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AREAS: A Computer Code for Estimating Air Pollutant Concentrations from Dispersed Sources

R. E. Moore

HEALTH AND SAFETY RESEARCH DIVISION
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CONTENTS

ABSTRACT

The AREAS area-source computer code, written in FORTRAN IV, is described and listed. This code, which runs in less than 7 seconds on the IBM 360/91 computer, estimates annual-average concentrations of an air pollutant at ground level in each of 400 grid squares in a 20 by 20 area reference grid. AREAS can be used for multiple, dispersed sources located in each of the 400 grid squares by treating them as area sources. Required input includes 20 by 20 arrays of annual-average point-source χ/Q values generated by use of a point-source model or computer code for specific grid sizes relative to the size of the area reference grid. AREAS can be applied to any size area for which a uniform meteorology can be assumed. It has been applied to dispersed emissions of fossil fuel combustion products and automobile emissions in Roane County, Tennessee, and to the atmospheric dispersion of radionuclides emitted from the tailings piles of uranium mills.

INTRODUCTION

Low-elevation, dispersed sources of air pollutants include emissions resulting from the combustion of coal, fuel oil, and natural gas by homes, schools, and commercial establishments, as well as emissions from vehicles. Air pollutants from these sources may significantly augment the contributions of air pollutants deriving from the tall stacks of industrial plants. A comprehensive study of the relative importance of various sources of air pollution in an area requires a quantitative treatment of the multiple dispersed sources as well as the major elevated point sources.

The AREAS computer code estimates concentrations in air at ground level from dispersed sources by treating them as area sources. That is, pollutants such as sulfur dioxide (SO_2), particulates, hydrocarbons, or carbon monoxide (CO) emitted from multiple, low-elevation dispersed sources are treated as though they were being emitted uniformly from square areas near ground level.

The code calculates average ground-level concentrations of an air pollutant for each of 400 grid squares of a 20 by 20 grid resulting from area emissions of the pollutant from all 400 grid squares. This 20 by 20 grid is referred to in this report as the area reference grid. It represents the geographic area under study, and it is assumed to be aligned west to east (x direction) and south to north (y direction). The grid squares are numbered from 1 to 20 from west to east and from south to north.

Input data include the total emission rate from the 20 by 20 grid (micrograms/second), the fraction of this total emitted from each of the 400 grid squares, and the grid size (meters). AREAS itself does not employ meteorological data as input, but instead uses arrays of 400 χ/Q[a] values to describe pollutant behavior derived from a point-source model which does employ annual-average meteorological data. A uniform meteorology across the area reference grid must be assumed.

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[a] χ/Q = ground-level concentration of the pollutant in air (χ) divided by its release rate from the source (Q).

MODEL DESCRIPTION

The basis of the AREAS model is the assumption that a square area source can be simulated by four point sources located at its corners. This was shown by computer runs to be a good approximation for squares located three or more squares away from a source square. Figure 1 illustrates the principle. The shaded square in (a) represents a square area source over which the pollutant is released at a uniform rate. The area release of the shaded square of (a) is simulated by four point sources at the corners of the square in (b). The release rate of each of these four point sources is equal to 1/4th of the release rate from the square area source. In order to estimate concentrations within three squares of a source, it may be necessary to change the size of the grid. This is done by subdividing the original grid into a smaller grid where it is possible to calculate concentrations at distances three grid squares away from the source. Figure 2 shows the relative sizes of each of the smaller grid sizes which may be used in this model. The first square shown in Fig. 2 (a) is taken from the area reference grid. If a receptor point is selected within the source square of this grid, it is necessary to go to a smaller grid such as that shown in (b). This alternative is a grid one-half as large. In the example shown in Fig. 2, the one-half scale size grid is not sufficiently small to permit utilization of the three square consideration. The next scale grid shown in (c) is sufficiently small to permit calculation of concentrations three squares away from the source square and so would be appropriate in this instance. Four arrays of point-source χ/Q values for grids of various specific sizes relative to that of the area reference grid are used in AREAS to generate reliable area-source χ/Q values.

Any point-source atmospheric dispersion computer code or model selected by the user may be used to produce the point-source χ/Q values for AREAS input. These χ/Q values should represent 22.5° sector averages. AIRDOS-II (ref. 1), a computer code based on the Gaussian plume model of Pasquill[2] and Gifford[3], is being used to provide the arrays of point-source χ/Q values for AREAS input in a study of air pollutant sources in Roane County, Tennessee.[4] It has also been used to provide AREAS input for predicting atmospheric dispersion of radionuclides emitted from the tailings piles of uranium mills. AIRDOS-II contains an option for estimating concentrations in a square grid configuration and can produce punched-card output for direct input to AREAS.

Annual-average meteorological data are used to produce the point-source χ/Q values which AREAS uses to generate annual-average area-source χ/Q values representing an area release from a single square in a 40 by 40 grid in which each of the 1600 squares is the same size as each of the 400 squares of the area reference grid. The source square is located at (20,20). The area-source χ/Q value for each of the 400 squares of the area reference grid is calculated by translocation from the (40,40) grid for each of the 400 area sources of the area reference grid. Figure 3 shows an example in which the source is (5,5) in the area reference grid. The χ/Q value at (15,15) is equal to the χ/Q value at (30,30) on the 40 by 40 grid. These χ/Q values are multiplied by the release rates of the 400 area sources to obtain the ground-level concentration in air in each of the 400 grid squares from each of the 400 sources. Adding the 400 values contributed from the 400 sources for each grid square then results in values representing the total concentrations of the pollutant from all area sources within the area reference grid.

The validity of the AREAS model and its limits of applicability depend directly upon three major factors. First, the pollutant concentrations calculated by AREAS from area emissions are subject to the same uncertainties and limitations that apply to the model used to generate the arrays of point-source χ/Q values used as input. Second, there is an implicit assumption in the use of AREAS to the effect that the annual-average meteorology is uniform across the geographic area under study. Accordingly, the results from using AREAS can be valid only to the extent that this assumption is valid. The third factor is concerned with the application of AREAS to dispersed sources. In order for multiple dispersed sources to be simulated by uniform area sources, they must be very numerous, fairly uniformly distributed, reasonably uniform in magnitude, and located at nearly the same elevation. If these criteria are not met, it is necessary to treat the sources as individual point sources rather than as area sources.

DATA INPUT FOR THE AREAS CODE

Table 1 lists the input parameters for AREAS with the data card formats. The first data input is IPUN, which is an option for punched-card output as defined in the table. The next data entry is SQSD, defined as the length in meters of the side of each of the 400 grid squares of the area reference grid. The total release rate of the pollutant from the area reference grid is then entered as ARSORC in units of micrograms/second. Next, 400 values for FRACT are entered. These FRACT values represent the fraction of ARSORC emitted from each of the 400 grid squares. The sum of the FRACT values is 1. The final input data consist of point-source χ/Q values for the center points of each of the 400 squares of a 20 by 20 square grid with the point source located at the center of the grid. The specific size requirements are as follows:

DCN array	Values for a grid size equal to that of the area reference grid.
BCN array	Values for a grid size double that of the area reference grid.
ACN array	Values for a grid size half that of the area reference grid.
CCN array	Values for a grid size 1/10th that of the area reference grid.

A total of 1600 point-source χ/Q values are entered for these four arrays.

DESCRIPTION OF THE CODE

AREAS, which is written in the FORTRAN IV computer language, will run on the IBM 360/91 machine in less than 7 sec. The various steps in the code are identified by Roman numerals in the discussion below and in the code listing in Appendix A. A sample run is given in Appendix B.

Step I is carried out after the input data listed in Table 1 are entered. A 40 by 40 array designated as BIR is defined as a grid with the sides of each of its 1600 squares equal in length to those of the 20 by 20 area reference grid. The external dimensions of the BIR grid are equal to those specified for the 20 by 20 BCN grid. Step I is the filling of the 40 by 40 BIR array with BCN values. This is accomplished by superposing the BIR grid on the BCN grid. Each BIR element of a contiguous block of four elements is given the same value as the BCN value which the block superposes. Thus, for example, BIR (1,1), BIR (1,2), BIR (2,1), and BIR (2,2) would each receive the χ/Q value of BCN (1,1). The superposition of the BIR grid on the BCN grid is shown in Fig. 4.

The next step (II) is to replace the inner 400 BIR values with χ/Q values for the 20 by 20 DCN grid.

The BIR grid containing point-source χ/Q values for a point source located at its center is then converted to a 39 by 39 area-source χ/Q array in which the square BIR (20,20) is the area source. This step (III) is accomplished by the DO loops

```
          DO 120 NO = 1,39
          DO 110 NR = 1,39
     110  BIR (NO,NR) = (BIR (NO,NR) +
        > BIR (NO + 1, NR) +
        > BIR (NO,NR + 1) +
        > BIR (NO + 1, NR + 1))/4.
     120  CONTINUE
```

The assumption used here is that a square area source can be simulated by four point sources located at the corner of the square.

At this stage, a 39 by 39 area-source χ/Q array has been established which could be used to define area-source χ/Q values for all of the 400 area sources within the smaller 20 by 20 area reference grid. Precision for squares near the area source squares is poor, however, for the BIR grid at this point, so additional refinement is carried out.

The refinement process consists first of defining a new array of 1600 squares designated as AIR as a grid having the same external dimensions as the 20 by 20 area reference grid. Step IV is the filling of AIR with point-source DCN values in the same manner as BIR was filled with BCN values. Next, the inner 400 squares of AIR are given ACN point-source values (Step V).

Step VI is a refinement of the inner 16 grid squares of AIR using CCN values.

Step VII is the conversion of the point-source AIR array to an area-source array in the same manner as is done in Step III for the BIR array.

Step VIII consists of refining the inner 9 squares of AIR, which are the squares from 19 through 21 in both x and y directions. Refinement is especially necessary for these squares because they include the source square itself and its eight adjacent squares. The refinement process uses the CCN 20 by 20 point-source array, which is 1/10 the size of the area reference grid and which covers an area consisting of squares 19 through 22 in both x and y directions of AIR. Figure 5 shows the AIR grid with the inner 9 squares which are refined by use of the CCN array.

In Step IX the inner 100 BIR values are replaced with values derived from the AIR array. At this point, BIR is a 39 by 39 refined area-source array.

Step X calculates the average concentrations in air at ground level for each of the 400 squares of the 20 by 20 area reference grid resulting from area emissions from each square. These air concentrations are defined as values for the array RSEP. The area emission rate for each square (Q) is

Q = FRACT(NO,NR) x ARSORC,

where NO and NR are the indices for the x and y axes of the area reference grid. The Q value for each of the 400 grids is multiplied by the appropriate χ/Q value for each receptor grid, which is stored in the 39 by 39 BIR array. For example (see Fig. 6), for the source square located at (1,1) on the area reference grid, the value of BIR (39,20) is the appropriate χ/Q for the receptor located at (20,1). The concentrations for each receptor square resulting from emissions from each of the 400 source squares are added together to produce the final RSEP values. Four nested DO loops are used to perform all of the operations in Step X:

```
DO 460 NO = 1,20
DO 450 NR = 1,20
DO 440 NA = 1,20
DO 430 NB = 1,20
IA = 20 + NA — NO
IB = 20 + NB — NR
```

```
430  RSEP(NA,NB) = BIR(IA,IB)* FRACT(NO,NR)* ARSORC + RSEP(NA,NB)
440  CONTINUE
450  CONTINUE
460  CONTINUE
```

Step XI performs the printing and card punching of the AREAS output. All of the input data are printed first. The total area release rate (micrograms/second) and the side of the grid squares of the area reference grid (meters) are printed. Then, a table is printed listing the fraction of the total area release rate for each of the 400 grid squares of the area reference grid. Next, a table is printed of point-source χ/Q input values for each of the 400 grid squares for grids of sizes equal to, double, half, and 1/10 that of the area reference grid. The final output is a table of the ground-level concentrations of the pollutant in air (micrograms/cubic centimeter) calculated by AREAS for each of the 400 grid squares of the area reference grid.

REFERENCES

1. R. E. Moore, The AIRDOS-II Computer Code for Estimating Radiation Dose to Man from Airborne Radionuclides in Areas Surrounding Nuclear Facilities, ORNL-5245 (April 1977).
2. F. Pasquill, Meteorol. Mag. 90, 1063 (1961).
3. F. A. Gifford, Jr., Nucl. Saf. 2(4), 47 (1961).
4. C. W. Miller and R. E. Moore, "Verification of a Methodology for Computing Ground-Level Air Concentrations of SO_2 and Suspended Particulates for Both Point and Dispersed Sources," in Proceedings of the Joint Conference on Applications of Air Pollution Meteorology, Nov. 29 — Dec. 2, 1977, Salt Lake City, Utah, American Meteorological Society, Boston, Mass.

Table 1. Input parameters for AREAS code

Parameter	Definition	Number of Values	Number of Cards	Data Type	Format
IPUN	Option for punched card output: IPUN = 0 — no cards punched; IPUN = 1 — ground level concentrations for the area reference grid are punched; IPUN = 2 — χ/Q values for a 40 by 40 grid with a single area source at grid (20,20) are punched; IPUN = 3 — both decks are punched.	1	1	integer	I10
SQSD	Length of side of each square of the 20 by 20 area reference grid (m)	1	1	fixed point	F10.1
ARSORC	Total area release rate of pollutant (μg/sec)	1	1	floating point	E10.3
FRACT	Fraction of ARSORC for each of the 400 squares of the area reference grid	400	50	floating point	8E10.3
DCN	Point source χ/Q values for a 20 by 20 grid equal to the size of the area reference grid (sec/cm^3)	400	50	floating point	8E10.3
BCN	As above except double size	400	50	floating point	8E10.3
ACN	As above except half size	400	50	floating point	8E10.3
CCN	As above except 1/10th size	400	50	floating point	8E10.3

ORNL-DWG 78-2875

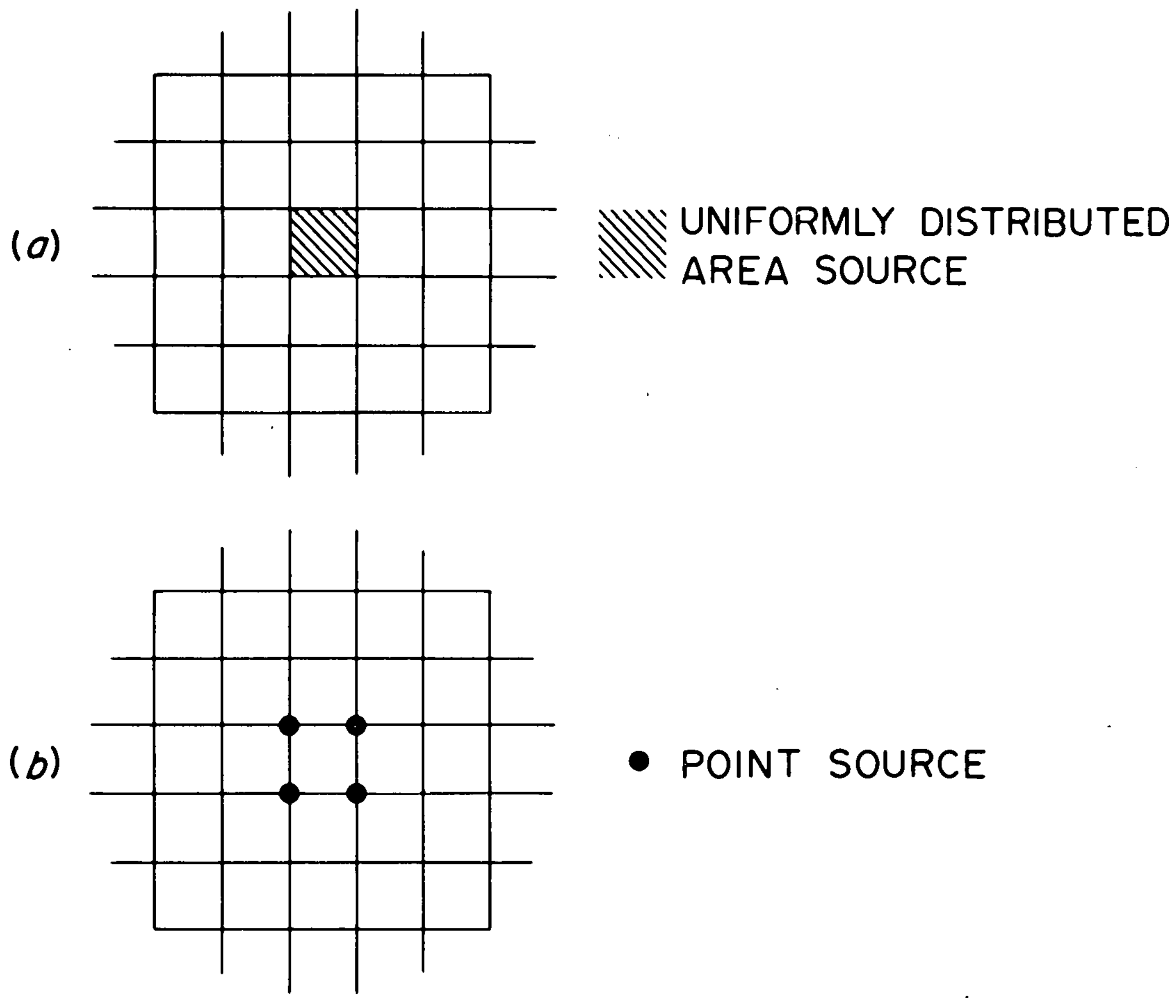

Fig. 1 Illustrations of alternate ways to simulate area sources. Both procedures yield approximately equivalent concentrations of an air pollutant at distances three or more units away from the source square.

ORNL-DWG 78-2876

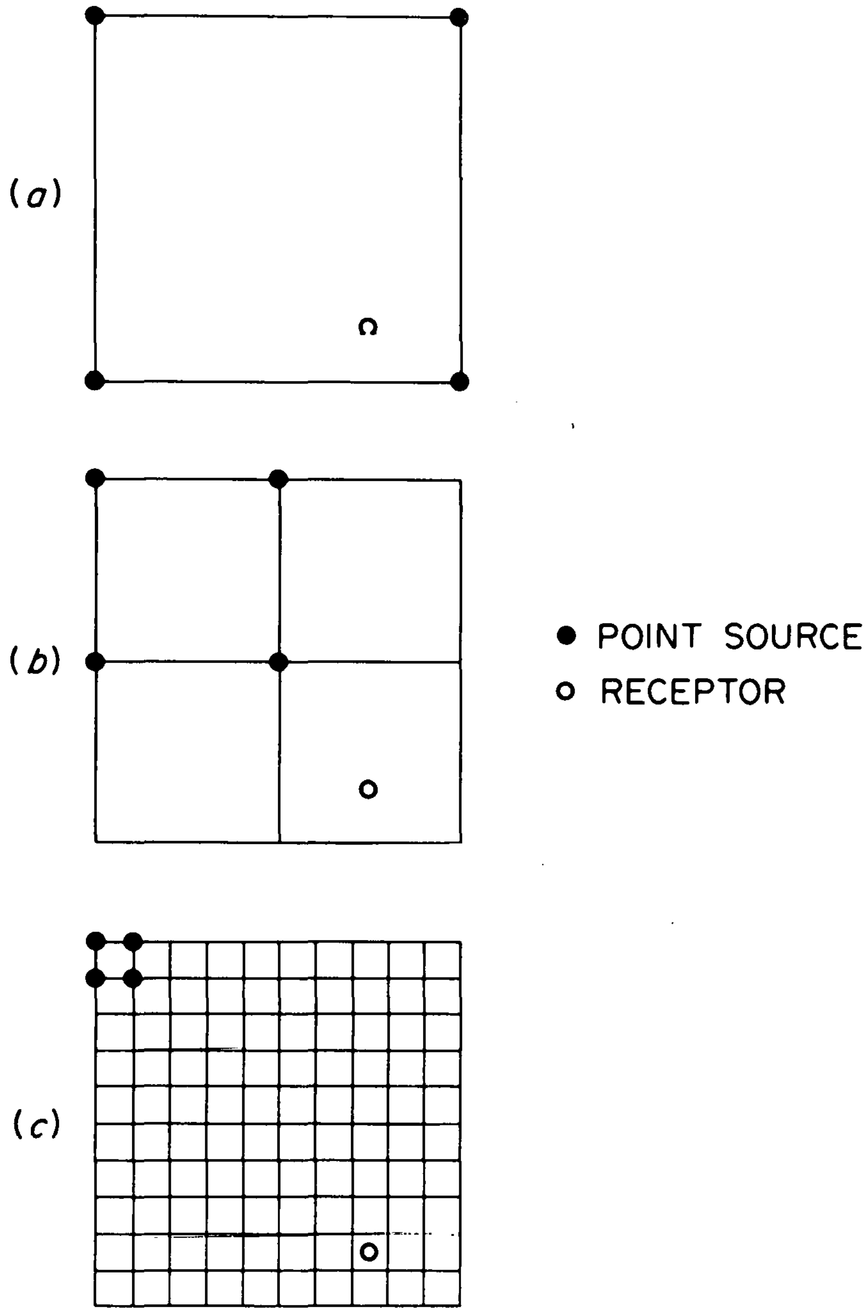

Fig. 2 Relative sizes of grid squares available to generate reliable area source χ/Q values.

ORNL-DWG 78-1182

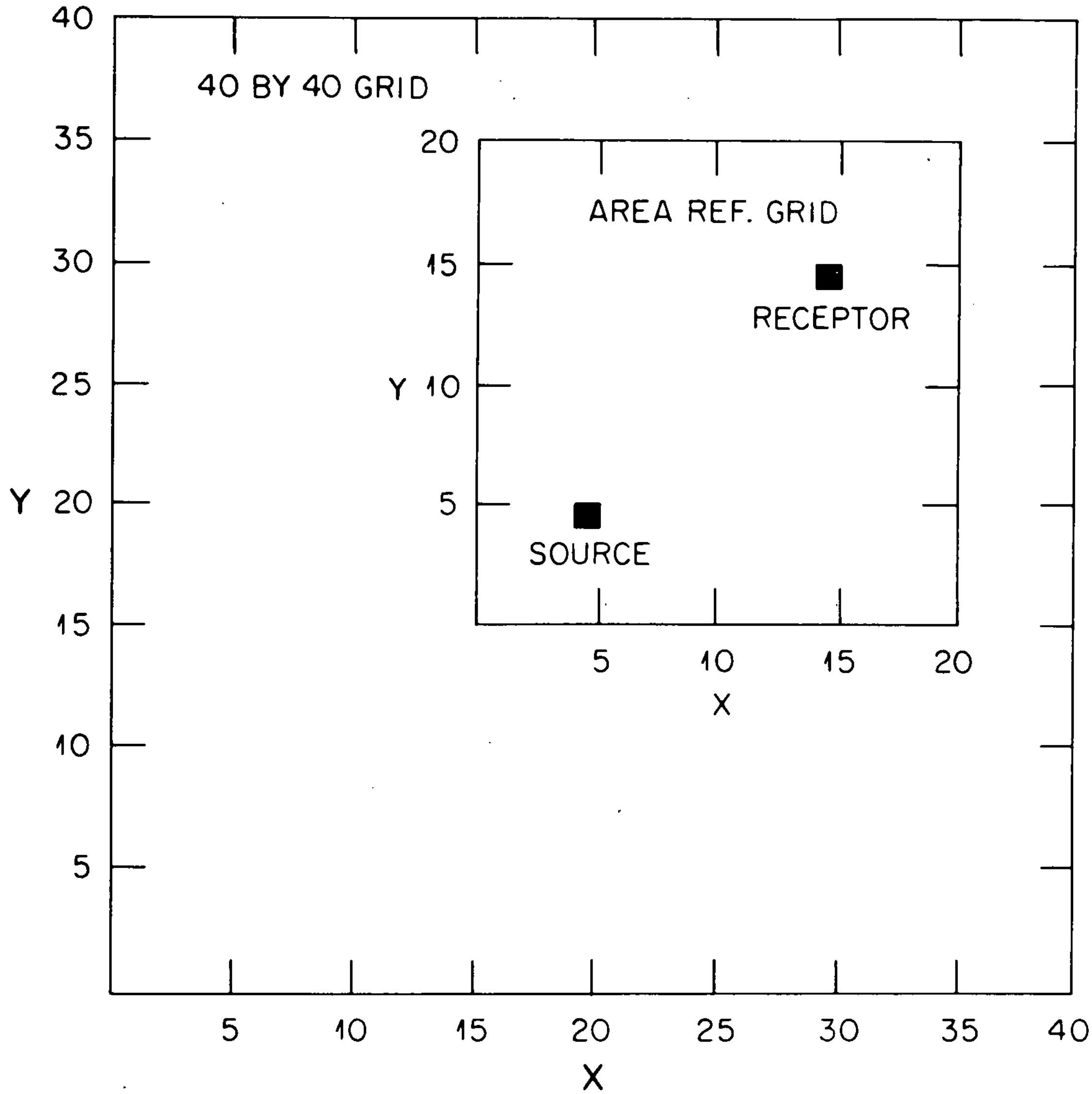

Fig. 3 Example case showing translocation of χ/Q values for the 40 by 40 grid with a source square at (20,20) to the area reference grid with a source square at (5,5).

ORNL—DWG 78-1183

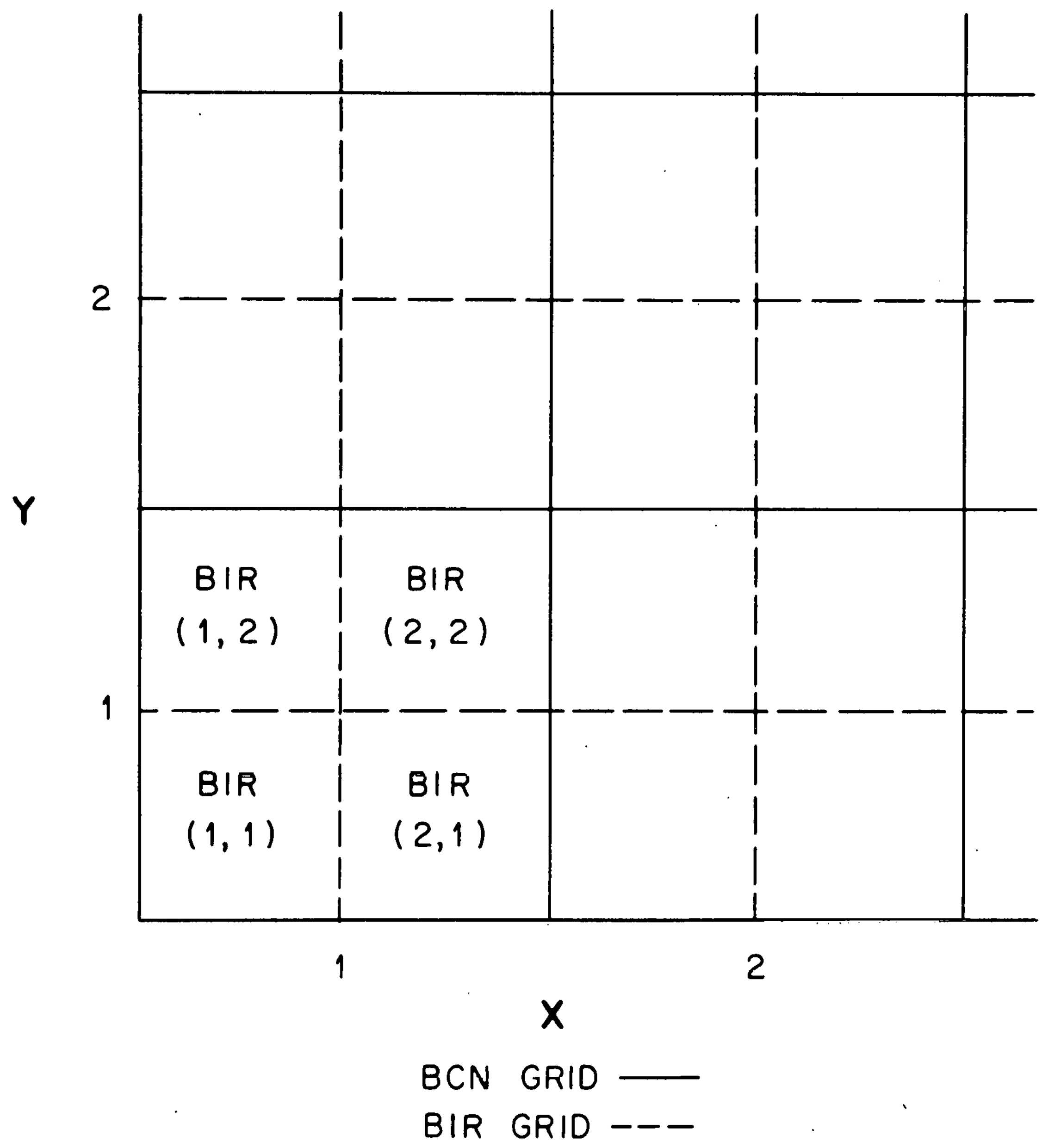

Fig. 4 Superposition of BIR grid on BCN grid.

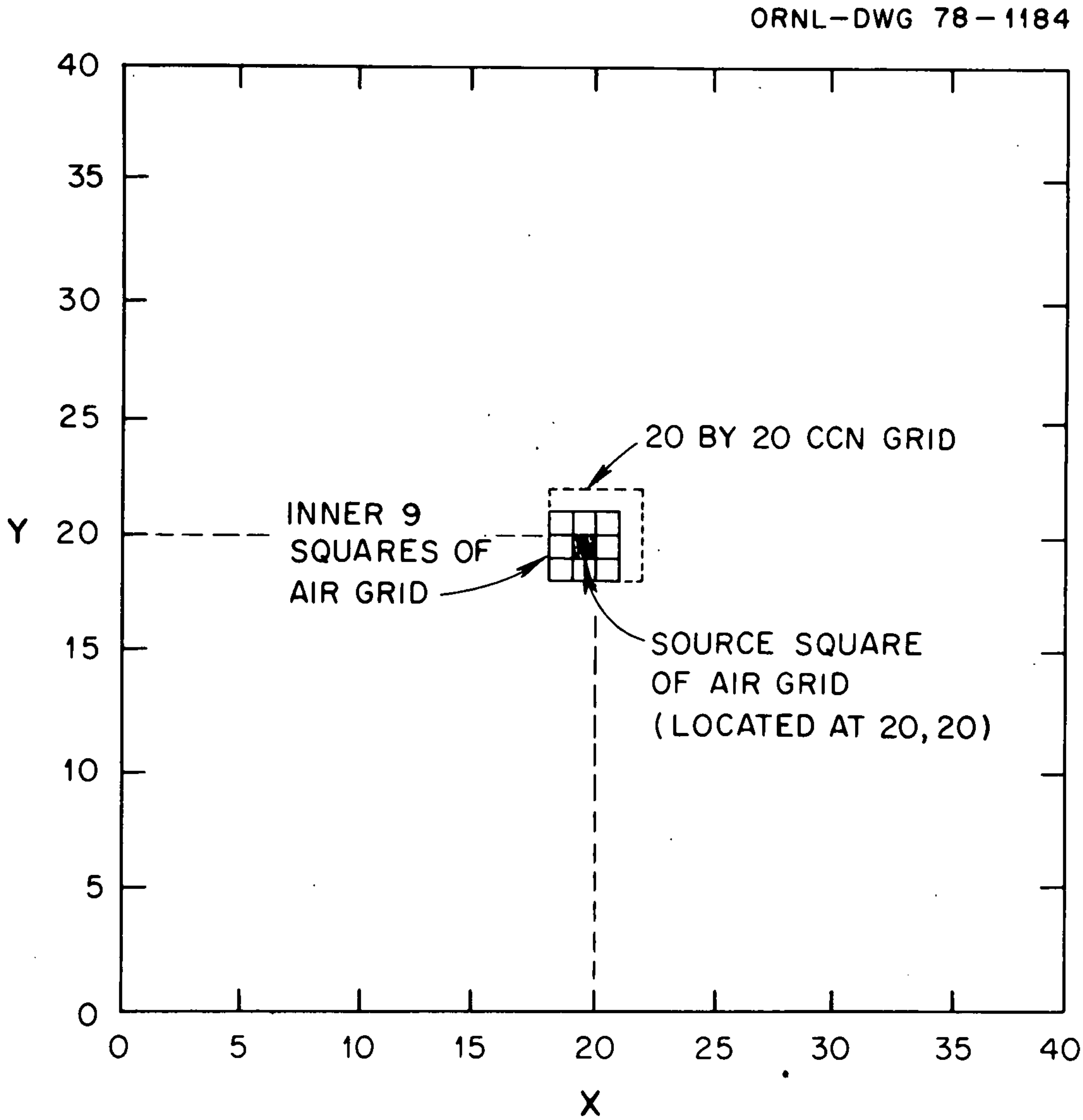

Fig. 5 The 40 by 40 AIR grid with the same external dimensions as the area reference grid.

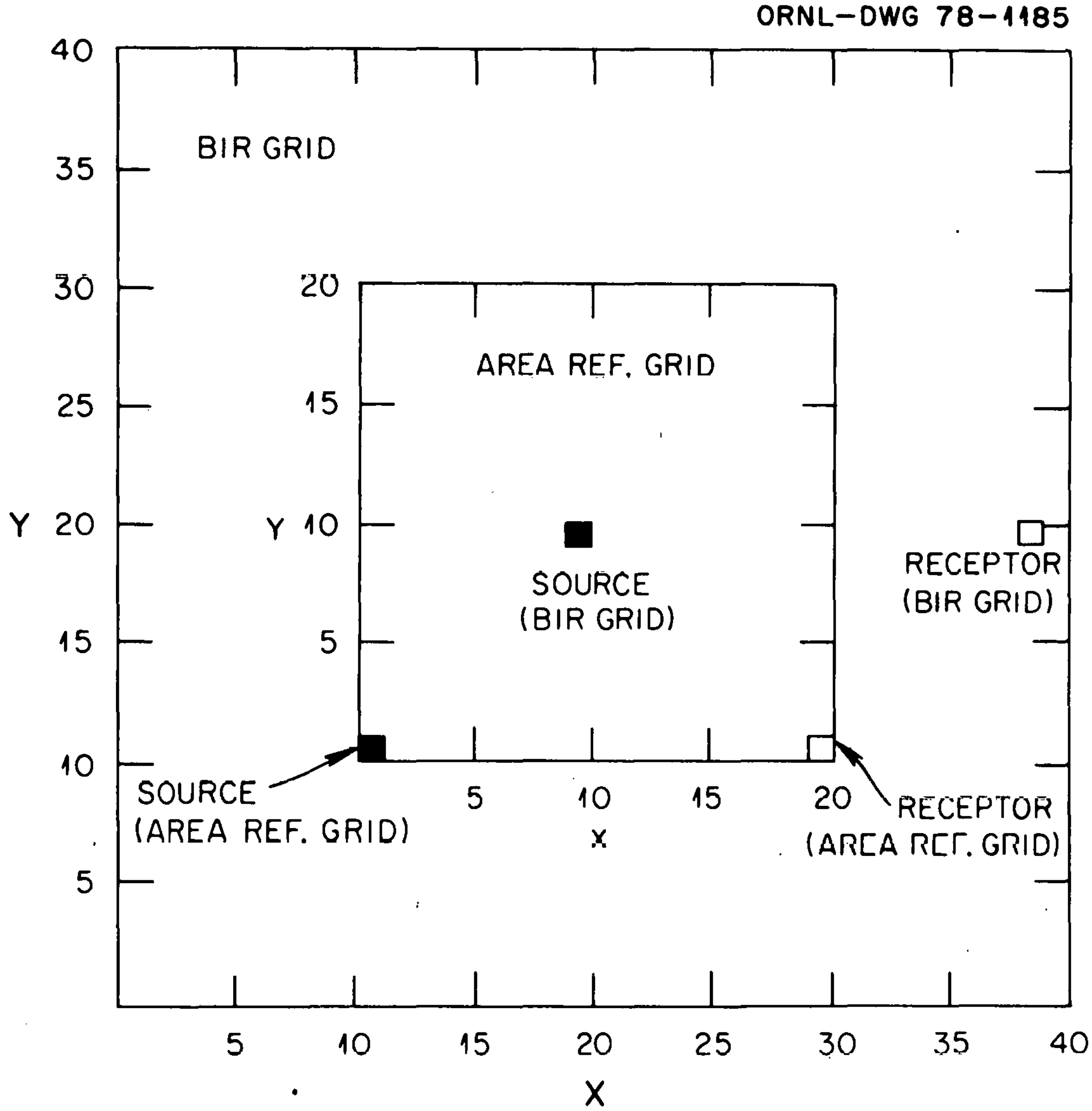

Fig. 6 The 20 by 20 area reference grid superposed on the BIR grid showing translocation of χ/Q values for single area source squares.

APPENDIX A. LISTING OF THE AREAS COMPUTER CODE

```
C
C          THE AREAS COMPUTER CODE
C
C      R. E. MOORE, HEALTH AND SAFETY RESEARCH DIV. ORNL, 12-1-77
C
C
      DIMENSION AIR(40,40),ACN(20,20),BCN(20,20),CCN(20,20),BIR(40,40),
     > DCN(20,20),RSEP(20,20),FRACT(20,20),SMRP(15,15),AKACN(20,20)
C
C        PUNCH OPTION
C
C        IF IPUN=0,NO CARDS ARE PUNCHED
C        IF IPUN=1,GROUND-LEVEL CONCENTRATIONS ARE PUNCHED
C        IF IPUN=2,CHI/Q VALUES IN SEC/CUBIC CM FOR A (40,40) GRID WITH
C                  A SINGLE AREA SOURCE AT (20,20) ARE PUNCHED
C        IF IPUN=3,BOTH THE ABOVE DECKS ARE PUNCHED
C
      READ 9000,IPUN
C
C        SQSD=SIDE OF GRID SQUARE(METERS)
C
      READ(50,9001)SQSD
C
C        ARSORC=TOTAL AREA-SOURCE RELEASE RATE(MICROGRAMS/SEC)
C
      READ(50,9002)ARSORC
C
C        FRACT=FRACTION OF TOTAL RELEASE FOR EACH GRID SQUARE
C
      READ(50,9002)((FRACT(NO,NR),NR=1,20),NO=1,20)
C
C        DCN=POINT SOURCE CHI/Q VALUES IN SEC/CUBIC CM FOR GRID
C        BCN=POINT SOURCE CHI/Q VALUES IN SEC/CUBIC CM FOR DOUBLE GRID
C        ACN=POINT SOURCE CHI/Q VALUES IN SEC/CUBIC CM FOR HALF GRID
C        CCN=POINT SOURCE CHI/Q VALUES IN SEC/CUBIC CM FOR 1/10TH GRID
C
      READ(50,9002)((DCN(NO,NR),NR=1,20),NO=1,20)
      READ(50,9002)((BCN(NO,NR),NR=1,20),NO=1,20)
      READ(50,9002)((ACN(NO,NR),NR=1,20),NO=1,20)
      READ(50,9002)((CCN(NO,NR),NR=1,20),NO=1,20)
      DO 20 NO=1,20
         DO 10 NR=1,20
   10       RSEP(NO,NR)=0
   20    CONTINUE
      DO 40 NO=1,15
         DO 30 NR=1,15
   30       SMRP(NC,NR)=0
   40    CONTINUE
C
C         STEP I
C
C        BIR GRID IS FILLED WITH BCN VALUES
C
      BIR(1,1)=BCN(1,1)
      BIR(1,2)=BCN(1,1)
      BIR(2,1)=BCN(1,1)
```

```
      BIR(2,2)=BCN(1,1)
      NO=1
      DO 50 NR=2,20
         BIR(1,NR*2)=BCN(NO,NR)
         BIR(1,NR*2-1)=BCN(NO,NR)
         BIR(2,NR*2)=BCN(NO,NR)
   50    BIR(2,NR*2-1)=BCN(NO,NR)
      NR=1
      DO 60 NO=2,20
         BIR(NO*2,1)=BCN(NO,NR)
         BIR(NO*2-1,1)=BCN(NO,NR)
         BIR(NO*2,2)=BCN(NO,NR)
   60    BIR(NO*2-1,2)=BCN(NO,NR)
      DO 80 NO=2,20
         DO 70 NR=2,20
            BIR(NO*2,NR*2)=BCN(NO,NR)
            BIR(NO*2-1,NR*2)=BCN(NO,NR)
            BIR(NO*2,NR*2-1)=BCN(NO,NR)
   70       BIR(NO*2-1,NR*2-1)=BCN(NO,NR)
   80    CONTINUE
C
C         STEP II
C
C        INNER BIR GRID IS FILLED WITH DCN VALUES
C
      DO 100 NO=1,20
         DO 90 NR=1,20
   90       BIR(NO+10,NR+10)=DCN(NO,NR)
  100    CONTINUE
C
C         STEP III
C
C        BIR GRID IS CONVERTED TO AREA-SOURCE VALUES
C
      DO 120 NO=1,39
         DO 110 NR=1,39
  110       BIR(NO,NR)=(BIR(NO,NR)+BIR(NO+1,NR)+BIR(NO,NR+1)+BIR(NO+1,
     >        NR+1))/4.
  120    CONTINUE
C
C         STEP IV
C
C        AIR GRID IS FILLED WITH DCN VALUES
C
      AIR(1,1)=DCN(1,1)
      AIR(1,2)=DCN(1,1)
      AIR(2,1)=DCN(1,1)
      AIR(2,2)=DCN(1,1)
      NO=1
      DO 130 NR=2,20
         AIR(1,NR*2)=DCN(NO,NR)
         AIR(1,NR*2-1)=DCN(O,NR)
         AIR(2,NR*2)=DCN(NO,NR)
  130    AIR(2,NR*2-1)=DCN(NO,NR)
      NR=1
      DO 140 NO=2,20
         AIR(NO*2,1)=DCN(NO,NR)
         AIR(NO*2-1,1)=DCN(NO,NR)
```

```
         AIR(NO*2,2)=DCN(NO,NR)
  140    AIR(NO*2-1,2)=DCN(NO,NR)
      DO 160 NO=2,20
         DO 150 NR=2,20
            AIR(NO*2,NR*2)=DCN(NO,NR)
            AIR(NO*2-1,NR*2)=DCN(NO,NR)
            AIR(NO*2,NR*2-1)=DCN(NO,NR)
  150       AIR(NO*2-1,NR*2-1)=DCN(NO,NR)
  160    CONTINUE
C
C         STEP V
C
C        INNER AIR GRID IS FILLED WITH ACN VALUES
C
      DO 18C NO=1,20
         DO 170 NR=1,20
  170       AIR(NO+10,NR+10)=ACN(NO,NR)
  180    CONTINUE
C
C         STEP VI
C
C        INNER 16 AIR SQUARES ARE REFINED USING CCN
C
      DO 200 NA=19,22
         DO 190 NB=19,22
  190       AIR(NA,NB)=0
  200    CONTINUE
      DO 220 NO=1,20
         DO 210 NR=1,20
            NA=19+(NO-.1)/5
            NB=19+(NR-.1)/5
  210       AIR(NA,NB)=CCN(NO,NR)+AIR(NA,NB)
  220    CONTINUE
      DO 240 NA=19,22
         DO 230 NB=19,22
  230       AIR(NA,NB)=AIR(NA,NB)/25.
  240    CONTINUE
C
C         STEP VII
C
C        AIR GRID IS CONVERTED TO AREA-SOURCE VALUES
C
      DO 260 NO=1,39
         DO 250 NR=1,39
  250       AIR(NO,NR)=(AIR(NO,NR)+AIR(NO+1,NR)+AIR(NO,NR+1)+AIR(NO+1,
     >        NR+1))/4.
  260    CONTINUE
C
C         STEP VIII
C
C        INNER 9 AIR VALUES ARE REFINED USING CCN
C
      DO 28C NO=1,19
         DO 270 NR=1,19
  270       AKACN(NO,NR)=(CCN(NO,NR)+CCN(NO+1,NR)+CCN(NO,NR+1)+ CCN(NO+
     >        1,NR+1))/4.
  280    CONTINUE
      DO 320 NO=6,10
```

```
          DO 310 NR=6,10
             DO 300 NA=1,15
                DO 290 NB=1,15
 290               SMRP(NA,NB)=AKACN(10+NA-NO,10+NB-NR)/25.+SMRP(NA,NB)
 300            CONTINUE
 310         CONTINUE
 320      CONTINUE
       DO 340 NO=19,21
          DO 330 NR=19,21
 330         AIR(NO,NR)=0
 340      CONTINUE
       DO 360 NA=1,15
          DO 350 NB=1,15
 350         AIR(19+((NA-.1)/5),19+((NB-.1)/5))=SMRP(NA,NB)+ AIR(19+((NA-
     >        .1)/5),19+((NB-.1)/5))
 360      CONTINUE
       DO 380 NO=19,21
          DO 370 NR=19,21
 370         AIR(NC,NR)=AIR(NO,NR)/25.
 380      CONTINUE
C
       DO 400 NO=1,20
          DO 390 NR=1,20
 390         AIR(NC,NR)=AIR(NO+10,NR+10)
 400      CONTINUE
C
C          STEP IX
C
C         INNER 100 EIR VALUES ARE REPLACED WITH VALUES FROM AIR GRID
C
       DO 42C NA=6,14
          DO 410 NB=6,14
             NO=NA+10
             NR=NB+10
 410         BIR(NO,NR)=(4.*AIR(2*NA-10,2*NB-10)+2.*AIR(2*NA-9,2*NB-10)+
     >        2.*AIR(2*NA-10,2*NB-9)+2.*AIR(2*NA-11,2*NB-10)+ 2.*AIR(2*
     >        NA-10,2*NB-11)+AIR(2*NA-9,2*NB-9)+ AIR(2*NA-11,2*NB-9)+
     >        AIR(2*NA-9,2*NB-11)+ AIR(2*NA-11,2*NB-11))/16.
 420      CONTINUE
C
C          STEP X
C
C         CONCENTRATIONS IN AIR ARE COMPUTED FOR ALL GRID SOURCES
C
       DO 460 NO=1,20
          DO 450 NR=1,20
             DO 440 NA=1,20
                DO 430 NB=1,20
                   IA=20+NA-NO
                   IB=20+NB-NR
 430               RSEP(NA,NB)=BIR(IA,IB)*FRACT(NO,NR)*ARSORC+RSEP(NA,NB)
 440            CONTINUE
 450         CONTINUE
 460      CONTINUE
C
C          STEP XI
C
C         THE AREAS OUTPUT IS PRINTED AND PUNCHED ON CARDS
```

```
C
      WRITE(51,9003)
      WRITE(51,9004)
      WRITE(51,9005)ARSORC
      WRITE(51,9006)SQSD
      WRITE(51,9007)
      WRITE(51,9008)
      WRITE(51,9007)
      WRITE(51,9009)
      WRITE(51,9010)
      WRITE(51,9004)
      DO 480 NO=1,5
         DO 470 NR=1,20
            NK=NO+5
            NL=NO+10
            NM=NO+15
 470        WRITE(51,9011)NO,NR,FRACT(NO,NR),NK,NR,FRACT(NK,NR),NL,NR,
     >        FRACT(NL,NR),NM,NR,FRACT(NM,NR)
 480     CONTINUE
      WRITE(51,9007)
      WRITE(51,9012)
      A=SQSD
      B=SQSD*2.
      C=SQSD*.5
      D=SQSD*.1
      WRITE(51,9013)
      WRITE(51,9014)
      WRITE(51,9015)A,B,C,D
      WRITE(51,9016)
      WRITE(51,9004)
      WRITE(51,9017)(((NO,NR,DCN(NO,NR),BCN(NO,NR),ACN(NO,NR),CCN(NO,NR)
     > ),NR=1,20),NO=1,20)
      WRITE(51,9012)
      WRITE(51,9018)
      WRITE(51,9004)
      WRITE(51,9019)
      WRITE(51,9010)
      WRITE(51,9004)
      DO 500 NO=1,5
         DO 490 NR=1,20
            NK=NO+5
            NL=NO+10
            NM=NO+15
 490        WRITE(51,9020)NO,NR,RSEP(NO,NR),NK,NR,RSEP(NK,NR),NL,NR,
     >        RSEP(NL,NR),NM,NR,RSEP(NM,NR)
 500     CONTINUE
      WRITE(51,9007)
      WRITE(51,9012)
      IF (IPUN.EQ.0) GO TO 520
      IF (IPUN.EQ.2) GO TO 510
      PUNCH 9021,((RSEP(NO,NR),NR=1,20),NO=1,20)
      IF (IPUN.EQ.1) GO TO 520
 510  CONTINUE
      PUNCH 9022,((BIR(NO,NR),NR=1,40),NO=1,40)
 520  CONTINUE
      STOP
 9000 FORMAT(I10)
 9001 FORMAT(F10.1)
```

```
9002 FORMAT(8E10.3)
9003 FORMAT('1',T56,'OUTPUT OF AREAS CODE')
9004 FORMAT('0')
9005 FORMAT('0',T20,'TOTAL AREA RELEASE RATE(MICROGRAMS/SEC)',T100,
    > E10.3)
9006 FORMAT('0',T20,'SIDE OF GRID SQUARE(METERS)',T100,F10.1)
9007 FORMAT(' ')
9008 FORMAT('0',T38,'FRACTION OF TOTAL AREA RELEASE RATE FOR EACH GRID
    >SQUARE')
9009 FORMAT('0',T8,'GRID',4X,'FRACTION',T41,'GRID',4X,'FRACTION', T75,
    > 'GRID',4X,'FRACTION',T109,'GRID',4X,'FRACTION')
9010 FORMAT('0',T7,'X',T12,'Y',T40,'X',T45,'Y',T74,'X',T79,'Y',T108,
    > 'X',T113,'Y')
9011 FORMAT(' ',T6,I2,T11,I2,T15,E10.3,T39,I2,T44,I2,T48,E10.3,T73,I2,
    > T78,I2,T82,E10.3,T107,I2,T112,I2,T116,E10.3)
9012 FORMAT('0',T10,'NOTE--THE X AND Y VALUES FOR THE GRID ARE INDICES
    >NUMBERED FROM WEST TO EAST AND FROM SOUTH TO NORTH,RESPECTIVELY.')
9013 FORMAT('1',T29,'POINT-SOURCE CHI/Q INPUT VALUES FOR FOUR SPECIFIED
    > GRID SIZES (SEC/CUBIC CM)')
9014 FORMAT('0',T8,'GRID',T29,'GRID SIDE=',T57,'GRID SIDE=',T85,
    >'GRID SIDE=',T113,'GRID SIDE=')
9015 FORMAT(' ',T24,F10.1,' METERS',T52,F10.1,' METERS',T80,F10.1,
    > ' METERS',T108,F10.1,' METERS')
9016 FORMAT('0',T7,'X',T12,'Y')
9017 FORMAT(' ',T6,I2,T11,I2,T29,E10.3,T57,E10.3,T85,E10.3,T113,E10.3)
9018 FORMAT('1',T43,'GROUND-LEVEL CONCENTRATION IN AIR (MICROGRAMS/CUBI
    >C CM)')
9019 FORMAT('0',T8,'GRID',4X,'CONCENTRATION',T41,'GRID',4X,
    > 'CONCENTRATION',T75,'GRID',4X,'CONCENTRATION',T109,'GRID',4X,
    > 'CONCENTRATION')
9020 FORMAT(' ',T6,I2,T11,I2,T17,E10.3,T39,I2,T44,I2,T50,E10.3,T73,I2,
    > T78,I2,T84,E10.3,T107,I2,T112,I2,T118,E10.3)
9021 FORMAT(8E10.3)
9022 FORMAT(10E8.2)
     END
```

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APPENDIX B. OUTPUT OF AN EXAMPLE CASE RUN WITH THE AREAS COMPUTER CODE

The example case is for a hypotheical square area-source releasing 1200 μg/sec of an air pollutant from near ground level. The square source is 2000 m on a side and assumed to cover the inner 100 grid squares of a 20 by 20 area reference grid. A uniform annual-average meteorology is used.

OUTPUT OF AREAS CODE

TOTAL AREA RELEASE RATE(MICROGRAMS/SEC) 0.120E 04

SIDE OF GRID SQUARE(METERS) 200.0

FRACTION OF TOTAL AREA RELEASE RATE FOR EACH GRID SQUARE

GRID X	GRID Y	FRACTION	GRID X	GRID Y	FRACTION	GRID X	GRID Y	FRACTION	GRID X	GRID Y	FRACTION
1	1	0.0	6	1	0.0	11	1	0.0	16	1	0.0
1	2	0.0	6	2	0.0	11	2	0.0	16	2	0.0
1	3	0.0	6	3	0.0	11	3	0.0	16	3	0.0
1	4	0.0	6	4	0.0	11	4	0.0	16	4	0.0
1	5	0.0	6	5	0.0	11	5	0.0	16	5	0.0
1	6	0.0	6	6	0.100E-01	11	6	0.100E-01	16	6	0.0
1	7	0.0	6	7	0.100E-01	11	7	0.100E-01	16	7	0.0
1	8	0.0	6	8	0.100E-01	11	8	0.100E-01	16	8	0.0
1	9	0.0	6	9	0.100E-01	11	9	0.100E-01	16	9	0.0
1	10	0.0	6	10	0.100E-01	11	10	0.100E-01	16	10	0.0
1	11	0.0	6	11	0.100E-01	11	11	0.100E-01	16	11	0.0
1	12	0.0	6	12	0.100E-01	11	12	0.100E-01	16	12	0.0
1	13	0.0	6	13	0.100E-01	11	13	0.100E-01	16	13	0.0
1	14	0.0	6	14	0.100E-01	11	14	0.100E-01	16	14	0.0
1	15	0.0	6	15	0.100E-01	11	15	0.100E-01	16	15	0.0
1	16	0.0	6	16	0.0	11	16	0.0	16	16	0.0
1	17	0.0	6	17	0.0	11	17	0.0	16	17	0.0
1	18	0.0	6	18	0.0	11	18	0.0	16	18	0.0
1	19	0.0	6	19	0.0	11	19	0.0	16	19	0.0
1	20	0.0	6	20	0.0	11	20	0.0	16	20	0.0
2	1	0.0	7	1	0.0	12	1	0.0	17	1	0.0
2	2	0.0	7	2	0.0	12	2	0.0	17	2	0.0
2	3	0.0	7	3	0.0	12	3	0.0	17	3	0.0
2	4	0.0	7	4	0.0	12	4	0.0	17	4	0.0
2	5	0.0	7	5	0.0	12	5	0.0	17	5	0.0
2	6	0.0	7	6	0.100E-01	12	6	0.100E-01	17	6	0.0
2	7	0.0	7	7	0.100E-01	12	7	0.100E-01	17	7	0.0
2	8	0.0	7	8	0.100E-01	12	8	0.100E-01	17	8	0.0
2	9	0.0	7	9	0.100E-01	12	9	0.100E-01	17	9	0.0
2	10	0.0	7	10	0.100E-01	12	10	0.100E-01	17	10	0.0
2	11	0.0	7	11	0.100E-01	12	11	0.100E-01	17	11	0.0
2	12	0.0	7	12	0.100E-01	12	12	0.100E-01	17	12	0.0
2	13	0.0	7	13	0.100E-01	12	13	0.100E-01	17	13	0.0
2	14	0.0	7	14	0.100E-01	12	14	0.100E-01	17	14	0.0
2	15	0.0	7	15	0.100E-01	12	15	0.100E-01	17	15	0.0
2	16	0.0	7	16	0.0	12	16	0.0	17	16	0.0
2	17	0.0	7	17	0.0	12	17	0.0	17	17	0.0
2	18	0.0	7	18	0.0	12	18	0.0	17	18	0.0
2	19	0.0	7	19	0.0	12	19	0.0	17	19	0.0
2	20	0.0	7	20	0.0	12	20	0.0	17	20	0.0
3	1	0.0	8	1	0.0	13	1	0.0	18	1	0.0
3	2	0.0	8	2	0.0	13	2	0.0	18	2	0.0
3	3	0.0	8	3	0.0	13	3	0.0	18	3	0.0
3	4	0.0	8	4	0.0	13	4	0.0	18	4	0.0
3	5	0.0	8	5	0.0	13	5	0.0	18	5	0.0
3	6	0.0		6	0.100E-01	13	6	0.100E-01	18	6	0.0

3	7	0.0	8	7	0.100E-01	13	7	0.100E-01	18	7	0.0
3	8	0.0	8	8	0.100E-01	13	8	0.100E-01	18	8	0.0
3	9	0.0	8	9	0.100E-01	13	9	0.100E-01	18	9	0.0
3	10	0.0	8	10	0.100E-01	13	10	0.100E-01	18	10	0.0
3	11	0.0	8	11	0.100E-01	13	11	0.100E-01	18	11	0.0
3	12	0.0	8	12	0.100E-01	13	12	0.100E-01	18	12	0.0
3	13	0.0	8	13	0.100E-01	13	13	0.100E-01	18	13	0.0
3	14	0.0	8	14	0.100E-01	13	14	0.100E-01	18	14	0.0
3	15	0.0	8	15	0.100E-01	13	15	0.100E-01	18	15	0.0
3	16	0.0	8	16	0.0	13	16	0.0	18	16	0.0
3	17	0.0	8	17	0.0	13	17	0.0	18	17	0.0
3	18	0.0	8	18	0.0	13	18	0.0	18	18	0.0
3	19	0.0	8	19	0.0	13	19	0.0	18	19	0.0
3	20	0.0	8	20	0.0	13	20	0.0	18	20	0.0
4	1	0.0	9	1	0.0	14	1	0.0	19	1	0.0
4	2	0.0	9	2	0.0	14	2	0.0	19	2	0.0
4	3	0.0	9	3	0.0	14	3	0.0	19	3	0.0
4	4	0.0	9	4	0.0	14	4	0.0	19	4	0.0
4	5	0.0	9	5	0.0	14	5	0.0	19	5	0.0
4	6	0.0	9	6	0.100E-01	14	6	0.100E-01	19	6	0.0
4	7	0.0	9	7	0.100E-01	14	7	0.100E-01	19	7	0.0
4	8	0.0	9	8	0.100E-01	14	8	0.100E-01	19	8	0.0
4	9	0.0	9	9	0.100E-01	14	9	0.100E-01	19	9	0.0
4	10	0.0	9	10	0.100E-01	14	10	0.100E-01	19	10	0.0
4	11	0.0	9	11	0.100E-01	14	11	0.100E-01	19	11	0.0
4	12	0.0	9	12	0.100E-01	14	12	0.100E-01	19	12	0.0
4	13	0.0	9	13	0.100E-01	14	13	0.100E-01	19	13	0.0
4	14	0.0	9	14	0.100E-01	14	14	0.100E-01	19	14	0.0
4	15	0.0	9	15	0.100E-01	14	15	0.100E-01	19	15	0.0
4	16	0.0	9	16	0.0	14	16	0.0	19	16	0.0
4	17	0.0	9	17	0.0	14	17	0.0	19	17	0.0
4	18	0.0	9	18	0.0	14	18	0.0	19	18	0.0
4	19	0.0	9	19	0.0	14	19	0.0	19	19	0.0
4	20	0.0	9	20	0.0	14	20	0.0	19	20	0.0
5	1	0.0	10	1	0.0	15	1	0.0	20	1	0.0
5	2	0.0	10	2	0.0	15	2	0.0	20	2	0.0
5	3	0.0	10	3	0.0	15	3	0.0	20	3	0.0
5	4	0.0	10	4	0.0	15	4	0.0	20	4	0.0
5	5	0.0	10	5	0.0	15	5	0.0	20	5	0.0
5	6	0.0	10	6	0.100E-01	15	6	0.100E-01	20	6	0.0
5	7	0.0	10	7	0.100E-01	15	7	0.100E-01	20	7	0.0
5	8	0.0	10	8	0.100E-01	15	8	0.100E-01	20	8	0.0
5	9	0.0	10	9	0.100E-01	15	9	0.100E-01	20	9	0.0
5	10	0.0	10	10	0.100E-01	15	10	0.100E-01	20	10	0.0
5	11	0.0	10	11	0.100E-01	15	11	0.100E-01	20	11	0.0
5	12	0.0	10	12	0.100E-01	15	12	0.100E-01	20	12	0.0
5	13	0.0	10	13	0.100E-01	15	13	0.100E-01	20	13	0.0
5	14	0.0	10	14	0.100E-01	15	14	0.100E-01	20	14	0.0
5	15	0.0	10	15	0.100E-01	15	15	0.100E-01	20	15	0.0
5	16	0.0	10	16	0.0	15	16	0.0	20	16	0.0
5	17	0.0	10	17	0.0	15	17	0.0	20	17	0.0
5	18	0.0	10	18	0.0	15	18	0.0	20	18	0.0
5	19	0.0	10	19	0.0	15	19	0.0	20	19	0.0
5	20	0.0	10	20	0.0	15	20	0.0	20	20	0.0

NOTE--THE X AND Y VALUES FOR THE GRID ARE INDICES NUMBERED FROM WEST TO EAST AND FROM SOUTH TO NORTH,RESPECTIVELY.

POINT-SOURCE CHI/Q INPUT VALUES FOR FOUR SPECIFIED GRID SIZES (SEC/CUBIC CM)

GRID X	GRID Y	GRID SIDE= 200.0 METERS	GRID SIDE= 400.0 METERS	GRID SIDE= 100.0 METERS	GRID SIDE= 20.0 METERS
1	1	0.133E-12	0.304E-13	0.585E-12	0.181E-10
1	2	0.149E-12	0.340E-13	0.654E-12	0.203E-10
1	3	0.167E-12	0.380E-13	0.731E-12	0.226E-10
1	4	0.185E-12	0.423E-13	0.813E-12	0.252E-10
1	5	0.205E-12	0.468E-13	0.900E-12	0.279E-10
1	6	0.225E-12	0.513E-13	0.987E-12	0.306E-10
1	7	0.244E-12	0.556E-13	0.107E-11	0.331E-10
1	8	0.260E-12	0.593E-13	0.114E-11	0.353E-10
1	9	0.272E-12	0.620E-13	0.119E-11	0.370E-10
1	10	0.278E-12	0.635E-13	0.122E-11	0.378E-10
1	11	0.278E-12	0.635E-13	0.122E-11	0.378E-10
1	12	0.272E-12	0.620E-13	0.119E-11	0.370E-10
1	13	0.260E-12	0.593E-13	0.114E-11	0.353E-10
1	14	0.244E-12	0.556E-13	0.107E-11	0.331E-10
1	15	0.225E-12	0.513E-13	0.987E-12	0.306E-10
1	16	0.205E-12	0.468E-13	0.900E-12	0.279E-10
1	17	0.185E-12	0.423E-13	0.813E-12	0.252E-10
1	18	0.167E-12	0.380E-13	0.731E-12	0.226E-10
1	19	0.149E-12	0.340E-13	0.654E-12	0.203E-10
1	20	0.133E-12	0.304E-13	0.585E-12	0.181E-10
2	1	0.149E-12	0.340E-13	0.654E-12	0.203E-10
2	2	0.169E-12	0.385E-13	0.741E-12	0.230E-10
2	3	0.192E-12	0.437E-13	0.840E-12	0.260E-10
2	4	0.217E-12	0.494E-13	0.950E-12	0.294E-10
2	5	0.244E-12	0.556E-13	0.107E-11	0.331E-10
2	6	0.272E-12	0.620E-13	0.119E-11	0.370E-10
2	7	0.300E-12	0.683E-13	0.131E-11	0.407E-10
2	8	0.324E-12	0.739E-13	0.142E-11	0.436E-10
2	9	0.343E-12	0.781E-13	0.150E-11	0.466E-10
2	10	0.353E-12	0.804E-13	0.155E-11	0.479E-10
2	11	0.353E-12	0.804E-13	0.155E-11	0.479E-10
2	12	0.343E-12	0.781E-13	0.150E-11	0.466E-10
2	13	0.324E-12	0.739E-13	0.142E-11	0.436E-10
2	14	0.300E-12	0.683E-13	0.131E-11	0.407E-10
2	15	0.272E-12	0.620E-13	0.119E-11	0.370E-10
2	16	0.244E-12	0.556E-13	0.107E-11	0.331E-10
2	17	0.217E-12	0.494E-13	0.950E-12	0.294E-10
2	18	0.192E-12	0.437E-13	0.840E-12	0.260E-10
2	19	0.169E-12	0.385E-13	0.741E-12	0.230E-10
2	20	0.149E-12	0.340E-13	0.654E-12	0.203E-10
3	1	0.167E-12	0.380E-13	0.731E-12	0.226E-10
3	2	0.192E-12	0.437E-13	0.840E-12	0.260E-10
3	3	0.221E-12	0.503E-13	0.968E-12	0.300E-10
3	4	0.254E-12	0.580E-13	0.112E-11	0.346E-10
3	5	0.292E-12	0.666E-13	0.128E-11	0.397E-10
3	6	0.333E-12	0.759E-13	0.146E-11	0.453E-10
3	7	0.375E-12	0.854E-13	0.164E-11	0.509E-10
3	8	0.413E-12	0.942E-13	0.181E-11	0.561E-10
3	9	0.443E-12	0.101E-12	0.194E-11	0.603E-10
3	10	0.460E-12	0.105E-12	0.202E-11	0.625E-10
3	11	0.460E-12	0.105E-12	0.202E-11	0.625E-10
3	12	0.443E-12	0.101E-12	0.194E-11	0.603E-10
3	13	0.413E-12	0.942E-13	0.181E-11	0.561E-10
3	14	0.375E-12	0.854E-13	0.164E-11	0.509E-10
3	15	0.333E-12	0.759E-13	0.146E-11	0.453E-10

3	16	0.292E-12	0.666E-13	0.128E-11	0.397E-10
3	17	0.254E-12	0.580E-13	0.112E-11	0.346E-10
3	18	0.221E-12	0.503E-13	0.968E-12	0.300E-10
3	19	0.192E-12	0.437E-13	0.840E-12	0.260E-10
3	20	0.167E-12	0.380E-13	0.731E-12	0.226E-10
4	1	0.185E-12	0.423E-13	0.813E-12	0.252E-10
4	2	0.217E-12	0.494E-13	0.950E-12	0.294E-10
4	3	0.254E-12	0.580E-13	0.112E-11	0.346E-10
4	4	0.300E-12	0.683E-13	0.131E-11	0.407E-10
4	5	0.353E-12	0.804E-13	0.155E-11	0.479E-10
4	6	0.413E-12	0.942E-13	0.181E-11	0.561E-10
4	7	0.478E-12	0.109E-12	0.210E-11	0.650E-10
4	8	0.542E-12	0.123E-12	0.238E-11	0.736E-10
4	9	0.594E-12	0.135E-12	0.260E-11	0.807E-10
4	10	0.623E-12	0.142E-12	0.274E-11	0.847E-10
4	11	0.623E-12	0.142E-12	0.274E-11	0.847E-10
4	12	0.594E-12	0.135E-12	0.260E-11	0.807E-10
4	13	0.542E-12	0.123E-12	0.238E-11	0.736E-10
4	14	0.478E-12	0.109E-12	0.210E-11	0.650E-10
4	15	0.413E-12	0.942E-13	0.181E-11	0.561E-10
4	16	0.353E-12	0.804E-13	0.155E-11	0.479E-10
4	17	0.300E-12	0.683E-13	0.131E-11	0.407E-10
4	18	0.254E-12	0.580E-13	0.112E-11	0.346E-10
4	19	0.217E-12	0.494E-13	0.950E-12	0.294E-10
4	20	0.185E-12	0.423E-13	0.813E-12	0.252E-10
5	1	0.205E-12	0.468E-13	0.900E-12	0.279E-10
5	2	0.244E-12	0.556E-13	0.107E-11	0.331E-10
5	3	0.292E-12	0.666E-13	0.128E-11	0.397E-10
5	4	0.353E-12	0.804E-13	0.155E-11	0.479E-10
5	5	0.428E-12	0.975E-13	0.188E-11	0.581E-10
5	6	0.513E-12	0.117E-12	0.225E-11	0.705E-10
5	7	0.623E-12	0.142E-12	0.274E-11	0.847E-10
5	8	0.733E-12	0.167E-12	0.322E-11	0.997E-10
5	9	0.830E-12	0.189E-12	0.364E-11	0.113E-09
5	10	0.888E-12	0.202E-12	0.390E-11	0.121E-09
5	11	0.888E-12	0.202E-12	0.390E-11	0.121E-09
5	12	0.830E-12	0.189E-12	0.364E-11	0.113E-09
5	13	0.733E-12	0.167E-12	0.322E-11	0.997E-10
5	14	0.623E-12	0.142E-12	0.274E-11	0.847E-10
5	15	0.513E-12	0.117E-12	0.225E-11	0.705E-10
5	16	0.428E-12	0.975E-13	0.188E-11	0.581E-10
5	17	0.353E-12	0.804E-13	0.155E-11	0.479E-10
5	18	0.292E-12	0.666E-13	0.128E-11	0.397E-10
5	19	0.244E-12	0.556E-13	0.107E-11	0.331E-10
5	20	0.205E-12	0.468E-13	0.900E-12	0.279E-10
6	1	0.225E-12	0.513E-13	0.987E-12	0.306E-10
6	2	0.272E-12	0.620E-13	0.119E-11	0.370E-10
6	3	0.333E-12	0.759E-13	0.146E-11	0.453E-10
6	4	0.413E-12	0.942E-13	0.181E-11	0.561E-10
6	5	0.513E-12	0.117E-12	0.225E-11	0.705E-10
6	6	0.656E-12	0.150E-12	0.288E-11	0.892E-10
6	7	0.830E-12	0.189E-12	0.364E-11	0.113E-09
6	8	0.103E-11	0.235E-12	0.453E-11	0.140E-09
6	9	0.123E-11	0.280E-12	0.539E-11	0.167E-09
6	10	0.136E-11	0.309E-12	0.595E-11	0.184E-09
6	11	0.136E-11	0.309E-12	0.595E-11	0.184E-09
6	12	0.123E-11	0.280E-12	0.539E-11	0.167E-09
6	13	0.103E-11	0.235E-12	0.453E-11	0.140E-09
6	14	0.830E-12	0.189E-12	0.364E-11	0.113E-09
6	15	0.656E-12	0.150E-12	0.288E-11	0.892E-10
6	16	0.513E-12	0.117E-12	0.225E-11	0.705E-10

6	17	0.413E-12	0.942E-13	0.181E-11	0.561E-10
6	18	0.333E-12	0.759E-13	0.146E-11	0.453E-10
6	19	0.272E-12	0.620E-13	0.119E-11	0.370E-10
6	20	0.225E-12	0.513E-13	0.987E-12	0.306E-10
7	1	0.244E-12	0.556E-13	0.107E-11	0.331E-10
7	2	0.300E-12	0.683E-13	0.131E-11	0.407E-10
7	3	0.375E-12	0.854E-13	0.164E-11	0.509E-10
7	4	0.478E-12	0.109E-12	0.210E-11	0.650E-10
7	5	0.623E-12	0.142E-12	0.274E-11	0.847E-10
7	6	0.830E-12	0.189E-12	0.364E-11	0.113E-09
7	7	0.112E-11	0.256E-12	0.492E-11	0.153E-09
7	8	0.151E-11	0.345E-12	0.664E-11	0.204E-09
7	9	0.196E-11	0.447E-12	0.861E-11	0.266E-09
7	10	0.230E-11	0.524E-12	0.101E-10	0.312E-09
7	11	0.230E-11	0.524E-12	0.101E-10	0.312E-09
7	12	0.196E-11	0.447E-12	0.861E-11	0.266E-09
7	13	0.151E-11	0.345E-12	0.664E-11	0.204E-09
7	14	0.112E-11	0.256E-12	0.492E-11	0.153E-09
7	15	0.830E-12	0.189E-12	0.364E-11	0.113E-09
7	16	0.623E-12	0.142E-12	0.274E-11	0.847E-10
7	17	0.478E-12	0.109E-12	0.210E-11	0.650E-10
7	18	0.375E-12	0.854E-13	0.164E-11	0.509E-10
7	19	0.300E-12	0.683E-13	0.131E-11	0.407E-10
7	20	0.244E-12	0.556E-13	0.107E-11	0.331E-10
8	1	0.260E-12	0.593E-13	0.114E-11	0.353E-10
8	2	0.324E-12	0.739E-13	0.142E-11	0.436E-10
8	3	0.413E-12	0.942E-13	0.181E-11	0.561E-10
8	4	0.542E-12	0.123E-12	0.238E-11	0.736E-10
8	5	0.733E-12	0.167E-12	0.322E-11	0.997E-10
8	6	0.103E-11	0.235E-12	0.453E-11	0.140E-09
8	7	0.151E-11	0.345E-12	0.664E-11	0.204E-09
8	8	0.230E-11	0.524E-12	0.101E-10	0.312E-09
8	9	0.347E-11	0.791E-12	0.152E-10	0.470E-09
8	10	0.462E-11	0.105E-11	0.203E-10	0.625E-09
8	11	0.462E-11	0.105E-11	0.203E-10	0.625E-09
8	12	0.347E-11	0.791E-12	0.152E-10	0.470E-09
8	13	0.230E-11	0.524E-12	0.101E-10	0.312E-09
8	14	0.151E-11	0.345E-12	0.664E-11	0.204E-09
8	15	0.103E-11	0.235E-12	0.453E-11	0.140E-09
8	16	0.733E-12	0.167E-12	0.322E-11	0.997E-10
8	17	0.542E-12	0.123E-12	0.238E-11	0.736E-10
8	18	0.413E-12	0.942E-13	0.181E-11	0.561E-10
8	19	0.324E-12	0.739E-13	0.142E-11	0.436E-10
8	20	0.260E-12	0.593E-13	0.114E-11	0.353E-10
9	1	0.272E-12	0.620E-13	0.119E-11	0.370E-10
9	2	0.343E-12	0.781E-13	0.150E-11	0.466E-10
9	3	0.443E-12	0.101E-12	0.194E-11	0.603E-10
9	4	0.594E-12	0.135E-12	0.260E-11	0.807E-10
9	5	0.830E-12	0.189E-12	0.364E-11	0.113E-09
9	6	0.123E-11	0.280E-12	0.539E-11	0.167E-09
9	7	0.196E-11	0.447E-12	0.861E-11	0.266E-09
9	8	0.347E-11	0.791E-12	0.152E-10	0.470E-09
9	9	0.714E-11	0.163E-11	0.313E-10	0.959E-09
9	10	0.138E-10	0.314E-11	0.605E-10	0.182E-08
9	11	0.138E-10	0.314E-11	0.605E-10	0.182E-08
9	12	0.714E-11	0.163E-11	0.313E-10	0.959E-09
9	13	0.347E-11	0.791E-12	0.152E-10	0.470E-09
9	14	0.196E-11	0.447E-12	0.861E-11	0.266E-09
9	15	0.123E-11	0.280E-12	0.539E-11	0.167E-09
9	16	0.830E-12	0.189E-12	0.364E-11	0.113E-09
9	17	0.594E-12	0.135E-12	0.260E-11	0.807E-10

9	18	0.443E-12	0.101E-12	0.194E-11	0.603E-10
9	19	0.343E-12	0.781E-13	0.150E-11	0.466E-10
9	20	0.272E-12	0.620E-13	0.119E-11	0.370E-10
10	1	0.278E-12	0.635E-13	0.122E-11	0.378E-10
10	2	0.353E-12	0.804E-13	0.155E-11	0.479E-10
10	3	0.460E-12	0.105E-12	0.202E-11	0.625E-10
10	4	0.623E-12	0.142E-12	0.274E-11	0.847E-10
10	5	0.888E-12	0.202E-12	0.390E-11	0.121E-09
10	6	0.136E-11	0.309E-12	0.595E-11	0.184E-09
10	7	0.230E-11	0.524E-12	0.101E-10	0.312E-09
10	8	0.462E-11	0.105E-11	0.203E-10	0.625E-09
10	9	0.138E-10	0.314E-11	0.605E-10	0.182E-08
10	10	0.176E-09	0.407E-10	0.726E-09	0.853E-08
10	11	0.176E-09	0.407E-10	0.726E-09	0.853E-08
10	12	0.138E-10	0.314E-11	0.605E-10	0.182E-08
10	13	0.462E-11	0.105E-11	0.203E-10	0.625E-09
10	14	0.230E-11	0.524E-12	0.101E-10	0.312E-09
10	15	0.136E-11	0.309E-12	0.595E-11	0.184E-09
10	16	0.888E-12	0.202E-12	0.390E-11	0.121E-09
10	17	0.623E-12	0.142E-12	0.274E-11	0.847E-10
10	18	0.460E-12	0.105E-12	0.202E-11	0.625E-10
10	19	0.353E-12	0.804E-13	0.155E-11	0.479E-10
10	20	0.278E-12	0.635E-13	0.122E-11	0.378E-10
11	1	0.278E-12	0.635E-13	0.122E-11	0.378E-10
11	2	0.353E-12	0.804E-13	0.155E-11	0.479E-10
11	3	0.460E-12	0.105E-12	0.202E-11	0.625E-10
11	4	0.623E-12	0.142E-12	0.274E-11	0.847E-10
11	5	0.888E-12	0.202E-12	0.390E-11	0.121E-09
11	6	0.136E-11	0.309E-12	0.595E-11	0.184E-09
11	7	0.230E-11	0.524E-12	0.101E-10	0.312E-09
11	8	0.462E-11	0.105E-11	0.203E-10	0.625E-09
11	9	0.138E-10	0.314E-11	0.605E-10	0.182E-08
11	10	0.176E-09	0.407E-10	0.726E-09	0.853E-08
11	11	0.176E-09	0.407E-10	0.726E-09	0.853E-08
11	12	0.138E-10	0.314E-11	0.605E-10	0.182E-08
11	13	0.462E-11	0.105E-11	0.203E-10	0.625E-09
11	14	0.230E-11	0.524E-12	0.101E-10	0.312E-09
11	15	0.136E-11	0.309E-12	0.595E-11	0.184E-09
11	16	0.888E-12	0.202E-12	0.390E-11	0.121E-09
11	17	0.623E-12	0.142E-12	0.274E-11	0.847E-10
11	18	0.460E-12	0.105E-12	0.202E-11	0.625E-10
11	19	0.353E-12	0.804E-13	0.155E-11	0.479E-10
11	20	0.278E-12	0.635E-13	0.122E-11	0.378E-10
12	1	0.272E-12	0.620E-13	0.119E-11	0.370E-10
12	2	0.343E-12	0.781E-13	0.150E-11	0.466E-10
12	3	0.443E-12	0.101E-12	0.194E-11	0.603E-10
12	4	0.594E-12	0.135E-12	0.260E-11	0.807E-10
12	5	0.830E-12	0.189E-12	0.364E-11	0.113E-09
12	6	0.123E-11	0.280E-12	0.539E-11	0.167E-09
12	7	0.196E-11	0.447E-12	0.861E-11	0.266E-09
12	8	0.347E-11	0.791E-12	0.152E-10	0.470E-09
12	9	0.714E-11	0.163E-11	0.313E-10	0.959E-09
12	10	0.138E-10	0.314E-11	0.605E-10	0.182E-08
12	11	0.138E-10	0.314E-11	0.605E-10	0.182E-08
12	12	0.714E-11	0.163E-11	0.313E-10	0.959E-09
12	13	0.347E-11	0.791E-12	0.152E-10	0.470E-09
12	14	0.196E-11	0.447E-12	0.861E-11	0.266E-09
12	15	0.123E-11	0.280E-12	0.539E-11	0.167E-09
12	16	0.830E-12	0.189E-12	0.364E-11	0.113E-09
12	17	0.594E-12	0.135E-12	0.260E-11	0.807E-10
12	18	0.443E-12	0.101E-12	0.194E-11	0.603E-10

12	19	0.343E-12	0.781E-13	0.150E-11	0.466E-10
12	20	0.272E-12	0.620E-13	0.119E-11	0.370E-10
13	1	0.260E-12	0.593E-13	0.114E-11	0.353E-10
13	2	0.324E-12	0.739E-13	0.142E-11	0.436E-10
13	3	0.413E-12	0.942E-13	0.181E-11	0.561E-10
13	4	0.542E-12	0.123E-12	0.238E-11	0.736E-10
13	5	0.733E-12	0.167E-12	0.322E-11	0.997E-10
13	6	0.103E-11	0.235E-12	0.453E-11	0.140E-09
13	7	0.151E-11	0.345E-12	0.664E-11	0.204E-09
13	8	0.230E-11	0.524E-12	0.101E-10	0.312E-09
13	9	0.347E-11	0.791E-12	0.152E-10	0.470E-09
13	10	0.462E-11	0.105E-11	0.203E-10	0.625E-09
13	11	0.462E-11	0.105E-11	0.203E-10	0.625E-09
13	12	0.347E-11	0.791E-12	0.152E-10	0.470E-09
13	13	0.230E-11	0.524E-12	0.101E-10	0.312E-09
13	14	0.151E-11	0.345E-12	0.664E-11	0.204E-09
13	15	0.103E-11	0.235E-12	0.453E-11	0.140E-09
13	16	0.733E-12	0.167E-12	0.322E-11	0.997E-10
13	17	0.542E-12	0.123E-12	0.238E-11	0.736E-10
13	18	0.413E-12	0.942E-13	0.181E-11	0.561E-10
13	19	0.324E-12	0.739E-13	0.142E-11	0.436E-10
13	20	0.260E-12	0.593E-13	0.114E-11	0.353E-10
14	1	0.244E-12	0.556E-13	0.107E-11	0.331E-10
14	2	0.300E-12	0.683E-13	0.131E-11	0.407E-10
14	3	0.375E-12	0.854E-13	0.164E-11	0.509E-10
14	4	0.478E-12	0.109E-12	0.210E-11	0.650E-10
14	5	0.623E-12	0.142E-12	0.274E-11	0.847E-10
14	6	0.830E-12	0.189E-12	0.364E-11	0.113E-09
14	7	0.112E-11	0.256E-12	0.492E-11	0.153E-09
14	8	0.151E-11	0.345E-12	0.664E-11	0.204E-09
14	9	0.196E-11	0.447E-12	0.861E-11	0.266E-09
14	10	0.230E-11	0.524E-12	0.101E-10	0.312E-09
14	11	0.230E-11	0.524E-12	0.101E-10	0.312E-09
14	12	0.196E-11	0.447E-12	0.861E-11	0.266E-09
14	13	0.151E-11	0.345E-12	0.664E-11	0.204E-09
14	14	0.112E-11	0.256E-12	0.492E-11	0.153E-09
14	15	0.830E-12	0.189E-12	0.364E-11	0.113E-09
14	16	0.623E-12	0.142E-12	0.274E-11	0.847E-10
14	17	0.478E-12	0.109E-12	0.210E-11	0.650E-10
14	18	0.375E-12	0.854E-13	0.164E-11	0.509E-10
14	19	0.300E-12	0.683E-13	0.131E-11	0.407E-10
14	20	0.244E-12	0.556E-13	0.107E-11	0.331E-10
15	1	0.225E-12	0.513E-13	0.987E-12	0.306E-10
15	2	0.272E-12	0.620E-13	0.119E-11	0.370E-10
15	3	0.333E-12	0.759E-13	0.146E-11	0.453E-10
15	4	0.413E-12	0.942E-13	0.181E-11	0.561E-10
15	5	0.513E-12	0.117E-12	0.225E-11	0.705E-10
15	6	0.656E-12	0.150E-12	0.288E-11	0.892E-10
15	7	0.830E-12	0.189E-12	0.364E-11	0.113E-09
15	8	0.103E-11	0.235E-12	0.453E-11	0.140E-09
15	9	0.123E-11	0.280E-12	0.539E-11	0.167E-09
15	10	0.136E-11	0.309E-12	0.595E-11	0.184E-09
15	11	0.136E-11	0.309E-12	0.595E-11	0.184E-09
15	12	0.123E-11	0.280E-12	0.539E-11	0.167E-09
15	13	0.103E-11	0.235E-12	0.453E-11	0.140E-09
15	14	0.830E-12	0.189E-12	0.364E-11	0.113E-09
15	15	0.656E-12	0.150E-12	0.288E-11	0.892E-10
15	16	0.513E-12	0.117E-12	0.225E-11	0.705E-10
15	17	0.413E-12	0.942E-13	0.181E-11	0.561E-10
15	18	0.333E-12	0.759E-13	0.146E-11	0.453E-10
15	19	0.272E-12	0.620E-13	0.119E-11	0.370E-10

15	20	0.225E-12	0.513E-13	0.987E-12	0.306E-10
16	1	0.205E-12	0.468E-13	0.900E-12	0.279E-10
16	2	0.244E-12	0.556E-13	0.107E-11	0.331E-10
16	3	0.292E-12	0.666E-13	0.128E-11	0.397E-10
16	4	0.353E-12	0.804E-13	0.155E-11	0.479E-10
16	5	0.428E-12	0.975E-13	0.188E-11	0.581E-10
16	6	0.513E-12	0.117E-12	0.225E-11	0.705E-10
16	7	0.623E-12	0.142E-12	0.274E-11	0.847E-10
16	8	0.733E-12	0.167E-12	0.322E-11	0.997E-10
16	9	0.830E-12	0.189E-12	0.364E-11	0.113E-09
16	10	0.888E-12	0.202E-12	0.390E-11	0.121E-09
16	11	0.888E-12	0.202E-12	0.390E-11	0.121E-09
16	12	0.830E-12	0.189E-12	0.364E-11	0.113E-09
16	13	0.733E-12	0.167E-12	0.322E-11	0.997E-10
16	14	0.623E-12	0.142E-12	0.274E-11	0.847E-10
16	15	0.513E-12	0.117E-12	0.225E-11	0.705E-10
16	16	0.428E-12	0.975E-13	0.188E-11	0.581E-10
16	17	0.353E-12	0.804E-13	0.155E-11	0.479E-10
16	18	0.292E-12	0.666E-13	0.128E-11	0.397E-10
16	19	0.244E-12	0.556E-13	0.107E-11	0.331E-10
16	20	0.205E-12	0.468E-13	0.900E-12	0.279E-10
17	1	0.185E-12	0.423E-13	0.813E-12	0.252E-10
17	2	0.217E-12	0.494E-13	0.950E-12	0.294E-10
17	3	0.254E-12	0.580E-13	0.112E-11	0.346E-10
17	4	0.300E-12	0.683E-13	0.131E-11	0.407E-10
17	5	0.353E-12	0.804E-13	0.155E-11	0.479E-10
17	6	0.413E-12	0.942E-13	0.181E-11	0.561E-10
17	7	0.478E-12	0.109E-12	0.210E-11	0.650E-10
17	8	0.542E-12	0.123E-12	0.238E-11	0.736E-10
17	9	0.594E-12	0.135E-12	0.260E-11	0.807E-10
17	10	0.623E-12	0.142E-12	0.274E-11	0.847E-10
17	11	0.623E-12	0.142E-12	0.274E-11	0.847E-10
17	12	0.594E-12	0.135E-12	0.260E-11	0.807E-10
17	13	0.542E-12	0.123E-12	0.238E-11	0.736E-10
17	14	0.478E-12	0.109E-12	0.210E-11	0.650E-10
17	15	0.413E-12	0.942E-13	0.181E-11	0.561E-10
17	16	0.353E-12	0.804E-13	0.155E-11	0.479E-10
17	17	0.300E-12	0.683E-13	0.131E-11	0.407E-10
17	18	0.254E-12	0.580E-13	0.112E-11	0.346E-10
17	19	0.217E-12	0.494E-13	0.950E-12	0.294E-10
17	20	0.185E-12	0.423E-13	0.813E-12	0.252E-10
18	1	0.167E-12	0.380E-13	0.731E-12	0.226E-10
18	2	0.192E-12	0.437E-13	0.840E-12	0.260E-10
18	3	0.221E-12	0.503E-13	0.968E-12	0.300E-10
18	4	0.254E-12	0.580E-13	0.112E-11	0.346E-10
18	5	0.292E-12	0.666E-13	0.128E-11	0.397E-10
18	6	0.333E-12	0.759E-13	0.146E-11	0.453E-10
18	7	0.375E-12	0.854E-13	0.164E-11	0.509E-10
18	8	0.413E-12	0.942E-13	0.181E-11	0.561E-10
18	9	0.443E-12	0.101E-12	0.194E-11	0.603E-10
18	10	0.460E-12	0.105E-12	0.202E-11	0.625E-10
18	11	0.460E-12	0.105E-12	0.202E-11	0.625E-10
18	12	0.443E-12	0.101E-12	0.194E-11	0.603E-10
18	13	0.413E-12	0.942E-13	0.181E-11	0.561E-10
18	14	0.375E-12	0.854E-13	0.164E-11	0.509E-10
18	15	0.333E-12	0.759E-13	0.146E-11	0.453E-10
18	16	0.292E-12	0.666E-13	0.128E-11	0.397E-10
18	17	0.254E-12	0.580E-13	0.112E-11	0.346E-10
18	18	0.221E-12	0.503E-13	0.968E-12	0.300E-10
18	19	0.192E-12	0.437E-13	0.840E-12	0.260E-10
18	20	0.167E-12	0.380E-13	0.731E-12	0.226E-10

19	1	0.149E-12	0.340E-13	0.654E-12	0.203E-10
19	2	0.169E-12	0.385E-13	0.741E-12	0.230E-10
19	3	0.192E-12	0.437E-13	0.840E-12	0.260E-10
19	4	0.217E-12	0.494E-13	0.950E-12	0.294E-10
19	5	0.244E-12	0.556E-13	0.107E-11	0.331E-10
19	6	0.272E-12	0.620E-13	0.119E-11	0.370E-10
19	7	0.300E-12	0.683E-13	0.131E-11	0.407E-10
19	8	0.324E-12	0.739E-13	0.142E-11	0.436E-10
19	9	0.343E-12	0.781E-13	0.150E-11	0.466E-10
19	10	0.353E-12	0.804E-13	0.155E-11	0.479E-10
19	11	0.353E-12	0.804E-13	0.155E-11	0.479E-10
19	12	0.343E-12	0.781E-13	0.150E-11	0.466E-10
19	13	0.324E-12	0.739E-13	0.142E-11	0.436E-10
19	14	0.300E-12	0.683E-13	0.131E-11	0.407E-10
19	15	0.272E-12	0.620E-13	0.119E-11	0.370E-10
19	16	0.244E-12	0.556E-13	0.107E-11	0.331E-10
19	17	0.217E-12	0.494E-13	0.950E-12	0.294E-10
19	18	0.192E-12	0.437E-13	0.840E-12	0.260E-10
19	19	0.169E-12	0.385E-13	0.741E-12	0.230E-10
19	20	0.149E-12	0.340E-13	0.654E-12	0.203E-10
20	1	0.133E-12	0.304E-13	0.585E-12	0.181E-10
20	2	0.149E-12	0.340E-13	0.654E-12	0.203E-10
20	3	0.167E-12	0.380E-13	0.731E-12	0.226E-10
20	4	0.185E-12	0.423E-13	0.813E-12	0.252E-10
20	5	0.205E-12	0.468E-13	0.900E-12	0.279E-10
20	6	0.225E-12	0.513E-13	0.987E-12	0.306E-10
20	7	0.244E-12	0.556E-13	0.107E-11	0.331E-10
20	8	0.260E-12	0.593E-13	0.114E-11	0.353E-10
20	9	0.272E-12	0.620E-13	0.119E-11	0.370E-10
20	10	0.278E-12	0.635E-13	0.122E-11	0.378E-10
20	11	0.278E-12	0.635E-13	0.122E-11	0.378E-10
20	12	0.272E-12	0.620E-13	0.119E-11	0.370E-10
20	13	0.260E-12	0.593E-13	0.114E-11	0.353E-10
20	14	0.244E-12	0.556E-13	0.107E-11	0.331E-10
20	15	0.225E-12	0.513E-13	0.987E-12	0.306E-10
20	16	0.205E-12	0.468E-13	0.900E-12	0.279E-10
20	17	0.185E-12	0.423E-13	0.813E-12	0.252E-10
20	18	0.167E-12	0.380E-13	0.731E-12	0.226E-10
20	19	0.149E-12	0.340E-13	0.654E-12	0.203E-10
20	20	0.133E-12	0.304E-13	0.585E-12	0.181E-10

NOTE--THE X AND Y VALUES FOR THE GRID ARE INDICES NUMBERED FROM WEST TO EAST AND FROM SOUTH TO NORTH,RESPECTIVELY.

GROUND-LEVEL CONCENTRATION IN AIR (MICROGRAMS/CUBIC CM)

GRID X	GRID Y	CONCENTRATION	GRID X	GRID Y	CONCENTRATION	GRID X	GRID Y	CONCENTRATION	GRID X	GRID Y	CONCENTRATION
1	1	0.182E-09	6	1	0.333E-09	11	1	0.411E-09	16	1	0.301E-09
1	2	0.207E-09	6	2	0.429E-09	11	2	0.549E-09	16	2	0.377E-09
1	3	0.236E-09	6	3	0.582E-09	11	3	0.776E-09	16	3	0.492E-09
1	4	0.267E-09	6	4	0.874E-09	11	4	0.122E-08	16	4	0.684E-09
1	5	0.301E-09	6	5	0.215E-08	11	5	0.288E-08	16	5	0.112E-08
1	6	0.333E-09	6	6	0.105E-07	11	6	0.122E-07	16	6	0.215E-08
1	7	0.363E-09	6	7	0.118E-07	11	7	0.139E-07	16	7	0.258E-08
1	8	0.386E-09	6	8	0.120E-07	11	8	0.143E-07	16	8	0.275E-08
1	9	0.403E-09	6	9	0.122E-07	11	9	0.145E-07	16	9	0.284E-08
1	10	0.411E-09	6	10	0.122E-07	11	10	0.145E-07	16	10	0.288E-08
1	11	0.411E-09	6	11	0.122E-07	11	11	0.145E-07	16	11	0.288E-08
1	12	0.403E-09	6	12	0.122E-07	11	12	0.145E-07	16	12	0.284E-08
1	13	0.386E-09	6	13	0.120E-07	11	13	0.143E-07	16	13	0.275E-08
1	14	0.363E-09	6	14	0.118E-07	11	14	0.139E-07	16	14	0.258E-08
1	15	0.333E-09	6	15	0.105E-07	11	15	0.122E-07	16	15	0.215E-08
1	16	0.301E-09	6	16	0.215E-08	11	16	0.288E-08	16	16	0.112E-08
1	17	0.267E-09	6	17	0.874E-09	11	17	0.122E-08	16	17	0.684E-09
1	18	0.236E-09	6	18	0.582E-09	11	18	0.776E-09	16	18	0.492E-09
1	19	0.207E-09	6	19	0.429E-09	11	19	0.549E-09	16	19	0.377E-09
1	20	0.182E-09	6	20	0.333E-09	11	20	0.411E-09	16	20	0.301E-09
2	1	0.207E-09	7	1	0.363E-09	12	1	0.403E-09	17	1	0.267E-09
2	2	0.240E-09	7	2	0.475E-09	12	2	0.536E-09	17	2	0.326E-09
2	3	0.280E-09	7	3	0.660E-09	12	3	0.758E-09	17	3	0.408E-09
2	4	0.326E-09	7	4	0.103E-08	12	4	0.119E-08	17	4	0.523E-09
2	5	0.377E-09	7	5	0.258E-08	12	5	0.284E-08	17	5	0.684E-09
2	6	0.429E-09	7	6	0.118E-07	12	6	0.122E-07	17	6	0.874E-09
2	7	0.475E-09	7	7	0.133E-07	12	7	0.138E-07	17	7	0.103E-08
2	8	0.512E-09	7	8	0.137E-07	12	8	0.142E-07	17	8	0.113E-08
2	9	0.536E-09	7	9	0.138E-07	12	9	0.144E-07	17	9	0.119E-08
2	10	0.549E-09	7	10	0.139E-07	12	10	0.145E-07	17	10	0.122E-08
2	11	0.549E-09	7	11	0.139E-07	12	11	0.145E-07	17	11	0.122E-08
2	12	0.536E-09	7	12	0.138E-07	12	12	0.144E-07	17	12	0.119E-08
2	13	0.512E-09	7	13	0.137E-07	12	13	0.142E-07	17	13	0.113E-08
2	14	0.475E-09	7	14	0.133E-07	12	14	0.138E-07	17	14	0.103E-08
2	15	0.429E-09	7	15	0.118E-07	12	15	0.122E-07	17	15	0.874E-09
2	16	0.377E-09	7	16	0.258E-08	12	16	0.284E-08	17	16	0.684E-09
2	17	0.326E-09	7	17	0.103E-08	12	17	0.119E-08	17	17	0.523E-09
2	18	0.280E-09	7	18	0.660E-09	12	18	0.758E-09	17	18	0.408E-09
2	19	0.240E-09	7	19	0.475E-09	12	19	0.536E-09	17	19	0.326E-09
2	20	0.207E-09	7	20	0.363E-09	12	20	0.403E-09	17	20	0.267E-09
3	1	0.236E-09	8	1	0.386E-09	13	1	0.386E-09	18	1	0.236E-09
3	2	0.280E-09	8	2	0.512E-09	13	2	0.512E-09	18	2	0.280E-09
3	3	0.337E-09	8	3	0.720E-09	13	3	0.720E-09	18	3	0.337E-09
3	4	0.408E-09	8	4	0.113E-08	13	4	0.113E-08	18	4	0.408E-09
3	5	0.492E-09	8	5	0.275E-08	13	5	0.275E-08	18	5	0.492E-09
3	6	0.582E-09	8	6	0.120E-07	13	6	0.120E-07	18	6	0.582E-09
3	7	0.660E-09	8	7	0.137E-07	13	7	0.137E-07	18	7	0.661E-09
3	8	0.720E-09	8	8	0.140E-07	13	8	0.140E-07	18	8	0.720E-09
3	9	0.758E-09	8	9	0.142E-07	13	9	0.142E-07	18	9	0.758E-09
3	10	0.776E-09	8	10	0.143E-07	13	10	0.143E-07	18	10	0.776E-09
3	11	0.776E-09	8	11	0.143E-07	13	11	0.143E-07	18	11	0.776E-09
3	12	0.758E-09	8	12	0.142E-07	13	12	0.142E-07	18	12	0.758E-09
3	13	0.720E-09	8	13	0.140E-07	13	13	0.140E-07	18	13	0.720E-09
3	14	0.660E-09	8	14	0.137E-07	13	14	0.137E-07	18	14	0.661E-09

3	15	0.582E-09	8	15	0.120E-07	13	15	0.120E-07	18	15	0.582E-09
3	16	0.492E-09	8	16	0.275E-08	13	16	0.275E-08	18	16	0.492E-09
3	17	0.408E-09	8	17	0.113E-08	13	17	0.113E-08	18	17	0.408E-09
3	18	0.337E-09	8	18	0.720E-09	13	18	0.720E-09	18	18	0.337E-09
3	19	0.280E-09	8	19	0.512E-09	13	19	0.512E-09	18	19	0.280E-09
3	20	0.236E-09	8	20	0.386E-09	13	20	0.386E-09	18	20	0.236E-09
4	1	0.267E-09	9	1	0.403E-09	14	1	0.363E-09	19	1	0.207E-09
4	2	0.326E-09	9	2	0.536E-09	14	2	0.475E-09	19	2	0.240E-09
4	3	0.408E-09	9	3	0.758E-09	14	3	0.660E-09	19	3	0.280E-09
4	4	0.523E-09	9	4	0.119E-08	14	4	0.103E-08	19	4	0.326E-09
4	5	0.684E-09	9	5	0.284E-08	14	5	0.258E-08	19	5	0.377E-09
4	6	0.874E-09	9	6	0.122E-07	14	6	0.118E-07	19	6	0.429E-09
4	7	0.103E-08	9	7	0.138E-07	14	7	0.133E-07	19	7	0.475E-09
4	8	0.113E-08	9	8	0.142E-07	14	8	0.137E-07	19	8	0.512E-09
4	9	0.119E-08	9	9	0.144E-07	14	9	0.138E-07	19	9	0.536E-09
4	10	0.122E-08	9	10	0.145E-07	14	10	0.139E-07	19	10	0.549E-09
4	11	0.122E-08	9	11	0.145E-07	14	11	0.139E-07	19	11	0.549E-09
4	12	0.119E-08	9	12	0.144E-07	14	12	0.138E-07	19	12	0.536E-09
4	13	0.113E-08	9	13	0.142E-07	14	13	0.137E-07	19	13	0.512E-09
4	14	0.103E-08	9	14	0.138E-07	14	14	0.133E-07	19	14	0.475E-09
4	15	0.874E-09	9	15	0.122E-07	14	15	0.118E-07	19	15	0.429E-09
4	16	0.684E-09	9	16	0.284E-08	14	16	0.258E-08	19	16	0.377E-09
4	17	0.523E-09	9	17	0.119E-08	14	17	0.103E-08	19	17	0.326E-09
4	18	0.408E-09	9	18	0.758E-09	14	18	0.660E-09	19	18	0.280E-09
4	19	0.326E-09	9	19	0.536E-09	14	19	0.475E-09	19	19	0.240E-09
4	20	0.267E-09	9	20	0.403E-09	14	20	0.363E-09	19	20	0.207E-09
5	1	0.301E-09	10	1	0.411E-09	15	1	0.333E-09	20	1	0.182E-09
5	2	0.377E-09	10	2	0.549E-09	15	2	0.429E-09	20	2	0.207E-09
5	3	0.492E-09	10	3	0.776E-09	15	3	0.582E-09	20	3	0.236E-09
5	4	0.684E-09	10	4	0.122E-08	15	4	0.874E-09	20	4	0.267E-09
5	5	0.112E-08	10	5	0.288E-08	15	5	0.215E-08	20	5	0.301E-09
5	6	0.215E-08	10	6	0.122E-07	15	6	0.105E-07	20	6	0.333E-09
5	7	0.258E-08	10	7	0.139E-07	15	7	0.118E-07	20	7	0.363E-09
5	8	0.275E-08	10	8	0.143E-07	15	8	0.120E-07	20	8	0.386E-09
5	9	0.284E-08	10	9	0.145E-07	15	9	0.122E-07	20	9	0.403E-09
5	10	0.288E-08	10	10	0.145E-07	15	10	0.122E-07	20	10	0.411E-09
5	11	0.288E-08	10	11	0.145E-07	15	11	0.122E-07	20	11	0.411E-09
5	12	0.284E-08	10	12	0.145E-07	15	12	0.122E-07	20	12	0.403E-09
5	13	0.275E-08	10	13	0.143E-07	15	13	0.120E-07	20	13	0.386E-09
5	14	0.258E-08	10	14	0.139E-07	15	14	0.118E-07	20	14	0.363E-09
5	15	0.215E-08	10	15	0.122E-07	15	15	0.105E-07	20	15	0.333E-09
5	16	0.112E-08	10	16	0.288E-08	15	16	0.215E-08	20	16	0.301E-09
5	17	0.684E-09	10	17	0.122E-08	15	17	0.874E-09	20	17	0.267E-09
5	18	0.492E-09	10	18	0.776E-09	15	18	0.582E-09	20	18	0.236E-09
5	19	0.377E-09	10	19	0.549E-09	15	19	0.429E-09	20	19	0.207E-09
5	20	0.301E-09	10	20	0.411E-09	15	20	0.333E-09	20	20	0.182E-09

NOTE--THE X AND Y VALUES FOR THE GRID ARE INDICES NUMBERED FROM WEST TO EAST AND FROM SOUTH TO NORTH, RESPECTIVELY.

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