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USER'S MANUAL FOR CASSANDRA: CLOUD SNAPSHOTS OF DUST RAISED ALO--ETC(U)
NOV 78 R L SHOWERS, C CRISCO

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1 OF 2
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TECHNICAL REPORT ARBRL-TR-02116

USER'S MANUAL FOR CASSANDRA: CLOUD SNAPSHOTS OF DUST RAISED ALOFT

Richard L. Showers
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November 1978

US ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND
BALLISTIC RESEARCH LABORATORY
ABERDEEN PROVING GROUND, MARYLAND

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Fallout Prediction
Fallout Exposure
Dust Clouds

Cloud Snapshots of Dust Raised Aloft

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The computer code, CASSANDRA, has been developed to simulate the spatial distribution and concentrations of dust raised aloft by a nuclear cloud. The code utilizes the DELFIC cloud rise description as the basis for a dynamic wafer shape/transport model. Dust concentration for a particular particle size class is calculated directly from the radius of the contributing wafer at the altitude of interest.

The outputs of the program are either an array of numbers specifying the values of collective dust density on a gridwork of points in space or a tabulation of

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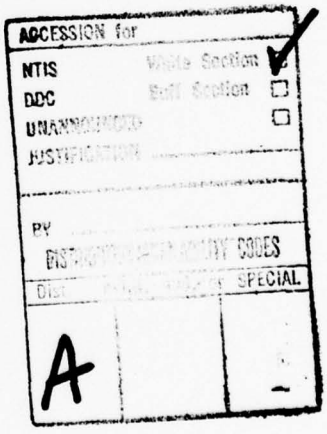
dust concentration at specified coordinates and times.
As a test case a simulation of the high explosive test Dial Pack was performed. The computed values were within the range of values reported from the cloud sampling.
In addition to a general description of the code, a user's guide has been incorporated. Examples have been included of computer generated output along with a complete listing of the CASSANDRA code.

1473 B

TABLE OF CONTENTS



LIST OF ILLUSTRATIONS

I. INTRODUCTION

A nuclear detonation on or close to land creates large persistent clouds of particulate debris, or dust, consisting of dense particles with sizes ranging to thousands of microns. Such a debris cloud poses a threat to RV's reentering the atmosphere at high velocities or ABM's leaving the ground. To determine the threat of erosion of missile heat shields, one must know the spatial distribution and concentrations of the material in the air. The computer code CASSANDRA has been developed as a means of supplying that information.

CASSANDRA is an acronym for "Cloud Snapshots of Dust Raised Aloft". It is a computer program designed to simulate the movement of dust raised aloft by a nuclear cloud. It offers a rapidly executed calculation of dust distribution and concentration for any time after the cloud begins to rise.

The code incorporates the highly detailed rising cloud model of the DELFIC[1] (Defense Land Fallout Interpretive Code) which provides a table of cloud parameters at predetermined time intervals from the time the cloud begins to rise to the time of stabilization. Other than the code necessary to produce the table of cloud parameters, CASSANDRA uses the particle fall procedures and atmosphere model of the DELFIC, but the remainder is a complete departure from that code.

II. CODE DESCRIPTION

The analytical and geometric basis of CASSANDRA begins with the description of the dust cloud at the initial time, which is the time that it begins to rise-usually several seconds after burst. For the purposes of cloud-rise calculations, the cloud is assumed to be an oblate spheroid. For dust calculations, the cloud is modeled, at the initial time, as a right circular cylinder. This cylinder is loaded with an uniformly distributed soil mass which is assumed to be composed of particles with an assigned size distribution. The soil mass in the cloud is subdivided into, at most, 200 particle size classes of equal mass and each of the particle size classes defines a separate, geometrically identical, colocated, dust cloud. Next, a geometric subdivision

---

1. *"Department of Defense Land Fallout Prediction System", DASA 1800*
   a. *Vol I - System Description, 27 Jun 66 (AD 483 897)*
   b. *Vol II - Initial Conditions, 30 Sep 66 (AD 803 144*
   c. *Vol III - Cloud Rise, 19 May 67 (AD 819 770)*
      Vol III - Cloud Rise, Revised, 1 Sep 70 (AD 879 890)
   d. *Vol IV - Atmospheric Transport, 2 Feb 67 (AD 815 263)*
   e. *Vol V - Particle Activity, Feb 68 (AD 832 239)*
   f. *Vol VI - Output Processor, 20 Feb 67 (AD 814 055L)*
   g. *Vol VII - Operator's Manual, Apr 68 (AD 836 871)*

is made of each of the colocated clouds by passing through them a set of equally spaced, parallel, horizontal planes which divide the clouds into a series of smaller subcylinders which are referred to as wafers. The wafers are the basic units of transport of CASSANDRA. Each of the geometrical wafers, then, becomes a set of superimposed wafers, one for each particle size class, and after the initial time each of the wafers is assumed to be transported independently. For the purpose of defining a dynamic wafer shape, each of the wafers is structured at the initial time by an arbitrary number of equally spaced altitude reference planes parallel to the top and bottom. The altitude reference planes subdivide the wafer vertically into compartments which aid in defining an outer shape for the wafer as it falls from the cloud.

Figure 1 represents, in cross section, the cloud at the initial time from a 1 kt detonation. The cloud has been subdivided into three wafers. The lower horizontal line represents the ground and the cloud has these dimensions and altitude at two seconds (initial time). The horizontal dashed lines represent an arbitrary number of internal altitude reference levels assigned to each wafer. These altitude reference levels provide internal reference altitudes at which wafer radii are calculated as different levels fall below the rising cloud bottom. These reference levels allow the wafer to assume a dynamically determined shape derived from the dynamics of the rising, expanding, wind-shifted cloud.

The growth, shape, and transport of wafers can best be visualized by first considering the simpler case of a single dust particle in the cloud at initial time. As the gas cloud rises it will impart an upward velocity to the particle which is equal to the velocity of the cloud itself. At the same time, the particle will have a downward component of velocity due to gravitational settling. The magnitude of the gravitational settling rate will be determined by the size of the particle, its mass and the density of the gas in the cloud at the time of interest. The particle, then, at any time, will have a vertical velocity which is the resultant of its upward and downward components. If the magnitude of the downward component is great enough, the particle will fall below the cloud bottom sometime before stabilization.

The wafers are transported by assuming that the wafer tops and bottoms are independent and that fall rates are determined by assigning the largest particle in the particle size class, characterizing the wafer, to the bottom and the smallest particle to the top. The altitudes of the wafer top and bottom are calculated for the end of a particular time step by calculating rates of fall of the appropriately sized particles within the cloud and subtracting those from the rate of rise of the cloud. If the bottom of the wafer does not fall below the bottom of the cloud during the time step, then new altitudes of the intermediate reference planes are calculated by allowing them to be equally spaced between the new wafer top and bottom altitudes. Additionally, the wafer radius at the top and bottom and at each reference altitude and horizontal coordinates of the wafer top and bottom is

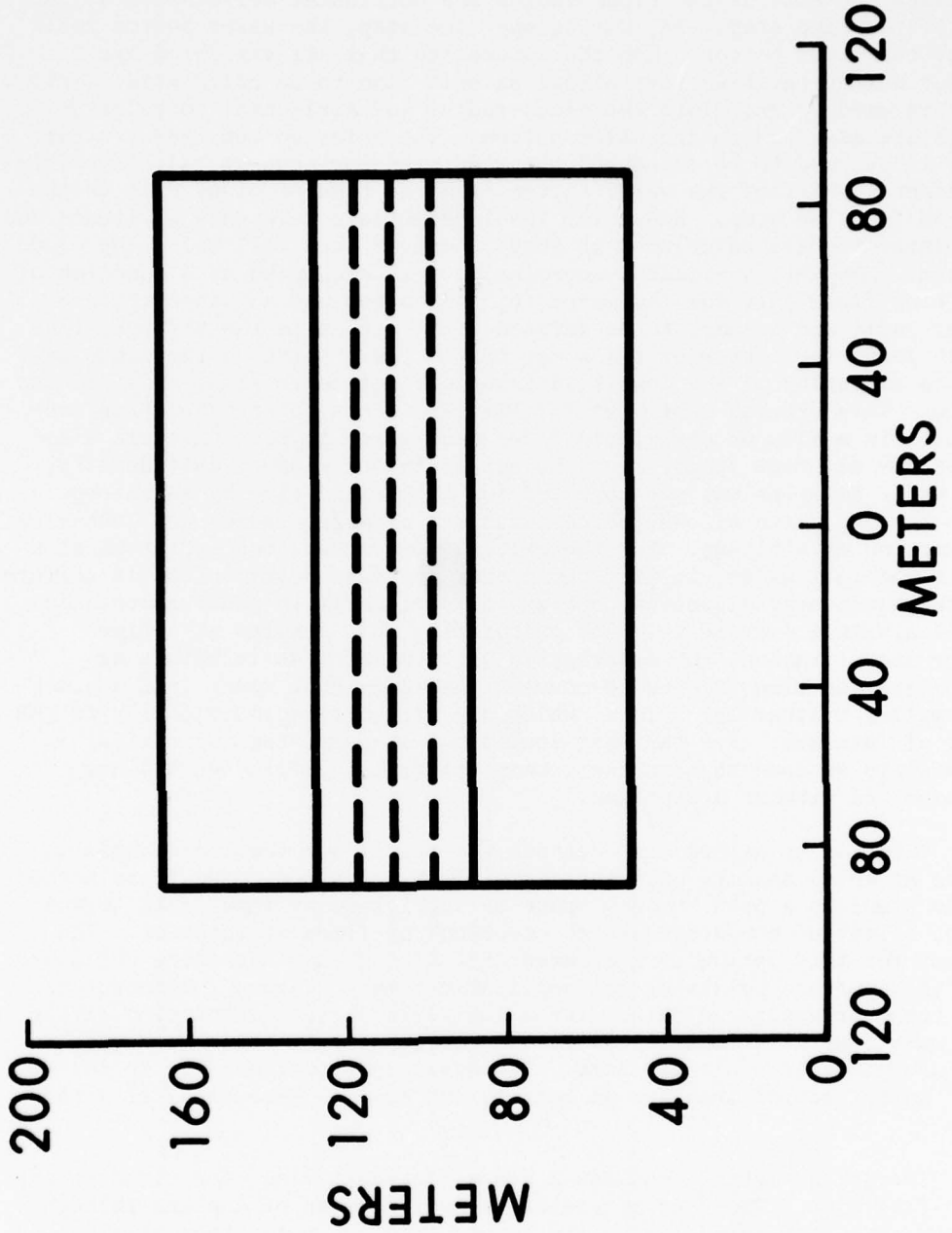


Figure 1. Cross Section of CASSANDRA Cloud 1.0 kt at 2.0 Seconds

assigned the same as the cloud radius and horizontal coordinates at the end of the time step. If, during any time step, the wafer bottom falls below the cloud bottom, then the assumption that all variables are linear during the time step allows an exit time to be calculated. This time is used to calculate the cloud radius and horizontal coordinates which are assigned to the wafer bottom. The wafer bottom radius after exit is assumed to be fixed and the wind transport coding calculates the horizontal shift of the wafer bottom from the time of cloud exit to the end of the time step. Radii for the intermediate reference altitudes and the wafer top are calculated as above whenever they fall below the cloud bottom. However, horizontal coordinates are calculated as a function of the wind field only for the wafer top and bottom and any intermediate wafer radii are assumed to be defined with respect to the straight line which joins the center of the wafer bottom and a point on the cloud axis at the elevation of the lowest intermediate reference plane still in the cloud. This process continues for all time steps to stabilization and results in a file of descriptions for each wafer in each particle size class for all time steps. For the actual calculation of dust density, the wafer descriptions are computed for a specific time by an interpolation process which allows the computations of wafer radius and center as a function of altitude. For the calculation of mass concentration at a point within a wafer, it is assumed that the mass distribution is uniform in the horizontal direction, but exists vertically in equal amounts in equal altitude increments. For calculating dust density at a time after stabilization, the description of each wafer as it exists at stabilization time is used to convert the individual wafer into a stack of smaller cylindrical wafers, which are transported individually to the time of interest. For the post-stabilization case, the cylindrical wafers are assumed to have their mass uniformly distributed and are transported without distortion.

The user is allowed two methods for specifying the coordinates in space at which density calculations will be performed. The first method is to simulate a path through space by supplying, as input data to the code, a list of coordinates with accompanying times of interest. The output for this option is a printed list of the mass densities calculated for the separate points at the applicable times. Figure 2 demonstrates the computer-generated output for a low yield surface detonation giving the mass concentrations at the listed coordinates in space with the accompanying times all the same. The mass concentrations are in 10^{-8} g cm^{-3} units, coordinates are in metres, and time in seconds after detonation.

The second method provides a cross-sectional view of a cloud at any specified time. The user specifies the orientation of a plane through ground zero, perpendicular to the ground, and the outer boundaries of a rectangle of interest in the plane. Figure 3 illustrates this output option. The detonation was of low yield and a single direction wind field was applied in which the velocity increased gradually with altitude. The time is 350 seconds, which is before stabilization. Contours of equal mass concentrations were drawn directly on the map. Mass concentrations are in units of 10^{-8} g cm^{-3}, altitude and downwind range in metres.

TARGET COORDINATES
VALUES RELATIVE TO GZ

NO.	X	Y	Z	T
1	.0000	.0000	.1000+04	1200.0
2	.0000	.0000	.1500+04	1200.0
3	.0000	.0000	.2000+04	1200.0
4	.0000	.0000	.2500+04	1200.0
5	.0000	.0000	.3000+04	1200.0

COMBIN 10 ISTART 1 ISTOP 100

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 209.34 TO 2000.00 MICRONS

1	.3859+01	2	.0000	3	.0000	4	.0000	5	.0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 197.52 TO 209.34 MICRONS

1	.1113+02	2	.0000	3	.0000	4	.0000	5	.0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 184.92 TO 197.52 MICRONS

1	.1723+02	2	.1827+01	3	.0000	4	.0000	5	.0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 171.37 TO 184.92 MICRONS

1	.4522+02	2	.2337+01	3	.0000	4	.0000	5	.0000

Figure 2. Dust Concentration at Target Coordinates at Specified Times

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 156.62 TO 171.37 MICRONS

1 .0000 2 .3406+01 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 140.29 TO 156.62 MICRONS

1 .0000 2 .6732+01 3 .1040+00 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 121.72 TO 140.29 MICRONS

1 .0000 2 .3281+02 3 .1038+01 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 99.64 TO 121.72 MICRONS

1 .0000 2 .0000 3 .1246+01 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 70.77 TO 99.64 MICRONS

1 .0000 2 .0000 3 .9921+01 4 .5719+00 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS .01 TO 70.77 MICRONS

1 .0000 2 .0000 3 .4800+01 4 .1152+01 5 .0000

Figure 2. Dust Concentration at Target Coordinates at Specified Times (Continued)

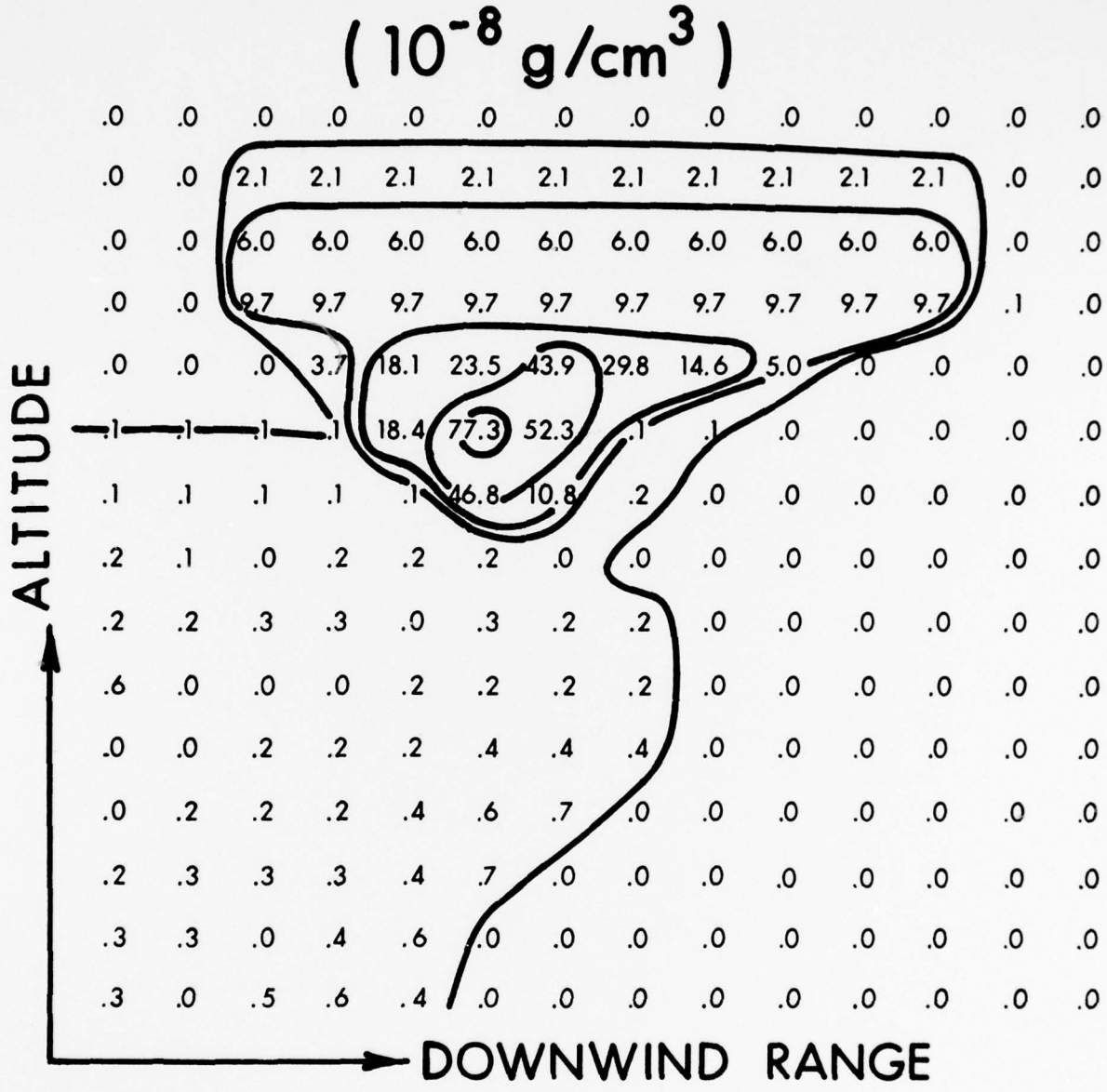


Figure 3. Dust Concentration at 350 Seconds

III. FORTRAN LISTINGS OF CASSANDRA

```
@:FOR,S  CASSANDRA.ATMR,R
FOR S0F3-06/11/76-10:06:43 (1,)

   SUBROUTINE ATMR      ENTRY POINT 000751

   STORAGE USED: CODE(1) 000772; DATA(0) 000202; BLAN. COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   ERROR
    0006   NRDU$
    0007   NIO3$
    0010   NIO2$
    0011   NIO1$
    0012   NPRT$
    0013   XPRR
    0014   EXP
    0015   NERR2$
    0016   NREW$
    0017   NWBU$
    0020   NRBU$
    0021   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000   000117 10F       0001   000322 100L      0001   000212 107OL     0001   000331 111L      0001   000342 113L
    0001   000353 115L      0001   000370 120L      0001   000372 130L      0001   000027 134G      0001   000377 135L
    0001   000406 137L      0001   000411 140L      0001   000425 150L      0001   000103 162G      0000   000120 20F
    0001   000455 200L      0001   000523 220L      0001   000537 222L      0001   000605 225L      0001   000627 240L
    0001   000644 250L      0001   000355 256G      0001   000723 270L      0000   000121 30F       0001   000462 313G
    0001   000601 374G      0000   000122 40F       0001   000166 50L       0001   000313 60L       0001   000173 70L
    0001   000223 72L       0001   000256 73L       0001   000033 90L       0004 R 000000 ALT       0000 R 000056 AP
    0000 R 000046 ATMMAX     0000 R 000026 ATMSUB     0000 R 000036 ATMZRO     0004 R 000404 ATP       0000 R 000106 A1
    0000 R 000107 A2         0000 R 000110 A3         0000 R 000111 A4         0000 R 000112 A5        0000 R 000113 A6
    0000 R 000114 A7         0000 R 000115 A8         0004   001010 B0         0003   000000 CAY       0004   001011 CG
    0004   001321 CHANGE     0004   001322 CMLR       0004   001323 CX         0004   003127 C2        0004   003130 C3
    0004   003131 C6         0000 R 000104 DALT       0004   003132 DEK        0003   000001 DETID     0003   000015 DIAM
    0003   000326 DMEAN      0004   003133 DNID       0003   000327 DNS        0004   003147 DRM       0004   003150 DS
    0004   003151 DST        0004   003152 DST0       0004   003153 DST1       0004   003154 DST2      0004   003155 DT
    0004   003156 DU         0004   003157 DWT        0004   003160 DX         0004   003161 DZ        0004   003162 ED
    0004   003163 EK         0004   003164 EPS        0004 R 003165 ES         0004 R 003166 ETA       0003   000330 EXP0
    0004   003572 F          0003   000331 FMASS      0000 R 000000 FMT        0004   003573 FW        0004 R 003574 GRV
    0003   001170 HEIGHT     0004   004200 HLR        0004   004201 HOB        0000 I 000072 I         0003   000641 IDISTP
    0003   000642 IEXEC      0000 I 000067 IGO        0000   000150 INJP$      0004   004202 IRAM      0004   004203 IRAD
    0003 I 000643 IRISE      0000 I 000103 IRROR      0003 I 000644 ISIN       0003 I 000645 ISOUT      0004   004204 KCLD
    0004   004205 KDI        0004   004206 KRX        0004   004207 KS         0004   004210 KSV       0004   004211 MCX
    0004   004212 MWYA       0004   004213 N          0000 I 000070 NBRNCH     0003   000646 NDSTP     0003   001172 NHOOO
    0004   004214 NNN        0000 I 000105 NPV        0004 I 004215 NPVA       0000 I 000073 N1        0000 I 000074 N2
```

```
0000 I 000075 N3        0000 I 000076 N4        0000 I 000077 N5        0000 I 000100 N6        0000 I 000101 N7
0000 I 000102 N8        0004   004216 P         0000 R 000066 PROGRM    0004 R 004217 PRS       0003   000647 PS
0004   004623 RA        0004   004624 RI        0004   004625 R         0004   004626 RA        0004   004627 RFD
0004 R 004630 RHZ       0004   005234 RL        0004 R 005235 RLH       0004   005641 RM        0004   005642 RZT
0004   005643 S         0004   005644 SAVE      0000 R 000014 SCALE     0003   001157 SD        0004   005645 SLDTMP
0004 R 005646 SLM       0004   006252 SMALLT    0003   001160 SSAM      0004   006253 SZRO      0004   006254 T
0004   006255 TE        0000 R 000116 TERR      0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2
0004   006256 TMSO      0003   001164 T2M       0004   006257 U         0003   001165 USOIL     0004   006260 V
0003   001166 VPR       0003   001503 VX        0003   002013 VY        0004   006261 VZRO      0003   001167 W
0000 R 000071 WATCOR    0004   006262 WT        0004   006263 X         0004   006264 XE        0004   006265 Y
0004   006575 Z         0004   006576 ZBER      0004   006577 ZBRSTZ    0004   006600 ZLMT      0003   001171 ZSCL
0003   001173 ZW
```

```
00101      1*            SUBROUTINE ATMR                                                    ATMR 001    000000
00101      2*      C                                                                        ATMR 002    000000
00101      3*      C     REVISED   MAY 1970                                                 ATMR 003    000000
00101      4*      C                                                                        ATMR 004    000000
00101      5*      C                                                                        ATMR 005    000000
00101      6*      C ***********************************************************************ATMR 006    000000
00101      7*      C                                                                        ATMR 007    000000
00101      8*      C     ATMR READS IN ATMOSPHERE TABLES                                    ATMR 008    000000
00101      9*      C                                                                        ATMR 009    000000
00101     10*      C     ATMOSPHERE TABLE GLOSSARY- UNITS ARE FOR THE SCALED ENTRIES        ATMR 010    000000
00101     11*      C                                                                        ATMR 011    000000
00101     12*      C   1   ALT - ALTITUDE ABOVE MSL (METERS)                              ATMR 012    000000
00101     13*      C   2   ATP - TEMPERATURE (DEGREES KELVIN)                             ATMR 013    000000
00101     14*      C   3   PRS - PRESSURE (MB)                                           ATMR 014    000000
00101     15*      C   4   RHZ - DENSITY (KGM/M**3)                                      ATMR 015    000000
00101     16*      C   5   RLH - RELATIVE HUMIDITY (PERCENT)                            ATMR 016    000000
00101     17*      C   6   ETA - VISCOSITY (KGM/(M-SEC))                                ATMR 017    000000
00101     18*      C   7   GRV - ACCELERATION OF GRAVITY  (M/SEC**2)                     ATMR 018    000000
00101     19*      C   8   SLM - MOLECULAR MEAN FREE PATH (M)                            ATMR 019    000000
00101     20*      C                                                                        ATMR 020    000000
00101     21*      C ***********************************************************************ATMR 021    000000
00101     22*      C                                                                        ATMR 022    000000
00103     23*            COMMON /SET1/                                                      ATMR 023    000000
00103     24*           1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,ATMR 024    000000
00103     25*           2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT    ,ATMR 025    000000
00103     26*           3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1     ,ATMR 026    000000
00103     27*           4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT   ,ATMR 027    000000
00103     28*           5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)             ATMR 028    000000
00104     29*            COMMON /CLOUD/                                                    ATMR 029    000000
00104     30*           1ALT(260)  ,ATP(260)  ,B0        ,CG(200)   ,CHANGE   ,CMLR     ,ATMR 030    000000
00104     31*           2CX(10,90) ,C2        ,C3        ,C6        ,DEK      ,DNID(12) ,ATMR 031    000000
00104     32*           3DRM       ,DS        ,DST       ,DST0      ,DST1     ,DST2     ,ATMR 032    000000
00104     33*           4DT        ,DU        ,DWT       ,DX        ,DZ       ,ED       ,ATMR 033    000000
00104     34*           5EK        ,EPS       ,ES        ,ETA(260)  ,F        ,FW       ,ATMR 034    000000
00104     35*           6GRV(260)  ,HLR       ,HOR       ,IPAM      ,IRAD     ,KCLD     ,ATMR 035    000000
00104     36*           7KOI       ,KRX       ,KS        ,KSV       ,MCX      ,MWYA     ,ATMR 036    000000
00104     37*           8N         ,NNN       ,NPVA      ,P         ,PRS(260) ,PW       ,ATMR 037    000000
00104     38*           9QI        ,R         ,RA        ,RED       ,RHZ(260) ,RL       ,ATMR 038    000000
00104     39*           1RLH(260)  ,RM        ,RZT       ,S         ,SAVE     ,SLDTMP   ,ATMR 039    000000
00104     40*           2SLM(260)  ,SMALLT    ,SZRO      ,T         ,TE       ,TMSO     ,ATMR 040    000000
00104     41*           3U         ,V         ,VZRO      ,WT        ,X        ,XE       ,ATMR 041    000000
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```
00104     42*          4Y(200)    ,Z         ,Z9ER      ,ZBRSTZ    ,ZLMT                    ATMR 042    00000n
00105     43*           DIMENSION FMT(12),SCALE(10),A_MSUB(8),ATMZRO(8),ATMMAX(8),AP(8)     ATMR 043    00000n
00105     44*     C                                                                          ATMR 044    00000n
00105     45*     C ***************************************************************************ATMR 045    00000n
00105     46*     C                                                                          ATMR 046    00000n
00106     47*      010  FORMAT(I4)                                                           ATMR 047    00000n
00107     48*        20 FORMAT(8I4)                                                          ATMR 048    00000n
00110     49*        30 FORMAT(12A6)                                                         ATMR 049    00000n
00111     50*        40 FORMAT(7F10.5/3F10.5)                                                ATMR 050    00000n
00111     51*     C                                                                          ATMR 051    00000n
00111     52*     C ********************************,******************************************ATMR 052    00000n
00111     53*     C ***************************************************************************ATMR 053    00000n
00111     54*     C                                                                          ATMR 054    00000n
00112     55*           DATA PROGRM/6H ATMR /                                                ATMR 055    00000n
00114     56*           DATA ATMSUB                                                          ATMR 056    00000n
00114     57*          1           /-1000.,294.66,.1347E+1,.18206E-4,.1139E4, 9.8,           ATMR 057    00000n
00114     58*          2 .60323E-7,77./                                                     ATMR 058    00000n
00116     59*           DATA ATMZRO                                                          ATMR 059    00000n
00116     60*          1           / 0.0,288.18,.1225DE+1,.17894E-4,.10133E4, 9.8,           ATMR 060    00000n
00116     61*          2 .66317E-7, 77./                                                    ATMR 061    00000n
00120     62*           DATA ATMMAX                                                          ATMR 062    00000n
00120     63*          1           /50000.,282.66,.10029E-2,.17628E-4,.A7858,9.6542,         ATMR 063    00000n
00120     64*          2 .75023E-4, 0.0/                                                    ATMR 064    00000n
00120     65*     C                                                                          ATMR 065    00000n
00122     66*           IGO=0                                                                ATMR 066    00000n
00123     67*           NBRNCH=1                                                             ATMR 067    00000n
00124     68*           WATCOR=(1.-18./29.)/100.                                             ATMR 068    00000?
00124     69*     C                                                                          ATMR 069    00000?
00124     70*     C     READ OBJECT-TIME FORMAT                                              ATMR 070    00000?
00124     71*     C                                                                          ATMR 071    00000?
00125     72*           READ(ISIN,30)FMT                                                     ATMR 072    00000a
00125     73*     C                                                                          ATMR 073    00000a
00125     74*     C     READ SCALE AND ADJUSTMENT FACTORS                                    ATMR 074    00000a
00125     75*     C                                                                          ATMR 075    00000a
00130     76*           READ(ISIN,40)SCALE                                                   ATMR 076    00001a
00133     77*           DO 90 I=3,10                                                         ATMR 077    00002?
00136     78*           IF(SCALE(I))90,91,90                                                 ATMR 078    00002?
00141     79*        91 SCALE(I)=1.                                                          ATMR 079    00003n
00142     80*        90 CONTINUE                                                             ATMR 080    00003a
00142     81*     C                                                                          ATMR 081    00003a
00142     82*     C     READ ATMOSPHERE DATA SEQUENCE INDICATES                              ATMR 082    00003a
00144     83*           READ(ISIN,20)N1,N2,N3,N4,N5,N6,N7,N8                                 ATMR 083    00003a
00144     84*     C                                                                          ATMR 084    00003a
00144     85*     C     READ NUMBER OF ATMOSPHERE TABLE ENTRIES                              ATMR 085    00003a
00144     86*     C                                                                          ATMR 086    00003a
00156     87*           READ(ISIN,10)NPVA                                                    ATMR 087    00006?
00156     88*     C                                                                          ATMR 088    00006?
00156     89*     C     READ ATMOSPHERE TABLE ENTRIES, SEQUENCE AND ADJUST THEM TO THE       ATMR 089    00006?
00156     90*     C     PROPER UNITS, AND WHERE APPROPRIATE COMPUTE THOSE ENTRIES NOT        ATMR 090    00006?
00156     91*     C     PROVIDED IN THE INPUT.  ETA, GRV, AND SLM NEED NOT BE INPUT.         ATMR 091    00006?
00156     92*     C     EITHER PRS OR RHZ (BUT NOT BOTH) NEED NOT BE INPUT                   ATMR 092    00006?
00156     93*     C                                                                          ATMR 093    00006?
00161     94*           DO 100 I=1,NPVA                                                      ATMR 094    00007A
00164     95*           READ(ISIN,FMT)AP                                                     ATMR 095    00010?
00167     96*           ALT(I)=(AP(N1)+SCALE(1))*SCALE(3)                                    ATMR 096    00011?
00170     97*           ATP(I)=(AP(N2)+SCALE(2))*SCALE(4)                                    ATMR 097    00011?
00171     98*           PRS(I)=AP(N3)*SCALE(5)                                               ATMR 098    00012?
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00172    99*          RHZ(I)=AP(N4)*SCALE(6)                                          ATMR 099    000126
00173   100*          RLH(I)=AP(N5)*SCALE(7)                                          ATMR 100    000131
00174   101*          ETA(I)=AP(N6)*SCALE(8)                                          ATMR 101    000134
00175   102*          GRV(I)=AP(N7)*SCALE(9)                                          ATMR 102    000137
00176   103*          SLM(I)=AP(N8)*SCALE(10)                                         ATMR 103    000142
00176   104*    C                                                                     ATMR 104    000142
00176   105*    C     ARE SUCCESSIVE TABLE ENTRIES IN ORDER OF INCREASING ALTITUDE-   ATMR 105    000142
00176   106*    C                                                                     ATMR 106    000142
00177   107*          IF(I.EQ.1) GO TO 50                                             ATMR 107    000145
00201   108*          IF (ALT(I)-ALT(I-1)) 45,45,50                                   ATMR 108    000150
00204   109*       45 IRROR=-45                                                       ATMR 109    000154
00205   110*          PRINT 40, ALT(I),ALT(I-1)                                       ATMR 110    000156
00211   111*          GO TO 130                                                       ATMR 111    000164
00212   112*       50 IF(GRV(I).GT.0.0) GO TO 70                                      ATMR 112    000166
00214   113*          GRV(I)=9.8                                                      ATMR 113    000170
00215   114*       70 IF(ETA(I) .GT.0.0) GO TO 1070                                   ATMR 114    000173
00217   115*          ETA(I)=1.458E-6*ATP(I)**1.5/(110.4+ATP(I))                      ATMR 115    000176
00220   116*    1070 IF(PRS(I).GT.0.0) GO TO 73                                      ATMR 116    000212
00222   117*          IF(RHZ(I).GT.0.0) GO TO 72                                      ATMR 117    000214
00224   118*       71 IRROR=-71                                                       ATMR 118    000217
00225   119*          GO TO 130                                                       ATMR 119    000221
00226   120*       72 ES= 6.11*(273./ATP(I))**5.13* EXP(25.*(ATP(I)-273. )/ATP(I))   ATMR 120    000223
00227   121*          PRS(I)= 2.8679* RHZ(I)*ATP(I) +ES*RLH(I)*WATCOR                 ATMR 121    000245
00230   122*          GO TO 60                                                        ATMR 122    000254
00231   123*       73 IF(RHZ(I).GT.0.0) GO TO 60                                      ATMR 123    000256
00233   124*          ES= 6.11*(273./ATP(I))**5.13* EXP(25.*(ATP(I)-273. )/ATP(I))   ATMR 124    000260
00234   125*          RHZ(I)= (PRS(I)-ES*RLH(I)*WATCOR)/(2.8679*ATP(I))               ATMR 125    000307
00235   126*       60 IF(SLM(I) .GT.0.0) GO TO 100                                    ATMR 126    000314
00237   127*          SLM(I)=2.33239E-7*ATP(I)/PRS(I)                                 ATMR 127    000315
00240   128*      100 CONTINUE                                                        ATMR 128    000323
00240   129*    C                                                                     ATMR 129    000323
00240   130*    C     DETERMINE IF THE TABLE MUST BE EXPANDED TO 256 ENTRIES          ATMR 130    000323
00240   131*    C                                                                     ATMR 131    000323
00242   132*      110 IF(NPVA-256)140,111,120                                         ATMR 132    000323
00242   133*    C                                                                     ATMR 133    000323
00242   134*    C 111 THE TABLES DO NOT NEED EXPANSION.  CHECK TO DETERMINE IF THE    ATMR 134    000323
00242   135*    C     TABLES HAVE THE PROPER BOUNDRIES.                               ATMR 135    000323
00242   136*    C                                                                     ATMR 136    000323
00245   137*      111 IF(ABS(ALT(1)+ 1000.).LE.1.) GO TO 113                          ATMR 137    000331
00247   138*      112 IRROR=-112                                                      ATMR 138    000336
00250   139*          GO TO 130                                                       ATMR 139    000340
00251   140*      113 IF(ABS(ALT(256)-5.E4).LE.50.) GO TO 115                         ATMR 140    000343
00253   141*      114 IRROR=-114                                                      ATMR 141    000347
00254   142*          GO TO 130                                                       ATMR 142    000351
00254   143*    C                                                                     ATMR 143    000351
00254   144*    C 115 THE TABLES HAVE THE PROPER BOUNDRIES.  CHECK TO DETERMINE IF THE ATMR 144    000351
00254   145*    C     ALTITUDE INTERVALS ARE ALL 200 METERS.                          ATMR 145    000351
00254   146*    C                                                                     ATMR 146    000351
00255   147*      115 DO 116 I=2,256                                                  ATMR 147    000355
00260   148*          IF(ABS(ALT(I)-ALT(I-1)-200.).GT.2.) GO TO 135                   ATMR 148    000355
00262   149*      116 CONTINUE                                                        ATMR 149    000366
00264   150*          GO TO 270                                                       ATMR 150    000366
00265   151*      120 IRROR=-120                                                      ATMR 151    000370
00266   152*      130 CALL ERROR(PROGRM,IRROR,ISOUT)                                  ATMR 152    000373
00267   153*      135 CONTINUE                                                        ATMR 153    000377
00270   154*          GO TO (140,137),NBRNCH                                          ATMR 154    000377
00271   155*      137 IRROR=-137                                                      ATMR 155    000406
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00272    156*          GO TO 130                                                    ATMR 156    000407
00272    157*    C                                                                  ATMR 157    000407
00272    158*    C 140 THE TABLES NEED EXPANSION OR INTERVAL ADJUSTMENT             ATMR 158    000407
00272    159*    C                                                                  ATMR 159    000407
00273    160*      140 REWIND IRISE                                                 ATMR 160    000411
00273    161*    C                                                                  ATMR 161    000411
00273    162*    C     DO THE TABLES BEGIN AT -1000 METERS-                       ATMR 162    000411
00273    163*    C     IF NOT MAKE AN ENTRY AT -1000 METERS FROM THE ARDC STANDARD ATMOS.ATMR 163  000411
00273    164*    C                                                                ATMR 164    000411
00274    165*          IF(ABS(ALT(1)+1000.) .GT. 1.) GO TO 150                    ATMR 165    000415
00276    166*          ALT(1)=-1000.                                              ATMR 166    000421
00277    167*          GO TO 200                                                  ATMR 167    000425
00300    168*      150 WRITE(IRISE)ATMSUB                                         ATMR 168    000425
00303    169*      160 IGO=IGO+1                                                  ATMR 169    000435
00303    170*    C                                                                ATMR 170    000435
00303    171*    C     DO THE TABLES HAVE AN ENTRY AT     0 METERS-               ATMR 171    000435
00303    172*    C     IF NOT MAKE AN ENTRY AT     0 METERS FROM THE ARDC STANDARD ATMOS.ATMR 172  000435
00303    173*    C                                                                ATMR 173    000435
00304    174*          IF(ALT(1)    .LE. 0.001)GO TO 200                          ATMR 174    000436
00306    175*          WRITE(IRISE)ATMZRO                                         ATMR 175    000442
00311    176*          IGO=IGO+1                                                  ATMR 176    000451
00311    177*    C                                                                ATMR 177    000451
00311    178*    C     STORE THE INPUT TABLES ON TAPE                             ATMR 178    000451
00311    179*    C                                                                ATMR 179    000451
00312    180*      200 DO 210 I=1,NPVA                                            ATMR 180    000455
00315    181*      210 WRITE(IRISE)ALT(I),ATP(I),RHZ(I),ETA(I),PRS(I),GRV(I),SLM(I),ATMR 181    000462
00315    182*         1 RLH(I)                                                    ATMR 182    000462
00315    183*    C                                                                ATMR 183    000462
00315    184*    C     DO THE TABLES HAVE AN ENTRY AT 50000 METERS-               ATMR 184    000462
00315    185*    C     IF NOT MAKE AN ENTRY AT 50000 METERS FROM THE ARDC STANDARD ATMOS.ATMR 185  000462
00315    186*    C                                                                ATMR 186    000462
00330    187*          IF(ALT(NPVA) .GE. 5.E4) GO TO 220                          ATMR 187    000476
00332    188*          IF(ABS(ALT(NPVA)-5.E4).LE.50.)GO TO 220                    ATMR 188    000502
00334    189*          WRITE(IRISE)ATMMAX                                         ATMR 189    000510
00337    190*          NPVA=NPVA+1                                                ATMR 190    000517
00337    191*    C                                                                ATMR 191    000517
00337    192*    C     INITIALIZE FOR THE TABLES EXPANSION                        ATMR 192    000517
00337    193*    C                                                                ATMR 193    000517
00340    194*      220 REWIND IRISE                                               ATMR 194    000525
00341    195*          NPVA=NPVA+IGO                                              ATMR 195    000525
00342    196*          IF(NPVA-256)222,222,221                                    ATMR 196    000530
00345    197*      221 IRROR=-221                                                 ATMR 197    000535
00346    198*          GO TO 130                                                  ATMR 198    000535
00347    199*      222 DALT=200.                                                  ATMR 199    000537
00350    200*          NPV=1                                                      ATMR 200    000540
00351    201*          READ(IRISE)ALT(1),ATP(1),RHZ(1),ETA(1),PRS(1),GRV(1),SLM(1),ATMR 201    000542
00351    202*         1 RLH(1)                                                    ATMR 202    000542
00363    203*          A1=ALT(1)                                                  ATMR 203    000556
00364    204*          A2=ATP(1)                                                  ATMR 204    000560
00365    205*          A3=RHZ(1)                                                  ATMR 205    000562
00366    206*          A4=ETA(1)                                                  ATMR 206    000564
00367    207*          A5=PRS(1)                                                  ATMR 207    000566
00370    208*          A6=GRV(1)                                                  ATMR 208    000570
00371    209*          A7=SLM(1)                                                  ATMR 209    000572
00372    210*          A8=RLH(1)                                                  ATMR 210    000574
00372    211*    C                                                                ATMR 211    000574
00372    212*    C     EXPAND THE TABLES TO 256 ENTRIES IN 200 METERS INTERVALS IN ATMR 212    000574
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00372    213*      C     ALTITUDE FROM -1000 TO 50000 METERS BY LINEAR INTERPOLATION      ATMR 213    000574
00372    214*      C     FROM THE  INPUT TABLES                                          ATMR 214    000574
00372    215*      C                                                                     ATMR 215    000574
00373    216*            DO 260 I=2,256                                                  ATMR 216    000601
00376    217*            ALT(I)=ALT(I-1)+DALT                                            ATMR 217    000601
00377    218*        225 IF(A1.GE.ALT(I))GO TO 250                                       ATMR 218    000605
00401    219*            IF(ALT(I)-A1 .LT. 2.) GO TO 250                                 ATMR 219    000610
00403    220*            NPV=NPV+1                                                       ATMR 220    000615
00404    221*            IF(NPVA-NPV .GE.0)GO TO 240                                     ATMR 221    000620
00406    222*        230 IPROD=230                                                       ATMR 222    000623
00407    223*            GO TO 130                                                       ATMR 223    000626
00410    224*        240 READ(IRISE)A1,A2,A3,A4,A5,A6,A7,A8                              ATMR 224    000627
00422    225*            GO TO 225                                                       ATMR 225    000642
00423    226*        250 TERP=  DALT      /(A1-ALT(I-1))                                 ATMR 226    000644
00424    227*            ATP(I)=ATP(I-1)+TERP*(A2-ATP(I-1))                              ATMR 227    000650
00425    228*            RHZ(I)=RHZ(I-1)+TERP*(A3-RHZ(I-1))                              ATMR 228    000655
00426    229*            ETA(I)=ETA(I-1)+TERP*(A4-ETA(I-1))                              ATMR 229    000662
00427    230*            PRS(I)=PRS(I-1)+TERP*(A5-PRS(I-1))                              ATMR 230    000667
00430    231*            GRV(I)=GRV(I-1)+TERP*(A6-GRV(I-1))                              ATMR 231    000674
00431    232*            SLM(I)=SLM(I-1)+TERP*(A7-SLM(I-1))                              ATMR 232    000701
00432    233*            RLH(I)=RLH(I-1)+TERP*(A8-RLH(I-1))                              ATMR 233    000706
00433    234*        260 CONTINUE                                                        ATMR 234    000715
00435    235*            NPVA=256                                                        ATMR 235    000715
00436    236*            NBRNCH=2                                                        ATMR 236    000717
00437    237*            GO TO 111                                                       ATMR 237    000721
00440    238*        270 RETURN                                                          ATMR 238    000723
00441    239*            END                                                             ATMR 239    000771
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18

END OF COMPILATION: NO DIAGNOSTICS.

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@:FOR,S  CASSANDRA.BDAT1,R
FOR S0E3-05/11/76-11:07:10 (1,)

   BLOCK DATA

   STORAGE USED: CODE(1) 000000; DATA(0) 000000; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   CLOUD  006601


   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0003   000000 ALT       0003   000404 ATP       0003   001010 B0        0003   001011 C6        0003 R 001321 CHANGE
    0003 R 001322 CMLR      0003   001323 CX        0003   003127 C2        0003   003130 C3        0003   003131 C6
    0003   003132 DEK       0003   003133 DNID      0003   003147 DRM       0003   003150 DS        0003   003151 DST
    0003 R 003152 DST0      0003 R 003153 DST1      0003 R 003154 DST2      0003   003155 DT        0003   003156 DU
    0003   003157 DWT       0003   003160 DX        0003   003161 DZ        0003   003162 ED        0003   003163 EK
    0003   003164 EPS       0003   003165 ES        0003   003166 ETA       0003   003572 F         0003   003573 FW
    0003   003574 GRV       0003   004200 HLR       0003   004201 HOB       0003   004202 IPAM      0003   004203 IRAD
    0003   004204 KCLD      0003   004205 KDI       0003   004206 KRX       0003   004207 KS        0003   004210 KSV
    0003   004211 MCX       0003 I 004212 MWYA      0003 I 004213 N         0003   004214 NNN       0003   004215 NPVA
    0003   004216 P         0003   004217 PRS       0003   004623 PW        0003   004624 QI        0003   004625 R
    0003   004626 RA        0003   004627 RED       0003   004630 RHZ       0003   005234 RL        0003   005235 RLH
    0003   005641 RM        0003   005642 RZT       0003   005643 S         0003   005644 SAVE      0003   005645 SLDTMP
    0003   005646 SLM       0003 R 006252 SMALLT    0003   006253 SZRO      0003   006254 T         0003   006255 TE
    0003   006256 TMSD      0003   006257 U         0003   006260 V         0003   006261 VZRO      0003 R 006262 WT
    0003   006263 X         0003 R 006264 XE        0003   006265 Y         0003   006575 Z         0003   006576 ZBER
    0003   006577 ZBRSTZ    0003   006600 ZLMT

19


00101      1*          BLOCK DATA                                                                              000000
00102      2*          COMMON /CLOUD/                                                                          000000
00102      3*         1ALT(260)  ,ATP(260)  ,B0        ,C6(200)   ,CHANGE    ,CMLR      ,CPV  013  000000
00102      4*         2CX(10,90) ,C2        ,C3        ,C6        ,DEK       ,DNID(12)  ,CPV  014  000000
00102      5*         3DRM       ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,CPV  015  000000
00102      6*         4DT        ,DU        ,DWT       ,DX        ,DZ        ,ED        ,CPV  016  000000
00102      7*         5EK        ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,CPV  017  000000
00102      8*         6GRV(260)  ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD      ,CPV  018  000000
00102      9*         7KDI       ,KRX       ,KS        ,KSV       ,MCX       ,MWYA      ,CPV  019  000000
00102     10*         8N         ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,CPV  020  000000
00102     11*         9QI        ,R         ,RA        ,RED       ,RHZ(260)  ,RL        ,CPV  021  000000
00102     12*         1RLH(260)  ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,CPV  022  000000
00102     13*         2SLM(260)  ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD      ,CPV  023  000000
00102     14*         3U         ,V         ,VZRO      ,WT        ,X         ,XE        ,CPV  024  000000
00102     15*         4Y(200)    ,Z         ,ZBER      ,ZBRSTZ    ,ZLMT                 CPV  025  000000
00103     16*          DATA XE/0.0/                                                                           000000
00105     17*          DATA CHANGE,CMLR, DST0,DST1,DST2 , SMALLT , WT , N , MWYA                              000000
00105     18*         1    / 100. , 0.0,.0625,0.5 ,5.0  , 0.0   , 0.0, 1 ,    1 /                          000000
00117     19*          END                                                                                    000000


        END OF COMPILATION:        NO  DIAGNOSTICS.
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0:FOR.S  CASSANDRA.CPER.R
FOR SOFS-05/11/76-1[illegible]:07:46 (*,)


   SUBROUTINE CPER      ENTRY POINT 000205

   STORAGE USED: CODE(1) 000211; DATA(0) 000100; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323
    0004   CLOUD   006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   NWDU$
    0006   NI02$
    0007   XPRR
    0010   ALOG10
    0011   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

20  0001   000005 107G      0001   000043 127G      0001   000150 162G      0001   000130 3L        0001   00007E 701L
    0000   000025 768F      0001   000107 760L      0001   000174 8L        0001   000024 900L      0001   000014 902L
    0000   000013 963F      0000 R 000010 A         0004   000000 ALT       0004   000404 ATP       0004   001010 B0
    0000 D 000011 C         0003   000000 CAY       0000 R 000006 CDRR      0004 R 001011 CG        0004   001321 CHANGE
    0004 R 001322 CMLR      0004   001323 CX        0004   003127 C2        0004   003130 C3        0004   003131 C6
    0000 R 000012 D         0004   003132 DEK       0003   000001 DETID     0003   000015 DIAM      0003   000326 DMEAN
    0004   003133 DUID      0003   000327 DNS       0004   003147 DPM       0004   003150 DS        0004 R 003151 DST
    0004   003152 DST0      0004   003153 DST1      0004   003154 DST2      0004   003155 DT        0004   003156 DU
    0004   003157 DWT       0004   003160 DX        0004   003161 D7        0004   003162 ED        0004   003163 EK
    0004   003164 EPS       0004   003165 ES        0004   003166 ETA       0003   000330 EXP0      0004   003572 F
    0003   000331 FMASS     0000 R 000002 FROG      0004   003573 FW        0004   003574 GPV       0003   001170 HEIGHT
    0004   004200 HLR       0004   004201 HOB       0003   000641 IDISTR    0003   000642 IEXEC     0000   000070 INJP$
    0004   004202 IPAM      0004   004203 IRAD      0003   000643 IRISE     0003   000644 ISIN      0003 I 000645 ISOUT
    0000 I 000000 J         0004   004204 KCLD      0004   004205 KDI       0004   004206 KRX       0004   004207 KS
    0004   004210 KSV       0004   004211 MCX       0004 I 004212 MWYA      0004   004213 N         0003 I 000646 NDSTR
    0003   001172 NH000     0004   004214 NNN       0004   004215 NPVA      0004   004216 P         0004   004217 PRS
    0003 D 000647 PS        0000 R 000003 PSIZE     0004   004623 PW        0004   004624 QT        0000 R 000007 QLOGA
    0004 R 004625 R         0004 R 004626 RA        0004 R 004627 RED       0004   004630 RH2       0004   005234 RL
    0004   005235 RLH       0004   005641 RM        0004   005642 R2T       0004   005643 S         0004   005644 SAVE
    0003   001157 SD        0004   005645 SLDTMP    0004   005646 SLM       0004   006252 SMALLT    0003   001160 SSAM
    0004   006253 SZR0      0004 R 006254 T         0004   006255 TE        0003   001161 TME       0003   001162 TMP1
    0003   001163 TMP2      0004   006256 TMSD      0003   001164 T2M       0004   006257 U         0003   001165 USOIL
    0004 R 006260 V         0000 R 000001 VIS       0000 R 000004 V0        0003   001166 VPR       0003   001503 VX
    0003   002013 VY        0004   006261 VZR0      0000 R 000005 V1        0003   001167 W         0004   006262 WT
    0004   006263 X         0004   006264 XE        0004 R 006265 Y         0004 R 006575 Z         0004   006576 ZBER
    0004   006577 ZBRSTZ    0004   006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV


00101      1*            SUBROUTINE CPER                                                CPER 001    00000E
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00101      C                                                                          CPFR 002    000005
00101      C ***********************************************************************CPFR 003    000005
00101      C                                                                          CPFR 004    000005
00101      C     CPFR COMPUTES PARTICLE FALLOUT RATE                                  CPFR 005    000005
00101      C                                                                          CPFR 006    000005
00101      C ***********************************************************************CPFR 007    000005
00101      C                                                                          CPFR 008    000005
00103            COMMON /SET1/                                                        CPFR 009    000005
00103           1CAY        ,DETID(12)  ,DIAM(201)  ,DMEAN      ,DNS        ,EXPO     ,CPFR 010    000005
00103           2FMASS(200),IDISTR     ,IEXEC      ,IRISE      ,ISIN       ,TSOUT    ,CPFR 011    000005
00103           3NDSTR      ,PS(200)    ,SD         ,SSAM       ,TME        ,TMP1     ,CPFR 012    000005
00103           4TMP2       ,T2M        ,USOIL      ,VPR        ,W          ,HEIGHT   ,CPFR 013    000005
00103           5ZSCL       ,NHODO      ,ZV(200)    ,VX(200)    ,VY(200)              CPFR 014    000005
00104            COMMON /CLOUD/                                                       CPFR 015    000005
00104           1ALT(260)   ,ATP(260)   ,B0         ,CG(200)    ,CHANGE     ,CMLR     ,CPFR 016    000005
00104           2CX(10,90)  ,C2         ,C3         ,C6         ,DEK        ,DNID(12) ,CPFR 017    000005
00104           3DRM        ,DS         ,DST        ,DST0       ,DST1       ,DST2     ,CPFR 018    000005
00104           4DT         ,DU         ,DWT        ,DX         ,DZ         ,FD       ,CPFR 019    000005
00104           5EK         ,EPS        ,ES         ,ETA(260)   ,F          ,FW       ,CPFR 020    000005
00104           6GRV(260)   ,HLR        ,HOB        ,IPAM       ,IRAD       ,XCLD     ,CPFR 021    000005
00104           7KDI        ,KRX        ,KS         ,KSV        ,MCX        ,MWYA     ,CPFR 022    000005
00104           8N          ,NNN        ,NPVA       ,P          ,PRS(260)   ,PW       ,CPFR 023    000005
00104           9QI         ,R          ,RA         ,RFD        ,RHZ(260)   ,RL       ,CPFR 024    000005
00104           1RLH(260)   ,RM         ,RZT        ,S          ,SAVF       ,SLDTMP   ,CPFR 025    000005
00104           2SLM(260)   ,SMALLT     ,SZRO       ,T          ,TE         ,TMSD     ,CPFR 026    000005
00104           3U          ,V          ,VZRO       ,WT         ,X          ,XE       ,CPFR 027    000005
00104           4Y(200)     ,Z          ,ZBFR       ,ZBRSTZ     ,ZLMT                 CPFR 028    000005
00104      C                                                                          CPFR 029    000005
00104      C ***********************************************************************CPFR 030    000005
00104      C                                                                          CPFR 031    000005
00104      C ***********************************************************************CPFR 032    000005
00104      C                                                                          CPFR 033    000005
00104      C ***********************************************************************CPFR 034    000005
00105        903 FORMAT (1H1//////////                                                CPFR 035    000005
00105           1  20X30HNEGATIVE PARTICLE DENSITY                            /////) CPFR 036    000005
00105      C                                         TEST FOR IMPOSSIBLE PARTICLE     CPFR 037    000005
00106            DO 901 J=1,NDSTR                                                     CPFR 038    000005
00111                IF(Y(J)) 902, 901, 901                                           CPFR 039    000005
00114      901       CONTINUE                                                         CPFR 040    000012
00116                GO TO 900                                                        CPFR 041    000012
00117        902 WRITE(ISOUT,903)                                                     CPFR 042    000014
00121            MWYA = 3                                                             CPFR 043    000020
00122            GO TO 008                                                            CPFR 044    000022
00123      900       CONTINUE                                                         CPFR 045    000024
00123      C                                                                          CPFR 046    000024
00123      C     COMPUTE PARTICLE FALLOUT RATES                                       CPFR 047    000024
00123      C                                                                          CPFR 048    000024
00124            VIS=1.458E-6*T**1.5/(110.4+T)                                        CPFR 049    000024
00125            FROG=1.3066667E-17*RFD                                               CPFR 050    000035
00126            DO 3 J=1,NDSTR                                                       CPFR 051    000043
00131            PSIZE=PS(J)*1.0E+6                                                   CPFR 052    000043
00132            VO=PSIZE/VIS                                                         CPFR 053    000045
00133            V1=PSIZE*VO*FROG                                                     CPFR 054    000047
00134            CDRR=V1*VO*RA                                                        CPFR 055    000052
00135            IF(CDRR-140.0)701,701,749                                            CPFR 056    000055
00140        749 IF(CDRR-4.5E+7)760,751,751                                           CPFR 057    000060
00143        751 WRITE(ISOUT,758)PSIZE,Z                                              CPFR 058    000064
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00147     59*       760 FORMAT(///'DAVIES EQUATIONS ARE INACCURATE FOR ',F12.3,'MICROMETERS CPER 059    00007
00147     60*          1AT',F12.3,'METERS')                                                  CPER 060    00007
00150     61*           GO TO 760                                                            CPER 061    00007
00151     62*       761 CS(J)=V1*(41666.7+CORR*(-2.3363E+2+CORR*(2.0154-6.9105E-3*CORR)))    CPER 062    00007
00152     63*           GO TO 3                                                              CPER 063    00010
00153     64*       762 QLOGA=ALOG10(CORR)-20.773                                            CPER 064    00010
00154     65*           CS(J)=50657.0*V1*CORR**((QLOGA*QLOGA-443.98)*0.0011235)              CPER 065    00011
00155     66*         3 CS(J)=CS(J)*(1.0+0.233/(PSIZE*RA))                                   CPER 066    00013
00155     67*       C                                                                        CPER 067    00013
00155     68*       C     COMPUTE OVERALL LOSS RATE OF FALLOUT FROM THE CLOUD AND ADJUST     CPER 068    00013
00155     69*       C     IN-CLOUD PARTICLE CONCENTRATIONS                                   CPER 069    00013
00155     70*       C                                                                        CPER 070    00013
00157     71*           CMLR=0.                                                              CPER 071    00013
00160     72*           A=3.1415927*R**2*DST                                                 CPER 072    00014
00161     73*           DO 1 J=1,NDSTR                                                       CPER 073    00015
00164     74*           C=0.523598*PS(J)**3                                                  CPER 074    00015
00165     75*           D=A*CS(J)                                                            CPER 075    00015
00166     76*           CMLR=CMLR+C*D*Y(J)                                                   CPER 076    00015
00167     77*         1 Y(J)=Y(J)*(1.-D/V)                                                   CPER 077    00016
00171     78*           CMLR=CMLR*RFD/DST                                                    CPER 078    00017
00172     79*       DOB RETURN                                                               CPER 079    00017
00173     80*           END                                                                  CPER 080    00021
```

END OF COMPILATION: NO DIAGNOSTICS.

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0:FOR,S  CASSANDRA.CPVX,R
FOR SOE3-06/11/76-10:09:28 (1,)

   SUBROUTINE CPV        ENTRY POINT 000506

   STORAGE USED: CODE(1) 000514; DATA(0) 000113; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   TRPL
    0006   XPRR
    0007   EXP
    0010   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000250 17L      0001   000424 176G     0001   000011 21L      0001   000017 22L      0001   000060 25L
    0001   000066 26L      0001   000167 6L       0001   000203 7L       0004 R 000000 ALT      0004 R 000404 ATP
    0004 R 001010 B0       0003   000000 CAY      0004 R 001011 CG       0004   001321 CHANGE   0004   001322 CMLR
    0004   001323 CX       0004 R 003127 C2       0004 R 003130 C3       0004 R 003131 C6       0004   003132 DEK
    0003   000001 DETID    0003   000015 DIAM     0003   000326 DMEAN    0004   003133 DNID     0003   000327 DNS
    0004   003147 DRM      0004   003150 DS       0004 R 003151 DST      0004 R 003152 DST0     0004   003153 DST1
    0004   003154 DST2     0004   003155 DT       0004   003156 DU       0004   003157 DWT      0004   003160 DX
    0004   003161 DZ       0004   003162 ED       0004 R 003163 EK       0004 R 003164 EPS      0004   003165 ES
    0004   003166 ETA      0003   000330 EXPO     0004 R 003572 F        0003 R 000331 FMASS    0000 R 000004 FQ
    0004   003573 FW       0004   003574 GRV      0003 R 001170 HEIGHT   0004 R 004200 HLR      0004   004201 HOR
    0003   000641 IDISTR    0003   000642 IEXEC    0000   000076 INJP$    0004   004202 IPAM     0004   004203 IRAD
    0003   000643 IRISE     0003   000644 ISIN     0003   000645 ISOUT    0000 I 000010 J        0004   004204 KCLD
    0004   004205 KDI      0004   004206 KRX      0004   004207 KS       0004   004210 KSV      0004   004211 MCX
    0004   004212 MWYA     0004   004213 N        0003 I 000646 NDSTR    0003   001172 NHODO    0004   004214 NNN
    0004 I 004215 NPVA     0000 R 000000 O        0004 R 004216 P        0003 R 001164 PHI      0004 R 004217 PRS
    0003 R 000647 PS       0004   004623 PW       0000 R 000007 Q        0004 R 004624 QT       0004 R 004625 R
    0004   004626 RA       0004 R 004627 RED      0004   004630 RHZ      0004 R 005234 RL       0004 R 005235 RLH
    0004 R 005641 RM       0000 R 000005 RMAO     0000 R 000006 RMWO     0004 R 005642 RZT      0004 R 005643 S
    0004   005644 SAVE     0003   001157 SD       0004   005645 SLDTMP   0004   005646 SLM      0004   006252 SMALLT
    0000 R 000003 SOILHT    0003 R 001160 SSAM     0004 R 006253 SZRO     0004 R 006254 T        0000 R 000001 TAD
    0004 R 006255 TE       0003 R 001161 TME      0003 R 001162 TMP1     0003 R 001163 TMP2     0004   006256 TMSD
    0000 R 000002 TPR      0004 R 006257 U        0003   001165 USOIL    0004 R 006260 V        0003   001166 VPR
    0003   001503 VX       0003   002013 VY       0004 R 006261 VZRO     0003 R 001167 W        0004   006262 WT
    0004 R 006263 X        0004 R 006264 XE       0004 R 006265 Y        0004 R 006575 Z        0004   006576 ZBER
    0004 R 006577 ZBRSTZ    0004 R 006600 ZLMT     0003   001171 ZSCL     0003   001173 ZV

00101      1*           SUBROUTINE CPV                                                    CPV  001    000000
00101      2*     C                                                                       CPV  002    000000
00101      3*     C     13 OCTOBER 1970                                                   CPV  003    000000
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00101     4*      C                                                                       CPV  004     00000n
00101     5*      C     INITIALIZE CLOUD AND PARTICLE VARIABLES                           CPV  005     00000n
00103     6*            COMMON /SET1/                                                     CPV  006     00000n
00103     7*           1CAY          ,DETID(12) ,DIAM(200) ,DMEAN      ,DNS      ,EXPO  ,CPV  007     00000n
00103     8*           2EMASS(200),IDIST0       ,IEXEC     ,IRISE     ,ISIN     ,ISOUT ,CPV  008     00000n
00103     9*           3NDST2        ,PS(200)   ,SD        ,SSAM      ,TME      ,TMP1  ,CPV  009     00000n
00103    10*           4TMP2         ,PHI       ,USOIL     ,VPR       ,W        ,HEIGHT,CPV  010     00000n
00103    11*           5ZSCL         ,NH200     ,ZV(200)   ,VX(200)   ,VY(200)          CPV  011     00000n
00104    12*            COMMON /CLOUD/                                                   CPV  012     00000n
00104    13*           1ALT(260)     ,ATP(260)  ,B0        ,CG(200)   ,CHANGE   ,CMLR  ,CPV  013     00000n
00104    14*           2CX(10,90)    ,C2        ,C3        ,C6        ,DEK      ,DNID(12),CPV  014     00000n
00104    15*           3DRM          ,DS        ,DST       ,DST0      ,DST1     ,DST2  ,CPV  015     00000n
00104    16*           4DT           ,DU        ,DWT       ,DX        ,DZ       ,ED    ,CPV  016     00000n
00104    17*           5EK           ,EPS       ,ES        ,ETA(260)  ,F        ,FW    ,CPV  017     00000n
00104    18*           6GRV(260)     ,HLR       ,HOR       ,IPAM      ,IRAD     ,KCLD  ,CPV  018     00000n
00104    19*           7KDI          ,KRX       ,KS        ,KSV       ,MCX      ,MWYA  ,CPV  019     00000n
00104    20*           8N            ,NNN       ,NPVA      ,P         ,PRS(260) ,PW    ,CPV  020     00000n
00104    21*           9QT           ,R         ,RA        ,RED       ,RHZ(260) ,RL    ,CPV  021     00000n
00104    22*           1RLH(260)     ,RM        ,RZT       ,S         ,SAVE     ,SLDTMP,CPV  022     00000n
00104    23*           2SLM(260)     ,SMALLT    ,SZRO      ,T         ,TE       ,TMSO  ,CPV  023     00000n
00104    24*           3U            ,V         ,VZRO      ,WT        ,X        ,XE    ,CPV  024     00000n
00104    25*           4Y(200)       ,Z         ,ZBER      ,ZBRSTZ    ,ZLMT           CPV  025     00000n
00104    26*      C                                                                       CPV  026     00000n
00104    27*      C                                                                       CPV  027     00000n
00104    28*      C                                                                                    00000n
00104    29*      C                                                                                    00000n
00104    30*      C                                                                       CPV  030     00000n
00104    31*      C                                                                       CPV  031     00000n
00104    32*      C                                                                       CPV  032     00000n
00105    33*            DST=DST0                                                          CPV  033     00000n
00106    34*            IF(W-0.55)20,21,21                                                CPV  034     00000l
00111    35*         20 C2=0.075                                                          CPV  035     00000s
00112    36*            GO TO 22                                                          CPV  036     00000w
00113    37*         21 C2=0.065*W**(-.24)                                                CPV  037     00001l
00114    38*         22 C3=0.175                                                          CPV  038     00001w
00115    39*            C6=1.0                                                            CPV  039     00002n
00115    40*      C                                                                       CPV  040     00002n
00116    41*            T=TMP1                                                            CPV  041     00002s
00116    42*      C                                                                       CPV  042     00002s
00116    43*      C     COMPUTE INITIAL RISE VELOCITY                                     CPV  043     00002s
00116    44*      C                                                                       CPV  044     00002s
00117    45*            D=0.409*W**0.071-1.0                                              CPV  045     00002w
00120    46*            U=(243.*W**0.018)*(TME**D)                                        CPV  046     00003x
00120    47*      C                                                                       CPV  047     00003x
00120    48*      C     COMPUTE INITIAL TURBULENT KINETIC ENERGY DENSITY                  CPV  048     00003x
00120    49*      C                                                                       CPV  049     00003x
00121    50*            EK=0.5*U**2                                                       CPV  050     00004w
00121    51*      C                                                                       CPV  051     00004w
00121    52*      C     COMPUTE FRACTION OF DETONATION ENERGY YIELD IN CLOUD              CPV  052     00004w
00121    53*      C     AT INITIAL TIME                                                   CPV  053     00004w
00121    54*      C                                                                       CPV  054     00004w
00121    55*      C     IS THIS A HIGH EXPLOSIVE BURST                                                 00004w
00122    56*            IF( F.EQ. 0.0  )  GO TO 25                                                     00005s
00124    57*            F=1.0                                                                          00005w
00125    58*            GO TO 26                                                                       00005x
00126    59*         25 CONTINUE                                                                       00006n
00127    60*            F=0.4406*W**0.01422                                               CPV  055     00006n
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00127     61*     C                                                                CPV  056    000060
00130     62*        26 CONTINUE                                                            000066
00130     63*     C     COMPUTE CLOUD CENTER HEIGHT, VOLUME, RADII, INITIAL MIXING RATIOS CPV  057    000066
00130     64*     C                                                                CPV  058    000066
00131     65*           Z=HEIGHT+ZBRSTZ+108.*W**0.349                              CPV  059    000066
00132     66*           CALL TRPL(Z,NPVA,ALT,ATP,TE)                               CPV  060    000076
00133     67*           CALL TRPL(Z,NPVA,ALT,PRS,P)                                CPV  061    000106
00134     68*           CALL TRPL(Z,NPVA,ALT,RLH,HLR)                              CPV  062    000114
00135     69*           P=P*100.                                                   CPV  063    000123
00136     70*           XE=109.98*HLR*(TE/273.)**(-5.13)*EXP((25.*(TE-273.))/TE)/(P*29.)  CPV  064    000126
00136     71*     C                                                                CPV  065    000126
00137     72*           TAD=0.                                                     CPV  066    000154
00140     73*           IF(TMP2-848.)5,5,6                                         CPV  067    000157
00143     74*         5 TPR=TMP2                                                   CPV  068    000163
00144     75*           GO TO 7                                                    CPV  069    000166
00145     76*         6 TPR=848.                                                   CPV  070    000167
00146     77*           TAD=1003.8*(TMP2-TPR)+0.06755*(TMP2**2-TPR**2)             CPV  071    000170
00147     78*         7 SOILHT=SSAM*(TAD+781.6*(TPR-TE)+0.2856*(TPR**2-TE**2)+     CPV  072    000203
00147     79*          11.881E+7*(1./TPR-1./TE))                                   CPV  073    000203
00150     80*           TAD=0.                                                     CPV  074    000226
00151     81*           TPR=T                                                      CPV  075    000227
00152     82*           IF(TPR-2300.)17,17,16                                      CPV  076    000231
00155     83*        16 TAD= -3587.5*(TPR-2300.) + 1.0625*(TPR**2-(2300.)**2)      CPV  077    000234
00156     84*           TPR=2300.                                                  CPV  078    000245
00157     85*        17 FQ=4.18E12*F*W-SOILHT                                      CPV  079    000250
00160     86*           RMAO=PHI*FQ/(TAD+946.6*(TPR-TE)+0.00855*(TPR**2-TE**2)+XE*(1697.66CPV  080    000254
00160     87*          1 *(T-TE) +0.572087*(T**2-TE**2)))                          CPV  081    000254
00161     88*           RMWO=FQ*(1.-PHI)/(1697.66*(T-TE)+0.572087*(T**2-TE**2)+2.5E6)  CPV  082    000306
00161     89*          1  +RMAO*XE                                                 CPV  083    000306
00162     90*           X=RMWO/RMAO                                                CPV  084    000317
00163     91*           V=(RMAO+RMWO)*287.*T*(1.+29.*X/18.)/(P*(1.+X))             CPV  085    000321
00164     92*           VZRO=V                                                     CPV  086    000340
00165     93*           R=(3.*V/(12.5663706*0.66145))**(1.0/3.0)                   CPV  087    000341
00166     94*           RZT=0.66145*R                                              CPV  088    000351
00167     95*           RM=RMAO+RMWO+SSAM                                          CPV  089    000353
00170     96*           S=SSAM/RMAO                                                CPV  090    000356
00171     97*           EPS=C3*(2.*EK)**1.5/RZT                                    CPV  091    000361
00171     98*     C     COMPUTE PARAMETERS USED FOR VERTICAL CLOUD RADIUS COMPUTATIONS  CPV  092    000361
00171     99*     C                                                                CPV  093    000361
00172    100*           RL=0.092*W**0.130                                          CPV  094    000375
00173    101*           BO=Z-RZT/RL                                                CPV  095    000401
00173    102*     C                                                                CPV  096    000401
00173    103*     C     COMPUTE INITIAL IN-CLOUD PARTICLE CONCENTRATIONS           CPV  097    000401
00173    104*     C                                                                CPV  098    000401
00174    105*           Q=S/(1.0+X+S)*RM/(V*RFD*0.5235988)                         CPV  099    000405
00175    106*           DO 801 J=1,NDSTR                                           CPV  100    000424
00200    107*           Y(J)=EMASS(J)*Q/PS(J)**3                                   CPV  101    000424
00201    108*       801 CG(J)=0.                                                   CPV  102    000432
00203    109*           SZRO=S                                                     CPV  103    000434
00204    110*           QI=0.5*(RM-SSAM)*T*(18.+29.*X)*(1.+YE)/(TE*(18.+29.*XE)*(1.+X))  CPV  104    000436
00205    111*           QI=QI*(1.+X)/(1.+X+S)                                      CPV  105    000460
00205    112*     C     UPPER LIMIT FOR Z TO PREVENT PROGRAM RUNAWAY               CPV  106    000460
00205    113*     C                                                                CPV  107    000460
00206    114*           ZLMT=10000.0*W**0.25                                       CPV  108    000464
00207    115*           RETURN                                                     CPV  109    000472
00210    116*           END                                                        CPV  110    000513
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Q:FOR,S  C/SSANDRA.CRMW,R
FOR S0E3-0*/11/76-10:09:42 (*,)

   SUBROUTINE CRMW      ENTRY POINT 000103

   STORAGE USED: CODE(1) 000111; DATA(0) 000152; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323
    0004   CLOUD   006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   NWDU$
    0006   NIO2$
    0007   NERR2$
    0010   ALOG
    0011   EXP
    0012   NIO1$
    0013   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000020 1L        0001   000056 1246      0001   000062 127G      0001   000047 2L        0000   000105 20F
    0000   000005 3F        0000   000043 8F        0004   000000 ALT       0004   000404 ATD       0000 R 000001 BARMU
    0004   001010 BD        0003   000000 CAY       0004   001011 CG        0004   001321 CHANGF    0004   001322 CMLR
    0004 R 001323 CX        0004   003127 C2        0004   003130 C3        0004   003131 C6        0004   003132 DEK
    0003   000001 DETID     0003   000015 DIAM      0003 R 000326 DMEAN     0004   003133 DNID      0003   000327 DNS
    0004   003147 DRM       0004   003150 DS        0004   003151 DST       0004   003152 DST0      0004   003153 DST1
    0004   003154 DST2      0004   003155 DT        0004   003156 DU        0004   003157 DWT       0004   003160 DX
    0004   003161 DZ        0004   003162 ED        0004   003163 EK        0000 R 000002 EMU       0004   003164 EPS
    0004   003165 ES        0004   003166 ETA       0003   000330 EXPO      0004   003572 F         0003   000331 FMASS
    0004   003573 FV        0004   003574 GRV       0003   001170 HEIGHT    0004   004200 HLR       0004   004201 HOB
    0000 I 000004 I         0003 I 000641 IDISTR    0003   000642 IEXEC     0000   000137 INJP$     0004   004202 IPAM
    0004   004203 IRAD      0003   000643 IRISE     0003   000644 ISIN      0003 I 000645 ISOUT     0000 I 000003 J
    0004   004204 KCLD      0004   004205 KDI       0004   004206 KRX       0004   004207 KS        0004   004210 KSV
    0004 I 004211 MCX       0004   004212 MWYA      0004   004213 N         0003   000646 NDSTR     0003   001172 NHODO
    0004   004214 NNN       0004   004215 NPVA      0004   004216 P         0004   004217 PRS       0003   000647 PS
    0004   004623 PW        0004   004624 QI        0004   004625 R         0004   004626 RA        0004   004627 RED
    0004   004630 RHZ       0004   005234 RL        0004   005235 RLH       0004   005641 RM        0004   005642 RZT
    0004   005643 S         0004   005644 SAVE      0003 R 001157 SD        0000 R 000000 SIGMA     0004   005645 SLDTMP
    0004   005646 SLM       0004   006252 SMALLT    0003   001160 SSAM      0004   006253 SZRO      0004   006254 T
    0004   006255 TF        0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2      0004   006256 TMSD
    0003   001164 T2M       0004   006257 U         0003   001165 USOIL     0004   006260 V         0003   001166 VPR
    0003   001503 VX        0003   002013 VY        0004   006261 VZRO      0003   001167 W         0004   006262 WT
    0004   006263 X         0004   006264 XE        0004   006265 Y         0004   006575 Z         0004   006576 ZBER
    0004   006577 ZBRSTZ    0004   006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV

00101      1*          SUBROUTINE CRMW                                                    CRMW 001    000000
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00101     2*      C                                                                       CRMW 002    00000?
00101     3*      C ***********************************************************************CRMW 003    00000?
00101     4*      C                                                                       CRMW 004    00000?
00101     5*      C     CRMW PRINTS SUMMARY OF OUTPUT OF THE CLOUD RISE MODULE.           CRMW 005    00000?
00101     6*      C                                                                       CRMW 006    00000?
00101     7*      C ***********************************************************************CRMW 007    00000?
00101     8*      C                                                                       CRMW 008    00000?
00103     9*            COMMON /SET1/                                                     CRMW 009    00000?
00103    10*           1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,CRMW 010    00000?
00103    11*           2EMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT    ,CRMW 011    00000?
00103    12*           3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1     ,CRMW 012    00000?
00103    13*           4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT   ,CRMW 013    00000?
00103    14*           5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)             CRMW 014    00000?
00104    15*            COMMON /CLOUD/                                                   CRMW 015    00000?
00104    16*           1ALT(260)  ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR     ,CRMW 016    00000?
00104    17*           2CX(10,90) ,C2        ,C3        ,C6        ,DEK       ,DNID(12) ,CRMW 017    00000?
00104    18*           3DRM       ,DS        ,DST       ,DST0      ,DST1      ,DST2     ,CRMW 018    00000?
00104    19*           4DT        ,DU        ,DWT       ,DX        ,DZ        ,ED       ,CRMW 019    00000?
00104    20*           5EK        ,EPS       ,ES        ,ETA(260)  ,F         ,FW       ,CRMW 020    00000?
00104    21*           6GRV(260)  ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD     ,CRMW 021    00000?
00104    22*           7KDI       ,KRX       ,KS        ,KSV       ,MCX       ,MWYA     ,CRMW 022    00000?
00104    23*           8N         ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW       ,CRMW 023    00000?
00104    24*           9QI        ,R         ,RA        ,RED       ,RHZ(260)  ,RL       ,CRMW 024    00000?
00104    25*           1RLH(260)  ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP   ,CRMW 025    00000?
00104    26*           2SLM(260)  ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD     ,CRMW 026    00000?
00104    27*           3U         ,V         ,VZRO      ,WT        ,X         ,XE       ,CRMW 027    00000?
00104    28*           4Y(200)    ,Z         ,ZBFR      ,ZBRSTZ    ,ZLMT                CRMW 028    00000?
00104    29*     C                                                                       CRMW 029    00000?
00104    30*     C ***********************************************************************CRMW 030    00000?
00104    31*     C                                                                       CRMW 031    00000?
00105    32*           3 FORMAT(//,10X,'PARAMETERS FOR THE LOGNORMAL PARTICLE DIAMETER-MASSCRMW 032    00000?
00105    33*            1 FREQUENCY DISTRIBUTION'/10X,'GEOMETRIC MEAN =',E12.5,'MICROMETERSCRMW 033    00000?
00105    34*            2',10X,'GEOMETRIC STANDARD DEVIATION =',E12.5)                   CRMW 034    00000?
00106    35*         008 FORMAT (1H1 /////                                               CRMW 035    00000?
00106    36*           1  10X41HCLOUD RISE AND EXPANSION HISTORY TABLE CX//1X)           CRMW 036    00000?
00107    37*          20 FORMAT(                                                         CRMW 037    00000?
00107    38*           1  49X19HCLOUD HISTORY TABLE//                                   CRMW 038    00000?
00107    39*           1  5X5(3X5HCLOUD, 3X), 3X4HBASE, 8X3HTOP, 7X6HRADIAL,            CRMW 039    00000?
00107    40*           2  3X11HTEMPERATURE,4X, 3HGAS/                                   CRMW 040    00000?
00107    41*           3  8X4HTIME, 5X8HINTERVAL, 5X4HBASE, 8X3HTOP, 6X6HRADIUS,        CRMW 041    00000?
00107    42*           4  3X3(3X4HRATE, 4X), 14X, 7HDENSITY/                           CRMW 042    00000?
00107    43*           5  5X3(3X5H(SEC), 3X), 3(4X3H(M), 4X), 3(2X7H(M/SEC), 2X),4X,   CRMW 043    00000?
00107    44*           6  3H(K),5X10H (KG/M**3)// (1X12, 1H), 1X, 1P10E11.4))          CRMW 044    00000?
00107    45*     C                                                                       CRMW 045    00000?
00107    46*     C ***********************************************************************CRMW 046    00000?
00107    47*     C ***********************************************************************CRMW 047    00000?
00107    48*     C                                                                       CRMW 048    00000?
00110    49*           WRITE(ISOUT,8)                                                    CRMW 049    00000?
00112    50*           GO TO (1,2,2),IDISTR                                              CRMW 050    00000?
00113    51*         1 SIGMA=ALOG(SD)                                                    CRMW 051    00002?
00114    52*           BARMU=ALOG(DMEAN)+3.*SIGMA**2                                     CRMW 052    00002?
00115    53*           EMU=EXP(BARMU)                                                    CRMW 053    00003?
00116    54*           WRITE(ISOUT,3)EMU,SD                                              CRMW 054    00003?
00122    55*         2 WRITE(ISOUT,20)(J,(CX(I,J),I=1,10),J=1,MCX)                       CRMW 055    00004?
00134    56*           RETURN                                                            CRMW 056    00006?
00135    57*           END                                                               CRMW 057    00011?
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D:FOR.S  CROSSAN.DRA.cPRX.R
FOR SOES-06/11/76-11:10:08 (*)

   SUBROUTINE CRM        ENTRY POINT 000221

   STORAGE USED: CODE(1) 000235; DATA(0) 000046; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323
    0004   CLOUD   006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   CPV
    0006   RSTR
    0007   RKGILL
    0010   CPFR
    0011   DBG
    0012   DCSN
    0013   CXPN
    0014   CRMW
    0015   NWDU$
    0016   NIO2$
    0017   EXP
    0020   XPRR
    0021   NERR2$
    0022   SQRT
    0023   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000167 1146L      0001   000105 126G       0001   000165 146L       0001   000206 148L       0001   000065 150L
    0001   000144 1531L      0001   000073 1532L      0001   000010 35L        0000   000002 532F       0001   000203 724L
    0001   000171 8L         0001   000127 87L        0001   000131 88L        0001   000156 901L       0004   000000 ALT
    0004   000404 ATP        0004   001010 B0         0003   000000 CAY        0004   001011 CG         0004   001321 CHANGE
    0004   001322 CMLR       0004   001323 CX         0004   003127 C2         0004   003130 C3         0004   003131 C6
    0004   003132 DEK        0003   000001 DETID      0003   000015 DIAM       0003   000326 DMEAN      0004   003133 DNID
    0003   000327 DNS        0004   003147 DRM        0004   003150 DS         0004 R 003151 DST        0004   003152 DST0
    0004 R 003153 DST1       0004   003154 DST2       0004   003155 DT         0004   003156 DU         0004   003157 DWT
    0004   003160 DX         0004   003161 DZ         0004   003162 ED         0004   003163 EK         0004   003164 EPS
    0004 R 003165 ES         0004   003166 ETA        0003   000330 EXPO       0004 R 003572 F          0003   000331 FMASS
    0004   003573 FW         0004   003574 GRV        0003   001170 HEIGHT     0004   004200 HLR        0004   004201 HOR
    0003   000641 INISTR     0003   000642 IEXEC      0000   000036 INJP$      0004   004202 IPAM       0004   004203 IRAD
    0003   000643 IRISE      0003   000644 ISIN       0003 I 000645 ISOUT      0000 I 000001 J          0004 I 004204 KCLD
    0004   004205 KDI        0004   004206 KRX        0004   004207 KS         0004 I 004210 KSV        0004   004211 MCX
    0004 I 004212 MWYA       0004 I 004213 N          0003 I 000646 NDSTR      0003   001172 NHODO      0004   004214 NNN
    0004   004215 NPVA       0004 R 004216 P          0004   004217 PRS        0003   000647 PS         0004 R 004623 PW
    0004   004624 QI         0004 R 004625 R          0004 R 004626 RA         0004   004627 RED        0004   004630 RHZ
    0004   005234 RL         0004   005235 RLH        0004 R 005641 RM         0004 R 005642 RZT        0004 R 005643 S
    0004   005644 SAVE       0003   001157 SD         0004   005645 SLDTMP     0004   005646 SLM        0004 R 006252 SMALLT
    0003   001160 SSAM       0004   006253 SZRO       0004 R 006254 T          0004   006255 TE         0003   001161 TME
    0003   001162 TMP1       0003   001163 TMP2       0004   006256 TMSD       0003   001164 T2M        0004   006257 U
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0003   001165 USOIL     0004 R 006260 V         0003   001166 VPR       0000 R 000000 VTEMPY    0003   001503 VX
0003   002013 VY        0004   006261 VZRO      0003   001167 W         0004 R 006262 WT        0004 R 006263 X
0004   006264 XE        0004 R 006265 Y         0004   006575 Z         0004   006576 ZBFR      0004   006577 ZBRSTZ
0004   006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV
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00101    1*          SUBROUTINE CRM                                                          CRM  001    00000n
00101    2*     C                                                                            CRM  002    00000n
00103    3*          COMMON /SET1/                                                           CRM  003    00000n
00103    4*         1CAY        ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,CRM  004    00000n
00103    5*         2EVASS(200),IDISTR     ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,CRM  005    00000n
00103    6*         3NDSTR      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,CRM  006    00000n
00103    7*         4TMP2       ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,CRM  007    00000n
00103    8*         5ZSCL       ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)               CRM  008    00000n
00104    9*          COMMON /CLOUD/                                                          CRM  009    00000n
00104   10*         1ALT(260)   ,ATP(260)  ,BO        ,CG(200)   ,CHANGE    ,CMLR      ,CRM  010    00000n
00104   11*         2CX(10,90)  ,C2        ,C3        ,C6        ,DEK       ,DNID(12)  ,CRM  011    00000n
00104   12*         3DRM        ,DS        ,DST       ,DSTO      ,DST1      ,DST2      ,CRM  012    00000n
00104   13*         4DT         ,DU        ,DWT       ,DX        ,DZ        ,ED        ,CRM  013    00000n
00104   14*         5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,CRM  014    00000n
00104   15*         6GRV(260)   ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD      ,CRM  015    00000n
00104   16*         7KOI        ,KRX       ,KS        ,KSV       ,MCX       ,MWYA      ,CRM  016    00000n
00104   17*         8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,CRM  017    00000n
00104   18*         9QI         ,R         ,RA        ,RED       ,RHZ(260)  ,RL        ,CRM  018    00000n
00104   19*         1RLH(260)   ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,CRM  019    00000n
00104   20*         2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD      ,CRM  020    00000n
00104   21*         3U          ,V         ,VZRO      ,WT        ,X         ,XE        ,CRM  021    00000n
00104   22*         4Y(200)     ,Z         ,ZBFR      ,ZBRSTZ    ,ZLMT                 CRM  022    00000n
00104   23*     C                                                                            CRM  023    00000n
00105   24*       532 FORMAT('1',,9X,'FRACTION OF THE DETONATION ENERGY YIELD IN THE CLOUCRM  024    00000n
00105   25*          1D AT INITIAL TIME IS',E12.5)                                           CRM  025    00000n
00105   26*     C                                                                            CRM  026    00000n
00105   27*     C    CALL CPV TO SET UP THE INITIAL CLOUD VARIABLES                          CRM  027    00000n
00105   28*     C                                                                            CRM  028    00000n
00106   29*          CALL CPV                                                                CRM  029    00000n
00106   30*     C                                                                            CRM  030    00000n
00107   31*          WRITE(ISOUT,532)F                                                       CRM  031    000001
00107   32*     C                                                                            CRM  032    000001
00107   33*     C    COMPUTE THE PARTIAL PRESSURE OF THE WATER VAPOR IN THE CLOUD            CRM  033    000001
00107   34*     C                                                                            CRM  034    000001
00112   35*        35 PW=P*X*29./(18.+29.*X)                                                 CRM  035    00001n
00112   36*     C                                                                            CRM  036    00001n
00112   37*     C    COMPUTE SATURATION WATER VAPOR PRESSURE AND CLOUD AIR MASS              CRM  037    00001n
00112   38*     C                                                                            CRM  038    00001n
00113   39*          ES=611.*(T/273.)**(-5.13)*EXP((25.*(T-273.))/T)                         CRM  039    000017
00114   40*          RA=RM/V*(1.+X)/(1.+X+S+WT)                                              CRM  040    000042
00114   41*     C                                                                            CRM  041    000042
00114   42*     C    WET OR DRY EQUATIONS                                                    CRM  042    000042
00114   43*     C                                                                            CRM  043    000042
00115   44*          GO TO (150,1531,1531),N                                                 CRM  044    000054
00116   45*       150 IF(ES-PW)152,152,1531                                                  CRM  045    00006E
00116   46*     C                                                                            CRM  046    00006E
00116   47*     C    STORE VARIABLES(KSV=1) OR RESTART AT PREVIOUS TIME STEP (KSV=2)         CRM  047    00006E
00116   48*     C                                                                            CRM  048    00006E
00121   49*       152 KSV=2                                                                  CRM  049    00007n
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00122     50*      1532 CALL PSTR                                                  CRM  050    000073
00123     51*           9 VTEMPY=V                                                 CRM  051    000074
00123     52*     C                                                                CRM  052    000074
00123     53*     C      INTEGRATE                                                 CRM  053    000074
00123     54*     C                                                                CRM  054    000074
00124     55*            CALL PKGILL                                               CRM  055    000076
00124     56*     C                                                                CRM  056    000076
00124     57*     C          ADJUST IN-CLOUD PARTICLE CONCENTRATIONS TO BE CONSISTENT WITH CRM  057    000076
00124     58*     C      CLOUD VOLUME CHANGE                                       CRM  058    000076
00124     59*     C                                                                CRM  059    000076
00125     60*            DO 86 J=1,NDSTR                                           CRM  060    000100
00130     61*        86 Y(J)=Y(J)*VTEMPY/V                                         CRM  061    000105
00130     62*     C                                                                CRM  062    000105
00130     63*     C      ACCUMULATE CLOUD TIME                                     CRM  063    000105
00130     64*     C                                                                CRM  064    000105
00132     65*            SMALLT=SMALLT+DST                                         CRM  065    000111
00132     66*     C                                                                CRM  066    000111
00132     67*     C      TEST FOR TIME STEP CHANGE                                 CRM  067    000111
00133     68*            IF(ABS(SMALLT-1.0).LT.0.001)GO TO 87                      CRM  068    000116
00135     69*            IF(SMALLT-1.0)8,87,88                                     CRM  069    000121
00140     70*        87 DST=DST1                                                   CRM  070    000127
00141     71*        88 R=SQRT(3.*V/(RZT*12.5663706E0))                            CRM  071    000131
00142     72*           GO TO 35                                                   CRM  072    000142
00142     73*     C                                                                CRM  073    000142
00142     74*     C      COMPUTE PARTICLE FALLOUT RATE                             CRM  074    000142
00142     75*     C                                                                CRM  075    000142
00143     76*      1531 CALL CPFR                                                  CRM  076    000144
00144     77*           GO TO (901,901,8),MWYA                                     CRM  077    000145
00145     78*       901 GO TO (1146,146),KCLD                                      CRM  078    000156
00146     79*       146 CALL DBG                                                   CRM  079    000165
00147     80*      1146 CALL DCSN                                                  CRM  080    000167
00150     81*         8 CALL CXPN                                                  CRM  081    000171
00151     82*           GO TO (724,724,148),MWYA                                   CRM  082    000172
00152     83*       724 KSV=1                                                      CRM  083    000203
00153     84*           GO TO 1532                                                 CRM  084    000204
00154     85*       148 CALL CRMW                                                  CRM  085    000206
00155     86*           RETURN                                                     CRM  086    000207
00156     87*           END                                                        CRM  087    000224

END OF COMPILATION:        NO  DIAGNOSTICS.
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Q:FOR,S  CASSANDRA.CXPN,R
FOR S0E3-06/11/76-10:11:51 (1,)

   SUBROUTINE CXPN      ENTRY POINT 000303

   STORAGE USED: CODE(1) 000310; DATA(0) 000054; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601


   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   NERR2$
    0006   ALOG
    0007   EXP
    0010   NWDU$
    0011   NIO2$
    0012   NERR3$


   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000224 100L      0001   000012 113G      0001   000012 116G      0001   000010 2L        0001   000004 20L
    0001   000242 217G      0001   000264 227G      0001   000141 343L      0001   000044 40L       0001   000057 42L
    0001   000061 43L       0000   000015 5000F     0001   000172 62L       0001   000203 65L       0001   000211 68L
    0001   000221 70L       0004   000000 ALT       0004   000404 ATP       0004   001010 B0        0003   000000 CAY
    0004   001011 CG        0004   001321 CHANGE    0004   001322 CMLR      0004 R 001323 CX        0000 R 000012 CXM
    0004   003127 C2        0004   003130 C3        0004   003131 C6        0004   003132 DEK       0003   000001 DETID
    0003   000015 DIAM      0000 R 000004 DLTM      0003   000326 DMEAN     0004   003133 DNID      0003   000327 DNS
    0004   003147 DRM       0004   003150 DS        0004   003151 DST       0004   003152 DST0      0004   003153 DST1
    0004   003154 DST2      0004   003155 DT        0004   003156 DU        0004   003157 DWT       0004   003160 DX
    0004   003161 DZ        0004   003162 ED        0004   003163 EK        0004   003164 EPS       0004   003165 ES
    0004   003166 ETA       0003   000330 EXPO      0004   003572 F         0003   000331 FMASS     0004   003573 FW
    0004   003574 GRV       0003   001170 HEIGHT    0004   004200 HLR       0004   004201 HOR       0003   000641 IDISTP
    0003   000642 IFXEC     0000   000042 INJP$     0004   004202 IPAM      0004   004203 IRAD      0003   000643 IRISE
    0003   000644 ISIN      0003 I 000645 ISOUT     0004   004204 KCLD      0004   004205 KDI       0004   004206 KRX
    0004   004207 KS        0004   004210 KSV       0004 I 004211 MCX       0000 I 000003 MI        0000 I 000002 MJ
    0000 I 000013 MK        0000 I 000014 ML        0004 I 004212 MWYA      0004   004213 N         0003   000646 NDSTR
    0003   001172 NHOD0     0004   004214 NNN       0004   004215 NPVA      0000 I 000011 NSTAT     0004   004216 P
    0004   004217 PRS       0003   000647 PS        0004   004623 PW        0004   004624 QI        0004 R 004625 R
    0004 R 004626 RA        0004   004627 RFD       0004   004630 RHZ       0004   005234 RL        0004   005235 RLH
    0004   005641 RM        0004 R 005642 RZT       0004   005643 S         0004   005644 SAVE      0003   001157 SD
    0004   005645 SLDTMP    0004   005646 SLM       0004 R 006252 SMALLT     0003   001160 SSAM      0004   006253 SZRO
    0004 R 006254 T         0004   006255 TE        0003 R 001161 TME       0003   001162 TMP1      0003   001163 TMP2
    0004   006256 TMSD      0000 R 000006 TSRD      0000 R 000005 TSTM      0000 R 000010 TSTR      0003   001164 T2M
    0004   006257 U         0003   001165 USOIL     0004   006260 V         0003   001166 VPR       0003   001503 VX
    0003   002013 VY        0004   006261 VZRO      0003 R 001167 W         0000 R 000000 WORD1     0000 R 000001 WORD2
    0004   006262 WT        0004   006263 X         0004   006264 XE        0004   006265 Y         0004 R 006575 Z
    0000 R 000007 ZA        0004 R 006576 ZBFR      0004   006577 ZBRST7    0004   006600 ZLMT      0003   001171 ZSCL
    0003   001173 ZV
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00101     1*            SUBROUTINE CXPN                                                                  CXPN 001    000000
00101     2*      C                                                                                      CXPN 002    000000
00101     3*      C                                                                                      CXPN 003    000000
00101     4*      C                                                                                      CXPN 004    000000
00101     5*      C     CXPN TABULATES THE CLOUD RISE AND EXPANSION OUTPUT TABLE ARRAY CX CXPN 005    000000
00101     6*      C     AND TESTS RATE OF RADIAL EXPANSION TO END CRM COMPUTATION. SEE 143CXPN 006    000000
00101     7*      C                                                                                      CXPN 007    000000
00101     8*      C                                                                                      CXPN 008    000000
00103     9*            COMMON /SET1/                                                                    CXPN 009    000000
00103    10*           1CAY        ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS        ,EXPO      ,CXPN 010    000000
00103    11*           2EMASS(200),IDISTR     ,IEXEC     ,IRTSE     ,ISIN       ,ISOUT     ,CXPN 011    000000
00103    12*           3NDSTR      ,PS(200)   ,SD        ,SSAM      ,TME        ,TMP1      ,CXPN 012    000000
00103    13*           4TMP2       ,T2M       ,USOIL     ,VPR       ,W          ,HEIGHT    ,CXPN 013    000000
00103    14*           5ZSCL       ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)                 CXPN 014    000000
00104    15*            COMMON /CLOUD/                                                                   CXPN 015    000000
00104    16*           1ALT(260)   ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,CXPN 016    000000
00104    17*           2CX(10,90)  ,C2        ,C3        ,C6        ,DEK        ,DNID(12)  ,CXPN 017    000000
00104    18*           3DRM        ,DS        ,DST       ,DSTO      ,DST1       ,DST2      ,CXPN 018    000000
00104    19*           4DT         ,DU        ,DWT       ,DX        ,DZ         ,FD        ,CXPN 019    000000
00104    20*           5EK         ,EPS       ,ES        ,ETA(260)  ,F          ,FW        ,CXPN 020    000000
00104    21*           6GRV(260)   ,HLP       ,HOB       ,IPAM      ,IPAD       ,KCLD      ,CXPN 021    000000
00104    22*           7KDI        ,KRX       ,KS        ,KSV       ,MCX        ,MWYA      ,CXPN 022    000000
00104    23*           8N          ,NNN       ,NPVA      ,P         ,PRS(260)   ,PW        ,CXPN 023    000000
00104    24*           9QI         ,R         ,RA        ,RED       ,RHZ(260)   ,RL        ,CXPN 024    000000
00104    25*           1RLH(260)   ,RM        ,RZT       ,S         ,SAVE       ,SLDTMP    ,CXPN 025    000000
00104    26*           2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TE         ,TMSO      ,CXPN 026    000000
00104    27*           3U          ,V         ,VZRO      ,WT        ,X          ,XE        ,CXPN 027    000000
00104    28*           4Y(200)     ,Z         ,ZBER      ,ZBRSTZ    ,ZLMT                  CXPN 028    000000
00104    29*     C                                                                                      CXPN 029    000000
00105    30*      5000 FORMAT(1H1, 9X, 46HCLOUD RISE IS TERMINATED IN CXPN AT STATEMENT ICXPN 030    000000
00105    31*           14, 8H BY THE A6, 7H SWITCH///)                                                  CXPN 031    000000
00105    32*     C                                                                                      CXPN 032    000000
00106    33*           DATA WORD1,WORD2/6HR RATE,6H MCX  /                                              CXPN 033    000000
00106    34*     C                                                                                      CXPN 034    000000
00106    35*     C     PERFORM FIRST PASS INITIALIZATION                                                CXPN 035    000000
00106    36*     C                                                                                      CXPN 036    000000
00111    37*           GO TO (002, 020, 040), MWYA                                                      CXPN 037    000000
00112    38*       002 DO 004 MJ = 1, 90                                                                CXPN 038    000012
00115    39*           DO 004 MI = 1, 10                                                                CXPN 039    000012
00120    40*       004 CX (MI, MJ) = 0.0                                                                CXPN 040    000012
00123    41*           MCX = 1                                                                          CXPN 041    000015
00124    42*           MWYA = 2                                                                         CXPN 042    000016
00125    43*           DLTM = 0.0                                                                       CXPN 043    000017
00126    44*           TSTM = SMALLT                                                                    CXPN 044    000020
00127    45*           TSRD=EXP(0.014778*ALOG(W)-7.0099)                                                CXPN 045    000022
00130    46*           ZBER = Z                                                                         CXPN 046    000034
00131    47*           GO TO 040                                                                        CXPN 047    000036
00131    48*     C                                                                                      CXPN 048    000036
00131    49*     C     IS IT TIME TO RECORD CLOUD STATUS IN THE CX ARRAY                                CXPN 049    000036
00131    50*     C        YES - TO 040                                                                  CXPN 050    000036
00131    51*     C        NO - TO 070                                                                   CXPN 051    000036
00131    52*     C                                                                                      CXPN 052    000036
00132    53*       020 IF (SMALLT - TSTM) 065, 040, 040                                                 CXPN 053    000040
00135    54*       040 CX (1, MCX) = SMALLT                                                             CXPN 054    000043
00136    55*           IF (Z - ZBER) 041, 042, 042                                                      CXPN 055    000047
00141    56*       041 ZA = ZBER                                                                        CXPN 056    000057
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00142    57*          GO TO 043                                                    CXPN 057    000056
00143    58*       042 ZA = Z                                                      CXPN 058    000057
00144    59*       043 CX (5, MCX) = R                                             CXPN 059    000061
00145    60*           CX (3, MCX) = T                                             CXPN 060    000064
00146    61*           CX(10,MCX)=RA                                               CXPN 061    000066
00146    62*     C                                  TEST TO END CRM COMPUTATION   CXPN 062    000066
00147    63*           IF (MCX-5)343,343,143                                       CXPN 063    000070
00152    64*       143 TSTR=ABS(ALOG(CX(5,MCX))-ALOG(CX(5,MCX-1)))                 CXPN 064    000074
00153    65*           TSTR = TSTR / (CX (1, MCX) - CX (1, MCX - 1))               CXPN 065    000116
00154    66*           IF (TSTR - TSRD) 243, 343, 343                              CXPN 066    000122
00157    67*       243 MWYA = 3                                                    CXPN 067    000125
00160    68*           NSTAT=243                                                   CXPN 068    000127
00161    69*           WRITE(ISOUT,5000)NSTAT,WORD1                                CXPN 069    000131
00165    70*       343 CX (3, MCX) = ZA - RZT                                      CXPN 070    000141
00166    71*           CX (4, MCX) = ZA + RZT                                      CXPN 071    000145
00167    72*       060 MCX = MCX + 1                                               CXPN 072    000150
00167    73*     C                                  CHECK CAPACITY OF ARRAY CX    CXPN 073    000150
00170    74*           IF (MCX - 90) 062, 062, 061                                 CXPN 074    000154
00173    75*       061 MWYA = 3                                                    CXPN 075    000156
00174    76*           NSTAT=61                                                    CXPN 076    000160
00175    77*           WRITE(ISOUT,5000)NSTAT,WORD2                                CXPN 077    000162
00201    78*       062 CXM = MCX                                                   CXPN 078    000172
00201    79*     C                                                                 CXPN 079    000172
00201    80*     C     COMPUTE THE TIME AT WHICH THE NEXT CX ARRAY ENTRIES ARE TO BE MADECXPN 080    000172
00201    81*     C                                                                 CXPN 081    000172
00202    82*           DLTM = DLTM + CXM * .084946                                 CXPN 082    000174
00203    83*           TSTM = TSTM + DLTM                                          CXPN 083    000200
00204    84*       065 IF (Z - ZBFR) 068, 068, 067                                 CXPN 084    000207
00207    85*       067 ZBFR = Z                                                    CXPN 085    000204
00210    86*       068 GO TO (070, 070, 100), MWYA                                 CXPN 086    000211
00211    87*       070 RETURN                                                      CXPN 087    000221
00211    88*     C                                  COMPLETE OUTPUT CX TABLE      CXPN 088    000221
00212    89*       100 MCX = MCX - 1                                               CXPN 089    000224
00213    90*           IF (CX (1, MCX - 1) - CX (1, MCX)) 102, 100, 102            CXPN 090    000226
00216    91*       102 DO 104 MK = 2, MCX                                          CXPN 091    000242
00216    92*     C                                  COMPUTE TIME INTERVAL LENGTH  CXPN 092    000242
00221    93*           CX (2, MK - 1) = CX (1, MK) - CX (1, MK - 1)                CXPN 093    000242
00221    94*     C                                  COMPUTE VERTICAL RATES        CXPN 094    000242
00222    95*           CX (6, MK - 1) = (CX (3, MK) - CX (3, MK - 1)) / CX (2, MK - 1)CXPN 095    000248
00223    96*           CX (7, MK-1) = (CX (4, MK) - CX(4, MK-1)) / CX (2, MK - 1)  CXPN 096    000250
00223    97*     C                                  COMPUTE RADIAL RATE           CXPN 097    000250
00224    98*       104 CX (8, MK - 1) = (CX (5, MK) - CX (5, MK - 1)) / CX (2, MK - 1)CXPN 098    000256
00226    99*           DO 106 ML = 1, MCX                                          CXPN 099    000264
00231   100*       106 CX (1, ML) = CX (1, ML) + TME                               CXPN 100    000268
00233   101*           GO TO 070                                                   CXPN 101    000267
00234   102*           END                                                         CXPN 102    000307

        END OF COMPILATION:        NO  DIAGNOSTICS.
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3:FOR:S  C:SSAMDRA.DBGA;R
FOR S0E3-PA/11/75-10:12:14 (1.)

   SUBROUTINE DBG        ENTRY POINT 000114

   STORAGE USED: CODE(1) 000130; DATA(0) 000101; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   NWDU$
    0006   NIO2$
    0007   NIO1$
    0010   MERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000033 1146L      0001   000103 149L       0001   000072 156G       0000   000001 16F        0000   000000 17F
    0001   000017 2146L      0000   000024 99F        0004   000000 ALT        0004   000404 ATP        0004   001010 B0
    0003   000000 CAY        0004 R 001011 CG         0004   001321 CHANGF     0004 R 001322 CMLR       0004   001323 CX
    0004   003127 C2         0004   003130 C3         0004   003131 C6         0004   003132 DEK        0003   000001 DETID
    0003   000015 DIAM       0003   000326 DMEAN      0004   003133 DNID       0003   000327 DNS        0004   003147 DRM
    0004   003150 DS         0004   003151 DST        0004   003152 DST0       0004   003153 DST1       0004   003154 DST2
    0004   003155 DT         0004   003156 DU         0004   003157 DWT        0004   003160 DX         0004   003161 DZ
    0004 R 003162 E0         0004 R 003163 EK         0004 R 003164 EPS        0004 R 003165 ES         0004   003166 ETA
    0003   000330 EXP0       0004   003572 F          0003   000331 FMASS      0004   003573 FW         0004   003574 GRV
    0003   001170 HEIGHT     0004 R 004200 HLR        0004   004201 HOB        0000 I 000000 I          0003   000641 IDISTP
    0003   000642 IEXEC      0000   000072 INJP$      0004   004202 IPAM       0004   004203 IRAD       0003   000643 IRISE
    0003   000644 ISIN       0003 I 000645 ISOUT      0004   004204 KCLD       0004   004205 KDT        0004   004206 KRX
    0004   004207 KS         0004   004210 KSV        0004   004211 MCX        0004   004212 MWYA       0004   004213 N
    0003 I 000646 NDSTR      0003   001172 NHODO      0004   004214 NNN        0004   004215 NPVA       0004 R 004216 P
    0004   004217 PRS        0003 R 000647 PS         0004 R 004623 PW         0004   004624 QI         0004 R 004625 R
    0004   004626 RA         0004   004627 RED        0004   004630 RHZ        0004   005234 RL         0004   005235 RLH
    0004 R 005641 RM         0004 R 005642 RZT        0004 R 005643 S          0004   005644 SAVE       0003   001167 SD
    0004   005645 SLDTMP     0004   005646 SLM        0004 R 006252 SMALLT     0003   001160 SSAM       0004   006253 SZRO
    0004 R 006254 T          0004 R 006255 TE         0003   001161 TME        0003   001162 TMP1       0003   001163 TMP2
    0004   006256 TMSO       0003   001164 T2M        0004 R 006257 U          0003   001165 USOIL      0004 R 006260 V
    0003   001166 VPR        0003   001503 VX         0003   002013 VY         0004   006261 VZRO       0003   001167 W
    0004 R 006262 WT         0004 R 006263 X          0004   006264 XE         0004 R 006265 Y          0004 R 006575 Z
    0004   006576 ZBFR       0004   006577 ZBRSTZ     0004   006600 ZLMT       0003   001171 ZSCL       0003   001173 ZV


00101      1*          SUBROUTINE DBG                                                          DBG  001    000000
00103      2*          COMMON /SET1/                                                           DBG  002    000000
00103      3*         1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,DBG  003    000000
00103      4*         2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,DBG  004    000000
00103      5*         3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,DBG  005    000000
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00103     6*          4T2P2       ,T2M        ,USOIL      ,VPR        ,W          ,HEIGHT     ,DBG  006     00000
00103     7*          5ZSCL       ,NHOOO      ,ZV(200)    ,VX(200)    ,VY(200)                 DBG  007     00000
00104     8*           COMMON /CLOUD/                                                          DBG  008     00000
00104     9*          1ALT(260)   ,ATP(260)   ,B0         ,CG(200)    ,CHANGE     ,CMLR       ,DBG  009     00000
00104    10*          2CX(10,90)  ,C2         ,C3         ,C6         ,DFK        ,DNID(12)   ,DBG  010     00000
00104    11*,         3DRM        ,DS         ,DST        ,DST0       ,DST1       ,DST2       ,DBG  011     00000
00104    12*          4DT         ,DU         ,DWT        ,DX         ,DZ         ,ED         ,DBG  012     00000
00104    13*          5EK         ,EPS        ,ES         ,ETA(260)   ,F          ,FW         ,DBG  013     00000
00104    14*          6GRV(260)   ,HLR        ,HOB        ,IPAM       ,IRAD       ,KCLD       ,DBG  014     00000
00104    15*          7KOI        ,KRX        ,KS         ,KSV        ,MCX        ,MWYA       ,DBG  015     00000
00104    16*          8N          ,NNN        ,NPVA       ,P          ,PRS(260)   ,PW         ,DBG  016     00000
00104    17*          9QI         ,R          ,RA         ,RED        ,RHZ(260)   ,RL         ,DBG  017     00000
00104    18*          1RLH(260)   ,RM         ,RZT        ,S          ,SAVE       ,SLDTMP     ,DBG  018     00000
00104    19*          2SLM(260)   ,SMALLT     ,SZRO       ,T          ,TE         ,TMSD       ,DBG  019     00000
00104    20*          3U          ,V          ,VZRO       ,WT         ,X          ,XE         ,DBG  020     00000
00104    21*          4Y(200)     ,Z          ,ZBER       ,ZBRSTZ     ,ZLMT                   DBG  021     00000
00104    22*     C                                                                            DBG  022     00000
00104    23*     C ***************************************************************************DBG  023     00000
00104    24*     C                                                                            DBG  024     00000
00104    25*     C     DBG TS DEBUG PRINTER                                                   DBG  025     00000
00104    26*     C                                                                            DBG  026     00000
00104    27*     C ***************************************************************************DBG  027     00000
00104    28*     C                                                                            DBG  028     00000
00104    29*     C                                                                            DBG  029     00000
00104    30*     C ***************************************************************************DBG  030     00000
00104    31*     C                                                                            DBG  031     00000
00105    32*       016 FORMAT (1H0 /                                                          DBG  032     00000
00105    33*          1  3X1P9E13.4 /                                                         DBG  033     00000
00105    34*          2  (10X1H*, 5X8E13.4))                                                  DBG  034     00000
00106    35*        17 FORMAT(21X,'PS',11X,'CG',11X,'Y',11X,'PS',11X,'CG',11X,'Y'/16X,1P6DBG  035     00000
00106    36*          1E13.4)                                                                 DBG  036     00000
00107    37*       099 FORMAT (1H0 / 49X17HCLOUD DEBUG PRINT //                               DBG  037     00000
00107    38*          1  9X2HST, 11X1HU, 12X1HX, 12X1HT, 12X1HR, 12X1H7, 12X2HFK,             DBG  038     00000
00107    39*          2  11X1HV, 12X2HWT / 10X1H*, 11X2HTE, 11X2HRM, 11X2HFS,                 DBG  039     00000
00107    40*          3  11X1HP, 12X2HPW, 11X2HED, 10X3HRLH, 11X1HS/                          DBG  040     00000
00107    41*          4  10X1H*, 10X3HEPS, 10X3HRZT , 9X4HCMLR,///)                           DBG  041     00000
00107    42*     C                                                                            DBG  042     00000
00107    43*     C ***************************************************************************DBG  043     00000
00107    44*     C ***************************************0***********************************DBG  044     00000
00107    45*     C                                                                            DBG  045     00000
00110    46*           IF (AMOD (SMALLT, 13.0)) 2146, 1149, 2146                              DBG  046     00000
00113    47*        ,149 WRITE(ISOUT,99)                                                      DBG  047     00011
00115    48*        2146 IF (SMALLT) 1146, 1146, 3146                                         DBG  048     00017
00120    49*        3146 IF(SMALLT-AINT(SMALLT))149,4146,149                                  DBG  049     00021
00123    50*        4146 IF(AMOD(SMALLT,2.0))1146,149,1146                                    DBG  050     00026
00126    51*        1146 WRITE(ISOUT,16)                                                      DBG  051     00033
00126    52*             1  SMALLT, U, X, T, R, Z, EK, V, WT,                               DBG  052     00033
00126    53*             2  TE, RM, ES, P, PW, ED, HLR, S,                                  DBG  053     00033
00126    54*             3  EPS, RZT , CMLR                                                 DBG  054     00033
00154    55*              WRITE(ISOUT,17)                                                   DBG  055     00066
00154    56*             1  (PS  (I), CG (I), Y (I),                                       DBG  056     00066
00154    57*             2  PS  (I + 1), CG (I + 1), Y (I + 1),,                          DBG  057     00066
00154    58*             3 I=1,NDSTR,2)                                                   DBG  058     00066
00167    59*         149 RETURN                                                           DBG  059     00101
00170    60*             END                                                              DBG  060     00117
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0:FOR,S  CASSANDRA,DCSN,R
FOR S0F3-06/11/76-1 :13:33 (1,)

   SUBROUTINE DCSN      ENTRY POINT 000135

   STORAGE USED: CODE(1) 000137; DATA(0) 000042; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323
    0004   CLOUD   006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   .ERR2$
    0006   .WDU$
    0007   .IO2$
    0010   .ERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000115 1L        0001   000025 1041L     0001   000105 13L       0001   000063 14L       0001   00005E 151L
    0001   000050 1521      0001   000010 1531L     0001   000033 154L      0001   000074 20L       0000   000005 66F
    0000   000011 77F       0001   000126 8L        0000   000015 88F       0004   000000 ALT       0004   000404 ATP
    0004   001010 B0        0003   000000 CAY       0004   001011 CG        0004 R 001321 CHANGE    0004   001322 CMLR
    0004   001323 CX        0004   003127 C2        0004   003130 C3        0004   003131 C6        0004   003132 DEK
    0003   000001 DETID     0003   000015 DIAM      0003   000326 DMEAN     0004   003133 DNID      0003   000327 DNS
    0004   003147 DRM       0004   003150 DS        0004 R 003151 DST       0004   003152 DST0      0004   003153 DST1
    0004 R 003154 DST2      0004   003155 DT        0004   003156 DU        0004   003157 DWT       0004   003160 DX
    0004   003161 DZ        0004   003162 ED        0004   003163 EK        0004   003164 EPS       0004 R 003165 ES
    0004   003166 ETA       0003   000330 EXPO      0004   003572 F         0003   000331 FMASS     0004   003573 FW
    0004   003574 GRV       0003   001170 HEIGHT    0004   004200 HLR       0004   004201 HOB       0003   000641 IDISTB
    0003   000642 IEXEC     0000   000036 INJP$     0004   004202 IPAM      0004   004203 IPAD      0003   000643 IRISE
    0003   000644 ISIN      0003 I 000645 ISOUT     0004 I 004204 KCLD      0004   004205 KDI       0004   004206 KRX
    0004   004207 KS        0004   004210 KSV       0004   004211 MCX       0004 I 004212 MWYA      0004 I 004213 N
    0003   000646 NDSTR     0003   001172 NHODO     0004   004214 NNN       0004   004215 NPVA      0000 I 000003 NSTAT
    0004   004216 P         0004   004217 PRS       0003   000647 PS        0004 R 004623 PW        0004   004624 QI
    0004 R 004625 R         0004   004626 RA        0004   004627 RED       0004   004630 RHZ       0004   005234 RL
    0004   005235 RLH       0004   005641 RM        0004   005642 RZT       0004   005643 S         0004   005644 SAVE
    0003   001157 SD        0004   005645 SLDTMP    0004   005646 SLM       0004 R 006252 SMALLT    0003   001160 SSAM
    0004   006253 SZRO      0004 R 006254 T         0004   006255 TE        0003   001161 TME       0003   001162 TMP1
    0003   001163 TMP2      0004   006256 TMSD      0003   001164 T2M       0004   006257 U         0003   001165 USOIL
    0004   006260 V         0003   001166 VPR       0003   001503 VX        0003   002013 VY        0004   006261 VZRO
    0003   001167 W         0000 R 000004 WORD      0000 R 000000 WORD1     0000 R 000001 WORD3     0000 R 000002 WORD4
    0004   006262 WT        0004   006263 X         0004   006264 XE        0004   006265 Y         0004 R 006575 Z
    0004   006576 ZBFR      0004   006577 ZBRSTZ    0004 R 006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV



00101      1*          SUBROUTINE DCSN                                                    DCSN 001    000000
00103      2*          COMMON /SET1/                                                      DCSN 002    000000
00103      3*         1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,DCSN 003    000000
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00103     4*          2EMASS(200)     ,IER      ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,DCSN 004   00000n
00103     5*          3NDSTR          ,PS(200)  ,SD        ,SSAM      ,TME       ,TMP1      ,DCSN 005   00000n
00103     6*          4TMP2           ,T2M      ,USOIL     ,VPR       ,W         ,HEIGHT    ,DCSN 006   00000n
00103     7*          5ZSCL           ,NH020    ,ZV(200)   ,VX(200)   ,VY(200)              DCSN 007   00000n
00104     8*           COMMON /CLOUD/                                                        DCSN 008   00000n
00104     9*          1ALT(260)       ,ATP(260) ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,DCSN 009   00000n
00104    10*          2CX(10,90)      ,C2       ,C3        ,C6        ,DEK       ,DNID(12)  ,DCSN 010   00000n
00104    11*          3DRM            ,DS       ,DST       ,DST0      ,DST1      ,DST2      ,DCSN 011   00000n
00104    12*          4DT             ,DU       ,DWT       ,DX        ,DZ        ,ED        ,DCSN 012   00000n
00104    13*          5EK             ,EPS      ,ES        ,ETA(260)  ,F         ,FW        ,DCSN 013   00000n
00104    14*          6GRV(260)       ,HLR      ,HOR       ,IPAM      ,IRAD      ,KCLD      ,DCSN 014   00000n
00104    15*          7KDI            ,KRX      ,KS        ,KSV       ,MCX       ,MWYA      ,DCSN 015   00000n
00104    16*          8N              ,NNN      ,NPVA      ,P         ,PRS(260)  ,PW        ,DCSN 016   00000n
00104    17*          9QI             ,R        ,RA        ,RED       ,RHZ(260)  ,PL        ,DCSN 017   00000n
00104    18*          1RLH(260)       ,RM       ,RZT       ,S         ,SAVE      ,SLDTMP    ,DCSN 018   00000n
00104    19*          2SLM(260)       ,SMALLT   ,SZRO      ,T         ,TE        ,TMSD      ,DCSN 019   00000n
00104    20*          3U              ,V        ,VZRO      ,WT        ,X         ,XE        ,DCSN 020   00000n
00104    21*          4Y(200)         ,Z        ,ZBER      ,ZBRSTZ    ,ZLMT                 DCSN 021   00000n
00104    22*     C                                                                          DCSN 022   00000n
00104    23*     C ***************************************************************         DCSN 023   00000n
00104    24*     C                                                                          DCSN 024   00000n
00104    25*     C     DCSN DETERMINES AT THE END OF EACH TIME STEP WHETHER TO              DCSN 025   00000n
00104    26*     C     CONTINUE THE CRM COMPUTATION                                         DCSN 026   00000n
00104    27*     C                                                                          DCSN 027   00000n
00104    28*     C ***************************************************************         DCSN 028   00000n
00104    29*     C                                                                          DCSN 029   00000n
00105    30*       066 FORMAT(14HOSWITCH TO DRY)                                            DCSN 030   00000n
00106    31*       077  FORMAT(14HOSWITCH TO WET)                                           DCSN 031   00000n
00107    32*       088 FORMAT(1H1, 9X, 46HCLOUD RISE IS TERMINATED IN DCSN AT STATEMENT ID  DCSN 032   00000n
00107    33*          14, 8H BY THE A6, 7H SWITCH///)                                       DCSN 033   00000n
00107    34*     C                                                                          DCSN 034   00000n
00110    35*          DATA WORD1,      WORD3,WORD4 /6H TEMP ,          6H ZLMT ,6HR.LT.1/   DCSN 035   00000n
00110    36*     C                                                                          DCSN 036   00000n
00110    37*     C ***************************************************************         DCSN 037   00000n
00110    38*     C ***************************************************************         DCSN 038   00000n
00110    39*     C                                                                          DCSN 039   00000n
00114    40*          GO TO (151,154,1531),N                                                DCSN 040   00000n
00114    41*     C                                                                          DCSN 041   00000n
00114    42*     C      SHOULD WE SWITCH TO WET MODE---                                     DCSN 042   00000n
00114    43*     C            YES-- TO 041                                                  DCSN 043   00000n
00114    44*     C                                                                          DCSN 044   00000n
00115    45*      ,531 IF(ES-PW)041,041,008                                                 DCSN 045   00001n
00115    46*     C                                                                          DCSN 046   00001n
00120    47*       041  N=2                                                                 DCSN 047   00001x
00121    48*           GO TO (151, 1041), KCLD                                              DCSN 048   00001s
00122    49*       1041 WRITE(ISOUT,77)                                                     DCSN 049   00002s
00124    50*            GO TO 151                                                           DCSN 050   00003l
00124    51*     C                                                                          DCSN 051   00003l
00124    52*     C 154 SHOULD WE SWITCH TO DRY MODE-                                        DCSN 052   00003l
00124    53*     C       NO TO 151                                                          DCSN 053   00003l
00124    54*     C                                                                          DCSN 054   00003l
00125    55*       154 IF(ES-PW.LE.0.0) GO TO 151                                           DCSN 055   00003x
00127    56*           N=1                                                                  DCSN 056   00003s
00130    57*           GO TO(151,152),KCLD                                                  DCSN 057   00004n
00131    58*       152 WRITE(ISOUT,66)                                                      DCSN 058   00005n
00131    59*     C                                                                          DCSN 059   00005n
00131    60*     C     TEST FOR TIME STEP CHANGE                                            DCSN 060   00005n
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00131     61*      C                                                                  DCSN 061    000056
00133     62*        IF1 IF (SMALLT - CHANGE) 014, 015, 015                           DCSN 062    000058
00136     63*        015 OST=OST2                                                     DCSN 063    000060
00136     64*      C                                                                  DCSN 064    000060
00136     65*      C     TEST FOR ANOMALOUS CLOUD RISE AND SET UP TERMINATION CONDITION IF DCSN 065    000060
00136     66*      C     ANOMALY IS FOUND                                             DCSN 066    000060
00136     67*      C                                                                  DCSN 067    000060
00136     68*      C                                                                  DCSN 068    000060
00136     69*      C     TEST FOR TEMPERATURE ANOMALY                                 DCSN 069    000060
00136     70*      C                                                                  DCSN 070    000060
00137     71*        014 IF(ABS(T)-10.)114,20,20                                      DCSN 071    000068
00142     72*        114 NSTAT=14                                                     DCSN 072    000068
00143     73*            WORD=WORD1                                                   DCSN 073    000070
00144     74*            GO TO 1                                                      DCSN 074    000072
00144     75*      C                                                                  DCSN 075    000072
00144     76*      C     TEST FOR R.LT.1 ANOMALY                                      DCSN 076    000072
00144     77*      C                                                                  DCSN 077    000072
00145     78*        020 IF(R-1.) 120,13,13                                           DCSN 078    000074
00150     79*        120 NSTAT=20                                                     DCSN 079    000077
00151     80*            WORD=WORD4                                                   DCSN 080    000101
00152     81*            GO TO 1                                                      DCSN 081    000103
00152     82*      C                                                                  DCSN 082    000103
00152     83*      C     DELETE CARDS 85 THROUGH 91                                   DCSN 083    000103
00152     84*      C                                                                  DCSN 084    000103
00152     85*      C                                                                  DCSN 085    000103
00152     86*      C                                                                  DCSN 086    000103
00152     87*      C                                                                  DCSN 087    000103
00152     88*      C                                                                  DCSN 088    000103
00152     89*      C                                                                  DCSN 089    000103
00152     90*      C                                                                  DCSN 090    000103
00152     91*      C                                                                  DCSN 091    000103
00152     92*      C     TEST FOR ZLVT ANOMALY                                        DCSN 092    000103
00152     93*      C                                                                  DCSN 093    000103
00153     94*        013 IF (Z - ZLVT) 008, 008, 113                                  DCSN 094    000106
00156     95*        113 NSTAT=13                                                     DCSN 095    000110
00157     96*            WORD=WORD3                                                   DCSN 096    000112
00157     97*      C                                          COMPLETE CX TABLE      DCSN 097    000112
00160     98*        001 MWYA = 3                                                     DCSN 098    000115
00161     99*            WRITE(ISOUT,88) NSTAT,WORD                                   DCSN 099    000116
00165    100*        008 RETURN                                                       DCSN 100    000126
00166    101*            END                                                          DCSN 101    000136

      END OF COMPILATION:        NO  DIAGNOSTICS.
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Q:FOR,S  CASSANDRA.DERI,R
FOR S0E3-06/11/76-10:13:44 (1,)

   SUBROUTINE DERIV     ENTRY POINT 001051

   STORAGE USED: CODE(1) 001057; DATA(0) 000123; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   TRPL
    0006   XPRR
    0007   EXP
    0010   SQRT
    0011   NERR2$
    0012   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000436 100L      0001   000527 101L      0001   000543 103L      0001   000545 104L      0001   000264 1101L
    0001   000266 1102L     0001   000340 1104L     0001   000416 1105L     0001   000767 1110L     0001   000075 16L
    0001   000115 17L       0001   000212 380L      0001   000174 3811L     0001   000200 3812L     0001   000724 555L
    0001   000741 621L      0001   001036 901L      0004 R 000000 ALT       0004 R 000404 ATP       0004   001010 B0
    0003   000000 CAY       0004   001011 CG        0004   001321 CHANGE    0000 R 000027 CL        0004 R 001322 CMLR
    0000 R 000002 CP        0000 R 000003 CPAI      0000 R 000005 CR        0000 R 000006 CS        0004   001323 CX
    0004 R 003127 C2        0004 R 003130 C3        0004 R 003131 C6        0004 R 003132 DEK       0003   000001 DETID
    0003   000015 DIAM      0003   000326 DMEAN     0004   003133 DNID      0003   000327 DNS       0004 R 003147 DRM
    0000 R 000025 DRME      0004 R 003150 DS        0004   003151 DST       0004   003152 DST0      0004   003153 DST1
    0004   003154 DST2      0004 R 003155 DT        0004 R 003156 DU        0004 R 003157 DWT       0004 R 003160 DX
    0004 R 003161 DZ        0004 R 003162 ED        0000 R 000037 ED1       0004 R 003163 EK        0004 R 003164 EPS
    0004   003165 ES        0004   003166 ETA       0003   000330 EXPO      0004   003572 F         0003   000371 FMASS
    0004   003573 FW        0004   003574 GRV       0003   001170 HEIGHT    0004 R 004200 HLR       0004   004201 HOB
    0003   000641 IDISTR     0003   000642 IEXEC     0000   000105 INJP$     0004   004202 IPAM      0004   004203 IRAD
    0003   000643 IRISE     0003   000644 ISIN      0003   000645 ISOUT     0004   004204 KCLD      0004   004205 KDI
    0004   004206 KRX       0004 I 004207 KS        0004   004210 KSV       0004   004211 MCX       0004   004212 MWYA
    0004 I 004213 N         0003   000646 NDSTR     0003 I 001172 NHODO     0004 I 004214 NNN       0004 I 004215 NPVA
    0000 R 000040 OMU       0004 R 004216 P         0004 R 004217 PRS       0003   000647 PS        0004   004623 PW
    0004 R 004624 QI        0000 R 000014 Q0        0000 R 000011 QT        0000 R 000010 QX        0000 R 000007 QXE
    0000 R 000026 Q1        0000 R 000030 Q2        0000 R 000031 Q3        0000 R 000032 Q4        0000 R 000033 Q5
    0000 R 000034 Q6        0000 R 000013 Q7        0000 R 000036 Q8        0000 R 000035 Q9        0004 R 004625 R
    0004 R 004626 RA        0004   004627 RED       0004   004630 RHZ       0004 R 005234 RL        0004 R 005235 RLH
    0004 R 005641 RM        0000 R 000004 RMIX      0000 R 000024 RS        0004 R 005642 RZT       0004 R 005643 S
    0004   005644 SAVE      0003   001157 SD        0004   005645 SLDTMP    0004   005646 SLM       0004   006252 SMALLT
    0003   001160 SSAM      0000 R 000012 SV        0004   006253 SZRO      0004 R 006254 T         0000 R 000000 TAD
    0004 R 006255 TE        0003   001161 TME       0003   001162 TMP1      0003 R 001163 TMP2      0004   006256 TMSD
    0000 R 000001 TPR       0003   001164 T2M       0004 R 006257 U         0003   001165 USOIL     0004 R 006260 V
    0003   001166 VPR       0000 R 000015 VS        0003 R 001503 VX        0000 R 000022 VYB       0000 R 000020 VXT
    0003 R 002013 VY        0000 R 000023 VYB       0000 R 000021 VYT       0004   006261 VZRO      0003   001167 W
    0004 R 006262 WT        0004 R 006263 X         0004 R 006264 XE        0004   006265 Y         0004 R 006575 Z
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0004 R 006576 ZBER       0004   006577 ZBRSTZ    0000 R 000017 ZBT       0004   006600 ZLMT      0003   001171 ZSCL
0000 R 000016 ZTP        0003 R 001173 ZV
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00101     1*          SUBROUTINE DERIV                                                                    DERIV001   00000n
00101     2*    C                                                                                         DERIV002   00000n
00101     3*    C     20 AUGUST 1969                                                                      DERIV003   00000n
00103     4*          COMMON /SET1/                                                                       DERIV004   00000n
00103     5*         1CAY        ,DETID(12) ,DIAM(200) ,DMEAN     ,DNS       ,EXPO      ,DERIV005   00000n
00103     6*         2EMASS(200),IDISTR     ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,DERIV006   00000n
00103     7*         3NDSTR      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,DERIV007   00000n
00103     8*         4TMP2       ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,DERIV008   00000n
00103     9*         5ZSCL       ,NHOOD     ,ZV(200)   ,VX(200)   ,VY(200)              DERIV009   00000n
00104    10*          COMMON /CLOUD/                                                                      DERIV010   00000n
00104    11*         1ALT(260)   ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,DERIV011   00000n
00104    12*         2CX(10,90)  ,C2        ,C3        ,C6        ,DEK       ,DNID(12)  ,DERIV012   00000n
00104    13*         3DRM        ,DS        ,DST       ,DSTO      ,DST1      ,DST2      ,DERIV013   00000n
00104    14*         4DT         ,DU        ,DWT       ,DX        ,DZ        ,ED        ,DERIV014   00000n
00104    15*         5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,DERIV015   00000n
00104    16*         6GRV(260)   ,HLR       ,HOR       ,IPAM      ,IRAD      ,KCLD      ,DERIV016   00000n
00104    17*         7KDI        ,KRX       ,KS        ,KSV       ,MCX       ,MWVA      ,DERIV017   00000n
00104    18*         8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,DERIV018   00000n
00104    19*         9QI         ,R         ,RA        ,RED       ,RHZ(260)  ,RL        ,DERIV019   00000n
00104    20*         1RLH(260)   ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,DERIV020   00000n
00104    21*         2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD      ,DERIV021   00000n
00104    22*         3U          ,V         ,VZRO      ,WT        ,X         ,XE        ,DERIV022   00000n
00104    23*         4Y(200)     ,Z         ,ZBER      ,ZBRSTZ    ,ZLMT                 DERIV023   00000n
00104    24*   C                                                                                         DERIV024   00000n
00104    25*   C                                                                                         DERIV025   00000n
00105    26*          DZ=U                                                                                DERIV026   00000n
00105    27*   C                                                                                         DERIV027   00000n
00105    28*   C                                                                                         DERIV028   00000n
00105    29*   C     OBTAIN VALUES OF AMBIENT TEMPERATURE, PRESSURE ,RELATIVE HUMIDITY                   DERIV029   00000n
00105    30*   C                                                                                         DERIV030   00000n
00106    31*          CALL TRPL(Z,NPVA,ALT,ATP,TE)                                                        DERIV031   000001
00107    32*          CALL TRPL(Z,NPVA,ALT,PRS,P)                                                         DERIV032   000010
00110    33*          CALL TRPL(Z,NPVA,ALT,RLH,HLR)                                                       DERIV033   000017
00111    34*          P=P*100.                                                                            DERIV034   00002E
00111    35*   C                                                                                         DERIV035   00002E
00111    36*   C                                                                                         DERIV036   00002E
00111    37*   C     COMPUTE AMBIENT AIR WATER MIXING RATIO                                              DERIV037   00002E
00111    38*   C                                                                                         DERIV038   00002E
00112    39*          XE=109.98*HLR*(TE/273.)**(-5.13)*EXP((25.*(TE-273.))/TE)/(P*29.)                    DERIV039   000031
00113    40*          TAD=0.                                                                              DERIV040   000061
00113    41*   C                                                                                         DERIV041   000061
00113    42*   C     COMPUTE SPECIFIC HEAT OF IN-CLOUD AIR                                               DERIV042   000061
00113    43*   C                                                                                         DERIV043   000061
00114    44*          IF(T-2300.)15,15,16                                                                 DERIV044   000062
00117    45*       15 TPR=T                                                                               DERIV045   000066
00120    46*          CP=946.6+0.1971*T                                                                   DERIV046   00007n
00121    47*          GO TO 17                                                                            DERIV047   000073
00122    48*       16 TPR=2300.                                                                           DERIV048   000075
00123    49*          TAD=-3587.5*(T-TPR)+1.0625*(T**2-TPR**2)                                            DERIV049   000076
00124    50*          CP=-3587.5+2.125*T                                                                  DERIV050   00011n
00125    51*       17 CP=(CP+X*(1697.66+1.144174*T))/(1.+X)                                               DERIV051   00011E
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00126     52*           CPAT=TAD+946.6*(TPR-TE)+0.09855*(TPR**2-TE**2)                    DERIV052   00012K
00126     53*     C                                                                       DERIV053   00012K
00126     54*     C     COMPUTE SPECIFIC HEAT OF IN-CLOUD AIR-WATER-SOIL MIXTURE          DERIV054   00012K
00126     55*     C                                                                       DERIV055   00012K
00127     56*           RMIX=(1.+X)/(1.+X+S+WT)                                           DERIV056   00014J
00130     57*           CR=CP*RMIX                                                        DERIV057   00014Q
00131     58*           IF(TMP2-T)380,381,381                                             DERIV058   00015J
00134     59*      381  IF(T-848.)3810,3810,3811                                         DERIV059   00015K
00137     60*     3810  CS=791.6+0.5612*T-1.881E7/T**2                                   DERIV060   00016J
00140     61*           GO TO 3812                                                        DERIV061   00017Q
00141     62*     3811  CS=1003.8+0.13510*T                                             DERIV062   00017W
00142     63*     3812  CR=CR+CS*(S+WT)/(1.+X+S+WT)                                      DERIV063   00020N
00143     64*      380  QXE=(1.+XE)/(1.+29.*XE/18.)                                     DERIV064   00021Q
00144     65*           QX=(1.+29.*X/18.)/(1.+X)                                          DERIV065   00022J
00145     66*           QT=T/TE                                                           DERIV066   00023J
00145     67*     C                                                                       DERIV067   00023J
00145     68*     C     COMPUTE HORIZONTAL RADIUS OF CLOUD                                DERIV068   00023J
00145     69*     C                                                                       DERIV069   00023J
00146     70*           R=SQRT(3.*V/(RZT*12.5663706E0))                                   DERIV070   00023W
00146     71*     C                                                                       DERIV071   00023W
00146     72*     C     IS CLOUD CENTER ALTITUDE GREATER OR LESS THAN ALTITUDE OF PREVIOUSDERIV072   00023W
00146     73*     C     TIME STEP                                                         DERIV073   00023W
00146     74*     C        GREATER- TO 1101                                               DERIV074   00023W
00146     75*     C        LESS - TO 1100                                                 DERIV075   00023W
00147     76*           IF(KS.GT.0)GO TO 1102                                             DERIV076   00024W
00151     77*           IF(Z-ZBFR)1100,1101,1101                                          DERIV077   00025J
00154     78*      1100 DZ=0.                                                           DERIV078   00025K
00155     79*           U=0.                                                              DERIV079   00025W
00156     80*           DU=0.                                                             DERIV080   00025Y
00157     81*           NNN=2                                                             DERIV081   00026N
00160     82*           GO TO 1102                                                        DERIV082   00026Q
00161     83*      1101 NNN=1                                                           DERIV083   00026W
00161     84*     C                                                                       DERIV084   00026W
00161     85*     C     COMPUTE CLOUD S TO VOLUME RATIO                                   DERIV085   00026W
00161     86*     C                                                                       DERIV086   00026W
00162     87*      1102 SV=12.5663706*R**2/V                                            DERIV087   00026W
00162     88*     C                                                                       DERIV088   00026W
00162     89*     C     COMPUTE TURBULENT KINETIC ENERGY DISSIPATION RATE                 DERIV089   00026W
00162     90*     C                                                                       DERIV090   00026W
00163     91*           EPS=C3*(2.*EK)**1.5/RZT                                           DERIV091   00027Q
00164     92*           Q7=AMAX1(ABS(U),SQRT(2.*EK))                                      DERIV092   00030W
00165     93*           QQ=QT*QX*QXE*(1.+X+WT)/(1.+X+S+WT)                                DERIV093   00031K
00166     94*           IF(NHODO)1103,1103,1104                                           DERIV094   00033Q
00171     95*      1103 VS=0.0                                                          DERIV095   00033K
00172     96*           GO TO 1105                                                        DERIV096   00033W
00172     97*     C                                                                       DERIV097   00033W
00172     98*     C     COMPUTE WIND SHEAR CORRECTION FACTOR                              DERIV098   00033W
00172     99*     C                                                                       DERIV099   00033W
00173    100*      1104 ZTP=Z+RZT                                                       DERIV100   00034N
00174    101*           ZBT=Z-RZT                                                         DERIV101   00034Q
00175    102*           CALL TRPL(ZTP,NHODO,ZV,VX,VXT)                                    DERIV102   00034K
00176    103*           CALL TRPL(ZTP,NHODO,ZV,VY,VYT)                                    DERIV103   00035W
00177    104*           CALL TRPL(ZBT,NHODO,ZV,VX,VXB)                                    DERIV104   00036K
00200    105*           CALL TRPL(ZBT,NHODO,ZV,VY,VYB)                                    DERIV105   00037Q
00201    106*           VS=SQRT((VXT-VXB)**2 + (VYT-VYB)**2)                              DERIV106   00040J
00202    107*      1105 RS=SV*Q7+1.5*C6*VS/R                                            DERIV107   00041K
00203    108*           GO TO (100,101,100),N                                             DERIV108   00042K
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00203    109*      C                                                                    DERIV109    000425
00203    110*      C     DRY EQUATIONS                                                  DERIV110    000425
00203    111*      C                                                                    DERIV111    000425
00203    112*      C                                                                    DERIV112    000425
00203    113*      C     COMPUTE AIR ENTRAINMENT RATE                                   DERIV113    000425
00203    114*      C                                                                    DERIV114    000425
00204    115*        100 DRME=(RM/(1.-CPAT/(CP*T*QX)))*RMIX*(RS    *RL+(QT*QX*QXE*9.8*U-EPS)*DERIV115    000436
00204    116*           *RMIX/(CP*T*QX)-9.8*U/(287./QXE*TE))                           DERIV116    000436
00205    117*            DRME=DRM                                                      DERIV117    000476
00205    118*      C                                                                    DERIV118    000476
00205    119*      C     SUBTRACT AWAY RATE OF MASS LOST DUE TO PARTICLES FALLING OUT CLOUDDERIV119    000476
00205    120*      C     BOTTOM DURING RISE                                             DERIV120    000476
00205    121*      C                                                                    DERIV121    000476
00206    122*            DRME=DRM-CMLR                                                 DERIV122    000477
00206    123*      C                                                                    DERIV123    000477
00206    124*      C     COMPUTE TIME DERIVATIVE OF WATER VAPOR MIXING RATIO            DERIV124    000477
00206    125*      C                                                                    DERIV125    000477
00207    126*            DXE=-(1.+X+S)/(1.+XE)*(X-XE)*DRME/RM                          DERIV126    000501
00207    127*      C                                                                    DERIV127    000501
00207    128*      C     COMPUTE TIME DERIVATIVE OF CLOUD TEMPERATURE                   DERIV128    000501
00207    129*      C                                                                    DERIV129    000501
00210    130*            DTE=-(RMIX*(QT*QX*QXE*9.8*U-EPS)+CPAT*DRME/RM)/CP             DERIV130    000515
00211    131*            WT=0.                                                         DERIV131    000527
00211    132*      C                                                                    DERIV132    000527
00211    133*      C     NO CHANGE IN LIQUID WATER MIXING RATIO                         DERIV133    000527
00211    134*      C                                                                    DERIV134    000527
00212    135*            DWT=0.                                                        DERIV135    000528
00213    136*            GO TO 555                                                     DERIV136    000525
00213    137*      C                                                                    DERIV137    000525
00213    138*      C     WET EQUATIONS                                                  DERIV138    000525
00213    139*      C                                                                    DERIV139    000525
00214    140*        101 Q1=1.+X*29./18.                                                DERIV140    000527
00215    141*            IF(T-273.)102,103,103                                         DERIV141    000533
00220    142*        102 CL=2.83E6                                                     DERIV142    000537
00221    143*            GO TO 104                                                     DERIV143    000541
00222    144*        103 CL=2.5E6                                                      DERIV144    000543
00223    145*        104 Q2=CL*X/(287.*T)                                              DERIV145    000545
00224    146*            Q3=18.*Q2/29./T                                               DERIV146    000550
00225    147*            Q4=1.+Q2                                                      DERIV147    000556
00226    148*            Q5=1.+CL*Q3/CP                                                DERIV148    000561
00227    149*            Q6=CL*(X-XE)/CP+T-TE                                          DERIV149    000565
00230    150*            Q8=RMIX/Q5                                                    DERIV150    000570
00231    151*            Q8=Q8/T/QX                                                    DERIV151    000577
00231    152*      C                                                                    DERIV152    000577
00231    153*      C     COMPUTE AIR ENTRAINMENT RATE                                   DERIV153    000577
00231    154*      C                                                                    DERIV154    000577
00232    155*            DRME=RMIX*(RM/(1.0-Q6*Q8))*(RS*RL+(Q5*QT*9.8*Q4*U*QXE-EPS)/CP/T/QX*DERIV155    000602
00232    156*           1Q9-(9.8*U)/(287./QXE*TE))                                     DERIV156    000602
00233    157*            DRME=DRM                                                      DERIV157    000637
00233    158*      C                                                                    DERIV158    000637
00233    159*      C     SUBTRACT AWAY RATE OF MASS LOST DUE TO PARTICLES FALLING OUT CLOUDDERIV159    000637
00233    160*      C     BOTTOM DURING RISE                                             DERIV160    000637
00233    161*      C                                                                    DERIV161    000637
00234    162*            DRME=DRM-CMLR                                                 DERIV162    000640
00234    163*      C                                                                    DERIV163    000640
00234    164*      C     COMPUTE TIME DERIVATIVE OF TEMPERATURE                         DERIV164    000640
00234    165*      C                                                                    DERIV165    000640
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00235    166*          DT=((-QX*QT*04*9.8*U/CP*QXE-06*DRME/(RMIX*RM))+EPS/CP)*09          DERIV166   000642
00235    167*     C                                                                      DERIV167   000642
00235    168*     C    COMPUTE TIME DERIVATIVE OF WATER VAPOR MIXING RATIO               DERIV168   000642
00235    169*     C                                                                      DERIV169   000642
00236    170*          DX=01*(03*DT+9.8*X*U/(287.*TE)*QXE)                               DERIV170   000665
00236    171*,    C                                                                      DERIV171   000665
00236    172*     C    COMPUTE TIME DERIVATIVE OF LIQUID WATER MIXING RATIO              DERIV172   000665
00236    173*     C                                                                      DERIV173   000665
00237    174*          DWT=-(1.+X+S+WT)/RM*((WT+X-XF)/(1.+XE)*DRME+WT*CMLR/(S+WT))-DX    DERIV174   000676
00237    175*     C                                                                      DERIV175   000676
00240    176*       555 ED1= 2.*C2*07*00/RZT                                             DERIV176   000720
00241    177*           GO TO (621,1110),NNN                                             DERIV177   000731
00242    178*       621 OMU=1.-RL                                                        DERIV178   000741
00242    179*     C                                                                      DERIV179   000741
00242    180*     C    COMPUTE CLOUD VERTICAL ACCELERATION                               DERIV180   000741
00242    181*     C                                                                      DERIV181   000741
00243    182*          DU=(9.8/OMU*(QT*QX*QXE*RMIX-1.)-(OMU*ED1    +DRM/RM)*U)*RM/(RM+QI)DERIV182   000745
00243    183*     C    COMPUTE EDDY VISCOUS RATE OF LOSS OF KINETIC ENERGY OF RISE       DERIV183   000745
00243    184*     C                                                                      DERIV184   000745
00244    185*      .110 ED=ED1*U**2                                                      DERIV185   000767
00244    186*     C    COMPUTE TIME DERIVATIVE OF TURBULENT KINETIC ENERGY DENSITY       DERIV186   000767
00244    187*     C                                                                      DERIV187   000767
00245    188*          DEK=ED-(EK-0.5*U**2)*DRME/RM-EPS                                  DERIV188   000775
00245    189*     C                                                                      DERIV189   000775
00245    190*     C    COMPUTE TIME DERIVATIVE OF SOIL MIXING RATIO                      DERIV190   000775
00245    191*     C                                                                      DERIV191   000775
00246    192*          DS=-(1.+X+S+WT)*S/RM*(CMLR/(S+WT)+DRME/(1.+XE))                   DERIV192   001005
00246    193*     C                                                                      DERIV193   001005
00246    194*     C    COMPUTE IN-CLOUD GAS DENSITY                                      DERIV194   001005
00246    195*     C                                                                      DERIV195   001005
00247    196*          RA=RM/V*RMIX                                                      DERIV196   001024
00250    197*          IF(EPS)902,902,901                                                DERIV197   001030
00253    198*       902 EPS=1.0E-4                                                       DERIV198   001035
00254    199*       901 RETURN                                                           DERIV199   001036
00255    200*           END                                                              DERIV200   001056

          END OF C MPILATION:        NO  DIAGNOSTICS.
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@:FOR,S  CC:SAMERA.DSTBN,R
FOR S0E3-0L/11/76-1  13:51 (*,)

   SUBROUTINE DSTBN     ENTRY POINT 000662

   STORAGE USED: CODE(1) 000472; DATA(0) 000134; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   NERR2$
    0005   ALOG
    0006   SQRT
    0007   EXP
    0010   NRDU*
    0011   NIO1$
    0012   NIO2$
    0013   ALOG10
    0014   XPRR
    0015   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000013 100L      0001   000046 102L      0001   000270 107L      0001   000022 112L      0001   000076 134G
    0001   000106 142G      0001   000263 163G      0001   000275 170G      0001   000322 200L      0000   000073 2001F
    0001   000421 201L      0001   000427 204L      0001   000453 2050L     0001   000515 2055L     0001   000535 2056L
    0001   000544 2057L     0001   000570 2060L     0001   000354 210G      0001   000373 221G      0001   000441 240G
    0001   000474 252G      0001   000522 262G      0001   000633 300L      0001   000614 306G      0001   000626 313G
    0001   000637 321G      0001   000645 400L      0000 R 000000 A         0000 R 000071 AJ        0000 R 000067 AN
    0000 R 000012 B         0000 R 000052 BARMU     0000 R 000036 BDLOW     0003 R 000000 CAY       0000 R 000051 C5
    0003   000001 DETID     0003 R 000015 DIAM      0003 R 000326 DMEAN     0000 R 000070 DMIN      0003   000327 DNS
    0003 R 000330 EXPO      0003 R 000331 FMASS     0000 R 000054 FRAC      0003   001170 HEIGHT    0000 I 000057 I
    0003 I 000641 IDISTR    0003   000642 IEXEC     0000 I 000065 IJ        0000   000117 INJP$     0003   000643 IRISE
    0003 I 000644 ISIN      0003   000645 ISOUT     0000 I 000062 IWAY      0000 I 000061 J         0000 I 000064 KSEG
    0000 I 000050 LO        0000 I 000055 ND        0003 I 000646 NDSTR     0000 I 000056 NH        0003   001172 NHODO
    0000 I 000063 NSEG      0000 R 000066 POW       0000 R 000060 PRB       0003 R 000647 PS        0003 R 001157 SD
    0000 R 000053 SIGMA     0003   001160 SSAM      0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2
    0003   001164 T2M       0003   001165 USOIL     0003   001166 VPR       0003   001503 VX        0003   002013 VY
    0003   001167 W         0000 R 000024 Y         0000 R 000072 YJ        0003   001171 ZSCL      0003   001173 ZV


00101      1*          SUBROUTINE DSTBN                                                              DSTBN001    00000n
00103      2*          COMMON /SET1/                                                                 DSTBN002    00000n
00103      3*         1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,DSTBN003    00000n
00103      4*         2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,DSTBN004    00000n
00103      5*         3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,DSTBN005    00000n
00103      6*         4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,DSTBN006    00000n
00103      7*         5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)               DSTBN007    00000n
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00104      8*          DIMENSION A(10),B(10),Y(10),BLOW(10)                                  00000n
00104      9*    C                                                                  DSTBN008  00000n
00104     10*    C     LOGNORMAL DISTRIBUTION TO 100                                DSTBN009  00000n
00104     11*    C     POWER FUNCTION DISTRIBUTION TO 200                           DSTBN010  00000n
00104     12*    C     TABULAR DISTRIBUTION TO 300                                  DSTBN011  00000n
00104     13*    C                                                                  DSTBN012  00000n
00104     14*    C     EQUATION 26.2.23 OF NBS-AMS 55 HANDBOOK IS USED TO COMPUTE THE DSTBN090  00000n
00104     15*    C     PROBABILITY FUNCTION ARGUMENT FROM THE RATIONAL POLYNOMIAL    DSTBN091  00000n
00104     16*    C     APPROXIMATION TO THE NORMAL PROBABILITY FUNCTION.            DSTBN092  00000n
00105     17*          TA(X)=SQRT(ALOG(1.0/X**2))                                            00000n
00106     18*          APX(X)=TA(X)-(2.515517+0.802853*TA(X)+0.010328*TA(X)**2)/       DSTBN   00000n
00106     19*         1(1.0+1.432788*TA(X)+0.189269*TA(X)**2+0.001308*TA(X)**3)       DSTBN096  00000n
00107     20*          LD=NDSTR+1                                                   DSTBN013  00000n
00110     21*          GO TO (100,200,300),IDISTR                                   DSTBN014  00000n
00111     22*      100 IF(DMEAN)111,111,112                                         DSTBN015  00001n
00114     23*      111 DMEAN=0.407                                                  DSTBN016  00001n
00115     24*          SD=4.0                                                       DSTBN017  00001n
00116     25*      112 IF(NDSTR-1)101,101,102                                       DSTBN018  00002n
00121     26*      101 PS(1)=DMEAN*1.0E-6                                           DSTBN019  00002n
00122     27*          C5=SD**5                                                     DSTBN020  00003n
00123     28*          DIAM(1)=DMEAN/C5                                             DSTBN021  00003n
00124     29*          DIAM(2)=DMEAN*C5                                             DSTBN022  00004n
00125     30*          FMASS(1)=1.0                                                 DSTBN023  00004n
00126     31*          GO TO 400                                                    DSTBN024  00004n
00127     32*      102 BARMU=ALOG(DMEAN)                                            DSTBN025  00004n
00130     33*          SIGMA=ALOG(SD)                                               DSTBN026  00005n
00131     34*          BARMU=BARMU+3.*SIGMA**2                                      DSTBN027  00005n
00132     35*          FRAC=1.0/FLOAT(NDSTR)                                        DSTBN028  00006n
00133     36*          DO 103 ND=1,NDSTR                                            DSTBN029  00007n
00136     37*      103 FMASS(ND)=FRAC                                               DSTBN030  00007n
00140     38*          NH=NDSTR/2                                                   DSTBN031  00007n
00141     39*          DO 104 I=1,NH                                                DSTBN032  00010n
00144     40*          PRB=FLOAT(I)*FRAC                                            DSTBN033  00010n
00145     41*          DIAM(I+1)=BARMU+APX(PRB)*SIGMA                               DSTBN034  00011n
00146     42*          J=NDSTR-I+1                                                  DSTBN035  00015n
00147     43*      104 DIAM(J)=BARMU-APX(PRB)*SIGMA                                 DSTBN036  00016n
00147     44*    C                                                                  DSTBN037  00016n
00147     45*    C     FOR THE 2 EXTREME INTERVALS THE AVERAGE DIAMETER IS          DSTBN038  00016n
00147     46*    C     ASSUMED TO BE AT HALF A MASS FRACTION FROM ZERO AND ONE      DSTBN039  00016n
00147     47*    C                                                                  DSTBN040  00016n
00151     48*          PRB=FRAC/2.0                                                 DSTBN041  00017n
00152     49*          PS(1)=BARMU+APX(PRB)*SIGMA                                   DSTBN042  00017n
00153     50*          PS(NDSTR)=BARMU-APX(PRB)*SIGMA                               DSTBN043  00023n
00154     51*          DIAM(1)=2.*PS(1)-DIAM(2)                                     DSTBN044  00024n
00155     52*          DIAM(LD)=2.*PS(NDSTR)-DIAM(NDSTR)                            DSTBN045  00024n
00155     53*    C                                                                  DSTBN046  00024n
00155     54*    C     CALCULATE MEAN DIAMETERS FROM BOUNDARY VALUES                DSTBN047  00024n
00155     55*    C                                                                  DSTBN048  00024n
00156     56*          J=NDSTR-1                                                    DSTBN049  00025n
00157     57*          IF(J-1)107,107,105                                           DSTBN050  00025n
00162     58*      105 DO 106 I=2,J                                                 DSTBN051  00025n
00165     59*      106 PS(I)=0.5*(DIAM(I)+DIAM(I+1))                                DSTBN052  00026n
00167     60*      107 DO 108 I=1,NDSTR                                             DSTBN053  00027n
00172     61*          DIAM(I)=EXP(DIAM(I))                                         DSTBN054  00027n
00173     62*      108 PS(I)=EXP(PS(I))*1.0E-6                                      DSTBN055  00030n
00175     63*          DIAM(LD)=EXP(DIAM(LD))                                       DSTBN056  00031n
00176     64*          GO TO 400                                                    DSTBN057  00032n
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00177     65*       200 IWAY=1                                                                    000329
00200     66*           IF( CAY .GT.  0.0  )  GO TO 201                                           000327
00202     67*           CAY=ABS(CAY)                                                              000326
00203     68*           CAY=CAY+0.5                                                               000330
00204     69*           IWAY=2                                                                    000332
00205     70*           NSEG=IFIX(CAY)                                                            000334
00206     71*           READ(ISIN,2001) (A(I),Y(I),I=1,NSEG)                                      000347
00215     72*       2001 FORMAT(  2E10.4 )                                                        000360
00216     73*           KSEG=1                                                                    000360
00217     74*           NSEG=NSEG-1                                                               000362
00220     75*           DO 2002 IJ=1,NSEG                                                         000366
00223     76*           B(IJ)=ALOG10(Y(IJ)/Y(IJ+1))/ALOG10(A(IJ)/A(IJ+1))                         000377
00224     77*           BDLOW(IJ)=A(IJ+1)                                                         000411
00225     78*       2002 CONTINUE                                                                 000414
00227     79*           BDLOW(NSEG)=0.0                                                           000414
00230     80*           POW=1.0/B(KSEG)                                                           000415
00231     81*        201 IF(NDSTR-1)203,204,204                                     DSTBN063     000421
00234     82*        203 NDSTR=10                                                   DSTBN064     000428
00235     83*        204 AN=FLOAT(NDSTR)                                            DSTBN065     000427
00236     84*            FRAC=1.0/AN                                                DSTBN066     000431
00237     85*            DO 205 I=1,NDSTR                                           DSTBN067     000441
00242     86*        205 EMASS(I)=FRAC                                              DSTBN068     000441
00244     87*            GO TO (2050,2055),IWAY                                                   000447
00245     88*       2050 CONTINUE                                                                 000457
00246     89*            POW=1.0/EXPO                                                             000457
00247     90*            DMIN=(FRAC/CAY)**POW                                                     000457
00250     91*             DMIN=DMIN/1.0E+6                                                        000466
00251     92*            DO 206 IJ=1,NDSTR                                          DSTBN071     000474
00254     93*            AJ=FLOAT(IJ)-1.0                                           DSTBN072     000474
00255     94*        206 DIAM(IJ)=(AN-AJ)**POW*DMIN                                 DSTBN073     000501
00257     95*            GO TO 2060                                                               000517
00260     96*       2055 CONTINUE                                                                 000515
00261     97*            DO 2058 IJ=1,NDSTR                                                       000515
00264     98*            YJ=100.0-FRAC*FLOAT(IJ-1) *100.0                                         000522
00265     99*            GO TO 2057                                                               000537
00266    100*       2056 CONTINUE                                                                 000536
00267    101*            KSEG=KSEG+1                                                              000536
00270    102*            POW=1.0/B(KSEG)                                                          000540
00271    103*       2057 CONTINUE                                                                 000544
00272    104*            DIAM(IJ)=A(KSEG+1)*(YJ/Y(KSEG+1))**POW                                   000544
00273    105*            IF( DIAM(IJ) .LT. BDLOW(KSEG) )  GO TO 2056                              000555
00275    106*            DIAM(IJ)=DIAM(IJ)/1.0E+6                                                 000560
00276    107*       2058 CONTINUE                                                                 000566
00300    108*            DMIN=DIAM(NDSTR)                                                         000566
00301    109*       2060 CONTINUE                                                                 000570
00302    110*            PS(NDSTR)=DMIN*0.5**POW                                    DSTBN074     000570
00303    111*            DIAM(LD)=PS(NDSTR)**2/DIAM(NDSTR)                          DSTBN075     000576
00304    112*            ND=NDSTR-1                                                 DSTBN076     000609
00305    113*            DO 207 IJ=1,ND                                             DSTBN077     000607
00310    114*        207 PS(IJ)=SQRT(DIAM(IJ)*DIAM(IJ+1))                           DSTBN078     000614
00312    115*            DO 208 IJ=1,LD                                             DSTBN079     000626
00315    116*        208 DIAM(IJ)=1.0E+6*DIAM(IJ)                                   DSTBN080     000626
00317    117*            GO TO 400                                                  DSTBN081     000631
00320    118*        300 DO 301 I=1,NDSTR                                           DSTBN082     000637
00323    119*        301 PS(I)=0.5*(DIAM(I)+DIAM(I+1))*1.0E-6                       DSTBN083     000637
00325    120*        400 RETURN                                                     DSTBN084     000645
00326    121*            END                                                        DSTBN098     000671
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Q:FOR,S  CASSANDRA.DVY,R
FOR S0E3-06/11/76-10:13:55 (1,)

   SUBROUTINE DIVY      ENTRY POINT 000307

   STORAGE USED: CODE(1) 000337; DATA(0) 000051; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   BSTWER 002123
    0004   PSTWER 000074

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   NERR2$
    0006   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000035 10L       0001   000101 120G      0001   000235 174G      0001   00,200 200L      0001   00012, 30L
    0001   000136 35L       0001   000170 50L       0001   000175 55L       0003 R 000000 ALTHLD    0003 R 001606 BOTCOR
    0000 L 000000 CORSET    0000 R 000011 DELA      0000 R 000002 H         0000 I 000007 I         0000   000013 INJP$
    0000 I 000001 LAM       0003 I 002052 LAMHLD    0000 I 000003 LCOR      0004 R 000000 PSTALT    0004 R 000012 PSTRAD
    0004 R 000036 PSTRHO    0004 R 000024 PSTSA     0004 R 000050 PSTX      0004 R 000062 PSTY      0003 R 000703 RADHLD
    0000 R 000006 RMOH      0000 R 000010 R12       0003 R 001730 TOPCOR    0000 R 000004 XRATIO    0000 R 000005 YRATIO

00101     1*          SUBROUTINE DIVY(NLAMNA,KTIM,IKLOUD,RMASS,NPSTW,NHODO)                    000014
00103     2*          COMMON/BSTWER/ ALTHLD(11,41),RADHLD(11,41),BOTCOR(2,41),                 000014
00103     3*         1               TOPCOR(2,41),LAMHLD(41)                                   000014
00104     4*          COMMON/PSTWER/ PSTALT(10),PSTRAD(10),PSTSA(10),PSTRHO(10)                000014
00104     5*         1             ,  PSTX(10),  PSTY(10)                                     000014
00105     6*          LOGICAL CORSET                                                           000014
00106     7*          CORSET=NHODO.GT. 0                                                       000014
00107     8*          LAM=NLAMNA-1                                                             000022
00110     9*          GO TO ( 10,200),IKLOUD                                                   000024
00111    10*       10 CONTINUE                                                               000034
00112    11*          H=ALTHLD(NLAMNA,KTIM)-ALTHLD(1,KTIM)                                     000034
00113    12*           LCOR=LAMHLD(KTIM)+1                                                     000037
00114    13*          XRATIO=(TOPCOR(1,KTIM)-BOTCOR(1,KTIM))/                                  000042
00114    14*         1          (ALTHLD(LCOR,KTIM)-ALTHLD(1,KTIM))                            000042
00115    15*          YRATIO=(TOPCOR(2,KTIM)-BOTCOR(2,KTIM))/                                  000057
00115    16*         1           (ALTHLD(LCOR,KTIM)-ALTHLD(2,KTIM))                           000057
00116    17*           RMOH=RMASS/H                                                           000061
00117    18*          DO 50 I=1,LAM                                                           000101
00117    19*     C                                                                            000101
00117    20*     C    CALCULATE MEAN DENSITY OF THIS PART OF WAFER                            000101
00122    21*          R12=RADHLD(I,KTIM)*RADHLD(I+1,KTIM)                                     000101
00123    22*          PSTRHO(I)=RMOH/R12                                                      000104
00123    23*     C                                                                            000104
00124    24*          PSTRAD(I)=R12                                                           000107
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00124     25*      C      CALCULATE ALTITUDE AND SEMI ALTITUDE OF WAFER                    000107
00125     26*             PSTSA(I)=(ALTHLD(I+1,KTIM)-ALTHLD(I,KTIM))/2.0                   000110
00126     27*             PSTALT(I)=ALTHLD(I,KTIM)+PSTSA(I)                                000114
00126     28*      C                                                                       000114
00126     29*      C      CALCULATE X AND Y COORDINATES                                    000114
00127     30*             IF( CORSET ) GO TO 30                                            000116
00131     31*             PSTX(I)=0.0                                                      000120
00132     32*             PSTY(I)=0.0                                                      000121
00133     33*             GO TO 35                                                         000123
00134     34*          30 CONTINUE                                                         000124
00135     35*             DELA=PSTALT(I)-ALTHLD(1,KTIM)                                    000124
00136     36*             PSTX(I)=BOTCOR(1,KTIM)+YRATIO*DELA                               000126
00137     37*             PSTY(I)=BOTCOR(2,KTIM)+YRATIO*DELA                               000131
00140     38*          35 IF( I+1 .LE. LAMHLD(KTIM) )  GO TO 50                            000136
00142     39*             IF( I .EQ. LAM ) GO TO 50                                        000143
00144     40*             NPSTW=I+1                                                        000146
00145     41*             PSTRAD(NPSTW)=RADHLD(NLAMNA,KTIM)**2                             000150
00146     42*             PSTRHO(NPSTW)=RMOH/PSTRAD(NPSTW)                                 000153
00147     43*             PSTSA(NPSTW)=(ALTHLD(NLAMNA,KTIM)-ALTHLD(LCOR,KTIM))/2.0         000156
00150     44*             PSTALT(NPSTW)=ALTHLD(LCOR,KTIM)+PSTSA(NPSTW)                     000160
00151     45*             PSTX(NPSTW)=TOPCOR(1,KTIM)                                       000163
00152     46*             PSTY(NPSTW)=TOPCOR(2,KTIM)                                       000164
00153     47*             GO TO 55                                                         000166
00154     48*          50 CONTINUE                                                         000173
00156     49*             NPSTW=LAM                                                        000173
00157     50*          55 CONTINUE                                                         000175
00160     51*             RETURN                                                           000175
00161     52*         200 CONTINUE                                                         000200
00161     53*      C      FIND OUT HOW MANY WAFERS WERE COMBINED                           000200
00162     54*             NPSTW=ABS( LAMHLD(1))                                            000200
00162     55*      C      CALCULATE HEIGHT FOR EACH WAFER AND SEMI-HEIGHT AND DENSITY      000200
00163     56*             PSTALT(1)=ALTHLD(2,KTIM)-ALTHLD(1,KTIM)                          000201
00164     57*             PSTRAD(1)=RADHLD(1,KTIM)**2                                      000204
00165     58*             PSTRHO(1)=RMASS/(PSTALT(1)*PSTRAD(1))                            000207
00166     59*             H=PSTALT(1)/FLOAT(NPSTW)                                         000213
00167     60*             PSTSA(1)=H/2.0                                                   000220
00170     61*             PSTALT(1)=ALTHLD(1,KTIM)+PSTSA(1)                                000223
00171     62*             PSTX(1)=BOTCOR(1,KTIM)                                           000224
00172     63*             PSTY(1)=BOTCOR(2,KTIM)                                           000227
00172     64*      C      BOTTOM WAFER ESTABLISHED USE IT TO CALCULATE THE REST            000227
00173     65*             DO 300 I=2,NPSTW                                                 000235
00176     66*             PSTSA(I)=PSTSA(1)                                                000235
00177     67*             PSTX(I)=PSTX(1)                                                  000237
00200     68*             PSTY(I)=PSTY(1)                                                  000241
00201     69*             PSTRAD(I)=PSTRAD(1)                                              000243
00202     70*             PSTRHO(I)=PSTRHO(1)                                              000245
00203     71*             PSTALT(I)=PSTALT(1)+H*FLOAT(I-1)                                 000247
00204     72*         300 CONTINUE                                                         000261
00206     73*             RETURN                                                           000261
00207     74*             END                                                              000336

        END OF COMPILATION:        NO  DIAGNOSTICS.
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0:FOR,S  CASSANDRA.ERR,R
FOR S0E3-06/11/76-10:14:02 (1,)


   SUBROUTINE ERROR     ENTRY POINT 000030


   STORAGE USED: CODE(1) 000041; DATA(0) 000033; BLANK COMMON(2) 000000


   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   NWDU$
    0004   NIO2$
    0005   NSTOP$
    0006   NERR3$


   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000   000001 1F        0001   000017 101L      0000   000026 INJP$     0000 I 00,000 IRR
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00101      1*          SUBROUTINE ERROR (PROGRM,IRROR,ISOUT)                                ERROR001    000000
00101      2*     C    T. W. SCHWENKE  TECHNICAL OPERATIONS RESEARCH                        ERROR002    000000
00101      3*     C    1 MARCH 1966                                                         ERROR003    000000
00101      4*     C                                                                         ERROR004    000000
00101      5*     C ***************************************************************************ERROR005    000000
00101      6*     C                                                                         ERROR006    000000
00101      7*     C    THIS PROGRAM WRITES A GENERALIZED ERROR COMMENT OF THE FOLLOWING      ERROR007    000000
00101      8*     C    FORM ON TAPE ISOUT AND THEN RETURNS IF THE SIGN OF IRROR IS           ERROR008    000000
00101      9*     C    POSITIVE OR STOPS IF ITS SIGN IS NEGATIVE.                           ERROR009    000000
00101     10*     C                                                                         ERROR010    000000
00101     11*     C        ERROR SENSED IN PROGRAM (PROGRM) AT OR NEAR STATEMENT NUMBER     ERROR011    000000
00101     12*     C        (IRROR).  PLEASE REFER TO THE PROGRAM LISTING.                   ERROR012    000000
00101     13*     C                                                                         ERROR013    000000
00101     14*     C    PRIOR TO CALLING ERROR  THE PARAMETER  PROGRM  MUST BE SET           ERROR014    000000
00101     15*     C                                    WITH THE BCD NAME OF THE CALLING     ERROR015    000000
00101     16*     C    PROGRAM AND PARAMETER  IRROR  MUST BE SET WITH THE NUMBER OF THE     ERROR016    000000
00101     17*     C    FORTRAN STATEMENT WHICH BEST IDENTIFIES THE ERROR CONDITION.         ERROR017    000000
00101     18*     C                                                                         ERROR018    000000
00101     19*     C ***************************************************************************ERROR019    000000
00101     20*     C                                                                         ERROR020    000000
00103     21*           FORMAT(//26H ERROR SENSED IN PROGRAM  A6,30H  AT OR NEAR STATEMENT  ERROR021    000000
00103     22*          1 NUMBER I6,40H .  PLEASE REFER TO THE PROGRAM LISTING.)            ERROR022    000000
00103     23*     C                                                                         ERROR023    000000
00103     24*     C ***************************************************************************ERROR024    000000
00103     25*     C ***************************************************************************ERROR025    000000
00103     26*     C                                                                         ERROR026    000000
00104     27*          IRR= IABS(IRROR)                                                     ERROR027    000000
00105     28*          WRITE(ISOUT,1)PROGRM,IRR                                             ERROR028    000001
00111     29*          IF(IRROR)101,100,100                                                 ERROR029    000010
00114     30*        100 RETURN                                                             ERROR030    000013
00115     31*        101 STOP                                                               ERROR031    000017
00116     32*          END                                                                  ERROR032    000040
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0:FOR,S  CASSANDRA.FTN,R
FOR S0F3-06/11/76-1:14:06 (*,)

    SUBROUTINE HEIT      ENTRY POINT 000174

    STORAGE USED: CODE(1) 000202; DATA(0) 000034; BLANK COMMON(2) 000000

     COMMON BLOCKS:

     0003   CLOUD  006601
     0004   ,AFER  000423

    EXTERNAL REFERENCES (BLOCK, NAME)

     0005   TRPL
     0006   .ERR3$
     0007   ALOG10
     0010   XPRR
     0011   .ERR3$

    STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

     0001   000012 10L       0001   000052 100L      0001   000072 110L      0001   000120 150L      0001   000134 155L
     0003 R 000000 ALT       0003   000404 ATP       0003   001010 B0        0000 R 000005 CD        0003   001011 CG
     0003   001321 CHANGE    0003   001322 CMLR      0003 R 001323 CX        0003   003127 C2        0003   003130 C3
     0003   003131 C6        0003   003132 DEK       0000 R 000001 DEN       0000 R 000006 DN        0003   003133 DNID
     0004 R 000135 DPX       0003   003147 DRM       0003   003150 DS        0003   003151 DST       0003   003152 DST0
     0003   003153 DST1      0003   003154 DST2      0003   003155 DT        0003   003156 DU        0003   003157 DWT
     0003   003160 DX        0003   003161 DZ        0003   003162 ED        0003   003163 EK        0003   003164 EPS
     0003   003165 ES        0003 R 003166 ETA       0003   003572 F         0004 R 000422 FROG      0003   003573 FW
     0003   003574 GRV       0003   004200 HLR       0003   004201 HOR       0000   000023 INJP$     0003   004202 IPAM
     0003   004203 IRAD      0003   004204 KCLD      0003   004205 KDI       0004 I 000000 KONE      0003   004206 KRX
     0003   004207 KS        0003   004210 KSV       0004 I 000001 KTWO      0004 I 000002 LT        0003   004211 MCX
     0003   004212 MNYA      0003   004213 N         0003   004214 NNN       0003 I 004215 NPVA      0003   004216 P
     0003   004217 PRS       0003   004523 PW        0000 R 000007 Q         0003   004624 QI        0003   004625 R
     0003   004626 RA        0003   004627 RED       0003 R 004630 RHZ       0003   005234 RL        0003   005235 RLH
     0003   005641 RM        0003   005642 RZT       0003   005643 S         0003   005644 SAVE      0003   005645 SLOTMP
     0003   005646 SLV       0003   006252 SMALLT    0003   006253 SZRO      0003   006254 T         0003   006255 TE
     0003   006256 TXSD      0003   006257 U         0000 R 000000 UP        0003   006260 V         0004 R 000421 VELOCF
     0000 R 000002 VIS       0004 R 000003 VISCX     0000 R 000003 VO        0003   006261 VZRO      0000 R 000004 V1
     0003   006262 WT        0003   006263 X         0003   006264 XE        0003   006265 Y         0003   006575 Z
     0003   006576 ZBER      0003   006577 ZBRSTZ    0003   006600 ZLMT

50

00101      1*          SUBROUTINE HEIT                                                                          000000
00101      2*         1  (ALITUD,PSIZ,KEY)                                                                     000000
00103      3*          COMMON /CLOUD/                                                                          000000
00103      4*         1ALT(260)   ,ATP(260)   ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,                  000000
00103      5*         2CX(10,90) ,C2         ,C3        ,C6        ,DEK       ,DNID(12)  ,                  000000
00103      6*         3DRM        ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,                  000000
00103      7*         4DT         ,DU        ,DWT       ,DX        ,DZ        ,ED        ,                  000000
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00103     8*          5EK         ,EPS        ,ES         ,ETA(260)  ,F          ,FW         ,
00103     9*          6GRV(260)   ,HLR        ,HOB        ,IPAM      ,IRAD       ,KCLD       ,
00103    10*          7KDI        ,KRX        ,KS         ,KSV       ,MCX        ,MWYA       ,
00103    11*          8N          ,NNN        ,NPVA       ,P         ,PRS(260)   ,PW         ,
00103    12*          9QI         ,R          ,RA         ,RFD       ,RHZ(260)   ,RL         ,
00103    13*          1RLH(260)   ,RM         ,RZT        ,S         ,SAVE       ,SLDTMP     ,
00103    14*          2SLM(260)   ,SMALLT     ,SZRO       ,T         ,TE         ,TMSD       ,
00103    15*          3U          ,V          ,VZRO       ,WT        ,X          ,XE         ,
00103    16*          4Y(200)     ,Z          ,ZBFR       ,ZBRSTZ    ,ZLMT
00104    17*           COMMON/WAFER/
00104    18*          1 KONE,KTWO,LT,VISCX(90),DPX(2,90),VELOCE,FROG
00105    19*           DIMENSION ALITUD(2)
00105    20*      C    THIS SUBROUTINE CALCULATES VERTICAL TRAVEL OF WAFER TOP OR
00105    21*      C    BOTTOM DURING ONE TIME STEP IN CX ARRAY.
00105    22*      C    THE PARTICLE DIAMETER IS PSIZ.
00105    23*      C    THE ORIGINAL LAMINA ALTITUDE IS ALITUD(KONE)
00105    24*      C    THE FINAL    LAMINA ALTITUDE IS ALITUD(KTWO)
00105    25*      C    KEY=1 SPECIFIES BELOW CLOUD CALCULATION
00105    26*      C    KEY=2 SPECIFIES ABOVE CLOUD CALCULATION
00106    27*          GO TO (10 ,100),KEY
00106    28*      C
00106    29*      C    BELOW CLOUD AIR DENSITY AND VISCOSITY
00106    30*      C
00107    31*       10 UP=CX(6,LT)+(ALITUD(KONE)-CX(3,LT) )* DPX(2,LT)
00110    32*          CALL TRPL(ALITUD(KONE),NPVA,ALT,RHZ,DEN)
00111    33*          CALL TRPL(ALITUD(KONE),NPVA,ALT,ETA,VIS)
00112    34*          GO TO 110
00112    35*      C
00112    36*      C    IN CLOUD GAS DENSITY AND VISCOSITY
00112    37*      C
00113    38*      100 UP=CX(6,LT)+(ALITUD(KONE)-CX(3,LT))*DPX(1,LT)
00114    39*          DEN=CX(10,LT)
00115    40*          VIS=VISCX(LT)
00115    41*      C
00115    42*      C    FALL SPEEDS
00115    43*      C
00116    44*      110 CONTINUE
00117    45*          V0=PSIZ/VIS
00120    46*          V1=PSIZ*V0*FROG
00121    47*          CD=V1*V0*DEN
00122    48*          IF( CD.GT. 140.0)  GO TO 150
00124    49*          DN=V1*(41666.7+CD*(-2.3363E+2+CD*(2.0154-6.9105F-3*CD)))
00125    50*          GO TO 155
00126    51*      150 CONTINUE
00127    52*          Q=ALOG10(CD)-20.773
00130    53*          DN=50657.0*V1*CD**(( 0*Q -443.98)* 0.0011235)
00131    54*      155 DN=DN*(1.0+0.233/ (PSIZ*DEN))
00132    55*          VELOCE=UP-DN
00133    56*          ALITUD(KTWO)=ALITUD(KONE)+ CX(2,LT)*VELOCE
00134    57*          RETURN
00135    58*          END

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

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D:FOR.S  CASSANDRA.ICRD;R
FOR S0E3-06/11/76-10:14:24 (1,)

 SUBROUTINE ICRD       ENTRY POINT 000225

 STORAGE USED: CODE(1) 000231; DATA(0) 000360; BLANK COMMON(2) 000000

 COMMON BLOCKS:

 0003   SFT1    002323
 0004   CLOUD   006601

 EXTERNAL REFERENCES (BLOCK, NAME)

 0005   ATMR
 0006   MRDU$
 0007   MIO3$
 0010   MIO2$
 0011   NWDU$
 0012   MIO1$
 0013   MERR3$

 STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

 0000    000017 1000F      0000    000112 1100F      0000    000113 1200F      0000    000114 1300F      0000    000115 1400F
 0000    000221 1500F      0000    000246 1600F      0000    000263 1700F      0001    000206 2L         0001    000173 221G
 0000    000322 998E       0000    000344 999F       0004 R  000000 ALT        0000 R  000000 ATID       0004 R  000404 ATP
 0004    001010 B0         0003    000000 CAY        0004    001011 C6         0004    001321 CHANGE     0004    001322 CMLR
 0004    001323 CX         0004    003127 C2         0004    003130 C3         0004    003131 C6         0004    003132 DEK
 0003    000001 DETID      0003    000015 DIAM       0003    000326 DMEAN      0004 R  003133 DNID       0003 R  000327 DNS
 0004    003147 DRM        0004    003150 DS         0004    003151 DST        0004    003152 DSTO       0004    003153 DST1
 0004    003154 DST2       0004    003155 DT         0004    003156 DU         0004    003157 DWT        0004    003160 DX
 0004    003161 DZ         0004    003162 ED         0004    003163 EK         0004    003164 EPS        0004    003165 ES
 0004 R  003166 ETA        0003    000330 EXPO       0004    003572 F          0003    000331 FMASS      0004 R  003573 FW
 0004 R  003574 GRV        0003    001170 HEIGHT     0004    004200 HLR        0004    004201 HOB        0000 I  000016 I
 0003 I  000641 IDISTR     0003    000642 IEXEC      0000    000351 INJP$      0004 I  004202 IRAM       0004 I  004203 IRAD
 0003    000643 IRISE      0003 I  000644 ISIN       0003 I  000645 ISOUT      0000 I  000014 KATM       0004 I  004204 KCLD
 0004 I  004205 KDI        0004 I  004206 KRX        0004    004207 KS         0004    004210 KSV        0004    004211 MCX
 0004    004212 MWYA       0004    004213 N          0003 I  000646 NDSTR      0003    001172 NHODO      0004    004214 NNN
 0004 I  004215 NPVA       0004    004216 P          0003 R  001164 PHI        0004 R  004217 PRS        0003    000647 PS
 0004    004623 PW         0004    004624 QI         0004    004625 R          0004    004626 RA         0004    004627 RED
 0004 R  004630 RHZ        0004    005234 RL         0004 R  005235 RLH        0004    005641 RM         0000 R  000015 RPHI
 0004    005642 RZT        0004    005643 S          0004    005644 SAVE       0003    001157 SD         0004 R  005645 SLDTMP
 0004 R  005646 SLM        0004    006252 SMALLT     0003    001160 SSAM       0004    006253 SZRO       0004    006254 T
 0004    006255 TE         0003    001161 TME        0003    001162 TMP1       0003    001163 TMP2       0004    006256 TMSD
 0004    006257 U          0003    001165 USOIL      0004    006260 V          0003    001166 VPR        0003    001503 VX
 0003    002013 VY         0004    006261 VZRO       0003 R  001167 W          0004    006262 WT         0004    006263 Y
 0004    006264 XE         0004    006265 Y          0004    006575 Z          0004    006576 ZBER       0004 R  006577 ZBRST2
 0004    006600 ZLMT       0003    001171 ZSCL       0003    001173 ZV
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00101     1*          SUBROUTINE ICRD                                                                  ICRD 001    00000n
00101     2*    C                                                                                      ICRD 002    00000n
00101     3*    C     13 OCTOBER 1970                                                                  ICRD 003    00000n
00101     4*    C                                                                                      ICRD 004    00000n
00101     5*    C ***************************************************************************         ICRD 005    00000n
00101     6*    C                                                                                      ICRD 006    00000n
00103     7*          COMMON /SET1/                                                                    ICRD 007    00000n
00103     8*         1CAY        ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,          ICRD 008    00000n
00103     9*         2FMASS(200),IDISTR     ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,          ICRD 009    00000n
00103    10*         3NDSTR      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,          ICRD 010    00000n
00103    11*         4TMP2       ,PHI       ,USOIL     ,VPR       ,W         ,HEIGHT    ,          ICRD 011    00000n
00103    12*         5ZSCL       ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)                         ICRD 012    00000n
00104    13*          COMMON /CLOUD/                                                                   ICRD 013    00000n
00104    14*         1ALT(260)   ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,          ICRD 014    00000n
00104    15*         2CX(10,90)  ,C2        ,C3        ,C6        ,DEK       ,DNID(12)  ,          ICRD 015    00000n
00104    16*         3DRM        ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,          ICRD 016    00000n
00104    17*         4DT         ,DU        ,DWT       ,DX        ,DZ        ,FD        ,          ICRD 017    00000n
00104    18*         5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,          ICRD 018    00000n
00104    19*         6GRV(260)   ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD      ,          ICRD 019    00000n
00104    20*         7KDI        ,KRX       ,KS        ,KSV       ,MCX       ,MWYA      ,          ICRD 020    00000n
00104    21*         8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,          ICRD 021    00000n
00104    22*         9QI         ,R         ,RA        ,RFD       ,RHZ(260)  ,RL        ,          ICRD 022    00000n
00104    23*         1RLH(260)   ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,          ICRD 023    00000n
00104    24*         2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD      ,          ICRD 024    00000n
00104    25*         3U          ,V         ,VZRO      ,WT        ,X         ,XE        ,          ICRD 025    00000n
00104    26*         4Y(200)     ,Z         ,ZBFR      ,ZBRSTZ    ,ZLMT                            ICRD 026    00000n
00104    27*    C                                                                                      ICRD 027    00000n
00105    28*          DIMENSION ATID(12)                                                               ICRD 028    00000n
00105    29*    C ***************************************************************************         ICRD 029    00000n
00105    30*    C ***************************************************************************         ICRD 030    00000n
00105    31*    C     CONTROL PARAMETER GLOSSARY                                                       ICRD 031    00000n
00105    32*    C                                                                                      ICRD 032    00000n
00105    33*    C       KDI    NUMBER OF WAFERS PER PARTICLE SIZE CLASS (RSXP)                         ICRD 033    00000n
00105    34*    C       IRAD   WAFER SUBDIVISION FACTOR (RSXP)                                         ICRD 034    00000n
00105    35*    C       KCLD   CRM DEBUG PRINTOUT CONTROL                                              ICRD 035    00000n
00105    36*    C       KRX    RSXP DEBUG PRINTOUT CONTROL                                             ICRD 036    00000n
00105    37*    C       IPAM   PARTICLE ACTIVITY CALCULATION CONTROL (ALWAYS ZERO)                     ICRD 037    00000n
00105    38*    C       KATM   ATMOSPHERE TABLE PRINTOUT CONTROL                                       ICRD 038    00000n
00105    39*    C      (NDSTR  NUMBER OF PARTICLE SIZE CLASSES)                                        ICRD 039    00000n
00105    40*    C      (IDISTR PARTICLE DISTRIBUTION FORM CONTROL)                                     ICRD 040    00000n
00105    41*    C                                                                                      ICRD 041    00000n
00105    42*    C ***************************************************************************         ICRD 042    00000n
00105    43*    C                                                                                      ICRD 043    00000n
00106    44*     1000 FORMAT(1H1,///51X19H* * * * * * * * *//12X101HT H E   D E P A R ICRD 044    00000n
00106    45*         1T M E N T   O F   D E F E N S E   F A L L O U T   P R E D I C T I ICRD 045    00000n
00106    46*         20 N   S Y S T E M,//51X,19H* * * * * * * * *////52X,17HCLOUD-RISICRD 046    00000n
00106    47*         3E MODULE///55X,11HPREPARED BY/                                                  ICRD 047    00000n
00106    48*         4 42X,37HNAVAL RADIOLOGICAL DEFENSE LABORATORY/ 55X,11HS.F.,CALIF./ICRD 048    00000n
00106    49*         5 58X,3HAND/ 53X,17HARCON CORPORATION/53X,16HWAKEFIELD, MASS.////) ICRD 049    00000n
00107    50*     1100 FORMAT(12A6)                                                                    ICRD 050    00000n
00110    51*     1200 FORMAT(6I4)                                                                     ICRD 051    00000n
00111    52*     1300 FORMAT(E12.5)                                                                   ICRD 052    00000n
00112    53*     1400 FORMAT(20X,'CLOUD RISE RUN IDENTIFICATION - ',12A6//20X,'ATMOSPHERICRD 053    00000n
00112    54*         1E IDENTIFICATION      -',12A6//20X,'ELEVATION OF GROUND ZERO = ',FICRD 054    00000n
00112    55*         28.1,' METERS'/20X,'SOIL SOLIDIFICATION TEMPERATURE = ',F8.1,' DEGRICRD 055    00000n
00112    56*         3EES KELVIN'/20X,'PARTICLE DENSITY (C.G.S.) = ',F8.4/20X,'YIELDS (KICRD 056    00000n
00112    57*         4T) -'/23X,'TOTAL = ',E11.4,3X,'FISSION = ',E11.4/20X,'FRACTION OF ICRD 057    00000n
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00112     58*          5AVAILABLE ENERGY USED TO HEAT AIR INITIALLY = 'F11.4)                    ICRD 058    000000
00113     59*       1500 FORMAT(20X,'COMPUTATION CONTROL INPUTS-'/20X,'  NDSTR IDISTR    KDICRD 059    000000
00113     60*          1I    IRAD    KCLD    KRX    IPAM    KATM'/20X,8I7///)              ICRD 060    000000
00114     61*       1600 FORMAT(20X,'FRACTION OF AVAILABLE ENERGY USED TO HEAT LIQUID WATERICRD 061    000000
00114     62*          1 INITIALLY = 'E11.4///)                                            ICRD 062    000000
00115     63*       1700 FORMAT(20X,      22HCOMPUTATION CONTROLS -/23X,                    ICRD 063    000000
00115     64*          1                                    44HNUMBER OF PARTICLE SIZICRD 064    000000
00115     65*          2E CLASSES REQUESTED = I4/23X, 54HNUMBER OF CLOUD SUBDIVISIONS(WAFEICRD 065    000000
00115     66*          3RS) PER SIZE CLASS = I4/                                           ICRD 066    000000
00115     67*          4                    23X, 27HWAFER SUBDIVISION FACTOR = I4)         ICRD 067    000000
00116     68*        900 FORMAT(1H1,                                                       ICRD 068    000000
00116     69*          1         50X,10HATMOSPHERE,51X//7X,3HALT,11X,3HATP,11X,3HRHZ,11X,3ICRD 069    000000
00116     70*          2HETA,11X,3HPRS,11X,3HGRV,11X,3HSLM,11X,3HRLH)                      ICRD 070    000000
00117     71*        999 FORMAT(//(8(2X,F12.5)))                                           ICRD 071    000000
00117     72*     C                                                                        ICRD 072    000000
00117     73*     C ***************************************************************************ICRD 073    000000
00117     74*     C ***************************************************************************ICRD 074    000000
00117     75*     C                                                                        ICRD 075    000000
00117     76*     C                                                                        ICRD 076    000000
00117     77*     C ***************************************************************************ICRD 077    000000
00117     78*     C                                                                        ICRD 078    000000
00117     79*     C  SEQUENCE OF INPUTS                                                    ICRD 079    000000
00117     80*     C                                                                        ICRD 080    000000
00117     81*     C  1  READ CLOUD RISE IDENTIFICATION                                     ICRD 081    000000
00117     82*     C  2  READ CONTROL CARD                                                  ICRD 082    000000
00117     83*     C  3  READ GZ ELEVATION (METERS)                                         ICRD 083    000000
00117     84*     C  4  READ SOIL SOLIDIFICATION TEMPERATURE (DEGREES KELVIN)              ICRD 084    000000
00117     85*     C  5  READ FISSION YIELD    (KT)                                         ICRD 085    000000
00117     86*     C  6  READ FRACTION OF ENERGY AVAILABLE IN THE CLOUD USED TO HEAT AIR    ICRD 086    000000
00117     87*     C  7  READ ATMOSPHERE IDENTIFICATION                                     ICRD 087    000000
00117     88*     C                                                                        ICRD 088    000000
00117     89*     C ***************************************************************************ICRD 089    000000
00117     90*     C                                                                        ICRD 090    000000
00120     91*           READ(ISIN,1100)DNID                                                ICRD 091    000000
00123     92*           READ(ISIN,1200)KDI,IRAD,KCLD,KRX,IPAM,KATM                         ICRD 092    000007
00133     93*           READ(ISIN,1300)ZBRSTZ                                              ICRD 093    000029
00136     94*           READ(ISIN,1300)SLDTMP                                              ICRD 094    000030
00141     95*           READ(ISIN,1300)FW                                                  ICRD 095    000036
00144     96*           READ(ISIN,1300)PHI                                                 ICRD 096    000044
00147     97*           READ(ISIN,1100)ATID                                                ICRD 097    000052
00147     98*     C                                                                        ICRD 098    000052
00152     99*           CALL ATMR                                                          ICRD 099    000062
00152    100*     C                                                                        ICRD 100    000062
00152    101*     C ***************************************************************************ICRD 101    000062
00152    102*     C                                                                        ICRD 102    000062
00152    103*     C  SEQUENCE OF OUTPUTS                                                   ICRD 103    000062
00152    104*     C                                                                        ICRD 104    000062
00152    105*     C  1  WRITE CLOUD RISE MODULE HEADING                                    ICRD 105    000062
00152    106*     C  2  WRITE INPUT DATA                                                   ICRD 106    000062
00152    107*     C  3  WRITE COMPUTATION CONTROLS                                         ICRD 107    000062
00152    108*     C  4  WRITE CRM COMPUTATION CONTROLS                                     ICRD 108    000062
00152    109*     C  5  WRITE RSXP COMPUTATION CONTROLS                                    ICRD 109    000062
00152    110*     C  6  WRITE ATMOSPHERE PROPERTIES                                        ICRD 110    000062
00152    111*     C                                                                        ICRD 111    000062
00152    112*     C ***************************************************************************ICRD 112    000062
00152    113*     C                                                                        ICRD 113    000062
00153    114*           RPHI=1.0-PHI                                                       ICRD 114    000064
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00154    115*          WRITE(ISOUT,1000)                                                    ICRD 115    000067
00156    116*          WRITE(ISOUT,1400)DNID,ATID,ZBRSTZ,SLDTMP,DNS,W,FW,PHI                ICRD 116    000074
00170    117*          WRITE(ISOUT,1600)RPHI                                                ICRD 117    000116
00173    118*          WRITE(ISOUT,1500)NDSTR,IDISTR,KDI,IRAD,KCLD,KRX,IPAM,KATM            ICRD 118    000124
00205    119*          WRITE(ISOUT,1700)NDSTR,KDI,IRAD                                      ICRD 119    000141
00212    120*          IF(KATM)2,2,1                                                        ICRD 120    000151
00215    121*        1 WRITE(ISOUT,998)                                                     ICRD 121    000156
00217    122*          WRITE(ISOUT,999)(ALT(I),ATP(I),RHZ(I),ETA(I),PRS(I),GRV(I),SLM(I),   ICRD 122    000164
00217    123*         1RLH(I),I=1,NPVA)                                                   ICRD 123    000164
00234    124*        2 KCLD = KCLD + 1                                                    ICRD 124    000206
00235    125*          KRX = KRX + 1                                                      ICRD 125    000218
00236    126*          RETURN                                                             ICRD 126    000219
00237    127*          END                                                                ICRD 127    000230

END OF COMPILATION:        NO  DIAGNOSTICS.
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@:FOR,S  CASSANDRA.LINK1,R
FOR SOEX-06/11/76-10:14:28 (1,)

   SUBROUTINE LINK1     ENTRY POINT 000605

   STORAGE USED: CODE(1) 000613; DATA(0) 000731; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   TIME
    0005   TEMP
    0006   MASS
    0007   VAPOR
    0010   DSTBN
    0011   SHWIND
    0012   NRDU$
    0013   NIO3$
    0014   NIO2$
    0015   NWDU$
    0016   NERR2$
    0017   NIO1$
    0020   XPRR
    0021   NSTOP$
    0022   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000   000012 1F      0000   000145 10F     0001   000361 102L    0001   000447 106L    0000   000014 11F
    0001   000471 116L    0001   000501 117L    0001   000506 118L    0000   000162 12F     0000   000207 13F
    0000   000324 14F     0001   000514 143L    0000   000334 15F     0001   000522 150L    0000   000340 16F
    0000   000435 17F     0001   000533 170L    0001   000527 171L    0000   000451 18F     0000   000507 19F
    0001   000570 190L    0000   000535 191F    0000   000547 192F    0000   000555 193F    0000   000676 194F
    0000   000702 195F    0000   000633 197F    0000   000013 2F      0001   000030 20L     0001   000551 200L
    0001   000061 210L    0001   000130 211L    0001   000110 22L     0001   000113 220L    0001   000152 2276
    0001   000171 23L     0000   000027 3F      0001   000325 302L    0001   000332 305L    0001   000342 309L
    0001   000436 310L    0001   000367 311L    0001   000375 315L    0001   000406 3446    0000   000031 4F
    0001   000051 402L    0000   000061 5F      0000   000065 6F      0001   000217 66L     0000   000071 7F
    0001   000223 70L     0000   000135 8F      0000   000141 9F      0001   000243 90L     0001   000254 92L
    0003 R 000326 DMEAN   0000 R 000010 DM1     0000 R 000011 DM2     0003 R 000327 DNS     0003 R 000330 EXPO
    0003 R 000331 FMASS   0003 R 001170 HEIGHT  0000 R 000003 HEW     0000 I 000005 I       0003 I 000641 IDISTR
    0003   000642 IFXEC   0000   000720 INJP$   0003   000643 IRISE   0000 I 000004 IS      0003 I 000644 ISIN
    0003 I 000645 ISOUT   0000 I 000001 J       0000 I 000007 JG      0000 I 000006 LD      0000 I 000002 N
    0003 I 000646 NDSTR   0003   001172 NHODO   0000 I 000000 NN      0003 R 000647 PS      0003 R 001157 SD
    0003 R 001160 SSAM    0003 R 001161 TME     0003 R 001162 TMP1    0003 R 001163 TMP2    0003   001164 T2M
    0003 R 001165 USOIL   0003 R 001166 VPR     0003   001503 VX      0003   002013 VY      0003 R 001167 W
    0003 R 001171 ZSCL    0003   001173 ZV
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00101      1*          SUBROUTINE LINK1                                                    LINK1001    00000n
00101      2*    C     INITIAL CONDITIONS (FIREBALL) MODULE                                LINK1002    00000n
00101      3*    C     ARCON CORPORATION  20 NOVEMBER  1969                                LINK1003    00000n
00101      4*    C                                                                         LINK1004    00000n
00101      5*    C ***************************************************************       LINK1005    00000n
00101      6*    C                                                                         LINK1006    00000n
00101      7*    C     PROGRAM TO DETERMINE THE INITIAL CONDITIONS SPECIFICATIONS OF       LINK1007    00000n
00101      8*    C     TIME, TEMPERATURE, TOTAL SOIL MASS, FRACTION OF THE SOIL BURDEN IN  LINK1008    00000n
00101      9*    C     THE VAPOR PHASE, AND THE SIZE FREQUENCY DISTRIBUTION OF THE         LINK1009    00000n
00101     10*    C     CONDENSED PHASE SOIL                                                LINK1010    00000n
00101     11*    C                                                                         LINK1011    00000n
00101     12*    C     THE FIRST CARD CONTAINS ANY ARBITRARY ALPHANUMERIC IDENTIFICATION.  LINK1012    00000n
00101     13*    C     THE SECOND CARD OF THE DATA DECK CONTAINS THE NUMBER OF CASES TO    LINK1013    00000n
00101     14*    C     BE RUN, FORMAT (I5).                                                LINK1014    00000n
00101     15*    C     THIS PARAMETER SHOULD BE LEFT BLANK IF THE USER WISHES THE PROGRAM  LINK1015    00000n
00101     16*    C     TO CALL LINK2 AND SHOULD BE GIVEN SOME POSITIVE VALUE N IF          LINK1016    00000n
00101     17*    C     THE USER WISHES THE PROGRAM TO STOP AFTER COMPUTING N SETS OF       LINK1017    00000n
00101     18*    C     INITIAL CONDITIONS.                                                 LINK1018    00000n
00101     19*    C                                                                         LINK1019    00000n
00101     20*    C     OTHER INPUT PARAMETERS ARE - TEST PARAMETER (IDISTR) TO DETERMINE   LINK1020    00000n
00101     21*    C     IF THE PARTICLE SIZE FREQUENCY DISTRIBUTION IS LOG-NORMAL, POWER    LINK1021    00000n
00101     22*    C     LAW, OR TABULAR, YIELD IN KILOTONS, HEIGHT(DEPTH) OF BURST IN       LINK1022    00000n
00101     23*    C     METERS, A SOIL TYPE INDICATOR, FALLOUT PARTICLE DENSITY(GM/CM**3),  LINK1023    00000n
00101     24*    C     MEAN(MICROMETERS) AND STANDARD DEVIATION FOR A LOG-NORMAL PARTICLE  LINK1024    00000n
00101     25*    C     SIZE FREQUENCY DISTRIBUTION, THE NUMBER OF PARTICLE SIZE CLASSES    LINK1025    00000n
00101     26*    C     IN THE PARTICLE SIZE FREQUENCY DISTRIBUTION. IF EITHER A TABULAR    LINK1026    00000n
00101     27*    C     OR POWER LAW DISTRIBUTION IS USED , THE MEAN AND STANDARD           LINK1027    00000n
00101     28*    C     DEVIATION ARE NOT CALLED FOR SINCE THEY DO NOT APPLY.     IF A      LINK1028    00000n
00101     29*    C     LOG-NORMAL DISTRIBUTION IS TO BE SUPPLIED BY THE PROGRAM, THE       LINK1029    00000n
00101     30*    C     MEAN AND STANDARD DEVIATION FIELDS ARE LEFT BLANK.                  LINK1030    00000n
00101     31*    C                                                                         LINK1031    00000n
00101     32*    C     FOR UNDERGROUND BURSTS INPUT DEPTH OF BURST AS A NEGATIVE NUMBER    LINK1032    00000n
00101     33*    C                                                                         LINK1033    00000n
00101     34*    C     THE OUTPUT UNITS ARE MASS IN KILOGRAMS, LENGTH IN METERS, TIME IN   LINK1034    00000n
00101     35*    C     SECONDS, TEMPERATURE IN DEGREES KELVIN, YIELD IN KILOTONS,          LINK1035    00000n
00101     36*    C     DISTRIBUTION PARAMETERS IN MICRONS                                  LINK1036    00000n
00101     37*    C                                                                         LINK1037    00000n
00101     38*    C ***********************  GLOSSARY  ***********************************  LINK1038    00000n
00101     39*    C                                                                         LINK1039    00000n
00101     40*    C     CAY           COEFFICIENT OF THE FREQUENCY FUNCTION FOR THE POWER   LINK1040    00000n
00101     41*    C                   LAW PARTICLE SIZE FREQUENCY DISTRIBUTION              LINK1041    00000n
00101     42*    C     DETID(I)      INITIAL CONDITIONS IDENTIFICATION ARRAY               LINK1042    00000n
00101     43*    C     DIAM(I)       ARRAY(201), UPPER BOUNDARY OF THE I-TH PARTICLE SIZE  LINK1043    00000n
00101     44*    C                   CLASS.  THE LAST ENTRY IN THE DIAM ARRAY IS THE LOWER LINK1044    00000n
00101     45*    C                   BOUNDARY OF THE LAST(SMALLEST) PARTICLE SIZE CLASS.   LINK1045    00000n
00101     46*    C                   THE LENGTH OF THE DIAM ARRAY IS ALWAYS ONE GREATER    LINK1046    00000n
00101     47*    C                   THAN THE NUMBER OF SIZE CLASSES(MICROMETERS)          LINK1047    00000n
00101     48*    C     DMEAN         MEDIAN DIAMETER (MICROMETERS) OF LOGNORMAL PARTICLE   LINK1048    00000n
00101     49*    C                   SIZE DISTRIBUTION                                     LINK1049    00000n
00101     50*    C     DNS           FALLOUT PARTICLE DENSITY (GM/CM**3)                   LINK1050    00000n
00101     51*    C     EXPO          EXPONENT OF THE FREQUENCY FUNCTION FOR THE POWER      LINK1051    00000n
00101     52*    C                   LAW PARTICLE SIZE FREQUENCY DISTRIBUTION              LINK1052    00000n
00101     53*    C     HEIGHT        HEIGHT OF BURST (METERS) ABOVE GROUND ZERO            LINK1053    00000n
00101     54*    C     IDISTR        CONTROL INTEGER FOR PARTICLE SIZE DISTRIBUTION        LINK1054    00000n
00101     55*    C                   1 - LOGNORMAL DISTRIBUTION                            LINK1055    00000n
00101     56*    C                   2 - POWER LAW DISTRIBUTION                            LINK1056    00000n
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00101    57*     C                  3 - TABULAR DISTRIBUTION READ IN ON CARDS (ARRAY WHY)LINK1057    00000n
00101    58*     C      IS          CONTROL INTEGER SPECIFIES WHETHER LOGNORMAL          LINK1058    00000n
00101    59*     C                  DISTRIBUTION IS SPECIFIED BY THE USER OR BY THE      LINK1059    00000n
00101    60*     C                  PROGRAM                                              LINK1060    00000n
00101    61*     C                  0 - PROGRAM SPECIFIED LOG-NORMAL DISTRIBUTION        LINK1061    00000n
00101    62*     C                  1 - USER SPECIFIED LOG-NORMAL DISTRIBUTION           LINK1062    00000n
00101    63*     C      ISIN        SYSTEM INPUT TAPE                                    LINK1063    00000n
00101    64*     C      ISOUT       SYSTEM OUTPUT TAPE                                   LINK1064    00000n
00101    65*     C      N           CONTROL INTEGER - NUMBER OF INPUT BURSTS             LINK1065    00000n
00101    66*     C      NDSTR       NUMBER OF PARTICLE SIZE CLASSES. MAXIMUM = 200       LINK1066    00000n
00101    67*     C      NHODO       NUMBER OF ENTRIES IN WIND HODOGRAPH TABLE            LINK1067    00000n
00101    68*     C      NN          INTEGER - TESTS NUMBER OF BURSTS RUN AGAINST THE     LINK1068    00000n
00101    69*     C                  NUMBER OF BURSTS TO BE RUN                           LINK1069    00000n
00101    70*     C      PS(I)       ARRAY(200), PARTICLE SIZE CLASS MIDPOINT DIAMETER    LINK1070    00000n
00101    71*     C                  (METERS)                                             LINK1071    00000n
00101    72*     C      SD          STANDARD DEVIATION OF LOGNORMAL PARTICLE SIZE        LINK1072    00000n
00101    73*     C                  DISTRIBUTION(DIMENSIONLESS)                          LINK1073    00000n
00101    74*     C      SSAM        MASS OF CONDENSED PHASE MATERIAL AT SPECIFICATION    LINK1074    00000n
00101    75*     C                  TIME                                                 LINK1075    00000n
00101    76*     C      TME         TIME OF INITIAL CONDITIONS SPECIFICATION             LINK1076    00000n
00101    77*     C      TMP1        AVERAGE TEMPERATURE OF GAS IN CLOUD                  LINK1077    00000n
00101    78*     C      TMP2        AVERAGE TEMPERATURE OF CONDENSED PHASE MATERIAL IN   LINK1078    00000n
00101    79*     C                  CLOUD                                                LINK1079    00000n
00101    80*     C      T2M         TEMPORARY STORAGE                                    LINK1080    00000n
00101    81*     C      USOIL       SOIL CLASS INDICATOR                                 LINK1081    00000n
00101    82*     C                  1.0 FOR SILICEOUS                                    LINK1082    00000n
00101    83*     C                  2.0 FOR CALCAREOUS                                   LINK1083    00000n
00101    84*     C      VPR         MASS OF VAPOR IN CLOUD AT SPECIFICATION TIME         LINK1084    00000n
00101    85*     C      VX(I)       X-COMPONENT OF WIND VELOCITY AT WIND HODOGRAPH       LINK1085    00000n
00101    86*     C                  STRATUM I (METERS/SEC.)                              LINK1086    00000n
00101    87*     C      VY(I)       Y-COMPONENT OF WIND VELOCITY AT WIND HODOGRAPH       LINK1087    00000n
00101    88*     C                  STRATUM I (METERS/SEC.)                              LINK1088    00000n
00101    89*     C      W           WEAPON YIELD (KT)                                    LINK1089    00000n
00101    90*     C      FMASS(I)    ARRAY OF FRACTION OF TOTAL PARTICULATE MASS IN I_TH  LINK1090    00000n
00101    91*     C                  PARTICLE SIZE CLASS. MAXIMUM LENGTH OF ARRAY = 200   LINK1091    00000n
00101    92*     C      ZSCL        SCALED HEIGHT OF BURST                               LINK1092    00000n
00101    93*     C      ZV(I)       ALTITUDE OF BASE OF ITH WIND LAYER.   CONVERTED TO   LINK1093    00000n
00101    94*     C                  ALTITUDE OF LAYER CENTER IN SHWIND (METERS ABOVE MSL)LINK1094    00000n
00101    95*     C                                                                       LINK1095    00000n
00101    96*     C ***************************************************************      LINK1096    00000n
00103    97*          COMMON /SET1/                                                      LINK1097    00000n
00103    98*         1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,LINK1098    00000n
00103    99*         2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT    ,LINK1099    00000n
00103   100*         3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1     ,LINK1100    00000n
00103   101*         4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT   ,LINK1101    00000n
00103   102*         5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)             LINK1102    00000n
00103   103*     C                                                                      LINK1103    00000n
00103   104*     C                                                                      LINK1104    00000n
00103   105*     C ***************************************************************      LINK1105    00000n
00103   106*     C                                                                      LINK1106    00000n
00104   107*          1    FORMAT(12A6)                                                LINK1107    00000n
00105   108*          2    FORMAT(/3X,60HTHE SPECIFIED STANDARD DEVIATION IS NEGATIVE HENCE ILINK1108    00000n
00105   109*              1NCORRECT///)                                                 LINK1109    00000n
00106   110*          3    FORMAT(7F10.3)                                              LINK1110    00000n
00107   111*          4    FORMAT(///25X28H****  INPUT PARAMETERS  ****/20X,5HYIELD,40X,E12.5LINK1111    00000n
00107   112*              1,2X,2HKT/20X,24HHEIGHT OR DEPTH OF BURST,21X,E12.5,2X,6HMETERS/20XLINK1112    00000n
00107   113*              2,13HSOIL CATEGORY)                                           LINK1113    00000n
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00110    114*       5    FORMAT(1H+,65X,9HSILICEOUS)                                                    LINK1114    00000n
00111    115*       6    FORMAT(1H+,65X,10HCALCAREOUS)                                                  LINK1115    00000n
00112    116*       7    FORMAT(//20X50HPRE-SHOT SOIL PARTICLE SIZE FREQUENCY DISTRIBUTION/LINK1116    00000n
00112    117*           125X32HA LOG-NORMAL DISTRIBUTION WITH -/30X,4HMEAN,31X,E12.5,2X,11HLINK1117    00000n
00112    118*           2MICROMETERS/30X,18HSTANDARD DEVIATION,17X,E12.5        /25X,34HTHILINK1118    00000n
00112    119*           3S DISTRIBUTION WAS SPECIFIED BY)                                              LINK1119    00000n
00113    120*       8    FORMAT(1H+,65X,11HTHE PROGRAM)                                                 LINK1120    00000n
00114    121*       9    FORMAT(1H+,65X,8HTHE USER)                                                     LINK1121    00000n
00115    122*      10    FORMAT(I5)                                                                     LINK1122    00000n
00116    123*      11    FORMAT(/3X,58HTHE SCALED DEPTH OF BURST IS BEYOND THE SCOPE OF THELINK1123    00000n
00116    124*           1 MODEL///)                                                                    LINK1124    00000n
00117    125*      12    FORMAT(/3X,111HTHE SCALED HEIGHT OF BURST IS SUCH THAT THERE IS NOLINK1125    00000n
00117    126*           1 SOIL MASS ENTRAINED IN THE CLOUD AND HENCE NO LOCAL FALLOUT///)  LINK1126    00000n
00120    127*      13    FORMAT(///25X37H****  INITIAL CLOUD PROPERTIES AT H +E12.5,14H SECLINK1127    00000n
00120    128*           1ONDS  ****//20X,23HAVERAGE GAS TEMPERATURE38X,E12.5,2X,14HDEGREES LINK1128    00000n
00120    129*           2KELVIN//20X,56HAVERAGE TEMPERATURE OF CONDENSED PHASE MATERIAL IN LINK1129    00000n
00120    130*           3CLOUD,5X,E12.5,2X,14HDEGREES KELVIN//20X,31HMASS OF VAPORIZED SOILLINK1130    00000n
00120    131*           4 IN CLOUD,30X,E12.5,2X,9HKILOGRAMS//20X41HMASS OF CONDENSED PHASE LINK1131    00000n
00120    132*           5MATERIAL IN CLOUD,20X,E12.5,2X,9HKILOGRAMS//20X,84HPARTICLE SIZE FLINK1132    00000n
00120    133*           6REQUENCY DISTRIBUTION AT THE TIME OF INITIAL CONDITIONS SPECIFICATLINK1133    00000n
00120    134*           7ION)                                                                          LINK1134    00000n
00121    135*      14    FORMAT(1H1///51X,14H**** DATA SET I2,6H  ****///)                              LINK1135    00000n
00122    136*      15    FORMAT(1X,14HLEAVING LINK 1)                                                   LINK1136    00000n
00123    137*        16 FORMAT('1'///51X,'* * * * * * * * * *'//12X,'T H E  D E P A R T MLINK1137    00000n
00123    138*           1 E N T  O F  D E F E N S E  F A L L O U T  P R E D I C T I O NLINK1138    00000n
00123    139*           2  S Y S T E M'//51X,'* * * * * * * * * *'////43X,'INITIAL CONDITILINK1139    00000n
00123    140*           3ONS (FIREBALL) MODULE',///55X,'PREPARED BY'/53X,'ARCON CORPORATIONLINK1140    00000n
00123    141*           4'/53X,'WAKEFIELD, MASS.'////25X,'****  INITIAL CONDITIONS IDENTIFILINK1141    00000n
00123    142*           5CATION  ****'/25X,12A6)                                                       LINK1142    00000n
00124    143*      17    FORMAT(/3X,60HTHE SPECIFIED MEAN PARTICLE SIZE IS NEGATIVE HENCE ILINK1143    00000n
00124    144*           1NCORRECT///)                                                                  LINK1144    00000n
00125    145*        18 FORMAT(//30X,36HPARTICLE SIZE FREQUENCY DISTRIBUTION/                         LINK1145    00000n
00125    146*           125X41HA TABULATED EMPIRICAL DISTRIBUTION WITH -/30XI2,2X,21HPARTICLINK1146    00000n
00125    147*           2LE SIZE CLASSES/25X,43HTHIS DISTRIBUTION WAS SPECIFIED BY THE USERLINK1147    00000n
00125    148*           3)                                                                             LINK1148    00000n
00126    149*        19 FORMAT(25X,'THE DISTRIBUTION IS LOG-NORMAL WITH -',/30X,'MEAN',31XLINK1149    00000n
00126    150*           1,E12.5,2X,'MICROMETERS'/30X,'STANDARD DEVIATION',17X,E12.5)       LINK1150    00000n
C    00127    151*     191  FORMAT(25X,48HTHE DISTRIBUTION IS THE SAME AS THAT GIVEN ABOVE)   LINK1151    00000n
00130    152*     192  FORMAT(//51X,19H* * * * * * * * * *//)                                  LINK1152    00000n
00131    153*      193 FORMAT('1',9X,'PARTICLE SIZE, LOWER SIZE INTERVAL BOUNDARY,MASS FRLINK1153    00000n
00131    154*           1EQUENCY, AND UPPER SIZE INTERVAL BOUNDARY'/10X,'FOR USE IN RSXP,TRLINK1154    00000n
00131    155*           2ANSPORT, AND ACTIVITY CALCULATIONS (DIAMETERS IN METERS)'//20X,'DILINK1155    00000n
00131    156*           3AMETER',4X,'LOWER BOUNDARY',3X,'MASS FRACTION',3X,'UPPER BOUNDARY'LINK1156    00000n
00131    157*           4//)                                                                           LINK1157    00000n
00132    158*      197 FORMAT(//30X,'PARTICLE SIZE FREQUENCY DISTRIBUTION'/25X,'POWER LAWLINK1158    00000n
00132    159*           1 DISTRIBUTION WITH - '/30X,I3,1X,'PARTICLE SIZE CLASSES'/30X,'THE LINK1159    00000n
00132    160*           2SPECIFIED PARAMETERS ARE'/30X,'CAY =',2X,E12.5/30X,'EXPO =',2X,E12LINK1160    00000n
00132    161*           3.5)                                                                           LINK1161    00000n
00133    162*      194 FORMAT(12X,I3,4(3X,E12.5))                                                  LINK1162    00000n
00134    163*     195  FORMAT(2E12.5)                                                               LINK1163    00000n
00134    164*     C                                                                                  LINK1164    00000n
00134    165*     C ***************************************************************************LINK1165    00000n
00134    166*     C ***************************************************'***********************LINK1166    00000n
00134    167*     C                                                                                  LINK1167    00000n
00135    168*           NN=1                                                                         LINK1168    00000n
00135    169*     C     READ INITIAL CONDITIONS RUN IDENTIFIER                                       LINK1169    00000n
00136    170*           READ (ISIN,1)(DETID(J),J=1,12)                                               LINK1170    00000n
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00136   171*      C     READ CONTROL INTEGER                                                    LINK1171   000001
00141   172*            READ (ISIN,10)N                                                         LINK1172   000011
00141   173*      C                                                                             LINK1173   000011
00141   174*      C     WRITE OVERALL TITLE                                                     LINK1174   000011
00144   175*            WRITE (ISOUT,16)(DETID(J),J=1,12)                                       LINK1175   000017
00147   176*       20   READ(ISIN,10)IDISTR                                                    LINK1176   000030
00152   177*            READ(ISIN,10)NDSTR                                                      LINK1177   000035
00155   178*            IF(NDSTR)401,401,402                                                    LINK1178   000043
00160   179*        401 NDSTR=100                                                               LINK1179   000046
00161   180*        402 GO TO (210,220,211),IDISTR                                          LINK1180   000051
00162   181*        210 READ(ISIN,3) W,HEIGHT,USOIL,DMEAN,SD,DNS,HEW                                   000061
00173   182*            IF(DNS .LE. 1.E-20) DNS=2.6                                             000074
00173   183*      C     WAS A PRESHOT PARTICLE LOG-NORMAL DISTRIBUTION SPECIFIED BY             LINK1182   000074
00173   184*      C     THE USER    YES TO 22                                                   LINK1183   000074
00175   185*            IF(DMEAN)21,21,22                                                       LINK1184   000102
00200   186*       21   IS=0                                                                    LINK1185   000105
00201   187*            GO TO 23                                                                LINK1186   000106
00202   188*       22   IS=1                                                                    LINK1187   000110
00203   189*            GO TO 23                                                                LINK1188   000111
00204   190*        220 READ(ISIN,3) W,HEIGHT,USOIL,EXPO,CAY,DNS,HEW                                   000115
00215   191*            GO TO 23                                                                LINK1190   000126
00216   192*        211 READ(ISIN,3) W,HEIGHT,USOIL,DNS,HEW                                         000130
00225   193*            READ(ISIN,195)(FMASS(I),DIAM(I),I=1,NDSTR)                              LINK1192   000145
00234   194*            LD=NDSTR+1                                                              LINK1193   000156
00235   195*            READ(ISIN,195)DIAM(LD)                                                  LINK1194   000161
00235   196*      C                                                                             LINK1195   000161
00235   197*      C 23  CONVERT HOB - DOB FROM METERS TO FEET                                   LINK1196   000161
00240   198*         23 HEIGHT=HEIGHT/0.3048                                                    LINK1197   000171
00240   199*      C     IF THIS IS H.E. SET W                                                           000171
00241   200*            IF( HEW.GT.  0.0 )  W=HEW                                               000173
00241   201*      C     ZSCL IS THE SCALED HOB  -  DOB                                          LINK1198   000173
00243   202*         60 ZSCL=HEIGHT/((W)**(1.0/3.4))                                            LINK1199   000200
00243   203*      C                                                                             LINK1200   000200
00243   204*      C     TEST THE DATA TO SEE IF THE MODEL IS APPROPRIATE                        LINK1201   000200
00244   205*            IF(HEIGHT)66,66,63                                                      LINK1202   000207
00247   206*         63 IF(ZSCL-180.0)70,70,150                                                 LINK1203   000212
00252   207*         66 IF(ZSCL+20.0)143,70,70                                                  LINK1204   000217
00255   208*       70   CALL TIME                                                              LINK1205   000223
00256   209*            CALL TEMP                                                               LINK1206   000224
00257   210*            CALL MASS                                                               LINK1207   000226
00260   211*            CALL VAPOR                                                              LINK1208   000230
00261   212*            GO TO (90,95,95),IDISTR                                                 LINK1209   000232
00261   213*      C                                                                             LINK1210   000232
00261   214*      C     TEST FOR ACCEPTABLE SPECIFICATIONS OF PRE-SHOT PARTICLE SIZE            LINK1211   000232
00261   215*      C     FREQUENCY DISTRIBUTION.                                                 LINK1212   000232
00262   216*       90   IF(SD)91,92,92                                                         LINK1213   000243
00265   217*       91   WRITE (ISOUT,2)                                                        LINK1214   000245
00267   218*            GO TO 93                                                                LINK1215   000252
00270   219*         92 IF(DMEAN)94,95,95                                                       LINK1216   000254
00273   220*       94   WRITE (ISOUT,17)                                                       LINK1217   000256
00273   221*      C 93  SHOULD THE RUN BE HALTED.    YES TO 190                               LINK1218   000256
00275   222*       93   IF(N)190,190,170                                                       LINK1219   000264
00275   223*      C                                                                             LINK1220   000264
00300   224*       95   CALL DSTBN                                                            LINK1221   000270
00300   225*      C                                                                             LINK1222   000270
00300   226*      C     CONVERT HOB - DOB BACK TO METERS FROM FEET                              LINK1223   000270
00301   227*            HEIGHT=HEIGHT*0.3048                                                    LINK1224   000271
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00301   228*      C                                                                  LINK1225  000271
00301   229*      C     CONVERT VPR AND SSAM FROM GRAMS TO KILOGRAMS                 LINK1226  000271
00302   230*            VPR=VPR/1000.0                                               LINK1227  000274
00302   231*      C     DURING COMPUTATION SSAM CONTAINS THE VALUE OF THE TOTAL MASS OF LINK1228  000274
00302   232*      C     GAS AND CONDENSED PHASE MATERIAL IN THE CLOUD.               LINK1229  000274
00303   233*            SSAM=SSAM/1000.0-VPR                                         LINK1230  000277
00303   234*      C                                                                  LINK1231  000277
00303   235*      C     WRITE INITIAL CONDITIONS RESULTS                             LINK1232  000277
00304   236*            WRITE(ISOUT,4)W,HEIGHT                                       LINK1233  000303
00310   237*            IF(USOIL-1.0)301,301,302                                     LINK1234  000312
00313   238*       301  WRITE (ISOUT,5)                                             LINK1235  000316
00315   239*            GO TO 305                                                    LINK1236  000323
00316   240*       302  WRITE (ISOUT,6)                                             LINK1237  000325
00320   241*        305 GO TO (309,310,311),IDISTR                                   LINK1238  000332
00321   242*        309 WRITE(ISOUT,7)DMEAN,SD                                       LINK1239  000342
00325   243*            IF (IS)102,103,102                                           LINK1240  000350
00330   244*       103  WRITE (ISOUT,8)                                             LINK1241  000352
00332   245*            GO TO 315                                                    LINK1242  000357
00333   246*       102  WRITE (ISOUT,9)                                             LINK1243  000361
00335   247*            GO TO 315                                                    LINK1244  000365
00336   248*        311 WRITE(ISOUT,18)NDSTR                                         LINK1245  000367
00336   249*      C                                                                  LINK1246  000367
00336   250*      C     PRINT FINAL PARTICLE SIZE CLASS                              LINK1247  000367
00336   251*      C                                                                  LINK1248  000367
00341   252*        315 WRITE(ISOUT,193)                                             LINK1249  000375
00343   253*            DO 602 J=1,NDSTR                                             LINK1250  000401
00346   254*            JQ=J+1                                                       LINK1251  000406
00347   255*            DM1=DIAM(JQ)*1.0E-6                                          LINK1252  000412
00350   256*            DM2=DIAM(J)*1.0E-6                                           LINK1253  000415
00351   257*        602 WRITE(ISOUT,194)J,PS(J),DM1,FMASS(J),DM2                     LINK1254  000420
00361   258*            GO TO 106                                                    LINK1255  000434
00362   259*        310 WRITE(ISOUT,197)NDSTR,CAY,EXPO                               LINK1256  000436
00367   260*            GO TO 315                                                    LINK1257  000446
00370   261*        106 WRITE(ISOUT,13)TME,TMP1,TMP2,VPR,SSAM                        LINK1258  000447
00377   262*            GO TO (116,118,117),IDISTR                                   LINK1259  000460
00400   263*        116 WRITE(ISOUT,19)DMEAN,SD                                      LINK1260  000471
00404   264*            GO TO 118                                                    LINK1261  000477
00405   265*        117 WRITE(ISOUT,191)                                             LINK1262  000501
00407   266*        118 WRITE(ISOUT,192)                                             LINK1263  000506
00411   267*            GO TO 171                                                    LINK1264  000512
00412   268*        143 WRITE (ISOUT,11)                                             LINK1265  000514
00414   269*            GO TO 171                                                    LINK1266  000520
00415   270*        150 WRITE (ISOUT,12)                                             LINK1267  000522
00415   271*      C                                                                  LINK1268  000522
00415   272*      C     TEST TO DETERMINE WHETHER TO CALL LINK 2, RETURN TO COMPUTE  LINK1269  000522
00415   273*      C     ANOTHER SET OF INITIAL CONDITIONS , OR EXIT.                 LINK1270  000522
00417   274*        171 IF(N-1)200,200,170                                           LINK1271  000527
00422   275*        170 IF(N-NN)190,190,180                                          LINK1272  000533
00425   276*        180 NN=NN+1                                                      LINK1273  000536
00426   277*            WRITE (ISOUT,14)NN                                           LINK1274  000541
00431   278*            GO TO 20                                                     LINK1275  000547
00432   279*        200 CALL SHWIND                                                  LINK1276  000551
00433   280*            WRITE(ISOUT,15)                                              LINK1277  000552
00435   281*            IF(HEW.GT. 0.0)  W=-W                                                  000557
00437   282*            RETURN                                                       LINK1278  000564
00440   283*        190 STOP                                                         LINK1279  000570
00441   284*            END                                                          LINK1280  000612
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@:FOR,S  CASSANDRA.LINK2,R
FOR SOE3-06/11/76-10:14:34 (1,)

   SUBROUTINE LINK2     ENTRY POINT 000074

   STORAGE USED: CODE(1) 000100; DATA(0) 000307; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   ICRD
    0006   CRM
    0007   TRPL
    0010   RSXP
    0011   NWDU&
    0012   NIO2$
    0013   NERR3$

29 STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000030 1226      0001   000022 5L        0000   000266 5I3F      0004   000000 ALT       0004   000400 ATP
    0004   001010 B0        0003   000000 CAY       0004   001011 C6        0004   001321 CHANGF    0004   001322 CMLR
    0004 R 001323 CX        0000 R 000000 CXTIM     0000 R 000132 CXTMP     0004   003127 C2        0004   003130 C3
    0004   003131 C6        0004   003132 DEK       0003   000001 DEVID     0003   000015 DIAM      0003   000326 DMEAN
    0004   003133 DNID      0003 R 000327 DNS       0004   003147 DRM       0004   003150 DS        0004   003151 DST
    0004   003152 DST0      0004   003153 DST1      0004   003154 DST2      0004   003155 DT        0004   003156 DU
    0004   003157 DWT       0004   003160 DX        0004   003161 DZ        0004   003162 ED        0004   003163 EK
    0004   003164 EPS       0004   003165 ES        0004   003166 ETA       0003   000330 EXPO      0004 R 003572 F
    0003   000331 FMASS     0004   003573 FW        0004   003574 GRV       0003 R 001170 HEIGHT    0004   004200 HLR
    0004 R 004201 HOB       0003   000641 IDISTR    0003   000642 IEXEC     0000   000301 INJP$     0004   004202 IPAM
    0004   004203 IRAD      0003   000643 IRISE     0003   000644 ISIN      0003 I 000645 ISOUT     0004   004204 KCLD
    0004   004205 KDI       0004   004206 KRX       0004   004207 KS        0004   004210 KSV       0000 I 000264 MA
    0000 I 000265 MB        0004 I 004211 MCX       0004   004212 MWYA      0004   004213 N         0003   000646 NDSTR
    0003   001172 NHODO     0004   004214 NNN       0004   004215 NPVA      0004   004216 P         0004   004217 PRS
    0003   000647 PS        0004   004623 PW        0004   004624 QT        0004   004625 R         0004   004626 RA
    0004 R 004627 RFD       0004   004630 RHZ       0004   005234 RL        0004   005235 RLH       0004   005641 RM
    0004   005642 RZT       0004   005643 S         0004   005644 SAVE      0003   001157 SD        0004 R 005645 SLDTMP
    0004   005646 SLM       0004   006252 SMALLT    0003 R 001160 SSAM      0004   006253 SZRO      0004   006254 T
    0004   006255 TE        0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2      0004 R 006256 TMSD
    0003   001164 T2M       0004   006257 U         0003   001165 USOIL     0004   006260 V         0003 R 001166 VPR
    0003   001503 VX        0003   002013 VY        0004   006261 VZRO      0003 R 001167 W         0004   006262 WT
    0004   006263 X         0004   006264 XE        0004   006265 Y         0004   006575 Z         0004   006576 ZBFR
    0004   006577 ZBRSTZ    0004   006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV

00101      1*          SUBROUTINE LINK2                                                LINK2001   000000
00101      2*     C                                                                    LINK2002   000000
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00101     3*     C  ALT    - ARRAY(260), ATMOSPHERE ALTITUDE IN METERS(MSL) CORRESPONDINGLINK2003   00000n
00101     4*     C            TO ATP, ETA, GRV, PRS, RHZ, RLH, SLM                      LINK2004   00000n
00101     5*     C  AP     - ARRAY(8), TEMPORARY STORAGE USED IN ATMR                   LINK2005   00000n
00101     6*     C  AREAMX - MAXIMUM PROJECTED AREA ON THE GROUND BELOW STABILIZED CLOUD LINK2006   00000n
00101     7*     C  ATMR   - SUBROUTINE, READS IN TABLES OF ALT,ATP,ETA,PRS,RHZ,RLH,GRV, LINK2007   00000n
00101     8*     C            SLM                                                       LINK2008   00000n
00101     9*     C  ATID   - ARRAY(12), 72 ALPHANUMERIC CHARACTERS FOR                  LINK2009   00000n
00101    10*     C            ATMOSPHERE IDENTIFICATION                                 LINK2010   00000n
00101    11*     C  ATP    - ARRAY(260), ATMOSPHERE TEMPERATURE (K) MATCHES ALT         LINK2011   00000n
00101    12*     C  BARM() - MEDIAN DIAMETER OF THE LOGNORMAL PARTICLE SIZE VS. MASS    LINK2012   00000n
00101    13*     C            DISTRIBUTION                                              LINK2013   00000n
00101    14*     C  BZ     - DEPOSIT INCREMENT LINEAR DIMENSION(CX(5,MCX)/IRAD)         LINK2014   00000n
00101    15*     C  B0     - PARAMETER USED TO DETERMINE CLOUD VERTICAL RADIUS          LINK2015   00000n
00101    16*     C  CG     - ARRAY(200), FALLING SPEEDS OF PARTICLES IN THE CLOUD       LINK2016   00000n
00101    17*     C            (M/SEC)                                                   LINK2017   00000n
00101    18*     C  CHANGE - CLOUD TIME AFTER WHICH STEP LENGTH CHANGES TO DST2         LINK2018   00000n
00101    19*     C  CL     - LATENT HEAT OF VAPORIZATION OF WATER                       LINK2019   00000n
00101    20*     C  CMLR   - CLOUD MASS LOSS RATE OF PARTICULATE FALLOUT                LINK2020   00000n
00101    21*     C  CP     - SPECIFIC HEAT OF AIR                                       LINK2021   00000n
00101    22*     C  CPAI   - SPECIFIC HEAT OF AIR INTEGRATED FROM TE TO T               LINK2022   00000n
00101    23*     C  CPFR   - SUBROUTINE, COMPUTES PARTICLE FALLOUT RATE DURING CLOUD    LINK2023   00000n
00101    24*     C            RISE CALCULATIONS                                         LINK2024   00000n
00101    25*     C  CPV    - SUBROUTINE, COMPUTES INITIAL CRM VARIABLES                 LINK2025   00000n
00101    26*     C  CR     - WEIGHTED AVERAGE SPECIFIC HEAT FOR AIR AND SOIL            LINK2026   00000n
00101    27*     C  CRM    - SUBROUTINE, COMPUTES CLOUD RISE AND EXPANSION VARIABLES    LINK2027   00000n
00101    28*     C  CRMW   - SUBROUTINE, PRINTS CRM OUTPUT                              LINK2028   00000n
00101    29*     C  CX     - ARRAY(10,90), CLOUD DIMENSIONS VS. TIME                    LINK2029   00000n
00101    30*     C            (1,J) - TIME(SEC) AFTER BURST                             LINK2030   00000n
00101    31*     C            (2,J) - CLOUD TIME INTERVAL(SEC) BEGINNING AT CX(1,J)     LINK2031   00000n
00101    32*     C            (3,J) - CLOUD BASE(M) AT CX(1,J)                          LINK2032   00000n
00101    33*     C            (4,J) - CLOUD TOP(M) AT CX(1,J)                           LINK2033   00000n
00101    34*     C            (5,J) - CLOUD RADIUS(M) AT CX(1,J)                        LINK2034   00000n
00101    35*     C            (6,J) - CLOUD BASE RATE (M/SEC) DURING CX(2,J)            LINK2035   00000n
00101    36*     C            (7,J) - CLOUD TOP  RATE (M/SEC) DURING CX(2,J)            LINK2036   00000n
00101    37*     C            (8,J) - CLOUD RADIAL RATE(M/SEC) DURING CX(2,J)           LINK2037   00000n
00101    38*     C            (9,J) - CLOUD TEMPERATURE (K) AT CX(1,J)                  LINK2038   00000n
00101    39*     C            (10,J) - IN-CLOUD GAS DENSITY (KG/M**3) AT CX(1,J)        LINK2039   00000n
00101    40*     C  CXPN   - SUBROUTINE, TABULATES CX ARRAY                             LINK2040   00000n
00101    41*     C  C2     - CONSTANT USED IN EDDY VISCOSITY MOMENTUM GENERATION        LINK2041   00000n
00101    42*     C            (YIELD DEPENDENT)                                         LINK2042   00000n
00101    43*     C  C3     - CONSTANT USED IN COMPUTING TURBULENT ENERGY DISSIPATION RATELINK2043   00000n
00101    44*     C  C6     - CONSTANT USED IN COMPUTING AIR ENTRAINMENT RATE INTO CLOUD LINK2044   00000n
00101    45*     C            CAUSED BY WIND SHEAR                                      LINK2045   00000n
00101    46*     C  DEK    - DERIVATIVE OF EK                                           LINK2046   00000n
00101    47*     C  DENT   - DATA STATEMENT USED FOR IDENTIFICATION OF IRISE TAPE       LINK2047   00000n
00101    48*     C  DERIV  - SUBROUTINE, EVALUATES DERIVATIVES OF CLOUD RISE VARIABLES  LINK2048   00000n
00101    49*     C  DETID  - ARRAY(12), 72 ALPHANUMERIC DETONATION IDENTIFICATION CARD  LINK2049   00000n
00101    50*     C  DIAM   - ARRAY(201), UPPER BOUNDARY OF I-TH PARTICLE SIZE CLASS.    LINK2050   00000n
00101    51*     C            THE LAST ENTRY IN THE ARRAY IS THE LOWER BOUNDARY OF THE  LINK2051   00000n
00101    52*     C            LAST(SMALLEST) PARTICLE SIZE CLASS. THE LENGTH OF THE DIAM LINK2052   00000n
00101    53*     C            ARRAY IS ALWAYS ONE GREATER THAN THE NUMBER OF SIZE CLASSES.LINK2053  00000n
00101    54*     C  DNID   - ARRAY(12), 72 ALPHANUMERIC RUN IDENTIFICATION              LINK2054   00000n
00101    55*     C  DNS    - FALLOUT PARTICLE DENSITY (GM/CM**3)                        LINK2055   00000n
00101    56*     C            IF NOT PUNCHED, DNS = 2.6                                 LINK2056   00000n
00101    57*     C  DPST   - ARRAY(8,2),  DEPOSIT INCREMENT VARIABLES COMPILED IN       LINK2057   00000n
00101    58*     C            SUBROUTINE RSXP. THE SECOND INDEX IS NEEDED ONLY IN THE RSXPLINK2058   00000n
00101    59*     C            CALCULATIONS TO DISTINGUISH THE INCREMENT TOP FROM THE    LINK2059   00000n
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00101    60*     C            INCREMENT BOTTOM.                                                    LINK2060    00000n
00101    61*     C            (1,MBT) - TIME  (SEC) OF ALTITUDE STABILIZATION OR GROUNDINGLINK2061    00000n
00101    62*     C            (2,MBT) - ALTITUDE OF INCREMENT CENTER OF MASS (METERS)      LINK2062    00000n
00101    63*     C            (3,MBT) - INCREMENT RADIUS AT CENTER OF MASS (METERS)        LINK2063    00000n
00101    64*     C            (4,MBT) - MEAN PARTICLE DIAMETER  (MICROMETERS)              LINK2064    00000n
00101    65*     C            (5,MBT) - INCREMENT MASS (KGM.)                              LINK2065    00000n
00101    66*     C            (6,MBT) - INCREMENT VERTICAL THICKNESS (METERS)              LINK2066    00000n
00101    67*     C            (7,MBT) - ALTITUDE OF INCREMENT BOTTOM (METERS)              LINK2067    00000n
00101    68*     C            (8,MBT) - INCREMENT VOLUME  (CUBIC METERS)                   LINK2068    00000n
00101    69*     C  DPSTK  - NUMBER OF DEPOSIT INCREMENTS PER PARTICLE SIZE CLASS          LINK2069    00000n
00101    70*     C  DPX    - ARRAY(2,90), DEPOSIT INCREMENT RISE AND EXPANSION VARIABLE    LINK2070    00000n
00101    71*     C            (1,J) - LIFT RATE FACTOR ABOVE CLOUD BASE (1/SEC)            LINK2071    00000n
00101    72*     C            (2,J) - LIFT RATE FACTOR BELOW CLOUD BASE (1/SEC)            LINK2072    00000n
00101    73*     C  DRM    - DERIVATIVE OF RM                                             LINK2073    00000n
00101    74*     C  DS     - DERIVATIVE OF S                                              LINK2074    00000n
00101    75*     C  DST    - INTEGRATION TIME STEP                                        LINK2075    00000n
00101    76*     C  DST0   - INITIAL INTEGRATION TIME STEP                                LINK2076    00000n
00101    77*     C  DST1   - INTERMEDIATE INTEGRATION TIME STEP                           LINK2077    00000n
00101    78*     C  DST2   - FINAL VALUE OF INTEGRATION TIME STEP                         LINK2078    00000n
00101    79*     C  DT     - DERIVATIVE OF T                                              LINK2079    00000n
00101    80*     C  DU     - DERIVATIVE OF U                                              LINK2080    00000n
00101    81*     C  DVBL   - ARRAY(8), USED TO TRANSMIT VARIABLE DERIVATIVES              LINK2081    00000n
00101    82*     C  DWT    - DERIVATIVE OF WT                                             LINK2082    00000n
00101    83*     C  DX     - DERIVATIVE OF X                                              LINK2083    00000n
00101    84*     C  DZ     - DERIVATIVE OF Z                                              LINK2084    00000n
00101    85*     C  ED     - EDDY VISCOSITY LOSS RATE OF KINETIC ENERGY OF RISE           LINK2085    00000n
00101    86*     C  EK     - TURBULENT KINETIC ENERGY DENSITY                             LINK2086    00000n
00101    87*     C  EPS    - KINETIC ENERGY LOSS RATE                                     LINK2087    00000n
00101    88*     C  ERROR  - SUBROUTINE, FOR GENERAL UTILITY INDICATION                   LINK2088    00000n
00101    89*     C  ES     - SATURATION PRESSURE OF WATER VAPOR (INVALID FOR TEMPERATURE  LINK2089    00000n
00101    90*     C            ABOVE BOILING POINT OF WATER)                                LINK2090    00000n
00101    91*     C  ETA    - ARRAY(260), ATMOSPHERIC DYNAMIC VISCOSITY (=COEFF. OF VISC.)LINK2091    00000n
00101    92*     C            (KGM/(M-SEC)) MATCHES ALT ARRAY                              LINK2092    00000n
00101    93*     C  EXTM   - IN SUBROUTINE RSXP, TIME INCREMENT BETWEEN WAFER HISTORY     LINK2093    00000n
00101    94*     C            DESCRIPTION POINTS                                           LINK2094    00000n
00101    95*     C  F      - FRACTION OF W IN FIREBALL AT START OF RISE                   LINK2095    00000n
00101    96*     C  FMASS  - ARRAY(200),PARTICLE SIZE CLASS FRACTION OF TOTAL MASS LIFTEDLINK2096    00000n
00101    97*     C  FMT    - OBJECT TIME FORMAT USED TO READ ATMOSPHERE TABLES             LINK2097    00000n
00101    98*     C  FROG   - CONSTANT USED IN COMPUTING PARTICLE FALL RATES               LINK2098    00000n
00101    99*     C  FW     - FISSION YIELD IN KILOTONS                                    LINK2099    00000n
00101   100*     C  GDPST  - ARRAY(10,100), DEPOSIT INCREMENT VARIABLES (OUTPUT OF RSXP) LINK2100    00000n
00101   101*     C            (1,J) - DEPOSIT INCREMENT X COORDINATE (METERS)              LINK2101    00000n
00101   102*     C            (2,J) - DEPOSIT INCREMENT Y COORDINATE (METERS)              LINK2102    00000n
00101   103*     C            (3,J) - TIME COORDINATE (SEC)                                LINK2103    00000n
00101   104*     C            (4,J) - PARTICLE DIAMETER (METERS)                           LINK2104    00000n
00101   105*     C            (5,J) - DEPOSIT INCREMENT MASS (KGM)                         LINK2105    00000n
00101   106*     C            (6,J) - Z COORDINATE OF INCREMENT CENTER OF MASS (METERS)    LINK2106    00000n
00101   107*     C            (7,J) - INCREMENT RADIUS AT CENTER OF MASS (METERS)          LINK2107    00000n
00101   108*     C            (8,J) - INCREMENT VERTICAL THICKNESS (METERS)                LINK2108    00000n
00101   109*     C            (9,J) - ALTITUDE OF INCREMENT BOTTOM (METERS)                LINK2109    00000n
00101   110*     C            (10,J) - INCREMENT VOLUME (CUBIC METERS)                     LINK2110    00000n
00101   111*     C  GRV    - ARRAY(260), ACCELERATION DUE TO GRAVITY(CM/SEC**2)           LINK2111    00000n
00101   112*     C  HEIGHT - HEIGHT OF BURST (METERS) ABOVE GROUND ZERO                   LINK2112    00000n
00101   113*     C  HLR    - RELATIVE HUMIDITY AT ALTITUDE OF CLOUD CENTER                LINK2113    00000n
00101   114*     C  HOB    - HEIGHT(FT) OF BURST ABOVE GROUND ZERO (ZBRSTZ)               LINK2114    00000n
00101   115*     C  ICRD   - SUBROUTINE, READS LINK2 INPUT CARDS                          LINK2115    00000n
00101   116*     C  IDISTR - PARTICLE DISTRIBUTION CONTROL PARAMETER (SET IN LINK1)       LINK2116    00000n
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00101   117*    C             1 - LOGNORMAL DISTRIBUTION                                    LINK2117   00000n
00101   118*    C             2 - POWER LAW DISTRIBUTION                                    LINK2118   00000n
00101   119*    C             3 - TABULAR INPUT DISTRIBUTION                                LINK2119   00000n
00101   120*    C   IEXEC  - CONTROL INTEGER FOR CALLING PROGRAM LINKS                       LINK2120   00000n
00101   121*    C   IPAM   - CONTROL INTEGER FOR PAM OPTION                                  LINK2121   00000n
00101   122*    C             0 - NO PAM CALL                                               LINK2122   00000n
00101   123*    C             1 - CALL PAM                                                  LINK2123   00000n
00101   124*    C   IRAD   - NUMBER OF CLOUD WAFER RADIUS SUBDIVISIONS (SEE B7)             LINK2124   00000n
00101   125*    C   IRISE  - LOGICAL DESIGNATION FOR TAPE USED FOR TEMPORY STORAGE IN       LINK2125   00000n
00101   126*    C             ATMR AND FOR RSXP OUTPUT                                      LINK2126   00000n
00101   127*    C   JBASE  - COMPUTED GO TO INDEX USED IN SUBROUTINE RSXP                    LINK2127   00000n
00101   128*    C             1 - CONTINUE DPST TRAJECTORY COMPUTATION                      LINK2128   00000n
00101   129*    C             2 - DPST TRAJECTORY COMPUTATION COMPLETE                      LINK2129   00000n
00101   130*    C   KATM   - ATMOSPHERE PRINTOUT SWITCH                                     LINK2130   00000n
00101   131*    C             0 - NO ATMOSPHERE PRINTOUT                                    LINK2131   00000n
00101   132*    C             1 - ATMOSPHERE PRINTOUT                                       LINK2132   00000n
00101   133*    C   KBASE  - COMPUTED GO TO INDEX USED IN SUBROUTINE RSXP                    LINK2133   00000n
00101   134*    C             1 - ADJUST DPST RADIUS AND ACTIVITY FOR LEAVING CLOUD         LINK2134   00000n
00101   135*    C             2 - ADJUSTMENT OF 1 HAS BEEN MADE                             LINK2135   00000n
00101   136*    C   KCLD   - CONTROL INDEX FOR CRM DEBUG PRINTOUT,                          LINK2136   00000n
00101   137*    C             0 - NO DEBUG PRINT OUT                                        LINK2137   00000n
00101   138*    C             1 - DEBUG PRINT OUT                                           LINK2138   00000n
00101   139*    C   KCX    - NUMBER OF DPST RISE AND EXPANSION INTERVALS                    LINK2139   00000n
00101   140*    C   KDI    - NUMBER OF DEPOSIT INCREMENT PER PSC                            LINK2140   00000n
00101   141*    C             IF NOT PUNCHED, IT IS COMPUTED BY PROGRAM                     LINK2141   00000n
00101   142*    C             (SEE RSXP)                                                    LINK2142   00000n
00101   143*    C   KDIP   - IN SUBROUTINE RSXP, NUMBER OF SUBDIVISIONS OF A WAFER WHOSE    LINK2143   00000n
00101   144*    C             TOP AND BOTTOM RADII ARE NOT EQUAL                            LINK2144   00000n
00101   145*    C   KDPST  - SEE DPSTK                                                      LINK2145   00000n
00101   146*    C   KRX    - CONTROL INDEX FOR RSXP DEBUG PRINTOUT                          LINK2146   00000n
00101   147*    C             0 - NO DEBUG PRINTOUT                                         LINK2147   00000n
00101   148*    C             1 - DEBUG PRINTOUT                                            LINK2148   00000n
00101   149*    C   KSV    - INDEX WHICH DETERMINES FUNCTION OF SUBROUTINE RSTR             LINK2149   00000n
00101   150*    C             1 - PRESERVE VARIABLES AT START OF TIME STEP                  LINK2150   00000n
00101   151*    C             2 - RESTORE VARIABLES TO THOSE AT START OF TIME STEP          LINK2151   00000n
00101   152*    C   LODD   - LENGTH OF PARTICLE DESCRIPTION DATA BLOCK (GDPST ARRAY IN      LINK2152   00000n
00101   153*    C             RSXP)                                                         LINK2153   00000n
00101   154*    C   MBT    - IN SUBROUTINE RSXP, DISTINGUISHES A WAFER TOP FROM A WAFER     LINK2154   00000n
00101   155*    C             BOTTOM                                                        LINK2155   00000n
00101   156*    C             MBT=1 SPECIFIES A WAFER TOP                                   LINK2156   00000n
00101   157*    C             MBT=2 SPECIFIES A WAFER BOTTOM                                LINK2157   00000n
00101   158*    C   MCX    - NUMBER OF TIME POINTS (ROWS) OF CX ARRAY                       LINK2158   00000n
00101   159*    C   MWYA   - 1, INITIAL ENTRY INTO CXPN                                     LINK2159   00000n
00101   160*    C             2, REGULAR ENTRY                                              LINK2160   00000n
00101   161*    C             3, FINAL ENTRY                                                LINK2161   00000n
00101   162*    C   N      - CLOUD MODE SWITCH                                              LINK2162   00000n
00101   163*    C   NDSTR  - NUMBER OF ENTRIES IN PARTICLE SIZE CLASS TABLE                 LINK2163   00000n
00101   164*    C   NHODO  - NUMBER OF ENTRIES IN THE WIND HODOGRAPH TABLE                  LINK2164   00000n
00101   165*    C   NNN    - TOTAL NUMBER OF EQUATIONS BEING INTEGRATED                     LINK2165   00000n
00101   166*    C   NPVA   - NUMBER OF ELEMENTS IN ALT AND CORRESPONDING ARRAYS           LINK2166   00000n
00101   167*    C             LIMITS OF NPVA = 1,260                                        LINK2167   00000n
00101   168*    C             THE MNEMONIC NPVA IS CHANGED TO NAT IN LINK 4                 LINK2168   00000n
00101   169*    C   P      - ATMOSPHERIC PRESSURE AT CLOUD CENTER ALTITUDE                  LINK2169   00000n
00101   170*    C   PHI    - FRACTION OF F*W USED TO HEAT AIR                               LINK2170   00000n
00101   171*    C   PPST   - ARRAY(8,10), TEMPORARY STORAGE OF DEPOSIT INCREMENT          LINK2171   00000n
00101   172*    C             VARIABLES IN RSXP FOR WAFER SUBDIVISIONS                      LINK2172   00000n
00101   173*    C   PRS    - ARRAY(260) ATMOSPHERIC PRESSURE (MB)  MATCHES ALT              LINK2173   00000n
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00101   174*     C  PS      - ARRAY(200), PARTICLE SIZE CLASS MIDPOINT DIAMETER (METERS)  LINK2174  00000n
00101   175*     C  PSIZE   - PARTICLE SIZE CLASS MIDPOINT(MICROMETERS)USED IN SUBR. CPFR  LINK2175  00000n
00101   176*     C  PW      - PARTIAL PRESSURE OF WATER VAPOR IN THE CLOUD                 LINK2176  00000n
00101   177*     C  Q       - CONVERSION FACTOR FOR FRACTION MASS TO NUMBER OF PARTICLES   LINK2177  00000n
00101   178*     C                    PER M**3                                           LINK2178  00000n
00101   179*     C  QI      - VIRTUAL MASS FACTOR TERM IN CLOUD EQUATION OF MOTION         LINK2179  00000n
00101   180*     C  QX      - FACTOR CONVERTS CLOUD TEMPERATURE TO VIRTUAL CLOUD           LINK2180  00000n
00101   181*     C            TEMPERATURE                                                LINK2181  00000n
00101   182*     C  QXE     - INVERSE OF FACTOR TO CONVERT AMBIENT TEMPERATURE TO          LINK2182  00000n
00101   183*     C            VIRTUAL AMBIENT TEMPERATURE                                LINK2183  00000n
00101   184*     C  R       - CLOUD HORIZONTAL RADIUS                                      LINK2184  00000n
00101   185*     C  RA      - GAS DENSITY OF CLOUD                                         LINK2185  00000n
00101   186*     C  RADIUS  - DEPOSIT INCREMENT RADIUS USED IN SUBROUTINE RSXP             LINK2186  00000n
00101   187*     C  RFD     - DENSITY OF EXTRA MATERIAL IN CLOUD(MKS)(EQUALS DNS*1000.)    LINK2187  00000n
00101   188*     C  RHZ     - ARRAY(260)  ATMOSPHERE AIR DENSITY (KGM/M**3) MATCHES ALT.   LINK2188  00000n
00101   189*     C            THE MNEMONIC RHZ IS CHANGED TO RHO IN LINK 4.              LINK2189  00000n
00101   190*     C  RKGILL  - SUBROUTINE, USES RUNGE-KUTTA METHOD TO INTEGRATE           LINK2190  00000n
00101   191*     C            DIFFERENTIAL EQUATIONS OF CLOUD                            LINK2191  00000n
00101   192*     C            (SEE CRM)                                                  LINK2192  00000n
00101   193*     C  RL      - EMPIRICAL CONSTANT USED TO CALCULATE ENTRAINMENT RATE AND    LINK2193  00000n
00101   194*     C            CLOUD VERTICAL RADIUS                                      LINK2194  00000n
00101   195*     C  RLH     - ARRAY(260)  ATMOSPHERE RELATIVE HUMIDITY MATCHES ALT         LINK2195  00000n
00101   196*     C  RM      - CLOUD MASS                                                   LINK2196  00000n
00101   197*     C  RMA0    - INITIAL AIR MASS OF CLOUD                                    LINK2197  00000n
00101   198*     C  RMIN    - MINIMUM PARTICLE RADIUS (MICROMETERS IN LINK1 CONVERTED TO   LINK2198  00000n
00101   199*     C            METERS IN SUBR. CPV FOR USE THROUGHOUT LINK2)              LINK2199  00000n
00101   200*     C  RMW0    - INITIAL WATER MASS OF CLOUD                                  LINK2200  00000n
00101   201*     C  RSTR    - SUBROUTINE WHICH PRESERVES AND/OR RESTORES CRM VARIABLES     LINK2201  00000n
00101   202*     C  RSXP    - SUBROUTINE, RISE AND EXPANSION MODEL  WHICH COMPUTES         LINK2202  00000n
00101   203*     C            DEPOSIT INCREMENT POSITIONS THROUGHOUT CLOUD RISE HISTORY  LINK2203  00000n
00101   204*     C  RZT     - VERTICAL CLOUD RADIUS                                        LINK2204  00000n
00101   205*     C  S       - CONDENSED SOIL MIXING RATIO                                  LINK2205  00000n
00101   206*     C  SCALE   - ARRAY(10) , ATMOSPHERE TABLE ADJUSTMENT FACTORS              LINK2206  00000n
00101   207*     C  SD      - PARTICLE SIZE GEOMETRIC STANDARD DEVIATION SUPPLIED BY LINK1 LINK2207  00000n
00101   208*     C            (DIMENSIONLESS).  IF NOT PUNCHED, SD = 4.0                 LINK2208  00000n
00101   209*     C            APPLICABLE ONLY FOR THE LOGNORMAL DISTRIBUTION             LINK2209  00000n
00101   210*     C  SLDTMP  - PARTICLE SOLIDIFICATION TEMPERATURE (K)                      LINK2210  00000n
00101   211*     C  SLM     - ARRAY(260)  ATMOSPHERE MEAN FREE PATH OF AIR MOLECULES(M)    LINK2211  00000n
00101   212*     C            MATCHES ALT                                                LINK2212  00000n
00101   213*     C  SMALLT  - TIME AFTER START OF COMPUTATION                              LINK2213  00000n
00101   214*     C  SOILHT  - LATENT HEAT OF VAPORIZATION OF CLOUD SOIL CONSTITUENT        LINK2214  00000n
00101   215*     C  SSAM    - TOTAL SOIL MASS (KG)                                         LINK2215  00000n
00101   216*     C  SZRO    - S AT INITIAL TIME                                            LINK2216  00000n
00101   217*     C  T       - CLOUD TEMPERATURE (K)                                        LINK2217  00000n
00101   218*     C  TE      - ATMOSPHERIC TEMPERATURE AT CLOUD CENTER ALTITUDE             LINK2218  00000n
00101   219*     C  TME     - INITIAL TIME (SEC) SUPPLIED BY LINK1                         LINK2219  00000n
00101   220*     C  TMP1    - INITIAL VAPOR TEMPERATURE (K) SUPPLIED BY LINK1              LINK2220  00000n
00101   221*     C  TMP2    - INITIAL TEMPERATURE OF CONDENSED PHASE MATERIAL IN CLOUD     LINK2221  00000n
00101   222*     C            SUPPLIED BY LINK1(NOT USED)                                LINK2222  00000n
00101   223*     C  TMSD    - TIME OF PARTICLE SOLIDIFICATION (SEC) WITHIN CLOUD           LINK2223  00000n
00101   224*     C  TRPL    - SUBROUTINE, USES LINEAR INTERPOLATION TO COMPUTE VARIABLE    LINK2224  00000n
00101   225*     C            CORRESPONDING TO ARGUMENT                                  LINK2225  00000n
00101   226*     C  TSRD    - R-RATE CLOUD RISE TERMINATION SWITCH PARAMETER               LINK2226  00000n
00101   227*     C  TSTM    - TIME AT WHICH NEXT CX ARRAY ENTRIES ARE TO BE MADE           LINK2227  00000n
00101   228*     C  U       - CLOUD VERTICAL VELOCITY                                      LINK2228  00000n
00101   229*     C  USOIL   - SOIL TYPE, 1.0 = SILICEOUS                                   LINK2229  00000n
00101   230*     C                       2.0 = CALCAREOUS                                   LINK2230  00000n
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00101   231*      C            IF NOT PUNCHED, USOIL = 1.0                                                    LINK2231   00000n
00101   232*      C  V       - CLOUD VOLUME                                                                   LINK2232   00000n
00101   233*      C  VBL     - ARRAY(8), DUMMY VARIABLES OF INTEGRATION(SUBS. DERIV,RKGILL)                   LINK2233   00000n
00101   234*      C  VIS     - DYNAMIC VISCOSITY OF IN-CLOUD GAS(KGM./M./SEC.) (SUBR. CPFR)                   LINK2234   00000n
00101   235*      C  VPR     - MASS OF VAPOR (KG) SUPPLIED BY LINK1                                           LINK2235   00000n
00101   236*      C  VX(I)   - ARRAY(200), X-COMPONENT OF WIND VELOCITY AT WIND HODOGRAPH                     LINK2236   00000n
00101   237*      C            STRATUM I, (METERS/SEC)                                                        LINK2237   00000n
00101   238*      C  VY(I)   - ARRAY(200), Y-COMPONENT OF WIND VELOCITY AT WIND HODOGRAPH                     LINK2238   00000n
00101   239*      C            STRATUM I, (METERS/SEC)                                                        LINK2239   00000n
00101   240*      C  W       - TOTAL YIELD (KT)                                                               LINK2240   00000n
00101   241*      C  WT      - SOLID AND LIQUID WATER MIXING RATIO                                            LINK2241   00000n
00101   242*      C  X       - IN-CLOUD WATER VAPOR MIXING RATIO                                              LINK2242   00000n
00101   243*      C  XE      - AMBIENT AIR WATER VAPOR MIXING RATIO                                           LINK2243   00000n
00101   244*      C  Y       - ARRAY(200),NUMBER OF IN-CLOUD PARTICLES/UNIT VOLUME OF CLOUD                   LINK2244   00000n
00101   245*      C  Z       - CLOUD CENTER ALTITUDE (METERS)                                                 LINK2245   00000n
00101   246*      C  ZBFR    - MAXIMUM Z OF CURRENT OR PREVIOUS ENTRIES TABULATED BY CXPN-                    LINK2246   00000n
00101   247*      C  ZBRSTZ  - Z-COORDINATE OF BURST GROUND ZERO (METERS ABOVE MSL)                           LINK2247   00000n
00101   248*      C  ZLMT    - UPPER LIMIT FOR CLOUD CENTER ALTITUDE TO PREVENT POSSIBLE                      LINK2248   00000n
00101   249*      C            COMPUTATIONAL RUNAWAY                                                          LINK2249   00000n
00101   250*      C  ZV(I)   - ALTITUDE OF CENTER PLANE OF WIND HODOGRAPH STRATUM I                           LINK2250   00000n
00101   251*      C            (METERS ABOVE MSL)                                                             LINK2251   00000n
00101   252*      C  ZVSB    - IN SUBROUTINE RSXP, DISTANCE OF A WAFER ABOVE CLOUD BASE                       LINK2252   00000n
00101   253*      C                                                                                           LINK2253   00000n
00101   254*      C *********************************************************************                    LINK2254   00000n
00101   255*      C                                                                                           LINK2255   00000n
00101   256*      C                                                                                           LINK2256   00000n
00101   257*      C.*************LINK2*****************                                                        LINK2257   00000n
00101   258*      C                                                                                           LINK2258   00000n
00101   259*      C                                                                                           LINK2259   00000n
00103   260*            COMMON /SET1/                                                                         LINK2260   00000n
00103   261*           1CAY        ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,                 LINK2261   00000n
00103   262*           2FMASS(200),IDISTR     ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,                 LINK2262   00000n
00103   263*           3NOSTR      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,                 LINK2263   00000n
00103   264*           4TMP2       ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,                 LINK2264   00000n
00103   265*           5ZSCL       ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)                               LINK2265   00000n
00104   266*            COMMON /CLOUD/                                                                        LINK2266   00000n
00104   267*           1ALT(260)   ,ATP(260)  ,B0        ,C6(200)   ,CHANGE    ,CMLR      ,                 LINK2267   00000n
00104   268*           2CX(10,90) ,C2         ,C3        ,C6        ,DEK       ,DNID(12)  ,                 LINK2268   00000n
00104   269*           3DRM        ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,                 LINK2269   00000n
00104   270*           4DT         ,DU        ,DWT       ,DX        ,DZ        ,FD        ,                 LINK2270   00000n
00104   271*           5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,                 LINK2271   00000n
00104   272*           6GRV(260)   ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD      ,                 LINK2272   00000n
00104   273*           7KDI        ,KRX       ,KS        ,KSV       ,MCX       ,MWYA      ,                 LINK2273   00000n
00104   274*           8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,                 LINK2274   00000n
00104   275*           9QI         ,R         ,RA        ,RFD       ,RHZ(260)  ,RL        ,                 LINK2275   00000n
00104   276*           1RLH(260)   ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,                 LINK2276   00000n
00104   277*           2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD      ,                 LINK2277   00000n
00104   278*           3U          ,V         ,VZRO      ,WT        ,X         ,XE        ,                 LINK2278   00000n
00104   279*           4Y(200)     ,Z         ,ZBFR      ,ZBRSTZ    ,ZLMT                                 LINK2279   00000n
00104   280*      C                                                                                           LINK2280   00000n
00104   281*      C                                                                                           LINK2281   00000n
00105   282*            DIMENSION CXTIM(90),CXTMP(90)                                                         LINK2282   00000n
00105   283*      C                                                                                           LINK2283   00000n
00105   284*      C                                                                                           LINK2284   00000n
00106   285*            HOB=HEIGHT*3.2808333                                                                  LINK2285   00000n
00107   286*            SSAM=SSAM+VPR                                                                         LINK2286   00000n
00110   287*            CALL ICRD                                                                             LINK2287   00000n
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00111    288*          RED=1000.*DNS                                          LINK2288   000007
00112    289*          F=0.0                                                             000012
00113    290*          IF(W .GT. 0.0 )  GO TO 5                                          000013
00115    291*          W=-W                                                              000016
00116    292*          F=W                                                               000020
00117    293*        5 CONTINUE                                                          000022
00120    294*          CALL CRM                                               LINK2289   000022
00120    295*    C                                                            LINK2290   000022
00120    296*    C     COMPUTE TIME OF PARTICLE SOLIDIFICATION                LINK2291   000022
00120    297*    C                                                            LINK2292   000022
00121    298*          DO 122 MA=1,MCX                                        LINK2293   000023
00124    299*          MB=MCX-MA+1                                            LINK2294   000030
00125    300*          CXTIM(MA)=CX(1,MB)                                     LINK2295   000035
00126    301*      122 CXTMP(MA)=CX(9,MB)                                     LINK2296   000037
00130    302*          CALL TRPL(SLDTMP,MCX,CXTMP,CXTIM,TMSD)                 LINK2297   000043
00131    303*          WRITE(ISOUT,513)TMSD                                   LINK2298   000052
00134    304*      513 FORMAT(/9X,'TIME OF SOIL SOLIDIFICATION = ',F9.4,' SEC')  LINK2299   000060
00135    305*       50 CALL RSXP                                              LINK2302   000060
00136    306*          RETURN                                                 LINK2303   000062
00137    307*          END                                                    LINK2304   000077

        END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
Q:FOR,S  CASSANDRA.MASS,R
FOR S0E3-06/11/76-10:14:45 (1,)

   SUBROUTINE MASS      ENTRY POINT 000104

   STORAGE USED: CODE(1) 000110; DATA(0) 000034; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   XPRR
    0005   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000053 240L      0001   000073 250L      0003   000000 CAY       0000 R 000000 D          0003   000001 DETID
    0003   000015 DIAM      0003   000326 DMEAN     0003   000327 DNS       0000 R 000004 E          0003   000330 EXPO
    0003   000331 FMASS     0003 R 001170 HEIGHT    0003   000641 IDISTR    0003   000642 IEXEC      0000   000022 INJP$
    0003   000643 IRISE     0003   000644 ISIN      0003   000645 ISOUT     0003   000646 NDSTR      0003   001172 NHODO
    0003   000647 PS        0000 R 000001 Q         0000 R 000002 R         0000 R 000003 S          0003   001157 SD
    0003 R 001160 SSAM      0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2       0003   001164 T2M
    0003   001165 USOIL     0003   001166 VPR       0003   001503 VX        0003   002013 VY         0003 R 001167 W
    0003 R 001171 ZSCL      0003   001173 ZV

00101      1*           SUBROUTINE MASS                                                    MASS 001    000000
00101      2*     C                                                                        MASS 002    000000
00101      3*     C ***************************************************************       MASS 003    000000
00101      4*     C                                                                        MASS 004    000000
00103      5*           COMMON /SET1/                                                      MASS 005    000000
00103      6*          1CAY       ,DETID(12) ,DIAM(201) ,DMEAN      ,DNS       ,EXPO     ,MASS 006    000000
00103      7*          2FMASS(200),IDISTR    ,IEXEC     ,IRISE      ,ISIN      ,ISOUT    ,MASS 007    000000
00103      8*          3NDSTR     ,PS(200)   ,SD        ,SSAM       ,TME       ,TMP1     ,MASS 008    000000
00103      9*          4TMP2      ,T2M       ,USOIL     ,VPR        ,W         ,HEIGHT   ,MASS 009    000000
00103     10*          5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)    ,VY(200)             MASS 010    000000
00103     11*     C                                                                        MASS 011    000000
00103     12*     C ***************************************************************       MASS 012    000000
00103     13*     C ***************************************************************       MASS 013    000000
00103     14*     C                                                                        MASS 014    000000
00103     15*     C     HOB  OR DOB                                                        MASS 015    000000
00104     16*           IF(HEIGHT)230,240,240                                              MASS 016    000000
00107     17*      230  D=2181.595                                                         MASS 017    000009
00110     18*           Q=-ZSCL                                                            MASS 018    000004
00111     19*           R=1.125E+02+(7.55E-01)*Q-(9.6E-06)*(Q**3.0)-(9.11E-12)*(Q**5.0)    MASS 019    000006
00112     20*           S=3.27E+01+(8.51E-01)*Q-(2.52E-05)*(Q**3.0)+(1.78E-10)*(Q**5.0)    MASS 020    000026
00113     21*           SSAM= D*((W)**(3.0/3.4))*(R**2.0)*S                                MASS 021    000040
00114     22*           GO TO 250                                                          MASS 022    000051
00115     23*      240  E=77.40685                                                         MASS 023    000057
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00116     24*           SSAVEF*((W)**(3.0/3.4))*((180.0-ZSCL)**2.0)*(360.0+ZSCL)      MASS 024    000058
00117     25*      250  RETURN                                                        MASS 025    000079
00120     26*           END                                                           MASS 026    000107

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
0:FOR,S  CASSANDRA.#THRE,R
FOR S0E3-06/11/76-10:14:49 (2,)

   MAIN PROGRAM

   STORAGE USED: CODE(1) 000076; DATA(0) 000035; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323


   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   FPOVFL
    0005   LINK1
    0006   LINK2
    0007   NINTR$
    0010   NRDU$
    0011   NIO3$
    0012   NIO2$
    0013   NERR2$
    0014   NWDU$
    0015   NSTOP$


   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000   000024 1F       0001   000043 101L     0001   000055 102L     0000   000025 2F       0001   000072 200L
    0000   000026 3F       0003   000000 CAY      0003   000001 DETID    0003   000015 DIAM     0003   000326 DMEAN
    0003   000327 DNS      0003   000330 EXPO     0003   000331 FMASS    0003   001170 HEIGHT   0000 I 000020 I
    0003   000641 IDISTR   0003   000642 IEXEC    0003 I 000643 IRISE    0003 I 000644 ISIN     0003 I 000645 ISOUT
    0000 I 000021 LGO      0000 I 000023 LNK      0000 I 000022 LTHRU    0000 I 000017 NDIV     0003   000646 NDSTR
    0003   001172 NHODO    0000 I 000000 NUMTAP   0003   000647 PS       0003   001157 SD       0003   001160 SSAM
    0003   001161 TME      0003   001162 TMP1     0003   001163 TMP2     0003   001164 T2M      0003   001165 USOIL
    0003   001166 VPR      0003   001503 VX       0003   002013 VY       0003   001167 W        0003   001171 ZSCL
    0003   001173 ZV


00101      1*          COMMON/SET1/                                                              000000
00101      2*         1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,LINK1098  000000
00101      3*         2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,LINK1099  000000
00101      4*         3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,LINK1100  000000
00101      5*         4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,LINK1101  000000
00101      6*         5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)              ,LINK1102  000000
00103      7*          DIMENSION NUMTAP(15)                                                      000001
00104      8*          NDIV=0                                                                    000001
00105      9*           CALL FPOVFL                                                              000002
00106     10*          READ(5,1) (NUMTAP(I),I=1,15)                                              000004
00111     11*        1 FORMAT(15I4)                                                              000018
00112     12*          ISIN=NUMTAP(1)                                                            000018
00113     13*          ISOUT=NUMTAP(2)                                                           000014
00114     14*          IRISE=NUMTAP(3)                                                           000020
00115     15*          READ(ISIN,2) LGO,LTHRU                                                    000022
00121     16*        2 FORMAT(2I2)                                                               000031
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00122     17*           GO TO (101,102,200,200), LGO                    000031
00123     18*       101 LNK=1                                           000043
00124     19*           WRITE(ISOUT,3) LNK                              000048
00127     20*         3 FORMAT(14H ENTERING LINK  ,I2,                  000052
00130     21*           CALL LINK1                                      000052
00131     22*       102 LNK=2                                           000055
00132     23*           IF(LNK.GT.LTHRU) GO TO 200                      000056
00134     24*           WRITE(ISOUT,3) LNK                              000061
00137     25*           CALL LINK2                                      000067
00140     26*       200 STOP                                            000072
00141     27*           END                                             000075

 END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
@:FOR,S  CASSANDRA.PDBXEC,R
FOR S0E3-06/11/76-10:14:55 (7.)

   MAIN PROGRAM

   STORAGE USED: CODE(1) 001274; DATA(0) 024576; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   NINTR$
    0004   NRDU$
    0005   NIO2$
    0006   NPRT$
    0007   NSTOP$
    0010   NREW$
    0011   NRBU$
    0012   NIO1$
    0013   NERR2$
    0014   NWDU$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000302 100L      0001   000444 1170L     0001   000472 119L      0001   000474 1190L     0001   000172 12L
    0001   000541 123L      0001   000567 125L      0001   000714 132L      0001   000714 140L      0001   000025 16L
    0001   000217 20L       0001   000134 2046      0001   000145 2136      0001   000154 2216      0001   000171 2316
    0001   000261 2656      0001   000301 30L       0001   000756 300L      0001   000761 305L      0001   000344 3266
    0001   000362 3416      0001   000401 3546      0001   001033 370L      0001   001043 372L      0001   001054 375L
    0001   000301 40L       0001   000462 4076      0001   000463 4126      0001   000507 4256      0001   000510 4306
    0001   001100 4400L     0001   000301 45L       0001   000302 46L       0001   000302 47L       0001   000617 4706
    0001   000626 4776      0001   001100 4995L     0001   001144 4998L     0001   000302 50L       0001   000663 5156
    0001   000672 5206      0001   000745 5346      0001   001200 6226      0001   001234 6316      0001   001244 6366
    0001   001253 6436      0000   024432 8000F     0000   024433 8002F     0000   024434 8003F     0000   024437 8004F
    0000   024460 8005F     0000   024464 8006F     0000   024503 80060F    0000   024512 8007F     0000   024537 8888F
    0000   024542 8889F     0000   024543 8890F     0000   024546 8891F     0000   024515 8892F     0000   024520 8893F
    0000   024531 8894F     0000   024534 8895F     0000   024550 8896F     0001   001152 9995L     0001   001154 9996L
    0000 R 004142 ALT       0000 R 000000 ALTHLD    0000 I 024324 AUXONE     0000 I 024325 AUXTWO     0000 R 001402 BOTCOR
    0000 R 005556 BSTIM     0000 I 024326 COMBIN    0000 R 003631 DIAM       0000 R 004546 ETA        0000 R 003321 FMASS
    0000 R 024341 FW        0000 L 024331 GOBACK    0000 L 024332 GRALCH     0000 R 024426 H          0000 R 024347 HEIGHT
    0000 I 024400 IBC       0000 I 024402 IBCM      0000 I 024403 IBP        0000 I 024413 IKLOUD     0000 I 024366 INDXK
    0000 I 024340 IPDQ      0000 I 024335 ISIN      0000 I 024336 ISOUT      0000 I 024376 ISTART     0000 I 024377 ISTOP
    0000 I 024431 ITG       0000 I 024364 J         0000 I 024375 JP         0000 I 024401 JTIM       0000 L 024333 JUMPRO
    0000 L 024334 JUMPTG    0000 I 024430 KTENL     0000 I 024427 KTENS      0000 I 024407 KTIM       0000 I 001616 LAMHLD
    0000 I 024416 LAMNA     0000 I 024417 LAMNAX    0000 I 015447 LAPS       0000 I 024411 LEAKO      0000 I 024415 LJ
    0000 I 024414 LK        0000 I 024405 LPSC      0000 I 024410 LWAF       0000 I 024367 MCAUX1     0000 I 024370 MCAUX2
    0000 I 024357 MCX       0000 I 006364 MITQDP    0000 I 024360 NATL       0000 I 024356 NDSTR      0000 I 024363 NDSTRP
    0000 I 024373 NETMUN    0000 I 024355 NHODO     0000 I 024404 NLAMNA     0000 I 024361 NONE       0000 I 024374 NTARP
    0000 I 024371 NTIM      0000 I 024362 NTWO      0000 I 024372 NUMTEN     0000 I 024365 NUMTIM     0000 I 024323 OPTION
    0000 R 024337 PI        0000 R 003011 PS        0000 R 000601 RADHLD     0000 R 024421 RADIUX     0000 R 024422 RADXSQ
    0000 R 024420 RATIOA    0000 R 024354 RFD       0000 R 005152 RHO        0000 R 024412 RMASS      0000 R 024345 SD
    0000 R 024343 SLDTMP    0000 R 024342 SSAM      0000 R 024406 SUBWAM     0000 I 024327 TARGET     0000 R 024425 TDSQU
    0000 R 024352 TGZ       0000 I 024330 TIMI      0000 R 024344 TWSD       0000 R 001510 TOPCOR     0000 R 006573 TPDQ
    0000 R 006427 TRAT      0000 R 005710 TX        0000 R 006054 TY         0000 R 006220 TZ         0000 R 002171 VX
    0000 R 002501 VY        0000 R 024346 W         0000 R 024423 XATALT     0000 R 024350 XGZ        0000 R 024424 YATALT
    0000 R 024351 YGZ       0000 R 024353 ZBRSTZ    0000 R 001661 ZV
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00101        DIMENSION                                                                      000000
00101       1  ALTHLD(11,35),RADHLD(11,35),BOTCOR(2,35),TOPCOR(2,35),LAMHLD(35)              000000
00103        DIMENSION                                                                      000001
00103       1  ZV(200),VX(200),VY(200),PS(200),FMASS(200),DIAM(201),                        000001
00103       2 ALT(260),ETA(260),RHO(260), BSTIM(90)                                          000001
00104        DIMENSION TX(100),TY(100),TZ(100),                                             000001
00104       1    MTTODP(35),TRAT(100),TPDQ(100,35),LAPS(100,35)                              000001
00105        INTEGER   OPTION,AUXONE,AUXTWO,COMBIN,TARGET ,                                  000001
00105       1  TIMI                                                                          000001
00106        LOGICAL GO BACK, GR AL CH,                                                     000001
00106       1        JUMP RD, JUMP TG                                                        000001
00106  C                                                                                    000001
00106  C***************************************************************************          000001
00106  C                                                                                    000001
00107   8000 FORMAT(I2)                                                                     000001
00110   8002 FORMAT( 8I5)                                                                   000001
00111   8003 FORMAT( I5/ (4E15.5))                                                          000001
00112   8004 FORMAT(1H1, 50X,18HTARGET COORDINATES  / 50X,21HVALUES RELATIVE TO             000001
00112       1 GZ   //  10X  3HNO.,10X 1HX, 16X1HY,16X1HZ,16X 1HT /)                          000001
00113   8005 FORMAT( 10X,I3, 3E16.4, F16.1)                                                 000001
00114   8006 FORMAT( // 10X,46HPARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS                 000001
00114       1   F9.2,2X,2HTO ,F9.2,2X, 7HMICRONS  //                                         000001
00114       1  )                                                                             000001
00115  80060 FORMAT( 10X,19HSECONDS AFTER BURST  / 10X,10I10  //)                           000001
00116   8007 FORMAT( 9X, I4, 10E10.4)                                                       000001
00116  C                                                                                    000001
00116  C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$   000001
00116  C                                                                                    000001
00116  C                                                                                    000001
00116  C                                                                                    000001
00117        ISIN=5                                                                         000001
00120        ISOUT=6                                                                        000003
00121        PI=3.1415927                                                                   000005
00122        GO BACK= .TRUE.                                                                000007
00122  C                                                                                    000007
00122  C     DETERMINE LOGICAL UNIT OF CLOUD TAPE                                           000007
00123        READ(ISIN,8000) IPDQ                                                           000011
00126         PRINT 8892,IPDQ                                                               000017
00131   8892  FORMAT(' IPDQ ',I2)                                                           000025
00131  C                                                                                    000025
00131  C                                                                                    000025
00131  C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$   000025
00131  C                                                                                    000025
00131  C                                                                                    000025
00131  C                                                                                    000025
00131  C                                                                                    000025
00131  C     SPECIFY TARGET OPTION                                                          000025
00131  C     THIS DETERMINES TYPE OF CALCULATION AND TIMES TO BE USED                       000025
00131  C                                                                                    000025
00132     16 READ(ISIN,8002)  OPTION ,                                                      000025
00132       1                 AUXONE,AUXTWO                                                  000025
00137         PRINT 8893,OPTION,AUXONE,AUXTWO                                               000034
00144   8893  FORMAT(' OPTION ',I2,' AUXONE ',I5,' AUXTWO ',I5)                             000043
00145        JUMP TG=.FALSE.                                                                000043
00146        IF( OPTION .EQ. 0) STOP                                                        000044
00150        IF( OPTION .LT. 0) JUMP TG= .TRUE.                                             000050
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00152     57*           OPTION=IABS( OPTION )                                                    000056
00153     58*           REWIND IPDQ                                                              000057
00154     59*           JUMP RD= .FALSE.                                                         000062
00154     60*     C                                                                              000062
00154     61*     C.*************************************************************************** 000062
00154     62*     C                                                                              000062
00154     63*     C     READ HEADER INFORMATION FROM CLOUD RISE TAPE                             000062
00154     64*     C                                                                              000062
00155     65*           READ(IPDQ) FW,SSAM,SLDTMP,TMSD,SD,W,HEIGHT,XGZ,YGZ,TGZ,                  000063
00155     66*          1 ZBRSTZ,RFD,NHODO,NDSTR,MCX,NATL,NONE,NTWO                               000063
00201     67*           NDSTRP=NDSTR+1                                                           000111
00202     68*           READ(IPDQ) (PS(J),FMASS(J),DIAM(J),J=1,NDSTR),DIAM(NDSTRP),              000122
00202     69*          1 (ALT(J),ETA(J),RHO(J),J=1,NATL),                                        000122
00202     70*          2 (BSTIM(J),J=1,MCX)                                                      000122
00225     71*           IF( NHODO .EQ. 0 ) GO TO 12                                              000157
00227     72*           READ(IPDQ) ( ZV(J),VX(J),VY(J),J=1,NHODO )                               000161
00237     73*        12 CONTINUE                                                                 000177
00237     74*     C                                                                              000177
00237     75*     C.*************************************************************************** 000177
00237     76*     C                                                                              000177
00240     77*           NUMTIM=1                                                                 000177
00241     78*           INDX K=2                                                                 000200
00242     79*           GO TO ( 20, 30, 40                                                       000202
00242     80*          1 , 45, 46, 47, 50                                                        000202
00242     81*          2                    ), OPTION                                           000202
00243     82*        20 CONTINUE                                                                 000217
00243     83*     C     OPTION 1    NO INTERPOLATION                                           000217
00243     84*     C                                                                              000217
00243     85*     C     SET INDICES FOR CX TIMES ACCORDING TO AUXONE , AUXTWO                    000217
00243     86*     C     SINGLE TIME CASE INDICATED BY AUXTWO=1                                   000217
00243     87*     C                                                                              000217
00243     88*     C                                                                              000217
00244     89*           INDX K=0                                                                 000217
00245     90*           IF( AUXONE .EQ. 0 ) AUXONE=1                                             000217
00247     91*           MCAUX1=MCX-AUXONE+1                                                      000223
00250     92*           PRINT 8894,MCAUX1                                                        000227
00253     93*      8894 FORMAT(' MCAUX1 ',I5)                                                    000234
00254     94*           IF( AUXTWO .EQ. 0 ) AUXTWO=1                                             000238
00256     95*           MCAUX2=MCAUX1+AUXTWO-1                                                   000240
00257     96*           NUMTIM=MCAUX2-MCAUX1+1                                                   000244
00260     97*            PRINT 8895,NUMTIM                                                       000247
00263     98*      8895  FORMAT(' NUMTIM ',I5)                                                   000261
00264     99*           DO 22 J=1,NUMTIM                                                         000261
00267    100*           NTIM=MCAUX1+J-1                                                          000261
00270    101*           MITQDP(J)=IFIX(BSTIM(NTIM))                                              000266
00271    102*        22 CONTINUE                                                                 000277
00273    103*           GO TO 100                                                                000277
00274    104*        30 CONTINUE                                                                 000301
00274    105*     C     TIME INTERPOLATION OF WAFER STRUCTURE BEFORE STABILIZATION               000301
00274    106*     C     ONE TIME PER TARGET, THAT TIME BEING INPUT WITH TARGET                   000301
00274    107*     C     COORDINATES (TRAT)                                                       000301
00275    108*        40 CONTINUE                                                                 000301
00275    109*     C     OPTION 3                                                                 000301
00275    110*     C     INTERPOLATION FOR PRESTABILIZATION TIMES                                 000301
00275    111*     C     MANY TIMES PER TARGET- TIME INPUT SEPARATE                               000301
00275    112*     C     FROM X,Y,Z INPUT                                                         000301
00276    113*        45 CONTINUE                                                                 000301
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00277              INDX K=0                                                      000301
00277      C       OPTION 4                                                      000301
00277      C       SAME AS OPTION 1 BUT PRODUCE STABILIZED CLOUD TAPE            000301
00300          46  CONTINUE                                                      000302
00300      C       OPTION 5                                                      000302
00300      C       SAME AS OPTION 2 BUT PRODUCE STABILIZED CLOUD TAPE            000302
00301          47  CONTINUE                                                      000302
00301      C       OPTION 6                                                      000302
00301      C       SAME AS 3 BUT PRODUCE STABILIZED CLOUD TAPE                   000302
00302          50  CONTINUE                                                      000302
00302      C       OPTION 7                                                      000302
00302      C       GO DIRECTLY TO PRODUCE STABILIZED CLOUD TAPE THEN EXIT        000302
00302      C       ASSUMES NO PRE-STABILIZATION COMPUTATIONS REQUESTED           000302
00303         100  CONTINUE                                                      000302
00303      C                                                                     000302
00304              NUMTEN= (NUMTIM+9)/10                                         000302
00305              NETMUN=NUMTEN*10                                              000306
00305      C                                                                     000306
00305      C                                                                     000306
00305      C                                                                     000306
00305      C                                                                     000306
00305      C*$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$  000306
00305      C                                                                     000306
00305      C       READ TARGET COORDINATES                                       000306
00305      C       VALUES ASSUMED TO BE RELATIVE TO GZ                           000306
00305      C                                                                     000306
00306              PRINT 8888,JUMPTG                                             000310
00311        8888   FORMAT(' JUMPTG ',O12)                                       000315
00311      C                                                                     000315
00311      C                                                                     000315
00312              IF(JUMP TG) GO TO 1170                                        000315
00314              READ(ISIN,8889) NTARP                                         000317
00317        8889  FORMAT(I5)                                                    000325
00320              PRINT 8890,NTARP                                              000325
00323        8890   FORMAT(' NTARP ',I5)                                         000335
00324               READ(ISIN,8891)(TX(J),TY(J),TZ(J),TRAT(J),J=1,NTARP)         000335
00335        8891   FORMAT(4E15.5)                                               000352
00335      C                                                                     000352
00335      C       PRINT TARGET INFORMATION                                      000352
00336              WRITE(ISOUT,8004)                                             000352
00340              DO 116 JP=1,NTARP                                             000362
00343         116  WRITE(ISOUT,8005) JP,TX(JP),TY(JP),TZ(JP),TRAT(JP)            000362
00343      C                                                                     000362
00343      C                                                                     000362
00343      C       SHIFT TARGET ALTITUDES TO RENDER THEM RELATIVE TO MSL         000362
00343      C                                                                     000362
00353              DO 117 JP=1,NTARP                                             000401
00356              TZ(JP)=TZ(JP)+ZBRSTZ                                          000401
00357         117  CONTINUE                                                      000404
00357      C.*************************************************************************  000404
00357      C                                                                     000404
00357      C       READ INTEGER TO CONTROL NUMBER OF PARTICLE SIZE CLASSES       000404
00357      C       BEING SUMMED AT EACH TARGET POINT-COMBIN                      000404
00357      C       VALUE OF ZERO INDICATES SUMMATION OF ALL PARTICLE SIZE CLASSES  000404
00361              READ(ISIN,8002)  COMBIN,ISTART,ISTOP                          000404
00366              IF( ISTART .EQ.  0  ) ISTART=NONE                             000414
00370              IF(  ISTOP .EQ. 0 )  ISTOP =NTWO                              000420
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00372   171*          IF(  ISTOP .EQ. 0 )  ISTOP=NDSTR                                  000424
00374   172*          IF( COMBIN .EQ. 0 ) COMBIN=ISTOP                                  000430
00376   173*          PRINT 8896,COMBIN,ISTART,ISTOP                                    000434
00403   174*       8896 FORMAT(' COMBIN ',I5,' ISTART ',I5,' ISTOP ',I5)                000440
00403   175*     C                                                                      000440
00403   176*,    C                                                                      000440
00403   177*     C                                                                      000440
00404   178*      1170 CONTINUE                                                         000440
00404   179*     C                                                                      000440
00404   180*     C    ESTABLISH FLOATING UPPER PARTICLE SIZE POINTER                    000440
00405   181*          IBC=ISTART-1                                                      000440
00405   182*     C                                                                      000440
00405   183*     C                                                                      000440
00406   184*          DO 118 TARGET=1,NTARP                                             000460
00411   185*          DO 118 JTIM=1,NUMTIM                                              000460
00414   186*          LAPS(TARGET,JTIM)=0                                               000460
00415   187*        118 CONTINUE                                                        000470
00415   188*     C                                                                      000470
00420   189*          GO TO 1190                                                        000470
00421   190*        119 CONTINUE                                                        000470
00422   191*          JUMP RD= .TRUE.                                                   000470
00423   192*       1190 CONTINUE                                                        000470
00423   193*     C                                                                      000470
00423   194*     C                                                                      000470
00423   195*     C    PREPARE TARGET POINT DENSITY ARRAY FOR SUMMING AGAIN              000470
00424   196*          DO 120 TARGET=1,NTARP                                             000470
00427   197*          DO 120 JTIM=1,NUMTIM                                              000510
00432   198*          TPDQ(TARGET,JTIM)=0.0                                             000510
00433   199*        120 CONTINUE                                                        000510
00433   200*     C                                                                      000510
00436   201*          IBCM=IBC+1                                                        000510
00437   202*          IBC=IBC+COMBIN                                                    000520
00440   203*          IF( IBC .GT. ISTOP )  IBC=ISTOP                                   000520
00442   204*          IBP=IBC+1                                                         000530
00442   205*     C                                                                      000530
00443   206*          IF( .NOT. JUMP RD ) GO TO 123                                     000530
00445   207*          JUMP RD= .NOT. JUMP RD                                            000530
00446   208*          GO TO 125                                                         000530
00447   209*        123  READ(IPDQ) NLAMNA,LPSC,SUBWAM,KTIM,LWAF,LFAKO                 000540
00457   210*          RMASS=SUBWAM/PI                                                   000550
00460   211*          IKLOUD=1                                                          000550
00460   212*     C                                                                      000550
00461   213*          IF( NLAMNA .LT. 0 )  GO TO 9995                                   000550
00463   214*          IF( LPSC .GT. IBC ) GO TO 9996                                    000560
00465   215*        125 CONTINUE                                                        000560
00465   216*     C                                                                      000560
00466   217*        130 READ(IPDQ)                                                      000560
00466   218*           1 (LAMHLD(LK),BOTCOR(1,LK),BOTCOR(2,LK),TOPCOR(1,LK),          000560
00466   219*           2 TOPCOR(2,LK),(ALTHLD(LJ,LK),RADHLD(LJ,LK),LJ=1,NLAMNA),      000560
00466   220*           3  LK=1,KTIM)                                                  000560
00505   221*          IF( LPSC .LT. ISTART ) GO TO 123                                  000640
00507   222*          IF(  LPSC .GT. ISTOP ) GO TO 9995                                 000640
00507   223*     C    IF THIS POINT IS REACHED THE PARTICLE SIZE CLASS IS IN RANGE      000640
00507   224*     C    FOR FURTHER CONSIDERATION                                         000640
00511   225*          IF(LAMHLD(1) .LT. 0)  IKLOUD=2                                    000650
00513   226*          IKLOUD=IKLOUD+INDX K                                              000650
00513   227*     C                                                                      000650
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00513   224*      C     ENTER TARGET LOOP                                                                  000655
00513   229*      C                                                                                        000655
00514   230*            DO 5000 TARGET=1,NTARP                                                             000666
00517   231*            DO 4998 JTIM=1,NUMTIM                                                              000672
00522   232*            TIMI=MCAUX1+JTIM-1                                                                 000672
00522   233*      C     CHECK IF TARGET HAS BEEN FOUND IN WAFER OF THIS PARTICLE SIZE                      000672
00523   234*            IF( LPSC .LE. LAPS(TARGET,JTIM)) GO TO 4998                                        000676
00523   235*      C                                                                                        000676
00523   236*      C     TARGET HAS NOT BEEN PREVIOUSLY FOUND TO BE IN WAFER OF THIS PARTICLE SIZE          000676
00523   237*      C     HENCE WE NOW TEST FOR THIS INCLUSION                                               000676
00525   238*            GO TO ( 140,4995,132,4400 ),IKLOUD                                                 000702
00525   239*      C                                                                                        000702
00525   240*      C     FIRST TEST IF TARGET IS IN GROSS ALTITUDE RANGE                                    000702
00525   241*      C                                                                                        000702
00526   242*        132 CONTINUE                                                                           000714
00526   243*      C                                                                                        000714
00527   244*        140 CONTINUE                                                                           000714
00530   245*            GRALCH=TZ(TARGET) .LT. ALTHLD(1,TIMI)                                              000714
00530   246*           1  .OR.                                                                             000714
00530   247*           2       TZ(TARGET) .GT. ALTHLD(NLAMNA,TIMI)                                         000714
00531   248*            IF( GR AL CH ) GO TO 4998                                                          000736
00531   249*      C                                                                                        000736
00531   250*      C     TARGET HAS BEEN ACCEPTED FOR REFINEMENT OF RANGE                                   000736
00531   251*      C     DETERMINE BETWEEN WHICH TWO LAMINA THE TARGET ALTITUDE FALLS                       000736
00531   252*      C     THEN COMPUTE RADIUS OF WAFER AT THAT ALTITUDE AND CENTER OF                        000736
00531   253*      C     LAMINA AT THAT ALTITUDE                                                            000736
00533   254*            DO 300 LAMNA=2,NLAMNA                                                              000745
00536   255*            IF( TZ(TARGET) .GT. ALTHLD(LAMNA,TIMI) )  GO TO 300                                000745
00536   256*      C                                                                                        000745
00536   257*      C                                                                                        000745
00540   258*            LAMNAX=LAMNA-1                                                                     000751
00541   259*            GO TO 305                                                                          000758
00542   260*        300 CONTINUE                                                                           000761
00544   261*        305 CONTINUE                                                                           000761
00544   262*      C                                                                                        000761
00544   263*      C     IS TARGET ALTITUDE ABOVE CLOUD BOTTOM ALTITUDE                                     000761
00544   264*      C     IF YES SIMPLY GO RETRIEVE RADIUS AND COORDINATES OF CENTER                         000761
00544   265*      C                                                                                        000761
00545   266*            IF( LAMNAX .GE. LAMHLD(TIMI) )  GO TO 375                                          000763
00545   267*      C                                                                                        000763
00545   268*      C     CALCULATE RADIUS OF STRUCTURED WAFER AT ALTITUDE TZ WHERE TARGET                   000763
00545   269*      C     IS BELOW CLOUD BOTTOM                                                              000763
00545   270*      C                                                                                        000763
00547   271*            RATIOA= (TZ(TARGET)-ALTHLD(LAMNAX,TIMI))  /                                        000767
00547   272*           1       (ALTHLD(LAMNAX+1,TIMI)-ALTHLD(LAMNAX,TIMI))                                 000767
00547   273*      C                                                                                        000767
00550   274*            RADIUX=RADHLD(LAMNAX,TIMI)+(RADHLD(LAMNAX+1,TIMI)-                                 001000
00550   275*           1   RADHLD(LAMNAX,TIMI))*RATIOA                                                    001000
00551   276*            RADXSQ=RADIUX*RADIUX                                                               001005
00551   277*      C                                                                                        001005
00551   278*      C                                                                                        001005
00551   279*      C     NOW THAT WE HAVE RADIUS CALCULATE COORDINATES OF CENTER OF LAMINA                  001005
00551   280*      C     AT SAME ALTITUDE                                                                   001005
00551   281*      C                                                                                        001005
00552   282*            XATALT=(TOPCOR(1,TIMI)-BOTCOR(1,TIMI))*RATIOA+BOTCOR(1,TIMI)                       001007
00553   283*            YATALT= (TOPCOR(2,TIMI)-BOTCOR(2,TIMI))*RATIOA+BOTCOR(2,TIMI)                      001015
00553   284*      C                                                                                        001015
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00553   285*      C     NOW SEE IF TARGET IS LOCATED AT A DISTANCE LESS THAN RADIUX      001014
00553   286*      C     FROM CENTER OF CIRCLE WITH COORDINATES (XATALT,YATALT)           001015
00553   287*      C                                                                      001016
00554   288*            TDSQU= (XATALT-TX(TARGET))**2+(YATALT-TY(TARGET))**2             001027
00554   289*      C                                                                      001028
00555   290*            IF( RADX SQ .LE. TD SQU ) GO TO 4998                             001027
00555   291*      C                                                                      001027
00555   292*      C     TARGET IS IN WAFER SO CALCULATE DENSITY AND SUM                  001027
00555   293*      C                                                                      001027
00557   294*        370 CONTINUE                                                         001038
00560   295*            H=ALTHLD(NLAMNA,TIMI)-ALTHLD(1,TIMI)                           001037
00561   296*        372 CONTINUE                                                         001048
00562   297*            TPDQ(TARGET,JTIM)=RMASS/(H*RADXSQ)+TPDQ(TARGET,JTIM)           001048
00563   298*            LAPS(TARGET,JTIM)=LPSC                                         001050
00564   299*            GO TO 4998                                                     001059
00565   300*        375 CONTINUE                                                         001058
00565   301*      C     TARGET IS IN CLOUD ALTITUDE RANGE                              001058
00565   302*      C     PERFORM APPROPRIATE TESTS                                      001058
00565   303*      C                                                                      001058
00566   304*            TDSQU=(TOPCOR(1,TIMI)-TX(TARGET))**2+(TOPCOR(2,TIMI)-TY(TARGET 001068
00566   305*           1  ))**2                                                        001068
00567   306*            RADXSQ=RADHLD(NLAMNA,TIMI)**2                                  001070
00570   307*        390 IF( TD SQU .GT. RADX SQ ) GO TO 4998                           001078
00570   308*      C                                                                      001078
00570   309*      C     TARGET IS IN CLOUD                                             001078
00570   310*      C     CALCULATE DENSITY                                              001078
00572   311*            GO TO 370                                                      001076
00572   312*      C                                                                      001076
00572   313*      C                                                                      001076
00572   314*      C                                                                      001076
00573   315*       400 CONTINUE                                                        001100
00574   316*       4995 CONTINUE                                                       001100
00575   317*            GRALCH= TZ(TARGET) .LT. ALTHLD(1,TIMI) .OR.                    001107
00575   318*           1  TZ(TARGET) .GT. ALTHLD(2,TIMI)                              001107
00576   319*            IF( GR AL CH ) GO TO 4998                                      001128
00600   320*            TDSQU=(BOTCOR(1,TIMI)-TX(TARGET))**2+                          001126
00600   321*           1  (BOTCOR(2,TIMI)-TY(TARGET))**2                             001126
00601   322*            RADXSQ=RADHLD(1,TIMI)**2                                       001139
00602   323*            H=ALTHLD(2,TIMI)-ALTHLD(1,TIMI)                                001138
00603   324*            IF( TDSQU .LE. RADXSQ )  GO TO 372                             001140
00605   325*       998 CONTINUE                                                        001150
00605   326*      C     4998 IS END OF TIMES LOOP                                      001150
00605   327*      C                                                                      001150
00605   328*      C                                                                      001150
00607   329*       5000 CONTINUE                                                       001150
00607   330*      C     5000 IS END OF TARGET LOOP                                     001150
00611   331*            GO TO 123                                                      001150
00612   332*       9995 CONTINUE                                                       001152
00613   333*            GO BACK= .NOT. GO BACK                                         001152
00613   334*      C                                                                      001152
00614   335*       9996 CONTINUE                                                       001154
00614   336*      C     PRINT PDQS FOR EACH TARGET FOR THIS COMBIN(ATION) OF           001154
00614   337*      C     PARTICLE SIZE CLASSES                                          001154
00615   338*            WRITE(ISOUT,8006)   DIAM(IBP),DIAM(IBCM)                       001154
00621   339*            DO 9999 KTENS=1,NETMUN,10                                      001200
00624   340*            KTENL=KTENS+9                                                  001204
00625   341*            IF( KTENL .GT. NUMTIM ) KTENL=NUMTIM                           001207
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00627    342*           WRITE(ISOUT,80060) (MITOOP(J),J=KTENS,KTENL )                    001215
00635    343*           DO 9998 ITG=1,NTARP                                              001244
00640    344*         9998 WRITE(ISOUT,8007) ITG,(TPDQ(ITG,J),J=KTENS,KTENL)             001244
00650    345*         9999 CONTINUE                                                      001265
00650    346*         C                                                                  001265
00650    347*         C                                                                  001265
00650    348*         C     SHOULD WE RETURN TO START ANOTHER PARTICLE SIZE COMBINATION   001265
00652    349*               IF( GO BACK )  GO TO 119                                     001265
00654    350*               GO BACK= .NOT. GO BACK                                       001267
00655    351*               GO TO 16                                                     001270
00656    352*               END                                                          001273

      END OF COMPILATION:        NO  DIAGNOSTICS.
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@FOR,S  CASSANDRA.PROXOT,R
FOR S0F3-06/11/76-10:15:49 (2.)

   MAIN PROGRAM

   STORAGE USED: CODE(1) 002361; DATA(0) 007604; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   ATMO   001010
    0004   PSTT   002426
    0005   WINDS  001130
    0006   RSTWFR 002123
    0007   PSTWFR 000074

    EXTERNAL REFERENCES (BLOCK, NAME)

    0010   DIVY
    0011   PRETRN
    0012   PSTRAN
    0013   NOMARG
    0014   STMARG
    0015   NINTR$
    0016   NRDU$
    0017   NIO2$
    0020   NPRT$
    0021   NSTOP$
    0022   NREW$
    0023   NRBU$
    0024   NIO1$
    0025   NERR2$
    0026   NWDU$
    0027   SIN
    0030   COS

    STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   001472 1012G     0001   001633 1046G     0001   002001 1103G     0001   002233 1147G     0001   002102 1170OL
    0001   002256 1177G     0001   001101 119L      0001   001103 1190L     0001   000205 12L       0001   002306 1211G
    0001   002324 1217G     0001   002341 1224G     0001   001134 123L      0001   001171 1230L     0001   001173 1231L
    0001   001175 124L      0001   001211 125L      0001   001320 131L      0001   001747 140L      0001   000022 16L
    0001   000216 20L       0001   001404 200L      0001   001456 2000L     0001   000137 216G      0001   000150 225G
    0001   001420 225L      0001   001545 227L      0001   001613 230L      0001   000157 233G      0001   001673 235L
    0001   001677 240L      0001   000177 244G      0001   001736 249L      0001   001740 250L      0001   001542 2500L
    0001   000232 262G      0001   000250 274G      0001   002012 300L      0001   002015 305L      0001   002071 370L
    0001   002101 372L      0001   000466 375G      0001   002113 375L      0001   000510 404G      0001   000551 426G
    0001   000564 435G      0001   000623 453G      0001   000644 466G      0001   002140 4995L     0001   000271 50L
    0001   002206 5000L     0001   000342 52L       0001   000731 524G      0001   000347 53L       0001   000737 547G
    0001   000370 55L       0001   000414 56L       0001   001017 563G      0001   000425 57L       0001   000446 58L
    0001   000570 61L       0001   000606 62L       0001   001075 620G      0001   000642 63L       0001   000712 630L
    0001   001107 633G      0001   000670 635L      0001   000677 649L      0001   000702 650L      0001   000720 66L
    0001   001157 666G      0001   000764 67L       0001   000766 68L       0001   000741 680L      0001   000752 685L
    0001   001007 69L       0001   001230 712G      0001   001237 721G      0001   001011 75L       0001   001373 755G
    0000   007312 8000F     0000   007313 8001F     0000   007315 8001OF    0000   007323 8002F     0000   007324 8003F
    0000   007327 8004F     0000   007350 8005F     0000   007354 8006F     0000   007373 8006OF    0000   007402 8007F
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0000   007544 81070F    0000   007407 8008F     0000   007420 8009F     0000   007530 8010F     0000   007533 8011F
0000   007545 8013F    0000   007550 8013F     0001   002246 900L      0001   002266 999L      0001   002212 9995L
0001   002214 9996L    0001   002353 9999L     0000 R 007230 ABSM      0004 R 001010 ALT       0006 R 000000 ALTHLD
0000 R 007215 ALTMAX   0000 R 007214 ALTMIN    0000 R 007207 ANGLE     0006 R 001606 BOTCOR    0000 R 005302 BPDQ
0000 R 007227 BSM      0000 R 001130 BSTIM     0000 R 007172 CLDTOP    0000 I 007127 COMBIN    0000 R 007231 DEBS
0000 R 007217 DELALT   0000 R 007216 DELR      0000 R 000620 DIAM      0000 R 007267 DRADSQ    0004   001415 DX
0004   002021 DY       0003 R 000000 ETA       0000 R 000310 FMASS     0000 R 007173 FROG      0000 R 007147 FTIM
0004   000404 FV       0000 R 007150 FW        0000 L 007133 GOBACK    0000 L 007134 GRALCH    0000 R 007301 H
0000 R 007156 HEIGHT   0000 I 007242 IBC       0000 I 007243 IBCM      0000 I 007244 IBP       0000 I 007254 IKLOUD
0000 I 007144 IRDQ     0000 I 007307 IPRINT    0000 I 007310 IP14      0000 I 007140 ISIN      0000 I 007141 ISOUT
0000 I 007237 ISTART   0000 I 007240 ISTOP     0000 I 007303 ITG       0000 I 007302 ITPM      0000 I 007266 IWP
0000 I 007175 J        0000 I 007306 JLAT      0000 I 007304 JLAST     0000 I 007311 JNUM      0000 I 007201 JP
0000 I 007235 JPOST    0000 I 007305 JSTRIP    0000 I 007232 JUMP      0000 L 007135 JUMPRD    0000 L 007136 JUMPTG
0000 I 007236 JWIND    0000 I 007226 JX        0000 I 007263 KOUNTA    0000 I 007264 KOUNTX    0000 I 007250 KTIM
0006 I 002052 LAMHLD   0000 I 007271 LAMNA     0000 I 007272 LAMNAX    0000 I 003516 LAPS      0000 I 007241 LASTPS
0000 I 007252 LEAKO    0000 I 007256 LJ        0000 I 007255 LK        0000 I 007145 LLPSC     0000 I 007246 LPSC
0000 I 007251 LWAS     0000 I 007166 MCX       0000 I 007176 MCXM      0000 I 007142 MID       0000 I 007270 MIDI
0000 I 007224 NAL      0000 I 007203 NALT      0000 I 007206 NANGL     0000 I 007167 NATL      0000 I 007225 NBSTS
0000 I 007234 NCLDT    0000 I 007165 NDSTR     0000 I 007174 NDSTRP    0000 I 007164 NHODO     0000 I 007245 NLAMNA
0000 I 007170 NONE     0000 I 007210 NOXS      0000 I 007211 NOYS      0000 I 007257 NPSTW     0000 I 007222 NR
0000 I 007205 NROW     0000 I 007204 NSTRIP    0000 I 007200 NTARP     0000 I 007261 NTIMI     0000 I 007202 NTIMS
0004   001414 NTOP     0000 I 007171 NTWO      0000 I 007177 NUMTIM    0000 I 007233 NZBR      0000 I 007126 OPTION
0000 R 007143 PI       0000 R 000000 PS        0004 R 002425 PSMID     0000 L 007137 PST       0007 R 000000 PSTALT
0007 R 000012 PSTRAD   0007 R 000036 PSTRHO    0007 R 000024 PSTSA     0007 R 000050 PSTX      0007 R 000062 PSTY
0006 R 000703 RADHLD   0000 R 007274 RADIUX    0000 R 007275 RADXSQ    0000 R 007273 RATIOA    0000 R 007260 RATL
0000 R 007163 RED      0003 R 000404 RHO       0000 R 007253 RMASS     0000 R 007213 RMAX      0000 R 007212 RMIN
0000 R 007223 RNR      0000 R 007154 SD        0000 R 007152 SLDTMP    0000 R 007146 SRAT      0000 R 007151 SSAM
0000 R 007247 SURWAM   0004   000000 T         0000 I 007130 TARG      0000 I 007131 TARGET    0000 R 007265 TAS
0000 R 007262 TASL     0000 R 007300 TDSQU     0000 R 007161 TGZ       0000 I 007132 TIMI      0000 R 007153 TMSD
0006 R 001730 TOPCOR   0000 R 001712 TPDQ      0000 R 001630 TRAT      0000 I 001546 TT        0000 R 001262 TX
0000 R 001356 TY       0000 R 001452 TZ        0005 R 000310 VX        0005 R 000620 VY        0000 R 007155 W
0000 R 007276 XATALT   0000 R 007157 XGZ       0000 R 007221 XROT      0000 R 007277 YATALT    0000 R 007160 YGZ
0000 R 007220 YROT     0000 R 007162 ZBRSTZ    0005 R 000000 ZV
```

```
00101      1*          COMMON/ATMO/                                                          000000
00101      2*         1            ETA(260),RHO(260)                                       000000
00103      3*          COMMON/PSTT/                                                          000001
00103      4*         1T(260),FV(260),ALT(260),NTOP,DX(260),DY(260),PSMID                   000001
00104      5*          COMMON/WINDS/                                                         000001
00104      6*         1  ZV(200),VX(200),VY(200)                                           000001
00105      7*          COMMON/BSTWFR/ ALTHLD(11,41),RADHLD(11,41),BOTCOR(2,41),             000001
00105      8*         1               TOPCOR(2,41),LAMHLD(41)                               000001
00106      9*          COMMON/PSTWFR/ PSTALT(10),PSTRAD(10),PSTSA(10),PSTRHO(10)            000001
00106     10*         1             ,  PSTX(10),  PSTY(10)                                 000001
00107     11*          DIMENSION                                                            000001
00107     12*         1  PS(200),FMASS(200),DIAM(200),BSTIM(90)                            000001
00110     13*          DIMENSION TX(60),TY(60),TZ(60),TT(50),                               000001
00110     14*         1          TRAT(50),TPDQ(900),LAPS(900),BPDQ(900)                    000001
00111     15*          INTEGER OPTION,COMBIN,TARG,TARGET,TIMI,TT                            000001
00112     16*          LOGICAL GO BACK, GR AL CH,                                           000001
00112     17*         1        JUMP RD, JUMP TG                                           000001
00112     18*         2       ,PST                                                        000001
00112     19*     C                                                                        000001
00112     20*     C*****************************************************************      000001
```

```
00112      C                                                                              000001
00113       8000 FORMAT(I2)                                                               000001
00114       8001 FORMAT( 6E12.4)                                                          000001
00115      80010 FORMAT(///  1X,9HALTITUDES /  ,(1X,10F12.1))                             000001
00116       8002 FORMAT( 8I5)                                                             000001
00117       8003 FORMAT( I5/ (4E15.5))                                                    000001
00120       8004 FORMAT(1H1, 50X,18HTARGET COORDINATES  / 50X,21HVALUES RELATIVE TO        000001
00120          1 GZ   //  10X  3HNO,,10X 1HX, 16X1HY,16X1HZ,16X 1HT /)                    000001
00121       8005 FORMAT( 10X,I3, 3E16.4, F16.1)                                           000001
00122       8006 FORMAT( // 10X,46HPARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS           000001
00122          1    F9.2,2X,2HTO ,F9.2,2X, 7HMICRONS  //                                  000001
00122          1  )                                                                       000001
00123      80060 FORMAT( 10X,19HSECONDS AFTER BURST  / 10X,10I10  //)                     000001
00124       8007 FORMAT( 10X, 5( I4,2X,E10.4, 4X )//  )                                   000001
00125       8008 FORMAT(5X,41HINSUFFICIENT TARGET DATA TO ENTER PROGRAM   )               000001
00126       8009 FORMAT(10X, 76HA MATRIX TARGET REPRESENTATION HAS BEEN CHOSEN WITH       000001
00126          1 THE FOLLOWING PARAMETERS  //// 12X,7HSTRIPS=I2,5X, 5HROWS=I2,5X          000001
00126          2  8HANGLE IS ,I4 ,18H DEGREES FROM EAST  // 12X,19HMINIMUM DISTANC       000001
00126          3E IS E15.5,5X19HMAXIMUM DISTANCE IS ,E15.5//  12X,                        000001
00126          3                                              19HMINIMUM ALTITUDE         000001
00126          4IS ,E15.5,5X,19HMAXIMUM ALTITUDE IS ,E15.5,//12X,44HHORIZONTAL DIS        000001
00126          5TANCE BETWEEN TARGET POINTS IS E15.5,// 12X,42HVERTICAL DISTANCE B        000001
00126          6ETWEEN TARGET POINTS IS    ,2X,E15.5 /// 6X,                              000001
00126          7   3( 1HX,11X,1HY,11X))                                                   000001
00127       8010 FORMAT(  2X, 15F8.1   ///   )                                            000001
00130       8011 FORMAT(///5X,24HTIME OF FOLLOWING MAP IS ,  F9.1,X,7HSECONDS  )          000001
00131      80070 FORMAT(1H1)                                                              000001
00131      C                                                                              000001
00131      C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$  000001
00131      C                                                                              000001
00131      C                                                                              000001
00131      C                                                                              000001
00132            ISIN=5                                                                   000001
00133            ISOUT=6                                                                  000003
00134            MID=41                                                                   000005
00135            PI=3.1415927                                                             000007
00136            GO BACK= .TRUE.                                                          000011
00136      C                                                                              000011
00136      C     DETERMINE LOGICAL UNIT OF CLOUD TAPE                                     000011
00137            READ(ISIN,8000)IPD9                                                      000013
00137      C                                                                              000013
00137      C                                                                              000013
00137      C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$  000013
00137      C                                                                              000013
00137      C                                                                              000013
00137      C                                                                              000013
00137      C                                                                              000013
00137      C     SPECIFY TARGET OPTION                                                    000013
00137      C     THIS DETERMINES TYPE OF CALCULATION AND TIMES TO BE USED                 000013
00137      C                                                                              000013
00142        16 READ(ISIN,8002) OPTION                                                    000022
00145           PRINT 8012,OPTION                                                         000027
00150       8012  FORMAT(' OPTION ',I5)                                                   000034
00151            JUMP TG=.FALSE.                                                          000034
00152            IF( OPTION .EQ. 0) STOP                                                  000035
00154            IF( OPTION .LT. 0) JUMP TG= .TRUE.                                       000041
```

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00156     77*           OPTION=IABS( OPTION )                                                    000046
00157     78*           REWIND IPDQ                                                              000050
00160     79*           JUMP RD= .FALSE.                                                         000054
00161     80*           LLPSC=0                                                                  000054
00162     81*           SRAT=5.0/6.0                                                             000055
00163     82*           PST=.FALSE.                                                              000057
00164     83*           FTIM=0.01                                                                000060
00164     84*      C                                                                             000060
00164     85*      C.*************************************.*****************************.****  000060
00164     86*      C                                                                             000060
00164     87*      C     READ HEADER INFORMATION FROM CLOUD RISE TAPE                            000060
00164     88*      C                                                                             000060
00165     89*           READ(IPDQ) FW,SSAM,SLDTMP,TMSD,SD,W,HEIGHT,XGZ,YGZ,TGZ,                  000062
00165     90*          1 ZBRGTZ,RFD,NHODO,NDSTR,MCX,NATL,NONE,NTWO,CLDTOP                        000062
00212     91*           FROG=1.3066667E-17*RFD                                                   000111
00213     92*           NDSTRP=NDSTR+1                                                           000114
00214     93*           READ(IPDQ) (PS(J),FMASS(J),DIAM(J),J=1,NDSTR),DIAM(NDSTRP),              000125
00214     94*          1 (ALT(J),ETA(J),RHO(J),J=1,NATL),                                        000125
00214     95*          2 (BSTIM(J),J=1,MCX)                                                      000125
00237     96*           MCXM=MCX-1                                                               000162
00240     97*           IF( NHODO .EQ. 0 ) GO TO 12                                              000165
00242     98*           READ(IPDQ) ( ZV(J),VX(J),VY(J),J=1,,NHODO )                              000167
00252     99*        12 CONTINUE                                                                 000205
00252    100*      C                                                                             000205
00252    101*      C.*****.*************************************************************.*****  000205
00252    102*      C                                                                             000205
00253    103*           NUMTIM=1                                                                 000205
00254    104*           GO TO (20,50),OPTION                                                     000206
00254    105*      C     CHOOSE PROPER TARGET ARRANGEMENT ACCORDING TO INPUT OPTION              000206
00254    106*      C                                                                             000206
00254    107*      C                                                                             000206
00254    108*      C                                                                             000206
00254    109*      C.$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$  000206
00254    110*      C                                                                             000206
00254    111*      C     READ TARGET COORDINATES                                                 000206
00254    112*      C     VALUES ASSUMED TO BE RELATIVE TO GZ                                     000206
00254    113*      C                                                                             000206
00255    114*        20 CONTINUE                                                                 000216
00256    115*           NUMTIM=1                                                                 000216
00256    116*      C                                                                             000216
00256    117*      C                                                                             000216
00257    118*           READ(ISIN,8003) NTARP,(TX(J),TY(J),TZ(J),TRAT(J),J=1,NTARP)              000217
00257    119*      C                                                                             000217
00257    120*      C     PRINT TARGET INFORMATION                                                000217
00271    121*           WRITE(ISOUT,8004)                                                        000240
00273    122*           DO 116 JP=1,NTARP                                                        000250
00276    123*         116 WRITE(ISOUT,8005) JP,TX(JP),TY(JP),TZ(JP),TRAT(JP)                     000250
00306    124*           NTIMS=NTARP                                                              000264
00307    125*           NALT=NTARP                                                               000266
00310    126*           GO TO 62                                                                 000267
00310    127*      C                                                                             000267
00310    128*      C                                                                             000267
00310    129*      C                                                                             000267
00311    130*        50 CONTINUE                                                                 000271
00311    131*      C     CONSTRUCT TARGET MATRIX IF THIS IS NOT JUST A TIME UPDATE REQUEST       000271
00312    132*           IF(JUMP TG) GO TO 61                                                     000271
00314    133*           READ(ISIN,8002) NSTRIP,NROW,NANGL                                        000272
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00321   134*          ANGLE=FLOAT(NANGL)*3.1415927/180.0                                  000302
00322   135*          NOXS=NSTRIP*15                                                      000310
00323   136*          NOYS=NROW*15                                                        000318
00324   137*          NTARR=NOXS*NOYS                                                     000316
00325   138*          READ(ISIN,8001) RMIN,RMAX,ALTMIN,ALTMAX,DELR,DELALT                 000320
00325   139*    C     ASSUME RMIN,ALTMIN ALWAYS SUPPLIED AND NOT BOTH RMAX=0 AND ALTMAX=0 000320
00325   140*    C     IF DELR=0 AND DELALT=0                                              000320
00335   141*          IF( DELR .EQ. 0.0 ) GO TO 52                                        000338
00337   142*          DELALT=SRAT*DELR                                                    000336
00340   143*          GO TO 53                                                            000340
00341   144*       52 CONTINUE                                                            000342
00342   145*          IF( DELALT .EQ. 0.0 ) GO TO 55                                      000342
00344   146*          DELR=DELALT/SRAT                                                    000348
00345   147*       53 RMAX=DELR*FLOAT(NOXS-1)+RMIN                                        000347
00346   148*          ALTMAX=DELALT*FLOAT(NOYS-1)+ALTMIN                                  000356
00347   149*          GO TO 58                                                            000366
00350   150*       55 CONTINUE                                                            000370
00351   151*          IF( RMAX .EQ. 0.0 ) GO TO 56                                        000370
00353   152*          DELR=(RMAX-RMIN)/FLOAT(NOXS-1)                                      000371
00354   153*          DELALT=DELR*SRAT                                                    000401
00355   154*          ALTMAX=DELALT*FLOAT(NOYS-1)+ALTMIN                                  000407
00356   155*          GO TO 58                                                            000412
00357   156*       56 CONTINUE                                                            000418
00360   157*          IF( ALTMAX .NE. 0.0 ) GO TO 57                                      000414
00362   158*          WRITE(ISOUT,8008)                                                   000415
00364   159*          STOP                                                                000422
00365   160*       57 CONTINUE                                                            000425
00366   161*          DELALT=(ALTMAX-ALTMIN)/FLOAT(NOYS-1)                                000428
00367   162*          DELR=DELALT/SRAT                                                    000434
00370   163*          RMAX=DELR*FLOAT(NOXS-1)+RMIN                                        000436
00371   164*       58 CONTINUE                                                            000446
00372   165*          YROT=SIN(ANGLE)                                                     000446
00373   166*          XROT=COS(ANGLE)                                                     000451
00373   167*    C     CONSTRUCT COORDINATE ARRAYS                                         000451
00374   168*          DO 59 NR=1,NOXS                                                     000466
00377   169*          RNR=RMIN+FLOAT(NR-1)*DELR                                           000466
00400   170*          TX(NR)=RNR*XROT                                                     000476
00401   171*       59 TY(NR)=RNR*YROT                                                     000500
00403   172*          DO 60 NAL=1,NOYS                                                    000510
00406   173*       60 TZ(NAL)=ALTMAX-FLOAT(NAL-1)*DELALT                                  000510
00410   174*          NALT=NOYS                                                           000522
00411   175*          WRITE(ISOUT,8009) NSTRIP,NROW,NANGL,RMIN,RMAX,ALTMIN,ALTMAX,       000524
00411   176*         1                  DELR,DELALT                                      000524
00424   177*          WRITE(ISOUT,8001)(TX(NR),TY(NR),NR=1,NOXS)                          000542
00433   178*          WRITE(ISOUT,80010)(TZ(NR),NR=1,NOYS)                                000556
00433   179*    C                                                                         000556
00433   180*    C     INPUT TIME FOR MATRIX TARGET REPRESENTATION SECONDS AFTER BURST     000556
00441   181*       61 READ(ISIN,8001) TRAT(1)                                             000570
00444   182*          WRITE(ISOUT,8011) TRAT(1)                                           000576
00447   183*          NTIMS=1                                                             000607
00450   184*       62 CONTINUE                                                            000606
00450   185*    C     ANALYSE TIMES FOR EITHER TARGET OPTION                              000606
00451   186*          NBSTS=0                                                             000606
00452   187*          DO 66 J=1,NTIMS                                                     000627
00455   188*          IF( TRAT(J) .LE. BSTIM(MCX) )  GO TO 63                             000627
00457   189*          IF( NBSTS.EQ. 0 ) NBSTS=J-1                                         000627
00461   190*          TT(J)=J                                                             000634
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00462   191*          PST=.TRUE.                                                    000636
00463   192*          GO TO 66                                                      000640
00464   193*       63 CONTINUE                                                      000644
00465   194*          DO 65 JX=1,MCXM                                               000648
00470   195*          BSM=(BSTIM(JX+1)+BSTIM(JX))/2.0-TRAT(J)                       000648
00471   196*          ABSM=ABS(BSM)                                                 000651
00472   197*          DEBS=BSTIM(JX+1)-BSTIM(JX)                                    000655
00473   198*          IF(ABS(DEBS/2.0-ABSM).LE. FTIM)  GO TO 650                    000656
00475   199*          IF(BSM) 630,635,635                                           000664
00500   200*       635 TT(J)=JX                                                     000670
00501   201*          TRAT(J)=(TRAT(J)-BSTIM(JX))/DEBS                              000671
00502   202*          GO TO 66                                                      000675
00503   203*       649 TT(J)=JX                                                     000677
00504   204*          GO TO 66                                                      000700
00505   205*       650 TRAT(J)=0.0                                                  000702
00506   206*          IF( BSM .GE. 0.0 )  GO TO 649                                 000702
00510   207*          TT(J)=JX+1                                                    000705
00511   208*          GO TO 66                                                      000710
00512   209*       630 IF(TRAT(J).LT.BSTIM(JX+1)) GO TO 635                         000712
00514   210*        65 CONTINUE                                                     000722
00516   211*        66 CONTINUE                                                     000722
00520   212*          IF( .NOT. PST )  GO TO 68                                     000722
00522   213*          JUMP=1                                                        000724
00523   214*          DO 67 JX=1,NATL                                               000731
00526   215*          GO TO (680,685),JUMP                                          000731
00527   216*       680 IF( ALT(JX) .LE. ZBRSTZ )  GO TO 67                          000741
00531   217*          NZBR=JX-1                                                     000748
00532   218*          JUMP=2                                                        000747
00533   219*       685 IF( ALT(JX) .LE. CLDTOP )  GO TO 67                          000752
00535   220*          NCLDT=JX                                                      000756
00536   221*          JPOST=NCLDT-NZBR+1                                            000757
00537   222*          GO TO 68                                                      000762
00540   223*        67 CONTINUE                                                     000766
00542   224*        68 CONTINUE                                                     000766
00542   225*     C     FIND WIND LAYER SURROUNDING ALT(NCLDT)  IF NEEDED          000766
00543   226*          JWIND=NHODO                                                   000764
00544   227*          IF( NHODO .LE. 0 )  GO TO 75                                  000767
00546   228*          DO 69 JX=1,NHODO                                              000772
00551   229*          IF( ALT(NCLDT) .GT. ZV(JX) )  GO TO 69                        000777
00553   230*          JWIND=JX                                                      001007
00554   231*          GO TO 75                                                      001005
00555   232*       69 CONTINUE                                                     001011
00557   233*       75 CONTINUE                                                     001011
00560   234*          IF( JUMP TG )  GO TO 11700                                    001011
00560   235*     C     SHIFT TARGET ALTITUDES TO RENDER THEM RELATIVE TO MSL       001011
00560   236*     C                                                                 001011
00562   237*          DO 117 JP=1,NALT                                              001017
00565   238*          TZ(JP)=TZ(JP)+ZBRSTZ                                          001017
00566   239*      117 CONTINUE                                                      001027
00566   240*     C*************************************************************** 001027
00570   241*     11700 CONTINUE                                                    001027
00570   242*     C                                                                 001027
00570   243*     C     READ INTEGER TO CONTROL NUMBER OF PARTICLE SIZE CLASSES     001027
00570   244*     C     BEING SUMMED AT EACH TARGET POINT-COMBIN                    001027
00570   245*     C     VALUE OF ZERO INDICATES SUMMATION OF ALL PARTICLE SIZE CLASSES 001027
00571   246*          READ(ISIN,8002)  COMBIN,ISTART,ISTOP                          001027
00576   247*          IF( ISTART .EQ.  0  ) ISTART=NONE                             001037
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00600    248*          IF(  ISTOP .EQ. 0 )  ISTOP =NTWO                                  001036
00602    249*          IF(  ISTOP .EQ. 0 )  ISTOP=NDSTR                                  001045
00604    250*          IF( COMBIN .EQ. 0 )  COMBIN=ISTOP-ISTART+1                        001051
00606    251*           PRINT 8013,COMBIN,ISTART,ISTOP                                   001057
00613    252*         8013  FORMAT(' COMBIN ',I5,' ISTART ',I5,' ISTOP ',I5)            001066
00613    253*     C                                                                     001066
00614    254*          LASTPS=0                                                         001066
00614    255*     C                                                                     001066
00614    256*     C                                                                     001066
00615    257*      1170 CONTINUE                                                        001067
00615    258*     C                                                                     001067
00615    259*     C    ESTABLISH FLOATING UPPER PARTICLE SIZE POINTER                   001067
00616    260*          IBC=ISTART-1                                                     001067
00616    261*     C                                                                     001067
00616    262*     C                                                                     001067
00617    263*          DO 118 TARGET=1,NTARP                                            001075
00622    264*          LAPS(TARGET)=0                                                   001075
00623    265*          TPDQ(TARGET)=0.0                                                 001075
00624    266*        118 CONTINUE                                                       001077
00624    267*     C                                                                     001077
00626    268*          GO TO 1190                                                       001077
00627    269*        119 CONTINUE                                                       001101
00630    270*          JUMP RD= .TRUE.                                                  001101
00631    271*      1190 CONTINUE                                                        001103
00631    272*     C                                                                     001103
00631    273*     C                                                                     001103
87 00631 274*     C    PREPARE TARGET POINT DENSITY ARRAY FOR SUMMING AGAIN             001103
00632    275*          DO 120 TARGET=1,NTARP                                            001103
00635    276*          BPDQ(TARGET)=0.0                                                 001107
00636    277*        120 CONTINUE                                                       001110
00636    278*     C                                                                     001110
00640    279*          IBCM=IBC+1                                                       001110
00641    280*          IBC=IBC+COMBIN                                                   001113
00642    281*          IF( IBC .GT. ISTOP )  IBC=ISTOP                                  001116
00644    282*          IBP=IBC+1                                                        001120
00644    283*     C                                                                     001120
00645    284*          IF( .NOT. JUMP RD ) GO TO 123                                    001127
00647    285*          JUMP RD= .NOT. JUMP RD                                           001131
00650    286*          GO TO 125                                                        001135
00651    287*        123  READ(IPDQ) NLAMNA,LPSC,SUBWAM,KTIM,LWAF,LFAKO                 001134
00661    288*          IF(LPSC.EQ.LASTPS)  GO TO 124                                    001145
00663    289*          IF( LASTPS.EQ. 0 )  GO TO 1231                                   001150
00665    290*          DO 1230 TARG=1,NTARP                                             001157
00670    291*          IF( LAPS(TARG).EQ. 0 )  GO TO 1230                               001157
00672    292*          BPDQ(TARG)=BPDQ(TARG)+TPDQ(TARG)/FLOAT(LAPS(TARG))               001160
00673    293*          TPDQ(TARG)=0.0                                                   001166
00674    294*          LAPS(TARG)=0                                                     001167
00675    295*       1230 CONTINUE                                                       001173
00677    296*       1231 LASTPS=LPSC                                                    001173
00700    297*        124 CONTINUE                                                      001175
00701    298*          RMASS=SUBWAM/PI                                                  001175
00702    299*          IKLOUD=1                                                         001177
00702    300*     C                                                                     001177
00703    301*          IF( NLAMNA .LT. 0 )  GO TO 9995                                  001201
00705    302*          IF( LPSC .GT. IBC ) GO TO 9996                                   001204
00707    303*        125 CONTINUE                                                       001211
00707    304*     C                                                                     001211
```

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00710    305*        130 READ(IPDQ)                                                    001211
00710    306*            1 (LAMHLD(LK),BOTCOR(1,LK),BOTCOR(2,LK),TOPCOR(1,LK),         001211
00710    307*            2 TOPCOR(2,LK),(ALTHLD(LJ,LK),RADHLD(LJ,LK),LJ=1,NLAMNA),     001211
00710    308*            3  LK=1,KTIM)                                                 001211
00727    309*             IF( LPSC .LT. ISTART ) GO TO 123                             001251
00731    310*             IF(  LPSC .GT. ISTOP ) GO TO 9995                            001255
00731    311*      C      IF THIS POINT IS REACHED THE PARTICLE SIZE CLASS IS IN RANGE  001255
00731    312*      C      FOR FURTHER CONSIDERATION                                    001255
00733    313*             IF(LAMHLD(1) .LT. 0)  IKLOUD=2                               001261
00733    314*      C                                                                   001261
00733    315*      C      CALCULATE TRANSPORT COEFFICIENTS IF POST STABILIZATION TIME(S) ARE  001261
00733    316*      C      REQUESTED AND THIS HAS NOT BEEN DONE FOR THIS PARTICLE SIZE CLASS.  001261
00733    317*      C      ALSO STABILIZE THE WAFER IF POST STAB. TIME(S) ARE REQUESTED  001261
00735    318*             IF( .NOT. PST ) GO TO 131                                    001266
00737    319*             CALL DIVY(NLAMNA,KTIM,IKLOUD,RMASS,NPSTW,NHODO)              001270
00740    320*             IF( LPSC .EQ. LLPSC ) GO TO 131                              001300
00742    321*             LLPSC=LPSC                                                   001305
00743    322*             PSMID=PS(LPSC)                                               001306
00744    323*             CALL PRETRN(FROG,NCLDT,NZBR,JPOST,JWIND)                     001310
00745    324*        131 CONTINUE                                                      001320
00745    325*      C                                                                   001320
00745    326*      C      ENTER TARGET LOOP                                            001320
00745    327*      C                                                                   001320
00746    328*             RATL=0.0                                                     001320
00747    329*             NTIMI=0                                                      001320
00750    330*             TASL=0.0                                                     001321
00751    331*             TIMI=1                                                       001322
00752    332*             KOUNTA=1                                                     001324
00753    333*             KOUNTX=0                                                     001325
00754    334*             DO 5000 TARG=1,NTARP                                         001327
00754    335*      C      ESTABLISH TARGET COORDINATES                                 001327
00757    336*             IF(OPTION .GT. 1 )  GO TO 200                                001327
00757    337*      C      SET INDICES FOR MANY TIME CASE                               001327
00761    338*             KOUNTX=TARG                                                  001327
00762    339*             KOUNTA=TARG                                                  001327
00763    340*             TIMI=TT(TARG)                                                001400
00764    341*             GO TO 225                                                    001402
00764    342*      C      COMPUTE COORDINATE INDICES FOR OPTION 2 TARGET               001402
00765    343*        200 CONTINUE                                                      001404
00766    344*             TIMI=TT(1)                                                   001404
00767    345*             KOUNTX=KOUNTX+1                                              001405
00770    346*             IF(KOUNTX .LE. NOXS )  GO TO 225                             001410
00772    347*             KOUNTX=1                                                     001413
00773    348*             KOUNTA=KOUNTA+1                                              001415
00774    349*        225 CONTINUE                                                      001420
00774    350*      C                                                                   001420
00774    351*      C      TARGET HAS NOT BEEN PREVIOUSLY FOUND TO BE IN WAFER OF THIS PARTICLE SIZE  001420
00774    352*      C      HENCE WE NOW TEST FOR THIS INCLUSION                         001420
00775    353*             IF( .NOT.(PST .AND. TRAT(TIMI) .GT. BSTIM(MCX) )) GO TO 227  001420
00775    354*      C      EXECUTE POST STAB. TIME TRANSPORT                            001420
00777    355*             IF(KTIM.LT.MCX)  GO TO 123                                   001431
00777    356*      C      HAS THIS WAFER BEEN TRANSPORTED TO CURRENT TIME              001431
01001    357*             TAS=TRAT(TIMI)-BSTIM(MCX)                                    001433
01002    358*             IF( TAS .LE. TASL )  GO TO 2000                              001437
01004    359*             TASL=TAS                                                     001442
01005    360*             CALL PSTRAN(TAS,NPSTW,NHODO,ZBRSTZ,NCLDT,JPOST,JWIND )       001444
01005    361*      C      IS CURRENT TARGET INCLUDED IN ANY WAFER AT THIS TIME         001444
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01006    362*      2000 CONTINUE                                                          001456
01007    363*           IF( (PSTALT(NPSTW)+PSTSA(NPSTW)) .LE. ZBRSTZ)  GO TO 5000         001456
01011    364*           DO 2500 IWP=1,NPSTW                                               001472
01014    365*           GRALCH=TZ(KOUNTA).LT.(PSTALT(IWP)-PSTSA(IWP) )                    001500
01014    366*          1 .OR.   TZ(KOUNTA) .GT.(PSTALT(IWP)+PSTSA(IWP))                   001500
01015    367*           IF( GRALCH )  GO TO 2500                                          001520
01015    368*     C     THE ALTITUDE IS OK  CHECK RADIUS                                  001520
01017    369*           DRADSQ=(PSTY(IWP)-TX(KOUNTX))**2                                  001521
01017    370*          1      +(PSTY(IWP)-TY(KOUNTX))**2                                 001521
01020    371*           IF( DRADSQ .GT. PSTRAD(IWP) )  GO TO 2500                         001527
01020    372*     C     INCLUSION IS VERIFIED                                             001527
01022    373*           TPDQ(TARG)=TPDQ(TARG)+PSTRHO(IWP)                                 001532
01023    374*           LAPS(TARG)=LAPS(TARG)+1                                           001536
01024    375*           GO TO 5000                                                        001540
01025    376*      2500 CONTINUE                                                          001543
01027    377*           GO TO 5000                                                        001543
01027    378*     C     THIS IS CLOUD RISE TIME TARGET                                    001543
01030    379*       227 CONTINUE                                                        001545
01030    380*     C     IS WAFER STILL IN THE AIR AT TARGET TIME                          001545
01031    381*           IF(KTIM .LT. TIMI)  GO TO 123                                     001545
01033    382*           IF(ALTHLD(NLAMNA,TIMI).LT.ZBRSTZ) GO TO 123                       001550
01035    383*           IF(TRAT(TIMI).EQ. 0.0 )  GO TO 250                                001560
01037    384*           IF((TIMI.EQ.NTIMI).AND.(RATL.EQ.TRAT(TIMI))) GO TO 249            001562
01041    385*           RATL=TRAT(TIMI)                                                   001576
01042    386*           NTIMI=TIMI                                                        001601
01042    387*     C                                                                       001601
01042    388*     C     FIND MID TIME INTERVAL WAFER DATA BY CALCULATION                  001601
01042    389*     C                                                                       001601
01043    390*           GO TO (230,240),IKLOUD                                            001603
01044    391*       230 LAMHLD(MID)=LAMHLD(NTIMI)                                       001613
01045    392*           DO 235 MIDI=1,NLAMNA                                              001615
01050    393*           ALTHLD(MIDI,MID)=ALTHLD(MIDI,TIMI)+RATL*                          001633
01050    394*          1                (ALTHLD(MIDI,TIMI+1)-ALTHLD(MIDI,TIMI))          001633
01051    395*           RADHLD(MIDI,MID)=RADHLD(MIDI,TIMI)+RATL*                          001637
01051    396*          1                (RADHLD(MIDI,TIMI+1)-RADHLD(MIDI,TIMI))          001637
01052    397*           IF( NHODO.EQ. 0 )  GO TO 235                                      001644
01054    398*           BOTCOR(1,MID)=BOTCOR(1,TIMI)+RATL*                                001646
01054    399*          1                (BOTCOR(1,TIMI+1)-BOTCOR(1,TIMI))                001646
01055    400*           BOTCOR(2,MID)=BOTCOR(2,TIMI)+RATL*                                001653
01055    401*          1                (BOTCOR(2,TIMI+1)-BOTCOR(2,TIMI))                001653
01056    402*           TOPCOR(1,MID)=TOPCOR(1,TIMI)+RATL*                                001660
01056    403*          1                (TOPCOR(1,TIMI+1)-TOPCOR(1,TIMI))                001660
01057    404*           TOPCOR(2,MID)=TOPCOR(2,TIMI)+RATL*                                001665
01057    405*          1                (TOPCOR(2,TIMI+1)-TOPCOR(2,TIMI))                001665
01060    406*       235 CONTINUE                                                          001675
01062    407*           GO TO 249                                                         001675
01063    408*       240 CONTINUE                                                          001677
01064    409*           ALTHLD(1,MID)=ALTHLD(1,TIMI)+RATL*                                001677
01064    410*          1                (ALTHLD(1,TIMI+1)-ALTHLD(1,TIMI))                001677
01065    411*           ALTHLD(2,MID)=ALTHLD(2,TIMI)+RATL*                                001705
01065    412*          1                (ALTHLD(2,TIMI+1)-ALTHLD(2,TIMI))                001705
01066    413*           RADHLD(1,MID)=RADHLD(1,TIMI)+RATL*                                001713
01066    414*          1                (RADHLD(1,TIMI+1)-RADHLD(1,TIMI))                001713
01067    415*           IF(NHODO.EQ. 0 )  GO TO 249                                       001717
01071    416*           BOTCOR(1,MID)=BOTCOR(1,TIMI)+RATL*                                001721
01071    417*          1                (BOTCOR(1,TIMI+1)-BOTCOR(1,TIMI))                001721
01072    418*           BOTCOR(2,MID)=BOTCOR(2,TIMI)+RATL*                                001730
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01072   419*          1                (BOTCOR(2,TIMI+1)-BOTCOR(2,TIMI))                    001736
01073   420*        249 TIMI=MID                                                             001736
01074   421*        250 CONTINUE                                                             001740
01075   422*            GO TO( 140,4995), IKLOUD                                             001740
01075   423*      C                                                                          001740
01075   424*      C     FIRST TEST IF TARGET IS IN GROSS ALTITUDE RANGE                      001740
01075   425*      C                                                                          001740
01075   426*      C                                                                          001740
01076   427*        140 CONTINUE                                                             001747
01077   428*            GRALCH=TZ(KOUNTA) .LT. ALTHLD(1,TIMI)                              001747
01077   429*           1  .OR.                                                              001747
01077   430*           2       TZ(KOUNTA) .GT. ALTHLD(NLAMNA,TIMI)                         001747
01100   431*            IF( GR AL CH ) GO TO 5000                                         001772
01100   432*      C                                                                          001772
01100   433*      C     TARGET HAS BEEN ACCEPTED FOR REFINEMENT OF RANGE                     001772
01100   434*      C     DETERMINE BETWEEN WHICH TWO LAMINA THE TARGET ALTITUDE FALLS         001772
01100   435*      C     THEN COMPUTE RADIUS OF WAFER AT THAT ALTITUDE AND CENTER OF          001772
01100   436*      C     LAMINA AT THAT ALTITUDE                                              001772
01102   437*            DO 300 LAMNA=2,NLAMNA                                              002001
01105   438*            IF( TZ(KOUNTA) .GT. ALTHLD(LAMNA,TIMI)) GO TO 300                  002001
01105   439*      C                                                                          002001
01105   440*      C                                                                          002001
01107   441*            LAMNAX=LAMNA-1                                                     002005
01110   442*            GO TO 305                                                          002010
01111   443*        300 CONTINUE                                                           002015
01113   444*        305 CONTINUE                                                           002015
01113   445*      C                                                                          002015
01113   446*      C     IS TARGET ALTITUDE ABOVE CLOUD BOTTOM ALTITUDE                       002015
01113   447*      C     IF YES SIMPLY GO RETRIEVE RADIUS AND COORDINATES OF CENTER           002015
01113   448*      C                                                                          002015
01114   449*            IF( LAMNAX .GE. LAMHLD(TIMI) )  GO TO 375                          002021
01114   450*      C                                                                          002021
01114   451*      C     CALCULATE RADIUS OF STRUCTURED WAFER AT ALTITUDE TZ WHERE TARGET     002021
01114   452*      C     IS BELOW CLOUD BOTTOM                                                002021
01114   453*      C                                                                          002021
01116   454*            RATIOA=(TZ(KOUNTA)-ALTHLD(LAMNAX,TIMI))/                           002025
01116   455*           1       (ALTHLD(LAMNAX+1,TIMI)-ALTHLD(LAMNAX,TIMI))                 002025
01116   456*      C                                                                          002025
01117   457*            RADIUX=RADHLD(LAMNAX,TIMI)+(RADHLD(LAMNAX+1,TIMI)-                 002036
01117   458*           1   RADHLD(LAMNAX,TIMI))*RATIOA                                     002036
01120   459*            RADXSQ=RADIUX*RADIUX                                               002047
01120   460*      C                                                                          002047
01120   461*      C                                                                          002047
01120   462*      C     NOW THAT WE HAVE RADIUS CALCULATE COORDINATES OF CENTER OF LAMINA    002047
01120   463*      C     AT SAME ALTITUDE                                                     002047
01120   464*      C                                                                          002047
01121   465*            XATALT=(TOPCOR(1,TIMI)-BOTCOR(1,TIMI))*RATIOA+BOTCOR(1,TIMI)       002045
01122   466*            YATALT= (TOPCOR(2,TIMI)-BOTCOR(2,TIMI))*RATIOA+BOTCOR(2,TIMI)      002057
01122   467*      C                                                                          002057
01122   468*      C     NOW SEE IF TARGET IS LOCATED AT A DISTANCE LESS THAN RADIUX          002057
01122   469*      C     FROM CENTER OF CIRCLE WITH COORDINATES (XATALT,YATALT)               002057
01122   470*      C                                                                          002057
01123   471*            TDSQU=(XATALT-TX(KOUNTX))**2+(YATALT-TY(KOUNTX))**2                002061
01123   472*      C                                                                          002061
01124   473*            IF( RADX SQ .LE. TD SQU )  GO TO 5000                              002065
01124   474*      C                                                                          002065
01124   475*      C     TARGET IS IN WAFER SO CALCULATE DENSITY AND SUM                      002065
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01124   476*      C                                                                  002065
01126   477*        370 CONTINUE                                                     002071
01127   478*            H=ALTHLD(NLAMNA,TIMI)-ALTHLD(1,TIMI)                         002075
01130   479*        372 CONTINUE                                                     002101
01131   480*            TPDQ(TARG)=TPDQ(TARG)+RMASS/(H*RADX SQ)                      002101
01132   481*            LAPS(TARG)=LAPS(TARG)+1                                      002106
01133   482*            GO TO 5000                                                   002111
01134   483*        375 CONTINUE                                                     002111
01134   484*      C     TARGET IS IN CLOUD ALTITUDE RANGE                            002111
01134   485*      C     PERFORM APPROPRIATE TESTS                                    002111
01134   486*      C                                                                  002111
01135   487*            TDSQU=(TOPCOR(1,TIMI)-TX(KOUNTX))**2+(TOPCOR(2,TIMI)-TY(KOUNTX 002124
01135   488*           1  ))**2                                                     002124
01136   489*            RADXSQ=RADHLD(NLAMNA,TIMI)**2                              002130
01137   490*        380 IF( TD SQU .GT. RADX SQ )  GO TO 5000                      002133
01137   491*      C                                                                  002133
01137   492*      C     TARGET IS IN CLOUD                                           002133
01137   493*      C     CALCULATE DENSITY                                            002133
01141   494*            GO TO 370                                                  002136
01141   495*      C                                                                  002136
01141   496*      C                                                                  002136
01141   497*      C                                                                  002136
01142   498*       400 CONTINUE                                                     002140
01143   499*       4995 CONTINUE                                                    002140
01144   500*            GRALCH=TZ(KOUNTA) .LT. ALTHLD(1,TIMI) .OR.                 002151
01144   501*           1       TZ(KOUNTA).GT.ALTHLD(2,TIMI)                        002151
01145   502*            IF( GR AL CH )  GO TO 5000                                 002167
01147   503*            TDSQU=(BOTCOR(1,TIMI)-TX(KOUNTX))**2+                      002170
01147   504*           1      (BOTCOR(2,TIMI)-TY(KOUNTX))**2                       002170
01150   505*            RADXSQ=RADHLD(1,TIMI)**2                                   002174
01151   506*            H=ALTHLD(2,TIMI)-ALTHLD(1,TIMI)                            002177
01152   507*            IF( TDSQU .LE. RADXSQ )  GO TO 372                         002202
01152   508*      C                                                                  002202
01152   509*      C                                                                  002202
01154   510*       5000 CONTINUE                                                    002210
01154   511*      C     5000 IS END OF TARGET LOOP                                   002210
01156   512*            GO TO 123                                                  002210
01157   513*       9995 CONTINUE                                                    002212
01160   514*            GO BACK= .NOT. GO BACK                                     002212
01160   515*      C                                                                  002212
01161   516*       9996 CONTINUE                                                    002214
01161   517*      C     PRINT PDQS FOR EACH TARGET FOR THIS COMBIN(ATION) OF         002214
01161   518*      C     PARTICLE SIZE CLASSES                                        002214
01162   519*            WRITE(ISOUT,8006)   DIAM(IBP),DIAM(IBCM)                   002214
01166   520*            DO 1979 ITPM=1,NTARP                                       002233
01171   521*       1979 BPDQ(ITPM)=BPDQ(ITPM)*1.0E+5                               002233
01173   522*            GO TO ( 900,999),OPTION                                    002236
01174   523*        900 CONTINUE                                                   002246
01175   524*            WRITE(ISOUT,8007)(ITG,BPDQ(ITG),ITG=1,NTARP)               002246
01204   525*             GO TO 9999                                                002264
01205   526*        999 CONTINUE                                                   002266
01206   527*             CALL NOMARG                                               002266
01207   528*            JLAST=(NSTRIP-1)*15+1                                      002267
01210   529*            DO 1984 JSTRIP=1,JLAST,15                                  002277
01213   530*            WRITE(ISOUT,80070)                                         002306
01215   531*            JLAI=JSTRIP+NOXS*(NOYS-1)                                  002317
01216   532*            DO 1980 IPRINT=JSTRIP,JLAI,NOXS                            002316
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01221    533*            IP14=IPRINT+14                                                  002324
01222    534*            WRITE(ISOUT,8010)(BPDO(JNUM),JNUM=IPRINT,IP14)                  002327
01230    535*       .9811 CONTINUE                                                       00235n
01232    536*        1984 CONTINUE                                                       00235n
01234    537*             CALL STMARG                                                    00235n
01235    538*        9999 CONTINUE                                                       00235n
01235    539*       C                                                                    00235n
01235    540*       C                                                                    00235n
01235    541*       C     SHOULD WE RETURN TO START ANOTHER PARTICLE SIZE COMBINATION    00235n
01236    542*             IF( GO BACK )  GO TO 119                                       00235n
01240    543*             GO BACK= .NOT. GO BACK                                         00235n
01241    544*             GO TO 16                                                       00235n
01242    545*             END                                                            00236n
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@:FOR,S  CASSANDRA.PRETRN,R
FOR SOE3-06/11/78-10:16:04 (1,)


   SUBROUTINE PRETRN    ENTRY POINT 000503

   STORAGE USED: CODE(1) 000530; DATA(0) 000100; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   ATMO    001010
    0004   PSTT    002426
    0005   WINDS   001130

   EXTERNAL REFERENCES (BLOCK, NAME)

    0006   ALOG10
    0007   XPRR
    0010   ALOG
    0011   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000037 100L      0001   000067 105L      0001   000122 106L      0001   000252 108L      0001   000331 110L
    0001   000132 137G      0001   000166 200L      0001   000217 205L      0001   000441 236G      0001   000417 999L
    0000 R 000014 A         0004 R 001010 ALT       0000 R 000016 AOB       0000 R 000015 B         0000 R 000004 CD
    0000 R 000007 DEZV      0004 R 001415 DX        0004 R 002021 DY        0003 R 000000 ETA       0000 R 000024 FALV
    0004 R 000404 FV        0000 R 000005 FVLAST    0000 R 000017 FV1       0000 R 000025 FV2       0000 R 000021 H1
    0000 R 000020 H2        0000 I 000012 I         0000   000045 INJP$     0000 I 000013 IX        0000 I 000001 JCUR
    0000 I 000000 JLAST     0000 I 000026 JPP       0000 I 000027 KX        0000 I 000030 KXE       0004   001414 NTOP
    0004 R 002425 PSMID     0000 R 000006 Q         0003 R 000404 RHO       0004 R 000000 T         0005 R 000310 VX
    0000 R 000010 VXLAST    0000 R 000022 VXNEXT    0005 R 000620 VY        0000 R 000011 VYLAST    0000 R 000023 VYNEXT
    0000 R 000002 V0        0000 R 000003 V1        0005 R 000000 ZV

00101      1*           SUBROUTINE PRETRN(FROG,NCLDT,NZBR,JPOST,JWIND)                                    000004
00103      2*           COMMON/ATMO/                                                                      000004
00103      3*          1             ETA(260),RHO(260)                                                  000004
00104      4*           COMMON/PSTT/                                                                      000004
00104      5*          1T(260),FV(260),ALT(260),NTOP,DX(260),DY(260),PSMID                                000004
00105      6*           COMMON/WINDS/                                                                     000004
00105      7*          1  ZV(200),VX(200),VY(200)                                                         000004
00106      8*           JLAST=JWIND                                                                       000004
00107      9*           JCUR=JWIND-1                                                                      000006
00107     10*     C     CALCULATE FALL VELOCITY FOR PARTICLE WITH SIZE PSMID AT TOP ALTITUDE               000006
00110     11*           V0=PSMID/ETA(NCLDT)                                                               000010
00111     12*           V1=PSMID*V0*FROG                                                                  000013
00112     13*           CD=V1*V0*RHO(NCLDT)                                                               000016
00113     14*           IF(CD.GT. 140.0 )  GO TO 100                                                      000021
00115     15*           FVLAST=V1*(41666.7+CD*(-2.3363E+2+CD*(2.0154-6.9105E-3*CD)))                      000024
00116     16*           GO TO 105                                                                         000035
00117     17*       100 CONTINUE                                                                          000037
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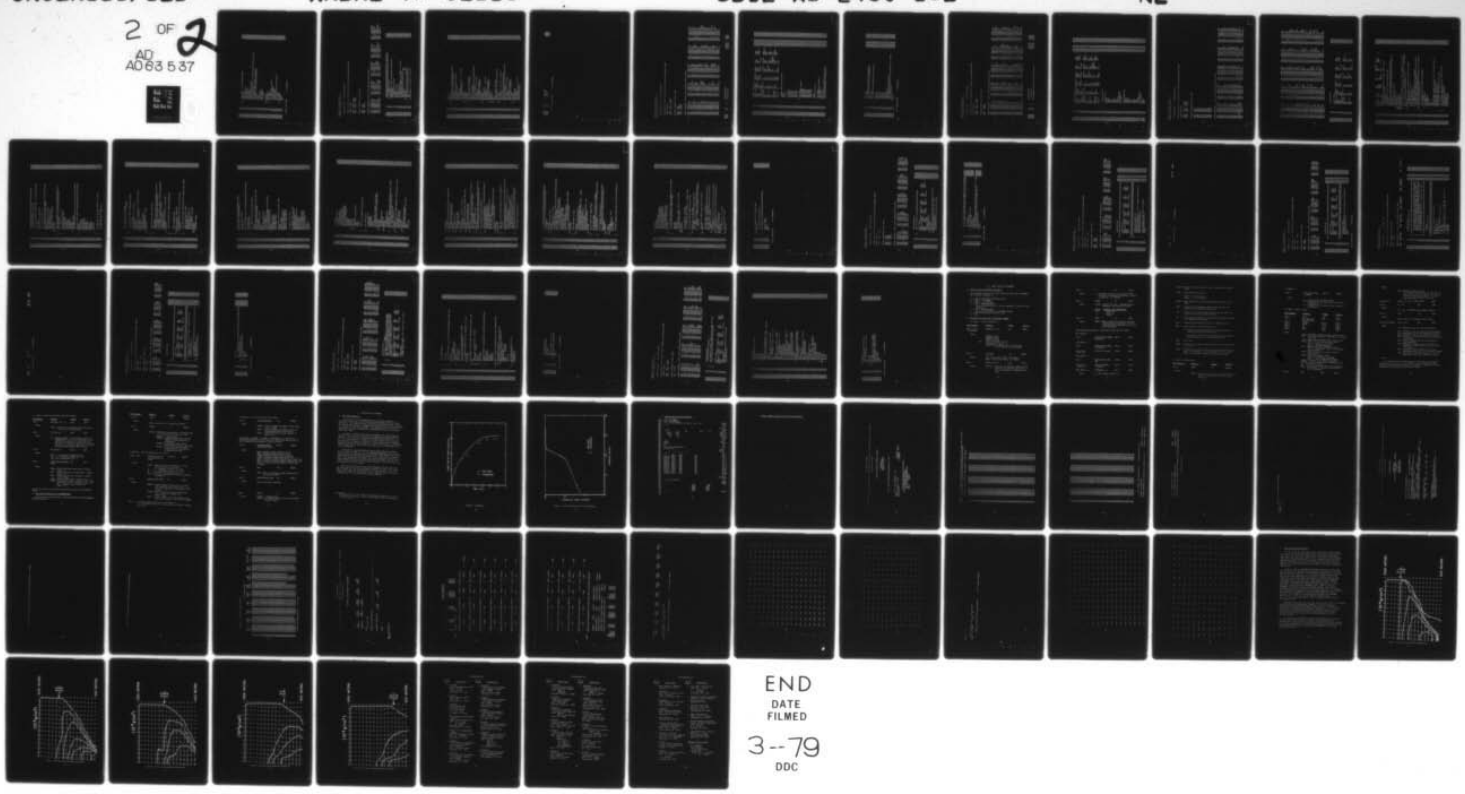
00120    19*          Q=ALOG10(CD)-20.773                                                    000037
00121    19*          FVLAST=50657.0*V1*CD**((Q*Q-443.98)*0.0011235)                         000047
00122    20*          FVLAST=FVLAST*(1.0+0.233/(PSMID*RHO(NCLDT)))                           000057
00123    21*        105 CONTINUE                                                             000067
00124    22*          FV(1)=FVLAST                                                           000067
00124    23*    C      NOW CALCULATE THE REST                                               000067
00125    24*          T(1)=0.0                                                               000070
00126    25*          IF(JWIND .LE. 0  )  GO TO 106                                          000071
00130    26*          DX(1)=0.0                                                              000074
00131    27*          DY(1)=0.0                                                              000075
00132    29*          DEZV=ZV(JLAST)-ZV(JCUR)                                                000076
00133    29*          VXLAST=VX(JLAST)+(VX(JCUR)-VX(JLAST))/DEZV*(ZV(JLAST)-ALT(NCLDT))      000107
00134    30*          VYLAST=VY(JLAST)+(VY(JCUR)-VY(JLAST))/DEZV*(ZV(JLAST)-ALT(NCLDT))      000117
00135    31*        106 CONTINUE                                                             000127
00136    32*          DO 1000 I=2,JPOST                                                      000127
00136    33*    C     FIND ALTITUDE INDEX CORRESPONDING TO I-TH ENTRY                       000127
00141    34*          IX=NCLDT-I+1                                                           000137
00141    35*    C                                                                           000137
00141    36*    C     CALCULATE FALL RATE AT THIS ALTITUDE                                  000137
00142    37*          V0=PSMID/ETA(IX)                                                       000136
00143    38*          V1=PSMID*V0*FROG                                                       000147
00144    39*          CD=V1*V0*RHO(IX)                                                       000147
00145    40*          IF( CD .GT.  140.0 )  GO TO 200                                        000157
00147    41*          FV(I)=V1*(41666.7+CD*(-2.3363E+2+CD*(2.0154-6.9105E-3*CD)))            000157
00150    42*          GO TO 205                                                              000167
00151    43*        200 CONTINUE                                                             000167
00152    44*          Q=ALOG10(CD)-20.773                                                    000167
00153    45*          FV(I)=50657.0*V1*CD**((Q*Q-443.98)*0.0011235)                          000177
00154    46*          FV(I)=FV(I)*(1.0+0.233/(PSMID*RHO(IX)))                                000207
00155    47*        205 CONTINUE                                                             000217
00155    48*    C     NOW CALCULATE TIME OF FALL FROM ALT(IX+1) TO THIS ALTITUDE            000217
00156    49*          A=ALT(IX+1)-ALT(IX)                                                    000217
00157    50*          B=FVLAST-FV(I)                                                         000227
00160    51*          AOB=A/B                                                                000227
00161    52*          T(I)=AOB*ALOG(FVLAST/FV(I))                                            000227
00161    53*    C     IF NEEDED CALCULATE HORIZONTAL TRANSPORT                              000227
00162    54*          IF( JWIND .LE. 0  )  GO TO 999                                         000237
00162    55*    C     CALCULATE HORIZONTAL TRANSPORT FOR ALT(IX) TO ALT(IX+1)               000237
00164    56*          DX(I)=0.0                                                              000241
00165    57*          DY(I)=0.0                                                              000247
00166    58*          FV1=FV(I-1)                                                            000247
00167    59*          H2=ALT(IX)                                                             000247
00170    60*          H1=ALT(IX+1)                                                           000247
00170    61*    C      HOW FAR CAN WE INTEGRATE IN THIS STEP                                000247
00171    62*        10A IF(  H2 .LT.  ZV(JCUR) )  GO TO 110                                 000257
00171    63*    C     WE CAN FINISH IN THIS STEP                                            000257
00171    64*    C     CALCULATE WIND VELOCITIES AT ALTITUDE H2                              000257
00173    65*          VXNEXT=VX(JLAST)+(VX(JCUR)-VX(JLAST))/DEZV*(ZV(JLAST)-H2)              000256
00174    66*          VYNEXT=VY(JLAST)+(VY(JCUR)-VY(JLAST))/DEZV*(ZV(JLAST)-H2)              000270
00175    67*          FALV=(FV1+FV(I))/2.0                                                   000276
00176    68*          DX(I)=DX(I)+(VXLAST+VXNEXT)*(H1-H2)/FALV                               000307
00177    69*          DY(I)=DY(I)+(VYLAST+VYNEXT)*(H1-H2)/FALV                               000317
00200    70*          DX(I)=DX(I)/2.0                                                        000317
00201    71*          DY(I)=DY(I)/2.0                                                        000327
00202    72*          VXLAST=VXNEXT                                                          000327
00203    73*          VYLAST=VYNEXT                                                          000327
00204    74*          GO TO 999                                                              000337
```

AD-A063 537 ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND ABERD--ETC F/G 18/3
USER'S MANUAL FOR CASSANDRA: CLOUD SNAPSHOTS OF DUST RAISED ALO--ETC(U)
NOV 78 R L SHOWERS, C CRISCO

UNCLASSIFIED ARBRL-TR-02116 SBIE-AD-E430 152 NL

2 OF 2
AD
AD A063 537



END
DATE FILMED
3--79
DDC

```
00204     75*     C
00204     76*     C      WIND CHANGES IN THIS ALTITUDE RANGE                                                    000327
00205     77*       110 CONTINUE                                                                                 000331
00206     78*           H2=ZV(JCUR)                                                                              000331
00207     79*           VXNEXT=VX(JCUR)                                                                          000335
00210     80*           VYNEXT=VY(JCUR)                                                                          000335
00211     81*           JLAST=JLAST-1                                                                            000337
00212     82*           JCUR=JLAST-1                                                                             000342
00213     83*           DELZV=ZV(JLAST)-ZV(JCUR)                                                                 000344
00214     84*           FV2=FV(I-1)+(FV(I)-FV(I-1))*(ALT(IX+1)-H2)/(ALT(IX+1)-ALT(IX))                           000351
00215     85*           FALV=(FV1+FV2)/2.0                                                                       000367
00216     86*           DX(I)=DX(I)+(VXLAST+VXNEXT)*(H1-H2)/FALV                                                 000366
00217     87*           DY(I)=DY(I)+(VYLAST+VYNEXT)*(H1-H2)/FALV                                                 000376
00220     88*           FV1=FV2                                                                                  000407
00221     89*           H1=H2                                                                                    000405
00222     90*           H2=ALT(IX)                                                                               000407
00223     91*           VXLAST=VXNEXT                                                                            000411
00224     92*           VYLAST=VYNEXT                                                                            000415
00225     93*           GO TO 108                                                                                000415
00225     94*     C                                                                                              000415
00226     95*       999 CONTINUE                                                                                 000417
00227     96*           FVLAST=FV(I)                                                                             000417
00230     97*      1000 CONTINUE                                                                                 000423
00232     98*           JPP=JPOST+1                                                                              000423
00233     99*           IF( JPP.GT. 260 )  RETURN                                                                000425
00235    100*           DO 1500 KX=JPP,260                                                                       000434
00240    101*           FV(KX)=FV(JPOST)                                                                         000441
00241    102*           KXE=NCLDT-KX+1                                                                           000443
00242    103*           T(KX)=(ALT(KXE+1)-ALT(KX))/FV(KX)                                                        000457
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Q:FOR,S  CASS/NORA,PSTR/R
FOR S0E3-06/11/76-10:16:09 (*,)

   SUBROUTINE PSTRAN    ENTRY POINT 000335

   STORAGE USED: CODE(1) 000357; DATA(0) 000041; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   PSTWFR 000074
    0004   PSTT   002426
    0005   WINDS  001130

   EXTERNAL REFERENCES (BLOCK, NAME)

    0006   ALOG
    0007   EXP
    0010   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000053 100L      0001   000022 110G      0001   000116 150L      0001   000121 160L      0001   000201 200L
    0001   000316 200DL     0001   000204 210L      0001   000224 225L      0001   000160 250L      0001   000275 300L
    0001   000040 4AL       0001   000042 50L       0004 R 001010 ALT       0000 R 000005 C         0000 R 000006 DA
    0000 R 000007 DATC      0000 R 000011 DT        0004 R 001415 DX        0004 R 002021 DY        0004 R 000404 FV
    0000 R 000010 FVA       0000 I 000001 I         0000   000015 INJP$     0000 I 000003 K         0000 I 000004 L
    0000 I 000000 NM        0004   001414 NTOP      0004   002425 PSMID     0003 R 000000 PSTALT    0003   000012 PSTRAD
    0003   000036 PSTRHO    0003 R 000024 PSTSA     0003 R 000050 PSTX      0003 R 000062 PSTY      0004 R 000000 T
    0000 R 000012 TERAC     0000 R 000002 TSUM      0005   000310 VX        0005   000620 VY        0005   000000 ZV


00101      1*           SUBROUTINE PSTRAN(TAS,NPSTW,NHODO,ZBRSTZ,NCLDT,JPOST,JWIND )                    000000
00103      2*           COMMON/PSTWFR/ PSTALT(10),PSTRAD(10),PSTSA(10),PSTRHO(10),                      000000
00103      3*          1       PSTX(10),PSTY(10)                                                        000000
00104      4*           COMMON/PSTT/                                                                    000000
00104      5*          1T(260),FV(260),ALT(260),NTOP,DX(260),DY(260),PSMID                              000000
00105      6*           COMMON/WINDS/                                                                   000000
00105      7*          1  ZV(200),VX(200),VY(200)                                                       000000
00106      8*           NM=NCLDT-1                                                                      000000
00107      9*           DO 2000 I=1,NPSTW                                                               000006
00112     10*           TSUM=0.0                                                                        000029
00112     11*      C    IS WAFER ABOVE SZ                                                               000029
00113     12*           IF( (PSTALT(I)+PSTSA(I)).LT. ZBRSTZ)  GO TO 2000                                000029
00115     13*           IF(PSTALT(I).GT. ZBRSTZ)  GO TO 48                                              000027
00117     14*           PSTALT(I)=PSTALT(I)-FV(JPOST)*TAS                                               000037
00120     15*           GO TO 2000                                                                      000036
00121     16*         48 CONTINUE                                                                       000040
00121     17*      C    FIND TIME TO NEXT ALTITUDE INTERFACE                                            000040
00121     18*      C    FIRST FIND ALT JUST BELOW WAFER ALTITUDE                                        000040
00122     19*           K=NM                                                                            000040
00123     20*         50 IF( PSTALT(I) .GT. ALT(K) )  GO TO 100                                         000042
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00125    21*            K=K-1                                                  000046
00126    22*            GO TO 50                                               000051
00127    23*          100 CONTINUE                                             000057
00127    24*      C       FIND TRANSPORT TIME FROM PSTALT(I) TO ALT(K)         000057
00127    25*      C       FIRST FIND FALL VELOCITY AT PSTALT(I)                000057
00130    26*              L=NCLDT-K+1                                          000053
00131    27*              C=(FV(L-1)-FV(L))/(ALT(K+1)-ALT(K))                  000060
00132    28*              DA=PSTALT(I)-ALT(K)                                  000066
00133    29*              DATC=DA*C                                            000071
00134    30*              FVA=FV(L)+DATC                                       000077
00135    31*              IF( ABS(DATC/FVA).LE.  .001 )  GO TO 150             000075
00137    32*              DT=1.0/C*ALOG(FVA/FV(L))                             000103
00140    33*               GO TO 160                                           000114
00141    34*          150  CONTINUE                                           000116
00142    35*              DT=DA/FVA                                            000116
00143    36*          160  CONTINUE                                           000121
00144    37*              IF( DT .LT. TAS )  GO TO 250                         000121
00144    38*      C       FINAL ALTITUDE IS IN THIS LAYER                      000121
00146    39*              DT=TAS                                               000125
00146    40*      C       FIND FINAL ALTITUDE                                  000125
00147    41*              PSTALT(I)=PSTALT(I)-FVA/C*(1.0-EXP(-(C*DT)))         000127
00147    42*      C       SHIFT X,Y IF NEEDED                                  000127
00150    43*              IF( NHODO .LE. 0 )  GO TO 2000                       000142
00152    44*              TFRAC=DT/T(L)                                        000144
00153    45*              PSTX(I)=PSTX(I)+TFRAC*DX(L)                          000147
00154    46*              PSTY(I)=PSTY(I)+TFRAC*DY(L)                          000152
00155    47*              GO TO 2000                                           000156
00156    48*          250 CONTINUE                                             000160
00157    49*              PSTALT(I)=ALT(K)                                     000161
00160    50*              IF( NHODO .LE. 0  )  GO TO 200                       000163
00162    51*              TFRAC=DT/T(L)                                        000166
00163    52*              PSTX(I)=PSTX(I)+TFRAC*DX(L)                          000171
00164    53*              PSTY(I)=PSTY(I)+TFRAC*DY(L)                          000174
00165    54*          200 CONTINUE                                             000201
00166    55*              TSUM=TSUM+DT                                         000201
00167    56*          210 K=K-1                                                000204
00170    57*              L=L+1                                                000206
00171    58*              IF(L.LE.JPOST)  GO TO 225                            000211
00173    59*              PSTALT(I)=PSTALT(I)-FV(JPOST)*(TAS-TSUM)             000214
00174    60*              GO TO 2000                                           000222
00175    61*          225 CONTINUE                                             000224
00176    62*              IF( (TSUM+T(L)) .LE. TAS )  GO TO 300                000226
00200    63*              DT=TAS-TSUM                                          000232
00201    64*              C=(FV(L-1)-FV(L))/(ALT(K+1)-ALT(K))                  000235
00202    65*              PSTALT(I)=PSTALT(I)-FV(L-1)/C*(1.0-EXP(-(C*DT)))     000247
00202    66*      C       SHIFT X,Y IF NEEDED                                  000247
00203    67*              IF( NHODO .LE. 0 )  GO TO 2000                       000256
00205    68*              TFRAC=DT/T(L)                                        000261
00206    69*              PSTX(I)=PSTX(I)+TFRAC*DX(L)                          000264
00207    70*              PSTY(I)=PSTY(I)+TFRAC*DY(L)                          000267
00210    71*              GO TO 2000                                           000277
00211    72*          300 CONTINUE                                             000277
00212    73*              PSTALT(I)=ALT(K)                                     000276
00213    74*              TSUM=TSUM+T(L)                                       000300
00214    75*              IF( NHODO .LE. 0  )  GO TO 210                       000307
00216    76*              PSTX(I)=PSTX(I)+DX(L)                                000306
00217    77*              PSTY(I)=PSTY(I)+DY(L)                                000311
```

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00220     78*           GO TO 210                                    000314
00221     79*     C000  CONTINUE                                     000315
00223     80*           RETURN                                       000316
00224     81*           END                                          000356

 END OF COMPILATION:        NO  DIAGNOSTICS.
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Q:FOR>S CASSANDRA.RKGL>R
FOR S0E3-0E/11/76-10:16:13 (1,)

   SUBROUTINE RKGILL    ENTRY POINT 000266

   STORAGE USED: CODE(1) 000277; DATA(0) 000073; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   DERIV
    0006   TRPL
    0007   NERR2$
    0010   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000066 1L        0001   000165 10L       0001   000073 1376      0001   000110 14,G      0001   00,13  1556
    0001   000154 164G      0001   000025 20L       0001   000103 3L        0001   000250 30L       0001   000125 5L
    0001   000147 7L        0004 R 000000 ALT       0004   000404 ATP       0004 R 001010 B0        0003   000000 CAY
    0004   001011 CG        0004   001321 CHANGE    0004   001322 CMLR      0004   001323 CX        0004   003127 C2
    0004   003130 C3        0004   003131 C6        0004 R 003132 DEK       0003   000001 DETID     0003   000015 DIAM
    0003   000326 DMEAN     0004   003133 DNID      0003   000327 DNS       0004 R 003147 DRM       0004 R 003150 DS
    0004 R 003151 DST       0004   003152 DST0      0004   003153 DST1      0004   003154 DST2      0004 R 003155 DT
    0004 R 003156 DU        0000 R 000000 DVBL      0004 R 003157 DWT       0004 R 003160 DX        0004 R 003161 DZ
    0004   003162 ED        0004 R 003163 EK        0004   003164 EPS       0004   003165 ES        0004   003166 ETA
    0003   000330 EXPO      0004   003572 F         0003   000331 FMASS     0004   003573 FW        0004   003574 GRV
    0000 R 000030 H         0003   001170 HEIGHT    0004   004200 HLR       0004   004201 HOR       0003   000641 IDISTB
    0003   000642 IFXEC     0000   000052 INJP$     0004   004202 IPAM      0004   004203 IRAD      0003   000643 IRISE
    0003   000644 ISIN      0003   000645 ISOUT     0000 I 000032 J         0004   004204 KCLD      0004   004205 KDI
    0004   004206 KRX       0004 I 004207 KS        0004   004210 KSV       0000 I 000031 KYCL      0004   004211 MCX
    0004   004212 MWYA      0004   004213 N         0003   000646 NDSTR     0003   001172 NHODO     0004   004214 NNN
    0004 I 004215 NPVA      0004   004216 P         0000 R 000033 PDR       0004 R 004217 PRS       0003   000647 PS
    0004   004623 PW        0004   004624 QI        0004   004625 R         0004   004626 RA        0004   004627 RFD
    0004   004630 RHZ       0000 R 000020 RKG       0004 R 005234 RL        0004   005235 RLH       0004 R 005641 RM
    0004 R 005642 RZT       0004 R 005643 S         0004   005644 SAVE      0003   001157 SD        0004   005645 SLDTMP
    0004   005646 SLM       0004   006252 SMALLT    0003   001160 SSAM      0004   006253 SZRO      0004 R 006254 T
    0004   006255 TE        0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2      0004   006256 TMSD
    0003   001164 T2M       0004 R 006257 U         0003   001165 USOIL     0004 R 006260 V         0000 R 000010 VBL
    0003   001166 VDR       0003   001503 VX        0003   002013 VY        0004   006261 VZRO      0003   001167 W
    0004 R 006262 WT        0004 R 006263 X         0004   006264 XE        0004   006265 Y         0004 R 006575 Z
    0004   006576 ZBFR      0004   006577 ZBRSTZ    0004   006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV


   00101      1*          SUBROUTINE RKGILL                                          RKGIL001   000000
   00101      2*     C                                                               RKGIL002   000000
   00101      3*     C    18 AUGUST 1969                                             RKGIL003   000000
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00103     4*          COMMON /SET1/                                                                  RKGIL004  00000n
00103     5*         1CAY        ,DETID(12) ,DTAM(201) ,DMEAN     ,DNS       ,EXPO      ,RKGIL005  00000n
00103     6*         2EMASS(200),INDISTR    ,IEXEC     ,IRTSE     ,ISIN      ,ISOUT     ,RKGIL006  00000n
00103     7*         3NDSTP      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,RKGIL007  00000n
00103     8*         4TMP2       ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,RKGIL008  00000n
00103     9*         5ZSCL       ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)               RKGIL009  00000n
00104    10*          COMMON /CLOUD/                                                                 RKGIL010  00000n
00104    11*         1ALT(260)   ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,RKGIL011  00000n
00104    12*         2CX(10,90)  ,C2        ,C3        ,C6        ,DEK       ,DNID(12)  ,RKGIL012  00000n
00104    13*         3DRM        ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,RKGIL013  00000n
00104    14*         4DT         ,DU        ,DWT       ,DX        ,DZ        ,FD        ,RKGIL014  00000n
00104    15*         5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,RKGIL015  00000n
00104    16*         6GRV(260)   ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD      ,RKGIL016  00000n
00104    17*         7KOI        ,KRX       ,KS        ,KSV       ,MCX       ,MWYA      ,RKGIL017  00000n
00104    18*         8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,RKGIL018  00000n
00104    19*         9QI         ,R         ,RA        ,RED       ,RHZ(260)  ,RL        ,RKGIL019  00000n
00104    20*         1RLH(260)   ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,RKGIL020  00000n
00104    21*         2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TE        ,TMSD      ,RKGIL021  00000n
00104    22*         3U          ,V         ,VZRO      ,WT        ,X         ,XE        ,RKGIL022  00000n
00104    23*         4Y(200)     ,Z         ,ZBER      ,ZBRSTZ    ,ZLMT                 RKGIL023  00000n
00104    24*     C                                                                                  RKGIL024  00000n
00104    25*     C                                                                                  RKGIL025  00000n
00105    26*          DIMENSION DVBL(8),VBL(8),RKG(8)                                               RKGIL026  00000n
00106    27*          H=DST                                                                         RKGIL027  00000n
00107    28*          KS  =0                                                                        RKGIL028  000001
00110    29*          KYCL=1                                                                        RKGIL029  000002
00110    30*     C                                                                                  RKGIL030  000002
00111    31*          VBL(1)=WT                                                                     RKGIL031  000004
00112    32*          VBL(2)=RM                                                                     RKGIL032  000006
00113    33*          VBL(3)=U                                                                      RKGIL033  00001n
00114    34*          VBL(4)=X                                                                      RKGIL034  000012
00115    35*          VBL(5)=T                                                                      RKGIL035  000014
00116    36*          VBL(6)=Z                                                                      RKGIL036  000016
00117    37*          VBL(7)=EK                                                                     RKGIL037  00002n
00120    38*          VBL(8)=S                                                                      RKGIL038  000022
00120    39*     C                                                                                  RKGIL039  000022
00121    40*       20 CALL DERIV                                                                    RKGIL040  000024
00122    41*          IF(U.EQ.0.0) VBL(3)=0.                                                        RKGIL041  000026
00124    42*          DVBL(1)=DWT                                                                   RKGIL042  000031
00125    43*          DVBL(2)=DRM                                                                   RKGIL043  000033
00126    44*          DVBL(3)=DU                                                                    RKGIL044  000035
00127    45*          DVBL(4)=DX                                                                    RKGIL045  000037
00130    46*          DVBL(5)=DT                                                                    RKGIL046  000041
00131    47*          DVBL(6)=DZ                                                                    RKGIL047  000043
00132    48*          DVBL(7)=DEK                                                                   RKGIL048  000045
00133    49*          DVBL(8)=DS                                                                    RKGIL049  000047
00133    50*     C                                                                                  RKGIL050  000047
00134    51*          KS=KS+1                                                                       RKGIL051  000051
00135    52*          GO TO (1,3,5,7),KS                                                            RKGIL052  000054
00135    53*     C                                                                                  RKGIL053  000054
00136    54*        1 DO 2 J=1,8                                                                    RKGIL054  000066
00141    55*          VBL(J)=VBL(J)+0.5*H*DVBL(J)                                                   RKGIL055  000073
00142    56*        2 RKG(J)=DVBL(J)                                                                RKGIL056  000076
00144    57*          GO TO 10                                                                      RKGIL057  000101
00145    58*        3 DO 4 J=1,8                                                                    RKGIL058  000103
00150    59*          VBL(J)=VBL(J)+.29289322*H*(DVBL(J)-RKG(J))                                    RKGIL059  000110
00151    60*        4 RKG(J)=.58578644*DVBL(J)+.12132034*RKG(J)                                     RKGIL060  000114
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100

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00153     61*          GO TO 10                                                  RKGIL061   000124
00154     62*        5 DO 6 J=1,8                                                RKGIL062   000128
00157     63*          VBL(J)=VBL(J)+1.7071068*H*(DVBL(J)-RKG(J))                RKGIL063   000132
00160     64*        6 RKG(J)=3.4142356*DVBL(J)-4.1213203*RKG(J)                 RKGIL064   000136
00162     65*          GO TO 10                                                  RKGIL065   000146
00163     66*        7 DO 8 J=1,8                                                RKGIL066   000147
00166     67*        8 VBL(J)=VBL(J)+.16666667*H*(DVBL(J)-2.*RKG(J))             RKGIL067   000154
00166     68*                                                                    RKGIL068   000154
00170     69*          KYCL=2                                                    RKGIL069   000162
00171     70*       10 WT=VBL(1)                                                 RKGIL070   000166
00172     71*          RM=VBL(2)                                                 RKGIL071   000166
00173     72*          U=VBL(3)                                                  RKGIL072   000170
00174     73*          X=VBL(4)                                                  RKGIL073   000172
00175     74*          T=VBL(5)                                                  RKGIL074   000174
00176     75*          Z=VBL(6)                                                  RKGIL075   000176
00177     76*          EK=VBL(7)                                                 RKGIL076   000200
00200     77*          S=VBL(8)                                                  RKGIL077   000202
00201     78*          RZT=RL*(Z-R0)                                             RKGIL078   000204
00202     79*          CALL TRPL(Z,NPVA,ALT,PRS,PQP)                             RKGIL079   000207
00203     80*          V=2.87*T*RM*(1.+X)/PQR/(1.+X+EK+WT)*(1.0+X*29./18.)/(1.0+X)  RKGIL080   000216
00204     81*          GO TO(20,30),KYCL                                         RKGIL081   000240
00205     82*       30 RETURN                                                    RKGIL082   000250
00206     83*          END                                                       RKGIL083   000276

      END OF COMPILATION:        NO  DIAGNOSTICS.
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?:FOR,S  CASSANDRA.RSTR,R
FOR S0E3-06/11/76-10:16:19 (1,)


   SUBROUTINE RSTR      ENTRY POINT 000122


   STORAGE USED: CODE(1) 000133; DATA(0) 000360; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   CLOUD  006601


   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   NERR2$
    0006   NERR3$


   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000012 1L        0001   000040 122G      0001   000077 144G      0001   000044 3L        0001   000010 5L
    0004   000000 ALT       0004   000404 ATP       0004   001010 B0        0003   000000 CAY       0004   001011 C6
    0004   001321 CHANGE    0004   001322 CMLR      0004   001323 CX        0004   003127 C2        0004   003130 C3
    0004   003131 C6        0004   003132 DEK       0003   000001 DETID     0003   000015 DIAM      0003   000326 DMEAN
    0004   003133 DNID      0003   000327 DNS       0004   003147 DRM       0004   003150 DS        0004 R 003151 DST
    0004   003152 DST0      0004   003153 DST1      0004   003154 DST2      0004   003155 DT        0004   003156 DU
    0004   003157 DWT       0004   003160 DX        0004   003161 DZ        0004   003162 ED        0004 R 003163 EK
    0004   003164 EPS       0004   003165 ES        0004   003166 ETA       0003   000330 EXP0      0004   003572 F
    0003   000331 FMASS     0004   003573 FW        0004   003574 GRV       0003   001170 HEIGHT    0004   004200 HLR
    0004   004201 HOB       0003   000641 IDISTR    0003   000642 IEXEC     0000   000337 INJP$     0004   004202 IPAM
    0004   004203 IRAD      0003   000643 IRISE     0003   000644 ISIN      0003   000645 ISOUT     0004   004204 KCLD
    0004   004205 KDI       0004   004206 KRX       0004   004207 KS        0004 I 004210 KSV       0004   004211 MCX
    0004   004212 MWYA      0004 I 004213 N         0003 I 000646 NDSTR     0003   001172 NHODO     0004   004214 NNN
    0000 I 000334 NP        0004   004215 NPVA      0004   004216 P         0000 R 000322 PEK       0000 R 000323 PRM
    0004   004217 PRS       0000 R 000333 PRZT      0003   000647 PS        0000 R 000324 PSS       0000 R 000325 PT
    0000 R 000326 PU        0000 R 000327 PV        0004   004623 PW        0000 R 000330 PWT       0000 R 000331 PX
    0000 R 000000 PY        0000 R 000332 PZ        0004   004624 QI        0004   004625 R         0004   004626 RA
    0004   004627 RED       0004   004630 RHZ       0004   005234 RL        0004   005235 RLH       0004 R 005641 RM
    0004 R 005642 RZT       0004 R 005643 S         0004   005644 SAVE      0003   001157 SD        0004   005645 SLDTMP
    0004   005646 SLM       0004 R 006252 SMALLT    0003   001160 SSAM      0004   006253 SZRO      0004 R 006254 T
    0004   006255 TE        0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2      0004   006256 TMSD
    0003   001164 T2M       0004 R 006257 U         0003   001165 USOIL     0004 R 006260 V         0003   001166 VPR
    0003   001503 VX        0003   002013 VY        0004   006261 VZRO      0003   001167 W         0004 R 006262 WT
    0004 R 006263 X         0004   006264 XE        0004 R 006265 Y         0004 R 006575 Z         0004   006576 ZBFR
    0004   006577 ZBRSTZ    0004   006600 ZLMT      0003   001171 ZSCL      0003   001173 ZV


00101      1*          SUBROUTINE RSTR                                                    RSTR 001    000000
00101      2*     C                                                                       RSTR 002    000000
00101      3*     C    20 AUGUST 1969                                                     RSTR 003    000000
00101      4*     C                                                                       RSTR 004    000000
00101      5*     C    RSTR PRESERVES AND/OR RESTORES CRM VARIABLES                       RSTR 005    000000
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00101     6*      C                                                                                                  RSTR 006    000002
00103     7*        COMMON /SET1/                                                                                    RSTR 007    000002
00103     8*       1CAY        ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,RSTR 008    000002
00103     9*       2EMASS(200),IDISTR     ,IEXEC     ,IRISE     ,ISIN      ,TSOUT     ,RSTR 009    000002
00103    10*       3NDSTR      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,RSTR 010    000002
00103    11*       4TMP2       ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,RSTR 011    000002
00103    12*       5ZSCL       ,NH000     ,ZV(200)   ,VX(200)   ,VY(200)               RSTR 012    000002
00104    13*        COMMON /CLOUD/                                                                                   RSTR 013    000002
00104    14*       1ALT(260)   ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,RSTR 014    000002
00104    15*       2CX(10,90)  ,C2        ,C3        ,C6        ,DEK       ,DNID(10)  ,RSTR 015    000002
00104    16*       3DRM        ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,RSTR 016    000002
00104    17*       4DT         ,DU        ,DWT       ,DX        ,DZ        ,FD        ,RSTR 017    000002
00104    18*       5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,RSTR 018    000002
00104    19*       6GRV(260)   ,HLR       ,HOR       ,IPAM      ,IRAD      ,KCLD      ,RSTR 019    000002
00104    20*       7KDI        ,KRX       ,KS        ,KSV       ,MCX       ,MWVA      ,RSTR 020    000002
00104    21*       8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,RSTR 021    000002
00104    22*       9QI         ,R         ,RA        ,RED       ,RHZ(260)  ,RL        ,RSTR 022    000002
00104    23*       1RLH(260)   ,RM        ,RZT       ,S         ,SAVE      ,SLDTMP    ,RSTR 023    000002
00104    24*       2SLM(260)   ,SMALLT    ,SZRO      ,T         ,TF        ,TMSD      ,RSTR 024    000002
00104    25*       3U          ,V         ,VZRO      ,WT        ,X         ,XE        ,RSTR 025    000002
00104    26*       4Y(200)     ,Z         ,ZBFR      ,ZBRSTZ    ,ZLMT                 RSTR 026    000002
00104    27*     C                                                                                                  RSTR 027    000002
00104    28*     C                                                                                                  RSTR 028    000002
00105    29*       DIMENSION PY(210)                                                                                RSTR 029    000002
00105    30*     C                                                                                                  RSTR 030    000002
00106    31*       GO TO(1,3),KSV                                                                                   RSTR 031    000002
00107    32*     1 PEK=EK                                                                                           RSTR 032    000012
00110    33*       PRM=PRM                                                                                          RSTR 033    000014
00111    34*       PSS=S                                                                                            RSTR 034    000016
00112    35*       PT=T                                                                                             RSTR 035    000017
00113    36*       PU=U                                                                                             RSTR 036    000021
00114    37*       PV=V                                                                                             RSTR 037    000023
00115    38*       PWT=WT                                                                                           RSTR 038    000025
00116    39*       PX=X                                                                                             RSTR 039    000027
00117    40*       PZ=Z                                                                                             RSTR 040    000031
00120    41*       PRZT=RZT                                                                                         RSTR 041    000033
00121    42*       DO 2 NP=1,NDSTR                                                                                  RSTR 042    000040
00124    43*     2 PY(NP)=Y(NP)                                                                                     RSTR 043    000040
00126    44*       GO TO 5                                                                                          RSTR 044    000042
00126    45*     C                                                                                                  RSTR 045    000042
00127    46*     3 SMALLT=SMALLT-DST                                                                                RSTR 046    000044
00130    47*       DST=0.5                                                                                          RSTR 047    000046
00131    48*       EK=PEK                                                                                           RSTR 048    000050
00132    49*       RM=PRM                                                                                           RSTR 049    000052
00133    50*       S=PSS                                                                                            RSTR 050    000054
00134    51*       T=PT                                                                                             RSTR 051    000056
00135    52*       U=PU                                                                                             RSTR 052    000060
00136    53*       V=PV                                                                                             RSTR 053    000062
00137    54*       WT=PWT                                                                                           RSTR 054    000064
00140    55*       X=PX                                                                                             RSTR 055    000066
00141    56*       Z=PZ                                                                                             RSTR 056    000070
00142    57*       RZT=PRZT                                                                                         RSTR 057    000072
00143    58*       DO 4 NP=1,NDSTR                                                                                  RSTR 058    000077
00146    59*     4 Y(NP)=PY(NP)                                                                                     RSTR 059    000077
00150    60*       N=3                                                                                              RSTR 060    000101
00151    61*     5 RETURN                                                                                           RSTR 061    000104
00152    62*       END                                                                                              RSTR 062    000132
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@:FOR,S  CASSANDRA.RSXP,R
FOR S0F3-06/11/76-10:16:24 (1,)


   SUBROUTINE RSXP      ENTRY POINT 002235

   STORAGE USED: CODE(1) 002362; DATA(0) 002735; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323
    0004   CLOUD   006601
    0005   DRIFT   001453
    0006   WAFER   000423


   EXTERNAL REFERENCES (BLOCK, NAME)

    0007   WINDA
    0010   HEIT
    0011   WINDB
    0012   NRDU$
    0013   NIO3$
    0014   NIO2$
    0015   NWDU$
    0016   NIO1$
    0017   NREW$
    0020   NWBU$
    0021   XPRR
    0022   NERR2$
    0023   NWEF$
    0024   NERR3$


   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   002036 1023G     0001   002045 1032G     0001   002076 1050G     0001   002112 1060G     0001   002137 1072G
    0001   002140 1074G     0001   000245 12L       0001   000004 122G      0001   000254 14L       0001   000262 15L
    0001   000270 16L       0001   000200 17L       0001   000161 214G      0001   000207 227G      0001   000343 24L
    0001   000235 243G      0001   000351 25L       0001   000247 255G      0001   000354 26L       0001   000247 260G
    0001   000356 27L       0001   000365 29L       0000   002441 3000F     0000   002442 3001F     0000   002443 3002F
    0000   002445 3003F     0000   002447 3004F     0000   002515 3005F     0000   002575 3006F     0000   002614 3010F
    0000   002627 3011F     0000   002632 3012F     0001   000335 310G      0001   000475 32L       0001   000431 364G
    0001   000443 373G      0001   000452 401G      0001   000467 411G      0001   000506 422G      0001   000545 435G
    0001   000551 44L       0001   000607 445G      0001   000631 456G      0001   000660 464G      0001   001761 4998L
    0001   001030 5000L     0001   002003 5010L     0001   002060 5011L     0001   001074 5040L     0001   001103 5045L
    0001   001123 5100L     0001   000754 524G      0001   001135 5400L     0001   001145 5420L     0001   001164 5425L
    0001   001202 5450L     0001   001211 5460L     0001   001223 5470L     0001   001247 5475L     0001   001265 5500L
    0001   001044 554G      0001   001275 5600L     0001   001353 5700L     0001   001466 5708L     0001   001470 5710L
    0001   001547 5800L     0001   001662 5820L     0001   002121 5830L     0001   002151 5831L     0001   001342 646G
    0001   001435 661G      0001   002157 6999L     0001   001674 7000L     0001   001536 707G      0001   001614 725G
    0001   001631 734G      0001   001740 763G      0000 R 002434 AEF       0000 R 002435 AEFIC     0004 R 000000 ALT
    0000 R 000070 ALTHLD     0000 R 000032 ALTMID     0000 R 002160 ANIMAL     0004   000404 ATP       0000 R 000000 BOTALT
    0000 R 001650 BOTCOR     0000 R 000060 BOTXY      0004   001010 B0        0003   000000 CAY       0004   001011 CG
    0004   001321 CHANGE     0004   001322 CMLR      0004 R 001323 CX        0004   003127 C2        0004   003130 C3
    0004   003131 C4         0004   003132 DEK       0000 R 002406 DELAM     0000 R 002402 DENOM     0003 R 000001 DETID
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0003 R 000015 ALAM      0000 R 002437 DLX       0003   000326 DMEAN     0004   003133 DNID      0003   000327 DNS
0000 R 002400 DOSTA     0006 R 000135 DPX       0004   003147 DRM       0004   003150 DS        0004   003151 DST
0004   003152 DST0      0004   003153 DST1      0004   003154 DST2      0000 R 002367 DSUBN     0004   003155 DT
0004   003156 DU        0004   003157 DWT       0004 R 003160 DX        0004   003161 DZ        0004   003162 ED
0004   003163 EK        0004   003572 F         0003 R 000331 FMASS     0006 R 000422 FROG      0004 R 003573 FW
0003   000330 FXPO      0004   003574 GRV       0003 R 001170 HEIGHT    0004   004200 HLR       0004   004201 HOB
0000 L 002350 HODO      0000 T 002373 I         0000 I 002325 IC        0003   000641 IDISTR    0003   000642 IEXEC
0000   002654 INJP$     0004   004202 IPAM      0004   004203 IRAD      0003 I 000643 IRISE     0003 I 000644 ISIN
0003 I 000645 ISOUT     0000 I 002351 J         0000 I 002375 KA        0000 I 002376 KB        0000 I 002401 KC
0004   004204 KCLD      0000 I 002402 KCX       0004 I 004205 KDI       0000 I 002377 KDPST     0000 I 002425 KLICK
0000 I 002423 KLOC      0000 I 002424 KLOD      0006 I 000000 KONE      0004   004206 KRX       0004   004207 KS
0000 I 002422 KSAV      0004   004210 KSV       0000 I 002420 KTIM      0006 I 000001 KTWO      0000 I 002417 LALT
0000 I 002416 LAMBE     0000 I 002427 LAMBEO    0000 I 002430 LAMBEP    0000 I 002110 LAMHLD    0000 I 002440 LJ
0000 I 002403 LK        0000 I 002407 LPSC      0006 I 000002 LT        0000 I 002426 LTIM      0000 I 002421 LTP
0000 I 002415 LWAF      0000 I 002365 LWONE     0000 I 002366 LWTWO     0000 I 002354 LX        0000 I 002355 LY
0004 I 004211 MCX       0004   004212 MWYA      0004   004213 N         0003 I 000646 NDSTR     0000 I 002353 NDSTRP
0000 I 002356 NFAKE     0003 I 001172 NHODO     0000 I 002370 NLAMNA    0004   004214 NNN       0000 I 002363 NONE
0005 I 000000 NPOSIT    0004 I 004215 NPVA      0000 I 002412 NREKOM    0000 I 002362 NSUBD     0000 I 002364 NTWO
0004   004216 P         0000 R 002352 PI        0004   004217 PRS       0003 R 000647 PS        0000 L 002347 PSCSUB
0000 R 002410 PSIZR     0000 R 002411 PSIZT     0004   004623 PW        0004   004624 QI        0004   004625 R
0004   004626 RA        0000 R 000760 RADHLD    0000 R 000004 RADIUS    0004 R 004627 RED       0004 R 004630 RHZ
0004   005234 RL        0004   005235 RLH       0004   005641 RM        0004   005642 RZT       0004   005643 S
0004   005644 SAVE      0003 R 001157 SD        0004 R 005645 SLDTMP    0004   005646 SLM       0000 R 002372 SLOPE
0004   006252 SMALLT    0003 R 001160 SSAM      0000 R 002413 SUBMAS    0000 R 002414 SUBWAM    0004   006253 SZRO
0004   006254 T         0005 R 000001 TC        0004   006255 TE        0000 R 002436 TFACT     0000 R 002361 TGZ
0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2      0004 R 006256 TMSD      0000 R 000002 TOPALT
0000 R 001770 TOPCOR    0000 R 000064 TOPXY     0003   001164 T2M       0004   006257 U         0003   001165 USOIL
0004   006260 V         0005 R 000133 VB        0005 R 000265 VC        0000 R 002431 VELBOT    0006 R 000421 VELOCF
0000 R 002432 VELTOP    0006 R 000003 VTSCX     0003   001166 VPR       0005 R 000417 VT        0003 R 001503 VX
0003 R 002013 VY        0004   006261 VZRO      0003 R 001167 W         0000 R 002405 WINITH    0004   006262 WT
0004   006263 X         0005 R 000551 XC        0004   006264 XE        0000 R 002357 XGZ       0004   006265 Y
0005 R 000703 YC        0000 R 002360 YGZ       0000 R 002371 YMAX      0000 R 002374 YTEST     0004   006575 Z
0005 R 001035 ZB        0004   006576 ZBFR      0004 R 006577 ZBRSTZ    0005 R 001167 ZC        0004   006600 ZLMT
0003   001171 ZSCL      0005 R 001321 ZT        0003 R 001173 ZV
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105

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00101      1*          SUBROUTINE RSXP                                                          000000
00101      2*     C                                                                             000000
00101      3*     C                                                                             000000
00103      4*          COMMON /SET1/                                                            000000
00103      5*         1CAY        ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,    000000
00103      6*         2FMASS(200),IDISTR     ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,    000000
00103      7*         3NDSTR      ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,    000000
00103      8*         4TMP2       ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,    000000
00103      9*         5ZSCL       ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)                  000000
00104     10*          COMMON /CLOUD/                                                           000000
00104     11*         1ALT(260)   ,ATP(260)  ,B0        ,CG(200)   ,CHANGE    ,CMLR      ,    000000
00104     12*         2CX(10,90)  ,C2        ,C3        ,C6        ,DEK       ,DNID(12)  ,    000000
00104     13*         3DRM        ,DS        ,DST       ,DST0      ,DST1      ,DST2      ,    000000
00104     14*         4DT         ,DU        ,DWT       ,DX        ,DZ        ,ED        ,    000000
00104     15*         5EK         ,EPS       ,ES        ,ETA(260)  ,F         ,FW        ,    000000
00104     16*         6GRV(260)   ,HLR       ,HOB       ,IPAM      ,IRAD      ,KCLD      ,    000000
00104     17*         7KDI        ,KRX       ,KS        ,KSV       ,MCX       ,MWYA      ,    000000
00104     18*         8N          ,NNN       ,NPVA      ,P         ,PRS(260)  ,PW        ,    000000
```

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00104     17*           SQI         ,R          ,RA         ,RFD        ,RHZ(260)   ,RL         ,    000000
00104     20*           1RLH(260)   ,RM         ,RZT        ,S          ,SAVE       ,SLDTMP    ,    000000
00104     21*           2SLM(260)   ,SMALLT     ,SZRO       ,T          ,TE         ,TMSD      ,    000000
00104     22*           3U          ,V          ,VZRO       ,WT         ,X          ,XE        ,    000000
00104     23*           4Y(200)     ,Z          ,ZBFR       ,ZBRSTZ     ,ZLMT                        000000
00105     24*            COMMON /DRIFT/                                                             000000
00105     25*           1  NPOSIT ,TC(90) ,VB(90) ,VC(90) ,VT(90) ,XC(90) ,YC(90) ,                 000000
00105     26*           2  ZB(90) ,ZC(90 ),ZT(90)                                                   000000
00106     27*            COMMON/WAFER/                                                              000000
00106     28*           1 KONE,KTWO,LT,VISCX(90),DPX(2,90),VELOCE,FROG                              000000
00107     29*            DIMENSION                                                                  000000
00107     30*           1 BOTALT(2),TOPALT(2),RADIUS(11,2),ALTMID(11,2),BOTXY(2,2),                 000000
00107     31*           2TOPXY(2,2),ALTHLD(11,40),RADHLD(11,40),BOTCOR(2,40),TOPCOR(2,40),          000000
00107     32*           3LAMHLD(40)                                                                000000
00110     33*            DIMENSION ANIMAL(101),IC(18)                                               000000
00111     34*            LOGICAL PSCSUB,HODO                                                        000000
00112     35*          3000 FORMAT(12A6)                                                            000000
00113     36*          3001 FORMAT(18I4)                                                            000000
00114     37*          3002 FORMAT(3E12.5)                                                          000000
00115     38*          3003 FORMAT(4E10.3)                                                          000000
00116     39*          3004 FORMAT(1H1,///51X19H* * * * * * * * * *  //12X101HT H E   D E P A      000000
00116     40*              1R T M E N T   O F   D E F E N S E   F A L L O U T   P R E D I C T      000000
00116     41*              2I O N   S Y S T E M ,//51X,19H* * * * * * * * * *  ////41X,39HCLOU      000000
00116     42*              3D RISE - POINT DENSITY CALCULATIONS //// )                              000000
00117     43*          3005 FORMAT(//                                                               000000
00117     44*              1 16X,2HFW,12X,4HSSAV,10X,6HSLDTMP,8X,4HTMSD,10X,5HSIGMA/               000000
00117     45*              2 10X,5(E13.6,1X) //                                                    000000
00117     46*              3 16X,2H W,12X,3HH0B,12X,3HREF  /                                       000000
00117     47*              4 10X, 3(E13.6,1X) ///                                                  000000
00117     48*              7 10X,5HDETID/10X,12A6 ///                                              000000
00117     49*              8 10X,26HCONTROL ARRAY IC(J),J=1,18 /10X,18I5///                        000000
00117     50*              9 10X,22HDETONATION COORDINATES ,10X,3HXGZ,13X,3HYGZ,13X,3HTGZ /        000000
00117     51*              1 34X,3(E13.6,3X)///,10X,6HNSUBD=,I5///)                                000000
00120     52*          3006 FORMAT(1H1,///25X,16HCLOUD TRAJECTORY/6X,2HXC,12X,2HYC,12X,2HZC,       000000
00120     53*              1 12X,2HTC,12X,2HVC/5(1X,E13.6))                                        000000
00120     54*          C                                                                            000000
00120     55*          C     CHANGE PARTICLE SIZE FROM METERS TO MICROMETERS                        000000
00121     56*                DO 9 J=1,NDSTR                                                         000000
00124     57*              9 PS(J)=PS(J)*1.0E6                                                      000004
00126     58*                PI=3.1415927                                                           000007
00127     59*                NDSTRP=NDSTR+1                                                         000011
00130     60*                NPOSIT=MCX                                                             000014
00131     61*                LX=1                                                                   000016
00132     62*                LY=2                                                                   000020
00133     63*                NFAKE=-1                                                               000023
00133     64*          C     READ ALL PERTINANT DATA FROM SYSTEM INPUT TAPE-WRITE HARD COPY         000023
00134     65*                READ(ISIN,3000) (DETID(J),J=1,12)                                      000024
00137     66*                READ(ISIN,3001) (IC(J),J=1,18)                                         000034
00142     67*                READ(ISIN,3002) XGZ,YGZ,TGZ                                            000044
00147     68*                READ(ISIN,3001) NSUBD,NONE,NTWO,LWONE,LWTWO                            000054
00147     69*          C                                                                            000054
00147     70*          C     CHECK IF BELOW CLOUD WAFER SUBDIVIONS WERE ASSIGNED                    000054
00147     71*          C     IF NOT, ASSIGN DEFAULT VALUE                                           000054
00156     72*                IF(NSUBD .EQ. 0 ) NSUBD=5                                              000066
00160     73*                DSUBN=FLOAT(NSUBD)                                                     000072
00161     74*                NLAMNA=NSUBD+1                                                         000075
00162     75*                WRITE(ISOUT,3004)                                                      000100
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00164    76*           WRITE(ISOUT,3005) FW,SSAM,SLOTMP,TMSD,SD,W,HEIGHT,RED,                00010R
00164    77*          1  (OPTID(J),J=1,12),                                                  00010R
00164    78*          2  (IC(J),J=1,18),XGZ,YGZ,TGZ,NSUBD                                    00010R
00164    79*     C                                                                           00010R
00164    80*     C     CHECK IF WIND SHIFTS ARE BEING MADE.  IF NOT SET HODO FALSE           00010R
00164    81*     C                                                                           00010R
00204    82*           HODO=.TRUE.                                                           00013R
00205    83*           IF (NHODO.EQ. 0) HODO=.FALSE.                                         00013?
00205    84*     C                                                                           00013?
00207    85*           IF(.NOT. HODO) GO TO 17                                               00014?
00207    86*     C                                                                           00014?
00207    87*     C     CALCULATE SLOPE FOR AUXILIARY FUNCTION TO HASTEN WIND LAYER           00014?
00207    88*     C     INDEX DETERMINATION AND MAX INTERCEPT                                 00014?
00211    89*           YMAX=1.0                                                              00014?
00212    90*           SLOPE=ZV(NHODO)/FLOAT(NHODO)                                          00015?
00213    91*           DO 10 I=1,NHODO                                                       00016?
00216    92*           YTEST=ZV(I)-SLOPE*FLOAT(I)                                            00016?
00217    93*           IF(YTEST .GT. YMAX) YMAX=YTEST                                        00016?
00221    94*        10 CONTINUE                                                              00020?
00223    95*        17 CONTINUE                                                              00020?
00223    96*     C                                                                           00020?
00223    97*     C     SHIFT CLOUD LATERALLY TO ACCOUNT FOR WINDS DURING RISE TO             00020?
00223    98*     C     STABILIZATION TIME IF WINDS ARE NON ZERO AND PRINT                    00020?
00223    99*     C     CLOUD TREJECTORY                                                      00020?
00223   100*     C                                                                           00020?
00224   101*           IF( .NOT. HODO ) GO TO 12                                             00020?
00224   102*     C     LOAD PROPER CLOUD LISTS                                               00020?
00226   103*           DO 11 J=1,NPOSIT                                                      00020?
00231   104*           TC(J)=CX(1,J)                                                         00020?
00232   105*           ZB(J)=CX(3,J)                                                         00021?
00233   106*           ZT(J)=CX(4,J)                                                         00021?
00234   107*           VB(J)=CX(6,J)                                                         00021?
00235   108*           VT(J)=CX(7,J)                                                         00021?
00236   109*        11 CONTINUE                                                              00022?
00240   110*           CALL WINDA (ZBRSTZ)                                                   00022?
00241   111*           WRITE(ISOUT,3006) (XC(J),YC(J),ZC(J),TC(J),VC(J),J=1,NPOSIT)          00022?
00241   112*     C                                                                           00022?
00241   113*     C     INITIALIZE WAFER UPDRIFT INTERPOLATION ARRAYS AND WAFER DATA          00022?
00241   114*     C     ARRAYS                                                                00022?
00253   115*        12 CONTINUE                                                              00024?
00254   116*           DO 13 KA=1,90                                                         00024?
00257   117*           DO 13 KB=1,2                                                          00024?
00262   118*        13 DPX(KB,KA)=0.0                                                        00024?
00265   119*           IF(KDI)15,15,14                                                       00025?
00270   120*        14 KDPST=KDI                                                             00025?
00271   121*           DPSTK=KDPST                                                           00025R
00272   122*           GO TO 16                                                              00026?
00273   123*        15 KDPST=10                                                              00026?
00274   124*           DPSTK=KDPST                                                           00026R
00275   125*           GO TO 14                                                              00026?
00276   126*        16 CONTINUE                                                              00027?
00276   127*     C                                                                           00027?
00276   128*     C                                                                           00027?
00276   129*     C     SET PARTICLE SIZE AND WAFER BOUNDS IF IN DEFAULT                      00027?
00276   130*     C                                                                           00027?
00277   131*           IF( NONE .EQ. 0 )  NONE=1                                             00027?
00301   132*           IF( NTWO .LT. NONE )  NTWO=NDSTR                                      00027R
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00303   133*          IF(  LWONE .EQ. 0 )  LWONE=1                                                    000317
00305   134*          IF( LWTWO .LT. LWONE )  LWTWO=KDPST                                             000323
00305   135*     C                                                                                    000323
00305   136*     C                                                                                    000323
00305   137*     C    COMPUTE WAFER UP-DRIFT INTERPOLATION ARRAYS                                     000323
00305   138*     C                                                                                    000323
00307   139*          DO 23 KC=1,MCX                                                                  000335
00312   140*          IF( CX(7,KC)-CX(6,KC) ) 23,23,24                                                000338
00315   141*       23 DPX(1,KC)=0.0                                                                   000340
00316   142*          GO TO 25                                                                        000341
00317   143*       24 DPX(1,KC)=(CX(7,KC)-CX(6,KC))/(CX(4,KC)-CX(3,KC))                               000343
00320   144*       25 IF(CX(6,KC))   26,26,27                                                         000351
00323   145*       26 DPX(2,KC)=0.0                                                                   000354
00324   146*          GO TO 29                                                                        000354
00325   147*       27 DENOM=CX(3,KC)-ZBRSTZ                                                           000356
00326   148*          IF(DENOM)28,26,28                                                               000360
00331   149*       28 DPX(2,KC)=CX(6,KC) / DENOM                                                      000361
00332   150*       29 CONTINUE                                                                        000367
00332   151*     C                                                                                    000367
00332   152*     C                                                                                    000367
00332   153*     C                                                                                    000367
00332   154*     C    INITIALIZE CLOUD RISE TAPE IRISE                                                000367
00332   155*     C                                                                                    000367
00334   156*          REWIND IRISE                                                                    000367
00335   157*          WRITE(IRISE) FW,SSAM,SLOTMP,TMSD,SD,W,HEIGHT,XGZ,YGZ,TGZ,                       000372
00335   158*         1  ZBRSTZ,RFD,NHODO,NDSTR,MCX,NPVA,NONE,NTWO                                      000372
00335   159*         2  , CX(4,MCX)                                                                   000372
00362   160*          WRITE(IRISE) (PS(J),FMASS(J),DIAM(J),J=1,NDSTR),DIAM(NDSTRP),                   000423
00362   161*         1  (ALT(J),ETA(J),RHZ(J),J=1,NPVA),                                              000423
00362   162*         1 (CX(1,LK),LK=1,MCX)                                                            000423
00405   163*          IF(NHODO.EQ. 0) GO TO 32                                                        000458
00407   164*          WRITE(IRISE) (ZV(J),VX(J),VY(J),J=1,NHODO )                                     000457
00417   165*       32 CONTINUE                                                                        000478
00417   166*     C                                                                                    000478
00417   167*     C    IRISE IS NOW READY FOR LOADING WITH WAFER DATA                                  000478
00417   168*     C                                                                                    000478
00417   169*     C                                                                                    000478
00417   170*     C                                                                                    000478
00420   171*          FROG=1.3066667E-17*RFD                                                          000478
00420   172*     C                                                                                    000478
00420   173*     C COMPUTE IN CLOUD AIR VISCOSITIES                                                   000478
00421   174*          DO 43 J=1,MCX                                                                   000506
00424   175*       43 VISCX(J)=1.458E-6*CX(9,J)**1.5/ (110.4+CX(9,J))                                 000506
00426   176*          KCX=MCX-1                                                                       000522
00426   177*     C                                                                                    000522
00426   178*     C    CALCULATE INITIAL WAFER ALTITUDES FOR ALL PARTICLE SIZE CLASSES                 000522
00426   179*     C                                                                                    000522
00427   180*          WINITH=(CX(4,1)-CX(3,1))/DPSTK                                                  000528
00430   181*          ANIMAL(1)=CX(3,1)                                                               000531
00431   182*          ANIMAL(KDPST+1)=CX(4,1)                                                         000533
00432   183*          IF( KDPST.EQ. 1 )  GO TO 44                                                     000535
00434   184*          DO 3999 J=2,KDPST                                                               000540
00437   185*          ANIMAL(J)=ANIMAL(J-1)+WINITH                                                    000545
00440   186*      3999 CONTINUE                                                                       000551
00442   187*        44 CONTINUE                                                                       000551
00443   188*          DELAM=WINITH/DSUBN                                                              000551
00443   189*     C                                                                                    000551
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00443    190*      C     OUTERMOST WAFER CALCULATION LOOP BEGINS HERE                                  000551
00443    191*      C     PARTICLE SIZE CLASSES ESTABLISHED                                             000551
00443    192*      C                                                                                   000551
00444    193*            DO 6999  LPSC=NONE,NTWO                                                       000610
00447    194*            PSCSUB=.TRUE.                                                                 000610
00447    195*      C                                                                                   000610
00447    196*      C     ESTABLISH PARTICLE SIZES TO CHARACTERIZE WAFER TOP AND BOTTOM                 000610
00447    197*      C                                                                                   000610
00450    198*            PSIZE=DIAM(LPSC)                                                              000612
00451    199*            PSIZT=DIAM(LPSC+1)                                                            000615
00451    200*      C                                                                                   000615
00451    201*      C     MIDDLE WAFER CALCULATION LOOP BEGINS HERE.                                    000615
00451    202*      C                                                                                   000615
00452    203*            NREKOM=0                                                                      000617
00452    204*      C     CALCULATE WAFER MASS FOR CURRENT PARTICLE SIZE CLASS                          000617
00453    205*            SUBMAS=  FMASS(LPSC)*SSAM/DPSTK                                               000620
00454    206*            SUBWAM=SUBMAS                                                                 000624
00455    207*            DO 5999 LWAF=LWONE,LWTWO                                                      000632
00460    208*            KONE=1                                                                        000632
00461    209*            KTWO=2                                                                        000634
00462    210*            BOTALT(KONE)=ANIMAL(LWAF)                                                     000636
00463    211*            DO 45 J=1,NLAMNA                                                              000660
00466    212*            RADIUS(J,KONE)=CX(5,1)                                                        000660
00467    213*            ALTMID(J,KONE)=BOTALT(KONE)+FLOAT(J-1)*DELAM                                  000662
00470    214*            ALTHLD(J,1)=ALTMID(J,KONE)                                                    000672
00471    215*            RADHLD(J,1)=RADIUS(J,KONE)                                                    000674
I09      00472    216*        45 CONTINUE                                                           000677
00474    217*            BOTXY(KONE,LX)=XC(1)                                                          000677
00475    218*            BOTXY(KONE,LY)=YC(1)                                                          000701
00476    219*            TOPXY(KONE,LX)=XC(1)                                                          000703
00477    220*            TOPXY(KONE,LY)=YC(1)                                                          000704
00477    221*      C                                                                                   000704
00477    222*      C     STORE INITIAL WAFER DATA IN OUTPUT ARRAYS                                     000704
00500    223*            LAMBE=0                                                                       000705
00501    224*            LAMHLD(1)=LAMBE                                                               000706
00502    225*            BOTCOR(1,1)=BOTXY(KONE,LX)                                                    000710
00503    226*            BOTCOR(2,1)=BOTXY(KONE,LY)                                                    000712
00504    227*            TOPCOR(1,1)=TOPXY(KONE,LX)                                                    000713
00505    228*            TOPCOR(2,1)=TOPXY(KONE,LY)                                                    000715
00505    229*      C                                                                                   000715
00505    230*      C                                                                                   000715
00506    231*            IF( PSCSUB) GO TO 5000                                                        000716
00506    232*      C                                                                                   000716
00510    233*            IF( LWAF.EQ. KOPST ) GO TO 5000                                               000720
00512    234*            TOPALT(KONE)=ANIMAL(KOPST+1)                                                  000723
00513    235*            NREKOM=KOPST+1-LWAF                                                           000726
00514    236*            SUBWAM=SUBMAS*FLOAT(NREKOM)                                                   000732
00515    237*            LAMHLD(1)=-NREKOM                                                             000737
00516    238*            BOTCOR(1,1)=XC(1)                                                             000740
00517    239*            BOTCOR(2,1)=YC(1)                                                             000742
00520    240*            ALTHLD(1,1)=BOTALT(KONE)                                                      000743
00521    241*            RADHLD(1,1)=RADIUS(1,KONE)                                                    000745
00522    242*            ALTHLD(2,1)=TOPALT(KONE)                                                      000750
00523    243*            DO 3500 LALT=1,KCX                                                            000754
00526    244*            LT=LALT                                                                       000754
00527    245*            KTIM=LALT+1                                                                   000756
00530    246*            LTP=KTIM                                                                      000760
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00531   247*          CALL HEIT                                                  000761
00531   248*         1   (BOTALT,PSIZB,2)                                       000761
00532   249*          CALL HEIT                                                  000766
00532   250*         1   (TOPALT,PSIZT,2)                                       000766
00533   251*          BOTCOR(1,LTP)=XC(LTP)                                      000771
00534   252*          BOTCOR(2,LTP)= YC(LTP)                                     001000
00535   253*          ALTHLD(1,LTP)=BOTALT(KTWO)                                 001002
00536   254*          ALTHLD(2,LTP)=TOPALT(KTWO)                                 001007
00537   255*          RADHLD(1,LTP)=CX(5,LTP)                                    001011
00540   256*          KSAV=KONE                                                  001016
00541   257*          KONE=KTWO                                                  001020
00542   258*          KTWO=KSAV                                                  001022
00543   259*       500 CONTINUE                                                  001025
00545   260*          GO TO 5010                                                 001025
00546   261*       5000 CONTINUE                                                 001030
00547   262*          TOPALT(KONE)=ANIMAL(LWAF+1)                                001030
00550   263*          KLOC=2                                                     001033
00551   264*          KLOD=2                                                     001035
00552   265*          KLICK=3                                                    001036
00552   266*     C                                                               001036
00552   267*     C    WAFER IS NOW DEFINED FOR INITIAL TIME                      001036
00552   268*     C                                                               001036
00552   269*     C                                                               001036
00552   270*     C    NOW LOOP ON TIME                                           001036
00552   271*     C                                                               001036
00553   272*          DO 4999 LTIM=1,KCX                                         001044
110 00556   273*          LAMBEO=LAMBE                                           001050
00557   274*          LAMBEP=LAMBE+1                                             001052
00560   275*          LT=LTIM                                                    001054
00561   276*          LTP=LT+1                                                   001056
00562   277*          IF( BOTALT(KONE).GT. ZBRSTZ )  GO TO 5040                  001060
00564   278*          BOTALT(KTWO)=BOTALT(KONE)+VELBOT*CX(2,LTIM)                001065
00565   279*          GO TO 5045                                                 001072
00566   280*       5040 CONTINUE                                                 001074
00567   281*          CALL HEIT                                                  001074
00567   282*         1  (BOTALT,PSIZB,KLOC)                                     001074
00570   283*          VELBOT=VELOCE                                              001100
00571   284*       5045 CONTINUE                                                 001103
00572   285*          CALL HEIT                                                  001103
00572   286*         1  (TOPALT,PSIZT,KLOD)                                     001103
00573   287*          VELTOP=VELOCE                                              001107
00573   288*     C    NOW CALCULATE HORIZONTAL SHIFT ACCORDING TO LAMINA IS ABOVE 001107
00573   289*     C    OR BELOW CLOUD BOTTOM IF WINDS ARE NOT ZERO                001107
00574   290*          IF(   .NOT. HODO) GO TO 5500                               001111
00576   291*          GO TO (5400,5100),KLOC                                     001111
00577   292*       5100 CONTINUE                                                 001112
00577   293*     C    LAMINA IS IN CLOUD, ASSIGN HORIZONTAL POSITION EQUAL TO CLOUD 001112
00577   294*     C    AT SAME TIME.                                              001112
00600   295*          BOTXY(KTWO,LX)=XC(LTP)                                     001127
00601   296*          BOTXY(KTWO,LY)=YC(LTP)                                     001131
00602   297*          GO TO 5450                                                 001133
00603   298*       5400 CONTINUE                                                 001135
00603   299*     C    BELOW CLOUD SHIFT-CALCULATE                                001135
00604   300*          IF(BOTALT(KTWO).GE.ZBRSTZ)  GO TO 5420                     001135
00606   301*          DX=0.0                                                     001141
00607   302*          DY=0.0                                                     001142
00610   303*          GO TO 5425                                                 001143
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00611    304*      5420 CONTINUE                                                          001145
00612    305*           VELOCE=VELBOT                                                     001146
00613    306*           CALL WIND B (DX,DY,BOTALT,NHODO,CX(2,LT),YMAX,SLOPE)              001150
00614    307*      5425 CONTINUE                                                          001160
00615    308*           BOTXY(KTWO,LX)=BOTXY(KONE,LX)+DX                                  001170
00616    309*           BOTXY(KTWO,LY)=BOTXY(KONE,LY)+DY                                  001176
00617    310*      5450 CONTINUE                                                          001200
00620    311*           GO TO(5470,5460),KLOD                                             001200
00621    312*      5460 CONTINUE                                                          001210
00622    313*           TOPXY(KTWO,LX)=XC(LTP)                                            001215
00623    314*           TOPXY(KTWO,LY)=YC(LTP)                                            001217
00624    315*           GO TO 5500                                                        001221
00625    316*      5470 CONTINUE                                                          001227
00626    317*           IF(TOPALT(KTWO).LT.ZBRSTZ)  GO TO 5475                            001226
00630    318*           VELOCE=VELTOP                                                     001231
00631    319*           CALL WINDB(DX,DY,TOPALT,NHODO ,CX(2,LT),YMAX,SLOPE )              001237
00632    320*      5475 CONTINUE                                                          001247
00633    321*           TOPXY(KTWO,LX)=TOPXY(KONE,LX)+DX                                  001256
00634    322*           TOPXY(KTWO,LY)=TOPXY(KONE,LY)+DY                                  001261
00635    323*      5500 CONTINUE                                                          001266
00635    324*      C    TOP AND BOTTOM OF WAFER NOW IN POSITION AT END OF TIME STEP       001266
00635    325*      C    READY FOR DETERMINATION OF INTERIOR STRUCTURE                     001266
00635    326*      C    WHAT IS WAFER PHASE                                               001266
00636    327*           GO TO (5600,5700,5800),KLICK                                      001265
00637    328*      5600 CONTINUE                                                          001275
00637    329*      C    WAFER COMPLETELY BELOW CLOUD BOTTOM AT BEGINNING OF TIME STEP,    001275
00637    330*      C    PROCESS ACCORDINGLY- TOP AND BOTTOM RADII ALREADY SET             001275
00637    331*      C                                                                      001275
00637    332*      C    CALCULATE ALITUDE EXPANSION FACTOR-AEF                            001275
00637    333*      C                                                                      001275
00640    334*           AEF=(TOPALT(KTWO)-BOTALT(KTWO))/ (TOPALT(KONE)-BOTALT(KONE)  )    001310
00641    335*      5610  ALTMID(1,KTWO)=BOTALT(KTWO)                                     001320
00642    336*           ALTMID(NLAMNA,KTWO)=TOPALT(KTWO)                                  001320
00643    337*           RADIUS(1,KTWO)=RADIUS(1,KONE)                                     001326
00644    338*           RADIUS(NLAMNA,KTWO)=RADIUS(NLAMNA,KONE)                           001330
00645    339*           DO 5650 LK=2, NSUBD                                               001340
00650    340*           ALTMID(LK,KTWO) =ALTMID(1,KTWO)+                                  001340
00650    341*          1                  AEF*(ALTMID(LK,KONE)-ALTMID(1,KONE))          001340
00651    342*           RADIUS(LK,KTWO)=RADIUS(LK,KONE)                                   001346
00652    343*      5650 CONTINUE                                                          001351
00654    344*           GO TO 7000                                                        001351
00655    345*      5700 CONTINUE                                                          001357
00655    346*      C                                                                      001357
00655    347*      C    WAFER TOP IN CLOUD AND BOTTOM BELOW CLOUD AT BEGINNING OF         001357
00655    348*      C    TIME STEP.                                                        001357
00655    349*      C                                                                      001357
00655    350*      C    CALCULATE EXPANSION FACTOR FOR PART OF WAFER REMAINING IN CLOUD.  001357
00656    351*           ALTMID(NLAMNA,KTWO)=TOPALT(KTWO)                                  001357
00657    352*           AEFIC= ( CX(4,LTP)-CX(3,LTP)) /( CX(4,LT)-CX(3,LT) )              001361
00660    353*           DO 5710 LK=LAMBEP,NLAMNA                                          001436
00663    354*           ALTMID(LK,KTWO)=ALTMID(NLAMNA,KTWO)-AEFIC *                       001436
00663    355*          1  (ALTMID(NLAMNA,KONE)-ALTMID(LK,KONE) )                         001436
00664    356*           IF(ALTMID(LK,KTWO).GT.CX(3,LTP) )  GO TO 5708                     001441
00664    357*      C    LAMINA HAS FALLEN THROUGH BOTTOM OF CLOUD IN THIS STEP.           001441
00664    358*      C    CALCULATE RADIUS AT TIME OF EXIT AND UPDATE COUNTERS              001441
00664    359*      C                                                                      001441
00666    360*           TFACT=(ALTMID(LK,KONE)-CX(3,LT)) /                                001446
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00666    361*          1     (CX(3,LTP)-CX(3,LT)-ALTMID(LK,KTWO)+ALTMID(LK,KONE))                    001444
00667    362*           RADIUS(LK,KTWO)=CX(5,LT)+TFACT*(CX(5,LTP)-CX(5,LT))                            001454
00670    363*           LAMBE=LAMBE+1                                                                  001461
00671    364*           GO TO 5710                                                                     001464
00672    365*         5708 CONTINUE                                                                    001466
00673    366*           RADIUS(LK,KTWO)=CX(5,LTP)                                                      001466
00674    367*         5710 CONTINUE                                                                    001474
00676    368*           IF( LAMBE.EQ. NLAMNA ) KLOD=1                                                  001474
00700    369*           KLICK=KLOC+KLOD-1                                                              001501
00700    370*     C     NOW CALCULATE ALTITUDES OF BELOW CLOUD LAMINA (PREVIOUSLY EXITED)              001501
00700    371*     C     RADII ALREADY ESTABLISHED.                                                     001501
00701    372*           AEF=( ALTMID(LAMBEP,KTWO)-BOTALT(KTWO))/                                       001505
00701    373*          1     ( ALTMID(LAMBEP,KONE)-ALTMID(1,KONE) )                                    001505
00702    374*           ALTMID(1,KTWO)=BOTALT(KTWO)                                                    001517
00703    375*           RADIUS(1,KTWO)=RADIUS(1,KONE)                                                  001522
00704    376*           IF(LAMBEP.LE.2)  GO TO 7000                                                    001524
00706    377*           DO 5750 LK=2,LAMBEO                                                            001536
00711    378*           ALTMID(LK,KTWO)=ALTMID(1,KTWO)+                                                001536
00711    379*          1              AEF*(ALTMID(LK,KONE)-ALTMID(1,KONE) )                           001536
00712    380*           RADIUS(LK,KTWO)=RADIUS(LK,KONE)                                                001542
00713    381*         5750 CONTINUE                                                                    001545
00715    382*           GO TO 7000                                                                     001545
00715    383*     C                                                                                    001545
00715    384*     C     WAFER COMPLETELY IN CLOUD                                                      001545
00715    385*     C                                                                                    001545
00716    386*         5800 CONTINUE                                                                    001547
00717    387*           ALTMID(1,KTWO)=BOTALT(KTWO)                                                    001547
00720    388*           ALTMID(NLAMNA,KTWO)=TOPALT(KTWO)                                               001554
00721    389*           DLX= (ALTMID(NLAMNA,KTWO)-ALTMID(1,KTWO) ) / DSUBN                             001560
00722    390*           RADIUS(1,KTWO)=CX(5,LTP)                                                       001563
00723    391*           RADIUS(NLAMNA,KTWO)=CX(5,LTP)                                                  001570
00724    392*           DO 5810 LK=2,NSUBD                                                             001614
00727    393*           ALTMID(LK,KTWO)=ALTMID(LK-1,KTWO) + DLX                                        001614
00730    394*           RADIUS(LK,KTWO)=CX(5,LTP)                                                      001616
00731    395*         5810 CONTINUE                                                                    001631
00731    396*     C                                                                                    001631
00731    397*     C     DID ANY LAMINA FALL THROUGH BOTTOM                                             001631
00731    398*     C                                                                                    001631
00733    399*           DO 5815 LK=1,NLAMNA                                                            001631
00736    400*           IF( ALTMID(LK,KTWO).GT. CX(3,LTP) ) GO TO 5820                                 001631
00736    401*     C     CALCULATE RADIUS OF LAMINA WHICH FELL THROUGH BOTTOM OF CLOUD                  001631
00736    402*     C     AT TIME OF EXIT                                                                001631
00736    403*     C                                                                                    001631
00740    404*           TFACT= (ALTMID(LK,KONE)-CX(3,LT) )/                                            001635
00740    405*          1       (CX(3,LTP)-CX(3,LT)-ALTMID(LK,KTWO)+ALTMID(LK,KONE) )                   001635
00741    406*           RADIUS(LK,KTWO)=CX(5,LT)+ TFACT*( CX(5,LTP)-CX(5,LT))                          001645
00742    407*           LAMBE=LAMBE+1                                                                  001652
00743    408*         5815 CONTINUE                                                                    001657
00743    409*     C                                                                                    001657
00745    410*           KLOD=1                                                                         001657
00746    411*         5820 CONTINUE                                                                    001662
00747    412*           IF( LAMBE.GT. 0  ) KLOC=1                                                      001662
00751    413*           KLICK=KLOC+KLOD-1                                                              001666
00752    414*           GO TO 7000                                                                     001672
00752    415*     C                                                                                    001672
00752    416*     C     WAFER NOW COMPLETELY ESTABLISHED AT NEW TIME-INDICATORS SET                    001672
00752    417*     C                                                                                    001672
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00752    418*      C                                                                    001672
00753    419*       7000 CONTINUE                                                       001674
00754    420*            KTIM=LTIM+1                                                   001704
00755    421*            LAMHLD(KTIM)=LAMBE                                            001707
00756    422*            BOTCOR(1,KTIM)=BOTXY(KTWO,LX)                                 001712
00757    423*            BOTCOR(2,KTIM)=BOTXY(KTWO,LY)                                 001716
00760    424*            TOPCOR(1,KTIM)=TOPXY(KTWO,LX)                                 001720
00761    425*            TOPCOR(2,KTIM)=TOPXY(KTWO,LY)                                 001723
00762    426*            DO 7010 LK=1,NLAMNA                                           001740
00765    427*            ALTHLD(LK,KTIM)=ALTMID(LK,KTWO)                               001740
00766    428*            RADHLD(LK,KTIM)=RADIUS(LK,KTWO)                               001741
00767    429*       7010 CONTINUE                                                      001744
00767    430*      C                                                                    001744
00767    431*      C     NOW INTERCHANGE WAFER ARRAY INDICES TO PREPARE SPACE FOR STORAGE 001744
00767    432*      C     OF DATA AT NEW TIME AND GO TO NEXT TIME STEP.                  001744
00767    433*      C                                                                    001744
00771    434*            KSAV=KONE                                                     001744
00772    435*            KONE=KTWO                                                     001746
00773    436*            KTWO=KSAV                                                     001750
00774    437*            IF(ALTHLD(NLAMNA,KTIM).LE. ZBRSTZ)  GO TO 4998                001751
00774    438*      C     END OF TIME LOOP IS HERE                                      001751
00776    439*       4999 CONTINUE                                                      001761
01000    440*       4998 CONTINUE                                                      001761
01000    441*      C                                                                    001761
01001    442*            IF(.NOT. PSCSUB)  GO TO 5010                                  001761
01003    443*            IF( KTIM.NE. MCX )  GO TO 5010                                001762
01005    444*            IF( ALTHLD(1,MCX) .GE.  CX(3,MCX) )  PSCSUB= .FALSE.          001765
01005    445*      C                                                                    001765
01005    446*      C     UNLOAD WAFER HISTORY ARRAYS ONTO OUTPUT TAPE                   001765
01005    447*      C                                                                    001765
01007    448*       5010 IF(IC(5) .NE. 0 ) GO TO 5011                                 002007
01011    449*            WRITE(IRISE)  NLAMNA,LPSC,SUBWAM,KTIM,LWAF,LWAF               002004
01021    450*            WRITE(IRISE)                                                  002024
01021    451*           1  (   LAMHLD(LK),BOTCOR(1,LK),BOTCOR(2,LK),TOPCOR(1,LK),      002024
01021    452*           2   TOPCOR(2,LK), ( ALTHLD(LJ,LK),RADHLD(LJ,LK), LJ=1,NLAMNA),  002024
01021    453*           3   LK=1,KTIM)                                                 002024
01021    454*      C                                                                    002024
01021    455*      C     DEBUG PRINT OF COMPLETE WAFER HISTORY IF IC(6)=1               002024
01040    456*       5011 CONTINUE                                                      002060
01040    457*      C                                                                    002060
01041    458*            IF( IC(6) .EQ. 0 )  GO TO 5831                                002061
01043    459*            WRITE(ISOUT,3010) LPSC,LWAF,SUBWAM,(LAMHLD(LK),LK=1,KTIM  )   002067
01054    460*            IF(  .NOT.  HODO  )  GO TO 5830                               002101
01056    461*            WRITE(ISOUT,3012) (BOTCOR(1,LK),BOTCOR(2,LK),TOPCOR(1,LK),    002107
01056    462*           1  TOPCOR(2,LK), LK=1,KTIM)                                    002107
01067    463*       5830 CONTINUE                                                      002121
01070    464*            WRITE(ISOUT,3011)((ALTHLD(LJ,LK),RADHLD(LJ,LK),LJ=1,NLAMNA),  002121
01070    465*           1    LK=1,KTIM  )                                             002121
01102    466*       3010 FORMAT(1H1,5X,5HLPSC=,I5,5X,5HLWAF=,I5,5X,7HSUBWAM=F15.8/     002151
01102    467*           1   40(1X,I2))                                                002151
01103    468*       3011 FORMAT(//,(1X,12E10.3))                                       002151
01104    469*       3012 FORMAT(// 4(5X,E15.6))                                        002151
01105    470*       5831 CONTINUE                                                      002151
01106    471*            IF( NREKOM .NE. 0)  GO TO 6999                                002151
01106    472*      C                                                                    002151
01106    473*      C     END OF WAFER LOOP IS HERE                                      002151
01110    474*       5999 CONTINUE                                                      002162
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01110    475*      C                                                              002162
01110    476*      C     END OF PARTICLE SIZE LOOP IS HERE                        002162
01112    477*     6999 CONTINUE                                                   002162
01112    478*      C                                                              002162
01112    479*      C     THIS IS THE END OF THE TAPE                              002162
01112    480*      C                                                              002162
01114    481*           WRITE(IRISE) NFAKE,NFAKE,SUBWAM,NFAKE,NFAKE,NFAKE         002162
01114    482*      C                                                              002162
01124    483*           END FILE IRISE                                            002174
01125    484*           REWIND   IRISE                                            002177
01126    485*           RETURN                                                    002202
01127    486*           END                                                       002261

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
@:FOR,S  CASSANDRA.SHWI,R
FOR S0E3-00/11/76-16:16:36 (1,)

   SUBROUTINE SHWIND    ENTRY POINT 000111

   STORAGE USED: CODE(1) 000117; DATA(0) 000063; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   NRDU$
    0005   NIO2$
    0006   NWDU$
    0007   NIO1$
    0010   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000   000013 1F        0001   000031 120G      0001   000053 133G      0001   000067 14 G      0000   000001 2F
    0001   000017 200L      0000   000016 3F        0001   000076 300L      0000   000043 4F        0000   000002 5F
    0003   000000 CAY       0003   000001 DETID     0003   000015 DIAM      0003   000326 DMEAN     0003   000327 DNS
    0003   000330 EXPO      0003   000331 FMASS     0003   001170 HEIGHT    0003   000641 IDISTR    0003   000642 IEXEC
    0000   000051 INJP$     0003   000643 IRISE     0003 I 000644 ISIN      0003 I 000645 ISOUT     0000 I 000000 J
    0000 I 000001 MHODO      0003   000646 NDSTR     0003 I 001172 NHODO     0003   000647 PS        0003   001157 SD
    0003   001160 SSAM      0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2      0003   001164 T2M
    0003   001165 USOIL     0003   001166 VPR       0003 R 001503 VX        0003 R 002013 VY        0003   001167 W
    0003   001171 ZSCL      0003 R 001173 ZV

C
00101      1*           SUBROUTINE SHWIND                                                    SHWND001   000000
00101      2*     C                                                                          SHWND002   000000
00101      3*     C     READS IN SHOT-TIME WIND HODOGRAPH ABOVE GROUND ZERO                  SHWND003   000000
00101      4*     C                                                                          SHWND004   000000
00103      5*           COMMON /SET1/                                                        SHWND005   000000
00103      6*          1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,SHWND006   000000
00103      7*          2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,TSOUT     ,SHWND007   000000
00103      8*          3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,SHWND008   000000
00103      9*          4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,SHWND009   000000
00103     10*          5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)               SHWND010   000000
00104     11*           READ(ISIN,1)NHODO                                                   SHWND011   000000
00107     12*           IF(NHODO)100,100,200                                                SHWND012   000000
00112     13*       100 WRITE(ISOUT,5)                                                      SHWND013   000000
00114     14*           GO TO 300                                                           SHWND014   000000
00115     15*         5 FORMAT('1',9X,'SHOT-TIME WINDS HAVE NOT BEEN SPECIFIED')            SHWND015   000000
00116     16*       200 READ(ISIN,2)(ZV(J),VX(J),VY(J),J=1,NHODO)                           SHWND016   000000
00126     17*           WRITE(ISOUT,3)NHODO                                                 SHWND017   000000
00131     18*           WRITE(ISOUT,4)(ZV(J),VX(J),VY(J),J=1,NHODO)                         SHWND018   000000
00131     19*     C                                                                         SHWND019   000000

115
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00131    20*      C     ZV(J) IS INPUT AS THE ALTITUDE OF THE BASE OF THE JTH WIND LEVEL.  SHWND020    000044
00131    21*      C     IT IS CONVERTED HERE TO THE CENTER  ALTITUDE OF THE JTH WIND LEVELSHWND021    000044
00131    22*      C                                                                       SHWND022    000044
00141    23*           MHODO=NHODO-1                                                      SHWND023    000060
00142    24*           DO 250 J=1,MHODO                                                   SHWND024    000063
00145    25*       250 ZV(J)=( ZV(J)+ZV(J+1))/2.0                                         SHWND025    000067
00147    26*           ZV(NHODO)= 1.0E6                                                   SHWND026    000073
00150    27*         1 FORMAT(I5)                                                         SHWND027    000076
00151    28*         2 FORMAT(3E13.6)                                                     SHWND028    000076
00152    29*         3 FORMAT('1',9X,'WIND HODOGRAPH AT GROUND ZERO',10X,'NHODO = ',I5//1SHWND029    000076
00152    30*          11X,'VECTOR ALTITUDE, ZV(J)',16X,'VX(J)',24X,'VY(J)')             SHWND030    000076
00153    31*         4 FORMAT(3(16X,E13.6))                                               SHWND031    000076
00154    32*       300 RETURN                                                           SHWND032    000076
00155    33*           END                                                              SHWND033    000116

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
@:FOR,S  CASSANDRA.TEMP,R
FOR SOE3-06/11/76-10:16:39 (1,)

   SUBROUTINE TEMP      ENTRY POINT 000066

   STORAGE USED: CODE(1) 000070; DATA(0) 000024; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   XPRR
    0005   ALOG10
    0006   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000 R 000001 A          0000 R 000002 B          0003   000000 CAY        0003   000001 DETID      0003   000016 DIAM
    0003   000326 DMEAN      0003   000327 DNS        0003   000330 EXPO       0003   000331 FMASS      0003   001170 HEIGHT
    0003   000641 IDISTR     0003   000642 IEXEC      0000   000016 INJP$      0003   000643 IRISE      0003   000644 ISIN
    0003   000645 ISOUT      0003   000646 NDSTR      0003   001172 NHODO      0003   000647 PS         0000 R 000000 Q
    0003   001157 SD         0003   001160 SSAM       0003 R 001161 TME        0003 R 001162 TMP1       0003 R 001163 TMP2
    0003 R 001164 T2M        0003   001165 USOIL      0003   001166 VPR        0003   001503 VX         0003   002013 VY
    0003 R 001167 W          0003 R 001171 ZSCL       0003   001173 ZV

117

00101      1*          SUBROUTINE TEMP                                                    TEMP 001    000000
00101      2*     C                                                                       TEMP 002    000000
00101      3*     C ***************************************************************************TEMP 003    000000
00101      4*     C                                                                       TEMP 004    000000
00103      5*          COMMON /SET1/                                                      TEMP 005    000000
00103      6*         1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,TEMP 006    000000
00103      7*         2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT    ,TEMP 007    000000
00103      8*         3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1     ,TEMP 008    000000
00103      9*         4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT   ,TEMP 009    000000
00103     10*         5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)             TEMP 010    000000
00103     11*     C                                                                       TEMP 011    000000
00103     12*     C ***************************************************************************TEMP 012    000000
00103     13*     C ***************************************************************************TEMP 013    000000
00103     14*     C                                                                       TEMP 014    000000
00103     15*     C    COMPUTE VAPOR TEMPERATURE                                          TEMP 015    000000
00104     16*          Q=ZSCL*W**(-.03921)                                                TEMP 016    000000
00105     17*          A=5980.*((1.145)**(Q/180.))*((W)**(-0.03948+0.02637*Q/180.0))      TEMP 017    000000
00106     18*          B=-0.4473*(W**(0.04360))                                           TEMP 018    000000
00107     19*          TMP1=A*((TME/T2M)**B)+1500.0                                       TEMP 019    000000
00107     20*     C                                                                       TEMP 020    000000
00107     21*     C    COMPUTE CONDENSED PHASE MATERIAL TEMPERATURE                       TEMP 021    000000
00110     22*          TMP2=50.0*ALOG10(W)+1400.0                                         TEMP 022    000000
00111     23*          RETURN                                                             TEMP 023    000000
```

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00112      244          END
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TEMP 024 000067

END OF COMPILATION: NO DIAGNOSTICS.

```
0:FOR,S  CASSANDRA.TIME,R
FOR S0E3-06/11/76-10:16:42 (1.)

   SUBROUTINE TIME      ENTRY POINT 000050

   STORAGE USED: CODE(1) 000052; DATA(0) 000017; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   XPRR
    0005   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0003   000000 CAY       0003   000001 DETID     0003   000015 DIAM      0003   000326 DMEAN     0003   000327 DNS
    0003   000330 EXPO      0003   000331 FMASS     0003   001170 HEIGHT    0003   000641 IDISTR    0003   000642 IEXEC
    0000   000011 INJD$     0003   000643 IRISE     0003   000644 ISIN      0003   000645 ISOUT     0003   000646 NDSTR
    0003   001172 NHODO     0003   000647 PS        0000 R 000000 Q         0003   001157 SD        0003   001160 SSAM
    0003 R 001161 TME       0003   001162 TMP1      0003   001163 TMP2      0003 R 001164 T2M       0003   001165 USOIL
    0003   001166 VPR       0003   001503 VX        0003   002013 VY        0003 R 001167 W         0003 R 001171 ZSCL
    0003   001173 ZV

119

00101      1*            SUBROUTINE TIME                                                          TIME 001    000000
00101      2*      C                                                                              TIME 002    000000
00101      3*      C ***************************************************************************TIME 003    000000
00101      4*      C                                                                              TIME 004    000000
00103      5*            COMMON /SET1/                                                            TIME 005    000000
00103      6*           1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,TIME 006    000000
00103      7*           2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,TIME 007    000000
00103      8*           3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,TIME 008    000000
00103      9*           4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,TIME 009    000000
00103     10*           5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)               TIME 010    000000
00103     11*      C                                                                              TIME 011    000000
00103     12*      C ***************************************************************************TIME 012    000000
00103     13*      C ***************************************************************************TIME 013    000000
00103     14*      C                                                                              TIME 014    000000
00104     15*            Q=ZSCL*W**(-.03921)                                                      TIME 015    000000
00105     16*            T2M=0.037*((0.045/0.037)**(Q/180.))*(W**(0.49-(0.07*Q/180.)))            TIME 016    000005
00106     17*            TME=(56.0*T2M)/(W**(0.3))                                                TIME 017    000030
00107     18*            RETURN                                                                   TIME 018    000040
00110     19*            END                                                                      TIME 019    000051

        END OF COMPILATION:        NO  DIAGNOSTICS.
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```
Q:FOR,S  CASSANDRA.TRPL,R
FOR S0E3-06/11/76-10:16:45 (*,)

   SUBROUTINE TRPL      ENTRY POINT 000077

   STORAGE USED: CODE(1) 000123; DATA(0) 000021; BLANK COMMON(2) 000000

   EXTERNAL REFERENCES (BLOCK, NAME)

    0003   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000030 113G      0001   000015 24L       0001   000021 26L       0001   000024 40L       0001   000041 48L
    0001   000054 54L       0000   000002 INJP$     0000 I 000001 MA        0000 I 000000 MB
```

```
00101      1*           SUBROUTINE TRPL (                                                    TRPL 001    000006
00101      2*          1  ARG, NPR, PARA, PARB, VRB)                                         TRPL 002    000006
00101      3*      C                                                                         TRPL 003    000006
00101      4*      C ***************************************************************        TRPL 004    000006
00101      5*      C                                                                         TRPL 005    000006
00101      6*      C     TRPL USES LINEAR INTERPOLATION TO LOCATE POSITION OF ARG WITHIN     TRPL 006    000006
00101      7*      C     THE ONE-DIMENSIONAL ARRAY PARA AND COMPUTES FOR THE CORRESPONDING   TRPL 007    000006
00101      8*      C     POSITION IN THE ONE-DIMENSIONAL ARRAY PARB, VRB. NPR IS THE         TRPL 008    000006
00101      9*      C     DIMENSION OF PARA AND PARB (WHOSE ELEMENTS CORRESPOND ONE TO ONE).  TRPL 009    000006
00101     10*      C     IF ARG IS OUTSIDE THE TABULATED VALUES OF PARA, VRB IS SELECTED     TRPL 010    000006
00101     11*      C     FROM THE CORRESPONDING END OF PARB.                                 TRPL 011    000006
00101     12*      C     PARA IS ORDERED FROM LEAST (PARA (1)) TO GREATEST (PARA (NPR))      TRPL 012    000006
00101     13*      C                                                                         TRPL 013    000006
00101     14*      C ***************************************************************        TRPL 014    000006
00101     15*      C                                                                         TRPL 015    000006
00103     16*           DIMENSION                                                            TRPL 016    000006
00103     17*          1  PARA (1), PARB (1)                                                 TRPL 017    000006
00103     18*      C                                                                         TRPL 018    000006
00103     19*      C ***************************************************************        TRPL 019    000006
00103     20*      C ***************************************************************        TRPL 020    000006
00103     21*      C                                                                         TRPL 021    000006
00104     22*        020 IF (ARG - PARA (1)) 022, 022, 040                                   TRPL 022    000006
00107     23*        022 MB = 1                                                              TRPL 023    000012
00110     24*        024 VRB = PARB (MB)                                                     TRPL 024    000016
00111     25*        026 RETURN                                                              TRPL 025    000021
00112     26*        040 DO 054 MA =2, NPR                                                   TRPL 026    000030
00115     27*            IF (ARG - PARA (MA)) 048, 044, 054                                  TRPL 027    000030
00120     28*        044 MB = MA                                                             TRPL 028    000035
00121     29*            GO TO 024                                                           TRPL 029    000037
00122     30*        048 VRB = (ARG - PARA (MA - 1)) * (PARB (MA) - PARB (MA - 1)) /         TRPL 030    000041
00122     31*           1  (PARA (MA) - PARA (MA - 1)) + PARB (MA - 1)                       TRPL 031    000041
00123     32*            GO TO 026                                                           TRPL 032    000052
00124     33*        054 CONTINUE                                                            TRPL 033    000057
00126     34*            MB = NPR                                                            TRPL 034    000057
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00127     35*           GO TO 024                                    TRPL 035    000061
00130     36*           END                                          TRPL 036    000122

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
@:FOR,S  CASSANDRA./APC,R
FOR S0E3-06/11/76-10:16:48 (*,)

   SUBROUTINE VAPOR      ENTRY POINT 000042

   STORAGE USED: CODE(1) 000044; DATA(0) 000010; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1    002323

   EXTERNAL REFERENCES (BLOCK, NAME)

    0004   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000032 120L       0001   000033 130L       0001   000017 200L       0003   000000 CAY        0003   000001 DETID
    0003   000015 DIAM       0003   000326 DMEAN      0003   000327 DNS        0003   000330 EXPO       0003   000331 FMASS
    0003   001170 HEIGHT     0003   000641 IDISTR     0003   000642 IFXEC      0000   000004 INJP$      0003   000643 IRISE
    0003   000644 ISIN       0003   000645 ISOUT      0003   000646 NDSTR      0003   001172 NHODO      0003   000647 PS
    0003   001157 SD         0003 R 001160 SSAM       0003   001161 TME        0003 R 001162 TMP1       0003   001163 TMP2
    0003   001164 T2M        0003 R 001165 USOIL      0003 R 001166 VPR        0003   001503 VX         0003   002013 VY
    0003   001167 W          0003   001171 ZSCL       0003   001173 ZV
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122

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00101      1*           SUBROUTINE VAPOR                                                    VAPOR001    00000
00101      2*      C                                                                        VAPOR002    00000
00101      3*      C                                                                        VAPOR003    00000
00101      4*      C                                                                        VAPOR004    00000
00101      5*      C                                                                        VAPOR005    00000
00101      6*      C ***************************************************************************VAPOR006    00000
00101      7*      C                                                                        VAPOR007    00000
00103      8*           COMMON /SET1/                                                       VAPOR008    00000
00103      9*          1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,VAPOR009    00000
00103     10*          2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT    ,VAPOR010    00000
00103     11*          3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1     ,VAPOR011    00000
00103     12*          4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT   ,VAPOR012    00000
00103     13*          5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)             VAPOR013    00000
00103     14*      C                                                                        VAPOR014    00000
00103     15*      C ***************************************************************************VAPOR015    00000
00103     16*      C ***************************************************************************VAPOR016    00000
00103     17*      C                                                                        VAPOR017    00000
00103     18*      C     BRANCH ON THE BASIS OF SOIL CATEGORY   -SILICEOUS TO 100,          VAPOR018    00000
00103     19*      C     CALCAREOUS TO 200                                                  VAPOR019    00000
00104     20*           IF(USOIL-1.0)100,100,200                                           VAPOR020    00000
00104     21*      C                                                                        VAPOR021    00000
00104     22*      C     IS THE COMPUTED VAPOR TEMPERATURE HIGHER THAN THE SILICEOUS SOIL   VAPOR022    00000
00104     23*      C     BOILING TEMPERATURE                                                VAPOR023    00000
00107     24*       100  IF(TMP1-3000.0)120,120,110                                         VAPOR024    00000
00112     25*       110  VPR=SSAM*0.00015*(TMP1-3000.0)                                    VAPOR025    00000
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00113     26*           GO TO 130                                                                  VAPOR026    000015
00113     27*     C                                                                                VAPOR027    000016
00113     28*     C     IS THE COMPUTED VAPOR TEMPERATURE HIGHER THAN THE CALCAREOUS SOIL          VAPOR028    000016
00113     29*     C     BOILING TEMPERATURE                                                        VAPOR029    000016
00114     30*      200  IF(TMP1-3100.0)120,120,115                                                VAPOR030    000017
00117     31*      115  VPRESSAM*0.00015*(TMP1-3100.0)                                           VAPOR031    000029
00120     32*           GO TO 130                                                                  VAPOR032    000030
00121     33*      120  VPRES0.0                                                                  VAPOR033    000039
00122     34*      130  RETURN                                                                     VAPOR034    000037
00123     35*           END                                                                        VAPOR035    000047

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

```
D:FOR,S  CASSAN RA,WINDA,R
FOR S0E3-06/11/76-10:16:51 (1,)

   SUBROUTINE WINDA     ENTRY POINT 000221

   STORAGE USED: CODE(1) 000231; DATA(0) 000033; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003   SET1   002323
    0004   DRIFT  001453

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005   FRROR
    0006   NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000006 111G      0001   000101 122L      0001   000144 124L      0001   000037 2217L     0001   000042 28L
    0001   000061 32L       0001   000064 35L       0001   000177 7734L     0003   000000 CAY       0000 R 000013 DELT
    0003   000001 DETID     0003   000015 DIAM      0003   000326 DMEAN     0003   000327 DNS       0003   000330 EXPO
    0003   000331 FMASS     0003   001170 HEIGHT    0000 I 000001 I         0003   000641 IDISTR    0003   000642 IEXEC
    0000   000016 INJP$     0003   000643 IRISE     0000 I 000004 IRROR     0003   000644 ISIN      0003 I 000645 ISOUT
    0000 I 000005 J         0000 I 000006 K         0000 I 000003 MHODO     0000 I 000002 MPOSIT    0003   000646 NDSTR
    0003 I 001172 NHODO     0004 I 000000 NPOSIT    0000 R 000000 PROGRM    0003   000647 PS        0003   001157 SD
    0003   001160 SSAM      0004 R 000001 TC        0003   001161 TME       0003   001162 TMP1      0003   001163 TMP2
    0000 R 000011 TTEMP     0003   001164 T2M       0003   001165 USOIL     0004 R 000133 VB        0004 R 000265 VC
    0003   001166 VPR       0004 R 000417 VT        0003 R 001503 VX        0003 R 002013 VY        0003   001167 W
    0004 R 000551 XC        0000 R 000007 XT        0004 R 000703 YC        0000 R 000010 YT        0004 R 001035 ZB
    0004 R 001167 ZC        0003   001171 ZSCL      0004 R 001321 ZT        0000 R 000012 ZTEMP     0003 R 001173 ZV

00101      1*           SUBROUTINE WIND A (                                                          00000n
00101      2*          1                  ZBRST7)                                                   00000n
00101      3*     C     THE PURPOSE OF THIS SUBROUTINE IS TO CALCULATE LATERAL                       00000n
00101      4*     C     CLOUD DRIFT DUE TO PREVAILING WINDS UP TO STABILIZATION                      00000n
00101      5*     C     TIME.  IT IS CALLLED BY SUBROUTINE RSXP IN DELFIC-PDQ.                       00000n
00101      6*     C     CALCULATIONS MADE HERE DETERMINE WAFER X,Y COORDINATES                       00000n
00101      7*     C     AS LONG AS WAFER IS STILL ABOVE CLOUD BOTTOM.                                00000n
00103      8*           COMMON /SET1/                                                                00000n
00103      9*          1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO      ,        00000n
00103     10*          2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT     ,        00000n
00103     11*          3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1      ,        00000n
00103     12*          4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT    ,        00000n
00103     13*          5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)                       00000n
00103     14*     C                                                                                 00000n
00104     15*           COMMON /DRIFT/                                                               00000n
00104     16*          1 NPOSIT ,TC(90) ,VB(90) ,VC(90) ,VT(90) ,XC(90) ,YC(90) ,                   00000n
00104     17*          2  ZB(90) ,ZC(90 ),ZT(90)                                                    00000n
00104     18*     C                                                                                 00000n
```

```
00105     19*           DATA PROGRM/5HWINDA/                                                    000000
00105     20*     C                                                                             000000
00105     21*     C                                                                             000000
00105     22*     C     INITIALIZE                                                              000000
00105     23*     C                                                                             000000
00105     24*     C     COMPUTE CLOUD CENTER  AND STEW DRIFT FACTOR ENTRIES IN RISE TABLE       000000
00105     25*     C                                                                             000000
00107     26*        10 CONTINUE                                                                000000
00110     27*           DO 25 I=1,NPOSIT                                                        000000
00113     28*           ZC(I) = (ZB(I)+ZT(I))/2.0                                               000006
00114     29*           VC(I)=(VB(I)+VT(I))/2.0                                                 000011
00115     30*        25 CONTINUE                                                                000016
00117     31*           NPOSIT = NPOSIT+1                                                       000016
00120     32*           NHODO=NHODO-1                                                           000021
00120     33*     C                                                                             000021
00120     34*     C     ENSURE THAT WIND VECTORS ARE DEFINED TO ABOVE                           000021
00120     35*     C     STABLIZED CLOUD BOTTOM ALTITUDE                                         000021
00120     36*     C                                                                             000021
00121     37*           IF ((ZV(NHODO)+ZV(NHODO))/2.0 .GE. ZB(NPOSIT)) GO TO 2217               000024
00123     38*        26 IRROR=-26                                                               000037
00124     39*           GO TO 7734                                                              000038
00124     40*     C                                                                             000036
00124     41*     C     FIND HODOGRAPH VECTOR ALTITUDE APPROPRIATE FOR INITTAL TIME             000036
00125     42*      2217 J=1                                                                     000037
00126     43*           K=1                                                                     000040
00127     44*        28 IF(ZC(1)-(ZV (J+1)+ZV(J))/2.0)  35,35,30                                000042
00132     45*        30 IF(J-NHODO)  31,32,32                                                   000050
00135     46*        31 J=J+1                                                                   000054
00136     47*           GO TO 28                                                                000057
00137     48*        32 IRROR = -32                                                             000061
00140     49*           GO TO 7734                                                              000062
00140     50*     C                                                                             000062
00140     51*     C     COMPUTE HORIZONTAL DISPLACEMENTS VS. TIME FOR THE CLOUD BOTTOM          000062
00140     52*     C     CENTER.                                                                 000062
00141     53*        35 XT=TC(1)*VX(J)                                                          000064
00142     54*           YT=TC(1)*VY(J)                                                          000067
00143     55*           XC(1)=XT                                                                000072
00144     56*           YC(1)=YT                                                                000073
00145     57*           TTEMP=TC(1)                                                             000074
00146     58*           ZTEMP=ZC(1)                                                             000076
00146     59*     C                                                                             000076
00146     60*     C 122 WHICH IS LOWER, NEXT CLOUD POSIT OR NEXT HODOGRAPH VECTOR               000076
00146     61*     C                                                                             000076
00147     62*       122 IF(J.GE.NHODO) GO TO 124                                                000101
00151     63*           IF((ZV(J+1) + ZV(J))/2. -ZC(K+1))123,124,124                            000105
00154     64*       123 DELT=((ZV(J+1)+ ZV(J))/2.- ZTEMP)/VC(K)                                 000114
00155     65*           ZTEMP= (ZV(J+1)+ZV(J))/2.                                               000123
00156     66*           TTEMP=TTEMP+DELT                                                        000125
00157     67*           XT=XT+       VX(J)*DELT                                                 000127
00160     68*           YT=YT+       VY(J)*DELT                                                 000133
00161     69*           J=J+1                                                                   000137
00162     70*           GO TO 122                                                               000142
00162     71*     C                                                                             000142
00162     72*     C     NEXT CLOUD CELL CENTER IS LOWER                                         000142
00163     73*       124 DELT=TC(K+1)-TTEMP                                                      000144
00164     74*           TTEMP=TC(K+1)                                                           000147
00165     75*           ZTEMP=ZC(K+1)                                                           000151
```

```
00166     76*           XC(K+1)=XT+VX(J)*DELT                                  000156
00167     77*           YC(K+1)=YT+VY(J)*DELT                                  000157
00170     78*           XT=XC(K+1)                                             000163
00171     79*           YT=YC(K+1)                                             000164
00172     80*           K=K+1                                                  000165
00173     81*           IF( K.LT. NPOSIT) GO TO 122                            000170
00175     82*           RETURN                                                 000171
00176     83*      -734 CALL ERROR(PROGRM,IRROR,ISOUT)                         000172
00177     84*           RETURN                                                 000173
00200     85*           END                                                    000230
```

EN- OF C.MPILATION: NO DIAGNOSTICS.

```
@:FOR:S  CASSANDRA./INDB:R
FOR S0F3-0A/11/76-10:16:55 (1.)

   SUBROUTINE WINDB      ENTRY POINT 000355

   STORAGE USED: CODE(1) 000430; DATA(0) 000064; BLANK COMMON(2) 000000

    COMMON BLOCKS:

    0003    SET1    002323
    0004    WAFER   000423

   EXTERNAL REFERENCES (BLOCK, NAME)

    0005    NERR3$

   STORAGE ASSIGNMENT  (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001    000015 10L      0001    000244 1000L    0001    000054 126G     0001    000260 150L     0001    000157 156G
    0001    000021 20L      0001    000304 200L     0001    000274 213G     0001    000306 300L     0001    000206 38L
    0001    000237 40L      0001    000242 50L      0001    000140 60L      0000 R  000023 ALTX     0000 R  000013 AX
    0000 R  000014 AY       0000 R  000015 BX       0000 R  000016 BY       0000 R  000022 C        0003    000000 CAY
    0000 R  000025 DELT     0000 R  000010 DELZ     0003    000001 DETID    0003    000015 DIAM     0003    000326 DMEAN
    0003    000327 DNS      0004    000135 DPX      0000 R  000011 DVX      0000 R  000012 DVY      0000 R  000021 DZA
    0000 R  000007 DZV      0003    000330 EXPO     0003    000331 FMASS    0004    000422 FROG     0003    001170 HEIGHT
    0000 I  000004 I        0003    000641 IDISTR   0003    000642 IEXEC    0000    000033 INJP$    0003    000643 IRISE
    0003    000644 ISIN     0003    000645 ISOUT    0000 I  000003 ISTRT    0000 I  000005 IV       0000 I  000006 IVP
    0000 I  000017 K        0000 I  000001 KA       0000 I  000002 KB       0004 I  000000 KONE     0000 I  000020 KP
    0000 I  000024 KS       0004 I  000001 KTWO     0004    000002 LT       0003    000646 NDSTR    0003    001172 NHODO
    0003    000647 PS       0003    001157 SD       0003    001160 SSAM     0003    001161 TME      0003    001162 TMP1
    0003    001163 TMP2     0003    001164 T2M      0003    001165 USOIL    0000 R  000000 V        0004 R  000421 VELOCF
    0000 R  000026 VFLX     0000 R  000027 VELY     0004    000003 VISCX    0003    001166 VPR      0003 R  001503 VX
    0003 R  002013 VY       0003    001167 W        0003    001171 ZSCL     0003 R  001173 ZV

00101      1*           SUBROUTINE WINDB                                                    000002
00101      2*          1  (DX,DY,ALITUD,NV,TIME,AXNT,S  )                                  000002
00101      3*     C                                                                        000002
00101      4*     C     THIS SUBROUTINE COMPUTES LATERAL SHIFT OF LAMINA THAT HAVE         000002
00101      5*     C     FALLEN BELOW CLOUD BOTTOM BEFORE STABILIZATION.                    000002
00101      6*     C                                                                        000002
00101      7*     C                                                                        000002
00103      8*           COMMON /SET1/                                                      000002
00103      9*          1CAY       ,DETID(12) ,DIAM(201) ,DMEAN     ,DNS       ,EXPO     ,000002
00103     10*          2FMASS(200),IDISTR    ,IEXEC     ,IRISE     ,ISIN      ,ISOUT    ,000002
00103     11*          3NDSTR     ,PS(200)   ,SD        ,SSAM      ,TME       ,TMP1     ,000002
00103     12*          4TMP2      ,T2M       ,USOIL     ,VPR       ,W         ,HEIGHT   ,000002
00103     13*          5ZSCL      ,NHODO     ,ZV(200)   ,VX(200)   ,VY(200)             000002
00104     14*           COMMON/WAFER/                                                     000002
00104     15*          1 KONE,KTWO,LT,VISCX(90),DPX(2,90),VELOCF,FROG                     000002
00105     16*           DIMENSION ALITUD(2)                                               000002
```

```
00106     17*           V=ABS(VELOCF)                                                    000003
00107     18*           IF(VELOCF.GE. 0.0) GO TO 10                                      000004
00111     19*           KA=KTWO                                                          000007
00112     20*           KB=KONE                                                          000011
00113     21*           GO TO 20                                                         000013
00114     22*        10 CONTINUE                                                         000015
00115     23*           KA=KONE                                                          000015
00116     24*           KB=KTWO                                                          000016
00117     25*        20 CONTINUE                                                         000021
00120     26*           ISTRT= IFIX( (ALITUD(KA)-AXNT ) / S )                            000021
00121     27*           IF((ALITUD(KB)-ALITUD(KA)).LE.  100.0)  GO TO 150                000034
00123     28*           DX=0.0                                                           000045
00124     29*           DY=0.0                                                           000046
00124     30*     C     FIND FIRST TRUE INCLUSIVE INTERVAL                               000046
00125     31*           DO 50 I=ISTRT,NV                                                 000050
00130     32*           IF(  ALITUD(KA).GT. ZV(I+1) )  GO TO 50                          000054
00132     33*           IV=I                                                             000060
00133     34*           IVP=I+1                                                          000063
00133     35*     C     CALCULATE PARTIAL INTERVAL TRANSPORT                             000063
00134     36*           DZV=ZV(IVP)-ZV(IV)                                               000066
00135     37*           DELZ=  ( ALITUD(KA)-ZV(IV)) / DZV                                000071
00136     38*           DVX= VX(IVP)-VX(IV)                                              000075
00137     39*           DVY=VY(IVP)-VY(IV)                                               000100
00140     40*           AX= VX(IV)+DELZ* DVX                                             000103
00141     41*           AY= VY(IV)+DELZ*DVY                                              000106
00142     42*           IF( ALITUD(KB).GT. ZV(IVP) ) GO TO 60                            000111
00144     43*           DELZ= (ALITUD(KB)-ZV(IV) ) / DZV                                 000115
00145     44*           BX= VX(IV)+DELZ* DVX                                             000121
00146     45*           BY= VY(IV)+DELZ* DVY                                             000124
00147     46*           DX= (ALITUD(KB)-ALITUD(KA))*(AX+BX)                              000130
00150     47*           DY= (ALITUD(KB)-ALITUD(KA))*(AY+BY)                              000133
00151     48*           GO TO 1000                                                       000136
00152     49*        60 CONTINUE                                                         000140
00153     50*           DX=(ZV(IVP)-ALITUD(KA))*(AX+VX(IVP))                             000144
00154     51*           DY=(ZV(IVP)-ALITUD(KA)) *(AY+VY(IVP))                            000150
00155     52*           DO  40 K= IVP,NV                                                 000157
00160     53*           KP=K+1                                                           000157
00161     54*           DZV=ZV(KP)-ZV(K)                                                 000163
00162     55*           IF( ALITUD(KB).LE. ZV(KP) ) GO TO 38                             000166
00164     56*           DX=DX+ DZV*(VX(K)+VX(KP) )                                       000173
00165     57*           DY=DY+ DZV*(VY(K)+VY(KP) )                                       000177
00166     58*           GO TO 40                                                         000204
00167     59*        38 CONTINUE                                                         000206
00170     60*           DZA= ALITUD(KB)-ZV(K)                                            000206
00171     61*           DELZ=DZA/ DZV                                                    000211
00172     62*           BX=VX(K)+ DELZ*( VX(KP)-VX(K))                                   000213
00173     63*           BY=VY(K)+ DELZ*( VY(KP)-VY(K))                                   000220
00174     64*           DX=DX+ DZA* (VX(K)+BX)                                           000226
00175     65*           DY=DY+ DZA* (VY(K)+BY)                                           000231
00176     66*           GO TO 1000                                                       000235
00177     67*        40 CONTINUE                                                         000240
00201     68*           GO TO 1000                                                       000240
00202     69*        50 CONTINUE                                                         000244
00204     70*      .000 C=2.0*V                                                         000244
00205     71*           DX= DX/C                                                         000246
00206     72*           DY= DY/C                                                         000251
00207     73*           RETURN                                                           000254
```

```
00210     74*        150 CONTINUE                                                  000260
00211     75*            ALTX=(ALITUD(KA)+ALITUD(KB) )/2.0                         000260
00212     76*            DO 200 K=ISTRT,NV                                         000274
00215     77*            IF( ALTX .GT. ZV(K+1) ) GO TO 200                         000274
00217     78*            KS=K                                                      000300
00220     79*            GO TO 300                                                 000302
00221     80*        200 CONTINUE                                                  000306
00223     81*        300 CONTINUE                                                  000306
00224     82*            DELT=(ALTX-ZV(KS))/(ZV(KS+1)-ZV(KS),                      000306
00225     83*            VELX=VX(KS)+DELT*( VX(KS+1)-VX(KS) )                      000314
00226     84*            VELY=VY(KS)+DELT*( VY(KS+1)-VY(KS) )                      000321
00227     85*            DX=VELX*TIME                                              000326
00230     86*            DY=VELY* TIME                                             000330
00231     87*            RETURN                                                    000332
00232     88*            END                                                       000427

      END OF COMPILATION:        NO  DIAGNOSTICS.
```

IV. USER'S GUIDE TO CASSANDRA

A. Control Cards for UNIVAC 1108 EXEC 8

The following sequence of control cards are input for a CASSANDRA run on UNIVAC 1108 EXEC 8:

1. @ RUN RUN-ID,ACCT-ID,PROJ-ID,10,200
2. @ ASG,A CASSANDRA.
3. @ ASG,T 8.,F//POS/10
4. @ XQT CASSANDRA.M3DUST
   Insert data deck here for initial conditions, cloud rise, and transport.
5. @ XQT CASSANDRA.MPDQ
   Insert data deck here for CASSANDRA output.
6. Blank card following last data card.
7. @ FIN

B. Data Deck for Execution of CASSANDRA. M3DUST

1. Deck 1 - Initial Conditions

Card Sequence	Mnemonic	Format	Read In
Card 1, File Assignments	NUMTAP(I),I=1,15	15I4	MTHRE

where:

NUMTAP(1)=ISIN
NUMTAP(2)=ISOUT
NUMTAP(3)=IRISE

and

ISIN=Card Reader, set to 5
ISOUT=Printer, set to 6
IRISE=Drum assignment, set to 8, the same as the control card assignment.

Card 2	LGO,LTHRU	2I2	MTHRE

where:

LGO = Start point, punch 1 in column 2.
LTHRU = Stop point, punch 2 in column 4.

Card 3	DETID(J),J=1,12	12A6	LINK 1

where:

DETID(J) = Arbitrary 72 character identification table for the initial conditions. It will be printed as it appears on the card.

Card 4	N	I5	LINK 1

where: N = The number of data sets for which initial condition calculations are desired. If zero or negative, 1 is assumed.

Card 5	IDISTR	I5	LINK 1

where: IDISTR = Preshot soil size - frequency option parameter with values as follows:

IDISTR	PARTICLE SIZE DISTRIBUTION
≤1	Log Normal
2	Power Law
3	Tabular

Card 6	NDSTR	I5	LINK 1

where: NDSTR = Number of entries in the soil particle size-frequency distribution. This has a maximum value of 200 and is set to 100 if not specified.

The following card order is controlled by the value of IDISTR

For IDISTR ≤1

Card 7	W,HEIGHT,USOIL,DMEAN, SD,DNS,HEW	7F10.3	LINK 1

For IDISTR = 2

Card 7	W,HEIGHT,USOIL,EXPO, CAY,DNS,HEW	7F10.3	LINK 1
Card 8 thru CAY + 8	A(I),Y(I),I=1,NSEG	2E10.4	DSTBN

For IDISTR = 3

Card 7	W,HEIGHT,USOIL,DNS, HEW	7F10.3	LINK 1
Card 8 thru NDSTR + 8	FMASS(I),DIAM(I), I=1,NDSTR	2E12.5	LINK 1
Card NDSTR + 9	DIAM(NDSTR + 1)	E12.5	LINK 1

where: W = Total weapon yield in kt.

HEIGHT = Height of burst in metres. May be negative for depth of burst.

USOIL = Indicator for soil type.

USOIL = 0. for siliceous.
USOIL = 1. for calcareous.

DMEAN = Mean diameter of the smallest particle size class to be used.

EXPO = Exponent of the frequency function for the power law particle size frequency distribution.

CAY = Coefficient of the frequency function for the power law particle size frequency distribution.

SD = The standard deviation of the log-normal preshot particle size frequency distribution.

DNS = Fallout particle density (g cm^{-3}). Defaults to 2.6.

HEW = High explosive yield if non-nuclear.

A = Diameter (microns) of particles from the power law particle size distribution curve.

Y = The percent finer by weight a particle size from the power law particle size distribution curve.

NSEG = IFIX (CAY).

FMASS = Fraction of the total particulate mass in the ith particle size class.

DIAM = Diameter of the largest particle in the ith particle size class. DIAM (NDSTR + 1) is the diameter of the smallest particle in the last (smallest) particle size class.

2. Deck 2 - GZ Wind Data

Card Sequence	Mnemonic	Format	Read In
Card 1	NHODO	I5	SHWIND

where:

NHODO = Number of wind levels in wind data deck. If NHODO = 0 no shot-time winds have been specified.

If NHODO > 0

Card 2	ZV(J),VX(J),VY(J), J=1,NHODO	3E13.6	SHWIND

where:

ZV = Height of the jth wind stratum.
VX = X component of the wind velocity of the jth stratum (m/s).
VY = Y component of the wind velocity of the jth stratum (m/s).

3. Deck 3 - LINK 2 Input

Card Sequence	Mnemonic	Format	Read In
Card 1	DNID	12A6	LINK 2
Card 2	KDI,IRAD,KCLD, KRX,IPAM,KATM	6I4	LINK 2
Card 3	ZBRSTZ	E12.5	LINK 2
Card 4	SLDTMP	E12.5	LINK 2
Card 5	FW	E12.5	LINK 2
Card 6	PHI	E12.5	LINK 2
Card 7	ATID	12A6	LINK 2

where:

DNID = Arbritrary cloud-rise module identification.
KDI = The number of deposit increments per particle size class.
IRAD = Number of cloud wafer radius subdivisions.
KCLD = Control Index for CRM debug printout.
KCLD = 1, print data from CRM.
KCLD = 0, no debug printout.
KRX = Control Index for RSXP debug printout
KRX = 0, no printout, KRX = 1, print debug data from RSXP.
IPAM = Particle activity calculation control (always zero).
KATM = Atmosphere printout switch.
KATM = 0, no printout from ATMR.
KATM = 1, print complete atmosphere.
ZBRSTZ = Altitude of GZ (metres above MSL).
SLDTMP = Particle solidification temperature (°K).
FW = Fission yield (kt).
PHI = Fraction of FW used to heat air internally.
ATID = An arbitrary 72 character identification for the atmosphere.

Card 8	FMT	12A6	ATMR

where:

FMT = Atmosphere data are read by the format specified on the FMT card. The eight values are then scaled by the data on the SCALE card and are taken to be in the order specified on the N1---N8 card.

Cards 9 & 10	SCALE(I),I=1,10	7F10.5/3F10.5	ATMR
Card 11	N1 - N8	8I4	ATMR

where:

N1 -- N8 = Atmosphere data sequence indices.

Card 12	NPVA	I4	ATMR

where:

NPVA = Number of atmosphere table entries.

Card 13 to NPVA+11	AP(I),I=1,8	FMT	ATMR

where:

AP = Atmosphere data. The data required are:

ALT = Altitude of the ith level above MSL(metres).
ATP = Temperature of the ith atmosphere level(°K).
PRS = Pressure of the ith atmosphere level(mb).
RHZ = Atmospheric air density of the ith atmospheric level(kg/m^3).
RLH = Relative humidity of the ith atmospheric level (percent).
ETA = Atmospheric dynamic viscosity of the ith atmospheric level (kg/(m-s). Does not have to be input.
GRV = Acceleration due to gravity at the ith atmospheric level ($cm\ s^{-2}$). Need not be input.
SLM = Mean-free-path of air molecules at the ith atmospheric level (m). Need not be input.

then:

If the data are in the above order, the sequence card would be punched 1, 2, 3, 4, 5, 6, 7, 8; however, if not, the proper number sequence would be punched and AP(I) is converted as required. For this program PRS or RHZ (but not both) need be input.

4. Deck 4 - Input for Cloud Rise and Point Density

Card Sequence	Mnemonic	Format	Read In
Card 1	DETID(J), J=1, 12	12A6	RSXP

where:

DETID = Arbitrary 72 character identification for the cloud rise calculations.

Card 2	IC(J),J=1,18	18I4	RSXP

where:

IC = Control indices. In the current version of CASSANDRA only two of the 18 elements of this control array are in use. These are IC(5) and IC(6). If IC(5)≠ 0, skips around writing wafer history arrays on IRISE tape. If IC(6) ≠ 0, debug prints complete wafer history.

Card 3	XGZ,YGZ,TGZ	3E12.5	RSXP

where:

XGZ = X - coordinate of ground zero (m).
YGZ = Y - coordinate of ground zero (m)
TGZ = Time of detonation (s),

Card 4	NSUBD,NONE,NTWO,LWONE, LWTWO	5I4	RSXP

where:

NSUBD = Below cloud wafer subdivisions. Default value = 5.
NONE = Starting particle size increment. Default value = 1.
NTWO = Ending particle size increment. Default value = NDSTR.
LWONE= Starting wafer bounds. Default value = 1.
LWTWO= Ending wafer bounds. Default value = KDPST where KDPST is set depending upon KDI. If KDI > 0, KDPST = KDI. If KDI = 0, KDPST = 10.

This is the end of the data decks required for execution of CASSANDRA. M3DUST.

C. Data Deck for Execution of CASSANDRA.MPDQ

The following input data deck is placed following the @XQT CASSANDRA. MPDQ control card.

Card Sequence	Mnemonic	Format	Read In
Card 1	IPDQ	I2	PDQXQT

where:

IPDQ = Logical unit of Cloud Tape (IRISE).

Card 2	OPTION	I5	PDQXQT

where:

OPTION = Specifies target option to determine type of calculation and times to be used.

OPTION = 0 program stops.
OPTION = 1 gives tabular output of dust loading at specified target coordinates.
OPTION = 2 gives map output of mass concentration at points in space.
OPTION = -1 or -2 are used to repeat calculation for a new set of coordinates and time.

IF OPTION = 1 the following cards are input:

Cards 3 and 4	NTARP,TX(J),TY(J), TZ(J),TRAT(J),J=1, NTARP	I5/4E15.5	PDQXQT

where:

NTARP = Number of target coordinates for which calculations are to be made.
TX = X - coordinate relative to GZ (m).
TY = Y - coordinate relative to GZ (m).
TZ = Altitude above ground level (m).
TRAT = Time after detonation at which calculation is made (s).

Card 5	COMBIN,ISTART,ISTOP	3I5	PDQXQT

where:

COMBIN = Control number of particle size classes being summed at each target point. If 0, indicates summation of all particle size classes.
ISTART = Control number for beginning particle size class to be treated. If 0, ISTART = NONE.
ISTOP = Control number for ending particle size class to be treated. If 0, ISTOP = NDSTR.

Card 6 If blank, program terminates since OPTION = 0.
If -1, program repeats if a new data deck for OPTION 1 follows this card.

IF OPTION = 2, the following cards are input:

Card 3	NSTRIP,NROW,NANGL	3I5	PDQXQT

where:

NSTRIP = Control integer for number of map strips to be printed.
NROW = Control integer for number of rows of point density data to be printed.
NANGL = Control integer for angle relative to east of GZ.

For example, if NSTRIP = 1, NROW = 2 and NANGL = 0, a map will be produced one page wide, with 15 points in X direction and 30 points in the Z direction and the angle will be 0° from east.

Card 4	RMIN,RMAX,ALTMIN ALTMAX,DELR,DELALT	6E12.4	PDQXQT

where:

RMIN = Minimum distance relative GZ (m).
RMAX = Maximum distance relative GZ (m).
ALTMIN = Minimum altitude above ground (m).
ALTMAX = Maximum altitude above ground (m).
DELR = Horizontal distance between target points (m).
DELALT = Vertical distance between target points (m).
One of the above other than RMIN and ALTMIN must be input.

Card 5	TRAT	E12.4	PDQXQT

where:

TRAT = Time (s) for matrix target representation, seconds after burst.

Card 6	COMBIN,ISTART,ISTOP	8I5	PDQXQT

where:

Same as previously discussed

Card 7	OPTION	I5	PDQXQT

where:

OPTION = 0 program stops.
OPTION = -2 program repeats for a new time update request (Card 5).

V. EVALUATION OF CASSANDRA

A. Dial Pack Simulation

The validity of the CASSANDRA code was tested by running a simulation of the dust cloud resulting from the high explosive event Dial Pack.[2] The Dial Pack event was chosen because there was a project for the specific purpose of sampling the dust cloud by aircraft traversal at a number of times and altitudes. The sampling project resulted in calculated values for average mass concentration at various altitudes within the cloud.

In order to simulate the cloud rise dynamics of a high explosive (HE) test with a program specifically designed for modelling nuclear clouds, it was necessary to modify the assumed energy partition. For HE, all of the energy was assumed to heat the cloud. Figure 4 shows the cloud top altitude as a function of time, calculated by CASSANDRA, together with some observed values for the Dial Pack cloud. Considering the irregular nature of the Dial Pack cloud, this is considered to be in fair agreement.

The particle size distribution used to characterize the preshot soil is shown in Figure 5. It is a continuous piecewise power law distribution and was constructed to fit the data points shown. The crosses represent data obtained from the analysis of a core sample of preshot soil. This particular core sample was chosen because the particle size range compared favorably with that found in the samples from the aircraft traversals and from ground based collectors. The size range used was from 0.012 to 2000 microns.

Due to the lack of shot time wind information for Dial Pack and the fact that the average wind changed direction by about 180° shortly before detonation, the simulation was run with zero wind. Since the figures for comparison are averages over a cloud traversal at a fixed altitude, this is not considered a serious drawback.

2. *Hyman, David S., et al, "Dust Cloud Analysis for Event Dial Pack", DASA 2694, Headquarters, Defense Atomic Support Agency, Washington, DC 20305, May 71.*

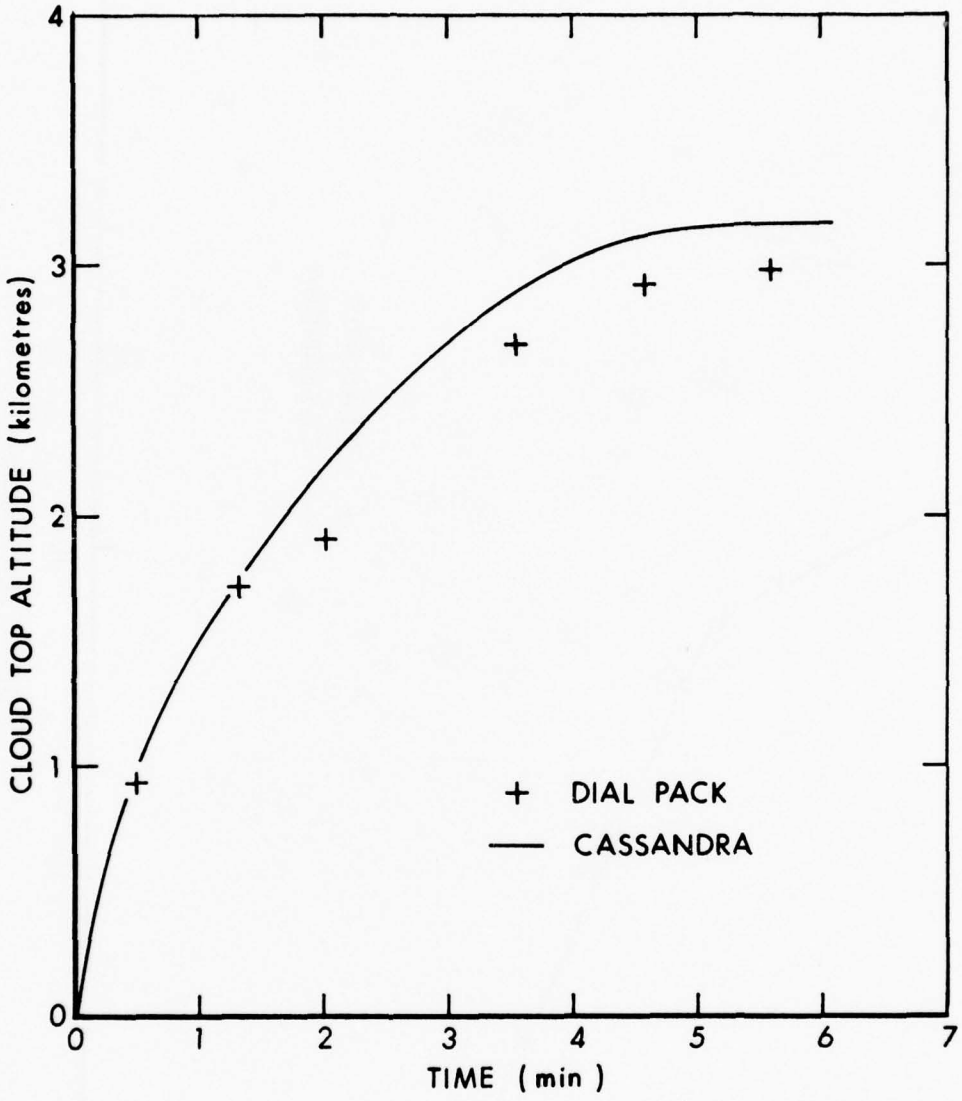

Figure 4. Cloud Rise

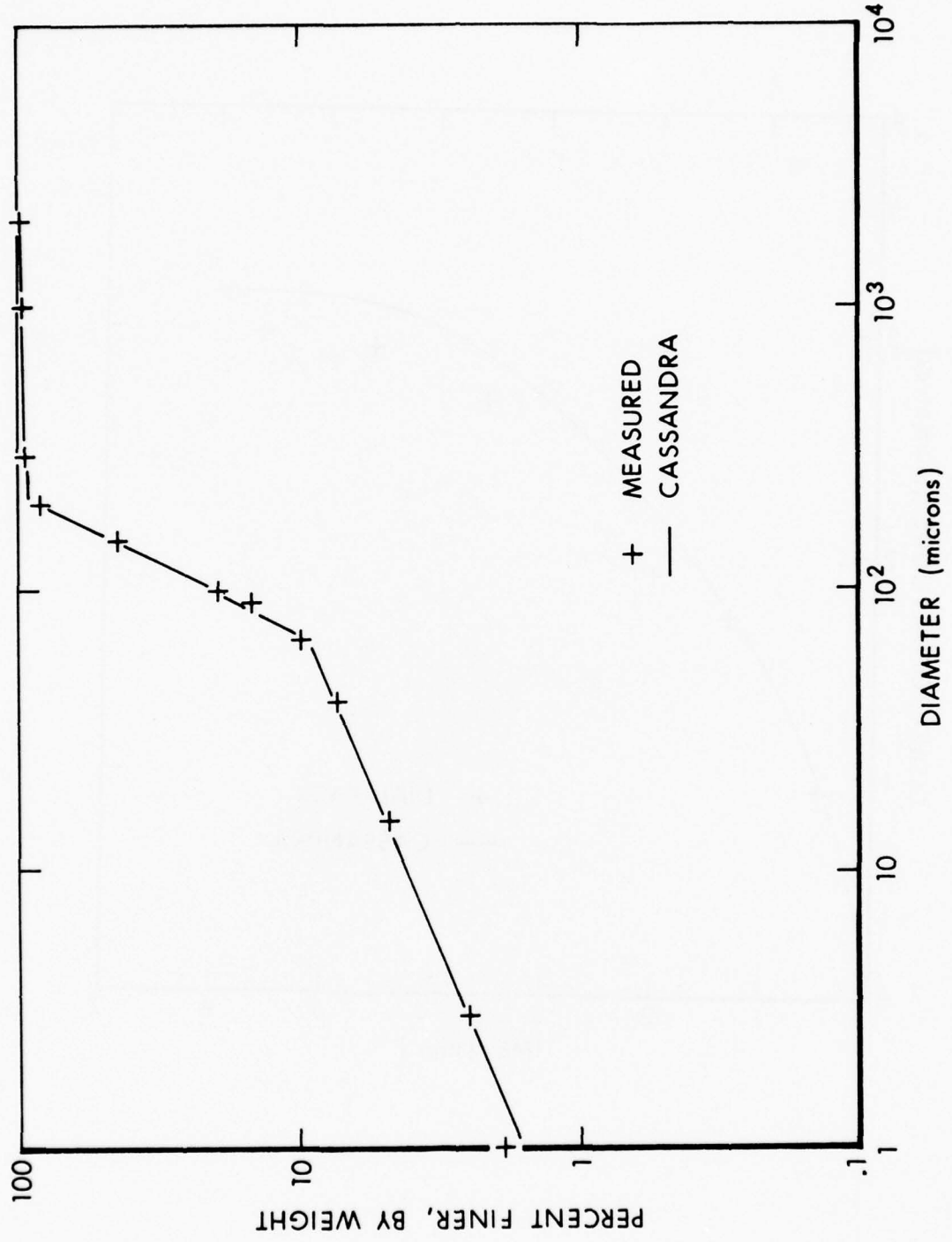

Figure 5. Dial Pack Particle Size Distribution

B. Sample Data Deck for Dial Pack Simulation

```
001  $ASG,A  CASSANDRA.
002  $ASG,T 8,F//POS/10
003  $XQT  CASSANDRA.M3DUST
004      5   6   8  15  16  20  21  22  17  18  11  12                    NUMTAP
005    1 2                                                                LGO
006                                                                       DETID
007                                                                          N
008        2                                                           IDTSTR
009      100                                                              NDSTR
010          1.0          4.1          2.0                  -4.0         1.6  WHUE
011        2000.0       100.0                                          A(1)Y(1)
012         215.0        95.0                                          A(2)Y(2)
013          69.0         9.5                                          A(3)Y(3)
014           1.0         1.6                                          A(4)Y(4)
015                                                                      NHODO
016                                                                      DNTD
017      10                                                              KDT
018    659.892                                                        ZPDSTZ
019    1673.0                                                           SLDTMP
020    0.5                                                                FW
021    1.0                                                                PHT
022    DIAL PACK ATM&SPHERIC DATA                                         ATTD
023    (5F10.0,3F2.0)                                                     FTM
024                                                                    SCALE1
025                                                                    SCALE2
026        1   2   3   4   5   6   7   8                                   SED
027      15                                                               NPVA
028                 299.2       931.4                 6..                ATM 1
029    784.555      286.9       850.                  52.                ATM 2
030    1552.346     281.1       775.                  44.                ATM 3
031    2326.54      277.5       705.                  36.                ATM 4
032    3128.47      271.1       638.                  39.                ATM 5
033    3918.20      267.7       577.                  30.                ATM 6
034    4722.57      262.5       520.                  30.                ATM 7
035    5555.59      256.6       466.                  30.                ATM 8
036    6380.38      250.5       417.                  30.                ATM 9
037    7246.92      249.5       370.                  30.                ATM10
038    8095.18      236.5       333.                  30.                ATM11
039    9045.85      230.8       258.                  30.                ATM12
040    9849.31      230.0       253.                  30.                ATM13
041    10762.18     241.1       220.                  30.                ATM14
042    11712.55     221.1       190.                  30.                ATM15
043                                                                      DETID
044                                                                         IC
045                                                                  XGZ,YGZ,TG
046                                                                      NSUB
047    $XQT  CASSANDRA.MPDQ                                               IPDQ
048      8                                                             OPTION
049        1                                                           NTARP
050        5
051                                          1000.          1200.
052                                          1500.          1200.
053                                          2000.          1200.
054                                          2500.          1200.
055                                          3000.          1200.
056        10                                                          COMBIN
057
058
```

C. Sample Computer Output for Dial Pack Simulation

* * * * * * * * *

THE DEPARTMENT OF DEFENSE FALLOUT PREDICTION SYSTEM

* * * * * * * * * *

INITIAL CONDITIONS (FIREBALL) MODULE

PREPARED BY
ARCON CORPORATION
WAKEFIELD, MASS.

**** INITIAL CONDITIONS IDENTIFICATION ****

**** INPUT PARAMETERS ****

YIELD	.50000+00	KT
HEIGHT OR DEPTH OF BURST	.41000+01	METERS
SOIL CATEGORY	CALCAREOUS	

PARTICLE SIZE FREQUENCY DISTRIBUTION
POWER LAW DISTRIBUTION WITH -
100 PARTICLE SIZE CLASSES
THE SPECIFIED PARAMETERS ARE
CAY = .45000+01
EXPO = .00000

PARTICLE SIZE, LOWER SIZE INTERVAL BOUNDARY, MASS FREQUENCY, AND UPPER SIZE INTERVAL BOUNDARY
FOR USE IN PSYR, TRANSPORT, AND ACTIVITY CALCULATIONS (DIAMETERS IN METERS)

	DIAMETER	LOWER BOUNDARY	MASS FRACTION	UPPER BOUNDARY
1	.16075-02	.12920-02	.10000-01	.20000-02
2	.10361-02	.83087-03	.10000-01	.12920-02
3	.66481-03	.53193-03	.10000-01	.83087-03
4	.42463-03	.33898-03	.10000-01	.53193-03
5	.26996-03	.21500-03	.10000-01	.33898-03
6	.21444-03	.21388-03	.10000-01	.21500-03
7	.21332-03	.21275-03	.10000-01	.21388-03
8	.21219-03	.21162-03	.10000-01	.21275-03
9	.21105-03	.21048-03	.10000-01	.21162-03
10	.20991-03	.20934-03	.10000-01	.21048-03
11	.20876-03	.20819-03	.10000-01	.20934-03
12	.20761-03	.20703-03	.10000-01	.20819-03
13	.20645-03	.20586-03	.10000-01	.20703-03
14	.20528-03	.20469-03	.10000-01	.20586-03
15	.20410-03	.20351-03	.10000-01	.20469-03
16	.20292-03	.20233-03	.10000-01	.20351-03
17	.20173-03	.20114-03	.10000-01	.20233-03
18	.20054-03	.19994-03	.10000-01	.20114-03
19	.19933-03	.19873-03	.10000-01	.19994-03
20	.19812-03	.19752-03	.10000-01	.19873-03
21	.19690-03	.19629-03	.10000-01	.19752-03
22	.19568-03	.19506-03	.10000-01	.19629-03
23	.19444-03	.19382-03	.10000-01	.19506-03
24	.19320-03	.19258-03	.10000-01	.19382-03
25	.19195-03	.19132-03	.10000-01	.19258-03
26	.19069-03	.19006-03	.10000-01	.19132-03
27	.18942-03	.18879-03	.10000-01	.19006-03
28	.18815-03	.18751-03	.10000-01	.18879-03
29	.18686-03	.18622-03	.10000-01	.18751-03
30	.18557-03	.18492-03	.10000-01	.18622-03
31	.18426-03	.18361-03	.10000-01	.18492-03
32	.18295-03	.18229-03	.10000-01	.18361-03
33	.18162-03	.18096-03	.10000-01	.18229-03
34	.18029-03	.17962-03	.10000-01	.18096-03
35	.17895-03	.17827-03	.10000-01	.17962-03
36	.17759-03	.17692-03	.10000-01	.17827-03
37	.17623-03	.17555-03	.10000-01	.17692-03
38	.17485-03	.17416-03	.10000-01	.17555-03
39	.17347-03	.17277-03	.10000-01	.17416-03
40	.17207-03	.17137-03	.10000-01	.17277-03
41	.17066-03	.16995-03	.10000-01	.17137-03
42	.16924-03	.16853-03	.10000-01	.16995-03
43	.16780-03	.16708-03	.10000-01	.16853-03
44	.16636-03	.16563-03	.10000-01	.16708-03
45	.16490-03	.16416-03	.10000-01	.16563-03
46	.16342-03	.16268-03	.10000-01	.16416-03
47	.16194-03	.16119-03	.10000-01	.16268-03
48	.16043-03	.15968-03	.10000-01	.16119-03
49	.15892-03	.15816-03	.10000-01	.15968-03
50	.15739-03	.15662-03	.10000-01	.15816-03
51	.15584-03	.15507-03	.10000-01	.15662-03

52	.15428-03	.15350-03	.10000-01	.15507-03
53	.15270-03	.15191-03	.10000-01	.15350-03
54	.15111-03	.15031-03	.10000-01	.15191-03
55	.14949-03	.14868-03	.10000-01	.15031-03
56	.14786-03	.14704-03	.10000-01	.14868-03
57	.14621-03	.14538-03	.10000-01	.14704-03
58	.14454-03	.14371-03	.10000-01	.14538-03
59	.14285-03	.14201-03	.10000-01	.14371-03
60	.14114-03	.14029-03	.10000-01	.14201-03
61	.13941-03	.13854-03	.10000-01	.14029-03
62	.13766-03	.13678-03	.10000-01	.13854-03
63	.13588-03	.13499-03	.10000-01	.13678-03
64	.13408-03	.13318-03	.10000-01	.13490-03
65	.13225-03	.13134-03	.10000-01	.13318-03
66	.13040-03	.12947-03	.10000-01	.13134-03
67	.12852-03	.12758-03	.10000-01	.12947-03
68	.12661-03	.12566-03	.10000-01	.12758-03
69	.12467-03	.12370-03	.10000-01	.12566-03
70	.12270-03	.12172-03	.10000-01	.12370-03
71	.12070-03	.11970-03	.10000-01	.12172-03
72	.11866-03	.11764-03	.10000-01	.11970-03
73	.11659-03	.11555-03	.10000-01	.11764-03
74	.11448-03	.11342-03	.10000-01	.11555-03
75	.11232-03	.11124-03	.10000-01	.11342-03
76	.11013-03	.10902-03	.10000-01	.11124-03
77	.10788-03	.10676-03	.10000-01	.10902-03
78	.10559-03	.10444-03	.10000-01	.10676-03
79	.10325-03	.10207-03	.10000-01	.10444-03
80	.10085-03	.99639-04	.10000-01	.10207-03
81	.98386-04	.97148-04	.10000-01	.99639-04
82	.95860-04	.94590-04	.10000-01	.97148-04
83	.93265-04	.91958-04	.10000-01	.94590-04
84	.90593-04	.89247-04	.10000-01	.91958-04
85	.87837-04	.86449-04	.10000-01	.89247-04
86	.84990-04	.83555-04	.10000-01	.86449-04
87	.82041-04	.80554-04	.10000-01	.83555-04
88	.78978-04	.77433-04	.10000-01	.80554-04
89	.75798-04	.74178-04	.10000-01	.77433-04
90	.72454-04	.70769-04	.10000-01	.74178-04
91	.65530-04	.60679-04	.10000-01	.70769-04
92	.52752-04	.45861-04	.10000-01	.60679-04
93	.39131-04	.33389-04	.10000-01	.45861-04
94	.27799-04	.23146-04	.10000-01	.33389-04
95	.18636-04	.15006-04	.10000-01	.23146-04
96	.11510-04	.88288-05	.10000-01	.15006-04
97	.62721-05	.44558-05	.10000-01	.88288-05
98	.27519-05	.16996-05	.10000-01	.44558-05
99	.74573-06	.32720-06	.10000-01	.16996-05
100	.62989-07	.12126-07	.10000-01	.32720-06

**** INITIAL CLOUD PROPERTIES AT H + .18586+01 SECONDS ****

AVERAGE GAS TEMPERATURE .24897+04 DEGREES KELVIN

AVERAGE TEMPERATURE OF CONDENSED PHASE MATERIAL IN CLOUD .13849+04 DEGREES KELVIN

MASS OF VAPORIZED SOIL IN CLOUD .00000 KILOGRAMS

MASS OF CONDENSED PHASE MATERIAL IN CLOUD .42266+06 KILOGRAMS

PARTICLE SIZE FREQUENCY DISTRIBUTION AT THE TIME OF INITIAL CONDITIONS SPECIFICATION

* * * * * * * * * *

SHOT- IMG WINDS HAVE NOT BEEN SPECIFIED
LEAVING . INK 1
ENTERING LINK 2

****

THE DEPARTMENT OF DEFENSE FALLOUT PREDICTION SYSTEM

****

CLOUD-RISE MODULE

PREPARED BY
NAVAL RADIOLOGICAL DEFENSE LABORATORY
S.F., CALIF.
AND
ARCON CORPORATION
WAKEFIELD, MASS.

CLOUD RISE RUN IDENTIFICATION -

ATMOSPHERE IDENTIFICATION -DIAL PACK ATMOSPHERIC DATA

ELEVATION OF GROUND ZERO = 659.9 METERS
SOIL SOLIDIFICATION TEMPERATURE = 1673.0 DEGREES KELVIN
PARTICLE DENSITY (C.G.S.) = 1.6000
YIELDS (KT) -
TOTAL = -.5000+00 FISSION = .6000+00
FRACTION OF AVAILABLE ENERGY USED TO HEAT AIR INITIALLY = .1000+01
FRACTION OF AVAILABLE ENERGY USED TO HEAT LIQUID WATER INITIALLY = .0000

COMPUTATION CONTROL INPUTS-

NDSTR	IDISTR	KDI	IRAD	KCLD	KRX	IPAM	KATM
100	2	10	0	0	0	0	0

COMPUTATION CONTROLS -
NUMBER OF PARTICLE SIZE CLASSES REQUESTED = 100
NUMBER OF CLOUD SUBDIVISIONS(WAFERS) PER SIZE CLASS = 10
WAFER SUBDIVISION FACTOR = 0

FRACTION OF THE DETONATION ENERGY YIELD IN THE CLOUD AT INITIAL TIME IS .10000+01

CLOUD RISE IS TERMINATED IN CXPN AT STATEMENT 243 BY THE R RATE SWITCH

CLOUD RISE AND EXPANSION HISTORY TABLE CX

CLOUD HISTORY TABLE

	CLOUD TIME (SEC)	CLOUD INTERVAL (SEC)	CLOUD BASE (M)	CLOUD TOP (M)	CLOUD RADIUS (M)	BASE RATE (M/SEC)	TOP RATE (M/SEC)	RADIAL RATE (M/SEC)	TEMPERATURE (K)	GAS DENSITY (KG/M**3)
1)	1.8586+00	1.8750-01	6.6896+02	8.2861+02	1.2068+02	1.3764+02	1.6290+02	2.3795+01	2.4897+03	1.1909-01
2)	2.0461+00	4.3750-01	6.9477+02	8.5915+02	1.2514+02	9.7710+01	1.1565+02	3.4211+01	1.9083+03	1.5487-01
3)	2.4836+00	8.7500-01	7.3752+02	9.0975+02	1.4011+02	5.3614+01	6.3456+01	3.0248+01	1.1492+03	2.5582-01
4)	3.3586+00	1.5000+00	7.8443+02	9.6527+02	1.6658+02	3.0674+01	3.6305+01	1.9158+01	7.1803+02	4.0700-01
5)	4.8586+00	1.5000+00	8.3044+02	1.0197+03	1.9531+02	2.3246+01	2.7514+01	1.4017+01	5.2193+02	5.5667-01
6)	6.3586+00	2.5000+00	8.6531+02	1.0610+03	2.1634+02	2.0581+01	2.4359+01	1.0922+01	4.5159+02	6.4053-01
7)	8.8586+00	3.0000+00	9.1676+02	1.1219+03	2.4364+02	1.9468+01	2.3042+01	8.6850+00	3.9822+02	7.2159-01
8)	1.1859+01	3.5000+00	9.7517+02	1.1910+03	2.6970+02	1.9022+01	2.2514+01	7.2711+00	3.6706+02	7.7696-01
9)	1.5359+01	4.5000+00	1.0417+03	1.2698+03	2.9515+02	1.8655+01	2.2080+01	6.3200+00	3.4655+02	8.1581-01
10)	1.9859+01	5.5000+00	1.1257+03	1.3692+03	3.2359+02	1.8132+01	2.1460+01	5.6668+00	3.3052+02	8.4595-01
11)	2.5359+01	6.5000+00	1.2254+03	1.4872+03	3.5475+02	1.7384+01	2.0575+01	5.2016+00	3.1815+02	8.6721-01
12)	3.1859+01	8.0000+00	1.3384+03	1.6210+03	3.8856+02	1.6372+01	1.9377+01	4.8558+00	3.0859+02	8.8113-01
13)	3.9859+01	8.5000+00	1.4694+03	1.7760+03	4.2741+02	1.5205+01	1.7996+01	4.5818+00	3.0081+02	8.8890-01
14)	4.8359+01	1.0000+01	1.5986+03	1.9289+03	4.6636+02	1.3991+01	1.6560+01	4.3340+00	2.9519+02	8.9070-01
15)	5.8359+01	1.1500+01	1.7385+03	2.0945+03	5.0970+02	1.2739+01	1.5078+01	4.0896+00	2.9055+02	8.8829-01
16)	6.9859+01	1.3000+01	1.8850+03	2.2679+03	5.5673+02	1.1497+01	1.3607+01	3.8420+00	2.8674+02	8.8241-01
17)	8.2859+01	1.4500+01	2.0345+03	2.4448+03	6.0667+02	1.0331+01	1.2227+01	3.5796+00	2.8360+02	8.7430-01
18)	9.7359+01	1.9500+01	2.1843+03	2.6221+03	6.5858+02	9.2080+00	1.0898+01	3.3283+00	2.8092+02	8.6561-01
19)	1.1686+02	1.5000+01	2.3638+03	2.8346+03	7.2348+02	8.2812+00	9.8015+00	3.1153+00	2.7812+02	8.5368-01
20)	1.3186+02	2.0000+01	2.4881+03	2.9817+03	7.7021+02	7.4854+00	8.8595+00	2.9378+00	2.7638+02	8.4470-01
21)	1.5186+02	2.5000+01	2.6378+03	3.1589+03	8.2896+02	6.5795+00	7.7873+00	2.7368+00	2.7443+02	8.3324-01
22)	1.7686+02	2.0000+01	2.8023+03	3.3535+03	8.9738+02	5.6306+00	6.6643+00	2.5800+00	2.7244+02	8.2063-01
23)	1.9686+02	2.5000+01	2.9149+03	3.4868+03	9.4898+02	4.5414+00	5.3751+00	2.4821+00	2.7119+02	8.1213-01
24)	2.2186+02	3.0000+01	3.0284+03	3.6212+03	1.0110+03	3.1588+00	3.7386+00	2.3925+00	2.7002+02	8.0321-01
25)	2.5186+02	3.0000+01	3.1232+03	3.7334+03	1.0828+03	1.7190+00	2.0345+00	2.3259+00	2.6913+02	7.9546-01
26)	2.8186+02	3.0000+01	3.1747+03	3.7944+03	1.1526+03	4.6157-01	5.4631-01	2.2951+00	2.6872+02	7.9102-01
27)	3.1186+02	3.5000+01	3.1886+03	3.8108+03	1.2214+03	2.1720-03	-2.1720-03	2.1867+00	2.6869+02	7.8959-01
28)	3.4686+02	3.5000+01	3.1887+03	3.8107+03	1.2980+03	0.0000	0.0000	2.0178+00	2.6882+02	7.8936-01
29)	3.8186+02	4.0000+01	3.1887+03	3.8107+03	1.3686+03	0.0000	0.0000	1.8745+00	2.6891+02	7.8912-01
30)	4.2186+02	4.5000+01	3.1887+03	3.8107+03	1.4436+03	0.0000	0.0000	1.7416+00	2.6899+02	7.8891-01
31)	4.6686+02	4.5000+01	3.1887+03	3.8107+03	1.5220+03	0.0000	0.0000	1.6255+00	2.6906+02	7.8873-01
32)	5.1186+02	4.5000+01	3.1887+03	3.8107+03	1.5951+03	0.0000	0.0000	1.5282+00	2.6912+02	7.8858-01
33)	5.5686+02	5.0000+01	3.1887+03	3.8107+03	1.6639+03	0.0000	0.0000	1.4412+00	2.6916+02	7.8845-01
34)	6.0686+02	0.0000	3.1887+03	3.8107+03	1.7359+03	0.0000	0.0000	0.0000	2.6921+02	7.8834-01

TIME OF SOIL SOLIDIFICATION = 2.1817 SEC

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THE DEPARTMENT OF DEFENSE FALLOUT PREDICTION SYSTEM

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CLOUD RISE - POINT DENSITY CALCULATIONS

FW	SSAM	SLDTMP	TMSD	SIGMA
.500000+00	.422662+06	.167300+04	.218168+01	.000000

W	HOB	RFD
.500000+00	.410000+01	.160000+04

DFTID
DIAL PACK TEST

CONTROL ARRAY IC(J),J=1,18

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DETONATION COORDINATES	XGZ	YGZ	TGZ
	.000000	.000000	.000000

NSUBD= 5

QXQT CASSANDRA.MPDQ
OPTION 1

TARGET COORDINATES
VALUES RELATIVE TO GZ

NO.	X	Y	Z	T
1	.0000	.0000	.1000+04	1304.0
2	.0000	.0000	.8000+03	1304.0
3	.0000	.0000	.6000+03	1304.0
4	.0000	.0000	.4000+03	1304.0
5	.0000	.0000	.2000+03	1304.0

COMBIN 10 ISTART 1 ISTOP 100

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 209.34 TO 2000.00 MICRONS

1 .3114+01 2 .5161+01 3 .5594-01 4 .9813-01 5 .2437+00

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 197.52 TO 209.34 MICRONS

1 .7552+01 2 .1697+02 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 184.92 TO 197.52 MICRONS

1 .1558+02 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 171.37 TO 184.92 MICRONS

1 .4913+01 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 156.62 TO 171.37 MICRONS

1 .0000 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 140.29 TO 156.62 MICRONS

1 .0000 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 121.72 TO 140.29 MICRONS

1 .0000 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 99.64 TO 121.72 MICRONS

1 .0000 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS 70.77 TO 99.64 MICRONS

1 .0000 2 .0000 3 .0000 4 .0000 5 .0000

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS .01 TO 70.77 MICRONS

1 .0000 2 .0000 3 .0000 4 .0000 5 .0000

OPTION 2
A MATRIX TARGET REPRESENTATION HAS BEEN CHOSEN WITH THE FOLLOWING PARAMETERS

STRIPS= 1 ROWS= 2 ANGLE IS 0 DEGREES FROM EAST

MINIMUM DISTANCE IS .00000 MAXIMUM DISTANCE IS .18538+04

MINIMUM ALTITUDE IS .00000 MAXIMUM ALTITUDE IS .32000+04

HORIZONTAL DISTANCE BETWEEN TARGET POINTS IS .13241+03

VERTICAL DISTANCE BETWEEN TARGET POINTS IS .11034+03

X	Y	X	Y	X	Y
.0000	.0000	.1324+03	.0000	.2648+03	.0000
.3972.03	.0000	.5297+03	.0000	.6621+03	.0000
.7945+03	.0000	.9269+03	.0000	.1059+04	.0000
.1192+04	.0000	.1324+04	.0000	.1457+04	.0000
.1589+04	.0000	.1721+04	.0000	.1854+04	.0000

ALTITUDES

3200.0	3089.7	2979.3	2869.0	2758.6	2648.3	2537.9	2 27.6	2317.2	2206.8
2096.5	1986.2	1875.9	1765.5	1655.2	1544.8	1434.5	1324.1	1213.8	1103.4
993.1	882.8	772.4	662.1	551.7	441.4	331.0	220.7	110.3	.0

TIME OF FOLLOWING MAP IS 1304.0 SECONDS

COMBIN 100 ISTART 1 ISTOP 100

PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS .01 TO 2000.00 MICRONS

.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.0
.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.0
.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.0
.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.0
1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.0
5.2	5.2	5.2	5.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.0
2.4	2.4	2.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.0
3.0	3.0	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.2	.0
4.9	4.9	3.0	3.0	2.4	2.4	2.2	2.0	1.8	1.6	1.5	1.3	1.2	1.0	.0
9.1	9.1	4.1	3.4	2.9	2.7	2.4	2.2	2.0	1.9	1.6	1.4	1.1	.8	.0
10.4	10.4	5.4	4.6	3.7	3.4	3.0	2.5	2.2	2.0	1.7	1.3	.9	.4	.0
14.1	14.1	6.6	5.2	4.9	3.9	3.6	3.1	2.6	2.1	1.6	1.3	.6	.0	.0
16.7	16.7	9.3	6.9	6.0	4.7	4.0	3.5	2.7	2.2	1.6	1.0	.2	.0	.0
19.3	19.3	11.9	8.2	6.5	5.6	4.3	3.5	2.9	2.2	1.4	.6	.0	.0	.0
22.9	22.9	13.9	10.0	8.3	6.5	5.1	4.0	2.8	2.2	1.2	.3	.0	.0	.0
25.9	25.9	15.9	11.6	8.8	6.5	5.1	4.1	2.8	1.7	.5	.0	.0	.0	.0

2[illegible].1	2[illegible].1	1[illegible].1	11.[illegible]	[illegible].4	6.0	4.0	2.7	1.3	.0	.0	.0	.0	.0	.0
30.5	30.5	16.1	11.1	7.7	4.7	2.2	.4	.0	.0	.0	.0	.0	.0	.0
32.7	32.7	15.[illegible]	9.6	5.4	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
30.5	30.5	12.4	5.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
24.[illegible]	24.9	6.[illegible]	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20.4	20.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2.5	2.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.3	.3	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.4	.4	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

```
OPTION    -2

    TIME OF FOLLOWING MAP IS   1500.0 SECONDS
COMBIN   100 ISTART     1 ISTOP   100

          PARTICLE SIZE RANGE FOR FOLLOWING TARGETS IS        .01  TO  2000.00  MICRONS
```

.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.0
.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.0
.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.0
.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.0
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.0
5.0	5.0	5.0	5.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	.0
1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	.0
2.6	2.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	.0
3.6	3.6	1.7	1.7	1.7	1.7	1.7	1.7	1.5	1.4	1.4	1.3	1.1	1.0	.0
8.0	8.0	3.0	3.0	2.4	2.1	1.8	1.8	1.6	1.4	1.3	1.2	1.0	.8	.0
8.7	8.7	3.7	2.9	2.9	2.6	2.3	2.0	1.7	1.5	1.4	1.1	1.0	.8	.0
12.1	12.1	4.5	3.7	3.3	2.9	2.6	2.3	1.9	1.6	1.4	1.2	.9	.5	.0
13.3	13.3	5.8	4.4	4.5	3.5	3.1	2.6	2.1	1.8	1.5	1.0	.6	.1	.0
14.8	14.8	7.4	6.0	4.9	4.4	3.4	2.9	2.3	1.9	1.5	1.0	.4	.0	.0
17.1	17.1	9.7	6.7	5.6	4.3	3.7	2.9	2.5	1.9	1.3	.8	.1	.0	.0
20.8	20.8	10.7	7.8	6.6	4.8	3.9	3.2	2.4	1.8	1.2	.4	.0	.0	.0

21.0	21.0	13.5	9.7	7.0	5.6	4.6	3.5	2.7	1.8	1.0	.1	.0	.0	.0
25.2	25.2	15.4	10.7	7.2	6.1	4.6	3.4	2.4	1.6	.5	.0	.0	.0	.0
25.8	26.2	14.5	11.2	7.7	5.2	3.9	2.5	1.3	.1	.0	.0	.0	.0	.0
29.2	29.2	14.7	10.4	6.9	4.4	2.2	.6	.0	.0	.0	.0	.0	.0	.0
29.2	29.2	13.6	9.2	4.9	1.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
27.2	27.2	11.6	4.6	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
24.4	24.4	6.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18.0	18.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2.5	2.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

D. Dial Pack Simulation Results

For Dial Pack, the dust samples were collected by simply opening a collector and flying through the cloud. The sample was then weighed and a value for average mass concentration obtained by calculating the volume swept out by the samples while it was open and dividing the mass of the sample by the volume. The dust concentration values from sampling which were chosen for comparison are those obtained with an aircraft path through the center of the cloud as closely as possible. Many of the samples were near the cloud edge and the values fluctuated considerably.

Figure 6 shows the CASSANDRA calculation for the Dial Pack cloud at 615 seconds. The aircraft traversal which took place at that time was at 2694 metres altitude. The average mass concentration calculated from the aircraft sample is 1.6×10^{-8} g cm^{-3}, shown in parentheses next to the arrow representing the aircraft sampling altitude. The value above the aircraft mass concentration is the average CASSANDRA calculated value at that altitude. The 2.8 below is the CASSANDRA calculated average concentration at 2590 metres altitude. The aircraft path was somewhat more toward the cloud edge than the rest so the value is lower than the CASSANDRA value. Figure 7 shows the CASSANDRA calculation for Dial Pack at 804 seconds. The aircraft traversed the cloud at that time at 2542 metres altitude. The average mass concentration represented by the aircraft sample was 2.0×10^{-8}g cm^{-3} as indicated in parentheses at the arrow representing the aircraft position. The average mass concentrations calculated by CASSANDRA were 2.0×10^{-8} g cm^{-3} for the altitude of 2590 metres and 3.0×10^{-8} g cm^{-3} for 2485 metres. These are shown above and below the aircraft value.

CASSANDRA calculations for Dial Pack cloud at 950 seconds, 1304 seconds, and 1500 seconds are presented as Figures 8, 9, and 10 respectively. Aircraft dust samples were obtained at these times at altitudes of 2390 metres, 2237 metres, and 2085 metres respectively. As before, the average mass concentrations obtained from aircraft samples are shown within parentheses next to the arrow in each figure and CASSANDRA average concentrations are printed for altitudes above and below aircraft results.

In conclusion, the CASSANDRA code has been evaluated by comparison with available field test data. The Dial Pack simulation using CASSANDRA has shown excellent agreement with dust concentrations obtained by aircraft traversing near or at the center of the Dial Pack dust cloud. The agreement constitutes a validation of CASSANDRA for calculating dust concentrations.

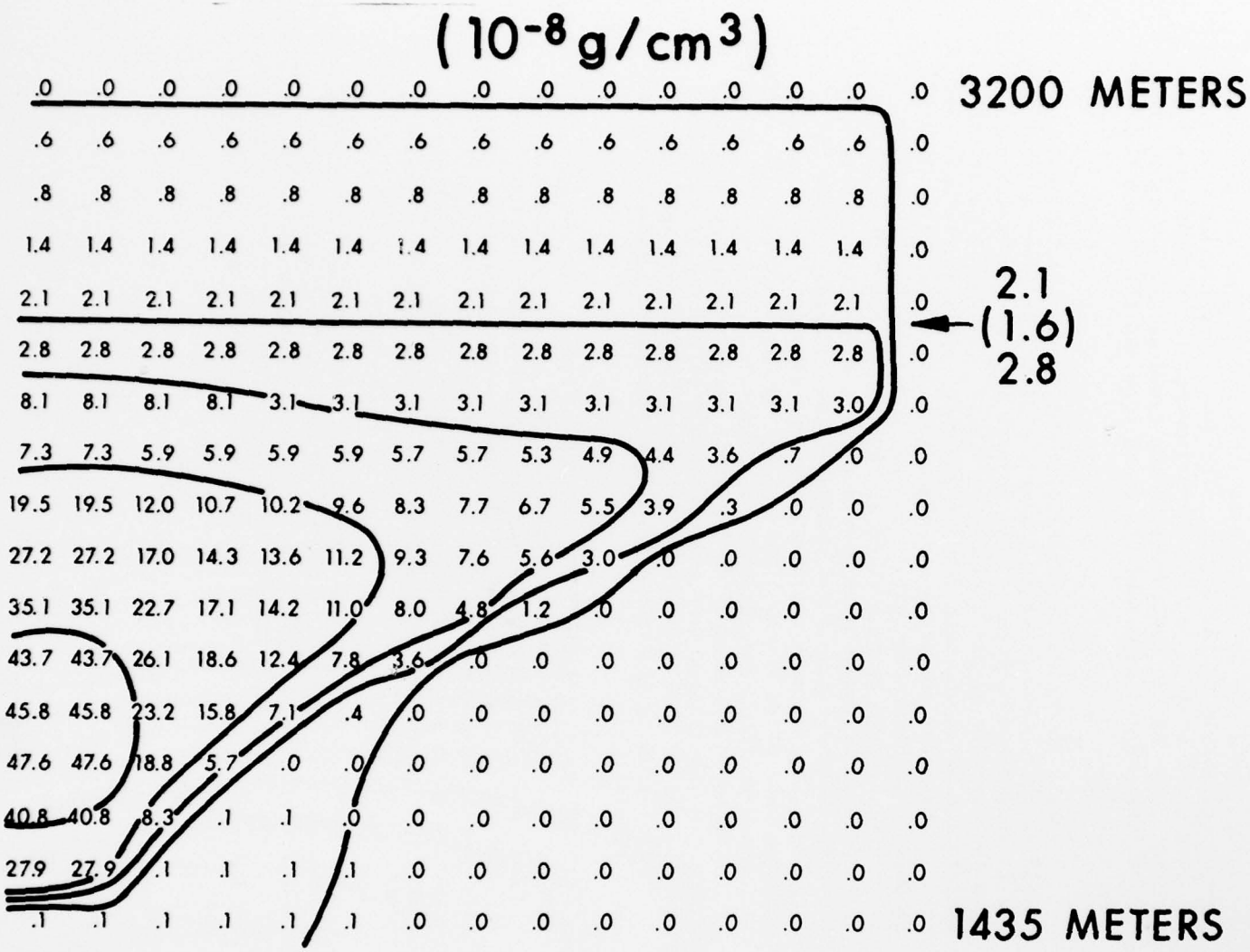

Figure 6. Dial Pack at 615 Seconds Dust Concentration

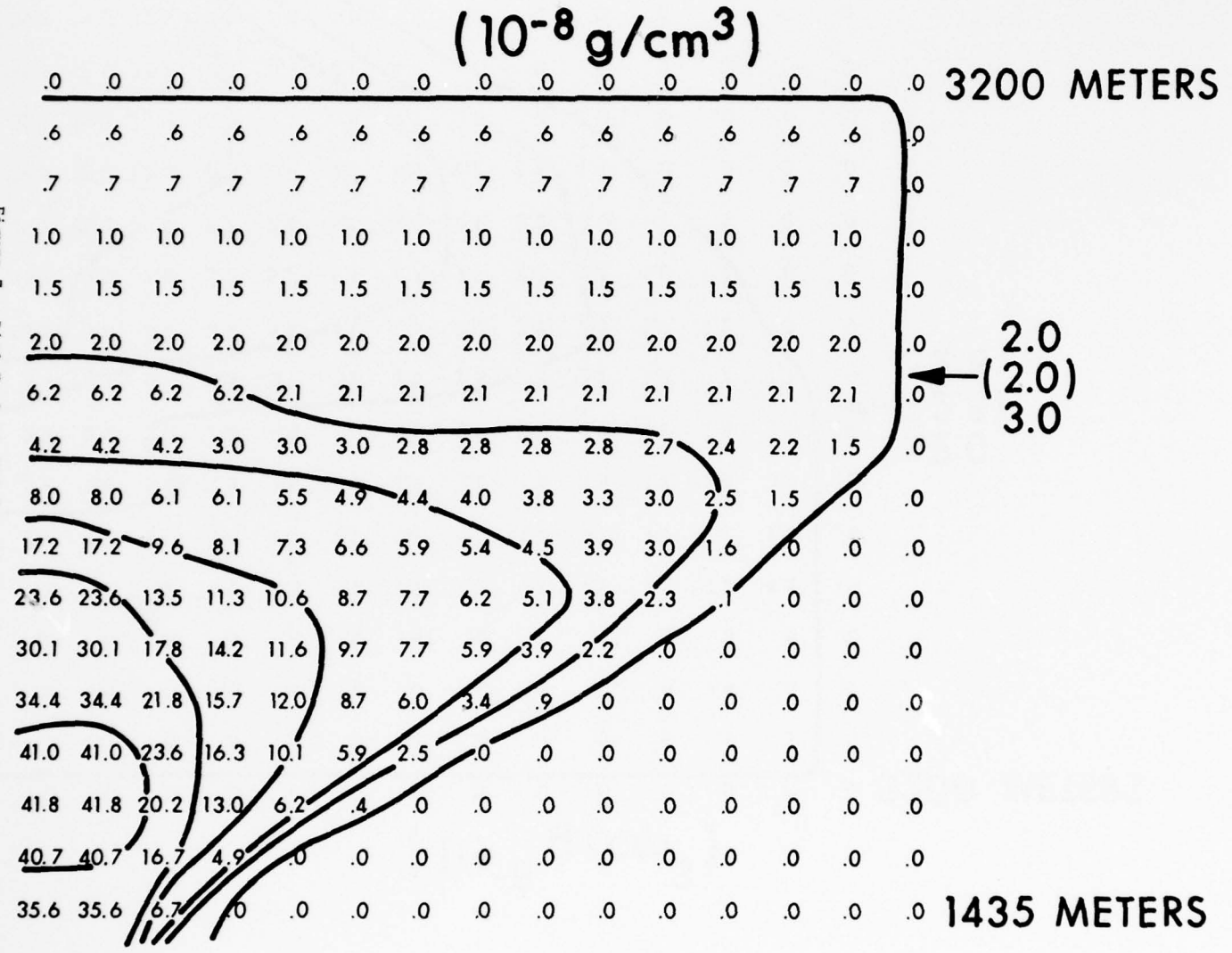

Figure 7. Dial Pack at 804 Seconds Dust Concentration

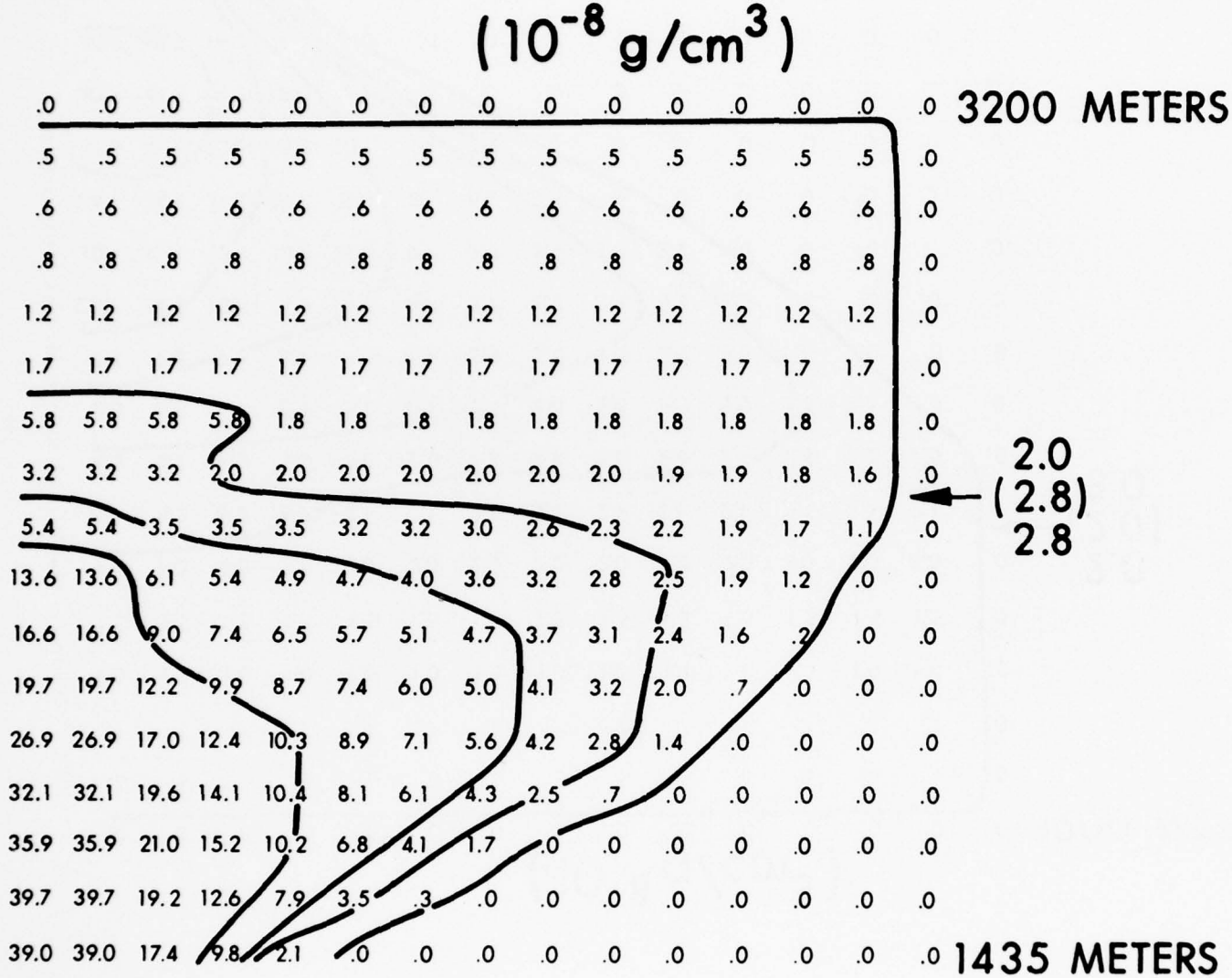

Figure 8. Dial Pack at 950 Seconds Dust Concentration

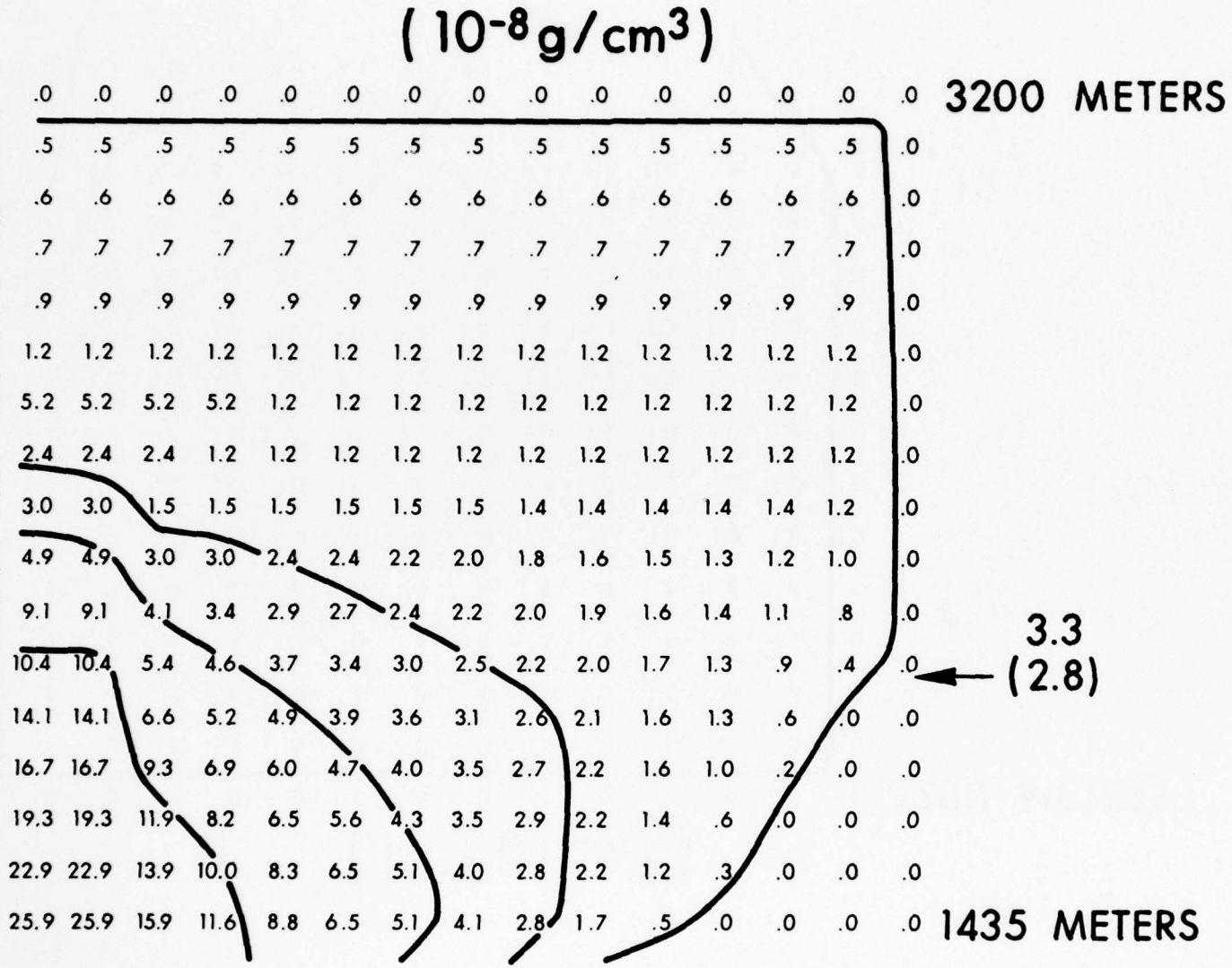

Figure 9. Dial Pack at 1304 Seconds Dust Concentration

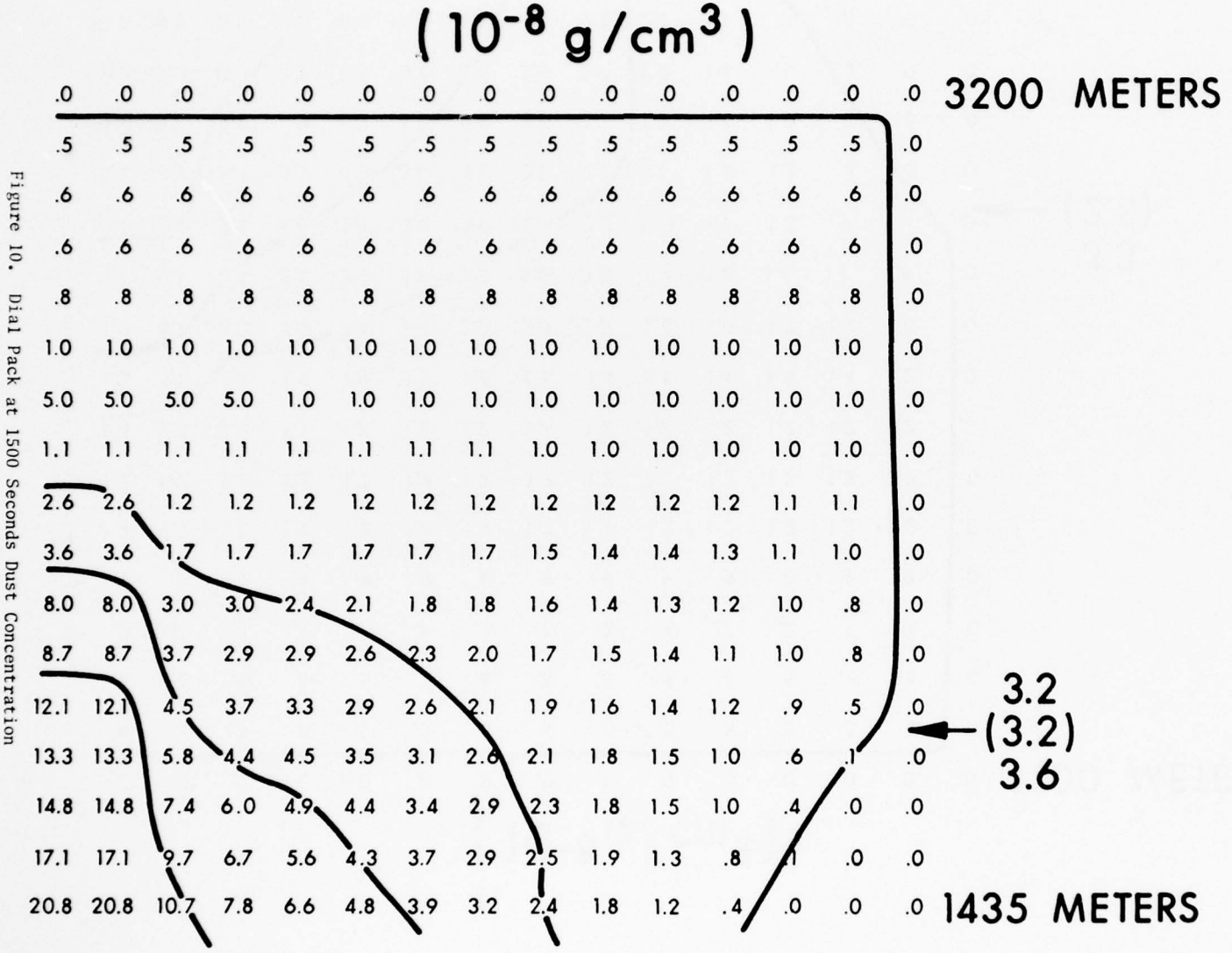

Figure 10. Dial Pack at 1500 Seconds Dust Concentration

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