALL CLEAR                                                         0030
      CALL HEADER(2)                                                     0030
      WRITE(6,6055)                                                      0030
 6055 FORMAT(//1X,43HIN WHAT RANGE ARE THE PAYLOAD NODE NUMBERS?//       0030
     +5X,12H1) 1000-1999/5X,12H2) 2000-2999/5X,12H3) 3000-3999/          0030
     +5X,12H4) 4000-4999//)                                              0030
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0031
      IF((IVALUE.LE.0).OR.(IVALUE.GE.5)) GO TO 160                       0031
      SERIES = IVALUE * 1000                                             0031
                                                                         0031
C  DETERMINE HOW NEW CONFIGURATION DATA WILL BE INPUT TO SPACE            0031
                                                                         0031
  200 CALL CLEAR                                                         0031
      CALL HEADER(2)                                                     0031
                                                                         0031
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      WRITE(6,6060)                                                          0031
 6060 FORMAT(//1X,40HHOW WILL PAYLOAD CONFIGURATION BE INPUT?//              0032
     +5X,13H1) VIA TAPE 4/                                                   0032
     +5X,32H2) VIA USER INPUT (THIS SESSION)/)                               0032
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)                 0032
      IF((IVALUE.LE.0).OR.(IVALUE.GE.3)) GO TO 200                           0032
      IF(IVALUE.EQ.1) NTAPE4 = .TRUE.                                        0032
      IF(IVALUE.EQ.2) NEWCON = .TRUE.                                        0032
      IF(IVALUE.EQ.2) ADSURF = .TRUE.                                        0032
                                                ORIGINAL PAGE IS             0032
   SELECT SURFACE SOURCES DESIRED               OF POOR QUALITY              0032
                                                                             0032
  250 CALL CLEAR                                                             0033
      CALL HEADER(2)                                                         0033
      WRITE(6,6070)                                                          0033
 6070 FORMAT(//1X,36HARE SURFACE SOURCES TO BE ACTIVATED?/)                  0033
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)                 0033
      OUT = .FALSE.                                                          0033
      IF(IRSPNS(IFIRST).EQ.1HN) GO TO 300                                    0033
  255 IF(.NOT.ORBITR) GO TO 270                                              0033
  260 CALL CLEAR                                                             0033
      CALL HEADER(2)                                                         0033
      WRITE(6,6080)                                                          0034
 6080 FORMAT(//1X,31HSELECT FROM THE FOLLOWING LIST://                       0034
     +5X,18H1) OUTGASSING ONLY/                                              0034
     +5X,24H2) EARLY DESORPTION ONLY/                                        0034
     +5X,21H3) CABIN LEAKAGE ONLY/                                           0034
     +5X,32H4) OUTGASSING + EARLY DESORPTION/                                0034
     +5X,29H5) OUTGASSING + CABIN LEAKAGE/                                   0034
     +5X,35H6) EARLY DESORPTION + CABIN LEAKAGE/                             0034
     +5X,48H7) OUTGASSING + EARLY DESORPTION + CABIN LEAKAGE//)               0034
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)                 0035
      IF((IVALUE.LE.0).OR.(IVALUE.GE.8)) GO TO 255                           0035
      IF((IVALUE.EQ.1).OR.(IVALUE.EQ.4).OR.(IVALUE.EQ.5).OR.                 0035
     +(IVALUE.EQ.7))OUT = .TRUE.                                             0035
      IF((IVALUE.EQ.2).OR.(IVALUE.EQ.4).OR.(IVALUE.EQ.6).OR.                 0035
     +(IVALUE.EQ.7))ED  = .TRUE.                                             0035
      IF((IVALUE.EQ.3).OR.(IVALUE.EQ.5).OR.(IVALUE.EQ.6).OR.                 0035
     +(IVALUE.EQ.7))LEAK = .TRUE.                                            0035
      GO TO 300                                                              0035
  270 CALL CLEAR                                                             0035
      CALL HEADER(2)                                                         0036
      WRITE(6,6085)                                                          0036
 6085 FORMAT(//1X,31HSELECT FROM THE FOLLOWING LIST://                       0036
     +5X,18H1) OUTGASSING ONLY/                                              0036
     +5X,24H2) EARLY DESORPTION ONLY/                                        0036
     +5X,34H3) OUTGASSING AND EARLY DESORPTION//)                            0036
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)                 0036
      IF((IVALUE.LE.0).OR.(IVALUE.GE.4)) GO TO 255                           0036
      IF((IVALUE.EQ.1).OR.(IVALUE.EQ.3)) OUT = .TRUE.                        0036
      IF((IVALUE.EQ.2).OR.(IVALUE.EQ.3))  ED = .TRUE.                        0036
                                                                             0037
   SEE IF MULTIPLE REFLECTIONS ARE DESIRED                                   0037
                                                                             0037
  300 CALL CLEAR                                                             0037
      CALL HEADER(2)                                                         0037
      WRITE(6,6090)                                                          0037
 6090 FORMAT(//1X,43HDO YOU WANT MULTIPLE REFLECTIONS EVALUATED?/)           0037
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)                 0037
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 400                                    0037
      REFLCT = .TRUE.                                                        0037
  310 WRITE(6,6100)                                                          0038
```

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6100 FORMAT(//1X,33HHOW MANY REFLECTIONS ARE DESIRED?/)                    0038
     CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)               0038
     IF((IVALUE.LE.0).OR.(IVALUE.GT.10)) GO TO 310                        0038
     NRFLCT = IVALUE                                                      0038
                                                                          0038
  SEE IF ORBITER POINT SOURCES (ENGINES/VENTS) ARE TO BE ACTIVATED        0038
                                                                          0038
 400 IF(.NOT.ORBITR) GO TO 500                                            0038
     CALL CLEAR                                                           0038
     CALL HEADER(2)                                                       0039
     WRITE(6,6110)                                                        0039
6110 FORMAT(//1X,51HDO YOU WANT ANY ORBITER ENGINES OR VENTS ACTIVATED?0039
    +/)                                                                   0039
     CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)               0039
     IF(IRSPNS(IFIRST).NE.1HY) GO TO 500                                  0039
     PLUME = .TRUE.                                                       0039
                                                                          0039
  SEE IF NEW POINT SOURCES ARE TO BE INPUT VIA NEW CONFIGURATION CARDS     0039
                                                                          0039
 500 CALL CLEAR                                                           0040
     CALL HEADER(2)                                                       0040
     WRITE(6,6130)                                                        0040
6130 FORMAT(//1X,39HDO YOU WANT TO INPUT NEW POINT SOURCES?/)             0040
     CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)               0040
     IF(IRSPNS(IFIRST).NE.1HY) GO TO 600                                  0040
     NEWCON = .TRUE.                                                      0040
 510 WRITE(6,6140)                                                        0040
6140 FORMAT(/1X,41HHOW MANY NEW POINT SOURCES WILL THERE BE?/)            0040
     CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)               0040
     IF(IVALUE.LE.0) GO TO 510                                            0041
     IF(IVALUE.GT.50) GO TO 510                                           0041
     NNEWPL = IVALUE                                                      0041
                                                                          0041
  DETERMINE TYPE OF CONTAMINATION ANALYSIS DESIRED                        0041
                                                                          0041
 600 CALL CLEAR                                                           0041
     CALL HEADER(2)                                                       0041
     WRITE(6,6150)                                                        0041
6150 FORMAT(//1X,35HSELECT TYPE(S) OF ANALYSIS DESIRED:/                  0041
    +1X,18H(TYPE 0 WHEN DONE)//                                           0042
    +5X,50H1) MASS COLUMN DENSITY (MCD) ALONG A LINE OF SIGHT/            0042
    +5X,55H2) DIRECT FLUX AND/OR DEPOSITION ON A RECEIVING SURFACE/       0042
    +5X,51H3) RETURN FLUX/DEPOSITION DUE TO AMBIENT SCATTERING)           0042
     IF((.NOT.PLUME).OR.(NNEWPL.EQ.0)) GO TO 610                          0042
     WRITE(6,6160)                                                        0042
6160 FORMAT(5X,48H4) RETURN FLUX/DEPOSITION DUE TO SELF SCATTERING//)     0042
 610 CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)               0042
     NHIVAL = 3                                                           0042
     IF(PLUME.OR.(NNEWPL.GT.0)) NHIVAL = 4                                0042
     IF((IVALUE.LT.0).OR.(IVALUE.GT.NHIVAL)) GO TO 600                    0043
     IF(IVALUE.EQ.1) MCD = .TRUE.                                         0043
     IF(IVALUE.EQ.2) DIRECT = .TRUE.                                      0043
     IF(IVALUE.EQ.3) RFAS2 = .TRUE.                                       0043
     IF(IVALUE.EQ.4) RFSS = .TRUE.                                        0043
     IF(IVALUE.NE.0) GO TO 610                                            0043
                                                                          0043
  NEED ADDITIONAL INPUT FOR BGK PLUME SELF SCATTERING MODEL               0043
                                                                          0043
     IF(.NOT.RFSS) GO TO 700                                              0043
 650 CALL CLEAR                                                           0044
     CALL HEADER(2)                                                       0044
     WRITE(6,6170)                                                        0044
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 6170 FORMAT(//1X,48HPLEASE INPUT FOLLOWING POINT SOURCE PARAMETERS -// 0044
     +5X,28HMACH NUMBER (MUST BE > 1.0)?//)                             0044
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0044
      IF(FVALUE.LT.1.) GO TO 650                                       0044
      MACH = FVALUE                                                    0044
  660 WRITE(6,6180)                                                    0044
 6180 FORMAT(//5X,31HTSTARR (IN DEGREES CENTIGRADE)?//)                0044
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0045
      IF(FVALUE.LE.-273.) GO TO 660                                    0045
      TSTARR = FVALUE                                                  0045
                                                                       0045
   DETERMINE HOW TAPE 10 THERMAL DATA IS TO BE USED                    0045
                                                                       0045
  700 CALL CLEAR                                                       0045
      CALL HEADER(2)                                                   0045
      WRITE(6,6190)                                                    0045
 6190 FORMAT(//1X,45HWHICH OF THE FOLLOWING THERMAL PROFILES FROM /     0045
     +1X,37HTAPE 10 SHOULD BE USED FOR THIS CASE://                    0046
     +5X,20H1) COLUMN 1 (MAXTMP)/                                      0046
     +5X,20H2) COLUMN 2 (MINTMP)/                                      0046
     +5X,22H3) COLUMN 3 (ATCODE=1)/                                    0046
     +5X,22H3) COLUMN 4 (ATCODE=2)/                                    0046
     +5X,22H5) COLUMN 5 (ATCODE=3)/                                    0046
     +5X,22H6) COLUMN 6 (ATCODE=4)/                                    0046
     +5X,22H7) COLUMN 7 (ATCODE=5)//)                                  0046
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0046
      IF((IVALUE.LE.0).OR.(IVALUE.GE.8)) GO TO 700                     0046
      IF(IVALUE.GE.3) ATCODE = IVALUE - 2                              0046
      IF(IVALUE.EQ.1) MAXTMP = .TRUE.                                  0047
      IF(IVALUE.EQ.2) MINTMP = .TRUE.                                  0047
                                                                       0047
   DETERMINE IF THERMAL DATA ARE TO BE INPUT VIA NAMELIST OR CARDS     0047
                                                                       0047
  750 CALL CLEAR                                                       0047
      CALL HEADER(2)                                                   0047
      WRITE(6,6200)                                                    0047
 6200 FORMAT(//1X,48HDO YOU WANT TO INPUT THERMAL DATA IN ADDITION TO/ 0047
     +1X,26HTHAT CONTAINED ON TAPE 10?//)                              0048
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0048
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 800                              0048
  760 WRITE(6,6210)                                                    0048
 6210 FORMAT(//1X,16HSHOULD INPUT BE://                                0048
     +5X,31H1) VIA NAMELIST (NEWTNL OPTION)/                           0048
     +5X,38H2) VIA FORMATTED CARDS (NEWTCD OPTION)//)                  0048
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0048
      IF((IVALUE.LE.0).OR.(IVALUE.GE.3)) GO TO 760                     0048
      IF(IVALUE.EQ.1) NEWTNL = .TRUE.                                  0048
      IF(IVALUE.EQ.2) NEWTCD = .TRUE.                                  0049
                                                                       0049
   DETERMINE IF THE USERS CASE SHOULD RESULT IN THE GENERATION         0049
   OF A POINT-BODY TAPE 13 VIEWFACTOR FILE (NEWMFP OPTION)             0049
                                                                       0049
  800 IF(.NOT.PAYLOD) GO TO 850                                        0049
      CALL CLEAR                                                       0049
      CALL HEADER(2)                                                   0049
      WRITE(6,6220)                                                    0049
 6220 FORMAT(//1X,47HDO YOU WANT THIS RUN TO GENERATE A TAPE 13 FROM/  0049
     +1X,40HTHE ORBITER TAPE 14 AND PAYLOAD TAPE 15?//)                0050
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0050
      IF(IRSPNS(IFIRST).EQ.1HY) NEWMFP = .TRUE.                        0050
                                                                       0050
   BEGIN SELECTION PROCESS FOR SPAC 54 ITPUT REPORT OPTIONS            0050
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 850 CONTINUE                                                          0050
*****       T O   B E   C O N T I N U E D   ************              0050
      IF(ORBITR) CALL ORBTR                                          0050
      IF(ORBITR) CALL PLUMEX                                         0050
      IF(.NOT.PLUME) KTOTAL=0                                        0051
      IF(NNEWPL.GT.0) KTOTAL = KTOTAL + NNEWPL                       0051
      CALL MATLX                                                     0051
      M1 = 1                                                         0051
      M2 = 10                                                        0051
      MOUT1 = 1                                                      0051
      MOUT2 = 2                                                      0051
      MED1 = 3                                                       0051
      MED2 = 6                                                       0051
      IF(.NOT.OUT) M1 = 3                                            0051
      IF(.NOT.(PLUME.OR.NNEWPL.GT.0)) M2 = 6                         0052
      IF((M2.EQ.6).AND.(.NOT.ED).AND.(.NOT.LEAK)) M2 = 2             0052
      RETURN                                                         0052
      END                                                            0052
      SUBROUTINE INPUTA                                              0052
                                                                     0052
      ***************************************************            0052
      *                                                 *            0052
      *  C O L L E C T   D A T A   F O R   I N P U T A  *            0052
      *                                                 *            0052
      ***************************************************            0053
                                                                     0053
=====================================================================0053
                                                                     0053
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,  0053
     +                  MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,  0053
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,  0053
     +               MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70) 0053
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),0053
     +                ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),0053
     +                    SERIES,      NEWDAT,      ADSURF,      NNEWPL,0054
     +                    JTOTAL,      KTOTAL,      NORBPL,  ISURF(300),0054
     +               ISSURF(300)                                       0054
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                    0054
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),     0054
     +               AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,  0054
     +                   M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,  0054
     +               TIMEOO                                            0054
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,  0054
     +                SUNM,   SUNH                                     0054
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),   0055
     +               ALPHA(25),      BETA(25),      GAMMA(25)         0055
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),    0055
     +              DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),    0055
     +              DOMEGA(25),     DS(25),       RMAX,     NTHETA,    0055
     +                  NPHI                                           0055
      COMMON /TEMPS/ TEMP(2000)                                        0055
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0055
     +                  CZLOC(50),    CTHETA(50),  CPHI(50),         0055
     +                 CIDENT(50)                                      0055
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                0056
      COMMON /SURFS/IDENT(300), AREA(300)                              0056
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),      0056
     +            KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),      0056
     +           MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),      0056
     +           NPLUME(25)                                            0056
      COMMON/CHFLAG/ CHATT,  CHALT, CHVEL,  CHSUN,   CHDS,CHORIG,     0056
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     +                CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),  0056
     +                CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),          0056
     +                CHPLUM(10,25), CHMF(10,25)                         0056
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),       0057
     +                    INDXJT,    INDXKT                             0057
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),           0057
     +              NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),           0057
     +              NUPLAC(6,30),  NUNPLM(6,25)                          0057
                                                                         0057
      REAL ONTIME, MACH, MOLWT                                           0057
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,    0057
     +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,    0057
     +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL             0057
      LOGICAL ORBITR, PAYLOD,   OUT,    ED,   LEAK,  PLUME,    MCD,     0058
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,    0058
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,    GO,     0058
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,    0058
     +         CHATT,  CHALT,  CHVEL,  CHSUN,  CHDS, CHORIG,  CHLOC,     0058
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,  CHMF,     0058
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL     0058
                                                                         0058
=========================================================================0058
                                                                         0058
  IF THE ORBITER AND/OR A PAYLOAD HAVE BEEN ACTIVATED, SEE IF THE USER   0059
  DESIRES TO ZERO OUT ANY SURFACES.  IF MULTIPLE REFLECTIONS HAVE BEEN   0059
  FLAGGED, SEE IF ANY NODES ARE TO BE ELIMINATED AS SECOND SURFACE SOUR0059
                                                                         0059
      IF(.NOT.(ORBITR.OR.PAYLOD))GO TO 500                               0059
      CALL CLEAR                                                         0059
      CALL HEADER(3)                                                     0059
      WRITE(6,6010)                                                      0059
 6010 FORMAT(//1X,33HDO YOU WANT ANY SURFACES DELETED?/)                 0059
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0059
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 250                                0060
                                                                         0060
  PROVIDE OPTION TO EITHER                                               0060
     1) INPUT SEQUENCE NUMBERS DIRECTLY                                  0060
     2) REVIEW ALL NODES, 1 SCREENFUL AT A TIME, THEN BRANCH TO 1)       0060
                                                                         0060
      CALL CLEAR                                                         0060
      CALL HEADER(3)                                                     0060
      WRITE(6,6020)                                                      0060
 6020 FORMAT(//1X,46HYOU HAVE TWO OPTIONS FOR ZEROING OUT SURFACES://    0060
     +5X,56H1) IF YOU KNOW THE SEQUENCE NUMBER (NOT THE NODE NUMBER)/    0061
     +8X,49HOF THE SURFACE(S) TO BE ELIMINATED, YOU CAN INPUT/           0061
     +8X,53HTHE NUMBER(S) DIRECTLY, TERMINATING THE LIST WITH "0"//      0061
     +5X,52H2) IF YOU KNOW THE NODE NUMBER, BUT NOT THE SEQUENCE/        0061
     +8X,51HNUMBER, YOU CAN ELECT TO REVIEW ALL NODES AND THEIR/         0061
     +8X,48HSEQUENCE NUMBERS, 1 SCREENFUL AT A TIME.  IF YOU/            0061
     +8X,48HSELECT THIS OPTION, REVIEW THE LIST AND JOT DOWN/            0061
     +8X,48HTHE APPROPRIATE SEQUENCE NUMBERS.  AT THE END OF/            0061
     +8X,48HTHE REVIEW, THE PROGRAM WILL PROMPT YOU AS IN 1)///)         0061
  110 WRITE(6,6030)                                                      0061
 6030 FORMAT(1X,36HPLEASE SELECT EITHER OPTION 1) OR 2)/)                 0062
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0062
      IF((IVALUE.LE.0).OR.(IVALUE.GE.3)) GO TO 110                       0062
      IF(IVALUE.EQ.1) GO TO 200                                          0062
                                                                         0062
  REVIEW CONFIGURATION                                                   0062
                                                                         0062
      CALL CLEAR                                                         0062
      WRITE(6,6040)                                                      0062
                                                                         0062
```

```
6040 FORMAT(1X,51H* REVIEW CONFIGURATION - PRESS RETURN TO CONTINUE */ 0062
    +5X,5HSEQ #,5X,4HNODE,6X,5HPLACE,6X,4HMATL,7X,4HAREA/             0063
    +5X,5H-----,5X,4H----,5X,6H------,5X,6H------,5X,7H-------)       0063
                                                                      0063
     NEXT = 1                                                         0063
 120 LCOUNT = 1                                                       0063
 130 WRITE(6,6050)NEXT,SURFSC(NEXT),SECT(NEXT),MATRL(NEXT),           0063
    +AREA(NEXT)                                                       0063
6050 FORMAT(6X,I3,6X,I4,5X,A6,5X,A6,5X,F7.1)                         0063
     NEXT = NEXT + 1                                                  0063
     LCOUNT = LCOUNT + 1                                              0063
     IF(NEXT.GT.JTOTAL) GO TO 150                                     0064
     IF(LCOUNT.GT.20) GO TO 150                                       0064
     GO TO 130                                                        0064
 150 CALL KYBDIN(IRSPNS,5,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0064
     IF(NEXT.GT.JTOTAL) GO TO 200                                     0064
     WRITE(6,6040)                                                    0064
     GO TO 120                                                        0064
                                                                      0064
  PROMPT FOR SURFACES TO BE ZEROED                                    0064
                                                                      0064
 200 CALL CLEAR                                                       0065
     CALL HEADER(3)                                                   0065
     WRITE(6,6055)                                                    0065
6055 FORMAT(//1X,39HINPUT SEQUENCE NUMBER(S) OF NODES TO BE/          0065
    +29HELIMINATED (TYPE 0 WHEN DONE)//)                              0065
     N = 1                                                            0065
 210 CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0065
     IF((IVALUE.LT.0).OR.(IVALUE.GT.300)) CALL IERROR                 0065
     IF(IVALUE.EQ.0) GO TO 250                                        0065
     ISURF(N) = IVALUE                                                0065
     N = N + 1                                                        0066
     GO TO 210                                                        0066
                                                                      0066
  IF MULTIPLE REFLECTIONS HAVE BEEN FLAGGED, USE SAME APPROACH AS     0066
  ABOVE FOR ZEROING OUT ANY SURFACES NOT DESIRED AS REFLECTORS        0066
                                                                      0066
 250 IF(.NOT.REFLCT) GO TO 500                                        0066
     CALL CLEAR                                                       0066
     CALL HEADER(3)                                                   0066
     WRITE(6,6060)                                                    0066
6060 FORMAT(//1X,41HDO YOU WANT ANY SURFACES TO BE DELETED AS/        0067
    +1X,23HSECOND SURFACE SOURCES?/)                                  0067
     CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0067
     IF(IRSPNS(IFIRST).NE.1HY) GO TO 500                              0067
                                                                      0067
  PROVIDE OPTION TO EITHER                                            0067
     1) INPUT SEQUENCE NUMBERS DIRECTLY                               0067
     2) REVIEW ALL NODES, 1 SCREENFUL AT A TIME, THEN BRANCH TO 1)    0067
                                                                      0067
     CALL CLEAR                                                       0067
     CALL HEADER(3)                                                   0068
     WRITE(6,6020)                                                    0068
 310 WRITE(6,6030)                                                    0068
     CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)           0068
     IF((IVALUE.LE.0).OR.(IVALUE.GE.3)) GO TO 310                     0068
     IF(IVALUE.EQ.1) GO TO 400                                        0068
                                                                      0068
  REVIEW CONFIGURATION                                                0068
                                                                      0068
     CALL CLEAR                                                       0068
     WRITE(6,6040)                                                    0069
```

```
      NEXT = 1                                                          0069
  320 LCOUNT = 1                                                        0069
  330 WRITE(6,6050)NEXT,SURFSC(NEXT),SECT(NEXT),MATRL(NEXT),            0069
     +AREA(NEXT)                                                        0069
      NEXT = NEXT + 1                                                   0069
      LCOUNT = LCOUNT + 1                                               0069
      IF(NEXT.GT.JTOTAL) GO TO 350                                      0069
      IF(LCOUNT.GT.20) GO TO 350                                        0069
      GO TO 330                                                         0070
  350 CALL KYBDIN(IRSPNS,5,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0070
      IF(NEXT.GT.JTOTAL) GO TO 400                                      0070
      WRITE(6,6040)                                                     0070
      GO TO 320                                                         0070
                                                                        0070
   PROMPT FOR SURFACES TO BE ZEROED                                     0070
                                                                        0070
  400 CALL CLEAR                                                        0070
      CALL HEADER(3)                                                    0070
      WRITE(6,6070)                                                     0071
 6070 FORMAT(//1X,39HINPUT SEQUENCE NUMBER(S) OF NODES TO BE/           0071
     +29HELIMINATED (TYPE 0 WHEN DONE)//)                               0071
      N = 1                                                             0071
  410 CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0071
      IF((IVALUE.LT.0).OR.(IVALUE.GT.300)) CALL IERROR                  0071
      IF(IVALUE.EQ.0) GO TO 500                                         0071
      ISSURF(N) = IVALUE                                                0071
      N = N + 1                                                         0071
      GO TO 410                                                         0071
                                                                        0072
   IF THE USER WANTS ORBITER OR OTHER (NEW) PLUMES ACTIVATED,           0072
   PROMPT FOR THEIR NODE NUMBERS AND ONTIMES.  PROVIDE OPTION           0072
   TO REVIEW ORBITER POINT SOURCES.                                     0072
                                                                        0072
  500 IF((.NOT.PLUME).AND.(NNEWPL.EQ.0)) GO TO 800                      0072
      N = 1                                                             0072
      IF(.NOT.PLUME) GO TO 700                                          0072
      CALL CLEAR                                                        0072
      CALL HEADER(3)                                                    0072
      WRITE(6,6075)                                                     0073
 6075 FORMAT(/9X,43H*** SELECT ACTIVE ORBITER POINT SOURCES ***/)       0073
      WRITE(6,6080)                                                     0073
 6080 FORMAT(//1X,49HYOU HAVE TWO OPTIONS FOR ACTIVATING ORBITER POINT/ 0073
     +1X,8HSOURCES://5X,44H1) IF YOU KNOW THE NODE NUMBER OF THE ENGINE/0073
     +8X,37HOR VENT YOU WANT TO ACTIVATE, YOU CAN/                      0073
     +8X,36HSIMPLY INPUT THE NODE NUMBER AND THE/                       0073
     +8X,28HDESIRED ON TIME (IN SECONDS)//                              0073
     +5X,51H2) IF YOU DON'T KNOW THE NODE NUMBER, YOU CAN ELECT/        0073
     +8X,47HTO REVIEW ALL ORBITER PREDEFINED POINT SOURCES,/            0073
     +8X,42HJOT DOWN THE DESIRED NODE NUMBERS AND THEN/                 0074
     +8X,18HBRANCH TO OPTION 1///)                                      0074
  510 WRITE(6,6030)                                                     0074
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0074
      IF((IVALUE.LE.0).OR.(IVALUE.GE.3)) GO TO 510                      0074
      IF(IVALUE.EQ.1) GO TO 600                                         0074
                                                                        0074
   REVIEW PREDEFINED ORBITER ENGINES AND VENTS                          0074
                                                                        0074
      CALL CLEAR                                                        0074
      WRITE(6,6090)                                                     0075
 6090 FORMAT(1X,51H* REVIEW ENGINES/VENTS - PRESS RETURN TO CONTINUE */ 0075
     +2X,4HNODE,4X,3HLOC,3X,4HTYPE,7X,1HX,9X,1HY,8X,1HZ,6X,5HTHETA,     0075
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     +6X,3HPHI/2X,4H----,2X,6H------,2X,6H------,3X,6H------,3X,          0075
     +6H------,3X,6H------,3X,6H------,3X,6H------)                       0075
                                                                          0075
      NEXT = 1                                                            0075
  520 LCOUNT = 1                                                          0075
  530 WRITE(6,6100)CIDENT(NEXT),CLOC(NEXT),CTYPE(NEXT),CXLOC(NEXT),       0075
     +              CYLOC(NEXT),CZLOC(NEXT),CTHETA(NEXT),CPHI(NEXT)      0075
 6100 FORMAT(2X,I4,2X,A6,2X,A6,5(2X,F7.1))                                0076
      NEXT = NEXT + 1                                                     0076
      LCOUNT = LCOUNT + 1                                                 0076
      IF(NEXT.GT.KTOTAL) GO TO 550                                        0076
      IF(LCOUNT.GT.20) GO TO 550                                          0076
      GO TO 530                                                           0076
  550 CALL KYBDIN(IRSPNS,5,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0076
      IF(NEXT.GT.KTOTAL) GO TO 600                                        0076
      WRITE(6,6090)                                                       0076
      GO TO 520                                                           0076
                                                                          0076
   PROMPT FOR ORBITER ENGINES/VENTS TO BE ACTIVATED                       0077
                                                                          0077
  600 CALL CLEAR                                                          0077
      CALL HEADER(3)                                                      0077
  610 WRITE(6,6110)                                                       0077
 6110 FORMAT(//1X,47HINPUT NODE NUMBER OF ORBITER ENGINE OR VENT YOU/     0077
     +1X,37HWANT ACTIVATED (ENTER 0 TO TERMINATE)/)                       0077
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0077
      IF(IVALUE.EQ.0) GO TO 700                                           0077
      IF((IVALUE.LT.5000).OR.(IVALUE.GT.9999)) GO TO 610                  0077
      PNTSC(N) = IVALUE                                                   0078
  620 WRITE(6,6120)                                                       0078
 6120 FORMAT(/1X,39HINPUT POINT SOURCE ON TIME (IN SECONDS)/)             0078
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0078
      IF(FVALUE.LE.0.) GO TO 620                                          0078
      ONTIME(N) = FVALUE                                                  0078
      N = N + 1                                                           0078
      GO TO 610                                                           0078
                                                                          0078
   PROMPT FOR NEW PLUME INPUTS, IF REQUESTED BACK IN CONTRL               0079
                                                                          0079
  700 NORBPL = N - 1                                                      0079
      IF(NNEWPL.EQ.0) GO TO 800                                           0079
      CALL CLEAR                                                          0079
      CALL HEADER(3)                                                      0079
      WRITE(6,6130)                                                       0079
 6130 FORMAT(//1X,25HNEW POINT SOURCE INPUTS -/)                          0079
  710 WRITE(6,6140)                                                       0079
 6140 FORMAT(/1X,43HINPUT NODE NUMBER OF NEW ENGINE OR VENT YOU/          0079
     +1X,37HWANT ACTIVATED (ENTER 0 TO TERMINATE)/)                       0079
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0080
      IF(IVALUE.EQ.0) GO TO 800                                           0080
      IF((IVALUE.LT.5000).OR.(IVALUE.GT.9999)) GO TO 710                  0080
      PNTSC(N) = IVALUE                                                   0080
  720 WRITE(6,6150)                                                       0080
 6150 FORMAT(/1X,39HINPUT POINT SOURCE ON TIME (IN SECONDS)/)             0080
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)              0080
      IF(FVALUE.LE.0) GO TO 720                                           0080
      ONTIME(N) = FVALUE                                                  0080
      N = N + 1                                                           0080
      IF(N.GT.(NORBPL + NNEWPL)) GO TO 800                                0081
      GO TO 710                                                           0081
                                                                          0081
   DETERMINE RECEIVING SURFACES DESIRED FOR ANALYSIS.  IF DIRECT          0081
```

ORIGINAL PAGE IS
OF POOR QUALITY

```
  FLUX ANALYSIS WAS REQUESTED, SEE IF USER WANTS TO LIMIT FIELD          0081
  OF VIEW OF RECEIVERS.                                                 0081
                                                                        0081
 800 KTOTAL = N - 1                                                     0081
     CALL CLEAR                                                         0081
     CALL HEADER(3)                                                     0082
     N = 1                                                              0082
     WRITE(6,6160)                                                      0082
6160 FORMAT(//1X,47HPLEASE ENTER RECEIVING SURFACE NODE NUMBERS (UP/    0082
    +1X,27HTO 25).  ENTER 0 WHEN DONE:/)                                0082
 810 WRITE(6,6170)                                                      0082
6170 FORMAT(5X,6HNODE? )                                                0082
 820 CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0082
     IF((IVALUE.LT.0).OR.(IVALUE.GE.5000)) GO TO 820                    0082
     IF(IVALUE.EQ.0) GO TO 900                                          0082
     RECEVR(N) = IVALUE                                                 0083
     N = N + 1                                                          0083
     GO TO 810                                                          0083
                                                                        0083
 900 IF(.NOT.DIRECT) GO TO 999                                          0083
     CALL CLEAR                                                         0083
     CALL HEADER(3)                                                     0083
     WRITE(6,6180)                                                      0083
6180 FORMAT(//1X,43HDO YOU WANT THE FIELD OF VIEW OF ANY OF THE/        0083
    +1X,55HRECEIVERS LIMITED TO LESS THAN 90 DEGREES (HALF ANGLE)?/)    0083
     CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0084
     IF(IRSPNS(IFIRST).NE.1HY) GO TO 999                                0084
 910 WRITE(6,6190)                                                      0084
6190 FORMAT(/1X,37HINPUT RECEIVER NODE NUMBER (0 TO END)/)              0084
 920 CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0084
     IF(IVALUE.EQ.0) GO TO 999                                          0084
     IF((IVALUE.LE.0).OR.(IVALUE.GE.5000)) GO TO 920                    0084
     DO 930 J=1,25                                                      0084
     IF(IVALUE.EQ.RECEVR(J)) GO TO 940                                  0084
 930 CONTINUE                                                           0084
     WRITE(6,6200)                                                      0085
6200 FORMAT(1X,45H***** THAT NODE DOES NOT CORRESPOND TO ANY OF/        0085
    +           7X,28HTHE RECEIVERS YOU IDENTIFIED)                     0085
     GO TO 910                                                          0085
 940 WRITE(6,6210)                                                      0085
6210 FORMAT(1X,37HINPUT DESIRED FOV LIMITING HALF ANGLE)                0085
 950 CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0085
     IF((FVALUE.LE.0.).OR.(FVALUE.GT.180.)) GO TO 950                   0085
     FOVANG(J) = FVALUE                                                 0085
     GO TO 910                                                          0085
                                                                        0086
  ***** ALL DONE WITH NAMELIST $INPUT DATA COLLECTIONS *****            0086
                                                                        0086
 999 RETURN                                                             0086
     END                                                                0086
     SUBROUTINE INPUTB                                                  0086
                                                                        0086
     ************************************************************       0086
     *                                                          *       0086
     *  C O L L E C T   D A T A   F O R   I N P U T B           *       0086
     *                                                          *       0087
     ************************************************************       0087
                                                                        0087
     RETURN                                                             0087
     END                                                                0087
     SUBROUTINE MPDB                                                    0087
                                                                        0087
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      ************************************************                  0087
      *                                              *                  0087
      *  C O L L E C T   D A T A   F O R   M P D B   *   ORIGINAL PAGE IS 0087
      *                                              *   OF POOR QUALITY 0088
      ************************************************                  0088
                                                                        0088
=======================================================================0088
                                                                        0088
       COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,    LEAK,  PLUME,  0088
      +                  MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,  0088
      +                NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,  0088
      +                MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70) 0088
       COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),0088
      +                ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),0089
      +                    SERIES,      NEWDAT,      ADSURF,      NNEWPL,0089
      +                    JTOTAL,      KTOTAL,      NORBPL,  ISURF(300),0089
      +                ISSURF(300)                                       0089
       COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                    0089
       COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),     0089
      +                AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,  0089
      +                    M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,  0089
      +                TIMEOO                                           0089
       COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,  0089
      +                SUNM,   SUNH                                     0090
       COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),   0090
      +                ALPHA(25),      BETA(25),       GAMMA(25)       0090
       COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),    0090
      +               DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),   0090
      +               DOMEGA(25),     DS(25),       RMAX,     NTHETA,  0090
      +                    NPHI                                        0090
       COMMON /TEMPS/ TEMP(2000)                                        0090
       COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0090
      +                   CZLOC(50),    CTHETA(50),  CPHI(50),         0090
      +                  CIDENT(50)                                    0091
       COMMON/MOLEC/  MOLWT(10), DIA(10)                                0091
       COMMON /SURFS/IDENT(300), AREA(300)                              0091
       COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),      0091
      +             KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),     0091
      +            MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),     0091
      +            NPLUME(25)                                          0091
       COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,    0091
      +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25), 0091
      +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),        0091
      +               CHPLUM(10,25), CHMF(10,25)                       0092
       COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),     0092
      +                   INDXJT,    INDXKT                           0092
       COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),         0092
      +             NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),         0092
      +             NUPLAC(6,30),  NUNPLM(6,25)                        0092
                                                                        0092
       REAL ONTIME, MACH, MOLWT                                         0092
       INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,  0092
      +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,  0092
      +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL          0093
       LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    MCD,  0093
      +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,  0093
      +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,  0093
      +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,  0093
      +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,  0093
      +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,  0093
      +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL   0093
                                                                        0093
```

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C=====================================================================0093
C                                                                     0094
C  SEE IF THE USER WANTS TO CHANGE THE DEFAULT ORBITER ALTITUDE, VELOCIT0094
C  OR ATTITUDE.  IF SO, SET CHANGE FLAGS AND PROMPT FOR INPUTS.       0094
C                                                                     0094
   10 CALL CLEAR                                                      0094
      CALL HEADER(7)                                                 0094
      WRITE(6,6010)PITCH,YAW,ROLL                                    0094
 6010 FORMAT(/1X,51HDO YOU WANT TO CHANGE THE ORBITER DEFAULT ATTITUDE? 0094
     +//2X,9H(PITCH = ,F6.2,8H, YAW = ,F6.2,9H, ROLL = ,F6.2,1H)//)  0094
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0094
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 50                             0095
      CHATT = .TRUE.                                                 0095
      WRITE(6,6020)                                                  0095
 6020 FORMAT(//1X,30HENTER PITCH ANGLE IN DEGREES -/25X)             0095
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0095
      PITCH = FVALUE                                                 0095
      WRITE(6,6030)                                                  0095
 6030 FORMAT(//1X,17HENTER YAW ANGLE -/25X)                          0095
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0095
      YAW = FVALUE                                                   0095
      WRITE(6,6040)                                                  0096
 6040 FORMAT(//1X,18HENTER ROLL ANGLE -/25X)                         0096
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0096
      ROLL = FVALUE                                                  0096
C                                                                     0096
   50 CALL CLEAR                                                      0096
      CALL HEADER(7)                                                 0096
      WRITE(6,6050)ALT                                               0096
 6050 FORMAT(/1X,51HDO YOU WANT TO CHANGE THE ORBITER DEFAULT ALTITUDE? 0096
     +//2X,7H(ALT = ,F6.2,4H KM))                                    0096
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0097
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 100                            0097
      CHALT = .TRUE.                                                 0097
   60 WRITE(6,6060)                                                  0097
 6060 FORMAT(//1X,30HENTER DESIRED ALTITUDE (IN KM)/25X)             0097
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0097
      IF(FVALUE.LE.0.) GO TO 60                                      0097
      ALT = FVALUE                                                   0097
C                                                                     0097
  100 CALL CLEAR                                                      0097
      CALL HEADER(7)                                                 0098
      WRITE(6,6070)VA                                                0098
 6070 FORMAT(/1X,51HDO YOU WANT TO CHANGE THE ORBITER DEFAULT VELOCITY? 0098
     +//2X,7H(VEL = ,F6.0,7H M/SEC))                                 0098
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0098
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 150                            0098
      CHVEL = .TRUE.                                                 0098
  110 WRITE(6,6080)                                                  0098
 6080 FORMAT(//1X,33HENTER DESIRED VELOCITY (IN M/SEC)/25X)          0098
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0098
      IF(FVALUE.LE.0.) GO TO 110                                     0099
      VA = FVALUE                                                    0099
C                                                                     0099
C  SEE WHICH ATMOSPHERIC DENSITY MODEL (SUNSPOT ACTIVITY) IS DESIRED  0099
C                                                                     0099
  150 CALL CLEAR                                                      0099
      CALL HEADER(7)                                                 0099
  160 WRITE(6,6090)                                                  0099
 6090 FORMAT(/1X,34HSELECT DESIRED ATMOSPHERE DENSITY://             0099
     +5X,6H1) LOW/5X,9H2) MEDIUM/5X,7H3) HIGH//25X)                  0099
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)         0100
```

```
      IF((IVALUE.LE.0).OR.(IVALUE.GE.4)) GO TO 160                      0100
      IF(IVALUE.EQ.1) SUNL=.TRUE.                                       0100
      IF(IVALUE.EQ.2) SUNM=.TRUE.                                       0100
      IF(IVALUE.EQ.3) SUNH=.TRUE.                                       0100
      IF((IVALUE.EQ.1).OR.(IVALUE.EQ.3)) CHSUN=.TRUE.                   0100
                                                                        0100
    IF THE USER HAS REQUESTED AN MCD, RFAS2 OR RFSS ANALYSIS, PROMPT    0100
    FOR LINE(S)-OF-SIGHT AND RECEIVER LOCATION(S)/ORIENTATION(S)        0100
                                                                        0100
  200 IF(.NOT.(MCD.AND.RFAS2.AND.RFSS)) GO TO 800                       0101
      CALL CLEAR                                                        0101
      CALL HEADER(7)                                                    0101
      WRITE(6,6100)                                                     0101
 6100 FORMAT(/1X,35H***** INPUT RECEIVER LOCATION *****//)              0101
      DO 250 N=1,25                                                     0101
      IF(RECEVR(N).EQ.0) GO TO 250                                      0101
      WRITE(6,6110)N,RECEVR(N),XO(N),YO(N),ZO(N)                        0101
 6110 FORMAT(//1X,20H*** RECEIVER NUMBER ,I2,8H - NODE ,I4//1X,         0101
     +52HDO YOU WANT TO CHANGE THE RECEIVER DEFAULT LOCATION?/           0101
     +5X,5H(X = ,F6.2,6H, Y = ,F6.2,6H, Z = ,F6.2,1H)/25X)              0102
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0102
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 250                               0102
      CHLOC(N) = .TRUE.                                                 0102
      WRITE(6,6115)                                                     0102
 6115 FORMAT(//1X,39HENTER RECEIVER X-COORDINATE (IN INCHES)/25X)       0102
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0102
      XO(N) = FVALUE                                                    0102
      WRITE(6,6120)                                                     0102
 6120 FORMAT(/5X,27HENTER RECEIVER Y-COORDINATE/25X)                    0102
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0103
      YO(N) = FVALUE                                                    0103
      WRITE(6,6130)                                                     0103
 6130 FORMAT(/5X,27HENTER RECEIVER Z-COORDINATE/25X)                    0103
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0103
      ZO(N) = FVALUE                                                    0103
  250 CONTINUE                                                          0103
                                                                        0103
    IF AN MCD ANALYSIS WAS REQUESTED, PROMPT FOR LINE-OF-SIGHT DEFINITION0103
                                                                        0103
  300 IF(.NOT.MCD) GO TO 500                                            0104
      CALL CLEAR                                                        0104
      CALL HEADER(7)                                                    0104
      WRITE(6,6180)                                                     0104
 6180 FORMAT(//1X,49H*** LINE-OF-SIGHT DEFINITION FOR MCD ANALYSIS ***  0104
     +//1X,56H(ONE MCD LINE-OF-SIGHT MAY BE INPUT FOR EACH RECEIVER -)  0104
     +//)                                                               0104
      DO 400 N=1,25                                                     0104
      IF(RECEVR(N).EQ.0) GO TO 400                                      0104
      WRITE(6,6190)N,RECEVR(N)                                          0104
 6190 FORMAT(//1X,20H*** RECEIVER NUMBER ,I2,8H - NODE ,I4//1X,         0105
     +26HINPUT ANGLE THETA (IN DEG)/25X)                                0105
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0105
      THETAL(N) = FVALUE                                                0105
      WRITE(6,6200)                                                     0105
 6200 FORMAT(/1X,24HINPUT ANGLE PHI (IN DEG)/25X)                       0105
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0105
      PHIL(N) = FVALUE                                                  0105
  400 CONTINUE                                                          0105
                                                                        0105
    IF AN RFAS2 OR RFSS ANALYSIS WAS REQUESTED, PROMPT FOR LOS DEFINITION0106
                                                                        0106
  500 IF(.NOT.(RFAS2.AND.RFSS)) GO TO 800                               0106
```

```
      CALL CLEAR                                                        0106
      CALL HEADER(7)                                                    0106
      WRITE(6,6210)                                                     0106
 6210 FORMAT(//1X,46H*** LOS DEFINITION FOR RFAS2/RFSS ANALYSIS ***//)  0106
      DO 550 N=1,25                                                     0106
      IF(RECEVR(N).EQ.0) GO TO 550                                      0106
      WRITE(6,6220)N,RECEVR(N)                                          0106
 6220 FORMAT(//1X,20H*** RECEIVER NUMBER ,I2,8H - NODE ,I4/)            0107
      WRITE(6,6140)                                                     0107
 6140 FORMAT(//1X,51HDO YOU WANT TO CHANGE RECEIVER DEFAULT ORIENTATION?0107
     +/1X,47H(DEFAULT IS WITH RECEIVER NORMAL ALONG +Z AXIS)//25X)       0107
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0107
      IF(IRSPNS(IFIRST).NE.1HY) GO TO 520                               0107
      CHVIEW(N) = .TRUE.                                                0107
      WRITE(6,6150)                                                     0107
 6150 FORMAT(/1X,41HINPUT 1ST ROTATION (ALPHA) - CCW ABOUT +Z/25X)       0107
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0107
      ALPHA(N) = FVALUE                                                 0108
      WRITE(6,6160)                                                     0108
 6160 FORMAT(/1X,44HINPUT 2ND ROTATION (BETA) - CCW ABOUT NEW +X/25X)    0108
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0108
      BETA(N) = FVALUE                                                  0108
      WRITE(6,6170)                                                     0108
 6170 FORMAT(/1X,45HINPUT 3RD ROTATION (GAMMA) - CCW ABOUT NEW +Z/25X)   0108
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0108
      GAMMA(N) = FVALUE                                                 0108
  520 WRITE(6,6225)                                                     0108
 6225 FORMAT(/1X,24HINPUT ANGLE THETA1 (DEG)/)                          0109
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0109
      THETA1(N) = FVALUE                                                0109
      WRITE(6,6230)                                                     0109
 6230 FORMAT(/1X,18HINPUT ANGLE THETA2/)                                0109
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0109
      THETA2(N) = FVALUE                                                0109
      WRITE(6,6240)                                                     0109
 6240 FORMAT(/1X,22HINPUT INCREMENT DTHETA/)                            0109
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0109
      DTHETA(N) = FVALUE                                                0110
      WRITE(6,6250)                                                     0110
 6250 FORMAT(/1X,16HINPUT ANGLE PHI1/)                                  0110
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0110
      PHI1(N) = FVALUE                                                  0110
      WRITE(6,6260)                                                     0110
 6260 FORMAT(/1X,16HINPUT ANGLE PHI2/)                                  0110
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0110
      PHI2(N) = FVALUE                                                  0110
      WRITE(6,6270)                                                     0110
 6270 FORMAT(/1X,20HINPUT INCREMENT DPHI/)                              0111
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0111
      DPHI(N) = FVALUE                                                  0111
                                                                        0111
  550 CONTINUE                                                          0111
                                                                        0111
                                                                        0111
  BASICALLY DONE - COULD ADD AT A FUTURE TIME THE OPTION TO MODIFY      0111
  THE DS(I) ARRAY, RMAX, DOMEGA(I), RFSTK, ETC. - IT WAS FELT THAT      0111
  THESE OPTIONS ARE SO SELDOM USED THAT IMPLEMENTATION WAS NOT          0111
  WARRANTED AT THIS TIME.                                               0112
                                                                        0112
                                                                        0112
  800 CONTINUE                                                          0112
      RETURN                                                            0112
```

```
      END                                                                0112
      SUBROUTINE ADDCON                                                  0112
                                                                         0112
      ************************************************************       0112
      *                                                          *       0112
      *  C O L L E C T   N E W   C O N F I G U R A T I O N   D A T A *   0113
      *                                                          *       0113
      ************************************************************       0113
                                                                         0113
     =====================================================================0113
                                                                         0113
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,     0113
     +                  MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,     0113
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,     0113
     +               MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70)  0113
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),0114
     +                ONTIME(50),  RECEVR(25),     ICCODE,  FOVANG(25),0114
     +                    SERIES,      NEWDAT,     ADSURF,      NNEWPL,0114
     +                    JTOTAL,      KTOTAL,     NORBPL,  ISURF(300),0114
     +               ISSURF(300)                                         0114
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                      0114
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),       0114
     +               AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,    MED2,   0114
     +                   M1,     M2,  AMBWT, AMBDIA, TSTARR,    MACH,   0114
     +               TIMEOO                                              0114
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,    SUNL,    0115
     +                 SUNM,   SUNH                                      0115
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),     0115
     +               ALPHA(25),      BETA(25),       GAMMA(25)           0115
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),      0115
     +             DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),       0115
     +             DOMEGA(25),     DS(25),       RMAX,       NTHETA,    0115
     +                NPHI                                               0115
      COMMON /TEMPS/ TEMP(2000)                                          0115
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0115
     +                   CZLOC(50),    CTHETA(50),  CPHI(50),           0116
     +                  CIDENT(50)                                       0116
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                  0116
      COMMON /SURFS/IDENT(300), AREA(300)                                0116
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),        0116
     +            KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),        0116
     +           MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),        0116
     +           NPLUME(25)                                              0116
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,      0116
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),  0116
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),          0117
     +               CHPLUM(10,25), CHMF(10,25)                          0117
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),       0117
     +                  INDXJT,     INDXKT                               0117
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),           0117
     +            NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),            0117
     +            NUPLAC(6,30),  NUNPLM(6,25)                           0117
                                                                         0117
      REAL ONTIME, MACH, MOLWT                                           0117
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,    0117
     +        PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,     0118
     +         CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL              0118
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,     MCD,   0118
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,    0118
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,    0118
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,    0118
     +         CHATT,  CHALT,  CHVEL,  CHSU                   CHDS, CHORIG,  CHLOC,    0118
```

```
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,    0118
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL    0118
                                                                         0118
C=====================================================================C0119
                                                                         0119
C  SEE IF THE USER DESIRES TO INPUT A NEW SURFACE CONFIGURATION AS      0119
C  PART OF THE SPACE II INPUT DECK (NEWCON OPTION).  IF SO, PROMPT      0119
C  FOR NODE NUMBER, LOCATION (PLACE), MATERIAL AND SURFACE AREA.        0119
C  THE PROGRAM AUTOMATICALLY DETERMINES THE SEQUENCE NUMBER FROM        0119
C  THE CURRENT VALUE OF JTOTAL, INCREMENTING JTOTAL AS SURFACES         0119
C  ARE ADDED.                                                           0119
                                                                         0119
      IF(.NOT.ADSURF) GO TO 500                                          0119
      CALL CLEAR                                                         0120
      CALL HEADER(4)                                                     0120
      INDXJT = JTOTAL                                                    0120
      WRITE(6,6010)                                                      0120
 6010 FORMAT(//40H*** NEW SURFACE CONFIGURATION INPUTS ***/)             0120
                                                                         0120
   10 WRITE(6,6020)                                                      0120
 6020 FORMAT(//32HINPUT NEW NODE NR. ("0" IF DONE)/)                     0120
      CALL KYBDIN(IRSPNS,0,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0120
      IF(IVALUE.EQ.0) GO TO 500                                          0120
      IF((IVALUE.LT.0).OR.(IVALUE.GE.5000)) GO TO 10                     0121
      JTOTAL = JTOTAL + 1                                                0121
      IDENT(JTOTAL) = IVALUE                                             0121
                                                                         0121
   20 WRITE(6,6030)                                                      0121
 6030 FORMAT(/30HINPUT LOCATION (6 LETTERS MAX)/)                        0121
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0121
      NCHAR = ILAST - IFIRST + 1                                         0121
      IF(NCHAR.GT.6) GO TO 20                                            0121
      IPAD = 6 - NCHAR                                                   0121
      IF(IPAD.EQ.0) GO TO 40                                             0122
      DO 30 I=1,IPAD                                                     0122
   30 NUSECT(I,JTOTAL) = 1H                                              0122
   40 IPAD1 = IPAD + 1                                                   0122
      II = 0                                                             0122
      DO 50 I=IPAD1,6                                                    0122
      II = II + 1                                                        0122
   50 NUSECT(I,JTOTAL) = IRSPNS(IFIRST + II - 1)                         0122
                                                                         0122
  120 WRITE(6,6040)                                                      0122
 6040 FORMAT(/30HINPUT MATERIAL (6 LETTERS MAX)/)                        0123
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0123
      NCHAR = ILAST - IFIRST + 1                                         0123
      IF(NCHAR.GT.6) GO TO 120                                           0123
      IPAD = 6 - NCHAR                                                   0123
      IF(IPAD.EQ.0) GO TO 140                                            0123
      DO 130 I=1,IPAD                                                    0123
  130 NUMATL(I,JTOTAL) = 1H                                              0123
  140 IPAD1 = IPAD + 1                                                   0123
      II = 0                                                             0123
      DO 150 I=IPAD1,6                                                   0124
      II = II + 1                                                        0124
  150 NUMATL(I,JTOTAL) = IRSPNS(IFIRST + II - 1)                         0124
                                                                         0124
  160 WRITE(6,6050)                                                      0124
 6050 FORMAT(/28HINPUT SURFACE AREA (SQ. IN.)/)                          0124
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)             0124
      IF(FVALUE.LE.0.) GO TO 160                                         0124
      AREA(JTOTAL) = FVALUE                                              0124
```

```
      GO TO 10                                                          0124
                                                                        0125
    INPUT NEW POINT SOURCE DATA                                         0125
                                                                        0125
  500 IF(NNEWPL.EQ.0) GO TO 999                                         0125
      CALL CLEAR                                                        0125
      CALL HEADER(4)                                                    0125
      INDXKT = KTOTAL - NNEWPL                                          0125
      WRITE(6,6060)                                                     0125
 6060 FORMAT(//31H*** NEW POINT SOURCE INPUTS ***/)                     0125
                                                                        0125
      DO 800 N=1,NNEWPL                                                 0126
      K = NORBPL + N                                                    0126
      WRITE(6,6070) N,PNTSC(K)                                          0126
 6070 FORMAT(/24HNEW POINT SOURCE NUMBER ,I2,15H - NODE NUMBER ,I4,1H:) 0126
  520 WRITE(6,6080)                                                     0126
 6080 FORMAT(/43HINPUT POINT SOURCE LOCATION (6 LETTERS MAX)/)          0126
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0126
      NCHAR = ILAST - IFIRST + 1                                        0126
      IF(NCHAR.GT.6) GO TO 520                                          0126
      IPAD = 6 - NCHAR                                                  0126
      IF(IPAD.EQ.0) GO TO 540                                           0127
      DO 530 I=1,IPAD                                                   0127
  530 NULOC(I,K) = 1H                                                   0127
  540 IPAD1 = IPAD + 1                                                  0127
      II = 0                                                            0127
      DO 550 I=IPAD1,6                                                  0127
      II = II + 1                                                       0127
  550 NULOC(I,K) = IRSPNS(IFIRST + II - 1)                              0127
                                                                        0127
  620 WRITE(6,6090)                                                     0127
 6090 FORMAT(/39HINPUT POINT SOURCE TYPE (6 LETTERS MAX)/)              0128
      CALL KYBDIN(IRSPNS,3,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0128
      NCHAR = ILAST - IFIRST + 1                                        0128
      IF(NCHAR.GT.6) GO TO 620                                          0128
      IPAD = 6 - NCHAR                                                  0128
      IF(IPAD.EQ.0) GO TO 640                                           0128
      DO 630 I=1,IPAD                                                   0128
  630 NUTYPE(I,K) = 1H                                                  0128
  640 IPAD1 = IPAD + 1                                                  0128
      II = 0                                                            0128
      DO 650 I=IPAD1,6                                                  0129
      II = II + 1                                                       0129
  650 NUTYPE(I,K) = IRSPNS(IFIRST + II - 1)                             0129
                                                                        0129
      WRITE(6,6100)                                                     0129
 6100 FORMAT(/40HINPUT POINT SOURCE X-COORDINATE (INCHES)/)             0129
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0129
      CXLOC(K) = FVALUE                                                 0129
      WRITE(6,6110)                                                     0129
 6110 FORMAT(/40HINPUT POINT SOURCE Y-COORDINATE (INCHES)/)             0129
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0130
      CYLOC(K) = FVALUE                                                 0130
      WRITE(6,6120)                                                     0130
 6120 FORMAT(/40HINPUT POINT SOURCE Z-COORDINATE (INCHES)/)             0130
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0130
      CZLOC(K) = FVALUE                                                 0130
      WRITE(6,6130)                                                     0130
 6130 FORMAT(/44HINPUT POINT SOURCE ORIENTATION ANGLE (THETA)/)         0130
      CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)            0130
      CTHETA(K) = FVALUE                                                0130
      WRITE(6,6140)                                                     0131
```

```
6140 FORMAT(/42HINPUT POINT SOURCE ORIENTATION ANGLE (PHI)/)
     CALL KYBDIN(IRSPNS,1,ITYPE,IVALUE,FVALUE,IFIRST,ILAST)
     CPHI(K) = FVALUE

 800 CONTINUE

  ALL DONE

 999 RETURN
     END
     SUBROUTINE ADDATA

     ********************************************
     *                                          *
     *  P R O C E S S   C H A N G E   C A R D S *
     *                                          *
     ********************************************

     RETURN
     END
     SUBROUTINE ADDTMP

     ************************************************************
     *                                                          *
     *  P R O C E S S   N E W   T E M P E R A T U R E   D A T A *
     *                                                          *
     ************************************************************

     RETURN
     END
     SUBROUTINE ADDVFS

     ******************************************
     *                                        *
     *  C O L L E C T   N E W   V F   D A T A *
     *                                        *
     ******************************************

     RETURN
     END
     SUBROUTINE BUILD

     ************************************************************
     *                                                          *
     *  B U I L D   S P A C E   I I   I N P U T   D A T A   F I L E *
     *                                                          *
     ************************************************************

=====================================================================
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,
     +                  MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,
     +               MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70)
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),
     +                ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),
     +                    SERIES,      NEWDAT,      ADSURF,      NNEWPL,
     +                    JTOTAL,      KTOTAL,      NORBPL,  ISURF(300),
     +               ISSURF(300)
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),
     +               AGEORB, AGEPLD,  MOUT1   MOUT2,   MED1,   MED2,
```

```
     +                    M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,     0137
     +                TIMEOO                                               0137
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,     0137
     +                 SUNM,   SUNH                                        0137
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),      0137
     +              ALPHA(25),       BETA(25),       GAMMA(25)            0137
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),       0137
     +             DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),       0138
     +             DOMEGA(25),     DS(25),       RMAX,     NTHETA,       0138
     +                   NPHI                                              0138
      COMMON /TEMPS/ TEMP(2000)                                           0138
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0138
     +                  CZLOC(50),    CTHETA(50),  CPHI(50),              0138
     +                 CIDENT(50)                                         0138
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                   0138
      COMMON /SURFS/IDENT(300), AREA(300)                                 0138
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),         0138
     +            KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),         0139
     +           MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),         0139
     +           NPLUME(25)                                               0139
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,       0139
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),   0139
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),           0139
     +               CHPLUM(10,25), CHMF(10,25)                          0139
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),       0139
     +                  INDXJT,     INDXKT                               0139
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),            0139
     +            NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),             0140
     +            NUPLAC(6,30),  NUNPLM(6,25)                            0140
                                                                         0140
      REAL ONTIME, MA( ), MOLWT                                          0140
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,    0140
     +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,    0140
     +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL             0140
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,     MCD,   0140
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,    0140
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,    0140
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,    0141
     +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,    0141
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,    0141
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL     0141
                                                                         0141
=========================================================================0141
                                                                         0141
  THE SPACE II INPUT DECK IS BUILT AND OUTPUT TO TAPE 1                  0141
                                                                         0141
                                                                         0141
  OUTPUT THE USER'S TITLE FOR THIS CASE                                  0141
                                                                         0142
      REWIND 1                                                           0142
      WRITE(1,1010)(ITITLE(I),I=1,72)                                    0142
 1010 FORMAT(72A1)                                                       0142
                                                                         0142
  GENERATE OUTPUT FOR NAMELIST $CONTRL                                   0142
  (SHOW ALL VALUES, WHETHER .T. OR .F., DEFAULT OR NOT)                  0142
                                                                         0142
      WRITE(1,1020)                                                      0142
 1020 FORMAT(8H $CONTRL)                                                 0142
                                                                         0143
      IF(ORBITR) WRITE(1,1030)                                           0143
 1030 FORMAT(16H  ORBITR=.TRUE.,)                                        0143
      IF(.NOT.ORBITR) WRITE(1,1040)                                      0143
```

```
1040 FORMAT(17H  ORBITR=.FALSE.,)

     IF(PAYLOD) WRITE(1,1050)
1050 FORMAT(16H  PAYLOD=.TRUE.,)
     IF(.NOT.PAYLOD) WRITE(1,1060)
1060 FORMAT(17H  PAYLOD=.FALSE.,)

     IF(OUT) WRITE(1,1070)
1070 FORMAT(13H  OUT=.TRUE.,)
     IF(.NOT.OUT) WRITE(1,1080)
1080 FORMAT(14H  OUT=.FALSE.,)

     IF(ED) WRITE(1,1090)
1090 FORMAT(12H  ED=.TRUE.,)
     IF(.NOT.ED) WRITE(1,1100)
1100 FORMAT(13H  ED=.FALSE.,)

     IF(LEAK) WRITE(1,1110)
1110 FORMAT(14H  LEAK=.TRUE.,)
     IF(.NOT.LEAK) WRITE(1,1120)
1120 FORMAT(15H  LEAK=.FALSE.,)

     IF(PLUME) WRITE(1,1130)
1130 FORMAT(15H  PLUME=.TRUE.,)
     IF(.NOT.PLUME) WRITE(1,1140)
1140 FORMAT(16H  PLUME=.FALSE.,)

     IF(MCD) WRITE(1,1150)
1150 FORMAT(13H  MCD=.TRUE.,)
     IF(.NOT.MCD) WRITE(1,1160)
1160 FORMAT(14H  MCD=.FALSE.,)

     IF(DIRECT) WRITE(1,1170)
1170 FORMAT(16H  DIRECT=.TRUE.,)
     IF(.NOT.DIRECT) WRITE(1,1180)
1180 FORMAT(17H  DIRECT=.FALSE.,)

     IF(RFAS2) WRITE(1,1190)
1190 FORMAT(15H  RFAS2=.TRUE.,)
     IF(.NOT.RFAS2) WRITE(1,1200)
1200 FORMAT(16H  RFAS2=.FALSE.,)

     IF(RFSS) WRITE(1,1210)
1210 FORMAT(14H  RFSS=.TRUE.,)
     IF(.NOT.RFSS) WRITE(1,1220)
1220 FORMAT(15H  RFSS=.FALSE.,)

     IF(REFLCT) WRITE(1,1222)
1222 FORMAT(16H  REFLCT=.TRUE.,)
     IF(.NOT.REFLCT) WRITE(1,1224)
1224 FORMAT(17H  REFLCT=.FALSE.,)
     IF(REFLCT) WRITE(1,1225) NRFLCT
1225 FORMAT(9H  NRFLCT=,I2,1H,)

     IF(NEWCON) WRITE(1,1226)
1226 FORMAT(16H  NEWCON=.TRUE.,)
     IF(.NOT.NEWCON) WRITE(1,1228)
1228 FORMAT(17H  NEWCON=.FALSE.,)

     IF(NTAPE4) WRITE(1,1230)
1230 FORMAT(16H  NTAPE4=.TRUE.,)
     IF(.NOT.NTAPE4) WRITE(1,1240)
```

```
1240 FORMAT(17H  NTAPE4=.FALSE.,)                                              0149
                                                                               0149
     IF(NEWTCD) WRITE(1,1250)                                                  0149
1250 FORMAT(16H  NEWTCD=.TRUE.,)                                               0150
     IF(.NOT.NEWTCD) WRITE(1,1260)                                             0150
1260 FORMAT(17H  NEWTCD=.FALSE.,)                                              0150
                                                                               0150
     IF(NEWTNL) WRITE(1,1270)                                                  0150
1270 FORMAT(16H  NEWTNL=.TRUE.,)                                               0150
     IF(.NOT.NEWTNL) WRITE(1,1280)                                             0150
1280 FORMAT(17H  NEWTNL=.FALSE.,)                                              0150
                                                                               0150
     IF(NEWMFS) WRITE(1,1290)                                                  0150
1290 FORMAT(16H  NEWMFS=.TRUE.,)                                               0151
     IF(.NOT.NEWMFS) WRITE(1,1300)                                             0151
1300 FORMAT(17H  NEWMFS=.FALSE.,)                                              0151
                                                                               0151
     IF(NEWMFP) WRITE(1,1310)                                                  0151
1310 FORMAT(16H  NEWMFP=.TRUE.,)                                               0151
     IF(.NOT.NEWMFP) WRITE(1,1320)                                             0151
1320 FORMAT(17H  NEWMFP=.FALSE.,)                                              0151
                                                                               0151
     IF(MINTMP) WRITE(1,1330)                                                  0151
1330 FORMAT(16H  MINTMP=.TRUE.,)                                               0152
     IF(MAXTMP) WRITE(1,1340)                                                  0152
1340 FORMAT(16H  MAXTMP=.TRUE.,)                                               0152
     IF(ATCODE.NE.0) WRITE(1,1350)ATCODE                                       0152
1350 FORMAT(9H  ATCODE=,I1,1H,)                                                0152
                                                                               0152
         HANDLE REPORTS HERE                                                   0152
                                                                               0152
     WRITE(1,1360)                                                             0152
1360 FORMAT(37H  REPORT(7)=.TRUE.,REPORT(51)=.TRUE.,)                          0152
     IF (DIRECT) WRITE(1,1370)                                                 0153
1370 FORMAT(22H  REPORT(21)=4*.TRUE.,)                                         0153
     IF (MCD) WRITE(1,1380)                                                    0153
1380 FORMAT(38H  REPORT(35)=.TRUE.,REPORT(37)=.TRUE.,)                         0153
     IF (RFSS .OR. RFAS2) WRITE(1,1390)                                        0153
1390 FORMAT(20H  REPORT(45)=.TRUE.,)                                           0153
                                                                               0153
     WRITE(1,1500)                                                             0153
1500 FORMAT(12H  GO=.TRUE.,/5H $END)                                           0153
                                                                               0153
  HANDLE PAYLOAD CARD, IF APPROPRIATE                                          0154
                                                                               0154
     IF(.NOT.PAYLOD) GO TO 100                                                 0154
     IF(NAMEPL.NE.6H      ) WRITE(1,1510)NAMEPL,SERIES                         0154
1510 FORMAT(A6,4X,I4)                                                          0154
     IF(NAMEPL.EQ.6H      ) WRITE(1,1520)(NEWNAM(I),I=1,6),SERIES              0154
1520 FORMAT(6A1,4X,I4)                                                         0154
                                                                               0154
  HANDLE OUTPUT FOR NAMELIST $INPUTA (ONLY MODS OR SPECIFIC INPUTS)            0154
                                                                               0154
 100 WRITE(1,1525)                                                             0155
1525 FORMAT(8H $INPUTA)                                                        0155
                                                                               0155
  ZEROED SURFACES                                                              0155
                                                                               0155
     DO 110 I=1,JTOTAL                                                         0155
     IF(ISURF(I).NE.0) WRITE(1,1530) ISURF(I)                                  0155
1530 FORMAT(9H  SURFSC(,I4,4H)=0,)                                             0155
 110 CONTINUE                                                                  0155
```

```
                                                                        0155
  ZEROED SECOND SURFACES                                                0156
                                                                        0156
      DO 120 I=1,JTOTAL                                                 0156
      IF(ISSURF(I).NE.0) WRITE(1,1540) ISSURF(I)                        0156
 1540 FORMAT(9H  SSURFS(,I4,4H)=0,)                                     0156
  120 CONTINUE                                                          0156
                                                                        0156
  HANDLE PNTSC, ONTIME AND NEWPL INPUTS                                 0156
                                                                        0156
      IF(.NOT.(PLUME.AND.(NNEWPL.GT.0))) GO TO 250                      0156
      DO 150 K=1,KTOTAL                                                 0157
      IF(PNTSC(K).NE.0) WRITE(1,1550) K,PNTSC(K)                        0157
 1550 FORMAT(8H  PNTSC(,I2,2H)=,I4,1H,)                                 0157
  150 CONTINUE                                                          0157
                                                                        0157
      DO 160 K=1,KTOTAL                                                 0157
      IF(PNTSC(K).NE.0) WRITE(1,1560) K,ONTIME(K)                       0157
 1560 FORMAT(9H  ONTIME(,I2,2H)=,F6.2,1H,)                              0157
  160 CONTINUE                                                          0157
                                                                        0157
  200 IF(NNEWPL.EQ.0) GO TO 250                                         0158
      KFIRST = NORBPL + 1                                               0158
      KLAST  = NORBPL + NNEWPL                                          0158
      DO 210 K=KFIRST,KLAST                                             0158
      WRITE(1,1565) K                                                   0158
 1565 FORMAT(8H  NEWPL(,I2,9H)=.TRUE.,)                                 0158
  210 CONTINUE                                                          0158
                                                                        0158
  HANDLE RECEVR, ICCODE AND FOVANG INPUTS                               0158
                                                                        0158
  250 NRECVR = 0                                                        0159
      DO 260 I=1,25                                                     0159
      IF(RECEVR(I).EQ.0) GO TO 260                                      0159
      NRECVR = NRECVR + 1                                               0159
      WRITE(1,1570) I,RECEVR(I)                                         0159
 1570 FORMAT(9H  RECEVR(,I2,2H)=,I4,1H,)                                0159
  260 CONTINUE                                                          0159
                                                                        0159
      IF(MCD.OR.DIRECT) ICCODE = 1                                      0159
      IF(RFAS2.OR.RFSS) ICCODE = 2                                      0159
      WRITE(1,1580) NRECVR,ICCODE                                       0160
 1580 FORMAT(12H  ICCODE(1)=,I2,1H*,I1,1H,)                             0160
                                                                        0160
      DO 270 I=1,25                                                     0160
      IF(FOVANG(I).NE.180.) WRITE(1,1590) I,FOVANG(I)                   0160
 1590 FORMAT(9H  FOVANG(,I2,2H)=,F6.2,1H,)                              0160
  270 CONTINUE                                                          0160
                                                                        0160
  CLOSE OUT NAMELIST $INPUTA                                            0160
                                                                        0160
      WRITE(1,1600)                                                     0161
 1600 FORMAT(12H  GO=.TRUE.,/5H $END)                                   0161
                                                                        0161
  PROCESS NEW CONFIGURATION INPUTS (SURFACES AND/OR POINT SOURCES)       0161
                                                                        0161
      IF(.NOT.NEWCON) GO TO 400                                         0161
      IF(.NOT.ADSURF) GO TO 300                                         0161
      JP1 = INDXJT + 1                                                  0161
      DO 290 J=JP1,JTOTAL                                               0161
      WRITE(1,1610)J,IDENT(J),(NUSECT(I,J),I=1,6),(NUMATL(I,J),I=1,6),  0161
     +             AREA(J)                                              0162
```

```
1610 FORMAT(I5,I5,4X,6A1,4X,6A1,F10.1)                                  0162
 290 CONTINUE                                                           0162
                                                                        0162
 300 IF(NNEWPL.EQ.0) GO TO 390                                          0162
     KP1 = INDXKT + 1                                                   0162
     KNEXT = NORBPL                                                     0162
     DO 350 K=KP1,KTOTAL                                                0162
     KNEXT = KNEXT + 1                                                  0162
     WRITE(1,1620)KNEXT,PNTSC(KNEXT),(NULOC(I,K),I=1,6),                0162
    +             (NUTYPE(I,K),I=1,6),CXLOC(K),CYLOC(K),CZLOC(K),       0163
    +             CTHETA(K),CPHI(K)                                     0163
1620 FORMAT(I5,I5,4X,6A1,4X,6A1,5F10.1)                                 0163
 350 CONTINUE                                                           0163
 390 WRITE(1,1630)                                                      0163
1630 FORMAT(5H99999)                                                    0163
                                                                        0163
  BUILD NAMELIST $INPUTB                                                0163
                                                                        0163
 400 CONTINUE                                                           0163
     WRITE(1,1700)                                                      0163
1700 FORMAT(8H $INPUTB)                                                 0164
     WRITE(1,1500)                                                      0164
                                                                        0164
  HANDLE OUTPUT FOR NAMELIST $MPDB (ONLY MODS OR SPECIFIC INPUTS)       0164
                                                                        0164
     WRITE(1,1800)                                                      0164
1800 FORMAT(6H $MPDB)                                                   0164
                                                                        0164
   MISSION DATA BANK MODIFICATIONS                                      0164
                                                                        0165
     IF (CHATT) WRITE(1,1810) PITCH,YAW,ROLL                            0165
1810 FORMAT(8H  PITCH=,F6.2,1H,/6H  YAW=,F6.2,1H,/7H  ROLL=,            0165
    +F6.2,1H,)                                                          0165
     IF (CHALT) WRITE(1,1820) ALT                                       0165
1820 FORMAT(6H  ALT=,F6.2,1H,)                                          0165
     IF (CHVEL) WRITE(1,1830) VA                                        0165
1830 FORMAT(5H  VA=,F6.2,1H,)                                           0165
     IF (.NOT. CHSUN) GO TO 500                                         0165
     IF (SUNL) WRITE(1,1835)                                            0165
1835 FORMAT(14H  SUNL=.TRUE.,/15H  SUNM=.FALSE.,)                       0166
     IF (SUNH) WRITE(1,1840)                                            0166
1840 FORMAT(14H  SUNH=.TRUE.,/15H  SUNM=.FALSE.,)                       0166
                                                                        0166
    MCD ANALYSIS DATA                                                   0166
                                                                        0166
 500 DO 510 I=1,25                                                      0166
     IF (.NOT. CHLOC(I)) GO TO 510                                      0166
     WRITE(1,1865)I,X0(I),I,Y0(I),I,Z0(I)                               0166
1865 FORMAT(5H  X0(,I2,2H)=,F6.2,4H,Y0(,I2,2H)=,F6.2,                   0166
    +4H,Z0(,I2,2H)=,F6.2,1H,)                                           0167
 510 CONTINUE                                                           0167
                                                                        0167
     IF (.NOT. MCD) GO TO 530                                           0167
     DO 520 I=1,25                                                      0167
     IF (RECEVR(I) .EQ. 0) GO TO 520                                    0167
     WRITE(1,1880) I,THETAL(I),I,PHIL(I)                                0167
1880 FORMAT(9H  THETAL(,I2,2H)=,F6.2,6H,PHIL(,I2,2H)=,F6.2,1H,)         0167
 520 CONTINUE                                                           0167
                                                                        0167
 530 IF (.NOT. (RFAS2 .AND. RFSS)) GO TO 600                            0168
     DO 560 I=1,25                                                      0168
     IF (.NOT. CHVIEW(I)) GO TO 540                                     0168
```

```
      WRITE(1,1885) I,ALPHA(I),I,BETA(I),I,GAMMA(I)                     0168
 1885 FORMAT(8H  ALPHA(,I2,2H)=,F6.2,6H,BETA(,I2,2H)=,F6.2,             0168
     +7H,GAMMA(,I2,2H)=,F6.2,1H,)                                       0168
                                                                        0168
  540 IF(RECEVR(I).EQ.0) GO TO 560                                      0168
      WRITE(1,1890) I,THETA1(I),I,THETA2(I)                             0168
 1890 FORMAT(9H  THETA1(,I2,2H)=,F6.2,8H,THETA2(,I2,2H)=,F6.2,1H,)      0168
      WRITE(1,1895) I,PHI1(I),I,PHI2(I)                                 0169
 1895 FORMAT(7H  PHI1(,I2,2H)=,F6.2,6H,PHI2(,I2,2H)=,F6.2,1H,)          0169
      WRITE(1,1900) I,DTHETA(I),I,DPHI(I)                               0169
 1900 FORMAT(9H  DTHETA(,I2,2H)=,F6.2,6H,DPHI(,I2,2H)=,F6.2)            0169
  560 CONTINUE                                                          0169
                                                                        0169
  600 WRITE(1,1500)                                                     0169
      WRITE(1,2000)                                                     0169
 2000 FORMAT(4HSTOP)                                                    0169
                                                                        0169
      RETURN                                                            0170
      END                                                               0170
      SUBROUTINE KYBDIN(IRSPNS,IDESIR,ITYPE,IVALUE,FVALUE,IFIRST,ILAST) 0170
                                                                        0170
      ************************************************                  0170
      *                                              *                  0170
      *  K E Y B O A R D   I N P U T   B U F F E R   *                  0170
      *                                              *                  0170
      ************************************************                  0170
                                                                        0170
                                - J. C. PIZZICAROLI                     0171
                                  7/12/83                               0171
                                                                        0171
C-------------------------------------------------------------------------0171
                                                                        0171
C  THIS SUBROUTINE PROVIDES THE CAPABILITY FOR AN INTERACTIVE FORTRAN PRO0171
C  TO CHECK THE STRUCTURE AND VALIDITY OF A USERS KEYBOARD INPUT BEFORE  0171
C  PASSING THE RESPONSE ON TO THE MAIN PROGRAM.  THIS PREVENTS A PROGRAM0171
C  FROM BOMBING DUE TO A FORTRAN ERROR INDUCED BY TYPOGRAPHICAL ERRORS,  0171
C  VARIABLE TYPE MISMATCHES OR OTHERWISE INAPPROPRIATE USER RESPONSES.   0171
                                                                        0172
C  THE APPROACH TAKEN IS TO INPUT ALL USER RESPONSES AS CHARACTER STRING0172
C  EACH CHARACTER IN THE RESPONSE STRING IS THEN DECODED, ONE AT A TIME,0172
C  UNTIL THE STRING CONTENTS CAN BE INTERPRETED AS ONE OF THE FOLLOWING  0172
C                                                                       0172
C              ITYPE = 0  -  INTEGER                                    0172
C                      1  -  FLOATING POINT                             0172
C                      2  -  FLOATING POINT, EXPONENTIAL FORMAT         0172
C                            *** NOT CURRENTLY IMPLEMENTED ****         0172
C                      3  -  STRING RESPONSE (I.E., YES, NO, ETC)       0172
C                      4  -  BLANK                                      0173
C                      5  -  NULL (CARRIAGE RETURN)                     0173
C                      6  -  UNRECOGNIZABLE (I.E., 1.2D, 4.4.4, ETC)    0173
C                                                                       0173
C  THE USERS RESPONSE IS PASSED TO THE SUBROUTINE KYBD AS THE CHARACTER  0173
C  ARRAY IRSPNS(80).  THE SUBROUTINE RETURNS THE FOLLOWING PARAMETERS -  0173
C                                                                       0173
C                IDESIR  -  TYPE OF RESPONSE DESIRED, PER ABOVE LIST    0173
C                 ITYPE  -  TYPE OF RESPONSE DECODED, PER ABOVE LIST    0173
C                IVALUE  -  IF RESPONSE DECODED AS INTEGER, CONTAINS    0173
C                           CORRESPONDING INTEGER VALUE                 0174
C                FVALUE  -  IF RESPONSE DECODED AS FLOATING POINT, CONTA0174
C                           CORRESPONDING FLOATING POINT VALUE          0174
C                IFIRST  -  IF RESPONSE DECODED AS CHARACTER STRING, CON0174
C                           LOCATION OF 74 ST NON-BLANK CHARACTER       0174
```

```
                ILAST  -  IF RESPONSE DECODED AS CHARACTER STRING, CON0174
                          LOCATION OF LAST NON-BLANK CHARACTER        0174
                                                                      0174
  TO USE THIS SUBROUTINE, FOR EXAMPLE, THE FOLLOWING FORTRAN CODE -   0174
                                                                      0174
                     READ(5,5001) X                                   0175
                5001 FORMAT(F10.4)                                    0175
                                                                      0175
  WOULD BE REPLACED BY -                                              0175
                                                                      0175
                     CALL KYBD(IRSPNS,IDESIR,ITYPE,IVALUE,FVALUE,IFIRST,0175
                                                                      0175
  THE SUBROUTINE CHECKS TO SEE THAT THE TYPE OF RESPONSE MADE BY THE  0175
  USER WAS APPROPRIATE.  IF NOT, THE USER WILL BE PROMPTED FOR ANOTHER 0175
  RESPONSE.                                                           0175
                                                                      0176
                                                                      0176
        KEY PROGRAM VARIABLES                                         0176
        --- ------- ---------                                         0176
                                                                      0176
          IDECPT  -  = 1 IF A DECIMAL POINT IS FOUND IN THE RESPONSE  0176
                     = 0 OTHERWISE                                    0176
            IDIG  -  = 1 IF AN INITIAL DIGIT IS FOUND IN THE RESPONSE 0176
                     = 0 OTHERWISE                                    0176
          IFDIG1  -  LOCATION IN ARRAY IRSPNS(80) CORRESPONDING TO THE 0176
                     LEFTMOST DIGIT IN A NUMERICAL RESPONSE           0177
          IFDIG2  -  LOCATION IN ARRAY IRSPNS(80) CORRESPONDING TO THE 0177
                     LEFTMOST DIGIT TO THE RIGHT OF A DECIMAL POINT IN 0177
                     A NUMERICAL RESPONSE                             0177
          ILDIG1  -  LOCATION IN IRSPNS(80) CORRESPONDING TO THE RIGHTM0177
                     DIGIT FOUND TO THE LEFT OF A DECIMAL POINT (IN A  0177
                     F.P. NUMBER), OR, THE ABSOLUTE RIGHTMOST DIGIT IN 0177
                     AN INTEGER RESPONSE                              0177
          ILDIG2  -  LOCATION IN IRSPNS(80) CORRESPONDING TO THE RIGHTM0177
                     DIGIT FOUND TO THE RIGHT OF A DECIMAL POINT      0177
          LDECPT  -  LOCATION IN IRSPNS(80) OF THE DECIMAL POINT, IF AN0178
           NDIG1  -  NUMBER OF DIGITS FOUND TO THE LEFT OF A DECIMAL PO0178
                     (IF ANY), OR, NUMBER OF DIGITS IN AN INTEGER RESPO0178
           NDIG2  -  NUMBER OF DIGITS FOUND TO THE RIGHT OF A DECIMAL P0178
                     (IF ANY)                                         0178
                                                                      0178
------------------------------------------------------------------------0178
                                                                      0178
      DIMENSION NUM(10),IRSPNS(80)                                    0178
      DATA NUM/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/               0178
      DATA IPLUS,MINUS,IBLANK,IPOINT/1H+,1H-,1H ,1H./                 0179
                                                                      0179
  READ IN USERS KEYBOARD RESPONSE                                     0179
                                                                      0179
    1 ITYPE = 5                                                       0179
      DO 2 J=1,80                                                     0179
    2 IRSPNS(J) = IBLANK                                              0179
      READ(5,5001)(IRSPNS(I),I=1,80)                                  0179
 5001 FORMAT(80A1)                                                    0179
      IF(EOF(5)) 900,5                                                0179
              INFORMATION READ                                        0180
    5 WRITE(6,5002) (IRSPNS(I), I=1,80)                               0180
 5002 FORMAT(/1X,2H? ,80A1)                                           0180
                                                                      0180
  INITIALIZE VARIABLES AND FLAGS                                      0180
                                                                      0180
      IDIG   = 0                                                      0180
```

```
      NDIG1  = 0                                                        0180
      NDIG2  = 0                                                        0180
      IDECPT = 0                                                        0180
      IFIRST = 0                                                        0181
      ILAST  = 0                                                        0181
      ISIGN  = +1                                                       0181
      IVALUE = 0                                                        0181
      FVALUE = 0.                                                       0181
      VALUE1 = 0.                                                       0181
      VALUE2 = 0.                                                       0181
      I      = 1                                                        0181
                                                                        0181
C     FIND FIRST NON-BLANK CHARACTER IN USER RESPONSE.  IF WE FALL THROUGH 0181
C     THE LOOP, INPUT CONSISTED ENTIRELY OF A BLANK LINE.               0182
                                                                        0182
10    ICHAR = IRSPNS(I)                                                 0182
      IF(ICHAR.NE.IBLANK) GO TO 20                                      0182
      I = I + 1                                                         0182
      IF(I.LE.80) GO TO 10                                              0182
      ITYPE = 4                                                         0182
      RETURN                                                            0182
                                                                        0182
C     A NON-BLANK CHARACTER WAS FOUND.  CHECK AGAINST 4 POSSIBILITIES - A 0182
C     SIGN (+ OR -), A DECIMAL POINT, A DIGIT, OR OTHERWISE.            0183
                                                                        0183
                                                                        0183
                                                                        0183
C     CHECK FOR A SIGN FIRST.  IF FOUND, SET THE FLAG ISIGN AND RETURN TO 0183
C     CONTINUE SCANNING THE REST OF THE RESPONSE FOR A NON-BLANK CHARACTER 0183
                                                                        0183
20    IF(ICHAR.NE.IPLUS) GO TO 30                                       0183
      I = I + 1                                                         0183
      IF(I.LE.80) GO TO 10                                              0183
      ITYPE = 6                                                         0184
      GO TO 900                                                         0184
30    IF(ICHAR.NE.MINUS) GO TO 40                                       0184
      ISIGN = -1                                                        0184
      I = I + 1                                                         0184
      IF(I.LE.80)GO TO 10                                               0184
      ITYPE = 6                                                         0184
      GO TO 900                                                         0184
                                                                        0184
C     CHECK FOR A DECIMAL POINT (WITH NO DIGITS TO THE LEFT OF IT).  IF THI0184
C     SHOULD BE THE CASE, SET FLAGS AND BRANCH OFF TO SCAN THE REST OF THE 0185
C     NUMBER (FRACTIONAL PART OF FLOATING POINT NUMBER).                0185
                                                                        0185
40    IF(ICHAR.NE.IPOINT) GO TO 50                                      0185
      LDECPT = I                                                        0185
      IDECPT = 1                                                        0185
      NDIG1  = 0                                                        0185
      GO TO 200                                                         0185
                                                                        0185
C     CHECK FOR AN INITIAL DIGIT.  IF THIS SHOULD BE THE CASE, BRANCH OFF T0185
C     SCAN THE REST OF THE NUMBER (COULD BE INTEGER OR FLOATING POINT)  0186
                                                                        0186
50    DO 60 J=1,10                                                      0186
      IF(ICHAR.EQ.NUM(J)) IDIG = 1                                      0186
60    CONTINUE                                                          0186
      IF(IDIG.NE.1) GO TO 70                                            0186
      NDIG1 = 1                                                         0186
      IFDIG1 = I                                                        0186
      GO TO 100                                                         0186
```

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C                                                                       0186
C  APPARENTLY, RESPONSE IS A CHARACTER STRING (FIRST NON-BLANK CHARACTER0187
C  WAS NEITHER A SIGN, A DECIMAL POINT NOR A DIGIT).  MARK POSITION OF  0187
C  THE FIRST CHARACTER AND SCAN FROM THE END TO FIND THE LAST NON-BLANK 0187
C  CHARACTER.  PASS THESE RESULTS BACK TO THE CALLING ROUTINE.          0187
C                                                                       0187
   70 IFIRST = I                                                        0187
      ITYPE = 3                                                         0187
      J = 81                                                            0187
   80 J = J - 1                                                         0187
      ILAST = J                                                         0187
      IF(J.EQ.I) GO TO 900                                              0188
      ICHAR = IRSPNS(J)                                                 0188
      IF(ICHAR.EQ.IBLANK) GO TO 80                                      0188
      GO TO 900                                                         0188
C                                                                       0188
C-----------------------------------------------------------------------0188
C                                                                       0188
C  AT THIS POINT, AN INITIAL DIGIT HAS BEEN FOUND, BUT THE USER RESPONSE0188
C  COULD STILL BE EITHER INTEGER OR FLOATING POINT (OR UNRECOGNIZABLE). 0188
C  CONTINUE SCANNING THE RESPONSE UNTIL A DISCRIMINATION CAN BE MADE.   0188
C                                                                       0189
  100 IDIG = 0                                                          0189
      I = I + 1                                                         0189
      IF(I.GT.80) GO TO 120                                             0189
      ICHAR = IRSPNS(I)                                                 0189
      DO 110 J=1,10                                                     0189
      IF(ICHAR.EQ.NUM(J)) IDIG = 1                                      0189
  110 CONTINUE                                                          0189
      IF(IDIG.NE.1) GO TO 120                                           0189
C                                                                       0189
C  NEXT CHARACTER WAS A DIGIT - UPDATE STATUS FLAGS AND CONTINUE SCAN    0190
C                                                                       0190
      NDIG1 = NDIG1 + 1                                                 0190
      ILDIG1 = I                                                        0190
      GO TO 100                                                         0190
C                                                                       0190
C  NEXT CHARACTER WAS NOT A DIGIT.  CHECK FOR A DECIMAL POINT - IF FOUND0190
C  IMPLIES USER RESPONSE IS A FLOATING POINT NUMBER, IN WHICH CASE BRANC0190
C  OFF TO SCAN FOR DIGITS TO THE RIGHT OF THE DECIMAL POINT (FRACTIONAL 0190
C                                                                       0190
  120 IF(ICHAR.NE.IPOINT) GO TO 130                                     0191
      IDECPT = 1                                                        0191
      LDECPT = I                                                        0191
      ILDIG1 = I - 1                                                    0191
      IFDIG2 = I + 1                                                    0191
      ITYPE = 1                                                         0191
      GO TO 200                                                         0191
C                                                                       0191
C  CHARACTER WAS NOT A DIGIT OR A DECIMAL POINT.  CHECK TO SEE IF IT WAS0191
C  BLANK (INTEGER TERMINATOR) - IF SO, WE CAN NOW BRANCH OFF AND DECODE 0191
C  INTEGER VALUE; IF NOT, RESPONSE IS UNRECOGNIZABLE.                   0192
C                                                                       0192
  130 IF(ICHAR.NE.IBLANK) GO TO 140                                     0192
      ILDIG1 = I - 1                                                    0192
      ITYPE = 0                                                         0192
      GO TO 300                                                         0192
  140 ITYPE = 6                                                         0192
      GO TO 900                                                         0192
C                                                                       0192
C-------------------------------- 77 --------------------------------0192
C                                                                       0193
```

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C THIS SECTION OF LOGIC IS ENTERED TO FIND ANY DIGITS TO THE RIGHT OF  0193
C THE DECIMAL POINT IN A FLOATING POINT NUMBER.                        0193
C                                                                      0193
  200 IDIG = 0                                                         0193
      I = I + 1                                                        0193
      IF(I.GT.80) GO TO 300                                            0193
      ICHAR = IRSPNS(I)                                                0193
      DO 210 J=1,10                                                    0193
      IF(ICHAR.EQ.NUM(J)) IDIG = 1                                     0193
  210 CONTINUE                                                         0194
      IF(IDIG.NE.1) GO TO 220                                          0194
      NDIG2 = NDIG2 + 1                                                0194
      ILDIG2 = I                                                       0194
      GO TO 200                                                        0194
C                                                                      0194
C CHARACTER WAS NOT A DIGIT - CHECK FOR A BLANK (FLOATING POINT TERMINA0194
C IF FOUND, BRANCH OFF TO DECODE THE FLOATING POINT VALUE; IF NOT, RESP0194
C IS UNRECOGNIZABLE                                                    0194
C                                                                      0194
  220 IF(ICHAR.NE.IBLANK) GO TO 240                                    0195
C                                                                      0195
C TERMINATING BLANK CHARACTER WAS FOUND.  CHECK TO MAKE SURE RESPONSE D0195
C NOT CONSIST SIMPLY OF A DECIMAL POINT (NO DIGITS ON EITHER SIDE)     0195
C                                                                      0195
      IF((NDIG1.EQ.0).AND.(NDIG2.EQ.0)) GO TO 240                      0195
      ITYPE = 1                                                        0195
      ILDIG2 = I - 1                                                   0195
      GO TO 300                                                        0195
  240 ITYPE = 6                                                        0195
      GO TO 900                                                        0196
C                                                                      0196
C----------------------------------------------------------------------0196
C                                                                      0196
C THIS SECTION OF LOGIC DECODES THE VALUE OF A FLOATING POINT OR INTEGE0196
C NUMBER FROM THE INDIVIDUAL DIGITS AND THE ORDER IN WHICH THEY OCCUR. 0196
C                                                                      0196
  300 IF(IDECPT.EQ.1) GO TO 400                                        0196
      ITYPE = 0                                                        0196
      IF(NDIG1.LE.5) GO TO 310                                         0196
      WRITE(6,6001)                                                    0197
 6001 FORMAT(5X,17HINTEGER TOO LARGE)                                  0197
      ITYPE = 6                                                        0197
      GO TO 900                                                        0197
C                                                                      0197
C INTEGER DECODE LOGIC                                                 0197
C                                                                      0197
  310 DO 320 J=IFDIG1,ILDIG1                                           0197
      ICHAR = IRSPNS(J)                                                0197
      DO 320 K=1,10                                                    0197
      IF(ICHAR.NE.NUM(K)) GO TO 320                                    0198
      IVALUE = IVALUE * 10 + K - 1                                     0198
  320 CONTINUE                                                         0198
      IVALUE = ISIGN * IVALUE                                          0198
      GO TO 900                                                        0198
C                                                                      0198
C FLOATING POINT DECODE LOGIC (USES INTEGER DECODE LOGIC TO            C 98
C OBTAIN VALUES OF LEFT AND RIGHT-HAND "INTEGERS")                     0198
C                                                                      0198
  400 ITYPE = 1                                                        0198
      IF(NDIG1.EQ.0) GO TO 450                                         0199
      DO 420 J=IFDIG1,ILDIG1                                           0199
      ICHAR = IRSPNS(J)                                                0199
```

```
      DO 420 K=1,10                                                     0199
      IF(ICHAR.NE.NUM(K)) GO TO 420                                     0199
      IVALUE = IVALUE * 10 + K - 1                                      0199
  420 CONTINUE                                                          0199
      VALUE1 = IVALUE                                                   0199
      IVALUE = 0                                                        0199
                                                                        0199
  450 IF(NDIG2.EQ.0) GO TO 500                                          0200
      DO 460 J=IFDIG2,ILDIG2                                            0200
      ICHAR = IRSPNS(J)                                                 0200
      DO 460 K=1,10                                                     0200
      IF(ICHAR.NE.NUM(K)) GO TO 460                                     0200
      IVALUE = IVALUE * 10 + K - 1                                      0200
  460 CONTINUE                                                          0200
      VALUE2 = IVALUE                                                   0200
                                                                        0200
  500 FVALUE = VALUE1 + VALUE2 / (10**NDIG2)                            0200
      FVALUE = ISIGN * FVALUE                                           0201
                                                                        0201
   CHECK THAT RESPONSE IS APPROPRIATE - IF NOT, USER MUST RE-INPUT      0201
                                                                        0201
  900 IF(ITYPE.EQ.IDESIR) RETURN                                        0201
                                                                        0201
 ===PUT IN DESCRIPTIVE MESSAGES TO ALERT USER===                        0201
                                                                        0201
      GO TO 1                                                           0201
      END                                                               0201
      SUBROUTINE ORBTR                                                  0202
                                                                        0202
      ****************************************************************  0202
      *                                                              *  0202
      *  S H U T T L E   O R B I T E R   B L O C K   D A T A         *  0202
      *                                                              *  0202
      ****************************************************************  0202
                                                                        0202
     THIS ROUTINE SETS UP THE STS ORBITER CONFIGURATION BY DEFINING      0202
     GEOMETRIC SURFACES,THEIR IDENTIFICATION NUMBERS, LOCATION, MATERIAL0202
     AND AREA.                                                          0203
       IDENT    = SURFACE IDENTIFICATION NUMBER (1-999)                 0203
       SECT     = ORBITER/SPACELAB GEOMETRIC SUBSECTION                 0203
          RADOOR= RADIATOR DOOR                                         0203
          BAY   = PAYLOAD BAY LINER, SIDE STRIPS, BULKHEADS             0203
          TAIL  = TAILFIN                                               0203
          CREW  = NOSE,CREW SECTION                                     0203
          WING  = WINGS                                                 0203
          FUSLAG= FUSELAGE                                              0203
          OMS   = OMS PODS                                              0203
          FILTER =OVERBOARD/INBOARD FILTERS                             0204
        MATRL    = SURFACE MATERIAL                                     0204
          LINER = PAYLOAD BAY LINER                                     0204
          BLKHED= FORE AND AFT BAY BULKHEADS                            0204
          TEFLON= TEFLON                                                0204
          LRSI  = LOW TEMP RSI                                          0204
          HRSI  = HIGH TEMP RSI                                         0204
          NOMEX = PAINTED FELT                                          0204
          RCC   = CARBON                                                0204
          CRACKS= LEAKING SURFACE                                       0204
          WINDOW= CABIN WINDOWS                                         0205
          FILI  = INBOARD FILTERS                                       0205
          FILO  = OVERBOARD FILTERS                                     0205
        AREA    = SURFACE AREA IN SQUARE INCHES                         0205
                                                                        0205
```

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C=====================================================================0205
C                                                                     0205
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    0205
     +                 MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,    0205
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,    0205
     +               MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70) 0206
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),0206
     +                ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),0206
     +                    SERIES,      NEWDAT,      ADSURF,      NNEWPL,0206
     +                    JTOTAL,      KTOTAL.      NORBPL,  ISURF(300),0206
     +               ISSURF(300)                                        0206
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                     0206
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),      0206
     +               AGECRB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,    0206
     +                   M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,    0206
     +               TIMEGO                                             0207
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,    0207
     +                 SUNM,   SUNH                                     0207
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),    0207
     +               ALPHA(25),      BETA(25),      GAMMA(25)          0207
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),     0207
     +              DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),     0207
     +              DOMEGA(25),     DS(25),       RMAX,     NTHETA,     0207
     +                   NPHI                                          0207
      COMMON /TEMPS/ TEMP(2000)                                         0207
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0208
     +                   CZLOC(50),    CTHETA(50),  CPHI(50).         0208
     +                  CIDENT(50)                                     0208
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                 0208
      COMMON /SURFS/IDENT(300), AREA(300)                               0208
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),       0208
     +             KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),      0208
     +            MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),      0208
     +            NPLUME(25)                                          0208
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,     0208
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),  0209
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),          0209
     +               CHPLUM(10,25), CHMF(10,25)                         0209
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),      0209
     +                  INDXJT,    INDXKT                              0209
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),          0209
     +             NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),          0209
     +             NUPLAC(6,30),  NUNPLM(6,25)                         0209
C                                                                     0209
      REAL ONTIME, MACH, MOLWT                                          0209
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,   0210
     +        PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,    0210
     +         CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL             0210
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    MCD,   0210
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,   0210
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,   0210
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,   0210
     +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,   0210
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,   0210
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL    0210
C                                                                     0211
C=====================================================================0211
      DIMENSION IORB1(190),IORB2(190),IORB3(190),XORB4(190)             0211
C                                                                     0211
C***** CURRENTLY THERE ARE 190 SURFACES USED IN THE ORBITER MODEL      0211
C                                                                     0211
      DATA (IORB1(I),I=1,100)                                           0211
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     1   /  20,  22,  24,  26,  30,  32,  34,  36,  40,  42,                0211
     2       44,  46,  50,  52,  54,  56,  21,  23,  25,  27,                0211
     3       31,  33,  35,  37,  41,  43,  45,  47,  51,  53,                0211
     4       55,  57, 202, 203, 230, 240, 241, 250, 260, 301,                0212
     5      305, 306, 307, 311, 315, 316, 317, 420, 425,  60,                0212
     6       62,  64,  66,  67,  68,  70,  72,  74,  76,  77,                0212
     7       80,  82,  84,  86,  87,  88,  90,  92,  94,  96,                0212
     8       97, 100, 102, 104, 110, 112, 115, 117, 118, 119,                0212
     9      121, 122, 130, 132, 134, 140, 142, 145, 147, 148,                0212
     *      149, 151, 152, 106, 107, 136, 137, 450, 451, 452 /               0212
      DATA (IORB1(I),I=101,190)                                              0212
     1   / 453, 454, 455, 456, 457, 458, 459, 460, 461, 462,                0212
     2       463, 464, 465, 466, 467, 468, 469, 160, 161, 162,              0212
     3       163, 164, 165, 166, 167, 168, 169, 170, 171, 172,              0213
     4       174, 175, 177, 180, 181, 182, 183, 184, 185, 190,              0213
     5       380, 381, 382, 383, 384, 385, 386, 387, 388, 389,              0213
     6       390, 391, 392, 393, 399,   1,   2,   3,   4,   5,             0213
     7         6,   7,   8,  11,  13, 440, 441, 442, 443, 445,              0213
     8       446, 447, 448, 570, 571, 572, 573, 580, 581, 582,              0213
     9       583, 575, 576, 577, 578, 585, 586, 587, 588,  13 /             0213
                                                                            0213
      DATA (IORB2(I),I=1,50)                                                0213
     1   / 6HRADOOR, 6HRADOOR, 6HRADOOR, 6HRADOOR, 6HRADOOR,                0213
     2       6HRADOOR, 6HRADOOR, 6HRADOOR, 6HRADOOR, 6HRADOOR,              0214
     3       6HRADOOR, 6HRADOOR, 6HRADOOR, 6HRADOOR, 6HRADOOR,              0214
     4       6HRADOOR, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG,              0214
     5       6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG,              0214
     6       6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG,              0214
     7       6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG,              0214
     8       6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG,              0214
     9       6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG,              0214
     *       6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6HFUSLAG, 6H   OMS /             0214
      DATA (IORB2(I),I=51,100)                                              0214
     1   / 6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS,                0215
     2       6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS,              0215
     3       6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS,              0215
     4       6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS, 6H   OMS,              0215
     5       6H   OMS, 6H  WING, 6H  WING, 6H  WING, 6H  WING,              0215
     6       6H  WING, 6H  WING, 6H  WING, 6H  WING, 6H  WING,              0215
     7       6H  WING, 6H  WING, 6H  WING, 6H  WING, 6H  WING,              0215
     8       6H  WING, 6H  WING, 6H  WING, 6H  WING, 6H  WING,              0215
     9       6H  WING, 6H  WING, 6H  WING, 6HELEVON, 6HELEVON,              0215
     *       6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON /             0215
      DATA (IORB2(I),I=101,150)                                             0216
     1   / 6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON,                0216
     2       6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON,              0216
     3       6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON, 6HELEVON,              0216
     4       6HELEVON, 6HELEVON, 6H  CREW, 6H  CREW, 6H  CREW,              0216
     5       6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW,              0216
     6       6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW,              0216
     7       6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW,              0216
     8       6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW, 6H  CREW,              0216
     9       6H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL,              0216
     *       6H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL /             0216
      DATA (IORB2(I),I=151,190)                                             0217
     1   /  H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL, 6H  TAIL,      0217
     2       6H   BAY, 6H   BAY, 6H   BAY, 6H   BAY, 6H   BAY,              0217
     3       6H   BAY, 6H   BAY, 6H   BAY, 6H   BAY, 6H   BAY,              0217
     4       6H   BAY, 6H   BAY, 6H   BAY, 6H   BAY, 6H   BAY,              0217
     5       6H   BAY, 6H   BAY, 6H   BAY, 6HFILTER, 6HFILTER,              0217
     6       6HFILTER, 6HFILTER, 6HFILTER, 6HFILTER, 6HFILTER,              0217
     7       6HFILTER, 6HFILTER, 6HFILT 31 6HFILTER, 6HFILTER,              0217
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8    6HFILTER, 6HFILTER, 6HFILTER, 6HFILTER, 6H  BAYL /                  0217
                                                                         0218
 DATA (IORB3(I),I=1,50)                                                  0218
1  / 6HTEFLON, 6HTEFLON, 6HTEFLON, 6HTEFLON, 6HTEFLON,                   0218
2    6HTEFLON, 6HTEFLON, 6HTEFLON, 6HTEFLON, 6HTEFLON,                   0218
3    6HTEFLON, 6HTEFLON, 6HTEFLON, 6HTEFLON, 6HTEFLON,                   0218
4    6HTEFLON, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0218
5    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0218
6    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0218
7    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0218
8    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0218
9    6H  LRSI, 6H NOMEX, 6H NOMEX, 6H  LRSI, 6H  LRSI,                   0219
*    6H NOMEX, 6H NOMEX, 6H  LRSI, 6H  LRSI, 6H  LRSI /                  0219
 DATA (IORB3(I),I=51,100)                                                0219
1  / 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0219
2    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0219
3    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0219
4    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0219
5    6H  LRSI, 6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX,                   0219
6    6H NOMEX, 6H  LRSI, 6H  HRSI, 6H  HRSI, 6H  LRSI,                   0219
7    6H   RCC, 6H   RCC, 6H NOMEX, 6H NOMEX, 6H NOMEX,                   0219
8    6H NOMEX, 6H NOMEX, 6H  LRSI, 6H  HRSI, 6H  HRSI,                   0220
9    6H  LRSI, 6H   RCC, 6H   RCC, 6H NOMEX, 6H NOMEX,                   0220
*    6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX /                  0220
 DATA (IORB3(I),I=101,150)                                               0220
1  / 6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX,                   0220
2    6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX,                   0220
3    6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX, 6H NOMEX,                   0220
4    6H NOMEX, 6H NOMEX, 6H   RCC, 6H  LRSI, 6H  LRSI,                   0220
5    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  HRSI,                   0220
6    6H  HRSI, 6H  HRSI, 6H  HRSI, 6H  HRSI, 6H  HRSI,                   0220
7    6H  LRSI, 6H  LRSI, 6H  LRSI, 6HWINDOW, 6HWINDOW,                   0221
8    6HWINDOW, 6HWINDOW, 6HWINDOW, 6HWINDOW, 6H  LRSI,                   0221
9    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI,                   0221
*    6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI /                  0221
 DATA (IORB3(I),I=151,190)                                               0221
1  / 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  LRSI, 6H  HRSI,                   0221
2    6H LINER, 6H LINER, 6H LINER, 6H LINER, 6H LINER,                   0221
3    6H LINER, 6H LINER, 6H LINER, 6HBLKHED, 6HBLKHED,                   0221
4    6H LINER, 6H LINER, 6H LINER, 6H LINER, 6H LINER,                   0221
5    6H LINER, 6H LINER, 6H LINER, 6H  FILI, 6H  FILI,                   0221
6    6H  FILI, 6H  FILI, 6H  FILI, 6H  FILI, 6H  FILI,                   0222
7    6H  FILI, 6H  FILO, 6H  FILO, 6H  FILO, 6H  FILO,                   0222
8    6H  FILO, 6H  FILO, 6H  FILO, 6H  FILO, 6HCRACKS /                  0222
                                                                         0222
 DATA (XORB4(I),I=1,50)                                                  0222
1  /  12200.,   12200.,   12200.,   12200.,   12200.,                   0222
2     12200.,   12200.,   12200.,   25580.,   25580.,                   0222
3     25580.,   25580.,   25580.,   25580.,   25580.,                   0222
4     25580.,   12200.,   12200.,   12200.,   12200.,                   0222
5     12200.,   12200.,   12200.,   12200.,   25580.,                   0222
6     25580.,   25580.,   25580.,   25580.,   25580.,                   0223
7     25580.,   25580.,   32520.,   32520.,   25730.,                   0223
8     16340.,   16340.,   19580.,   20240.,   26600.,                   0223
9     30930.,   30930.,   24770.,   26600.,   30930.,                   0223
*     30930.,   24770.,    1312.,    1312.,    1145.  /                  0223
 DATA (XORB4(I),I=51,100)                                                0223
1 /    7850.,   37920.,    1991.,    2028.,     415.,                   0223
2       895.,    1406.,    1312.,     715.,     600.,                   0223
3      1145.,    7813.,   37740.,    1991.,    2028.,                   0223
4       415.,     895.,    1406.,    1312.,     715.,                   0223
5       601.,    6356.,   29590.,    9125.,   23340.,                   0224
```

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     6     19280.,   19280.,    5650.,    2508.,    3302.,                0224
     7      2251.,    3123.,    6356.,   29590.,    9125.,                0224
     8     23340.,   19280.,   19280.,    5650.,    2508.,                0224
     9      3302.,    2251.,    3123.,    6499.,   17210.,                0224
     *      6499.,    9125.,     138.,     415.,     692.  /               0224
      DATA (XORB4(I),I=101,150)                                            0224
     1  /    960.,    1246.,    1523.,    1800.,    2076.,                0224
     2      2353.,    2630.,     138.,     415.,     692.,                0224
     3       969.,    1246.,    1523.,    1800.,    2076.,                0224
     4      2353.,    2630.,    7191.,    9348.,    9348.,                0225
     5      3380.,    3380.,    4253.,    4253.,   12590.,                0225
     6     12590.,    9600.,    9600.,    3705.,    3705.,                0225
     7     20720.,   10150.,   10150.,    1424.,    1424.,                0225
     8      1424.,    1424.,    1424.,    1424.,   10250.,                0225
     9     16920.,   16920.,    8833.,    8833.,   13940.,                0225
     *     13940.,    6116.,    6116.,    2744.,    2744.  /              0225
      DATA (XORB4(I),I=151,190)                                            0225
     1  /    1160.,    1160.,    3081.,    3081.,    3823.,                0225
     2     26620.,   26620.,   26620.,   26620.,   26620.,                0225
     3     26620.,   26620.,   26620.,   32690.,   32690.,                0226
     4      3444.,    3444.,    3444.,    3444.,    3444.,                0226
     5      3444.,    3444.,    3444.,     207.,     207.,                0226
     6       207.,     207.,     207.,     207.,     207 ,                0226
     7       207.,     144.,     144.,     144.,     144.,                0226
     8       144.,     144.,     144.,     144.,   32690.  /               0226
                                                                           0226
LOAD ALL OF THE ABOVE ORBITER DATA INTO THE PROPER ARRAYS                  0226
                                                                           0226
      II = 0                                                               0226
      DO 40 I=1,190                                                        0227
      II = II + 1                                                          0227
      IDENT(II) = IORB1(I)                                                 0227
      SECT(II)  = IORB2(I)                                                 0227
      MATRL(II) = IORB3(I)                                                 0227
      AREA(II)  = XORB4(I)                                                 0227
      IF(MATRL(II).NE.6HCRACKS) GO TO 30                                   0227
      IF(LEAK) GO TO 30                                                    0227
      II = II - 1                                                          0227
      GO TO 35                                                             0227
   30 CONTINUE                                                             0227
      IF((SECT(II).NE.6H   BAY).AND.(SECT(II).NE.6H  BAYL).AND.            0228
     +(SECT(II).NE.6HFILTER)) GO TO 35                                     0228
      IF(PAYLOD) II = II - 1                                               0228
   35 CONTINUE                                                             0228
   40 CONTINUE                                                             0228
                                                                           0228
      JTOTAL = II                                                          0228
                                                                           0228
                                                                           0228
      DO 100 I=1,JTOTAL                                                    0228
      SSURFS(I) = IDENT(I)                                                 0228
  100 SURFSC(I) = IDENT(I)                                                 0229
      RETURN                                                               0229
      END                                                                  0229
      SUBROUTINE LMOPX                                                     0229
                                                                           0229
      ************************************                                 0229
      *                                  *                                 0229
      *  L M O P   B L O C K   D A T A   *                                 0229
      *                                  *                                 0229
      ************************************                                 0229
                                                                           0230
      RETURN                                                               0230
```

```
      END                                                                0230
      SUBROUTINE SMTPX                                                   0230
                                                                         0230
      ************************************                               0230
      *                                  *                               0230
      *  S M T P   B L O C K   D A T A   *                               0230
      *                                  *                               0230
      ************************************                               0230
                                                                         0231
      RETURN                                                             0231
      END                                                                0231
      SUBROUTINE FIVPX                                                   0231
                                                                         0231
      ************************************                               0231
      *                                  *                               0231
      *  F I V P   B L O C K   D A T A   *                               0231
      *                                  *                               0231
      ************************************                               0231
                                                                         0232
      RETURN                                                             0232
      END                                                                0232
      SUBROUTINE P801X                                                   0232
                                                                         0232
      ************************************                               0232
      *                                  *                               0232
      *  P 8 0 1   B L O C K   D A T A   *                               0232
      *                                  *                               0232
      ************************************                               0232
                                                                         0233
      RETURN                                                             0233
      END                                                                0233
      SUBROUTINE DSPIUX                                                  0233
                                                                         0233
      ****************************************                           0233
      *                                      *                           0233
      *  D S P / I U S   B L O C K   D A T A *                           0233
      *                                      *                           0233
      ****************************************                           0233
                                                                         0234
      RETURN                                                             0234
      END                                                                0234
      SUBROUTINE INIT                                                    0234
                                                                         0234
      ********************************************************************0234
      *                                                                  *0234
      *  P R E P R O C E S S O R   I N I T I A L I Z A T I O N           *0234
      *                                                                  *0234
      ********************************************************************0235
                                                                         0235
=========================================================================0235
                                                                         0235
       COMMON /CNTRL/ ORBITR, PAYLOD,     OUT,      ED,    LEAK,   PLUME,  0235
     +                   MCD, DIRECT,   RFAS2,    RFSS, REFLCT, NRFLCT,  0235
     +                NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,     0235
     +                MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70)  0235
       COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),0235
     +                 ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),0235
     +                     SERIES,      NEWDAT,      ADSURF,      NNEWPL,0236
     +                     JTOTAL,      KTOTAL,      NORBPL,  ISURF(300),0236
     +                ISSURF(300)                                         0236
       COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP  CHNGPL                      0236
       COMMON /RATES/ RATE(25,10), TAU(25,10                 TSTART(3), TSTOP(3),  0236
```

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     +                AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,     0236
     +                    M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,     0236
     +                TIMEOO                                               0236
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,     0236
     +                  SUNM,   SUNH                                       0236
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, X0(25), Y0(25), Z0(25),      0237
     +               ALPHA(25),       BETA(25),       GAMMA(25)           0237
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),       0237
     +              DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),       0237
     +              DOMEGA(25),     DS(25),       RMAX,     NTHETA,      0237
     +                   NPHI                                              0237
      COMMON /TEMPS/ TEMP(2000)                                           0237
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),0237
     +                   CZLOC(50),    CTHETA(50),  CPHI(50),            0237
     +                  CIDENT(50)                                        0237
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                   0238
      COMMON /SURFS/IDENT(300), AREA(300)                                 0238
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),         0238
     +             KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),         0238
     +            MATRL(300),     NAMEPL,   CLOC(50),  CTYPE(50),         0238
     +            NPLUME(25)                                              0238
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,       0238
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),    0238
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),            0238
     +               CHPLUM(10,25), CHMF(10,25)                           0238
      COMMON/INDX/   INDXSP(25), INDXK(25), INDXP(30), INDXPL(25),        0239
     +                  INDXJT,   INDXKT                                  0239
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300), NNULOC(6,50),            0239
     +             NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),             0239
     +             NUPLAC(6,30),  NUNPLM(6,25)                            0239
                                                                          0239
      REAL ONTIME, MACH, MOLWT                                            0239
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,     0239
     +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,     0239
     +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL              0239
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    MCD,     0240
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,     0240
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,     0240
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,     0240
     +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,     0240
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,     0240
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL     0240
                                                                          0240
     ================================================================================0240
                                                                          0240
      ORBITR=.TRUE.                                                       0241
      PAYLOD=.FALSE.                                                      0241
      OUT=.TRUE.                                                          0241
      ED=.FALSE.                                                          0241
      LEAK=.FALSE.                                                        0241
      PLUME=.FALSE.                                                       0241
      MCD=.TRUE.                                                          0241
      DIRECT=.FALSE.                                                      0241
      RFAS2=.FALSE.                                                       0241
      RFSS=.FALSE.                                                        0241
      REFLCT=.FALSE.                                                      0241
      NRFLCT=1                                                            0242
      NEWCON=.FALSE.                                                      0242
      NTAPE4=.FALSE.                                                      0242
      NEWTCD=.FALSE.                                                      0242
      NEWTNL=.FALSE.                                                      0242
      NEWMFS=.FALSE.                                                      0242
```

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      NEWMFP=.FALSE.                                                    0242
      MINTMP=.FALSE.                                                    0242
      MAXTMP=.TRUE.                                                     0242
      ATCODE=0                                                          0243
                                                                        0243
      DO 100 I=1,300                                                    0243
      SURFSC(I)=0                                                       0243
      SSURFS(I)=0                                                       0243
      ISURF(I)=0                                                        0243
      ISSURF(I)=0                                                       0243
  100 CONTINUE                                                          0243
      DO 110 I=1,30                                                     0243
      PNTSC(I)=0                                                        0243
      NEWPL(I)=.FALSE.                                                  0244
      ONTIME(I)=0.0                                                     0244
  110 CONTINUE                                                          0244
      DO 120 I=1,25                                                     0244
      RECEVR(I)=0                                                       0244
      FOVANG(I)=180.                                                    0244
  120 CONTINUE                                                          0244
      ICCODE=0                                                          0244
      SERIES=1000                                                       0244
                                                                        0244
      CHNGES=0                                                          0245
      CHNGEK=0                                                          0245
      CHNGEP=0                                                          0245
      CHNGPL=0                                                          0245
      MACH=1.0                                                          0245
                                                                        0245
      ALT=400.                                                          0245
      SUNL=.FALSE.                                                      0245
      SUNM=.TRUE.                                                       0245
      SUNH=.FALSE.                                                      0245
      VA=7650.                                                          0246
      PITCH=0.                                                          0246
      YAW=0.                                                            0246
      ROLL=0.                                                           0246
      DO 150 I=1,25                                                     0246
      X0(I)=1107.                                                       0246
      Y0(I)=0.                                                          0246
      Z0(I)=507.                                                        0246
      ALPHA(I)=0.                                                       0246
      BETA(I)=0.                                                        0246
      GAMMA(I)=0.                                                       0247
      THETA1(I)=0.                                                      0247
      THETA2(I)=10.24                                                   0247
      PHI1(I)=0.                                                        0247
      PHI2(I)=360.                                                      0247
      DTHETA(I)=10.24                                                   0247
      DPHI(I)=45.                                                       0247
  150 CONTINUE                                                          0247
      THETAL(1)=0.0                                                     0247
      DO 160 I=1,8                                                      0247
      I1=I+1                                                            0248
      I2=I+9                                                            0248
      I3=I+17                                                           0248
      THETAL(I1)=30.                                                    0248
      THETAL(I2)=60.                                                    0248
      THETAL(I3)=82.5                                                   0248
  160 CONTINUE                                                          0248
      PHIL(1)=0.0                                                       0248
      DO 170 I=1,3                                                      0248
```

```
      I1 = 2 + 8 * (I - 1)                                              0248
      I2 = 3 + 8 * (I - 1)                                              0249
      I3 = 4 + 8 * (I - 1)                                              0249
      I4 = 5 + 8 * (I - 1)                                              0249
      I5 = 6 + 8 * (I - 1)                                              0249
      I6 = 7 + 8 * (I - 1)                                              0249
      I7 = 8 + 8 * (I - 1)                                              0249
      I8 = 9 + 8 * (I - 1)                                              0249
      PHIL(I1)=0.0                                                      0249
      PHIL(I2)=45.0                                                     0249
      PHIL(I3)=90.0                                                     0249
      PHIL(I4)=135.0                                                    0249
      PHIL(I5)=180.0                                                    0250
      PHIL(I6)=225.0                                                    0250
      PHIL(I7)=270.0                                                    0250
      PHIL(I8)=315.0                                                    0250
  170 CONTINUE                                                          0250
                                                                        0250
      RETURN                                                            0250
      END                                                               0250
      SUBROUTINE TEACH                                                  0250
                                                                        0250
      ************************************************************      0251
      *                                                          *      0251
      *  P R E P R O C E S S O R   I N S T R U C T I O N S       *      0251
      *                                                          *      0251
      ************************************************************      0251
                                                                        0251
                                                                        0251
      RETURN                                                            0251
      END                                                               0251
      SUBROUTINE MATLX                                                  0251
                                                                        0252
      ****************************************************************  0252
      *                                                              *  0252
      *  M A T E R I A L S / S P E C I E S   B L O C K   D A T A     *  0252
      *                                                              *  0252
      ****************************************************************  0252
                                                                        0252
      RETURN                                                            0252
      END                                                               0252
      SUBROUTINE PLUMEX                                                 0252
                                                                        0253
      ********************************************************************0253
      *                                                                  0253
      *  O R B I T E R   P O I N T   S O U R C E   B L O C K   D A T A   0253
      *                                                                  0253
      ********************************************************************0253
                                                                        0253
                                                                        0253
  THIS ROUTINE LOADS IN EXISTING INFORMATION NEEDED TO EVALUATE         0253
  ENGINES/VENTS.  10 SPECIES CAN BE TRACED IN THE CLOUD AROUND THE      0254
  SPACECRAFT.                                                           0254
                                                                        0254
                                                                        0254
  SPECIE,M                          ENG          EVAP                   0254
                                    FIRINGS      OPERATION              0254
                                                                        0254
   1- OUTGAS1                                                           0254
   2- OUTGAS2                                                           0254
   3- H2O                      87   .290(.326)   1.0                    0254
   4- N2                            .420(.306)                          0254
                                                                        0255
```

```
     5- CO2                          .078(.036)                                0255
     6- O2                           .001(.001)                                0255
     7- CO                           .184(.134)                                0255
     8- H2                           .017(.170)                                0255
     9- H                            .001(.015)                                0255
    10- MMHNO3                       .002(.001)                                0255
                                                                               0255
    THIS ROUTINE SETS UP THE STS ORBITER CONFIGURATION BY DEFINING              0255
    THEIR IDENTIFICATION NUMBERS, LOCATION, AND ORIENTATION.                   0255
     CIDENT     = ENGINE/VENT IDENTIFICATION NUMBER(5000-5999)                 0256
     CLOC       = ENGINE/VENT SIX LETTER CODE TO DEFINE LOCATION               0256
     CTYPE      = SIX LETTER NAME TO DEFINE TYPE OF PROPULSION SYSTEM          0256
     CXLOC      = X LOCATION OF ENGINE/VENT IN ORBITER OR BASE COORDS.         0256
     CYLOC      = Y LOCATION                                                   0256
     CZLOC      = Z LOCATION                                                   0256
     CTHETA     = ORIENTATION OF NOZZLE CENTERLINE OFF Z AXIS                  0256
     CPHI       = ORIENTATION OF CENTERLINE FROM  +X AXIS                      0256
                                                                               0256
 *****  NOTE - THIS ROUTINE'S STRUCTURE IS NOT ANSI STANDARD FORTRAN IV        0256
 *****         IT SHOULD BE MODIFIED: PULL ALL DATA STATEMENTS FORWARD        0257
 *****         OF ANY EXECUTABLE CODE AND SEPARATE MIXED MODE ASSIGNMEN       0257
 *****         INTO SEPARATE DATA STATEMENTS.                                 0257
                                                                               0257
=================================================================================0257
                                                                               0257
      COMMON /CNTRL/ ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,          0257
     +                 MCD, DIRECT,  RFAS2,   RFSS, REFLCT, NRFLCT,          0257
     +               NEWCON, NTAPE4, NEWTCD, NEWTNL, NEWMFS, NEWMFP,         0257
     +               MINTMP, MAXTMP, ATCODE, R41DEP,     GO, REPORT(70)      0257
      COMMON/CONFIG/ SURFSC(300), SSURFS(300),   PNTSC(50),   NEWPL(50),      0258
     +                ONTIME(50),  RECEVR(25),      ICCODE,  FOVANG(25),     0258
     +                    SERIES,      NEWDAT,      ADSURF,      NNEWPL,     0258
     +                    JTOTAL,      KTOTAL,      NORBPL,  ISURF(300),     0258
     +               ISSURF(300)                                               0258
      COMMON/CHANGE/ CHNGES, CHNGEK, CHNGEP, CHNGPL                            0258
      COMMON /RATES/ RATE(25,10), TAU(25,10), TSTART(3), TSTOP(3),             0258
     +               AGEORB, AGEPLD,  MOUT1,  MOUT2,   MED1,   MED2,          0258
     +                   M1,     M2,  AMBWT, AMBDIA, TSTARR,   MACH,          0258
     +               TIMEOO                                                    0258
      COMMON /ORBIT/    ALT,     VA,  PITCH,    YAW,   ROLL,   SUNL,          0259
     +                SUNM,   SUNH                                             0259
      COMMON  /GEOM/ XORGIN, YORGIN, ZORGIN, XO(25), YO(25), ZO(25),           0259
     +               ALPHA(25),      BETA(25),      GAMMA(25)                 0259
      COMMON /INTEG/THETAL(25),   PHIL(25), THETA1(25), THETA2(25),            0259
     +              DTHETA(25),   PHI1(25),   PHI2(25),   DPHI(25),           0259
     +              DOMEGA(25),     DS(25),       RMAX,     NTHETA,          0259
     +                  NPHI                                                  0259
      COMMON /TEMPS/ TEMP(2000)                                                0259
      COMMON/PLUMES/ PLUMEC(10,25), SPECMF(10,25), CXLOC(50), CYLOC(50),       0259
     +                   CZLOC(50),    CTHETA(50),  CPHI(50),                 0260
     +                  CIDENT(50)                                            0260
      COMMON/MOLEC/  MOLWT(10), DIA(10)                                        0260
      COMMON /SURFS/IDENT(300), AREA(300)                                      0260
      COMMON/CHAR/ITITLE(72), IRSPNS(80),  NEWNAM(6),  LTYPE(25),              0260
     +             KINDS(25),  PLACE(30), SPECIE(10),  SECT(300),            0260
     +            MATRL(300)      NAMEPL,   CLOC(50),  CTYPE(50),            0260
     +            NPLUME(25)                                                 0260
      COMMON/CHFLAG/ CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS,CHORIG,            0260
     +               CHTIM,  CHAGE, CHINDX,   CHWT,  CHDIA, CHLOC(25),        0260
     +               CHVIEW(25), CHRATE(25,10),  CHTAU(25,10),                0261
     +               CHPLUM(10,25), CHMF(10,25)                               0261
      COMMON/INDX/   INDXSP(25), INDXK(25,88),NDXP(30), INDXPL(25),           0261
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     +                    INDXJT,    INDXKT                                    0261
      COMMON/NUCON/NUSECT(6,300), NUMATL(6,300),  NULOC(6,50),                 0261
     +             NUTYPE(6,50),  NUSPEC(6,10), NUKIND(6,25),                  0261
     +             NUPLAC(6,30),  NUNPLM(6,25)                                 0261
                                                                               0261
      REAL ONTIME, MACH, MOLWT                                                 0261
      INTEGER SURFSC, SSURFS,  PNTSC, RECEVR, ITITLE,  LTYPE,  KINDS,          0261
     +         PLACE, SPECIE,   SECT,  MATRL, ATCODE, SERIES, CIDENT,          0262
     +          CLOC,  CTYPE, CHNGES, CHNGEK, CHNGEP, CHNGPL                   0262
      LOGICAL ORBITR, PAYLOD,    OUT,     ED,   LEAK,  PLUME,    MCD,         0262
     +        DIRECT,  RFAS2,   RFSS, REFLCT, NEWCON, NTAPE4, NEWTCD,         0262
     +        NEWTNL, NEWMFS, NEWMFP, MINTMP, MAXTMP, REPORT,     GO,         0262
     +         NEWPL,   SUNL,   SUNM,   SUNH, R41DEP, NEWDAT, ADSURF,         0262
     +         CHATT,  CHALT,  CHVEL,  CHSUN,   CHDS, CHORIG,  CHLOC,         0262
     +        CHVIEW,  CHTIM, CHRATE,  CHTAU,  CHAGE, CHPLUM,   CHMF,         0262
     +        CHINDX,   CHWT,  CHDIA, INDXSP,  INDXK,  INDXP, INDXPL          0262
=================================================================================0263
      DIMENSION  SPDATA(250),PFDATA(250),NPLME(25),IPTS(300)                   0263
                                                                               0263
*****************************************************************            0263
                                                                               0263
                                                                               0263
   LOAD IN THE PLUME FUNCTION COEFICIENTS FOR THE FOLLOWING ENGINES            0263
                                                                               0263
     KKINDS = 25                                                               0263
     DATA(NPLME(K),K=1,25)                                                     0263
      TYPES OF ENGINES/VENTS                                                   0263
    1 /  6H   RCS,                                                             0264
    2    6H   VCS,                                                             0264
    3    6H   OMS,                                                             0264
    4    6H EVAP1,                                                             0264
    5    6H E05HE,                                                             0264
    6    6H CO2XE,                                                             0264
    7    6H XECH4,                                                             0264
    8    6H E13HE,                                                             0264
    9    6H UMBV1,                                                             0264
    *    6H UMBV2,                                                             0264
    1    6H IUSSM,                                                             0265
    2    6H IUSLM,                                                             0265
    3 13*6H  NULL/                                                             0265
                                                                               0265
     DO 5 K=1,KKINDS                                                           0265
5    NPLUME(K) = NPLME(K)                                                      0265
                                                                               0265
                                                                               0265
   LOAD IN THE PLUME FUNCTION COEFICIENTS                                      0265
                                                                               0265
     DATA(PFDATA(K),K=1,250)                                                   0266
       C1     C2      C3    THETA1 C5    C6    THETA2 MFLUX VELOC  TYPE       0266
    1 /1351.,10.00,.0126,64.0, 35.0,-.0840,180.,  0.,3.5E+5,6H   RCS,         0266
    2   23.2, 8.65,.0137,40.0,5.810,-.0467,140.,.0[illegible],3.5E+5,6H   VCS,  0266
    3  9332.,10.65,.0126,64.0,235.0,-.0840,180.,  0.,3.5E+5,6H   OMS,         0266
    4  1.963, 6.00,.0106,148.,   0.,    0.,148.,  0.,1.0E+5,6H EVAP1,         0266
    5 .00404, 1.75,.0174, 90.,   0.,    0., 90.,  0.,7.8E+4,6H E05HE,         0266
    6 .00136, 1.75,.0174, 90.,   0.,    0., 90.,  0.,7.8E+4.6H CO2XE,         0266
    7 .01220, 1.75,.0174, 90.,   0.,    0., 90.,  0.,7.8E+4,6H XECH4,         0266
    8 .00243, 1.75,.0174, 90.,   0.,    0., 90.,  0.,7.8E+4,6H E13HE,         0267
    9 .64800, 1.75,.0174, 90.,   0.,    0., 90.,  0.,7.8E+4,6H UMBV1,         0267
    * .00136, 1.75,.0174, 90.,   0.,    0., 90.,  0.,7.8E+4,6H UMBV2,         0267
    1 15061.,10.65,.0126, 64., 299.,-.0822,179    0.,3.5E+5,6H IUSSM,         0267
    2 17752.,10.65,.0126, 64., 352.,-.0822,179. 89 0.,3.5E+5,6H IUSLM,         0267
```

```
   3 130*0./                                                              0267
                                                                          0267
                                                                          0267
    DO 20 K=1,KKINDS                                                      0267
    DO 10 L=1,10                                                          0267
10  PLUMEC(L,K) = PFDATA( (K-1) * 10 + L )                                0268
20  CONTINUE                                                              0268
                                                                          0268
  LOAD IN THE SPECIES MASS FRACTIONS TO BE USED FOR THE ENGINES           0268
    DATA(SPDATA(K),K=1,250)                                               0268
 TYPE OUT1   OUT2   H2O    N2     CO2    O2     CO     H2     H     MMH HNO3 0268
   1 /0.0,   0.0,  .290,  .420,  .078,  .001,  .184,  .017,  .001,  .002,  0268
   2  0.0,   0.0,  .290,  .420,  .078,  .001,  .184,  .017,  .001,  .002,  0268
   3  0.0,   0.0,  .290,  .420,  .078,  .001,  .184,  .017,  .001,  .002,  0268
   4  0.0,   0.0,1.000,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,  0268
                                                      HE     XE    CH4     0269
   5  0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   1.0,   0.0,   0.0,  0269
   6  0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.1,   0.0,   0.9,  0269
   7  0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.9,   0.1,  0269
   8  0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   1.0,   0.0,   0.0,  0269
   9  0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   1.0,   0.0,   0.0,  0269
   *  0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.0,   0.1,   0.0,   0.9,  0269
      AL2O3 CO    HCL    N2     H2O    CO2    ALCL   H2     ALOCL OTHERS    0269
   1.3130,.2713,.1803,.0822,.0579,.0206,.0215,.0267,.0106,.0158,          0269
   2.3130,.2713,.1803,.0822,.0579,.0206,.0215,.0267,.0106,.0158,          0269
   3 130*0./                                                              0270
                                                                          0270
    DO 40 K=1,KKINDS                                                      0270
    DO 30 L=1,10                                                          0270
30  SPECMF(L,K)=SPDATA( (K-1)*10+L )                                      0270
40  CONTINUE                                                              0270
                                                                          0270
 CURRENTLY THERE ARE 48 ENGINES/VENTS USED ON THE ORBITER                 0270
                                                                          0270
 ****************************************                                 0270
    * * MASTER ARRAY FOR ENGINES * *                                     0271
                                                                          0271
                                                                          0271
 FORWARD RCS ENGINES                                                      0271
    DATA(IPTS(I),I=1,84)                                                  0271
   1 /7112,6HFLF -X,6H   RCS,  332,   -14,   389,                         0271
   2  7122,6HFCF -X,6H   RCS,  332,     0,   391,                         0271
   3  7132,6HFRF -X,6H   RCS,  332,    14,   389,                         0271
   4  7123,6HFLS +Y,6H   RCS,  360,   -47,   368,                         0271
   5  7113,6HFLS +Y,6H   RCS,  360,   -47,   354,                         0271
   6  7115,6HFLU +Z,6H   RCS,  350,   -13,   395,                         0272
   7  7125,6HFCU +Z,6H   RCS,  350,     0,   395,                         0272
   8  7135,6HFRU +Z,6H   RCS,  350,    13,   395,                         0272
   9  7116,6HFLD -Z,6H   RCS,  333,   -41,   381,                         0272
   *  7126,6HFLD -Z,6H   RCS,  347,   -45,   386,                         0272
   1  7144,6HFRS -Y,6H   RCS,  362,    47,   368,                         0272
   2  7134,6HFRS -Y,6H   RCS,  362,    47,   354,                         0272
   3  7136,6HFRD -Z,6H   RCS,  333,    41,   381,                         0272
   4  7146,6HFRD -Z,6H   RCS,  347,    45,   386/                         0272
 AFT RCS ENGINES LEFT SIDE OF ORBITER                                     0272
    DATA(IPTS(I),I=85,156)                                                0273
   5 /7211,6HALA +X,6H   RCS, 1557,  -119,   473,                         0273
   6  7231,6HALA +X,6H   RCS, 1557,  -132,   473,                         0273
   7  7243,6HALS +Y,6H   RCS, 1516,  -123,   459,                         0273
   8  7223,6HALS +Y,6H   RCS, 1529,  -123,   459,                         0273
   9  7233,6HALS +Y,6H   RCS, 1542,  -122,   459,                         0273
   *  7213,6HALS +Y,6H   RCS, 1555,  -122,   459,                         0273
```

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     1  7245,6HALU +Z,6H    RCS,  1516,   -132,    481,                    0273
     2  7225,6HALU +Z,6H    RCS,  1529,   -132,    481,                    0273
     3  7215,6HALU +Z,6H    RCS,  1542,   -132,    481,                    0273
     4  7240,6HALD -Z,6H    RCS,  1516,   -112,    437,                    0274
     5  7226,6HALD -Z,6H    RCS,  1529,   -111,    440,                    0274
     6  7236,6HALD -Z,6H    RCS,  1542,   -110,    443/                    0274
   AFT RCS ENGINES RIGHT SIDE OF ORBITER                                   0274
      DATA(IPTS(I),I=157,228)                                              0274
     7 /7311,6HARA +X,6H    RCS,  1557,    119,    473,                    0274
     8  7331,6HARA +X,6H    RCS,  1557,    132,    473,                    0274
     9  7344,6HARS -Y,6H    RCS,  1516,    123,    459,                    0274
     *  7324,6HARS -Y,6H    RCS,  1529,    123,    459,                    0274
     1  7334,6HARS -Y,6H    RCS,  1542,    123,    459,                    0274
     2  7314,6HARS -Y,6H    RCS,  1555,    123,    459,                    0274
     3  7345,6HARU +Z,6H    RCS,  1516,    132,    481,                    0275
     4  7325,6HARU +Z,6H    RCS,  1529,    132,    481,                    0275
     5  7315,6HARU +Z,6H    RCS,  1542,    132,    481,                    0275
     6  7346,6HARD -Z,6H    RCS,  1516,    112,    437,                    0275
     7  7326,6HARD -Z,6H    RCS,  1529,    111,    440,                    0275
     8  7336,6HARD -Z,6H    RCS,  1542,    110,    443/                    0275
   RCS VERNIER ENGINES                                                     0275
      DATA(IPTS(I),I=229,264)                                              0275
     9 /8116,6HFLD -Z,6H    VCS,   324,    -46,    374,                    0275
     *  8136,6HFRD -Z,6H    VCS,   324,     46,    374,                    0275
     1  8257,6HALD -Z,6H    VCS,  1565,   -144,    459,                    0276
     2  8258,6HALS +Y,6H    VCS,  1565,   -118,    457,                    0276
     3  8357,6HARD -Z,6H    VCS,  1565,    144,    459,                    0276
     4  8358,6HARS +Y,6H    VCS,  1565,   -118,    457/                    0276
   FLASH EVAPORATOR                                                        0276
      DATA(IPTS(I),I=265,276)                                              0276
     5 /6877,6HARS +Y,6H EVAP1,  1506,    127,    305,                    0276
     6  6879,6HALS -Y,6H EVAP1,  1506,   -127,    305/                    0276
   OMS ENGINES                                                             0276
      DATA(IPTS(I),I=277,288)                                              0276
     7 /9000,6H SMALL,6H   OMS,    80,      0,      0,                    0277
     8  9002,6H LARGE,6H   OMS,   180,      0,      0/                    0277
                                                                          0277
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++  0277
      KK=0                                                                0277
      DO 50 K=1,300,6                                                     0277
      KK=KK+1                                                             0277
      CIDENT(KK)= IPTS(K)                                                 0277
      CLOC(KK)  = IPTS(K+1)                                               0277
      CTYPE(KK) = IPTS(K+2)                                               0277
      CXLOC(KK) = IPTS(K+3)                                               0278
      CYLOC(KK) = IPTS(K+4)                                               0278
      CZLOC(KK) = IPTS(K+5)                                               0278
50    CONTINUE                                                            0278
      KTOTAL = 48                                                         0278
      RETURN                                                              0278
      END                                                                 0278
      SUBROUTINE IERROR                                                   0278
                                                                          0278
      **********************************                                  0278
      *                                *                                  0279
      *  E R R O R   M E S S A G E S   *                                  0279
      *                                *                                  0279
      **********************************                                  0279
                                                                          0279
      RETURN                                                              0279
      END                                                                 0279
      SUBROUTINE CLEAR                                                    0279
                                                                          0279
```

ORIGINAL PAGE IS
OF POOR QUALITY

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      ****************************************                          0279
      *                                      *                          0280
      *  C L E A R   C R T   S C R E E N     *                          0280
      *                                      *                          0280
      ****************************************                          0280
                                                                        0280
                                                                        0280
  THIS ROUTINE IS SET UP TO CLEAR THE SCREEN OF A BEEHIVE TERMINAL      0280
  (MODEL DM2S) BY OUTPUTTING AN ESC-E SEQUENCE TO THE TERMINAL,         0280
  WHICH MUST BE IN ASCII MODE TO RECOGNIZE THE 12-BIT SEQUENCE.         0280
                                                                        0281
      DATA ICLS/7673050000000000000B/                                   0281
      WRITE(6,6010) ICLS                                                0281
 6010 FORMAT(A3)                                                        0281
      RETURN                                                            0281
      END                                                               0281
      SUBROUTINE HEADER(INDEX)                                          0281
                                                                        0281
      ************************************                              0281
      *                                  *                              0281
      *  P R O G R A M   H E A D E R     *                              0282
      *                                  *                              0282
      ************************************                              0282
                                                                        0282
================================================================================0282
                                                                        0282
      IF(INDEX.EQ.1) GO TO 100                                          0282
      IF(INDEX.EQ.2) GO TO 200                                          0282
      IF(INDEX.EQ.3) GO TO 300                                          0282
      IF(INDEX.EQ.4) GO TO 400                                          0282
      IF(INDEX.EQ.5) GO TO 500                                          0283
      IF(INDEX.EQ.6) GO TO 600                                          0283
      IF(INDEX.EQ.7) GO TO 700                                          0283
      IF(INDEX.EQ.8) GO TO 800                                          0283
      IF(INDEX.EQ.9) GO TO 900                                          0283
                                                                        0283
      M A I N   P R O G R A M   H E A D E R                             0283
                                                                        0283
  100 CALL CLEAR                                                        0283
      WRITE(6,60,0)                                                     0283
 6010 FORMAT(//17X,                                                     0284
     +35H------------------------------------/17X,                     0284
     +35H-                                   -/17X,                     0284
     +35H-         S P A C E   I I           -/17X,                     0284
     +35H-                                   -/17X,                     0284
     +35H-       I N P U T   D E C K         -/17X,                     0284
     +35H-                                   -/17X,                     0284
     +35H-     P R E P R O C E S S O R       -/17X,                     0284
     +35H-                                   -/17X,                     0284
     +35H------------------------------------///72(1H=))               0284
      RETURN                                                            0285
                                                                        0285
      H E A D E R   F O R   S U B R O U T I N E   C O N T R L           0285
                                                                        0285
  200 WRITE(6,6020)                                                     0285
 6020 FORMAT(//14X,                                                     0285
     +41H-----------------------------------------/14X,                 0285
     +41H-                                       -/14X,                 0285
     +41H-     P R O G R A M   C O N T R O L     -/14X,                 0285
     +41H-                                       -/14X,                 0285
     +41H-         P A R A M E T E R S           -/14X,                 0286
```

```
     +41H-                                                          -/14X,
     +41H-----------------------------------------------------------//)
      RETURN

      H E A D E R   F O R   S U B R O U T I N E   I N P U T A

  300 WRITE(6,6030)
 6030 FORMAT(//9X,
     +51H-------------------------------------------------------------/9X,
     +51H-                                                           -/9X,
     +51H-     C O N T A M I N A T I O N   S O U R C E               -/9X,
     +51H-                                                           -/9X,
     +51H-                 D E F I N I T I O N                       -/9X,
     +51H-                                                           -/9X,
     +51H-------------------------------------------------------------)
      RETURN

  400 RETURN
  500 RETURN
  600 RETURN
  700 RETURN
  800 RETURN
  900 RETURN
      END
```


END

DATE

DEC. 29, 1983